Construction Stormwater Pollution Prevention Plan (SWPPP)

for the:

Dom-Mar Transfer and Recycling Facility
1118 and 1138 Dolsontown Road
Wawayanda, New York 10940
NYSDEC Permit No. T.B.D.

January 2025

prepared for:

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1. Introduction

A stormwater management assessment has been conducted for the proposed project to protect the waters of the State of New York from the adverse impacts of stormwater runoff. This report presents an analysis of the project in accordance with the New York State Department of Environmental Conservation SPDES General Permit for Stormwater Discharges from Construction Activity Permit No. GP-0-20-001 and the New York State Stormwater Management Design Manual. As required, the Stormwater Pollution Prevention Plan (SWPPP) is designed, where appropriate, to incorporate green infrastructure techniques that preserve natural resources and utilize the existing hydrology of the site, provide runoff reduction practices, water quality treatment practices, apply volume and peak control practices for channel protection, overbank flood control, and extreme flood control.

In accordance with Appendix B, Table 2 of the SPDES General Permit for Construction Activity, GP-0-20-001, new development and redevelopment projects that involve a soil disturbance of one or more acres require the preparation of a full SWPPP that includes post-construction stormwater management practices. In total, approximately 9.6 acres of soil disturbance is expected during the construction of this project. Therefore, this project requires the development of a full SWPPP, including erosion and sediment controls, green infrastructure site planning techniques, runoff reduction volume practices, and post-construction stormwater management practices.

The general contractor and subcontractors performing any activity that involves soil disturbance will be required to comply with the terms and conditions of the SWPPP for the project identified as a condition of authorization to discharge stormwater. The contractors and subcontractors shall 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 trained contractor(s) shall serve as the representative(s) of the applicant for the duration of construction and shall be responsible for the proper implementation of the SWPPP. The trained contractor(s) shall also be qualified to conduct inspections of stormwater management practices. 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 Contractor shall provide signed certifications (Attachment 3) for itself and all applicable subcontractors at the preconstruction meeting. These signed certifications shall be included as part of the SWPPP. The SWPPP must be maintained on-site and be accessible during normal business hours.

As required by the conditions described in the SPDES general permit, the SWPPP shall be kept current and updated as often as necessary to protect the environment and reflect what is presently occurring at the site. At a minimum, the SWPPP shall be amended:

- Whenever the current provisions prove to be ineffective in minimizing pollutants in stormwater discharges from the site,
- Whenever there is a change in design, construction, or operation at the site that has or could have an effect on the discharge of pollutants, and
- To address issues or deficiencies identified during an inspection by the qualified inspector, the New York State Department of Environmental Conservation (NYSDEC), or other regulatory authority (i.e., MS4).

The owner or operator shall notify the MS4 in writing of any planned amendments or modifications to the post-construction stormwater management practice component of the SWPPP. Unless otherwise notified by the MS4, the owner or operator shall have the SWPPP amendments or modifications reviewed and accepted by the MS4 prior to commencing construction of the post-construction stormwater management practice.

A copy of this SWPPP must be maintained at the site at all times and must be made available to regulatory officials at their request in order to comply with the General Permit.

The owner or operator shall retain a copy of the NOI, NOI Acknowledgement 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 Notice of Termination (NOT) submitted in accordance with Part V of the General Permit

1.1 Scope of the Project

The project will involve the construction of a waste transfer and recycling facility, administrative building and associated utilities, access drive, parking areas, and stormwater appurtenances.

1.2 Location of the Project

The project site is located in the Town of Wayawanda, NY just north of NY State I-84. A General Location Map is included as Figure 1.

This project discharges to tributaries of Monhagen Brook which is listed as a 303(d) waterbody in Appendix E-303(d) Segments Impaired by Construction Related Pollutant(s) of GP-0-20-001. The primary pollutant of concern for Monhagen Brook is phosphorus. Measures taken to reduce the discharge of phosphorus to these waterbodies are described in Section 7 of this document.

For construction sites that directly discharge to one of the 303(d) segments listed in Appendix E, a 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 (See Section 4). The application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days as noted in Section 4.

1.3 Project Type and Size

The project is classified as a new development project with some re-development areas that will disturb approximately 9.6 acres of an approximately 44.3-acre property and will result in an increase in impervious area (pavement, roofs, surface water) of approximately 5.49 acres.

1.4 Project Description

The proposed project includes the construction of a new 42,000 square foot building that will be divided into a waste transfer facility and a recycling area, and a 3,160 square foot administrative office building. Additional site development will include approximately 157,000 square feet of paved entrance, parking, and walkway areas. The proposed parking lot will be sized to provide adequate parking spaces for employees, customers, visitors, and truck/trailer staging and storage.

To evaluate the environmental impacts from the potential full development of the site a Conceptual Full Build Out Plan including a Truck Maintenance Facility was prepared. The full build out of the site is not expected to occur until at least five years after the Transfer and Recycling Facility is constructed. Future site development shall occur under an updated SWPPP and NOI.

1.5 Cultural Resources

The New York State Office of Parks, Recreation and Historic Preservation (OPRHP) Cultural Resource Information System (CRIS) online mapping system was used to determine the potential impacts the project may have on archeologically sensitive and/or historic landmarks. The CRIS Map is included as Figure 5.

A summary of the CRIS survey is provided below:

- The construction activity will occur in an archeologically sensitive area.
- The construction activity will not occur on or adjacent to a property listed or determined to be eligible for listing on the National or State Register of Historic Places.
- The construction activity will not include the construction of a new building in the vicinity of any building or object that is more than 50 years old that has been determined by OPRHP to be historically/archeologically significant.

A Phase 1 archaeological survey was performed by Tracker Archaeology Services, Inc. as part of the SEQR process and no archaeological items of significance were found. The Phase 1 Archaeological Survey Report was submitted to the CRIS database as part of the SEQR Process. In a Letter dated June 15th, 2021, the New York State Historic Preservation Office (SHPO) recommended that the project will not adversely affect historic or archaeological properties listed or eligible for listing on the National Register of Historic Places conditioned on a commitment by the applicant to implement the Human Remains Discovery Protocol should any evidence of human remains, or possible burial goods be encountered during construction. The commitment to implement the Human Remains Discovery Protocol is included on the Site Plan (Drawing 2) as Note 5. The Letter and the Human Remains Discovery Protocol is included in Attachment 8.

1.6 Wetlands

According to the NYSDEC Environmental Resource Map (Figure 3) no New York State jurisdictional wetlands or related 100-ft adjacent area (buffer) exist within the proposed development area. Federal jurisdiction wetlands are shown on Figure 4 within the proposed development area. A wetland delineation was performed by EnSol, and a request for the United States Army Corps of Engineers (USACE) Jurisdictional Determination was prepared by Capital Environmental Consultants, Inc. of Kingston, New York and submitted to the USACE on April 16, 2021. A Jurisdictional Determination Letter dated January 5, 2022, was received from the USACE (Application Number NAN-2021-00721-WOR). The project has been designed to avoid impacting jurisdictional federal wetlands. Jurisdictional wetlands and drainageways shall be delineated with orange construction fencing adjacent to planned areas of disturbance.

1.7 Training

New maintenance personnel and at least one specified individual from hired contractors will receive training on the goals and objectives of this SWPPP. Training sessions will be conducted by a person that meets the definition of a Qualified Inspector as defined in Section 4. Training will occur after maintenance personnel are hired but prior to them undertaking any maintenance responsibilities and shall cover the topics identified in the Maintenance Employee Training Program and sign-in sheet included in Attachment 3. Training and education are intended to help ensure all employees are aware of proper maintenance procedures and the potential for stormwater pollution so that maintenance is performed without error and water quality impacts can be minimized and prevented to the greatest practicable extent. Maintenance procedures will be taken from the appropriate specification in the "New York Standards and Specifications for Erosion and Sediment Control."

A list of those who have attended the training is to be maintained with this SWPPP. The form in Attachment 3 should be used to document the employees/contractors present for each SWPPP training and education meeting. Completed training logs shall be kept for the record in Attachment 3.

2. Project Soils

The NRCS Soil Map is included as Figure 2. The figure shows the soil types within the proposed project area, and their hydrologic soil group (HSG) information.

2.1 Soil Types

The following soil types and hydrologic groups are present within the project area of disturbance:

Table 1 – Soil Type

Soil Symbol, Name, % Slope Range	Hydrologic Group (HSG)[1]	Texture	Character	% Within disturbed area
MdB, Mardin gravelly silt loam, 3 to 8 percent slopes	D	Gravelly silt loam	Moderately well drained	76.6%
MdC, Mardin gravelly silt loam, 8 to 15 percent slopes	D	Gravelly silt loam	Moderately well drained	2.5%
RbA, Rhinebeck silt loam, 0 to 3 percent slopes	C/D	Silty clay loam	Somewhat poorly drained	7.5%
Wd, Wayland soils complex, non-calcareous substratum, 0 to 3 percent slopes	B/D	Silt loam	Poorly drained	13.4%

Note:
1. If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

2.2 Discussion of Soil Characteristics

There are four hydrologic soil groups within the area of disturbance (AOD). The primary soil series within the project area is the Mardin gravelly silt loam soil, which has a HSG rating D, which indicates poor infiltration potential.

2.3 Subsurface Investigation

Eight exploratory borings designated on the logs as B-1 through B-8 were completed on April 9, 12, and 13, 2021 by SoilTesting Inc. of Oxford, Connecticut. The boreholes were located across the proposed project area, including one borehole located in each of the proposed wet ponds, the bioretention basin, the storm sewer alignment, the Transfer and Recycling Facility building, the area north of the Facility, the parking lot, and the entrance road. The location of the boreholes are shown on the Site Plan and the Erosion and Sediment Control Plan drawings included in Attachment 1.

In general, the subsurface soils consist of a surficial approximately four-to-six-inch-thick layer of topsoil underlain by brown and grey fine, medium, and coarse sand with varying amounts of silt, fine and coarse gravel, cobbles, and trace amounts of clay. The brown and grey sand was predominately classified as SW/SM, and SP/SM per the USCS, which consists of well graded sand, fine to coarse sand/silty sand and poorly graded sand/silty sand. The borehole logs are included in Attachment 7. The subsurface conditions at the proposed post construction stormwater features are described in Section 8.

3. Construction Phasing

3.1 Sequence of Construction Activities

The Contractor's work schedule and methods shall be consistent with the SWPPP or amended SWPPP. Once approved, the progress schedule shall become a part of the SWPPP.

The following list is a suggested sequence of major construction activities for the project to meet the NYSDEC requirements:

1. Install orange construction fencing along wetland boundaries.
2. Install temporary perimeter sediment controls (compost filter sock).
3. Construct stabilized construction entrance for site.
4. Construct temporary sediment basins (future detention pond).
5. Construct drainage swales, culverts, and access roads.
6. Site grading to final proposed grades/pavement subgrades.
7. Construct/install building, utilities, and stormwater management controls (storm sewer, catch basins, rip-rap outlet protection, bioretention basin).
8. Pave all areas where required.
9. Install plantings, seed, and mulch.
10. Convert temporary sediment basins to permanent detention ponds once site stabilization is complete.
11. Remove temporary erosion and sediment controls when site reaches final stabilization.

4. Erosion and Sediment Control Measures

4.1 Erosion and Control Plan

An erosion control plan has been developed in accordance with the "New York Standards and Specifications for Erosion and Sediment Control." The erosion control plan limits the amount of area exposed prior to stabilization, diverts drainage runoff from adjacent areas away from and around the construction site area, and employs various sediment control methods such as silt fence, sediment basin, and inlet/outlet protection. The various erosion and sediment control methods shall be installed in the sequence noted in the previous section.

Silt Fence or Equivalent:

Silt Fence or equivalent such as Compost Filter Sock is proposed along the downslope perimeter of the area to be disturbed to contain and prevent sediment from reaching waters of the State of New York.

Orange Construction Fencing:

Orange construction fencing shall be placed around sensitive areas such as jurisdictional wetlands to deter disturbance from construction personnel and equipment. These areas are shown on the Erosion and Sediment Control Plan in Attachment 1.

Temporary Surface Stabilization: In areas where soil disturbance has temporarily ceased and will not be disturbed again within seven calendar days, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven days from the date the current soil disturbance activity ceased. Areas will be stabilized in accordance with the New York State Standards and Specifications for Erosion and Sediment Control or as directed by the Engineer.

Drainage Pipe Inlet/Outlet Stabilization: As part of the permanent erosion control measure, the inlet and outlet of the culvert pipes will be provided with either stone riprap apron or an apron consisting of erosion control product with vegetation to provide the required erosion control which blends in with the surrounding natural features and topography. The location and type of stabilization to be provided is shown on project plans.

Construction Entrance: A stabilized construction entrance shall be constructed to access the site from Dolsontown Road. This entrance/area shall conform to the New York State Standards and Specifications for Erosion and Sediment Control.

Dust Control: The contractor will be required to minimize dust generation during the construction activities. Provisions such as watering, the use of cover materials, and the application of calcium chloride have proven effective in dust control and can be approved by the Engineer for use in the affected areas.

Storm Drain Inlet Protection: Temporary protection will be provided at all proposed catch basins to prevent clogging of the infiltration system prior to final stabilization of the site.

Temporary Sediment Basin: Temporary sediment basins will be constructed to receive runoff from the majority of the impacted area and allow for settling of sediment before discharging off site. The Sediment Basins shall be converted to the Wet Detention Ponds after site stabilization. The Sediment Basins shall discharge through a Skimmer connected to the Wet Pond outlet structure low flow orifice as shown on the Storm Water Details drawing included in Attachment 1.

Rip-Rap Stone Check Dams: Stone check dams will be installed in temporary drainage swales to reduce velocity and minimize the migration of sediments within the swales. Check dams shall be installed in accordance with the New York State Standards and Specifications for Erosion and Sediment Control.

Permanent Surface Stabilization: In areas where soil disturbance has permanently ceased, the application of soil stabilization methods must be initiated by the end of the next business day and completed within seven days from the date the current soil disturbance activity ceased. Areas will be stabilized in accordance with the New York State Standards and Specifications for Erosion and Sediment Control or as directed by the Engineer. See the seed mixture table below for locations, rates, and applicability.

Table 2 – Site Seed Mixtures

Seed Mixture	Location	Rate	Seeding Season
General Purpose Erosion Control (Permanent)	Non-Paved Areas excluding the Wet Ponds below the maximum pool, Bioretention Basin, and Drainage Swales	• Creeping red fescue (Ensylva, Pennlawn, or Boreal) at 20 lbs/acre • Chewings fescue (Common) at 20 lbs/acre • Perennial ryegrass (Pennfine, Linn) at 20 lbs/acre • Red clover (Common) at 20 lbs/acre	Early spring, late summer/fall
OBL Wetland Mix w/ Aroostook Winter Rye Cover Crop	Wet Pond Shallow Water Area (Aquatic Bench)	0.5 lbs/1,000 sf w/ cover crop at 30 lbs/acre	Early spring, fall
Retention Basin Wildlife Mix w/ Aroostook Winter Rye Cover Crop	Bioretention Basin	0.5 lbs/1,000 sf w/ cover crop at 30 lbs/acre	Early spring, fall
Riparian Buffer Mix w/ Aroostook Winter Rye Cover Crop	Wet Pond Shore Line Fringe (Normal Pool to Maximum Pool)	20 /bs/acre w/ cover crop at 30 lbs/acre	Early spring, fall
Temporary Construction Seeding Mix	Non-paved areas excluding the Wet Ponds below the maximum pool, the Bioretention Basin, and drainage swales	• Perennial ryegrass (Pennfine, Linn) at 30 lbs/acre* • Aroostook winter rye at 100 lbs/acre	Spring, summer, fall
Vegetated Waterway Mix	Drainage swales	• White clover at 8 lbs/acre • Smooth bromegrass at 20 lbs/acre • Creeping red fescue at 20 lbs/acre	Early spring, late August

* If temporary seeding is undertaken in late fall, Aroostook winter rye may be used instead of perennial ryegrass.

The Sediment and Erosion Control Plan is included in Attachment 1. The seeding and planting plan and details are shown on the Landscaping Plan and Landscaping Details Drawings included in Attachment 1.

4.2 SWPPP Implementation and Maintenance Responsibilities

Implementation of all E&SC devices will be by the Contractor as indicated in the contract documents.

The owner or operator shall have a qualified inspector conduct site inspections at least twice every seven (7) calendar days while soil disturbance activities are on-going. The two (2) inspections shall be separated by a minimum of two (2) full calendar days. Per Section 154.8 A. (2) of the Town of Wawayanda Town Code (Town Code) an inspection and associated report shall be completed within 24 hours of any storm event producing more than 0.5 inches of precipitation.

The owner or operator shall not disturb greater than five (5) acres of soil at any one time without prior written authorization from the MS4 in accordance with Part II C. 3 of the General Permit.

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 Department of Water (SPDES) Program contact at the Regional Office or, the traditional land use control MS4 (where applicable), in writing prior to reducing the frequency of inspections.
The qualified inspector shall be a:

- Licensed Professional Engineer,
- Certified Professional in Erosion and Sediment Control (CPESC),
- Registered Landscape Architect, or
- Someone working under the direct supervision or, 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 qualified inspector shall prepare an inspection report after each and every inspection (Attachment 3). Within one business day of the completion of an inspection, the qualified inspector shall notify the owner or operator and appropriate contractor or subcontractor of any corrective actions that need to be taken. The contractor or subcontractor shall begin implementing corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame. The inspection reports shall be signed by the qualified inspector and shall be maintained on site with the SWPPP. Reports shall also be sent to the Stormwater Management Officer designated by the Town of Wawayanda Town Board (Town Board).

5. Existing Watershed Information

The approximately 44.3-acre property predominately consists of meadow areas with forested and shrub covered areas throughout the remainder of the site. Surface runoff on the parcel drains to two drainageways – Monhagen Brook, which flows west to east across the property and an unnamed tributary to Monhagen Brook, which flows north to south across the property. The topography of the site is generally flat (0 to 3%) with steeper slopes (3 to 8%) in the northern portion of the site. The site drains primarily by sheet flow to a wetland along the southern property boundary. The watershed area considered for this project is approximately 18.8 acres and is primarily open grass field with patches of trees along the southern border. See the Pre-Development Watershed Map in Attachment 4 for additional information.

6. Green Infrastructure

6.1 Reduction of Impervious Cover

The paved area of the project has been limited to the minimum amount of space necessary to provide adequate employee, visitor, and truck parking, as well as adequate drive widths for tractor trailers to traverse the site.

6.2 Runoff Reduction Techniques

Through the application of a combination of green infrastructure techniques and standard stormwater management practices, 15% of the Initial Water Quality volume has been reduced. The following Runoff Reduction volume (RRv) technique was utilized:

Table 3 – Runoff Reduction Techniques

Reduction of Contributing Volume Practices	Description
Bioretention Basin	0.229-acre feet of runoff will be reduced by the basin (total one-year storm runoff volume from contributing drainage area).

7. Pollution Prevention Measures

7.1 Waste Disposal

If needed, all waste materials will be collected and stored in securely lidded metal dumpsters on site. The dumpster will comply with all local and state solid waste management regulations. All litter, trash, and non-contaminated construction debris will be deposited in the dumpsters to prevent them from becoming a pollutant source in the stormwater discharges.

7.2 Sanitary Waste

If needed, portable toilet units or field offices with toilet facilities will be used for sanitary purposes.

7.3 Construction Chemicals and Materials

All chemicals should be stored properly in a closed container, preferably indoors, and should not be allowed to come into contact with stormwater runoff. Any contaminated soils/materials which may result from construction activities will be contained and cleaned up in accordance with applicable state and federal regulations.

Construction materials will be stored in the contractor staging/stockpile area. Any soil stockpiles shall be properly stabilized as shown on the Erosion and Sediment Control Details drawing included in Attachment 1. A compost filter sock will be placed downgradient of the contractor staging/stockpile area to intercept any runoff from this area.

7.4 Phosphorus

Various measures shall be taken to reduce the concentration of phosphorus in waters discharged from the site to the 303(d)-waterbody mentioned in Section I. These include reducing runoff velocity and volume of runoff flowing over disturbed areas, sedimentation, chemical filtration, conformance with the NYS Nutrient Runoff Law (ECL article 17, title 21 and Agriculture and Markets Law § 146-g), and proper equipment maintenance practices. The site will also be inspected by a qualified inspector biweekly (see Section IV) because the site's stormwater infrastructure discharges to 303(d) waterbodies.

Reducing the volume of runoff flowing over disturbed areas will be accomplished through the use of swales designed to convey stormwater to the sediment basins, limiting disturbed areas to the minimum area necessary, and limiting impervious surface cover to the maximum extent practicable. Reducing the velocity of runoff will be achieved through storage of stormwater in sediment basins, properly vegetating swales, scarifying soils prior to stabilization, and through installation of erosion and sediment controls like compost filter socks. Compost filter socks intercept runoff and filter out sediment and provide some chemical filtration of runoff through adsorption of soluble phosphorus ions to organic matter in the filter sock.

Phosphorus concentrations in discharges from the site will also be achieved by implementing provisions and recommendations from the NYS Nutrient Runoff Law. These include the following practices:

- Soil will be sampled and evaluated to determine the need for fertilizer.
- No use of fertilizers with greater than 0.67% phosphorus by weight unless soil test results indicate phosphorus addition is necessary.
- No application of fertilizer within 20 feet of a waterbody unless there is a 10-foot-wide vegetated area between the waterbody and site of fertilizer application or within 3 feet of a waterbody if a spreader guard, deflector shield, or drop spreader are used.
- No application of fertilizers between December 1st and April 1st.

- Sweeping up and properly applying or containerizing fertilizer accidently applied over impervious surfaces.

Other measures intended to reduce phosphorus concentrations in discharges from the site include stabilization of soil stockpiles, proper waste management and chemical storage, proper vehicle maintenance, and no use of phosphorus containing cleaning products on construction equipment.

Water Quality Volume and Runoff Reduction calculations were performed in accordance with the added requirements of Chapter 10 Enhanced Phosphorus Removal Supplement of the New York State Stormwater Design Manual.

7.5 Stormwater Hotspot

In accordance with Table 4.3 of the New York State Stormwater Management Design Manual, the site would be classified as a stormwater hotspot under the categories of vehicle fueling, vehicle service and maintenance, and because the site is considered an industrial site covered under the SPDES General Permit for Stormwater Discharges Associated with Industrial Activity. A stormwater hotspot is a land use or activity that generates higher concentrations of hydrocarbons, trace metals or toxicants than are found in typical stormwater runoff.

Sites designated as hotspots have important implications for how stormwater is managed. Infiltration practices are generally avoided for projects that meet the hotspot criteria. As covered in Section 6.2 standard infiltration practices will not be used on the site and runoff reduction for the site will be achieved utilizing a bio-retention basin. It should also be noted that the majority of industrial activities taking place on the site will be indoors, or under cover to prevent stormwater contamination.

8. Post Construction Stormwater Control Practices

8.1 Post Construction Practices

A bioretention basin and two detention ponds will be utilized in conjunction with several dry drainageways to meet water quality and quantity requirements. Stormwater management practice sizing and other calculations related to the wet ponds, bioretention basin, and the drainageways are provided in Attachment 4, including the Post Development Watershed Map. Refer to Attachment 1 for locations and details of the stormwater management practices.

8.1.1 Wet Pond 1

Wet Pond 1 is located south of the Facility and receives stormwater runoff from the southern and southeastern portions of the Site and overflow from the Bioretention Basin. The Pond includes a four-foot deep forebay. The Pond Rim elevation is 454.75, the Pond side slopes consist of a 4:1 slope to the permanent pool elevation of 450.2, an eight-foot-wide aquatic bench to a depth of 1 foot below the pool elevation and then a 2:1 slope to the base of the Pond at elevation 445.75. A typical detail of the Pond Cross Section is shown on the Stormwater Details drawing included in Attachment 1. Borehole B-6 was drilled in the location of Wet Pond 1. The ground water level was observed at an elevation of approximately 448 in April 2021. This groundwater elevation is compatible with the permanent pool design of the Pond.

The Wet Pond shall be seeded in accordance with the Landscaping Plan and Detail drawings included in Attachment 1. The aquatic bench below the permanent shall be seeded with the OBL Wetland Mix, the area between the permanent pool and the peak 100-year storm elevation shall be seeded with the Riparian Buffer Seed Mix, and the area above the peak elevation shall be seeded with the general seed mix. The Wet Pond 1 outlet structure consists of a square three-foot by three-foot concrete structure with a low flow orifice, a weir, and a grate spillway sized for attenuating 1-year, 10-year and 100-year storm event peak flows respectively. The Pond routing information including peak elevation and flowrate for each storm event are shown on the HydroCAD reports included in Attachment 4. Wet Pond 1 shall discharge to the wetland adjacent to Monhagen Brook via a culvert with stone rip rap outlet protection. An 18-foot wide, 1.0-foot-deep vegetated Emergency Spillway shall direct overflow away from the Pond.

8.1.2 Wet Pond 2

Wet Pond 2 is located to the east of the Facility and receives stormwater runoff from the northern and eastern portions of the Site. The Pond includes a four-foot deep forebay. The Pond Rim elevation is 451.25, the Pond side slopes consist of a 4:1 slope to the permanent pool elevation of 447, an eight-foot-wide aquatic bench to a depth of 1 foot below the pool elevation, and then a 2:1 slope to the base of the Pond at elevation 442.5. Borehole B-8 was drilled in the location of Wet Pond 2. The ground water level was observed at an elevation of approximately 447 in April 2021. This groundwater level is compatible with the permanent pool design of the Pond.

The Wet Pond shall be seeded in accordance with the Landscaping Plan and Detail drawings included in Attachment 1. outlet structure consists of a square three-foot by three-foot concrete structure with a low flow orifice, a weir, and a grate spillway sized for attenuating 1-year, 10-year and 100-year storm event peak flows respectively. The Pond routing information including peak elevation and flowrate for each storm event are shown on the HydroCAD reports included in Attachment 4. Wet Pond 1 shall discharge to the wetland adjacent to the unnamed tributary to Monhagen Brook via a culvert with stone rip rap outlet protection. An 18-foot wide, 1.0-foot-deep vegetated Emergency Spillway shall direct overflow away from the Pond.

8.1.3 Bioretention Basin

The Bioretention Basin is located to the southwest and west of the administration building parking lot. The Bioretention Basin receives runoff from the administration building, and the associated parking lot, and access roads. The Bioretention Basin shall include a stone diaphragm along the edge of the paved parking lot and access road for erosion control. Vegetated slopes above the Basin, and vegetated swales upstream of the Basin shall provide settling of solids. A three-inch mulch layer shall also be included above the planting soil within the basin. Stormwater runoff is filtered through the vegetation and planting soil within the Basin and collected by subsurface collection pipes which discharge the treated stormwater to the Wetland area to the south. The Basin Rim elevation is 455.5, the Basin base elevation is 454, and the elevation of the subsurface collection system is 450.8. Borehole B-4 was drilled within the Basin location. The ground water level was observed at an elevation of approximately 447.4 in April 2021. This groundwater level provides greater than two feet of separation to the base of the Basin's filter soil. Typical details for the Bioretention Basin are shown on the Stormwater Details drawing included in Attachment 1.

The Basin shall be seeded with the Retention Basin Wildlife seed mix as specified on the Landscaping Plan and Detail drawings included in Attachment 1. Discharge from the Bioretention Basin shall be controlled by a square three-foot by three-foot concrete structure with a grate spillway at an elevation of 454.5. The outlet structure will direct overflow from the Basin to Wet Pond 1. The Catch Basin will provide a ponding depth of 0.5 feet. The Bioretention Basin is designed to contain the one-year 24-hour storm event without discharging through the outlet structure to provide enhanced phosphorus treatment and the minimum runoff reduction volume for the site. The Basin routing information including peak elevation and flowrate for each storm event are shown on the HydroCAD reports included in Attachment 4. The Bioretention Basin soil filter is modeled as exfiltration through the outlet structure. The exfiltration rate is based on the water elevation in the Basin and a hydraulic conductivity value of 0.250 in/hr or 0.5 ft/day as specified by the NYSDEC Green Infrastructure spreadsheet. In addition to the routing reports the NYSDEC Green Infrastructure spreadsheet assuming two days of filter time, and an average ponding depth of 0.25 feet is included in Attachment 4.

8.1.4 Vegetated Drainageways

Vegetated drainageways shall intercept stormwater runoff from the Facility roads and access areas, and convey the runoff to culverts, and the stormwater sewer system which eventually discharge to the Bioretention Basin, and the Wet Ponds. The vegetated drainageways shall be seeded with the Vegetated Waterway Mix as specified on the Landscaping Plan and Detail drawings included in Attachment 1. The drainageway Seed Mix consists of the B. Mixture included in the New York State Standard and Specifications for Vegetating Waterways. The drainageways shall have a trapezoid shape, with a minimum depth of one foot, and a minimum base width of two feet with maximum 2:1 side slopes. The typical drainageway detail is shown on the Erosion and Sediment Control Details Drawing included in Attachment 1.

Each drainageway was evaluated for a 24-hour 10 year and 100-year storm events using the Manning equation. The Final Channel Design Summary included in Attachment 4 shows the depth of flow, free board, and velocity for each drainageway. The permissible velocity per Table 4.1 of the New York State Standards and Specifications for Erosion and Sediment Control for Grass Mixtures, slopes of 0-5% and easily eroded soils is 4 feet per second. As the summary shows the velocity is less than 3.5 feet per second for all drainageways for the 10-year 24-hour storm event. The freeboard in each drainageway is greater than 0.5 feet for the 10-year 24-hour storm and the 100-year 24-hour storm is fully contained in each drainageway.

8.1.5 Stormwater Sewer System

The stormwater sewer system is located north of the Transfer and Recycling Building. The System consists of three-by-three-foot concrete catch basins connected to 24-inch diameter corrugated HDPE pipe. Typical details for the stormwater sewer system are shown on the Stormwater Details drawing included in Attachment 1. The catch basins collect stormwater runoff from the paved road and access area north of the Transfer and Recycling Building and the HDPE pipe conveys the runoff east to Wet Pond 2. The Stormwater Sewer system including each catch basin was hydraulically modeled for each storm event in HydroCAD using the dynamic storage indication method. During the 100-year 24-hour storm event the peak elevation is contained within each catch basin. The HydroCAD reports are included in Attachment 4.

8.2 Hydraulic Analysis of Stormwater Control Practices

The following table summarizes the Watershed Physical Parameters for the proposed Stormwater Control Practices. The Cornell Extreme Precipitation database was used for the rainfall depth for each respective storm event.

Table 4 - Stormwater Management Plan Summary

Storm Event	Pre-Development Peak Discharge (cfs)	Post–Development Peak Discharge	Required Volume (acre-ft)	Volume Provided (acre-ft)
1 (Cpv)	11.72	6.46	0.611	1.04
10 (Qp)	31.60	16.86	Post-Development Peak Discharge attenuated to Pre-Development Peak Discharge	Post-Development Peak Discharge attenuated to Pre-Development Peak Discharge
100 (Qf)	68.98	51.04	Post-Development Peak Discharge attenuated to Pre-Development Peak Discharge	Post-Development Peak Discharge attenuated to Pre-Development Peak Discharge
Area of disturbance		9.6 ac		
Required Water Quality Volume		1.489af / 64,861cf		
Runoff Reduction Provided		0.229af / 9,975 cf		
Water Quality Provided		Wet Ponds: 1.3 af / 56,628cf		

Note: Pre-Development and Post-Development Peak Discharge and the Required Volume and Volume Provided for each storm event were calculated for the entire Site by combining eastern and western drainage areas evaluated in separate HydroCAD models due to the limit on the number of available nodes in HydroCAD.

In the post-development period discharges will be through a pond outlet structure, which allows discharges at the design criteria as demonstrated by the hydraulic analyses included in Attachment 4. Discharges will not contribute to violation of water quality standards established in Section 154-7 B. of the Town Code.

8.2.1 Water Quality Volume

The Water Quality Volume (WQv) represents the volume of runoff generated from the entire 90th percentile rain event. A stormwater management practice sized using the WQv will capture and treat 90% of all 24-hour rain events. The WQv is directly related to the amount of impervious cover constructed at a site. The WQv was calculated in accordance with Chapter 10 Enhanced Phosphorus Removal Supplement of the New York State Stormwater Design Manual dated January 2015. The total required WQv for the site is the estimated runoff volume resulting from the 1 year 24-hour storm event over the post development watershed. The runoff volume from the 1 year 24-hour storm event is included on the HydroCAD report for each post development watershed included in Attachment 4. The WQv for the Wet Pond 1 and Wet Pond 2 watershed is 0.894 acre-ft, and 0.595 acre-ft respectively. The run-off reduction provided by the Bio-Retention Basin (0.229 acre-ft) within the Wet Pond 1 watershed as discussed in Section 8.2.1.1 below is subtracted from the Wet Pond 1 WQv, resulting in a WQv of 0.665 acre-ft. The calculations are shown on the Calculation Sheet included in Attachment 4. The WQv shall be provided within the permanent pool volumes of Wet Pond 1 and Wet Pond 2 which are 0.67 acre-ft, and 0.63 acre-ft respectively. The Permanent Pool cumulative volume calculation is included on the Calculation Sheet and on the HydroCAD pond routing reports included in Attachment 4.

8.2.1.1 Runoff Reduction Volume

The Runoff Reduction Volume RRv is the reduction of the total WQv by application of green infrastructure techniques and standard practices to replicate the pre-development hydrology. The minimum RRv was calculated per Section 4.3 and Chapter 10 of the New York State Stormwater Design Manual and is shown on the Calculation Sheet included in Attachment 4. The minimum RRv is 0.229 acre-ft and shall be provided by the Bioretention Basin. The Bioretention Basin is designed to contain and treat 100% of the one year 24-hour storm runoff volume from the contributing drainage area. The RRv provided by the Bio Retention Basin is 0.229 acre-feet.

8.2.2 Stream Channel Protection Volume

The Stream Channel Protection Volume (Cpv) is designed to protect stream channels from erosion. In New York State this goal is accomplished by providing 24-hour extended detention of the one-year, 24-hour storm event. The CPv was determined in accordance with Section 4.4 of the New York State Stormwater Design Manual. The calculation is included in the Calculation Sheet included in Attachment 4. The Wet Pond outlet structure low flow orifice attenuates the post development one-year, 24-hour peak discharge rate to lower than predevelopment rates. The total Cpv volume for the developed drainage area is 0.840 acre-ft, subtracting the RRv provided by the Bio-Retention Basin (0.229 acre-ft) the Cpv is 0.611. The Cpv is included above the permanent pool in each Wet Pond below the outlet structure weir, elevation 450. 20 to 451.75 in Wet Pond 1 and elevation 447 to 448.6 in Wet Pond 2. The Cpv provided in Wet Pond 1 is 0.54 acre-ft, and the Cpv provided in Wet Pond 2 is 0.50 acre-ft, the total Cpv provided is 1.04 acre-ft.

8.2.3 Overbank Flood Protection Volume

The primary purpose of the overbank flood control sizing criterion is to prevent an increase in the frequency and magnitude of out-of-bank flooding generated by urban development (i.e., flow events that exceed the bank full capacity of the channel, and therefore must spill over into the floodplain). Overbank control requires storage to attenuate the post development 10-year, 24-hour peak discharge rate (Qp) to predevelopment rates. The Qp is provided in Wet Ponds 1 and 2 above the permanent pool elevation. The Wet Pond Outlet Structure Wier and the low flow orifice attenuates the post development 10-year 24-hour peak discharge rate to lower than predevelopment rates.

8.2.4 Extreme Flood Protection Volume

The intent of the extreme flood criteria is to prevent the increased risk of flood damage from large storm events, maintain the boundaries of the predevelopment 100-year floodplain, and protect the physical integrity of stormwater management practices. 100-Year storm control requires storage to attenuate the post development 100-year, 24-hour peak discharge rate (Qf) to predevelopment rates. The Qf is provided in Wet Ponds 1 and 2 above the permanent pool elevation. The Wet Pond Outlet Structure low flow orifice, weir, and spillway grate attenuates the post development 100-year 24-hour peak discharge rate to lower than predevelopment rates. Each Wet Pond also shall have an emergency vegetated spillway located above the 100 year storm elevation, which shall have a minimum width of 18 feet, a minimum slope of 1%.

8.3 Inspection and Maintenance Schedule of Stormwater Controls

All stormwater management practices will be maintained in good operating condition in order to ensure ongoing effectiveness of the stormwater management system.

Post construction inspections will be performed annually and after major storm events. The following will be inspected:

- Catch basin grates and sumps
- Bioretention Basin
- Vegetated swales
- Stormwater detention pond and outlet structure

Inspections will be in accordance with the Inspection Forms in Attachment 3. The Inspection Forms will be completed during each inspection and signed by the Qualified Inspector.

8.4 Maintenance

Maintenance and/or repair of stormwater management features will be performed as required based on the outcome of inspections. See the Stormwater BMP Specific Maintenance and Inspection Checklists located in Attachment 3.

Prior to the issuance of approval for a land development activity that has a stormwater management facility as one of the requirements the applicant shall execute a maintenance easement agreement pursuant to Sections 154-6 B. (3)(h) and 154-8 B. of the Town of Wawayanda Code. Additionally, the Town Board shall approve a formal maintenance agreement for the stormwater management facilities on the site, in accordance with Sections 154-6 B. (3)(i) and 154-8 E. of the Town Code. Both documents shall be kept with a copy of this SWPPP in Attachment 6.

9. Termination of Permit Coverage

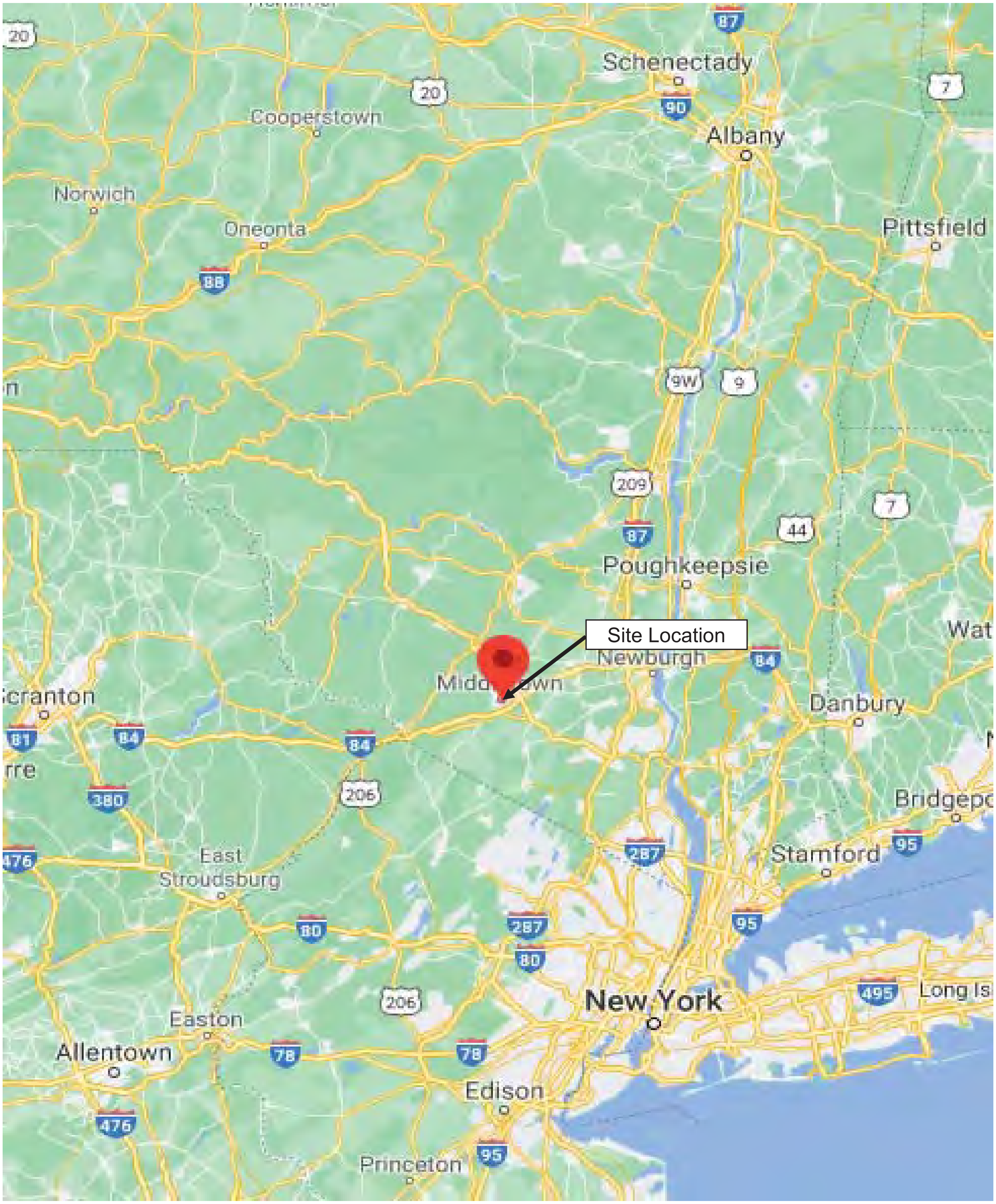
An owner or operator that is eligible to terminate coverage under the General Permit must submit a completed Notice of Termination (NOT) to the NYSDEC. A copy of the NOT is located in Attachment 3. An owner or operator may terminate coverage when one or more of the following conditions have been met:

- Total construction completion.
- Planned shutdown with partial construction completion.
- A new owner or operator has obtained coverage under the General Permit.

Figures

EnSol, Inc.

ENGINEERING + ENVIRONMENTAL



EnSol, Inc. Environmental Solutions 661 Main Street, Niagara Falls, NY 14301 Ph:716-285-3920 Fax: 716-285-3928	**DOM-MAR Transfer and Recycling Facility** **Dolsontown Rd.** **Middletown, Orange County, New York**	**FIGURE 1**
Prepared By: BPB Date Prepared: 3/25/21	**Source:** google.com	**GENERAL LOCATION MAP** PN: 20-0062

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
MdB	Mardin gravelly silt loam, 3 to 8 percent slopes	13.9	76.6%
MdC	Mardin gravelly silt loam, 8 to 15 percent slopes	0.5	2.5%
RbA	Rhinebeck silt loam, 0 to 3 percent slopes	1.4	7.5%
Wd	Wayland soils complex, non-calcareous substratum, 0 to 3 percent slopes, frequently flooded	2.4	13.4%
Totals for Area of Interest		**18.2**	**100.0%**

EnSol, Inc.
Environmental Solutions
661 Main Street, Niagara Falls, NY 14301
Ph:716-285-3920 Fax: 716-285-3928

DOM-MAR Transfer and Recycling Facility

Dolsontown Rd.
Middletown, Orange County, New York

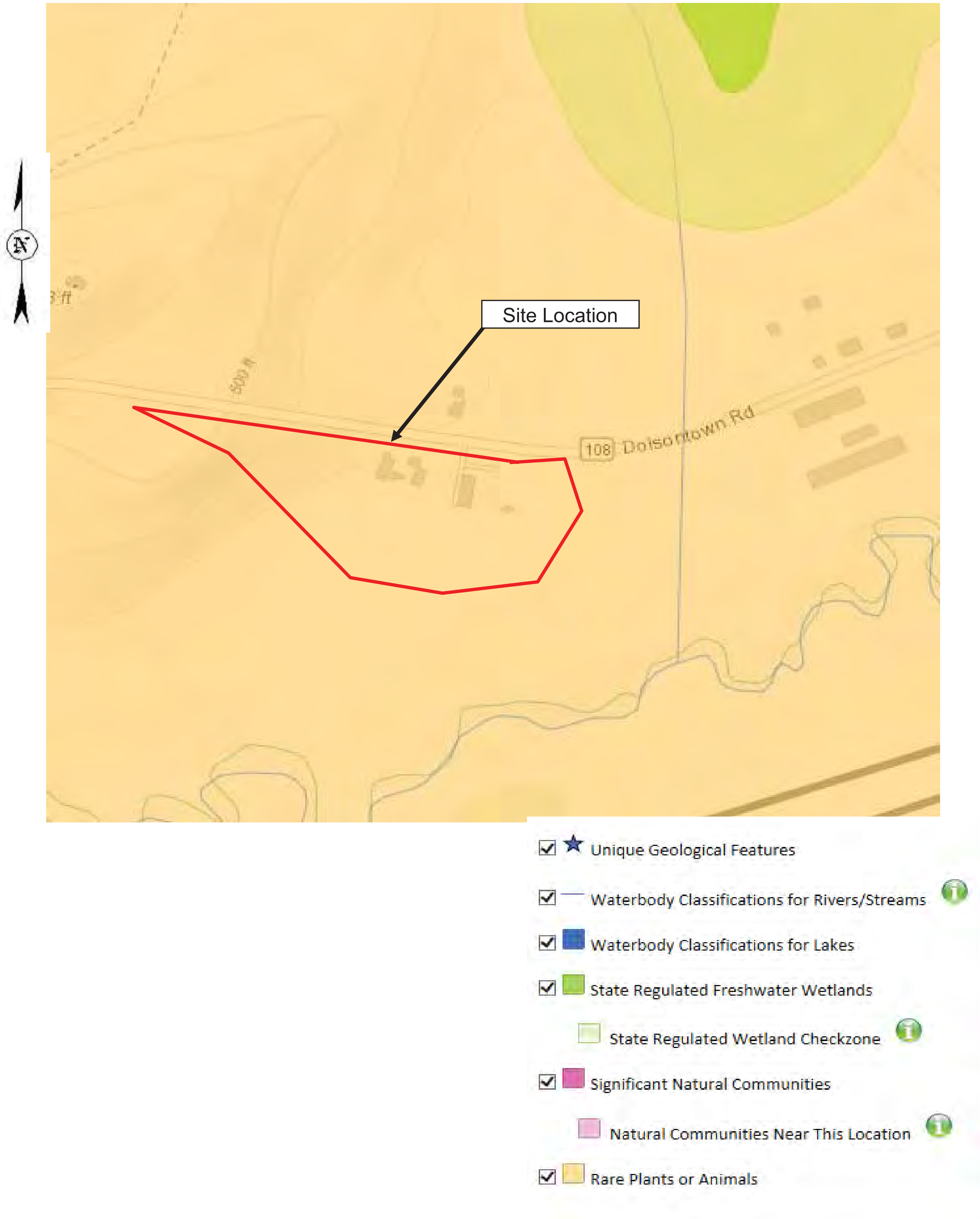
FIGURE 2

NRCS SOILS MAP

Prepared By: BPB
Date Prepared: 3/25/21

Source:
USDA

PN: 20-0062



EnSol, Inc. Environmental Solutions 661 Main Street, Niagara Falls, NY 14301 Ph:716-285-3920 Fax: 716-285-3928	**DOM-MAR Transfer and Recycling Facility**	**FIGURE 3**
	Dolsontown Rd. **Middletown, Orange County, New York**	**NYSDEC ENVIRONMENTAL RESOURCE MAP**
Prepared By: BPB Date Prepared: 3/25/21	**Source:** www.dec.gov/gis/erm	PN:

Attribute:PEM1E (Details)

Type: Freshwater Emergent Wetland

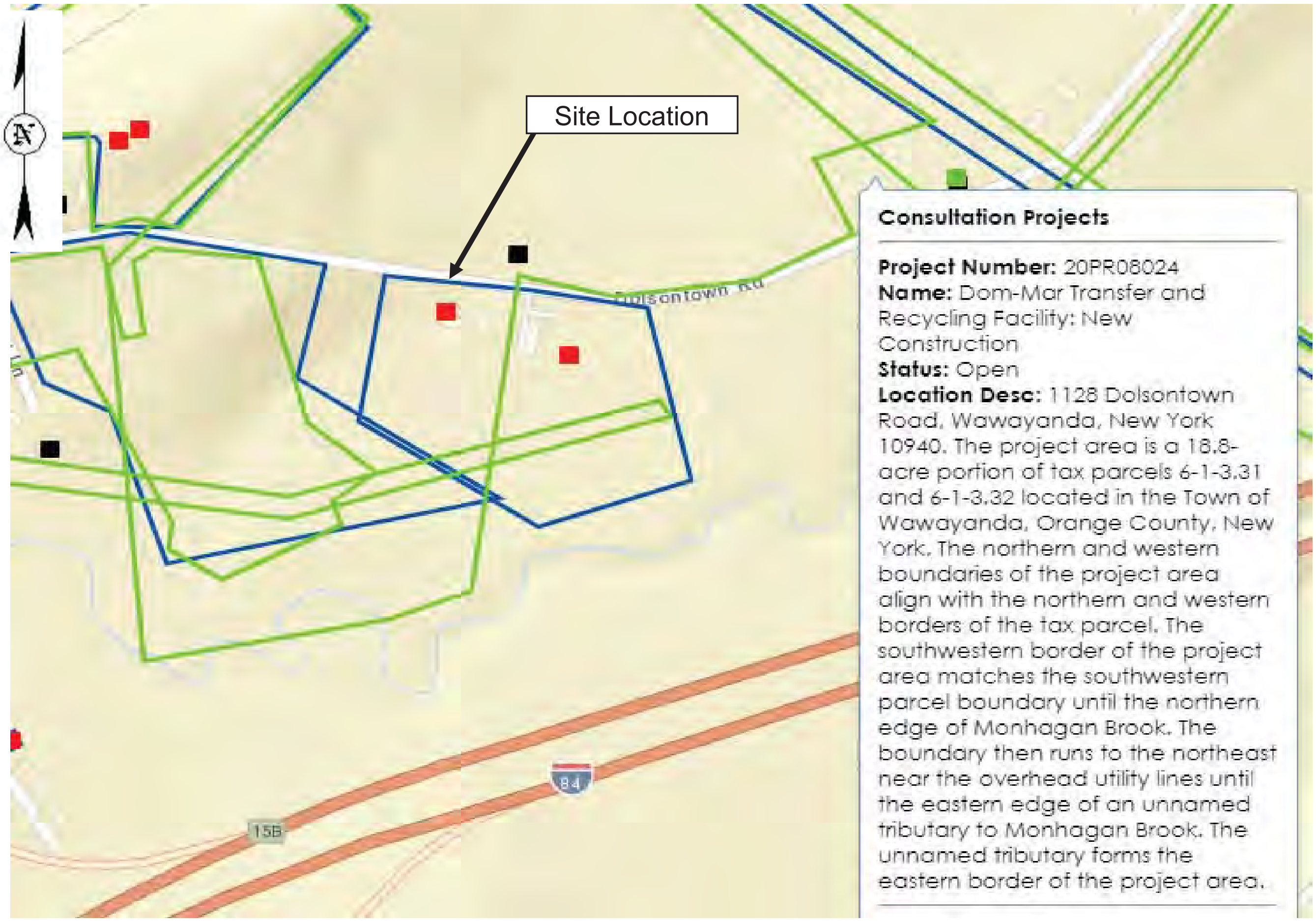
Acres:0.344141811

More about the NWI Wetlands **NWI Wetlands**.

LEGEND

Wetlands
Wetlands
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

EnSol, Inc. Environmental Solutions 661 Main Street, Niagara Falls, NY 14301 Ph:716-285-3920 Fax: 716-285-3928	**DOM-MAR Transfer and Recycling Facility** **Dolsontown Rd.** **Middletown, Orange County, New York**	**FIGURE 4**
Prepared By: BPB Date Prepared: 3/25/21	**Source:** www.fws.gov/wetlands/data/mapper.html	**FEDERAL WETLANDS MAP** PN:



National Register Building Sites (View)

Survey Archaeology Areas (View)

USN Building Districts (View)

Consultation Projects (View)

Survey Building Areas (View)

Archeologically Sensitive Areas

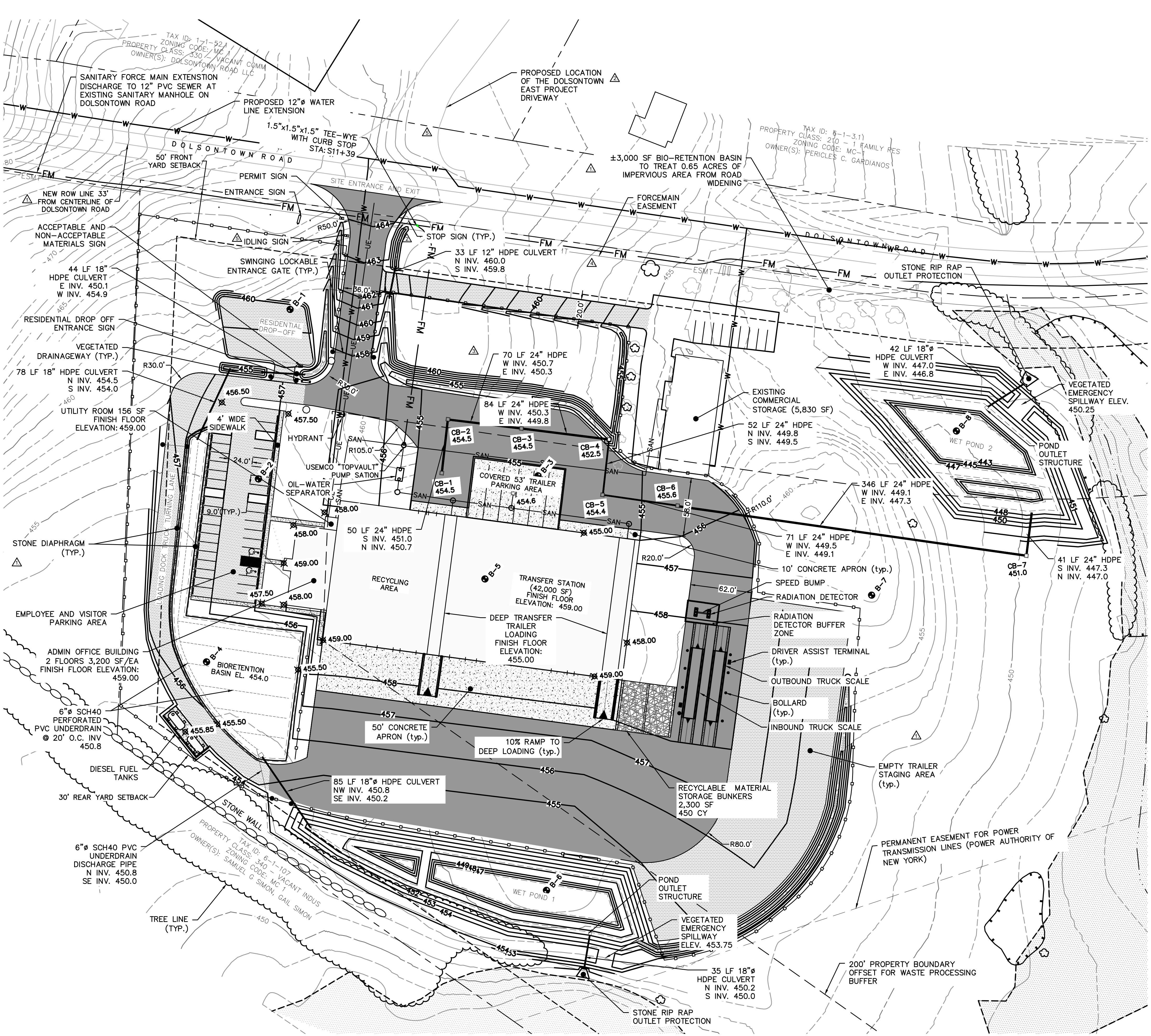
EnSol, Inc. Environmental Solutions 661 Main Street, Niagara Falls, NY 14301 Ph:716-285-3920 Fax: 716-285-3928	**DOM-MAR Transfer and Recycling Facility** **Dolsontown Rd.** **Middletown, Orange County, New York**	**FIGURE 5**
Prepared By: BPB Date Prepared: 3/25/21	**Source:** www.cris.parks.ny.gov	**SHPO MAP** PN:

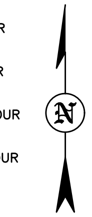
Attachment 1

EnSol, Inc.

ENGINEERING + ENVIRONMENTAL

Site Drawings



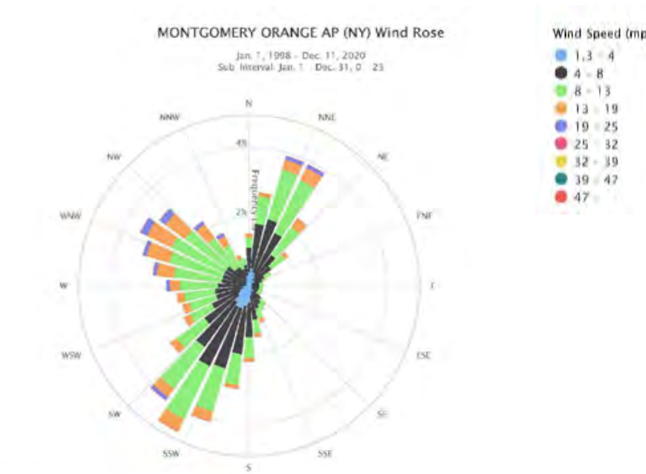


LEGEND:

450	EXISTING GROUND MAJOR CONTOUR
	EXISTING GROUND MINOR CONTOUR
450	PROPOSED GRADING MAJOR CONTOUR
448	PROPOSED GRADING MINOR CONTOUR
	PROPERTY BOUNDARY
	PROPERTY BOUNDARY SETBACK
	EXISTING BUILDING
	JURISDICTIONAL FEDERAL WETLAND
	OUTDOOR SIGNAGE
	STANDARD DUTY PAVEMENT
	HEAVY DUTY PAVEMENT
	CONCRETE
	GRAVEL
	FENCE
SAN	SANITARY SEWER
W W	WATERLINE
FM	FORCEMAIN
UE UE	UNDERGROUND ELECTRIC
GAS GAS	NATURAL GAS LINE
	PROPOSED SWALE
	PROPOSED STORM SEWER
CB-1 454.50	3'X3' CATCH BASIN ID AND RIM ELEVATION
	LOCKING GATE
B-3	BOREHOLE LOCATION

NOTES:

1. EXISTING PROPERTY LINE, BUILDINGS AND TOPOGRAPHY FROM A SURVEY PREPARED FOR MIKE MARANGI, DATED NOVEMBER 16, 2020, BY LANC & TULLY ENGINEERING AND SURVEYING, P.C.
2. ELEVATIONS BASED ON NAVD88 DATUM, HORIZONTAL DATUM IS NEW YORK STATE PLANE EAST.
2. WETLAND BOUNDARIES AND THE FEDERAL JURISDICTION ARE FROM THE WETLAND DELINEATION REPORT FOR DOLSONTOWN ROAD PREPARED BY ENSOL, INC. DATED DECEMBER 2020. FEDERAL JURISDICTION WAS CONFIRMED THROUGH A JURISDICTIONAL DETERMINATION FROM THE UNITED STATES ARMY CORPS OF ENGINEERS DATED JANUARY 5, 2022 (APPLICATION NUMBER NAN–2021–00721–WOR). WETLAND FLAGS AND BOUNDARY LOCATION ARE FROM THE SURVEY PREPARED FOR MIKE MARANGI DATED NOVEMBER 16, 2020, BY LANC & TULLEY ENGINEERING AND SURVEYING, P.C.
3. EACH RESIDENTIAL, INDUSTRIAL, COMMERCIAL SUBDIVISION OR SITE PLANS SHALL CONTRIBUTE RECREATIONAL FEES CALCULATED ON THE BASIS OF GROSS FLOOR AREA FOR ALL NEW CONSTRUCTION.
4. THE EXISTING COMMERCIAL STORAGE BUILDING WATER LINE SHALL BE DISCONNECTED FROM THE EXISTING WATER WELL AND CONNECTED TO THE EXTENDED WATER LINE ALONG DOLSONTOWN ROAD. THE SANITARY LINE SHALL BE DISCONNECTED FROM THE EXISTING SEPTIC SYSTEM AND DRAIN TO THE SANITARY PUMP STATION TO BE DISCHARGED TO THE EXISTING SEWER LINE ON DOLSONTOWN ROAD VIA A FORCE MAIN.
5. BASED ON THE NEW YORK STATE HISTORIC PRESERVATION OFFICE (SHPO) LETTER DATED JUNE 15TH 2021 AND THE PHASE 1 ARCHAEOLOGICAL INVESTIGATION FOR THE DOM–MAR TRANSFER AND RECYCLING CENTER, TOWN OF WAWAYANDA, ORANGE COUNTY, NEW YORK, PERFORMED BY TRACKER ARCHAEOLOGY OF MONROE, NEW YORK, NO EVIDENCE OF ARCHEOLOGICAL SITES WERE FOUND WITHIN THE PROJECT'S AREA OF POTENTIAL EFFECTS. THE APPROXIMATE LOCATION OF A NEW YORK STATE MUSEUM–RECORDED ARCHAEOLOGICAL SITE NYSM 6169 DESCRIBED AS "CEMETERY" IS MAPPED IN THE PROJECT AREA. THE SHPO HUMAN REMAINS DISCOVERY PROTOCOL DATED JANUARY 2021 SHALL BE IMPLEMENTED SHOULD ANY EVIDENCE OF HUMAN REMAINS OR POSSIBLE BURIAL GROUNDS BE ENCOUNTERED DURING CONSTRUCTION.



NO.	REVISION	BY	DATE
1	UPDATED PER DOLSONTOWN ROAD FINAL GENERIC ENVIRONMENTAL IMPACT STATEMENT.	DAL	05/2023
2	UPDATED FOR ONE SITE ACCESSWAY	DAL	10/2023
3	ADDED SWINGING GATE AND PERIMETER FENCE	DAL	10/2023
4	ADDED FORCEMAIN PUMPSTATION, WATERLINE + EASEMENT	ACC	10/2024
5	ADDED IDLING SIGN, ENTRANCE SIGN, AND PERMIT SIGN	ACC	01/2025

EnSol
EnSol, Inc.
3000 Alt. Blvd.,
Grand Island, NY 14072
716.285.3920

DAVID A. LENOX, P.E.
NYSPE LICENSE NO. 093384

CLIENT: DOM KAM LLC

SITE: DOM-MAR RECYCLING AND TRANSFER FACILITY
TOWN OF WAWAYANDA
COUNTY OF ORANGE
STATE OF NEW YORK

PROJECT: SITE PLAN AND SPECIAL USE PERMIT APPLICATION

TITLE: SITE PLAN

ISSUE: REVIEW

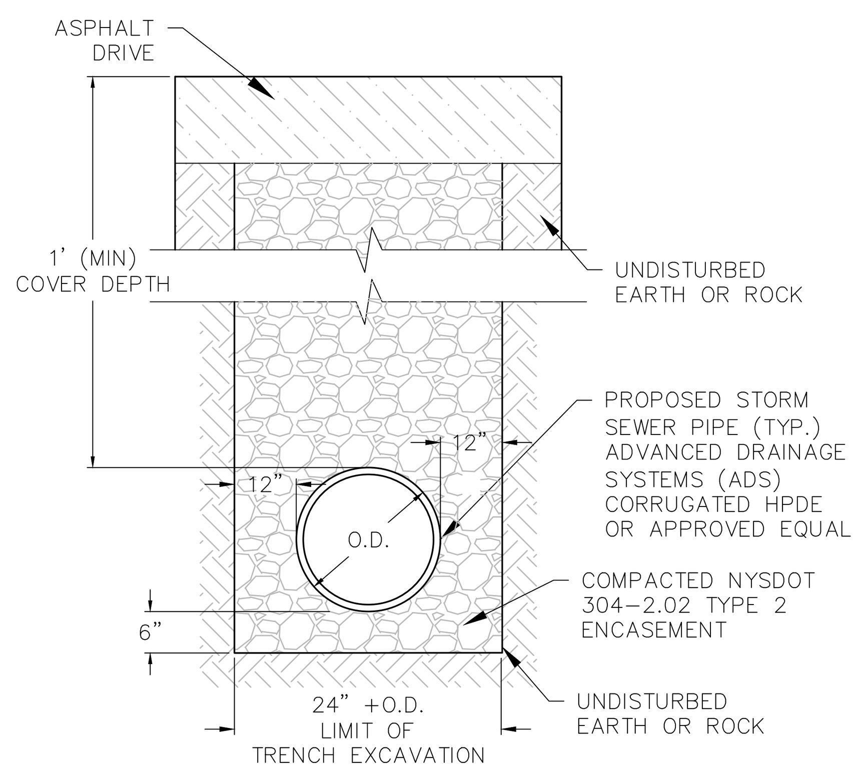
DES: DAL	DRN: SJD	CHK: DAL

PROJECT NO: 029-A0001
DATE: JANUARY 2025

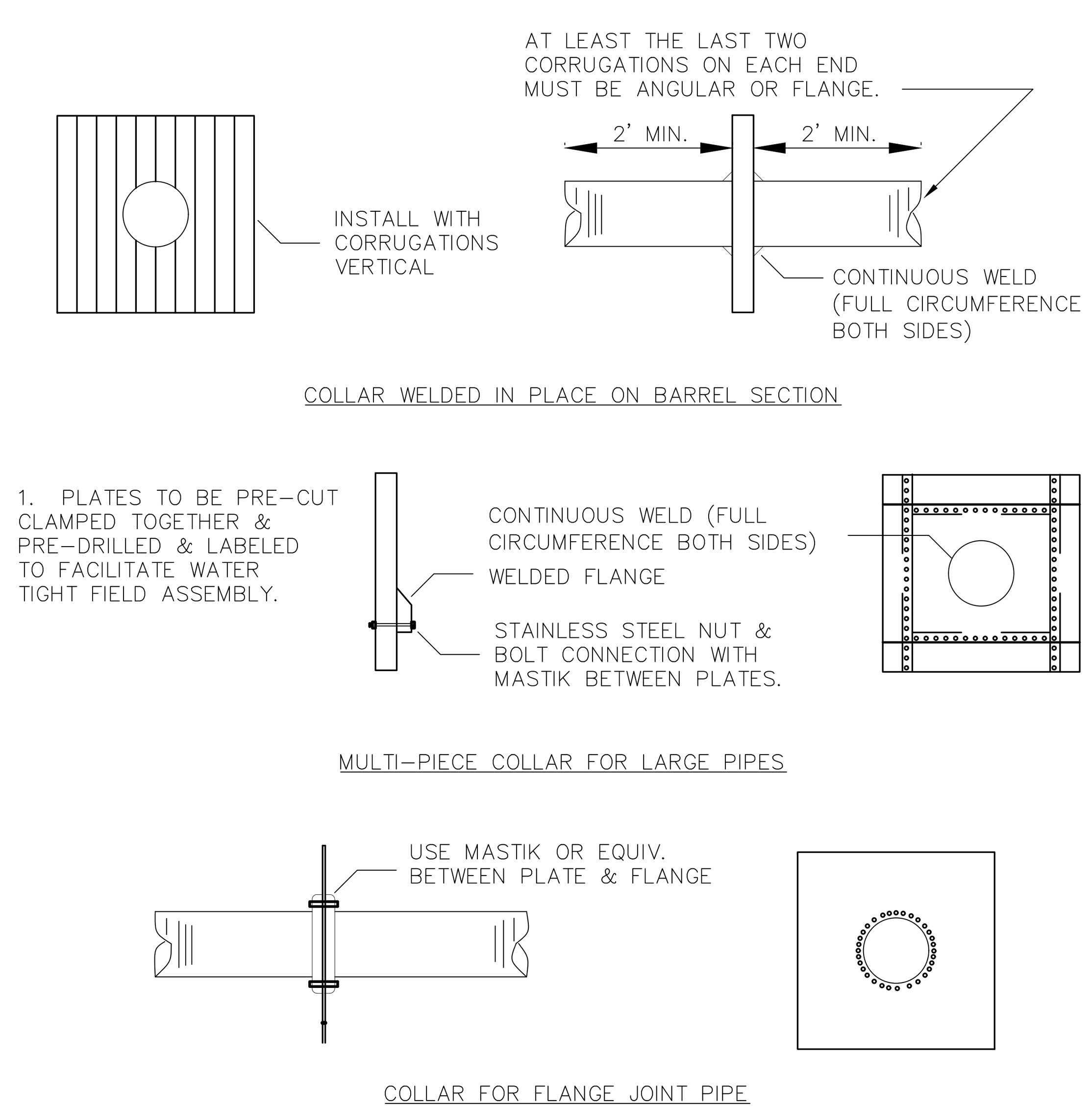
GRAPHIC SCALE: 0' 50' 100'

FILE: Sheet 3 And Sheet 5 REV 4.dwg

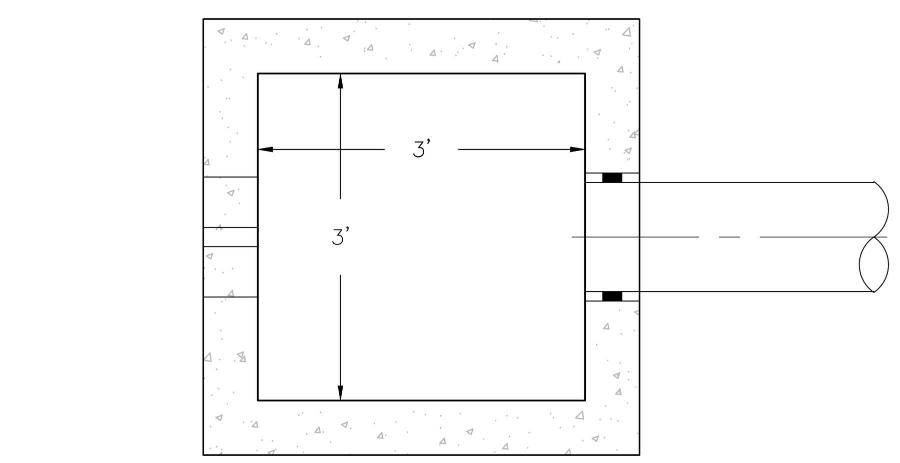
REV NO: 5
SHEET NO: 3

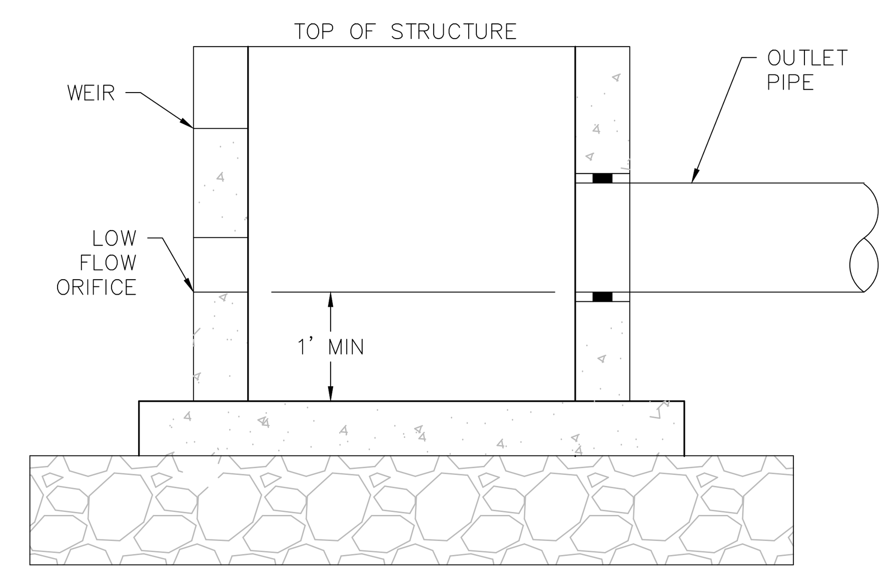


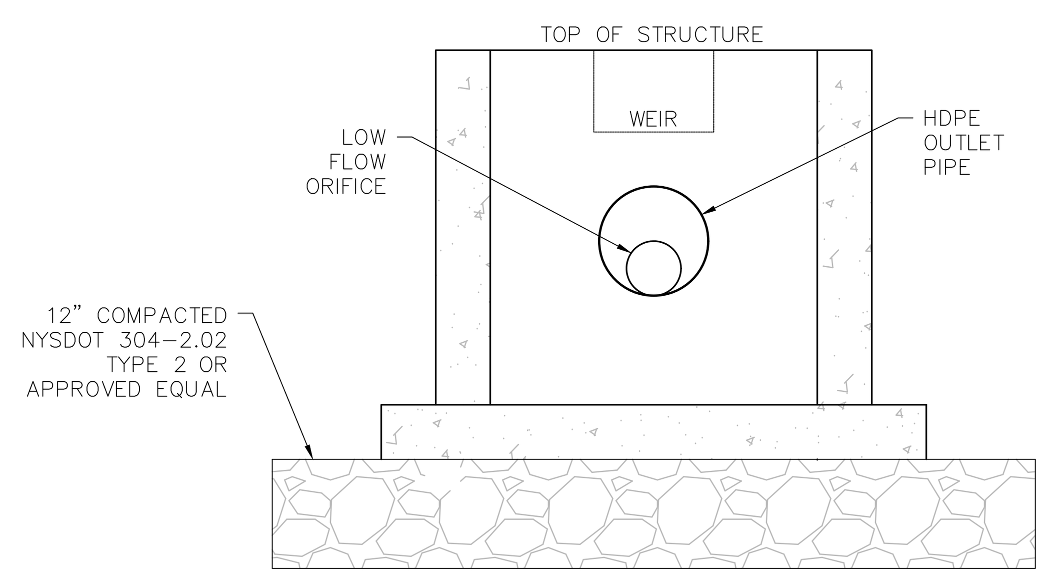
STORM PIPE TRENCH DETAIL
NOT TO SCALE



ANTI-SEEP COLLAR DETAIL
NOT TO SCALE





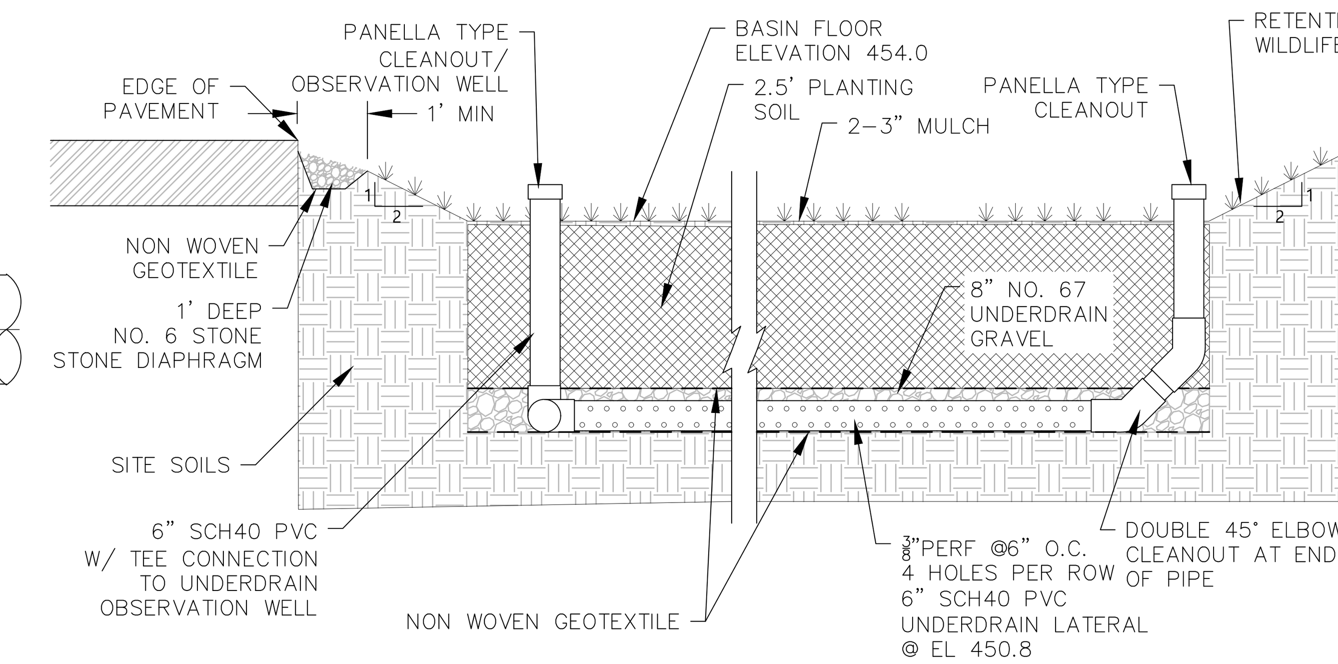


NOTES:
1. ALL OUTLET STRUCTURE INLETS TO BE COVERED BY REMOVABLE TRASH RACKS WITH OPENINGS SMALLER THAN THAT OF THE INLET (ORIFICE, WEIR, ETC.).

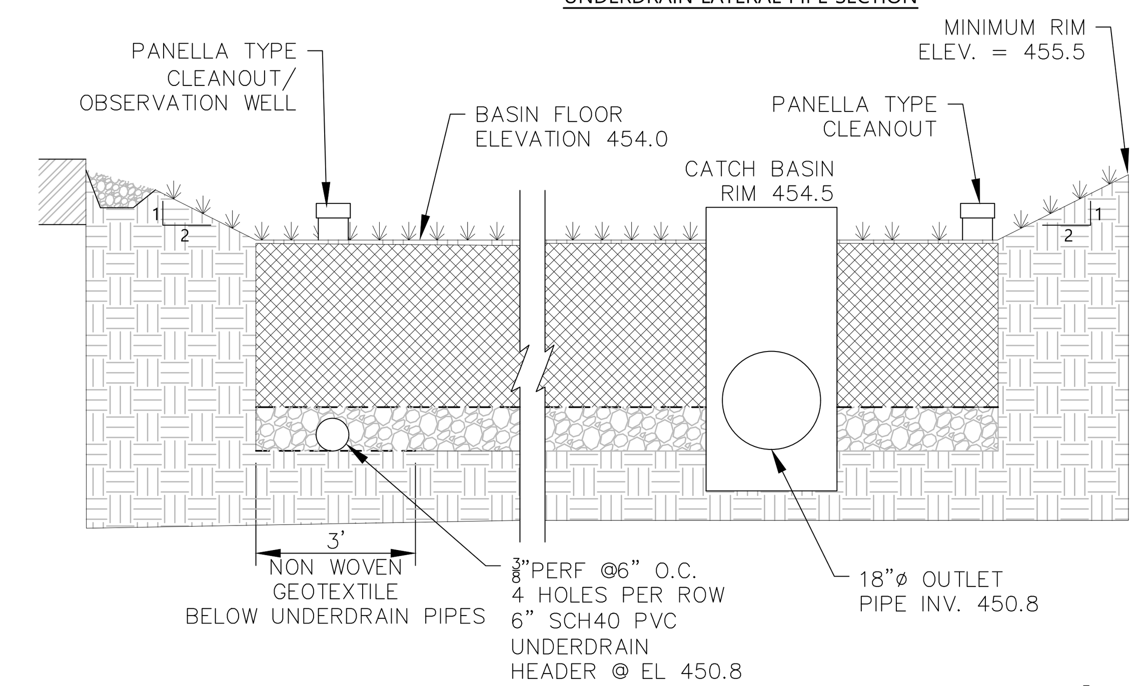
	WET POND 1 OUTLET		WET POND 2 OUTLET	
OUTLET	SIZE	ELEVATION	SIZE	ELEVATION
OUTLET PIPE	18 IN ø	450.2	18 IN ø	447.0
LOW FLOW ORIFICE	3 IN ø	450.2	3 IN ø	447.0
WEIR	12 IN	451.75	12 IN	448.6
TOP OF STRUCTURE	3 FT X 3 FT	452.60	3 FT X 3 FT	450.0

1.

POND OUTLET STRUCTURE
NOT TO SCALE



UNDERDRAIN LATERAL PIPE SECTION



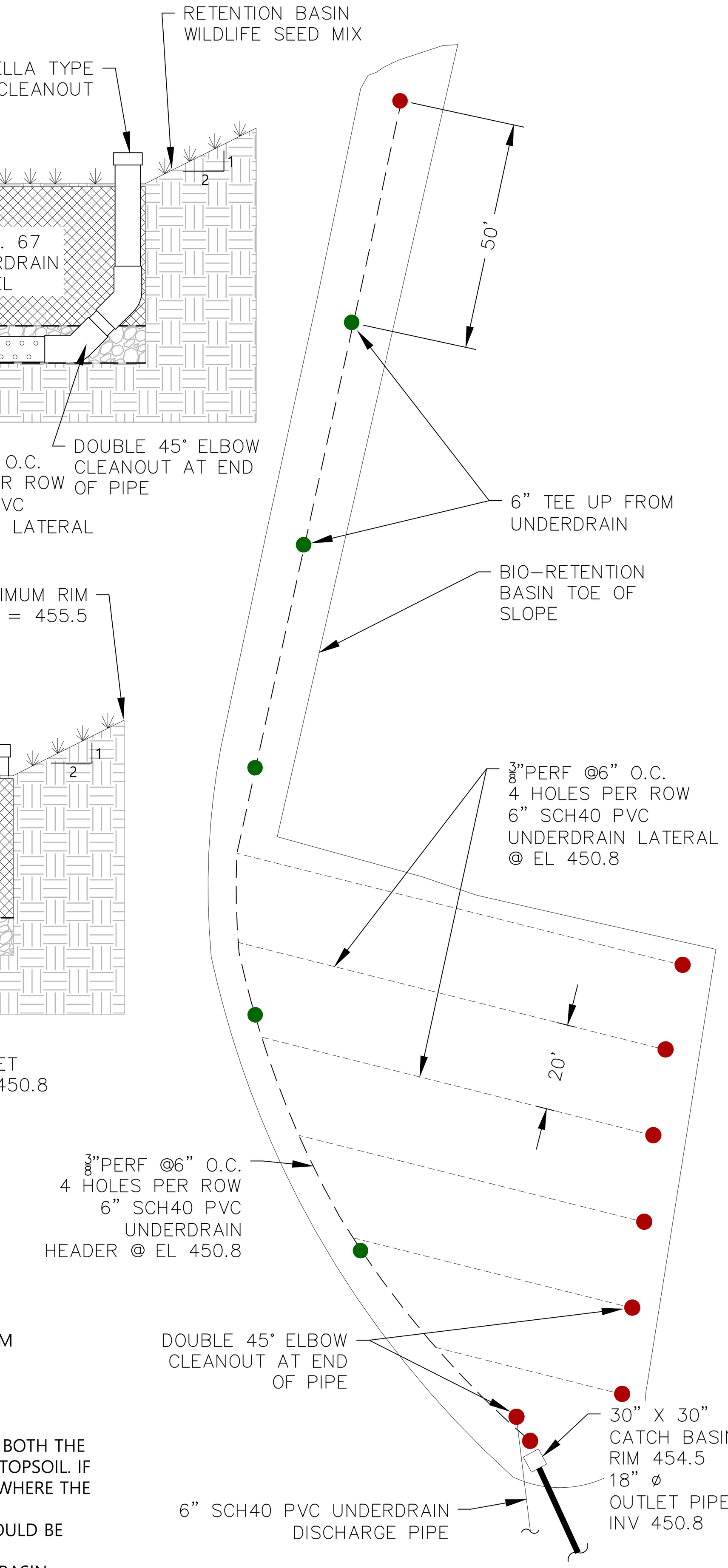
UNDERDRAIN HEADER PIPE AND CATCH BASIN SECTION

DETAIL NOTES:
1. PLANTING SOIL SHALL BE TESTED AND SHALL MEET THE FOLLOWING CRITERIA:

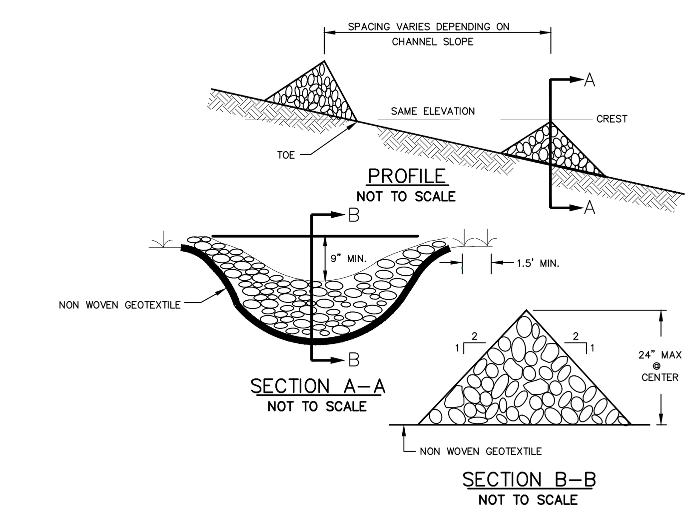
PH RANGE	5.2-7.0	SOLUBLE SALTS	NOT TO EXCEED 500PPM
ORGANIC MATTER	1.5 - 4%	CLAY	10 - 25%
MAGNESIUM	35 LB/AC	SILT	30 - 55%
PHOSPHORUS P_2O_5	75 LB/AC	SAND	35 - 60%
POTASSIUM K_2O	85 LB/AC		

2. ALL BIORETENTION AREAS SHALL HAVE A MINIMUM OF ONE TEST. EACH TEST SHALL CONSIST OF BOTH THE STANDARD SOIL TESTS (NOTE 1). A TEXTURAL ANALYSIS IS REQUIRED FOR THE SITE STOCKPILED TOPSOIL. IF TOPSOIL IS IMPORTED, THEN A TEXTURAL ANALYSIS SHALL BE PERFORMED FOR EACH LOCATION WHERE THE TOPSOIL WAS EXCAVATED.
3. COMPACTION OF BOTH THE BASE OF THE BIORETENTION AREA AND THE REQUIRED BACKFILL SHOULD BE MINIMIZED. USE EXCAVATION HOES WHEN POSSIBLE TO REMOVE ORIGINAL SOIL.
4. SEE APPENDIX C OF THE "NEW YORK STATE STORMWATER DESIGN MANUAL" FOR BIORETENTION BASIN SPECIFICATIONS.
5. ALL UNDERDRAIN PIPES TO HAVE A 3' (MIN) NONWOVEN GEOTEXTILE FABRIC PLACED DIRECTLY BELOW PIPE.

BIORETENTION BASIN DETAIL
NOT TO SCALE

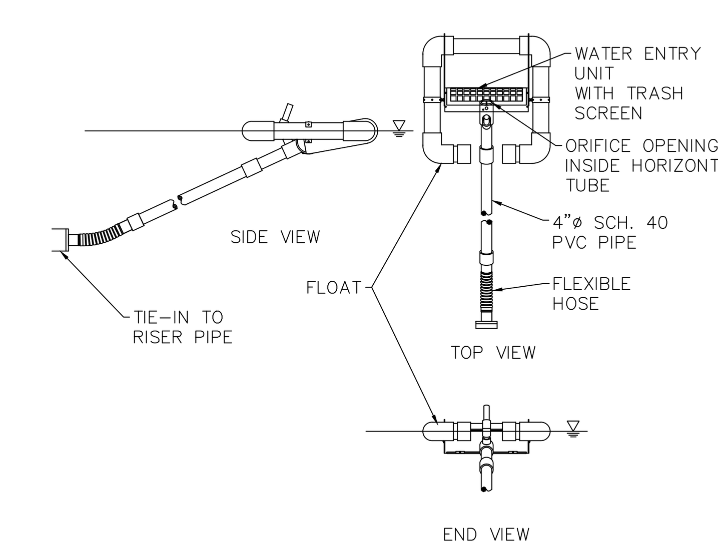


UNDERDRAIN LAYOUT/PLAN VIEW 1.



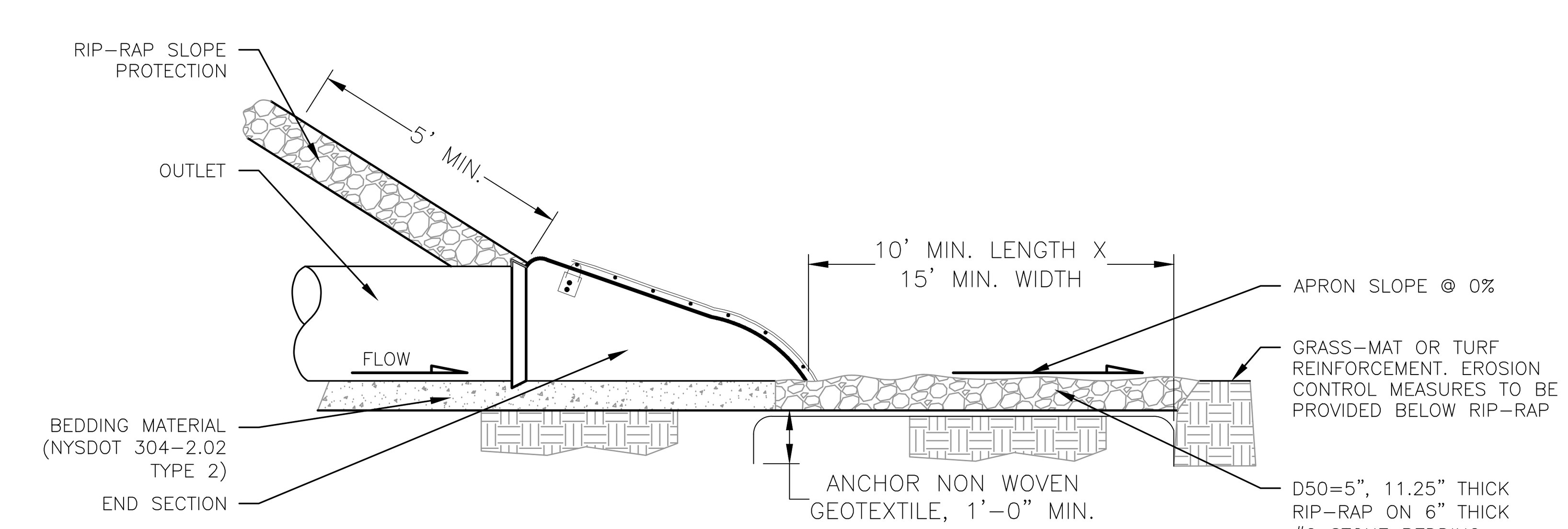
NOTES:
1. CHECK DAMS SHALL BE PLACED AT THE LOCATIONS SHOWN ON THE EROSION AND SEDIMENT CONTROL PLAN.
2. SET SPACING OF CHECK DAMS TO ASSUME THAT THE ELEVATIONS OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION OF THE TOW OF THE UPSTREAM DAM.
3. EXTEND THE STONE A MINIMUM OF 1.5 FEET BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.
4. PROTECT THE CHANNEL DOWNSTREAM OF THE LOWEST CHECK DAM FROM SCOUR AND EROSION WITH STONE OR LINER AS APPROPRIATE.
5. ENSURE THAT CHANNEL APPURTENANCES SUCH AS CULVERT ENTRANCES BELOW CHECK DAMS ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED STONES.

STONE CHECK DAM DETAIL
NOT TO SCALE

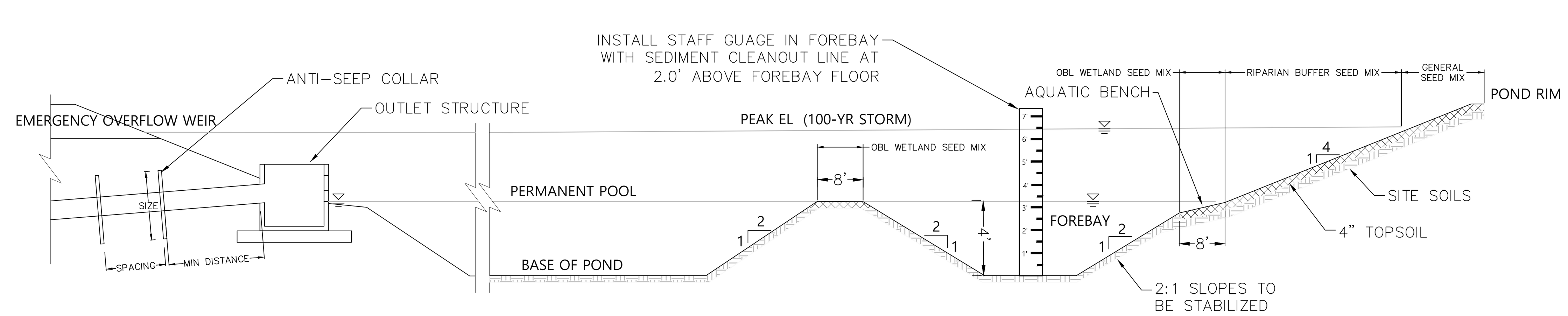


	SEDIMENT BASIN 1	SEDIMENT BASIN 2
RISER TIE-IN	450.2'	447.0'
ORIFICE SIZE	2.3"	2.3"
4" PVC PIPE LENGTH	2.2' MIN	2.3' MIN

SEDIMENT BASIN SKIMMER
NTS



POND OUTLET PROTECTION
NOT TO SCALE



POND CROSS-SECTION
NOT TO SCALE 1.

ANTI-SEEP COLLARS

	WET POND 1 (WEST POND)			WET POND 2 (EAST POND)		
#	SIZE (MIN)	SPACING	MAX DISTANCE	SIZE (MIN)	SPACING	MAX DISTANCE
1	4.4'	N.A.	19.6'	5.1'	N.A.	24.5'
2	3.1'	4'-11.2'	19.6'	3.3'	4.5'-12.6'	24.5'
3	2.5'	2.5'-7'	19.6'	2.6'	2.8'-7.7'	24.5'

NOTES:
1. FIRST COLLAR TO BE PLACED A MINIMUM DISTANCE WITHIN THE BERM SO THAT THE TOP OF THE COLLAR HAS A MINIMUM 1' OF COVER.

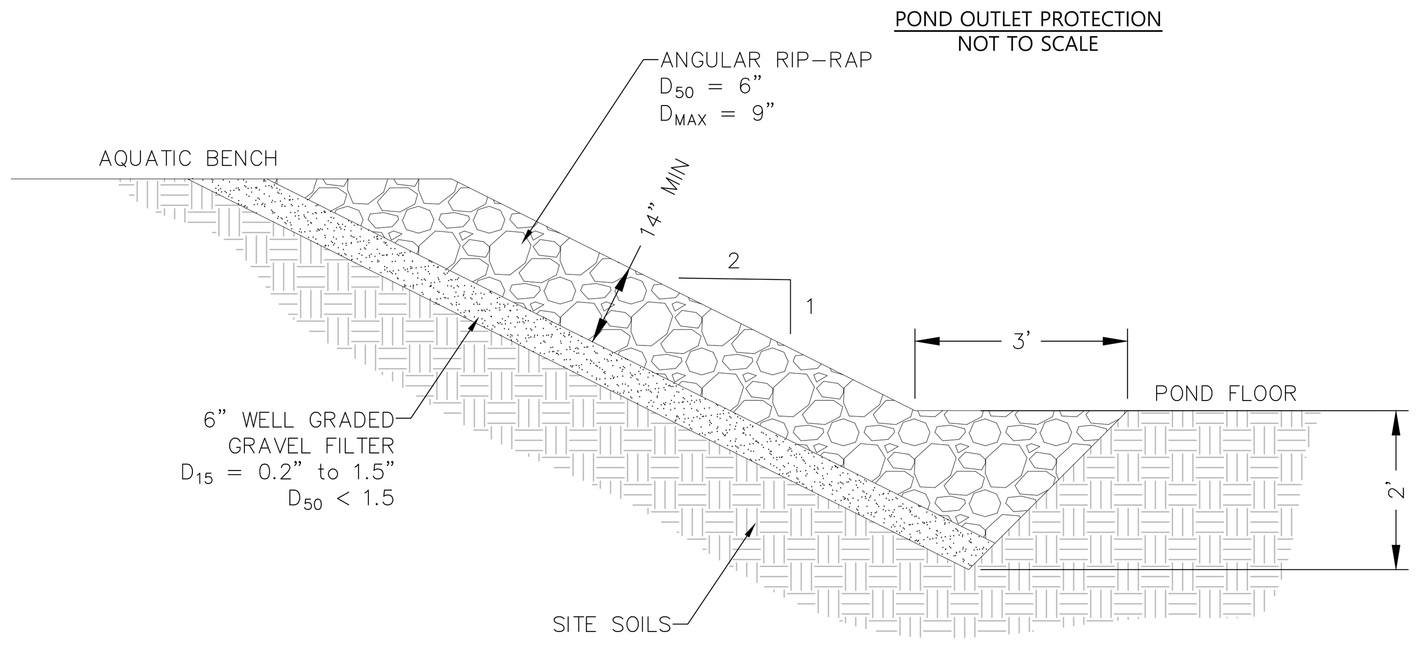
WET POND LANDSCAPING ZONES

ZONE	DEPTH RANGE	ELEVATION	
		WET POND 1	WET POND 2
DEEP WATER AREAS	18"-6'	446.0-448.7	442.5-445.5
SHALLOW WATER AREA	NORMAL POOL-18"	448.7-450.2	445.5-447.0
SHORELINE FRINGE	MAX POOL-NORMAL POOL	450.2-453.46	447.0-450.09

POND ELEVATIONS

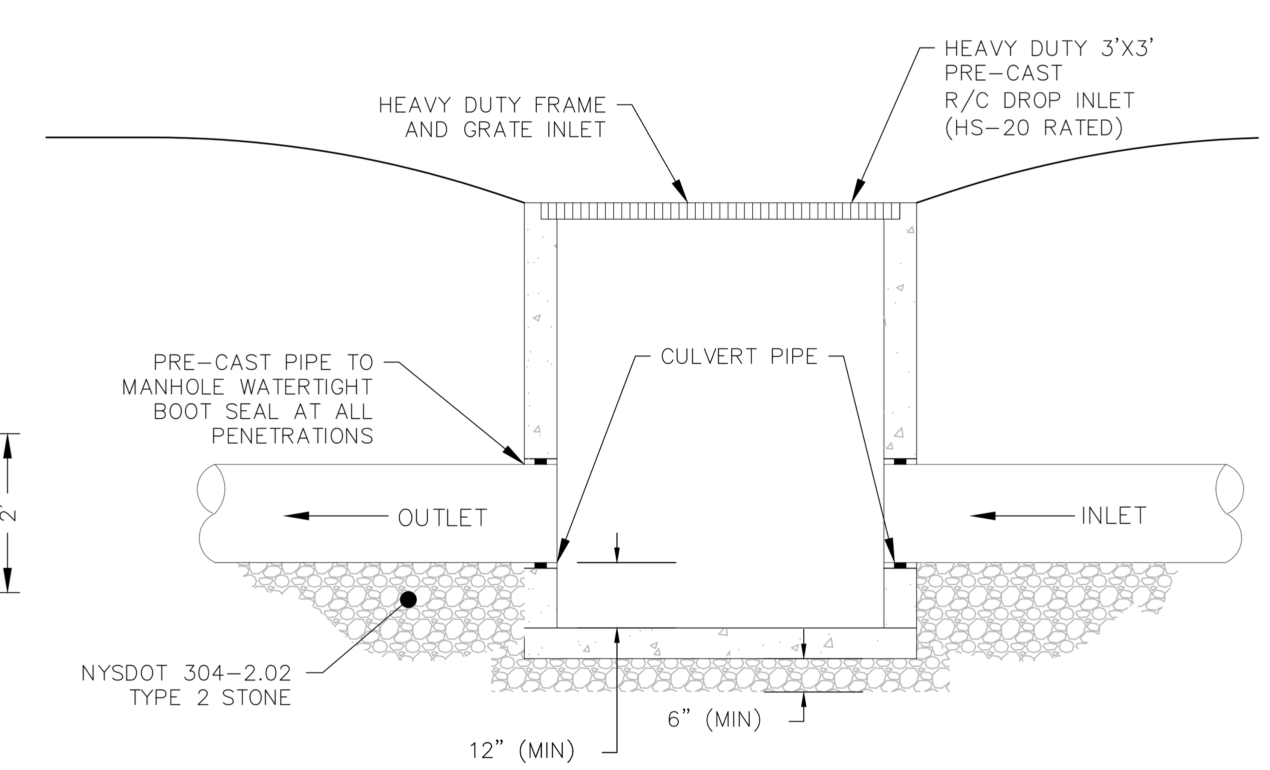
ELEVATION	WET POND 1	WET POND 2
POND RIM	454.75	451.25
EMERGENCY OVERFLOW	453.75	450.25
PEAK (100-YR STORM)	453.64	450.21
PERMANENT POOL	450.2	447.0
EDGE OF AQUATIC BENCH	449.2	446.0
BASE OF POND	445.75	442.5

1.



NOTES:
1. ALL 2:1 SLOPES WITHIN WET POND 1 AND WET POND 2 TO BE ARMORED WITH RIP-RAP TO PREVENT EROSION DUE TO SEEPAGE.

RIP-RAP ARMORED SLOPE PROTECTION
NOT TO SCALE



CATCH BASIN DETAIL
NOT TO SCALE

NO.	REVISION	BY	DATE
1.	ADDED FORE BAY TO POND CROSS SECTION DETAIL	DAL	05/2023
2.	UPDATED POND OUTLET ELEVATIONS	ACC	01/2025

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NYSPE LICENSE NO. 093384

CLIENT:
DOM KAM LLC

SITE:
DOM-MAR RECYCLING AND TRANSFER FACILITY
TOWN OF WAWAYANDA
COUNTY OF ORANGE
STATE OF NEW YORK

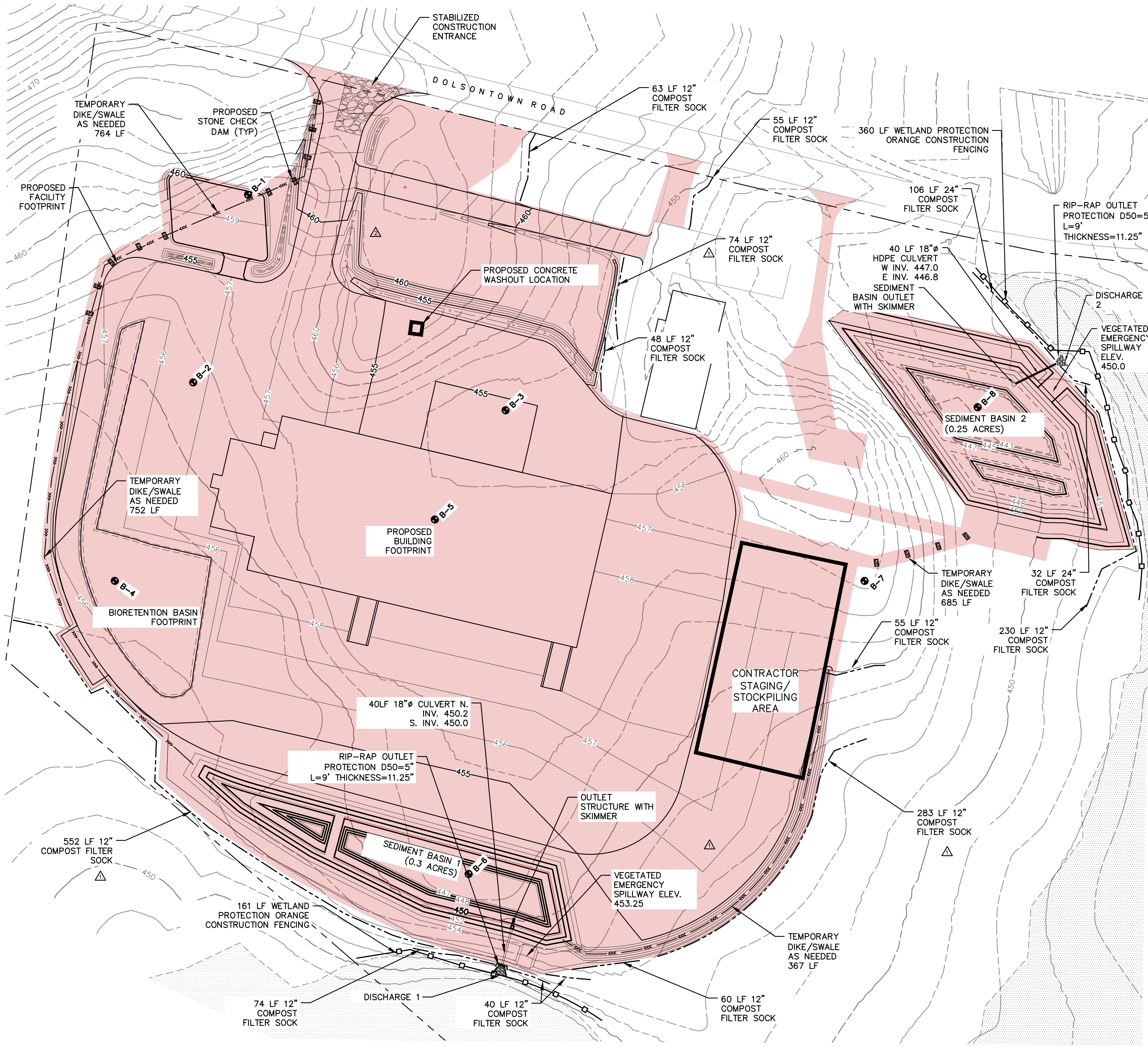
PROJECT:
SITE PLAN AND SPECIAL USE PERMIT APPLICATION

TITLE:
STORMWATER DETAILS

ISSUE: REVIEW

DES:	DRN:	CHK:
BPB	BPB	DL

PROJECT NO: 029-A0001
DATE: JANUARY 2025
GRAPHIC SCALE: NOTED
FILE: Sheet 12 - Stormwater Details.dwg
REV NO: 2
SHEET NO: 12



LEGEND:

450	EXISTING GROUND MAJOR CONTOUR
	EXISTING GROUND MINOR CONTOUR
450	PROPOSED GRADING MAJOR CONTOUR
448	PROPOSED GRADING MINOR CONTOUR
	PROPERTY BOUNDARY
	EXISTING BUILDING
B-3	BOREHOLE LOCATION
	JURISDICTIONAL FEDERAL WETLAND
	TEMPORARY DIVERSION BERM/SWALE
	SILT FENCE/COMPOST FILTER SOCK
	PROPOSED AREA OF DISTURBANCE TOTAL = 9.6 ACRES
	ORANGE CONSTRUCTION FENCE

GENERAL NOTES:

1. CONTRACTOR TO VERIFY ALL FIELD CONDITIONS AND UTILITY LOCATIONS PRIOR TO START OF CONSTRUCTION.
2. INSTALL STABILIZED CONSTRUCTION ENTRANCE AND PERIMETER EROSION AND SEDIMENT CONTROL FEATURES PRIOR TO COMMENCING SITE WORK.
3. ADDITIONAL COMPOST FILTER SOCK MAY BE REQUIRED TO PREVENT SILT LADEN RUNOFF FROM FLOWING ONTO PAVED AREAS AND/OR ADJACENT PROPERTIES.
4. MAINTAIN EROSION AND SEDIMENT CONTROL FEATURES THROUGHOUT CONSTRUCTION. REMOVE ACCUMULATED SILT AND SEDIMENT AS NEEDED. REPAIR OR REPLACE ALL DAMAGED COMPOST FILTER SOCK IMMEDIATELY.
5. SEDIMENT BASIN PERMANENT POOL DEWATERING TO BE DONE VIA PUMP TO STABILIZED DISCHARGE AREA UTILIZING SILT BAG OR APPROVED EQUAL AS NEEDED.
6. IMMEDIATELY SEED ALL DESIGNATED GRASS AREAS THAT HAVE BEEN COMPLETED THROUGH FINAL GRADE.
7. CONTRACTOR STAGING AREA, STOCKPILE AREAS, AND CONCRETE WASHOUT TO BE LOCATED PER OWNER APPROVAL. PROVIDE SILT CONTROL FEATURES AROUND ALL TEMPORARY STOCKPILES. SEED AND MULCH ALL STOCKPILES THAT WILL REMAIN INACTIVE FOR LONGER THAN 7 DAYS. CONCRETE WASHOUT TO BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH NYSDEC STANDARD AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL.
8. MAINTAIN EROSION CONTROL FEATURES UNTIL ADEQUATE FINAL VEGETATION HAS BEEN ESTABLISHED (80% COVERAGE AT 2-INCH STAND OF GRASS). SEDIMENT BASIN OUTLET STRUCTURES TO BE CONVERTED TO FINAL WETPOND OUTLET CONFIGURATION UPON FINAL STABILIZATION.

SOIL RESTORATION REQUIREMENT

TYPE OF SOIL DISTURBANCE	SOIL RESTORATION REQUIREMENT	COMMENTS/EXAMPLES
NO SOIL DISTURBANCE	RESTORATION NOT PERMITTED	PRESERVATION OF NATURAL FEATURES
MINIMAL SOIL DISTURBANCE	RESTORATION NOT REQUIRED	CLEARING AND GRUBBING
AREAS WHERE TOPSOIL IS STRIPPED ONLY – NO CHANGE IN GRADE	HYDROLOGIC SOIL GROUP C&D AERATE[1] AND APPLY 6 INCHES OF TOPSOIL	PROTECT AREA FROM ANY ONGOING CONSTRUCTION ACTIVITIES
AREAS OF CUT OR FILL	HYDROLOGIC SOIL GROUP C&D APPLY FULL SOIL RESTORATION[2]	
HEAVY TRAFFIC AREAS ON SITE (ESPECIALLY IN A ZONE 5–25 FEET AROUND BUILDINGS BUT NOT WITHIN A 5 FOOT PERIMETER AROUND FOUNDATION WALLS	APPLY FULL SOIL RESTORATION (DECOMPACTION AND COMPOST ENHANCEMENT)	
AREAS WHERE RUNOFF REDUCTION AND/OR INFILTRATION FRACTICES ARE APPLIED	RESTORATION NOT REQUIRED, BUT MAY BE APPLIED TO ENHANCE THE REDUCTION SPECIFIED FOR APPROPRIATE PRACTICES	KEEP CONSTRUCTION EQUIPMENT FROM CROSSING THESE AREAS. TO PROTECT NEWLY INSTALLED PRACTICE FROM ANY ONGOING CONSTRUCTION ACTIVITIES CONSTRUCT A SINGLE PHASE OPERATION FENCE AREA
REDEVELOPMENT PROJECTS	SOIL RESTORATION IS REQUIRED ON REDEVELOPMENT PROJECTS IN AREAS WHERE EXISTING IMPERVIOUS AREA WILL BE CONVERTED TO PERVIOUS AREA	

NOTES:
1. AERATION INCLUDE THE USE OF MACHINES SUCH AS TRACTOR-DRAWIN IMPLEMENTS WITH COULTERS MAKING A NARROW SLIT IN THE SOIL, A ROLLER WITH MANY SPIKES MAKING INDENTATIONS IN THE SOIL, OR PRONGS WHICH FUNCTION LIKE A MINI-SUBSOILER.
2. PER "DEEP RIPPING AND DE-COMPACTION, DEC 2008".

TABLE 5.3 FROM NEW YORK STATE STORMWATER DESIGN MANUAL 2015

NO.	REVISION	BY	DATE
1	UPDATED PER DOLSONTOWN ROAD FINAL GENERIC ENVIRONMENTAL IMPACT STATEMENT.	DAL	05/2023
2	UPDATED FOR ONE SITE ACCESS WAY.	DAL	10/2023

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PROJECT:
SITE PLAN AND SPECIAL USE PERMIT APPLICATION

TITLE:
EROSION AND SEDIMENT CONTROL PLAN

ISSUE: REVIEW

DES: BPB | DRN: BPB | CHK: DAL

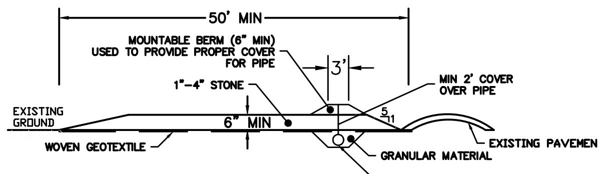
PROJECT NO: 20-0062 | DATE: OCTOBER 2023

GRAPHIC SCALE: 0' 60' 120'

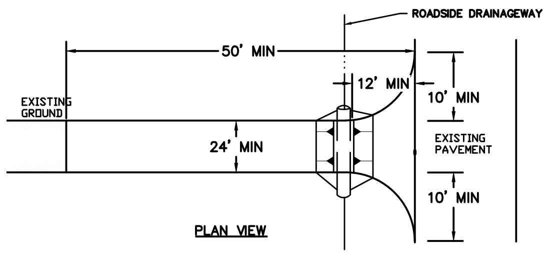
FILE: Sheet 14 And 15 - ESC Plan Rev 2 (Updated Grading).dwg

REV NO: 2

SHEET NO: 14



PROFILE VIEW

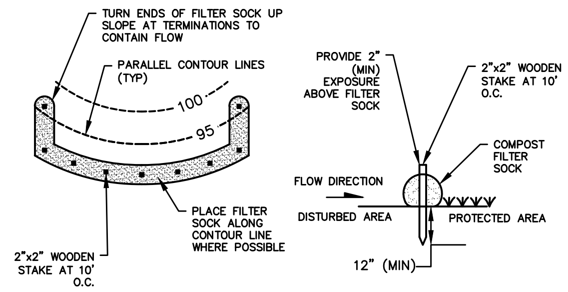


PLAN VIEW

DETAIL NOTES:

1. GRAVEL DRIVE 1-4" CLEAN STONE OR RECLAIMED CONCRETE EQUIVALENT.
2. WOVEN GEOTEXTILE TO BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE.
3. ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE.
4. STABILIZED CONSTRUCTION ENTRANCE SHALL BE MAINTAINED IN GOOD WORKING ORDER THROUGHOUT CONSTRUCTION TO PREVENT TRACKING OF SOILS & SEDIMENT ONTO PUBLIC RIGHT-OF-WAY. REMOVE ALL SOILS & SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHT-OF-WAY IMMEDIATELY.
5. INSPECT ENTRANCE AFTER EACH RAIN EVENT AND REPAIR AS NECESSARY.
6. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAP.

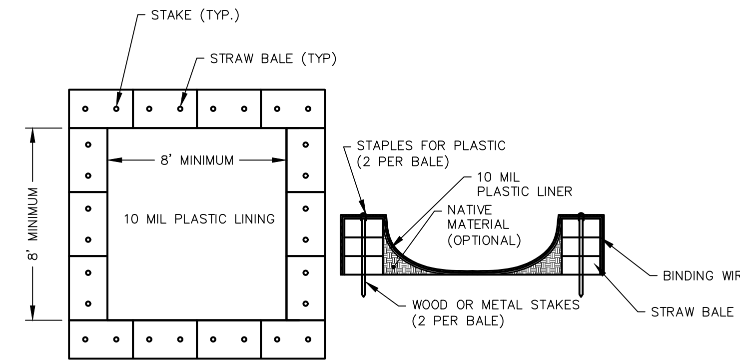
STABILIZED CONSTRUCTION ENTRANCE
NOT TO SCALE



PLAN VIEW

PROFILE VIEW

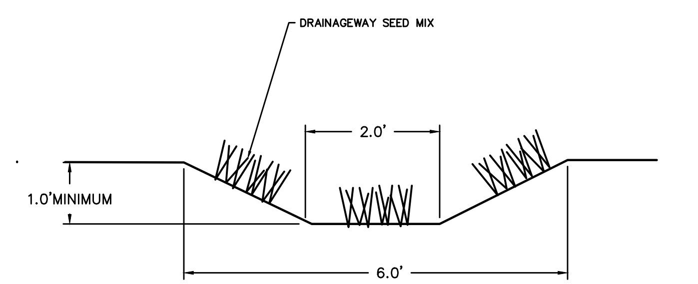
COMPOST FILTER SOCK INSTALLATION DETAILS
NOT TO SCALE



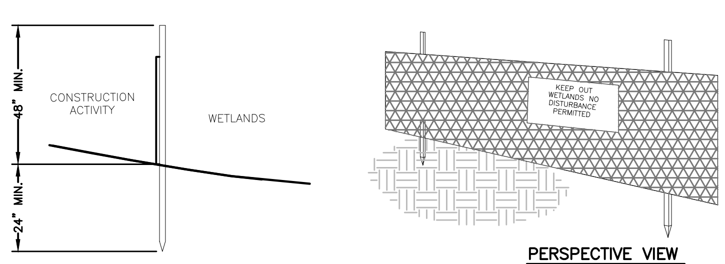
NOTES:

1. WASHOUT FACILITY TO BE SIZED BY CONTRACTOR TO CONTAIN SOLIDS, WASH WATER, AND RAINFALL AND SIZED TO ALLOW THE EVAPORATION OF THE WASH WATER AND RAINFALL.
2. WASH WATER SHALL BE ESTIMATED AT 7 GALLONS PER CHUTE AND 50 GALLONS PER HOPPER OF CONCRETE PUMP TRUCK AND/OR DISCHARGING DRUM.
3. MINIMUM SIZE 8'Wx8'Lx2'H.
4. LOCATE MINIMUM 100' FROM SWALES, STORM INLETS, AND WETLAND.

CONCRETE WASHOUT DETAIL
NOT TO SCALE



VEGETATED DRAINAGEWAY DETAIL
NOT TO SCALE



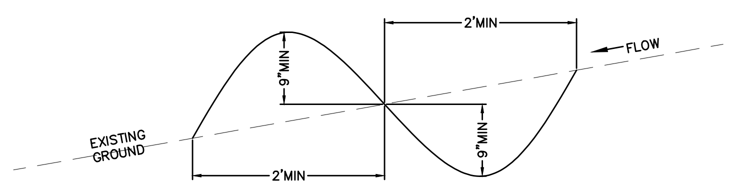
SECTION

PERSPECTIVE VIEW

GENERAL NOTES
1) WETLAND PROTECTION FENCING TO BE INSTALLED PRIOR TO GRADING AND THE INSTALLATION OF EROSION AND CONTROL SEDIMENT CONTROL MEASURES.

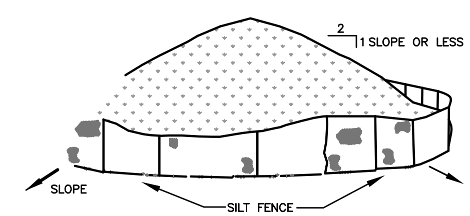
2) ALL PROTECTION FENCING IS TO REMAIN IN PLACE UNTIL CONSTRUCTION ACTIVITIES ARE COMPLETE AND SITE STABILIZATION IS ACHIEVED

WETLAND PROTECTION FENCE DETAIL
NOT TO SCALE



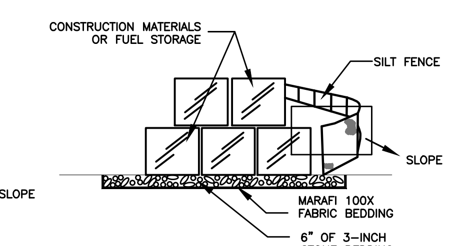
NOTES:
1. PERIMETER DIKE/SWALE SHALL HAVE UNINTERRUPTED POSITIVE GRADE.
2. DIVERTED RUNOFF FROM DISTURBED AREA TO BE CONVEYED TO SEDIMENT TRAPPING DEVICE.
3. DIVERTED RUNOFF FROM UNDISTURBED AREA SHALL OUTLET TO UNDISTURBED STABILIZED AREA.

TEMPORARY DIKE/SWALE DETAIL
NOT TO SCALE



1. AREA CHOSEN FOR STOCKPILING OPERATIONS SHALL BE DRY AND STABLE.
2. MAXIMUM SLOPE OF STOCKPILE SHALL BE 1 : 2.
3. SILT FENCING OR COMPOST FILTER SOCK SHALL BE PLACED 5-FEET DOWNSLOPE OF EACH PILE. UPON COMPLETION OF SOIL STOCKPILING, TOPSOIL SHALL BE STABILIZED WITH SEED AND MULCH IF NOT TO BE DISTURBED/UTILIZED WITHIN 14 DAYS.
4. SEE ADDITIONAL DETAILS FOR INSTALLATION OF SILT FENCE OR COMPOST FILTER SOCK.
5. TEMPORARY PERIMETER DIKES MAY BE REQUIRED TO DIRECT CLEAN RUNOFF FROM STOCKPILE AREAS. REFER TO EROSION AND SEDIMENT CONTROL PLAN.

SOIL STOCKPILE



1. AREA CHOSEN FOR STORAGE OPERATIONS SHALL BE DRY AND STABLE.
2. MINIMUM DISTANCE TO A NATURAL WATER COURSE SHALL BE 50'.
3. THE TOP SIX INCHES OF NATIVE MATERIAL SHALL BE REMOVED FROM MATERIAL/FUEL STORAGE AREA AND REPLACED WITH MARAFI 100X GEOTEXTILE FABRIC AND SIX INCHES OF CRUSHED STONE BEDDING. CRUSHED STONE SHALL MEET NYSDOT ITEM No. 623.11 SPECFICATIONS.
4. SILT FENCING OR COMPOST FILTER SOCK SHALL BE PLACED 5-FEET DOWNSLOPE OF STORAGE AREA.
5. TEMPORARY PERIMETER DIKES MAY BE REQUIRED TO DIRECT CLEAN RUNOFF FROM STORAGE AREAS. REFER TO EROSION AND SEDIMENT CONTROL PLAN.

FUEL OR MATERIAL STORAGE AREA

NO	REVISION	BY	DATE

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ISSUE:
REVIEW

DES: BPB	DRN: BPB	CHK: DAL
PROJECT NO: 20-0062	DATE: OCTOBER 2023	

GRAPHIC SCALE: 0' 60' 120'

FILE:
Sheet 14 And 15 - ESC Plan Rev 2 (Updated Grading).dwg

REV NO:	SHEET NO:
1	15

Z:\Marangi Disposal (029)\029-A0001 TS Permit Application\Drawings\2. Town Site Plan Drawings\Sheet 14 and 15 - ESC Plan Rev 2 (Updated Grading).dwg, 1/15/2025 10:15:35 AM

Attachment 2

EnSol, Inc.

ENGINEERING + ENVIRONMENTAL

SPDES General Permit for Stormwater Discharges from Construction Activity

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES

From

CONSTRUCTION ACTIVITY

Permit No. GP- 0-20-001

Issued Pursuant to Article 17, Titles 7, 8 and Article 70

of the Environmental Conservation Law

Effective Date: January 29, 2020

Expiration Date: January 28, 2025

John J. Ferguson

Chief Permit Administrator

Authorized Signature

1-23-20

Date

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

PREFACE

Pursuant to Section 402 of the Clean Water Act ("CWA"), stormwater *discharges* from certain *construction activities* are unlawful unless they are authorized by a *National Pollutant Discharge Elimination System ("NPDES")* permit or by a state permit program. New York administers the approved State Pollutant Discharge Elimination System (SPDES) program with permits issued in accordance with the New York State Environmental Conservation Law (ECL) Article 17, Titles 7, 8 and Article 70.

An *owner or operator* of a *construction activity* that is eligible for coverage under this permit must obtain coverage prior to the *commencement of construction activity*. Activities that fit the definition of "*construction activity*", as defined under 40 CFR 122.26(b)(14)(x), (15)(i), and (15)(ii), constitute construction of a *point source* and therefore, pursuant to ECL section 17-0505 and 17-0701, the *owner or operator* must have coverage under a SPDES permit prior to *commencing construction activity*. The *owner or operator* cannot wait until there is an actual *discharge* from the *construction site* to obtain permit coverage.

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

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

Table of Contents

Part 1. PERMIT COVERAGE AND LIMITATIONS

A. Permit Application

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

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

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

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

B. Effluent Limitations Applicable to Discharges from Construction Activities

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

1. Erosion and Sediment Control Requirements - The *owner or operator* must select, design, install, implement and maintain control measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. The selection, design, installation, implementation, and maintenance of these control measures must meet the non-numeric effluent limitations in Part I.B.1.(a) – (f) of this permit and be in accordance with the New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016, using sound engineering judgment. Where control measures are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must include in the *Stormwater Pollution Prevention Plan* (“SWPPP”) the reason(s) for the

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

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

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

(ii) Control stormwater *discharges*, including both peak flowrates and total stormwater volume, to *minimize* channel and *streambank* erosion and scour in the immediate vicinity of the *discharge* points;

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

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

(v) *Minimize* sediment *discharges* from the site;

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

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

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

(ix) *Minimize* dust. On areas of exposed soil, *minimize* dust through the appropriate application of water or other dust suppression techniques to control the generation of pollutants that could be discharged from the site.

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

c. **Dewatering**. *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, hazardous and toxic waste, and other materials present on the site to precipitation and to stormwater. Minimization of exposure is not required in cases where the exposure to precipitation and to stormwater will not result in a *discharge* of *pollutants*, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use) ; and

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

e. **Prohibited *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 discharges directly to tidal waters, or fifth order or larger streams.

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

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

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

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

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

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

(iii) Channel Protection Volume (Cpv): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:
(1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or
(2) The site *discharge*s directly to tidal waters, or fifth order or larger streams.

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

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

c. Sizing Criteria for Redevelopment Activity

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

(1) Reduce the existing *impervious cover* by a minimum of 25% of the total disturbed, *impervious area*. The Soil Restoration criteria in Section 5.1.6 of the Design Manual must be applied to all newly created pervious areas, or

(2) Capture and treat a minimum of 25% of the WQv from the disturbed, *impervious area* by the application of standard SMPs; or reduce 25% of the WQv from the disturbed, *impervious area* by the application of RR techniques or standard SMPs with RRv capacity., or

(3) Capture and treat a minimum of 75% of the WQv from the disturbed, *impervious area* as well as any additional runoff from tributary areas by application of the alternative practices discussed in Sections 9.3 and 9.4 of the Design Manual., or

(4) Application of a combination of 1, 2 and 3 above that provide a weighted average of at least two of the above methods. Application of this method shall be in accordance with the criteria in Section 9.2.1(B) (IV) of the Design Manual.

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

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

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

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

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

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

D. Maintaining Water Quality

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

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

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

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

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

If there is evidence indicating that despite compliance with the terms and conditions of this general permit it is demonstrated that the stormwater *discharge*s authorized by this permit are causing or contributing to a violation of *water quality standards*, or if the Department determines that a modification of the permit is necessary to prevent a violation of *water quality standards*, the authorized *discharge*s will no longer be eligible for coverage under this permit. The Department may require the *owner or operator* to obtain an individual SPDES permit to continue discharging.

E. Eligibility Under This General Permit

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

2. Except for non-stormwater *discharges* explicitly listed in the next paragraph, this permit only authorizes stormwater *discharge*s; including stormwater runoff, snowmelt runoff, and surface runoff and drainage, from *construction activities*.

3. Notwithstanding paragraphs E.1 and E.2 above, the following non-stormwater discharges are authorized by this permit: those listed in 6 NYCRR 750-1.2(a)(29)(vi), with the following exception: "Discharges from firefighting activities are authorized only when the firefighting activities are emergencies/unplanned"; waters to which other components have not been added that are used to control dust in accordance with the SWPPP; and uncontaminated *discharge*s from *construction site* de-watering operations. All non-stormwater discharges must be identified in the SWPPP. Under all circumstances, the *owner or operator* must still comply with *water quality standards* in Part I.D of this permit.

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

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

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

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

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

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

4. *Construction activities* or *discharges* from *construction activities* that may adversely affect an *endangered or threatened species* unless the *owner or*

operator has obtained a permit issued pursuant to 6 NYCRR Part 182 for the project or the Department has issued a letter of non-jurisdiction for the project. All documentation necessary to demonstrate eligibility shall be maintained on site in accordance with Part II.D.2 of this permit;

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

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

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

    b. Which are undertaken on land with no existing *impervious cover*; and

    c. Which disturb one (1) or more acres of land designated on the current United States Department of Agriculture ("USDA") Soil Survey as Soil Slope Phase "D", (provided the map unit name is inclusive of slopes greater than 25%), or Soil Slope Phase "E" or "F" (regardless of the map unit name), or a combination of the three designations.

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

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

    b. Which are undertaken on land with no existing *impervious cover*; and

    c. Which disturb two (2) or more acres of land designated on the current USDA Soil Survey as Soil Slope Phase "D" (provided the map unit name is inclusive of slopes greater than 25%), or Soil Slope Phase "E" or "F" (regardless of the map unit name), or a combination of the three designations.

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

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

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

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

   c. Documentation of satisfactory compliance with Section 106 of the National Historic Preservation Act for a coterminous project area:

(i) No Affect
(ii) No Adverse Affect
(iii) Executed Memorandum of Agreement, or

d. Documentation that:

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

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

Part II. PERMIT COVERAGE

A. How to Obtain Coverage

1. An *owner or operator* of a *construction activity* that is not subject to the requirements of a regulated, traditional land use control MS4 must first prepare a SWPPP in accordance with all applicable requirements of this permit and then submit a completed Notice of Intent (NOI) to the Department to be authorized to discharge under this permit.

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

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

B. Notice of Intent (NOI) Submittal

1. Prior to December 21, 2020, an owner or operator shall use either the electronic (eNOI) or paper version of the NOI that the Department prepared. Both versions of the NOI are located on the Department's website (http://www.dec.ny.gov/). The paper version of the NOI shall be signed in accordance with Part VII.H. of this permit and submitted to the following address:

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

2. Beginning December 21, 2020 and in accordance with EPA's 2015 NPDES Electronic Reporting Rule (40 CFR Part 127), the *owner or operator* must submit the NOI electronically using the *Department's* online NOI.

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

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

C. Permit Authorization

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

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

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

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

c. the final SWPPP has been prepared, and

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

3. An *owner or operator* that has satisfied the requirements of Part II.C.2 above will be authorized to *discharge* stormwater from their *construction activity* in accordance with the following schedule:

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

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

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

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

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

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

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

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

D. General Requirements For Owners or Operators With Permit Coverage

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

2. The *owner or operator* shall maintain a copy of the General Permit (GP-0-20-001), NOI, *NOI Acknowledgment Letter*, SWPPP, MS4 SWPPP Acceptance form, inspection reports, responsible contractor's or subcontractor's certification statement (see Part III.A.6.), and all documentation necessary to demonstrate eligibility with this permit at the *construction site* until all disturbed areas have achieved *final stabilization* and the NOT has been submitted to the Department. The documents must be maintained in a secure location, such as a job trailer, on-site construction office, or mailbox with lock. The secure location must be accessible during normal business hours to an individual performing a compliance inspection.

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

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

b. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016.

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

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

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

4. In accordance with statute, regulations, and the terms and conditions of this permit, the Department may suspend or revoke an *owner's or operator's* coverage under this permit at any time if the Department determines that the SWPPP does not meet the permit requirements or consistent with Part VII.K..

5. Upon a finding of significant non-compliance with the practices described in the SWPPP or violation of this permit, the Department may order an immediate stop to all activity at the site until the non-compliance is remedied. The stop work order shall be in writing, describe the non-compliance in detail, and be sent to the *owner or operator*.

6. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*, the *owner or operator* shall notify the

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

E. Permit Coverage for Discharges Authorized Under GP-0-15-002

1. Upon renewal of SPDES General Permit for Stormwater Discharges from *Construction Activity* (Permit No. GP-0-15-002), an *owner or operator* of *a construction activity* with coverage under GP-0-15-002, as of the effective date of GP- 0-20-001, shall be authorized to *discharge* in accordance with GP- 0-20-001, unless otherwise notified by the Department.

   An *owner or operator* may continue to implement the technical/design components of the post-construction stormwater management controls provided that such design was done in conformance with the technical standards in place at the time of initial project authorization. However, they must comply with the other, non-design provisions of GP-0-20-001.

F. Change of Owner or Operator

1. When property ownership changes or when there is a change in operational control over the construction plans and specifications, the original *owner or operator* must notify the new *owner or operator*, in writing, of the requirement to obtain permit coverage by submitting a NOI with the Department. For *construction activities* subject to the requirements of a *regulated, traditional land use control MS4,* the original *owner or operator* must also notify the MS4, in writing, of the change in ownership at least 30 calendar days prior to the change in ownership.

2. Once the new *owner or operator* obtains permit coverage, the original *owner or operator* shall then submit a completed NOT with the name and permit identification number of the new *owner or operator* to the Department at the address in Part II.B.1. of this permit. If the original *owner or operator* maintains ownership of a portion of the *construction activity* and will disturb soil, they must maintain their coverage under the permit.

3. Permit coverage for the new *owner or operator* will be effective as of the date the Department receives a complete NOI, provided the original *owner or*

operator was not subject to a sixty (60) business day authorization period that has not expired as of the date the Department receives the NOI from the new *owner or operator*.

Part III. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

A. General SWPPP Requirements

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

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

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

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

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

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

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

d. to document the final construction conditions.

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

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

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

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

the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater *discharge*s from *construction activities* and that it is unlawful for any person to cause or contribute to a violation of *water quality standards*. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations"

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

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

B. Required SWPPP Contents

1. Erosion and sediment control component - All SWPPPs prepared pursuant to this permit shall include erosion and sediment control practices designed in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016. Where erosion and sediment control practices are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must demonstrate *equivalence* to the technical standard. At a minimum, the erosion and sediment control component of the SWPPP shall include the following:

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

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

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

d. A construction phasing plan and sequence of operations describing the intended order of *construction activities*, including clearing and grubbing, excavation and grading, utility and infrastructure installation and any other activity at the site that results in soil disturbance;

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

f. A temporary and permanent soil stabilization plan that meets the requirements of this general permit and the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016, for each stage of the project, including initial land clearing and grubbing to project completion and achievement of *final stabilization*;

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

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

i. A maintenance inspection schedule for the contractor(s) identified in Part III.A.6. of this permit, to ensure continuous and effective operation of the erosion and sediment control practices. The maintenance inspection schedule shall be in accordance with the requirements in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016;

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

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

l. Identification of any elements of the design that are not in conformance with the design criteria in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016. Include the reason for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

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

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

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

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

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

c. A Stormwater Modeling and Analysis Report that includes:
   (i) Map(s) showing pre-development conditions, including watershed/subcatchments boundaries, flow paths/routing, and design points;

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

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

   (iv) Summary table, with supporting calculations, which demonstrates that each post-construction stormwater management practice has been designed in conformance with the *sizing criteria* included in the Design Manual;

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

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

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

e. Infiltration test results, when required; and

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

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

C. Required SWPPP Components by Project Type

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

Part IV. INSPECTION AND MAINTENANCE REQUIREMENTS

A. General Construction Site Inspection and Maintenance Requirements

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

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

B. Contractor Maintenance Inspection Requirements

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

begin implementing corrective actions within one business day and shall complete the corrective actions in a reasonable time frame.

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

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

C. Qualified Inspector Inspection Requirements

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

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

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

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

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

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

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

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

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

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

   b. For construction sites where soil disturbance activities are on-going and the *owner or operator* has received authorization in accordance with Part II.D.3 to disturb greater than five (5) acres of soil at any one time, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

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

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

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

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

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

a. Date and time of inspection;

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

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

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

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

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

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

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

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

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

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

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

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

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

Part V. TERMINATION OF PERMIT COVERAGE

A. Termination of Permit Coverage

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

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

   a. Total project completion - All *construction activity* identified in the SWPPP has been completed; 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; <u>and</u> all areas disturbed as of the project shutdown date have achieved *final stabilization*; <u>and</u> all temporary, structural erosion and sediment control measures have been removed; <u>and</u> all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational;

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

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

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

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

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

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

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

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

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

Part VI. REPORTING AND RETENTION RECORDS

A. Record Retention

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

B. Addresses

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

Part VII. STANDARD PERMIT CONDITIONS

A. Duty to Comply

The *owner or operator* must comply with all conditions of this permit. All contractors and subcontractors associated with the project must comply with the terms of the SWPPP. Any non-compliance with this permit constitutes a violation of the Clean Water

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

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

B. Continuation of the Expired General Permit

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

C. Enforcement

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

D. Need to Halt or Reduce Activity Not a Defense

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

E. Duty to Mitigate

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

F. Duty to Provide Information

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

G. Other Information

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

H. Signatory Requirements

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

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

(i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or

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

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

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

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

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

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

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

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

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

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

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

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

I. Property Rights

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

J. Severability

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

K. Requirement to Obtain Coverage Under an Alternative Permit

1. The Department may require any owner or operator authorized by this permit to apply for and/or obtain either an individual SPDES permit or another SPDES general permit. When the Department requires any discharger authorized by a general permit to apply for an individual SPDES permit, it shall notify the discharger in writing that a permit application is required. This notice shall

include a brief statement of the reasons for this decision, an application form, a statement setting a time frame for the owner or operator to file the application for an individual SPDES permit, and a deadline, not sooner than 180 days from owner or operator receipt of the notification letter, whereby the authorization to discharge under this general permit shall be terminated. Applications must be submitted to the appropriate Permit Administrator at the Regional Office. The Department may grant additional time upon demonstration, to the satisfaction of the Department, that additional time to apply for an alternative authorization is necessary or where the Department has not provided a permit determination in accordance with Part 621 of this Title.

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

L. Proper Operation and Maintenance

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

M. Inspection and Entry

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

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

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

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

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

N. Permit Actions

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

O. Definitions

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

P. Re-Opener Clause

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

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

Q. Penalties for Falsification of Forms and Reports

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

R. Other Permits

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

APPENDIX A – Acronyms and Definitions

Acronyms

APO – Agency Preservation Officer
BMP – Best Management Practice
CPESC – Certified Professional in Erosion and Sediment Control
Cpv – Channel Protection Volume
CWA – Clean Water Act (or the Federal Water Pollution Control Act, 33 U.S.C. §1251 et seq)
DOW – Division of Water
EAF – Environmental Assessment Form
ECL - Environmental Conservation Law
EPA – U. S. Environmental Protection Agency
HSG – Hydrologic Soil Group
MS4 – Municipal Separate Storm Sewer System
NOI – Notice of Intent
NOT – Notice of Termination
NPDES – National Pollutant Discharge Elimination System
OPRHP – Office of Parks, Recreation and Historic Places
Qf – Extreme Flood
Qp – Overbank Flood
RRv – Runoff Reduction Volume
RWE – Regional Water Engineer
SEQR – State Environmental Quality Review
SEQRA - State Environmental Quality Review Act
SHPA – State Historic Preservation Act
SPDES – State Pollutant Discharge Elimination System
SWPPP – Stormwater Pollution Prevention Plan
TMDL – Total Maximum Daily Load
UPA – Uniform Procedures Act
USDA – United States Department of Agriculture
WQv – Water Quality Volume

Definitions

All definitions in this section are solely for the purposes of this permit.

Agricultural Building – a structure designed and constructed to house farm implements, hay, grain, poultry, livestock or other horticultural products; excluding any structure designed, constructed or used, in whole or in part, for human habitation, as a place of employment where agricultural products are processed, treated or packaged, or as a place used by the public.

Agricultural Property –means the land for construction of a barn, *agricultural building*, silo, stockyard, pen or other structural practices identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State" prepared by the Department in cooperation with agencies of New York Nonpoint Source Coordinating Committee (dated June 2007).

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

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

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

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

Construction Site – means the land area where *construction activity(ies)* will occur. See definition for "*Commence (Commencement of) Construction Activities*" and "*Larger Common Plan of Development or Sale" also.*

Dewatering – means the act of draining rainwater and/or groundwater from building foundations, vaults or excavations/trenches.

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

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

Embankment –means an earthen or rock slope that supports a road/highway.

Endangered or Threatened Species – see 6 NYCRR Part 182 of the Department's rules and regulations for definition of terms and requirements.

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

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

Final Stabilization - means that all soil disturbance activities have ceased and a uniform, perennial vegetative cover with a density of eighty (80) percent over the entire pervious surface has been established; or other equivalent stabilization measures, such as permanent landscape mulches, rock rip-rap or washed/crushed stone have been applied on all disturbed areas that are not covered by permanent structures, concrete or pavement.

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

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

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

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

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

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

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

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

Municipal Separate Storm Sewer (MS4) - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

(i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to surface waters of the State;
(ii) Designed or used for collecting or conveying stormwater;
(iii) Which is not a *combined sewer*; and
(iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

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

Natural Buffer –means an undisturbed area with natural cover running along a surface water (e.g. wetland, stream, river, lake, etc.).

New Development – means any land disturbance that does not meet the definition of Redevelopment Activity included in this appendix.

New York State Erosion and Sediment Control Certificate Program – a certificate program that establishes and maintains a process to identify and recognize individuals who are capable of developing, designing, inspecting and maintaining erosion and sediment control plans on projects that disturb soils in New York State. The certificate program is administered by the New York State Conservation District Employees Association.

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

Nonpoint Source - means any source of water pollution or pollutants which is not a discrete conveyance or *point source* permitted pursuant to Title 7 or 8 of Article 17 of the Environmental Conservation Law (see ECL Section 17-1403).

Overbank –means flow events that exceed the capacity of the stream channel and spill out into the adjacent floodplain.

Owner or Operator - means the person, persons or legal entity which owns or leases the property on which the *construction activity* is occurring; an entity that has operational control over the construction plans and specifications, including the ability to make modifications to the plans and specifications; and/or an entity that has day-to-day operational control of those activities at a project that are necessary to ensure compliance with the permit conditions.

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

Point Source - means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, vessel or other floating craft, or landfill leachate collection system from which *pollutants* are or may be discharged.

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

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

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

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

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

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

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

Regulated, Traditional Land Use Control MS4 - means a city, town or village with land use control authority that is authorized to discharge under New York State DEC's

SPDES General Permit For Stormwater Discharges from Municipal Separate Stormwater Sewer Systems (MS4s) or the City of New York's Individual SPDES Permit for their Municipal Separate Storm Sewer Systems (NY-0287890).

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

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

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

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

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

Steep Slope – means land area designated on the current United States Department of Agriculture ("USDA") Soil Survey as Soil Slope Phase "D", (provided the map unit name is inclusive of slopes greater than 25%) , or Soil Slope Phase E or F, (regardless of the map unit name), or a combination of the three designations.

Streambank – as used in this permit, means the terrain alongside the bed of a creek or stream. The bank consists of the sides of the channel, between which the flow is confined.

Stormwater Pollution Prevention Plan (SWPPP) – means a project specific report, including construction drawings, that among other things: describes the construction activity(ies), identifies the potential sources of pollution at the *construction site*; describes and shows the stormwater controls that will be used to control the pollutants (i.e. erosion and sediment controls; for many projects, includes post-construction stormwater management controls); and identifies procedures the *owner or operator* will implement to comply with the terms and conditions of the permit. See Part III of the permit for a complete description of the information that must be included in the SWPPP.

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

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

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

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

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

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

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

Uniform Procedures Act (UPA) Permit - means a permit required under 6 NYCRR Part 621 of the Environmental Conservation Law (ECL), Article 70.

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

APPENDIX B – Required SWPPP Components by Project Type

Table 1
Construction Activities that Require the Preparation of a SWPPP That Only Includes Erosion and Sediment Controls

The following construction activities that involve soil disturbances of one (1) or more acres of land, but less than five (5) acres: • Single family home not located in one of the watersheds listed in Appendix C or not *directly discharging* to one of the 303(d) segments listed in Appendix E • Single family residential subdivisions with 25% or less impervious cover at total site build-out and not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E • Construction of a barn or other *agricultural building*, silo, stock yard or pen.
The following construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land: All construction activities located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.
The following construction activities that involve soil disturbances of one (1) or more acres of land: • Installation of underground, linear utilities; such as gas lines, fiber-optic cable, cable TV, electric, telephone, sewer mains, and water mains • Environmental enhancement projects, such as wetland mitigation projects, stormwater retrofits and stream restoration projects • Pond construction • Linear bike paths running through areas with vegetative cover, including bike paths surfaced with an impervious cover • Cross-country ski trails and walking/hiking trails • Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are not part of residential, commercial or institutional development; • Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that include incidental shoulder or curb work along an existing highway to support construction of the sidewalk, bike path or walking path. • Slope stabilization projects • Slope flattening that changes the grade of the site, but does not significantly change the runoff characteristics

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

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

- Spoil areas that will be covered with vegetation
- Vegetated open space projects (i.e. recreational parks, lawns, meadows, fields, downhill ski trails) excluding projects that *alter hydrology from pre to post development* conditions,
- Athletic fields (natural grass) that do not include the construction or reconstruction of *impervious area* 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 greater than five acres and construction activities that include the construction or reconstruction of impervious area
- Temporary access roads, median crossovers, detour roads, lanes, or other temporary impervious areas that will be restored to pre-construction conditions once the construction activity is complete

Table 2

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

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

- Single family home located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family home that disturbs five (5) or more acres of land
- Single family residential subdivisions located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions that involve soil disturbances of between one (1) and five (5) acres of land with greater than 25% impervious cover at total site build-out
- Single family residential subdivisions that involve soil disturbances of five (5) or more acres of land, and single family residential subdivisions that involve soil disturbances of less than five (5) acres that are part of a larger common plan of development or sale that will ultimately disturb five or more acres of land
- Multi-family residential developments; includes duplexes, townhomes, condominiums, senior housing complexes, apartment complexes, and mobile home parks
- Airports
- Amusement parks
- Breweries, cideries, and wineries, including establishments constructed on agricultural land
- Campgrounds
- Cemeteries that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Commercial developments
- Churches and other places of worship
- Construction of a barn or other *agricultural building* (e.g. silo) and structural practices as identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State" that include the construction or reconstruction of *impervious area*, excluding projects that involve soil disturbances of less than five acres.
- Golf courses
- Institutional development; includes hospitals, prisons, schools and colleges
- Industrial facilities; includes industrial parks
- Landfills
- Municipal facilities; includes highway garages, transfer stations, office buildings, POTW's, water treatment plants, and water storage tanks
- Office complexes
- Playgrounds that include the construction or reconstruction of impervious area
- Sports complexes
- Racetracks; includes racetracks with earthen (dirt) surface
- Road construction or reconstruction, including roads constructed as part of the construction activities listed in Table 1

Table 2 (Continued)

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

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

- Parking lot construction or reconstruction, including parking lots constructed as part of the construction activities listed in Table 1
- Athletic fields (natural grass) that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Athletic fields with artificial turf
- Permanent access roads, parking areas, substations, compressor stations and well drilling pads, surfaced with *impervious cover,* and constructed as part of an over-head electric transmission line project, wind-power project, cell tower project, oil or gas well drilling project, sewer or water main project or other linear utility project
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are part of a residential, commercial or institutional development
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are part of a highway construction or reconstruction project
- All other construction activities that include the construction or reconstruction of *impervious area* or *alter the hydrology from pre to post development* conditions, and are not listed in Table 1

APPENDIX C – Watersheds Requiring Enhanced Phosphorus Removal

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

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

Figure 1 - New York City Watershed East of the Hudson

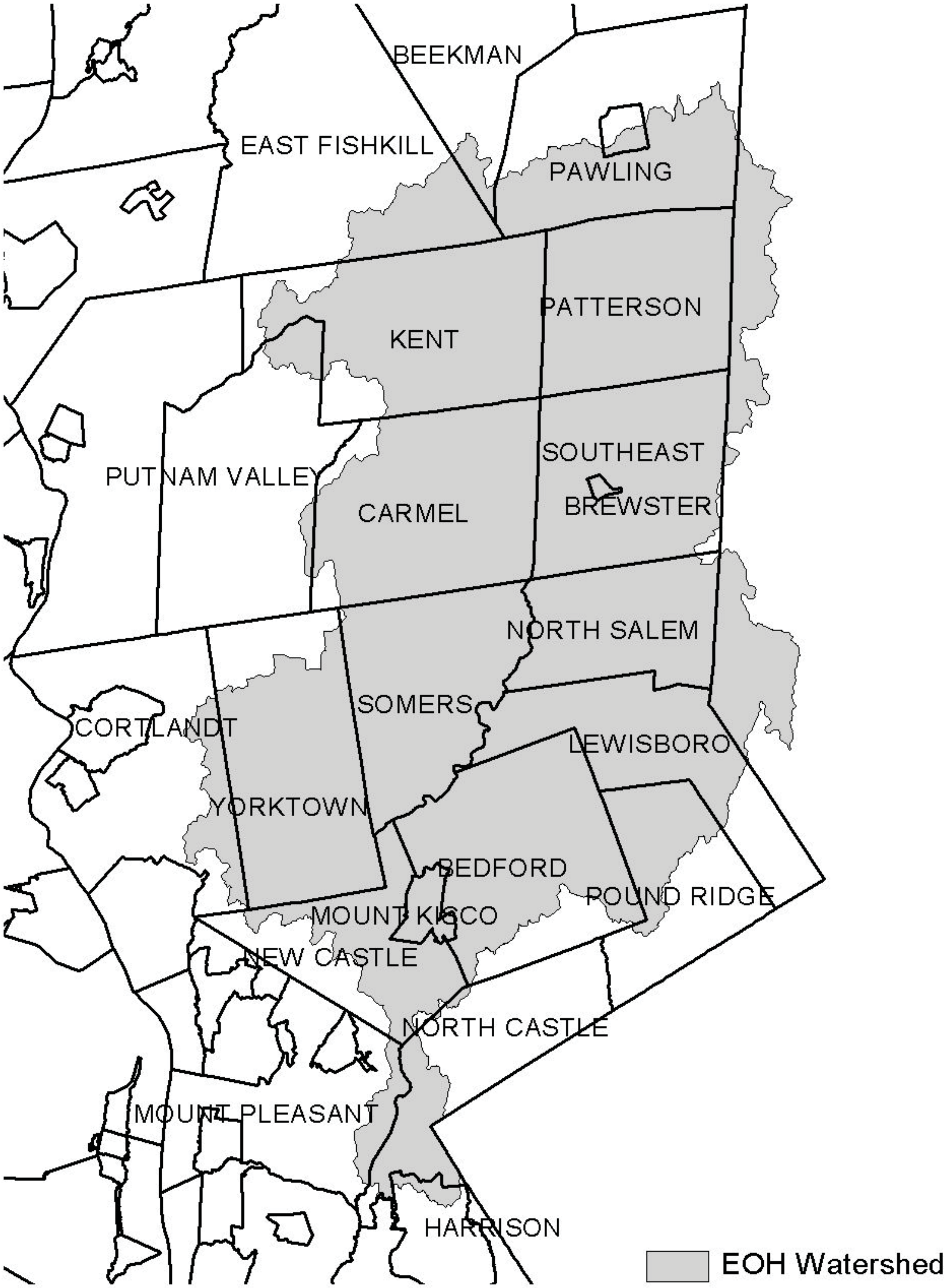


Figure 2 - Onondaga Lake Watershed

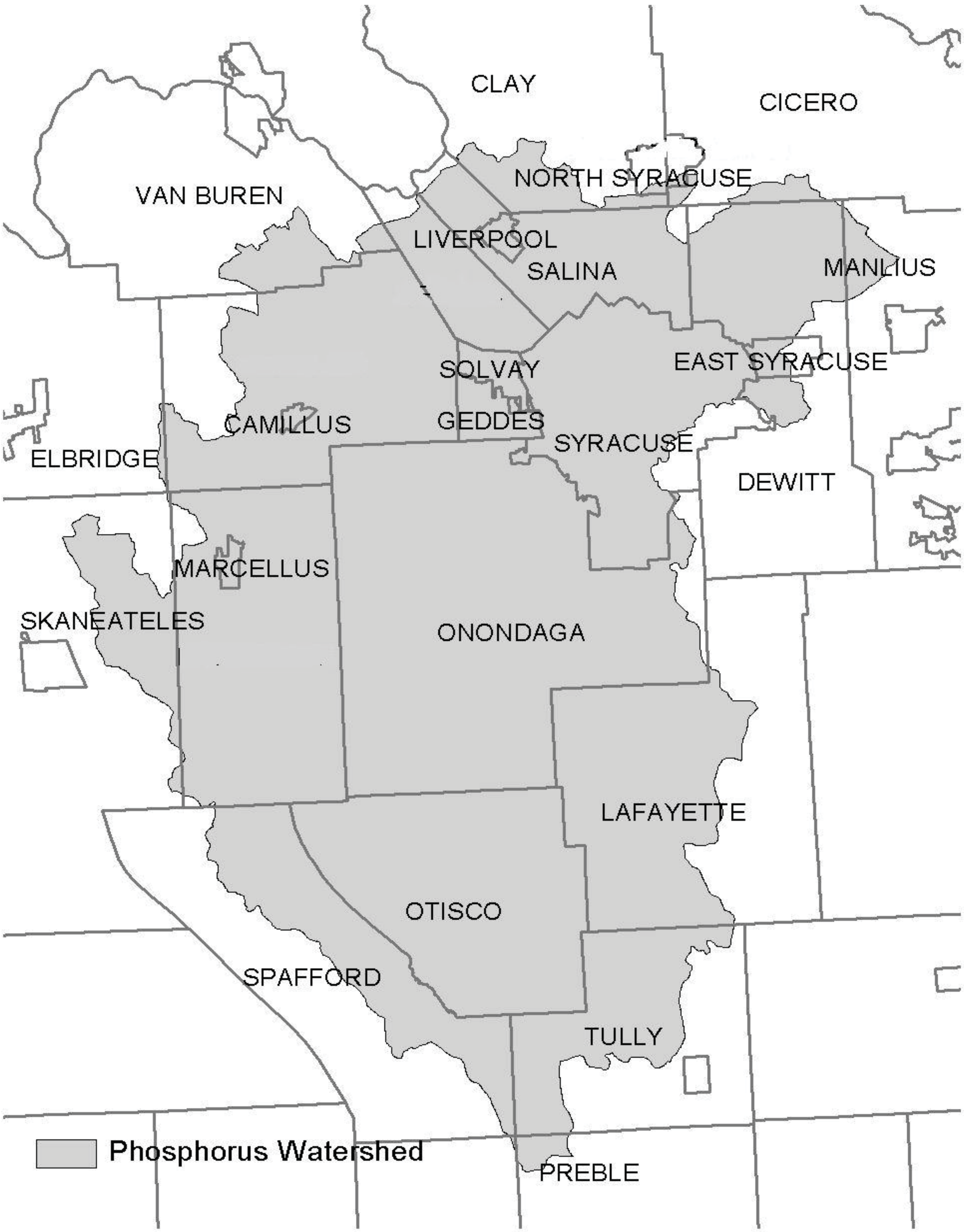


Figure 3 - Greenwood Lake Watershed

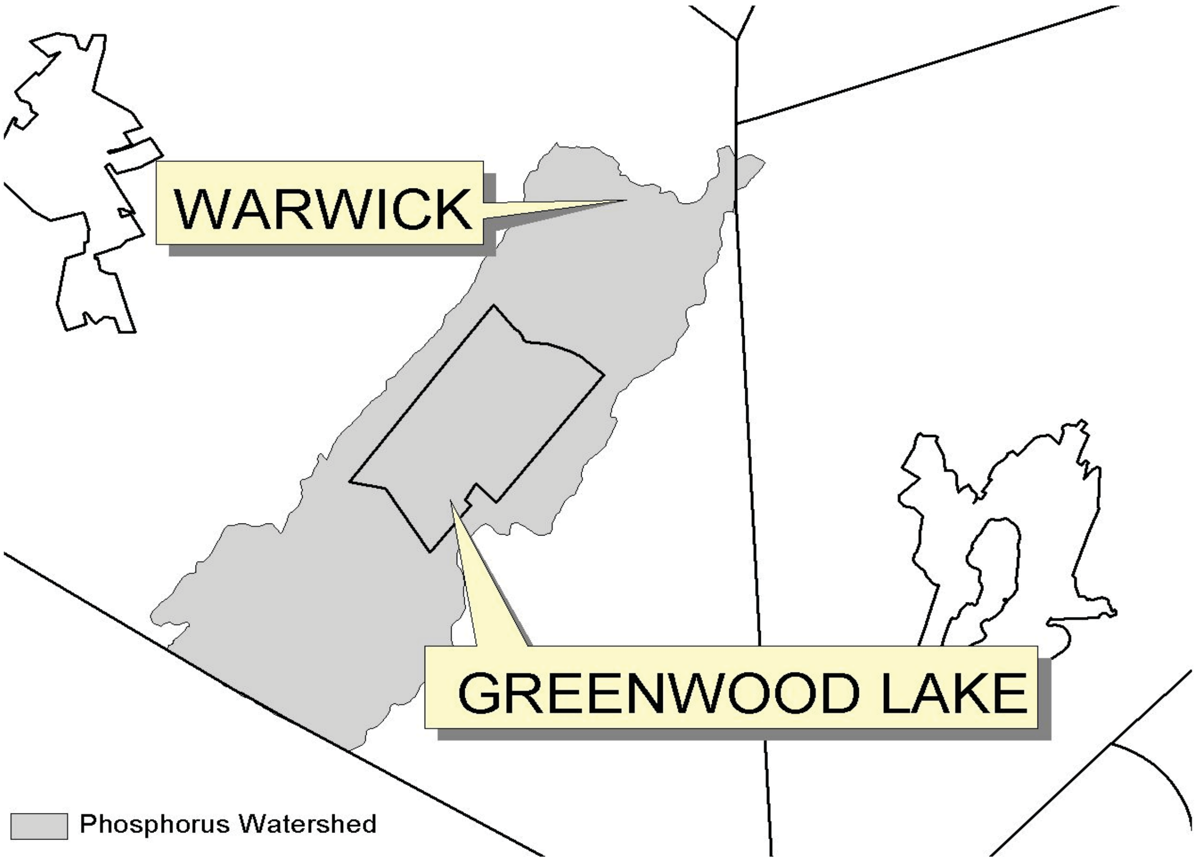


Figure 4 - Oscawana Lake Watershed

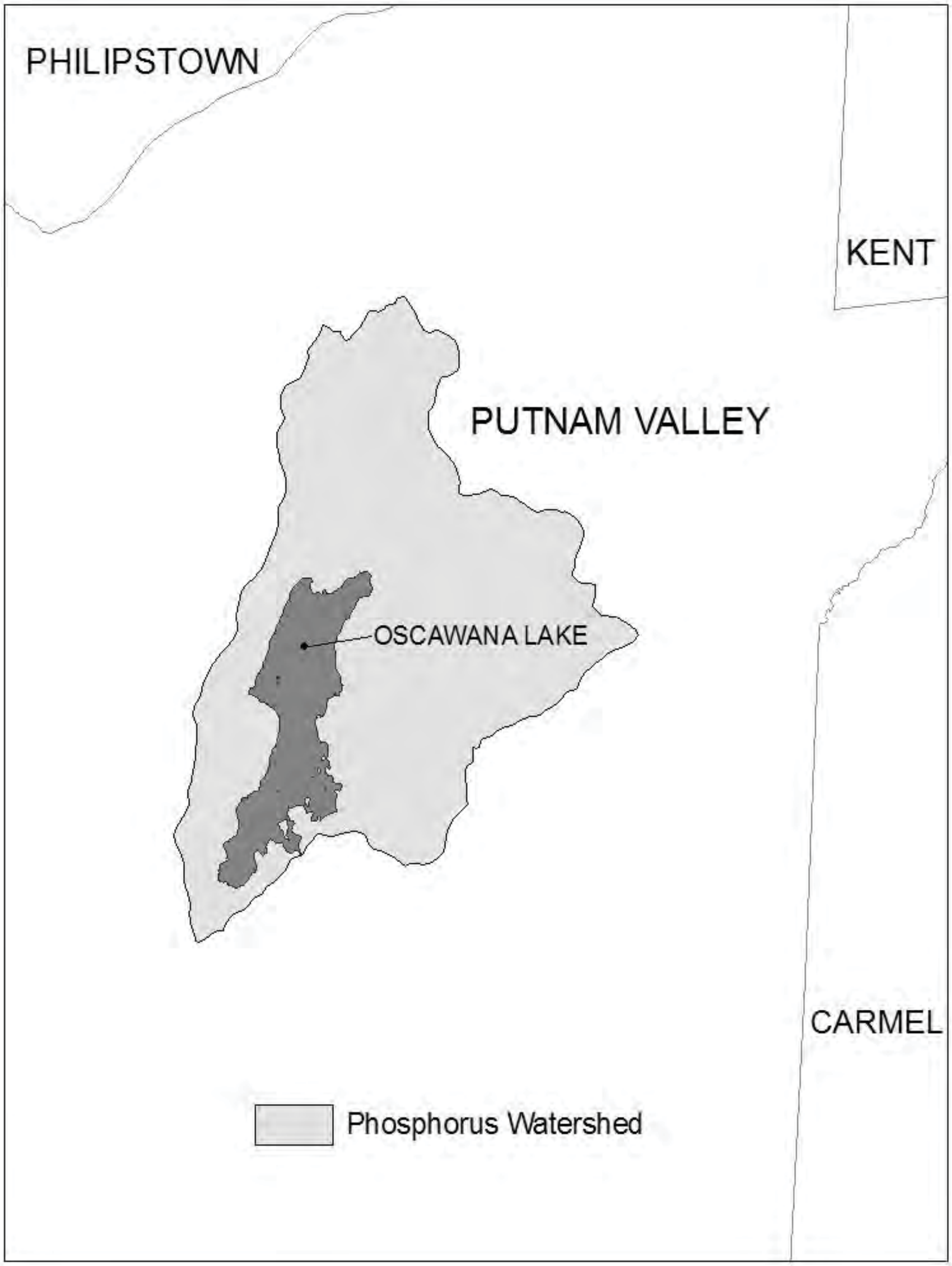
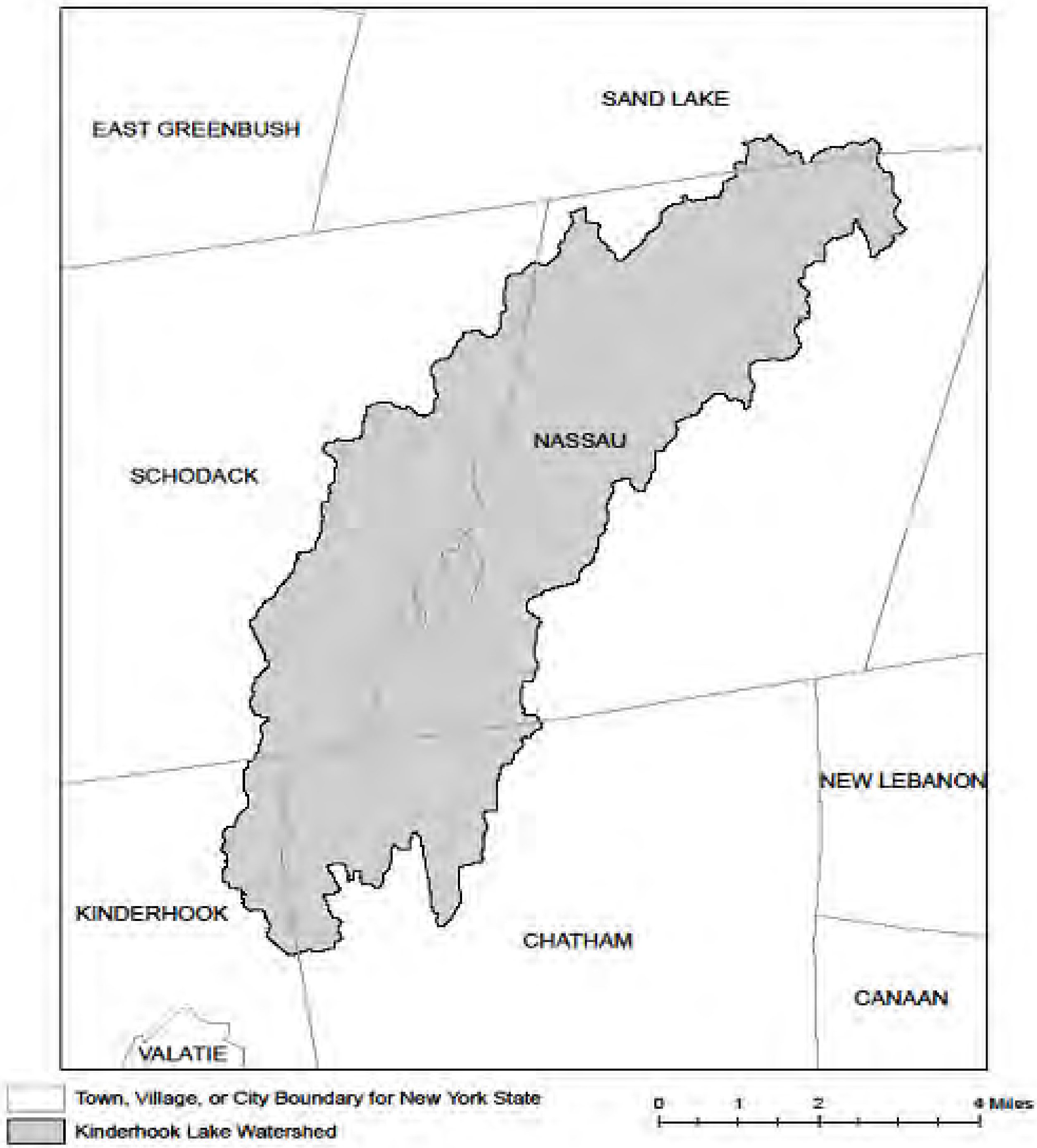


Figure 5 - Kinderhook Lake Watershed



APPENDIX D – Watersheds with Lower Disturbance Threshold

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

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

APPENDIX E – 303(d) Segments Impaired by Construction Related Pollutant(s)

List of 303(d) segments impaired by pollutants related to *construction activity* (e.g. silt, sediment or nutrients). The list was developed using "The Final New York State 2016 Section 303(d) List of Impaired Waters Requiring a TMDL/Other Strategy" dated November 2016. *Owners or operators* of single family home and single family residential subdivisions with 25% or less total impervious cover at total site build-out that involve soil disturbances of one or more acres of land, but less than 5 acres, and *directly discharge* to one of the listed segments below shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the New York State Stormwater Management Design Manual ("Design Manual"), dated January 2015.

COUNTY	WATERBODY	POLLUTANT
Albany	Ann Lee (Shakers) Pond, Stump Pond	Nutrients
Albany	Basic Creek Reservoir	Nutrients
Allegany	Amity Lake, Saunders Pond	Nutrients
Bronx	Long Island Sound, Bronx	Nutrients
Bronx	Van Cortlandt Lake	Nutrients
Broome	Fly Pond, Deer Lake, Sky Lake	Nutrients
Broome	Minor Tribs to Lower Susquehanna (north)	Nutrients
Broome	Whitney Point Lake/Reservoir	Nutrients
Cattaraugus	Allegheny River/Reservoir	Nutrients
Cattaraugus	Beaver (Alma) Lake	Nutrients
Cattaraugus	Case Lake	Nutrients
Cattaraugus	Linlyco/Club Pond	Nutrients
Cayuga	Duck Lake	Nutrients
Cayuga	Little Sodus Bay	Nutrients
Chautauqua	Bear Lake	Nutrients
Chautauqua	Chadakoin River and tribs	Nutrients
Chautauqua	Chautauqua Lake, North	Nutrients
Chautauqua	Chautauqua Lake, South	Nutrients
Chautauqua	Findley Lake	Nutrients
Chautauqua	Hulburt/Clymer Pond	Nutrients
Clinton	Great Chazy River, Lower, Main Stem	Silt/Sediment
Clinton	Lake Champlain, Main Lake, Middle	Nutrients
Clinton	Lake Champlain, Main Lake, North	Nutrients
Columbia	Kinderhook Lake	Nutrients
Columbia	Robinson Pond	Nutrients
Cortland	Dean Pond	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Dutchess	Fall Kill and tribs	Nutrients
Dutchess	Hillside Lake	Nutrients
Dutchess	Wappingers Lake	Nutrients
Dutchess	Wappingers Lake	Silt/Sediment
Erie	Beeman Creek and tribs	Nutrients
Erie	Ellicott Creek, Lower, and tribs	Silt/Sediment
Erie	Ellicott Creek, Lower, and tribs	Nutrients
Erie	Green Lake	Nutrients
Erie	Little Sister Creek, Lower, and tribs	Nutrients
Erie	Murder Creek, Lower, and tribs	Nutrients
Erie	Rush Creek and tribs	Nutrients
Erie	Scajaquada Creek, Lower, and tribs	Nutrients
Erie	Scajaquada Creek, Middle, and tribs	Nutrients
Erie	Scajaquada Creek, Upper, and tribs	Nutrients
Erie	South Branch Smoke Cr, Lower, and tribs	Silt/Sediment
Erie	South Branch Smoke Cr, Lower, and tribs	Nutrients
Essex	Lake Champlain, Main Lake, South	Nutrients
Essex	Lake Champlain, South Lake	Nutrients
Essex	Willsboro Bay	Nutrients
Genesee	Bigelow Creek and tribs	Nutrients
Genesee	Black Creek, Middle, and minor tribs	Nutrients
Genesee	Black Creek, Upper, and minor tribs	Nutrients
Genesee	Bowen Brook and tribs	Nutrients
Genesee	LeRoy Reservoir	Nutrients
Genesee	Oak Orchard Cr, Upper, and tribs	Nutrients
Genesee	Tonawanda Creek, Middle, Main Stem	Nutrients
Greene	Schoharie Reservoir	Silt/Sediment
Greene	Sleepy Hollow Lake	Silt/Sediment
Herkimer	Steele Creek tribs	Silt/Sediment
Herkimer	Steele Creek tribs	Nutrients
Jefferson	Moon Lake	Nutrients
Kings	Hendrix Creek	Nutrients
Kings	Prospect Park Lake	Nutrients
Lewis	Mill Creek/South Branch, and tribs	Nutrients
Livingston	Christie Creek and tribs	Nutrients
Livingston	Conesus Lake	Nutrients
Livingston	Mill Creek and minor tribs	Silt/Sediment
Monroe	Black Creek, Lower, and minor tribs	Nutrients
Monroe	Buck Pond	Nutrients
Monroe	Cranberry Pond	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Monroe	Lake Ontario Shoreline, Western	Nutrients
Monroe	Long Pond	Nutrients
Monroe	Mill Creek and tribs	Nutrients
Monroe	Mill Creek/Blue Pond Outlet and tribs	Nutrients
Monroe	Minor Tribs to Irondequoit Bay	Nutrients
Monroe	Rochester Embayment - East	Nutrients
Monroe	Rochester Embayment - West	Nutrients
Monroe	Shipbuilders Creek and tribs	Nutrients
Monroe	Thomas Creek/White Brook and tribs	Nutrients
Nassau	Beaver Lake	Nutrients
Nassau	Camaans Pond	Nutrients
Nassau	East Meadow Brook, Upper, and tribs	Silt/Sediment
Nassau	East Rockaway Channel	Nutrients
Nassau	Grant Park Pond	Nutrients
Nassau	Hempstead Bay	Nutrients
Nassau	Hempstead Lake	Nutrients
Nassau	Hewlett Bay	Nutrients
Nassau	Hog Island Channel	Nutrients
Nassau	Long Island Sound, Nassau County Waters	Nutrients
Nassau	Massapequa Creek and tribs	Nutrients
Nassau	Milburn/Parsonage Creeks, Upp, and tribs	Nutrients
Nassau	Reynolds Channel, west	Nutrients
Nassau	Tidal Tribs to Hempstead Bay	Nutrients
Nassau	Tribs (fresh) to East Bay	Nutrients
Nassau	Tribs (fresh) to East Bay	Silt/Sediment
Nassau	Tribs to Smith/Halls Ponds	Nutrients
Nassau	Woodmere Channel	Nutrients
New York	Harlem Meer	Nutrients
New York	The Lake in Central Park	Nutrients
Niagara	Bergholtz Creek and tribs	Nutrients
Niagara	Hyde Park Lake	Nutrients
Niagara	Lake Ontario Shoreline, Western	Nutrients
Niagara	Lake Ontario Shoreline, Western	Nutrients
Oneida	Ballou, Nail Creeks and tribs	Nutrients
Onondaga	Harbor Brook, Lower, and tribs	Nutrients
Onondaga	Ley Creek and tribs	Nutrients
Onondaga	Minor Tribs to Onondaga Lake	Nutrients
Onondaga	Ninemile Creek, Lower, and tribs	Nutrients
Onondaga	Onondaga Creek, Lower, and tribs	Nutrients
Onondaga	Onondaga Creek, Middle, and tribs	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Onondaga	Onondaga Lake, northern end	Nutrients
Onondaga	Onondaga Lake, southern end	Nutrients
Ontario	Great Brook and minor tribs	Silt/Sediment
Ontario	Great Brook and minor tribs	Nutrients
Ontario	Hemlock Lake Outlet and minor tribs	Nutrients
Ontario	Honeoye Lake	Nutrients
Orange	Greenwood Lake	Nutrients
Orange	Monhagen Brook and tribs	Nutrients
Orange	Orange Lake	Nutrients
Orleans	Lake Ontario Shoreline, Western	Nutrients
Orleans	Lake Ontario Shoreline, Western	Nutrients
Oswego	Lake Neatahwanta	Nutrients
Oswego	Pleasant Lake	Nutrients
Putnam	Bog Brook Reservoir	Nutrients
Putnam	Boyd Corners Reservoir	Nutrients
Putnam	Croton Falls Reservoir	Nutrients
Putnam	Diverting Reservoir	Nutrients
Putnam	East Branch Reservoir	Nutrients
Putnam	Lake Carmel	Nutrients
Putnam	Middle Branch Reservoir	Nutrients
Putnam	Oscawana Lake	Nutrients
Putnam	Palmer Lake	Nutrients
Putnam	West Branch Reservoir	Nutrients
Queens	Bergen Basin	Nutrients
Queens	Flushing Creek/Bay	Nutrients
Queens	Jamaica Bay, Eastern, and tribs (Queens)	Nutrients
Queens	Kissena Lake	Nutrients
Queens	Meadow Lake	Nutrients
Queens	Willow Lake	Nutrients
Rensselaer	Nassau Lake	Nutrients
Rensselaer	Snyders Lake	Nutrients
Richmond	Grasmere Lake/Bradys Pond	Nutrients
Rockland	Congers Lake, Swartout Lake	Nutrients
Rockland	Rockland Lake	Nutrients
Saratoga	Ballston Lake	Nutrients
Saratoga	Dwaas Kill and tribs	Silt/Sediment
Saratoga	Dwaas Kill and tribs	Nutrients
Saratoga	Lake Lonely	Nutrients
Saratoga	Round Lake	Nutrients
Saratoga	Tribs to Lake Lonely	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Schenectady	Collins Lake	Nutrients
Schenectady	Duane Lake	Nutrients
Schenectady	Mariaville Lake	Nutrients
Schoharie	Engleville Pond	Nutrients
Schoharie	Summit Lake	Nutrients
Seneca	Reeder Creek and tribs	Nutrients
St.Lawrence	Black Lake Outlet/Black Lake	Nutrients
St.Lawrence	Fish Creek and minor tribs	Nutrients
Steuben	Smith Pond	Nutrients
Suffolk	Agawam Lake	Nutrients
Suffolk	Big/Little Fresh Ponds	Nutrients
Suffolk	Canaan Lake	Silt/Sediment
Suffolk	Canaan Lake	Nutrients
Suffolk	Flanders Bay, West/Lower Sawmill Creek	Nutrients
Suffolk	Fresh Pond	Nutrients
Suffolk	Great South Bay, East	Nutrients
Suffolk	Great South Bay, Middle	Nutrients
Suffolk	Great South Bay, West	Nutrients
Suffolk	Lake Ronkonkoma	Nutrients
Suffolk	Long Island Sound, Suffolk County, West	Nutrients
Suffolk	Mattituck (Marratooka) Pond	Nutrients
Suffolk	Meetinghouse/Terrys Creeks and tribs	Nutrients
Suffolk	Mill and Seven Ponds	Nutrients
Suffolk	Millers Pond	Nutrients
Suffolk	Moriches Bay, East	Nutrients
Suffolk	Moriches Bay, West	Nutrients
Suffolk	Peconic River, Lower, and tidal tribs	Nutrients
Suffolk	Quantuck Bay	Nutrients
Suffolk	Shinnecock Bay and Inlet	Nutrients
Suffolk	Tidal tribs to West Moriches Bay	Nutrients
Sullivan	Bodine, Montgomery Lakes	Nutrients
Sullivan	Davies Lake	Nutrients
Sullivan	Evens Lake	Nutrients
Sullivan	Pleasure Lake	Nutrients
Tompkins	Cayuga Lake, Southern End	Nutrients
Tompkins	Cayuga Lake, Southern End	Silt/Sediment
Tompkins	Owasco Inlet, Upper, and tribs	Nutrients
Ulster	Ashokan Reservoir	Silt/Sediment
Ulster	Esopus Creek, Upper, and minor tribs	Silt/Sediment
Warren	Hague Brook and tribs	Silt/Sediment

303(d) Segments Impaired by Construction Related Pollutant(s)

Warren	Huddle/Finkle Brooks and tribs	Silt/Sediment
Warren	Indian Brook and tribs	Silt/Sediment
Warren	Lake George	Silt/Sediment
Warren	Tribs to L.George, Village of L George	Silt/Sediment
Washington	Cossayuna Lake	Nutrients
Washington	Lake Champlain, South Bay	Nutrients
Washington	Tribs to L.George, East Shore	Silt/Sediment
Washington	Wood Cr/Champlain Canal and minor tribs	Nutrients
Wayne	Port Bay	Nutrients
Westchester	Amawalk Reservoir	Nutrients
Westchester	Blind Brook, Upper, and tribs	Silt/Sediment
Westchester	Cross River Reservoir	Nutrients
Westchester	Lake Katonah	Nutrients
Westchester	Lake Lincolndale	Nutrients
Westchester	Lake Meahagh	Nutrients
Westchester	Lake Mohegan	Nutrients
Westchester	Lake Shenorock	Nutrients
Westchester	Long Island Sound, Westchester (East)	Nutrients
Westchester	Mamaroneck River, Lower	Silt/Sediment
Westchester	Mamaroneck River, Upper, and minor tribs	Silt/Sediment
Westchester	Muscoot/Upper New Croton Reservoir	Nutrients
Westchester	New Croton Reservoir	Nutrients
Westchester	Peach Lake	Nutrients
Westchester	Reservoir No.1 (Lake Isle)	Nutrients
Westchester	Saw Mill River, Lower, and tribs	Nutrients
Westchester	Saw Mill River, Middle, and tribs	Nutrients
Westchester	Sheldrake River and tribs	Silt/Sediment
Westchester	Sheldrake River and tribs	Nutrients
Westchester	Silver Lake	Nutrients
Westchester	Teatown Lake	Nutrients
Westchester	Titicus Reservoir	Nutrients
Westchester	Truesdale Lake	Nutrients
Westchester	Wallace Pond	Nutrients
Wyoming	Java Lake	Nutrients
Wyoming	Silver Lake	Nutrients

APPENDIX F – List of NYS DEC Regional Offices

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

Attachment 3

EnSol, Inc.

ENGINEERING + ENVIRONMENTAL

Miscellaneous Forms

NOI for coverage under Stormwater General Permit for Construction Activity

version 1.40

(Submission #: HQ9-NNK5-RJABV, version 1)

Details

Originally Started By	David Lenox
Alternate Identifier	Dom-Mar Recycling and Transfer Facility
Submission ID	HQ9-NNK5-RJABV
Submission Reason	New
Status	Draft

Form Input

Owner/Operator Information

Owner/Operator Name (Company/Private Owner/Municipality/Agency/Institution, etc.)
DOM KAM LLC

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

Owner/Operator Contact Person First Name
Michael

Owner/Operator Mailing Address
366 Highland Ave. Ext.

City
Middletown

State
New York

Zip
10940

Phone
845-343-5566

Email
mikemarangi@aol.com

Federal Tax ID
86-2134170

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

Project Location

Project/Site Name
Dom-Mar Recycling and Transfer Facility

Street Address (Not P.O. Box)
1118 Dolsontown Road

Side of Street
South

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

State
NY

Zip
10940

DEC Region
3

> The DEC Region must be provided. Please use the NYSDEC Stormwater Interactive Map (https://gisservices.dec.ny.gov/gis/stormwater/) to confirm which DEC Region this site is located in. To view the DEC Regions, click on "Other Useful Reference Layers" on the left side of the map, then click on "DEC Administrative Boundary." Zoom out as needed to see the Region boundaries.
> For projects that span multiple Regions, please select a primary Region and then provide the additional Regions as a note in Question 39.

County
ORANGE

Name of Nearest Cross Street
MCVEIGH Road

Distance to Nearest Cross Street (Feet)
1970

Project In Relation to Cross Street
West

Tax Map Numbers Section-Block-Parcel
6-1-3.31 and 6-1-3.32

Tax Map Numbers
NONE PROVIDED

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

1. Coordinates

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

Navigate to your location and click on the map to get the X,Y coordinates
41.42257225101493,-74.41673586704768

Project Details

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

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

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

Pre-Development Existing Landuse
Pasture/Open Land

Post-Development Future Land Use
Industrial

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

---

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

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

Total Site Area (acres)
44.3

Total Area to be Disturbed (acres)
9.6

Existing Impervious Area to be Disturbed (acres)
0.3

Future Impervious Area Within Disturbed Area (acres)
5.5

5. Do you plan to disturb more than 5 acres of soil at any one time?
Yes

---

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

A (%)
0

B (%)
0

C (%)
0

D (%)
100

7. Is this a phased project?
No

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

Start Date
06/01/2025

End Date
06/01/2025

9. Identify the nearest surface waterbody(ies) to which construction site runoff will discharge.
Wetlands adjacent to Monhagen Brook and tributary to Monhagen Brook

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

9a. Type of waterbody identified in question 9?
Wetland/Federal Jurisdiction On Site (Answer 9b)

Other Waterbody Type Off Site Description
NONE PROVIDED

9b. If "wetland" was selected in 9A, how was the wetland identified?
Delineated by Consultant

10. Has the surface waterbody(ies) in question 9 been identified as a 303(d) segment in Appendix E of GP-0-20-001?
Yes

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

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

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

If No, skip question 13.

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

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

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

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

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

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

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

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

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

Required SWPPP Components

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

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

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

23. Has the post-construction stormwater management practice component of the SWPPP been developed in conformance with the 2015 or 2024 NYS Stormwater Management Design Manual?
Yes

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

SWPPP Preparer
EnSol Inc.

Contact Name (Last, First)
Lenox, David

Mailing Address
3000 Alt Blvd.

City
Grand

State
New York

Zip
14072

Phone
716-285-3920

Email
dlenox@ensolinc.com

Download SWPPP Preparer Certification Form

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

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

Download SWPPP Preparer Certification Form

Please upload the SWPPP Preparer Certification

SWPPP Preparer Certification Form.pdf - 01/15/2025 05:31 PM

Comment

NONE PROVIDED

Erosion & Sediment Control Criteria

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

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

Temporary Structural
Check Dams
Sediment Basin
Stabilized Construction Entrance
Silt Fence
Storm Drain Inlet Protection
Perimeter Dike/Swale
Dust Control

Biotechnical
None

Vegetative Measures
Grassed Waterway
Mulching
Protecting Vegetation
Seeding
Topsoiling

Permanent Structural
Land Grading
Rock Outlet Protection
Riprap Slope Protection

Other
NONE PROVIDED

Post-Construction Criteria

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

27. Identify all site planning practices that were used to prepare the final site plan/layout for the project.
Preservation of Undisturbed Area
Reduction of Clearing and Grading
Roadway Reduction
Sidewalk Reduction
Driveway 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.
All disturbed areas will be restored in accordance with the Soil Restoration requirements in Table 5.3 of the Design Manual (see page 5-22).

28. Provide the total Water Quality Volume (WQv) required for this project (based on final site plan/layout). (Acre-feet)
1.489

29. Post-construction SMP Identification

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

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

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

30. Indicate the Total RRv provided by the RR techniques (Area/Volume Reduction) and Standard SMPs with RRv capacity identified in question 29. (acre-feet)
.229

31. Is the Total RRv provided (#30) greater than or equal to the total WQv required (#28)?
No

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

32. Provide the Minimum RRv required based on HSG. [Minimum RRv Required = (P) (0.95) (Ai) / 12, Ai=(s) (Aic)] (acre-feet)
.229

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

If Yes, go to question 33.

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

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

33. SMPs

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

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

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

33a. Indicate the Total WQv provided (i.e. WQv treated) by the SMPs identified in question #33 and Standard SMPs with RRv Capacity identified in question #29. (acre-feet)
1.3

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

34. Provide the sum of the Total RRv provided (#30) and the WQv provided (#33a).
1.529

35. Is the sum of the RRv provided (#30) and the WQv provided (#33a) greater than or equal to the total WQv required (#28)?
Yes

If Yes, go to question 36.

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

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

CPv Required (acre-feet)
0.611

CPv Provided (acre-feet)
1.04

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

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

Overbank Flood Control Criteria (Qp)

Pre-Development (CFS)
31.6

Post-Development (CFS)
16.86

Total Extreme Flood Control Criteria (Qf)

Pre-Development (CFS)
68.98

Post-Development (CFS)
51.04

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

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

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

39. Use this space to summarize the specific site limitations and justification for not reducing 100% of WQv required (#28). (See question #32a) This space can also be used for other pertinent project information.
The total WQv could not be reduced due to poorly draining site soils and high-water table.

Post-Construction SMP Identification

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

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

RR Techniques (Area Reduction)

Round to the nearest tenth

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

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

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

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

Total Contributing Acres for Tree Planting/Tree Pit (RR-3)
NONE PROVIDED

Total Contributing Impervious Acres for Tree Planting/Tree Pit (RR-3)
NONE PROVIDED

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

RR Techniques (Volume Reduction)

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

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

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

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

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

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

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

Standard SMPs with RRv Capacity

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

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

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

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

Total Contributing Impervious Acres for Bioretention (F-5)
0.82

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

Standard SMPs

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

Total Contributing Impervious Acres for Wet Pond (P-2)
5.64

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

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

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

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

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

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

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

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

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

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

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

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

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

Total Contributing Impervious Area for Hydrodynamic
NONE PROVIDED

Total Contributing Impervious Area for Wet Vault
NONE PROVIDED

Total Contributing Impervious Area for Media Filter
NONE PROVIDED

"Other" Alternative SMP?
NONE PROVIDED

Total Contributing Impervious Area for "Other"
NONE PROVIDED

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

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

Manufacturer of Alternative SMP
NONE PROVIDED

Name of Alternative SMP
NONE PROVIDED

Other Permits

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

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

If Other, then identify
NONE PROVIDED

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

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

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

MS4 SWPPP Acceptance

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

If No, skip question 44

44. Has the "MS4 SWPPP Acceptance" form been signed by the principal executive officer or ranking elected official and submitted along with this NOI?
NONE PROVIDED

MS4 SWPPP Acceptance Form Download

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

MS4 Acceptance Form Upload
NONE PROVIDED
Comment
NONE PROVIDED

Owner/Operator Certification

Owner/Operator Certification Form Download

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

Upload Owner/Operator Certification Form
NONE PROVIDED
Comment
NONE PROVIDED

Attachments

Date	Attachment Name	Context	User
1/15/2025 5:31 PM	SWPPP Preparer Certification Form.pdf	Attachment	David Lenox

CONR 8
(03/14)

SPDES STORMWATER POLLUTION PREVENTION PLAN (SWPPP) REVISION

JOB STAMP

Date: ______________________

Day of Week: S M T W T F S

Sheet No. ____ of ____

This form is to be used when revisions to the current Stormwater Pollution Prevention Plan (SWPPP) are required by SPDES General Permit for Stormwater Discharges from Construction Activity. The completed form must be filed in the Engineer's Field Office.

Reason for the Revision(s): Revision(s) were requested by NYSDEC: ☐ Yes ☐ No

Describe the Revision(s) to the SWPPP:

Engineer-in-Charge Signature: ______________________

EICs Name & Title: ______________________

Date Completed: ______________ Copy to Contractor: ______________

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 and all post-construction stormwater management practices identified in the SWPPP are maintained in effective operating condition at all times.

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. Owner or Operator Maintenance Inspection Requirements

1. The ***owner or operator*** shall inspect, in accordance with the requirements in the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, the erosion and sediment controls identified in the SWPPP to ensure that they are being maintained in effective operating condition at all times.

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 ***owner or operator*** can stop conducting the maintenance inspections. The ***owner or operator*** shall begin conducting the maintenance inspections in accordance with Part IV.B.1. as soon as soil disturbance activities resume.

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

C. Qualified Inspector Inspection Requirements

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

[Note: The ***trained contractor*** identified in Part III.A.6. **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 (5000) 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 Regional Office stormwater contact person (see contact information in Appendix A) or, in areas under the jurisdiction of a regulated, traditional land use control MS4, the MS4 (provided the 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 Regional Office stormwater contact person (see contact information in Appendix A) or, in areas under the jurisdiction of a regulated, traditional land use control MS4, the MS4 (provided the 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 postconstruction 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.

3. At a minimum, the ***qualified inspector*** shall inspect all erosion and sediment control practices 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 that need repair or maintenance;

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

h. Description and sketch of areas that are disturbed at the time of the inspection and areas that have been stabilized (temporary and/or final) since the last inspection;

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 to correct deficiencies identified with the construction of the post-construction stormwater management practice(s); and

k. 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 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., the inspection reports shall be maintained on site with the SWPPP.

Stormwater Pond/Wetland Operation, Maintenance and Management Inspection Checklist

Project ______________________________
Location: ______________________________
Site Status: ______________________________

Date: ______________________________
Time: ______________________________

Inspector: ______________________________

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
1. Embankment and emergency spillway (Annual, After Major Storms)		
1. Vegetation and ground cover adequate		
2. Embankment erosion		
3. Animal burrows		
4. Unauthorized planting		
5. Cracking, bulging, or sliding of dam		
a. Upstream face		
b. Downstream face		
c. At or beyond toe		
downstream		
upstream		
d. Emergency spillway		
6.Pond, toe & chimney drains clear and functioning		
7.Seeps/leaks on downstream face		
8.Slope protection or riprap failure		
9. Vertical/horizontal alignment of top of dam "As-Built"		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
10. Emergency spillway clear of obstructions and debris		
11. Other (specify)		
2. Riser and principal spillway (Annual)		
Type: Reinforced concrete _____ Corrugated pipe _____ Masonry _____ 1. Low flow orifice obstructed		
2. Low flow trash rack. a. Debris removal necessary		
b. Corrosion control		
3. Weir trash rack maintenance a. Debris removal necessary		
b. corrosion control		
4. Excessive sediment accumulation insider riser		
5. Concrete/masonry condition riser and barrels a. cracks or displacement		
b. Minor spalling (<1")		
c. Major spalling (rebars exposed)		
d. Joint failures		
e. Water tightness		
6. Metal pipe condition		
7. Control valve a. Operational/exercised		
b. Chained and locked		
8. Pond drain valve a. Operational/exercised		
b. Chained and locked		
9. Outfall channels functioning		
10. Other (specify)		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
3. Permanent Pool (Wet Ponds) (monthly)		
1. Undesirable vegetative growth		
2. Floating or floatable debris removal required		
3. Visible pollution		
4. Shoreline problem		
5. Other (specify)		
4. Sediment Forebays		
1.Sedimentation noted		
2. Sediment cleanout when depth < 50% design depth		
5. Dry Pond Areas		
1. Vegetation adequate		
2. Undesirable vegetative growth		
3. Undesirable woody vegetation		
4. Low flow channels clear of obstructions		
5. Standing water or wet spots		
6. Sediment and / or trash accumulation		
7. Other (specify)		
6. Condition of Outfalls (Annual , After Major Storms)		
1. Riprap failures		
2. Slope erosion		
3. Storm drain pipes		
4.Endwalls / Headwalls		
5. Other (specify)		
7. Other (Monthly)		
1. Encroachment on pond, wetland or easement area		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
2. Complaints from residents		
3.Aesthetics a. Grass growing required		
b. Graffiti removal needed		
c. Other (specify)		
4. Conditions of maintenance access routes.		
5. Signs of hydrocarbon build-up		
6. Any public hazards (specify)		
8. Wetland Vegetation (Annual)		
1. Vegetation healthy and growing Wetland maintaining 50% surface area coverage of wetland plants after the second growing season. (If unsatisfactory, reinforcement plantings needed)		
2. Dominant wetland plants: Survival of desired wetland plant species Distribution according to landscaping plan?		
3. Evidence of invasive species		
4. Maintenance of adequate water depths for desired wetland plant species		
5. Harvesting of emergent plantings needed		
6. Have sediment accumulations reduced pool volume significantly or are plants "choked" with sediment		
7. Eutrophication level of the wetland.		
8. Other (specify)		

Comments:

Actions to be Taken:

Open Channel Operation, Maintenance, and Management Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

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

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

Comments:

Actions to be Taken:

Bioretention Operation, Maintenance and Management Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
1. Debris Cleanout (Monthly)		
Bioretention and contributing areas clean of debris		
No dumping of yard wastes into practice		
Litter (branches, etc.) have been removed		
2. Vegetation (Monthly)		
Plant height not less than design water depth		
Fertilized per specifications		
Plant composition according to approved plans		
No placement of inappropriate plants		
Grass height not greater than 6 inches		
No evidence of erosion		
3. Check Dams/Energy Dissipaters/Sumps (Annual, After Major Storms)		
No evidence of sediment buildup		

Maintenance Item	Satisfactory / Unsatisfactory	Comments
Sumps should not be more than 50% full of sediment		
No evidence of erosion at downstream toe of drop structure		
4. Dewatering (Monthly)		
Dewaters between storms		
No evidence of standing water		
5. Sediment Deposition (Annual)		
Swale clean of sediments		
Sediments should not be > 20% of swale design depth		
6. Outlet/Overflow Spillway (Annual, After Major Storms)		
Good condition, no need for repair		
No evidence of erosion		
No evidence of any blockages		
7. Integrity of Filter Bed (Annual)		
Filter bed has not been blocked or filled inappropriately		

Comments:

Actions to be Taken:

Contractor Certification

DOM-MAR TRANSFER AND RECYCLING FACILITY
1128 Dolsontown Road
Town of Wawayanda, Orange County, New York

"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 storm water discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations"

____
Signature Date

____
Name

____
Title

Contracting Firm Information

____
Name

____
Address

____
Telephone

____
Trained Contractor

The named Contractor is responsible for the ALL SWPPP elements, including inspections by a Qualified Inspector.

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

MS4 Stormwater Pollution Prevention Plan (SWPPP) Acceptance Form

for

Construction Activities Seeking Authorization Under SPDES General Permit

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

I. Project Owner/Operator Information	
1. Owner/Operator Name:	
2. Contact Person:	
3. Street Address:	
4. City/State/Zip:	
II. Project Site Information	
5. Project/Site Name:	
6. Street Address:	
7. City/State/Zip:	WAWAYANDA / NY / 10940
III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance Information	
8. SWPPP Reviewed by:	
9. Title/Position:	
10. Date Final SWPPP Reviewed and Accepted:	
IV. Regulated MS4 Information	
11. Name of MS4:	
12. MS4 SPDES Permit Identification Number: NYR20A	
13. Contact Person:	
14. Street Address:	
15. City/State/Zip:	
16. Telephone Number:	

MS4 SWPPP Acceptance Form - continued

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

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

Printed Name:

Title/Position:

Signature:

Date:

VI. Additional Information

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

EnSol, Inc.
661 Main St.
Niagara Falls, NY 14301
716.285.3920

ENGINEERING +
ENVIRONMENTAL

ensolinc.com

Transmitted Via Electronic Mail

January 15, 2025

Mr. Charles White
Stormwater Management Officer
80 Ridgebury Hill Road
Slate Hill, NY 10940

Re: 5-Acre Disturbance Waiver
Dom-Mar Transfer and Recycling Facility
Dolsontown Road
Wawayanda, New York 10940

Dear Mr. White:

On behalf of DOM KAM LLC., EnSol, Inc. (EnSol) has prepared this letter to summarize construction activities for the proposed Dom-Mar Transfer and Recycling Facility, located in Wawayanda, New York. Due to the size of the proposed facility and associated earthwork/site improvements the project will disturb more than 5 acres of soil at one time, therefore, in accordance with Part II.D.3 of the SPDES General Permit for Stormwater Discharges Associated with Construction Activities GP-0-20-001 (PERMIT), the applicant is seeking a waiver from the MS4 to create more than 5 acres of soil disturbance at one time. Phasing the project to limit the disturbance below 5 acres is not practical due to the size of the facility and the existing topography.

The project will include clearing and regrading of approximately 9.6 acres of predominantly meadow areas with some minor forested and shrub covered areas. Construction will consist of a new 42,000 square foot transfer station and recycling building, a 3,160 square foot admin building, approximately 157,000 square feet of paved entrance, parking, and walkway areas, and stormwater management BMPs. Topsoil within the project limits will be stripped and stockpiled for future use.

Runoff from land that is disturbed as part of development will be managed by both permanent and temporary stormwater management and erosion/sediment (E&S) control features as shown on the attached project specific Erosion and Sediment Control Drawing, and in accordance with the Facilities "Construction Stormwater Pollution Prevention Plan (SWPPP)", prepared by EnSol, dated January 2025.

The following measures will be implemented as part of the project:

- Installation of orange construction fencing.
- Installation of compost filter sock in defined areas, or as required by SWPPP inspections;
- Construct stabilized construction entrance for site.
- Construct temporary sediment basins.
- Installation of temporary dikes/swales to direct stormwater to either permanent or temporary stormwater management features (i.e., sedimentation basins, etc.);
- Periodic sediment removal from existing and proposed drainage swales, ditches, and sediment basin areas;
- Seeding of inactive disturbed surfaces and slopes following construction activities;

- Maintenance of new and existing stormwater management and E&S control features.
- Site grading to final proposed grades/pavement subgrades.
- Construct/install building, utilities, and stormwater management controls (storm sewer, catch basins, rip-rap outlet protection, bioretention basin).
- Pave all areas where required.
- Install plantings, seed and mulch.
- Convert temporary sediment basins to permanent detention ponds once site stabilization is complete.
- Remove temporary erosion and sediment controls when site reaches final stabilization.

This project discharges to tributaries of Monhagen Brook which is listed as a 303(d) waterbody in Appendix E-303(d) Segments Impaired by Construction Related Pollutant(s) of the PERMIT. The primary pollutant of concern for Monhagen Brook is phosphorus. Measures taken to reduce the discharge of phosphorus to these waterbodies are described in Section VII of the project's SWPPP.

For construction sites that directly discharge to one of the 303(d) segments listed in Appendix E, a 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. 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 in accordance with Part I.B.1b. of the PERMIT.

Please find attached Sheets 02 Site Plan and 09 Erosion and Sediment Control Plan describing various aspects of the stormwater management and E&S control features to be implemented, and the phasing of construction, as part of the construction project.

Following your review of the aforementioned information, if you have questions or require additional information, please feel free to contact me at (716) 285-3920 ext 203.

Sincerely,

EnSol Inc.

David A. Lenox, P.E.
Senior Engineer

cc:

Attachments

Sheet 02 - Site Plan
Sheet 09 - Erosion and Sediment Control Plan

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

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

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

I. Owner or Operator Information

1. Owner/Operator Name:

2. Street Address:

3. City/State/Zip:

4. Contact Person: | 4a.Telephone:

4b. Contact Person E-Mail:

II. Project Site Information

5. Project/Site Name:

6. Street Address:

7. City/Zip: WAWAYANDA NY 10940

8. County: ORANGE

III. Reason for Termination

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

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

9c. □ Other (Explain on Page 2)

IV. Final Site Information:

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

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

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

____

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

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

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

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

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

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

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

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

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

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

V. Additional Information/Explanation:

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

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

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

Printed Name:

Title/Position:

Signature:	Date:

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

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

(NYS DEC Notice of Termination - January 2015)

Stormwater Pollution Prevention Plan
Employee Training List

GENERAL INFORMATION			
Training Topic:	**Implementation of the SWPPP, Maintenance Procedures, Pollution Control Practices**		
Name/Title of Trainer:			
Date of Meeting:		**Time of Meeting:**	

SIGN-IN FORM	
Name	**Signature**

Attachment 4

EnSol, Inc.

ENGINEERING + ENVIRONMENTAL

Hydrologic Analysis

EnSol, Inc.
Environmental Solutions

PROJECT NO.: 20-0062

CLIENT: DOM KAM LLC PROJECT: Dom-Mar Transfer and Recycling Facility Prepared By: BPB Date: 3/2021
SUBJECT: Stormwater Modeling Calculations Reviewed By: DAL Date: 1/2025

STORMWATER MANAGEMENT DESIGN AND ANALYSIS SUMMARY

PURPOSE:
- Analyze pre-development and post-development stormwater management for the Facility.
- Develop design basis and stormwater modeling input parameters to analyze a bioretention basin and 2 stormwater detention ponds for post-development stormwater management purposes. Stormwater BMPs will provide necessary stormwater detention, Runoff Reduction, and water quality to meet New York State Stormwater Regulations.
- Determine suitability of wet ponds use as temporary sediment basins.
- Size the storm sewer pipe network to convey the 10-yr storm without surcharging.
- Size riprap outlet protection.
- Size anti-seep collars for wet pond outlet pipes.
- Prove adequacy (10-year storm) for the swales located throughout the project site.

EXISTING SITE CONDITIONS
- The property consists of predominately grassed areas with wooded and brushed covered areas throughout the remainder of the site. Surface runoff on the parcel drains to two drainageways – Monhagan Brook, which flows west to east across the property and an unnamed tributary to Monhagan Brook, which flows north to south across the property. The topography of the site is generally flat (0 to 3%) with steeper slopes (3 to 8%) in the northern portion of the site.

POST DEVELOPMENT SITE CONDITIONS
- The proposed development of the facility involves constructing approximately 5.49 acres of additional impervious area (parking/driveway, and buildings). This stormwater analysis focuses on an increase in impervious area, and changes in site grading.
- Site will drain to 2 separate wet ponds and 1 bio-retention basin.

DESIGN STORM EVENTS:
- Design for Middletown New York (Extreme Precipitation Tables Northeast Regional Climate Center)
  - 1 Year Event = 2.64 inches
  - 10 Year Event = 4.68 inches
  - 100 Year Event = 8.22 inches

CALCULATIONS:

1. **Water Quality Volume (WQv)**
   Total run-off from one year storm event over developed area for enhanced phosphorus removal:
   Drainage Areas DA-1, DA-3, DA-4, and DA-5 for Pond 1 =
   0.080 acre-ft + 0.081 acre-ft + 0.068 acre-ft + 0.665 acre-ft = 0.894 acre-ft

   Drainage Areas DA-2, DA-7A-E, DA-8 for Pond 2 =
   0.098 acre-ft + 0.072 acre-ft + 0.041 acre-ft + 0.064 acre-ft + 0.064 acre-ft + 0.067 acre-ft + 0.189 acre-ft = 0.595 acre-ft

   WQv = 0.894 acre-ft + 0.595 acre-ft = **1.489 acre-ft = 64,861 ft^3**

2. Minimum Runoff Reduction Volume (RRv-min)
   Design objectives for runoff reduction are to capture and provide 100% of the WQv through runoff reduction. In

sites such as the site being evaluated with poorly draining soils, high groundwater tables, and other limiting factors it is not feasible to meet this 100% requirement. Therefore, a minimum RRv has been calculated and met.

RRv-min = (P*Rv*A_{ic}*S)/12
P = one year 24-hour storm rainfall (enhanced phosphorus removal) = 2.64"
Rv = 0.05+ 0.009(I)
I= 100% impervious
Aic= New Area of Impervious Cover = 5.49 acres
S = Hydrologic Soil Group (HSG) Specific Reduction Factor = 0.2 (HSG D)
RRv-min = (2.64*0.95*5.49*0.2)/12 = **0.229 acre-ft = 9,975 ft^3**

3. **Runoff Reduction Volume (RRv)**
Runoff Reduction achieved through a Bioretention Basin designed to contain 100% of one year storm runoff from the contributing area for enhanced phosphorus removal (no overflow from Bioretention Basin for one year 24 hour storm event).
One Year 24-hour Storm Runoff from Drainage Areas DA-1, DA-3, and DA-4:
(0.080 acre-ft + 0.081 acre-ft + 0.068 acre-ft) = **0.229 acre-ft** = **9,975 ft^3**

4. **Water Quality Provided:**
Total WQv Required= WQv – RRv = 1.489 ac-ft – 0.229 ac-ft = **1.26 ac-ft**

Wet Pond 1 (Southwest Pond) Sizing
Add 1 year 24-hour storm runoff volume from Drainage Areas DA-1, DA-3, DA-4, and DA-5 for Pond 1 =
0.080 acre-ft + 0.081 acre-ft + 0.068 acre-ft + 0.665 acre-ft = 0.894 acre-ft = 38,943 ft^3

Remaining WQv = Total WQv (DA 1-5) – RRv Achieved (Bioretention Basin)
= 38,943 ft^3– 9,975 ft^3 = **28,968 ft^3**

WQv Provided by Pond 1:

Elevation	Area (sq ft)	Average Area (sq ft)	Incremental Depth (ft)	Incremental Volume (ft^3)	Cumulative Volume (ft^3)	Cumulative Volume (acre-ft)
445.75	3,856					
446	4,074	3,965	0.25	991	991	0.02
447	4,996	4,535	1.00	4,535	5,526	0.13
448	6,037	5,516	1.00	5,516	11,042	0.25
449.2	7,447	6,742	1.20	8,090	19,132	0.44
450.2	**12,600**	**10,024**	**1.00**	**10,024**	**29,156**	**0.67**
451	15,292	13,946	0.80	11,157	40,313	0.93
451.75	17,677	16,485	0.75	12,363	52,677	1.21
452	18,334	17,101	0.25	4,275	56,952	1.31
452.6	20,216	18,742	0.60	11,245	68,197	1.57
453	21,494	20,015	0.40	8,006	76,203	1.75
454	25,274	23,384	1.00	23,384	99,587	2.29

Base of Pond = 445.75, permanent pool elevation = 450.2, Permanent Pool Volume = **29,156 ft^3**
WQv Provided by Pond 1 = **29,156 ft^3 = 0.67 acre-ft**

Pond 1 Forebay Volume (included in total Pond Volume)

Elevation	Area (sq ft)	Average Area (sq ft)	Incremental Depth (ft)	Incremental Volume (ft^3)	Cumulative Volume (ft^3)	Cumulative Volume (acre-ft)
445.75	37					
447	180	108.5	1.25	135.6	135.6	0.00
448	377	278.58	1.00	278.58	414.2	0.01
449.2	722	549.47	1.20	659.36	1,074	0.02
450.2	2,275	1,498.56	1.00	1,498.56	2,573	0.06

Pond 2 (East Pond) Sizing

Add 1 year 24-hour storm runoff volume from

Drainage Areas DA-2, DA-7A-E, DA-8 for Pond 2 =
0.098 acre-ft + 0.072 acre-ft + 0.041 acre-ft + 0.064 acre-ft + 0.064 acre-ft + 0.067 acre-ft + 0.189 acre-ft = 0.595 acre-ft = **25,918 ft^3**

Total WQv = **25,918 ft^3**

WQv Provided by Pond 2

Elevation	Area (sq ft)	Average Area (sq ft)	Incremental Depth (ft)	Incremental Volume (ft^3)	Cumulative Volume (ft^3)	Cumulative Volume (acre-ft)
442.5	3,449					
443	4,086	3,767	0.5	1,884	1,884	0.04
444	5,024	4,555	1.0	4,555	6,439	0.15
445	6,044	5,534	1.0	5,534	11,973	0.27
446	7,144	6,594	1.0	6,594	18,567	0.43
447	**11,029**	**9,086**	**1.0**	**9,086**	**27,653**	**0.63**
448	14,046	12,537	1.0	12,537	40,190	0.92
448.6	15,386	14,716	0.6	8,830	49,020	1.13
449	16,312	15,849	0.4	6,340	55,359	1.27
450	19,045	17,679	1.0	17,679	73,038	1.68
451	21,510	20,278	1.0	20,278	93,316	2.14

Base of Pond is 442.5 ft, Permanent Pool elevation 447, Permanent Pool Volume = **27,653 ft^3**
WQv Provided by Pond 2 = **27,653 ft^3 = 0.63 ac-ft**

Total WQv Provided = Pond 1 + Pond 2 = 0.67 ac-ft + 0.63 ac-ft = 1.3 ac-ft

Pond 2 Forebay Volume (included in total Pond Volume)

Elevation	Area (sq ft)	Average Area (sq ft)	Incremental Depth (ft)	Incremental Volume (ft^3)	Cumulative Volume (ft^3)	Cumulative Volume (acre-ft)
442.5						
443	345	505	0.5	253	253	0.01
444	665	845	1.0	845	1,098	0.03
445	1,025	1,225	1.0	1,225	2,323	0.05
446	1,424	2,077	1.0	2,077	4,400	0.10
447	2,730	2,730	1.0	2,730	7,130	0.16

5. **Stream Channel Protection Volume**
The Stream Channel Protection Volume (Cpv) is designed to protect stream channels from erosion. In New York State this goal is accomplished by providing 24-hour extended detention of the one-year, 24-hour storm event. The CPv was determined in accordance with Section 4.4 of the New York State Stormwater Design Manual. The calculation is included in the Calculation Sheet included in Attachment 4. The Wet Pond outlet structure low flow orifice attenuates the post development one-year, 24-hour peak discharge rate to lower than predevelopment rates. The total Cpv volume for the developed drainage area is 0.840 acre-ft, subtracting the RRv provided by the Bio-Retention Basin (0.229 acre-ft) the Cpv is 0.611. The Cpv is included above the permanent pool in each Wet Pond below the outlet structure weir, elevation 450. 20 to 451.75 in Wet Pond 1 and elevation 447 to 448.6 in Wet Pond 2. The Cpv provided in Wet Pond 1 is 0.54 acre-ft, and the Cpv provided in Wet Pond 2 is 0.50 acre-ft, the total Cpv provided is 1.04 acre-ft.

6. **Overbank Flood Protection Volume**
The primary purpose of the overbank flood control sizing criterion is to prevent an increase in the frequency and magnitude of out-of-bank flooding generated by urban development (i.e., flow events that exceed the bank full capacity of the channel, and therefore must spill over into the floodplain). Overbank control requires storage to attenuate the post development 10-year, 24-hour peak discharge rate (Qp) to predevelopment rates. The Qp is provided in Wet Pond 1 and 2 above the permanent pool. The Wet Pond Outlet Structure Wier attenuates the post development 10-year 24-hour peak discharge rate to lower than predevelopment rates.

7. **Extreme Flood Protection Volume**
The intent of the extreme flood criteria is to (a) prevent the increased risk of flood damage from large storm events, (b) maintain the boundaries of the predevelopment 100-year floodplain, and (c) protect the physical integrity of stormwater management practices. 100 Year Control requires storage to attenuate the post development 100-year, 24-hour peak discharge rate (Qf) to predevelopment rates. The Qf is provided in Wet Pond 1 and 2 above the permanent pool. The Wet Pond Outlet Structure attenuates the post development 100-year 24-hour peak discharge rate to lower than predevelopment rates.

8. **Post Development Calculations:**
Site Runoff was calculated utilizing HydroCAD V10.10 by HydroCAD Software Solutions, LLC.

Design Storm	Pre-Development Peak Runoff West (cfs)	Pre-Development Peak Runoff East (cfs)	Total Pre-Development (cfs)	Post-Development Peak Runoff West (cfs)	Post-Development Peak Runoff East (cfs)	Total Post-Development Peak Runoff (cfs)
1 year	5.36	6.50	11.72	3.08	4.85	6.46
10 year	14.71	17.25	31.60	9.12	11.93	16.86
100 year	32.37	37.27	68.98	27.01	30.55	51.04

Peak Pond Elevation during 100-yr, 24-hr storm
Wet Pond 1 (West Pond) = 453.64. Set Pond top of Berm elevation to 454.75.
Wet Pond 2 (East Pond) = 450.21. Set Pond top of Berm elevation to 451.25.

9. **Storm Sewer Pipe Network Sizing**
The storm sewer pipe network was hydraulically modeled for each storm event. See attached HydroCAD Reports.

10. **Pond Outlet, Storm Sewer, Culvert Riprap Protection Sizing**
See attached Calculation sheets.

11. **Sediment Basin Sizing**
Southwestern Sediment Basin:
Surface Area = 0.015 * Drainage Area = 0.015*5.5 acres = 0.08 acres
Surface Area = 0.01 *Qp = 0.01*14.71 cfs = 0.15 acres
Sediment Basin Area = **0.29 acres** (Permanent Pool Elevation)
Minimum required sediment storage zone volume = 1,000 cubic feet per acre from each disturbed acre within the total drainage area.
Minimum Sediment Storage Volume = 5.5 acres * 1,000 ft^3 = 5,500 ft^3
Permanent Pool Volume = **29,156 ft^3**
Minimum required dewatering zone volume = 3,600 cubic feet per total area drainage to the basin.
Minimum Dewatering Zone Volume = 5.5 acres * 3,600 ft^3 = 19,800 ft^3
Volume Provided between Qp wier (Elevation 451.75) and pool = **23,521 ft^3**
Discharge will occur through skimmer attached to outlet structure designed for attenuating 1-year, 10-year and 100-year post development storm events. Spillway design on attached Channel Design Spreadsheet.

Eastern Sediment Basin:
Surface Area = 0.015 * Drainage Area
Surface Area = 0.015* 4.2 acres = 0.063 acres
Surface Area = 0.01 *Qp = 0.01* 17.25 cfs = 0.17 acres
Sediment Basin Area = **0.25 acres** (Permanent Pool Elevation)
Minimum Sediment Storage Volume = 4.2 acres * 1,000 ft^3 = 4,200 ft^3
Permanent Pool Volume = **27,653 ft^3 ft^3**
Minimum Dewatering Zone Volume = 4.2 acres * 3,600 ft^3 = 15,120 ft^3
Volume Provided between Qp wier (elevation 448.6) and pool = **21,367 ft^3**
Discharge will occur through skimmer attached to outlet structure designed for attenuating 1-year, 10-year and 100-year post development storm events. Spillway design on attached Channel Design Spreadsheet.

12. **Swale Adequacy**
    Per the New York State Stormwater Design Manual:
    Peak Velocity for 10-yr storm must be non-erosive (i.e. 3.5-5.0 fps)
    Minimum freeboard during 10-yr storm = 6 inches
    All swales meet the above requirements.
    See attached Channel Design Spreadsheet.

CONCLUSIONS:

- Existing site conditions exhibit poorly draining soils and high groundwater table, which limit available methods to achieve RRv, therefore the site must meet RRv-min requirements.
- Minimum Runoff Reduction Volume is exceeded by the Bioretention Basin.
- The WQv provided by the Stormwater Detention Ponds exceeds the required WQv.
- The Stormwater Detention Ponds provides adequate detention time and stormwater storage volume for reducing the Post Development peak flow from 10- and 100-year storms to below Pre-Development conditions.
- The wet pond designs have been analyzed for use as temporary sediment basins during construction. By installing a skimmer in the wet ponds low flow orifices, the wet ponds will meet the requirements of temporary sediment basins.
- The swales will have maximum velocities less than 4 fps and provide more than 6" of freeboard during the 10-year storm and will fully contain a 100-year storm.

ATTACHMENTS:

- NYSDEC Green Infrastructure Worksheet
- Site Drainage Area Maps
- HydroCAD Model Calculations
- Skimmer Calculations
- Outlet Protection Calculations

STREAM CHANNEL PROTECTION VOLUME (Cpv)
1-YEAR STORM

Provide 24-hour extended detention of 1-year, 24-hour storm for post-development

Q_1 =	2.50	ac-ft	Post Developed Runoff Volume
q_i =	25.31	cfs	Post Developed Peak Runoff
q_o =	11.72	cfs	Pre-Developed Peak Runoff
q_o / q_i =	0.463		Calculated
V_s/V_r =	0.293		$V_s/V_r = 0.683-1.43(q_o/q_i)+1.64(q_o/q_i)^2-0.804(q_o/q_i)^3$
			(or Figure B.2 of NYSDM)
CPv =	**0.730**	**ac-ft**	$Qp = (V_s/V_r)(Q_1)$

Add 10% to 15% to required volume for multi-stage storage scenarios (per NYS Design Manual)

CPv =	**0.840**	**ac-ft**
	36,592	cf

Average Release Rate over 24-hour detention period

$\mathbf{q_{CPv24}}$ **=**	**0.424**	**cfs**	q_{24} = (Cpv*43560)/(24*60*60)

Final Channel Design Summary

Using manning equation

INPUT DATA									OUTPUT DATA					ANALYSIS	
Channel	Description	ChannelDepth H (ft)	Flow Depth D (ft)	Base Width W (ft)	Min. Slope So (%)	Mannings n	Side Slopes (H:V) Left y:1	Side Slopes (H:V) Right x:1	Free Board (ft)	Velocity V (ft/sec)	Flow Area A (sq ft)	Wetted Perim. Wp (ft)	Hyd. Radius rH	Flow Q_{calc} (cfs)	Required Flow Q_{req} (cfs)
Ditch 1	100 yr	1.50	0.76	2	1.00%	0.035	2	2	0.7	2.7	2.68	5.40	0.50	7.13	7.13
Ditch 1	10 yr	1.50	0.52	2	1.00%	0.035	2	2	1.0	2.2	1.58	4.33	0.37	3.44	3.38
Ditch 2	100 yr	1.00	0.65	2	1.00%	0.035	2	2	0.4	2.5	2.15	4.91	0.44	5.26	5.25
Ditch 2	10 yr	1.00	0.45	2	1.00%	0.035	2	2	0.6	2.0	1.31	4.01	0.33	2.63	2.56
Ditch 3	100 yr	1.00	0.50	2	1.00%	0.035	2	2	0.5	2.1	1.50	4.24	0.35	3.20	3.13
Ditch 3	10 yr	1.00	0.33	2	1.00%	0.035	2	2	0.7	1.7	0.88	3.48	0.25	1.49	1.45
Ditch 4	100 yr	1.50	0.84	2	0.50%	0.035	2	2	0.7	2.0	3.09	5.76	0.54	6.15	6.02
Ditch 4	10 yr	1.50	0.62	2	0.50%	0.035	2	2	0.9	1.7	2.01	4.77	0.42	3.40	3.35

Equations

$R_h = A/Wp$

$A = (W*D)+(1/2*D*(D*y))+(1/2*D*(D*x))$

$V = (k/n)*(R_h)^{2/3}*S_o^{1/2}$

$Q_{calc} = V*A$

Where:

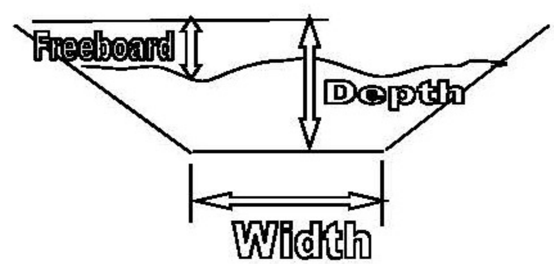
k = 1.486 in US Units

A = Wetted X-Section Area

Wp= Wetted Perimeter

TABLE 3–4 Recommended Design Values of Manning Roughness Coefficients, n^a

	Manning n Range[b]
I. Unlined open channels[c]	
A. Earth, uniform section	
1. Clean, recently completed	0.016–0.018
2. Clean, after weathering	0.018–0.020
3. With short grass, few weeds	0.022–0.027
4. In graveled soil, uniform section, clean	0.022–0.025
B. Earth, fairly uniform section	
1. No vegetation	0.022–0.025
2. Grass, some weeds	0.025–0.030
3. Dense weeds or aquatic plants in deep channels	0.030–0.035
4. Sides, clean gravel bottom	0.025–0.030
5. Sides, clean, cobble bottom	0.030–0.040
C. Dragline excavated or dredged	
1. No vegetation	0.028–0.033
2. Light brush on banks	0.035–0.050
D. Rock	
1. Based on design section	0.035
2. Based on actual mean section	
a. Smooth and uniform	0.035–0.040
b. Jagged and irregular	0.040–0.045
E. Channels not maintained, weeds and brush uncut	
1. Dense weeds, high as flow depth	0.08–0.12
2. Clean bottom, brush on sides	0.05–0.08
3. Clean bottom, brush on sides, highest stage of flow	0.07–0.11
4. Dense brush, high stage	0.10–0.14
II. Roadside channels and swales with maintained vegetation[d,e] (values shown are for velocities of 2 and 6 ft/sec):	
A. Depth of flow up to 0.7 ft	
1. Bermuda grass, Kentucky bluegrass, buffalo grass	
a. Mowed to 2 in	0.07–0.045
b. Length 4 to 6 in	0.09–0.05
2. Good stand, any grass	
a. Length about 12 in	0.18–0.09
b. Length about 24 in	0.30–0.15
3. Fair stand, any grass	
a. Length about 12 in	0.14–0.08
b. Length about 24 in	0.25–0.13



Pipe Flow Capacity Using Chezy-Manning Equation

INPUT DATA						OUTPUT DATA				ANALYSIS		
Culvert ID	Pipe Dia D (in)	Pipe Type	Pipe Mannings "n"	Pipe Slope So (%)	Pipe Length L (ft)	Velocity V (ft/sec)	Hyd. Radius R_h (ft)	Output Time of Concentration Tc (sec)	Output Time of Concentration Tc (min)	Available Flow Capacity Q_{calc} (cfs)	Required Flow Capacity Q_{req} (cfs)	Notes
Culvert1	12	CPE-SMOOTH BORE (ADS N-12)	0.012	0.7%	29	4.11	0.25	7.05	0.12	**3.229**	1.26	$Q_{calc} > Q_{req}$ OK
Culvert 2	18	CPE-SMOOTH BORE (ADS N-12)	0.012	0.5%	28	4.55	0.38	6.15	0.10	**8.047**	5.36	$Q_{calc} > Q_{req}$ OK
Culvert 3	18	CPE-SMOOTH BORE (ADS N-12)	0.012	0.6%	85	4.99	0.38	17.04	0.28	**8.815**	5.36	$Q_{calc} > Q_{req}$ OK

Notes:
1. Flow Capacity (Q_{calc}) assumes pipe in full flow.
2. Flow Required (Q_{req}) *100 year design storm*

REFERENCES

Mannings n Values (from ADS design manual)			
Pipe Material	**Construction**	**n**	
Polyethylene Pipe	Corrugated	0.015 - 0.020	Varies with Diameter
	Smooth	0.012	(CSW)
Plastic Pipe (SDR,S&D)	-	0.011	
Plastic Pipe (PVC and ABS)	-	0.009	
Corrugated Metal Pipe	CMP	0.022 - 0.026	
Rivited Steel	-	0.015 - 0.017	
Lock-bar and Welded Steel Pipe	-	0.012 - 0.013	
Brass and Glass	-	0.009 - 0.013	
Concrete Pipe	Average	0.013	
	Steel Forms	0.012 - 0.014	
	Finished	0.011 - 0.012	
Spiral Rib	-	0.012	
Vitrified Sewer	-	0.013 - 0.015	
Clay Drainage Tile	Common	0.012-1.014	
Brick	-	0.016	
Rubble Masonary	-	0.016	
Firm Gravel	-	0.023	

Equations

$A=\pi*(D/2)^2$ $R_h = A/Wp$ $Q_{calc} = V*A$

$Wp=\pi*D$ $V = (k/n)*(R_h)^{2/3}*S_o^{1/2}$

Where:
k = 1.486 in US Units A = Wetted X-Section Area Wp= Wetted Perimeter

Other References
Civil Eng. Ref. Manual, Sixth Edition
Manning's n - Appendix A, Page 5-23
Time of Concentration T_c
(see Ref. page 6-13, Eq. 6.29, 6.30, 6.31)

Civil Eng. Ref. Manual, Seventh Edition, Lindeburg
Manning's Roughness Coefficient, n - Appendix 19.A, Page A37

Technical Notes
Advanced Drainage Systems (ADS), Technical Note 2.109, Flow Capacity, June, 2001
Table 1: Manning's "n" Value for Design (Storm and Sanitary Sewers)

Bioretention Worksheet

(For use on HSG C or D Soils with underdrains)

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

Af	Required Surface Area (ft2)
WQv	Water Quality Volume (ft3)
df	Depth of the Soil Medium (feet)
hf	Average height of water above the planter bed
tf	Volume Through the Filter Media (days)

k The hydraulic conductivity [ft/day], can be varied depending on the properties of the soil media. Some reported conductivity values are: ***Sand*** - 3.5 ft/day (City of Austin 1988); ***Peat*** - 2.0 ft/day (Galli 1990); ***Leaf Compost*** - 8.7 ft/day (Claytor and Schueler, 1996); ***Bioretention Soil*** (0.5 ft/day (Claytor &

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**
6	2.01	1.11	0.55	0.55	5587.66	1.40	
Enter Impervious Area Reduced by Disconnection of Rooftops		0.00	55%	0.55	5,588	<<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*	

Soil Information

Soil Group	D		
Soil Infiltration Rate	0.10	*in/hour*	*Okay*
Using Underdrains?	Yes	*Okay*	

Calculate the Minimum Filter Area

		Value	Units	Notes
WQv		5,588	*ft^3*	
Enter Depth of Soil Media	*df*	2.5	*ft*	*2.5-4 ft*
Enter Hydraulic Conductivity	*k*	0.5	*ft/day*	
Enter Average Height of Ponding	*hf*	0.25	*ft*	*6 inches max.*
Enter Filter Time	*tf*	2	*days*	
Required Filter Area	***Af***	**5080**	***ft^2***	

Determine Actual Bio-Retention Area

Filter Width	98	*ft*
Filter Length	142	*ft*
Filter Area	13916	*ft^2*
Actual Volume Provided	15308	*ft^3*

Determine Runoff Reduction

Is the Bioretention contributing flow to another practice?		No	Select Practice	N/A
RRv	6,123			
RRv applied	**5,588**	***ft^3***	***This is 40% of the storage provided or WQv whichever is less.***	
Volume Treated	0	*ft^3*	*This is the portion of the WQv that is not reduced in*	
Volume Directed	0	*ft^3*	This volume is directed another practice	
Sizing √	OK		*Check to be sure Area provided ≥ Af*	

Extreme Precipitation Tables

Northeast Regional Climate Center

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

Smoothing	Yes
State	New York
Location	
Longitude	74.417 degrees West
Latitude	41.423 degrees North
Elevation	0 feet
Date/Time	Thu, 05 Jan 2023 12:27:31 -0500

Extreme Precipitation Estimates

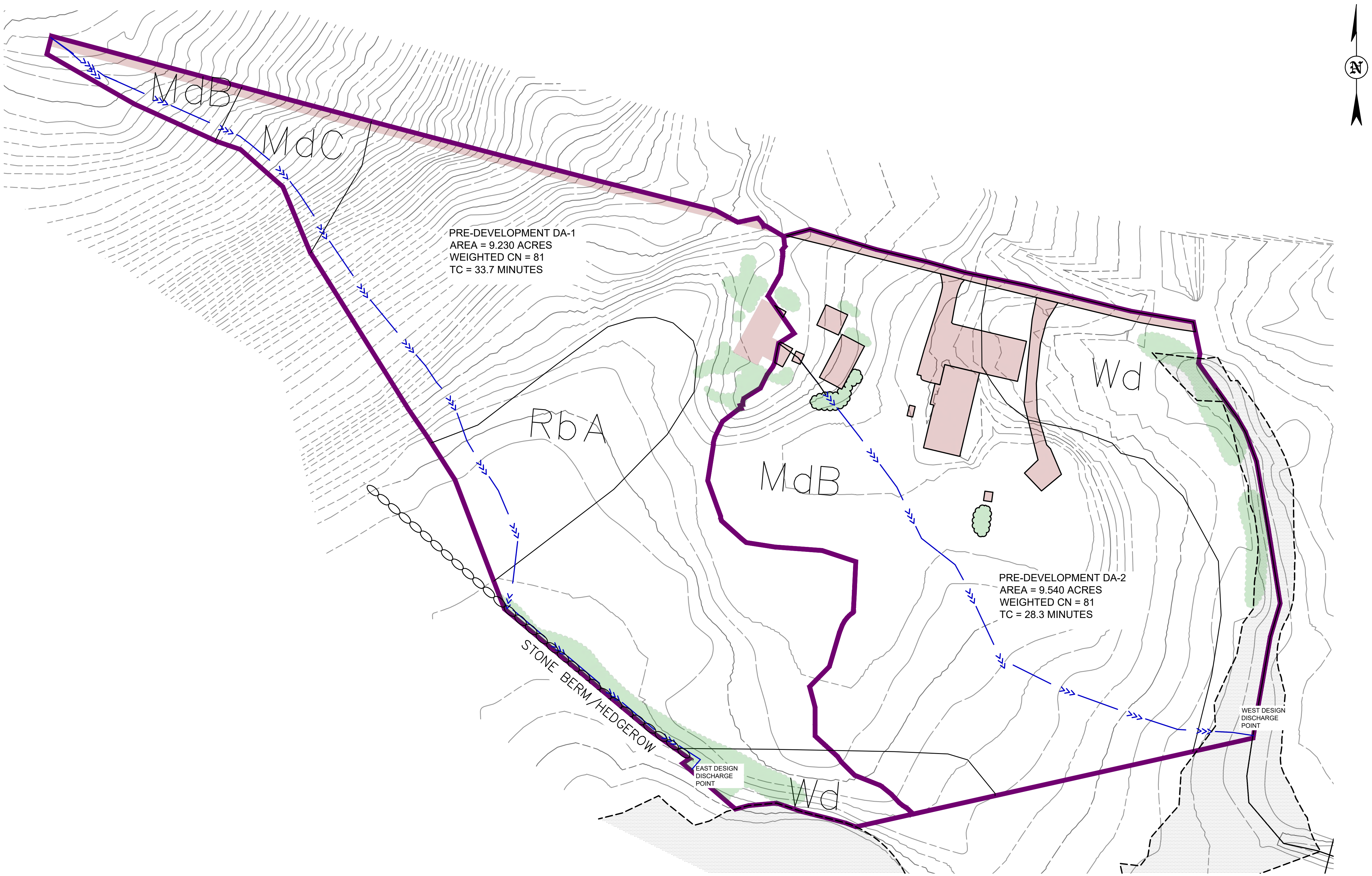
	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.33	0.50	0.62	0.82	1.02	1.26	**1yr**	0.88	1.18	1.45	1.77	2.17	2.64	3.07	**1yr**	2.33	2.95	3.38	4.08	4.71	**1yr**
2yr	0.39	0.60	0.75	0.98	1.24	1.54	**2yr**	1.07	1.43	1.76	2.15	2.62	3.17	3.63	**2yr**	2.80	3.49	4.00	4.71	5.37	**2yr**
5yr	0.46	0.71	0.89	1.19	1.53	1.92	**5yr**	1.32	1.77	2.20	2.70	3.28	3.96	4.57	**5yr**	3.50	4.40	5.01	5.80	6.57	**5yr**
10yr	0.51	0.81	1.02	1.38	1.80	2.27	**10yr**	1.55	2.08	2.62	3.21	3.89	4.68	5.45	**10yr**	4.14	5.24	5.96	6.79	7.66	**10yr**
25yr	0.60	0.95	1.21	1.67	2.23	2.85	**25yr**	1.92	2.57	3.29	4.05	4.90	5.85	6.87	**25yr**	5.18	6.61	7.49	8.38	9.40	**25yr**
50yr	0.68	1.09	1.39	1.95	2.62	3.38	**50yr**	2.26	3.01	3.91	4.81	5.81	6.94	8.20	**50yr**	6.14	7.89	8.90	9.82	10.98	**50yr**
100yr	0.77	1.24	1.60	2.27	3.09	4.01	**100yr**	2.67	3.54	4.66	5.73	6.91	8.22	9.79	**100yr**	7.28	9.42	10.59	11.52	12.82	**100yr**
200yr	0.87	1.42	1.84	2.64	3.65	4.76	**200yr**	3.15	4.17	5.54	6.82	8.22	9.75	11.70	**200yr**	8.63	11.25	12.61	13.52	14.99	**200yr**
500yr	1.04	1.71	2.24	3.25	4.55	5.97	**500yr**	3.93	5.17	6.96	8.57	10.32	12.23	14.81	**500yr**	10.82	14.24	15.90	16.72	18.44	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.29	0.44	0.54	0.73	0.89	1.11	**1yr**	0.77	1.09	1.26	1.61	1.98	2.41	2.61	**1yr**	2.14	2.51	2.86	3.36	3.93	**1yr**
2yr	0.37	0.58	0.71	0.96	1.19	1.43	**2yr**	1.03	1.40	1.62	2.07	2.56	3.09	3.52	**2yr**	2.73	3.39	3.90	4.58	5.23	**2yr**
5yr	0.42	0.65	0.81	1.11	1.41	1.66	**5yr**	1.22	1.62	1.88	2.42	3.01	3.69	4.26	**5yr**	3.27	4.10	4.70	5.40	6.16	**5yr**
10yr	0.46	0.71	0.88	1.24	1.60	1.86	**10yr**	1.38	1.82	2.10	2.66	3.38	4.23	4.92	**10yr**	3.74	4.73	5.39	6.05	6.87	**10yr**
25yr	0.53	0.80	1.00	1.42	1.87	2.13	**25yr**	1.62	2.09	2.47	3.19	3.91	5.06	5.96	**25yr**	4.48	5.73	6.49	6.93	7.93	**25yr**
50yr	0.58	0.88	1.10	1.58	2.12	2.40	**50yr**	1.83	2.35	2.77	3.61	4.38	5.82	6.90	**50yr**	5.15	6.63	7.48	7.68	8.85	**50yr**
100yr	0.64	0.97	1.21	1.75	2.40	2.69	**100yr**	2.07	2.63	3.12	4.09	4.92	6.72	8.02	**100yr**	5.95	7.71	8.62	9.08	9.84	**100yr**
200yr	0.71	1.07	1.36	1.97	2.74	3.01	**200yr**	2.37	2.94	3.51	4.66	5.53	7.77	9.32	**200yr**	6.88	8.96	9.97	10.26	10.93	**200yr**
500yr	0.83	1.23	1.58	2.30	3.27	3.50	**500yr**	2.82	3.42	4.11	5.55	6.50	9.44	11.40	**500yr**	8.36	10.96	12.11	12.05	12.57	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.36	0.55	0.68	0.91	1.12	1.35	**1yr**	0.97	1.32	1.53	1.95	2.40	2.83	3.31	**1yr**	2.50	3.18	3.65	4.37	5.11	**1yr**
2yr	0.41	0.63	0.78	1.05	1.30	1.54	**2yr**	1.12	1.51	1.76	2.23	2.78	3.29	3.75	**2yr**	2.91	3.61	4.17	4.96	5.61	**2yr**
5yr	0.50	0.77	0.95	1.31	1.66	1.98	**5yr**	1.43	1.93	2.25	2.88	3.58	4.27	4.88	**5yr**	3.78	4.69	5.32	6.20	6.95	**5yr**
10yr	0.59	0.91	1.13	1.58	2.04	2.44	**10yr**	1.76	2.39	2.74	3.54	4.38	5.22	5.99	**10yr**	4.62	5.76	6.44	7.45	8.40	**10yr**
25yr	0.75	1.14	1.41	2.02	2.66	3.25	**25yr**	2.29	3.18	3.64	4.64	5.73	6.79	7.82	**25yr**	6.01	7.52	8.31	9.50	10.69	**25yr**
50yr	0.89	1.35	1.68	2.42	3.26	3.73	**50yr**	2.81	3.64	4.46	5.68	7.00	8.27	9.57	**50yr**	7.32	9.20	10.09	11.44	12.85	**50yr**
100yr	1.06	1.60	2.01	2.90	3.98	4.54	**100yr**	3.44	4.43	5.47	6.94	8.57	10.08	11.73	**100yr**	8.92	11.28	12.23	13.99	15.46	**100yr**
200yr	1.27	1.91	2.42	3.50	4.88	5.53	**200yr**	4.21	5.40	6.72	8.50	10.49	12.29	14.38	**200yr**	10.88	13.82	14.84	16.89	18.61	**200yr**
500yr	1.61	2.40	3.08	4.48	6.37	7.16	**500yr**	5.49	7.00	8.83	11.11	13.70	15.94	18.78	**500yr**	14.11	18.06	19.15	21.67	23.82	**500yr**



LEGEND:

450 EXISTING GROUND MAJOR CONTOUR
EXISTING GROUND MINOR CONTOUR
PROPERTY BOUNDARY
EXISTING BUILDING/PAVEMENT IMPERVIOUS AREA
WOODED AREA
JURISDICTIONAL FEDERAL WETLAND
RUNOFF FLOW PATH
DRAINAGE AREA BOUNDARY
SOIL BOUNDARY

IT IS A VIOLATION OF THE NEW YORK STATE EDUCATION LAW, ARTICLE 145 SECTION 7209, FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER OR LAND SURVEYOR TO ALTER AN ITEM IN ANY WAY.

NO	REVISION	BY	DATE

EnSol
EnSol, Inc.
3000 Alt. Blvd.,
Grand Island, NY 14072
716.285.3920

CLIENT:
DOM KAM, LLC.

SITE:
DOM-MAR TRANSFER AND RECYCLING FACILITY
CITY OF WAWAYANDA
COUNTY OF ORANGE
STATE OF NEW YORK

PROJECT:
MARANGI DISPOSAL
TS PERMIT

TITLE:
PRE-DEVELOPMENT WATERSHED MAP

ISSUE: REVIEW

DES: BPB | DRN: BPB | CHK: DAL

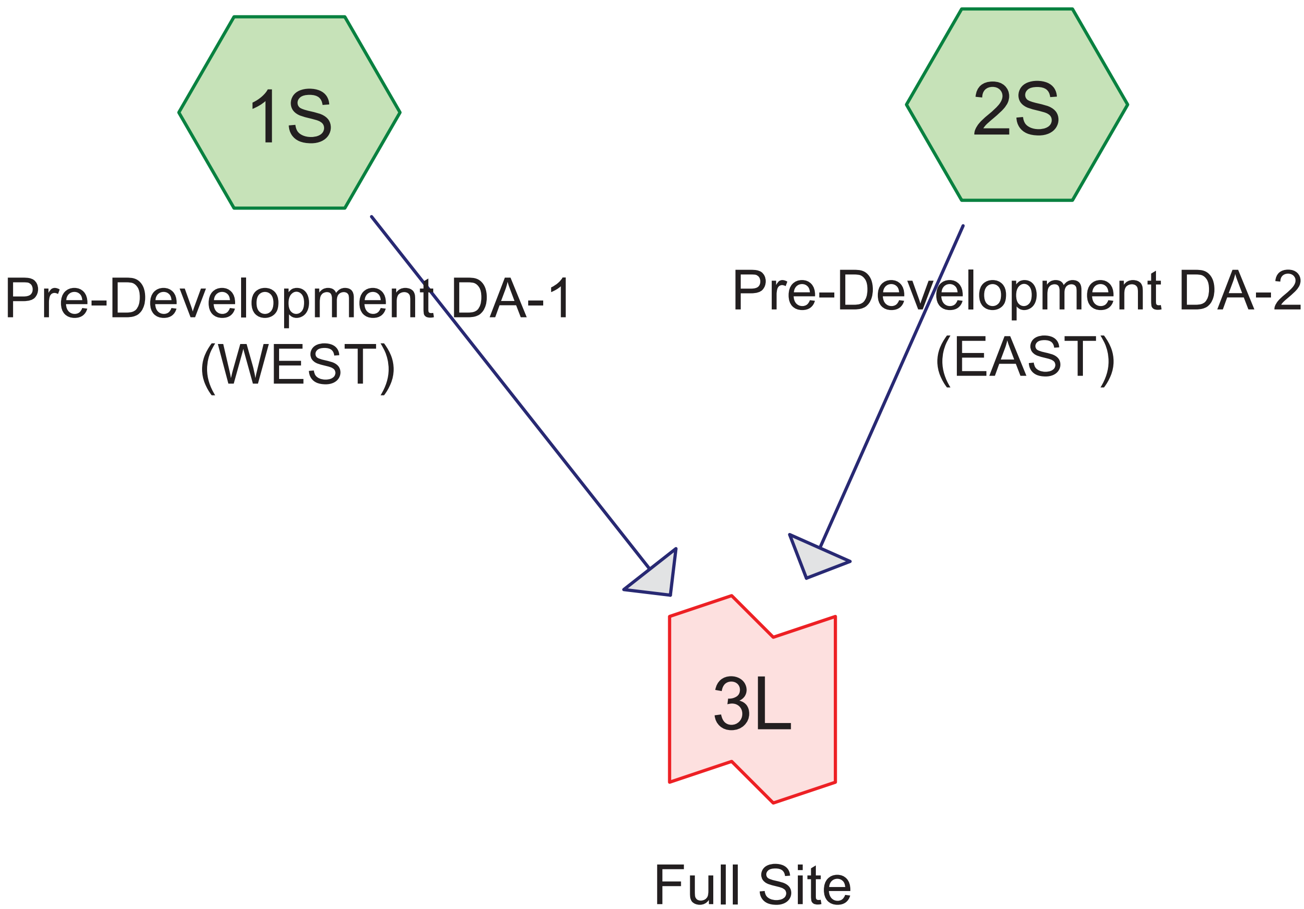
PROJECT NO: 20-0062 | DATE: JANUARY 2023

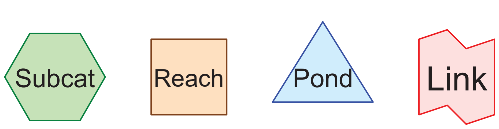
GRAPHIC SCALE: 0' 75' 150'

FILE: Pre-Development Watershed.dwg

REV NO: 00 | SHEET NO: 1

Y:\Marangi Disposal (029)\029-A0001 TS Permit Application\Drawings\3. Stormwater Drawings\Pre-Development Watershed.dwg, 1/15/2025 4:25:20 PM





Routing Diagram for Pre-Development-Jan 2023
Prepared by HP, Printed 2/1/2023
HydroCAD® 10.10-5a s/n 07607 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment 1S: Pre-Development DA-1 (WEST)

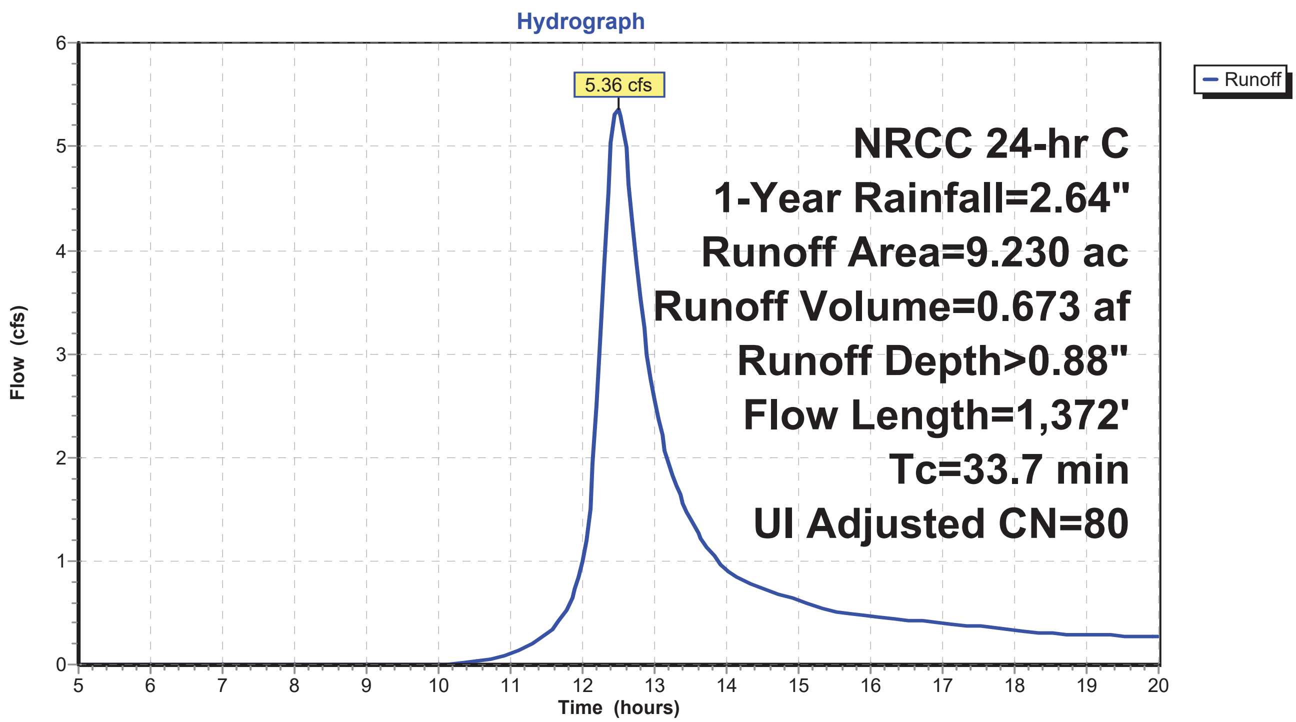
Runoff = 5.36 cfs @ 12.49 hrs, Volume= 0.673 af, Depth> 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Adj	Description
8.370	80		Pasture/grassland/range, Good, HSG D
0.510	79		Woods/grass comb., Good, HSG D
0.350	98		Unconnected pavement, HSG D
9.230	81	80	Weighted Average, UI Adjusted
8.880			96.21% Pervious Area
0.350			3.79% Impervious Area
0.350			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.0295	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
5.5	676	0.0870	2.06		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
15.9	596	0.0080	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
33.7	1,372	Total			

Subcatchment 1S: Pre-Development DA-1 (WEST)



Summary for Subcatchment 2S: Pre-Development DA-2 (EAST)

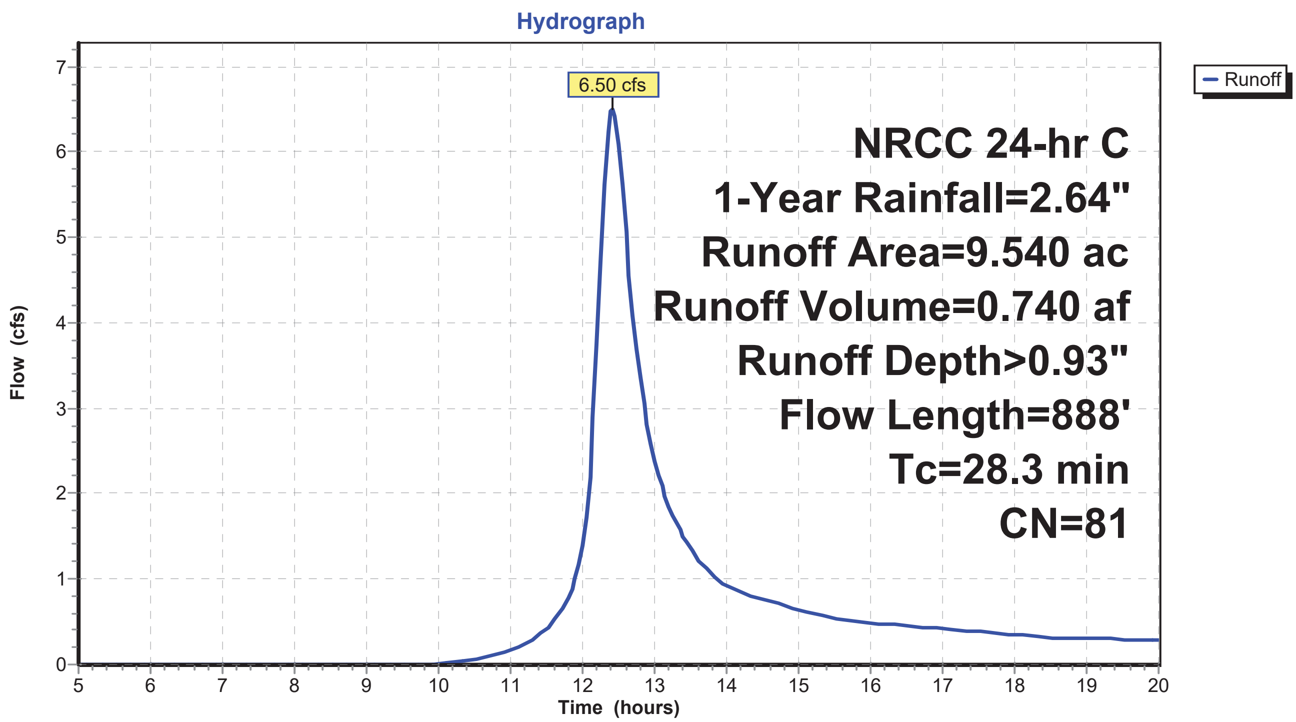
Runoff = 6.50 cfs @ 12.41 hrs, Volume= 0.740 af, Depth> 0.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
8.450	80	Pasture/grassland/range, Good, HSG D
0.370	79	Woods/grass comb., Good, HSG D
0.720	98	Unconnected pavement, HSG D
9.540	81	Weighted Average
8.820		92.45% Pervious Area
0.720		7.55% Impervious Area
0.720		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	100	0.0300	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
7.6	267	0.0070	0.59		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.5	521	0.0211	1.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
28.3	888	Total			

Subcatchment 2S: Pre-Development DA-2 (EAST)

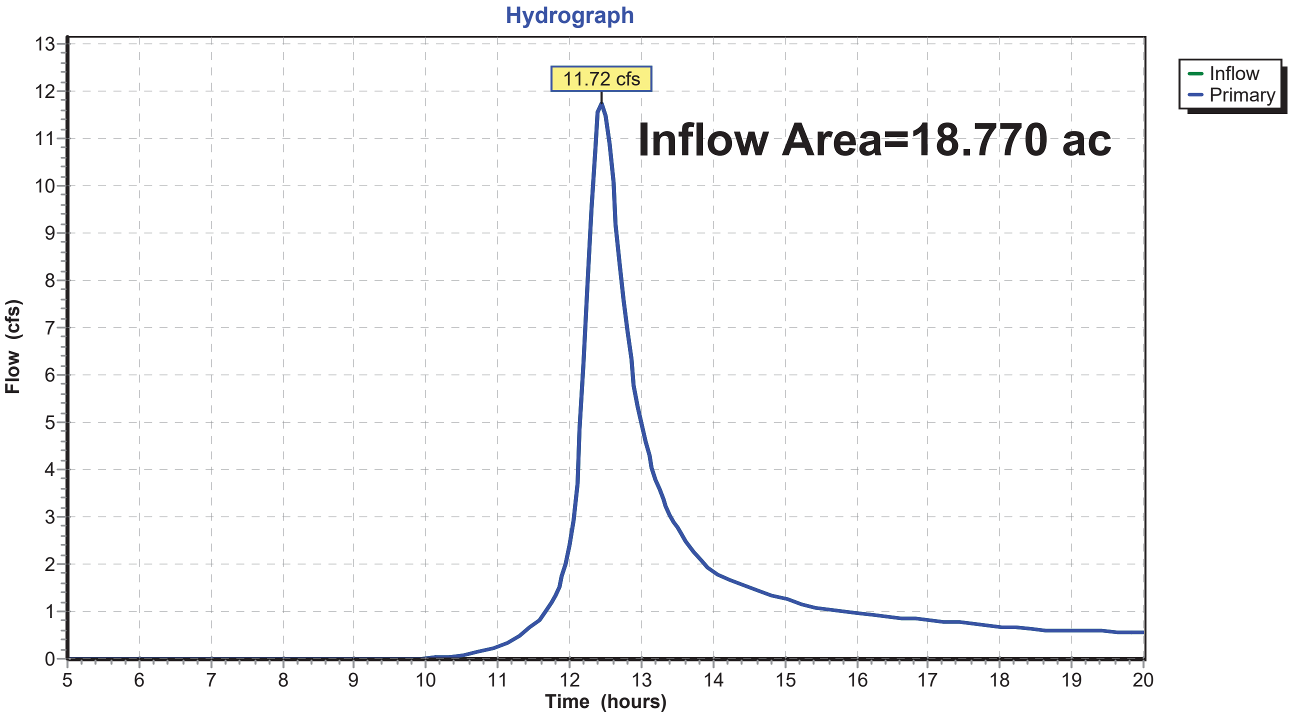


Summary for Link 3L: Full Site

Inflow Area =	18.770 ac,	5.70% Impervious,	Inflow Depth > 0.90"	for 1-Year event	
Inflow =	11.72 cfs @	12.45 hrs,	Volume=	1.413 af	
Primary =	11.72 cfs @	12.45 hrs,	Volume=	1.413 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 3L: Full Site



Summary for Subcatchment 1S: Pre-Development DA-1 (WEST)

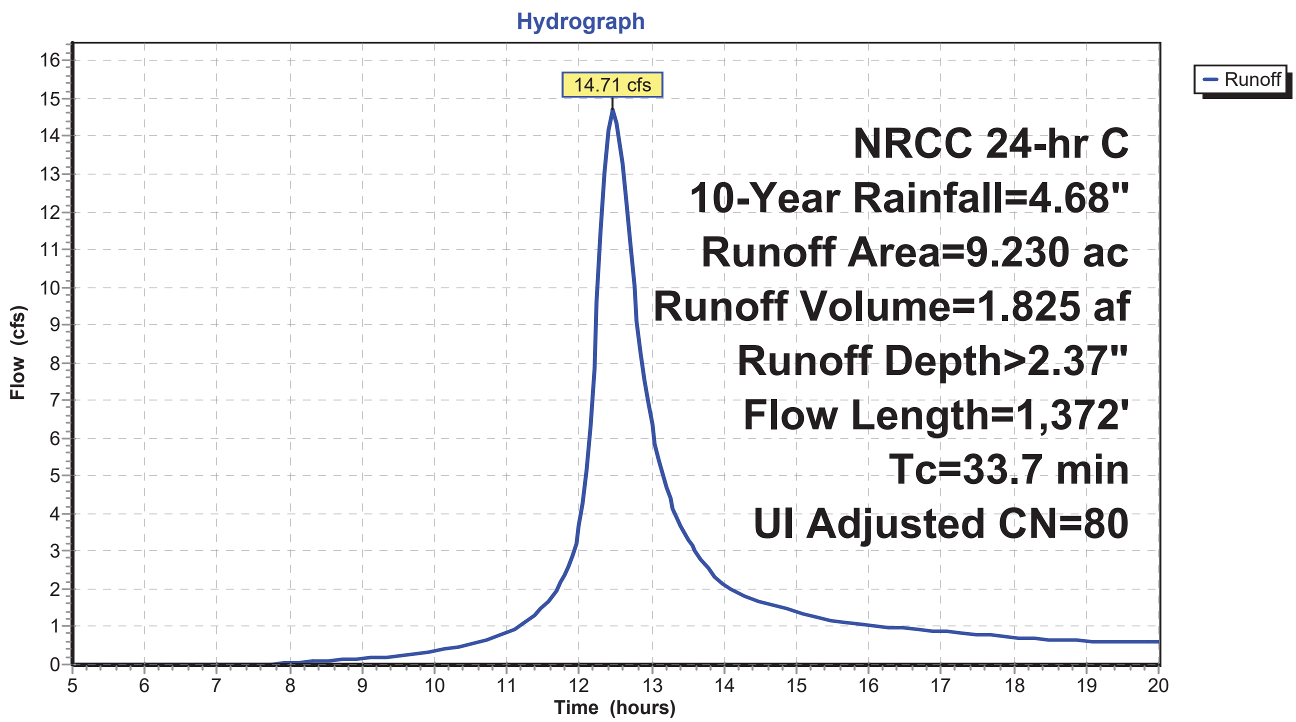
Runoff = 14.71 cfs @ 12.47 hrs, Volume= 1.825 af, Depth> 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Adj	Description
8.370	80		Pasture/grassland/range, Good, HSG D
0.510	79		Woods/grass comb., Good, HSG D
0.350	98		Unconnected pavement, HSG D
9.230	81	80	Weighted Average, UI Adjusted
8.880			96.21% Pervious Area
0.350			3.79% Impervious Area
0.350			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.0295	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
5.5	676	0.0870	2.06		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
15.9	596	0.0080	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
33.7	1,372	Total			

Subcatchment 1S: Pre-Development DA-1 (WEST)



Summary for Subcatchment 2S: Pre-Development DA-2 (EAST)

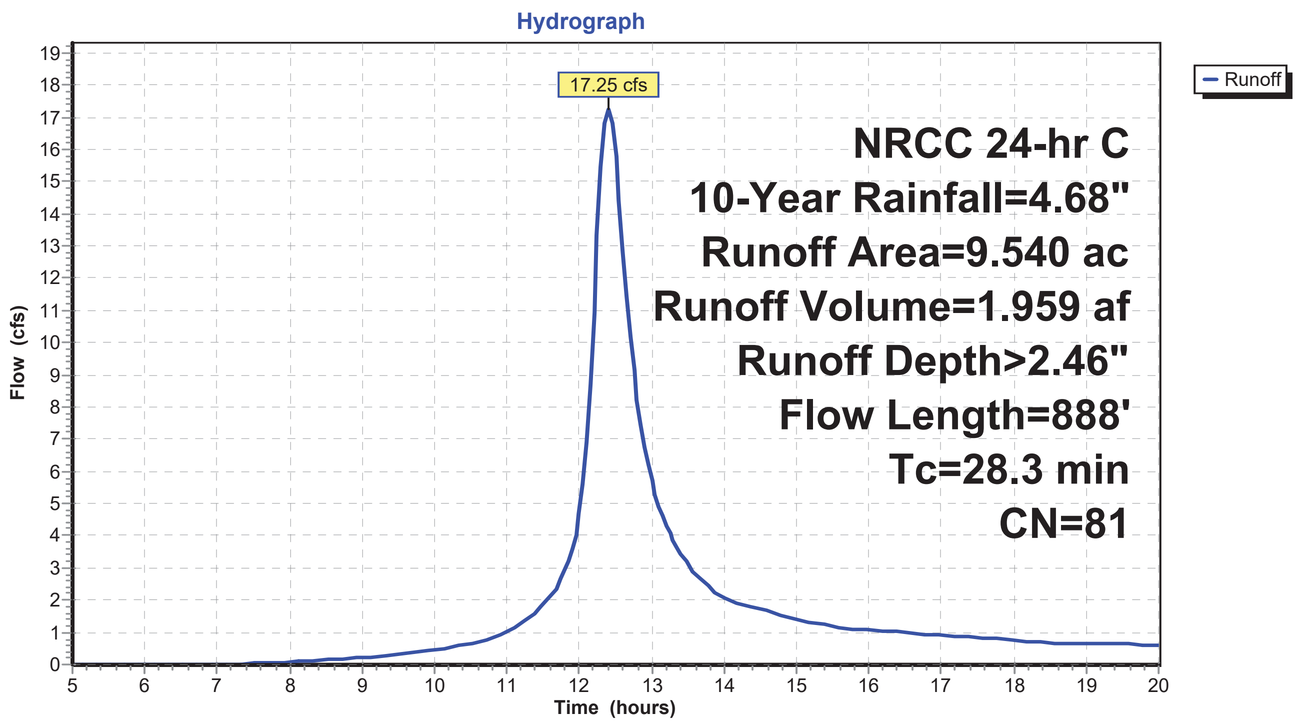
Runoff = 17.25 cfs @ 12.40 hrs, Volume= 1.959 af, Depth> 2.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
8.450	80	Pasture/grassland/range, Good, HSG D
0.370	79	Woods/grass comb., Good, HSG D
0.720	98	Unconnected pavement, HSG D
9.540	81	Weighted Average
8.820		92.45% Pervious Area
0.720		7.55% Impervious Area
0.720		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	100	0.0300	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
7.6	267	0.0070	0.59		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.5	521	0.0211	1.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
28.3	888	Total			

Subcatchment 2S: Pre-Development DA-2 (EAST)

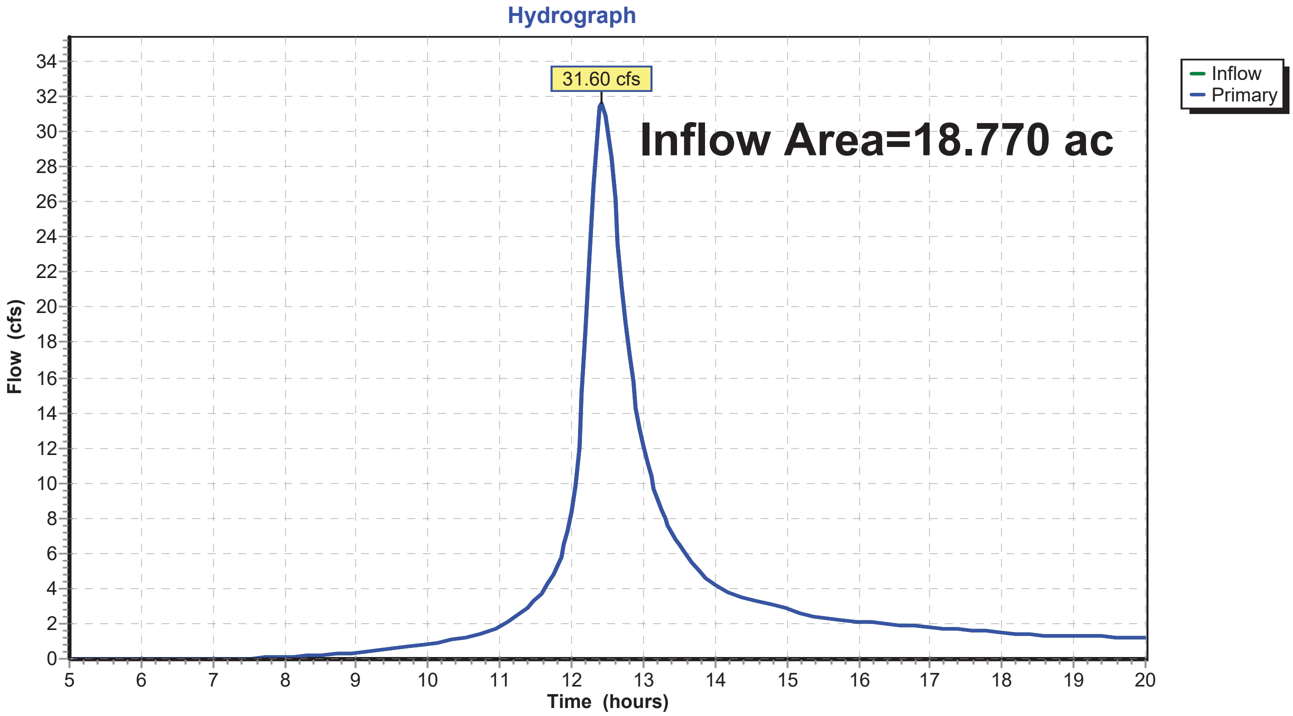


Summary for Link 3L: Full Site

Inflow Area =	18.770 ac,	5.70% Impervious,	Inflow Depth > 2.42"	for 10-Year event	
Inflow =	31.60 cfs @	12.43 hrs,	Volume=	3.784 af	
Primary =	31.60 cfs @	12.43 hrs,	Volume=	3.784 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 3L: Full Site



Summary for Subcatchment 1S: Pre-Development DA-1 (WEST)

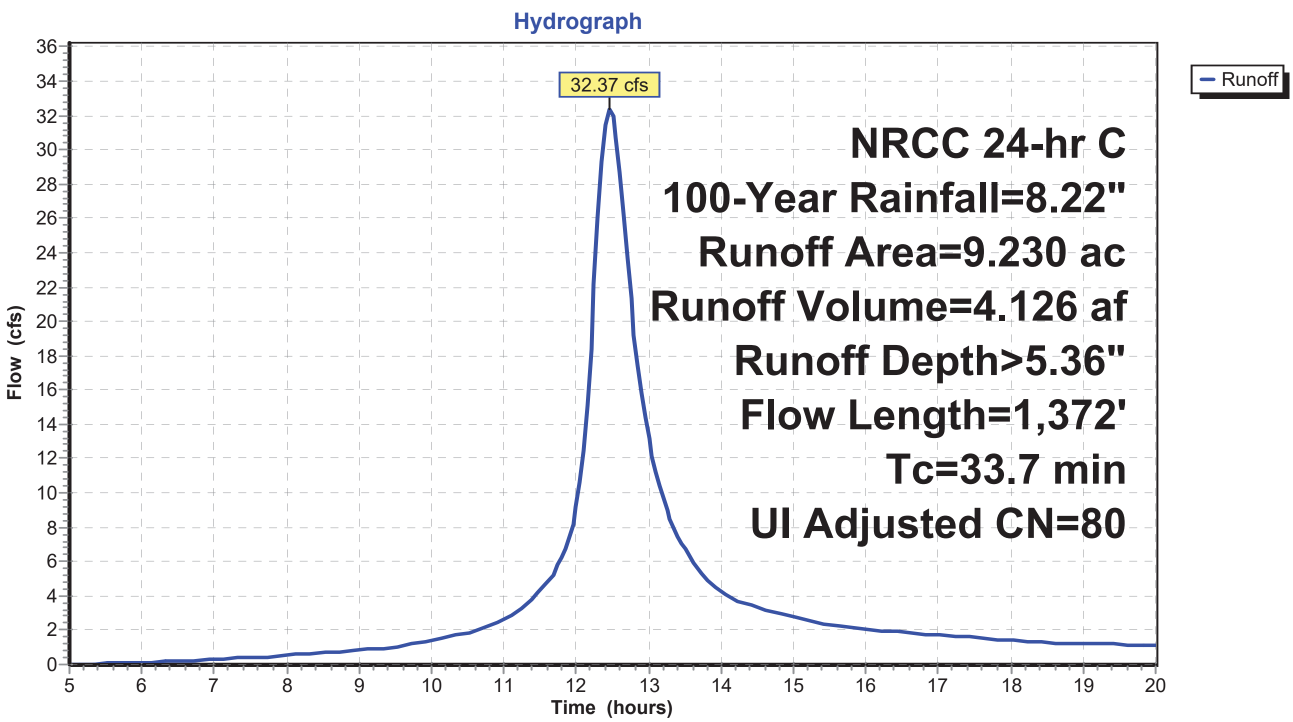
Runoff = 32.37 cfs @ 12.46 hrs, Volume= 4.126 af, Depth> 5.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Adj	Description
8.370	80		Pasture/grassland/range, Good, HSG D
0.510	79		Woods/grass comb., Good, HSG D
0.350	98		Unconnected pavement, HSG D
9.230	81	80	Weighted Average, UI Adjusted
8.880			96.21% Pervious Area
0.350			3.79% Impervious Area
0.350			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.0295	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
5.5	676	0.0870	2.06		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
15.9	596	0.0080	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
33.7	1,372	Total			

Subcatchment 1S: Pre-Development DA-1 (WEST)



Summary for Subcatchment 2S: Pre-Development DA-2 (EAST)

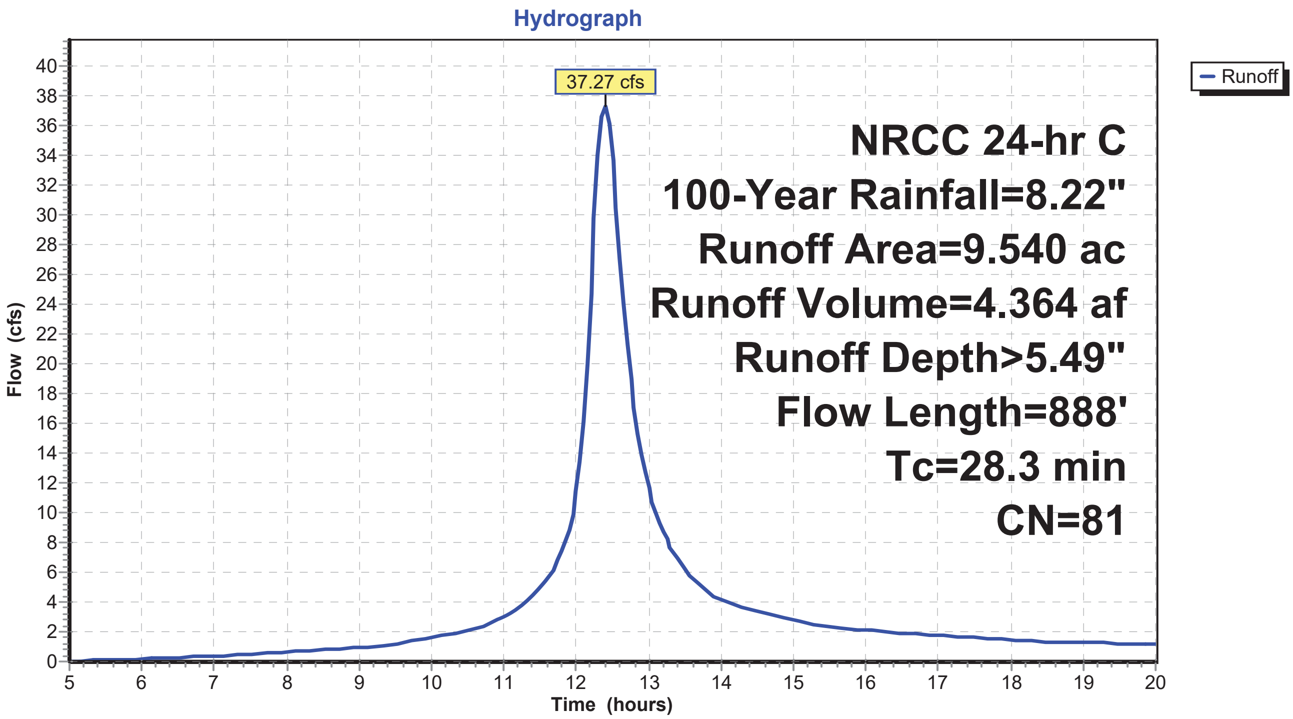
Runoff = 37.27 cfs @ 12.39 hrs, Volume= 4.364 af, Depth> 5.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
8.450	80	Pasture/grassland/range, Good, HSG D
0.370	79	Woods/grass comb., Good, HSG D
0.720	98	Unconnected pavement, HSG D
9.540	81	Weighted Average
8.820		92.45% Pervious Area
0.720		7.55% Impervious Area
0.720		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	100	0.0300	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
7.6	267	0.0070	0.59		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.5	521	0.0211	1.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
28.3	888	Total			

Subcatchment 2S: Pre-Development DA-2 (EAST)

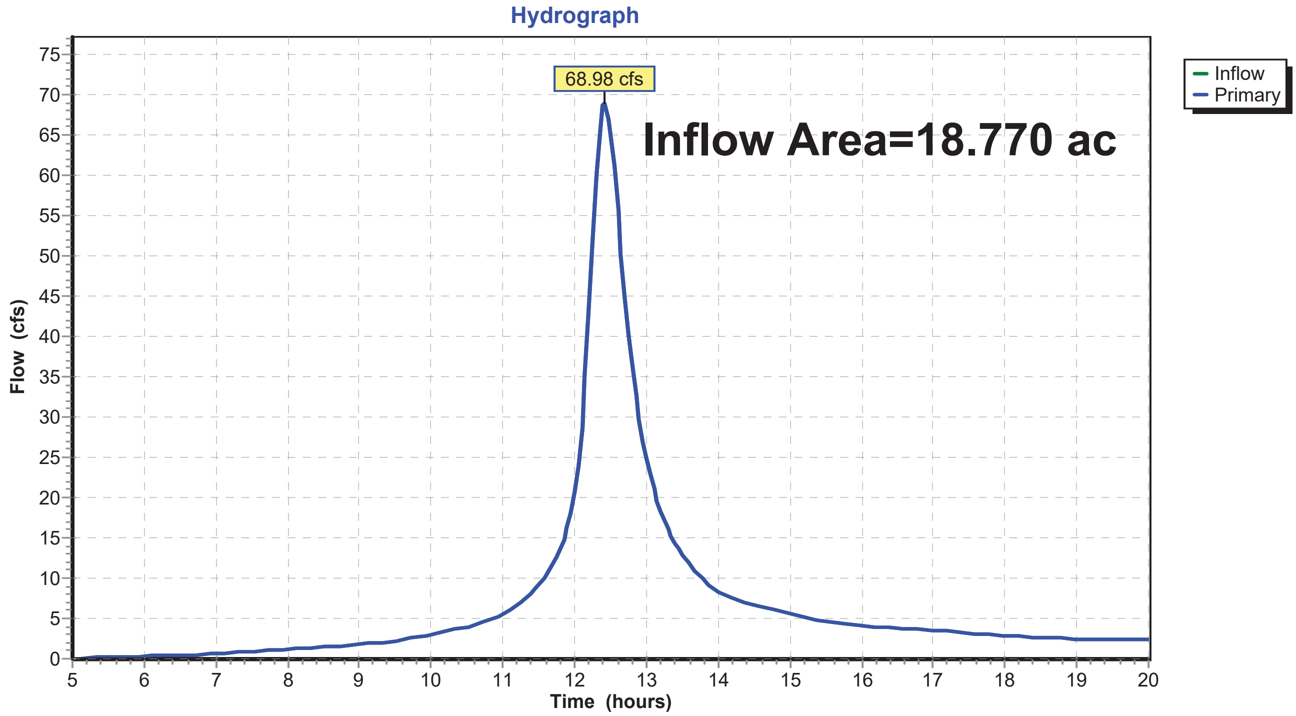


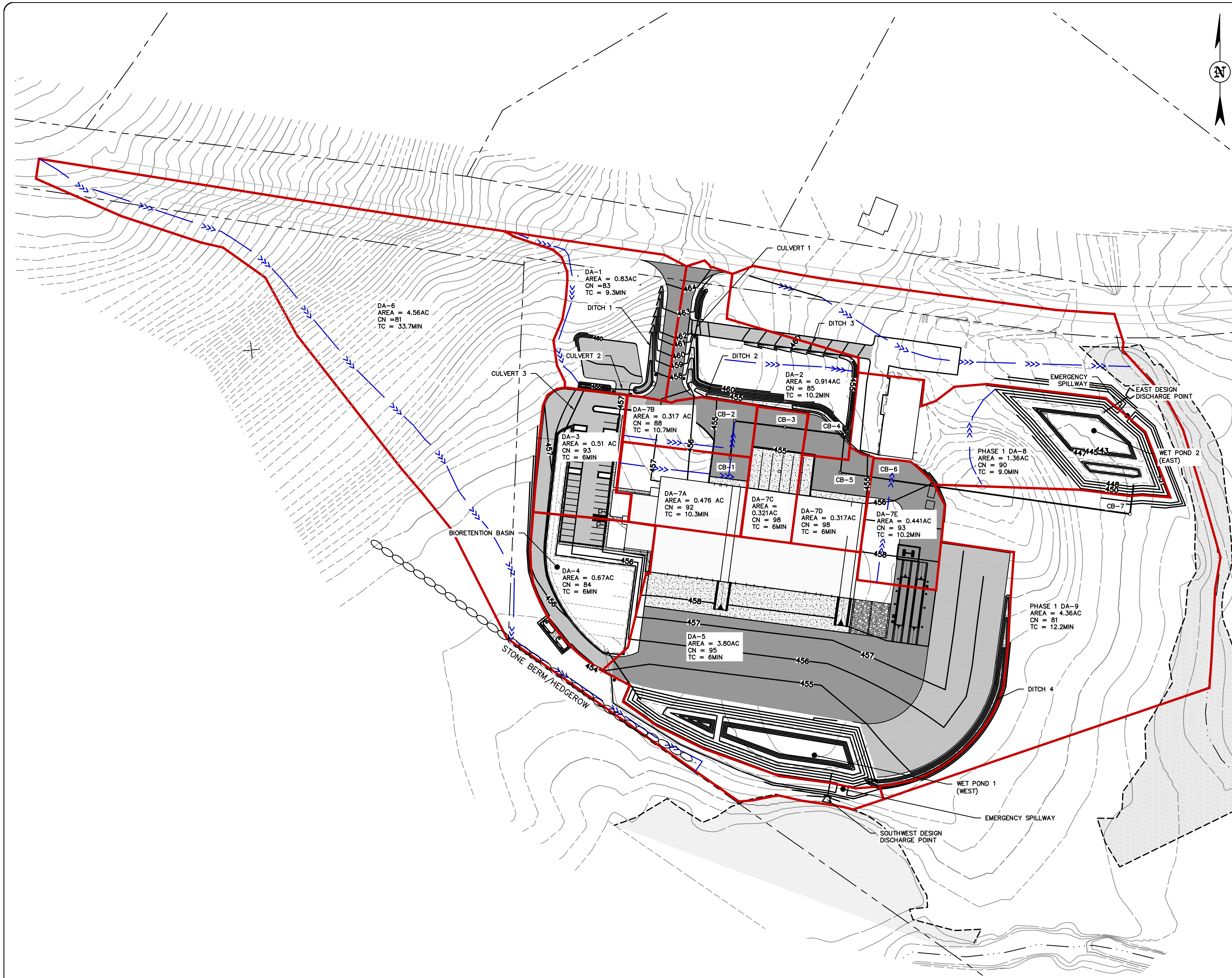
Summary for Link 3L: Full Site

Inflow Area =	18.770 ac,	5.70% Impervious,	Inflow Depth > 5.43"	for 100-Year event	
Inflow =	68.98 cfs @	12.42 hrs,	Volume=	8.490 af	
Primary =	68.98 cfs @	12.42 hrs,	Volume=	8.490 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 3L: Full Site





LEGEND:

	EXISTING GROUND MAJOR CONTOUR
	EXISTING GROUND MINOR CONTOUR
450	PROPOSED GRADING MAJOR CONTOUR
448	PROPOSED GRADING MINOR CONTOUR
	PROPERTY BOUNDARY
	PROPERTY BOUNDARY SETBACK
	EXISTING BUILDING
	JURISDICTIONAL FEDERAL WETLAND
	STANDARD DUTY PAVEMENT
	HEAVY DUTY PAVEMENT
	CONCRETE
	GRAVEL
	PROPOSED SWALE
	PROPOSED STORM SEWER
	3'X3' CATCH BASIN
	LOCKING GATE
	RUNOFF FLOWPATH
	DRAINAGE AREA BOUNDARY

NO.	REVISION	BY	DATE

EnSol
EnSol, Inc.
3000 Alt. Blvd.,
Grand Island, NY 14072
716.285.3920

DAVID A. LENOX, P.E.
NYSPE LICENSE NO. 093384

CLIENT:
DOM KAM LLC

SITE:
DOM-MAR RECYCLING AND TRANSFER FACILITY
TOWN OF WAWAYANDA
COUNTY OF ORANGE
STATE OF NEW YORK

PROJECT:
SITE PLAN AND SPECIAL USE PERMIT APPLICATION

TITLE:
POST DEVELOPMENT WATERSHED MAP

ISSUE:
REVIEW

DES:	DRN:	CHK:
DAL	SJD	DAL

PROJECT NO:	DATE:
029-A0001	JANUARY 2025

GRAPHIC SCALE:
0' 75' 150'

FILE:
Post Watershed Development Map.dwg

REV NO:	SHEET NO:
0	1

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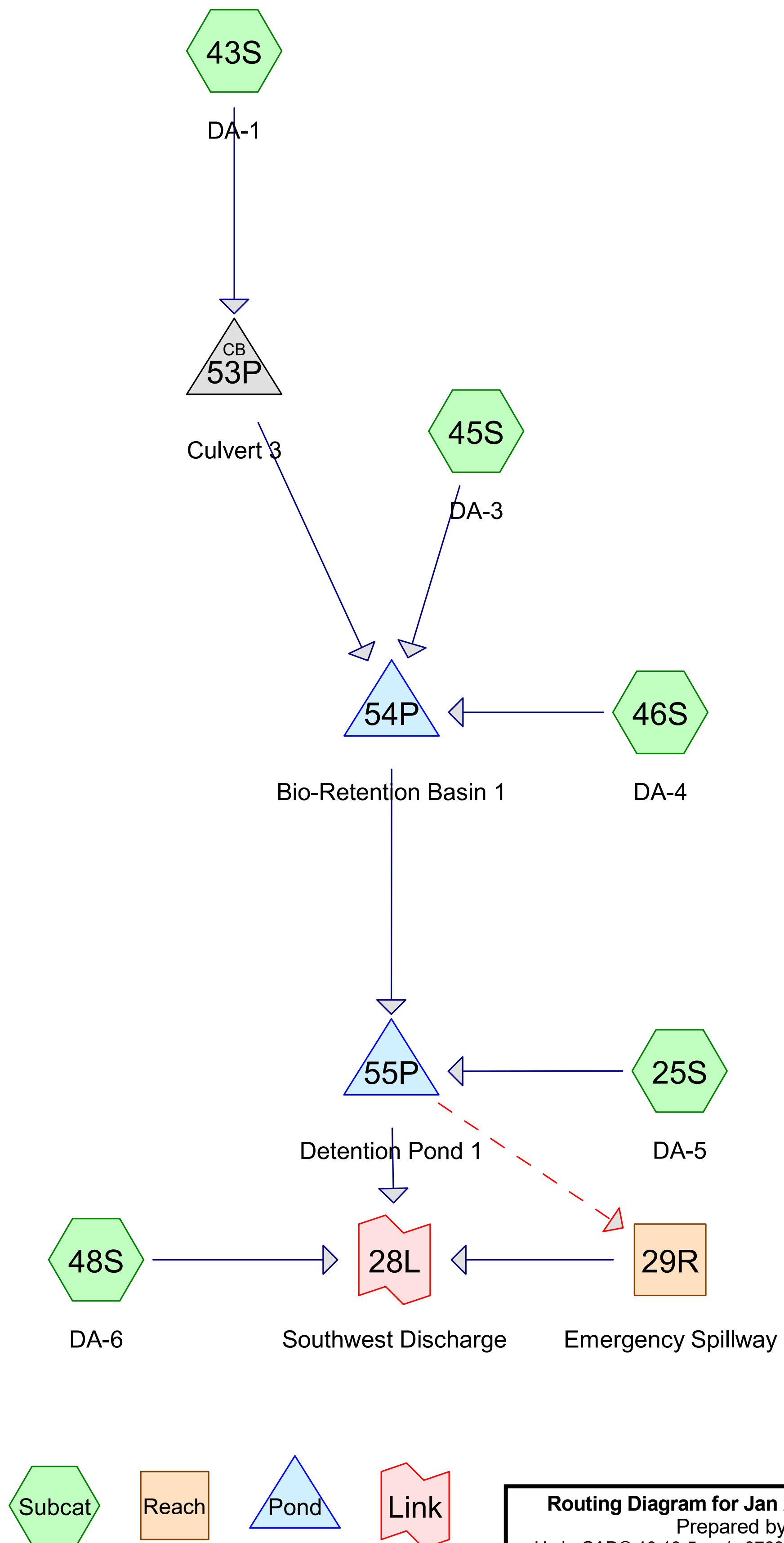


Routing Diagram for Jan 2025 Phase 1 Transfer Station WEST
Prepared by HP, Printed 1/15/2025
HydroCAD® 10.10-5a s/n 07607 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment 25S: DA-5

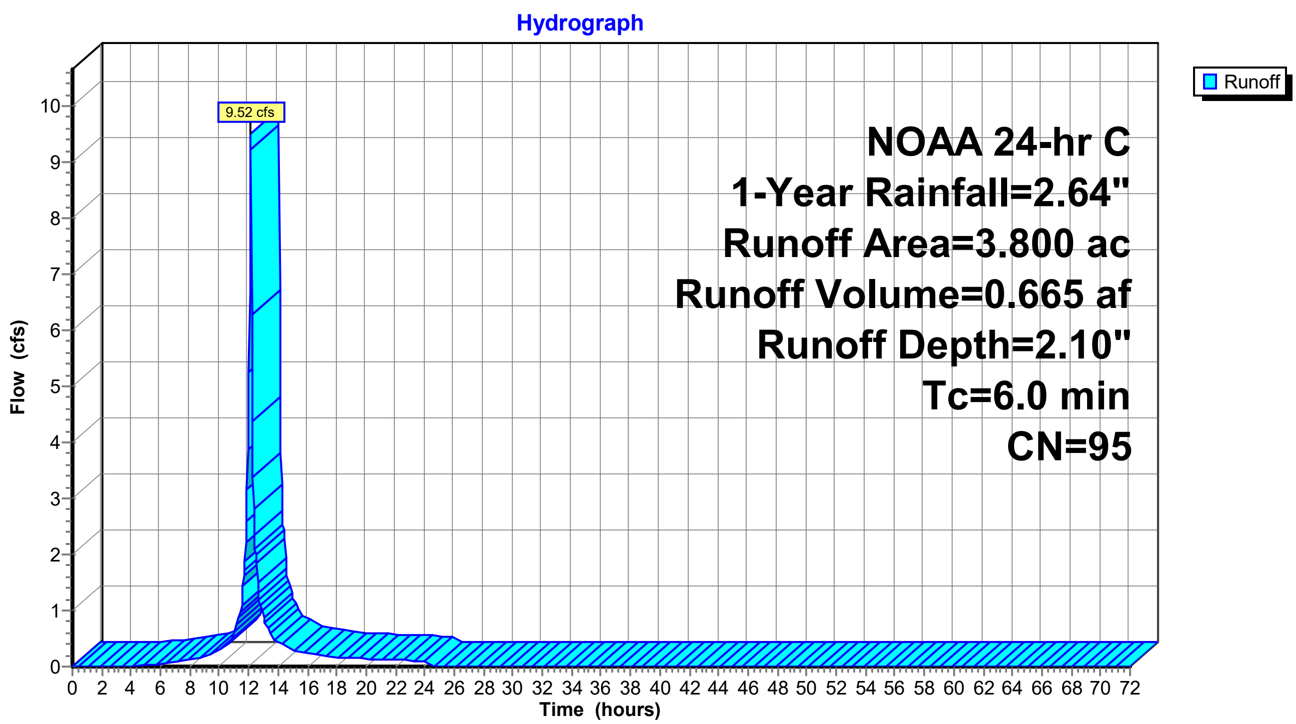
Runoff = 9.52 cfs @ 12.13 hrs, Volume= 0.665 af, Depth= 2.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.477	80	>75% Grass cover, Good, HSG D
2.905	98	Paved parking, HSG D
0.289	98	Water Surface, HSG D
0.063	91	Gravel roads, HSG D
0.066	80	>75% Grass cover, Good, HSG D
3.800	95	Weighted Average
0.606		15.95% Pervious Area
3.194		84.05% Impervious Area

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

Subcatchment 25S: DA-5



Summary for Subcatchment 29S: Ditch 4

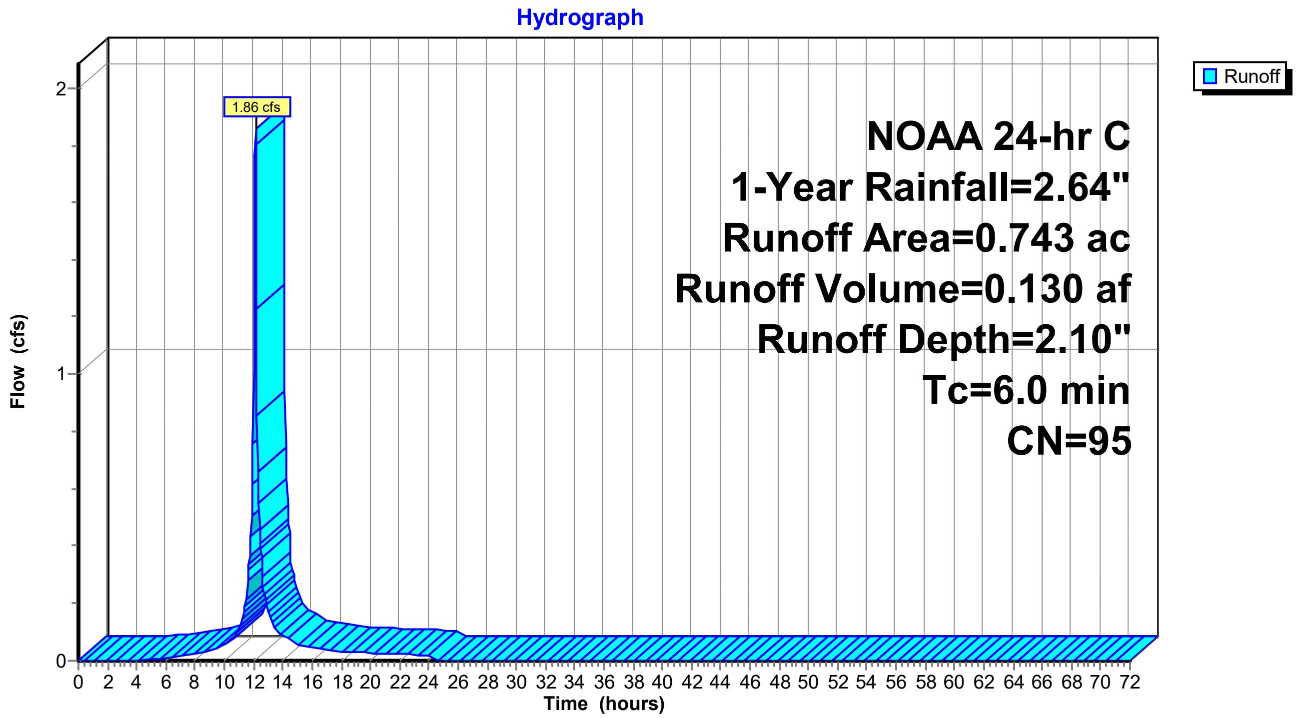
Runoff = 1.86 cfs @ 12.13 hrs, Volume= 0.130 af, Depth= 2.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.637	98	Paved roads w/curbs & sewers, HSG D
0.106	80	>75% Grass cover, Good, HSG D
0.743	95	Weighted Average
0.106		14.27% Pervious Area
0.637		85.73% Impervious Area

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

Subcatchment 29S: Ditch 4



Summary for Subcatchment 30S: Ditch 3

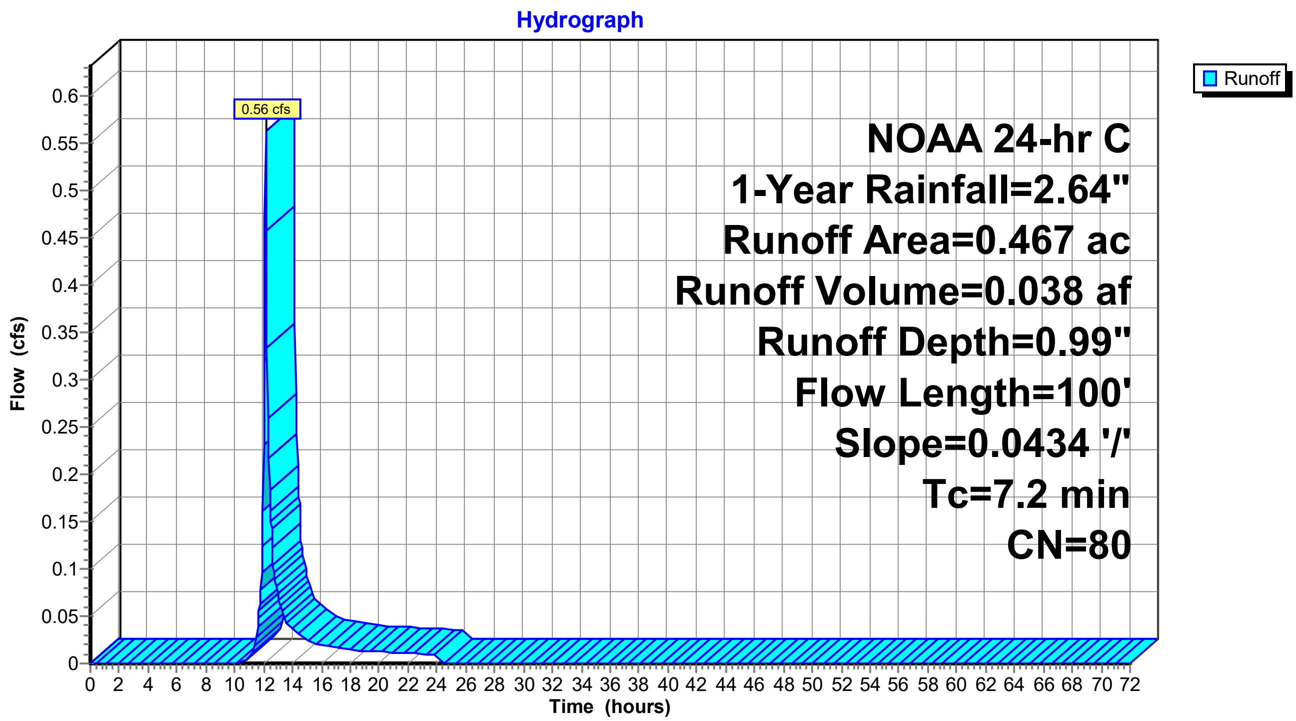
Runoff = 0.56 cfs @ 12.15 hrs, Volume= 0.038 af, Depth= 0.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.467	80	>75% Grass cover, Good, HSG D
0.467		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	100	0.0434	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"

Subcatchment 30S: Ditch 3



Summary for Subcatchment 31S: Culvert 1

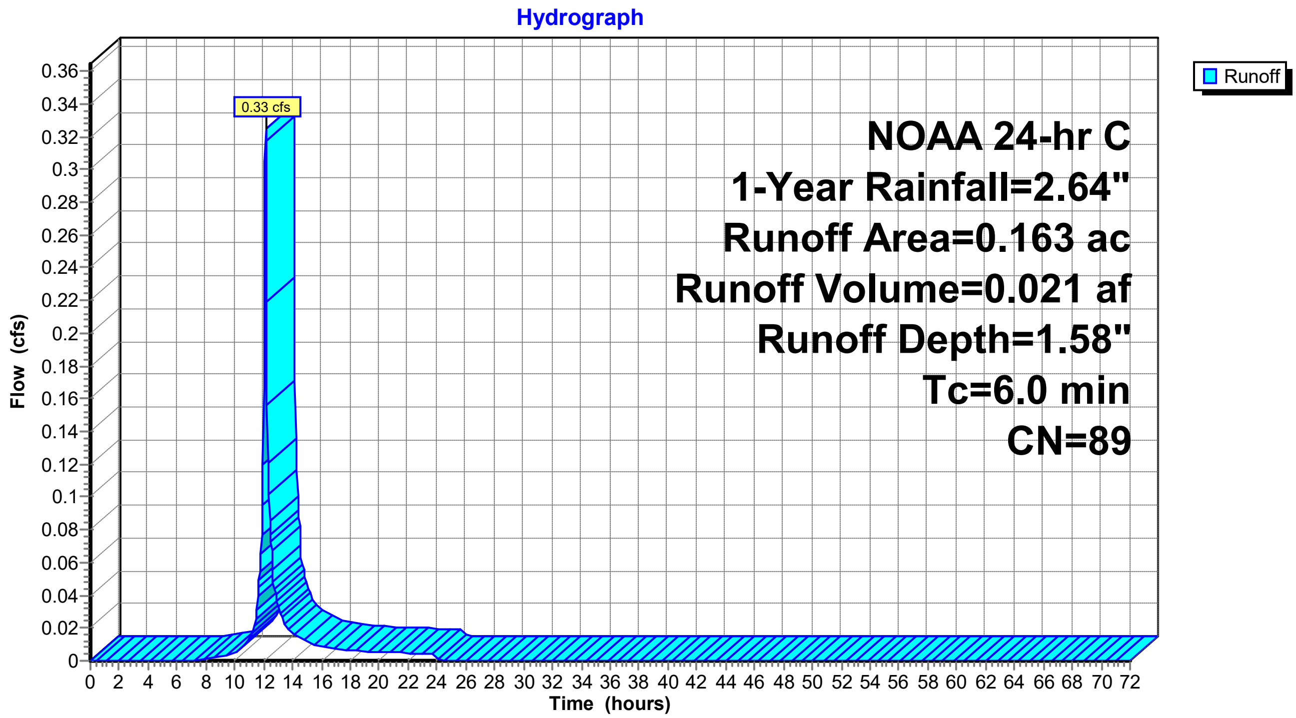
Runoff = 0.33 cfs @ 12.13 hrs, Volume= 0.021 af, Depth= 1.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.083	98	Paved parking, HSG D
0.080	80	>75% Grass cover, Good, HSG D
0.163	89	Weighted Average
0.080		49.08% Pervious Area
0.083		50.92% Impervious Area

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

Subcatchment 31S: Culvert 1



Summary for Subcatchment 43S: DA-1

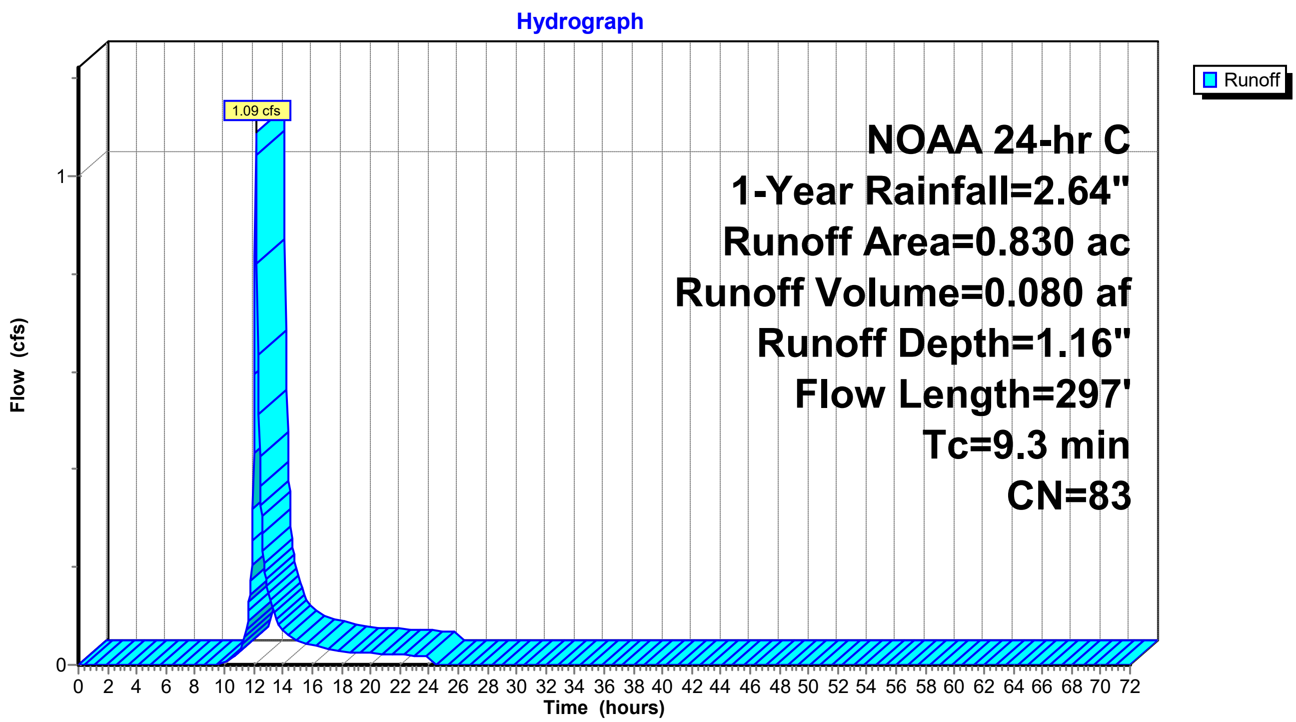
Runoff = 1.09 cfs @ 12.17 hrs, Volume= 0.080 af, Depth= 1.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.700	80	>75% Grass cover, Good, HSG D
0.130	98	Paved parking, HSG D
0.830	83	Weighted Average
0.700		84.34% Pervious Area
0.130		15.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	100	0.0990	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
1.7	197	0.0720	1.88		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.3	297	Total			

Subcatchment 43S: DA-1



Summary for Subcatchment 45S: DA-3

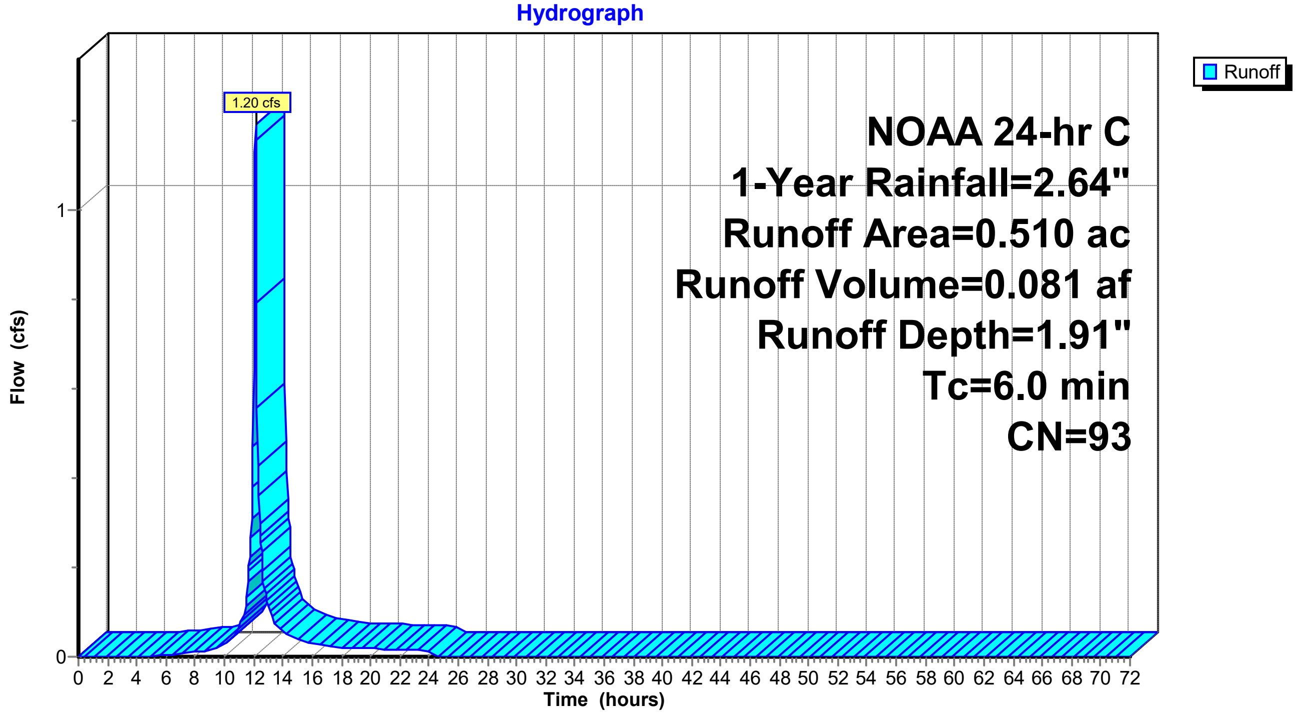
Runoff = 1.20 cfs @ 12.13 hrs, Volume= 0.081 af, Depth= 1.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.110	73	Brush, Good, HSG D
0.400	98	Paved parking, HSG D
0.510	93	Weighted Average
0.110		21.57% Pervious Area
0.400		78.43% Impervious Area

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

Subcatchment 45S: DA-3



Summary for Subcatchment 46S: DA-4

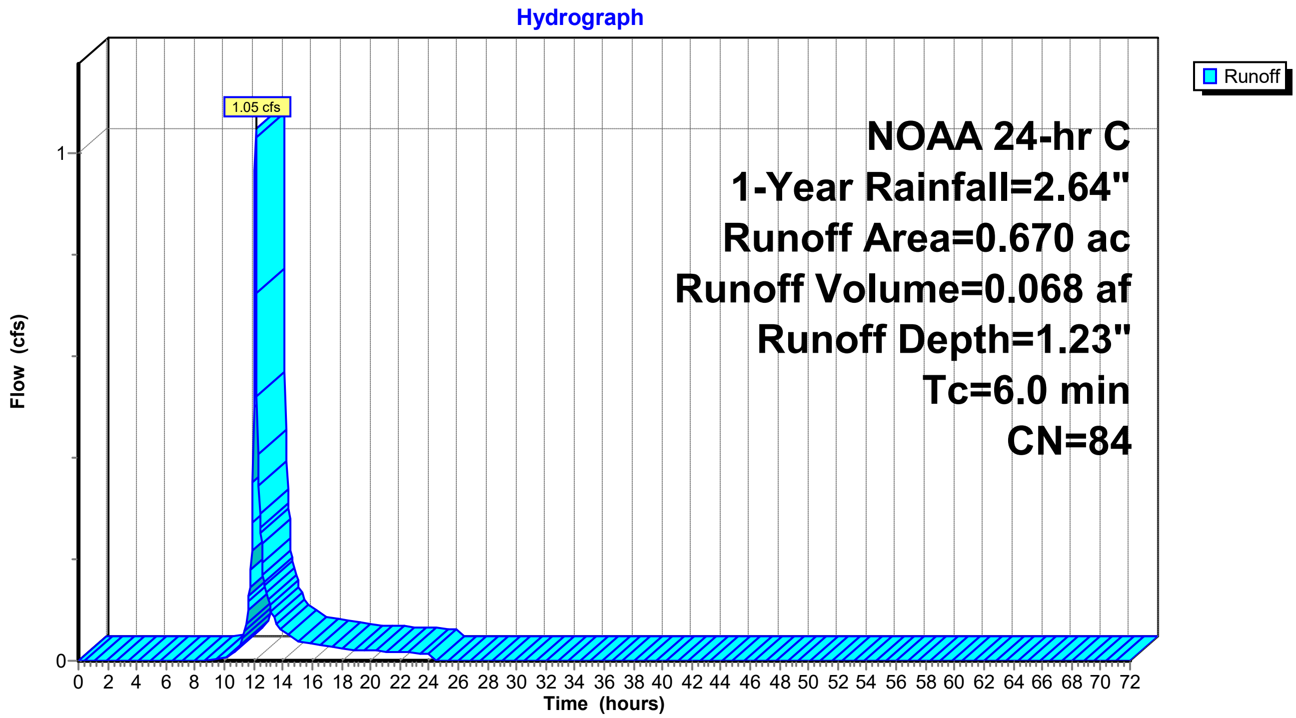
Runoff = 1.05 cfs @ 12.13 hrs, Volume= 0.068 af, Depth= 1.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.380	73	Brush, Good, HSG D
0.290	98	Paved parking, HSG D
0.670	84	Weighted Average
0.380		56.72% Pervious Area
0.290		43.28% Impervious Area

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

Subcatchment 46S: DA-4



Summary for Subcatchment 48S: DA-6

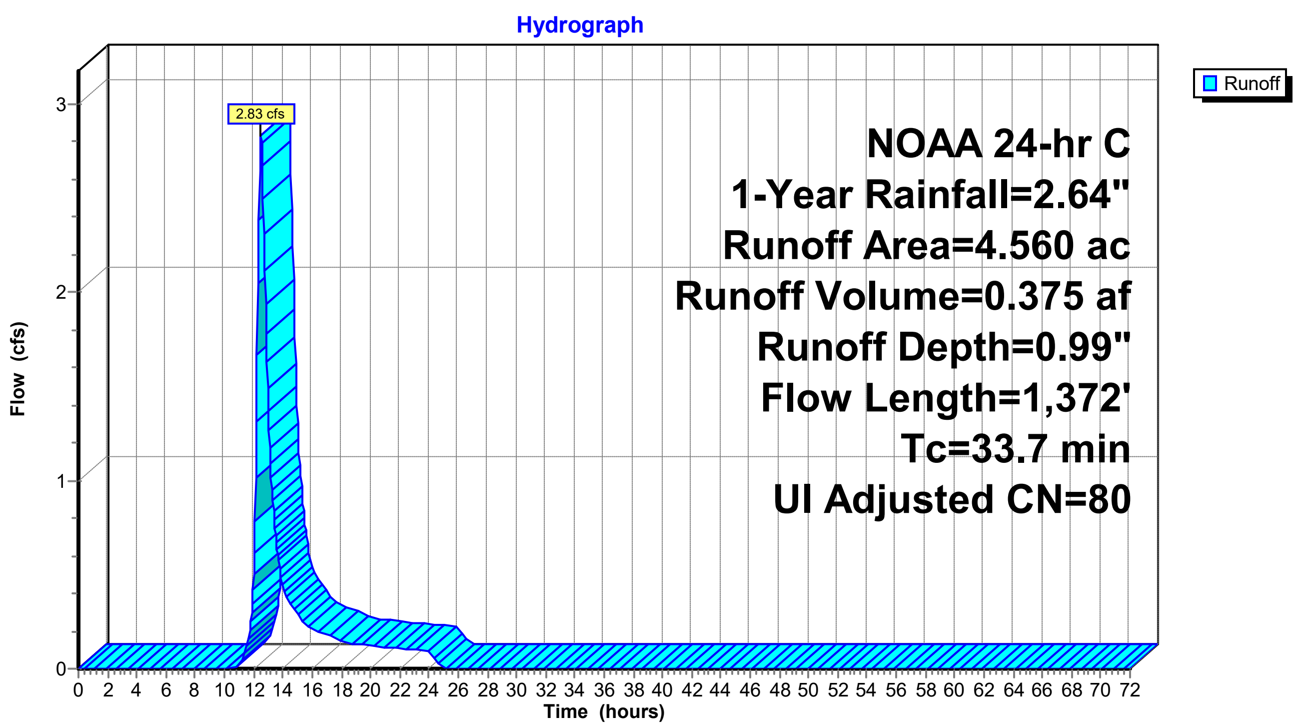
Runoff = 2.83 cfs @ 12.50 hrs, Volume= 0.375 af, Depth= 0.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Adj	Description
4.239	80		Pasture/grassland/range, Good, HSG D
0.127	79		Woods/grass comb., Good, HSG D
0.194	98		Unconnected pavement, HSG D
4.560	81	80	Weighted Average, UI Adjusted
4.366			95.75% Pervious Area
0.194			4.25% Impervious Area
0.194			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.0295	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
5.5	676	0.0870	2.06		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
15.9	596	0.0080	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
33.7	1,372	Total			

Subcatchment 48S: DA-6



Summary for Reach 29R: Emergency Spillway

Inflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af
Outflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

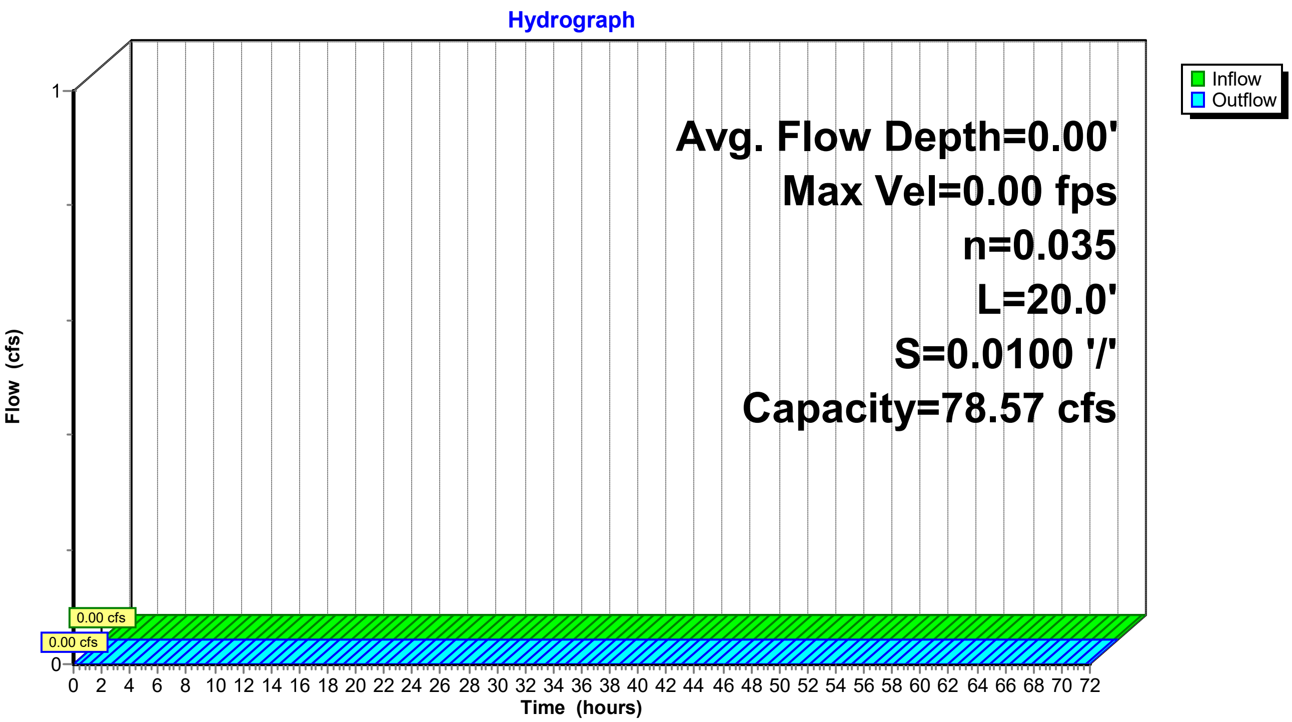
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.00' Flow Area= 20.0 sf, Capacity= 78.57 cfs

18.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 2.0 '/' Top Width= 22.00'
Length= 20.0' Slope= 0.0100 '/'
Inlet Invert= 453.75', Outlet Invert= 453.55'

‡


Reach 29R: Emergency Spillway



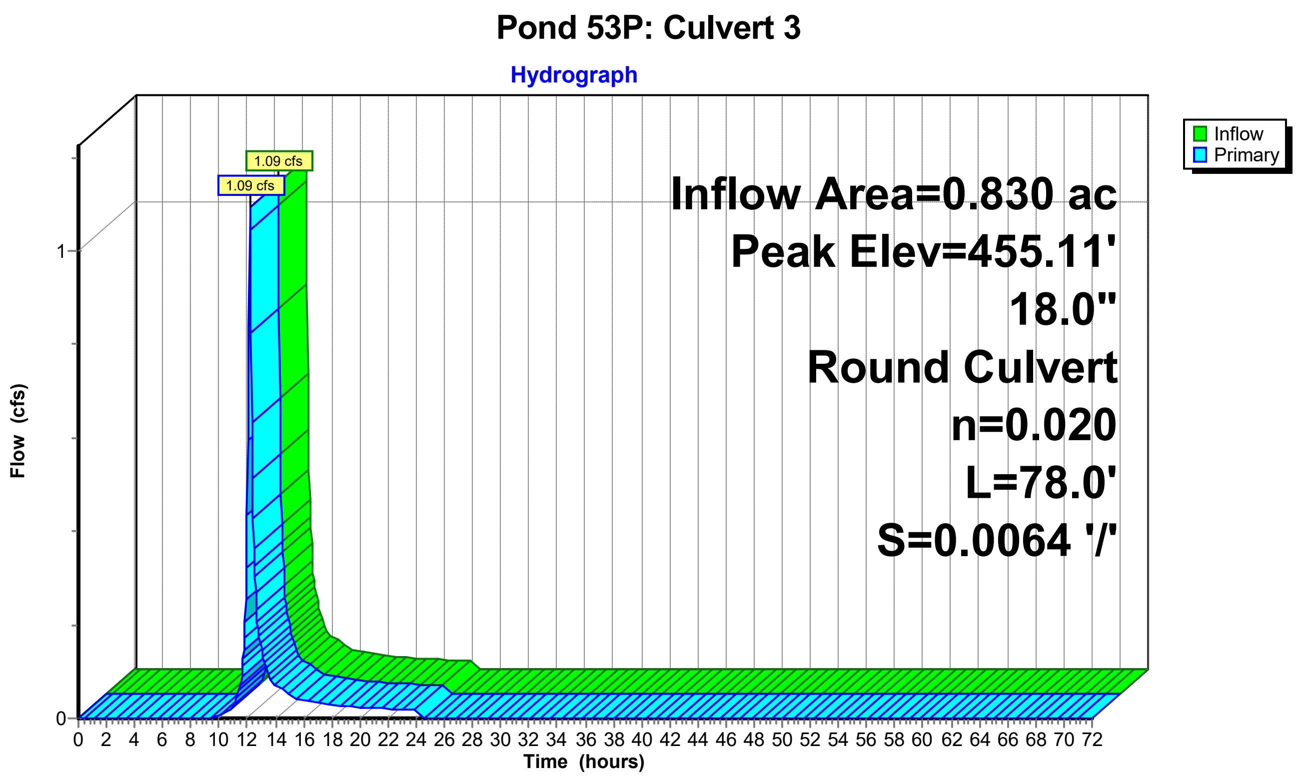
Summary for Pond 53P: Culvert 3

Inflow Area = 0.830 ac, 15.66% Impervious, Inflow Depth = 1.16" for 1-Year event
Inflow = 1.09 cfs @ 12.17 hrs, Volume= 0.080 af
Outflow = 1.09 cfs @ 12.17 hrs, Volume= 0.080 af, Atten= 0%, Lag= 0.0 min
Primary = 1.09 cfs @ 12.17 hrs, Volume= 0.080 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 455.11' @ 12.17 hrs
Flood Elev= 457.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	454.50'	**18.0" Round Culvert** L= 78.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 454.50' / 454.00' S= 0.0064 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.06 cfs @ 12.17 hrs HW=455.10' TW=454.19' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.06 cfs @ 2.37 fps)



Summary for Pond 54P: Bio-Retention Basin 1

Inflow Area = 2.010 ac, 40.80% Impervious, Inflow Depth = 1.37" for 1-Year event
Inflow = 3.28 cfs @ 12.14 hrs, Volume= 0.230 af
Outflow = 0.09 cfs @ 16.78 hrs, Volume= 0.230 af, Atten= 97%, Lag= 278.3 min
Primary = 0.09 cfs @ 16.78 hrs, Volume= 0.230 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 454.43' @ 16.78 hrs Surf.Area= 14,710 sf Storage= 6,116 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 685.5 min (1,515.9 - 830.4)

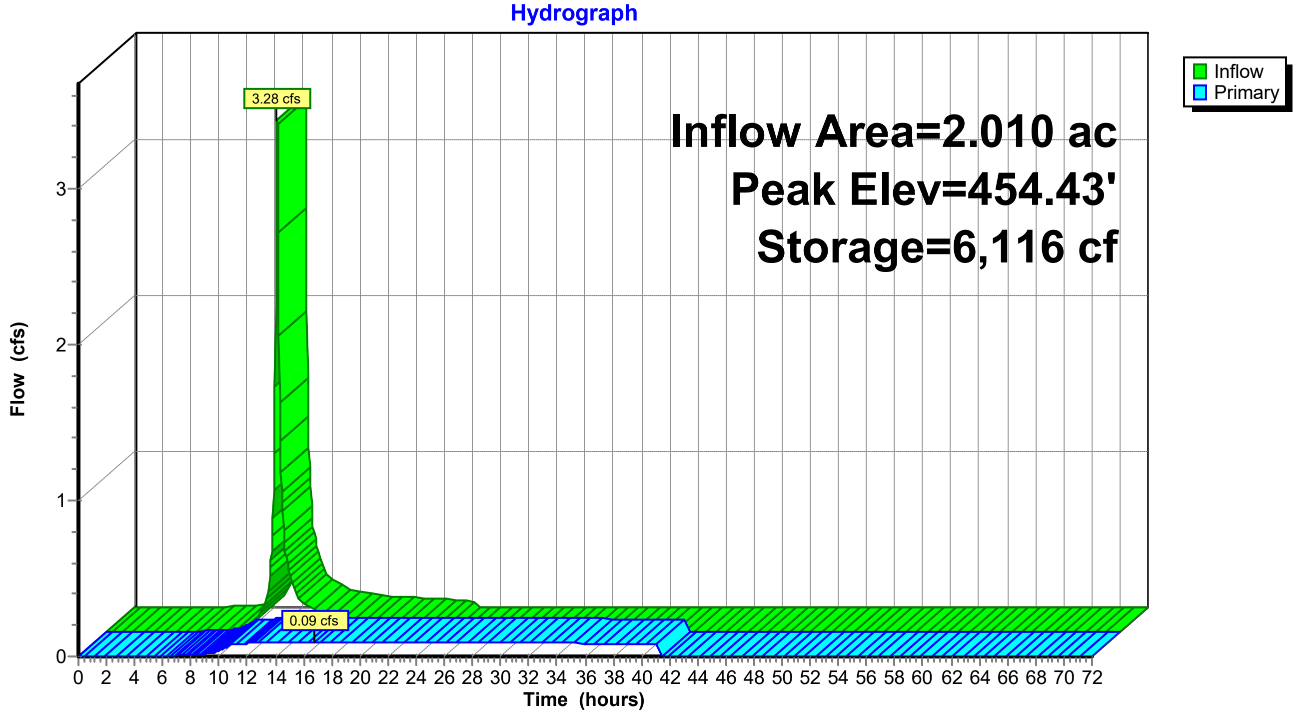
Volume	Invert	Avail.Storage	Storage Description
#1	454.00'	22,875 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
454.00	14,000	0	0
455.50	16,500	22,875	22,875

Device	Routing	Invert	Outlet Devices
#1	Primary	450.80'	**18.0" Round Culvert** L= 85.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 450.80' / 450.20' S= 0.0071 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	454.50'	**36.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	454.00'	**0.250 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 448.80'

Primary OutFlow Max=0.09 cfs @ 16.78 hrs HW=454.43' TW=451.67' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.09 cfs of 11.16 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  └─**3=Exfiltration** (Controls 0.09 cfs)

Pond 54P: Bio-Retention Basin 1



Summary for Pond 55P: Detention Pond 1

Inflow Area = 5.810 ac, 69.09% Impervious, Inflow Depth = 1.85" for 1-Year event
Inflow = 9.61 cfs @ 12.13 hrs, Volume= 0.895 af
Outflow = 0.27 cfs @ 17.51 hrs, Volume= 0.864 af, Atten= 97%, Lag= 322.7 min
Primary = 0.27 cfs @ 17.51 hrs, Volume= 0.864 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Starting Elev= 450.20' Storage= 28,039 cf
Peak Elev= 451.67' @ 17.51 hrs Storage= 50,324 cf (22,285 cf above start)

Plug-Flow detention time= 2,507.9 min calculated for 0.221 af (25% of inflow)
Center-of-Mass det. time= 996.6 min (1,972.9 - 976.3)

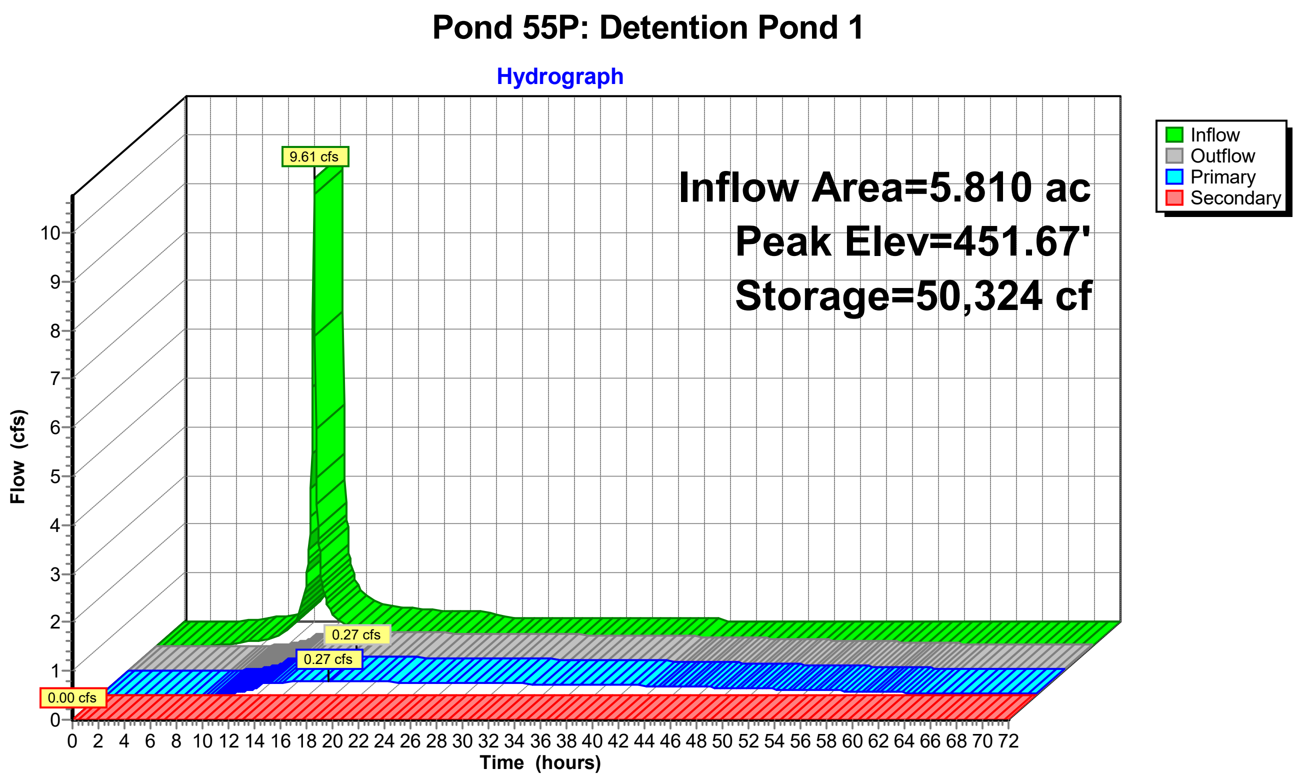
Volume	Invert	Avail.Storage	Storage Description
#1	446.00'	98,470 cf	**Custom Stage Data** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
446.00	0
446.20	787
447.00	4,409
448.00	9,925
449.20	18,016
450.20	28,039
451.00	39,196
452.00	55,835
453.00	75,086
454.00	98,470

Device	Routing	Invert	Outlet Devices
#1	Primary	450.20'	**18.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 450.20' / 450.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	450.20'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	451.75'	**1.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	452.60'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	453.75'	**Channel/Reach** using Reach 29R: Emergency Spillway

Primary OutFlow Max=0.27 cfs @ 17.51 hrs HW=451.67' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.27 cfs of 5.35 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.27 cfs @ 5.58 fps)
  ├─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=450.20' TW=453.75' (Dynamic Tailwater)
└─**5=Channel/Reach** (Channel Controls 0.00 cfs)

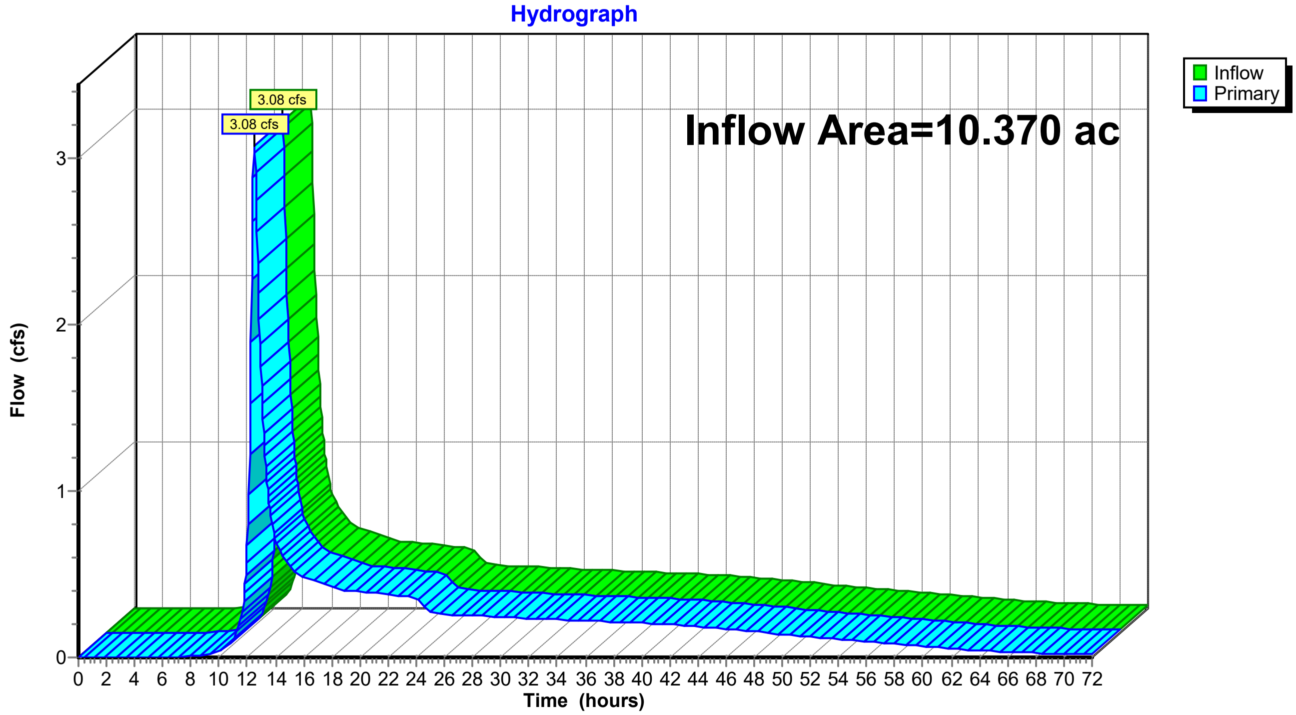


Summary for Link 28L: Southwest Discharge

Inflow Area = 10.370 ac, 40.58% Impervious, Inflow Depth > 1.43" for 1-Year event
Inflow = 3.08 cfs @ 12.50 hrs, Volume= 1.239 af
Primary = 3.08 cfs @ 12.50 hrs, Volume= 1.239 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 28L: Southwest Discharge



Summary for Subcatchment 25S: DA-5

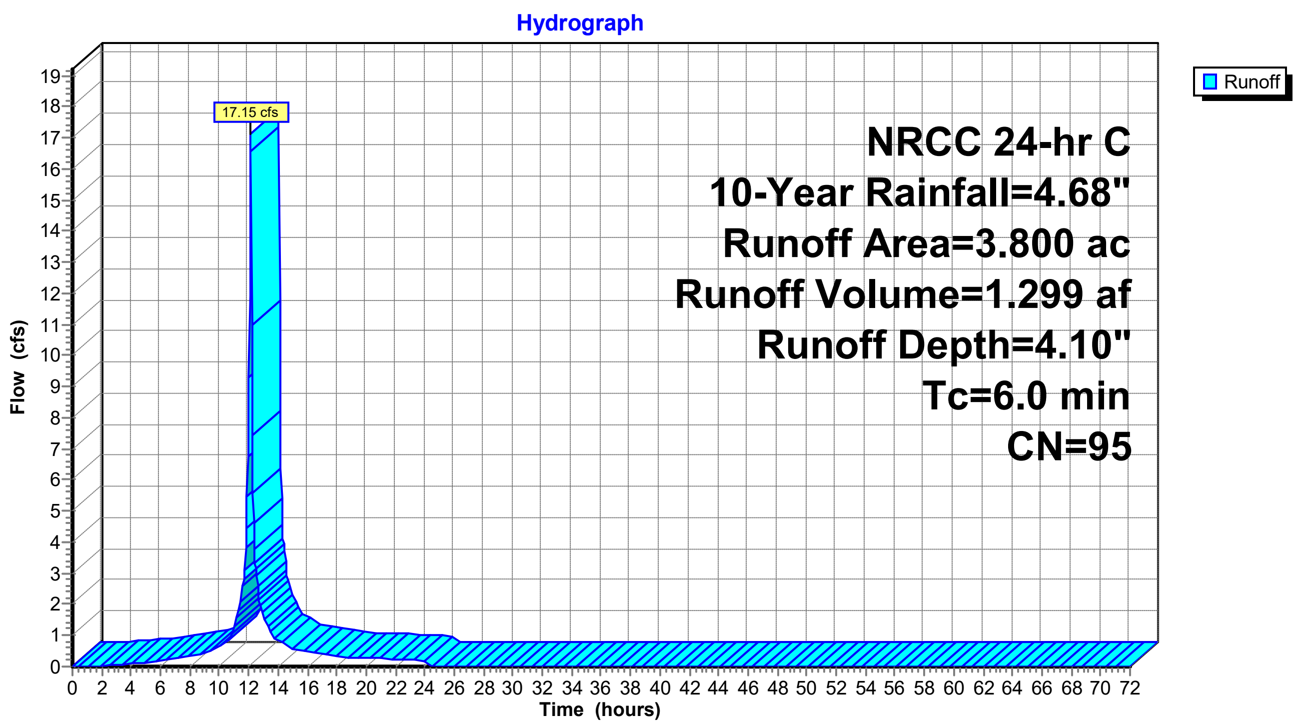
Runoff = 17.15 cfs @ 12.13 hrs, Volume= 1.299 af, Depth= 4.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
0.477	80	>75% Grass cover, Good, HSG D
2.905	98	Paved parking, HSG D
0.289	98	Water Surface, HSG D
0.063	91	Gravel roads, HSG D
0.066	80	>75% Grass cover, Good, HSG D
3.800	95	Weighted Average
0.606		15.95% Pervious Area
3.194		84.05% Impervious Area

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

Subcatchment 25S: DA-5



Summary for Subcatchment 29S: Ditch 4

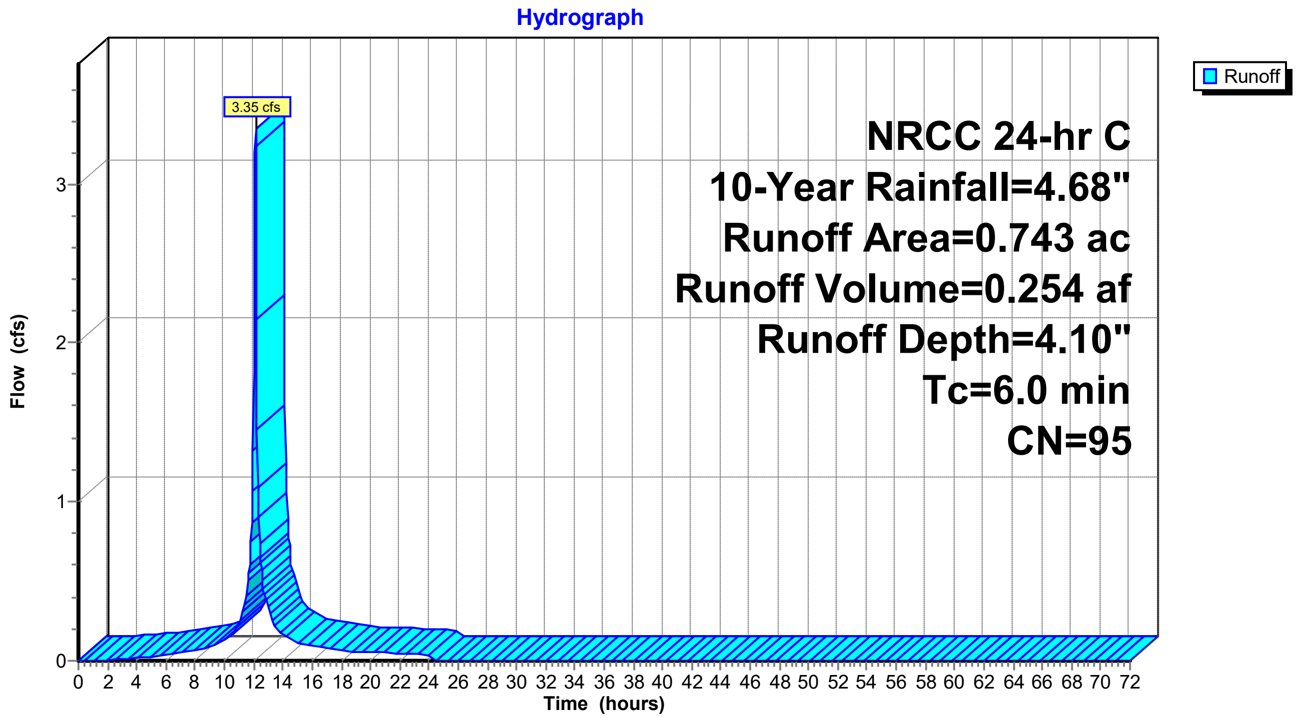
Runoff = 3.35 cfs @ 12.13 hrs, Volume= 0.254 af, Depth= 4.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
0.637	98	Paved roads w/curbs & sewers, HSG D
0.106	80	>75% Grass cover, Good, HSG D
0.743	95	Weighted Average
0.106		14.27% Pervious Area
0.637		85.73% Impervious Area

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

Subcatchment 29S: Ditch 4



Summary for Subcatchment 30S: Ditch 3

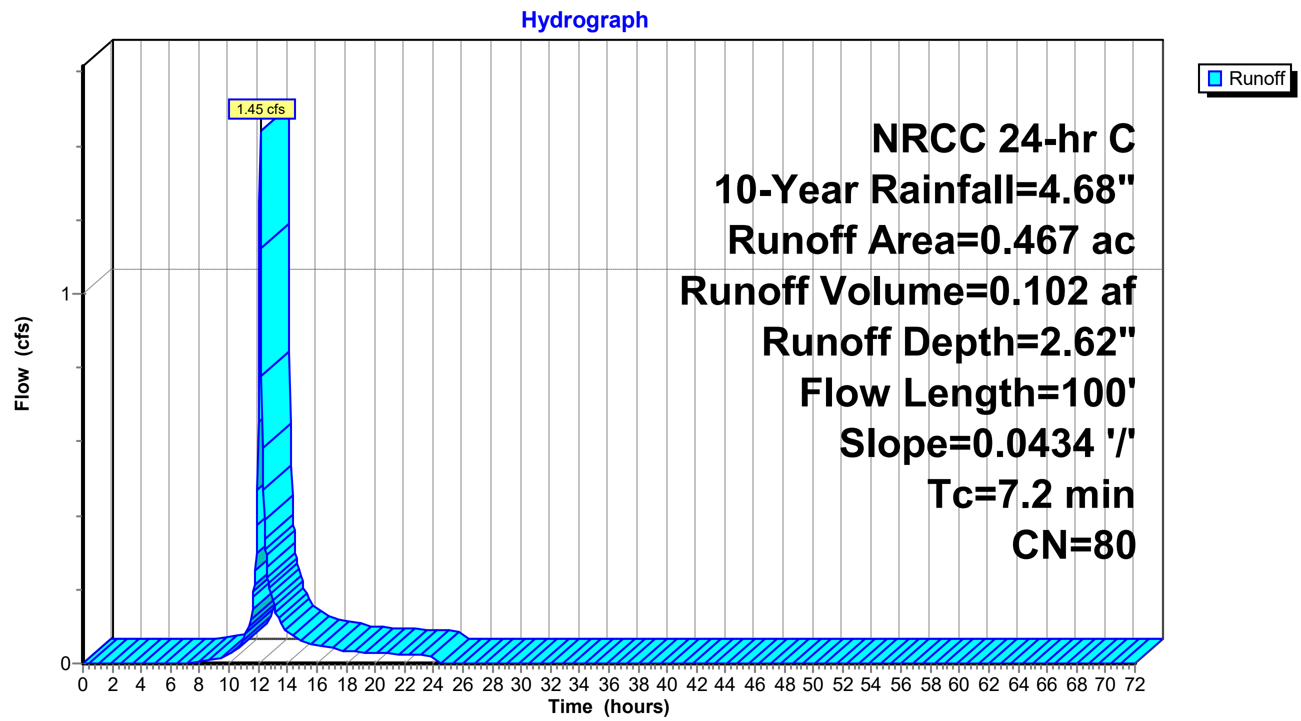
Runoff = 1.45 cfs @ 12.14 hrs, Volume= 0.102 af, Depth= 2.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
0.467	80	>75% Grass cover, Good, HSG D
0.467		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	100	0.0434	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"

Subcatchment 30S: Ditch 3



Summary for Subcatchment 31S: Culvert 1

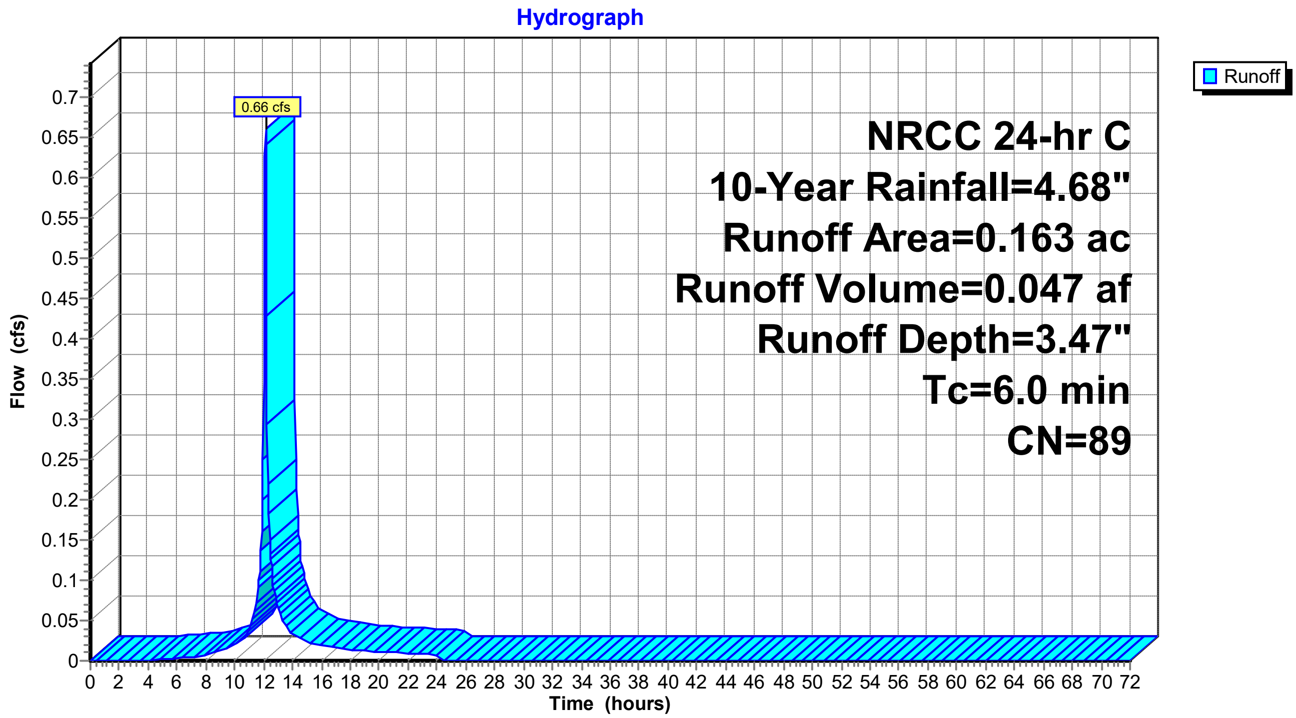
Runoff = 0.66 cfs @ 12.13 hrs, Volume= 0.047 af, Depth= 3.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
0.083	98	Paved parking, HSG D
0.080	80	>75% Grass cover, Good, HSG D
0.163	89	Weighted Average
0.080		49.08% Pervious Area
0.083		50.92% Impervious Area

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

Subcatchment 31S: Culvert 1



Summary for Subcatchment 43S: DA-1

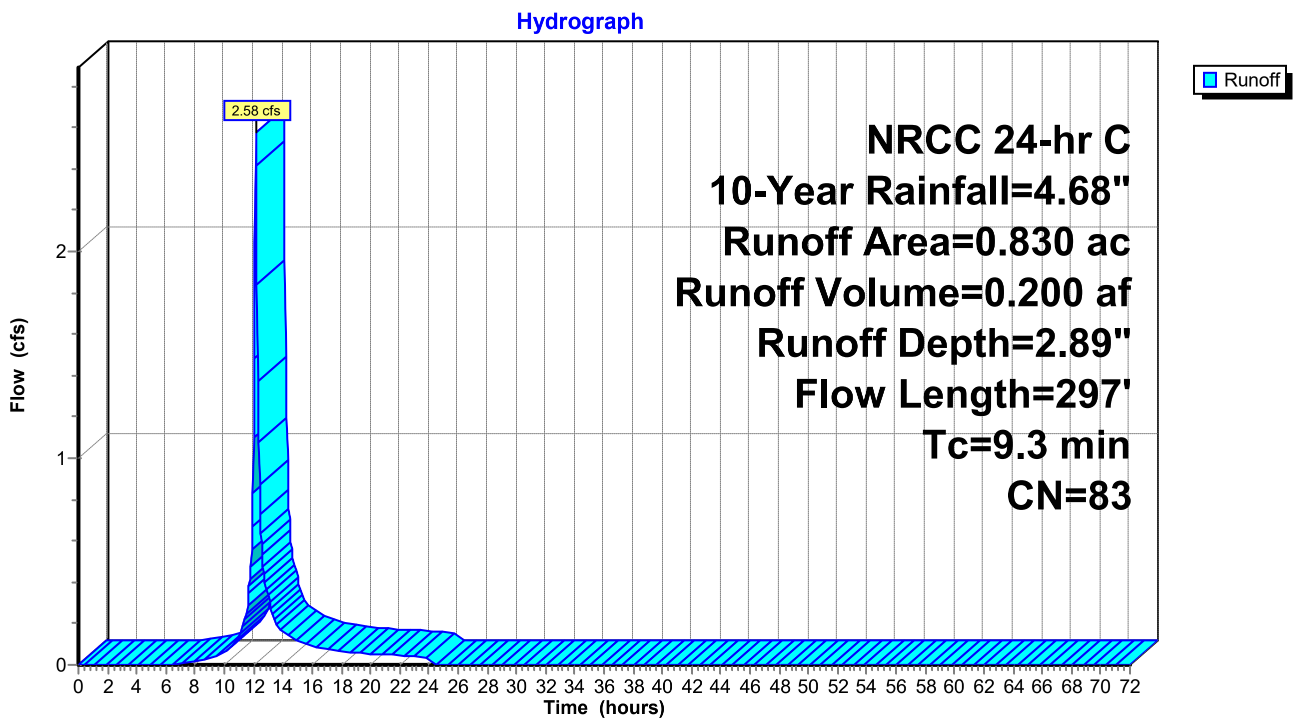
Runoff = 2.58 cfs @ 12.16 hrs, Volume= 0.200 af, Depth= 2.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
0.700	80	>75% Grass cover, Good, HSG D
0.130	98	Paved parking, HSG D
0.830	83	Weighted Average
0.700		84.34% Pervious Area
0.130		15.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	100	0.0990	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
1.7	197	0.0720	1.88		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.3	297	Total			

Subcatchment 43S: DA-1



Summary for Subcatchment 45S: DA-3

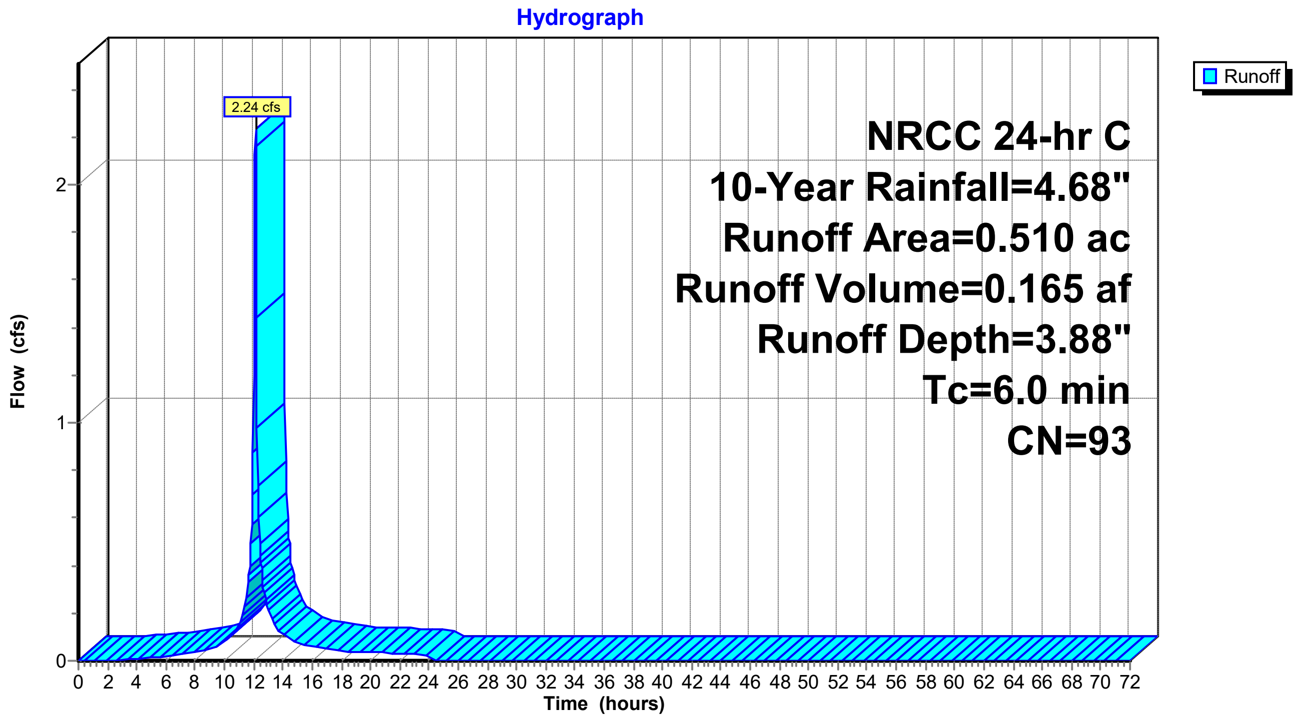
Runoff = 2.24 cfs @ 12.13 hrs, Volume= 0.165 af, Depth= 3.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
0.110	73	Brush, Good, HSG D
0.400	98	Paved parking, HSG D
0.510	93	Weighted Average
0.110		21.57% Pervious Area
0.400		78.43% Impervious Area

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

Subcatchment 45S: DA-3



Summary for Subcatchment 46S: DA-4

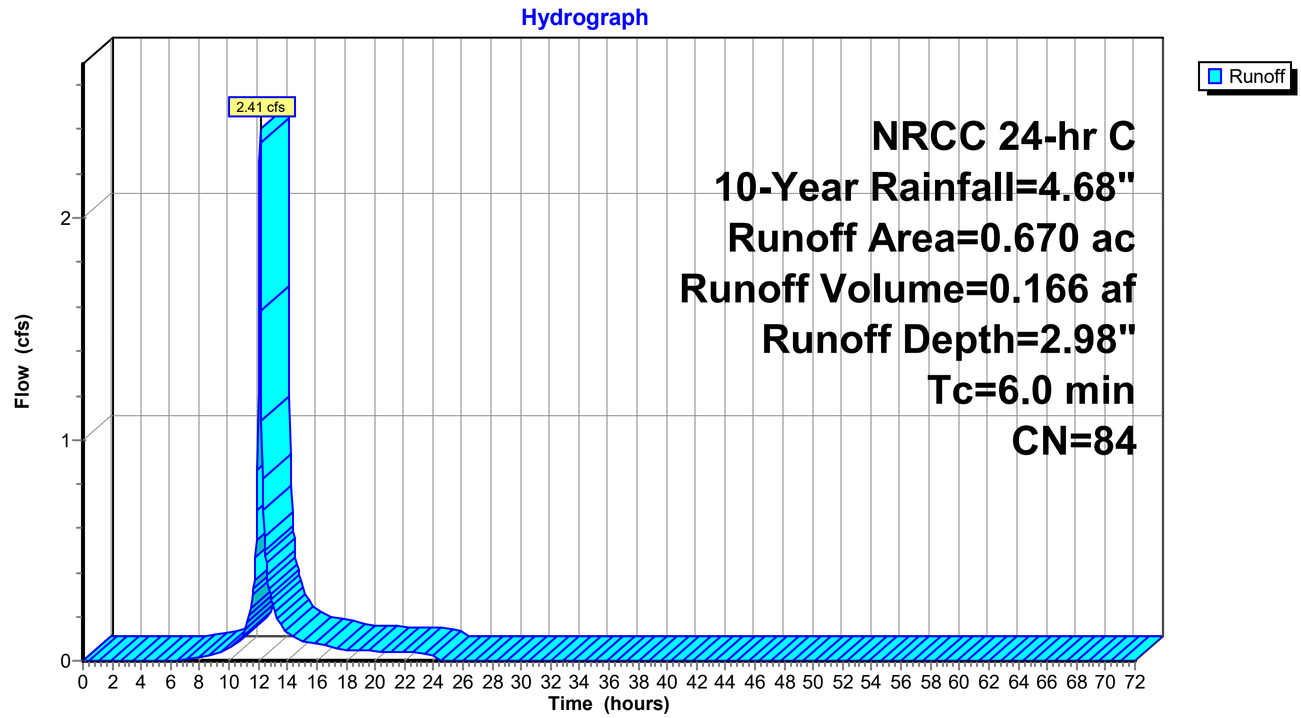
Runoff = 2.41 cfs @ 12.13 hrs, Volume= 0.166 af, Depth= 2.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
0.380	73	Brush, Good, HSG D
0.290	98	Paved parking, HSG D
0.670	84	Weighted Average
0.380		56.72% Pervious Area
0.290		43.28% Impervious Area

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

Subcatchment 46S: DA-4



Summary for Subcatchment 48S: DA-6

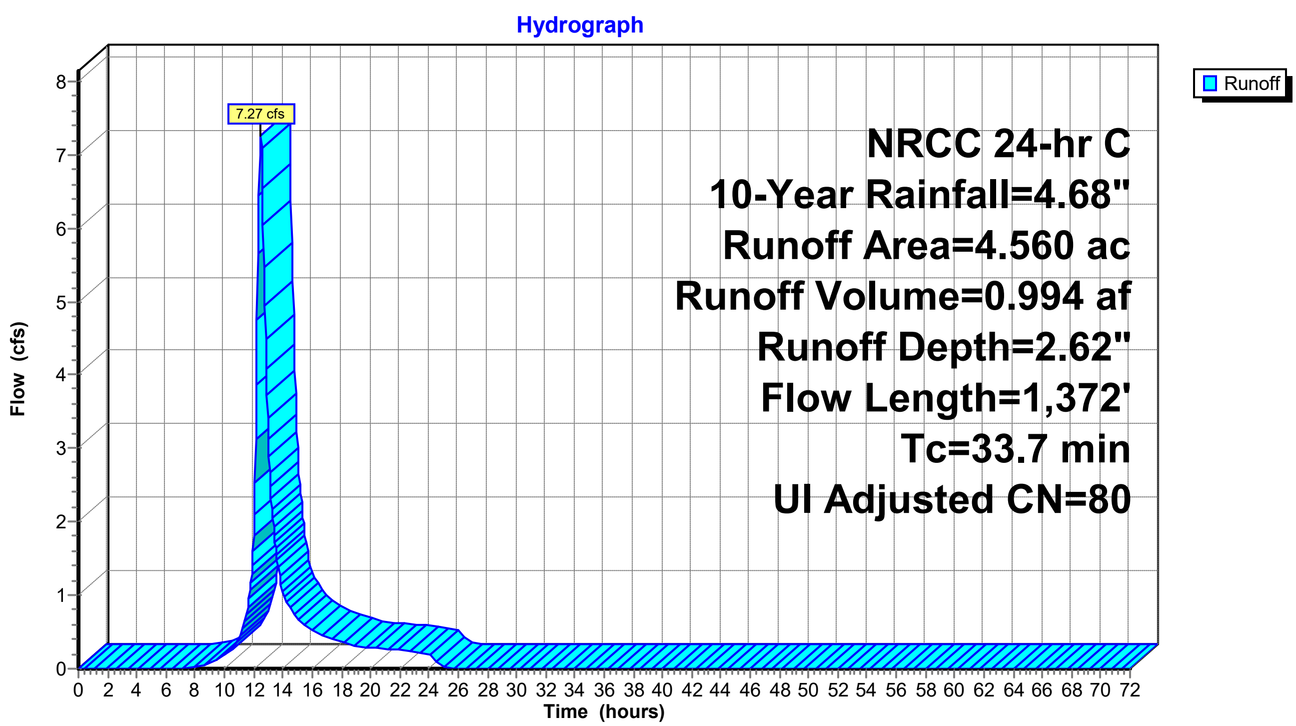
Runoff = 7.27 cfs @ 12.47 hrs, Volume= 0.994 af, Depth= 2.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Adj	Description
4.239	80		Pasture/grassland/range, Good, HSG D
0.127	79		Woods/grass comb., Good, HSG D
0.194	98		Unconnected pavement, HSG D
4.560	81	80	Weighted Average, UI Adjusted
4.366			95.75% Pervious Area
0.194			4.25% Impervious Area
0.194			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.0295	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
5.5	676	0.0870	2.06		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
15.9	596	0.0080	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
33.7	1,372	Total			

Subcatchment 48S: DA-6



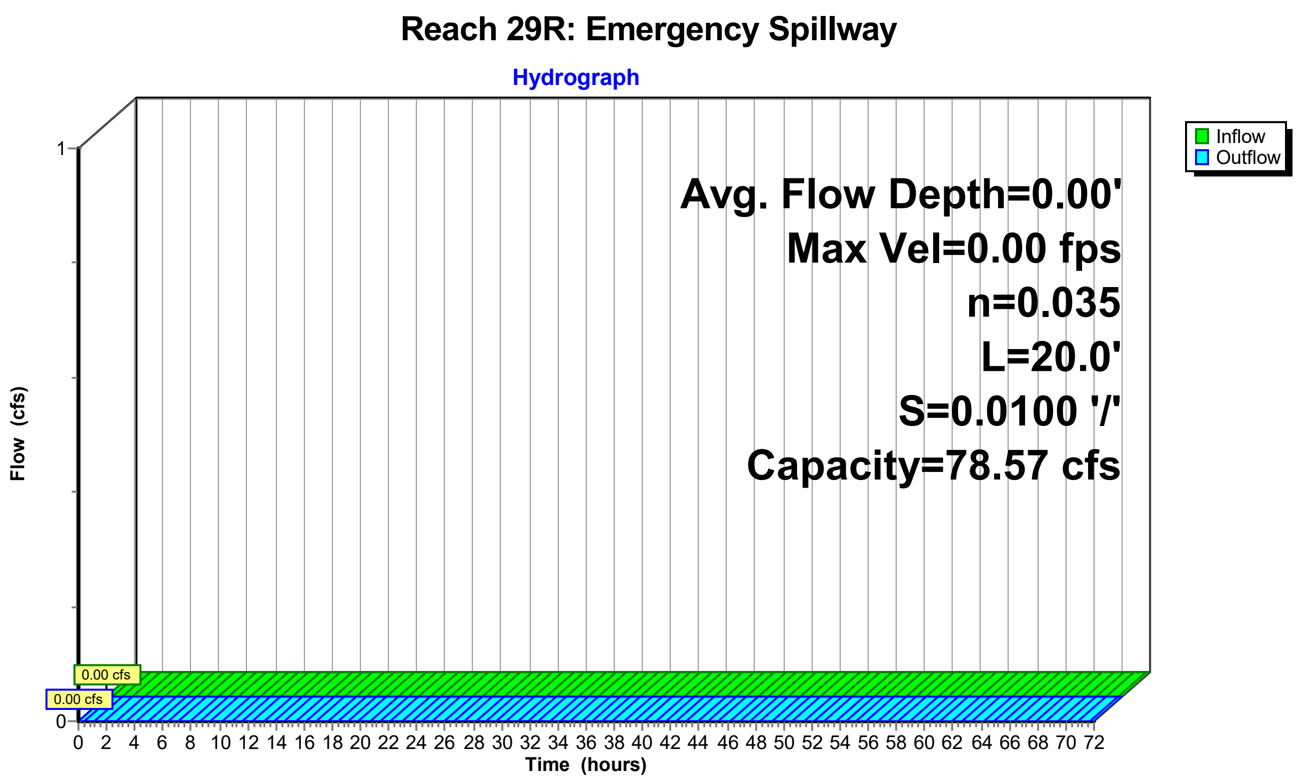
Summary for Reach 29R: Emergency Spillway

Inflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af
Outflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.00' Flow Area= 20.0 sf, Capacity= 78.57 cfs

18.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 2.0 '/' Top Width= 22.00'
Length= 20.0' Slope= 0.0100 '/'
Inlet Invert= 453.75', Outlet Invert= 453.55'



Summary for Pond 53P: Culvert 3

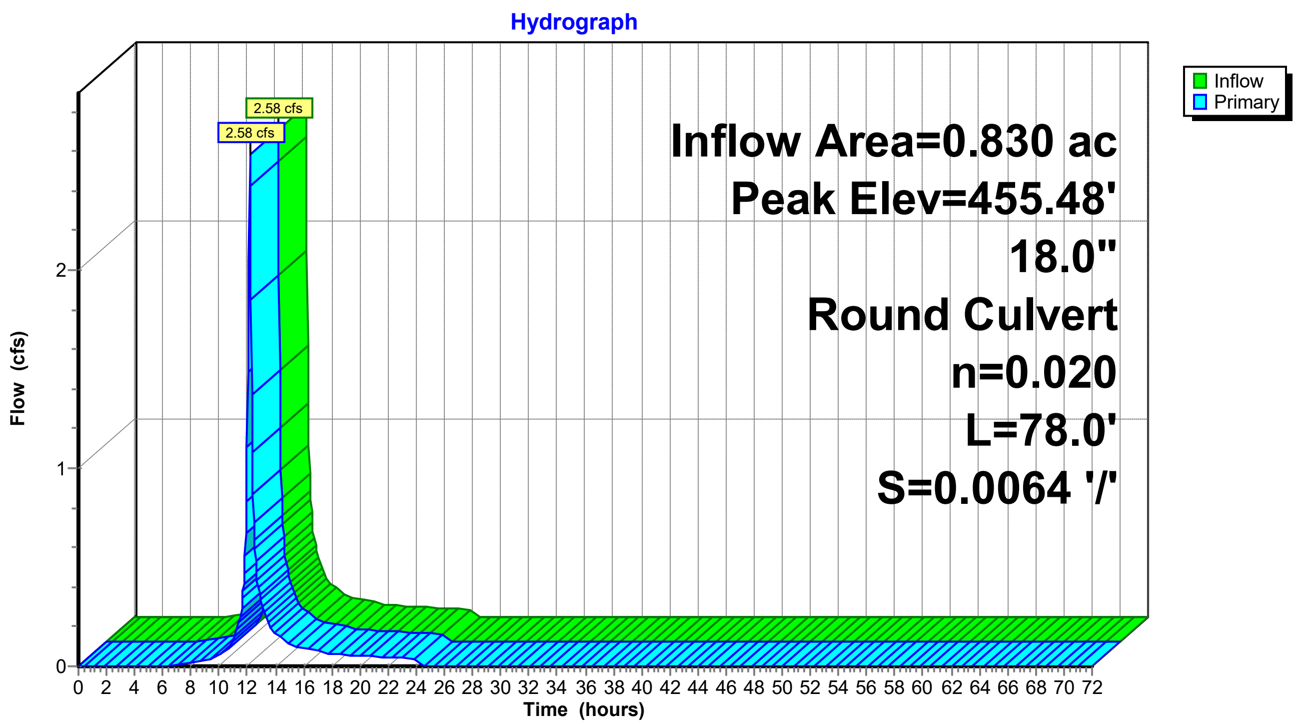
Inflow Area =	0.830 ac,	15.66% Impervious,	Inflow Depth =	2.89"	for 10-Year event
Inflow =	2.58 cfs @	12.16 hrs,	Volume=	0.200 af	
Outflow =	2.58 cfs @	12.16 hrs,	Volume=	0.200 af,	Atten= 0%, Lag= 0.0 min
Primary =	2.58 cfs @	12.16 hrs,	Volume=	0.200 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 455.48' @ 12.16 hrs
Flood Elev= 457.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	454.50'	**18.0" Round Culvert** L= 78.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 454.50' / 454.00' S= 0.0064 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.52 cfs @ 12.16 hrs HW=455.47' TW=454.52' (Dynamic Tailwater)
1=Culvert (Barrel Controls 2.52 cfs @ 2.98 fps)

Pond 53P: Culvert 3



Summary for Pond 54P: Bio-Retention Basin 1

Inflow Area = 2.010 ac, 40.80% Impervious, Inflow Depth = 3.17" for 10-Year event
Inflow = 7.11 cfs @ 12.14 hrs, Volume= 0.531 af
Outflow = 2.18 cfs @ 12.37 hrs, Volume= 0.531 af, Atten= 69%, Lag= 14.0 min
Primary = 2.18 cfs @ 12.37 hrs, Volume= 0.531 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 454.64' @ 12.37 hrs Surf.Area= 15,069 sf Storage= 9,322 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 458.2 min (1,270.6 - 812.4)

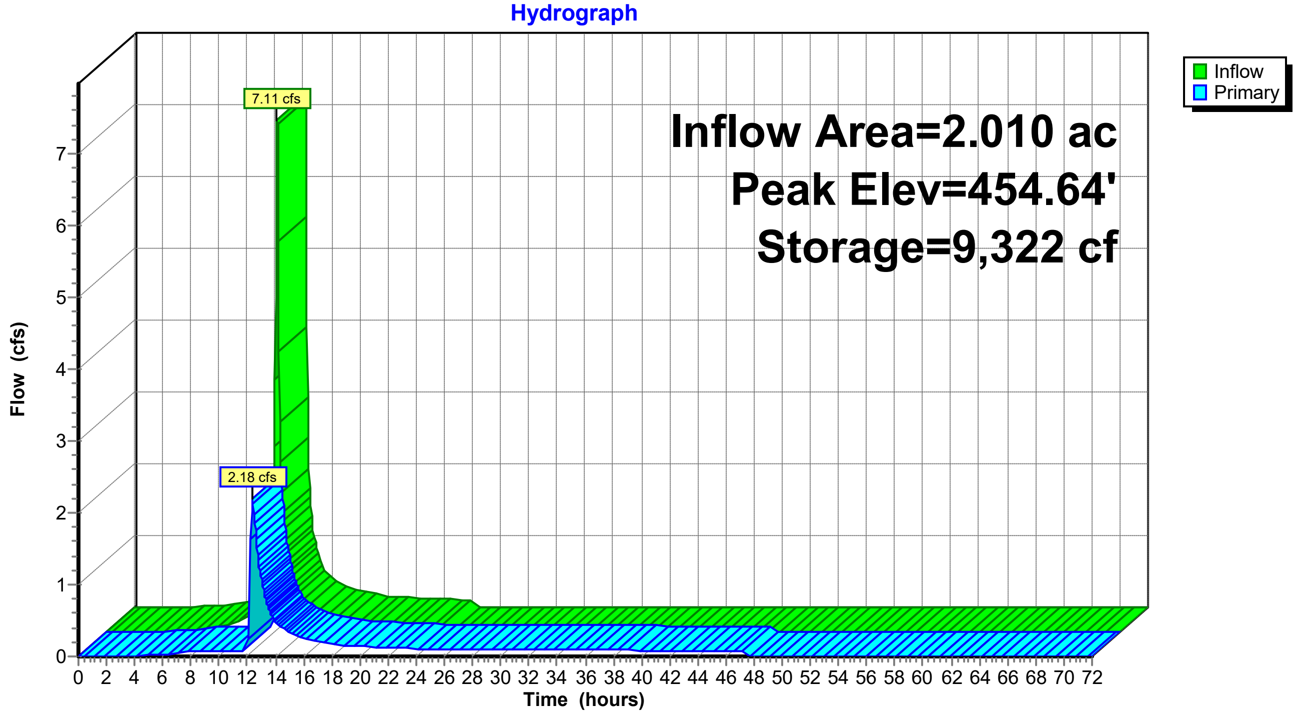
Volume	Invert	Avail.Storage	Storage Description
#1	454.00'	22,875 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
454.00	14,000	0	0
455.50	16,500	22,875	22,875

Device	Routing	Invert	Outlet Devices
#1	Primary	450.80'	**18.0" Round Culvert** L= 85.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 450.80' / 450.20' S= 0.0071 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	454.50'	**36.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	454.00'	**0.250 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 448.80'

Primary OutFlow Max=2.17 cfs @ 12.37 hrs HW=454.64' TW=452.29' (Dynamic Tailwater)
└─**1=Culvert** (Passes 2.17 cfs of 10.30 cfs potential flow)
  ├─**2=Orifice/Grate** (Weir Controls 2.07 cfs @ 1.23 fps)
  └─**3=Exfiltration** (Controls 0.10 cfs)

Pond 54P: Bio-Retention Basin 1



Summary for Pond 55P: Detention Pond 1

Inflow Area = 5.810 ac, 69.09% Impervious, Inflow Depth = 3.78" for 10-Year event
Inflow = 17.15 cfs @ 12.13 hrs, Volume= 1.830 af
Outflow = 2.51 cfs @ 13.08 hrs, Volume= 1.788 af, Atten= 85%, Lag= 57.4 min
Primary = 2.51 cfs @ 13.08 hrs, Volume= 1.788 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Starting Elev= 450.20' Storage= 28,039 cf
Peak Elev= 452.51' @ 13.08 hrs Storage= 65,684 cf (37,645 cf above start)

Plug-Flow detention time= 1,314.6 min calculated for 1.144 af (63% of inflow)
Center-of-Mass det. time= 654.6 min (1,572.2 - 917.6)

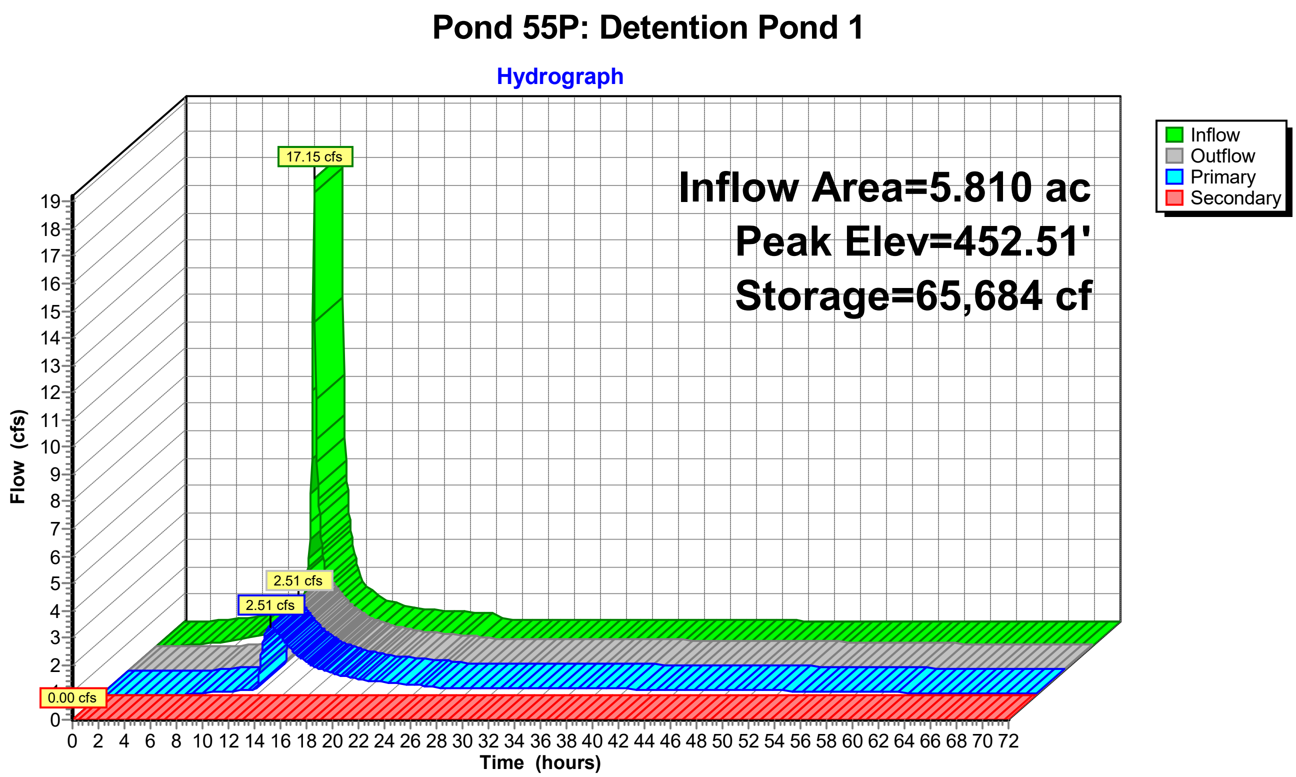
Volume	Invert	Avail.Storage	Storage Description
#1	446.00'	98,470 cf	**Custom Stage Data** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
446.00	0
446.20	787
447.00	4,409
448.00	9,925
449.20	18,016
450.20	28,039
451.00	39,196
452.00	55,835
453.00	75,086
454.00	98,470

Device	Routing	Invert	Outlet Devices
#1	Primary	450.20'	**18.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 450.20' / 450.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	450.20'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	451.75'	**1.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	452.60'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	453.75'	**Channel/Reach** using Reach 29R: Emergency Spillway

Primary OutFlow Max=2.51 cfs @ 13.08 hrs HW=452.51' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 2.51 cfs of 8.39 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.35 cfs @ 7.12 fps)
  ├─**3=Broad-Crested Rectangular Weir** (Weir Controls 2.16 cfs @ 2.84 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=450.20' TW=453.75' (Dynamic Tailwater)
└─**5=Channel/Reach** (Channel Controls 0.00 cfs)

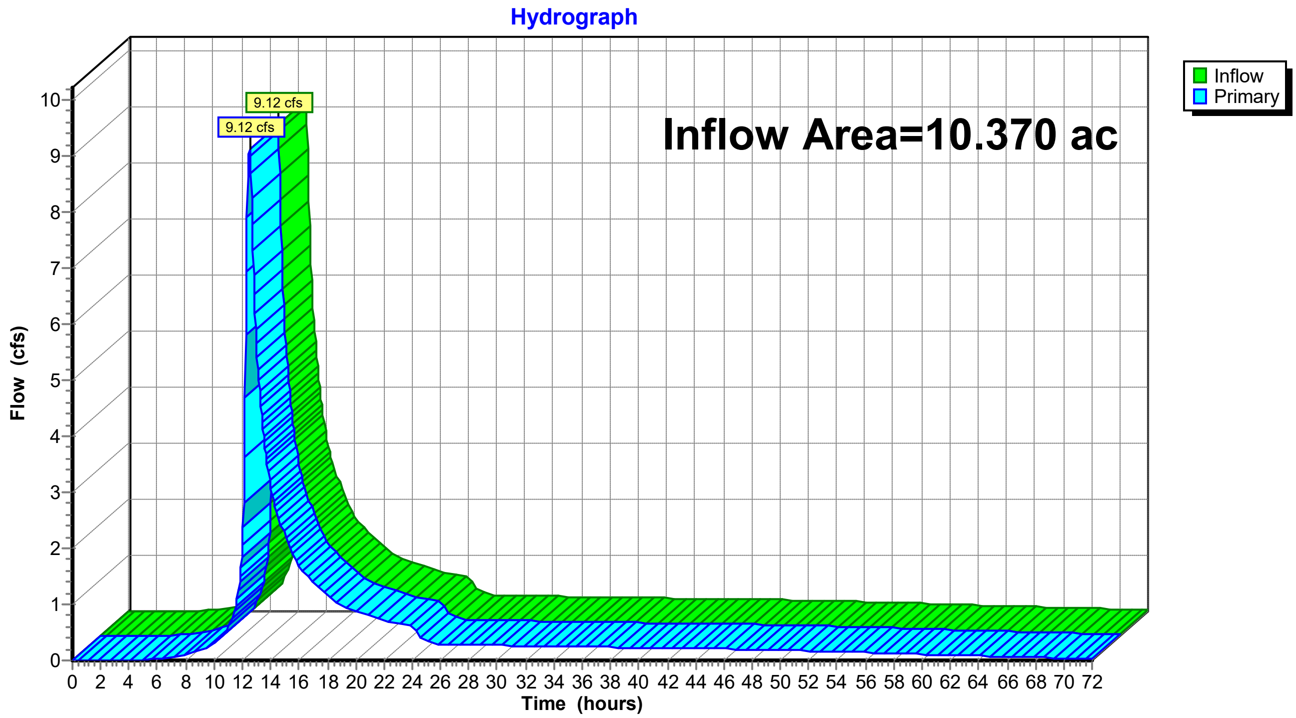


Summary for Link 28L: Southwest Discharge

Inflow Area = 10.370 ac, 40.58% Impervious, Inflow Depth > 3.22" for 10-Year event
Inflow = 9.12 cfs @ 12.50 hrs, Volume= 2.782 af
Primary = 9.12 cfs @ 12.50 hrs, Volume= 2.782 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 28L: Southwest Discharge



Summary for Subcatchment 25S: DA-5

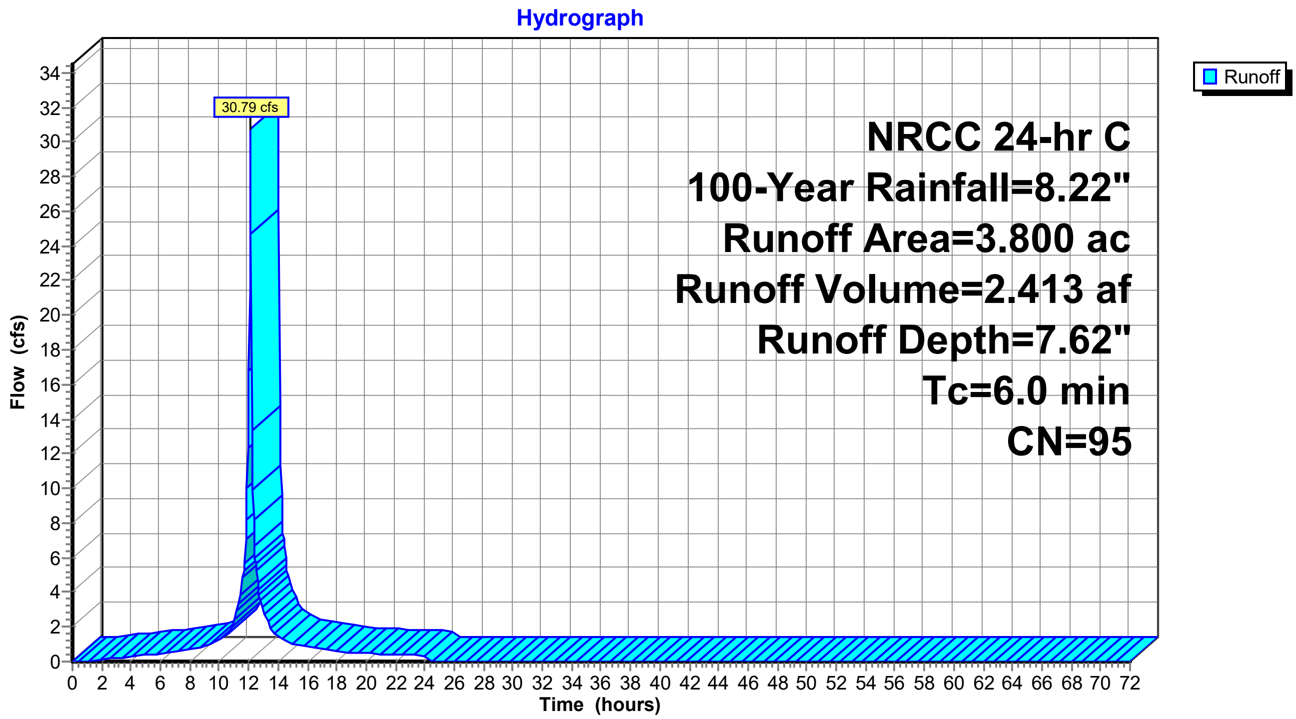
Runoff = 30.79 cfs @ 12.13 hrs, Volume= 2.413 af, Depth= 7.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
0.477	80	>75% Grass cover, Good, HSG D
2.905	98	Paved parking, HSG D
0.289	98	Water Surface, HSG D
0.063	91	Gravel roads, HSG D
0.066	80	>75% Grass cover, Good, HSG D
3.800	95	Weighted Average
0.606		15.95% Pervious Area
3.194		84.05% Impervious Area

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

Subcatchment 25S: DA-5



Summary for Subcatchment 29S: Ditch 4

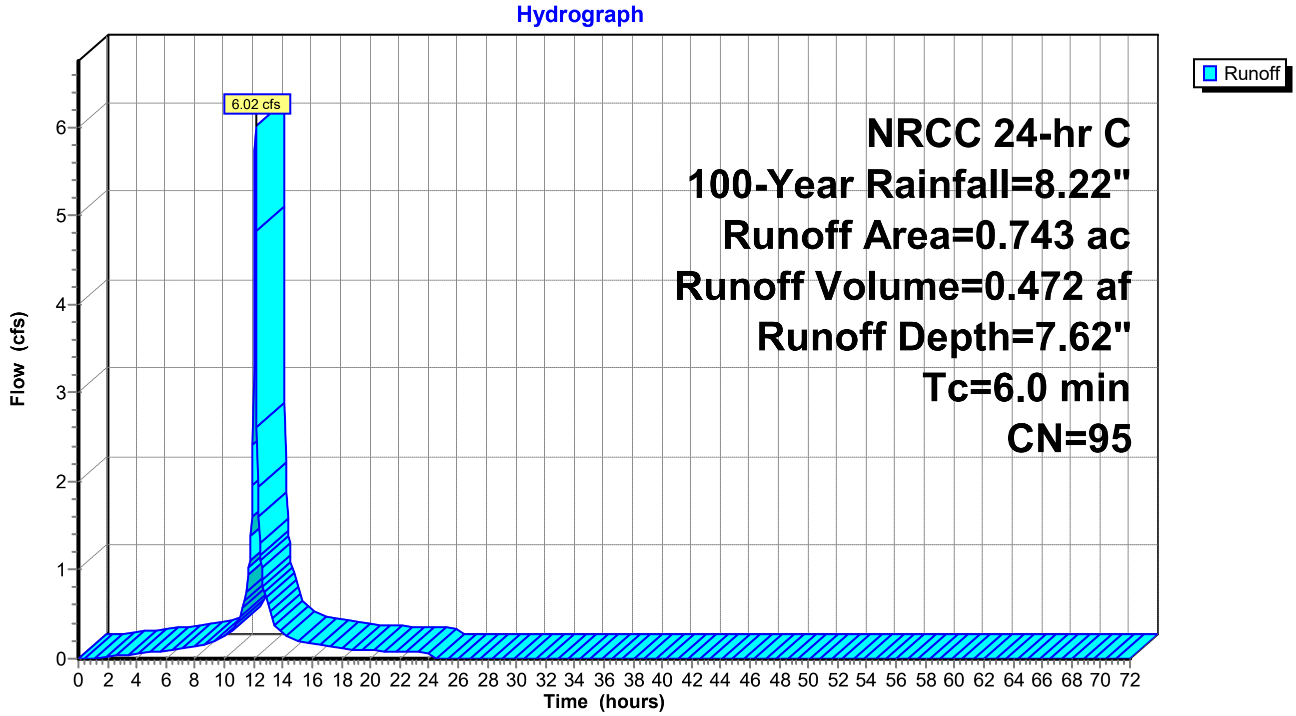
Runoff = 6.02 cfs @ 12.13 hrs, Volume= 0.472 af, Depth= 7.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
0.637	98	Paved roads w/curbs & sewers, HSG D
0.106	80	>75% Grass cover, Good, HSG D
0.743	95	Weighted Average
0.106		14.27% Pervious Area
0.637		85.73% Impervious Area

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

Subcatchment 29S: Ditch 4



Summary for Subcatchment 30S: Ditch 3

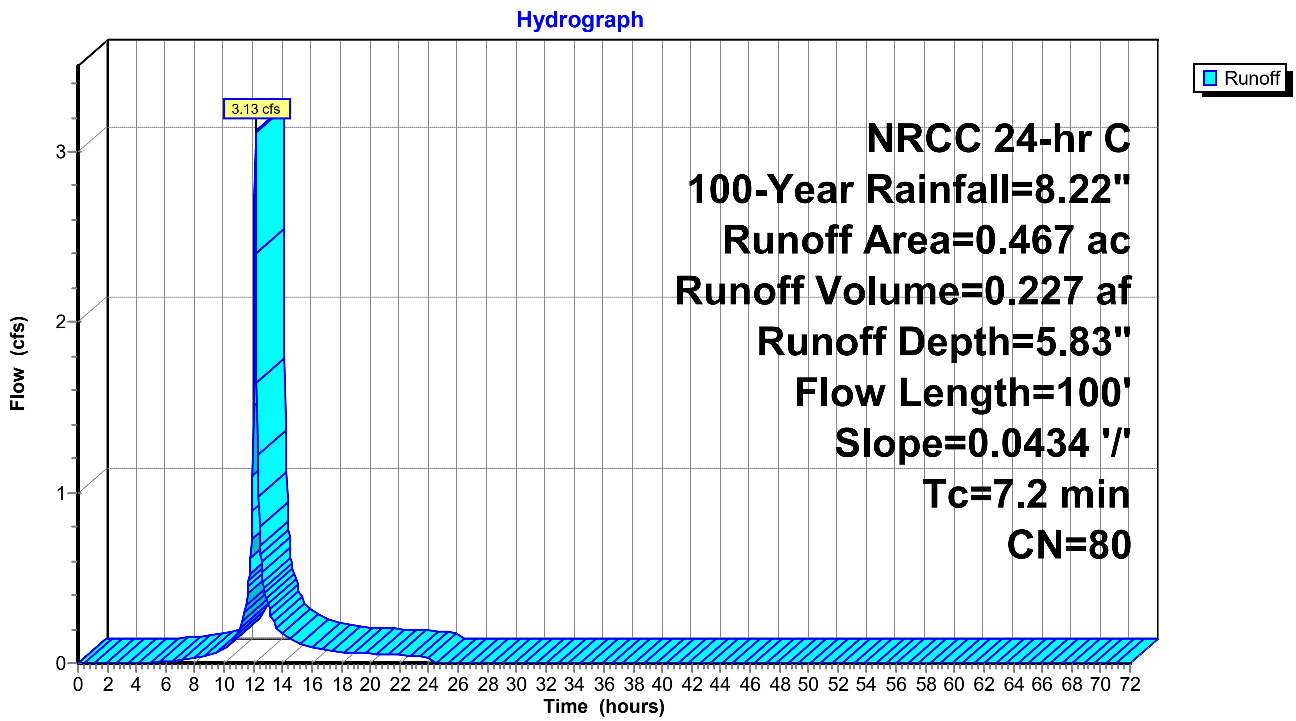
Runoff = 3.13 cfs @ 12.14 hrs, Volume= 0.227 af, Depth= 5.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
0.467	80	>75% Grass cover, Good, HSG D
0.467		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	100	0.0434	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"

Subcatchment 30S: Ditch 3



Summary for Subcatchment 31S: Culvert 1

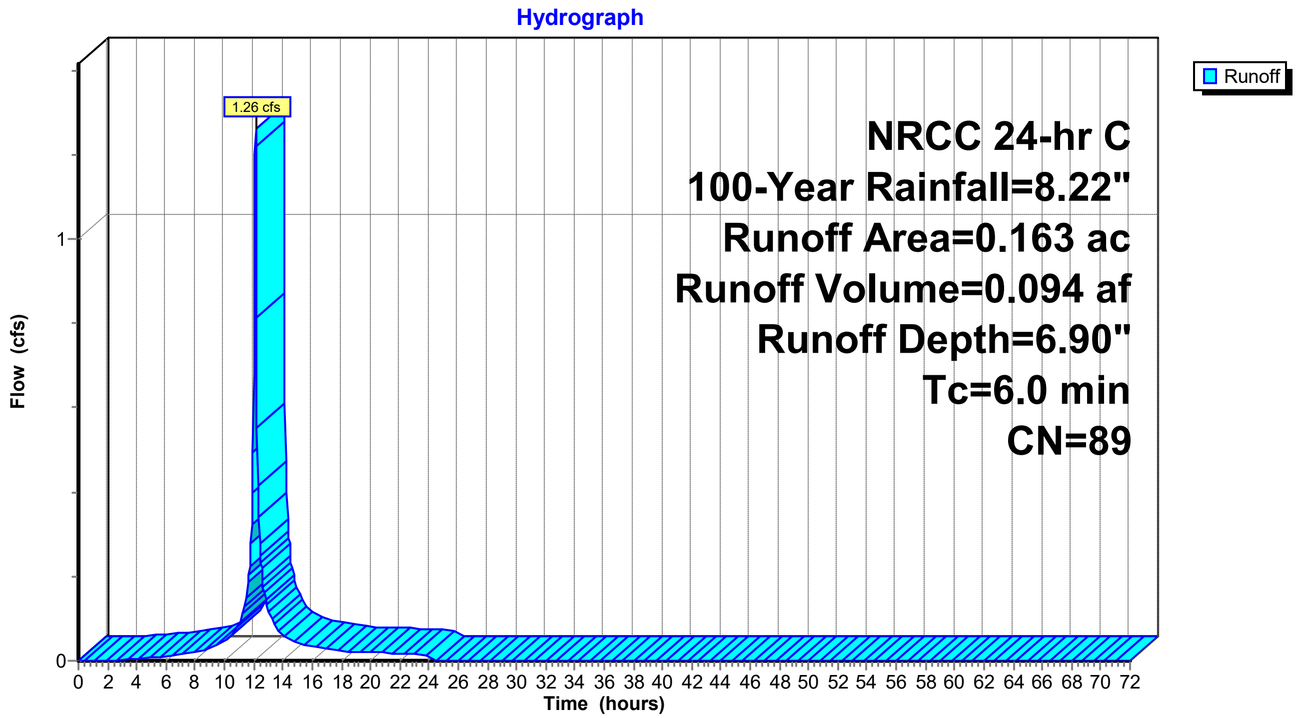
Runoff = 1.26 cfs @ 12.13 hrs, Volume= 0.094 af, Depth= 6.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
0.083	98	Paved parking, HSG D
0.080	80	>75% Grass cover, Good, HSG D
0.163	89	Weighted Average
0.080		49.08% Pervious Area
0.083		50.92% Impervious Area

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

Subcatchment 31S: Culvert 1



Summary for Subcatchment 43S: DA-1

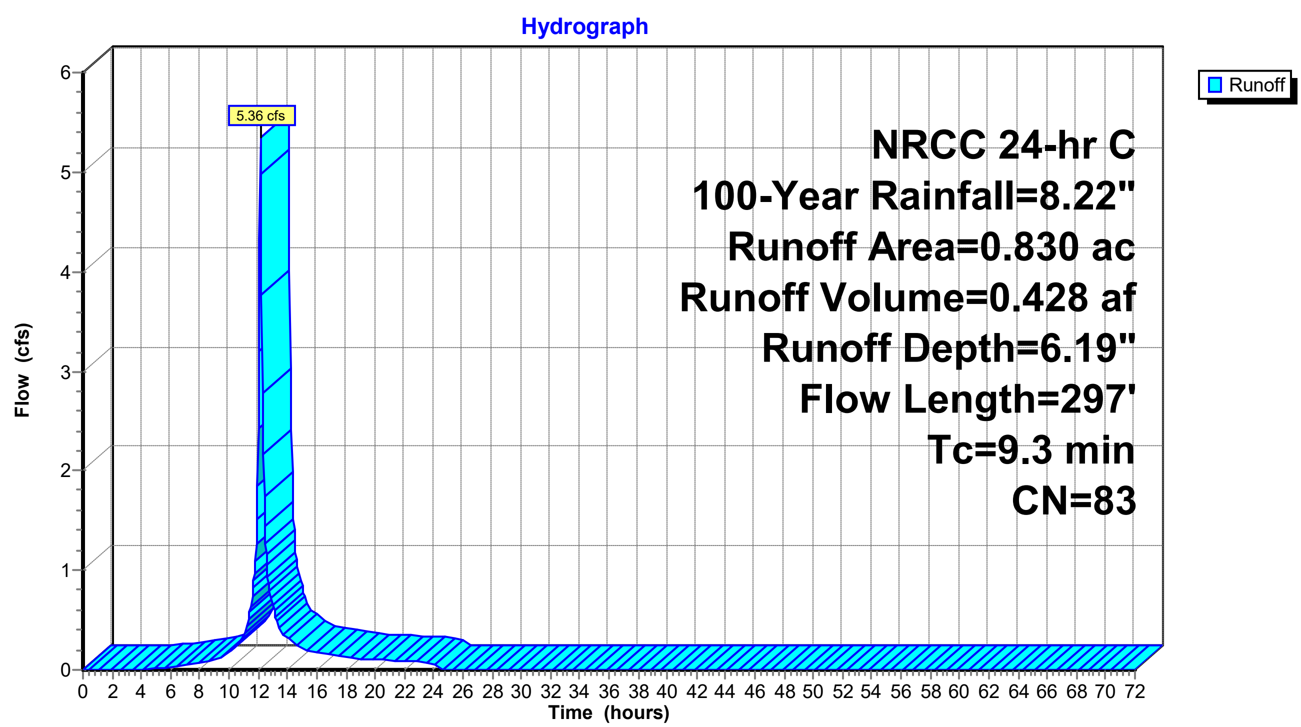
Runoff = 5.36 cfs @ 12.16 hrs, Volume= 0.428 af, Depth= 6.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
0.700	80	>75% Grass cover, Good, HSG D
0.130	98	Paved parking, HSG D
0.830	83	Weighted Average
0.700		84.34% Pervious Area
0.130		15.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	100	0.0990	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
1.7	197	0.0720	1.88		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.3	297	Total			

Subcatchment 43S: DA-1



Summary for Subcatchment 45S: DA-3

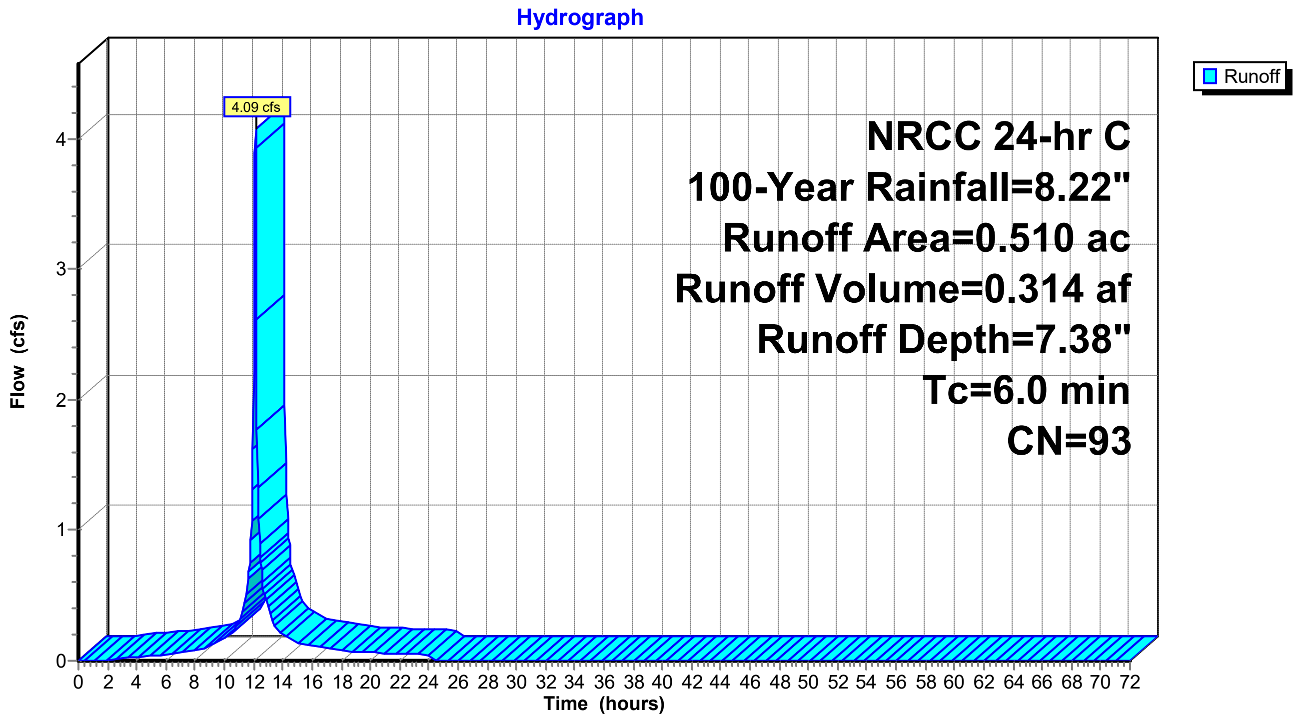
Runoff = 4.09 cfs @ 12.13 hrs, Volume= 0.314 af, Depth= 7.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
0.110	73	Brush, Good, HSG D
0.400	98	Paved parking, HSG D
0.510	93	Weighted Average
0.110		21.57% Pervious Area
0.400		78.43% Impervious Area

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

Subcatchment 45S: DA-3



Summary for Subcatchment 46S: DA-4

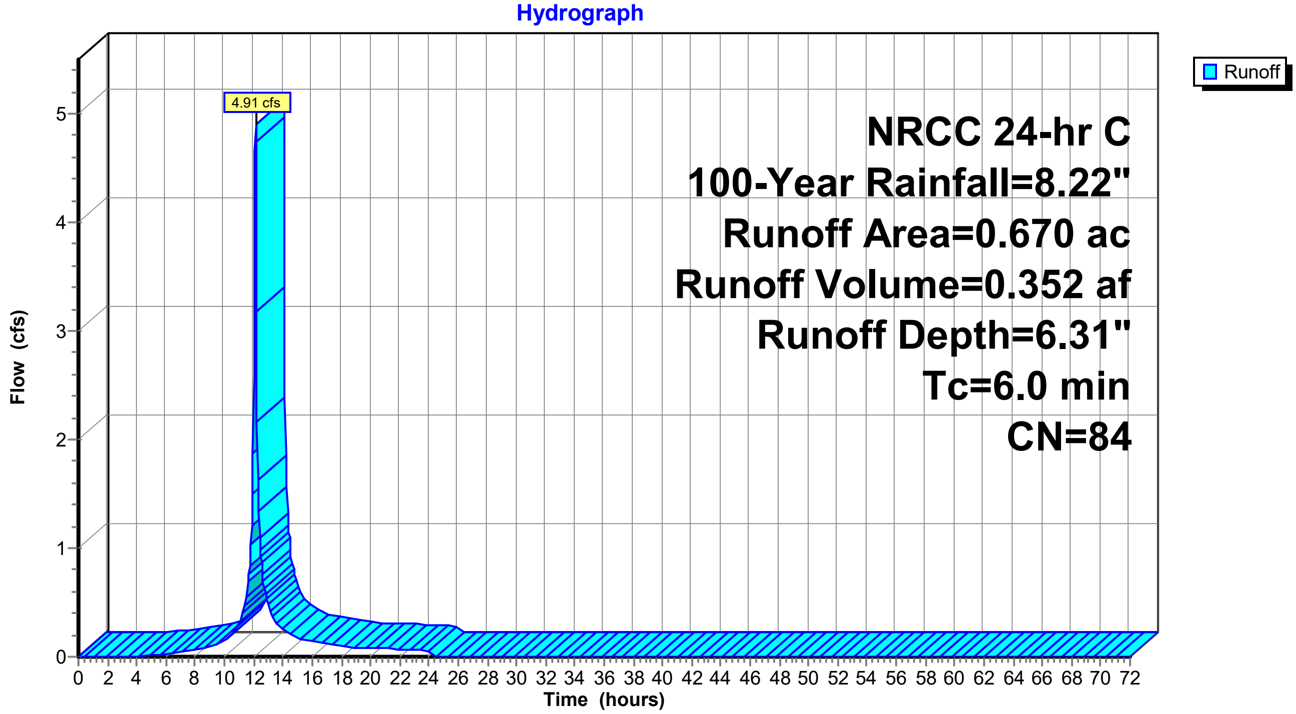
Runoff = 4.91 cfs @ 12.13 hrs, Volume= 0.352 af, Depth= 6.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
0.380	73	Brush, Good, HSG D
0.290	98	Paved parking, HSG D
0.670	84	Weighted Average
0.380		56.72% Pervious Area
0.290		43.28% Impervious Area

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

Subcatchment 46S: DA-4



Summary for Subcatchment 48S: DA-6

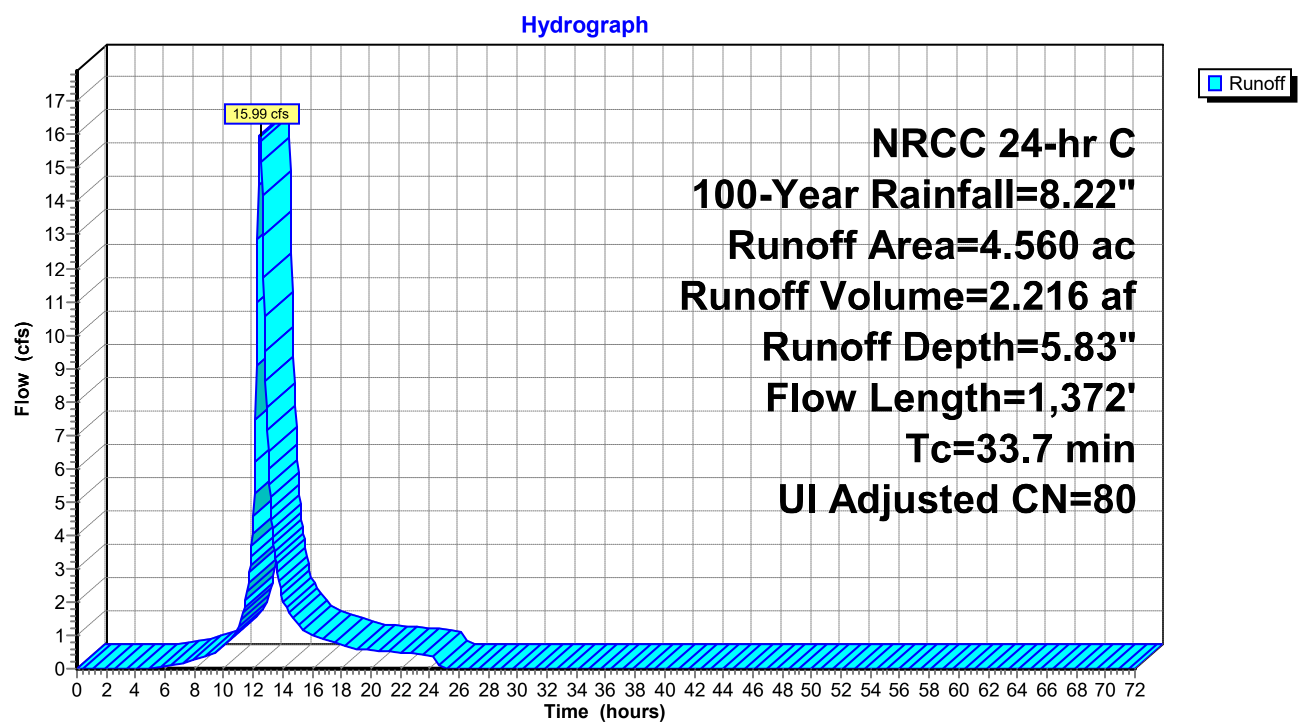
Runoff = 15.99 cfs @ 12.46 hrs, Volume= 2.216 af, Depth= 5.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Adj	Description
4.239	80		Pasture/grassland/range, Good, HSG D
0.127	79		Woods/grass comb., Good, HSG D
0.194	98		Unconnected pavement, HSG D
4.560	81	80	Weighted Average, UI Adjusted
4.366			95.75% Pervious Area
0.194			4.25% Impervious Area
0.194			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.0295	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
5.5	676	0.0870	2.06		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
15.9	596	0.0080	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
33.7	1,372	Total			

Subcatchment 48S: DA-6



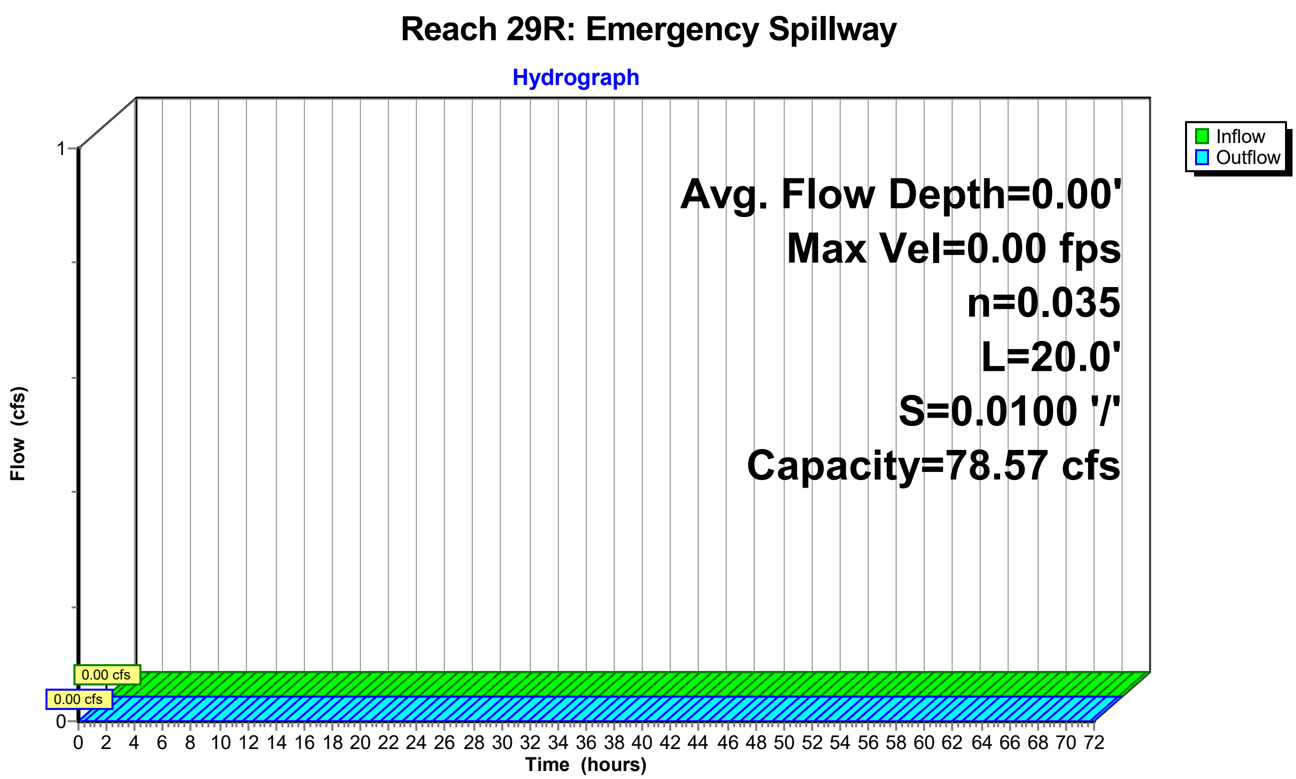
Summary for Reach 29R: Emergency Spillway

Inflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af
Outflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.00' Flow Area= 20.0 sf, Capacity= 78.57 cfs

18.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 2.0 '/' Top Width= 22.00'
Length= 20.0' Slope= 0.0100 '/'
Inlet Invert= 453.75', Outlet Invert= 453.55'



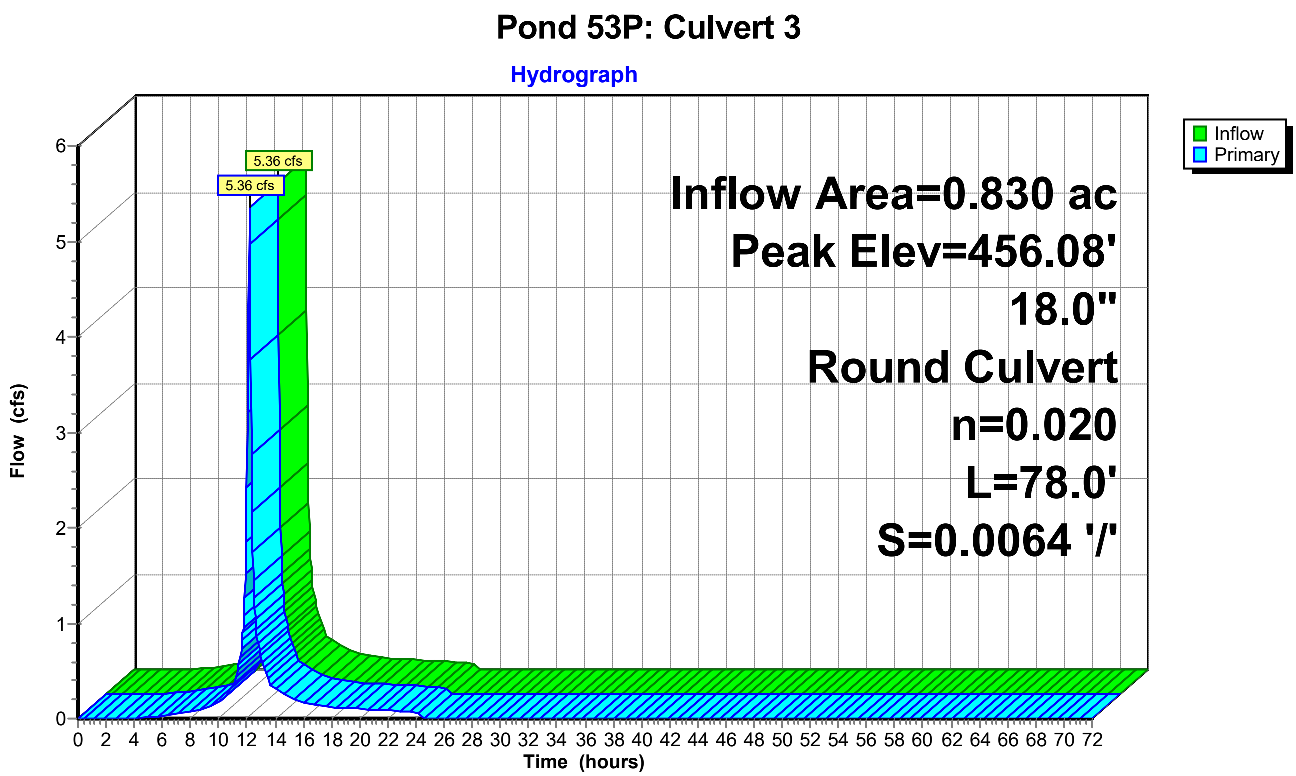
Summary for Pond 53P: Culvert 3

Inflow Area = 0.830 ac, 15.66% Impervious, Inflow Depth = 6.19" for 100-Year event
Inflow = 5.36 cfs @ 12.16 hrs, Volume= 0.428 af
Outflow = 5.36 cfs @ 12.16 hrs, Volume= 0.428 af, Atten= 0%, Lag= 0.0 min
Primary = 5.36 cfs @ 12.16 hrs, Volume= 0.428 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 456.08' @ 12.16 hrs
Flood Elev= 457.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	454.50'	**18.0" Round Culvert** L= 78.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 454.50' / 454.00' S= 0.0064 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 1.77 sf

Primary OutFlow Max=5.24 cfs @ 12.16 hrs HW=456.05' TW=454.88' (Dynamic Tailwater)
1=Culvert (Barrel Controls 5.24 cfs @ 3.56 fps)



Summary for Pond 54P: Bio-Retention Basin 1

Inflow Area = 2.010 ac, 40.80% Impervious, Inflow Depth = 6.53" for 100-Year event
Inflow = 14.13 cfs @ 12.14 hrs, Volume= 1.094 af
Outflow = 9.30 cfs @ 12.17 hrs, Volume= 1.094 af, Atten= 34%, Lag= 1.9 min
Primary = 9.30 cfs @ 12.17 hrs, Volume= 1.094 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 454.92' @ 12.24 hrs Surf.Area= 15,537 sf Storage= 13,621 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 246.8 min (1,038.3 - 791.5)

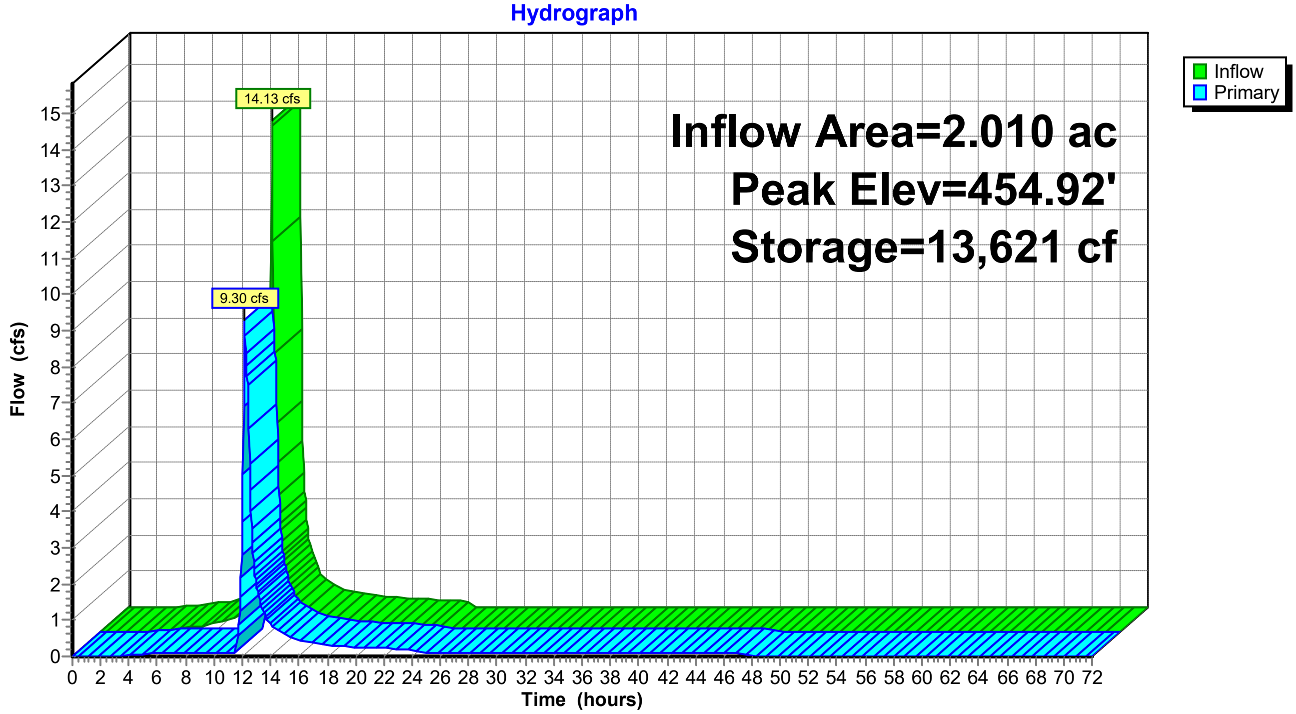
Volume	Invert	Avail.Storage	Storage Description
#1	454.00'	22,875 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
454.00	14,000	0	0
455.50	16,500	22,875	22,875

Device	Routing	Invert	Outlet Devices
#1	Primary	450.80'	**18.0" Round Culvert** L= 85.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 450.80' / 450.20' S= 0.0071 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	454.50'	**36.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	454.00'	**0.250 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 448.80'

Primary OutFlow Max=8.60 cfs @ 12.17 hrs HW=454.89' TW=453.25' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 8.60 cfs @ 4.87 fps)
  ├─**2=Orifice/Grate** (Passes < 9.58 cfs potential flow)
  └─**3=Exfiltration** (Passes < 0.10 cfs potential flow)

Pond 54P: Bio-Retention Basin 1



Summary for Pond 55P: Detention Pond 1

Inflow Area =	5.810 ac,	69.09% Impervious,	Inflow Depth = 7.24"	for 100-Year event
Inflow =	39.36 cfs @	12.13 hrs, Volume=	3.507 af	
Outflow =	11.02 cfs @	12.50 hrs, Volume=	3.462 af,	Atten= 72%, Lag= 21.8 min
Primary =	11.02 cfs @	12.50 hrs, Volume=	3.462 af	
Secondary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Starting Elev= 450.20' Storage= 28,039 cf
Peak Elev= 453.64' @ 12.50 hrs Storage= 90,113 cf (62,074 cf above start)

Plug-Flow detention time= 649.3 min calculated for 2.816 af (80% of inflow)
Center-of-Mass det. time= 391.2 min (1,237.0 - 845.8)

Volume	Invert	Avail.Storage	Storage Description
#1	446.00'	98,470 cf	**Custom Stage Data** Listed below

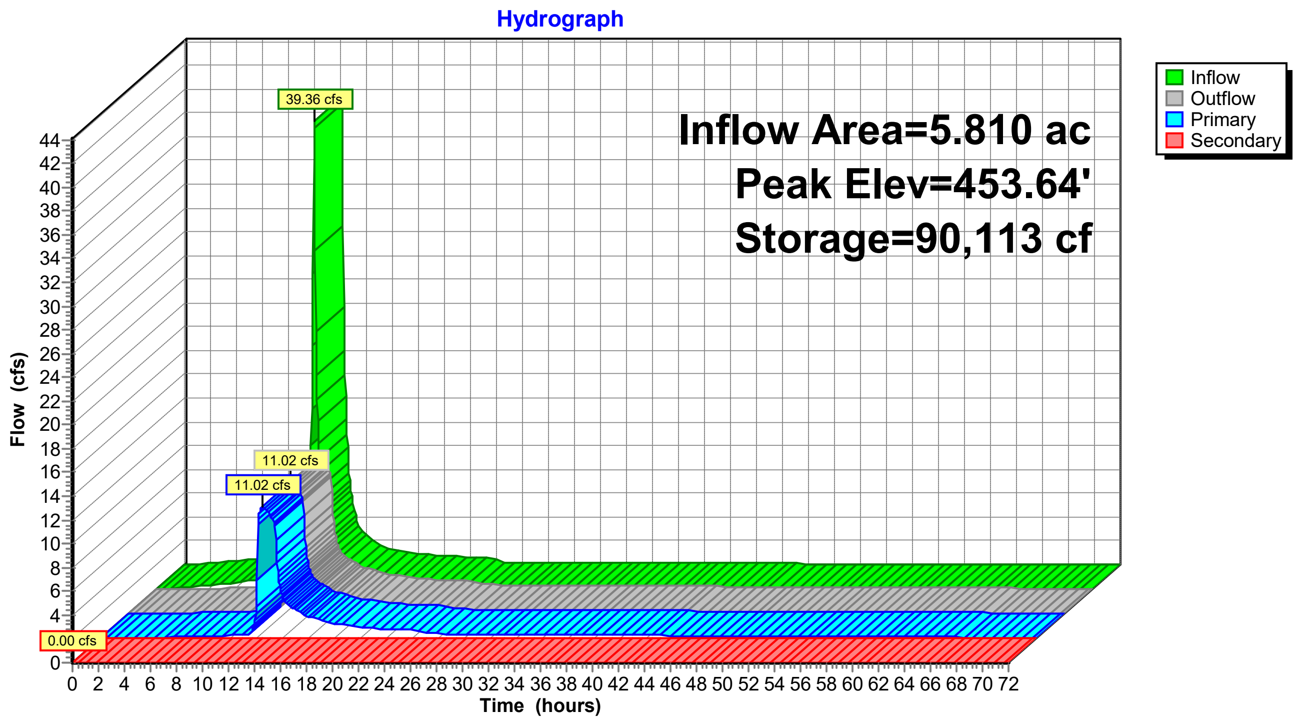
Elevation (feet)	Cum.Store (cubic-feet)
446.00	0
446.20	787
447.00	4,409
448.00	9,925
449.20	18,016
450.20	28,039
451.00	39,196
452.00	55,835
453.00	75,086
454.00	98,470

Device	Routing	Invert	Outlet Devices
#1	Primary	450.20'	**18.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 450.20' / 450.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	450.20'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	451.75'	**1.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	452.60'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	453.75'	**Channel/Reach** using Reach 29R: Emergency Spillway

Primary OutFlow Max=11.02 cfs @ 12.50 hrs HW=453.64' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 11.02 cfs @ 6.24 fps)
2=Orifice/Grate (Passes < 0.43 cfs potential flow)
3=Broad-Crested Rectangular Weir (Passes < 8.64 cfs potential flow)
4=Orifice/Grate (Passes < 19.66 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=450.20' TW=453.75' (Dynamic Tailwater)
5=Channel/Reach (Channel Controls 0.00 cfs)

Pond 55P: Detention Pond 1

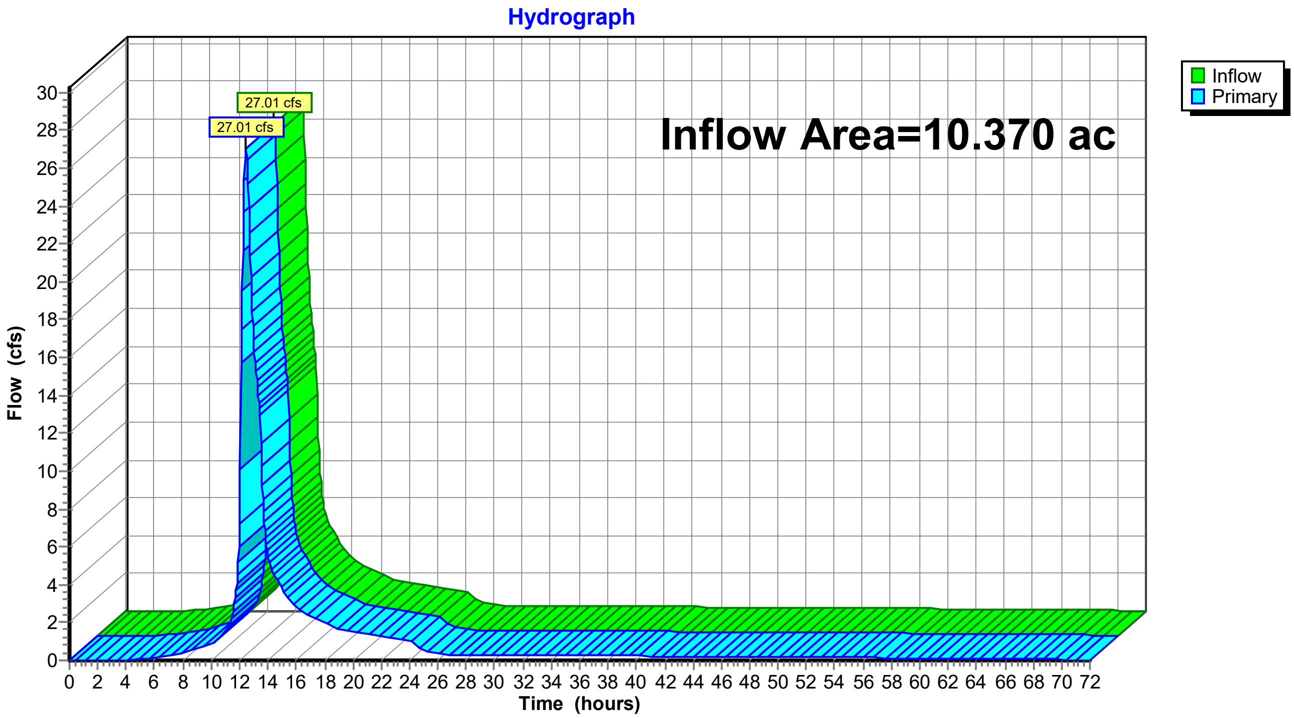


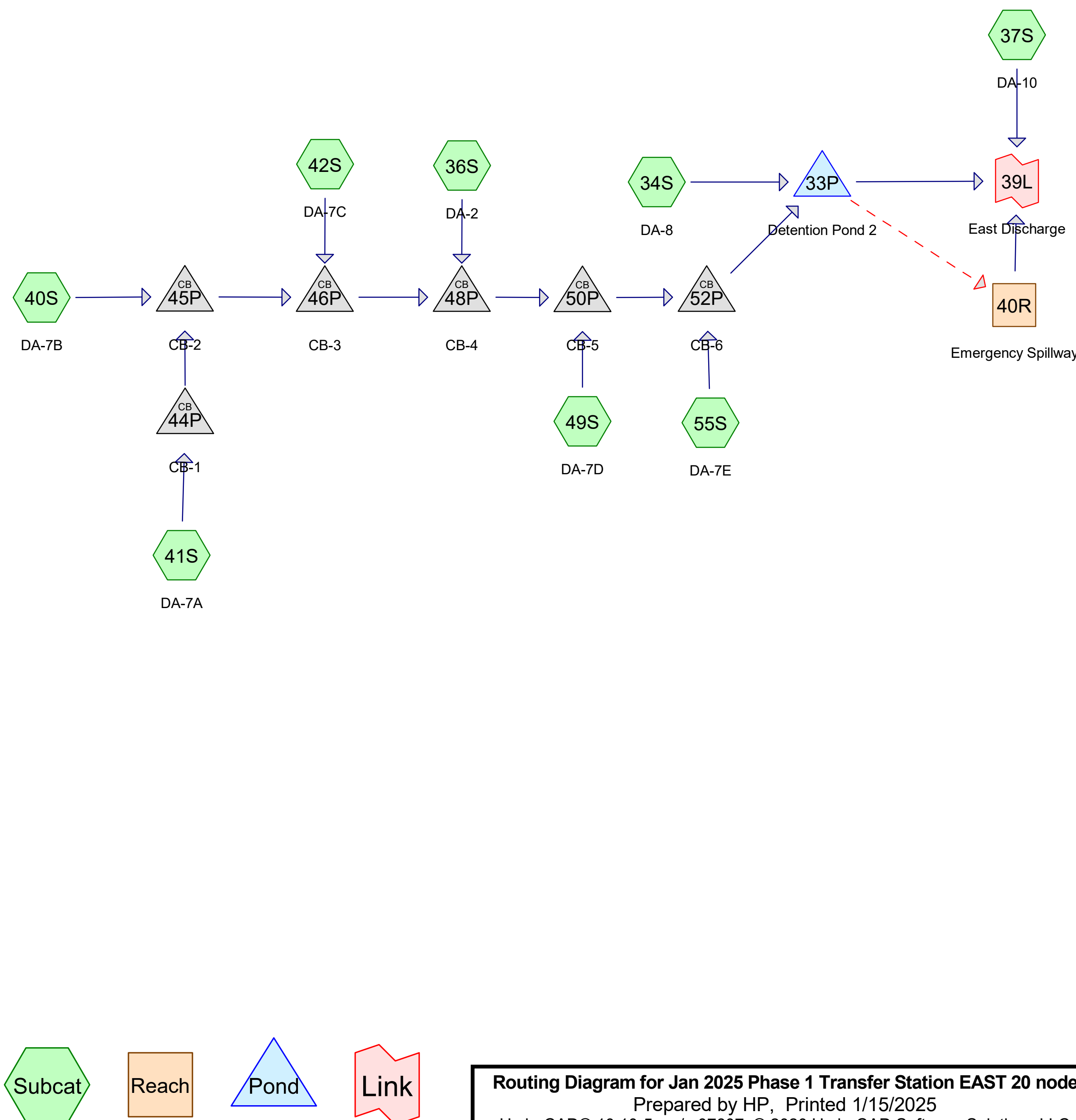
Summary for Link 28L: Southwest Discharge

Inflow Area = 10.370 ac, 40.58% Impervious, Inflow Depth > 6.57" for 100-Year event
Inflow = 27.01 cfs @ 12.46 hrs, Volume= 5.678 af
Primary = 27.01 cfs @ 12.46 hrs, Volume= 5.678 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 28L: Southwest Discharge





Routing Diagram for Jan 2025 Phase 1 Transfer Station EAST 20 node
Prepared by HP, Printed 1/15/2025
HydroCAD® 10.10-5a s/n 07607 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment 34S: DA-8

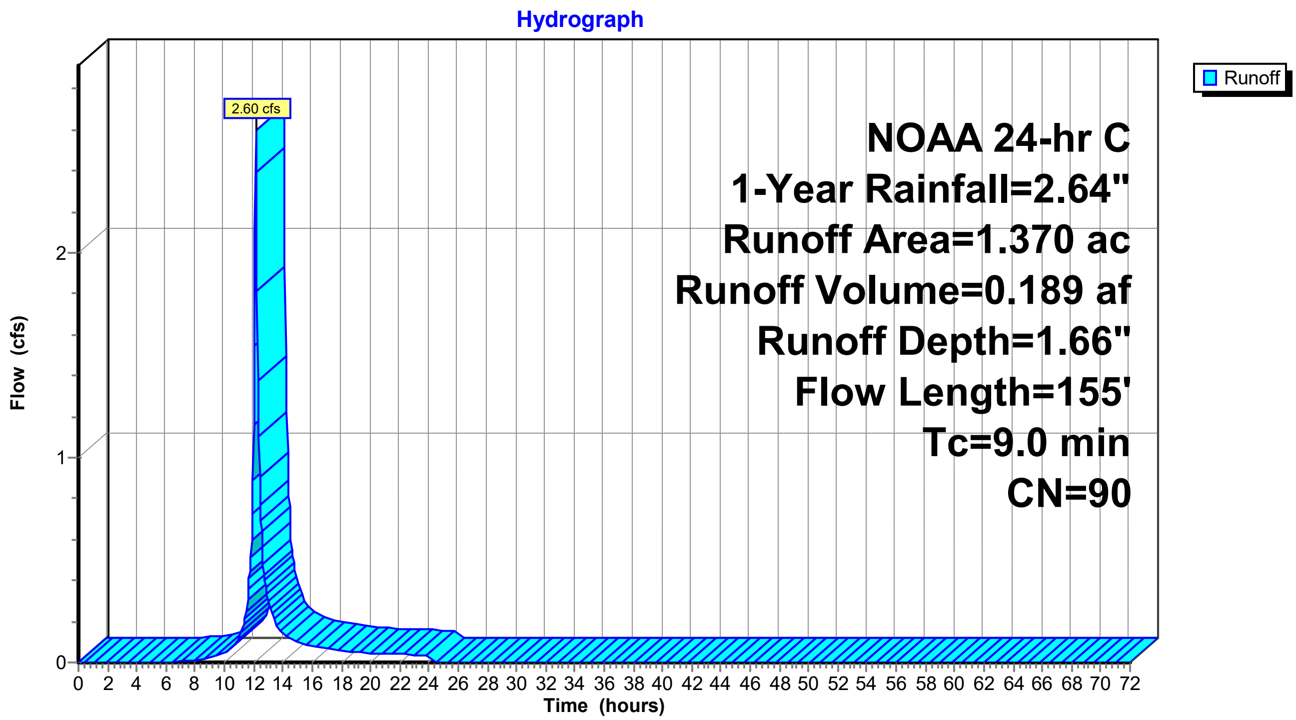
Runoff = 2.60 cfs @ 12.16 hrs, Volume= 0.189 af, Depth= 1.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.620	80	>75% Grass cover, Good, HSG D
0.210	98	Paved parking, HSG D
0.540	98	Water Surface, 0% imp, HSG D
1.370	90	Weighted Average
1.160		84.67% Pervious Area
0.210		15.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	100	0.0790	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
0.7	55	0.0380	1.36		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.0	155	Total			

Subcatchment 34S: DA-8



Summary for Subcatchment 36S: DA-2

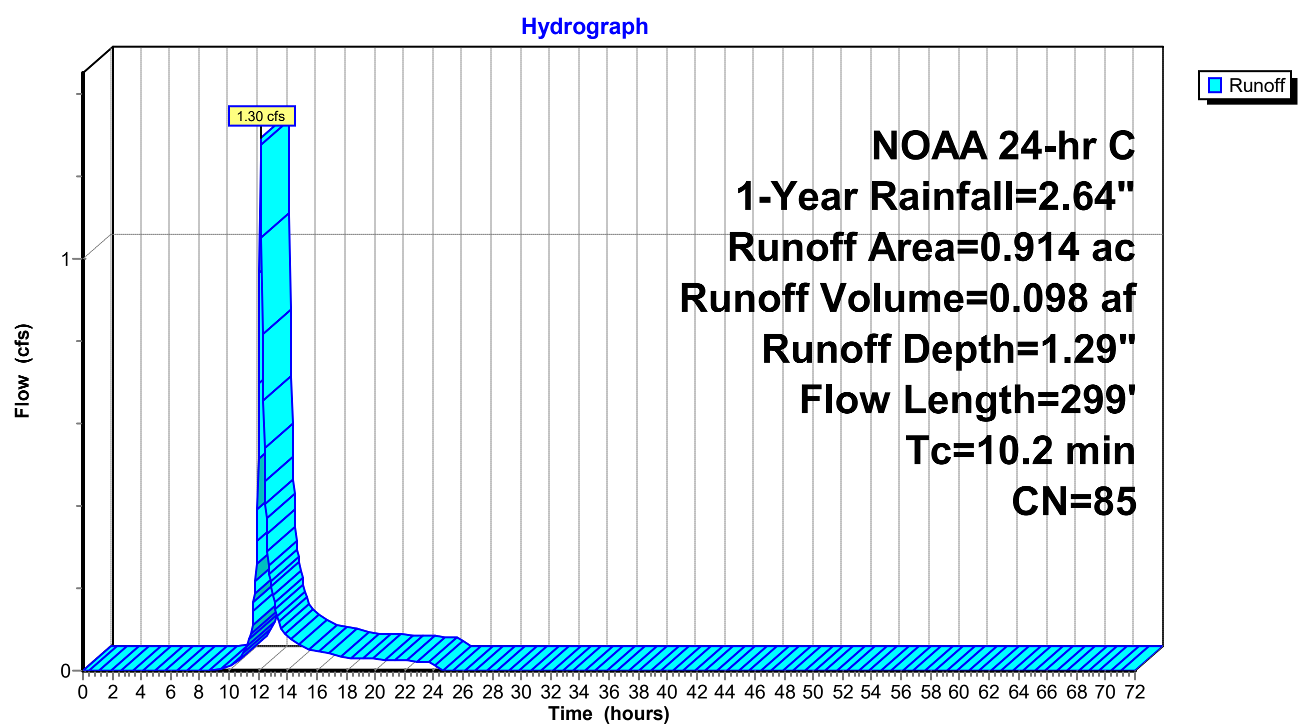
Runoff = 1.30 cfs @ 12.18 hrs, Volume= 0.098 af, Depth= 1.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.648	80	>75% Grass cover, Good, HSG D
0.266	98	Paved parking, HSG D
0.914	85	Weighted Average
0.648		70.90% Pervious Area
0.266		29.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0300	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"
1.2	102	0.0390	1.38		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	97	0.0100	2.57	10.27	**Channel Flow,** Area= 4.0 sf Perim= 8.5' r= 0.47' n= 0.035 Earth, dense weeds
10.2	299	Total			

Subcatchment 36S: DA-2



Summary for Subcatchment 37S: DA-10

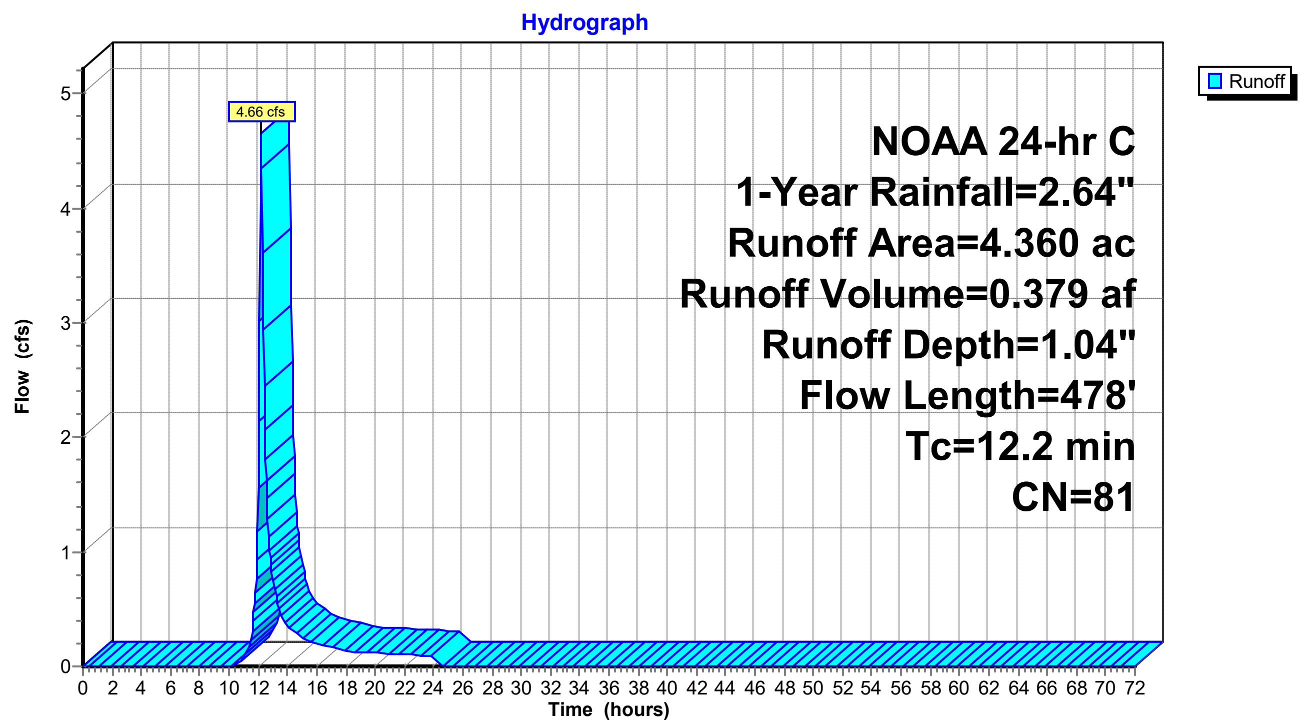
Runoff = 4.66 cfs @ 12.21 hrs, Volume= 0.379 af, Depth= 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
4.048	80	>75% Grass cover, Good, HSG D
0.312	98	Paved parking, HSG D
4.360	81	Weighted Average
4.048		92.84% Pervious Area
0.312		7.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0400	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"
0.7	129	0.0221	3.02		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.0	249	0.0221	1.04		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.2	478	Total			

Subcatchment 37S: DA-10



Summary for Subcatchment 40S: DA-7B

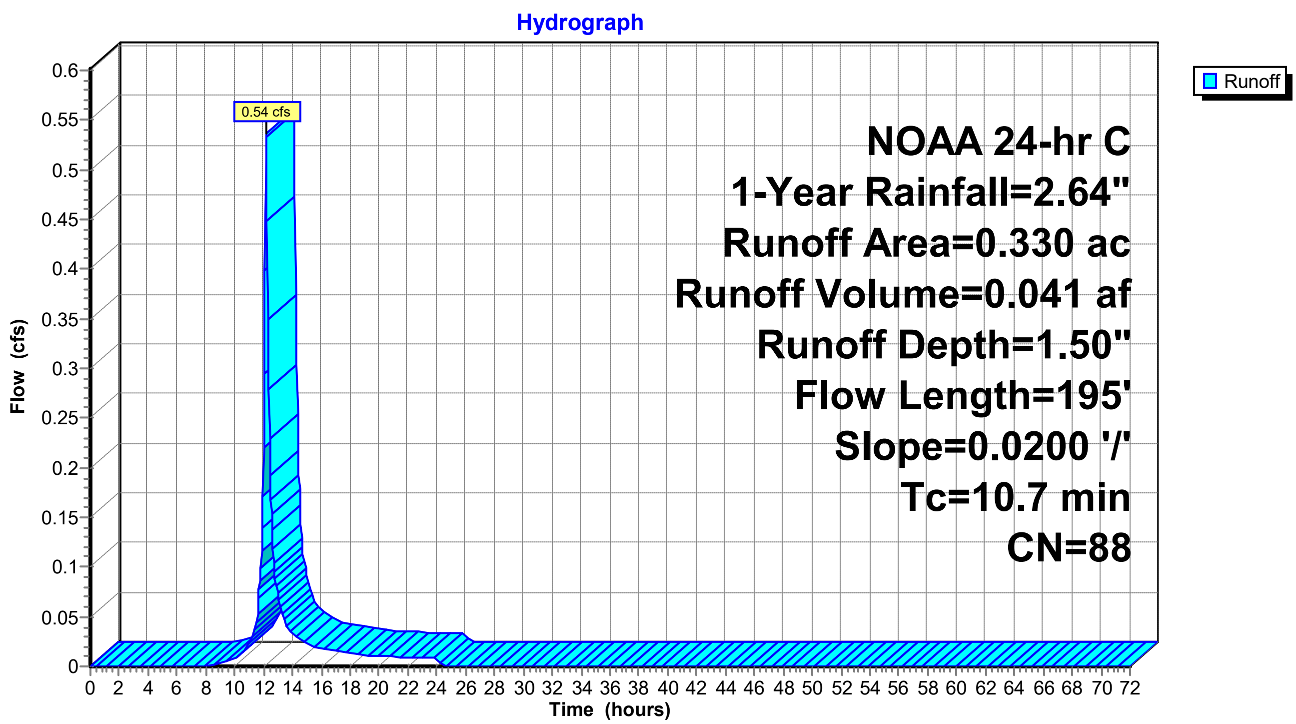
Runoff = 0.54 cfs @ 12.19 hrs, Volume= 0.041 af, Depth= 1.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.192	80	>75% Grass cover, Good, HSG D
0.138	98	Paved parking, HSG D
0.330	88	Weighted Average
0.192		58.18% Pervious Area
0.138		41.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"
0.5	31	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	64	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.7	195	Total			

Subcatchment 40S: DA-7B



Summary for Subcatchment 41S: DA-7A

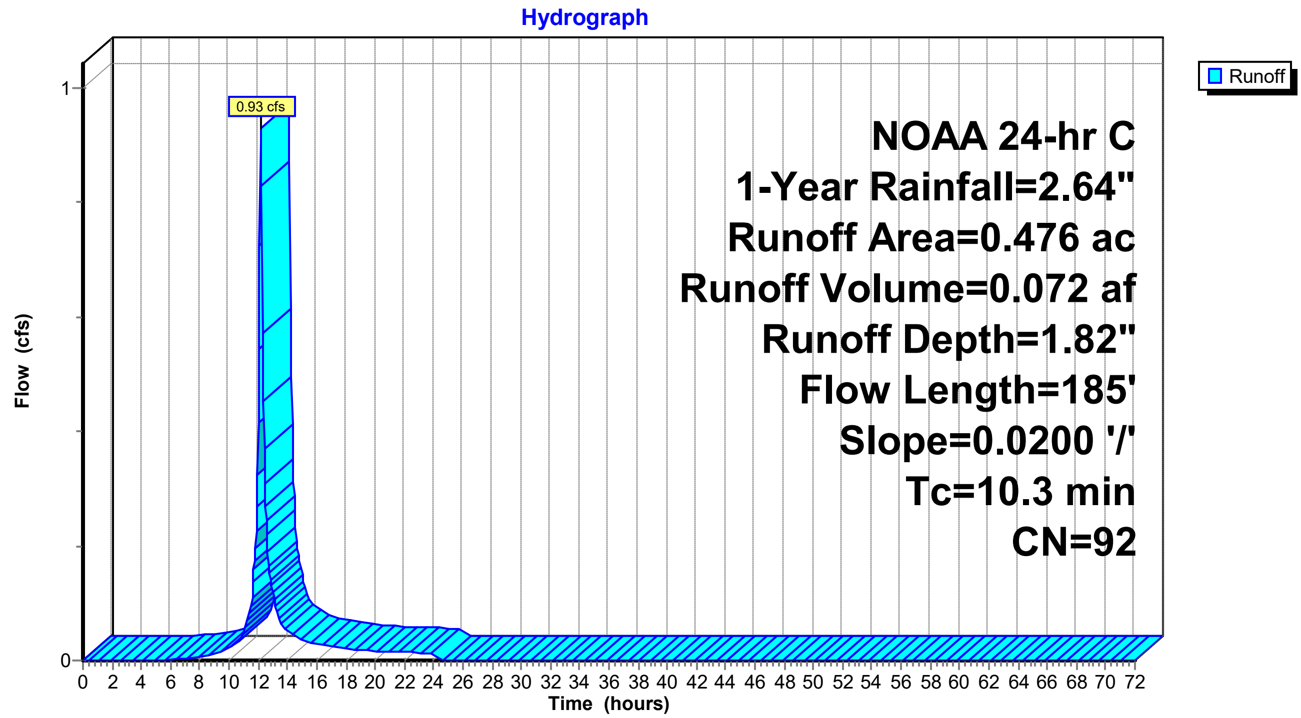
Runoff = 0.93 cfs @ 12.18 hrs, Volume= 0.072 af, Depth= 1.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.165	80	>75% Grass cover, Good, HSG D
0.311	98	Paved parking, HSG D
0.476	92	Weighted Average
0.165		34.66% Pervious Area
0.311		65.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"
0.2	31	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.3	54	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.3	185	Total			

Subcatchment 41S: DA-7A



Summary for Subcatchment 42S: DA-7C

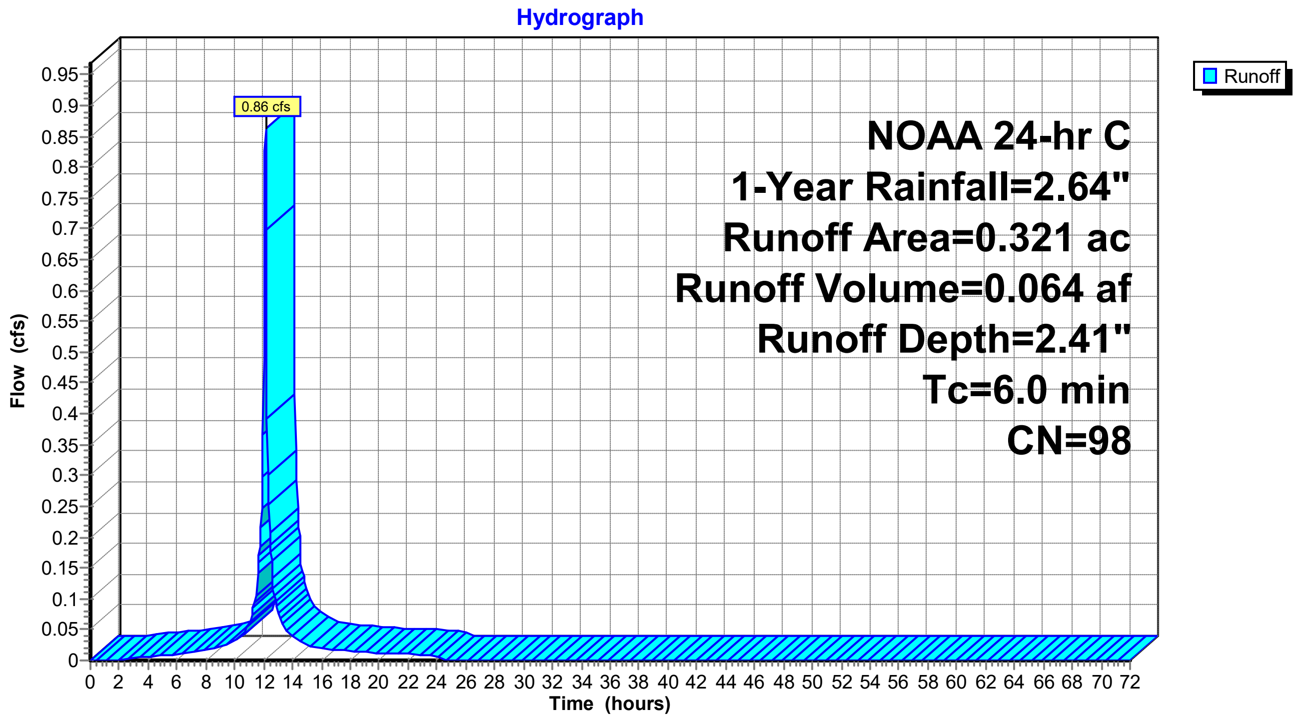
Runoff = 0.86 cfs @ 12.13 hrs, Volume= 0.064 af, Depth= 2.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.321	98	Paved parking, HSG D
0.321		100.00% Impervious Area

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

Subcatchment 42S: DA-7C



Summary for Subcatchment 49S: DA-7D

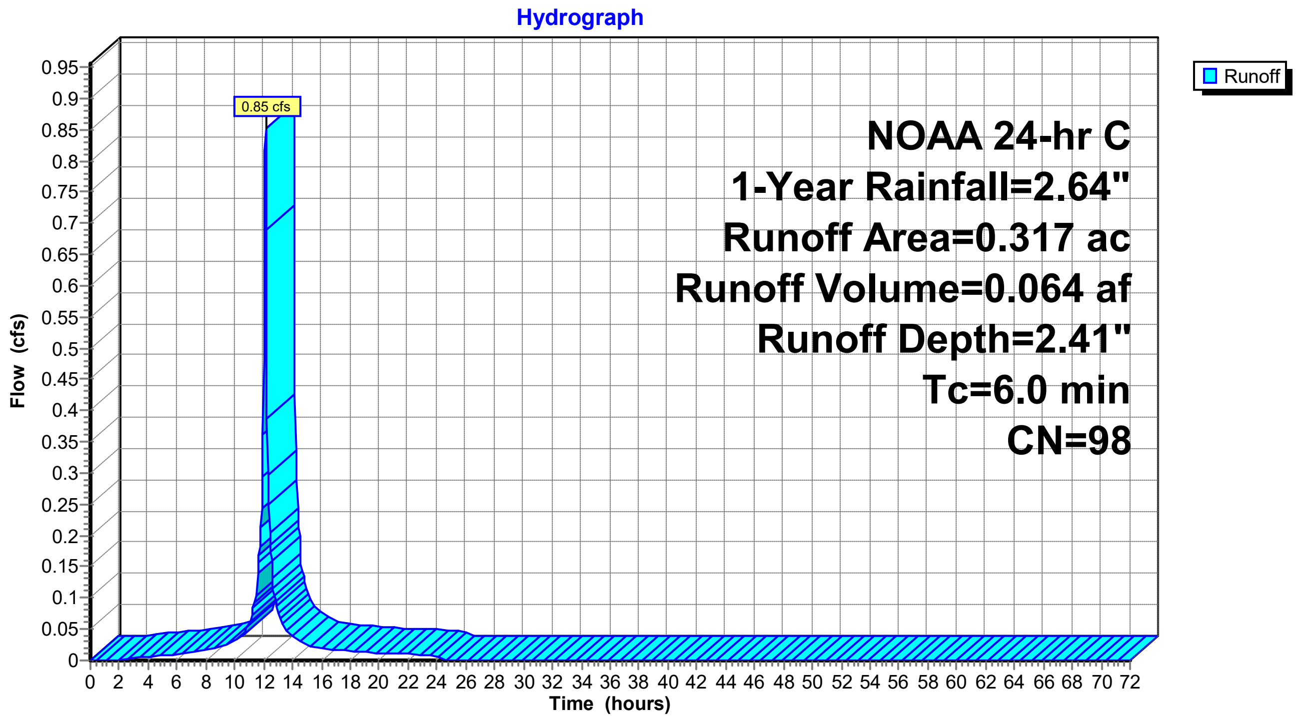
Runoff = 0.85 cfs @ 12.13 hrs, Volume= 0.064 af, Depth= 2.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.317	98	Paved parking, HSG D
0.317		100.00% Impervious Area

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

Subcatchment 49S: DA-7D



Summary for Subcatchment 55S: DA-7E

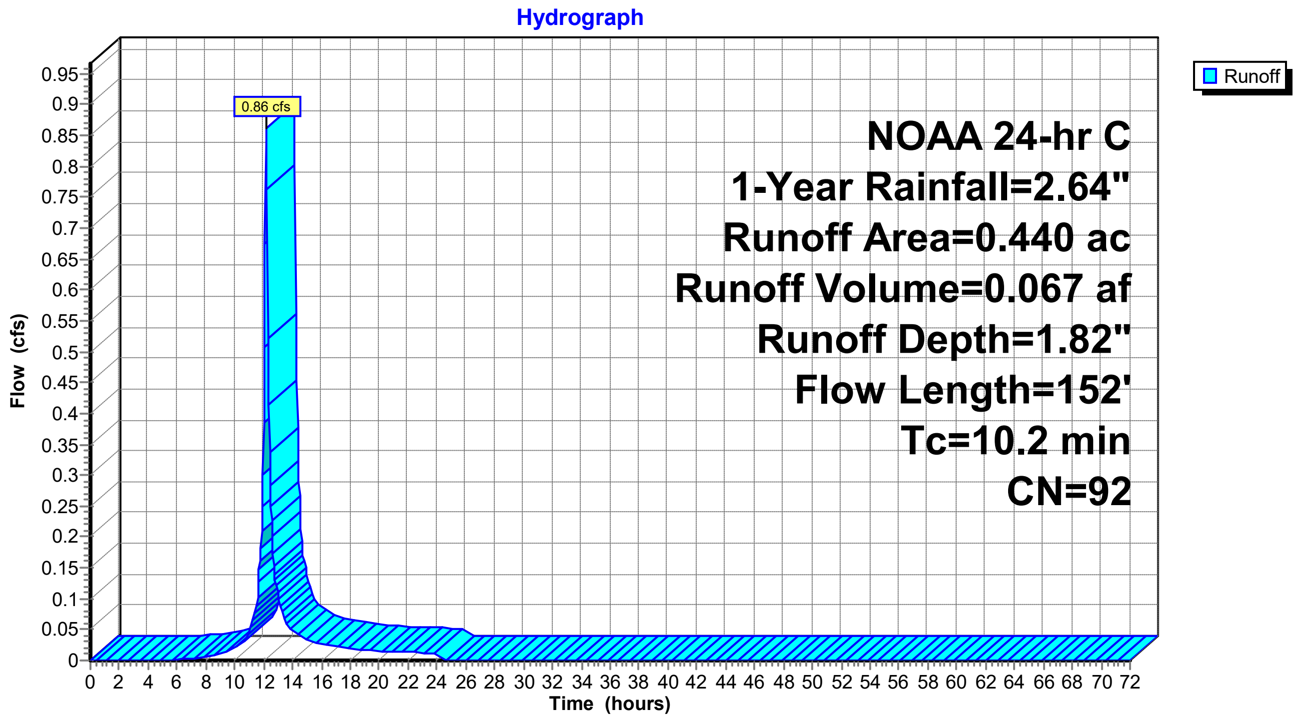
Runoff = 0.86 cfs @ 12.18 hrs, Volume= 0.067 af, Depth= 1.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NOAA 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.153	80	>75% Grass cover, Good, HSG D
0.287	98	Paved parking, HSG D
0.440	92	Weighted Average
0.153		34.77% Pervious Area
0.287		65.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"
0.2	22	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	30	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.2	152	Total			

Subcatchment 55S: DA-7E



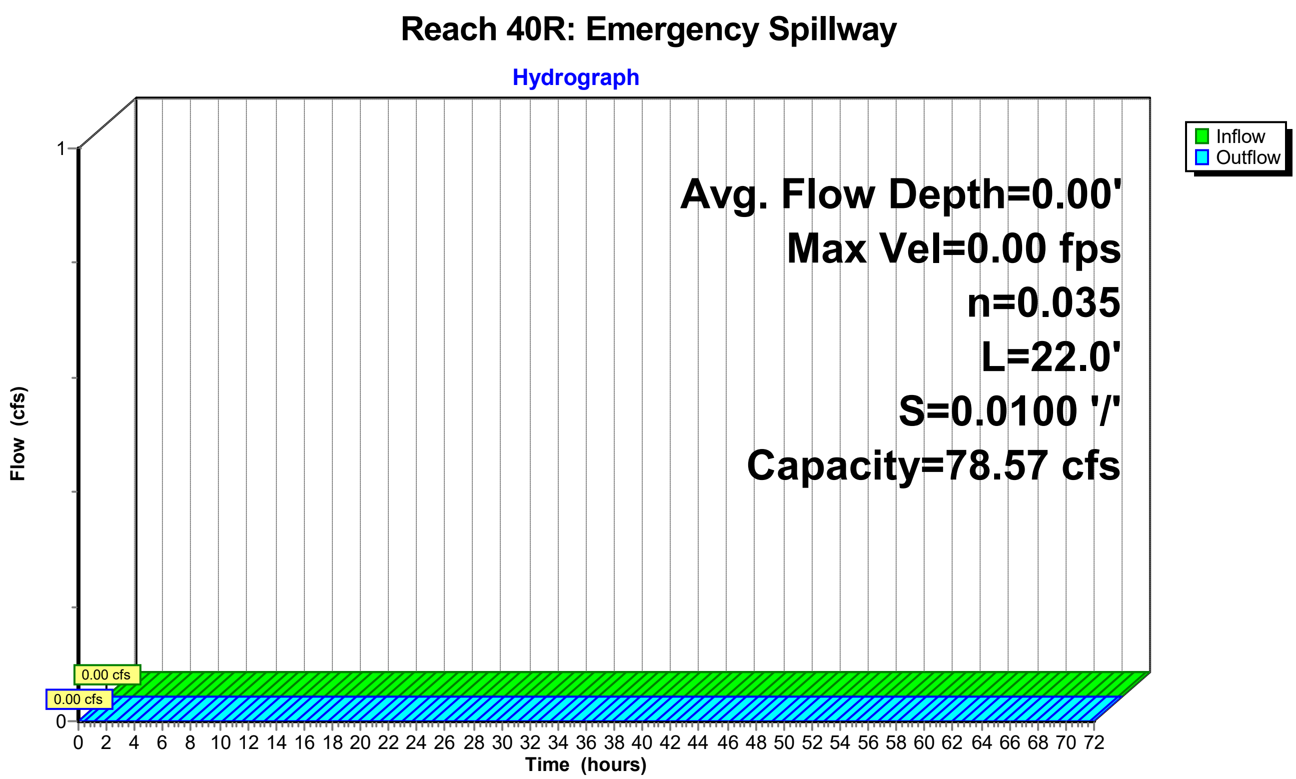
Summary for Reach 40R: Emergency Spillway

Inflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af
Outflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.00' Flow Area= 20.0 sf, Capacity= 78.57 cfs

18.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 2.0 '/' Top Width= 22.00'
Length= 22.0' Slope= 0.0100 '/'
Inlet Invert= 450.25', Outlet Invert= 450.03'



Summary for Pond 33P: Detention Pond 2

Inflow Area = 4.168 ac, 44.39% Impervious, Inflow Depth = 1.72" for 1-Year event
Inflow = 7.77 cfs @ 12.16 hrs, Volume= 0.596 af
Outflow = 0.25 cfs @ 15.70 hrs, Volume= 0.579 af, Atten= 97%, Lag= 212.3 min
Primary = 0.25 cfs @ 15.70 hrs, Volume= 0.579 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Starting Elev= 447.00' Storage= 26,653 cf
Peak Elev= 448.28' @ 15.70 hrs Storage= 44,369 cf (17,716 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 883.3 min (1,693.4 - 810.1)

Volume	Invert	Avail.Storage	Storage Description
#1	442.50'	93,316 cf	**Custom Stage Data** Listed below

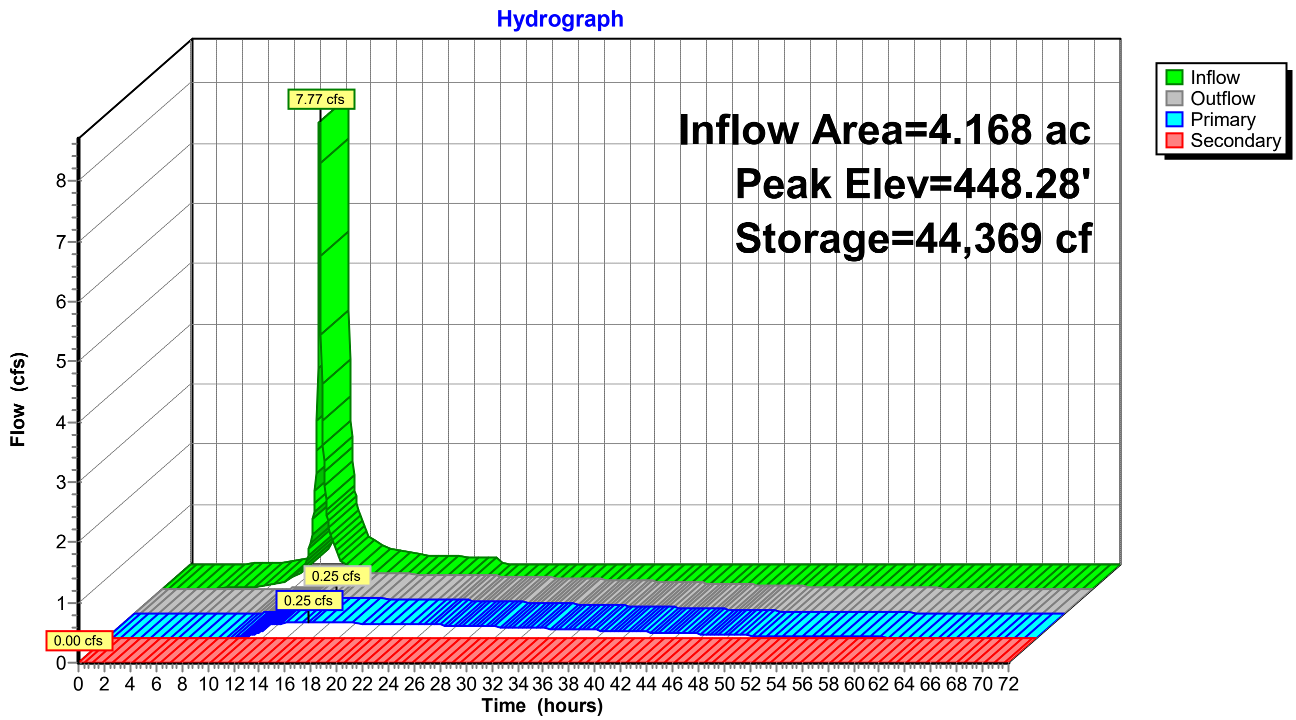
Elevation (feet)	Cum.Store (cubic-feet)
442.50	0
443.00	1,884
444.00	6,439
445.00	11,973
446.00	18,567
447.00	26,653
448.00	40,190
449.00	55,359
450.00	73,038
451.00	93,316

Device	Routing	Invert	Outlet Devices
#0	Secondary	451.00'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	447.00'	**18.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 447.00' / 446.80' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	447.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	448.60'	**1.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	450.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	450.25'	**Channel/Reach** using Reach 40R: Emergency Spillway

Primary OutFlow Max=0.25 cfs @ 15.70 hrs HW=448.28' TW=0.00' (Dynamic Tailwater)
1=Culvert (Passes 0.25 cfs of 4.34 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.25 cfs @ 5.16 fps)
3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)
4=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=447.00' TW=450.25' (Dynamic Tailwater)
5=Channel/Reach (Channel Controls 0.00 cfs)

Pond 33P: Detention Pond 2



Summary for Pond 44P: CB-1

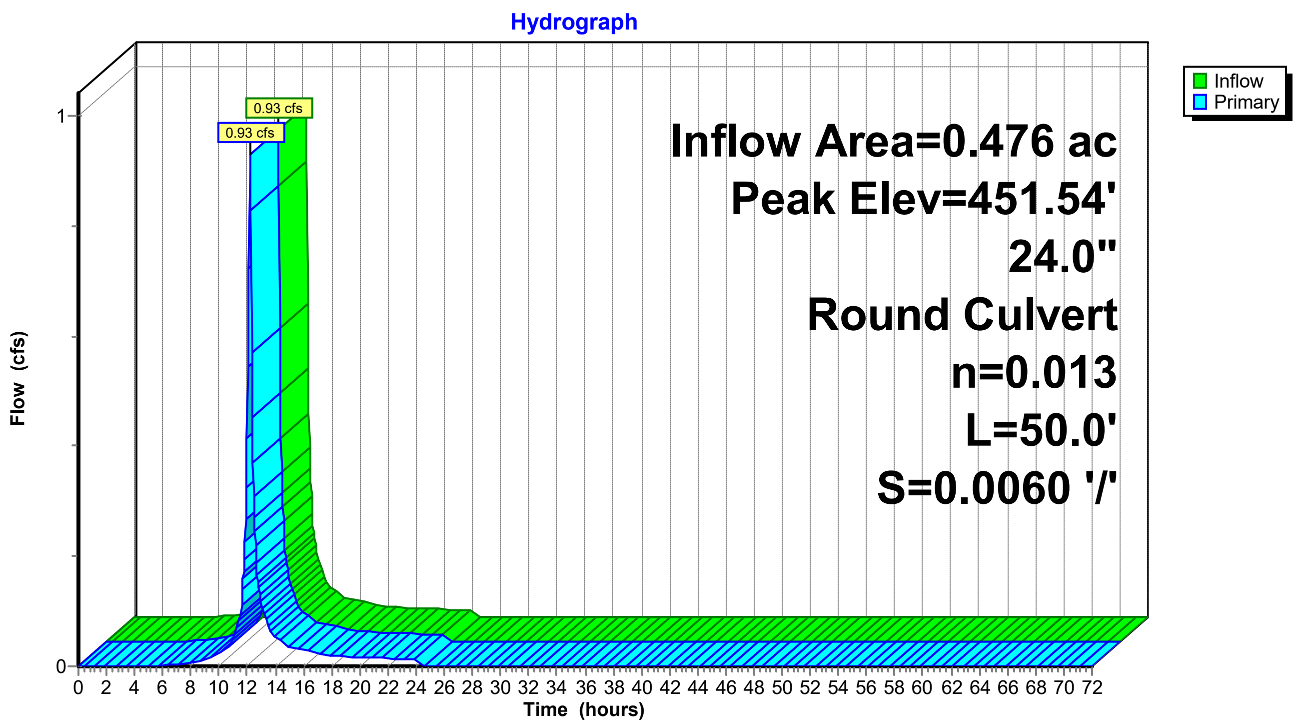
Inflow Area = 0.476 ac, 65.34% Impervious, Inflow Depth = 1.82" for 1-Year event
Inflow = 0.93 cfs @ 12.18 hrs, Volume= 0.072 af
Outflow = 0.93 cfs @ 12.18 hrs, Volume= 0.072 af, Atten= 0%, Lag= 0.0 min
Primary = 0.93 cfs @ 12.18 hrs, Volume= 0.072 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 451.54' @ 12.21 hrs
Flood Elev= 454.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	451.00'	**24.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 451.00' / 450.70' S= 0.0060 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.78 cfs @ 12.18 hrs HW=451.52' TW=451.35' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 0.78 cfs @ 1.81 fps)

Pond 44P: CB-1



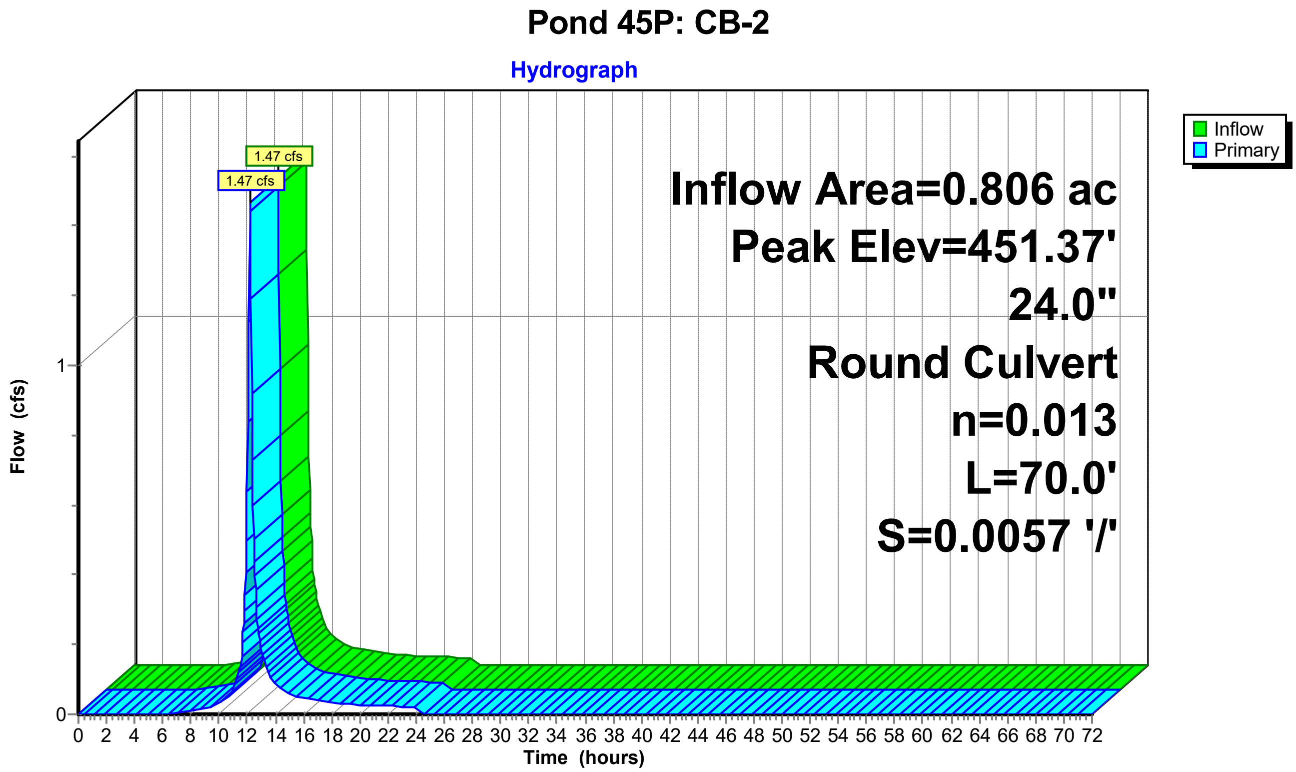
Summary for Pond 45P: CB-2

Inflow Area = 0.806 ac, 55.71% Impervious, Inflow Depth = 1.69" for 1-Year event
Inflow = 1.47 cfs @ 12.18 hrs, Volume= 0.114 af
Outflow = 1.47 cfs @ 12.18 hrs, Volume= 0.114 af, Atten= 0%, Lag= 0.0 min
Primary = 1.47 cfs @ 12.18 hrs, Volume= 0.114 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 451.37' @ 12.20 hrs
Flood Elev= 454.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	450.70'	**24.0" Round Culvert** L= 70.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 450.70' / 450.30' S= 0.0057 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=1.31 cfs @ 12.18 hrs HW=451.36' TW=451.11' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.31 cfs @ 2.18 fps)



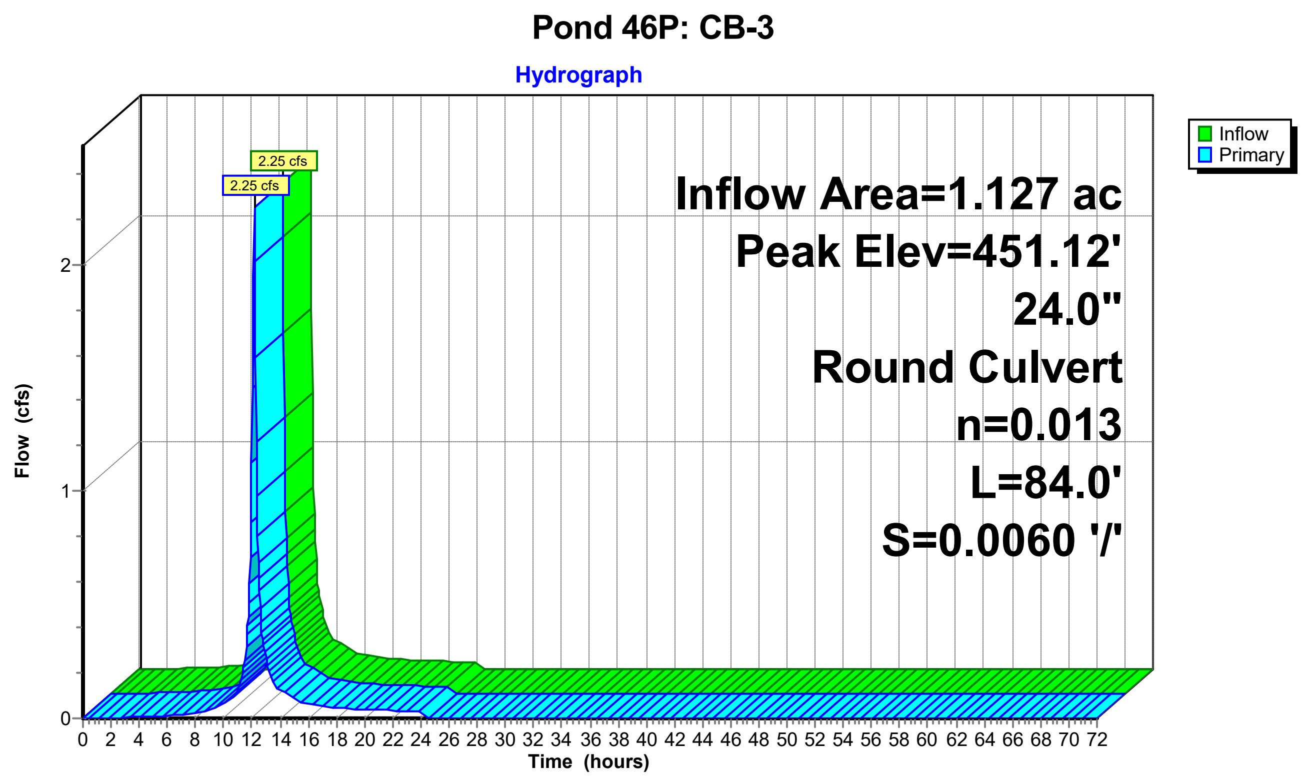
Summary for Pond 46P: CB-3

Inflow Area = 1.127 ac, 68.32% Impervious, Inflow Depth = 1.90" for 1-Year event
Inflow = 2.25 cfs @ 12.15 hrs, Volume= 0.178 af
Outflow = 2.25 cfs @ 12.15 hrs, Volume= 0.178 af, Atten= 0%, Lag= 0.0 min
Primary = 2.25 cfs @ 12.15 hrs, Volume= 0.178 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 451.12' @ 12.19 hrs
Flood Elev= 454.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	450.30'	**24.0" Round Culvert** L= 84.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 450.30' / 449.80' S= 0.0060 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=1.86 cfs @ 12.15 hrs HW=451.10' TW=450.83' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 1.86 cfs @ 2.34 fps)



Summary for Pond 48P: CB-4

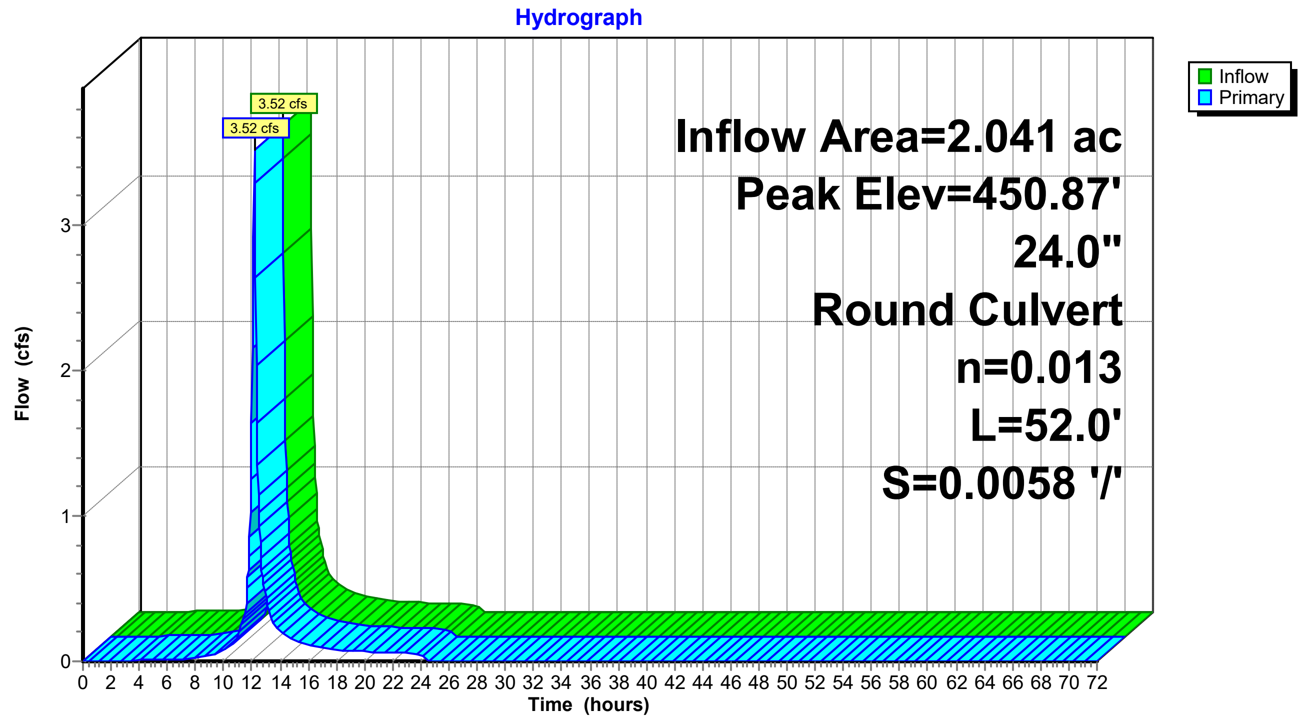
Inflow Area =	2.041 ac,	50.76% Impervious,	Inflow Depth = 1.63"	for 1-Year event	
Inflow =	3.52 cfs @	12.16 hrs,	Volume=	0.276 af	
Outflow =	3.52 cfs @	12.16 hrs,	Volume=	0.276 af,	Atten= 0%, Lag= 0.0 min
Primary =	3.52 cfs @	12.16 hrs,	Volume=	0.276 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 450.87' @ 12.19 hrs
Flood Elev= 454.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	449.80'	**24.0" Round Culvert** L= 52.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 449.80' / 449.50' S= 0.0058 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=2.99 cfs @ 12.16 hrs HW=450.83' TW=450.58' (Dynamic Tailwater)
1=Culvert (Outlet Controls 2.99 cfs @ 2.66 fps)

Pond 48P: CB-4



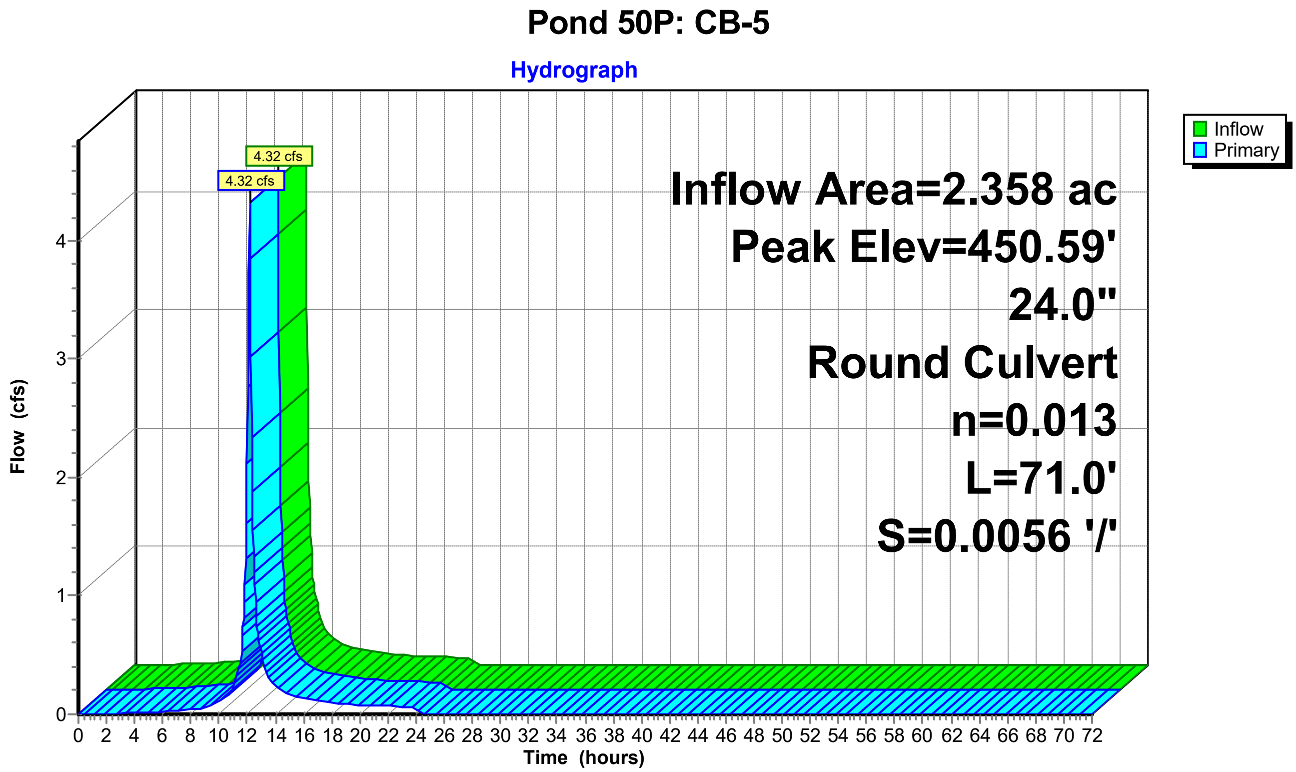
Summary for Pond 50P: CB-5

Inflow Area = 2.358 ac, 57.38% Impervious, Inflow Depth = 1.73" for 1-Year event
Inflow = 4.32 cfs @ 12.15 hrs, Volume= 0.340 af
Outflow = 4.32 cfs @ 12.15 hrs, Volume= 0.340 af, Atten= 0%, Lag= 0.0 min
Primary = 4.32 cfs @ 12.15 hrs, Volume= 0.340 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 450.59' @ 12.17 hrs
Flood Elev= 455.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	449.50'	**24.0" Round Culvert** L= 71.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 449.50' / 449.10' S= 0.0056 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=3.95 cfs @ 12.15 hrs HW=450.58' TW=450.15' (Dynamic Tailwater)
1=Culvert (Outlet Controls 3.95 cfs @ 3.30 fps)



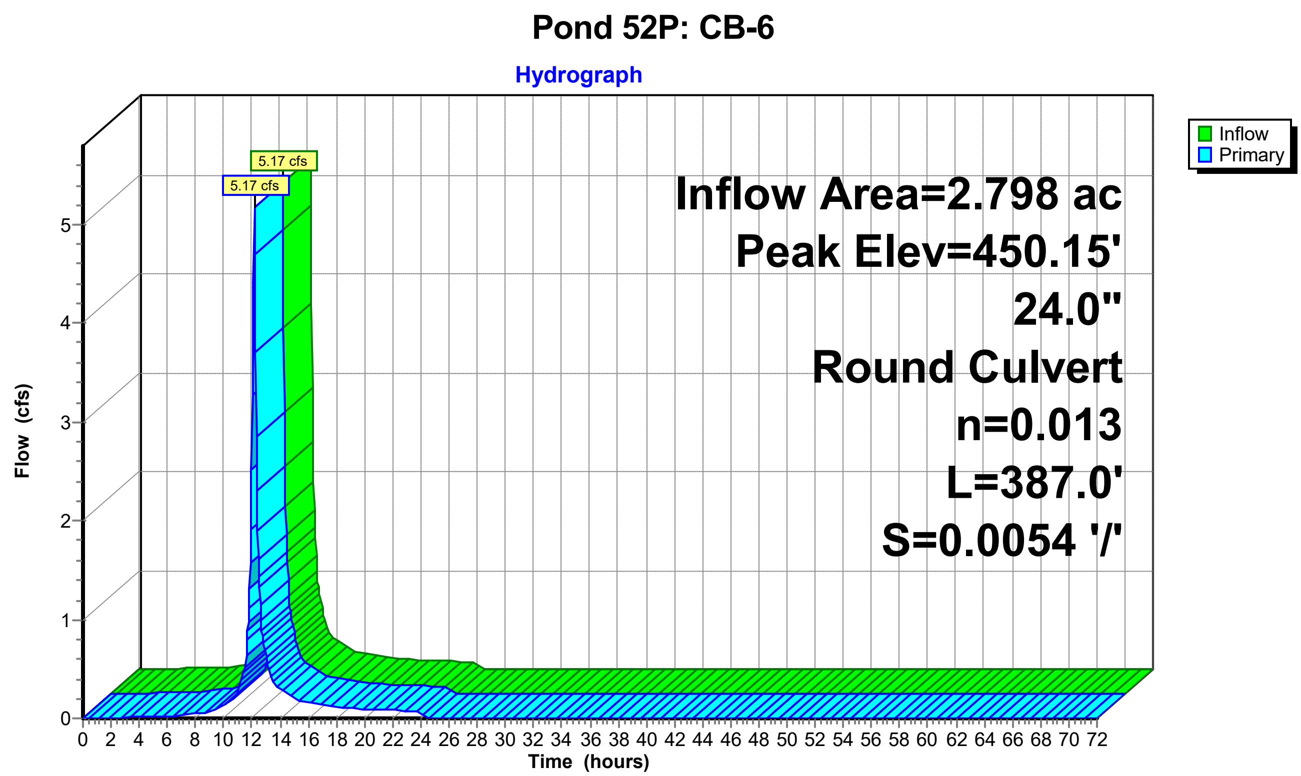
Summary for Pond 52P: CB-6

Inflow Area =	2.798 ac,	58.61% Impervious,	Inflow Depth = 1.75"	for 1-Year event	
Inflow =	5.17 cfs @	12.16 hrs,	Volume=	0.407 af	
Outflow =	5.17 cfs @	12.16 hrs,	Volume=	0.407 af,	Atten= 0%, Lag= 0.0 min
Primary =	5.17 cfs @	12.16 hrs,	Volume=	0.407 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 450.15' @ 12.16 hrs
Flood Elev= 454.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	449.10'	**24.0" Round Culvert** L= 387.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 449.10' / 447.00' S= 0.0054 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=5.11 cfs @ 12.16 hrs HW=450.14' TW=447.65' (Dynamic Tailwater)
1=Culvert (Barrel Controls 5.11 cfs @ 4.49 fps)

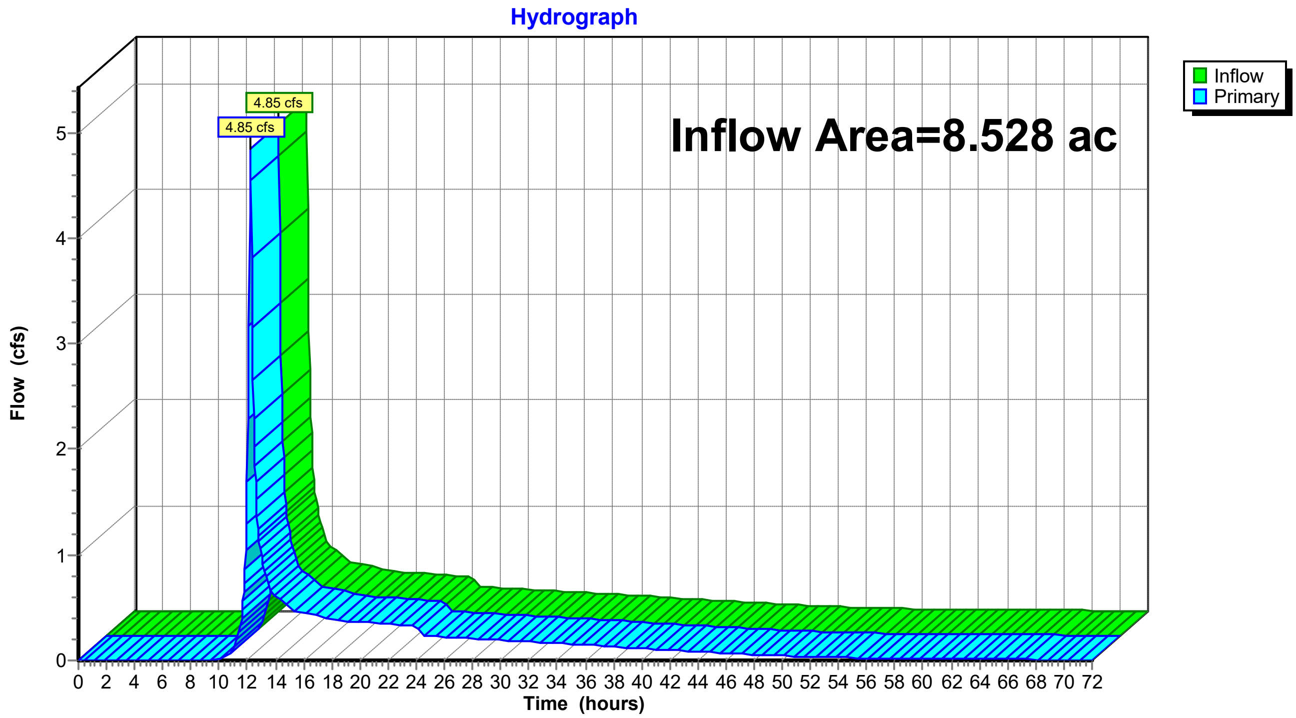


Summary for Link 39L: East Discharge

Inflow Area = 8.528 ac, 25.35% Impervious, Inflow Depth > 1.35" for 1-Year event
Inflow = 4.85 cfs @ 12.21 hrs, Volume= 0.958 af
Primary = 4.85 cfs @ 12.21 hrs, Volume= 0.958 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 39L: East Discharge



Summary for Subcatchment 34S: DA-8

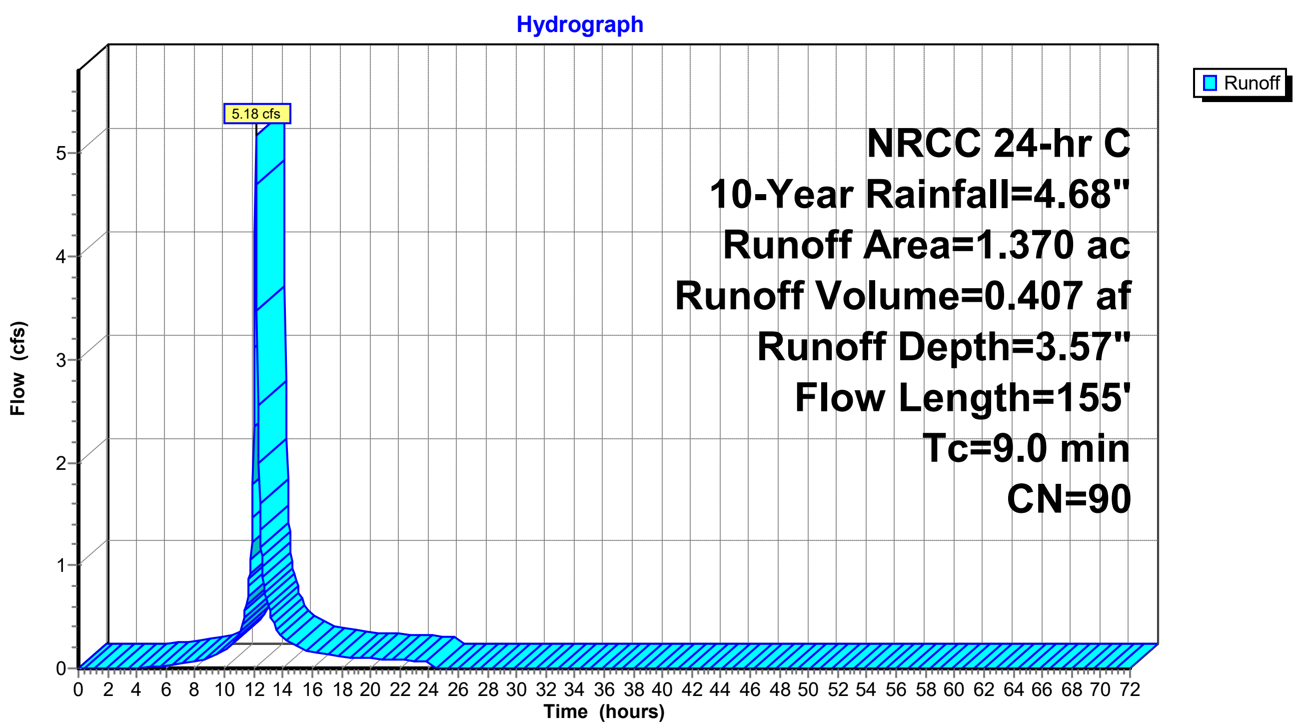
Runoff = 5.18 cfs @ 12.16 hrs, Volume= 0.407 af, Depth= 3.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
0.620	80	>75% Grass cover, Good, HSG D
0.210	98	Paved parking, HSG D
0.540	98	Water Surface, 0% imp, HSG D
1.370	90	Weighted Average
1.160		84.67% Pervious Area
0.210		15.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	100	0.0790	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
0.7	55	0.0380	1.36		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.0	155	Total			

Subcatchment 34S: DA-8



Summary for Subcatchment 36S: DA-2

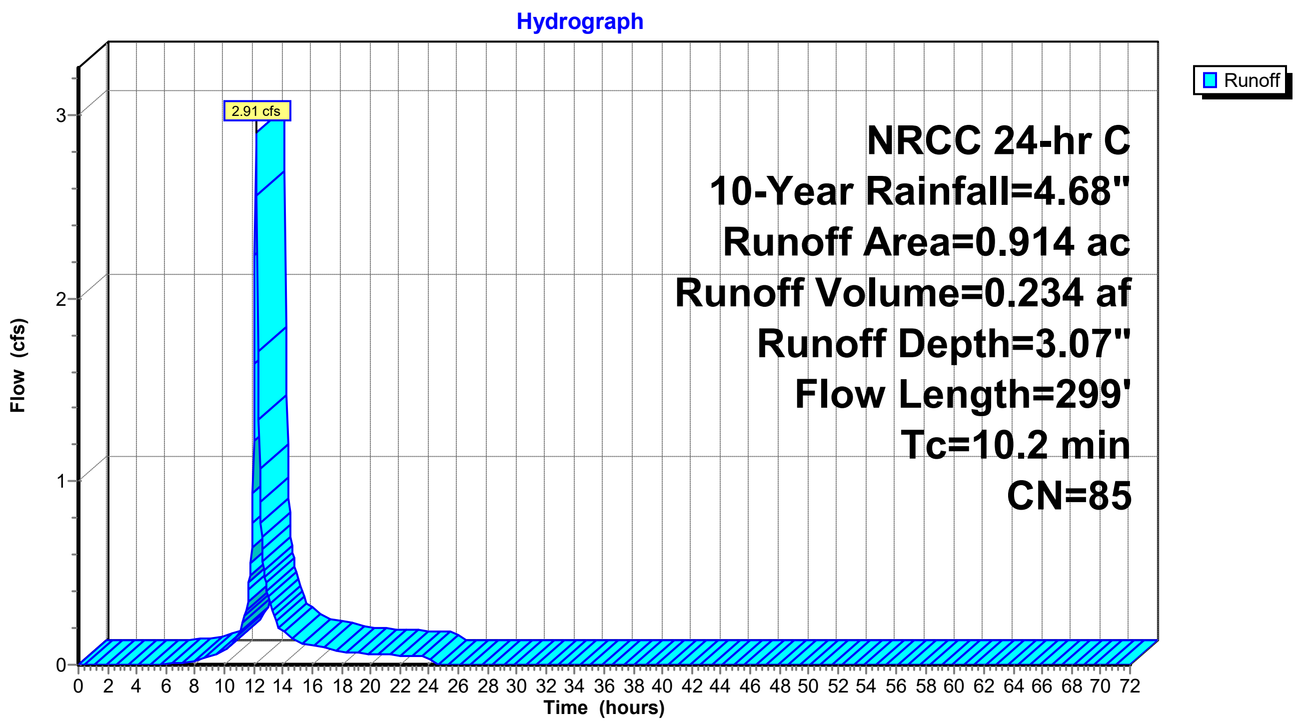
Runoff = 2.91 cfs @ 12.18 hrs, Volume= 0.234 af, Depth= 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
0.648	80	>75% Grass cover, Good, HSG D
0.266	98	Paved parking, HSG D
0.914	85	Weighted Average
0.648		70.90% Pervious Area
0.266		29.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0300	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"
1.2	102	0.0390	1.38		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	97	0.0100	2.57	10.27	**Channel Flow,** Area= 4.0 sf Perim= 8.5' r= 0.47' n= 0.035 Earth, dense weeds
10.2	299	Total			

Subcatchment 36S: DA-2



Summary for Subcatchment 37S: DA-10

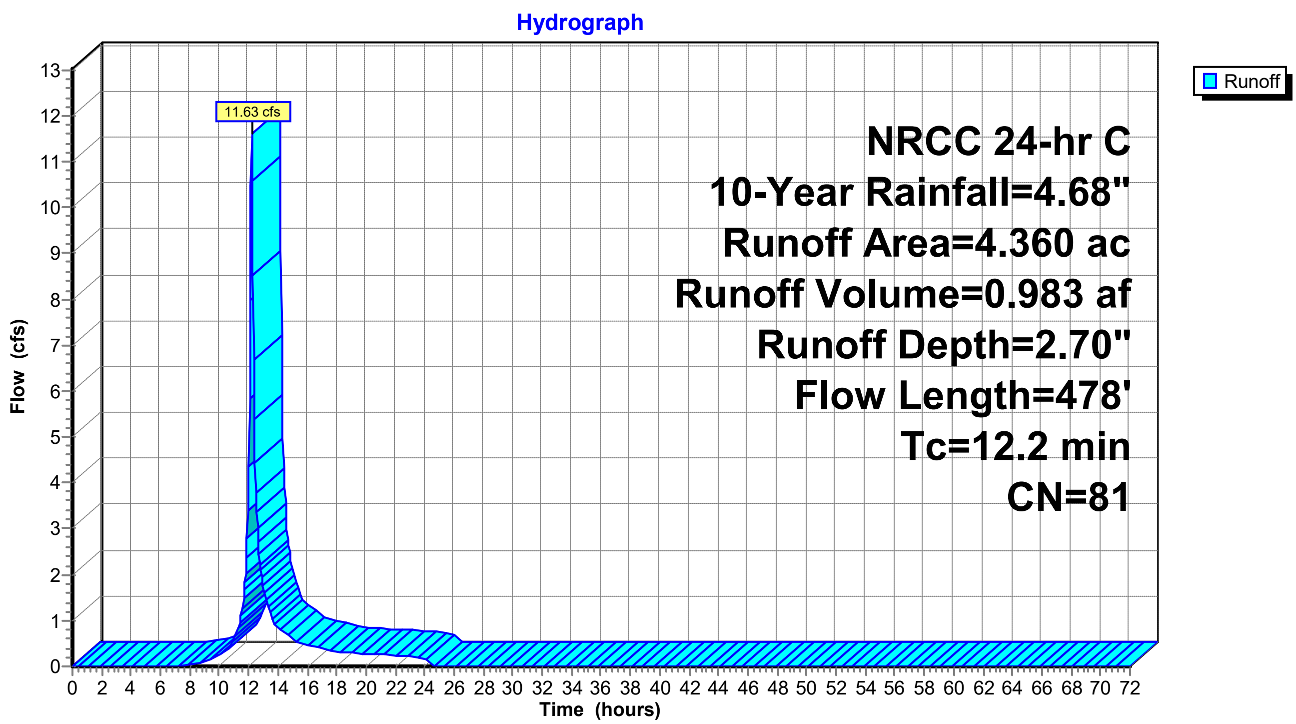
Runoff = 11.63 cfs @ 12.20 hrs, Volume= 0.983 af, Depth= 2.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
4.048	80	>75% Grass cover, Good, HSG D
0.312	98	Paved parking, HSG D
4.360	81	Weighted Average
4.048		92.84% Pervious Area
0.312		7.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0400	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"
0.7	129	0.0221	3.02		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.0	249	0.0221	1.04		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.2	478	Total			

Subcatchment 37S: DA-10



Summary for Subcatchment 40S: DA-7B

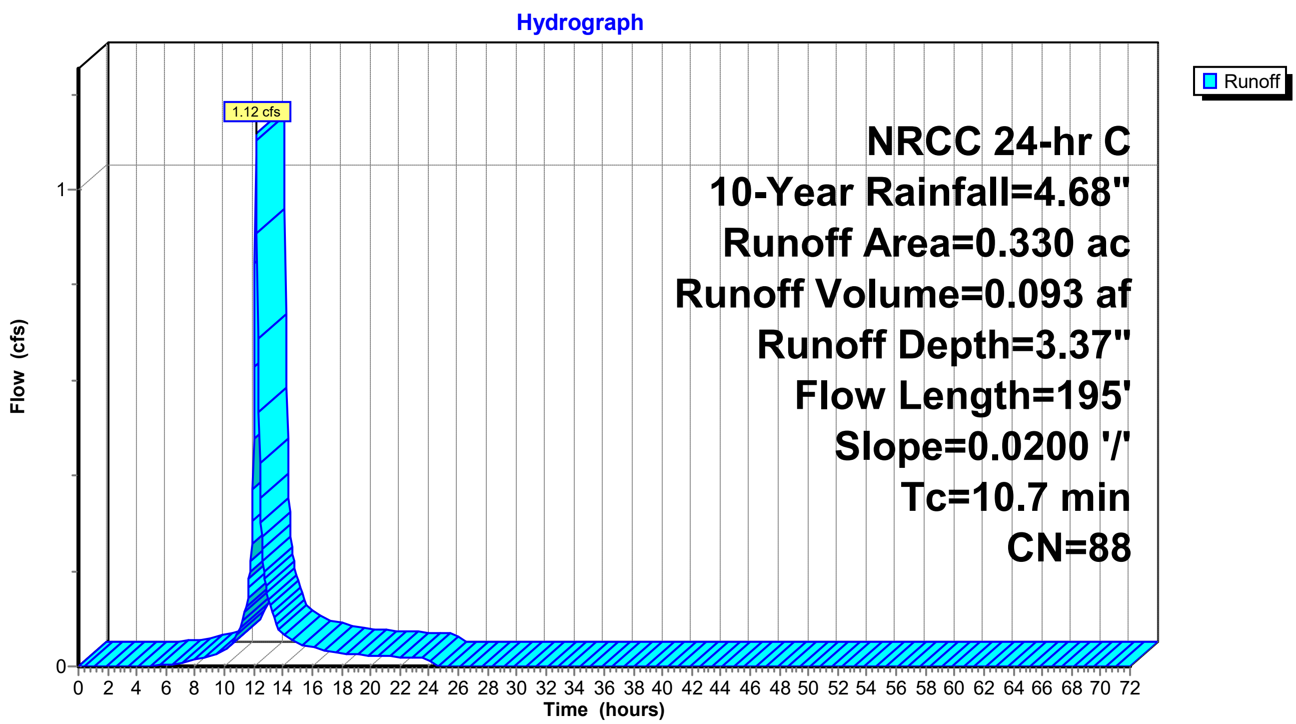
Runoff = 1.12 cfs @ 12.18 hrs, Volume= 0.093 af, Depth= 3.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
0.192	80	>75% Grass cover, Good, HSG D
0.138	98	Paved parking, HSG D
0.330	88	Weighted Average
0.192		58.18% Pervious Area
0.138		41.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"
0.5	31	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	64	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.7	195	Total			

Subcatchment 40S: DA-7B



Summary for Subcatchment 41S: DA-7A

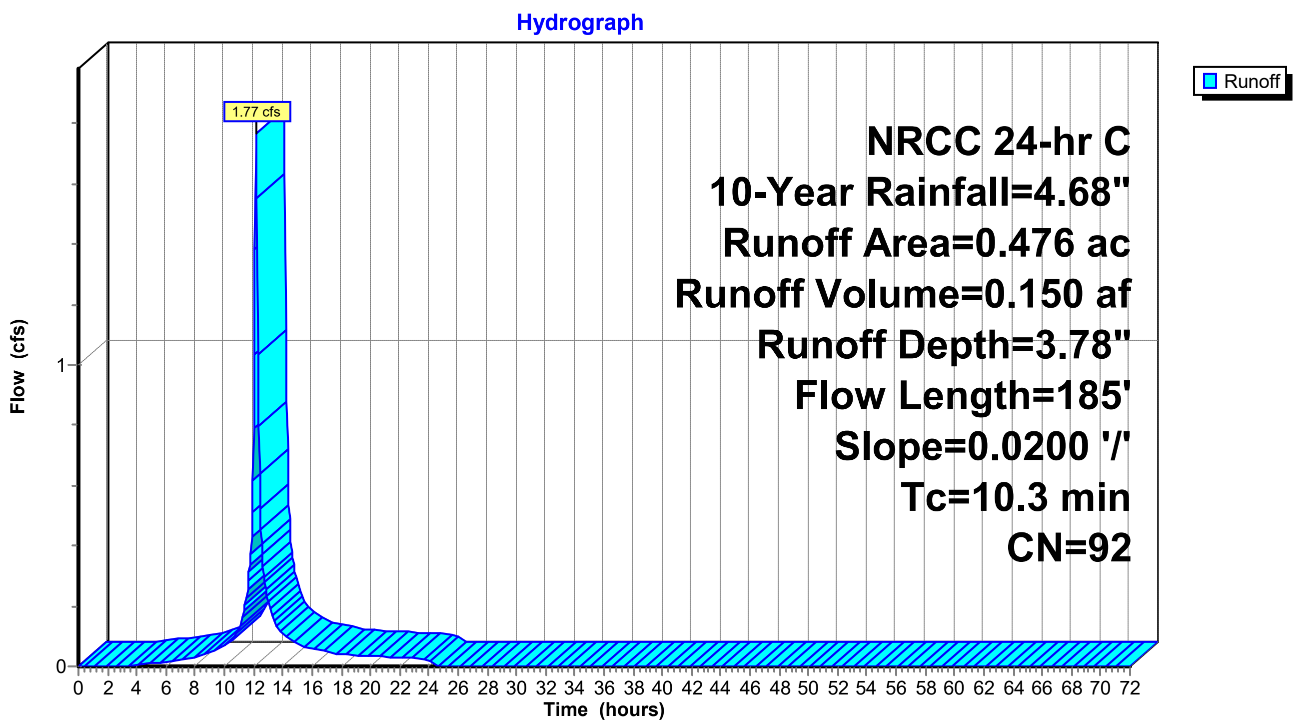
Runoff = 1.77 cfs @ 12.17 hrs, Volume= 0.150 af, Depth= 3.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
0.165	80	>75% Grass cover, Good, HSG D
0.311	98	Paved parking, HSG D
0.476	92	Weighted Average
0.165		34.66% Pervious Area
0.311		65.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"
0.2	31	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.3	54	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.3	185	Total			

Subcatchment 41S: DA-7A



Summary for Subcatchment 42S: DA-7C

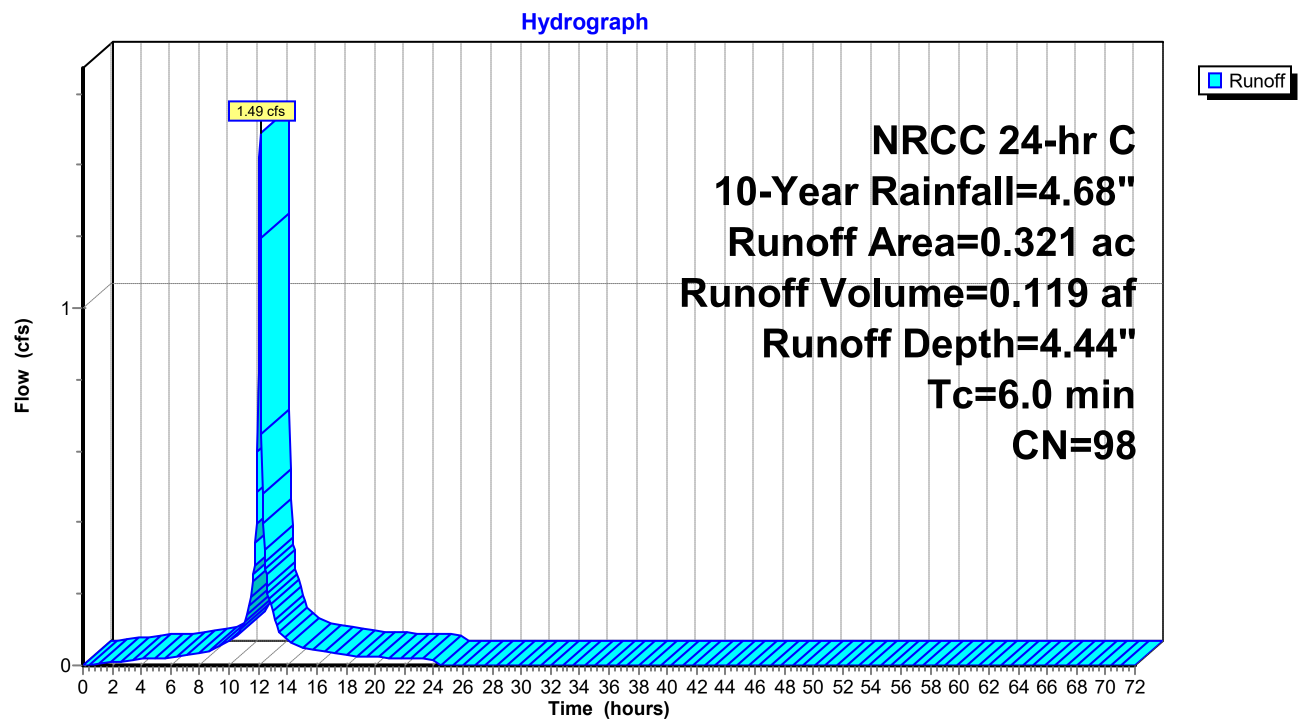
Runoff = 1.49 cfs @ 12.13 hrs, Volume= 0.119 af, Depth= 4.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
0.321	98	Paved parking, HSG D
0.321		100.00% Impervious Area

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

Subcatchment 42S: DA-7C



Summary for Subcatchment 49S: DA-7D

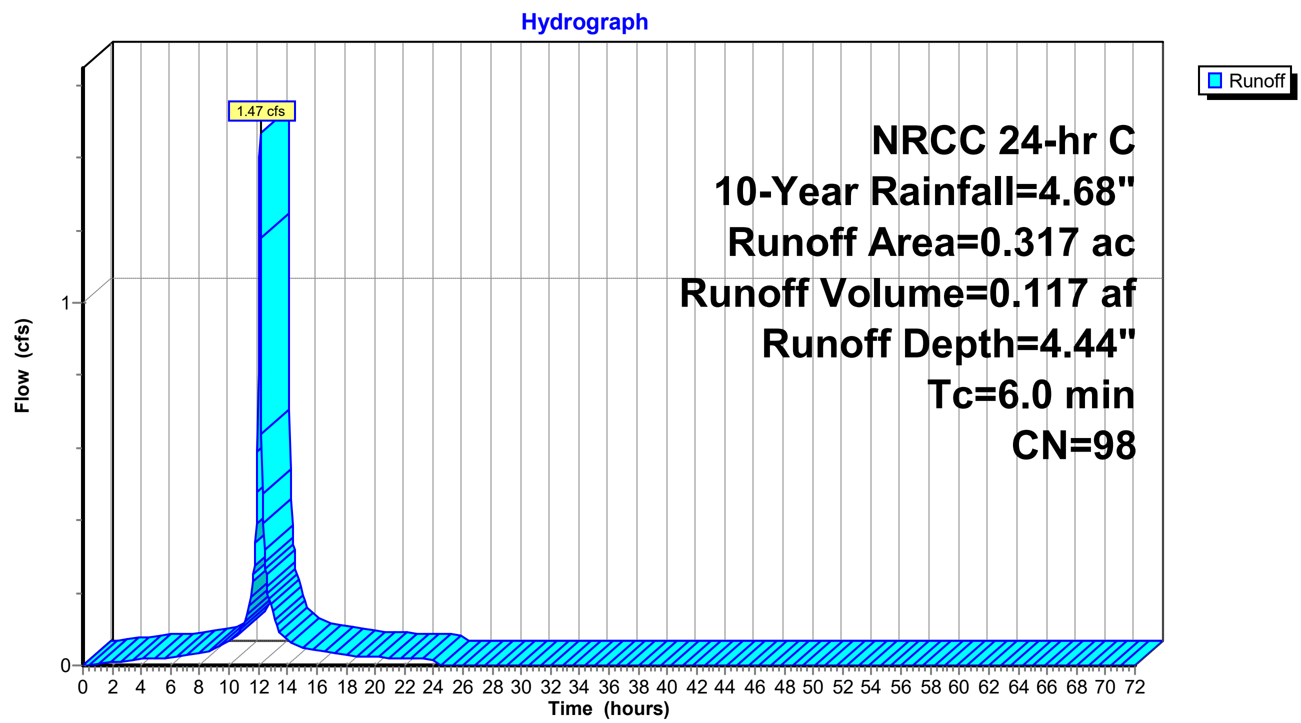
Runoff = 1.47 cfs @ 12.13 hrs, Volume= 0.117 af, Depth= 4.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
0.317	98	Paved parking, HSG D
0.317		100.00% Impervious Area

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

Subcatchment 49S: DA-7D



Summary for Subcatchment 55S: DA-7E

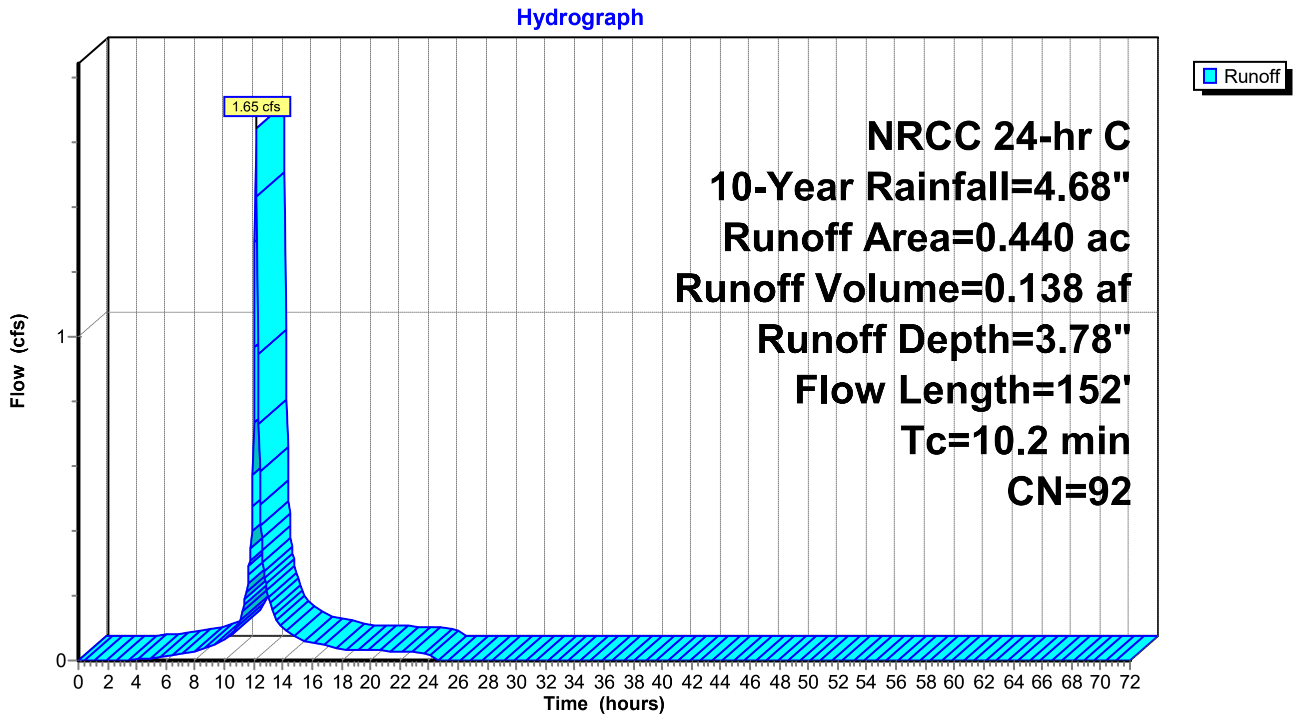
Runoff = 1.65 cfs @ 12.17 hrs, Volume= 0.138 af, Depth= 3.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.68"

Area (ac)	CN	Description
0.153	80	>75% Grass cover, Good, HSG D
0.287	98	Paved parking, HSG D
0.440	92	Weighted Average
0.153		34.77% Pervious Area
0.287		65.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"
0.2	22	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	30	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.2	152	Total			

Subcatchment 55S: DA-7E



Summary for Reach 40R: Emergency Spillway

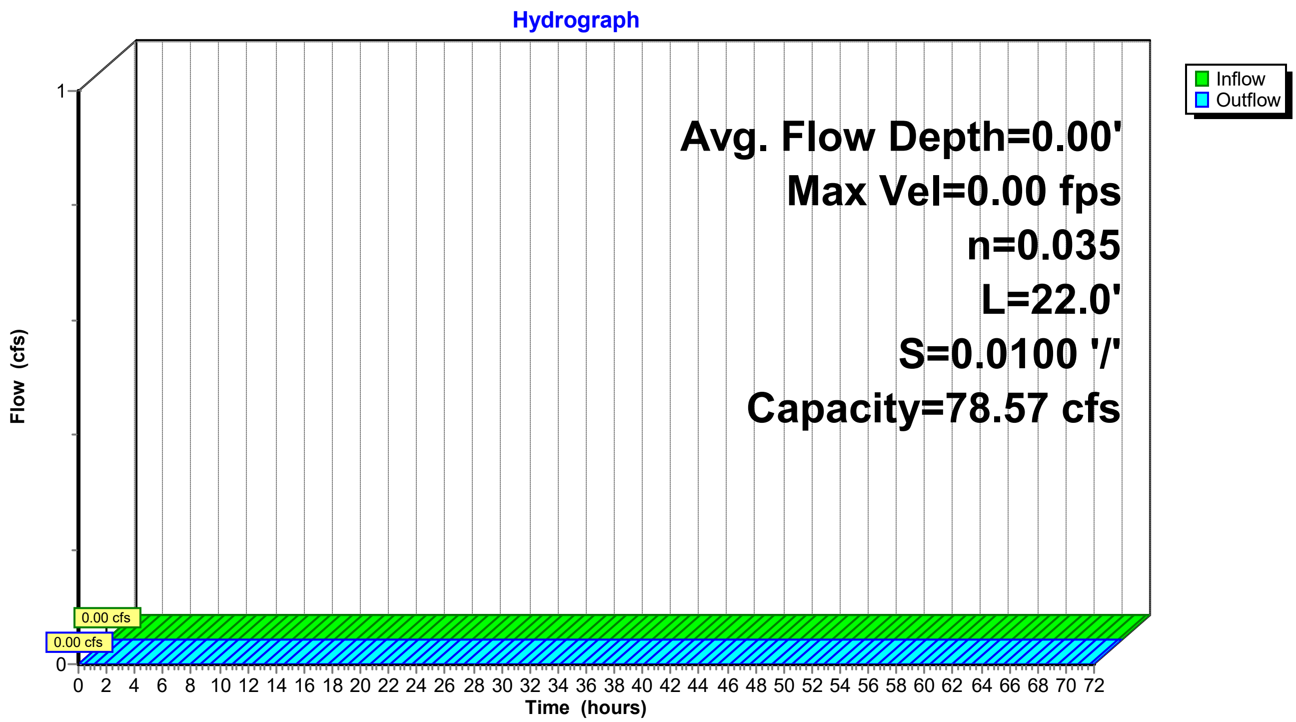
Inflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af
Outflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.00' Flow Area= 20.0 sf, Capacity= 78.57 cfs

18.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 2.0 '/' Top Width= 22.00'
Length= 22.0' Slope= 0.0100 '/'
Inlet Invert= 450.25', Outlet Invert= 450.03'

Reach 40R: Emergency Spillway



Summary for Pond 33P: Detention Pond 2

Inflow Area =	4.168 ac, 44.39% Impervious,	Inflow Depth = 3.62"	for 10-Year event	
Inflow =	15.30 cfs @	12.16 hrs, Volume=	1.259 af	
Outflow =	1.59 cfs @	13.14 hrs, Volume=	1.235 af,	Atten= 90%, Lag= 59.1 min
Primary =	1.59 cfs @	13.14 hrs, Volume=	1.235 af	
Secondary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Starting Elev= 447.00' Storage= 26,653 cf
Peak Elev= 449.15' @ 13.14 hrs Storage= 58,060 cf (31,407 cf above start)

Plug-Flow detention time= 1,451.0 min calculated for 0.623 af (50% of inflow)
Center-of-Mass det. time= 717.0 min (1,511.8 - 794.7)

Volume	Invert	Avail.Storage	Storage Description
#1	442.50'	93,316 cf	**Custom Stage Data** Listed below

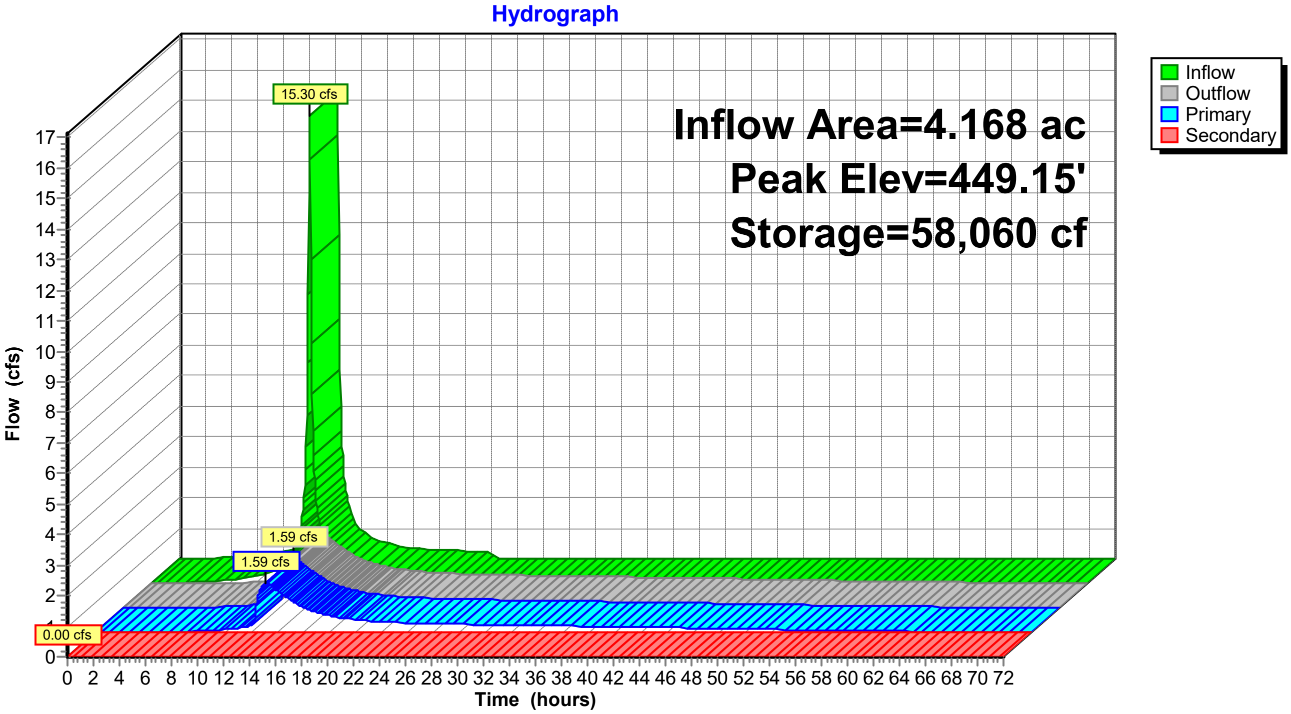
Elevation (feet)	Cum.Store (cubic-feet)
442.50	0
443.00	1,884
444.00	6,439
445.00	11,973
446.00	18,567
447.00	26,653
448.00	40,190
449.00	55,359
450.00	73,038
451.00	93,316

Device	Routing	Invert	Outlet Devices
#0	Secondary	451.00'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	447.00'	**18.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 447.00' / 446.80' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	447.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	448.60'	**1.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	450.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	450.25'	**Channel/Reach** using Reach 40R: Emergency Spillway

Primary OutFlow Max=1.59 cfs @ 13.14 hrs HW=449.15' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.59 cfs of 7.96 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.34 cfs @ 6.86 fps)
  ├─**3=Broad-Crested Rectangular Weir** (Weir Controls 1.25 cfs @ 2.26 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=447.00' TW=450.25' (Dynamic Tailwater)
└─**5=Channel/Reach** (Channel Controls 0.00 cfs)

Pond 33P: Detention Pond 2



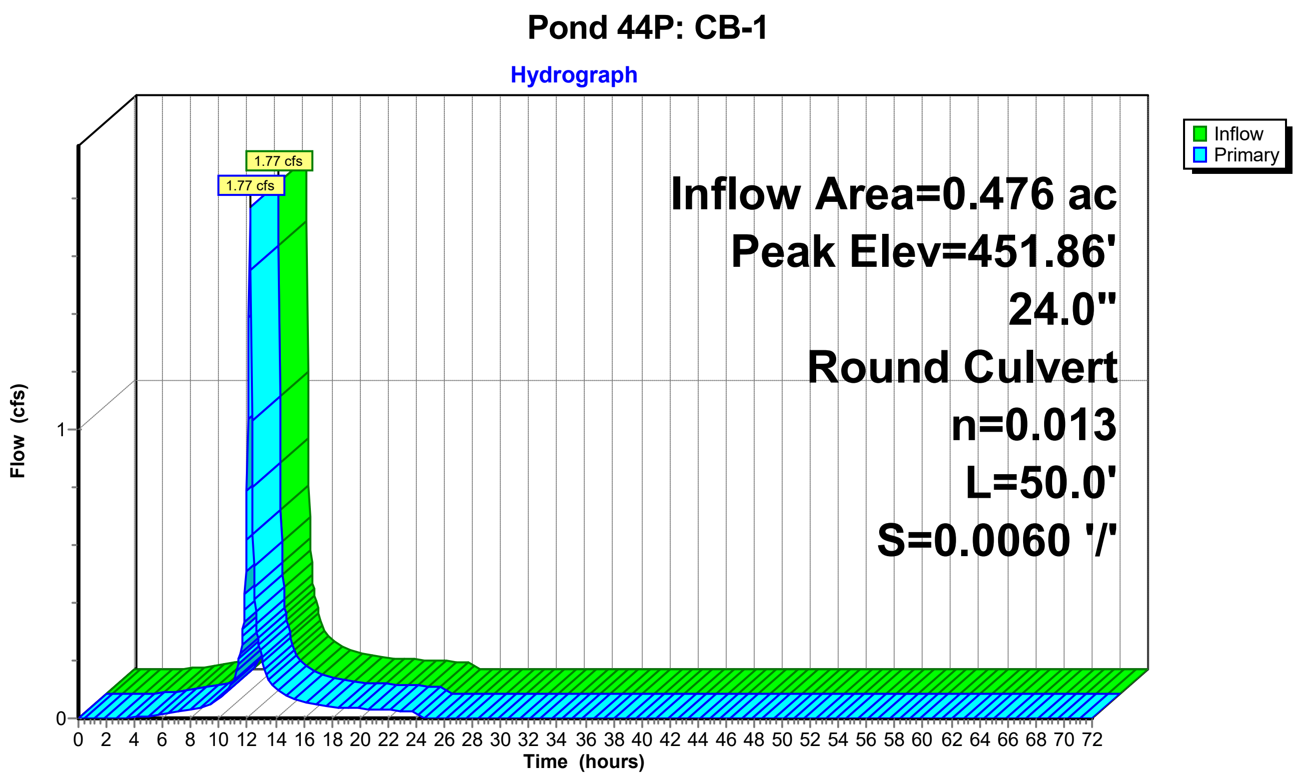
Summary for Pond 44P: CB-1

Inflow Area = 0.476 ac, 65.34% Impervious, Inflow Depth = 3.78" for 10-Year event
Inflow = 1.77 cfs @ 12.17 hrs, Volume= 0.150 af
Outflow = 1.77 cfs @ 12.17 hrs, Volume= 0.150 af, Atten= 0%, Lag= 0.0 min
Primary = 1.77 cfs @ 12.17 hrs, Volume= 0.150 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 451.86' @ 12.25 hrs
Flood Elev= 454.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	451.00'	**24.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 451.00' / 450.70' S= 0.0060 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=1.09 cfs @ 12.17 hrs HW=451.79' TW=451.71' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 1.09 cfs @ 1.39 fps)



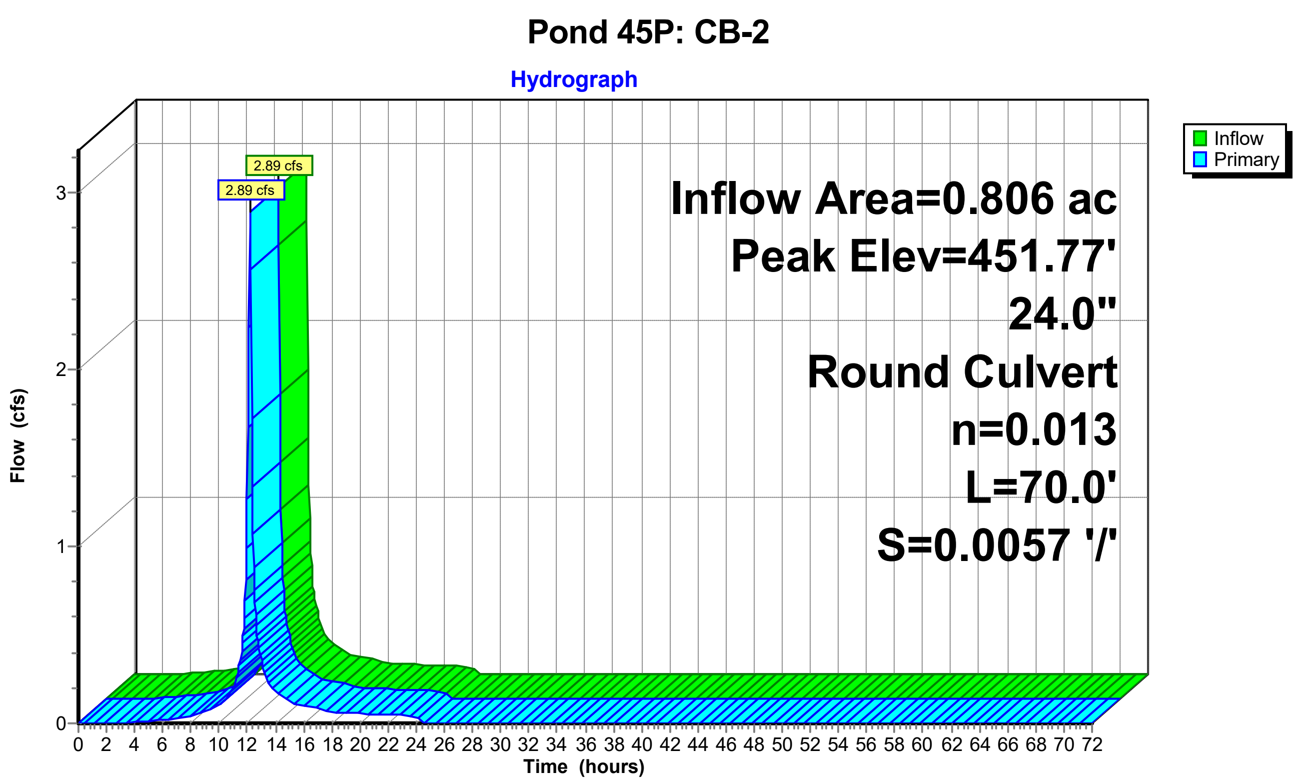
Summary for Pond 45P: CB-2

Inflow Area = 0.806 ac, 55.71% Impervious, Inflow Depth = 3.61" for 10-Year event
Inflow = 2.89 cfs @ 12.18 hrs, Volume= 0.242 af
Outflow = 2.89 cfs @ 12.18 hrs, Volume= 0.242 af, Atten= 0%, Lag= 0.0 min
Primary = 2.89 cfs @ 12.18 hrs, Volume= 0.242 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 451.77' @ 12.23 hrs
Flood Elev= 454.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	450.70'	**24.0" Round Culvert** L= 70.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 450.70' / 450.30' S= 0.0057 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=2.10 cfs @ 12.18 hrs HW=451.72' TW=451.57' (Dynamic Tailwater)
1=Culvert (Outlet Controls 2.10 cfs @ 1.90 fps)



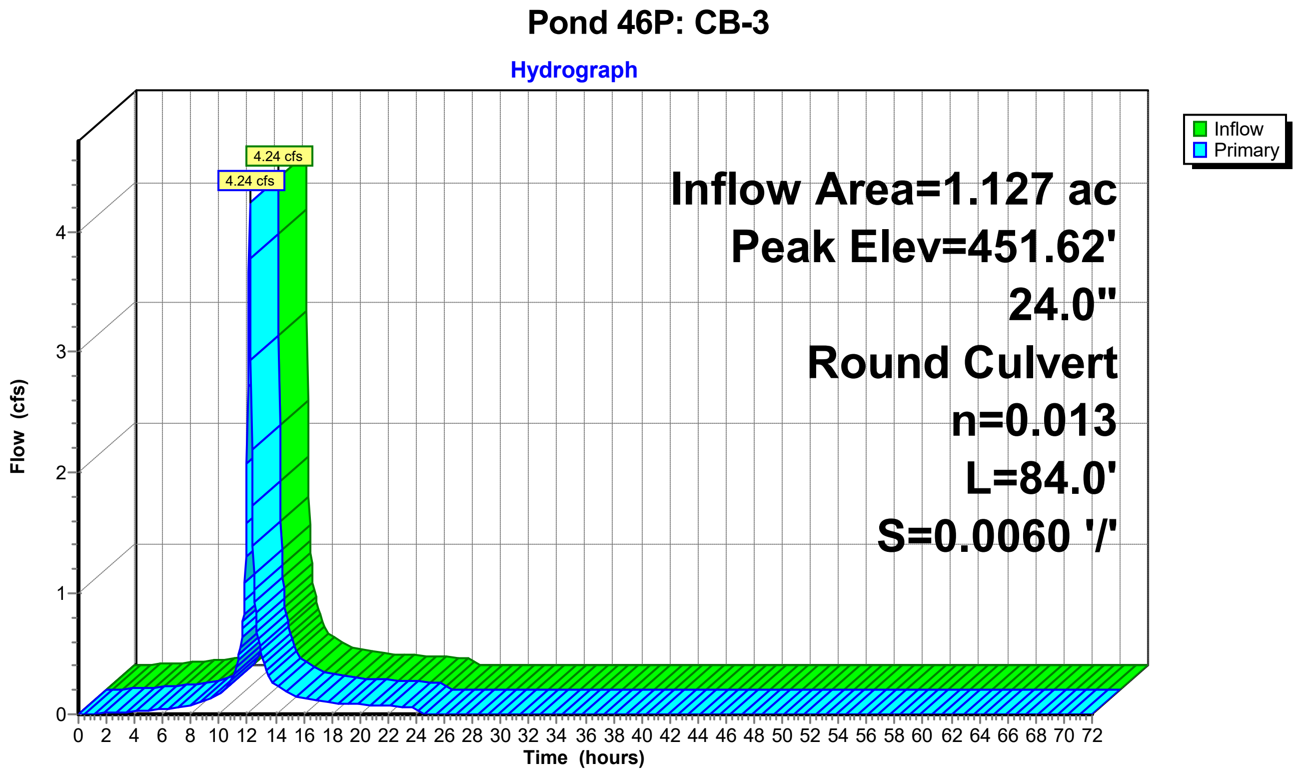
Summary for Pond 46P: CB-3

Inflow Area = 1.127 ac, 68.32% Impervious, Inflow Depth = 3.85" for 10-Year event
Inflow = 4.24 cfs @ 12.15 hrs, Volume= 0.361 af
Outflow = 4.24 cfs @ 12.15 hrs, Volume= 0.361 af, Atten= 0%, Lag= 0.0 min
Primary = 4.24 cfs @ 12.15 hrs, Volume= 0.361 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 451.62' @ 12.22 hrs
Flood Elev= 454.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	450.30'	**24.0" Round Culvert** L= 84.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 450.30' / 449.80' S= 0.0060 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=2.74 cfs @ 12.15 hrs HW=451.53' TW=451.38' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 2.74 cfs @ 1.93 fps)



Summary for Pond 48P: CB-4

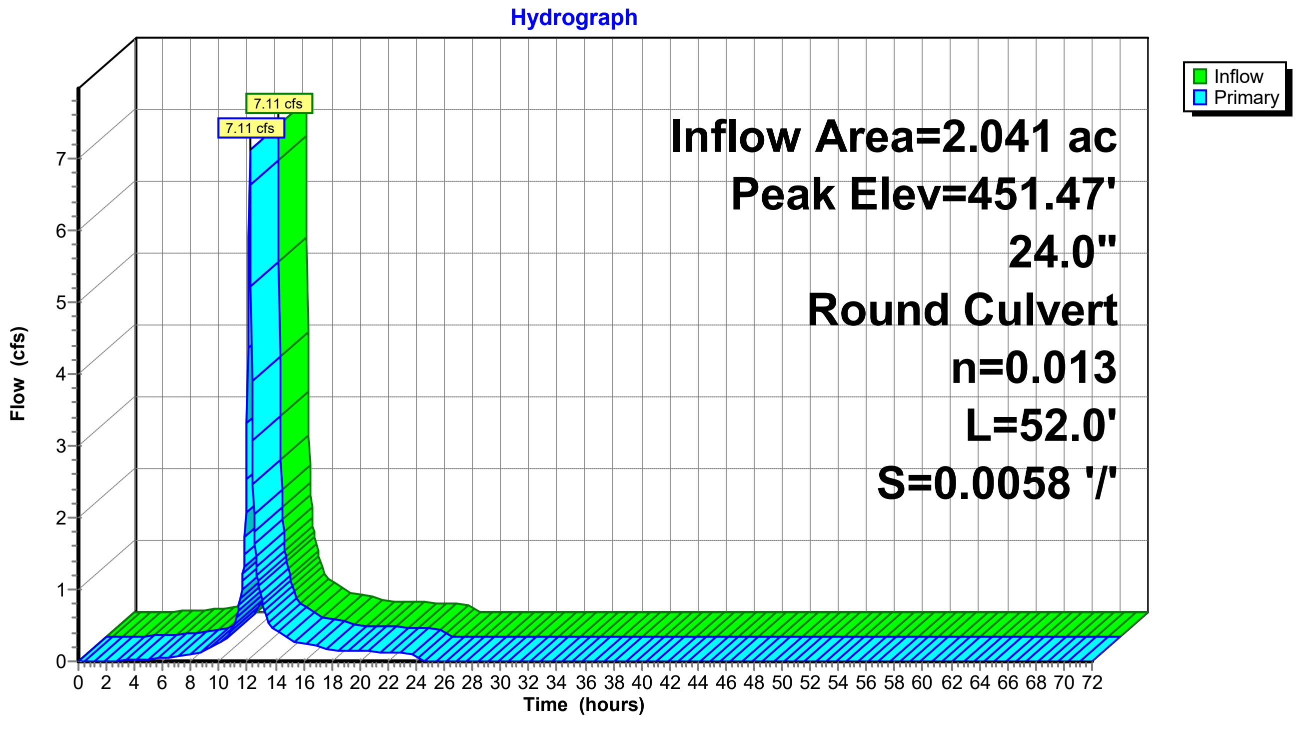
Inflow Area = 2.041 ac, 50.76% Impervious, Inflow Depth = 3.50" for 10-Year event
Inflow = 7.11 cfs @ 12.16 hrs, Volume= 0.595 af
Outflow = 7.11 cfs @ 12.16 hrs, Volume= 0.595 af, Atten= 0%, Lag= 0.0 min
Primary = 7.11 cfs @ 12.16 hrs, Volume= 0.595 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 451.47' @ 12.20 hrs
Flood Elev= 454.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	449.80'	**24.0" Round Culvert** L= 52.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 449.80' / 449.50' S= 0.0058 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=5.49 cfs @ 12.16 hrs HW=451.39' TW=451.14' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 5.49 cfs @ 2.80 fps)

Pond 48P: CB-4



Summary for Pond 50P: CB-5

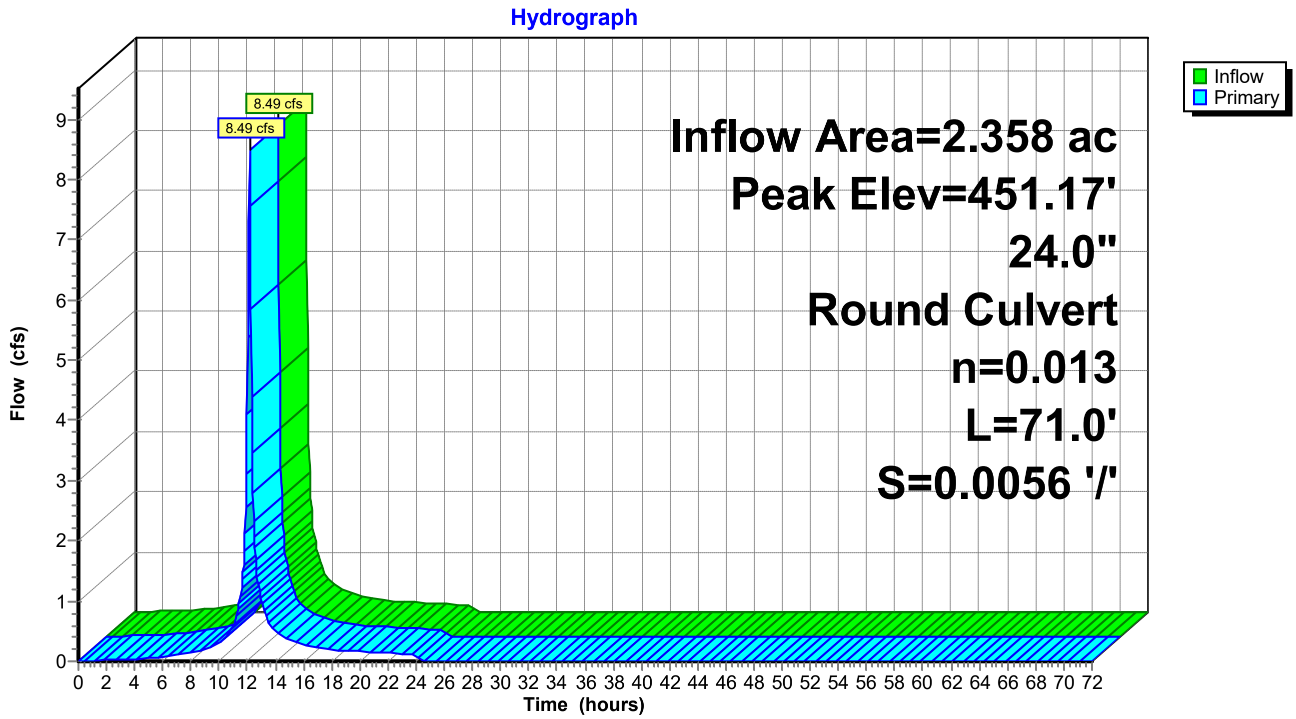
Inflow Area = 2.358 ac, 57.38% Impervious, Inflow Depth = 3.63" for 10-Year event
Inflow = 8.49 cfs @ 12.15 hrs, Volume= 0.713 af
Outflow = 8.49 cfs @ 12.15 hrs, Volume= 0.713 af, Atten= 0%, Lag= 0.0 min
Primary = 8.49 cfs @ 12.15 hrs, Volume= 0.713 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 451.17' @ 12.18 hrs
Flood Elev= 455.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	449.50'	**24.0" Round Culvert** L= 71.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 449.50' / 449.10' S= 0.0056 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=7.37 cfs @ 12.15 hrs HW=451.14' TW=450.68' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 7.37 cfs @ 3.63 fps)

Pond 50P: CB-5



Summary for Pond 52P: CB-6

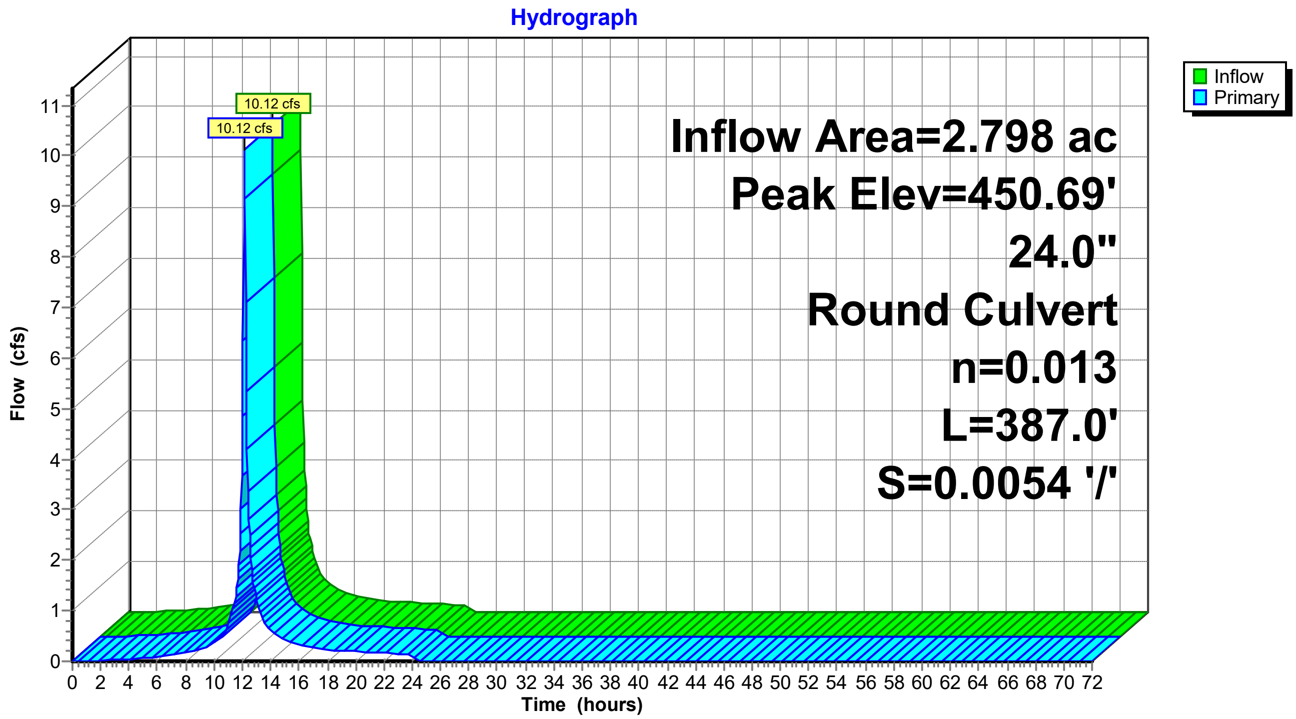
Inflow Area = 2.798 ac, 58.61% Impervious, Inflow Depth = 3.65" for 10-Year event
Inflow = 10.12 cfs @ 12.16 hrs, Volume= 0.851 af
Outflow = 10.12 cfs @ 12.16 hrs, Volume= 0.851 af, Atten= 0%, Lag= 0.0 min
Primary = 10.12 cfs @ 12.16 hrs, Volume= 0.851 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 450.69' @ 12.16 hrs
Flood Elev= 454.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	449.10'	**24.0" Round Culvert** L= 387.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 449.10' / 447.00' S= 0.0054 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=9.64 cfs @ 12.16 hrs HW=450.67' TW=448.45' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 9.64 cfs @ 4.99 fps)

Pond 52P: CB-6

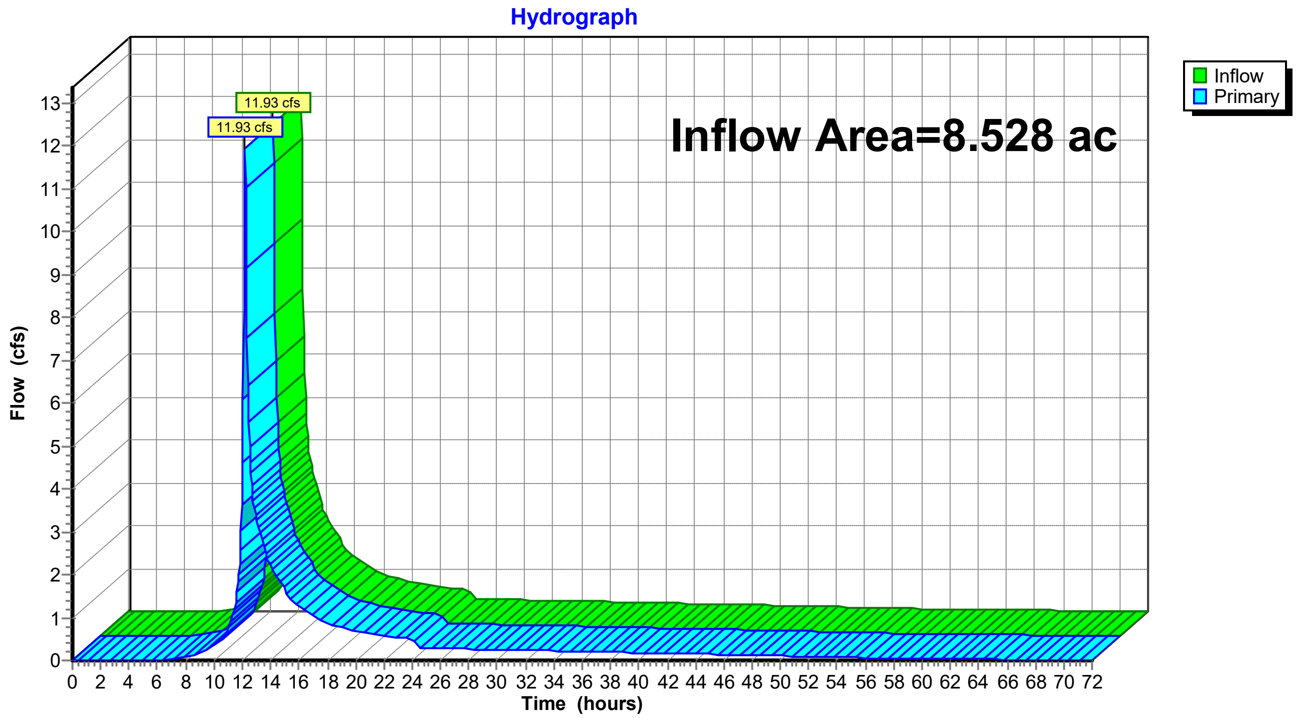


Summary for Link 39L: East Discharge

Inflow Area = 8.528 ac, 25.35% Impervious, Inflow Depth > 3.12" for 10-Year event
Inflow = 11.93 cfs @ 12.20 hrs, Volume= 2.218 af
Primary = 11.93 cfs @ 12.20 hrs, Volume= 2.218 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 39L: East Discharge



Summary for Subcatchment 34S: DA-8

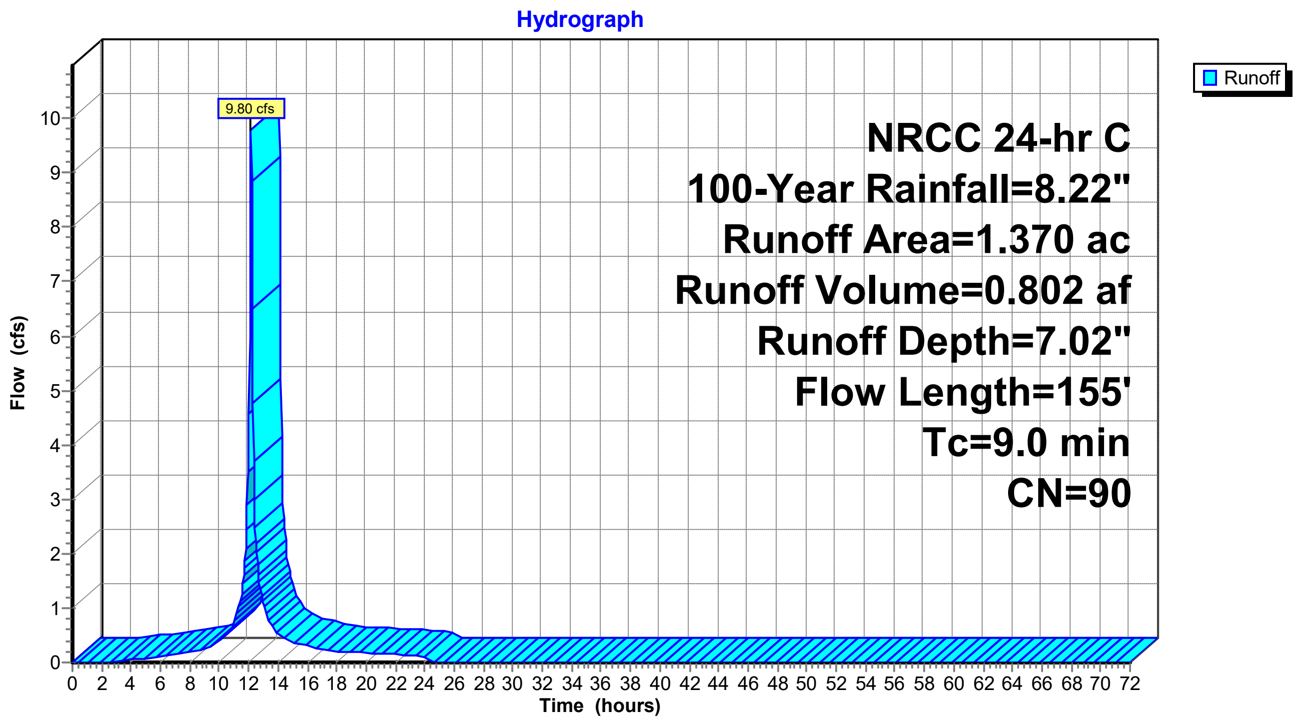
Runoff = 9.80 cfs @ 12.16 hrs, Volume= 0.802 af, Depth= 7.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
0.620	80	>75% Grass cover, Good, HSG D
0.210	98	Paved parking, HSG D
0.540	98	Water Surface, 0% imp, HSG D
1.370	90	Weighted Average
1.160		84.67% Pervious Area
0.210		15.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	100	0.0790	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
0.7	55	0.0380	1.36		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.0	155	Total			

Subcatchment 34S: DA-8



Summary for Subcatchment 36S: DA-2

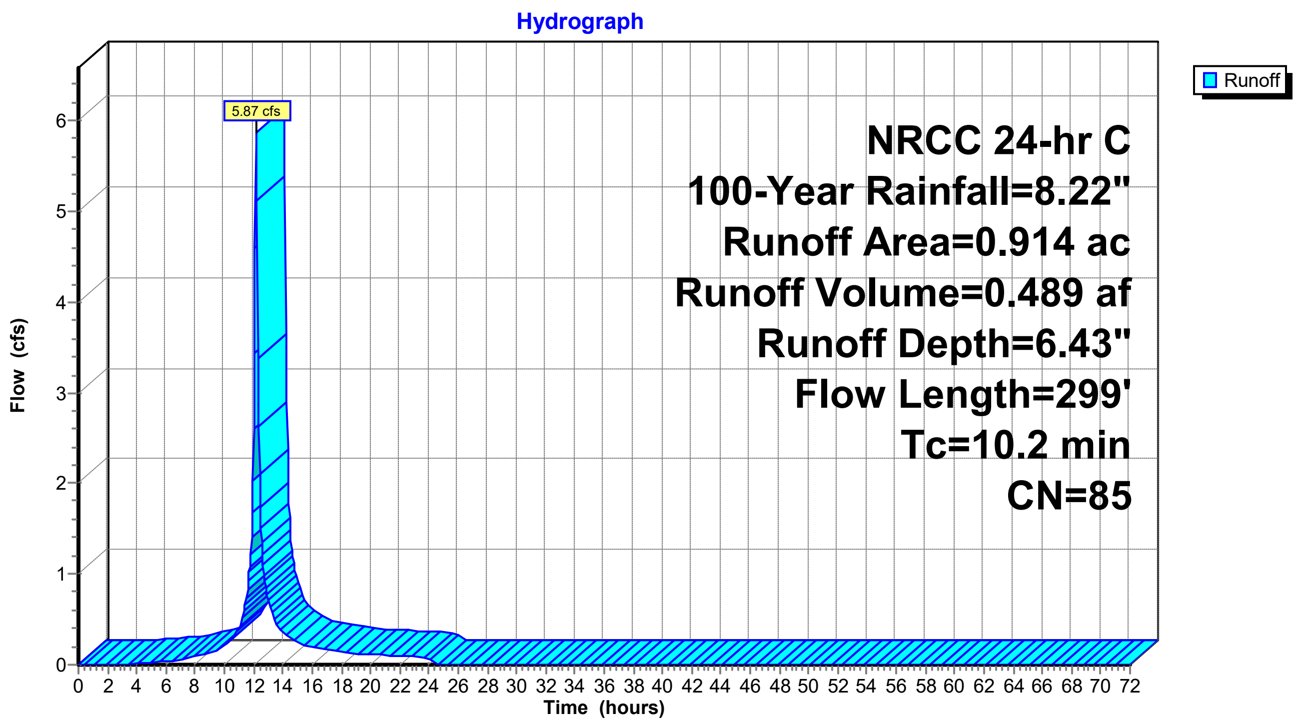
Runoff = 5.87 cfs @ 12.17 hrs, Volume= 0.489 af, Depth= 6.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
0.648	80	>75% Grass cover, Good, HSG D
0.266	98	Paved parking, HSG D
0.914	85	Weighted Average
0.648		70.90% Pervious Area
0.266		29.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0300	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"
1.2	102	0.0390	1.38		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	97	0.0100	2.57	10.27	**Channel Flow,** Area= 4.0 sf Perim= 8.5' r= 0.47' n= 0.035 Earth, dense weeds
10.2	299	Total			

Subcatchment 36S: DA-2



Summary for Subcatchment 37S: DA-10

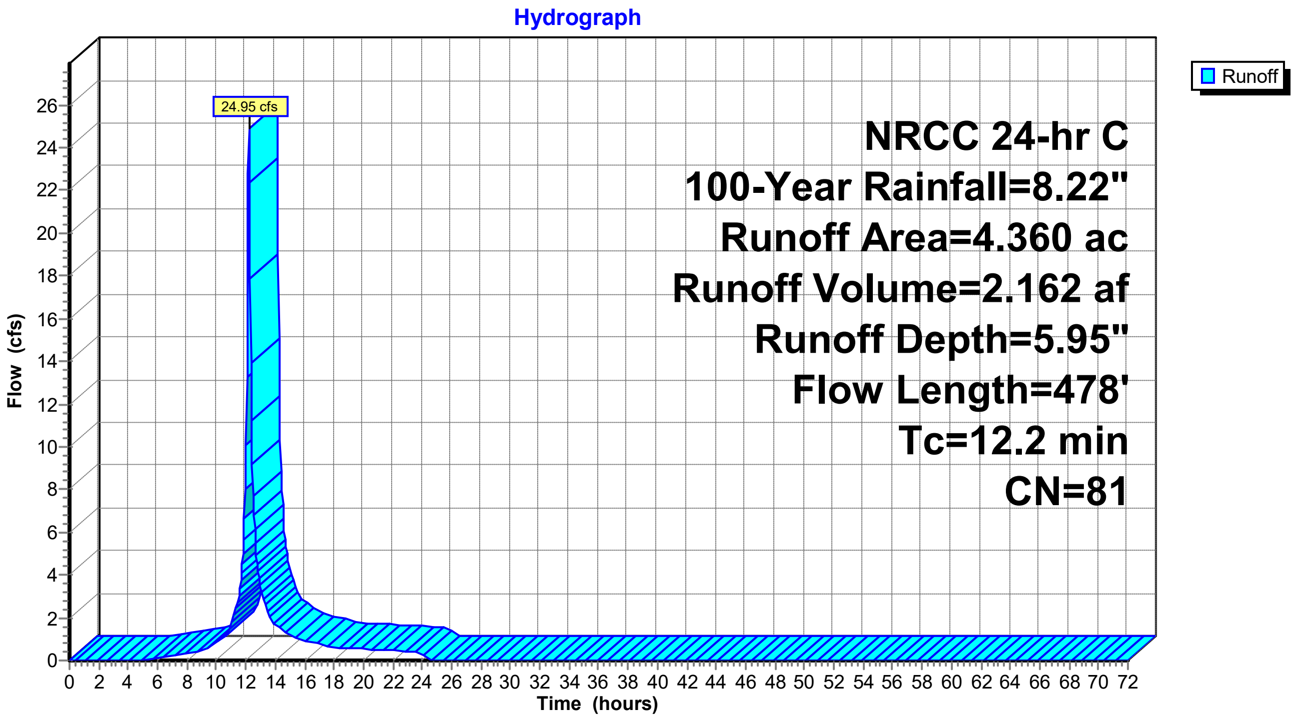
Runoff = 24.95 cfs @ 12.20 hrs, Volume= 2.162 af, Depth= 5.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
4.048	80	>75% Grass cover, Good, HSG D
0.312	98	Paved parking, HSG D
4.360	81	Weighted Average
4.048		92.84% Pervious Area
0.312		7.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0400	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"
0.7	129	0.0221	3.02		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.0	249	0.0221	1.04		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.2	478	Total			

Subcatchment 37S: DA-10



Summary for Subcatchment 40S: DA-7B

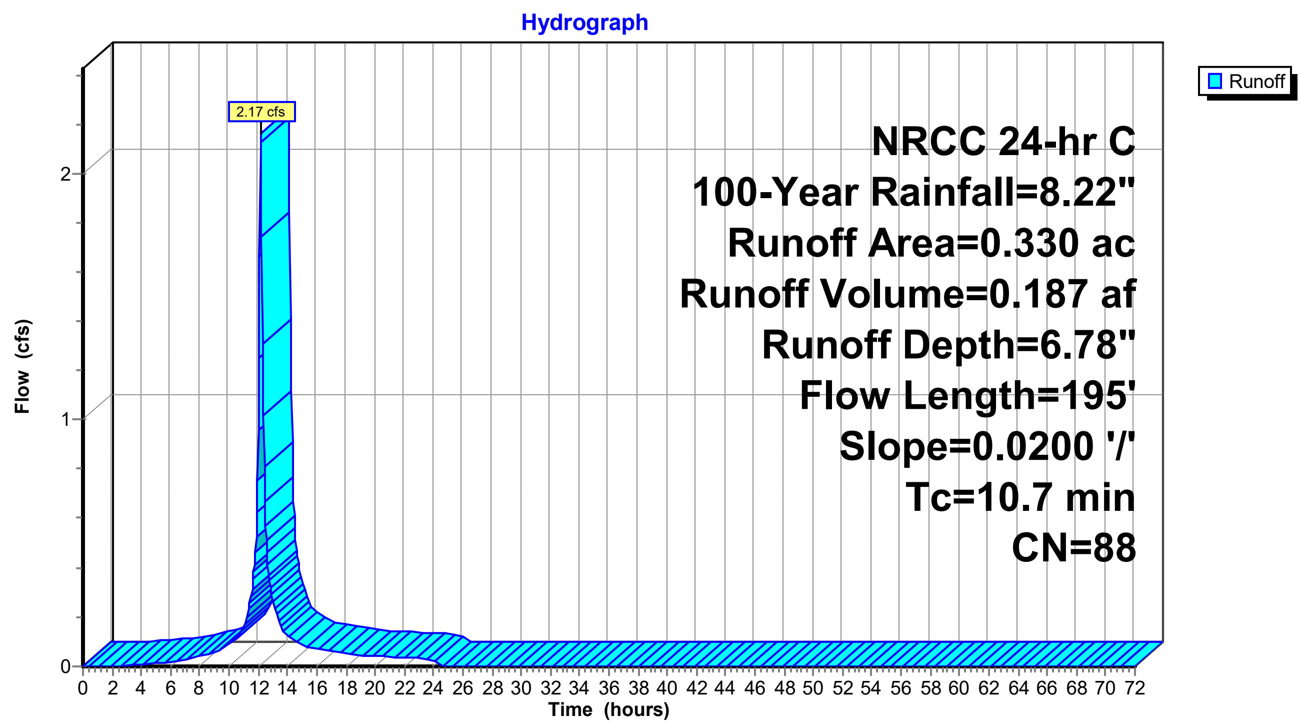
Runoff = 2.17 cfs @ 12.18 hrs, Volume= 0.187 af, Depth= 6.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
0.192	80	>75% Grass cover, Good, HSG D
0.138	98	Paved parking, HSG D
0.330	88	Weighted Average
0.192		58.18% Pervious Area
0.138		41.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"
0.5	31	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	64	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.7	195	Total			

Subcatchment 40S: DA-7B



Summary for Subcatchment 41S: DA-7A

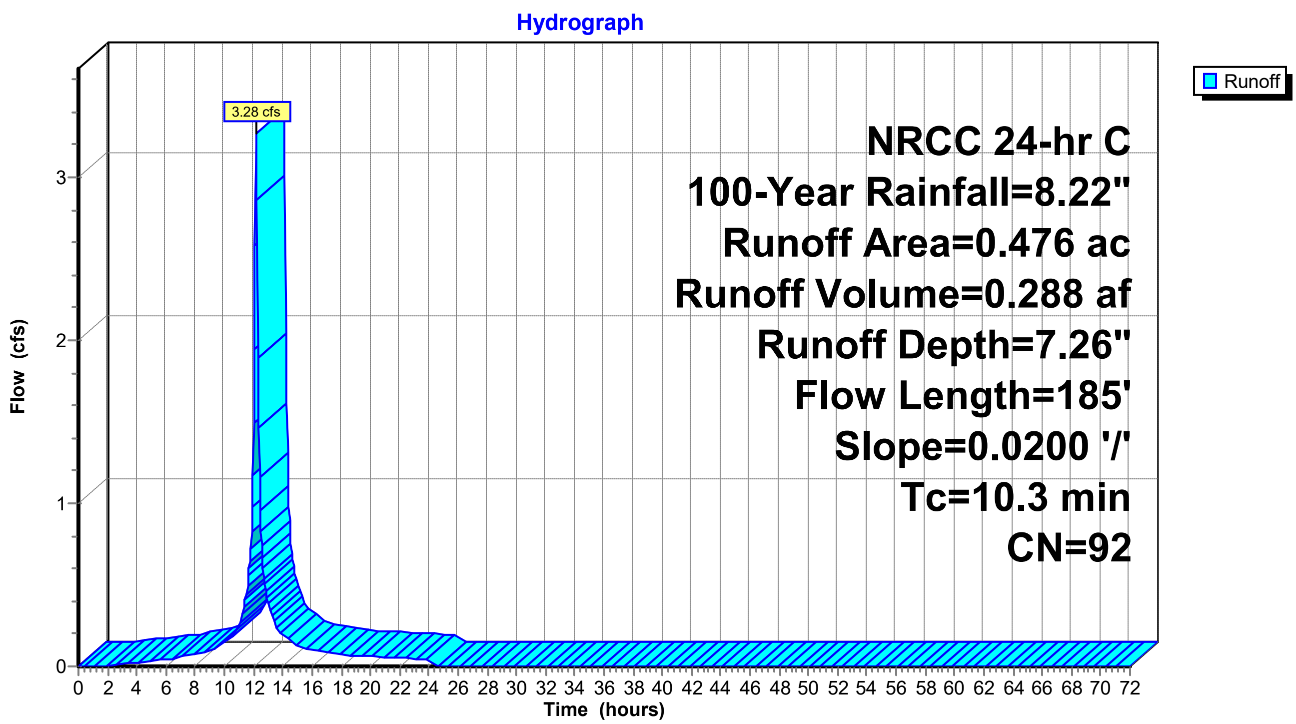
Runoff = 3.28 cfs @ 12.17 hrs, Volume= 0.288 af, Depth= 7.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
0.165	80	>75% Grass cover, Good, HSG D
0.311	98	Paved parking, HSG D
0.476	92	Weighted Average
0.165		34.66% Pervious Area
0.311		65.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"
0.2	31	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.3	54	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.3	185	Total			

Subcatchment 41S: DA-7A



Summary for Subcatchment 42S: DA-7C

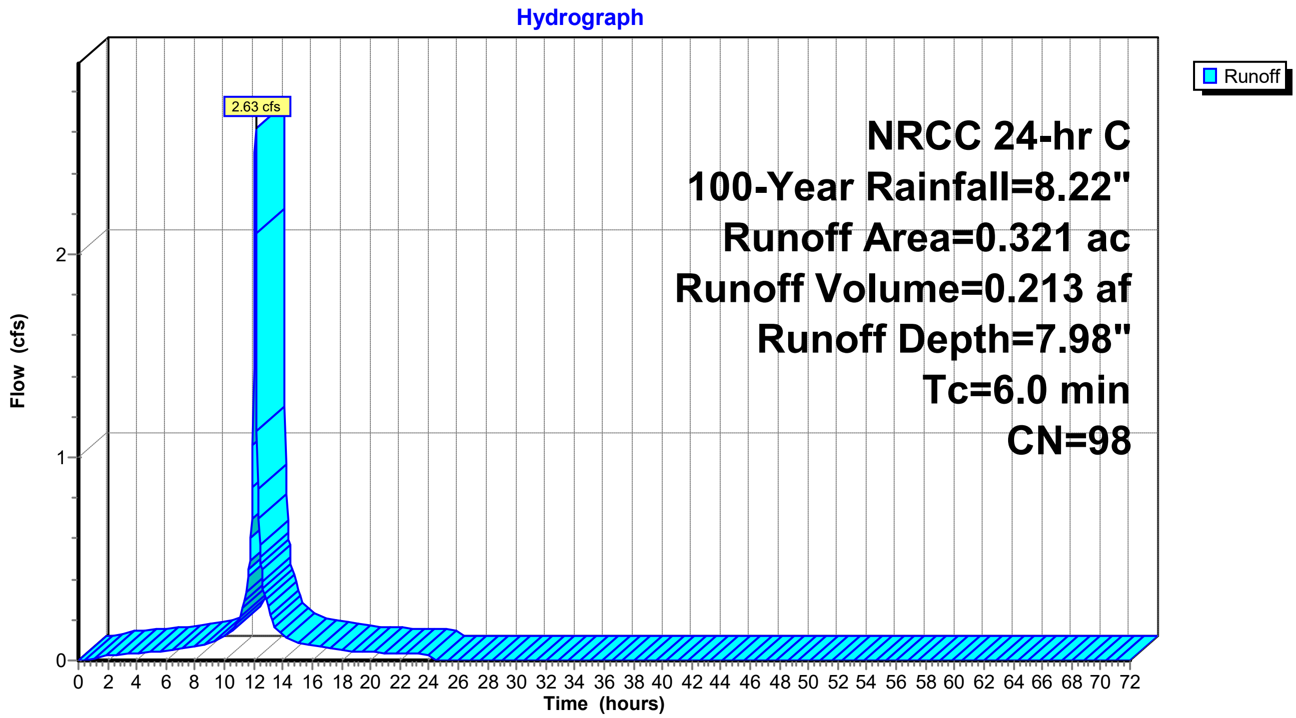
Runoff = 2.63 cfs @ 12.13 hrs, Volume= 0.213 af, Depth= 7.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
0.321	98	Paved parking, HSG D
0.321		100.00% Impervious Area

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

Subcatchment 42S: DA-7C



Summary for Subcatchment 49S: DA-7D

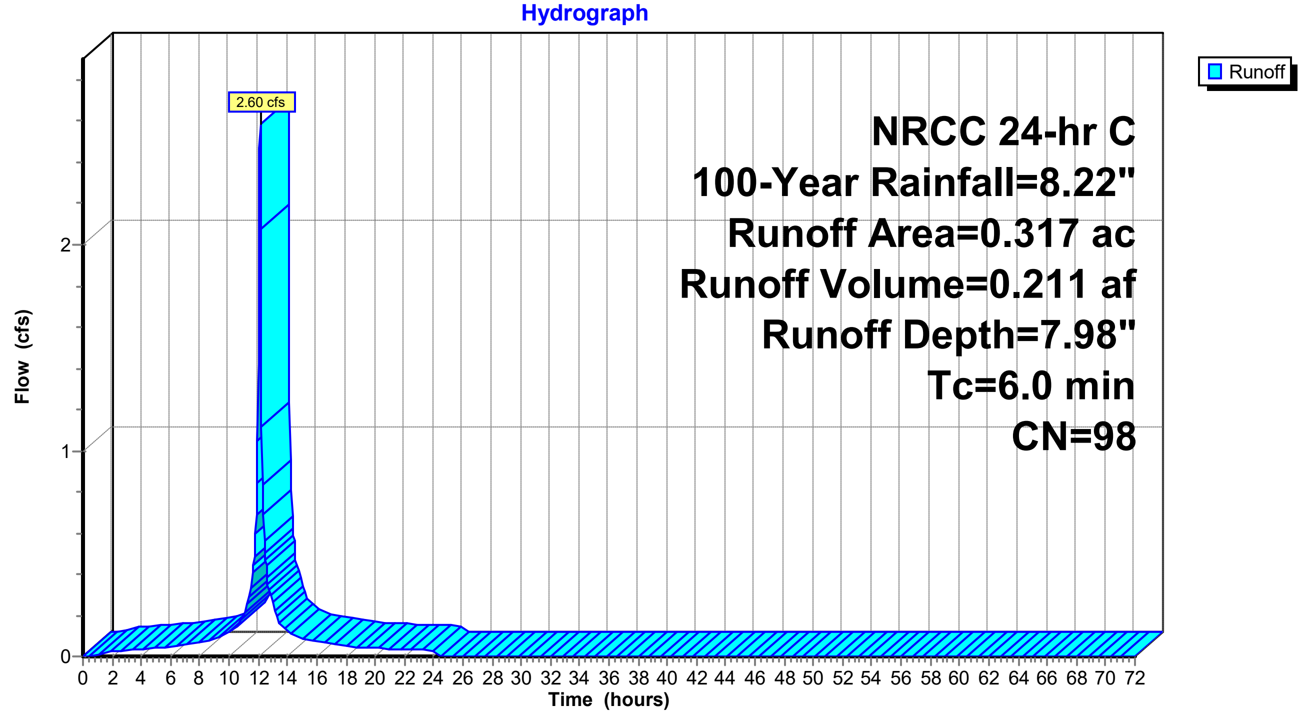
Runoff = 2.60 cfs @ 12.13 hrs, Volume= 0.211 af, Depth= 7.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
0.317	98	Paved parking, HSG D
0.317		100.00% Impervious Area

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

Subcatchment 49S: DA-7D



Summary for Subcatchment 55S: DA-7E

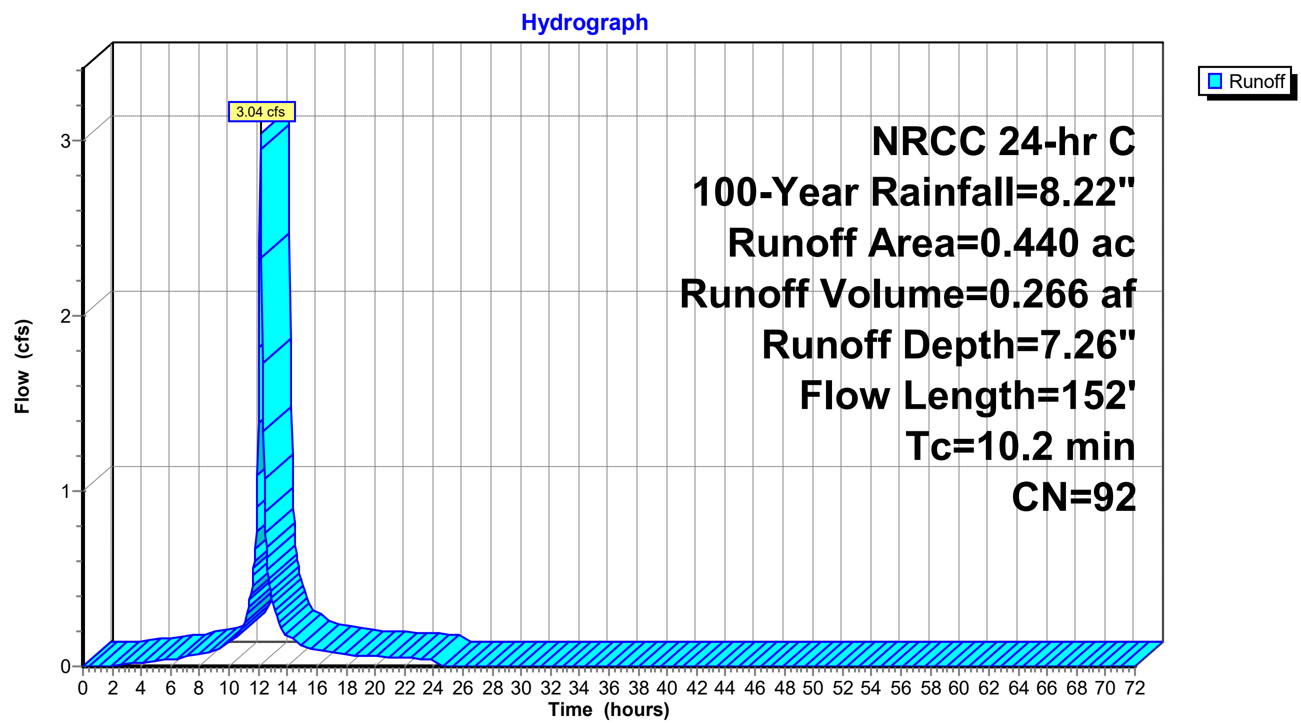
Runoff = 3.04 cfs @ 12.17 hrs, Volume= 0.266 af, Depth= 7.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.22"

Area (ac)	CN	Description
0.153	80	>75% Grass cover, Good, HSG D
0.287	98	Paved parking, HSG D
0.440	92	Weighted Average
0.153		34.77% Pervious Area
0.287		65.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"
0.2	22	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	30	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.2	152	Total			

Subcatchment 55S: DA-7E



Summary for Reach 40R: Emergency Spillway

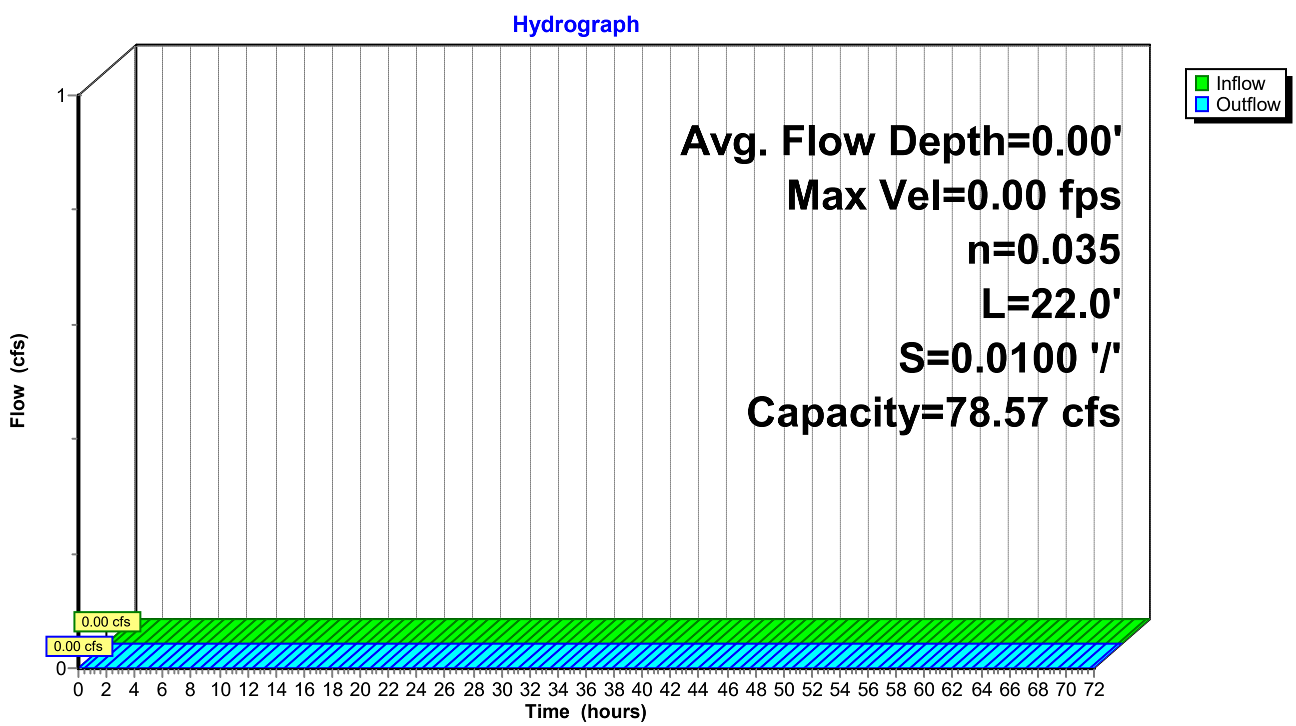
Inflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af
Outflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.00' Flow Area= 20.0 sf, Capacity= 78.57 cfs

18.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 2.0 '/' Top Width= 22.00'
Length= 22.0' Slope= 0.0100 '/'
Inlet Invert= 450.25', Outlet Invert= 450.03'

Reach 40R: Emergency Spillway



Summary for Pond 33P: Detention Pond 2

Inflow Area = 4.168 ac, 44.39% Impervious, Inflow Depth = 7.07" for 100-Year event
Inflow = 28.89 cfs @ 12.16 hrs, Volume= 2.456 af
Outflow = 9.67 cfs @ 12.40 hrs, Volume= 2.432 af, Atten= 67%, Lag= 14.4 min
Primary = 9.67 cfs @ 12.40 hrs, Volume= 2.432 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Starting Elev= 447.00' Storage= 26,653 cf
Peak Elev= 450.21' @ 12.40 hrs Storage= 77,261 cf (50,608 cf above start)

Plug-Flow detention time= 691.7 min calculated for 1.818 af (74% of inflow)
Center-of-Mass det. time= 434.2 min (1,211.7 - 777.5)

Volume	Invert	Avail.Storage	Storage Description
#1	442.50'	93,316 cf	**Custom Stage Data** Listed below

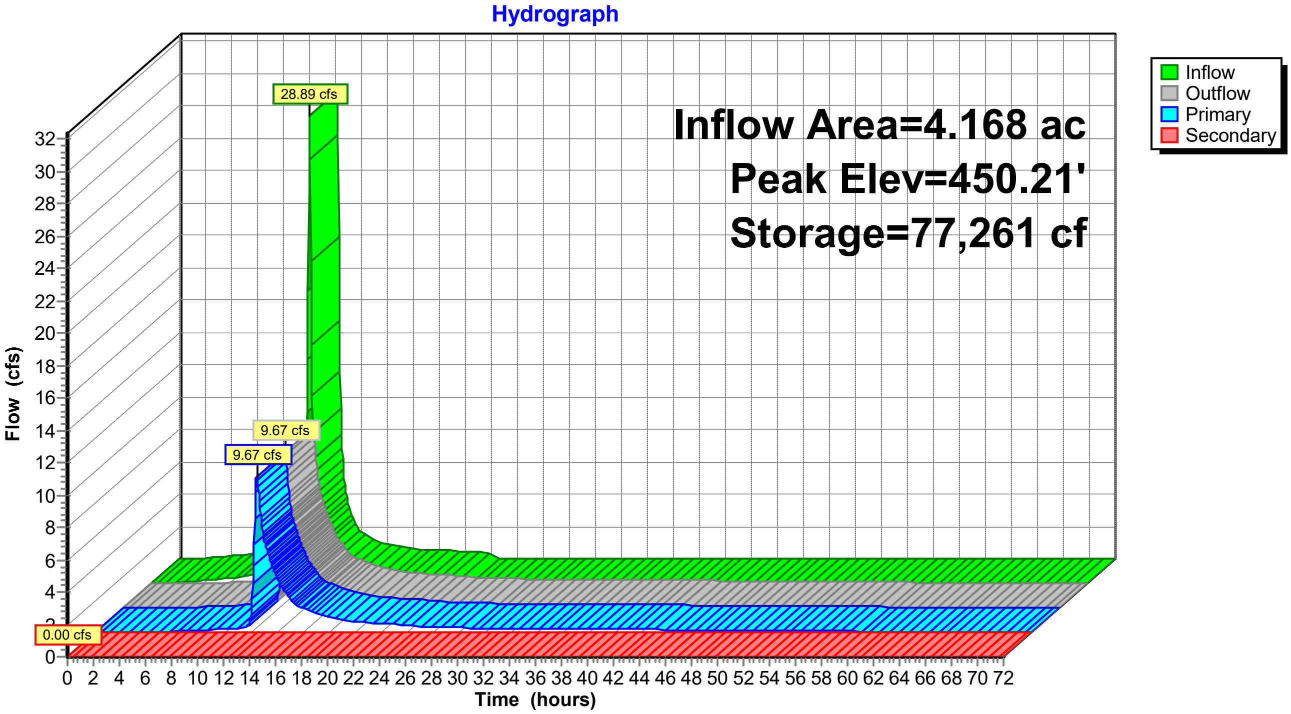
Elevation (feet)	Cum.Store (cubic-feet)
442.50	0
443.00	1,884
444.00	6,439
445.00	11,973
446.00	18,567
447.00	26,653
448.00	40,190
449.00	55,359
450.00	73,038
451.00	93,316

Device	Routing	Invert	Outlet Devices
#0	Secondary	451.00'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	447.00'	**18.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 447.00' / 446.80' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	447.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	448.60'	**1.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	450.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	450.25'	**Channel/Reach** using Reach 40R: Emergency Spillway

Primary OutFlow Max=9.66 cfs @ 12.40 hrs HW=450.21' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 9.66 cfs of 10.53 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.41 cfs @ 8.45 fps)
  ├─**3=Broad-Crested Rectangular Weir** (Weir Controls 6.77 cfs @ 4.21 fps)
  └─**4=Orifice/Grate** (Weir Controls 2.48 cfs @ 1.49 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=447.00' TW=450.25' (Dynamic Tailwater)
└─**5=Channel/Reach** (Channel Controls 0.00 cfs)

Pond 33P: Detention Pond 2



Summary for Pond 44P: CB-1

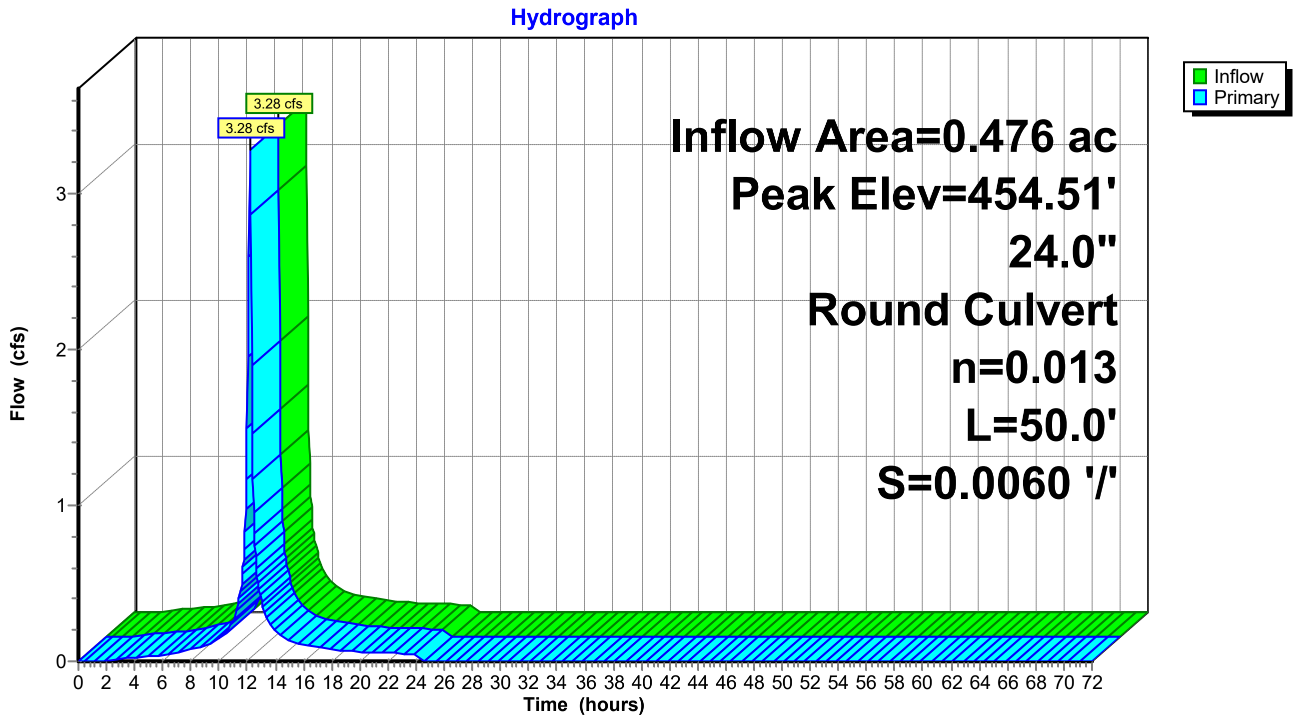
Inflow Area = 0.476 ac, 65.34% Impervious, Inflow Depth = 7.26" for 100-Year event
Inflow = 3.28 cfs @ 12.17 hrs, Volume= 0.288 af
Outflow = 3.28 cfs @ 12.17 hrs, Volume= 0.288 af, Atten= 0%, Lag= 0.0 min
Primary = 3.28 cfs @ 12.17 hrs, Volume= 0.288 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 454.51' @ 12.40 hrs
Flood Elev= 454.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	451.00'	**24.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 451.00' / 450.70' S= 0.0060 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 12.17 hrs HW=452.26' TW=452.36' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Pond 44P: CB-1



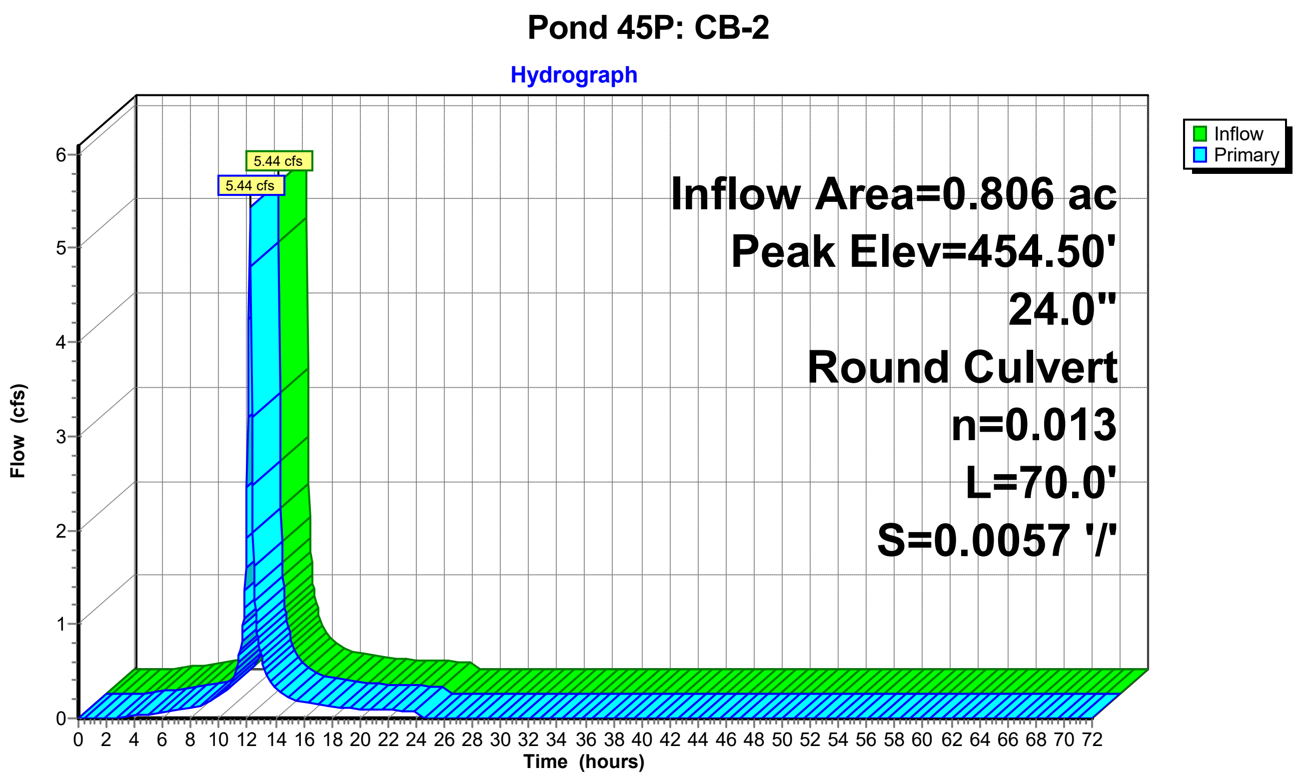
Summary for Pond 45P: CB-2

Inflow Area =	0.806 ac, 55.71% Impervious,	Inflow Depth = 7.07"	for 100-Year event
Inflow =	5.44 cfs @ 12.18 hrs,	Volume=	0.475 af
Outflow =	5.44 cfs @ 12.18 hrs,	Volume=	0.475 af, Atten= 0%, Lag= 0.0 min
Primary =	5.44 cfs @ 12.18 hrs,	Volume=	0.475 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 454.50' @ 12.35 hrs
Flood Elev= 454.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	450.70'	**24.0" Round Culvert** L= 70.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 450.70' / 450.30' S= 0.0057 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 12.18 hrs HW=452.37' TW=452.62' (Dynamic Tailwater)
└**1=Culvert** (Controls 0.00 cfs)



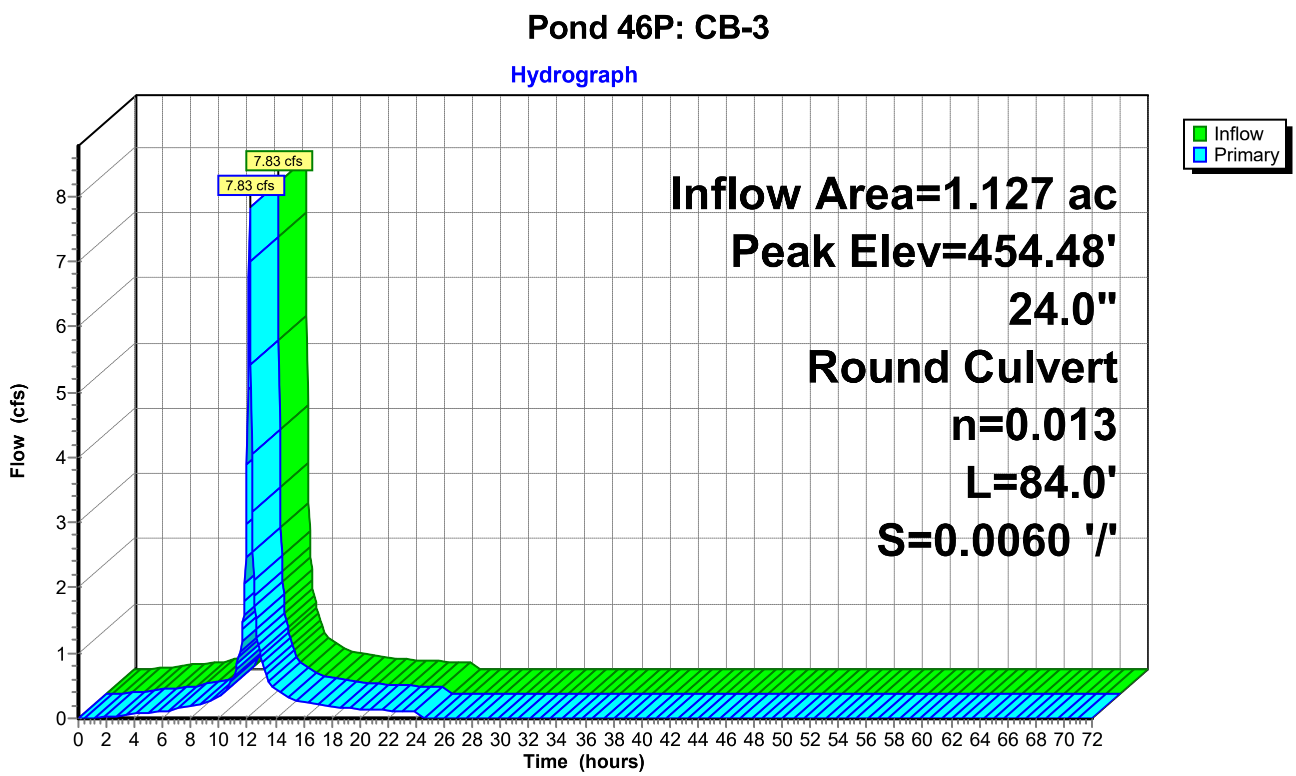
Summary for Pond 46P: CB-3

Inflow Area =	1.127 ac,	68.32% Impervious,	Inflow Depth = 7.33"	for 100-Year event
Inflow =	7.83 cfs @	12.15 hrs, Volume=	0.688 af	
Outflow =	7.83 cfs @	12.15 hrs, Volume=	0.688 af, Atten= 0%, Lag= 0.0 min	
Primary =	7.83 cfs @	12.15 hrs, Volume=	0.688 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 454.48' @ 12.30 hrs
Flood Elev= 454.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	450.30'	**24.0" Round Culvert** L= 84.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 450.30' / 449.80' S= 0.0060 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 12.15 hrs HW=452.34' TW=452.76' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)



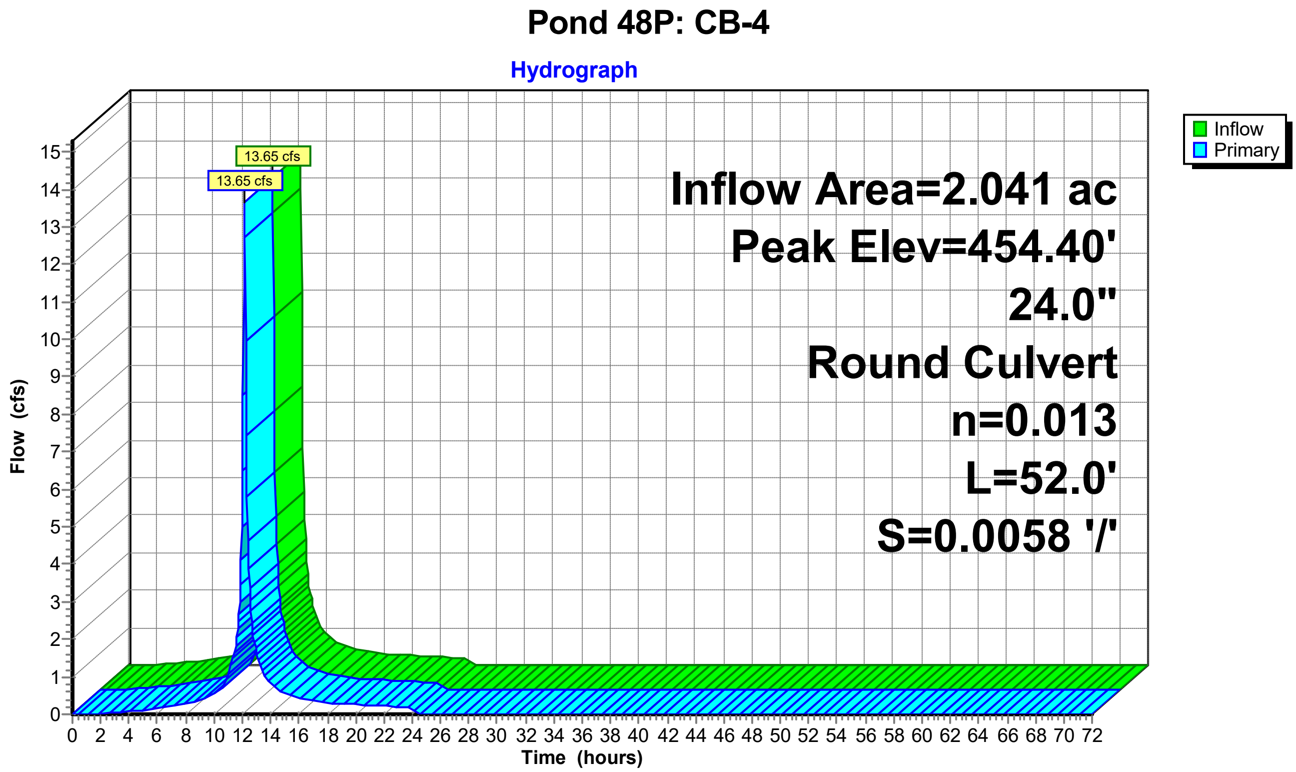
Summary for Pond 48P: CB-4

Inflow Area =	2.041 ac,	50.76% Impervious,	Inflow Depth = 6.92"	for 100-Year event	
Inflow =	13.65 cfs @	12.16 hrs,	Volume=	1.177 af	
Outflow =	13.65 cfs @	12.16 hrs,	Volume=	1.177 af,	Atten= 0%, Lag= 0.0 min
Primary =	13.65 cfs @	12.16 hrs,	Volume=	1.177 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 454.40' @ 12.25 hrs
Flood Elev= 454.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	449.80'	**24.0" Round Culvert** L= 52.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 449.80' / 449.50' S= 0.0058 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 12.16 hrs HW=452.88' TW=453.03' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)



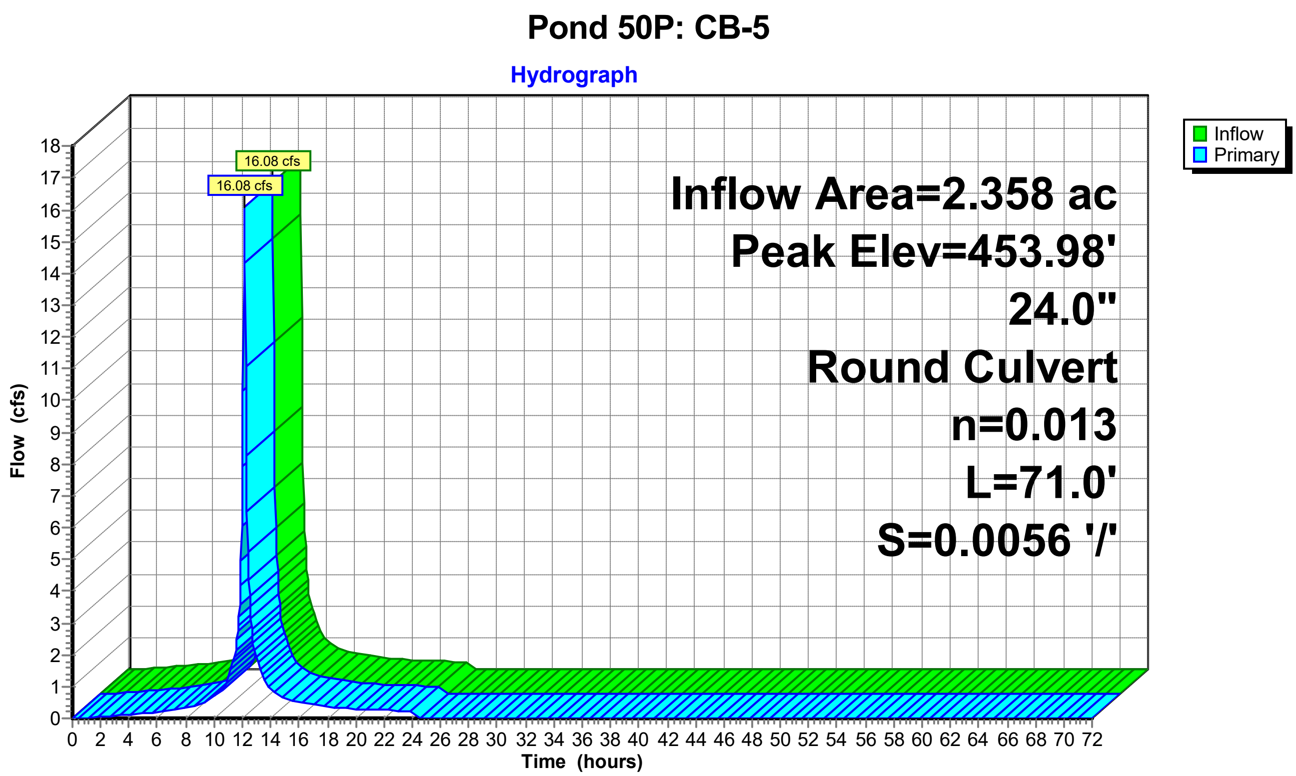
Summary for Pond 50P: CB-5

Inflow Area = 2.358 ac, 57.38% Impervious, Inflow Depth = 7.06" for 100-Year event
Inflow = 16.08 cfs @ 12.15 hrs, Volume= 1.388 af
Outflow = 16.08 cfs @ 12.15 hrs, Volume= 1.388 af, Atten= 0%, Lag= 0.0 min
Primary = 16.08 cfs @ 12.15 hrs, Volume= 1.388 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 453.98' @ 12.21 hrs
Flood Elev= 455.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	449.50'	**24.0" Round Culvert** L= 71.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 449.50' / 449.10' S= 0.0056 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 12.15 hrs HW=452.86' TW=453.04' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)



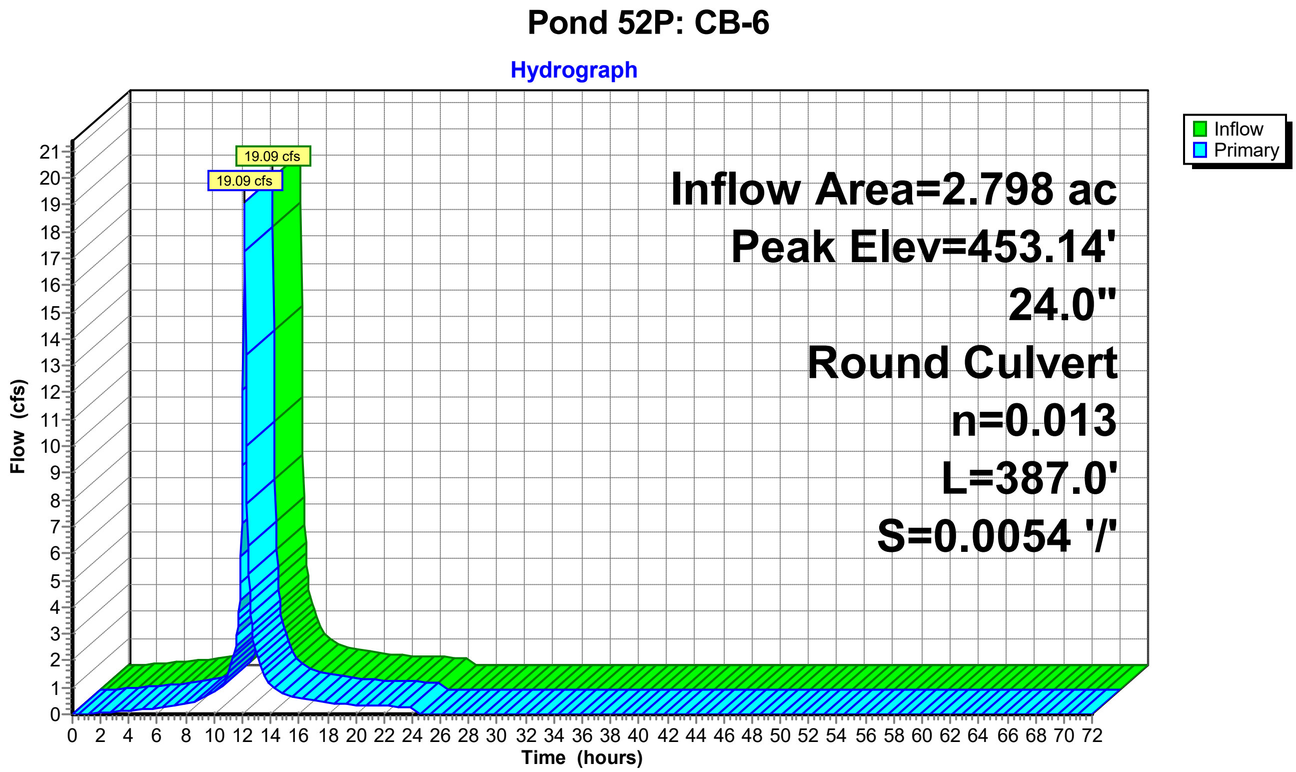
Summary for Pond 52P: CB-6

Inflow Area =	2.798 ac,	58.61% Impervious,	Inflow Depth = 7.10"	for 100-Year event
Inflow =	19.09 cfs @	12.16 hrs, Volume=	1.655 af	
Outflow =	19.09 cfs @	12.16 hrs, Volume=	1.655 af,	Atten= 0%, Lag= 0.0 min
Primary =	19.09 cfs @	12.16 hrs, Volume=	1.655 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 453.14' @ 12.16 hrs
Flood Elev= 454.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	449.10'	**24.0" Round Culvert** L= 387.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 449.10' / 447.00' S= 0.0054 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=18.23 cfs @ 12.16 hrs HW=453.02' TW=449.72' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 18.23 cfs @ 5.80 fps)

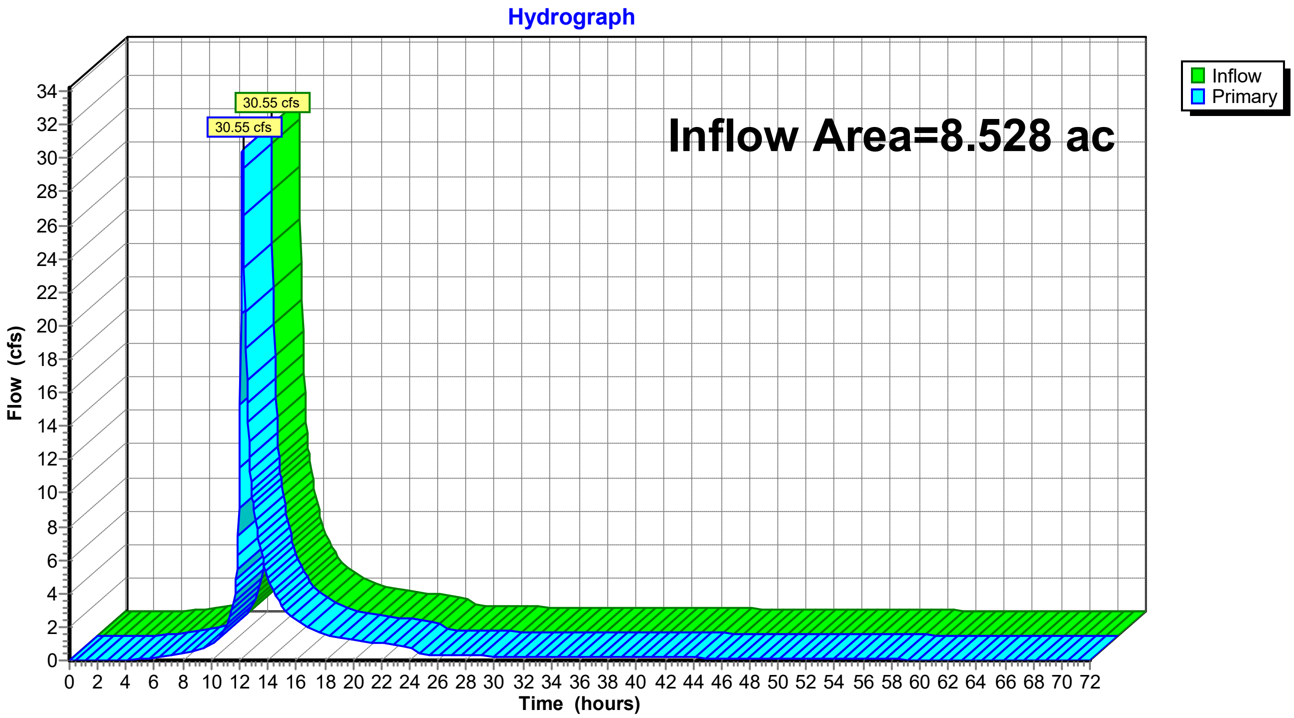


Summary for Link 39L: East Discharge

Inflow Area = 8.528 ac, 25.35% Impervious, Inflow Depth > 6.46" for 100-Year event
Inflow = 30.55 cfs @ 12.21 hrs, Volume= 4.593 af
Primary = 30.55 cfs @ 12.21 hrs, Volume= 4.593 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 39L: East Discharge



Summary for Subcatchment 34S: DA-8

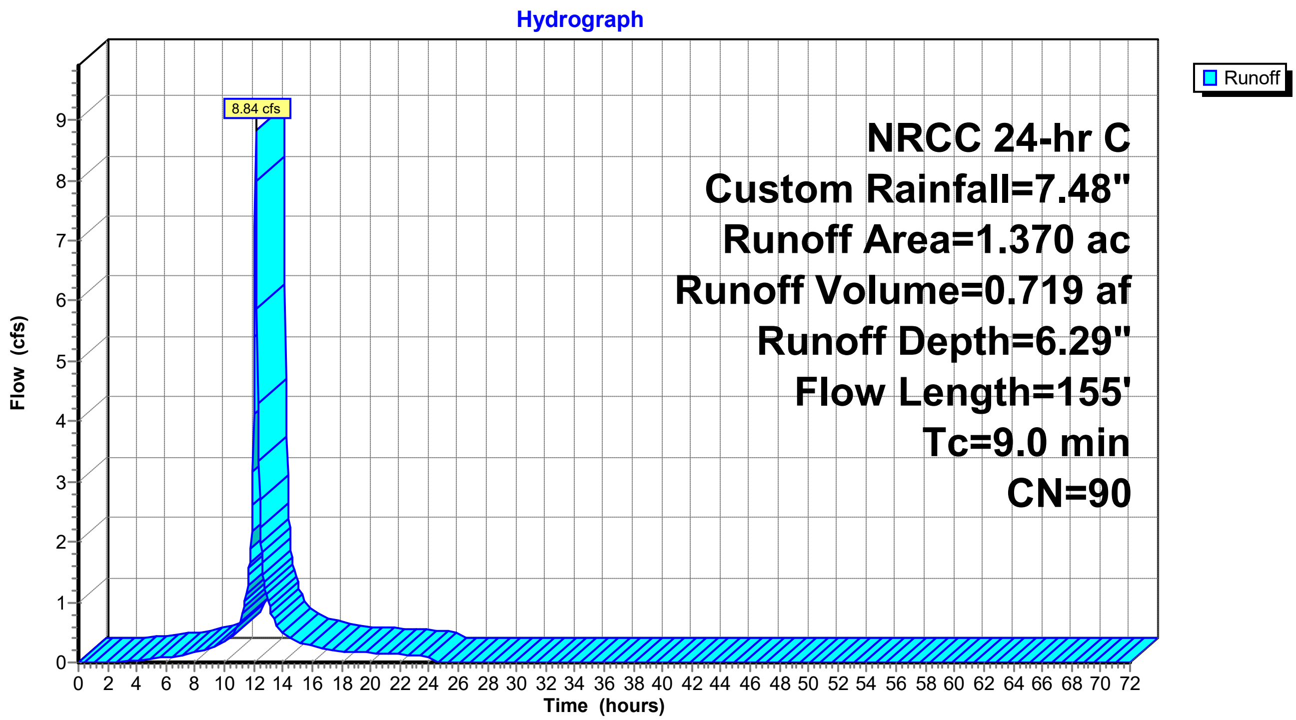
Runoff = 8.84 cfs @ 12.16 hrs, Volume= 0.719 af, Depth= 6.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C Custom Rainfall=7.48"

Area (ac)	CN	Description
0.620	80	>75% Grass cover, Good, HSG D
0.210	98	Paved parking, HSG D
0.540	98	Water Surface, 0% imp, HSG D
1.370	90	Weighted Average
1.160		84.67% Pervious Area
0.210		15.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	100	0.0790	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.17"
0.7	55	0.0380	1.36		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.0	155	Total			

Subcatchment 34S: DA-8



Summary for Subcatchment 36S: DA-2

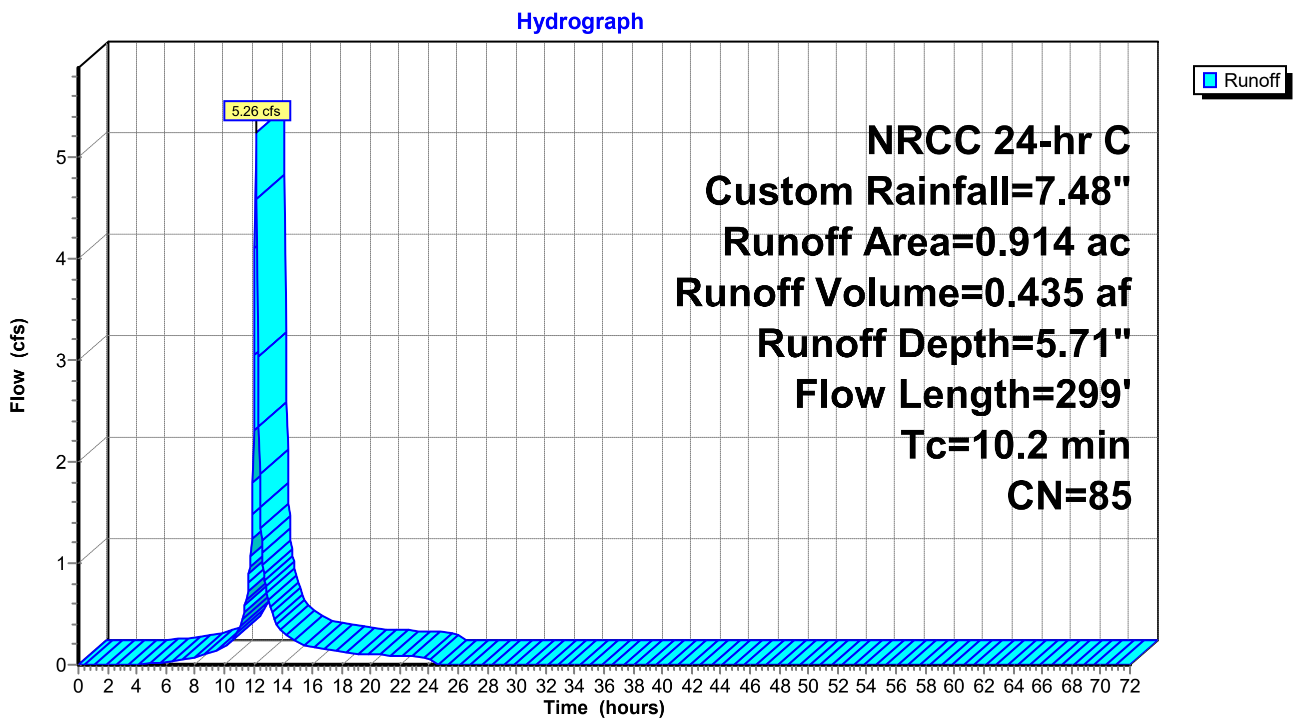
Runoff = 5.26 cfs @ 12.17 hrs, Volume= 0.435 af, Depth= 5.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C Custom Rainfall=7.48"

Area (ac)	CN	Description
0.648	80	>75% Grass cover, Good, HSG D
0.266	98	Paved parking, HSG D
0.914	85	Weighted Average
0.648		70.90% Pervious Area
0.266		29.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0300	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"
1.2	102	0.0390	1.38		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	97	0.0100	2.57	10.27	**Channel Flow,** Area= 4.0 sf Perim= 8.5' r= 0.47' n= 0.035 Earth, dense weeds
10.2	299	Total			

Subcatchment 36S: DA-2



Summary for Subcatchment 37S: DA-10

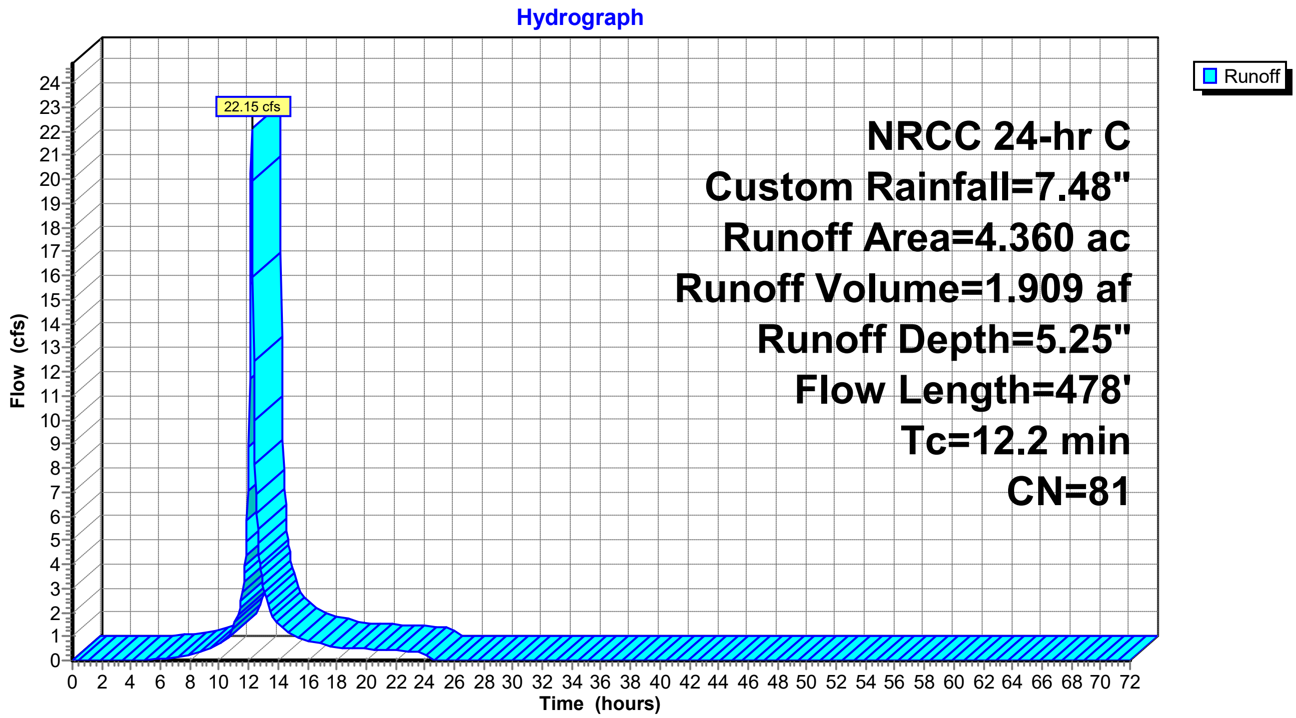
Runoff = 22.15 cfs @ 12.20 hrs, Volume= 1.909 af, Depth= 5.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C Custom Rainfall=7.48"

Area (ac)	CN	Description
4.048	80	>75% Grass cover, Good, HSG D
0.312	98	Paved parking, HSG D
4.360	81	Weighted Average
4.048		92.84% Pervious Area
0.312		7.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	100	0.0400	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"
0.7	129	0.0221	3.02		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.0	249	0.0221	1.04		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.2	478	Total			

Subcatchment 37S: DA-10



Summary for Subcatchment 40S: DA-7B

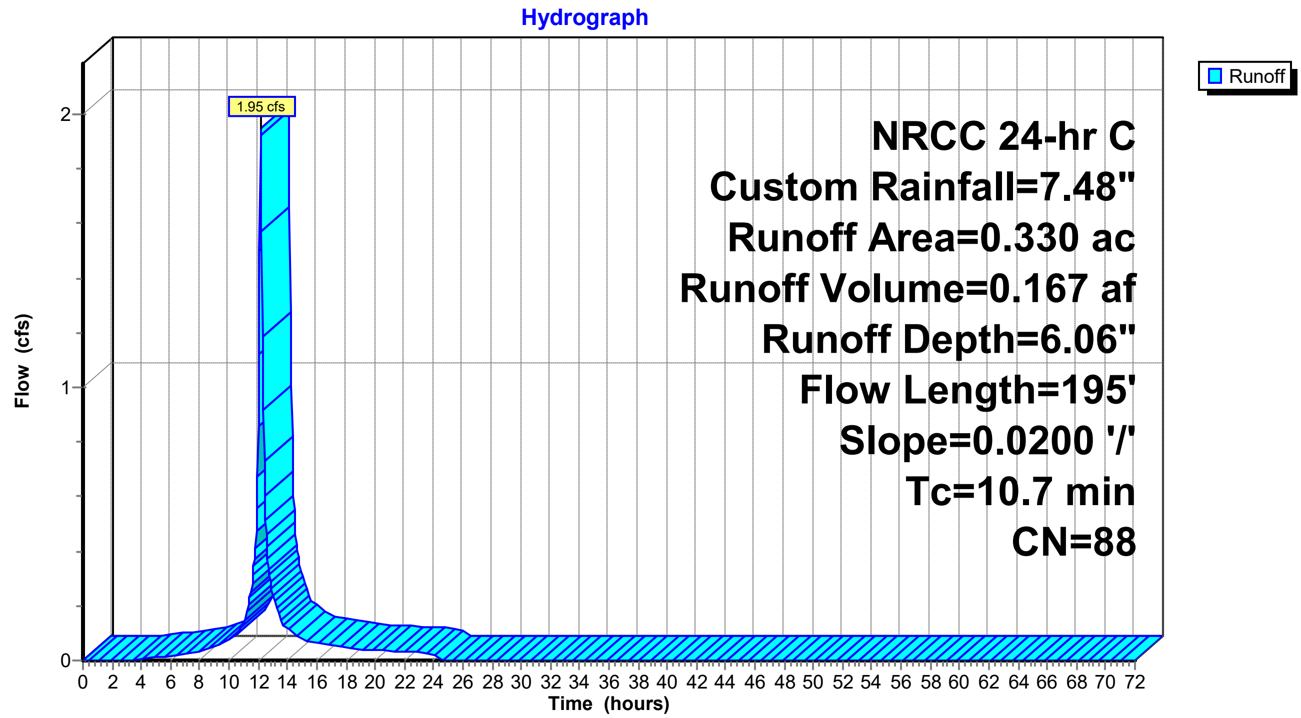
Runoff = 1.95 cfs @ 12.18 hrs, Volume= 0.167 af, Depth= 6.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C Custom Rainfall=7.48"

Area (ac)	CN	Description
0.192	80	>75% Grass cover, Good, HSG D
0.138	98	Paved parking, HSG D
0.330	88	Weighted Average
0.192		58.18% Pervious Area
0.138		41.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"
0.5	31	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	64	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.7	195	Total			

Subcatchment 40S: DA-7B



Summary for Subcatchment 41S: DA-7A

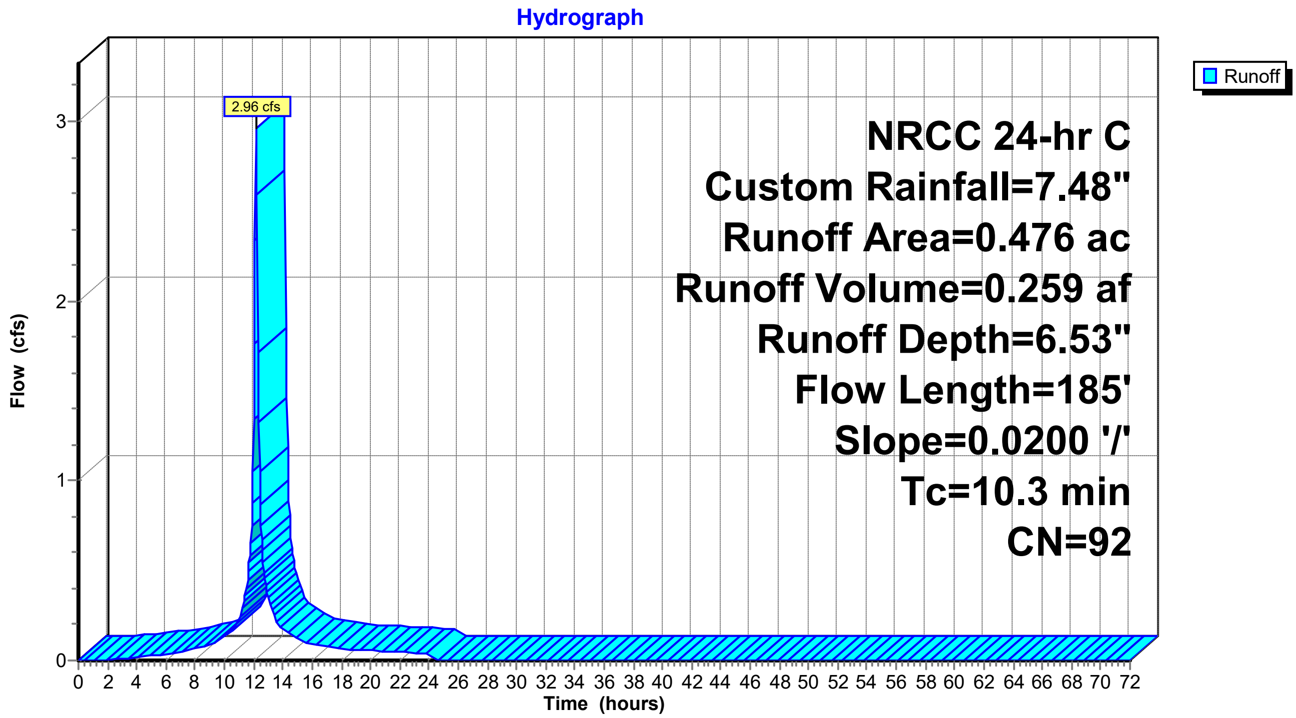
Runoff = 2.96 cfs @ 12.17 hrs, Volume= 0.259 af, Depth= 6.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C Custom Rainfall=7.48"

Area (ac)	CN	Description
0.165	80	>75% Grass cover, Good, HSG D
0.311	98	Paved parking, HSG D
0.476	92	Weighted Average
0.165		34.66% Pervious Area
0.311		65.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"
0.2	31	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.3	54	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.3	185	Total			

Subcatchment 41S: DA-7A



Summary for Subcatchment 42S: DA-7C

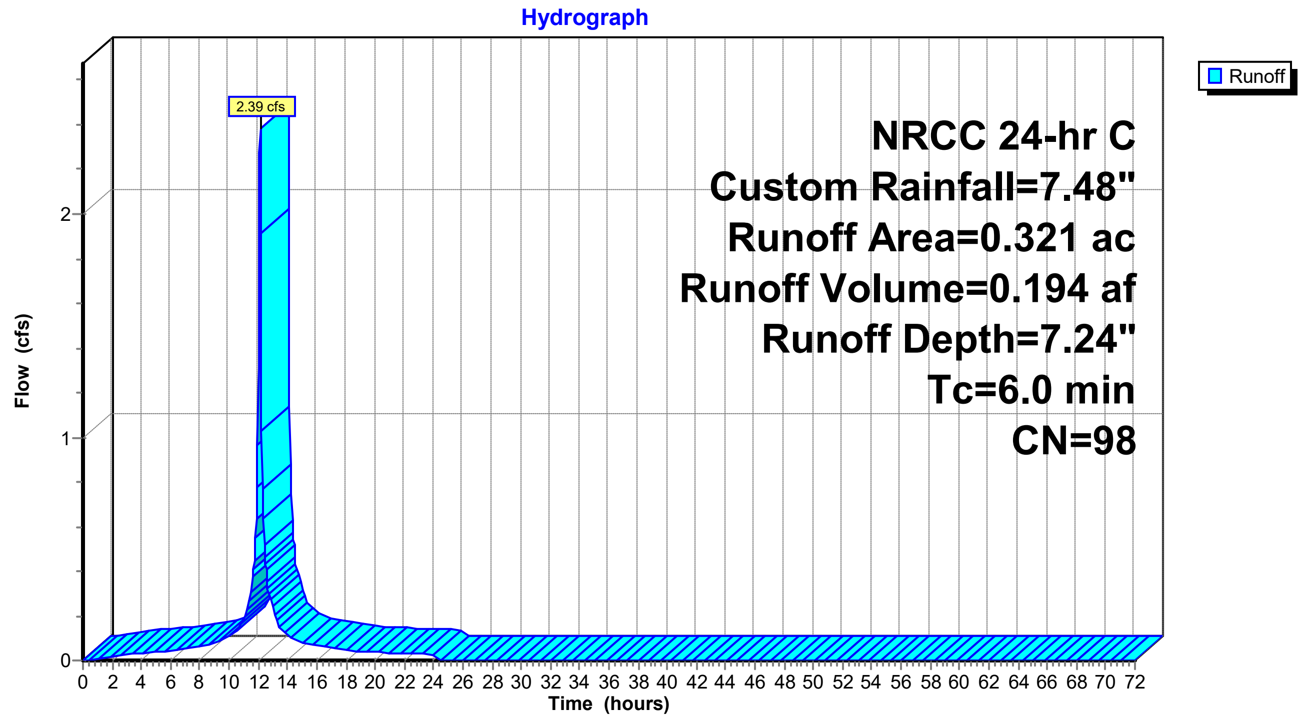
Runoff = 2.39 cfs @ 12.13 hrs, Volume= 0.194 af, Depth= 7.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C Custom Rainfall=7.48"

Area (ac)	CN	Description
0.321	98	Paved parking, HSG D
0.321		100.00% Impervious Area

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

Subcatchment 42S: DA-7C



Summary for Subcatchment 49S: DA-7D

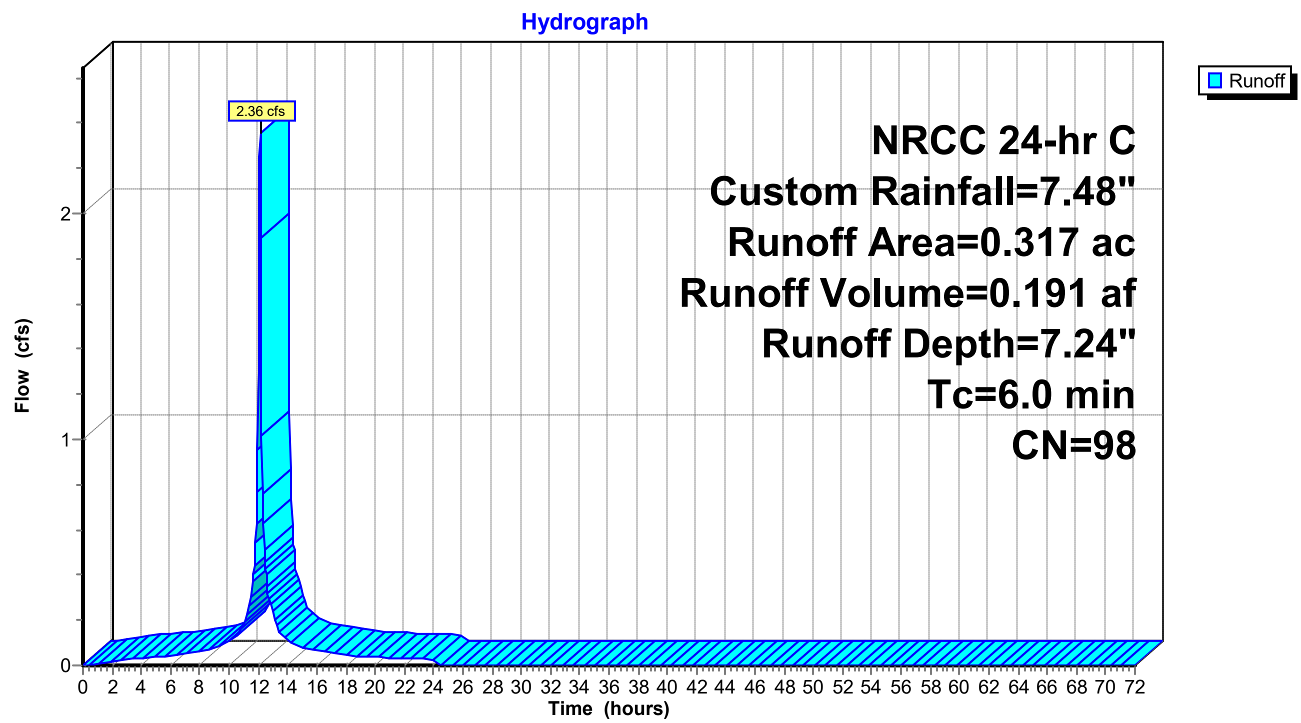
Runoff = 2.36 cfs @ 12.13 hrs, Volume= 0.191 af, Depth= 7.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C Custom Rainfall=7.48"

Area (ac)	CN	Description
0.317	98	Paved parking, HSG D
0.317		100.00% Impervious Area

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

Subcatchment 49S: DA-7D



Summary for Subcatchment 55S: DA-7E

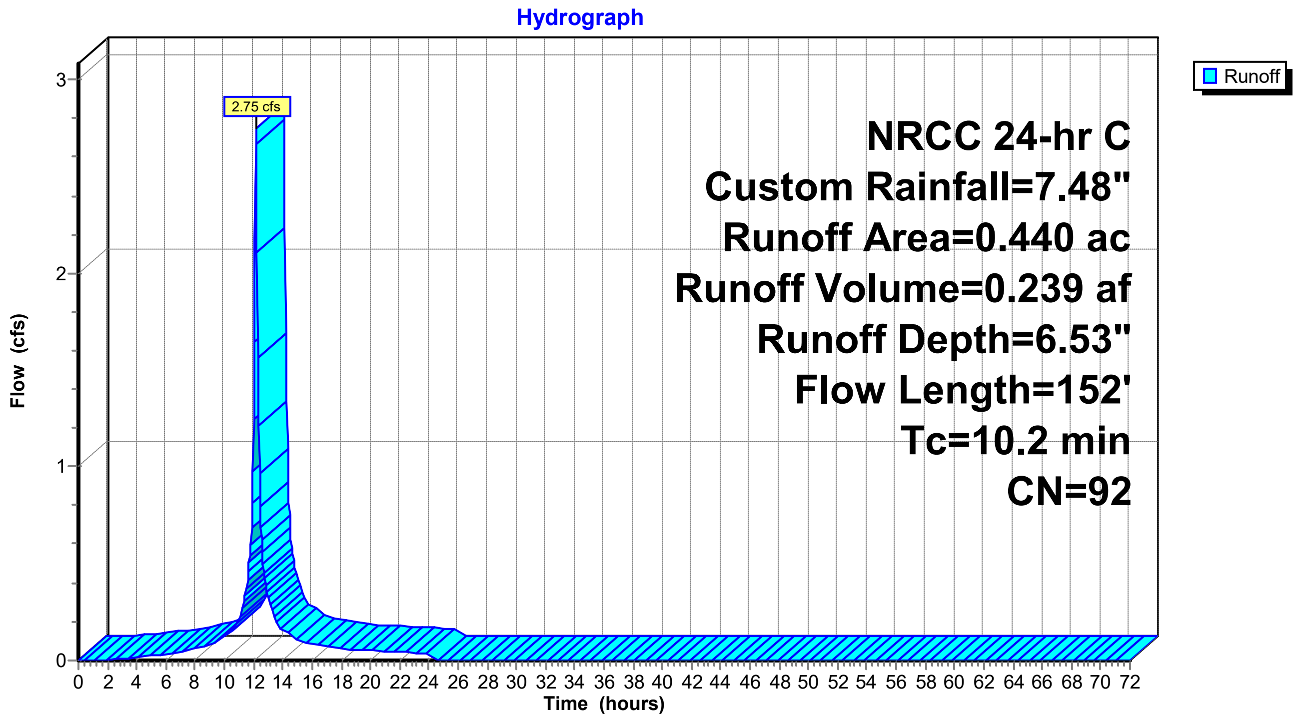
Runoff = 2.75 cfs @ 12.17 hrs, Volume= 0.239 af, Depth= 6.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C Custom Rainfall=7.48"

Area (ac)	CN	Description
0.153	80	>75% Grass cover, Good, HSG D
0.287	98	Paved parking, HSG D
0.440	92	Weighted Average
0.153		34.77% Pervious Area
0.287		65.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0200	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.17"
0.2	22	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	30	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.2	152	Total			

Subcatchment 55S: DA-7E



Summary for Reach 40R: Emergency Spillway

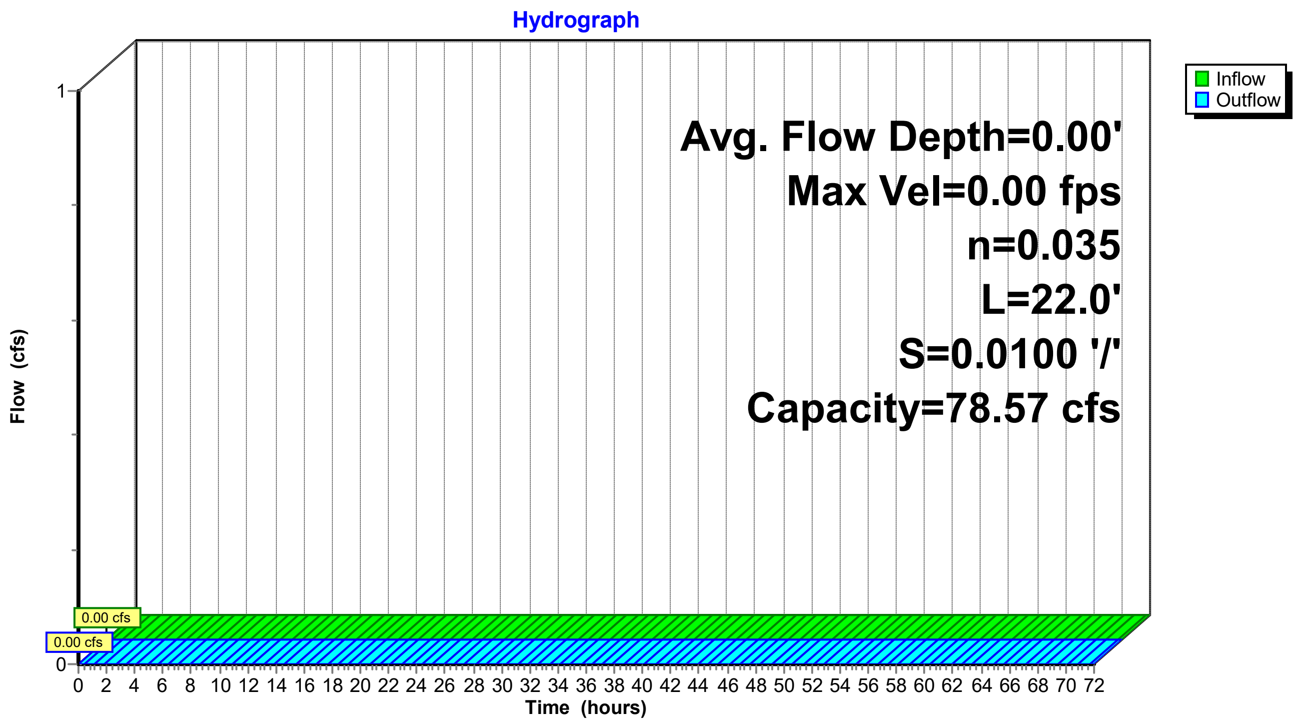
Inflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af
Outflow	=	0.00 cfs @	0.00 hrs, Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.00' Flow Area= 20.0 sf, Capacity= 78.57 cfs

18.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 2.0 '/' Top Width= 22.00'
Length= 22.0' Slope= 0.0100 '/'
Inlet Invert= 450.25', Outlet Invert= 450.03'

Reach 40R: Emergency Spillway



Summary for Pond 33P: Detention Pond 2

Inflow Area = 4.168 ac, 44.39% Impervious, Inflow Depth = 6.34" for Custom event
Inflow = 26.06 cfs @ 12.16 hrs, Volume= 2.204 af
Outflow = 6.50 cfs @ 12.48 hrs, Volume= 2.179 af, Atten= 75%, Lag= 19.4 min
Primary = 6.50 cfs @ 12.48 hrs, Volume= 2.179 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Starting Elev= 447.00' Storage= 26,653 cf
Peak Elev= 450.05' @ 12.48 hrs Storage= 74,057 cf (47,404 cf above start)

Plug-Flow detention time= 772.2 min calculated for 1.567 af (71% of inflow)
Center-of-Mass det. time= 471.3 min (1,251.5 - 780.2)

Volume	Invert	Avail.Storage	Storage Description
#1	442.50'	93,316 cf	**Custom Stage Data** Listed below

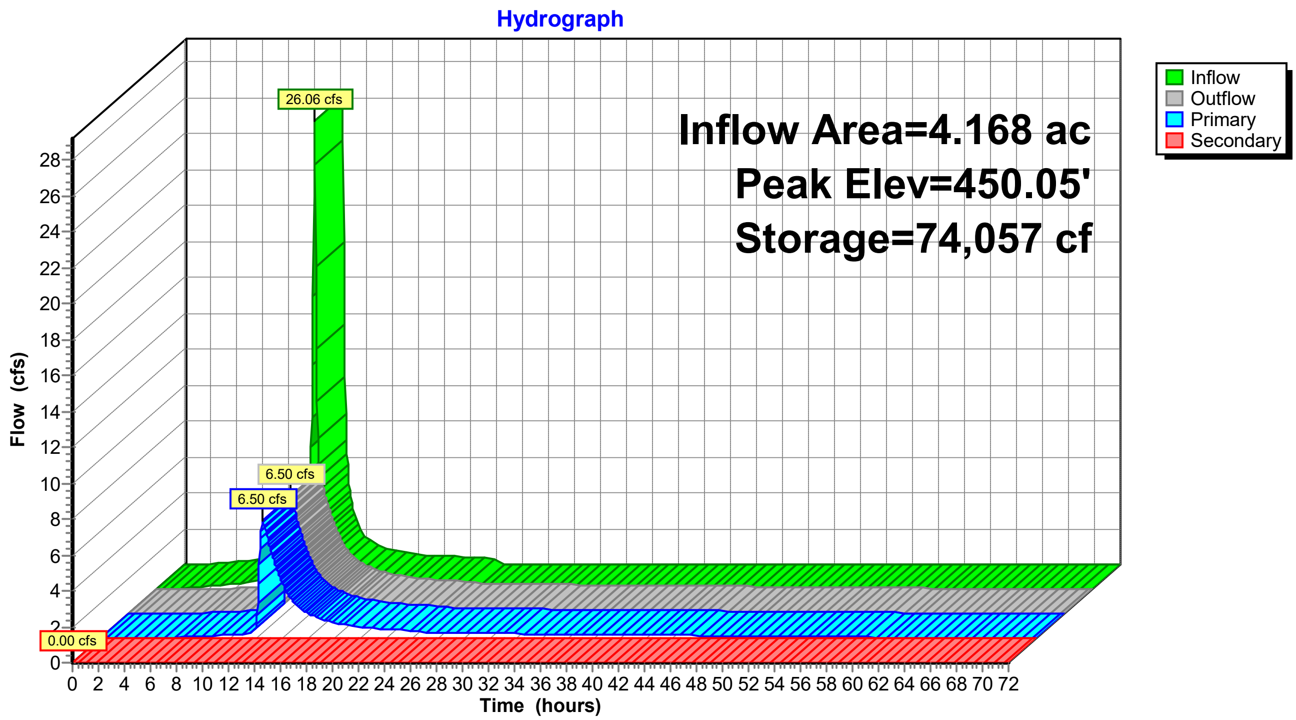
Elevation (feet)	Cum.Store (cubic-feet)
442.50	0
443.00	1,884
444.00	6,439
445.00	11,973
446.00	18,567
447.00	26,653
448.00	40,190
449.00	55,359
450.00	73,038
451.00	93,316

Device	Routing	Invert	Outlet Devices
#0	Secondary	451.00'	**Automatic Storage Overflow** (Discharged without head)
#1	Primary	447.00'	**18.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 447.00' / 446.80' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	447.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	448.60'	**1.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	450.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	450.25'	**Channel/Reach** using Reach 40R: Emergency Spillway

Primary OutFlow Max=6.49 cfs @ 12.48 hrs HW=450.05' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 6.49 cfs of 10.19 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.40 cfs @ 8.23 fps)
  ├─**3=Broad-Crested Rectangular Weir** (Weir Controls 5.79 cfs @ 4.00 fps)
  └─**4=Orifice/Grate** (Weir Controls 0.29 cfs @ 0.73 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=447.00' TW=450.25' (Dynamic Tailwater)
└─**5=Channel/Reach** (Channel Controls 0.00 cfs)

Pond 33P: Detention Pond 2



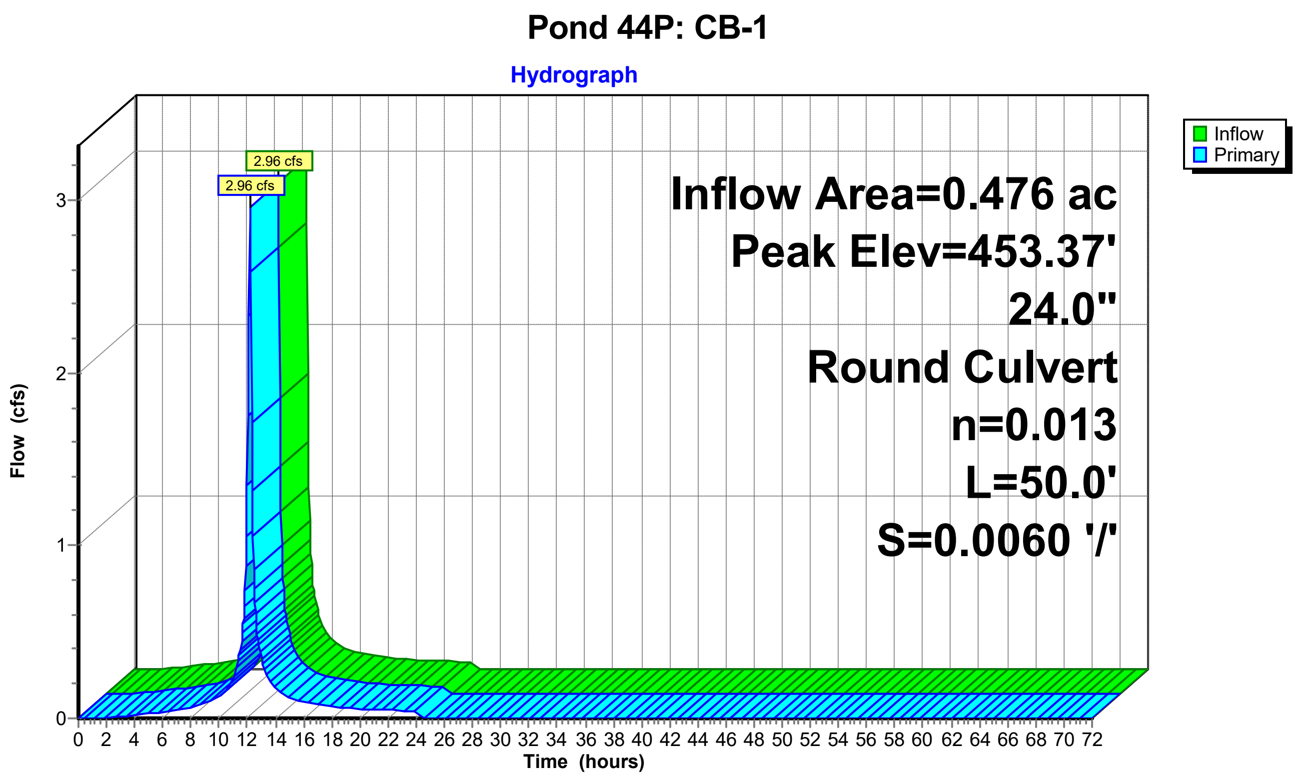
Summary for Pond 44P: CB-1

Inflow Area = 0.476 ac, 65.34% Impervious, Inflow Depth = 6.53" for Custom event
Inflow = 2.96 cfs @ 12.17 hrs, Volume= 0.259 af
Outflow = 2.96 cfs @ 12.17 hrs, Volume= 0.259 af, Atten= 0%, Lag= 0.0 min
Primary = 2.96 cfs @ 12.17 hrs, Volume= 0.259 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 453.37' @ 12.39 hrs
Flood Elev= 454.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	451.00'	**24.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 451.00' / 450.70' S= 0.0060 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 12.17 hrs HW=452.16' TW=452.22' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)



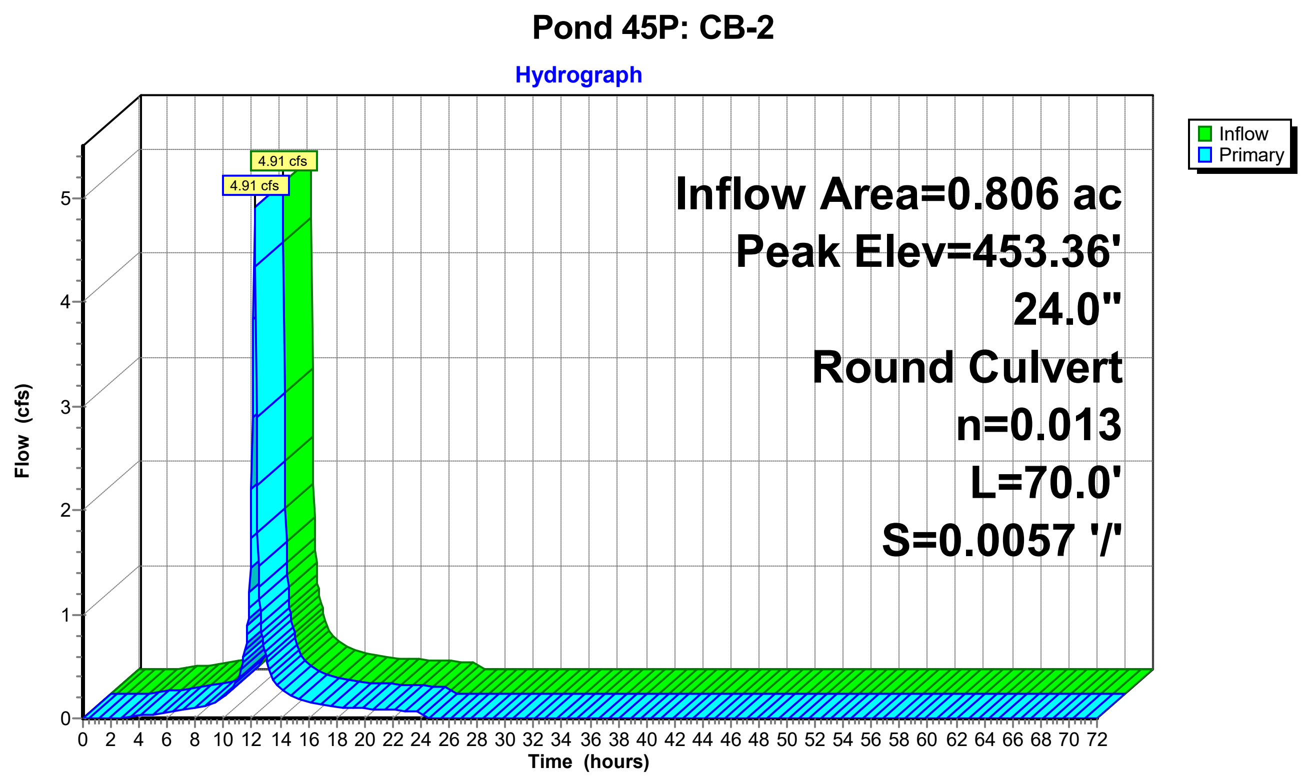
Summary for Pond 45P: CB-2

Inflow Area = 0.806 ac, 55.71% Impervious, Inflow Depth = 6.34" for Custom event
Inflow = 4.91 cfs @ 12.18 hrs, Volume= 0.426 af
Outflow = 4.91 cfs @ 12.18 hrs, Volume= 0.426 af, Atten= 0%, Lag= 0.0 min
Primary = 4.91 cfs @ 12.18 hrs, Volume= 0.426 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 453.36' @ 12.34 hrs
Flood Elev= 454.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	450.70'	**24.0" Round Culvert** L= 70.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 450.70' / 450.30' S= 0.0057 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 12.18 hrs HW=452.23' TW=452.30' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)



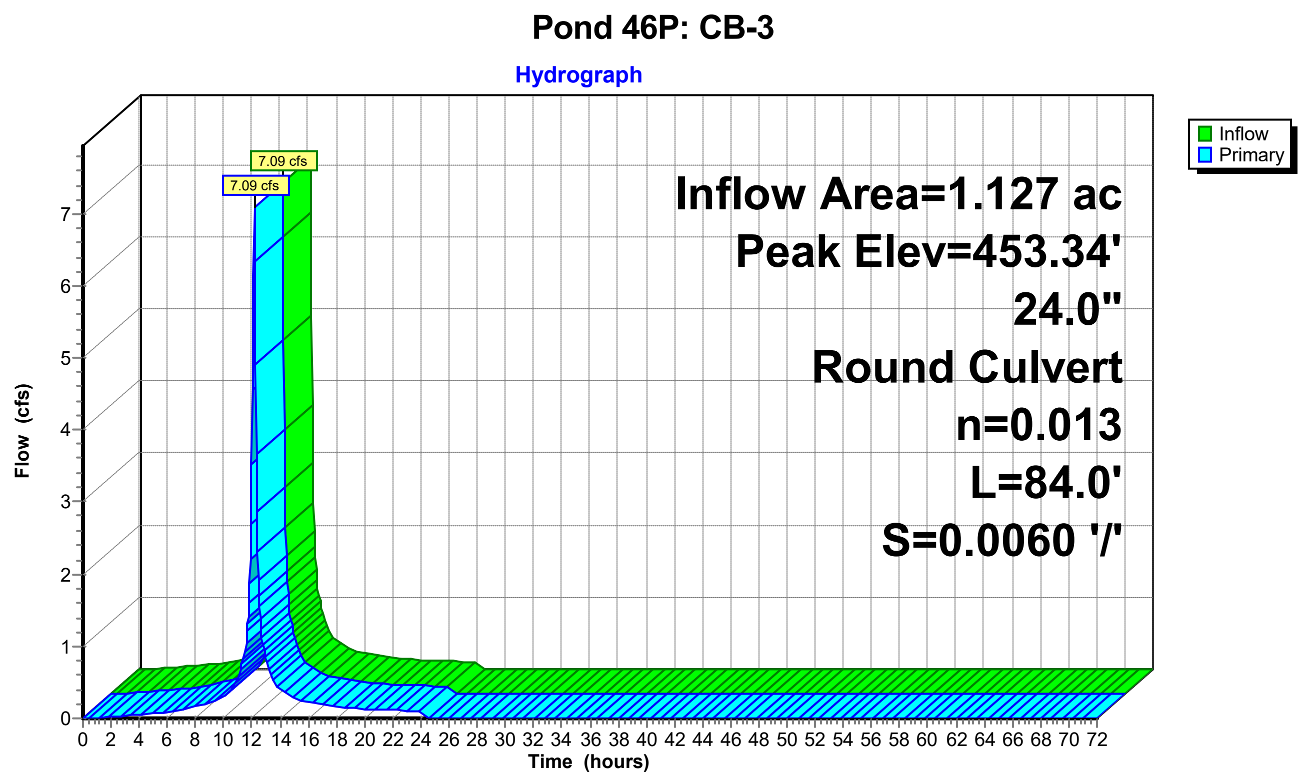
Summary for Pond 46P: CB-3

Inflow Area = 1.127 ac, 68.32% Impervious, Inflow Depth = 6.59" for Custom event
Inflow = 7.09 cfs @ 12.15 hrs, Volume= 0.619 af
Outflow = 7.09 cfs @ 12.15 hrs, Volume= 0.619 af, Atten= 0%, Lag= 0.0 min
Primary = 7.09 cfs @ 12.15 hrs, Volume= 0.619 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 453.34' @ 12.29 hrs
Flood Elev= 454.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	450.30'	**24.0" Round Culvert** L= 84.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 450.30' / 449.80' S= 0.0060 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 12.15 hrs HW=452.14' TW=452.31' (Dynamic Tailwater)
└**1=Culvert** (Controls 0.00 cfs)



Summary for Pond 48P: CB-4

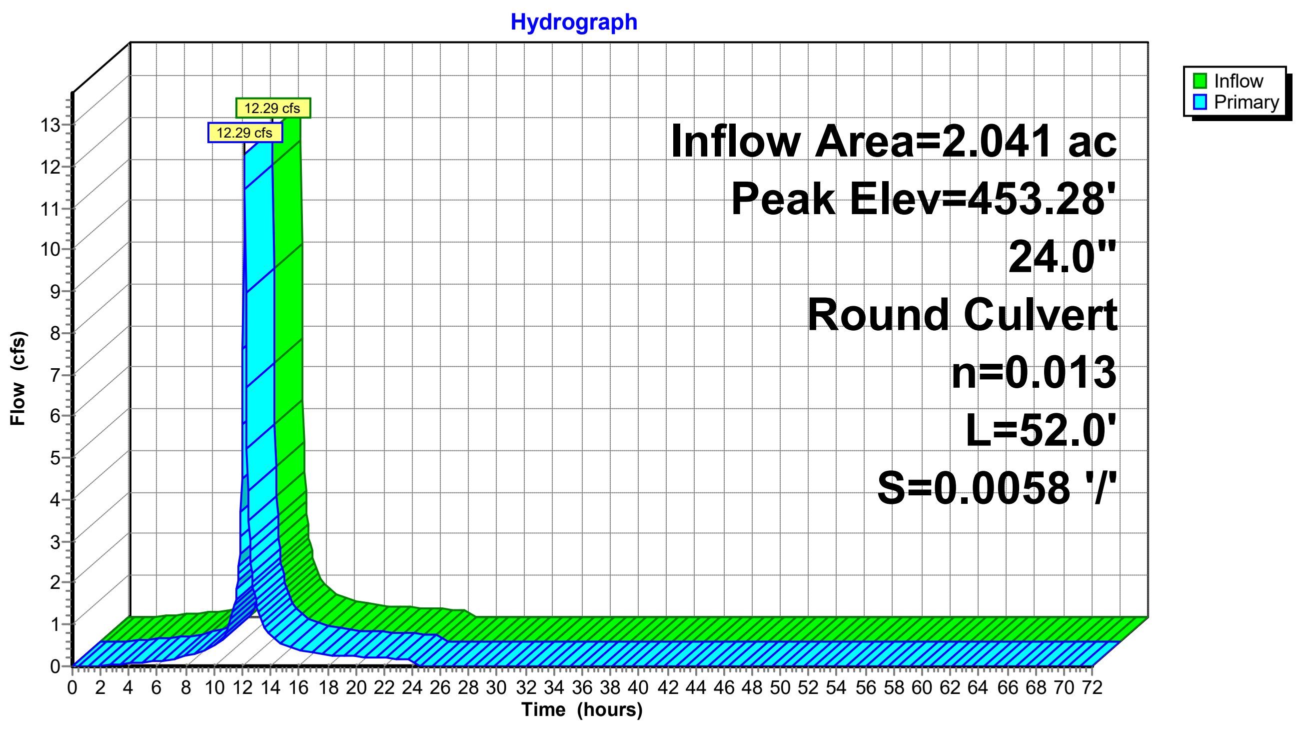
Inflow Area = 2.041 ac, 50.76% Impervious, Inflow Depth = 6.20" for Custom event
Inflow = 12.29 cfs @ 12.16 hrs, Volume= 1.054 af
Outflow = 12.29 cfs @ 12.16 hrs, Volume= 1.054 af, Atten= 0%, Lag= 0.0 min
Primary = 12.29 cfs @ 12.16 hrs, Volume= 1.054 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 453.28' @ 12.24 hrs
Flood Elev= 454.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	449.80'	**24.0" Round Culvert** L= 52.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 449.80' / 449.50' S= 0.0058 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=1.89 cfs @ 12.16 hrs HW=452.39' TW=452.38' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.89 cfs @ 0.60 fps)

Pond 48P: CB-4



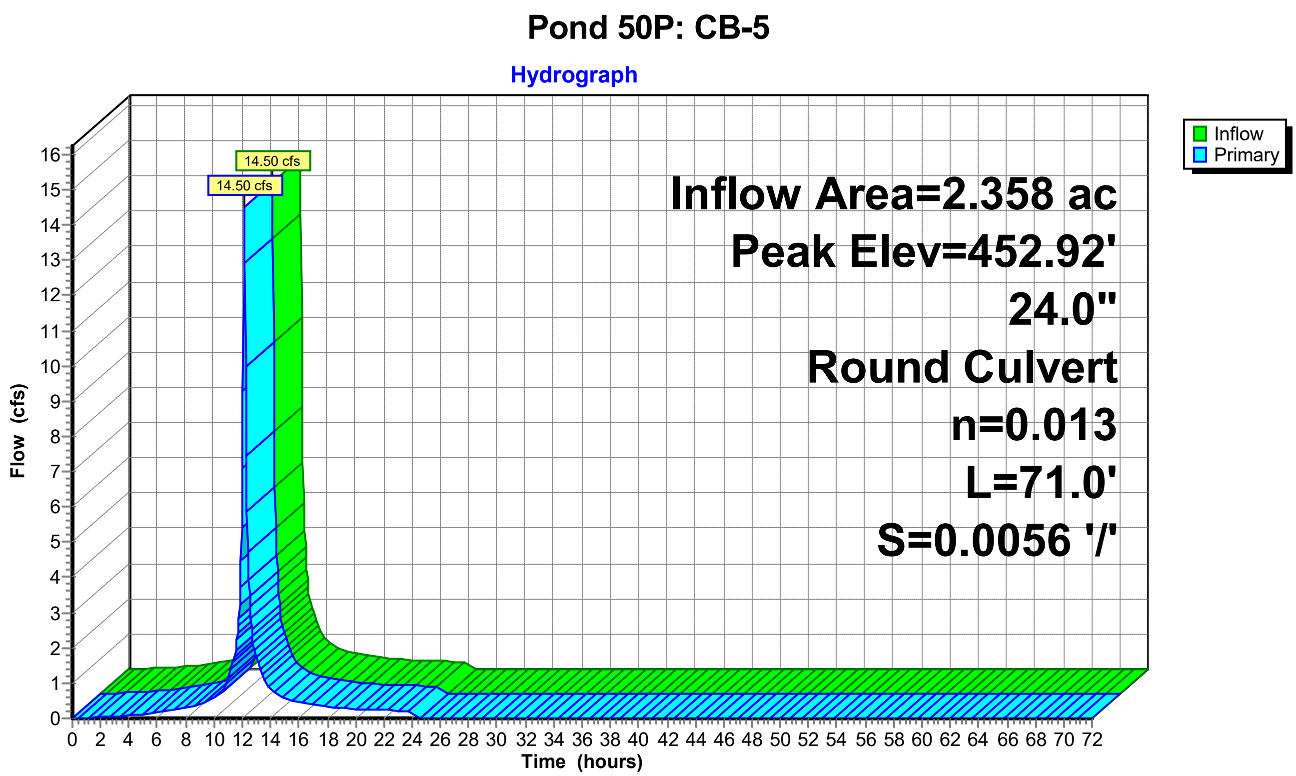
Summary for Pond 50P: CB-5

Inflow Area = 2.358 ac, 57.38% Impervious, Inflow Depth = 6.34" for Custom event
Inflow = 14.50 cfs @ 12.15 hrs, Volume= 1.246 af
Outflow = 14.50 cfs @ 12.15 hrs, Volume= 1.246 af, Atten= 0%, Lag= 0.0 min
Primary = 14.50 cfs @ 12.15 hrs, Volume= 1.246 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 452.92' @ 12.20 hrs
Flood Elev= 455.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	449.50'	**24.0" Round Culvert** L= 71.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 449.50' / 449.10' S= 0.0056 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=4.96 cfs @ 12.15 hrs HW=452.27' TW=452.16' (Dynamic Tailwater)
1=Culvert (Inlet Controls 4.96 cfs @ 1.58 fps)



Summary for Pond 52P: CB-6

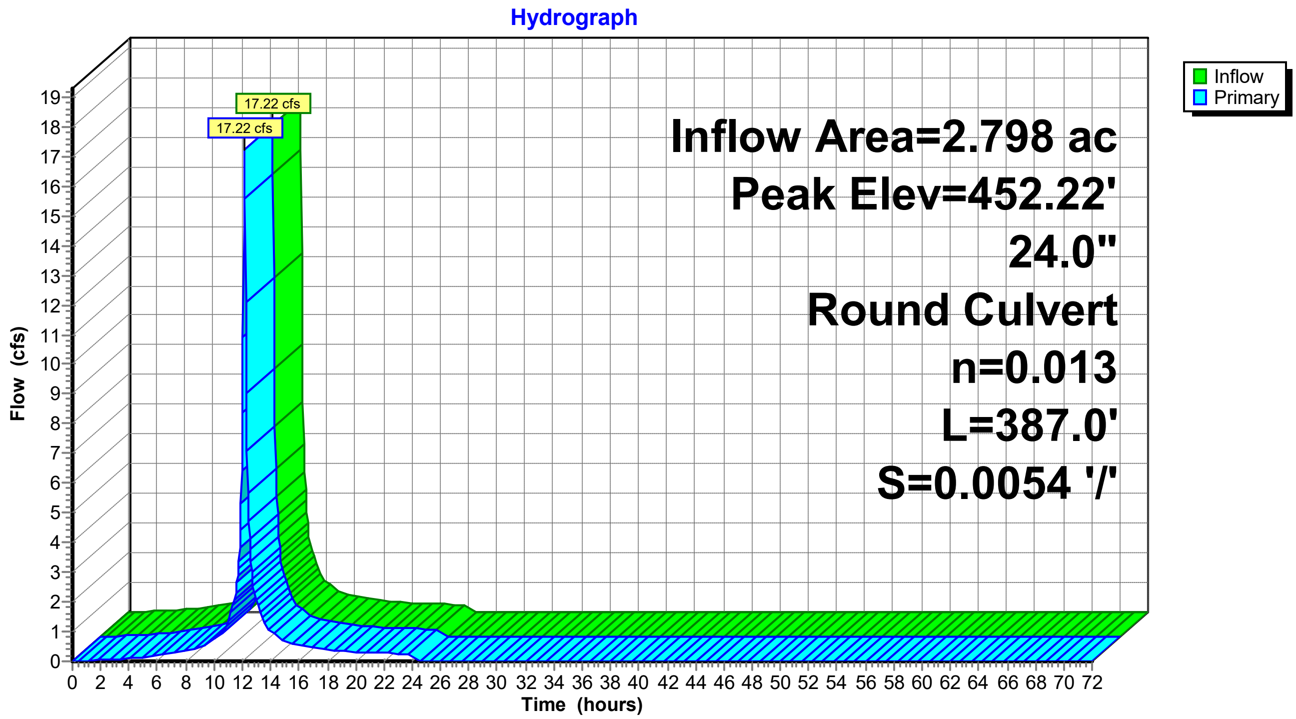
Inflow Area = 2.798 ac, 58.61% Impervious, Inflow Depth = 6.37" for Custom event
Inflow = 17.22 cfs @ 12.16 hrs, Volume= 1.485 af
Outflow = 17.22 cfs @ 12.16 hrs, Volume= 1.485 af, Atten= 0%, Lag= 0.0 min
Primary = 17.22 cfs @ 12.16 hrs, Volume= 1.485 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 452.22' @ 12.16 hrs
Flood Elev= 454.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	449.10'	**24.0" Round Culvert** L= 387.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 449.10' / 447.00' S= 0.0054 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=16.36 cfs @ 12.16 hrs HW=452.15' TW=449.49' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 16.36 cfs @ 5.21 fps)

Pond 52P: CB-6

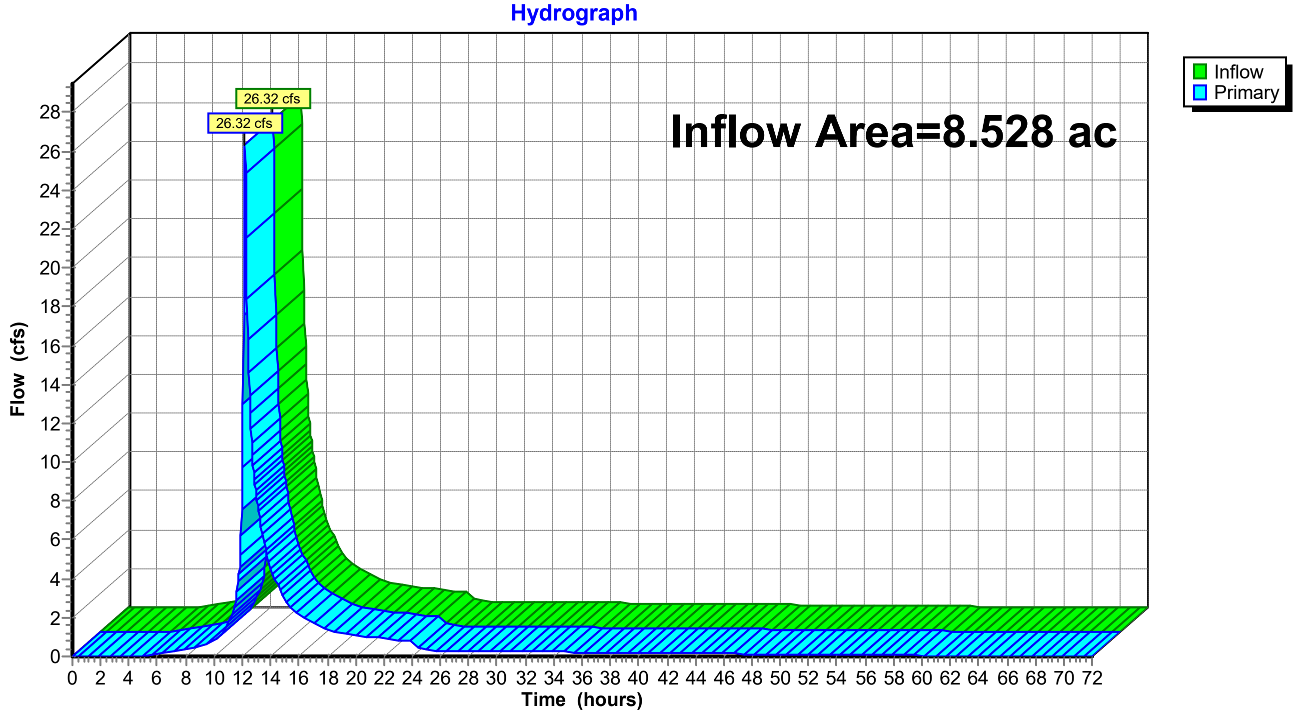


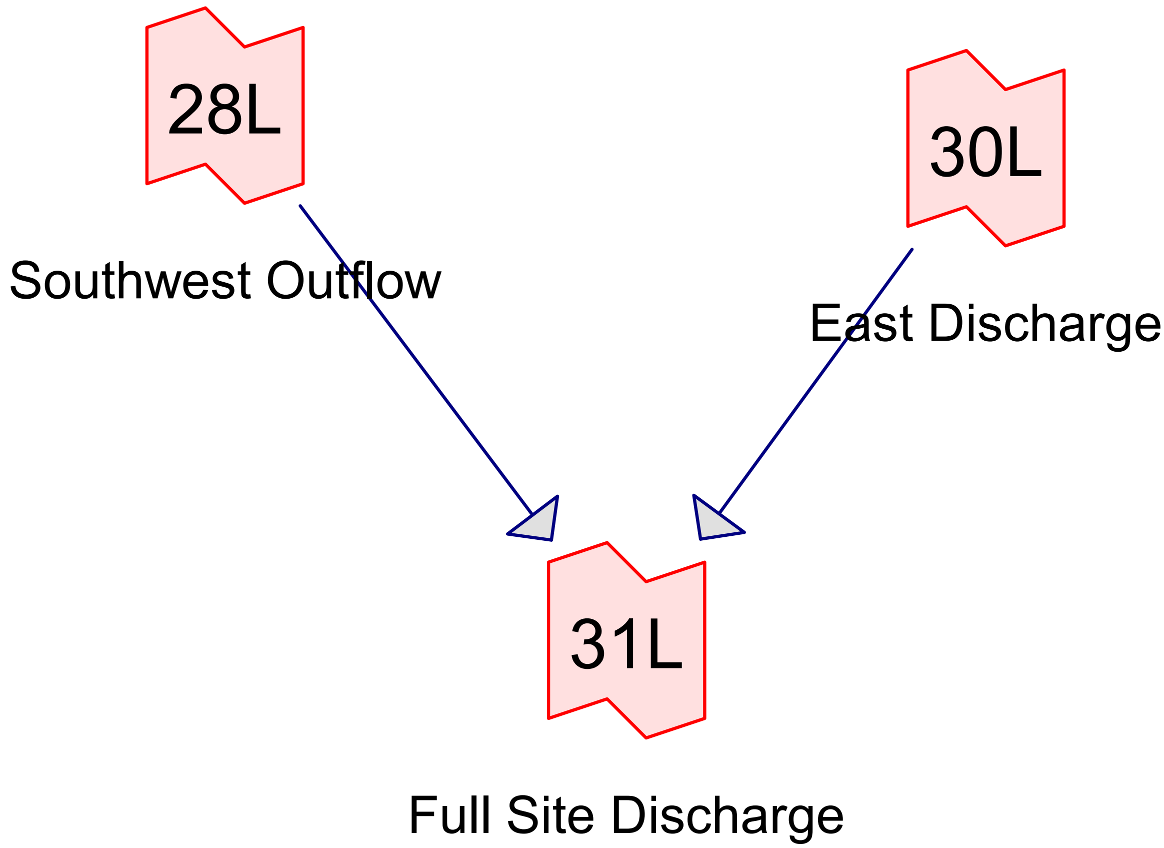
Summary for Link 39L: East Discharge

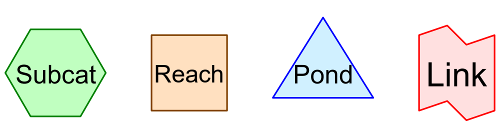
Inflow Area = 8.528 ac, 25.35% Impervious, Inflow Depth > 5.75" for Custom event
Inflow = 26.32 cfs @ 12.21 hrs, Volume= 4.088 af
Primary = 26.32 cfs @ 12.21 hrs, Volume= 4.088 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 39L: East Discharge







Routing Diagram for Jan 2025 Transfer Station FULL
Prepared by HP, Printed 1/15/2025
HydroCAD® 10.10-5a s/n 07607 © 2020 HydroCAD Software Solutions LLC

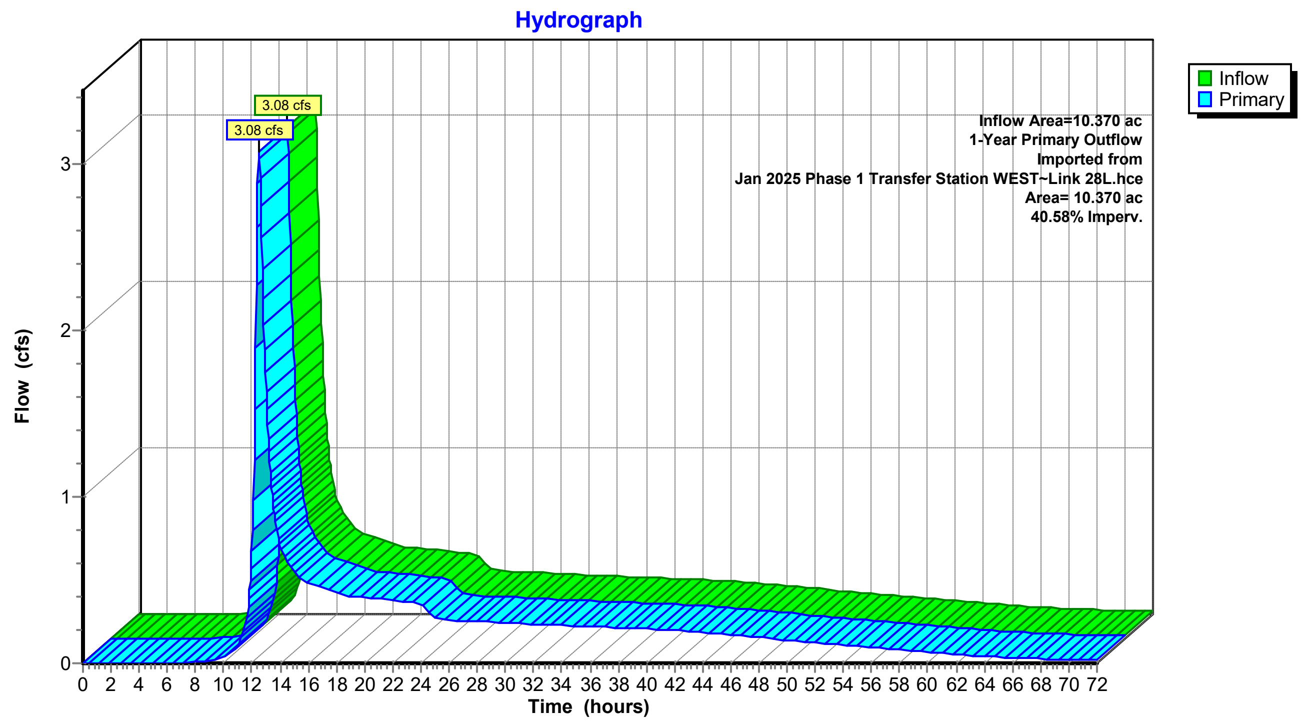
Summary for Link 28L: Southwest Outflow

Inflow Area = 10.370 ac, 40.58% Impervious, Inflow Depth > 1.43" for 1-Year event
Inflow = 3.08 cfs @ 12.50 hrs, Volume= 1.239 af
Primary = 3.08 cfs @ 12.50 hrs, Volume= 1.239 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

1-Year Primary Outflow Imported from Jan 2025 Phase 1 Transfer Station WEST~Link 28L.hce

Link 28L: Southwest Outflow



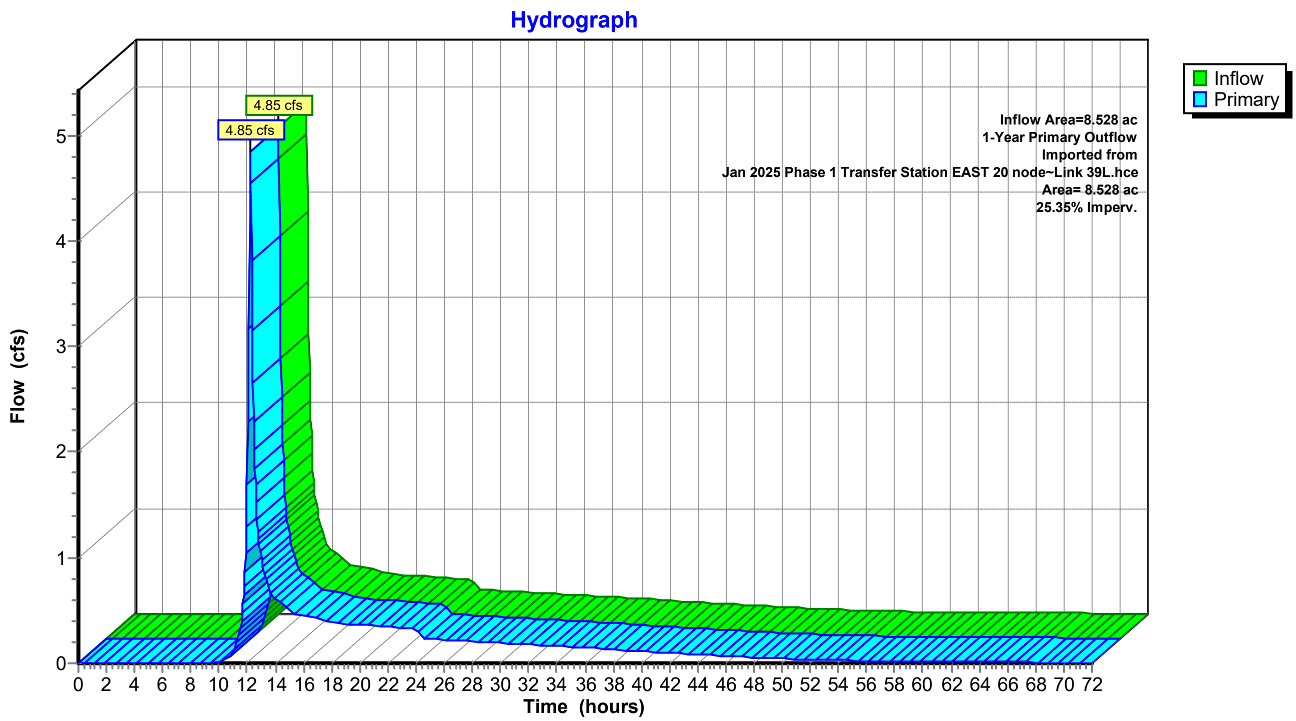
Summary for Link 30L: East Discharge

Inflow Area = 8.528 ac, 25.35% Impervious, Inflow Depth > 1.35" for 1-Year event
Inflow = 4.85 cfs @ 12.21 hrs, Volume= 0.958 af
Primary = 4.85 cfs @ 12.21 hrs, Volume= 0.958 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

1-Year Primary Outflow Imported from Jan 2025 Phase 1 Transfer Station EAST 20 node~Link 39L.hce

Link 30L: East Discharge

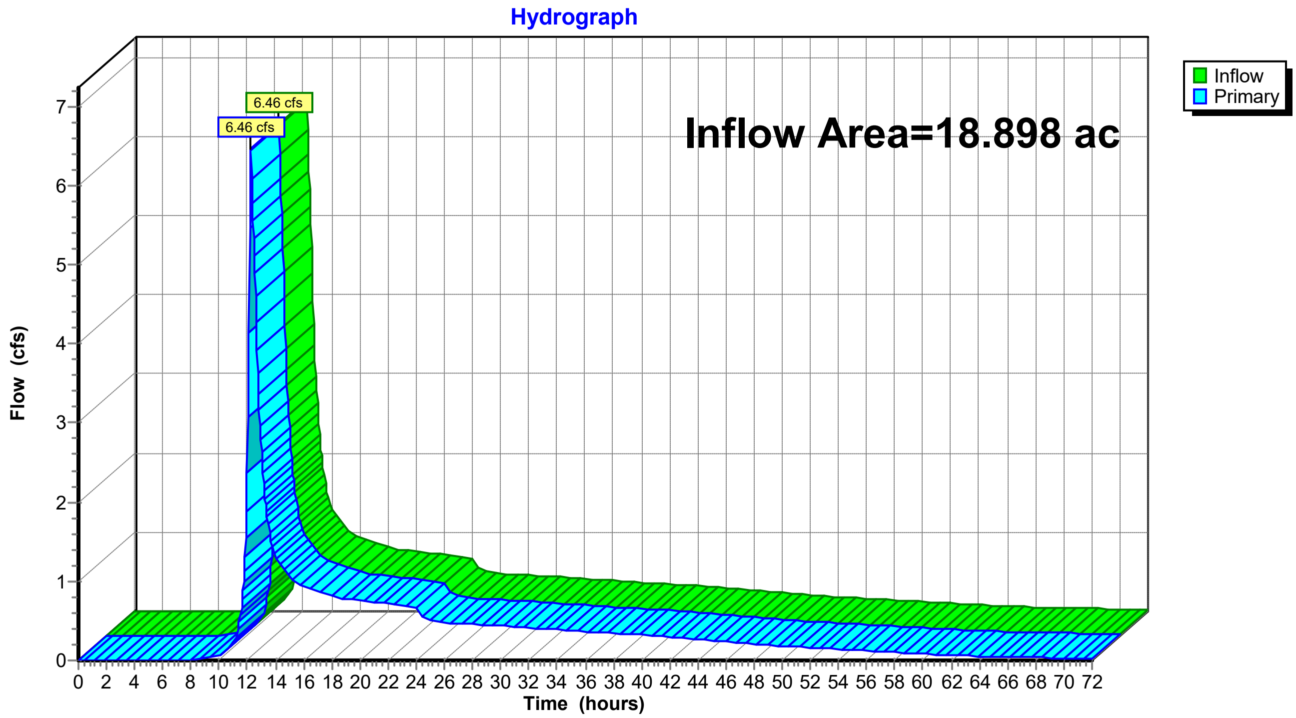


Summary for Link 31L: Full Site Discharge

Inflow Area = 18.898 ac, 33.71% Impervious, Inflow Depth > 1.40" for 1-Year event
Inflow = 6.46 cfs @ 12.23 hrs, Volume= 2.197 af
Primary = 6.46 cfs @ 12.23 hrs, Volume= 2.197 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 31L: Full Site Discharge



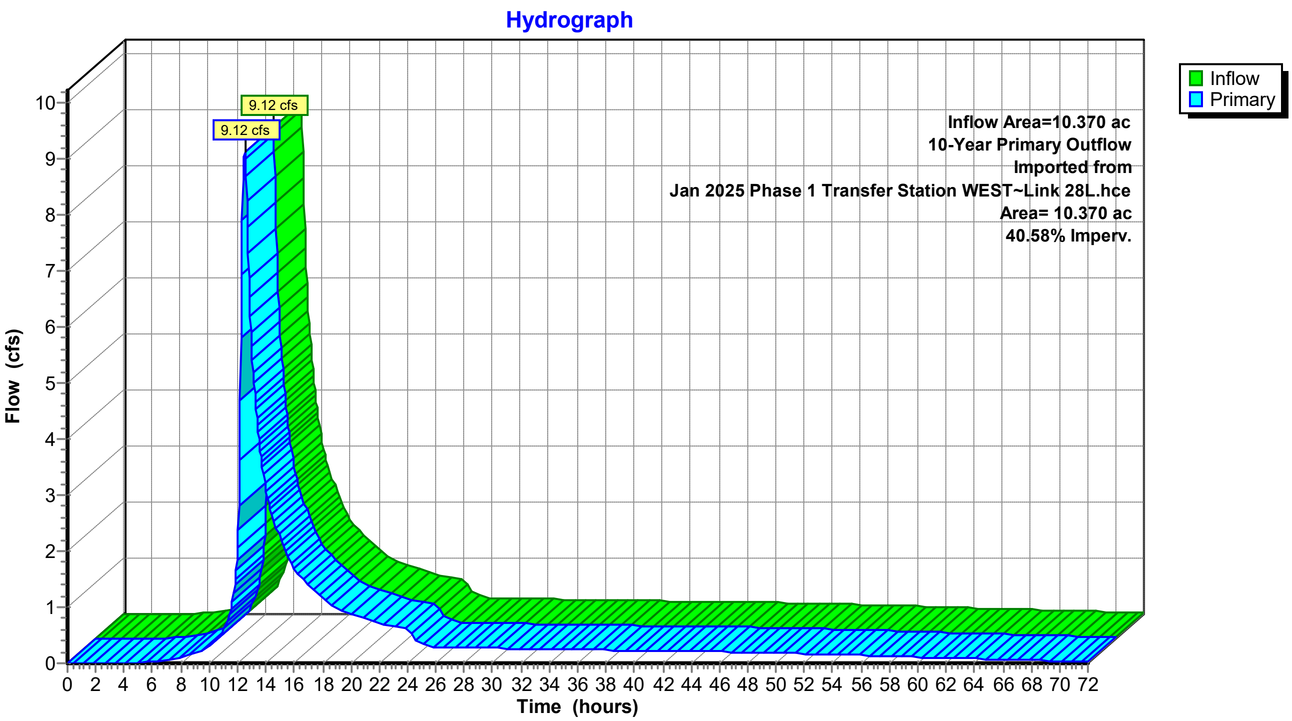
Summary for Link 28L: Southwest Outflow

Inflow Area = 10.370 ac, 40.58% Impervious, Inflow Depth > 3.22" for 10-Year event
Inflow = 9.12 cfs @ 12.50 hrs, Volume= 2.782 af
Primary = 9.12 cfs @ 12.50 hrs, Volume= 2.782 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

10-Year Primary Outflow Imported from Jan 2025 Phase 1 Transfer Station WEST~Link 28L.hce

Link 28L: Southwest Outflow



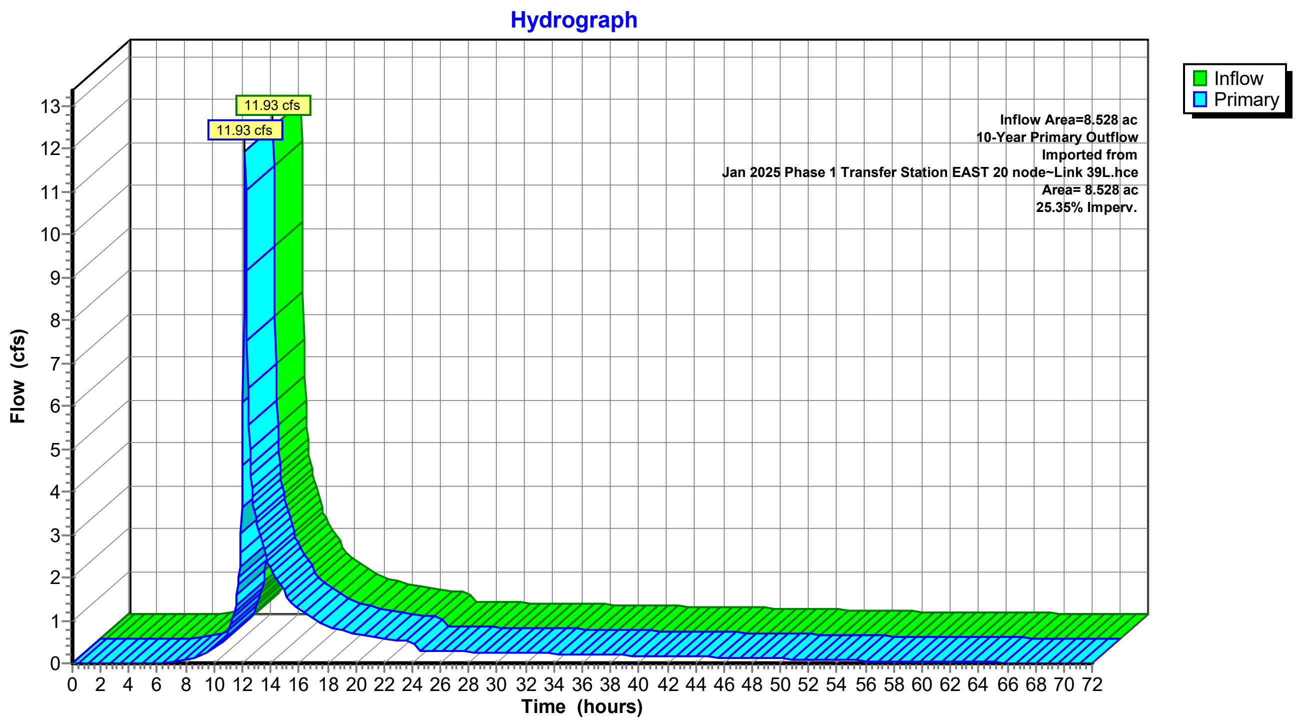
Summary for Link 30L: East Discharge

Inflow Area = 8.528 ac, 25.35% Impervious, Inflow Depth > 3.12" for 10-Year event
Inflow = 11.93 cfs @ 12.20 hrs, Volume= 2.218 af
Primary = 11.93 cfs @ 12.20 hrs, Volume= 2.218 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

10-Year Primary Outflow Imported from Jan 2025 Phase 1 Transfer Station EAST 20 node~Link 39L.hce

Link 30L: East Discharge

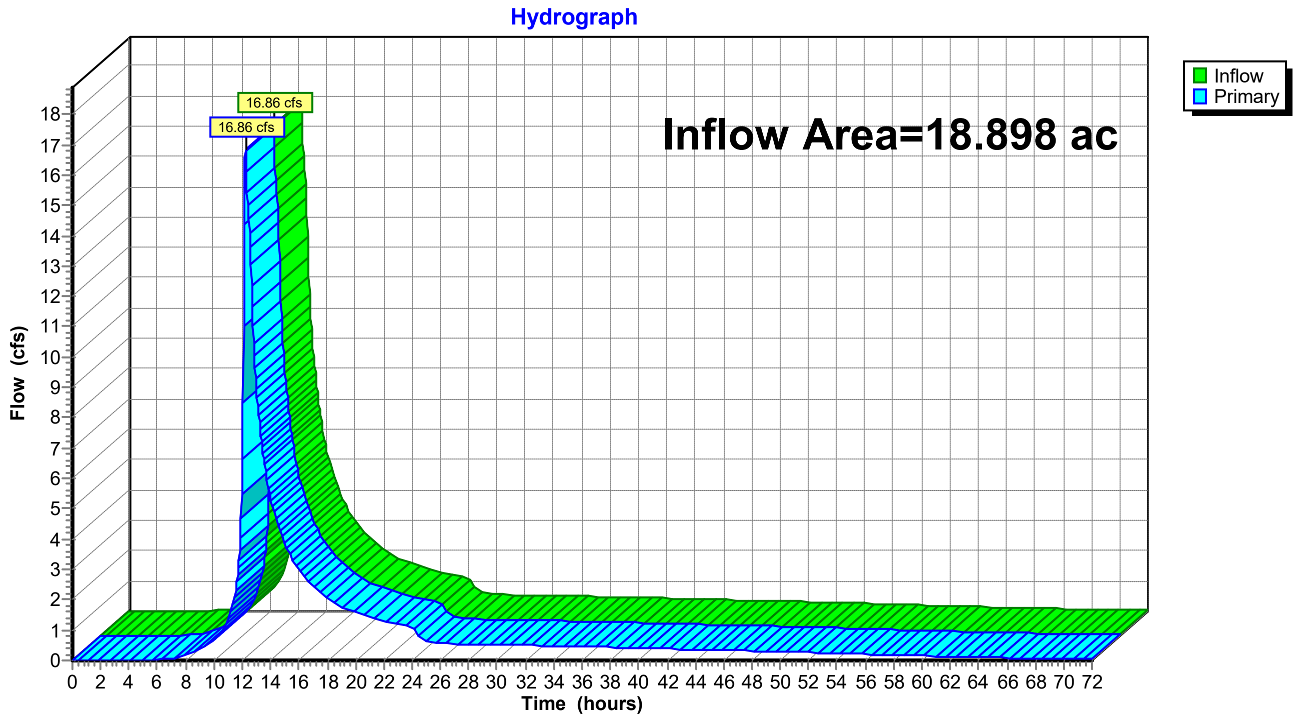


Summary for Link 31L: Full Site Discharge

Inflow Area =	18.898 ac,	33.71% Impervious,	Inflow Depth > 3.17"	for 10-Year event	
Inflow =	16.86 cfs @	12.24 hrs,	Volume=	5.000 af	
Primary =	16.86 cfs @	12.24 hrs,	Volume=	5.000 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 31L: Full Site Discharge



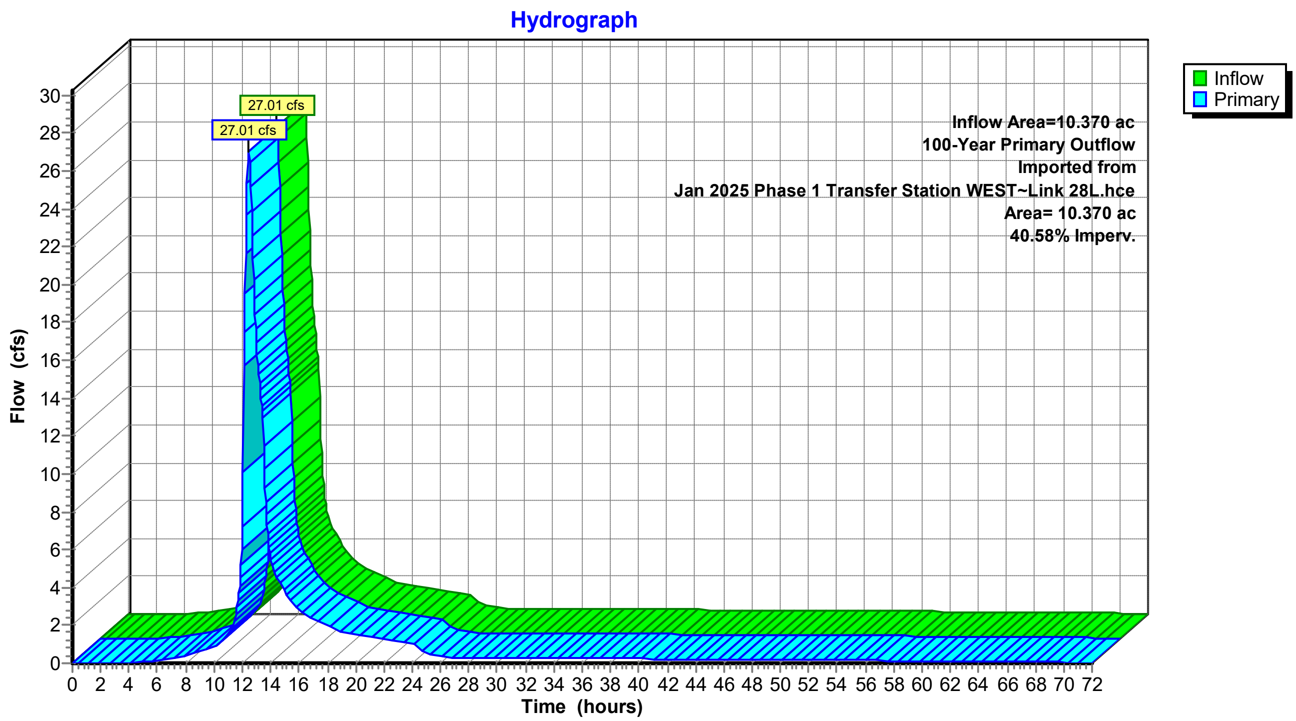
Summary for Link 28L: Southwest Outflow

Inflow Area = 10.370 ac, 40.58% Impervious, Inflow Depth > 6.57" for 100-Year event
Inflow = 27.01 cfs @ 12.46 hrs, Volume= 5.678 af
Primary = 27.01 cfs @ 12.46 hrs, Volume= 5.678 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

100-Year Primary Outflow Imported from Jan 2025 Phase 1 Transfer Station WEST~Link 28L.hce

Link 28L: Southwest Outflow



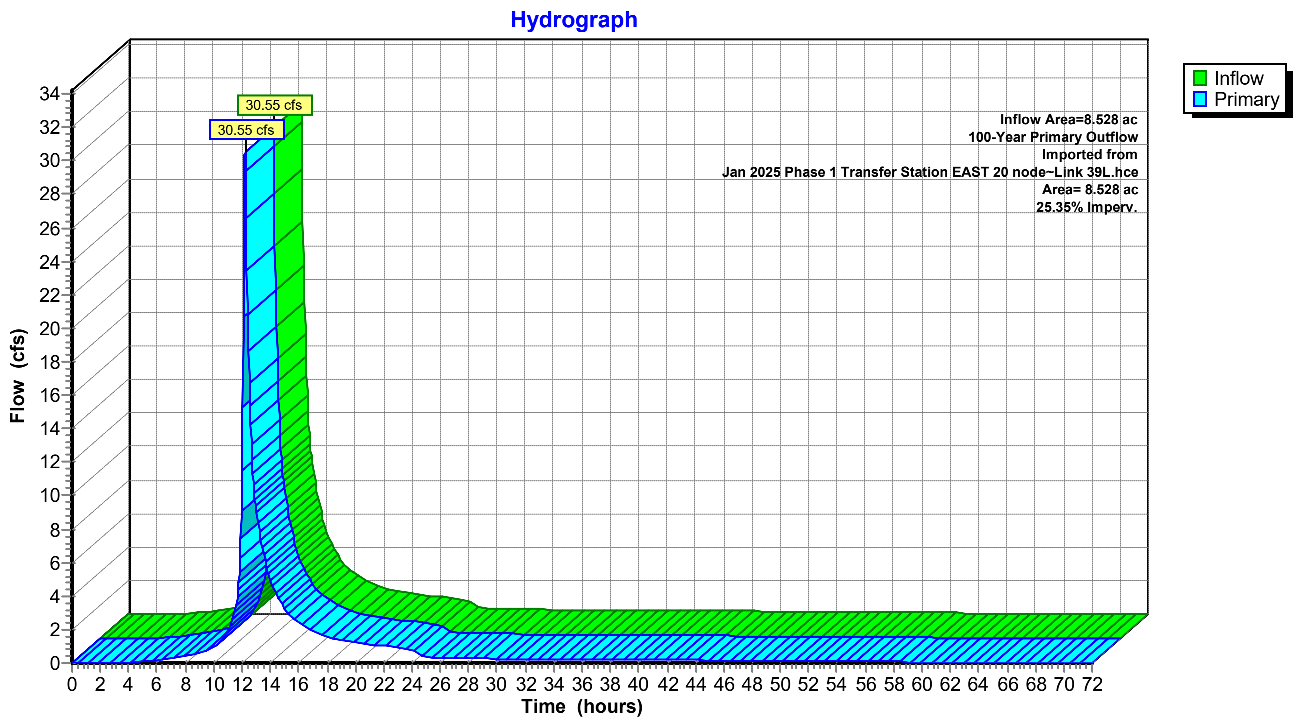
Summary for Link 30L: East Discharge

Inflow Area = 8.528 ac, 25.35% Impervious, Inflow Depth > 6.46" for 100-Year event
Inflow = 30.55 cfs @ 12.21 hrs, Volume= 4.593 af
Primary = 30.55 cfs @ 12.21 hrs, Volume= 4.593 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

100-Year Primary Outflow Imported from Jan 2025 Phase 1 Transfer Station EAST 20 node~Link 39L.hce

Link 30L: East Discharge

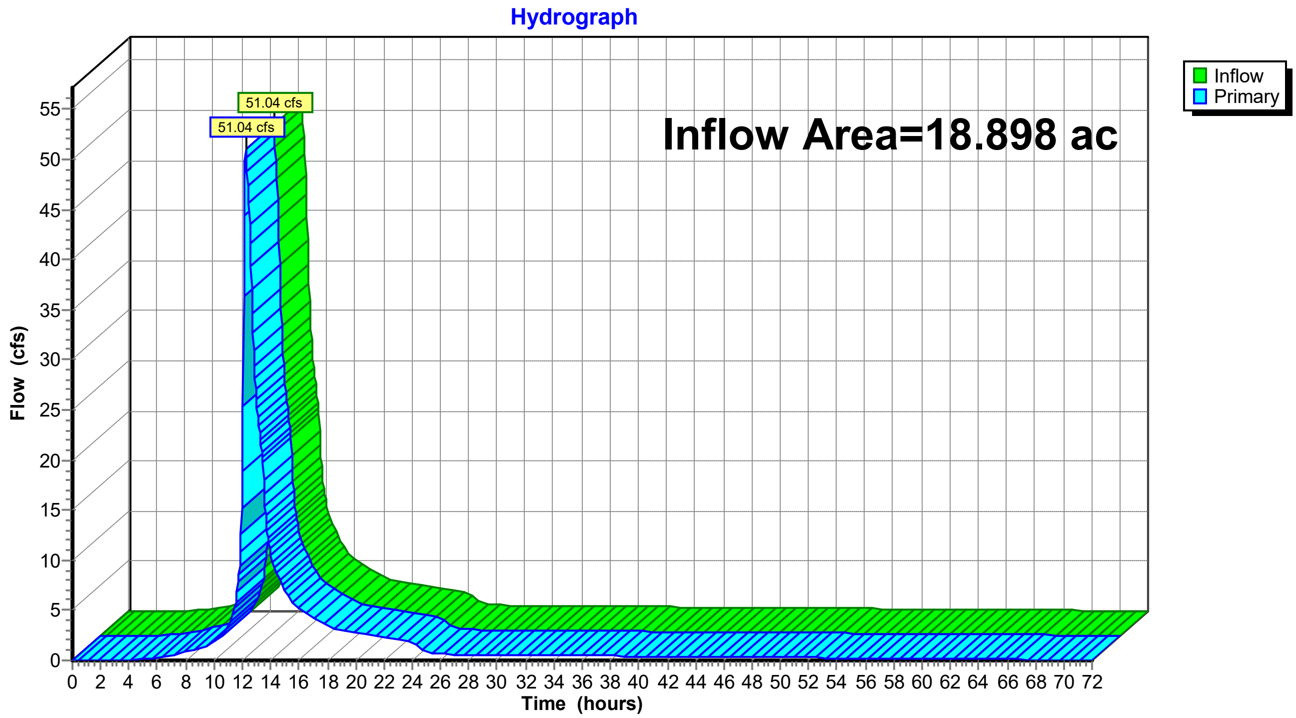


Summary for Link 31L: Full Site Discharge

Inflow Area = 18.898 ac, 33.71% Impervious, Inflow Depth > 6.52" for 100-Year event
Inflow = 51.04 cfs @ 12.25 hrs, Volume= 10.271 af
Primary = 51.04 cfs @ 12.25 hrs, Volume= 10.271 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 31L: Full Site Discharge



Therefore, the minimum A_o formula for 48 hrs. reduces to:

$$A_o = \frac{A_s \times 2h^{0.5}}{588{,}326}$$

Material Specifications

1. Skimmer Devices - These devices shall be constructed with Schedule 40 PVC pipe with diameters of 4 to 6 inches. The flexible arm shall be equal diameter of non -perforated, corrugated, plastic tubing.

2. Riser-pipe Devices - These devices shall be constructed of Schedule 40 PVC if plastic pipe is used or galvanized corrugated steel or aluminum pipe. The minimum diameter shall be 6 inches if the device is used in conjunction with another permanent riser. All perforations will be at the interior of the corrugations.

Maintenance

1. Dewatering devices shall be inspected weekly and after each runoff event.

2. Filter fabric or media will be replaced as needed.

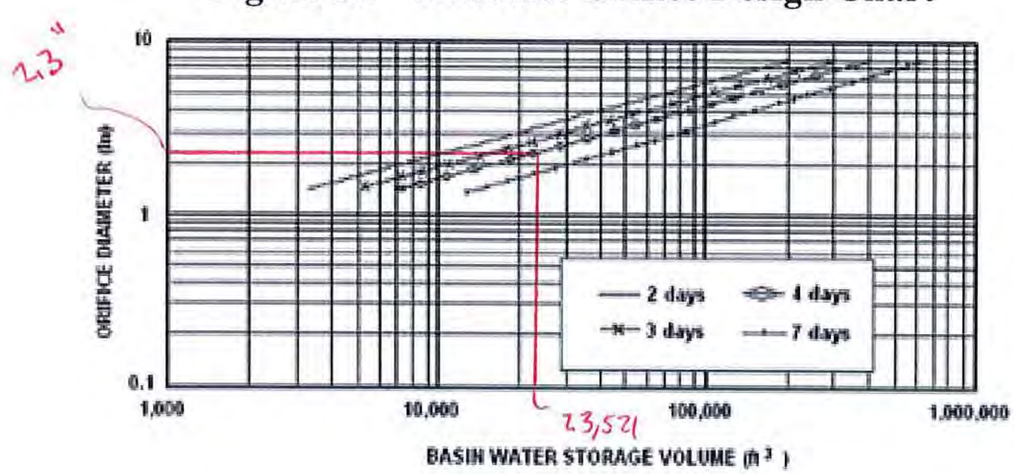
3. Any malfunctioning skimmer or its components shall be repaired or replaced within 24 hours of inspection notification.

4. Sediment shall be removed from the system when it reaches the level marked in a sediment cleanout stake or the top of the skimmer landing area.

5. The structure shall only be removed when the tributary area has been properly stabilized.

SOUTH WEST
SEDIMENT BASIN 2

Figure 5.3 - Skimmer Orifice Design Chart



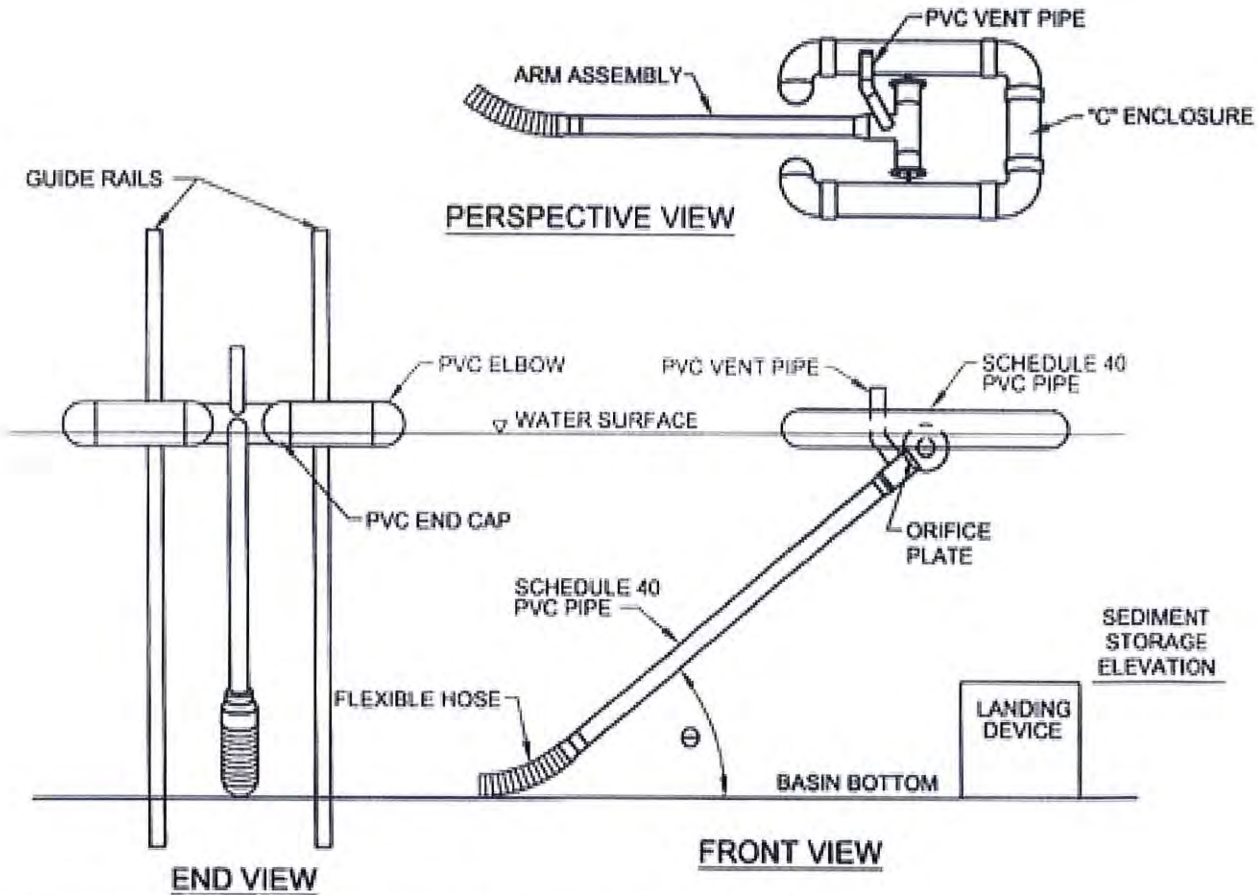
* Figure adapted from Penn State Agricultural and Biological Fact Sheet F-253

Notes:

1. Figure 5.3 is for use in designing the orifice plate for the skimmer shown in Figure 5.4. It assumes 3" to 5" head (depending upon the size of the skimmer). The required head for use of Figure 5.3 varies as follows: For a skimmer with a dewatering tube ≤ 2 1/2" diameter, use a 2" head. For a 3" diameter tube, use a 2.5" head; 4" tube, use 3.3" head, 5" tube use 4" head, and 6" diameter tube use 5" head.

2. Find the vertical line representing the basin's dewatering zone volume. At the intersection of the vertical line with the desired dewatering time, read horizontally to the left to find the required skimmer orifice diameter.

Figure 5.4
Skimmer Dewatering Device



* Figure adapted from Penn State Agricultural and Biological Fact Sheet F-253

Basin No.	Water Surface Elevation (ft.)	Arm Length* (ft.)	Arm Dia. (in.)	Orifice Size** (in.)	Top of Landing Device Elevation (ft.)	Flexible Hose Length (in.)	Flexible Hose Attachment Elevation (ft.)
1	451.75	2.2	2.3	2.3	450.2	48"	450.2

* Minimum Arm length = Full design storage depth x 1.414 (for 45 degree angle)
** Must be equal to or less than arm diameter

Therefore, the minimum A_o formula for 48 hrs. reduces to:

$$A_o = \frac{A_s \times 2h^{0.5}}{588{,}326}$$

Material Specifications

1. Skimmer Devices - These devices shall be constructed with Schedule 40 PVC pipe with diameters of 4 to 6 inches. The flexible arm shall be equal diameter of non-perforated, corrugated, plastic tubing.

2. Riser-pipe Devices - These devices shall be constructed of Schedule 40 PVC if plastic pipe is used or galvanized corrugated steel or aluminum pipe. The minimum diameter shall be 6 inches if the device is used in conjunction with another permanent riser. All perforations will be at the interior of the corrugations.

Maintenance

1. Dewatering devices shall be inspected weekly and after each runoff event.

2. Filter fabric or media will be replaced as needed.

3. Any malfunctioning skimmer or its components shall be repaired or replaced within 24 hours of inspection notification.

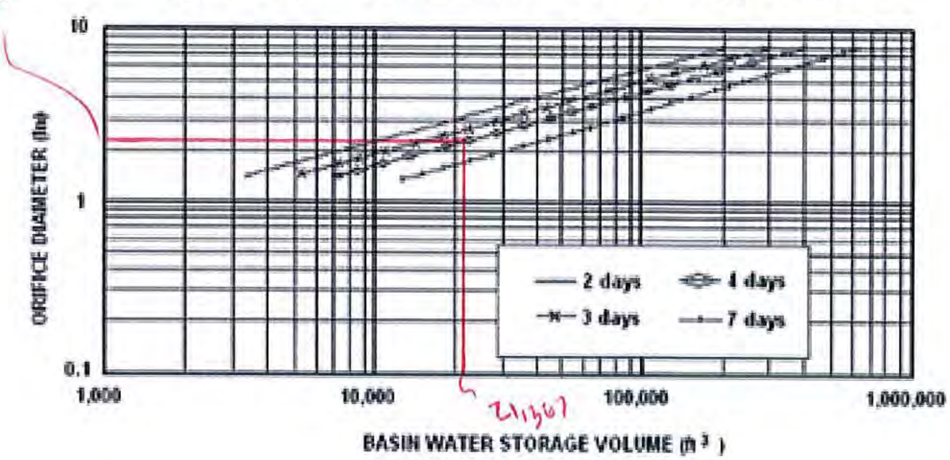
4. Sediment shall be removed from the system when it reaches the level marked in a sediment cleanout stake or the top of the skimmer landing area.

5. The structure shall only be removed when the tributary area has been properly stabilized.

EAST SEDIMENT BASIN 2

2.3"

Figure 5.3 - Skimmer Orifice Design Chart



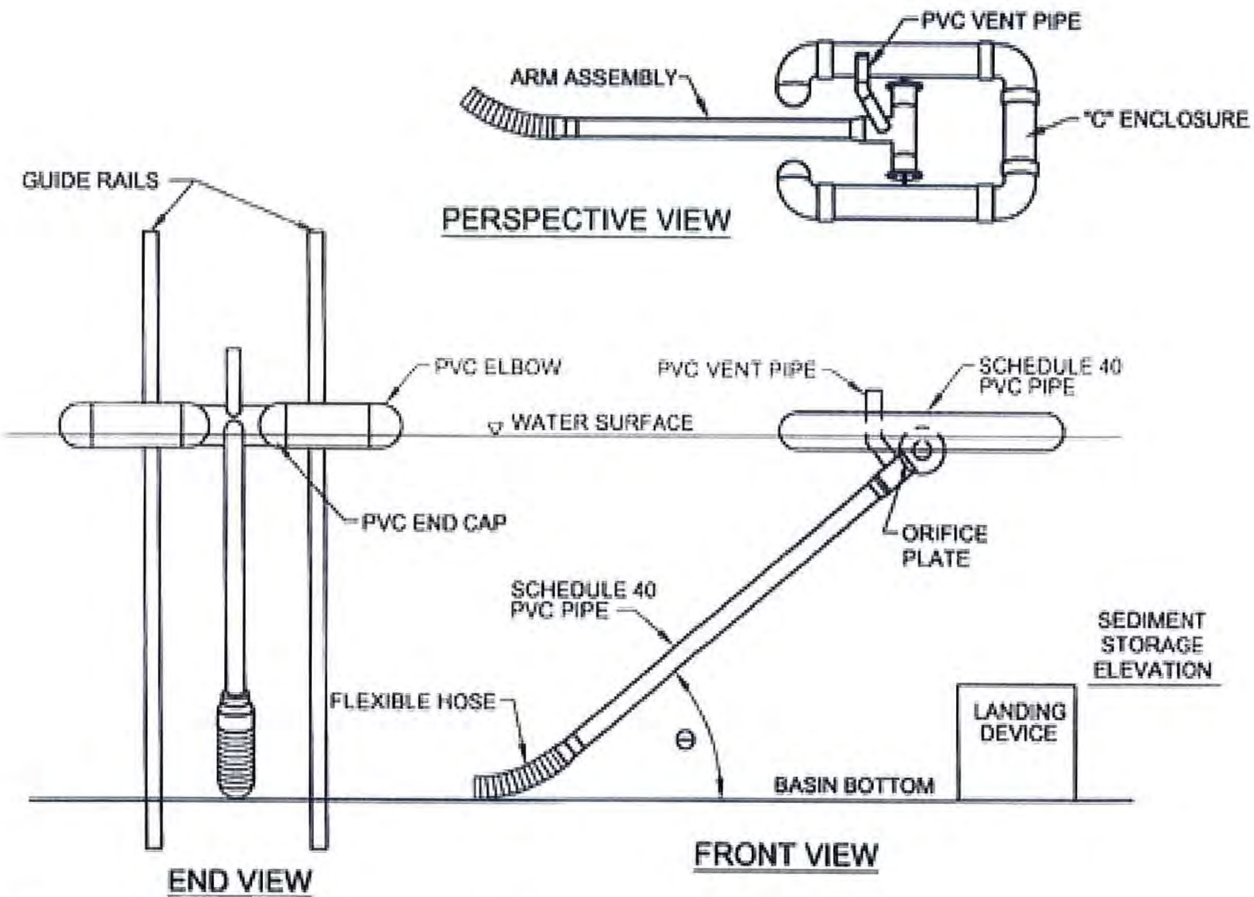
* Figure adapted from Penn State Agricultural and Biological Fact Sheet F-253

Notes:

1. Figure 5.3 is for use in designing the orifice plate for the skimmer shown in Figure 5.4. It assumes 3" to 5" head (depending upon the size of the skimmer). The required head for use of Figure 5.3 varies as follows: For a skimmer with a dewatering tube ≤ 2 1/2" diameter, use a 2" head. For a 3" diameter tube, use a 2.5" head; 4" tube, use 3.3" head, 5" tube use 4" head, and 6" diameter tube use 5" head.

2. Find the vertical line representing the basin's dewatering zone volume. At the intersection of the vertical line with the desired dewatering time, read horizontally to the left to find the required skimmer orifice diameter.

Figure 5.4
Skimmer Dewatering Device



* Figure adapted from Penn State Agricultural and Biological Fact Sheet F-253

Basin No.	Water Surface Elevation (ft.)	Arm Length* (ft.)	Arm Dia. (in.)	Orifice Size** (in.)	Top of Landing Device Elevation (ft.)	Flexible Hose Length (in.)	Flexible Hose Attachment Elevation (ft.)
2	448.6	2.3	2.3	2.3	447	48"	447

* Minimum Arm length = Full design storage depth x 1.414 (for 45 degree angle)
** Must be equal to or less than arm diameter

SOUTH WEST BASIN
WET POND 1

Figure 5.16
Anti-Seep Collar Design

This procedure provides the anti-seep collar dimensions for only temporary sediment basins to increase the seepage length by 15% for various pipe slopes, embankment slopes and riser heights.

The first step in designing anti-seep collars is to determine the length of pipe within the saturated zone of the embankment. This can be done graphically or by the following equation, assuming that the upstream slope of the embankment intersects the invert of the pipe at its upstream end. (See embankment-invert intersection on the drawing below:

$$L_s = \overset{2.4}{y}\ (\overset{4}{z} + 4)\left[1 + \frac{\overset{0.005}{\text{pipe slope}}}{0.25-\underset{0.005}{\text{pipe slope}}}\right] = 19.6 \text{ ft}$$

1.02

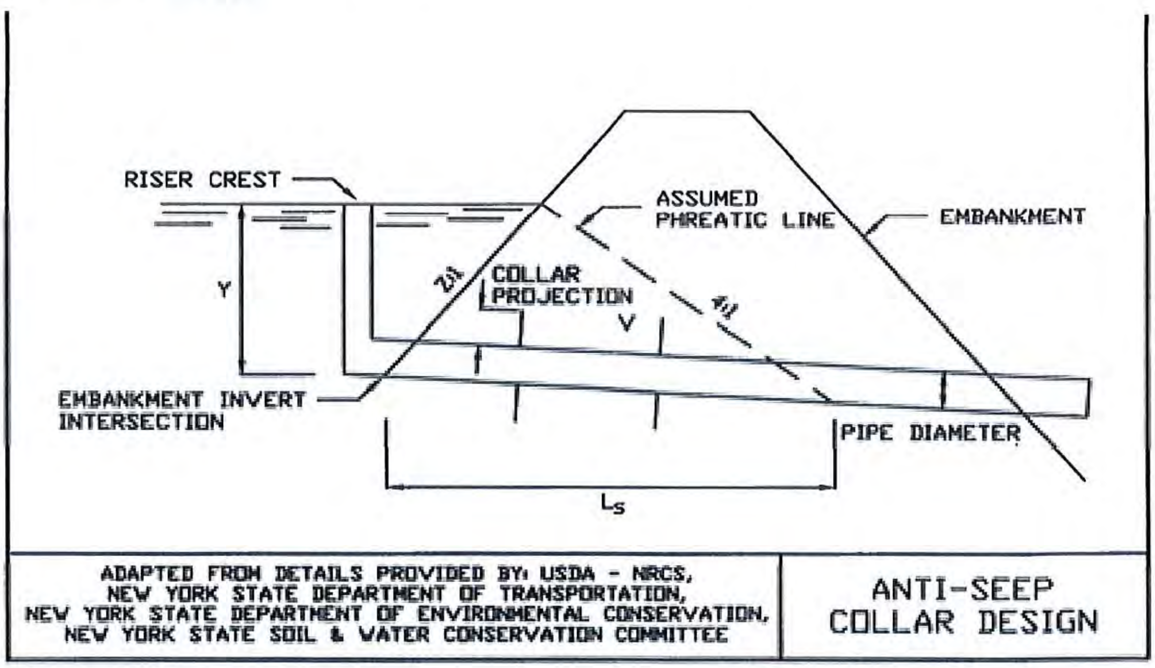
Where: L_s = length of pipe in the saturated zone (ft.)

y = distance in feet from upstream invert of pipe to highest normal water level expected to occur during the life of the structure, usually the top of the riser.

z = slope of upstream embankment as a ratio of z ft. horizontal to one ft. vertical.

pipe slope = slope of pipe in feet per foot.

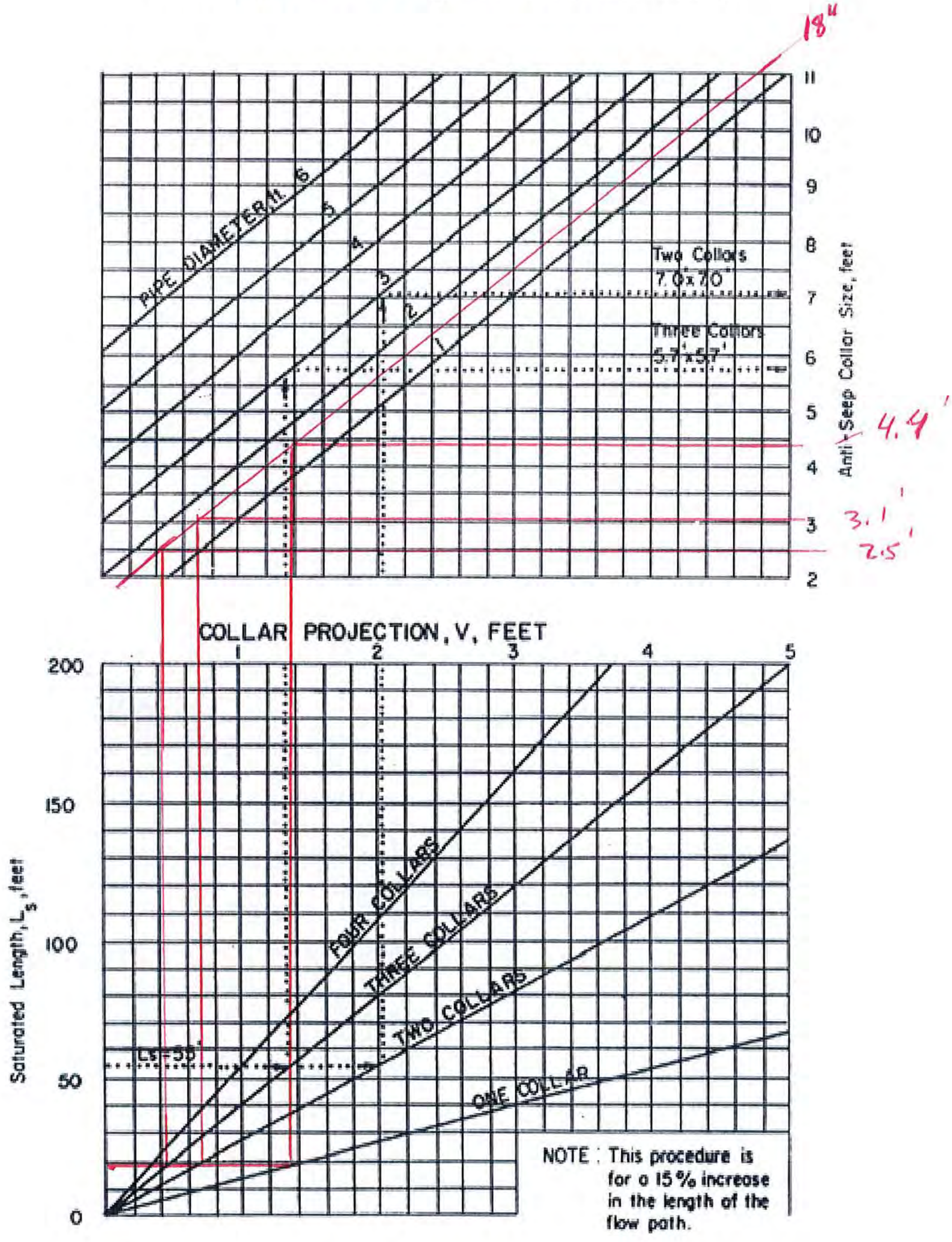
This procedure is based on the approximation of the phreatic line as shown in the drawing below:



SOUTH WEST BASIN

WET POND 1

Figure 5.17
Anti-Seep Collar Design Charts (USDA - NRCS)



EAST BASIN
WET POND 2

Figure 5.16
Anti-Seep Collar Design

This procedure provides the anti-seep collar dimensions for only temporary sediment basins to increase the seepage length by 15% for various pipe slopes, embankment slopes and riser heights.

The first step in designing anti-seep collars is to determine the length of pipe within the saturated zone of the embankment. This can be done graphically or by the following equation, assuming that the upstream slope of the embankment intersects the invert of the pipe at its upstream end. (See embankment-invert intersection on the drawing below:

$$L_S = \overset{3}{y}\,(\overset{4}{z} + 4)\left[1 + \frac{\overset{0.005}{\text{pipe slope}}}{0.25 - \underset{0.005}{\text{pipe slope}}}\right] = 24.5\ \text{ft}$$

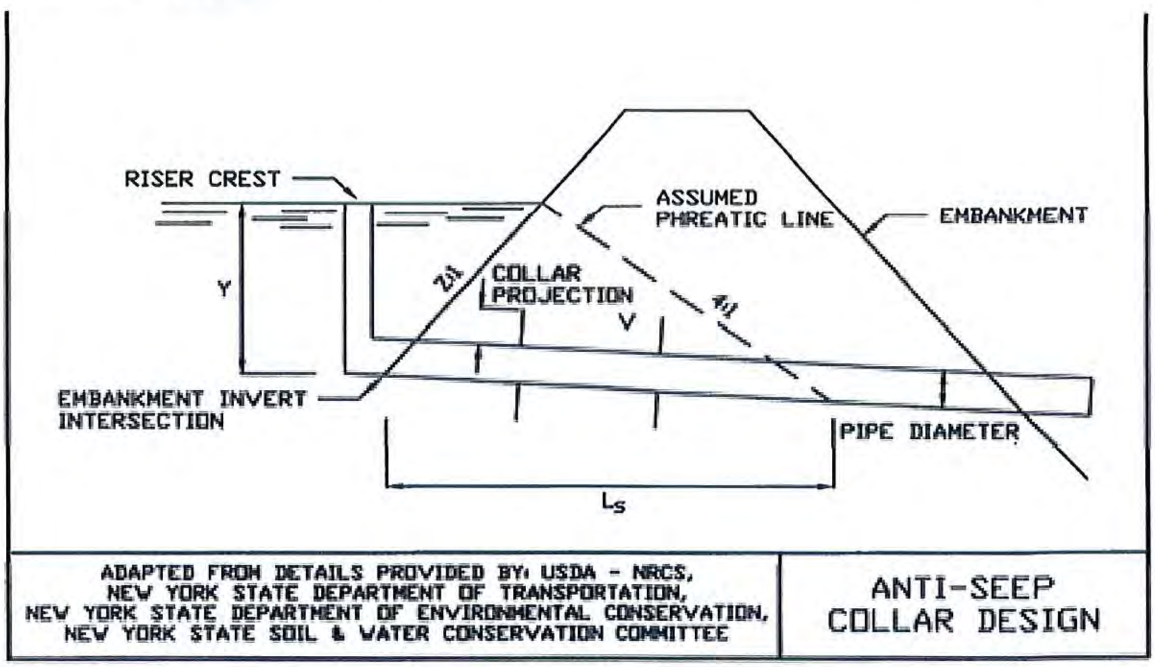
Where: L_S = length of pipe in the saturated zone (ft.)

y = distance in feet from upstream invert of pipe to highest normal water level expected to occur during the life of the structure, usually the top of the riser.

z = slope of upstream embankment as a ratio of z ft. horizontal to one ft. vertical.

pipe slope = slope of pipe in feet per foot.

This procedure is based on the approximation of the phreatic line as shown in the drawing below:



EAST BASIN
WET POND 2

Figure 5.17
Anti-Seep Collar Design Charts (USDA - NRCS)

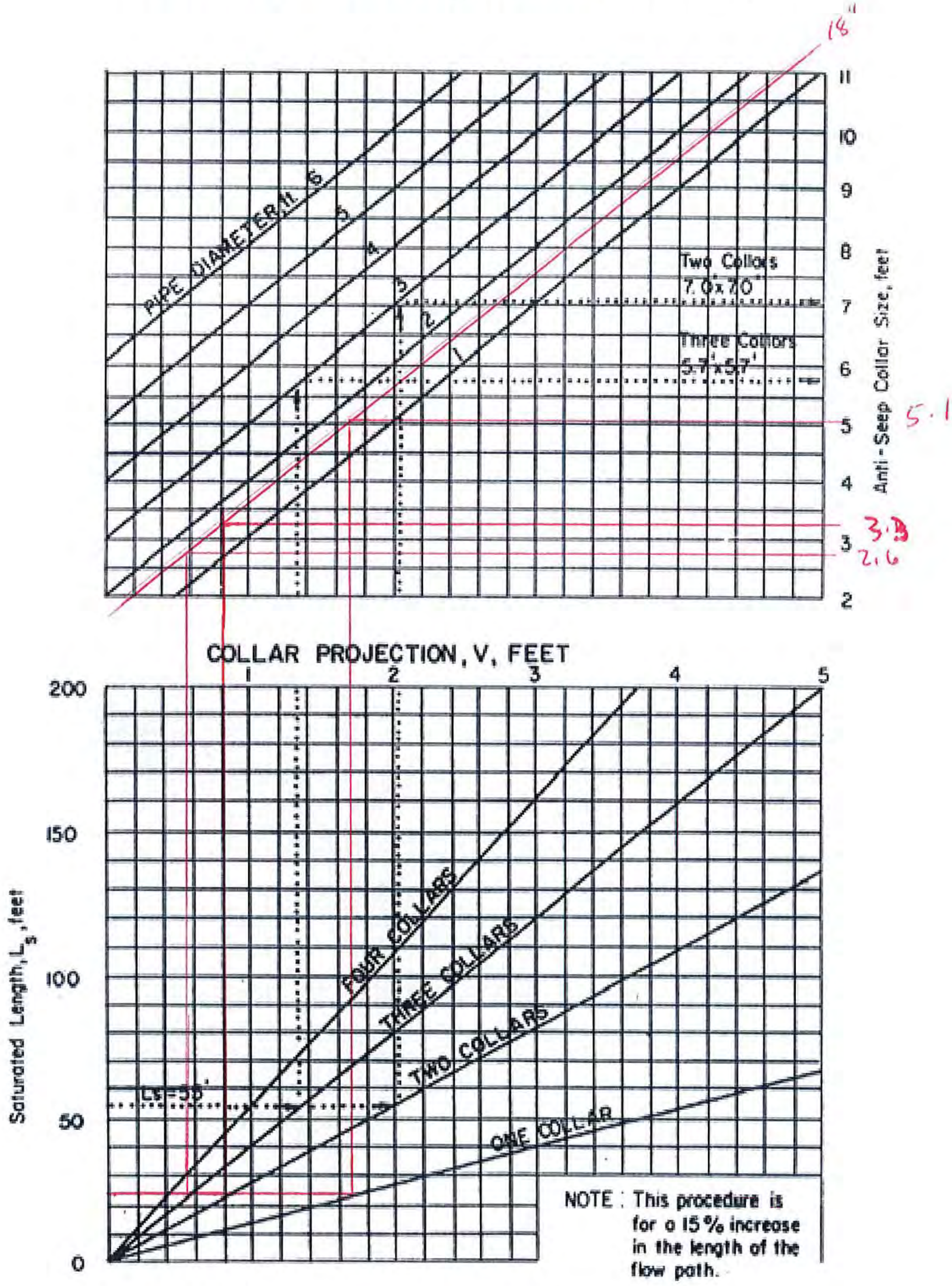
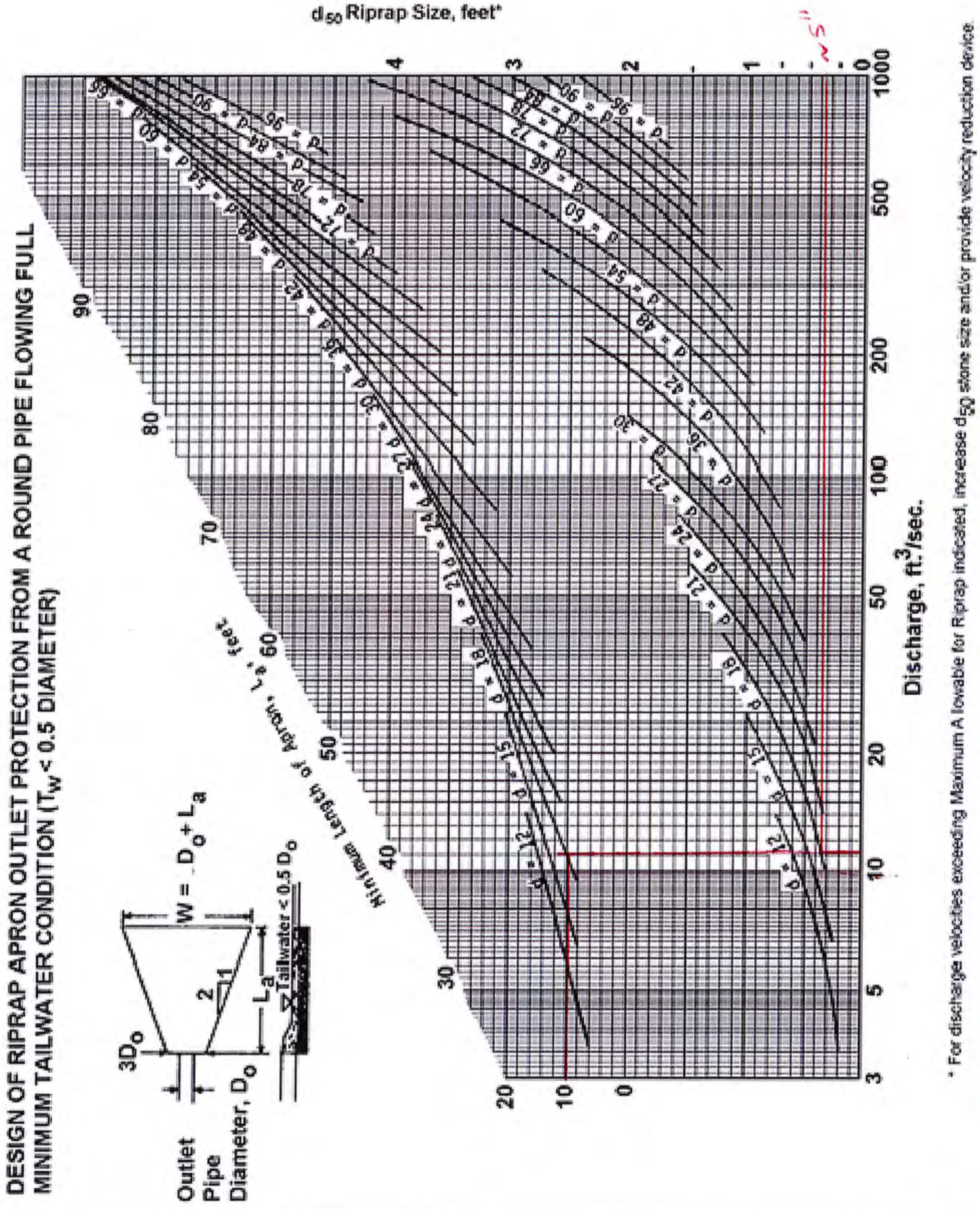


Figure 3.16
Outlet Protection Design—Minimum Tailwater Condition Chart
(Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)



100 YR STORM DISCHARGE
WET POND 1 – 11.02 cfs
WET POND 2 – 9.67 cfs
WET POND 1 CONTROLS

D_o = 18"
$3D_o$ = 4.5'
L_a = 10'
W = 10+4.5 = 14.5' – 15'
t = 11.25"

Attachment 5

EnSol, Inc.

ENGINEERING + ENVIRONMENTAL

NYS Erosion and Sediment Control

STANDARD AND SPECIFICATIONS FOR CHECK DAM

Definition & Scope

Small barriers or dams constructed of stone, bagged sand or gravel, or other durable materials across a drainageway to reduce erosion in a drainage channel by reducing the velocity of flow in the channel.

Conditions Where Practice Applies

This practice is used as a **temporary** and, in some cases, a **permanent** measure to limit erosion by reducing velocities in open channels that are degrading or subject to erosion or where permanent stabilization is impractical due to short period of usefulness and time constraints of construction.

Design Criteria

Drainage Area: Maximum drainage area above the check dam shall not exceed two (2) acres.

Height: Not greater than 2 feet. Center shall be maintained 9 inches lower than abutments at natural ground elevation.

Side Slopes: Shall be 2:1 or flatter.

Spacing: The check dams shall be spaced as necessary in the channel so that the crest of the downstream dam is at the elevation of the toe of the upstream dam. This spacing is equal to the height of the check dam divided by the channel slope.

Therefore:

$$S = \frac{h}{s}$$

Where: S = spacing interval (ft.)
h = height of check dam (ft.)
s = channel slope (ft./ft.)

Example:

For a channel with a 4% slope and 2 ft. high stone check dams, they are spaced as follows:

$$S = \frac{2\ \text{ft}}{0.04\ \frac{\text{ft}}{\text{ft}}} = 50\ \text{ft}$$

For stone check dams: Use a well graded stone matrix 2 to 9 inches in size (NYS – DOT Light Stone Fill meets these requirements).

The overflow of the check dams will be stabilized to resist erosion that might be caused by the check dam. See Figure 3.1 on page 3.3 for details.

Check dams should be anchored in the channel by a cutoff trench 1.5 ft. wide and 0.5 ft. deep and lined with filter fabric to prevent soil migration.

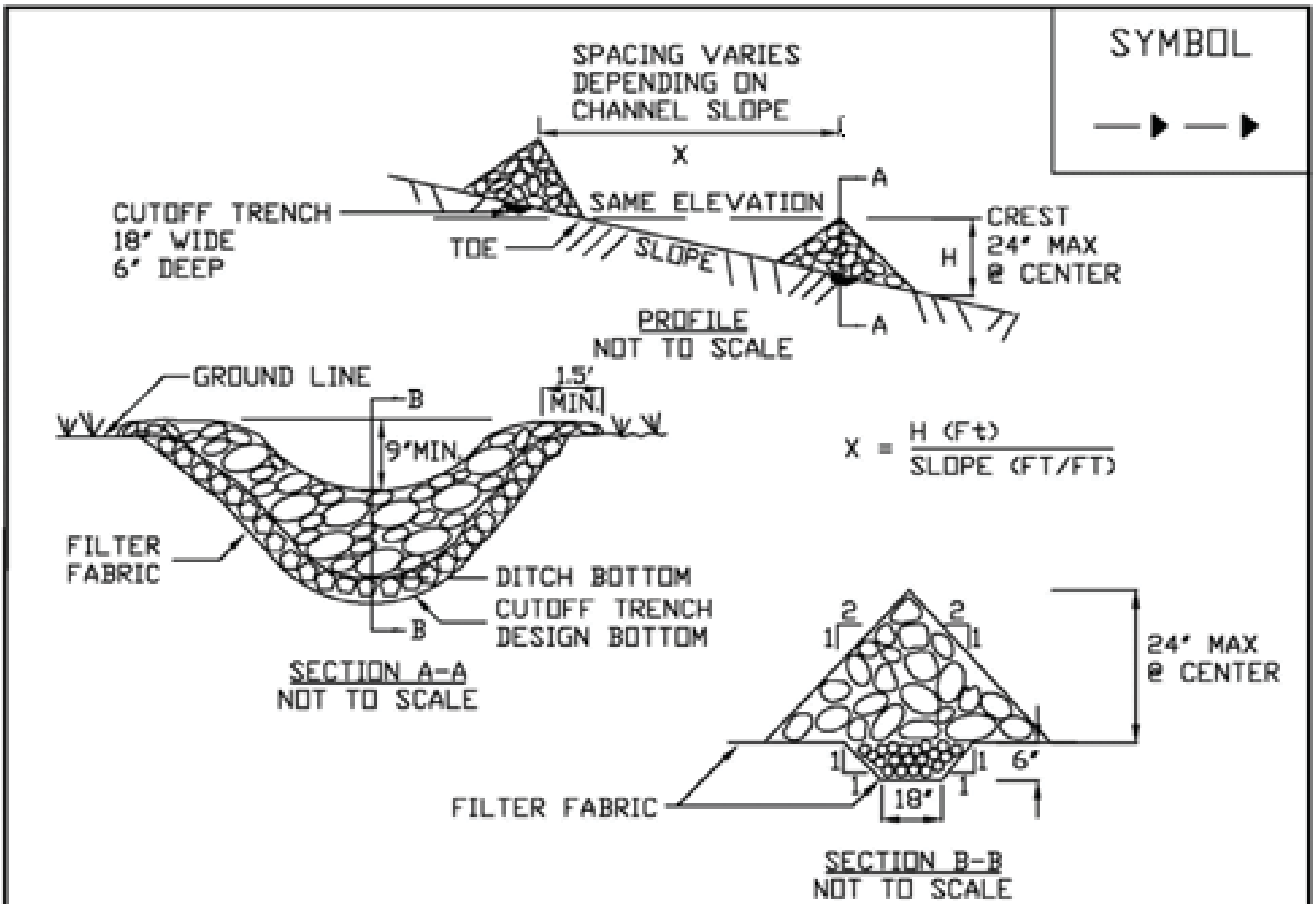
For filter sock or fiber roll check dams: The check dams will be anchored by staking the dam to the earth contact surface. The dam will extend to the top of the bank. The check dam will have a splash apron of NYS DOT #2 crushed stone extending a minimum 3 feet downstream from the dam and 1 foot up the sides of the channel. The compost and materials for a filter sock check dam shall meet the requirements shown in the standard for Compost Filter Sock on page 5.7.

Maintenance

The check dams should be inspected after each runoff event. Correct all damage immediately. If significant erosion has occurred between structures, a liner of stone or other suitable material should be installed in that portion of the channel or additional check dams added.

Remove sediment accumulated behind the dam as needed to allow channel to drain through the stone check dam and prevent large flows from carrying sediment over the dam.

Figure 3.1
Stone Check Dam Detail



CONSTRUCTION SPECIFICATIONS

1. STONE WILL BE PLACED ON A FILTER FABRIC FOUNDATION TO THE LINES, GRADES AND LOCATIONS SHOWN IN THE PLAN.
2. SET SPACING OF CHECK DAMS TO ASSUME THAT THE ELEVATIONS OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION OF THE TOE OF THE UPSTREAM DAM.
3. EXTEND THE STONE A MINIMUM OF 1.5 FEET BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.
4. PROTECT THE CHANNEL DOWNSTREAM OF THE LOWEST CHECK DAM FROM SCOUR AND EROSION WITH STONE OR LINER AS APPROPRIATE.
5. ENSURE THAT CHANNEL APPURTENANCES SUCH AS CULVERT ENTRANCES BELOW CHECK DAMS ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED STONE.

MAXIMUM DRAINAGE AREA 2 ACRES.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STONE CHECK DAM

STANDARD AND SPECIFICATIONS FOR DIVERSION

Definition & Scope

A drainage way of parabolic or trapezoidal cross-section with a supporting ridge on the lower side that is constructed across the slope to intercept and convey runoff to stable outlets at non-erosive velocities.

Conditions Where Practice Applies

Diversions are used where:

1. Runoff from higher areas has potential for damaging properties, causing erosion, or interfering with, or preventing the establishment of, vegetation on lower areas.

2. Surface and/or shallow subsurface flow is damaging sloping upland.

3. The length of slopes needs to be reduced so that soil loss will be kept to a minimum.

Diversions are only applicable below stabilized or protected areas. Avoid establishment on slopes greater than fifteen percent. Diversions should be used with caution on soils subject to slippage. Construction of diversions shall be in compliance with state and local drainage and water laws.

Design Criteria

Location

Diversion location shall be determined by considering outlet conditions, topography, land use, soil type, length of slope, seep planes (when seepage is a problem), and the development layout.

Capacity

Peak rates of runoff values used in determining the capacity requirements shall be calculated using the most current hydrologic data from the Northeast Regional Climate Center in an appropriate model.

The constructed diversion shall have capacity to carry, as a minimum, the peak discharge from a 10 year frequency rainfall event with freeboard of not less than 0.3 feet.

Diversions designed to protect homes, schools, industrial buildings, roads, parking lots, and comparable high-risk areas, and those designed to function in connection with other structures, shall have sufficient capacity to carry peak runoff expected from a storm frequency consistent with the hazard involved.

Cross Section

The diversion channel shall be parabolic or trapezoidal in shape. Parabolic Diversion design charts are provided in Tables 3.2, 3.3 and 3.4 on pages 3.10, 3.12 and 3.13**.** The diversion shall be designed to have stable side slopes. The side slopes shall not be steeper than 2:1 and shall be flat enough to ensure ease of maintenance of the diversion and its protective vegetative cover.

The ridge shall have a minimum width of four feet at the design water elevation; a minimum of 0.3 feet freeboard and a reasonable settlement factor shall be provided.

Velocity and Grade

The permissible velocity for the specified method of stabilization will determine the maximum grade. Maximum permissible velocities of flow for the stated conditions of stabilization shall be as shown in Table 3.1 on page 3.10 of this standard.

Diversions are not usually applicable below high sediment producing areas unless land treatment practices or structural measures, designed to prevent damaging accumulations of sediment in the channels, are installed with, or before, the diversions.

Outlets

Each diversion must have an adequate outlet. The outlet may be a grassed waterway, vegetated or paved area, grade stabilization structure, flow spreader, flow diffuser, stable watercourse, or subsurface drain outlet. In all cases, the outlet must convey runoff to a point where outflow will not cause damage. Vegetated outlets shall be installed before diversion construction, if needed, to ensure establishment of vegetative cover in the outlet channel.

The design elevation of the water surface in the diversion shall not be lower than the design elevation of the water surface in the outlet at their junction when both are operating at design flow.

Stabilization

Vegetated diversions shall be stabilized in accordance with the following tables.

Table 3.1
Diversion Maximum Permissible Design Velocities Table

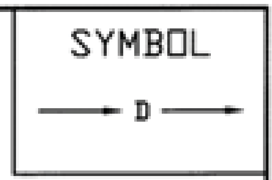
Soil Texture	Retardance and Cover	Permissible Velocity (ft / second) for Selected Channel Vegetation
Sand, Silt, Sandy loam, silty loam, loamy sand (ML, SM, SP, SW)	C-Kentucky 31 tall fescue and Kentucky bluegrass	3.0
	D-Annuals[1] Small grain (rye, oats, barley, millet) Ryegrass	2.5
Silty clay loam, Sandy clay loam (ML-CL, SC)	C-Kentucky 31 tall fescue and Kentucky bluegrass	4.0
	D-Annuals[1] Small grain (rye, oats, barley, millet) Ryegrass	3.5
Clay (CL)	C-Kentucky 31 tall fescue and Kentucky bluegrass	5.0
	D-Annuals[1] Small grain (rye, oats, barley, millet) Ryegrass	4.0

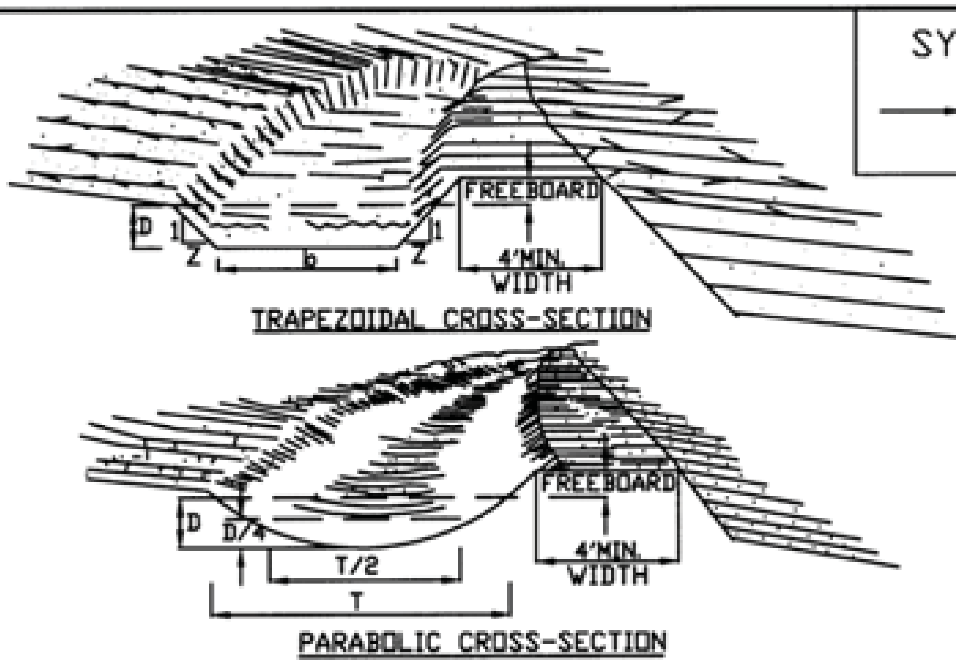
[1] Annuals—Use only as temporary protection until permanent vegetation is established.

Table 3.2 - Retardance Factors for Various Grasses and Legumes Table

Retardance	Cover	Condition
A	Reed canarygrass	Excellent stand, tall (average 36 inches)
B	Smooth bromegrass	Good stand, mowed (average 12 to 15 inches)
	Tall fescue	Good stand, unmowed (average 18 inches)
	Grass-legume mixture—Timothy, smooth bromegrass, or Orchard grass with birdsfoot trefoil	Good stand, uncut (average 20 inches)
	Reed canarygrass	Good stand, mowed (average 12 to 15 inches)
	Tall fescue, with birdsfoot trefoil or ladino clover	Good stand, uncut (average 18 inches)
C	Redtop	Good stand, headed (15 to 20 inches)
	Grass-legume mixture—summer (Orchard grass, redtop, Annual ryegrass, and ladino or white clover)	Good stand, uncut (6 to 8 inches)
	Kentucky bluegrass	Good stand, headed (6 to 12 inches)
D	Red fescue	Good stand, headed (12 to 18 inches)
	Grass-legume mixture—fall, spring (Orchard grass, redtop, Annual ryegrass, and white or ladino clover)	Good stand, uncut (4 to 5 inches)

Figure 3.4
Diversion Detail





CONSTRUCTION SPECIFICATIONS

1. ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF SO AS NOT TO INTERFERE WITH THE PROPER FUNCTIONING OF THE DIVERSION.
2. THE DIVERSION SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED HEREIN, AND BE FREE OF BANK PROJECTIONS OR OTHER IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
3. FILLS SHALL BE COMPACTED AS NEEDED TO PREVENT UNEQUAL SETTLEMENT THAT WOULD CAUSE DAMAGE IN THE COMPLETE DIVERSION.
4. ALL EARTH REMOVED AND NOT NEEDED IN CONSTRUCTION SHALL BE SPREAD OR DISPOSED OF SO THAT IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE DIVERSION.
5. STABILIZATION SHALL BE DONE ACCORDING TO THE APPROPRIATE STANDARD AND SPECIFICATIONS FOR VEGETATIVE PRACTICES.
   A. FOR DESIGN VELOCITIES OF LESS THAN 3.5 FT. PER. SEC., SEEDING AND MULCHING MAY BE USED FOR THE ESTABLISHMENT OF THE VEGETATION. IT IS RECOMMENDED THAT, WHEN CONDITIONS PERMIT, TEMPORARY DIVERSIONS OR OTHER MEANS SHOULD BE USED TO PREVENT WATER FROM ENTERING THE DIVERSION DURING THE ESTABLISHMENT OF THE VEGETATION.
   B. FOR DESIGN VELOCITIES OF MORE THAN 3.5 FT. PER. SEC., THE DIVERSION SHALL BE STABILIZED WITH SOD, WITH SEEDING PROTECTED BY JUTE OR EXCELSIOR MATTING OR WITH SEEDING AND MULCHING INCLUDING TEMPORARY DIVERSION OF THE WATER UNTIL THE VEGETATION IS ESTABLISHED.

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

Table 3.3
Parabolic Diversion Design, Without Freeboard Tables - 1 (USDA– NRCS)

PARABOLIC DIVERSION DESIGN, WITHOUT FREEBOARD

RETARDANCE - D & C
GRADE, % - 0.50

V_1 Based on Permissible Velocity of the Soil With Retardance "D"
Top Width, Depth & V_2 Based on Retardance "C"

Q	V_1 = 2.0			V_1 = 2.5			V_1 = 3.0			V_1 = 3.5			V_1 = 4.0			V_1 = 4.5			V_1 = 5.0			V_1 = 5.5			V_1 = 6.0		
cfs	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2
15	9	1.6	1.6																								
20	11	1.6	1.7																								
25	14	1.6	1.7	9	1.9	2.1																					
30	17	1.6	1.7	11	1.9	2.2	8	2.2	2.5																		
35	20	1.6	1.7	12	1.9	2.3	9	2.1	2.6																		
40	22	1.6	1.7	14	1.8	2.3	11	2.1	2.7																		
45	25	1.5	1.7	16	1.8	2.3	12	2.0	2.8																		
50	28	1.5	1.7	18	1.8	2.4	13	2.0	2.8	10	2.4	3.2															
55	31	1.5	1.7	19	1.8	2.4	15	2.0	2.8	11	2.4	3.3															
60	33	1.5	1.7	21	1.8	2.4	16	2.0	2.8	11	2.4	3.3															
65	36	1.5	1.8	23	1.8	2.4	17	2.0	2.9	12	2.4	3.3															
70	39	1.5	1.7	24	1.8	2.4	18	2.0	2.9	13	2.3	3.4															
75	42	1.5	1.8	26	1.8	2.4	19	2.0	2.9	14	2.3	3.4	11	2.7	3.7												
80	44	1.5	1.8	28	1.8	2.4	21	2.0	2.9	15	2.3	3.4	12	2.7	3.8												
90	50	1.5	1.8	31	1.8	2.4	24	2.0	2.9	17	2.3	3.4	13	2.7	3.8												
100	55	1.5	1.8	35	1.8	2.4	26	2.0	2.9	19	2.3	3.5	15	2.6	3.9	12	3.0	4.1									

PARABOLIC DIVERSION DESIGN, WITHOUT FREEBOARD

RETARDANCE - D & C
GRADE, % - 1.0

V_1 based on Permissible Velocity of the Soil With Retardance "D"
Top Width, Depth & V_2 Based on Retardance "C"

Q	V_1 = 2.0			V_1 = 2.5			V_1 = 3.0			V_1 = 3.5			V_1 = 4.0			V_1 = 4.5			V_1 = 5.0			V_1 = 5.5			V_1 = 6.0		
cfs	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2
15	13	1.1	1.5	8	1.3	2.0																					
20	18	1.1	1.5	11	1.3	2.1	8	1.5	2.6																		
25	22	1.1	1.5	14	1.3	2.1	9	1.5	2.6	8	1.6	3.0															
30	27	1.1	1.5	17	1.3	2.1	11	1.5	2.7	9	1.6	3.0															
35	31	1.1	1.5	19	1.3	2.2	13	1.5	2.8	11	1.6	3.1	8	1.8	3.6												
40	35	1.1	1.5	22	1.3	2.1	15	1.4	2.8	12	1.5	3.1	9	1.8	3.7												
45	40	1.1	1.5	25	1.3	2.2	17	1.5	2.8	13	1.6	3.2	10	1.8	3.7												
50	44	1.1	1.5	28	1.3	2.2	19	1.4	2.8	15	1.6	3.2	11	1.8	3.7	9	2.0	4.2									
55	46	1.1	1.5	30	1.3	2.2	20	1.4	2.8	16	1.5	3.3	12	1.8	3.8	10	2.0	4.3									
60	53	1.1	1.5	33	1.3	2.2	22	1.4	2.8	18	1.5	3.3	14	1.7	3.8	10	2.0	4.3									
65	57	1.1	1.5	36	1.3	2.2	24	1.4	2.8	19	1.5	3.3	15	1.7	3.8	11	2.0	4.3	9	2.2	4.7						
70	61	1.1	1.5	38	1.3	2.2	26	1.4	2.8	21	1.5	3.3	16	1.7	3.9	12	2.0	4.4	10	2.2	4.7						
75	66	1.1	1.5	41	1.3	2.2	28	1.4	2.9	22	1.5	3.3	17	1.7	3.9	13	2.0	4.5	11	2.2	4.7						
80	70	1.1	1.5	44	1.3	2.2	29	1.4	2.9	24	1.5	3.3	18	1.7	3.9	14	2.0	4.4	11	2.2	4.9						
90	79	1.1	1.5	49	1.3	2.2	33	1.4	2.9	27	1.5	3.3	20	1.7	3.9	15	1.9	4.5	13	2.2	4.9	11	2.4	5.2			
100	87	1.1	1.5	55	1.3	2.2	37	1.4	2.9	29	1.5	3.3	22	1.7	3.9	17	1.9	4.5	14	2.2	4.9	12	2.4	5.3			

Table 3.4
Parabolic Diversion Design, Without Freeboard Tables - 2 (USDA– NRCS)

PARABOLIC DIVERSION DESIGN, WITHOUT FREEBOARD

RETARDANCE - D & C
GRADE, % - 1.5

V_1 Based on Permissible Velocity of the Soil With Retardance "D"
Top Width, Depth & V_2 Based on Retardance "C"

Q	V_1 = 2.0			V_1 = 2.5			V_1 = 3.0			V_1 = 3.5			V_1 = 4.0			V_1 = 4.5			V_1 = 5.0			V_1 = 5.5			V_1 = 6.0		
cfs	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2
15	17	0.9	1.4	11	1.1	1.9	8	1.2	2.4																		
20	23	0.9	1.4	15	1.0	1.9	10	1.2	2.5	7	1.4	3.0	5	1.5	3.4												
25	28	0.9	1.4	19	1.0	1.9	12	1.2	2.6	8	1.4	3.2	7	1.5	3.6												
30	34	0.9	1.4	22	1.0	1.9	15	1.2	2.6	10	1.3	3.2	8	1.5	3.6	7	1.6	4.0									
35	40	0.9	1.4	26	1.0	2.0	17	1.1	2.6	12	1.3	3.3	10	1.4	3.7	8	1.6	4.1									
40	45	0.9	1.4	30	1.0	1.9	20	1.2	2.6	14	1.3	3.3	11	1.4	3.7	9	1.6	4.2	7	1.8	4.6						
45	51	0.9	1.4	33	1.0	2.0	22	1.1	2.6	15	1.3	3.4	12	1.4	3.8	10	1.5	4.3	8	1.8	4.6						
50	56	0.9	1.4	37	1.0	2.0	25	1.1	2.7	17	1.3	3.4	14	1.4	3.9	11	1.5	4.3	9	1.8	4.8						
55	62	0.9	1.5	41	1.0	2.0	27	1.1	2.6	19	1.3	3.4	15	1.4	3.9	12	1.5	4.3	10	1.7	4.9	8	1.9	5.1			
60	67	0.9	1.5	44	1.0	2.0	30	1.1	2.7	20	1.3	3.4	16	1.4	3.9	14	1.5	4.4	11	1.7	4.9	9	1.9	5.2			
65	73	0.9	1.5	48	1.0	2.0	32	1.1	2.7	22	1.3	3.4	18	1.4	3.9	15	1.5	4.4	11	1.7	5.0	10	1.9	5.3			
70	78	0.9	1.5	51	1.0	2.0	34	1.1	2.7	24	1.3	3.4	19	1.4	3.9	16	1.5	4.4	12	1.7	4.9	10	1.9	5.4	9	2.1	5.6
75	83	0.9	1.5	55	1.0	2.0	37	1.1	2.7	25	1.3	3.4	21	1.4	3.9	17	1.5	4.4	13	1.7	5.0	11	1.9	5.4	9	2.1	5.6
80	89	0.9	1.5	59	1.0	2.0	39	1.1	2.7	27	1.3	3.4	22	1.4	3.9	18	1.5	4.4	14	1.7	5.0	12	1.9	5.5	10	2.1	5.8
90	100	0.9	1.5	66	1.0	2.0	44	1.1	2.7	30	1.3	3.5	25	1.4	3.9	20	1.5	4.4	15	1.7	5.0	13	1.9	5.4	11	2.0	5.9
100				73	1.0	2.0	49	1.1	2.7	33	1.3	3.5	27	1.4	3.9	22	1.5	4.5	17	1.7	5.1	15	1.9	5.5	12	2.0	6.0

PARABOLIC DIVERSION DESIGN, WITHOUT FREEBOARD

RETARDANCE - D & C
GRADE, % - 2.0

V_1 Based on Permissible Velocity of the Soil With Retardance "D"
Top Width, Depth & V_2 Based on Retardance "C"

Q	V_1 = 2.0			V_1 = 2.5			V_1 = 3.0			V_1 = 3.5			V_1 = 4.0			V_1 = 4.5			V_1 = 5.0			V_1 = 5.5			V_1 = 6.0		
cfs	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2
15	21	0.8	1.3	13	0.9	1.9	9	1.0	2.4	7	1.2	2.9															
20	28	0.8	1.3	17	0.9	1.9	12	1.0	2.4	9	1.1	3.0	7	1.3	3.5	5	1.4	3.8									
25	35	0.8	1.3	21	0.9	1.9	15	1.0	2.4	11	1.1	3.0	8	1.3	3.7	7	1.4	4.0									
30	41	0.8	1.3	26	0.9	1.9	18	1.0	2.5	13	1.1	3.0	10	1.2	3.7	8	1.3	4.2	7	1.5	4.5						
35	48	0.8	1.4	30	0.9	1.9	22	1.0	2.4	15	1.1	3.1	11	1.2	3.8	9	1.3	4.2	8	1.5	4.7						
40	55	0.8	1.3	34	0.9	1.9	25	1.0	2.5	18	1.1	3.1	13	1.2	3.8	11	1.3	4.3	9	1.5	4.7	7	1.7	5.0			
45	62	0.8	1.4	38	0.9	1.9	28	1.0	2.5	20	1.1	3.1	14	1.2	3.8	12	1.3	4.3	10	1.4	4.8	8	1.6	5.2			
50	68	0.8	1.4	42	0.9	1.9	31	1.0	2.5	22	1.1	3.1	16	1.2	3.9	13	1.3	4.3	11	1.4	4.8	9	1.6	5.3	8	1.7	5.6
55	75	0.8	1.4	46	0.9	1.9	34	1.0	2.5	24	1.1	3.1	17	1.2	3.8	14	1.3	4.3	12	1.4	4.9	10	1.6	5.3	8	1.7	5.8
60	82	0.8	1.4	51	0.9	1.9	37	1.0	2.5	26	1.1	3.1	19	1.2	3.9	16	1.3	4.4	13	1.4	4.8	11	1.6	5.3	9	1.7	5.7
65	88	0.8	1.4	55	0.9	1.9	40	1.0	2.5	28	1.1	3.1	21	1.2	3.9	17	1.3	4.4	14	1.4	4.9	11	1.6	5.4	10	1.7	5.7
70	95	0.8	1.4	59	0.9	1.9	43	1.0	2.5	30	1.1	3.1	22	1.2	3.9	18	1.3	4.4	15	1.4	4.9	12	1.6	5.4	10	1.7	5.8
75				63	0.9	1.9	46	1.0	2.5	32	1.1	3.2	24	1.2	3.9	20	1.3	4.4	16	1.4	5.0	13	1.6	5.5	11	1.7	5.9
80				67	0.9	2.0	48	1.0	2.5	35	1.1	3.1	25	1.2	3.9	21	1.3	4.4	17	1.4	4.9	14	1.6	5.4	12	1.7	6.0
90				75	0.9	2.0	54	1.0	2.5	39	1.1	3.2	28	1.2	3.9	23	1.3	4.4	19	1.4	4.9	16	1.6	5.5	13	1.7	5.9
100				83	0.9	2.0	60	1.0	2.5	43	1.1	3.2	31	1.2	3.9	26	1.3	4.4	21	1.4	5.0	17	1.6	5.5	15	1.7	6.0

STANDARD AND SPECIFICATIONS FOR GRADE STABILIZATION STRUCTURE

Definition & Scope

A **permanent** structure to stabilize the grade or to control head cutting in artificial channels by reduction of velocities and grade in the watercourse or by providing channel linings or structures that can withstand the higher velocities.

Conditions Where Practice Applies

This practice applies to sites where the capability of earth and vegetative measures is exceeded in the safe handling of water at permissible velocities, where excessive grades or overfall conditions are encountered, or where water is to be lowered structurally from one elevation to another. These structures should generally be planned and installed along with, or as a part of, other practices in an overall surface water management system.

Design Criteria

Compliance with Laws and Regulations

Design and construction shall be in compliance with state and local laws and regulations. Such compliance is the responsibility of the landowner or developer.

General

Designs and specifications shall be prepared for each structure on an individual job basis depending on its purpose, site conditions, and the basic criteria of the conservation practice with which the structure is planned. Typical structures are as follows:

1. Channel linings of concrete, asphalt, half round metal pipe or other suitable lining materials. These linings should generally be used where channel velocities exceed safe velocities for vegetated channels due to increased grade or a change in channel cross section or where durability of vegetative lining is adversely affected by seasonal changes. Adequate protection will be provided to prevent erosion or scour of both ends of the channel lining.
2. Overfall structures of concrete, metal, rock riprap, or other suitable material is used to lower water from one elevation to another. These structures are applicable where it is desirable to drop the watercourse elevation over a very short horizontal distance. Adequate protection will be provided to prevent erosion or scour upstream, downstream and along sides of overfall structures. Structures should be located on straight sections of channel with a minimum of 100 feet of straight channel each way.
3. Pipe drops of metal pipe with suitable inlet and outlet structures. The inlet structure may consist of a vertical section of pipe or similar material, an embankment, or a combination of both. The outlet structure will provide adequate protection against erosion or scour at the pipe outlet.

Capacity

Structures that are designed to operate in conjunction with other erosion control practices shall have, as a minimum, capacity equal to the bankfull capacity of the channel delivering water to the structures. The minimum design capacity for structures that are not designed to perform in conjunction with other practices shall be that required to handle the peak rate of flow from a 10-year, 24-hour frequency storm or bankfull, whichever is greater. Peak rates of runoff used in determining the capacity requirements shall be determined by appropriate methods.

Set the rest of the structure at an elevation that will stabilize the grade of the upstream channel. The outlet should be set at an elevation to assure stability. Outlet velocities should be kept within the allowable limits for the receiving stream. Structural drop spillways need to include a foundation drainage system to reduce hydrostatic loads.

Permanent structures which involve the retarding of floodwater or the impoundment of water shall be designed using the criteria set forth in the New York State DEC Guidelines for the Design of Dams.

Construction Specifications

Structures shall be installed according to lines and grades shown on the plan. The foundation for structures shall be cleared of all undesirable materials prior to the installation of the structure. Materials used in construction shall be in conformance with the design frequency and life expectancy of the practice. Earth fill, when used as a part of the structure, shall be placed in 4-inch lifts and hand compacted within 2 feet of the structure.

Seeding, fertilizing, and mulching shall conform to the applicable standards and specifications in Section 4.

Construction operations shall be carried out in such a manner that erosion and air and water pollution will be minimized. State and local laws concerning pollution abatement shall be complied with at every site.

Locate emergency bypass areas so that floods in excess of structural capacity enter the channel far enough downstream so as not to cause damage to the structure.

Maintenance

Once properly installed, the maintenance for the grade stabilization structure should be minimal. Inspect the structure periodically and after major storm events. Check fill for piping or extreme settlement. Ensure a good vegetative cover. Check the channel for scour or debris and loss of rock from aprons. Repair or replace failing structures immediately.

STANDARD AND SPECIFICATIONS FOR GRASSED WATERWAY

Definition & Scope

A natural or **permanent** man-made channel of parabolic or trapezoidal cross-section that is below adjacent ground level and is stabilized by suitable vegetation. The flow channel is normally wide and shallow and conveys the runoff down the slope without causing damage by erosion.

Conditions Where Practice Applies

Grass waterways are used where added vegetative protection is needed to control erosion resulting from concentrated runoff.

Design Criteria

Capacity

The minimum capacity shall be that required to confine the peak rate of runoff expected from a 10-year 24 hour frequency rainfall event or a higher frequency corresponding to the hazard involved. This requirement for confinement may be waived on slopes of less than one (1) percent where out-of-bank flow will not cause erosion or property damage.

Peak rates of runoff values used in determining the capacity requirements shall be computed by appropriate methods. Where there is base flow, it shall be handled by a stone center, subsurface drain, or other suitable means since sustained wetness usually prevents adequate vegetative cover. The cross-sectional area of the stone center or subsurface drain size to be provided shall be determined by using a flow rate of 0.1 cfs/acre or by actual measurement of the maximum base flow.

Velocity

Please see Table 3.1, Diversion Maximum Permissible Design Velocities on page 3.10, for seed, soil, and velocity variables.

Cross Section

The design water surface elevation of a grassed waterway receiving water from diversions or other tributary channels shall be equal to or less than the design water surface elevation in the diversion or other tributary channels.

The top width of parabolic waterways shall not exceed 30 feet and the bottom width of trapezoidal waterways shall not exceed 15 feet unless multiple or divided waterways, stone center, or other means are provided to control meandering of low flows.

Structural Measures

In cases where grade or erosion problems exist, special control measures may be needed such as lined waterways (see page 3.27), or grade stabilization measures (see page 3.21). Where needed, these measures will be supported by adequate design computations. For typical cross sections of waterways with riprap sections or stone centers, refer to Figure 3.8 on page 3.24.

The design procedures for parabolic and trapezoidal channels are available in the NRCS Engineering Field Handbook. Figure 3.9 on page 3.25 also provides a design chart for parabolic waterway.

Outlets

Each waterway shall have a stable outlet. The outlet may be another waterway, a stabilized open channel, grade stabilization structure, etc. In all cases, the outlet must discharge in such a manner as not to cause erosion. Outlets shall be constructed and stabilized prior to the operation of the waterway.

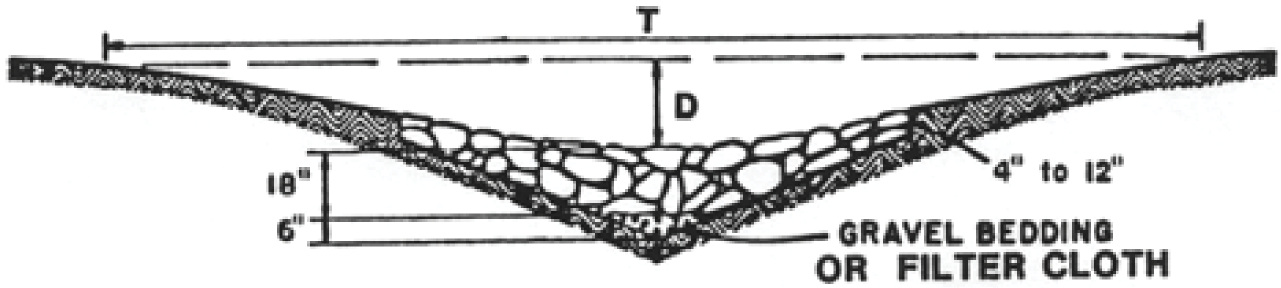
Stabilization

Waterways shall be stabilized in accordance with the appropriate vegetative stabilization standard and specifications, and will be dependent on such factors as slope, soil class, etc. See standard for Vegetating Waterways on Page 4.78.

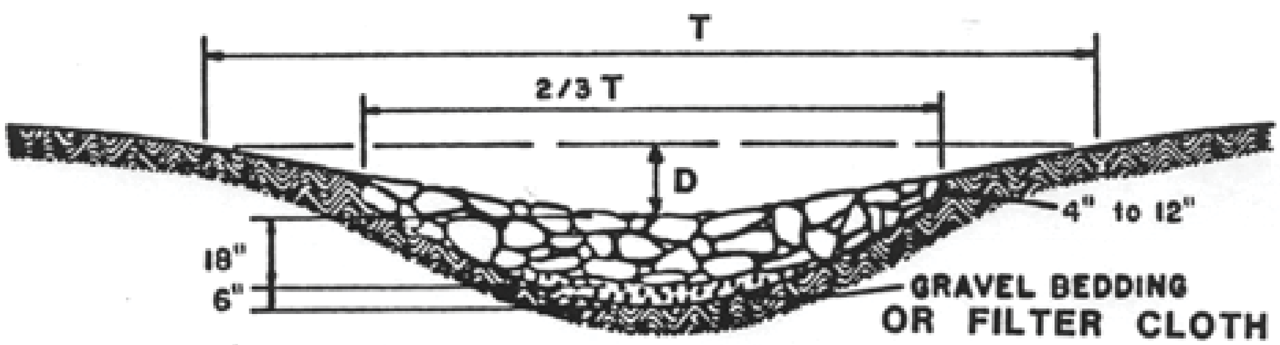
Construction Specifications

See Figure 3.10 on page 3.26 for details.

Figure 3.8
Typical Waterway Cross Sections Details



Waterway with stone center drain. "V" section shaped by motor grader.



Waterway with stone center drain. Rounded section shaped by bulldozer.

Figure 3.9
Parabolic Waterway Design Chart (USDA - NRCS)

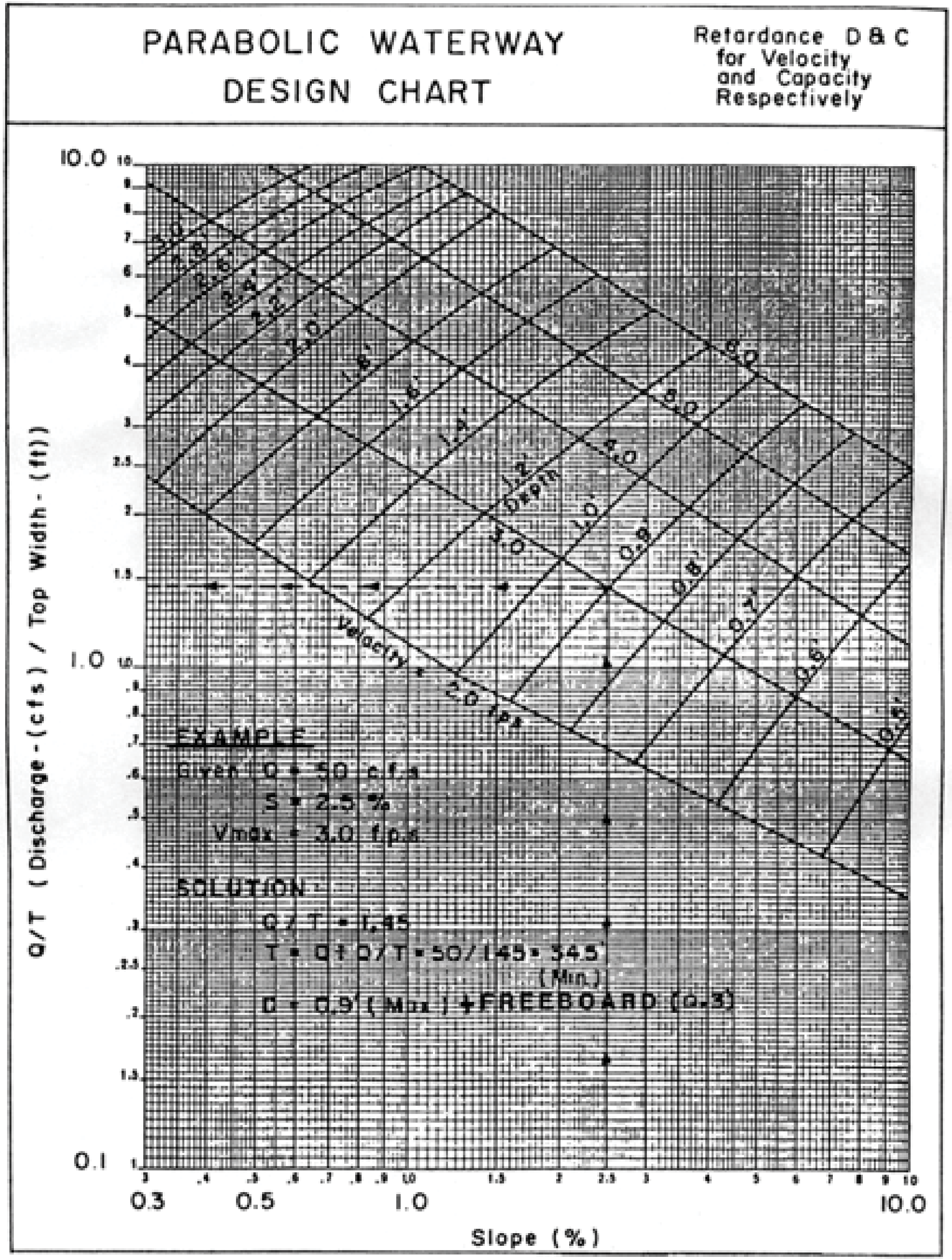
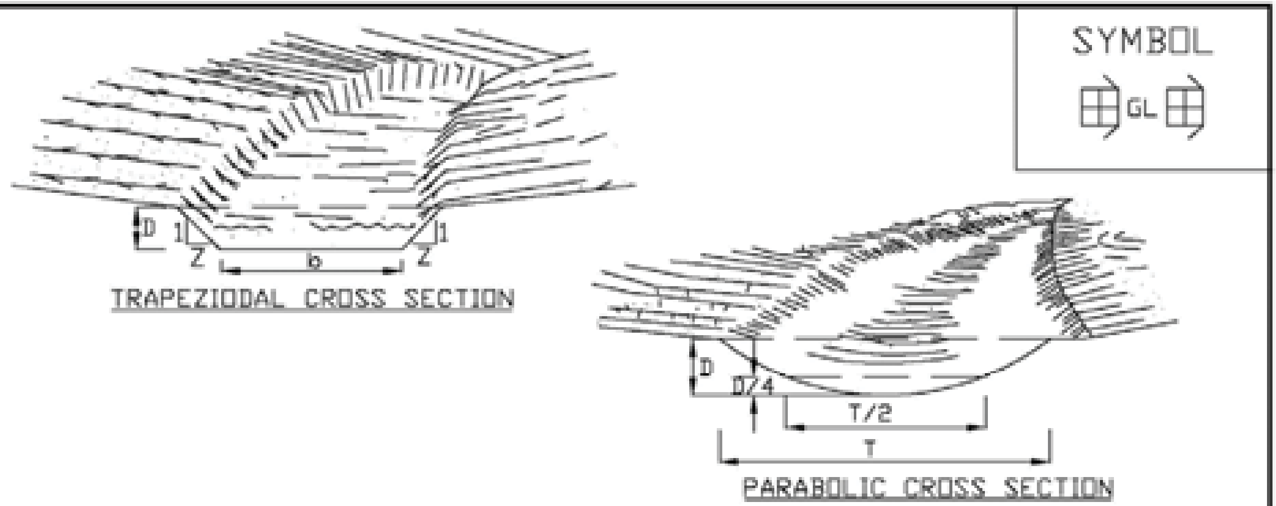


Figure 3.10
Grassed Waterway Detail



CONSTRUCTION SPECIFICATIONS

1. ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF SO AS NOT TO INTERFERE WITH THE PROPER FUNCTIONING OF THE WATERWAY.
2. THE WATERWAY SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED HEREIN, AND BE FREE OF BANK PROJECTIONS OR OTHER IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
3. FILLS SHALL BE COMPACTED AS NEEDED TO PREVENT UNEQUAL SETTLEMENT THAT WOULD CAUSE DAMAGE IN THE COMPLETE WATERWAY.
4. ALL EARTH REMOVED AND NOT NEEDED IN CONSTRUCTION SHALL BE SPREAD OR DISPOSED OF SO THAT IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE WATERWAY.
5. STABILIZATION SHALL BE DONE ACCORDING TO THE APPROPRIATE STANDARD AND SPECIFICATIONS FOR VEGETATIVE PRACTICES.
   A. FOR DESIGN VELOCITIES OF LESS THAN 3.5 FT. PER. SEC., SEEDING AND MULCHING MAY BE USED FOR THE ESTABLISHMENT OF THE VEGETATION. IT IS RECOMMENDED THAT, WHEN CONDITIONS PERMIT, TEMPORARY WATERWAYS OR OTHER MEANS SHOULD BE USED TO PREVENT WATER FROM ENTERING THE WATERWAY DURING THE ESTABLISHMENT OF THE VEGETATION.
   B. FOR DESIGN VELOCITIES OF MORE THAN 3.5 FT. PER. SEC., THE WATERWAY SHALL BE STABILIZED WITH SOD, WITH SEEDING PROTECTED BY JUTE OR EXCELSIOR MATTING OR WITH SEEDING AND MULCHING INCLUDING TEMPORARY DIVERSION OF THE WATER UNTIL THE VEGETATION IS ESTABLISHED.
   C. STRUCTURAL - VEGETATIVE PROTECTION
   SUBSURFACE DRAIN FOR BASE FLOW SHALL BE CONSTRUCTED AS SHOWN ON THE STANDARD DRAWING AND AS SPECIFIED IN THE STANDARD AND SPECIFICATIONS FOR SUBSURFACE DRAIN.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	GRASSED WATERWAY

STANDARD AND SPECIFICATIONS FOR SOIL RESTORATION

Definition & Scope

The decompaction of areas of a development site or construction project where soils have been disturbed to recover the original properties and porosity of the soil; thus providing a sustainable growth medium for vegetation, reduction of runoff and filtering of pollutants from stormwater runoff.

Conditions Where Practice Applies

Soil restoration is to be applied to areas whose heavy construction traffic is done and final stabilization is to begin. This is generally applied in the cleanup, site restoration, and landscaping phase of construction followed by the permanent establishment of an appropriate ground cover to maintain the soil structure. Soil restoration measures should be applied over and adjacent to any runoff reduction practices to achieve design performance.

Design Criteria

1. Soil restoration areas will be designated on the plan views of areas to be disturbed.
2. Soil restoration will be completed in accordance with Table 4.6 on page 4.53.

Specification for Full Soil Restoration

During periods of relatively low to moderate subsoil moisture, the disturbed subsoils are returned to rough grade and the following Soil Restoration steps applied:

1. Apply 3 inches of compost over subsoil. The compost shall be well decomposed (matured at least 3 months), weed-free, organic matter. It shall be aerobically composted, possess no objectionable odors, and contain less than 1%, by dry weight, of man-made foreign matter. The physical parameters of the compost shall meet the standards listed in Table 5.2 - Compost Standards Table, except for "Particle Size" 100% will pass the 1/2" sieve. **Note: All biosolids compost produced in New York State (or approved for importation) must meet NYS DEC's 6 NYCRR Part 360 (Solid Waste Management Facilities) requirements. The Part 360 requirements are equal to or more stringent than 40 CFR Part 503 which ensure safe standards for pathogen reduction and heavy metals content.**

2. Till compost into subsoil to a depth of at least 12 inches using a cat-mounted ripper, tractor mounted disc, or tiller, to mix and circulate air and compost into the subsoil.
3. Rock-pick until uplifted stone/rock materials of four inches and larger size are cleaned off the site.
4. Apply topsoil to a depth of 6 inches.
5. Vegetate as required by the seeding plan. Use appropriate ground cover with deep roots to maintain the soil structure.
6. Topsoil may be manufactured as a mixture or a mineral component and organic material such as compost.

At the end of the project an inspector should be able to push a 3/8" metal bar 12 inches into the soil just with body weight. This should not be performed within the drip line of any existing trees or over utility installations that are within 24 inches of the surface.

Maintenance

Keep the site free of vehicular and foot traffic or other weight loads. Consider pedestrian footpaths.

Table 4.6
Soil Restoration Requirements

<table>
<tr><th>Type of Soil Disturbance</th><th colspan="2">Soil Restoration Requirement</th><th>Comments/Examples</th></tr>
<tr><td>No soil disturbance</td><td colspan="2">Restoration not permitted</td><td>Preservation of Natural Features</td></tr>
<tr><td>Minimal soil disturbance</td><td colspan="2">Restoration not required</td><td>Clearing and grubbing</td></tr>
<tr><td rowspan="2">Areas where topsoil is stripped only - no change in grade</td><td>HSG A&B</td><td>HSG C&D</td><td rowspan="2">Protect area from any ongoing construction activities.</td></tr>
<tr><td>Apply 6 inches of topsoil</td><td>Aerate* and apply 6 inches of topsoil</td></tr>
<tr><td rowspan="2">Areas of cut or fill</td><td>HSG A&B</td><td>HSG C&D</td><td rowspan="2"></td></tr>
<tr><td>Aerate* and apply 6 inches of topsoil</td><td>Apply full Soil Restoration**</td></tr>
<tr><td>Heavy traffic areas on site (especially in a zone 5-25 feet around buildings but not within a 5 foot perimeter around foundation walls)</td><td colspan="2">Apply full Soil Restoration (decompaction and compost enhancement)</td><td></td></tr>
<tr><td>Areas where Runoff Reduction and/or Infiltration practices are applied</td><td colspan="2">Restoration not required, but may be applied to enhance the reduction specified for appropriate practices.</td><td>Keep construction equipment from crossing these areas. To protect newly installed practice from any ongoing construction activities construct a single phase operation fence area</td></tr>
<tr><td>Redevelopment projects</td><td colspan="2">Soil Restoration is required on redevelopment projects in areas where existing impervious area will be converted to pervious area.</td><td></td></tr>
<tr><td colspan="4">* Aeration includes the use of machines such as tractor-drawn implements with coulters making a narrow slit in the soil, a roller with many spikes making indentations in the soil, or prongs which function like a mini-subsoiler.
** Per "Deep Ripping and De-compaction, DEC 2008".</td></tr>
</table>

STANDARD AND SPECIFICATIONS FOR PERMANENT CONSTRUCTION AREA PLANTING

Definition & Scope

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

Conditions Where Practice Applies

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

Criteria

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

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

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

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

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

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

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

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

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

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

For 10lbs of PLS from this lot =

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

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

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

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

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

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

80% Perennial Vegetative Cover

50% Perennial Vegetative Cover

Table 4.4
Permanent Construction Area Planting Mixture Recommendations

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

STANDARD AND SPECIFICATIONS FOR MULCHING

Definition and Scope

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

Conditions Where Practice Applies

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

Criteria

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

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

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

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

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

Select appropriate mulch anchoring material.

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

Table 4.2
Guide to Mulch Materials, Rates, and Uses

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

Table 4.3
Mulch Anchoring Guide

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

STANDARD AND SPECIFICATIONS FOR ROCK OUTLET PROTECTION

Definition & Scope

A **permanent** section of rock protection placed at the outlet end of the culverts, conduits, or channels to reduce the depth, velocity, and energy of water, such that the flow will not erode the receiving downstream reach.

Conditions Where Practice Applies

This practice applies where discharge velocities and energies at the outlets of culverts, conduits, or channels are sufficient to erode the next downstream reach. This applies to:

1. Culvert outlets of all types.

2. Pipe conduits from all sediment basins, dry storm water ponds, and permanent type ponds.

3. New channels constructed as outlets for culverts and conduits.

Design Criteria

The design of rock outlet protection depends entirely on the location. Pipe outlet at the top of cuts or on slopes steeper than 10 percent, cannot be protected by rock aprons or riprap sections due to re-concentration of flows and high velocities encountered after the flow leaves the apron.

Many counties and state agencies have regulations and design procedures already established for dimensions, type and size of materials, and locations where outlet protection is required. Where these requirements exist, they shall be followed.

Tailwater Depth

The depth of tailwater immediately below the pipe outlet must be determined for the design capacity of the pipe. If the tailwater depth is less than half the diameter of the outlet pipe, and the receiving stream is wide enough to accept divergence of the flow, it shall be classified as a Minimum Tailwater Condition; see Figure 3.16 on page 3.42 as an example. If the tailwater depth is greater than half the pipe diameter and the receiving stream will continue to confine the flow, it shall be classified as a Maximum Tailwater Condition; see Figure 3.17 on page 3.43 as an example. Pipes which outlet onto flat areas with no defined channel may be assumed to have a Minimum Tailwater Condition; see Figure 3.16 on page 3.42 as an example.

Apron Size

The apron length and width shall be determined from the curves according to the tailwater conditions:

Minimum Tailwater – Use Figure 3.16 on page 3.42
Maximum Tailwater – Use Figure 3.17 on page 3.43

If the pipe discharges directly into a well defined channel, the apron shall extend across the channel bottom and up the channel banks to an elevation one foot above the maximum tailwater depth or to the top of the bank, whichever is less.

The upstream end of the apron, adjacent to the pipe, shall have a width two (2) times the diameter of the outlet pipe, or conform to pipe end section if used.

Bottom Grade

The outlet protection apron shall be constructed with no slope along its length. There shall be no overfall at the end of the apron. The elevation of the downstream end of the apron shall be equal to the elevation of the receiving channel or adjacent ground.

Alignment

The outlet protection apron shall be located so that there are no bends in the horizontal alignment.

Materials

The outlet protection may be done using rock riprap, grouted riprap, or gabions. Outlets constructed on the bank of a stream or wetland shall not use grouted rip-rap, gabions or concrete.

Riprap shall be composed of a well-graded mixture of rock size so that 50 percent of the pieces, by weight, shall be larger than the d_{50} size determined by using the charts. A well-graded mixture, as used herein, is defined as a mixture composed primarily of larger rock sizes, but with a sufficient mixture of other sizes to fill the smaller voids between the rocks. The diameter of the largest rock size in such a mixture shall be 1.5 times the d_{50} size.

Thickness

The minimum thickness of the riprap layer shall be 1.5 times the maximum rock diameter for d_{50} of 15 inches or less; and 1.2 times the maximum rock size for d_{50} greater than 15 inches. The following chart lists some examples:

D_{50} (inches)	d_{max} (inches)	Minimum Blanket Thickness (inches)
4	6	9
6	9	14
9	14	20
12	18	27
15	22	32
18	27	32
21	32	38
24	36	43

Rock Quality

Rock for riprap shall consist of field rock or rough unhewn quarry rock. The rock shall be hard and angular and of a quality that will not disintegrate on exposure to water or weathering. The specific gravity of the individual rocks shall be at least 2.5.

Filter

A filter is a layer of material placed between the riprap and the underlying soil surface to prevent soil movement into and through the riprap. Riprap shall have a filter placed under it in all cases.

A filter can be of two general forms: a gravel layer or a plastic filter cloth. The plastic filter cloth can be woven or non-woven monofilament yarns, and shall meet these base requirements: thickness 20-60 mils, grab strength 90-120 lbs; and shall conform to ASTM D-1777 and ASTM D-1682.

Gravel filter blanket, when used, shall be designed by comparing particle sizes of the overlying material and the base material. Design criteria are available in Standard and Specification for Anchored Slope and Channel Stabilization on page 4.7.

Gabions

Gabions shall be made of hexagonal triple twist mesh with heavily galvanized steel wire. The maximum linear dimension of the mesh opening shall not exceed 4 ½ inches and the area of the mesh opening shall not exceed 10 square inches.

Gabions shall be fabricated in such a manner that the sides, ends, and lid can be assembled at the construction site into a rectangular basket of the specified sizes. Gabions shall be of single unit construction and shall be installed according to manufacturer's recommendations.

The area on which the gabion is to be installed shall be graded as shown on the drawings. Foundation conditions shall be the same as for placing rock riprap, and filter cloth shall be placed under all gabions. Where necessary, key, or tie, the structure into the bank to prevent undermining of the main gabion structure.

Maintenance

Once a riprap outlet has been installed, the maintenance needs are very low. It should be inspected after high flows for evidence of scour beneath the riprap or for dislodged rocks. Repairs should be made immediately.

Design Procedure

1. Investigate the downstream channel to assure that nonerosive velocities can be maintained.

2. Determine the tailwater condition at the outlet to establish which curve to use.

3. Use the appropriate chart with the design discharge to determine the riprap size and apron length required. It is noted that references to pipe diameters in the charts are based on full flow. For other than full pipe flow, the parameters of depth of flow and velocity must be used to adjust the design discharges.

4. Calculate apron width at the downstream end if a flare section is to be employed.

Design Examples are demonstrated in Appendix B.

Construction Specifications

1. The subgrade for the filter, riprap, or gabion shall be prepared to the required lines and grades. Any fill required in the subgrade shall be compacted to a density of approximately that of the surrounding undisturbed material.

2. The rock or gravel shall conform to the specified grad-

ing limits when installed respectively in the riprap or filter.

3. Filter cloth shall be protected from punching, cutting, or tearing. Any damage other than an occasional small hole shall be repaired by placing another piece of cloth over the damaged part or by completely replacing the cloth. All overlaps, whether for repairs or for joining two pieces of cloth shall be a minimum of one foot.

4. Rock for the riprap or gabion outlets may be placed by equipment. Both shall each be constructed to the full course thickness in one operation and in such a manner as to avoid displacement of underlying materials. The rock for riprap or gabion outlets shall be delivered and placed in a manner that will ensure that it is reasonably homogenous with the smaller rocks and spalls filling the voids between the larger rocks. Riprap shall be placed in a manner to prevent damage to the filter blanket or filter cloth. Hand placement will be required to the extent necessary to prevent damage to the permanent works.

Figure 3.16
Outlet Protection Design—Minimum Tailwater Condition Chart
(Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)

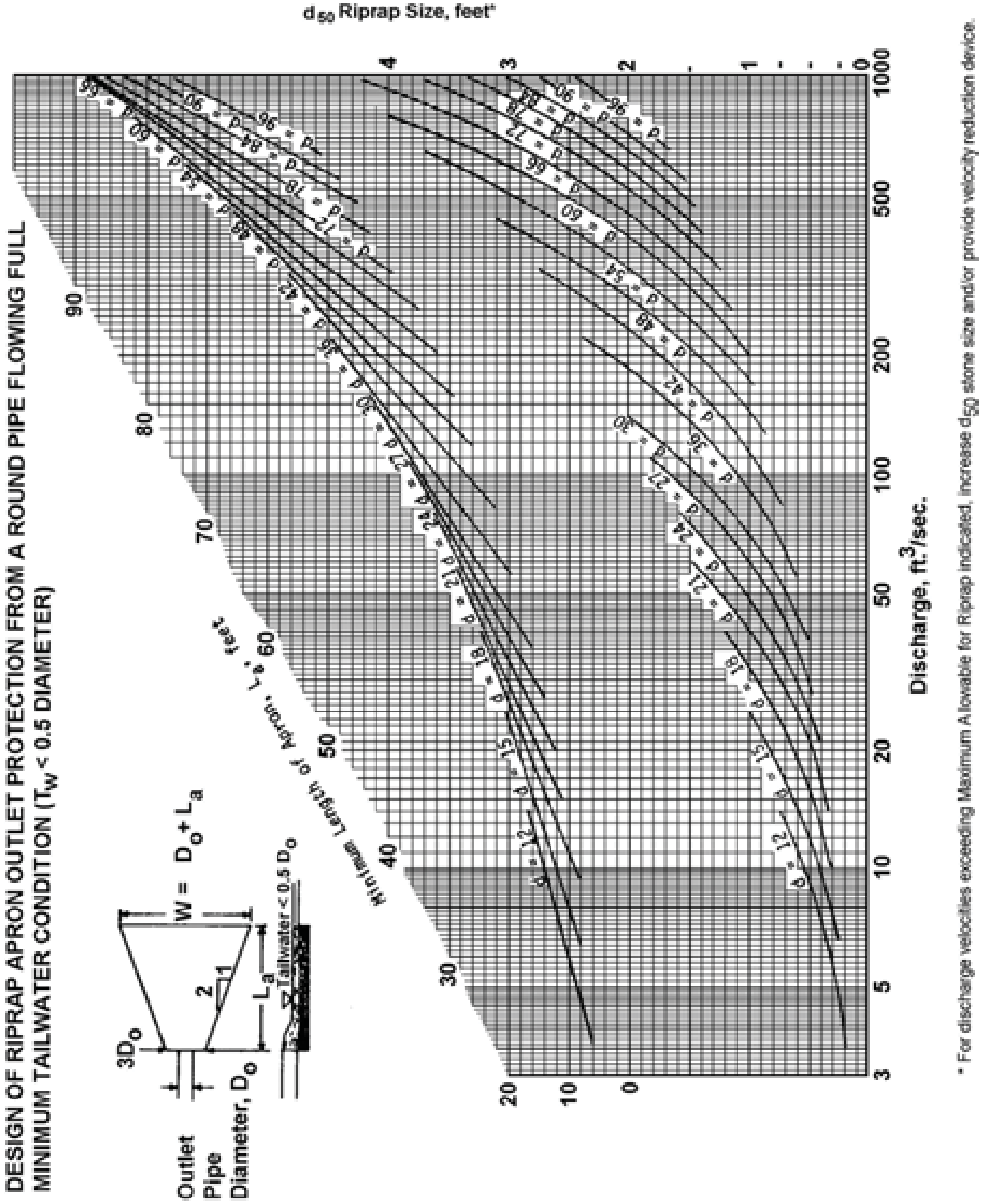


Figure 3.17
Outlet Protection Design—Maximum Tailwater Condition Chart
(Design of Outlet Protection from a Round Pipe Flowing Full, Maximum Tailwater Condition: $T_w \geq 0.5D_o$) (USDA - NRCS)

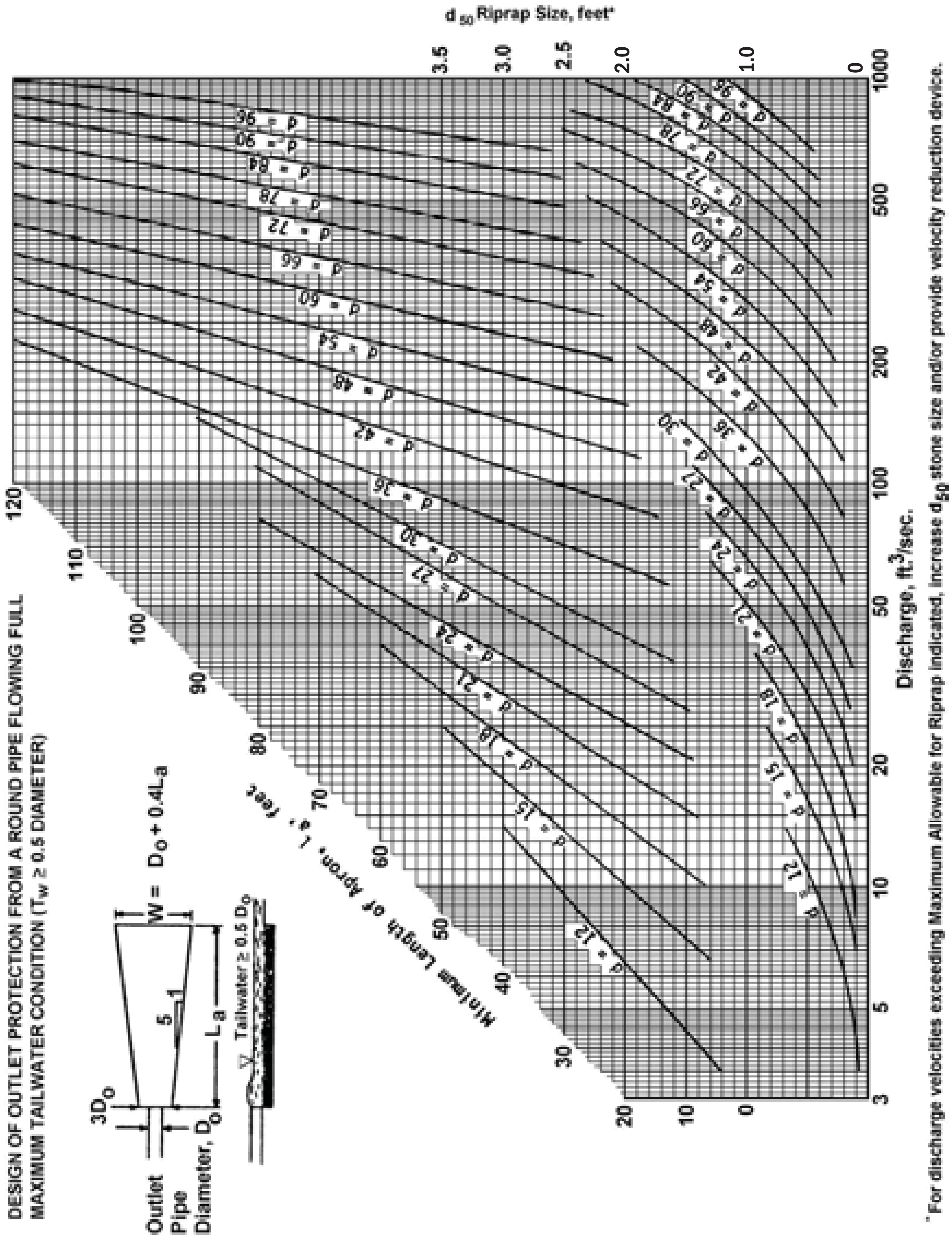


Figure 3.18
Riprap Outlet Protection Detail (1)

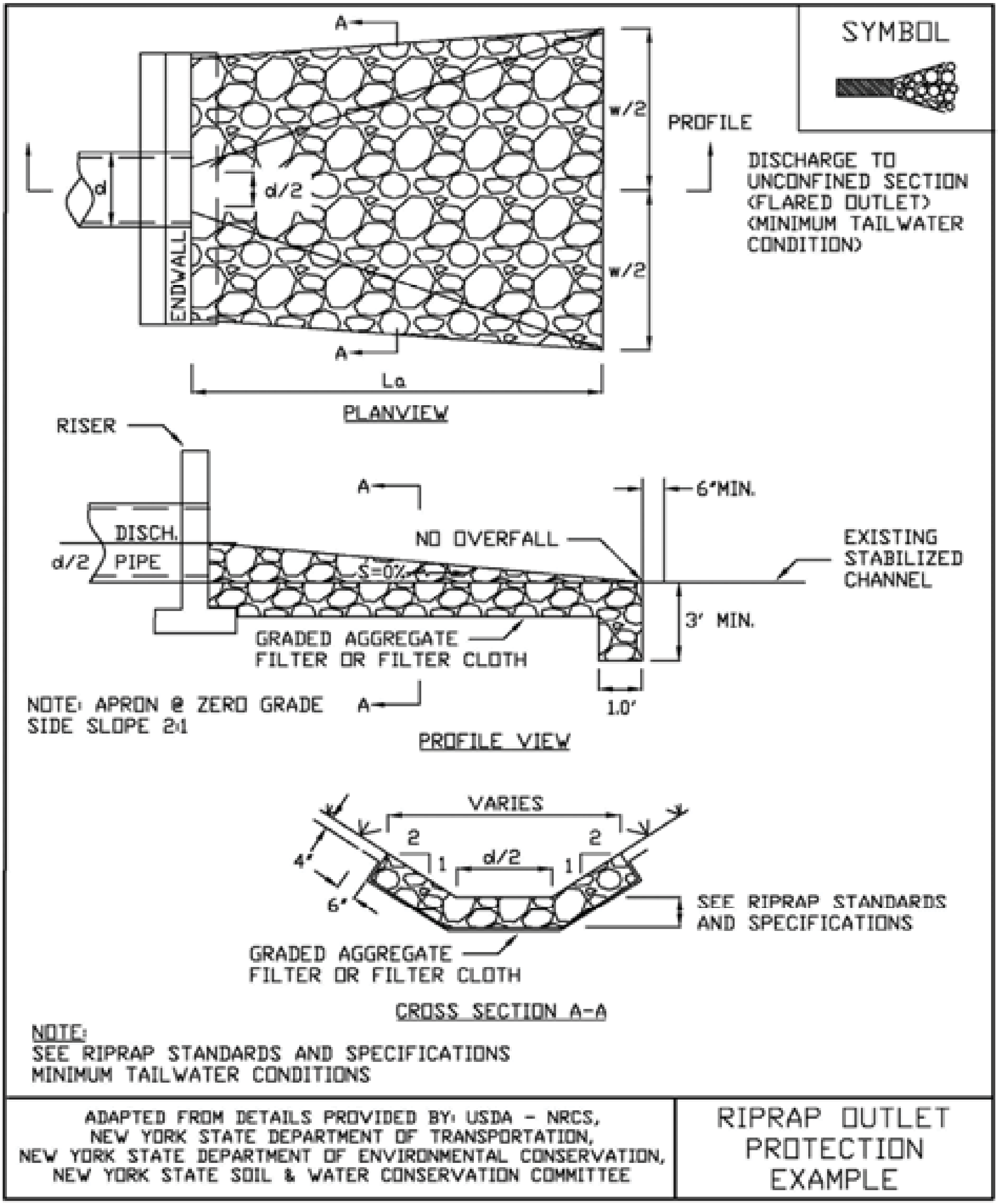


Figure 3.19
Riprap Outlet Protection Detail (2)

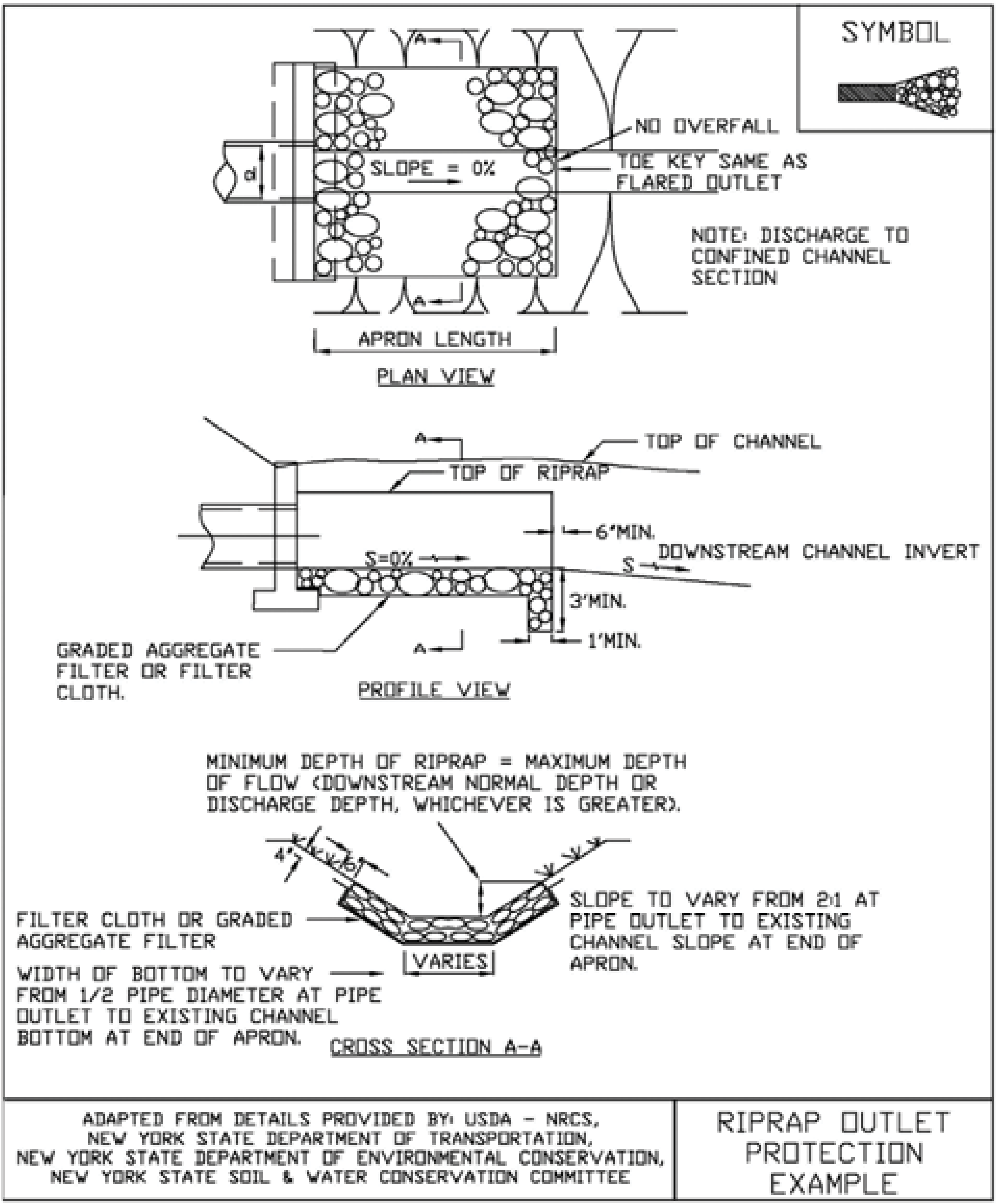
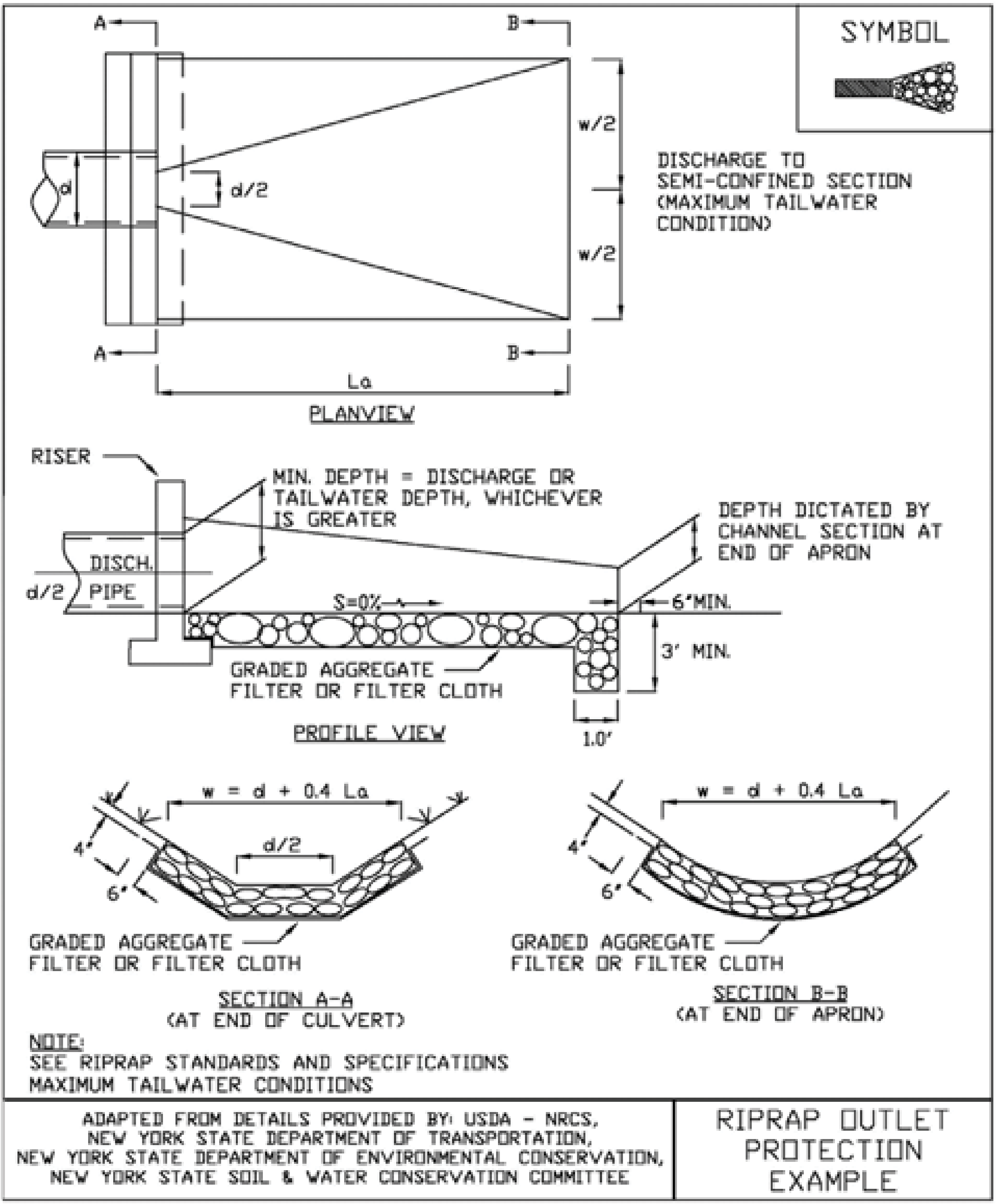


Figure 3.20
Riprap Outlet Protection Detail (3)



STANDARD AND SPECIFICATIONS FOR PERIMETER DIKE/SWALE

Definition & Scope

A **temporary** ridge of soil formed by excavating an adjoining swale located along the perimeter of the site or disturbed area. Its purpose is to prevent off site storm run-on from entering a disturbed area and to prevent sediment laden storm runoff from leaving the construction site or disturbed area.

Conditions Where Practice Applies

Perimeter dike/swale is constructed to divert flows from entering a disturbed area, or along tops of slopes to prevent flows from eroding the slope, or along base of slopes to direct sediment laden flows to a trapping device.

The perimeter dike/swale shall remain in place until the disturbed areas are permanently stabilized.

Design Criteria

See Figure 3.14 on page 3.36 for details.

The perimeter dike/swale shall not be constructed outside property lines or setbacks without obtaining legal easements from affected adjacent property owners. A design is not required for perimeter dike/swale. The following criteria shall be used:

Drainage area – Less than 2 acres (for drainage areas larger than 2 acres but less than 10 acres, see earth dike or construction ditch; for drainage areas larger than 10 acres, see standard and specifications for diversion).

Height – 18 inches minimum from bottom of swale to top of dike evenly divided between dike height and swale depth.

Bottom width of dike – 2 feet minimum.

Width of swale – 2 feet minimum.

Grade – Dependent upon topography, but shall have positive drainage (sufficient grade to drain) to an adequate outlet. Maximum allowable grade not to exceed 8 percent.

Stabilization – The disturbed area of the dike and swale shall be stabilized within 2 days of installation, in accordance with the standard and specifications for construction ditch (page 3.4).

Outlet

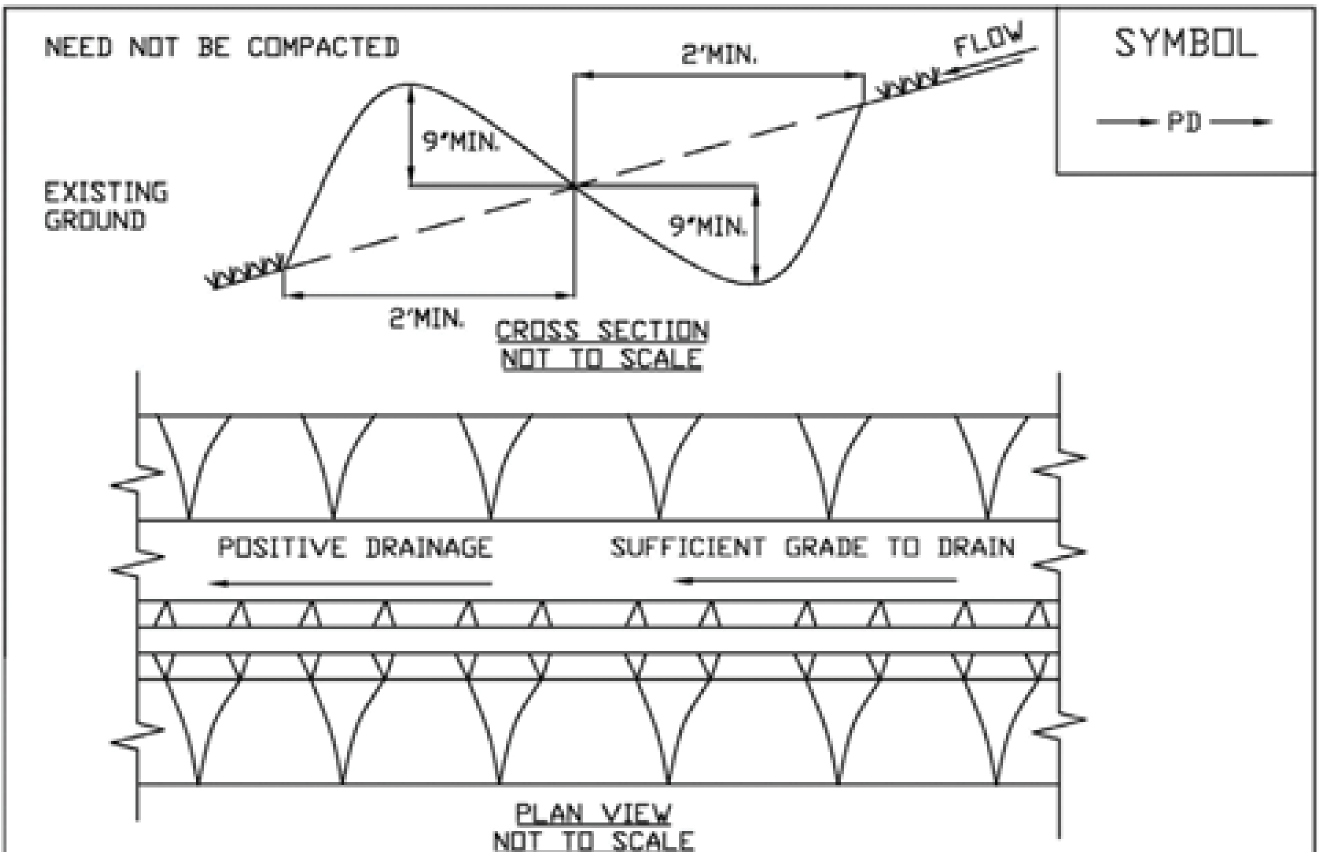
1. Perimeter dike/swale shall have a stabilized outlet.

2. Diverted runoff from a protected or stabilized upland area shall outlet directly onto an undisturbed stabilized area.

3. Diverted runoff from a disturbed or exposed upland area shall be conveyed to a sediment trapping device such as a sediment trap, sediment basin, or to an area protected by any of these practices.

4. The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet.

Figure 3.14
Perimeter Dike/Swale Detail



CONSTRUCTION SPECIFICATIONS

1. ALL PERIMETER DIKE/SWALE SHALL HAVE UNINTERRUPTED POSITIVE GRADE TO AN OUTLET.
2. DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
3. DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSIVE VELOCITY.
4. THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED IN THE STANDARD.
5. STABILIZATION OF THE AREA DISTURBED BY THE DIKE AND SWALE SHALL BE DONE IN ACCORDANCE WITH THE STANDARD AND SPECIFICATIONS FOR TEMPORARY SEEDING AND MULCHING, AND SHALL BE DONE WITHIN 2 DAYS.
6. PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.

MAX. DRAINAGE AREA LIMIT: 2 ACRES

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	PERIMETER DIKE OR SWALE

STANDARD AND SPECIFICATIONS FOR TEMPORARY CONSTRUCTION AREA SEEDING

Definition & Scope

Providing temporary erosion control protection to disturbed areas and/or localized critical areas for an interim period by covering all bare ground that exists as a result of construction activities or a natural event. Critical areas may include but are not limited to steep excavated cut or fill slopes and any disturbed, denuded natural slopes subject to erosion.

Conditions Where Practice Applies

Temporary seedings may be necessary on construction sites to protect an area, or section, where final grading is complete, when preparing for winter work shutdown, or to provide cover when permanent seedings are likely to fail due to mid-summer heat and drought. The intent is to provide temporary protective cover during temporary shutdown of construction and/or while waiting for optimal planting time.

Criteria

Water management practices must be installed as appropriate for site conditions. The area must be rough graded and slopes physically stable. Large debris and rocks are usually removed. Seedbed must be seeded within 24 hours of disturbance or scarification of the soil surface will be necessary prior to seeding.

Fertilizer or lime are not typically used for temporary seedings.

IF: Spring or summer or early fall, then seed the area with ryegrass (annual or perennial) at 30 lbs. per acre (Approximately 0.7 lb./1000 sq. ft. or use 1 lb./1000 sq. ft.).

IF: Late fall or early winter, then seed Certified 'Aroostook' winter rye (cereal rye) at 100 lbs. per acre (2.5 lbs./1000 sq. ft.).

Any seeding method may be used that will provide uniform application of seed to the area and result in relatively good soil to seed contact.

Mulch the area with hay or straw at 2 tons/acre (approx. 90 lbs./1000 sq. ft. or 2 bales). Quality of hay or straw mulch allowable will be determined based on long term use and visual concerns. Mulch anchoring will be required where wind or areas of concentrated water are of concern. Wood fiber hydromulch or other sprayable products approved for erosion control (nylon web or mesh) may be used if applied according to manufacturers' specification. Caution is advised when using nylon or other synthetic products. They may be difficult to remove prior to final seeding and can be a hazard to young wildlife species.

STANDARD AND SPECIFICATIONS FOR TOPSOILING

Definition & Scope

Spreading a specified quality and quantity of topsoil materials on graded or constructed subsoil areas to provide acceptable plant cover growing conditions, thereby reducing erosion; to reduce irrigation water needs; and to reduce the need for nitrogen fertilizer application.

Conditions Where Practice Applies

Topsoil is applied to subsoils that are droughty (low available moisture for plants), stony, slowly permeable, salty or extremely acid. It is also used to backfill around shrub and tree transplants. This standard does not apply to wetland soils.

Design Criteria

1. Preserve existing topsoil in place where possible, thereby reducing the need for added topsoil.

2. Conserve by stockpiling topsoil and friable fine textured subsoils that must be stripped from the excavated site and applied after final grading where vegetation will be established. Topsoil stockpiles must be stabilized. Stockpile surfaces can be stabilized by vegetation, geotextile or plastic covers. This can be aided by orientating the stockpile lengthwise into prevailing winds.

3. Refer to USDA Natural Resource Conservation Service soil surveys or soil interpretation record sheets for further soil texture information for selecting appropriate design topsoil depths.

Site Preparation

1. As needed, install erosion and sediment control practices such as diversions, channels, sediment traps, and stabilizing measures, or maintain if already installed.

2. Complete rough grading and final grade, allowing for depth of topsoil to be added.

3. Scarify all compact, slowly permeable, medium and fine textured subsoil areas. Scarify at approximately right angles to the slope direction in soil areas that are steeper than 5 percent. Areas that have been overly compacted shall be decompacted in accordance with the Soil Restoration Standard.

4. Remove refuse, woody plant parts, stones over 3 inches in diameter, and other litter.

Topsoil Materials

1. Topsoil shall have at least 6 percent by weight of fine textured stable organic material, and no greater than 20 percent. Muck soil shall not be considered topsoil.

2. Topsoil shall have not less than 20 percent fine textured material (passing the NO. 200 sieve) and not more than 15 percent clay.

3. Topsoil treated with soil sterilants or herbicides shall be so identified to the purchaser.

4. Topsoil shall be relatively free of stones over 1 1/2 inches in diameter, trash, noxious weeds such as nut sedge and quackgrass, and will have less than 10 percent gravel.

5. Topsoil containing soluble salts greater than 500 parts per million shall not be used.

6. Topsoil may be manufactured as a mixture of a mineral component and organic material such as compost.

Application and Grading

1. Topsoil shall be distributed to a uniform depth over the area. It shall not be placed when it is partly frozen, muddy, or on frozen slopes or over ice, snow, or standing water puddles.

2. Topsoil placed and graded on slopes steeper than 5 percent shall be promptly fertilized, seeded, mulched, and stabilized by “tracking” with suitable equipment.

3. Apply topsoil in the amounts shown in Table 4.7 below:

Table 4.7 - Topsoil Application Depth		
Site Conditions	**Intended Use**	**Minimum Topsoil Depth**
1. Deep sand or loamy sand	Mowed lawn	6 in.
	Tall legumes, unmowed	2 in.
	Tall grass, unmowed	1 in.
2. Deep sandy loam	Mowed lawn	5 in.
	Tall legumes, unmowed	2 in.
	Tall grass, unmowed	none
3. Six inches or more: silt loam, clay loam, loam, or silt	Mowed lawn	4 in.
	Tall legumes, unmowed	1 in.
	Tall grass, unmowed	1 in.

STANDARD AND SPECIFICATIONS FOR TREES, SHRUBS, AND VINES

Definition & Scope

Establishing trees, shrubs, and vines or selectively reducing stand density and trimming woody plants to protect the soil and plant resources, improve an area for recreation and increase the attractiveness and usefulness of areas.

Conditions Where Practice Applies

On any area planned for recreation or landscape use such as yard areas, leisure areas, picnic areas, and park lands providing outdoor recreational opportunities.

Criteria and Specifications

1. Planting nursery stock

   A. Select species to serve the intended purpose. See Appendix G, Table G.1, "Trees Suitable for Landscape and Conservation Plantings in New York." Where planting of trees is to be done in recreation areas, use those species resistant to compaction listed in Table G.2, "Susceptibility of Tree Species to Compaction" whenever possible.

   B. Plant Materials

   1) Plants shall conform to the species, variety, size, number, and conditions as stated in a conservation plan or on a plant list shown on landscape drawings. "American Standard for Nursery Stock," by American Association of Nurserymen, shall be used to develop the plant list for landscape drawings and to check quality of plant materials.

   2) Durable, legible labels with the scientific and common name and cultivar shall be securely attached to plants, bundles of seedlings, containers, and/or flats.

   C. Plant Protection

   Prior to delivery, the trunk, branches, and foliage of the plants shall be sprayed with non-toxic antidesiccant, applied according to the manufacturer's recommendations. This does not apply to state nursery seedlings.

   D. Planting Time

   Deciduous trees and shrubs: April 1 to June 1 and October 15 to December 15. Evergreen trees and shrubs: April 1 to June 1 and September 1 to November 15.

   E. Spacing

   Plant all trees and shrubs well back from buildings to allow for mature crown size. The following are guides for planning:

Large Trees	50-60 feet apart
Small Trees	20-30 feet apart
Columnar Species	6-8 feet apart
Hedges	1-4 feet apart
Shrubs	For clumps, plan spacing so mature shrubs will be touching or overlapping by only 1 or 2 feet

   F. Site Preparation

   1) Individual sites for planting seedlings can be prepared by scalping the sod away from a four foot square area where the seedling is to be planted.

   2) All planting beds shall be cultivated to a depth of 8 inches, or chemically treated for weed control. Remove objectionable objects that will interfere with maintenance of site.

   G. Planting

   1) Plants shall be located as shown on plans and/or drawings and, where necessary, located on the site by stakes, flags or other means.

   2) Prior to planting, remove galvanized wire basket securing root ball, untie and roll down burlap covering from around the stem.

3) The plants shall be set upright in holes as illustrated in Figure G.1 in Appendix G.

4) All plants shall be thoroughly watered on the same day of planting. Plants that have settled shall be reset to grade.

H. Wrapping

Immediately after planting, wrap deciduous tree trunks from the bottom to the first limb with a 4 inch wide bituminous impregnated, insect resistant tape or paper manufactured for that purpose. Tie with jute (bag strings) at top and bottom. The wrap should be removed per nursery recommendations.

I. Mulching

Mulch the disturbed area around individual trees and shrubs with a 2-3" layer of wood chips. Pull wood chips 1 inch away from the base of shrubs to avoid fungus development.

J. Pruning

After planting, prune to remove injured twigs and branches. The natural shape of the plant should not be changed.

K. Cleanup and Maintenance

1) After all work is complete, all excess soil, peat moss, debris, etc., shall be removed from the site.

2) Water plants two weeks after planting. For two years, water plants every two weeks during dry periods, which exceed three weeks without a good soaking rain, or water as needed in accordance with local conditions. Shrubs may require 5 to 10 gallons and trees, 20 to 30 gallons for each watering.

3) Remove trunk wrap per nursery recommendation.

2. Transplanting "Wild" Stock

Successful transplanting of wild stock will require heavy equipment and considerable labor as a large weight of soil must be moved with the roots.

A. Select trees and shrubs with good form and full crowns.

B. Transplant only when plants are dormant and soil is moist. Wrap soil ball with burlap to prevent soil from separating from roots.

C. Table 4.8 shows minimum diameter and approximate weight of soil ball that must be moved with each size plant.

D. Plant and maintain as described above for nursery stock.

PRUNING AND THINNING

Use	Cleared Width Each Side of Trail Tread (ft.)	Cleared Height (ft.)
TRAILS		
Hiking	1	8
Bicycle	2	10
Motorbike	2	10
Horse	2	12
X-Country Ski	Total: 3-12	12[1]
Snowmobile	Total: 6-12	12[1]
PICNIC & CAMPING AREAS		
Campfire/Grill	10 ft. diam.	15
[1] Includes allowance for snow depth and snow load on branches		

1. Pruning

A. Remove trees, limbs, and limb stubs to the above widths and heights specified for the intended use.

B. Remove dead, diseased, or dying limbs that may fall.

C. Do not remove more than one-third of the live crown of a tree in a year.

D. Cut limbs flush to the branch bark ridge.

E. Use the 3 or 4 cut pruning method on all branches over 2 inches in diameter: First cut about one-third the way through the underside of the limb (about 6-12 inches from the tree trunk). Then (approximately an inch further out) make a second cut through the limb from the upper side. When the branch is removed, there is no splintering of the main tree trunk. Remove the stub. If the branch is larger than 5-6 inches in diameter, use the four cut system. Cuts 1 and 2 remain the same and cut 3 should be from the underside of the limb, on the outside of the branch collar. Cut 4 should be from the top and in alignment with the 3rd cut. Cut 3 should be 1/4 to 1/3 the way through the limb. This will prevent the bark from peeling down the trunk. Do not paint the cut surface.

2. Thinning

   A. Remove dead, diseased, dying, poorly anchored, or ice damaged trees that pose a hazard to recreationists or that interfere with intended use.

   B. To maintain grass cover in a wooded area, thin according to formula Dx3 (average diameter of the trunk of overstory trees, in inches, times three—the answer is the spacing between trees to be left, in feet). For example, for trees with average diameter of 6 inches, spacing after thinning should leave trees 18 feet apart on average. Crown cover after thinning should be about 50 percent.

   C. Selectively thin as needed to favor those trees that are most "resistant" to compaction around their roots. See Table G.2, "Susceptibility of Tree Species to Compaction" in Appendix G. If the soil on the site is naturally well drained, those species in the "intermediate" group may also be favored.

Table 4.8
Size and Weight of Earth Ball Required to Transplant Wild Stock

	Shade Trees (Maple, Ash, Oak, Birch, etc.)		Small Trees & Shrubs (Crabapple, Thornapple, Viburnum, Dogwood, etc.)		
Caliper[1] (Inches)	Minimum Diameter Ball (Inches)	Weight of Ball (lbs.)	Up to 6 ft. Height — 6 ft. and Caliper[1]	Minimum Diameter Ball (Inches)	Weight of Ball (lbs.)
1/2	14	88	2	12	55
3/4	16	130	3	14	88
1	18	186	4	16	130
1-1/4	20	227	5	18	186
1-1/2	22	302	3/4	18	186
1-3/4	24	390	1	20	227
2	28	621	1-1/2	22	302
3	32	836	1-3/4	24	390
3-1/2	38	1,400	2	28	621
4	42	1,887	2-1/2	32	836
			3	38	1,400

[1]Caliper is a diameter measurement of trees at a height of 6 inches above the ground.

STANDARD AND SPECIFICATIONS FOR VEGETATING WATERWAYS

Definition & Scope

Waterways are a **permanently** constructed conveyance channel, shaped or graded. They are vegetated for the safe transport of excess surface water from construction sites and urban areas without damage from erosion.

Conditions Where Practice Applies

This standard applies to vegetating waterways and similar water carrying structures.

Supplemental measures may be required with this practice. These may include: subsurface drainage to permit the growth of suitable vegetation and to eliminate wet spots; a section stabilized with asphalt, stone, or other suitable means; or additional storm drains to handle snowmelt or storm runoff.

Retardance factors for determining waterway dimensions are shown in Table 3.1 on page 3.10 and “Maximum Permissible Velocities for Selected Grass and Legume Mixtures” (See Table 4.10 on page 4.79).

Design Criteria

Waterways or outlets shall be protected against erosion by vegetative means as soon after construction as practical. Vegetation must be well established before diversions or other channels are outletted into them. Consideration should be given to the use of turf reinforcement mats, excelsior matting, other rolled erosion control products, or sodding of channels to provide erosion protection as soon after construction as possible. It is strongly recommended that the center line of the waterway be protected with one of the above materials to avoid center gullies and to protect seedlings from erosion before establishment.

1. Liming, fertilizing, and seedbed preparation.

   A. Lime to pH 6.5.

   B. **The soil should be tested to determine the amounts of amendments needed.** If the soil must be fertilized before results of a soil test can be obtained to determine fertilizer needs, apply commercial fertilizer at 1.0 lbs/1,000 sq. ft. of N, P_2O_5, and K_2O.

   C. Lime and fertilizer shall be mixed thoroughly into the seedbed during preparation.

   D. Channels, except for paved section, shall have at least 4 inches of topsoil.

   E. Remove stones and other obstructions that will hinder maintenance.

2. Timing of Seeding.

   A. Early spring and late August are best.

   B. Temporary cover to protect from erosion is recommended during periods when seedings may fail.

3. Seed Mixtures:

Mixtures	Rate per Acre (lbs)	Rate per 1,000 sq. ft. (lbs)
A. White clover or ladino clover[1]	8	0.20
Smooth bromegrass	20	0.45
Creeping red fescue[2]	2	0.05
Total	30	0.70
OR		
B. Smooth bromegass[3]	25	0.60
Creeping red fescue	20	0.50
Perennial ryegrass	10	0.20
Total	55	1.30

[1] Inoculate with appropriate inoculum immediately prior to seeding. Ladino or birdsfoot trefoil may be substituted for common white clover and seeded at the same rate.

[2] Perennial ryegrass may be substituted for the creeping red fescue but increase seeding rate to 5 lbs/acre (0.1 lb/1,000 sq. ft).

[3] Use this mixture in areas which are mowed frequently. Common white clover may be added if desired and seeded at 8 lbs/acre (0.2 lb/1,000 sq. ft.)

4. Seeding

Select the appropriate seed mixture and apply uniformly over the area. Rolling or cultipacking across the waterway is desirable.

Waterway centers or crucial areas may be sodded. Refer to the standard and specification for Stabilization with Sod. Be sure sod is securely anchored using staples or stakes.

5. Mulching

All seeded areas will be mulched. Channels more than 300 feet long, and/or where the slope is 5 percent or more, must have the mulch securely anchored. Refer to the standard and specifications for Mulching for details.

6. Maintenance

Fertilize, lime, and mow as needed to maintain dense protective vegetative cover.

Waterways shall not be used for roadways.

If rills develop in the centerline of a waterway, prompt attention is required to avoid the formation of gullies. Either stone and/or compacted soil fill with excelsior or filter fabric as necessary may be used during the establishment phase. See Figure 4.25, Rill Maintenance Measures. Spacing between rill maintenance barriers shall not exceed 100 feet.

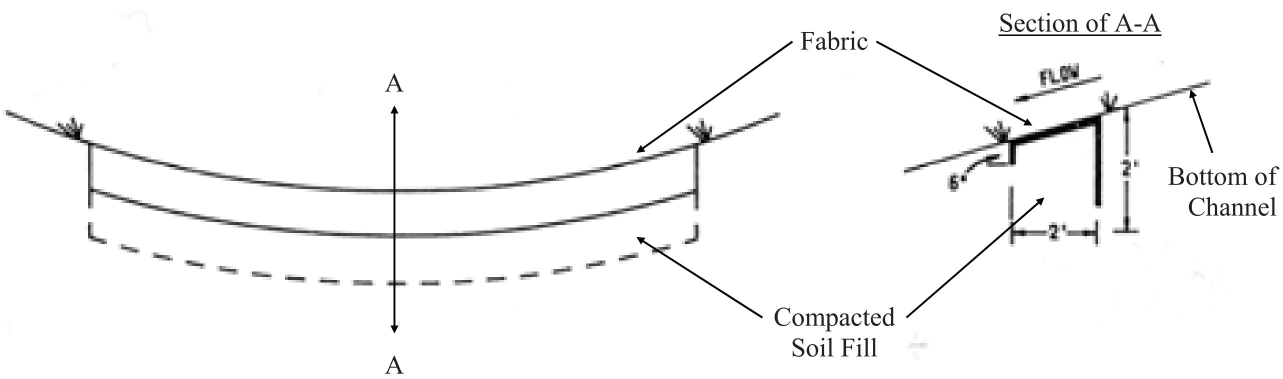
Table 4.10
Maximum Permissible Velocities for Selected Seed Mixtures

Cover	Slope Range [2] (%)	Permissible Velocity [1]	
		Erosion-resistant Soils (ft. per sec.) K=0.10 - 0.35 [3]	Easily Eroded Soils (ft. per sec.) K=0.36 - 0.80
Smooth Bromegrass Hard Fescue	0-5 5-10 Over 10	7 6 5	5 4 3
Grass Mixtures	[2] 0-5 5-10	5 4	4 3
White/Red Clover Alfalfa Red Fescue	[4] 0-5	3.5	2.5

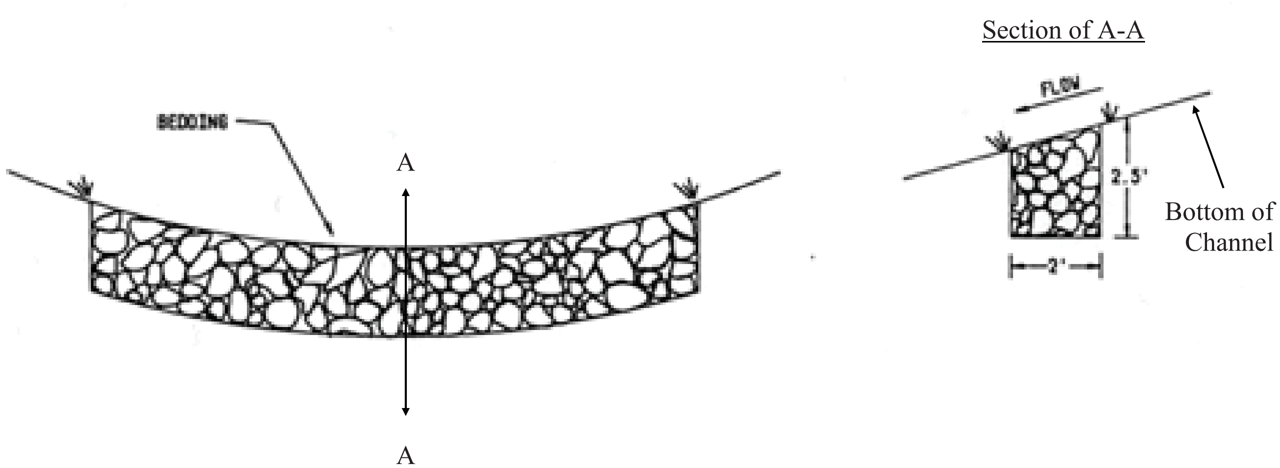
[1] Use velocities exceeding 5 feet per second only where good covers and proper maintenance can be obtained.
[2] Do not use on slopes steeper than 10 percent except for vegetated side slopes in combination with a stone, concrete, or highly resistant vegetative center section.
[3] K is the soil erodibility factor used in the Revised Universal Soil Loss Equation. Visit Appendix A or consult the appropriate USDA-NRCS technical guide for K values for New York State soils.
[4] Do not use on slopes steeper than 5 percent except for vegetated side slopes in combination with a stone, concrete, or highly resistant vegetative center section.
[5] Annuals - use on mild slopes or as temporary protection until permanent covers are established.
[6] Use on slopes steeper than 5 percent is not recommended.

Figure 4.25
Rill Maintenance Measures

Filter Fabric



Stone



STANDARD AND SPECIFICATIONS FOR COMPOST FILTER SOCK

Definition & Scope

A **temporary** sediment control practice composed of a degradable geotextile mesh tube filled with compost filter media to filter sediment and other pollutants associated with construction activity to prevent their migration offsite.

Condition Where Practice Applies

Compost filter socks can be used in many construction site applications where erosion will occur in the form of sheet erosion and there is no concentration of water flowing to the sock. In areas with steep slopes and/or rocky terrain, soil conditions must be such that good continuous contact between the sock and the soil is maintained throughout its length. For use on impervious surfaces such as road pavement or parking areas, proper anchorage must be provided to prevent shifting of the sock or separation of the contact between the sock and the pavement. Compost filter socks are utilized both at the site perimeter as well as within the construction areas. These socks may be filled after placement by blowing compost into the tube pneumatically, or filled at a staging location and moved into its designed location.

Design Criteria

1. Compost filter socks will be placed on the contour with both terminal ends of the sock extended 8 feet upslope at a 45 degree angle to prevent bypass flow.

2. Diameters designed for use shall be 12" – 32" except that 8" diameter socks may be used for residential lots to control areas less than 0.25 acres.

3. The flat dimension of the sock shall be at least 1.5 times the nominal diameter.

4. The **Maximum Slope Length** (in feet) above a compost filter sock shall not exceed the following limits:

Dia. (in.)	Slope %						
	2	5	10	20	25	33	50
8	225*	200	100	50	20	—	—
12	250	225	125	65	50	40	25
18	275	250	150	70	55	45	30
24	350	275	200	130	100	60	35
32	450	325	275	150	120	75	50

* Length in feet

5. The compost infill shall be well decomposed (matured at least 3 months), weed-free, organic matter. It shall be aerobically composted, possess no objectionable odors, and contain less than 1%, by dry weight, of man-made foreign matter. The physical parameters of the compost shall meet the standards listed in Table 5.2 - Compost Standards Table. **Note: All biosolids compost produced in New York State (or approved for importation) must meet NYS DEC's 6 NYCRR Part 360 (Solid Waste Management Facilities) requirements. The Part 360 requirements are equal to or more stringent than 40 CFR Part 503 which ensure safe standards for pathogen reduction and heavy metals content. When using compost filter socks adjacent to surface water, the compost should have a low nutrient value.**

6. The compost filter sock fabric material shall meet the

7. Compost filter socks shall be anchored in earth with 2” x 2” wooden stakes driven 12” into the soil on 10 foot centers on the centerline of the sock. On uneven terrain, effective ground contact can be enhanced by the placement of a fillet of filter media on the disturbed area side of the compost sock.

8. All specific construction details and material specifications shall appear on the erosion and sediment control constructions drawings when compost filter socks are included in the plan.

Maintenance

1. Traffic shall not be permitted to cross filter socks.

2. Accumulated sediment shall be removed when it reaches half the above ground height of the sock and disposed of in accordance with the plan.

3. Socks shall be inspected weekly and after each runoff event. Damaged socks shall be repaired in the manner required by the manufacturer or replaced within 24 hours of inspection notification.

4. Biodegradable filter socks shall be replaced after 6 months; photodegradable filter socks after 1 year. Polypropylene socks shall be replaced according to the manufacturer’s recommendations.

5. Upon stabilization of the area contributory to the sock, stakes shall be removed. The sock may be left in place and vegetated or removed in accordance with the stabilization plan. For removal the mesh can be cut and the compost spread as an additional mulch to act as a soil supplement.

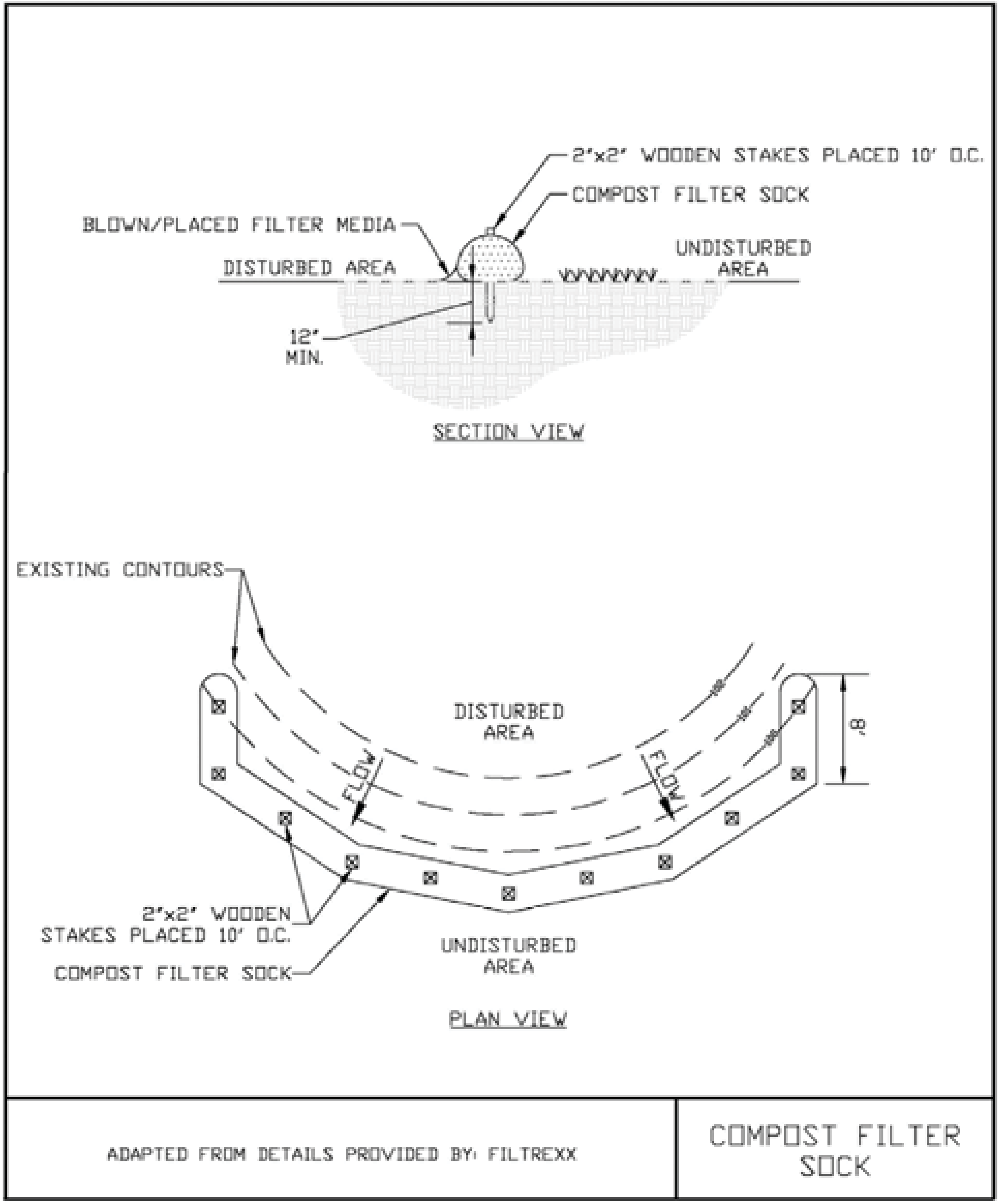
Table 5.1 - Compost Sock Fabric Minimum Specifications Table

Material Type	3 mil HDPE	5 mil HDPE	5 mil HDPE	Multi-Filament Polypropylene (MFPP)	Heavy Duty Multi-Filament Polypropylene (HDMFPP)
Material Characteristics	Photodegradable	Photodegradable	Biodegradable	Photodegradable	Photodegradable
Sock Diameters	12” 18”	12” 18” 24” 32”	12” 18” 24” 32”	12” 18” 24” 32”	12” 18” 24” 32”
Mesh Opening	3/8”	3/8”	3/8”	3/8”	1/8”
Tensile Strength		26 psi	26 psi	44 psi	202 psi
Ultraviolet Stability % Original Strength (ASTM G-155)	23% at 1000 hr.	23% at 1000 hr.		100% at 1000 hr.	100% at 1000 hr.
Minimum Functional Longevity	6 months	9 months	6 months	1 year	2 years

Table 5.2 - Compost Standards Table

Organic matter content	25% - 100% (dry weight)
Organic portion	Fibrous and elongated
pH	6.0 – 8.0
Moisture content	30% - 60%
Particle size	100% passing a 1” screen and 10 - 50% passing a 3/8” screen
Soluble salt concentration	5.0 dS/m (mmhos/cm) maximum

Figure 5.2
Compost Filter Sock



STANDARD AND SPECIFICATIONS FOR DEWATERING DEVICE

Definition & Scope

An appurtenance to a sediment trapping structure such as a basin or trap that allows sediment laden water to pond allowing sediment to settle out while removing relatively clean water to a suitable, stable outlet.

Condition Where Practice Applies

Dewatering devices are appropriate where the discharge from a trap or basin will be by gravity flow through a riser and pipe outlet system. The skimmer dewatering device is the preferred option. A fixed pipe dewatering device, configured as a perforated vertical riser surrounded by filter fabric and stone material is an alternate option for small structures.

Design Criteria

Skimmer Device

1. Skimmers must be designed so as to float just beneath the water surface to remove the least sediment laden water effectively.
2. Skimmer shall be constructed with a 4 foot long flexible pipe elbow to allow for vertical movement of the skimmer for its designated range of operation.
3. The designer will provide a table that shows all required dimensions for the skimmer. An example of this table is shown in Figure 5.4 on page 5.12. See design example in Appendix B.
4. The skimmer will be provided with vertical travel guides and a resting stone pad set at the appropriate design elevation.
5. The orifice plate will be at the "T" intersection of the perforated skimmer section with the non-perforated extension arm.

Riser-Pipe Device

1. The riser-pipe device is constructed as a fixed rigid structure with a larger diameter pipe as the vertical riser connected to a smaller diameter horizontal pipe barrel.
2. The joint of these two conduits will be anchored by means of a concrete block or welded steel plate to prevent flotation.
3. The riser will be perforated above the bottom of the dewatering zone elevation and wrapped with a geotextile filter fabric to filter out sediment.
4. The filter fabric shall be covered with stone graded as NYSDOT #1, #2, or a blend of both, to protect the fabric from deterioration.
5. An orifice plate shall be placed in the riser at the bottom of the dewatering zone elevation to control the dewatering rate.

Dewatering Drawdown

As a minimum, sediment traps and basins should have their temporary storage dewatered over a 48 hour period to maximize sediment retention. If the soils disturbed within the drainage area will have 60% - 80% fines the settling time should be increased to 4 days. Soils containing greater than 80% fines will need longer settling times but in no case longer than 7 days to maintain the hydraulic performance of the basin for recurring runoff events.

1. Skimmer orifices may be sized by using the design chart shown in Figure 5.3 on page 5.11.
2. Riser-pipe orifice sizes may be approximated by the following formula:

$$A_0 = \frac{A_s \times 2h^{0.5}}{T \times C_d \times 20{,}428}$$

Where:

A_0 = Areas of the dewatering orifice (ft^2)

As = Surface area of the basin/trap (ft^2)

h = head of water above the orifice (ft)

C_d = 0.6 (contraction coefficient of an orifice)

T = Detention time needed to dewater basin (48 hours minimum)

Therefore, the minimum A_o formula for 48 hrs. reduces to:

$$A_o = \frac{A_s \times 2h^{0.5}}{588{,}326}$$

Material Specifications

1. Skimmer Devices - These devices shall be constructed with Schedule 40 PVC pipe with diameters of 4 to 6 inches. The flexible arm shall be equal diameter of non-perforated, corrugated, plastic tubing.

2. Riser-pipe Devices - These devices shall be constructed of Schedule 40 PVC if plastic pipe is used or galvanized corrugated steel or aluminum pipe. The minimum diameter shall be 6 inches if the device is used in conjunction with another permanent riser. All perforations will be at the interior of the corrugations.

Maintenance

1. Dewatering devices shall be inspected weekly and after each runoff event.

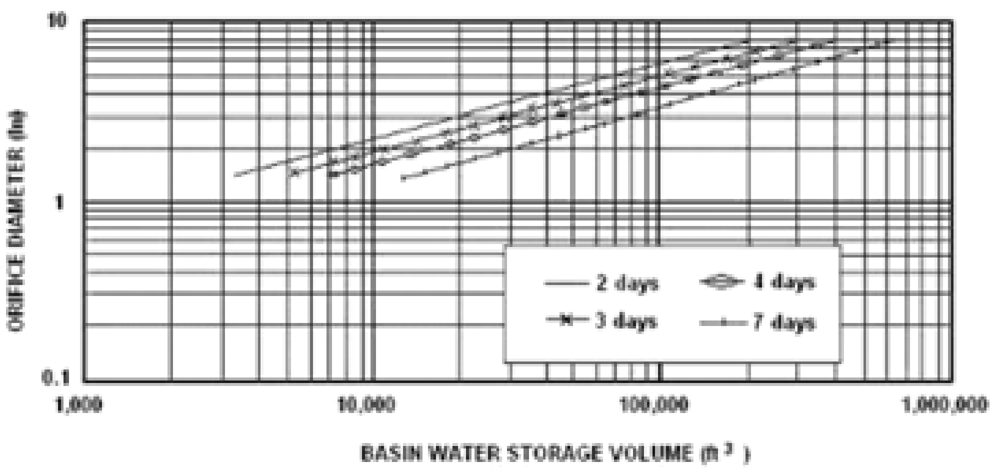
2. Filter fabric or media will be replaced as needed.

3. Any malfunctioning skimmer or its components shall be repaired or replaced within 24 hours of inspection notification.

4. Sediment shall be removed from the system when it reaches the level marked in a sediment cleanout stake or the top of the skimmer landing area.

5. The structure shall only be removed when the tributary area has been properly stabilized.

Figure 5.3 - Skimmer Orifice Design Chart



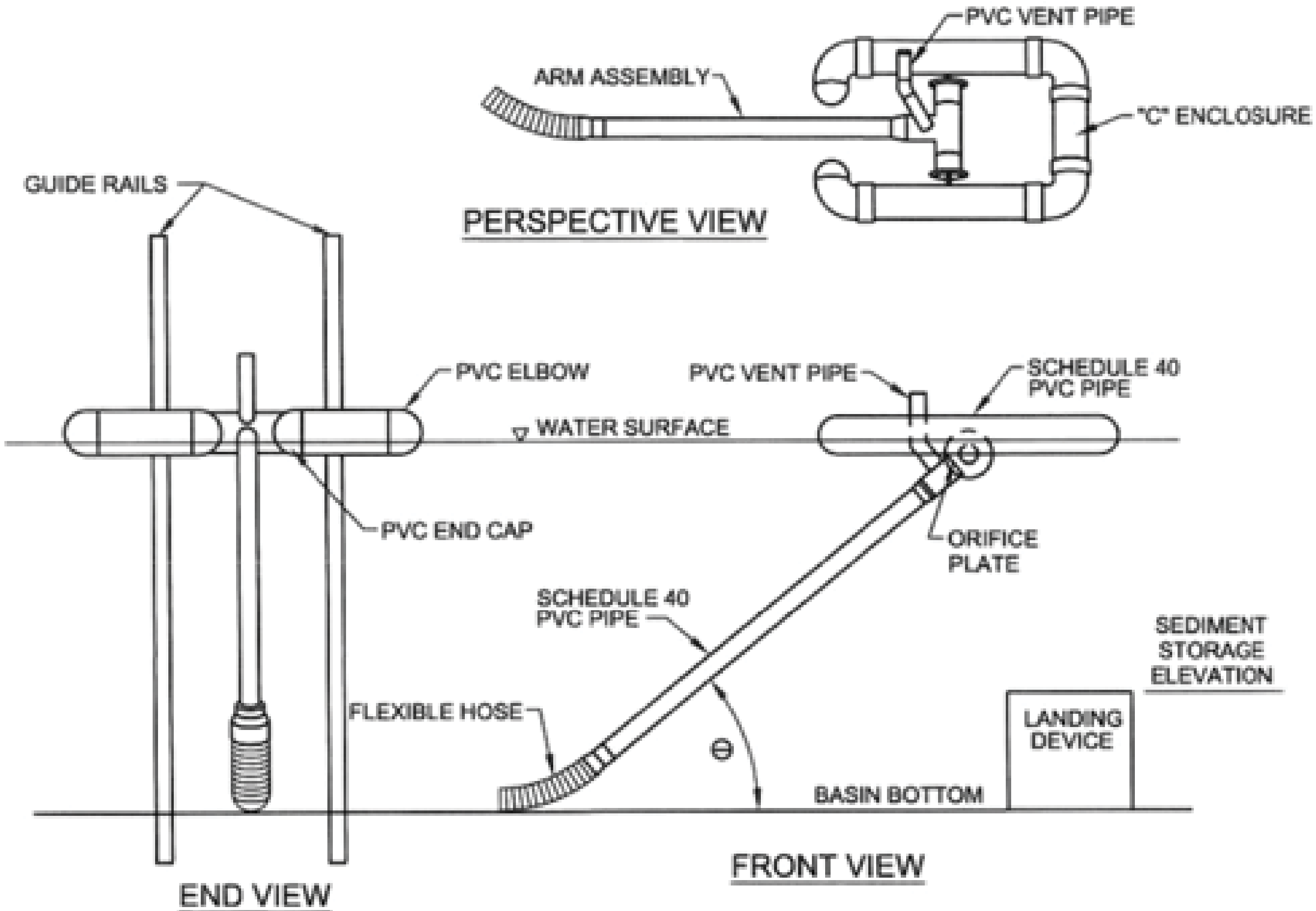
* Figure adapted from Penn State Agricultural and Biological Fact Sheet F-253

Notes:

1. Figure 5.3 is for use in designing the orifice plate for the skimmer shown in Figure 5.4. It assumes 3” to 5” head (depending upon the size of the skimmer). The required head for use of Figure 5.3 varies as follows: For a skimmer with a dewatering tube ≤ 2 1/2” diameter, use a 2” head. For a 3” diameter tube, use a 2.5” head; 4” tube, use 3.3” head, 5” tube use 4” head, and 6” diameter tube use 5” head.

2. Find the vertical line representing the basin’s dewatering zone volume. At the intersection of the vertical line with the desired dewatering time, read horizontally to the left to find the required skimmer orifice diameter.

Figure 5.4
Skimmer Dewatering Device



* Figure adapted from Penn State Agricultural and Biological Fact Sheet F-253

Basin No.	Water Surface Elevation (ft.)	Arm Length* (ft.)	Arm Dia. (in.)	Orifice Size** (in.)	Top of Landing Device Elevation (ft.)	Flexible Hose Length (in.)	Flexible Hose Attachment Elevation (ft.)
* Minimum Arm length = Full design storage depth x 1.414 (for 45 degree angle) ** Must be equal to or less than arm diameter							

Skimmer Construction Notes

1. Pipe flotation section shall be solvent welded to ensure an airtight assembly. The contractor is required to conduct a test to check for leaks prior to installation.

2. Skimmer section shall have 12 rows of 1/2” diameter holes, 1 1/4” on center. If additional filtration is necessary, the filtering media shall consist of a Type GD-II geotextile fabric wrapped around the perforated portion of the skimmer and attached with plastic snap ties, bands, etc.

3. Flexible pipe shall be inserted into solid pipe and fastened with 2 #8 wood screws.

4. At a minimum, the structure shall be inspected after each rain and repairs made as needed. If vandalism is a problem, more frequent inspection may be necessary.

5. Construction operations shall be carried out in such a manner that erosion and water pollution are minimized.

6. The structure shall only be removed when the contributing drainage area has been properly stabilized.

Materials

(Note: materials for a 4” diameter arm assembly)

1. Solid Pipe - 4” Schedule 40 PVC

2. Perforated Pipe - 4” Schedule 40 PVC

3. 90º Tee (1 each) - 4” Schedule 40 PVC

4. 90º Elbow (4 each) - 4” Schedule 40 PVC

5. Cap (2 each) - 4” Schedule 40 PVC, solid

6. Flexible pipe - 4” Corrugated Plastic Tubing (non-perforated)

Figure 5.5
Riser Pipe Dewatering Device

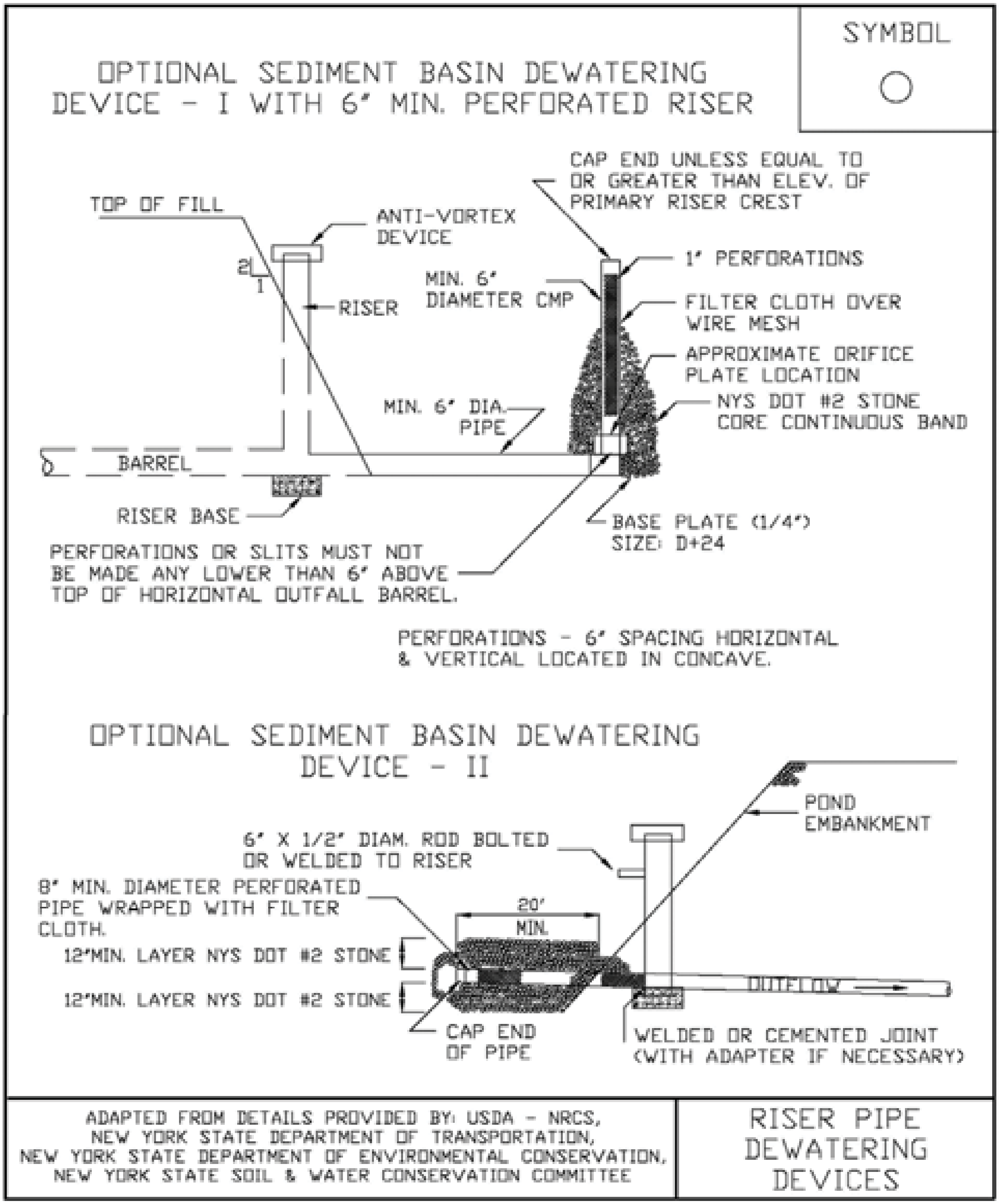


Figure 5.6
Riser Pipe Dewatering Device Construction Notes

Riser Pipe Construction Notes

1. Standpipe and connector pipe shall be a minimum of 6 inches diameter.

2. Metal pipe may be galvanized steel or aluminum; plastic pipe may be Schedule 40 PVC or HDPP.

3. Construction operations shall be carried out in such a manner that erosion and water pollution are minimized.

4. The structure shall only be removed when the contributing drainage area has been properly stabilized.

5. All pipe connections shall be watertight. The lower portion of the standpipe, at a point above the barrel connection, shall be fitted with an internal orifice plate sized to release the volume of the basin no sooner than 48 hours.

6. The top 2/3 of the standpipe shall be perforated with 1 inch diameter hole or slit spaced 6 inches vertically and horizontally and placed in the concave portion of the pipe. No holes will be allowed within 6 inches inches of the horizontal connector pipe.

7. The riser shall be wrapped with a Type GD-II geotextile fabric. The fabric shall extend 6inches above the highest hole and 6” below the lowest hole. Where ends of fabric come together, they shall be overlapped, folded and stapled to prevent bypass.

8. Straps or connecting bands shall be used to hold the fabric and wire mesh (as needed) in place. They shall be placed at the top and bottom of the cloth.

9. The standpipe shall be anchored with either concrete base or steel plate base to prevent flotation. Concrete bases shall be 12 inches thick with the standpipe embedded nine inches. Steel plate bases will be 1/4 inch minimum thickness attached to the standpipe by a continuous weld around the bottom to form a watertight connection. The plate shall have 2.5 feet of stone, gravel or tampered earth placed on it.

10. The perforated standpipe shall be surrounded by NYSDOT #1 or #2 stone or a blend of both to protect the filter fabric.

STANDARD AND SPECIFICATIONS FOR SEDIMENT BASIN

Definition & Scope

A **temporary** basin with a barrier or dam constructed across a drainage way or at other suitable locations to intercept sediment-laden runoff and reduce the amount of sediment leaving the disturbed area in order to protect drainageways, properties, and rights-of-way below the sediment basin.

Conditions Where Practice Applies

A sediment basin is appropriate where physical site conditions or land ownership restrictions preclude the installation of other control measures to adequately control runoff, erosion, and sedimentation. However, it is required that other erosion control measures be used with the sediment basin. The basin may be used below construction operations which expose critical areas to soil erosion. The basin shall be maintained until the disturbed area is protected against erosion by permanent stabilization.

This standard applies to the installation of temporary sediment basins on sites where: (a) failure of the structure would not result in loss of life, damage to homes or buildings, or interruption of use or service of public roads or utilities; (b) the drainage area does not exceed 50 acres; and (c) the basin is to be removed within 36 months after the beginning of construction of the basin.

Permanent (to function more than 36 months) sediment basins, or structures that temporarily function as a sediment basin but are intended for use as a permanent pool shall be classified as **permanent** structures and shall conform to criteria appropriate for permanent structures. These structures shall be designed and constructed to conform to NRCS Standard And Specification No. 378 for Ponds in the National Handbook of Conservation Practices and the New York State Department of Environmental Conservation, "Guidelines for the Design of Dams."

Design Criteria

Compliance with Laws and Regulations

Design and construction shall comply with state and local laws, ordinances, rules and regulations, including permits.

Location - Maximum Drainage Area = 50 acres

The sediment basin should be located to obtain the maximum storage benefit from the terrain and for ease of cleanout of the trapped sediment. It should be located to minimize interference with construction activities and construction of utilities. Whenever possible, sediment basins should be located so that storm drains may outfall or be diverted into the basin. **Do not locate basins in perennial streams.**

Size and Shape of the Basin

The sediment basin will contain two separate zones. The lowest zone is the sediment storage zone. This zone is sized for a volume equal to 1,000 cubic feet per disturbed acre over the course of the life of the project, contributing to the basin as measured from the bottom of the basin to the bottom of the dewatering zone. It shall have a minimum depth of 1 foot. Layered above this zone is the dewatering zone. This zone is sized for a minimum volume equal to 3,600 cubic feet per each acre draining to the basin. This volume is temporarily stored between the sediment storage zone and the crest of the principal spillway. This zone should be a minimum of 3 feet deep. See Figures 5.8 and 5.9 on pages 5.26 and 5.27. This 3,600 cubic feet per acre is equivalent to one inch of sediment per acre of drainage area. The entire drainage area is used for this computation, rather than the disturbed area above, to maximize trapping efficiency. The length to width ratio shall be 2:1 or greater, where length is the distance between the inlet and outlet. A wedge shape shall be used with the inlet located at the narrow end. See Figure 5.22 on page 5.41.

Surface Area

Research studies (Barfield and Clar 1985; Pitt, 2003) indicate that the following relationship between surface area and peak inflow rate gives a trapping efficiency of 75% for silt loam soils, and greater than 90% for loamy sand soils:

$A = 0.01\ Qp$ or, $A = 0.015x\ D.A.$ (whichever is greater)

where,

A = the basin surface area, acres, measured at the service spillway crest; and

Qp = the peak inflow rate for the design storm. (The minimum design storm will be a 10 year, 24 hour storm under construction conditions).

D.A. = contributing drainage area.

Sediment basins shall be cleaned out when the sediment storage zone volume described above is reduced by 50 percent, except in no case shall the sediment level be permitted to build up higher than one foot below the bottom of the dewatering zone. At this elevation, cleanout shall be performed to restore the original design volume to the sediment storage zone.

The elevation corresponding to the maximum allowable sediment level shall be determined and shall be stated in the design data as a distance below the top of the riser and shall be clearly marked on the riser.

The basin dimensions necessary to obtain the required basin volume as stated above shall be clearly shown on the plans to facilitate plan review, construction, and inspection.

Spillway Design

Runoff shall be computed by standard accepted hydrologic methods noted previously in this book of standards. **Runoff computations shall be based upon the worst soil cover conditions expected to prevail in the contributing drainage area during the anticipated effective life of the structure.** The combined capacities of the principal and emergency spillway shall be sufficient to pass the peak rate of runoff from a ten (10) year frequency, 24 hour duration storm.

1. Principal spillway: A spillway consisting of a vertical pipe or box type riser joined (watertight connection) to a pipe (barrel) which shall extend through the embankment and outlet beyond the downstream toe of the fill. The minimum capacity of the principal spillway shall be 0.2 cfs per acre of drainage area when the water surface is at the emergency spillway crest elevation. For those basins with no emergency spillway, the principal spillway shall have the capacity to handle the peak flow from a ten-year frequency rainfall event. The minimum size of the barrel shall be 8 inches in diameter. See Figures 5.10, 5.11 and 5.12 on pages 5.28, 5.29, and 5.30 for principal spillway sizes and capacities.

   A. Crest elevation: When used in combination with an emergency spillway, the crest elevation of the riser shall be a minimum one foot below the elevation of the control section of the emergency spillway.

   B. Watertight riser and barrel assembly: The riser and all pipe connections shall be completely watertight except for the inlet opening at the top, or a dewatering opening. There shall not be other holes, leaks, rips, or perforations in the structure.

   C. Dewatering the basin:

   1) Preferred Method- The preferred method for dewatering sediment basins is by using surface skimmers to decant the cleaner top surface water from the basin as the sediment settles out. See Dewatering Device Standard, page 5.10.

   2) Alternative Method– A fixed vertical riser pipe configured with perforations and filter fabric with a cone of pea gravel or small crushed stone is an alternative option for use. See Figure 5.5 on page 5.14.

   The sediment basin dewatering system shall be designed to release the dewatering zone volume between 2 to 7 days in watersheds not impaired by sediment, and 4-7 days in sediment impaired watersheds (check the NYSDEC Waterbody Inventory/Priority Waterbody List - **http://www.dec.ny.gov/chemical/36730.html**, to see if your site is in an impaired watershed). The design performance range will depend on the percent of silt and clay in the soils tributary to the basin. If the performance of the basin does not meet water quality objectives after 7 days, chemical treatment may be necessary.

   D. Anti-vortex device and trash rack:

   An anti-vortex device and trash rack shall be securely installed on top of the riser and shall be the concentric type as shown in Figure 5.13 and 5.14 on pages 5.31 and 5.32.

   E. Base:

   The riser shall have a base attached with a watertight connection and shall have sufficient weight to prevent flotation of the riser. Two approved bases for risers ten feet or less in height are: 1) a concrete base 18 in. thick with the riser embedded 9 in. in the base, and 2) a ¼" minimum thickness steel plate attached to the riser by a continuous weld around the circumference of the riser to form a watertight connection. The plate shall have 2.5 feet of stone, gravel, or compacted earth placed on it to prevent flotation. In either case, each side of the square base shall be twice the riser diameter.

   For risers greater than ten feet high, computations shall be made to design a base which will prevent flotation. The minimum factor of safety shall be 1.20 (Downward forces = 1.20 x upward forces). See Figure 5.15 on page 5.33 for details.

F. Anti-Seep Collars: Anti-seep collars shall be installed around all conduits through earth fills of impoundment structures according to the following criteria:

1) Collars shall be placed to increase the seepage length along the conduit by a minimum of 15 percent of the pipe length located within the saturation zone.

2) Collar spacing shall be between 5 and 14 times the vertical projection of each collar.

3) All collars shall be placed within the saturation zone.

4) The assumed normal saturation zone (phreatic line) shall be determined by projecting a line at a slope of 4 horizontal to 1 vertical from the point where the normal water (riser crest) elevation touches the upstream slope of the fill to a point where this line intersects the invert of the pipe conduit. All fill located within this line may be assumed as saturated.

$$2(N)(P)=1.15(L_s) \qquad N=(0.075)(L_s)/P$$

When anti-seep collars are used, the equation for revised seepage length becomes:

Where: Ls = Saturated length is length, in feet, of pipe between riser and intersection of phreatic line and pipe invert.

N = number of anti-seep collars.

P = vertical projection of collar from pipe, in feet.

5) All anti-seep collars and their connections shall be watertight. See Figures 5.16 and 5.17 on pages 5.34 and 5.35 for anti-seep collar design and Figure 5.18 on page 5.36 for construction details. Seepage diaphragms may be used in lieu of anti-seep collars. They shall be designed in accordance to USDA NRCS Pond Standard 378.

G. Outlet: An outlet shall be provided, including a means of conveying the discharge in an erosion free manner to an existing stable channel. Where discharge occurs at the property line, drainage easements will be obtained in accordance with local ordinances. Adequate notes and references will be shown on the erosion and sediment control plan.

Protection against scour at the discharge end of the pipe spillway shall be provided. Measures may include basin, riprap, revetment, excavated plunge pools, or other approved methods. See Standard and Specification for Rock Outlet Protection, Section 3, page 3.39.

2. Emergency Spillways: The entire flow area of the emergency spillway shall be constructed in undisturbed ground (not fill). The emergency spillway cross-section shall be trapezoidal with a minimum bottom width of eight feet. This spillway channel shall have a straight control section of at least 20 feet in length; and a straight outlet section for a minimum distance equal to 25 feet.

A. Capacity: The minimum capacity of the emergency spillway shall be that required to pass the peak rate of runoff from the 10 year 24-hour frequency storm, less any reduction due to flow in the pipe spillway. Emergency spillway dimensions may be determined by using the method described in Figure 5.19 on page 5.37 and the Design Tables in Figures 5.20 and 5.21 on pages 5.38 and 5.39.

B. Velocities: The velocity of flow in the exit channel shall not exceed 5 feet per second for vegetated channels. For channels with erosion protection other than vegetation, velocities shall be within the non-erosive range for the type of protection used.

C. Erosion Protection: Erosion protection shall be provided for by vegetation as prescribed in this publication or by other suitable means such as riprap, asphalt or concrete.

D. Freeboard: Freeboard is the difference between the design high water elevation in the emergency spillway and the top of the settled embankment. If there is no emergency spillway, it is the difference between the water surface elevation required to pass the design flow through the pipe and the top of the settled embankment. Freeboard shall be at least one foot.

Embankment Cross-Section

1. The maximum height of dam = 15 feet (measured from the low point of original ground at the downstream toe to the top of the dam).

2. Minimum top width of dam = 10 feet.

3. Side slopes shall be 2.5 to 1 or flatter.

Entrance of Runoff into Basin

Points of entrance of surface runoff into excavated sediment basins shall be protected to prevent erosion. Considerable care should be given to the major points of inflow into basins. In many cases the difference in elevation of the inflow and the bottom of the basin is considerable, thus creating a potential for severe gullying and sediment generation. Often a riprap drop at major points of inflow would eliminate gullying and sediment generation.

Diversions, grade stabilization structures or other water control devices shall be installed as necessary to ensure direction of runoff and protect points of entry into the basin. Points of entry should be located so as to ensure maximum travel distance of entering runoff to point of exit (the riser) from the basin.

Disposal

The sediment basin plans shall indicate the method (s) of disposing of the sediment removed from the basin. The sediment shall be placed in such a manner that it will not erode from the site. The sediment shall not be deposited downstream from the basin, adjacent to a stream or floodplain. Disposal sites will be covered by an approved sediment control plan.

The sediment basins plans shall also show the method of disposing of the sediment basin after the drainage area is stabilized, and shall include the stabilization of the sediment basin site. Water contained within the storage areas shall be removed from the basin by pumping, cutting the top of the riser, or other appropriate method prior to removing or breaching the embankment. **Sediment shall not be allowed to flush into a stream or drainageway.**

Chemical Treatment

Precipitation of sediment is enhanced with the use of specific chemical flocculants that can be applied to the sediment basin in liquid, powder, or solid form. Flocculants include anionic polyelectrolytes such as polyacrylimides, aluminum sulfate (alum), polyaluminum chloride and chitosan. Cationic polyelectrolytes have a greater toxicity to fish and other aquatic organisms than anionic polyelectrolytes because they bind to the gills of fish resulting in respiratory failure (Pitt, 2003).

Chemical treatment shall not be substituted for proper erosion and sediment control. To reduce the need for flocculants, proper controls include planning, phasing, sequencing and practice design in accordance to NY Standards. **Chemical applications shall not be applied without written approval from the NYSDEC.**

Safety

Sediment basins are attractive to children and can be very dangerous. Local ordinances and regulations must be adhered to regarding health and safety. The developer or owner shall check with local building officials on applicable safety requirements. If fencing of sediment basins is required, the location of and type of fence shall be shown on the plans.

Construction Specifications

Site Preparation

Areas under the embankment shall be cleared, grubbed, and stripped of topsoil to remove trees, vegetation, roots, or other objectionable material. In order to facilitate cleanout and restoration, the pool area (measured at the top of the pipe spillway) will be cleared of all brush, trees, and other objectionable materials.

Cutoff-Trench

A cutoff trench shall be excavated along the centerline of earth fill embankments. The minimum depth shall be two feet. The cutoff trench shall extend up both abutments to the riser crest elevation. The minimum bottom width shall be four feet, but wide enough to permit operation of excavation and compaction equipment. The side slopes shall be no steeper than 1:1. Compaction requirements shall be the same as those for embankment. The trench shall be dewatered during the back-filling/compaction operations.

Embankment

The fill material shall be taken from approved areas shown on the plans. It shall be clean mineral soil free of roots, woody vegetation, oversized stones, rocks, or other objectionable material. Relatively pervious materials such as sand or gravel (Unified Soil Classes GW, GP, SW & SP) shall not be placed in the embankment. Areas on which fill is to be placed shall be scarified prior to placement of fill. The fill material shall contain sufficient moisture so that it can be formed by hand into a ball without crumbling. If water can be squeezed out of a ball, it is too wet for proper compaction. Fill material shall be placed in six to eight-inch thick continuous layers over the entire length of the fill. Compaction shall be obtained by routing and hauling the construction equipment over the fill so that the entire surface of each layer of the fill is traversed by at least one wheel or tread track of the equipment or by the use of a compactor. The embankment shall be constructed to an elevation 10 percent higher than the design height to allow for settlement.

Pipe Spillway

The riser shall be securely attached to the barrel or barrel stub by welding the full circumference making a watertight structural connection. The barrel stub must be attached to the riser at the same percent (angle) of grade as the outlet conduit. The connection between the riser and the riser base shall be watertight. All connections between barrel sections must be achieved by approved watertight bank assemblies. The barrel and riser shall be placed on a firm, smooth foundation of impervious soil. Pervious materials such as sand, gravel, or crushed stone shall not be used as backfill around the pipe or anti-seep collars. The fill material around the pipe spillway shall be placed in four-inch layers and compacted under and around the pipe to at least the same density as the adjacent embankment.

A minimum depth of two feet of hand compacted backfill shall be placed over the pipe spillway before crossing it with construction equipment. Steel base plates on risers shall have at least 2 ½ feet of compacted earth, stone, or gravel placed over it to prevent flotation.

Emergency Spillway

The emergency spillway shall be installed in undisturbed ground. The achievement of planned elevations, grades, design width, entrance and exit channel slopes are critical to the successful operation of the emergency spillway and must be constructed within a tolerance of +/- 0.2 feet.

Vegetative Treatment

Stabilize the embankment and emergency spillway in accordance with the appropriate vegetative standard and specification immediately following construction. In no case shall the embankment remain unstabilized for more than three (3) days.

Erosion and Pollution Control

Construction operations shall be carried out in such a manner that erosion and water pollution will be minimized. State and local laws shall be complied with concerning pollution abatement.

Safety

State and local requirements shall be met concerning fencing and signs, warning the public of hazards of soft sediment and floodwater.

Maintenance

1. Repair all damages caused by soil erosion and construction equipment at or before the end of each working day.

2. Sediment shall be removed from the basin when it reaches the specified depth for cleanout noted on the plans which will not exceed 50% of the capacity of the sediment storage zone. This sediment shall be placed in such a manner that it will not erode from the site. The sediment shall not be deposited downstream from the embankment, adjacent to a stream or floodplain.

Final Disposal

When temporary structures have served their intended purpose and the contributing drainage area has been properly stabilized, the embankment and resulting sediment deposits are to be leveled or otherwise disposed of in accordance with the approved sediment control plan. The proposed use of a sediment basin site will often dictate final disposition of the basin and any sediment contained therein. If the site is scheduled for future construction, then the basin material and trapped sediments must be removed, safely disposed of, and backfilled with a structural fill. When the basin area is to remain open space, the pond may be pumped dry, graded, and backfilled.

Information to be Submitted

Sediment basin designs and construction plans submitted for review to a local municipality, New York State DEC, New York City DEP, Soil and Water Conservation District, or other agency shall include the following:

1. Specific location of the basin.

2. Plan view of the storage basin and emergency spillway, showing existing and proposed contours.

3. Cross section of dam, principal spillway, emergency spillway, and profile of emergency spillway.

4. Details of pipe connections, riser to pipe connections, riser base, anti-seep control, trash rack cleanout elevation, and anti-vortex device.

5. Runoff calculations for 1 and 10-year frequency storms, if required.

6. Storage Computations

    A. Zones total required

    B. Zones total Available

    C. Elevation of sediment at which cleanout shall be required; also stated as a distance from the riser

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

Computed by ______________________ Date ____________Checked by _______________Date _________
Project____Basin #_________________________
Location ________________________ Total Area draining to basin (≤50 Ac.) ____________________Acres

BASIN SIZE DESIGN

1. Sediment storage zone volume = 1,000 cu. ft. x number of disturbed acres = _______ cu. ft., Top of Zone Elev. _____
2. Dewatering zone volume = 3,600 cu. ft. x number of drainage area acres = _______cu. ft., Top of Zone Elev. _______
3. Length to width ratio = ____________
4. A. Cleanout at 50% of sediment storage zone volume, Elev. ____________
   B. Distance below top of riser __________ feet
5. Minimum surface area is larger of 0.01 $Q_{(10)}$ _________or, 0.015 DA = ___________ use ___________acres

DESIGN OF SPILLWAYS & ELEVATIONS

Runoff

6. $Q_{p(10)}$ = ___________________________cfs (Attach runoff computation sheets)

Pipe Spillway (Q_{ps})

7. Min. pipe spillway cap., Q_{ps} = 0.2 x _______Drainage Area, acres = ________cfs
   Note: If there is no emergency spillway, then required $Q_{ps} = Q_{p(10)}$ = ________cfs.
8. H, head = ________ft. Barrel length = ________ft
9. Barrel: Diam. _______inches; Q_{ps} = (Q) ___________x (cor.fac.)________=_________cfs.
10. Riser: Diam. _______inches; Length ________ft.; h = _________ft. Crest Elev. _____________
11. Trash Rack: Diameter = ________inches; H, height = __________inches

Emergency Spillway Design

12. Emergency Spillway Flow, $Q_{es} = Q_p - Q_{ps}$ = ___________ - ____________ = ___________cfs.
13. Width _______ft.; H_p _________ft Crest elevation ___________; Design High Water Elev. ___________
    Entrance channel slope___________________________% ; Top of Dam Elev. ________________
    Exit channel slope ______________________________%

ANTI-SEEP COLLAR/SEEPAGE DIAPHRAGM DESIGN

Collars:

14. y = ________ft.; z = _______:1; pipe slope = ________%, L_s = _______ft.
    Use _______ collars, ______ - ______inches square; projection = ________ft.

Diaphragms:

#_________ width_________ ft. height _________ft.

DEWATERING ORIFICE SIZING

(Determined from the Dewatering Device Standard)

15. Dewatering orifice diameter = ________ inches. Skimmer ___ or Riser ____ (check one)
16. Design dewatering time ________ days (Min. 2 days required)

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET
INSTRUCTIONS FOR USE OF FORM

1. Minimum required sediment storage zone volume is 1,000 cubic feet per acre from each disturbed acre within the total drainage area. Minimum required dewatering zone volume is 3,600 cubic feet per total area draining to the basin.

2. The volume of a naturally shaped basin (no excavation in basin) may be approximated by the formula V = (0.4)(A)(d), where V is in cubic feet, A is the surface area of the basin, in square feet, and d is the maximum depth of the basin, in feet. Volume may be computed from contour information or other suitable methods.

3. If volume of basin is not adequate for required storage, excavate to obtain the required zone volumes.

4. The minimum surface area of the basin pool at the storage volume elevation will be the larger of the two elevations shown.

5. Use of the NRCC hydrologic data at www.precip.net with an appropriate hydrologic model, is the preferred process for runoff computation. Runoff curve numbers will be computed for the drainage area that reflects the maximum construction condition.

6. Required minimum discharge from pipe spillway equals 0.2 cfs/ac. times total drainage area. (This is equivalent to a uniform runoff of 5 in. per 24 hours). The pipe shall be designed to carry Q_p if site conditions preclude installation of an emergency spillway to protect the structure.

7. Determine value of “H” from field conditions; “H” is the interval between the centerline of the outlet pipe and the emergency spillway crest, or if there is no emergency spillway, to the design high water.

8. See Pipe Flow Charts, Figures 5.11 and 5.12 on pages 5.29 and 5.30.

9. See Riser Inflow Curves, Figure 5.10 on page 5.28.

10. Compute the orifice size required to dewater the basin over a minimum 48 hour period. See the Dewatering Device Standard on page 5.10.

11. See Trash Rack and Anti-Vortex Device Design, Figures 5.13 and 5.14 on pages 5.31 and 5.32.

12. Compute Q_{es} by subtracting actual flow carried by the pipe spillway from the total inflow, Q_p.

13. Use appropriate tables to obtain values of H_p, bottom width, and actual Q_{es}. If no emergency spillway is to be used, so state, giving reason (s).

14. See Anti-Seep Collar / Seepage Diaphragm Design (see figures 5.16, 5.17 and 5.18 on pages 5.34, 5.35 and 5.36).

15. Fill in design elevations. The emergency spillway crest must be set no closer to riser crest than value of h, which causes pipe spillway to carry the minimum, required Q. Therefore, the elevation difference between spillways shall be equal to the value of h, or one foot, whichever is greater. Design high water is the elevation of the emergency spillway crest plus the value of H_p, or if there is no emergency spillway, it is the elevation of the riser crest plus h required to handle the 10-year storm. Minimum top of dam elevation requires 1.0 ft. of freeboard above design high water.

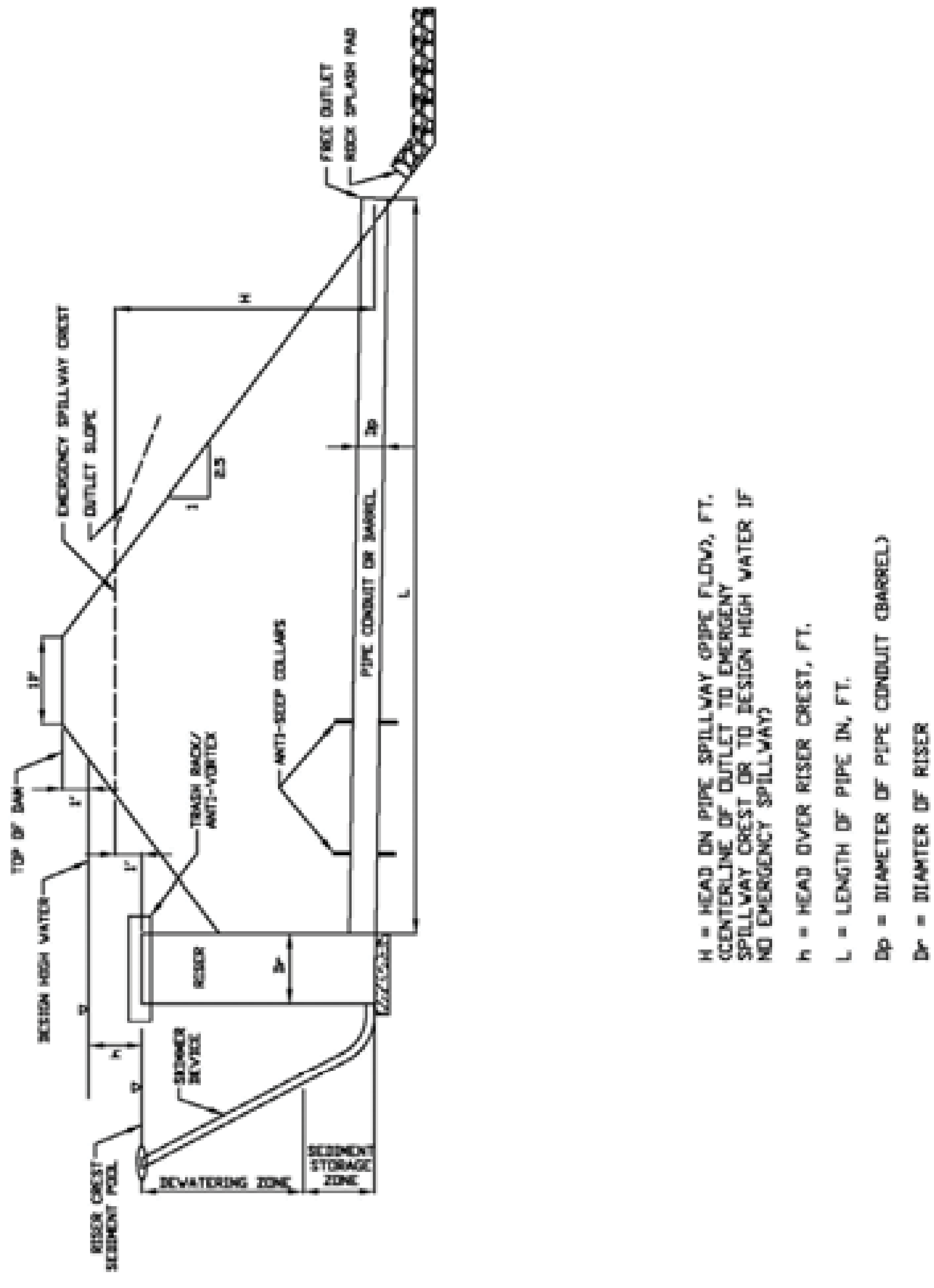
To use charts for pipe spillway design:

1. Enter chart, Figures 5.11 or 5.12 on pages 5.29 and 5.30 with H and required discharge.

2. Find diameter of pipe conduit that provides equal or greater discharge

3. Enter chart, Figure 5.10 on page 5.28 with actual pipe discharge. Read across to select smallest riser that provides discharge within weir flow portion of rating curve. Read down to find corresponding h required. This h must be 1 foot or less.

Figure 5.8
Pipe Spillway Design



ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	PIPE SPILLWAY DESIGN

Figure 5.9
Sediment Basin

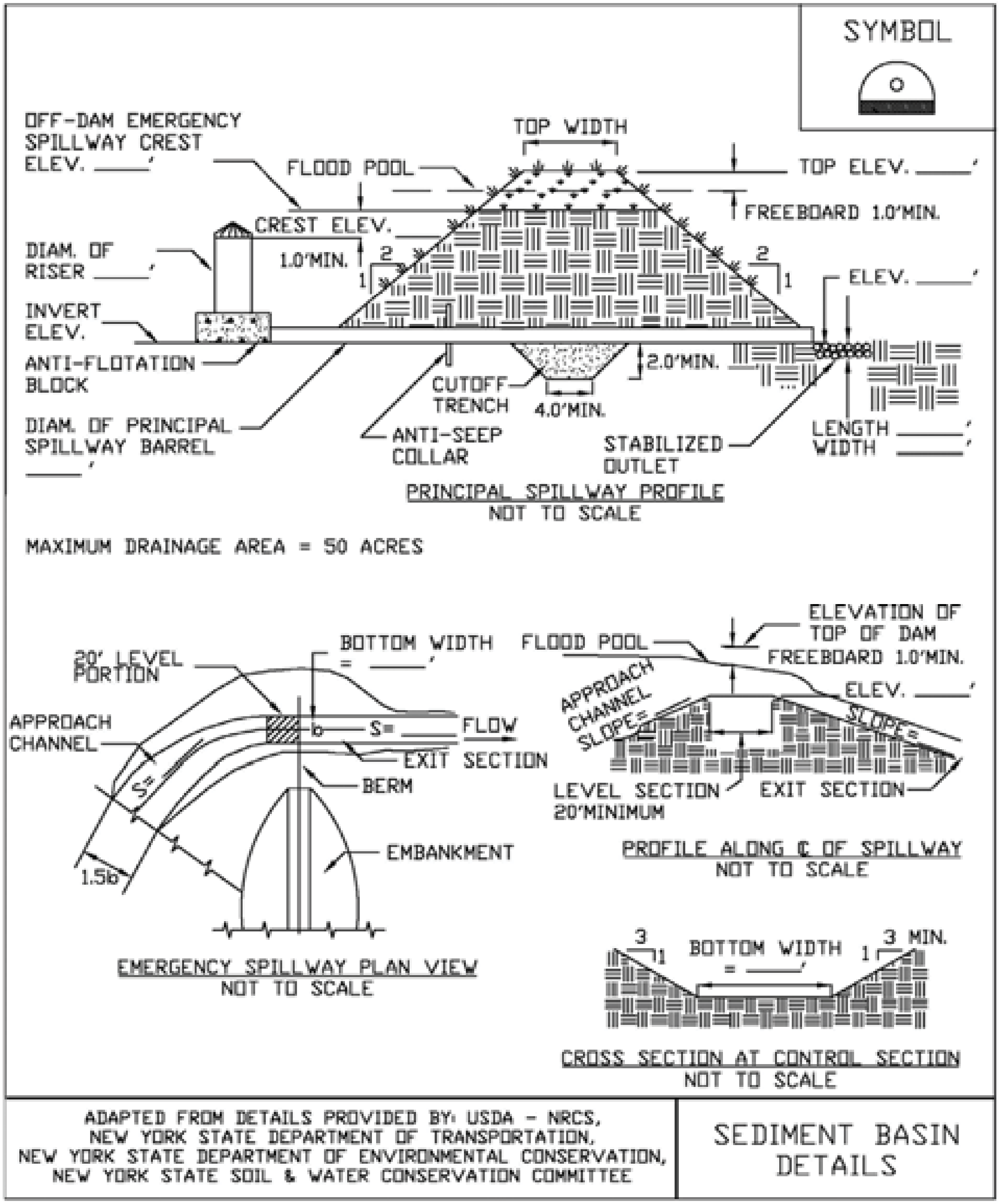


Figure 5.10
Riser Inflow Chart (USDA - NRCS)

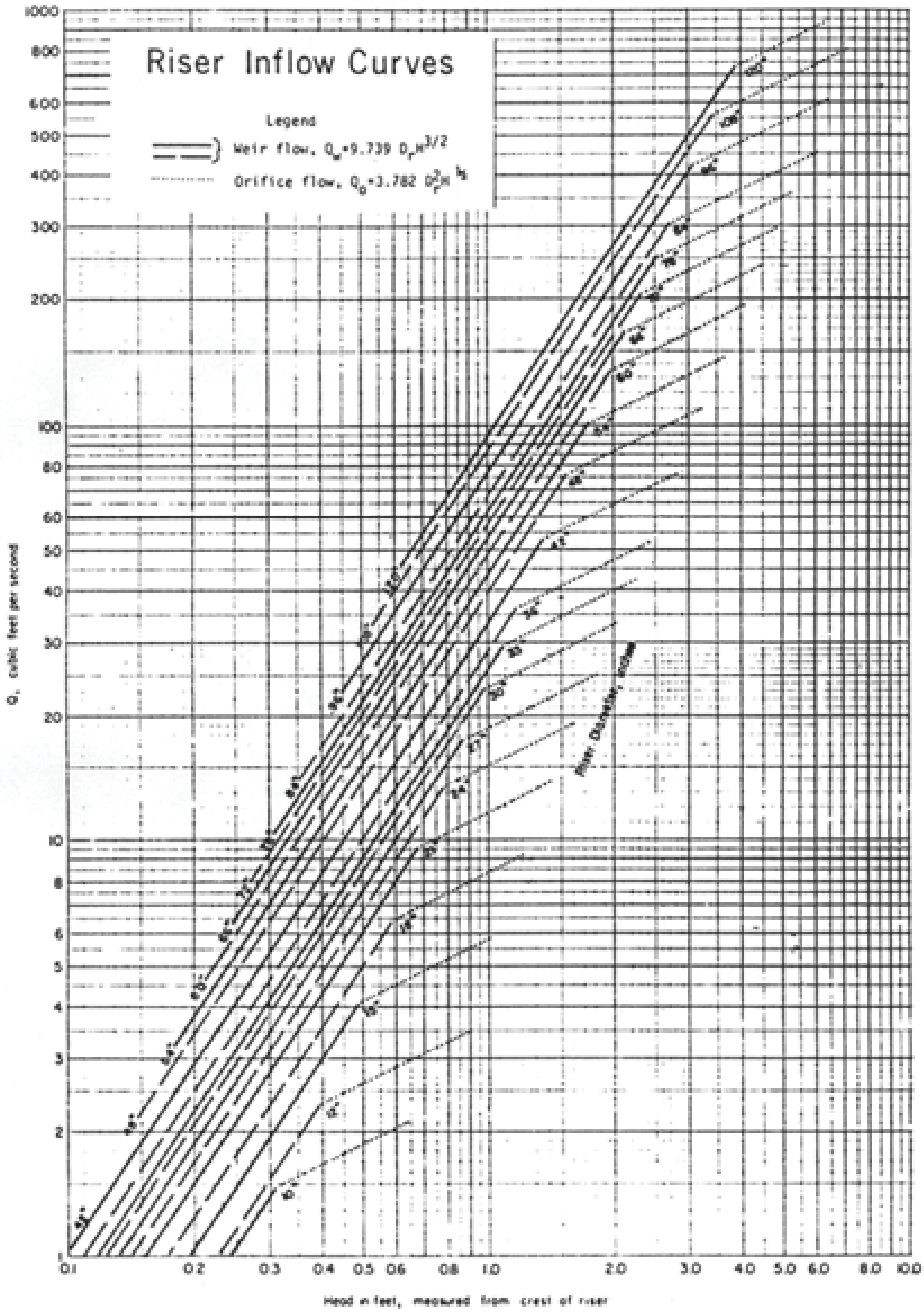


Figure 5.11
Pipe Flow Chart; "n" = 0.025 (USDA - NRCS)

PIPE FLOW CHART n = 0.025

FOR CORRUGATED METAL PIPE INLET $K_m = K_e + K_b = 1.0$ AND 70 FEET OF CORRUGATED METAL PIPE CONDUIT (full flow assumed)

Note correction factors for pipe lengths other than 70 feet

diameter of pipe in inches

H, in feet	6"	8"	10"	12"	15"	18"	21"	24"	30"	36"	42"	48"	54"	60"	66"	72"	78"	84"	90"	96"	102"
1	0.33	0.70	1.25	1.98	3.48	5.47	7.99	11.0	18.8	28.8	41.1	55.7	72.6	91.8	113	137	163	191	222	255	290
2	0.47	0.99	1.76	2.80	4.92	7.74	11.3	15.6	26.6	40.8	58.2	78.8	103	130	160	194	231	271	314	360	410
3	0.58	1.22	2.16	3.43	6.02	9.48	13.8	19.1	32.6	49.9	71.2	96.5	126	159	196	237	282	331	384	441	502
4	0.67	1.40	2.49	3.97	6.96	10.9	16.0	22.1	37.6	57.7	82.3	111	145	184	226	274	326	383	444	510	580
5	0.74	1.57	2.79	4.43	7.78	12.2	17.9	24.7	42.1	64.5	92.0	125	162	205	253	306	365	428	496	570	648
6	0.82	1.72	3.05	4.86	8.52	13.4	19.6	27.0	46.1	70.6	101	136	178	225	277	336	399	469	544	624	710
7	0.88	1.86	3.30	5.25	9.20	14.5	21.1	29.2	49.8	76.3	109	147	192	243	300	362	431	506	587	674	767
8	0.94	1.99	3.53	5.61	9.84	15.5	22.6	31.2	53.2	81.5	116	158	205	260	320	388	461	541	628	721	820
9	1.00	2.11	3.74	5.95	10.4	16.4	24.0	33.1	56.4	86.5	123	167	218	275	340	411	489	574	666	764	870
10	1.05	2.22	3.94	6.27	11.0	17.3	25.3	34.9	59.5	91.2	130	176	230	290	358	433	516	605	702	806	917
11	1.10	2.33	4.13	6.58	11.5	18.2	26.5	36.6	62.4	95.6	136	185	241	304	376	454	541	635	736	845	962
12	1.15	2.43	4.32	6.87	12.1	19.0	27.7	38.2	65.2	99.9	142	193	252	318	392	475	565	663	769	883	1004
13	1.20	2.53	4.49	7.15	12.6	19.7	28.8	39.8	67.8	104	148	201	262	331	408	494	588	690	800	919	1045
14	1.25	2.63	4.66	7.42	13.0	20.5	29.9	41.3	70.4	108	154	208	272	343	424	513	610	716	830	953	1085
15	1.29	2.72	4.83	7.68	13.5	21.2	30.9	42.8	72.8	112	159	216	281	355	439	531	631	741	860	987	1123
16	1.33	2.81	4.99	7.93	13.9	21.9	32.0	44.2	75.2	115	165	223	290	367	453	548	652	765	888	1019	1160
17	1.37	2.90	5.14	8.18	14.3	22.6	32.9	45.5	77.5	119	170	230	229	378	467	565	672	789	915	1051	1195
18	1.41	2.98	5.29	8.41	14.8	23.2	33.9	46.8	79.8	120	174	236	308	389	480	581	692	812	942	1081	1230
19	1.45	3.06	5.43	8.64	15.2	23.9	34.8	48.1	82.0	126	179	243	316	400	494	597	711	834	967	1111	1264
20	1.49	3.14	5.57	8.87	15.6	24.5	35.7	49.4	84.1	129	184	249	325	410	506	613	729	856	993	1139	1297
21	1.53	3.22	5.71	9.09	15.9	25.1	36.6	50.6	86.2	132	188	255	333	421	519	628	747	877	1017	1168	1329
22	1.56	3.29	5.85	9.30	16.3	25.7	37.5	51.8	88.2	135	193	261	341	430	531	643	765	898	1041	1195	1360
23	1.60	3.37	5.98	9.51	16.7	26.2	38.3	53.0	90.2	138	197	267	348	440	543	657	782	918	1064	1222	1390
24	1.63	3.44	6.11	9.72	17.0	26.8	39.1	54.1	92.1	141	201	273	356	450	555	671	799	937	1087	1248	1420
25	1.66	3.51	6.23	9.92	17.4	27.4	39.9	55.2	94.0	144	206	279	363	459	566	685	815	957	1110	1274	1450
26	1.70	3.58	6.36	10.1	17.7	27.9	40.7	56.3	95.9	147	210	284	370	468	577	699	831	976	1132	1299	1478
27	1.73	3.65	6.48	10.3	18.1	28.4	41.5	57.4	97.7	150	214	290	377	477	588	712	847	994	1153	1324	1507
28	1.76	3.72	6.60	10.5	18.4	29.0	42.3	58.4	99.5	153	218	295	384	486	599	725	863	1013	1174	1348	1534
29	1.79	3.78	6.71	10.7	18.7	29.5	43.0	59.5	101	155	221	300	391	494	610	738	878	1030	1195	1372	1561
30	1.82	3.85	6.83	10.9	19.1	30.0	43.7	60.5	103	158	225	305	398	503	620	750	893	1048	1216	1396	1588

Correction Factors For Other Pipe Lengths

L, in feet	6"	8"	10"	12"	15"	18"	21"	24"	30"	36"	42"	48"	54"	60"	66"	72"	78"	84"	90"	96"	102"
20	1.49	1.63	1.58	1.53	1.47	1.42	1.37	1.34	1.28	1.24	1.20	1.18	1.16	1.14	1.13	1.11	1.10	1.10	1.09	1.08	1.08
30	1.44	1.41	1.39	1.36	1.32	1.29	1.27	1.24	1.21	1.18	1.15	1.13	1.12	1.11	1.10	1.09	1.08	1.07	1.07	1.06	1.06
40	1.26	1.27	1.25	1.23	1.21	1.20	1.18	1.17	1.14	1.12	1.11	1.10	1.09	1.08	1.07	1.06	1.06	1.05	1.05	1.05	1.04
50	1.16	1.16	1.15	1.14	1.13	1.12	1.11	1.10	1.09	1.08	1.07	1.06	1.06	1.05	1.05	1.04	1.04	1.04	1.03	1.03	1.03
60	1.07	1.07	1.07	1.06	1.06	1.05	1.05	1.05	1.04	1.04	1.03	1.03	1.03	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.01
70	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	.94	.94	.95	.95	.95	.95	.96	.96	.96	.97	.97	.97	.98	.98	.98	.98	.98	.98	.99	.99	.99
90	.89	.89	.90	.90	.91	.91	.92	.92	.93	.94	.94	.95	.95	.96	.96	.96	.97	.97	.97	.97	.94
100	.85	.85	.86	.86	.87	.88	.89	.89	.90	.91	.92	.93	.93	.94	.94	.95	.95	.95	.96	.96	.94
120	.78	.79	.79	.90	.81	.82	.83	.83	.85	.86	.87	.89	.89	.90	.91	.89	.92	.93	.93	.94	.92
140	.72	.73	.74	.75	.76	.77	.78	.79	.81	.82	.84	.85	.86	.87	.88	.86	.89	.90	.91	.91	.90
160	.68	.69	.69	.70	.71	.73	.74	.75	.77	.79	.80	.82	.83	.84	.85	.92	.87	.88	.89	.89	

Figure 5.12
Pipe Flow Chart; “n” = 0.013 (USDA - NRCS)

PIPE FLOW CHART n = 0.013

FOR REINFORCED CONCRETE PIPE INLET $K_m = K_e + K_b = 1.00$ AND 70 FEET OF REINFORCED CONCRETE PIPE CONDUIT (full flow assumed)

Note correction factors for pipe lengths other than 70 feet

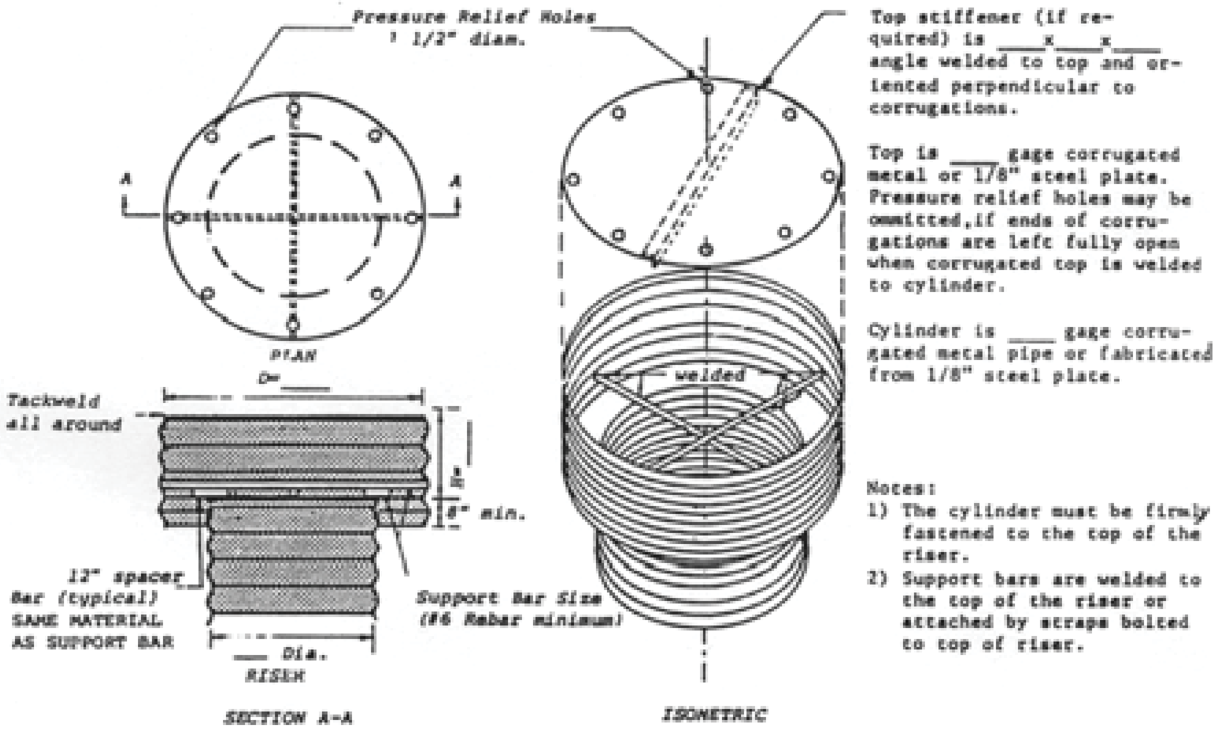
diameter of pipe in inches

H, in feet	12"	15"	18"	21"	24"	30"	36"	42"	48"	54"	60"	66"	72"	78"	84"	90"	96"	102"
1	3.22	5.44	8.29	11.8	15.9	26.0	38.6	53.8	71.4	91.5	114	139	167	197	229	264	302	342
2	4.55	7.69	11.7	16.7	22.5	36.8	54.6	76.0	101	129	161	197	236	278	324	374	427	483
3	5.57	9.42	14.4	20.4	27.5	45.0	66.9	93.1	124	159	198	241	289	341	397	458	523	592
4	6.43	10.9	16.6	23.5	31.8	52.0	77.3	108	143	183	228	278	334	394	459	529	604	683
5	7.19	12.2	18.5	26.3	35.5	58.1	86.4	120	160	205	255	311	373	440	513	591	675	764
6	7.88	13.3	20.3	28.8	38.9	63.7	94.6	132	175	224	280	341	409	482	542	647	739	837
7	8.51	14.4	21.9	31.1	42.0	68.8	102	142	189	242	302	368	441	521	607	699	798	904
8	9.10	15.4	23.5	33.3	44.9	73.5	109	152	202	259	323	394	472	557	685	748	854	966
9	9.65	16.3	24.9	35.3	47.7	78.0	116	161	214	275	342	418	500	590	688	793	905	1025
10	10.2	17.2	26.2	37.2	50.2	82.2	122	170	226	289	361	440	527	622	725	836	954	1080
11	10.7	18.0	27.5	39.0	52.7	86.2	128	178	237	304	379	462	553	653	761	877	1001	1133
12	11.1	18.9	28.7	40.8	55.0	90.1	134	186	247	317	395	482	578	682	794	916	1045	1184
13	11.6	19.6	29.9	42.4	57.3	93.7	139	194	257	330	411	502	601	710	827	953	1088	1232
14	12.0	20.4	31.0	44.1	59.4	97.3	145	201	267	342	427	521	624	736	858	989	1129	1278
15	12.5	21.1	32.1	45.6	61.5	101	150	208	277	354	442	539	646	762	888	1024	1169	1323
16	12.9	21.8	33.2	47.1	63.5	104	155	215	286	366	457	557	667	787	917	1057	1207	1367
17	13.3	22.4	34.2	48.5	65.5	107	159	222	294	377	471	574	688	812	946	1090	1244	1409
18	13.7	23.1	35.2	49.9	67.4	110	164	228	303	388	484	591	708	835	973	1121	1280	1450
19	14.0	23.7	36.1	51.3	69.2	113	168	234	311	399	497	607	727	858	1000	1152	1315	1489
20	14.4	24.3	37.1	52.6	71.0	116	173	240	319	409	510	623	746	880	1026	1182	1350	1528
21	14.7	24.9	38.0	53.9	72.8	119	177	246	327	419	523	638	764	902	1051	1211	1383	1566
22	15.1	25.5	38.9	55.2	74.5	122	181	252	335	429	535	653	782	923	1076	1240	1415	1603
23	15.4	26.1	39.8	56.5	76.2	125	186	258	342	439	547	668	800	944	1100	1260	1447	1639
24	15.8	26.7	40.6	57.7	77.8	127	189	263	350	448	559	682	817	964	1123	1295	1478	1674
25	16.1	27.2	41.5	58.9	79.4	130	193	269	357	458	571	696	834	984	1147	1322	1509	1708
26	16.4	27.7	42.3	60.0	81.0	133	197	274	364	467	582	710	850	1004	1169	1348	1539	1742
27	16.7	28.3	43.1	61.2	82.5	135	201	279	371	476	593	723	867	1023	1192	1373	1568	1775
28	17.0	28.8	43.9	62.3	84.1	138	204	285	378	484	604	737	883	1041	1214	1399	1597	1808
29	17.3	29.3	44.7	63.4	85.5	140	208	290	384	493	615	750	898	1060	1235	1423	1625	1840
30	17.6	29.8	45.4	64.5	87.0	142	212	294	391	501	625	763	913	1078	1256	1448	1653	1871

Correction Factors For Other Pipe Lengths

L, in feet	12"	15"	18"	21"	24"	30"	36"	42"	48"	54"	60"	66"	72"	78"	84"	90"	96"	102"
20	1.30	1.24	1.21	1.18	1.15	1.12	1.10	1.08	1.07	1.06	1.05	1.05	1.04	1.04	1.03	1.03	1.03	1.03
30	1.22	1.18	1.15	1.13	1.12	1,09	1.08	1.06	1.05	1.05	1.04	1.04	1.03	1.03	1.03	1.02	1.02	1.02
40	1.15	1.13	1.11	1.10	1.08	1.07	1.05	1.05	1.04	1.03	1.03	1.03	1.02	1.02	1.02	1.02	1.02	1.02
50	1.09	1.08	1.07	1.06	1.05	1.04	1.04	1.03	1.03	1.02	1.02	1.02	1.02	1.01	1.01	1.01	1.01	1.01
60	1.04	1.04	1.03	1.03	1.03	1.02	1.02	1.02	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
70	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	.96	.97	.97	.97	.98	.98	.98	.99	.99	.99	.99	.99	.99	.99	.99	.95	.99	.99
90	.93	.94	.94	.95	.95	.96	.97	.97	.98	.98	.98	.98	.98	.99	.99	.99	.99	.99
100	.90	.91	.92	.93	.93	.95	.95	.96	.97	.97	.97	.98	.98	.98	.98	.98	.98	.99
120	.84	.86	.87	.89	.90	.91	.93	.94	.94	.95	.96	.96	.96	.97	.97	.97	.97	.98
140	.80	.82	.83	.85	.86	.88	.90	.91	.92	.93	.94	.94	.95	.95	.96	.96	.96	.97
160	.76	.78	.80	.82	.83	.86	.88	.89	.90	.91	.92	.93	.94	.94	.95	.95	.95	.96

Figure 5.13
Concentric Trash Rack and Anti-Vortex Device (USDA - NRCS)



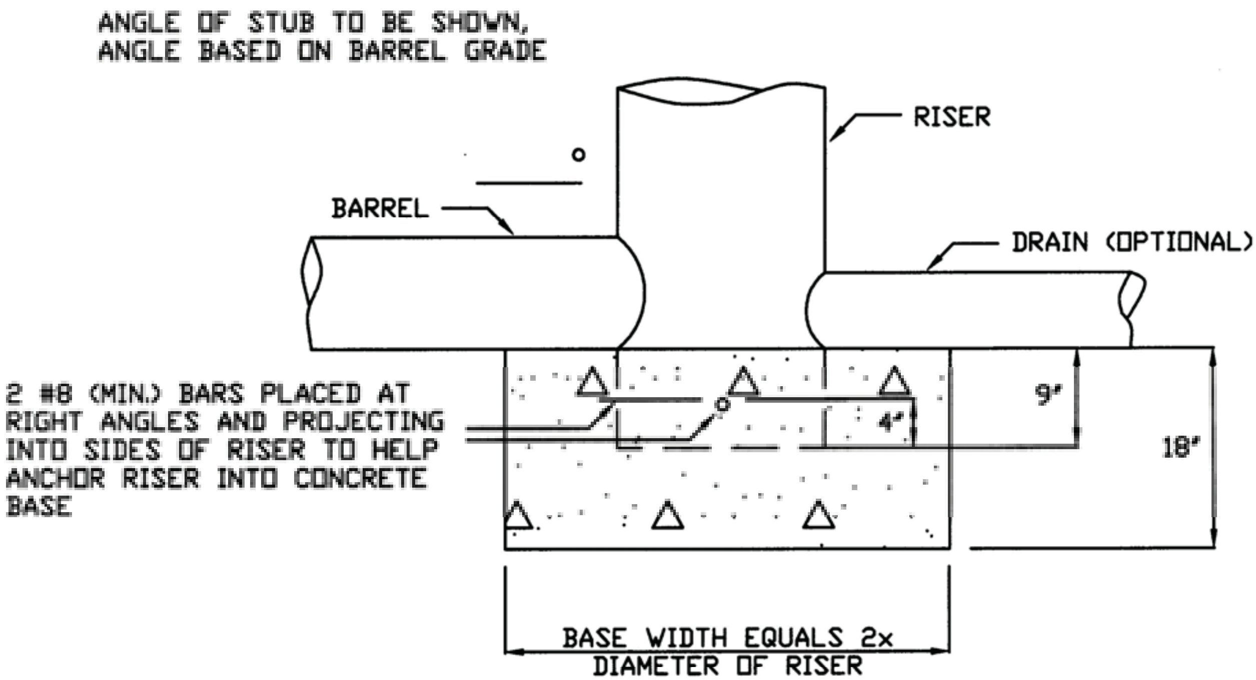
CONCENTRIC TRASH RACK AND ANTI-VORTEX DEVICE
(not to scale)

Figure 5.14
Concentric Trash Rack and Anti-Vortex Device Design Table
(USDA - NRCS)

Riser Diam.(in)	Cylinder Diam (in.)	Thick. Gage	H (in.)	Minimum Size Support Bar	Minimun Top Thickness	Minimun Top Stiffener
12	18	16	6	#6 Rebar	16 ga.	—
15	21	16	7	#6 Rebar	16 ga.	—
18	27	16	8	#6 Rebar	16 ga.	—
21	30	16	11	#6 Rebar	16 ga.	—
24	36	16	13	#6 Rebar	14 ga.	—
27	42	16	15	#6 Rebar	14 ga.	—
36	54	14	17	#8 Rebar	12 ga.	—
42	60	14	19	#8 Rebar	12 ga.	—
48	72	12	21	1 1/4" pipe or 1 1/4x1 1/4x1/4 angle	10 ga.	—
54	78	12	25	See 48" Riser	10 ga.	—
60	90	12	29	1 1/2" pipe or 1 1/2x1 1/2x1/2 angle	8 ga.	—
66	96	10	33	2" pipe or	8 ga.	
				2x2x3/16 angle	w/stiffener	2x2x1/4 angle
72	102	10	36	——See 66" Riser——		2 1/2x2 1/2x1/4 angle
78	114	10	39	2 1/2" pipe or 2x2x1/4 angle	See 72" Riser	See 72" Riser
84	120	10	42	2 1/2" pipe or	See 72"	2 1/2x
				2 1/2x2 1/2x1/4 angle	Riser	2 1/2x 5/16 angle

Note: The criteria for sizing the cylinder is that the area between the inside of the cylinder and the outside of the riser is equal to or greater than the area inside the riser. Therefore, the above table is invalid for use with concrete pipe risers.

Figure 5.15
Riser Base Details



CONSTRUCTION SPECIFICATIONS

1. THE CONCRETE BASE SHALL BE POURED IN SUCH A MANNER TO INSURE THAT THE CONCRETE FILLS THE BOTTOM OF THE RISER TO THE INVERT OF THE OUTLET PIPE TO PREVENT THE RISER FROM BREAKING AWAY FROM THE BASE.
2. WITH ALUMINUM OR ALUMINIZED PIPE, THE EMBEDDED SECTION MUST BE PAINTED WITH CHROMATE OR EQUIVALENT.
3. RISER BASE MAY BE SIZED AS COMPUTED USING FLOATATION WITH A FACTOR OF SAFETY OF 1.2.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	RISER BASE DETAIL SEDIMENT BASIN

Figure 5.16
Anti-Seep Collar Design

This procedure provides the anti-seep collar dimensions for only temporary sediment basins to increase the seepage length by 15% for various pipe slopes, embankment slopes and riser heights.

The first step in designing anti-seep collars is to determine the length of pipe within the saturated zone of the embankment. This can be done graphically or by the following equation, assuming that the upstream slope of the embankment intersects the invert of the pipe at its upstream end. (See embankment-invert intersection on the drawing below:

$$L_s = y\,(z + 4)\left[1 + \frac{\text{pipe slope}}{0.25-\text{pipe slope}}\right]$$

Where: L_s = length of pipe in the saturated zone (ft.)

y = distance in feet from upstream invert of pipe to highest normal water level expected to occur during the life of the structure, usually the top of the riser.

z = slope of upstream embankment as a ratio of z ft. horizontal to one ft. vertical.

pipe slope = slope of pipe in feet per foot.

This procedure is based on the approximation of the phreatic line as shown in the drawing below:

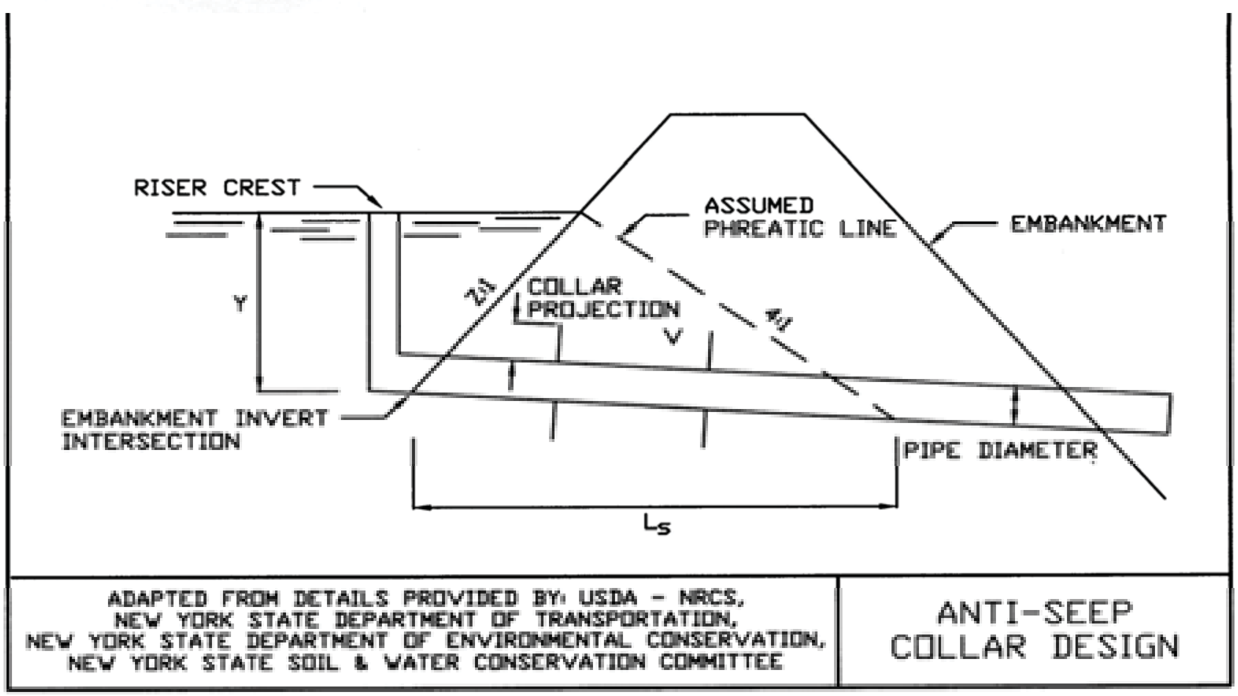


Figure 5.17
Anti-Seep Collar Design Charts (USDA - NRCS)

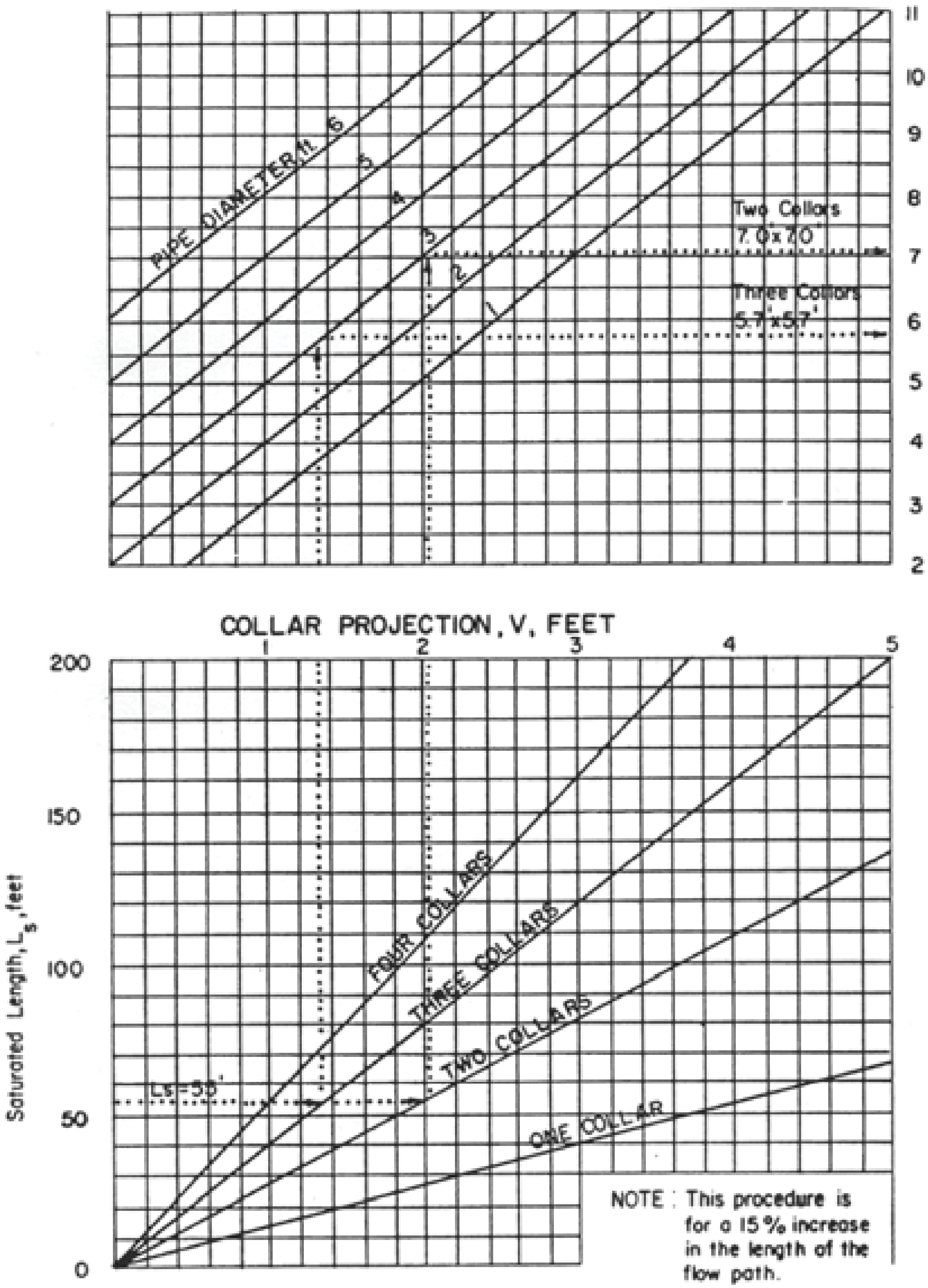


Figure 5.18
Anti-Seep Collar

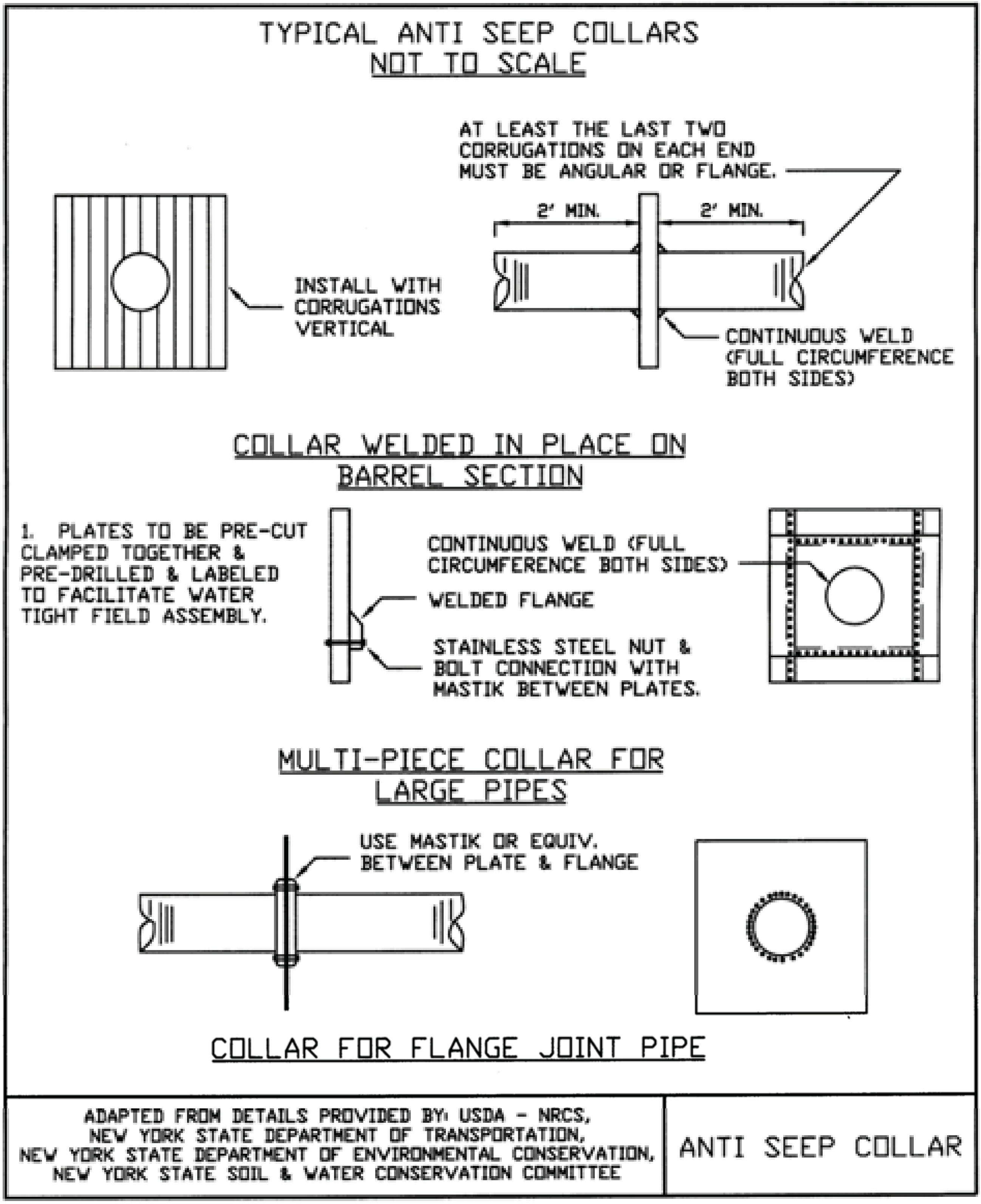
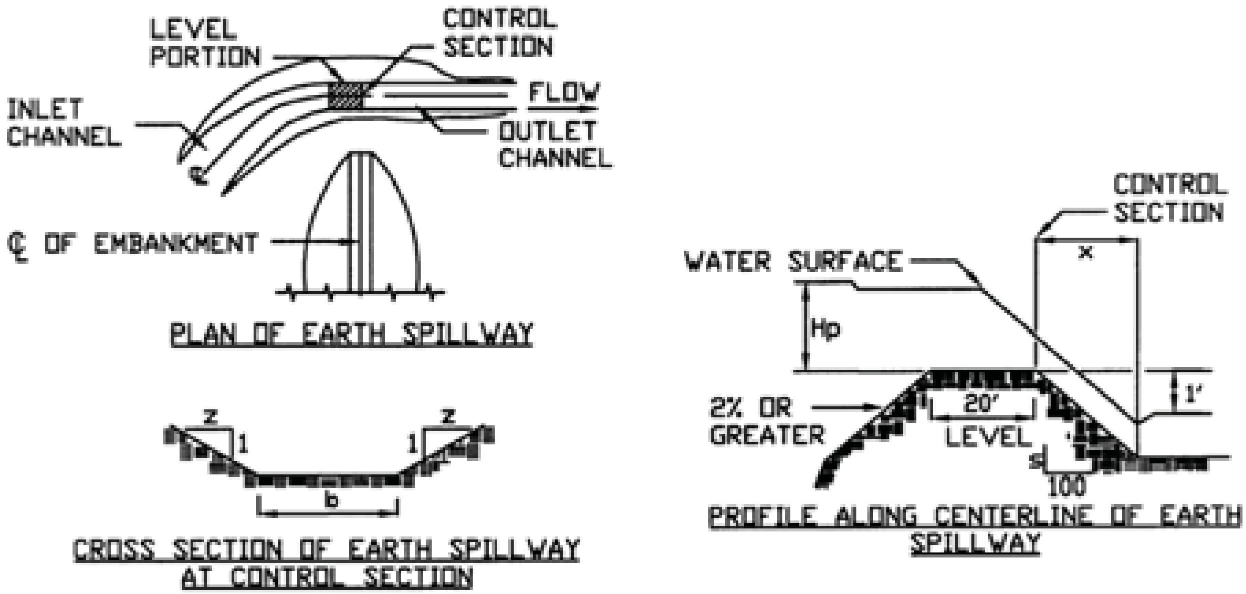


Figure 5.19
Design Data for Earth Spillways



LEGEND

n = MANNING'S COEFFICIENT OF ROUGHNESS.

Hp = DIFFERENCE IN ELEVATION BETWEEN CREST OF EARTH SPILLWAY AT THE CONTROL SECTION AND WATER SURFACE IN RESERVOIR, IN FEET.

b = BOTTOM WIDTH OF EARTH SPILLWAY AT THE CONTROL SECTION, IN FEET.

Q = TOTAL DISCHARGE, IN cfs.

V = VELOCITY, IN FEET PER SECOND, THAT WILL EXIST IN CHANNEL BELOW CONTROL SECTION, AT DESIGN Q, IF CONSTRUCTED TO SLOPE (S) THAT IS SHOWN.

S = FLATTEST SLOPE (S), IN %, ALLOWABLE FOR CHANNEL BELOW CONTROL SECTION.

X = MINIMUM LENGTH OF CHANNEL BELOW CONTROL SECTION, IN FEET.

z = SIDE SLOPE RATIO.

NOTES:

1) FOR A GIVEN Hp A DECREASE IN THE EXIT SLOPE FROM S AS GIVEN IN THE TABLE DECREASES SPILLWAY DISCHARGE BUT INCREASING THE EXIT SLOPE FROM S DOES NOT INCREASE DISCHARGE. IF AN EXIT SLOPE (Se) STEEPER THAN S IS USED, THEN VELOCITY (Ve) IN THE EXIT CHANNEL WILL INCREASE ACCORDING TO THE FOLLOWING RELATIONSHIP:

$$Ve = V\left(\frac{Se}{S}\right)^{0.3}$$

2) DATA TO RIGHT OF HEAVY VERTICAL LINES ON DRAWINGS SHOULD BE USED WITH CAUTION, AS THE RESULTING SECTIONS WILL BE EITHER POORLY PROPORTIONED OR HAVE VELOCITIES IN EXCESS OF 6 FT/SEC.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	DESIGN DATA FOR EARTH SPILLWAYS

Figure 5.20
Design Table for Vegetated Earth Spillways in Erosion Resistant Soils, K=0.1 - 0.35, Side Slopes = 3:1

Discharge Q CFS	Slope Range Minimum Percent	Slope Range Maximum Percent	Bottom Width Feet	Stage Feet
15	3.3	12.2	8	.83
	3.5	18.2	12	.69
20	3.1	8.9	8	.97
	3.2	13.0	12	.81
	3.3	17.3	16	.70
25	2.9	7.1	8	1.09
	3.2	9.9	12	.91
	3.3	13.2	16	.79
	3.3	17.2	20	.70
30	2.9	6.0	8	1.20
	3.0	8.2	12	1.01
	3.0	10.7	16	.88
	3.3	13.8	20	.78
35	2.8	5.1	8	1.30
	2.9	6.9	12	1.10
	3.1	9.0	16	.94
	3.1	11.3	20	.85
	3.2	14.1	24	.77
40	2.7	4.5	8	1.40
	2.9	6.0	12	1.18
	2.9	7.6	16	1.03
	3.1	9.7	20	.91
	3.1	11.9	24	.83
45	2.6	4.1	8	1.49
	2.8	5.3	12	1.25
	2.9	6.7	16	1.09
	3.0	8.4	20	.98
	3.0	10.4	24	.89
50	2.7	3.7	8	1.57
	2.8	4.7	12	1.33
	2.8	6.0	16	1.16
	2.9	7.3	20	1.03
	3.1	9.0	24	.94
60	2.6	3.1	8	1.73
	2.7	3.9	12	1.47
	2.7	4.8	16	1.28
	2.9	5.9	20	1.15
	2.9	7.3	24	1.05
	3.0	8.6	28	.97
70	2.5	2.8	8	1.88
	2.6	3.3	12	1.60
	2.6	4.1	16	1.40
	2.7	5.0	20	1.26
	2.8	6.1	24	1.15
	2.9	7.0	28	1.05
80	2.5	2.9	12	1.72
	2.6	3.6	16	1.51
	2.7	4.3	20	1.35
80	2.8	5.2	24	1.24
	2.8	5.9	28	1.14
	2.9	7.0	32	1.06
90	2.5	2.6	12	1.84
	2.5	3.1	16	1.61
	2.6	3.8	20	1.45
	2.7	4.5	24	1.32
	2.8	5.3	28	1.22
	2.8	6.1	32	1.14
100	2.5	2.8	16	1.71
	2.6	3.3	20	1.54
	2.6	4.0	24	1.41
	2.7	4.8	28	1.30
	2.7	5.3	32	1.21
	2.8	6.1	36	1.13
120	2.5	2.8	20	1.71
	2.6	3.2	24	1.56
	2.7	3.8	28	1.44
	2.7	4.2	32	1.34
	2.7	4.8	36	1.26
140	2.5	2.7	24	1.71
	2.5	3.2	28	1.58
	2.6	3.6	32	1.47
	2.6	4.0	36	1.38
	2.7	4.5	40	1.30
160	2.5	2.7	28	1.70
	2.5	3.1	32	1.58
	2.6	3.4	36	1.49
	2.6	3.8	40	1.40
	2.7	4.3	44	1.33
180	2.4	2.7	32	1.72
	2.4	3.0	36	1.60
	2.5	3.4	40	1.51
	2.6	3.7	44	1.43
200	2.5	2.7	36	1.70
	2.5	2.9	40	1.60
	2.5	3.3	44	1.52
	2.6	3.6	48	1.45
220	2.4	2.6	40	1.70
	2.5	2.9	44	1.61
	2.5	3.2	48	1.53
240	2.5	2.6	44	1.70
	2.5	2.9	48	1.62
	2.6	3.2	52	1.54
260	2.4	2.6	48	1.70
	2.5	2.9	52	1.62
280	2.4	2.6	52	1.70
300	2.5	2.6	56	1.69

Figure 5.21
Design Table for Vegetated Earth Spillways in Very Erodible Soils, K = 0.36 - 0.80, Side Slopes = 3:1
(USDA - NRCS)

Discharge Q CFS	Slope Range Minimum Percent	Slope Range Maximum Percent	Bottom Width Feet	Stage Feet
10	3.5	4.7	8	.68
15	3.4	4.4	12	.69
	3.4	5.9	16	.60
20	3.3	3.3	12	.80
	3.3	4.1	16	.70
	3.5	5.3	20	.62
25	3.3	3.3	16	.79
	3.3	4.0	20	.70
	3.5	4.9	24	.64
30	3.3	3.3	20	.78
	3.3	4.0	24	.71
	3.4	4.7	28	.65
	3.4	5.5	32	.61
35	3.2	3.2	24	.77
	3.3	3.9	28	.71
	3.5	4.6	32	.66
	3.5	5.2	36	.62
40	3.3	3.3	28	.76
	3.4	3.8	32	.71
	3.4	4.4	36	.67
	3.4	5.0	40	.64
45	3.3	3.3	32	.76
	3.4	3.8	36	.71
	3.4	4.3	40	.67
	3.4	4.8	44	.64
50	3.3	3.3	36	.75
	3.3	3.8	40	.71
	3.3	4.3	44	.68
60	3.2	3.2	44	.75
	3.2	3.7	48	.72
70	3.3	3.3	52	.75
80	3.1	3.1	56	.78

Procedure for Determining or Altering Sediment Basin Shape

As specified in the Standard and Specification, the pool area at the elevation of the crest of the principal spillway shall have a length to width ratio of at least 2.0 to 1. The purpose of this requirement is to minimize the “short circuiting” effect of the sediment laden inflow to the riser and thereby increase the effectiveness of the sediment basin. The purpose of this procedure is to prescribe the parameters, procedures, and methods of determining and modifying the shape of the basin.

The length of the flow path (L) is the distance from the point of inflow to the riser (outflow point). The point of inflow is the point that the stream enters the normal pool (pool level at the riser crest elevation). The pool area (A) is the area of the normal pool. The effective width (W_e) is found by the equation:

$$W_e = A/L \text{ and L:W ratio} = L/W_e$$

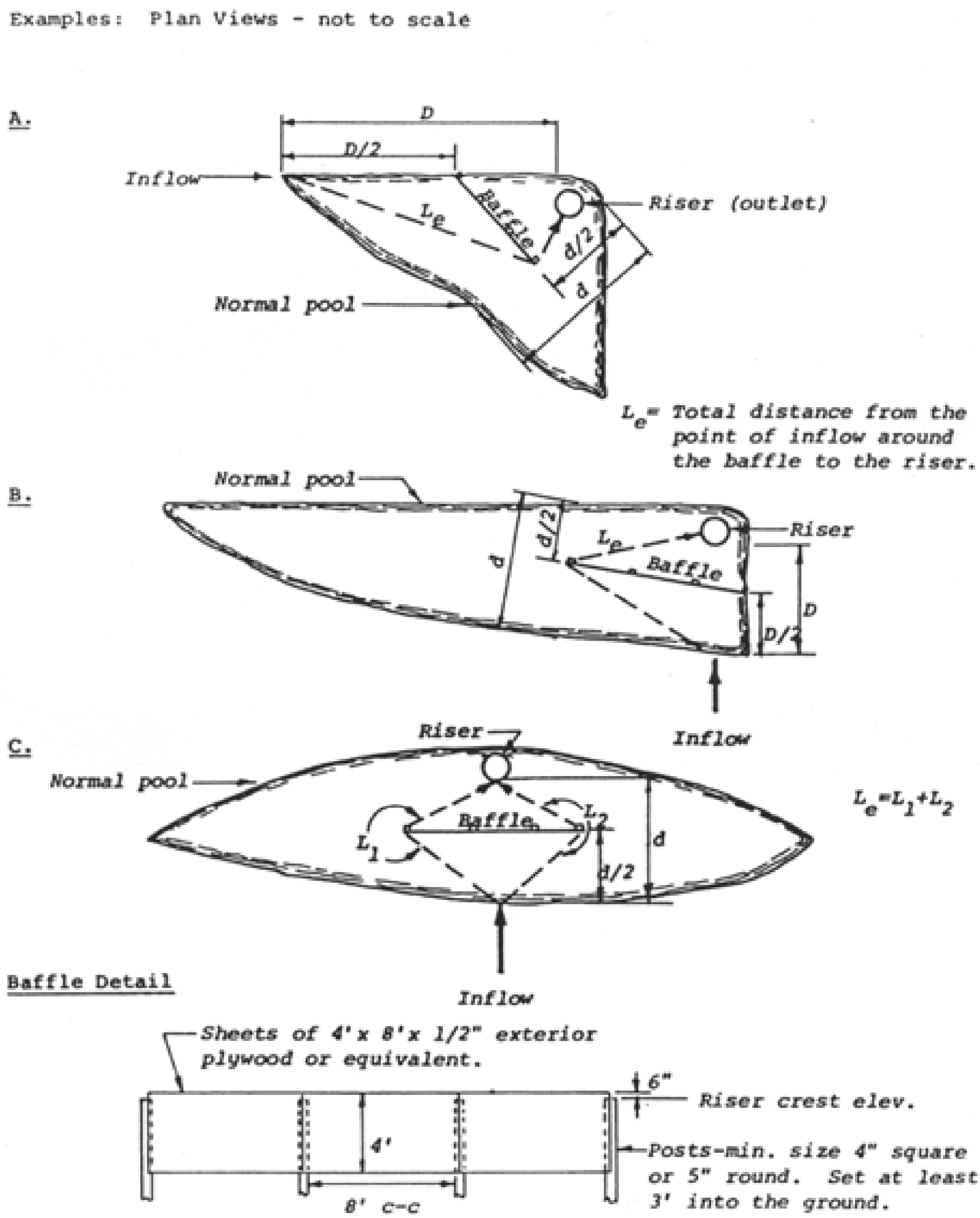
In the event there is more than one inflow point, any inflow point that conveys more than 30 percent of the total peak inflow rate shall meet the length to width ratio criteria.

The required basin shape may be obtained by proper site selection, by excavation, or by constructing a baffle in the basin. The purpose of the baffle is to increase the effective flow length from the inflow point to the riser. Baffles (see Figure 5.22 on following page) shall be placed midway between the inflow point around the end of the baffle to the outflow point. Then:

$$W_e = A/L_e \text{ and L:W ratio} = L_e/W_e$$

Three examples are shown on the following page. Note that for the special case in example C the water is allowed to go around both ends of the baffle and the effective length, $L_e = L_1 + L_2$. Otherwise, the length to width ratio computations are the same as shown above. This special case procedure for computing L_e is allowable only when the two flow paths are equal, i.e., when $L_1 = L_2$. A baffle detail is also shown in Figure 5.22 on page 5.41.

Figure 5.22
Sediment Basin Baffle Details (USDA - NRCS)



STANDARD AND SPECIFICATIONS FOR SILT FENCE

Definition & Scope

A **temporary** barrier of geotextile fabric installed on the contours across a slope used to intercept sediment laden runoff from small drainage areas of disturbed soil by temporarily ponding the sediment laden runoff allowing settling to occur. The maximum period of use is limited by the ultraviolet stability of the fabric (approximately one year).

Conditions Where Practice Applies

A silt fence may be used subject to the following conditions:

1. Maximum allowable slope length and fence length will not exceed the limits shown in the Design Criteria for the specific type of silt fence used ; and
2. Maximum ponding depth of 1.5 feet behind the fence; and
3. Erosion would occur in the form of sheet erosion; and
4. There is no concentration of water flowing to the barrier; and
5. Soil conditions allow for proper keying of fabric, or other anchorage, to prevent blowouts.

Design Criteria

1. Design computations are not required for installations of 1 month or less. Longer installation periods should be designed for expected runoff.
2. All silt fences shall be placed as close to the disturbed area as possible, but at least 10 feet from the toe of a slope steeper than 3H:1V, to allow for maintenance and roll down. The area beyond the fence must be undisturbed or stabilized.
3. The type of silt fence specified for each location on the plan shall not exceed the maximum slope length and maximum fence length requirements shown in the following table:

		Slope Length/Fence Length (ft.)		
Slope	Steepness	Standard	Reinforced	Super
<2%	< 50:1	300/1500	N/A	N/A
2-10%	50:1 to 10:1	125/1000	250/2000	300/2500
10-20%	10:1 to 5:1	100/750	150/1000	200/1000
20-33%	5:1 to 3:1	60/500	80/750	100/1000
33-50%	3:1 to 2:1	40/250	70/350	100/500
>50%	> 2:1	20/125	30/175	50/250

Standard Silt Fence (SF) is fabric rolls stapled to wooden stakes driven 16 inches in the ground.
Reinforced Silt Fence (RSF) is fabric placed against welded wire fabric with anchored steel posts driven 16 inches in the ground.
Super Silt Fence (SSF) is fabric placed against chain link fence as support backing with posts driven 3 feet in the ground.

4. Silt fence shall be removed as soon as the disturbed area has achieved final stabilization.

The silt fence shall be installed in accordance with the appropriate details. Where ends of filter cloth come together, they shall be overlapped, folded and stapled to prevent sediment bypass. Butt joints are not acceptable. A detail of the silt fence shall be shown on the plan. See Figure 5.30 on page 5.56 for Reinforced Silt Fence as an example of details to be provided.

Criteria for Silt Fence Materials

1. Silt Fence Fabric: The fabric shall meet the following specifications unless otherwise approved by the appropriate erosion and sediment control plan approval authority. Such approval shall not constitute statewide acceptance.

Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	110	ASTM D 4632
Elongation at Failure (%)	20	ASTM D 4632
Mullen Burst Strength (PSI)	300	ASTM D 3786
Puncture Strength (lbs)	60	ASTM D 4833
Minimum Trapezoidal Tear Strength (lbs)	50	ASTM D 4533
Flow Through Rate (gal/ min/sf)	25	ASTM D 4491
Equivalent Opening Size	40-80	US Std Sieve ASTM D 4751
Minimum UV Residual (%)	70	ASTM D 4355

2. Fence Posts (for fabricated units): The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a minimum cross sectional area of 3.5 square inches. Steel posts will be standard T and U section weighing not less than 1.00 pound per linear foot. Posts for super silt fence shall be standard chain link fence posts.

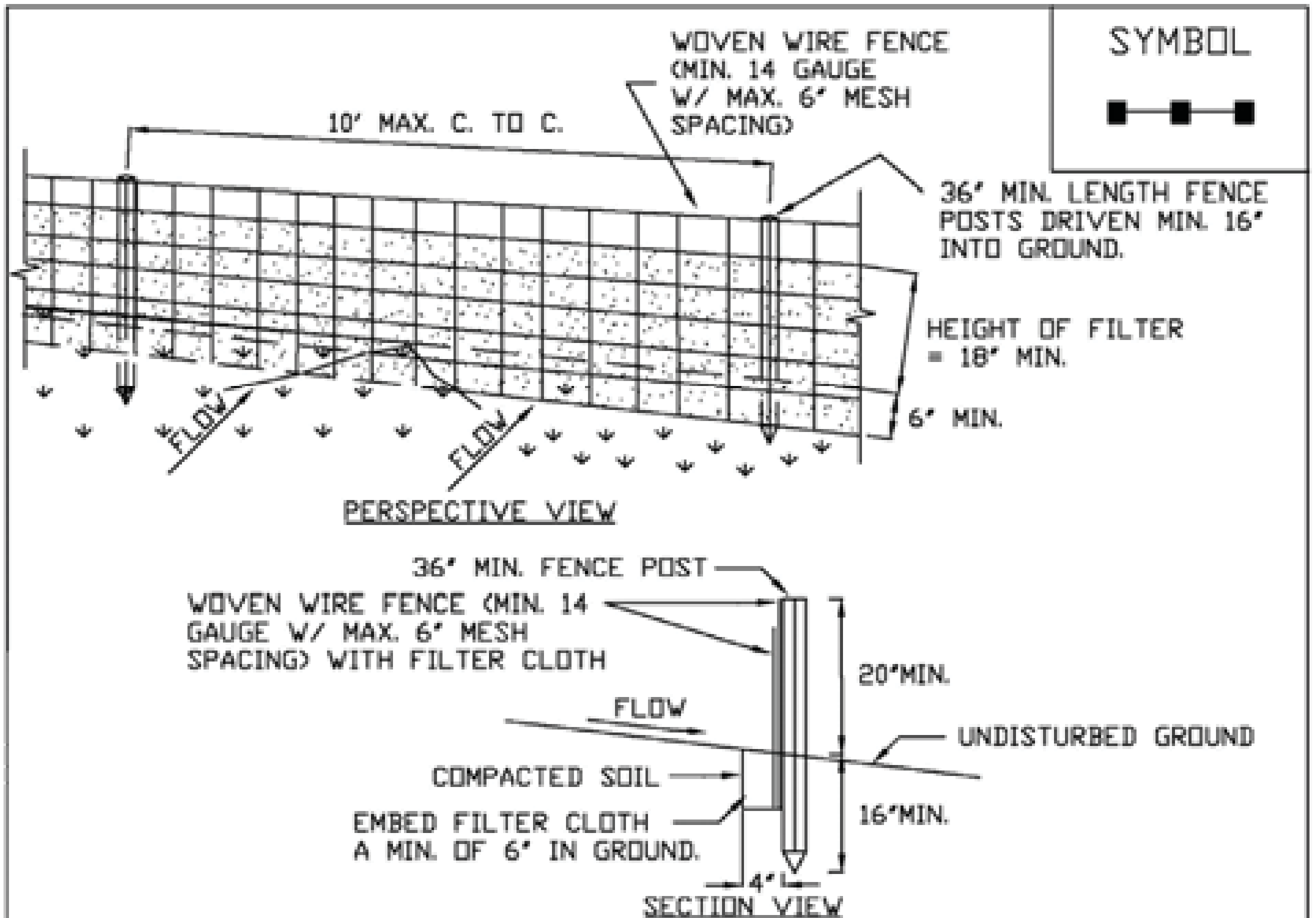
3. Wire Fence for reinforced silt fence: Wire fencing shall be a minimum 14 gage with a maximum 6 in. mesh opening, or as approved.

4. Prefabricated silt fence is acceptable as long as all material specifications are met.

Reinforced Silt Fence

Super Silt Fence

Figure 5.30
Reinforced Silt Fence



CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 6" MAXIMUM MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.
4. PREFABRICATED UNITS SHALL MEET THE MINIMUM REQUIREMENTS SHOWN.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	REINFORCED SILT FENCE

STANDARD AND SPECIFICATIONS FOR STORM DRAIN INLET PROTECTION

Definition & Scope

A **temporary** barrier with low permeability, installed around inlets in the form of a fence, berm or excavation around an opening, detaining water and thereby reducing the sediment content of sediment laden water by settling thus preventing heavily sediment laden water from entering a storm drain system.

Conditions Where Practice Applies

This practice shall be used where the drainage area to an inlet is disturbed, it is not possible to temporarily divert the storm drain outfall into a trapping device, and watertight blocking of inlets is not advisable. **It is not to be used in place of sediment trapping devices.** This practice shall be used with an upstream buffer strip if placed at a storm drain inlet on a paved surface. It may be used in conjunction with storm drain diversion to help prevent siltation of pipes installed with low slope angle.

Types of Storm Drain Inlet Practices

There are five (5) specific types of storm drain inlet protection practices that vary according to their function, location, drainage area, and availability of materials:

I. Excavated Drop Inlet Protection
II. Fabric Drop Inlet Protection
III. Stone & Block Drop Inlet Protection
IV. Paved Surface Inlet Protection
V. Manufactured Insert Inlet Protection

Design Criteria

Drainage Area – The drainage area for storm drain inlets shall not exceed one acre. Erosion control/temporary stabilization measures must be implemented on the disturbed drainage area tributary to the inlet. The crest elevations of these practices shall provide storage and minimize bypass flow.

Type I – Excavated Drop Inlet Protection

This practice is generally used during initial overlot grading after the storm drain trunk line is installed.

Limit the drainage area to the inlet device to 1 acre. Excavated side slopes shall be no steeper than 2:1. The minimum depth shall be 1 foot and the maximum depth 2 feet as measured from the crest of the inlet structure. Shape the excavated basin to fit conditions with the longest dimension oriented toward the longest inflow area to provide maximum trap efficiency. The capacity of the excavated basin should be established to contain 900 cubic feet per acre of disturbed area. Weep holes, protected by fabric and stone, should be provided for draining the temporary pool.

Inspect and clean the excavated basin after every storm. Sediment should be removed when 50 percent of the storage volume is achieved This material should be incorporated into the site in a stabilized manner.

Type II – Fabric Drop Inlet Protection

This practice is generally used during final elevation grading phases after the storm drain system is completed.

Limit the drainage area to 1 acre per inlet device. Land area slope immediately surrounding this device should not exceed 1 percent. The maximum height of the fabric above the inlet crest shall not exceed 1.5 feet unless reinforced.

The top of the barrier should be maintained to allow overflow to drop into the drop inlet and not bypass the inlet to unprotected lower areas. Support stakes for fabric shall be a minimum of 3 feet long, spaced a maximum 3 feet apart. They should be driven close to the inlet so any overflow drops into the inlet and not on the unprotected soil. Improved performance and sediment storage volume can be obtained by excavating the area.

Inspect the fabric barrier after each rain event and make repairs as needed. Remove sediment from the pool area as necessary with care not to undercut or damage the filter fabric. Upon stabilization of the drainage area, remove all materials and unstable sediment and dispose of properly. Bring the adjacent area of the drop inlet to grade, smooth and compact and stabilize in the appropriate manner to the site.

Type III – Stone and Block Drop Inlet Protection

This practice is generally used during the initial and intermediate overlot grading of a construction site.

Limit the drainage area to 1 acre at the drop inlet. The stone barrier should have a minimum height of 1 foot and a maximum height of 2 feet. Do not use mortar. The height should be limited to prevent excess ponding and bypass flow.

Recess the first course of blocks at least 2 inches below the crest opening of the storm drain for lateral support. Subsequent courses can be supported laterally if needed by placing a 2x4 inch wood stud through the block openings perpendicular to the course. The bottom row should have a few blocks oriented so flow can drain through the block to dewater the basin area.

The stone should be placed just below the top of the blocks on slopes of 2:1 or flatter. Place hardware cloth of wire mesh with ½ inch openings over all block openings to hold stone in place.

As an optional design, the concrete blocks may be omitted and the entire structure constructed of stone, ringing the outlet ("doughnut"). The stone should be kept at a 3:1 slope toward the inlet to keep it from being washed into the inlet. A level area 1 foot wide and four inches below the crest will further prevent wash. Stone on the slope toward the inlet should be at least 3 inches in size for stability and 1 inch or smaller away from the inlet to control flow rate. The elevation of the top of the stone crest must be maintained 6 inches lower than the ground elevation down slope from the inlet to ensure that all storm flows pass over the stone into the storm drain and not past the structure. Temporary diking should be used as necessary to prevent bypass flow.

The barrier should be inspected after each rain event and repairs made where needed. Remove sediment as necessary to provide for accurate storage volume for subsequent rains. Upon stabilization of contributing drainage area, remove all materials and any unstable soil and dispose of properly.

Bring the disturbed area to proper grade, smooth, compact and stabilize in a manner appropriate to the site.

Type IV – Paved Surface Inlet Protection

This practice is generally used after pavement construction has been done while final grading and soil stabilization is occurring. These practices should be used with upstream buffer strips in linear construction applications, and with temporary surface stabilization for overlot areas, to reduce the sediment load at the practice. This practice includes sand bags, compost filter socks, geo-tubes filled with ballast, and manufactured surface barriers. Pea gravel can also be used in conjunction with these practices to improve performance. When the inlet is not at a low point, and is offset from the pavement or gutter line, protection should be selected and installed so that flows are not diverted around the inlet.

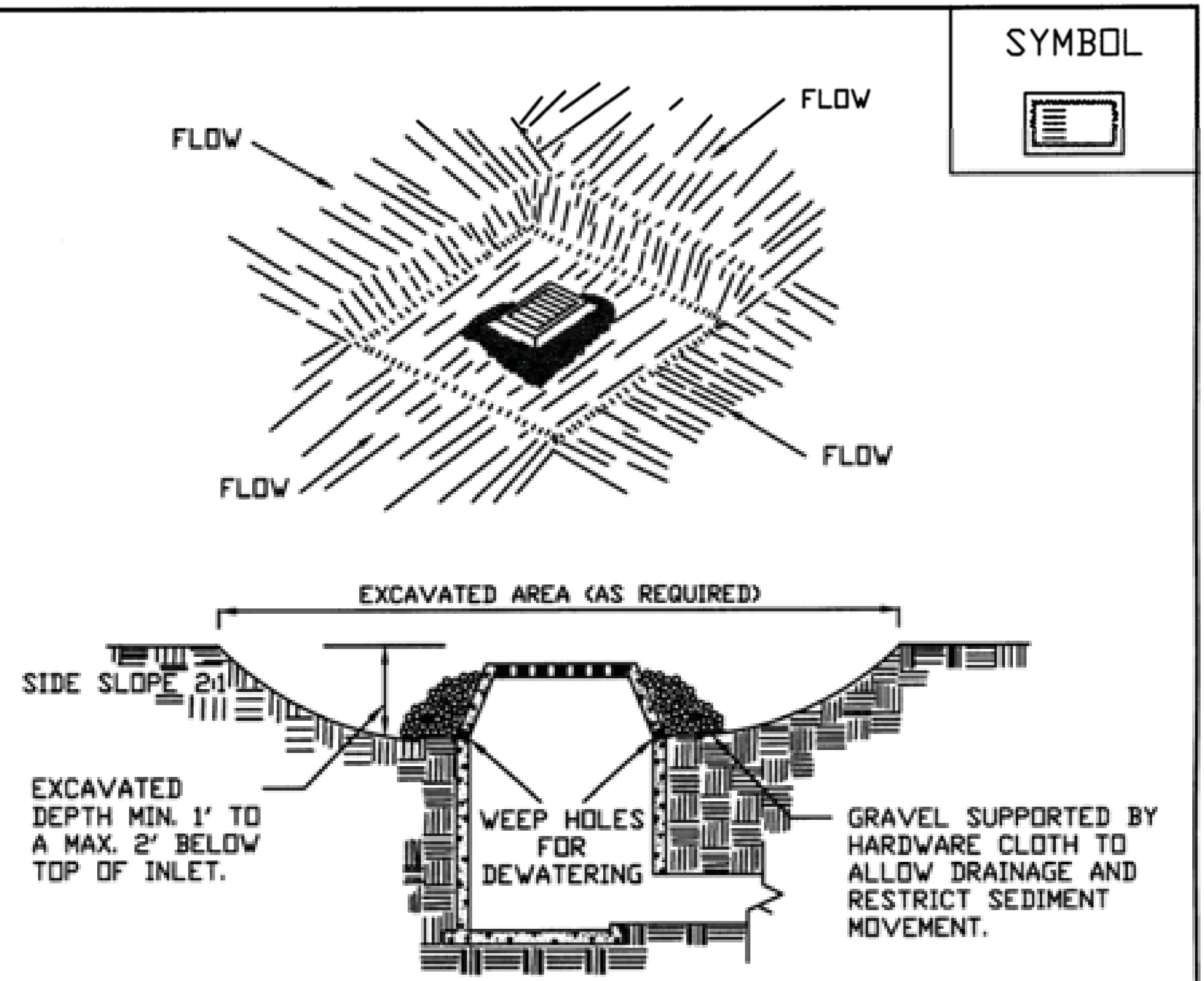
The drainage area should be limited to 1 acre at the drain inlet. All practices will be placed at the inlet perimeter or beyond to maximize the flow capacity of the inlet. Practices shall be weighted, braced, tied, or otherwise anchored to prevent movement or shifting of location on paved surfaces. Traffic safety shall be integrated with the use of this practice. All practices should be marked with traffic safety cones as appropriate. Structure height shall not cause flooding or by-pass flow that would cause additional erosion.

The structure should be inspected after every storm event. Any sediment should be removed and disposed of on the site. Any broken or damaged components should be replaced. Check all materials for proper anchorage and secure as necessary.

Type V - Manufactured Insert Inlet Protection

The drainage area shall be limited to 1 acre at the drain inlet. All inserts will be installed and anchored in accordance with the manufacturers recommendations and design details. The fabric portion of the structure will equal or exceed the performance standard for the silt fence fabric. The inserts will be installed to preserve a minimum of 50 percent of the open, unobstructed design flow area of the storm drain inlet opening to maintain capacity for storm events.

Figure 5.31
Excavated Drop Inlet Protection



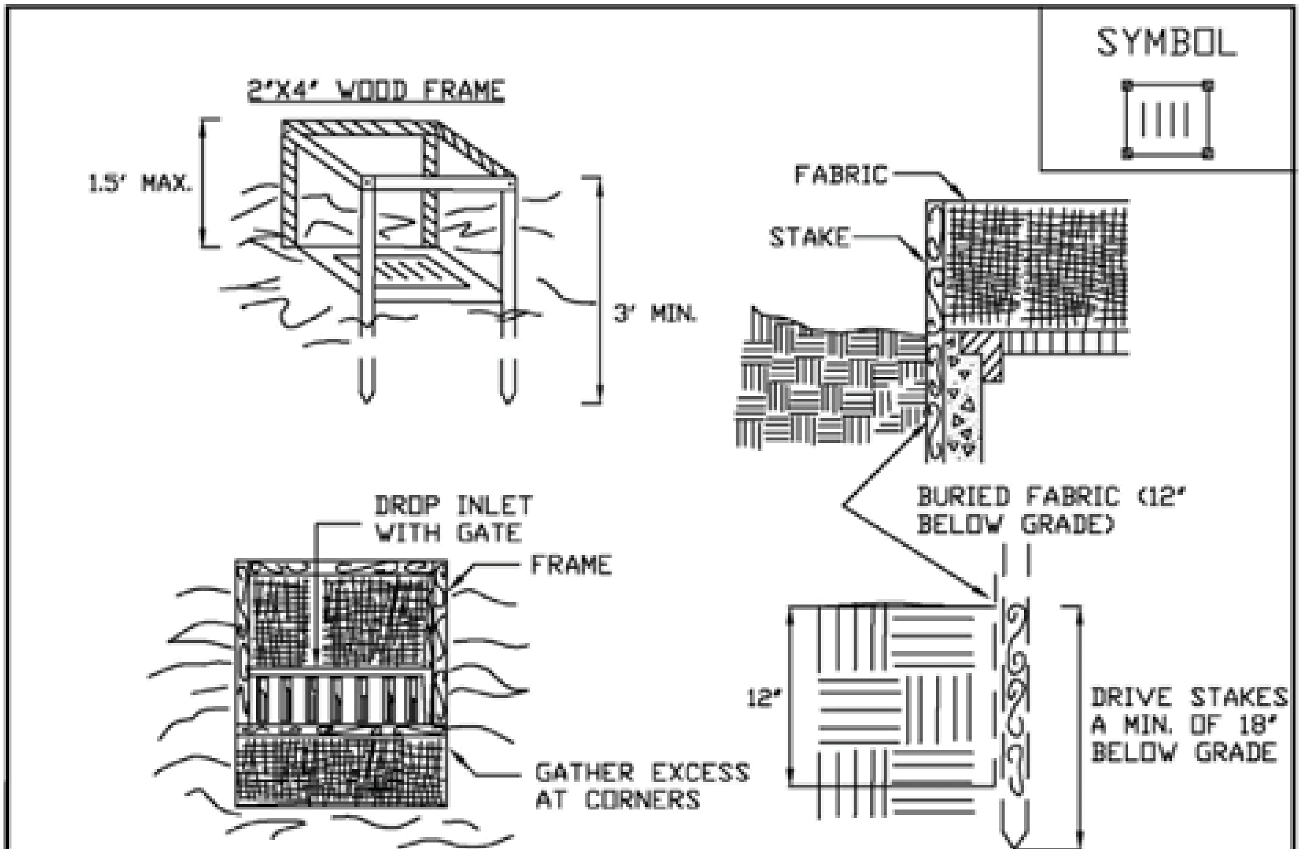
CONSTRUCTION SPECIFICATIONS

1. CLEAR THE AREA OF ALL DEBRIS THAT WILL HINDER EXCAVATION.
2. GRADE APPROACH TO THE INLET UNIFORMLY AROUND THE BASIN.
3. WEEP HOLES SHALL BE PROTECTED BY GRAVEL.
4. UPON STABILIZATION OF CONTRIBUTING DRAINAGE AREA, SEAL WEEP HOLES, FILL EXCAVATION WITH STABLE SOIL TO FINAL GRADE, COMPACT IT PROPERLY AND STABILIZE WITH PERMANENT SEEDING.

MAXIMUM DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	EXCAVATED DROP INLET PROTECTION

Figure 5.32
Fabric Drop Inlet Protection



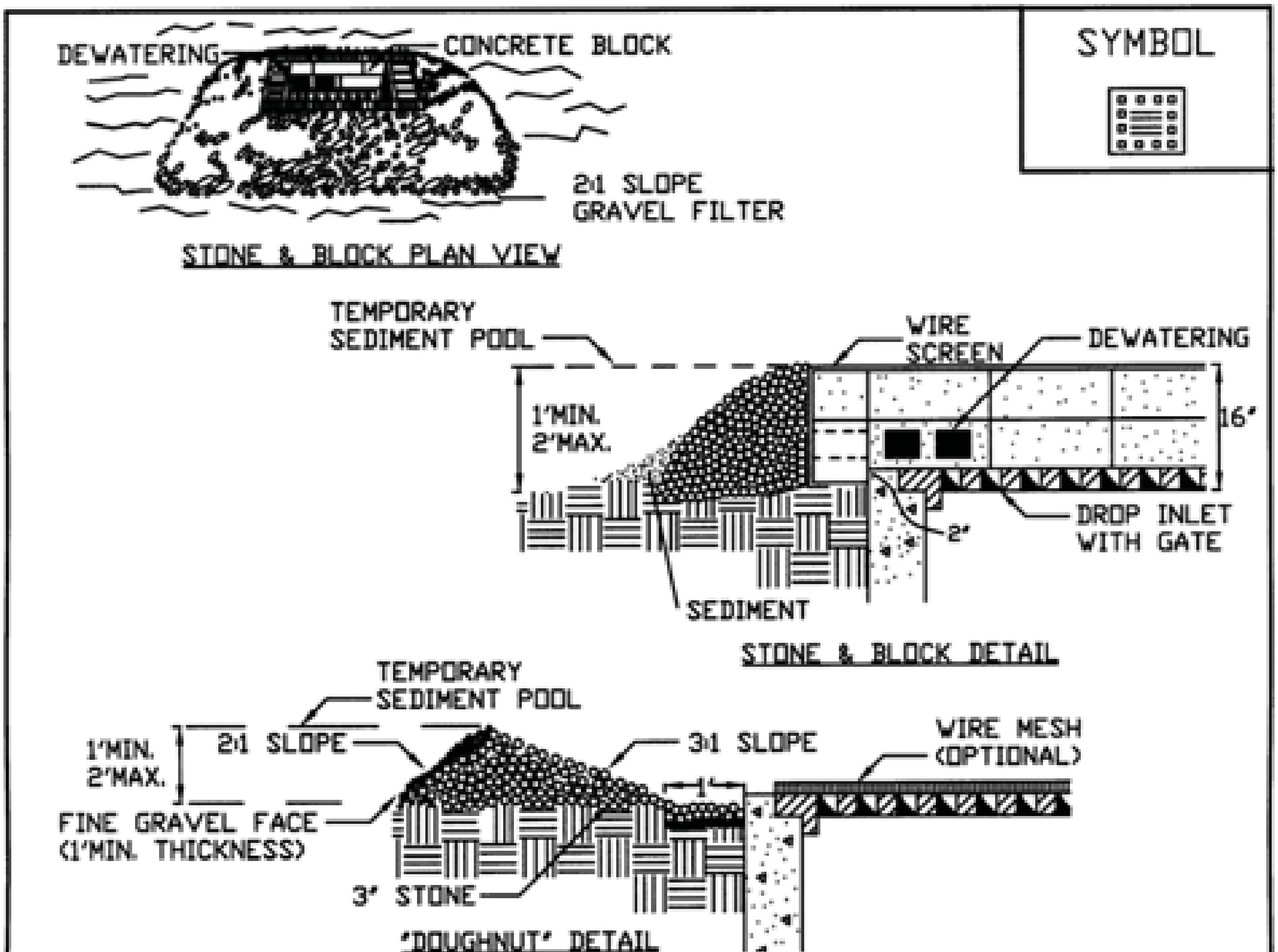
CONSTRUCTION SPECIFICATIONS

1. FABRIC SHALL HAVE AN EOS OF 40-85. BURLAP MAY BE USED FOR SHORT TERM APPLICATIONS.
2. CUT FABRIC FROM A CONTINUOUS ROLL TO ELIMINATE JOINTS. IF JOINTS ARE NEEDED THEY WILL BE OVERLAPPED TO THE NEXT STAKE.
3. STAKE MATERIALS WILL BE STANDARD 2" x 4" WOOD OR EQUIVALENT. METAL WITH A MINIMUM LENGTH OF 3 FEET.
4. SPACE STAKES EVENLY AROUND INLET 3 FEET APART AND DRIVE A MINIMUM 18 INCHES DEEP. SPANS GREATER THAN 3 FEET MAY BE BRIDGED WITH THE USE OF WIRE MESH BEHIND THE FILTER FABRIC FOR SUPPORT.
5. FABRIC SHALL BE EMBEDDED 1 FOOT MINIMUM BELOW GROUND AND BACKFILLED. IT SHALL BE SECURELY FASTENED TO THE STAKES AND FRAME.
6. A 2" x 4" WOOD FRAME SHALL BE COMPLETED AROUND THE CREST OF THE FABRIC FOR OVER FLOW STABILITY.

MAXIMUM DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	FABRIC DROP INLET PROTECTION

Figure 5.33
Stone & Block Drop Inlet Protection



CONSTRUCTION SPECIFICATIONS

1. LAY ONE BLOCK ON EACH SIDE OF THE STRUCTURE ON ITS SIDE FOR DEWATERING. FOUNDATION SHALL BE 2 INCHES MINIMUM BELOW REST OF INLET AND BLOCKS SHALL BE PLACED AGAINST INLET FOR SUPPORT.
2. HARDWARE CLOTH OR 1/2" WIRE MESH SHALL BE PLACED OVER BLOCK OPENINGS TO SUPPORT STONE.
3. USE CLEAN STONE OR GRAVEL 1/2-3/4 INCH IN DIAMETER PLACED 2 INCHES BELOW TOP OF THE BLOCK ON A 2:1 SLOPE OR FLATTER.
4. FOR STONE STRUCTURES ONLY, A 1 FOOT THICK LAYER OF THE FILTER STONE WILL BE PLACED AGAINST THE 3 INCH STONE AS SHOWN ON THE DRAWINGS.

MAXIMUM DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STONE & BLOCK DROP INLET PROTECTION

STANDARD AND SPECIFICATIONS FOR ARMORED SLOPE AND CHANNEL STABILIZATION

Definition & Scope

A **permanent** layer of stone designed to protect and stabilize areas subject to erosion by protecting the soil surface from rain splash, sheet flow, rill and gully erosion and channel erosion. It can also be used to improve the stability of soil slopes that are subject to seepage or have poor soil structure.

Conditions Where Practice Applies

Riprap is used for cut and fill slopes subject to seepage, erosion, or weathering, particularly where conditions prohibit the establishment of vegetation. Riprap is also used for channel side slopes and bottoms, temporary dewatering diversion channels where the flow velocities exceed 6 feet/second, grade sills, on shorelines subject to erosion, and at inlets and outlets to culverts, bridges, slope drains, grade stabilization structures, and storm drains.

Slope Stabilization Design Criteria

Gradation – Riprap shall be a well-graded mixture with 50% by weight larger than the specified design size. The diameter of the largest stone size in such a mixture should be 1.5 times the d_{50} size with smaller sizes grading down to 1 inch. The designer should select the size or sizes that equal or exceed that minimum size based on riprap gradations commercially available in the area.

Thickness – The minimum layer thickness shall be 1.5 times the maximum stone diameter, but in no case less than 6 inches.

Quality – Stone for riprap shall be hard, durable field or quarry materials. They shall be angular and not subject to breaking down when exposed to water or weathering. The specific gravity shall be at least 2.5.

Size – The sizes of stones used for riprap protection are determined by purpose and specific site conditions:

1. Slope Stabilization – Riprap stone for slope stabilization not subject to flowing water or wave action shall be sized for the proposed grade. The gradient of the slope to be stabilized shall be less than the natural angle of repose of the stone selected. Angles of repose of riprap stones may be estimated from Figure 4.1.

   Riprap used for surface stabilization of slopes does not add significant resistance to sliding or slope failure and should not be considered a retaining wall. Slopes approaching 1.5:1 may require special stability analysis. The inherent stability of the soil must be satisfactory before riprap is used for surface stabilization.

2. Channel Stabilization - Design criteria for sizing stone for stability of channel side slopes are presented under Channel Stabilization Design Criteria on page 4.10.

2. Outlet Protection – Design criteria for sizing stone and determining dimensions of riprap aprons are presented in Standards and Specifications for Rock Outlet Protection on page 3.39.

Filter Blanket – A filter blanket is a layer of material placed between the riprap and the underlying soil to prevent soil movement into or through the riprap. A suitable filter may consist of a well-graded gravel or sand-gravel layer or a synthetic filter fabric manufactured for this purpose. The design of a gravel filter blanket is based on the ratio of particle size in the overlying filter material to that of the base material in accordance with the criteria below. Multiple layers may be designed to affect a proper filter if necessary.

A gravel filter blanket should have the following relationship for a stable design:

$$\frac{d_{15}\ \text{filter}}{d_{85}\ \text{base}} \leq 5$$

$$5 < \frac{d_{15}\ \text{filter}}{d_{50}\ \text{base}} \leq 40$$

and

$$\frac{d_{50}\ \text{filter}}{d_{50}\ \text{base}} \leq 40$$

Filter refers to the overlying material while base refers to the underlying material. These relationships must hold between the base and filter and the filter and riprap to prevent migration of material. In some cases, more than one filter may be needed. Each filter layer should be a minimum of 6 inches thick, unless an acceptable filter fabric is used.

A synthetic filter fabric may be used with or in place of gravel filters. The following particle size relationships should exist:

1. Filter fabric covering a base containing 50% or less by weight of fine particles (#200 sieve size):

   A. $$\frac{d_{85}\ \text{base (mm)}}{\text{EOS} \times \text{filter fabric (mm)}} > 1$$

   B. total open area of filter fabric should not exceed 36%

2. Filter fabric covering other soils:

   A. EOS is no larger than 0.21 mm (#70 sieve size)

   B. total open area of filter fabric should not exceed 10%

*EOS – Equivalent opening size compared to a U.S. standard sieve size.

No filter fabric should have less than 4% open area or an EOS less than U.S. Standard Sieve #100 (0.15 mm). The permeability of the fabric must be greater than that of the soil. The fabric may be made of woven or nonwoven monofilament yarns and should meet the following minimum requirements:

Thickness 20-60 mils

grab strength 90-120 lbs.

conform to ASTM D-1682 or ASTM D-177

Filter blankets should always be provided where seepage is significant or where flow velocity and duration of flow or turbulence may cause underlying soil particles to move though the riprap.

Construction Specifications

Subgrade Preparation – Prepare the subgrade for riprap and filter to the required lines and grades shown on the plans. Compact any fill required in the subgrade to a density approximating that of the undisturbed material or overfill depressions with riprap. Remove brush, trees, stumps, and other objectionable material. Cut the subgrade sufficiently deep so that the finished grade of the riprap will be at the elevation of the surrounding area. Channels shall be excavated sufficiently to allow placement of the riprap in a manner such that the finished inside dimensions and grade of the riprap meet design specifications.

Sand and gravel filter blanket – Place the filter blanket immediately after the ground foundation is prepared. For gravel, spread filter stone in a uniform layer to the specified depth. Where more than one layer of filter material is used, spread the layers with minimal mixing.

Synthetic filter fabric – Place the cloth directly on the prepared foundation. Overlap the edges by at least 2 feet, and space the anchor pins every 3 feet along the overlap. Bury the upper and lower ends of the cloth a minimum of 12 inches below ground. Take precautions not to damage the cloth by dropping the riprap. If damage occurs, remove the riprap and repair the sheet by adding another layer of filter fabric with a minimum overlap of 12 inches around the damaged area. Where large stones are to be placed, a 4-inch layer of fine sand or gravel is recommended to protect the filter cloth. Filter fabric is not recommended as a filter on slopes steeper than 2 horizontal to 1 vertical.

Stone placement – Placement of the riprap shall follow immediately after placement of the filter. Place riprap so that it forms dense, well-graded mass of stone with a minimum of voids. The desired distribution of stones throughout the mass may be obtained by selective loading at the quarry and controlled dumping during final placement. Place riprap to its full thickness in one operation. Do not place riprap by dumping through chutes or other methods that cause segregation of stone sizes. Be careful not to dislodge the underlying base or filter when placing the stones.

The toe of the riprap shall be keyed into a stable foundation at its base as shown in Figure 4.2 **-** Typical Riprap Slope Protection Detail. The toe should be excavated to a depth of 2.0 feet. The design thickness of the riprap shall extend a minimum of 3 feet horizontally from the slope. The finished slope should be free of pockets of small stone or clusters of large stones. Hand placing may be necessary to achieve proper distribution of stone sizes to produce a relatively smooth, uniform surface. The finished grade of the riprap should blend with the surrounding area.

Maintenance

Riprap shall be inspected periodically for scour or dislodged stones. Control weed and brush growth as needed.

Figure 4.1
Angles of Repose of Riprap Stones (FHWA)

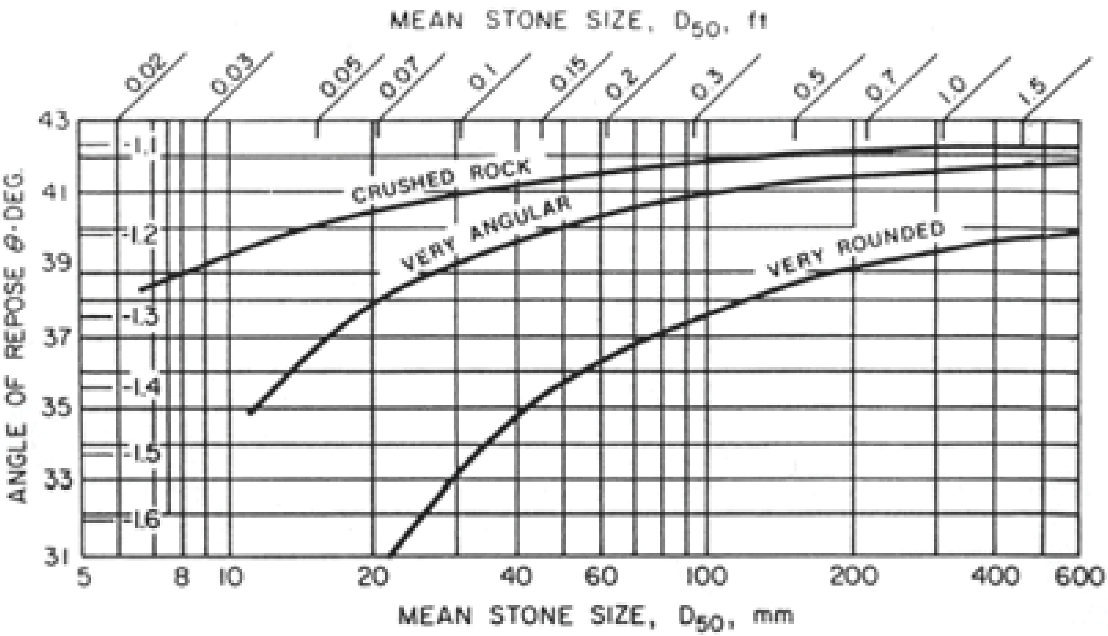
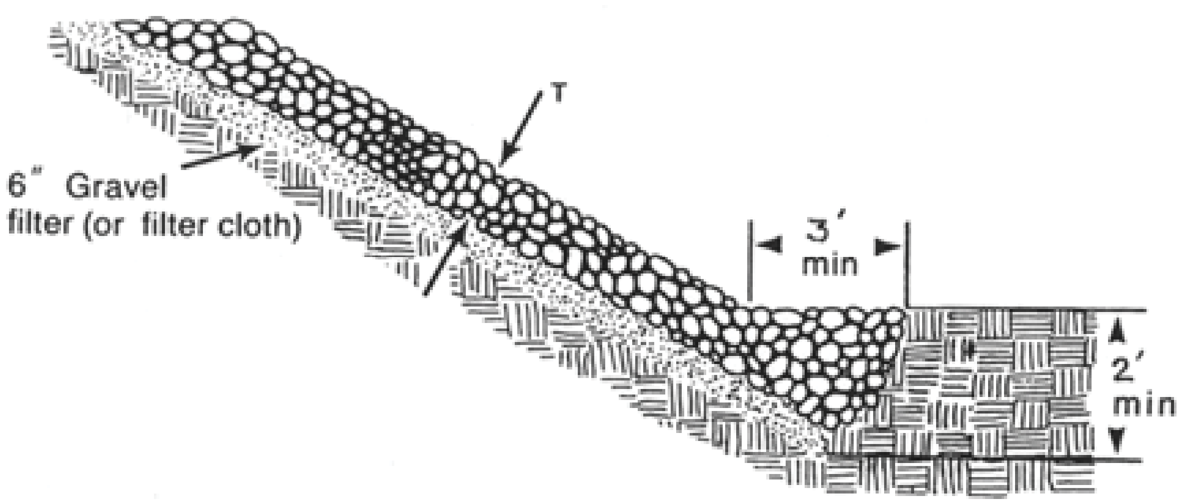


Figure 4.2
Typical Riprap Slope Protection Detail



Channel Stabilization Design Criteria

1. Since each channel is unique, measures for structural channel stabilization should be installed according to a design based on specific site conditions.

2. The plan and profile of the design reach should approximate a naturally stable channel from the project area, based on a stable "reference reach" for the subject channel type.

3. Develop designs according to the following principles:

   - Make protective measures compatible with other channel modifications planned or being carried out in the channel reaches.
   - Whenever excavation and re-shaping work is proposed within channels, the design should provide functional channel dimensions and geometry at each section. Work proposed within a stream channel may require permits from the NYS DEC and US Army Corps of Engineers.
   - Use the design velocity of the peak discharge of the 10-year storm or bankfull discharge, whichever is less. Structural measures should be capable of withstanding greater flows without serious damage.
   - Ensure that the channel bottom is stable or stabilized by structural means before installing any permanent slope protection.
   - Channel stabilization should begin at a stable location and end at a stable point along the bank.
   - Changes in alignment should not be done without a complete analysis of the environmental and stability effects on the entire system.
   - Provisions should be made to maintain and improve fish and wildlife habitat. For example, restoring lost vegetation will provide valuable shade, food, and/or cover.
   - Ensure that all requirements of state law and all permit requirements of local, state, and federal agencies are met.

Construction Specifications

Riprap – Riprap is the most commonly used material to structurally stabilize a channel. While riprap will provide the structural stabilization necessary, the side slope can be enhanced with vegetative material to slow the velocity of water, filter debris, and enhance habitat. See Principles of Biotechnical Practices on page 4.1, for more information.

1. Side slope – slopes shall be graded to 2:1 or flatter prior to placing bedding, filter fabric, or riprap.

2. Filter – filters should be placed between the base material and the riprap and meet the requirements of criteria listed pages 4.7 and 4.8.

3. Gradation – The gradation of the riprap is dependent on the velocity expected against the bank for the design conditions. See Table 4.1 on page 4.12. Once the velocity is known, gradation can be selected from the table for the appropriate class of rock. Note, this table was developed for a 2:1 slope; if the slope steepens to 1.5:1 the gradations should be increased 20%. The riprap should extend 2 feet below the channel bottom and be keyed into the side slope both at the upstream end and downstream end of the proposed work or reach.

See Figure 4.3 on page 4.13 for details.

Reinforced Concrete - Is often used to armor eroding sections of flow channel by constructing walls, bulk heads, or stabilize bank linings in urban areas for redevelopment work. Provide positive drainage behind these structures to relieve uplift pressures.

Grid Pavers – Modular concrete units with or without void areas can be used to stabilize flow channel. Units with void areas can allow the establishment of vegetation. These structures may be obtained in a variety of shapes (Figure 4.4) or they may be formed and poured in place. Maintain design and installation in accordance with manufacturer's instructions.

Revetment – Structural support or armoring to protect an embankment from erosion. Riprap and gabions are commonly used. Also used is a hollow fabric mattress with cells that receive a concrete mixture. Any revetment should be installed to a depth below the anticipated channel degradation and into the channel bed as necessary to provide stability.

Modular Pre-Cast Units – Interlocking modular precast units of different sizes, shapes, heights, and depths, have been developed for a wide variety of applications. They provide vertical support in tight areas as well as durability. Many types are available with textured surfaces. They also act as gravity retaining walls. They should be designed and installed in accordance with the manufacturer's recommendations (Figure 4.4). All areas disturbed by construction should be stabilized as soon as the structural measures are complete.

Maintenance

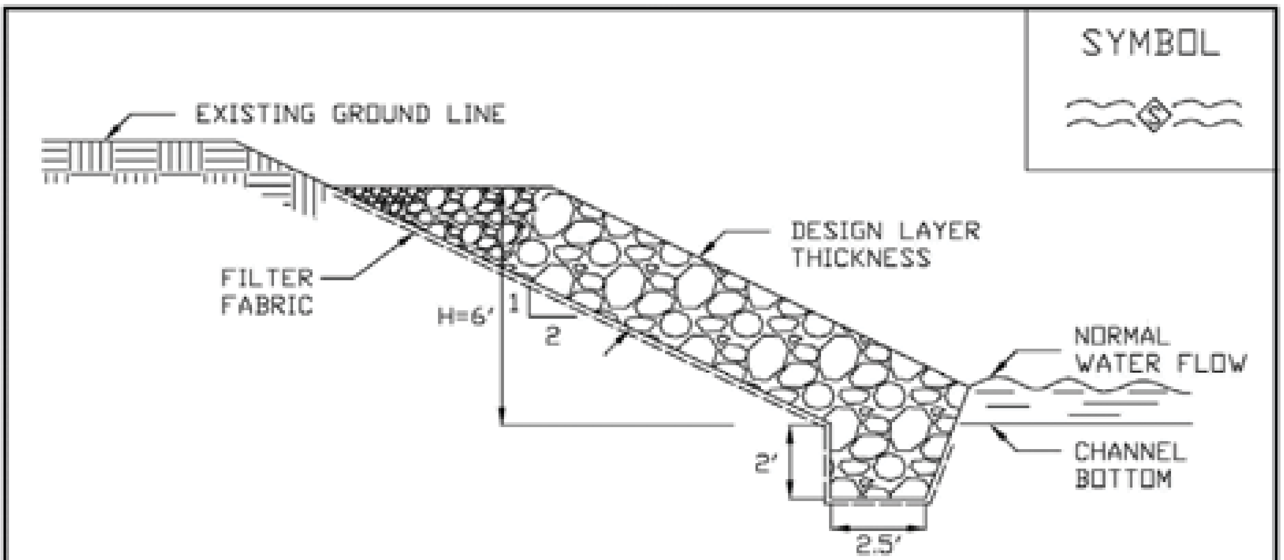
Check stabilized flow channel sections after every high-water event, and make any needed repairs immediately to prevent any further damage or unraveling of the existing work.

Table 4.1 - Riprap Gradations for Channel Stabilization

Class	Layer Thickness (in.)	Max. Velocity (ft/s)	Wave Height (ft.)		PERCENT FINER BY WEIGHT											
					D_{10}			D_{50}			D_{85}			D_{100}		
					Wt. (lbs.)	d_o (in.)	$d_{\square}$ (in.)	Wt. (lbs.)	d_o (in.)	$d_{\square}$ (in.)	Wt. (lbs.)	d_o (in.)	$d_{\square}$ (in.)	Wt. (lbs.)	d_o (in.)	$d_{\square}$ (in.)
I	18	8.5	-		5	5	4	50	10	8	100	13	10	150	15	12
II	18	10	-		17	7	6	170	15	12	340	19	15	500	22	18
III	24	12	2		46	10	8	460	21	17	920	26	21	1400	30	24
IV	36	14	3		150	15	12	1500	30	25	3000	39	32	4500	47	36
V	48	17	4.8		370	20	16	3700	42	34	7400	53	43	11,000	60	49

d_o = gravel material $d_{\square}$ = angular rock riprap
Wt = weight in pounds

Figure 4.3
Riprap Channel Stabilization



RIPRAP DESIGN TABLE

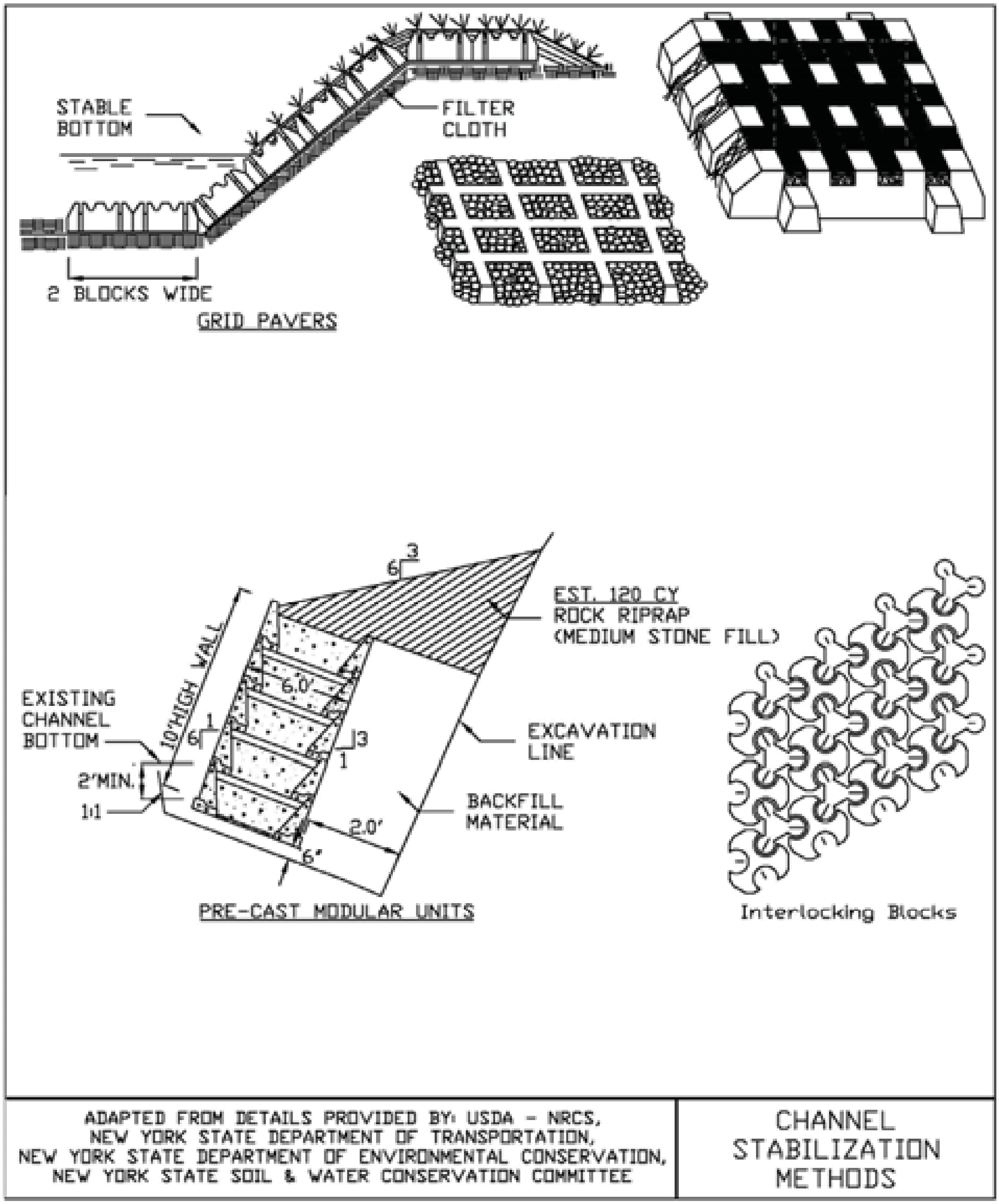
REACH	CLASS	THICKNESS	LAYER	HEIGHT	D10	D50	D85	D100	FILTER

CONSTRUCTION SPECIFICATIONS

1. SLOPE SHALL BE GRADED TO 2:1 OR FLATTER PRIOR TO PLACING FILTER, FILTER FABRIC, OR RIPRAP.
2. RIPRAP SHALL BE PLACED TO MAINTAIN A UNIFORM GRADATION. LARGER STONE SHALL BE PLACED AT THE TOE.
3. ENDS OF THE RIPRAP SHALL BE KEYED INTO A STABLE BANK. WHEN TYING INTO OTHER STRUCTURES, LARGER RIPRAP CAN BE LAID IN STEPS OR STACKED AS NEEDED TO FIT. STONES LARGER THAN THOSE DESIGNED FOR FLOW SHALL BE USED FOR THIS PURPOSE.
4. REMAINING DISTURBED AREAS SHALL BE GRADED AND PERMANENTLY SEEDED AND MULCHED.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	RIPRAP CHANNEL STABILIZATION

Figure 4.4
Channel Stabilization Methods



Attachment 6

EnSol, Inc.

ENGINEERING + ENVIRONMENTAL

Maintenance Agreement and Easement

Town of Wawayanda

Schedule A
Sample Stormwater Control Facility Maintenance Agreement
[Amended 2-4-2021 by L.L. No. 1-2021]

WHEREAS the Town of Wawayanda, Orange County, New York, (“the Town”), a municipal corporation with an office located at 80 Ridgebury Hill Road, Slate Hill, New York 10973 and ________________________________ (“the facility owner”), with an office located at ____ want to enter into an agreement to provide for the long-term construction, maintenance and continuation of stormwater control measures approved by the Town for the project described in the project plans for referred to below for property known on the tax map of the Town as Section ____ Block ___ Lot ___ being and intended to be the property described in a deed from ______________________, the facility owner, dated__________ and recorded in the Orange County Clerk’s Office in Liber _____ at Page ____, and being more particularly describe in Schedule A annexed hereto (the “Property”) and

WHEREAS the Town and the facility owner desire that the stormwater control measures be built in accordance with the approved project plans and thereafter be maintained, cleaned, repaired, replaced and continued for the period of time set forth in this Agreement by the facility owner, its heirs, successors and assigns in order to ensure optimum performance of the components.

THEREFORE, the Town and the facility owner agree as follows:

1. This Agreement binds the Town and the facility owner, its heirs, successors and assigns to the construction, maintenance and continuation of stormwater control measures depicted in the approved project plans entitled “Site Plan for _______________________________________” by__________________________, P.E., P.C. dated ____________________ for final approval (the Site Plan) on file with the Town and intended to be made a part of this Agreement as if more fully set forth herein.

2. The facility owner, its heirs, successors and assigns shall construct, maintain, clean, repair, replace and continue the stormwater control measures depicted in the Site Plan as necessary to ensure optimum performance of the measures to design specifications. The stormwater control measures may include, but shall not be limited to, the following drainage ditches, swales, dry wells, infiltrators, drop inlets, pipes, culverts, soil absorption devices, catch basins, manholes and stormwater treatment and management ponds.

3. The facility owner, its heirs, successors and assigns shall be responsible for all expenses related to the construction, maintenance and continuation of the stormwater control measures and shall establish a means for the collection and distribution of expenses among parties for any commonly owned facilities.

4. The facility owner, its heirs, successors and assigns shall provide for the periodic inspection of the stormwater control measures, not less than once in every one-year period, to determine the condition and integrity of the measures. Such inspection shall be performed by a professional engineer licensed by the State of New York. The inspecting engineer shall prepare and submit to the Town, within 30 days of the inspection, a written report of the findings, including recommendations for those actions necessary for the repair and/or continuation of the stormwater control measures.

5. The facility owner, its heirs, successors and assigns shall not authorize, undertake or permit alteration, abandonment, modification or discontinuation of the stormwater control measures except in accordance with written approval of the Town, which approval the Town can withhold in its sole discretion.

6. The facility owner, its heirs, successors and assigns shall undertake necessary repairs and replacement of the stormwater control measures at the direction of the Town or in accordance with the recommendations of the inspecting engineer.

7. This Agreement shall be recorded in the Office of the County Clerk, County of Orange. This Agreement and the requirements contained herein, shall run with the land and shall bind the facility owner, its heirs, successors and assigns for a term of ninety-nine (99) years, unless discontinued with the written approval of the Town in accordance with Par. 5 of this Agreement. The facility owner, its heirs, successors and assigns agree to execute any documents required by the Town in connection with this Agreement and the implementation of this Agreement and failure to so execute any such documents shall constitute a violation of this Agreement.

8. If ever the Town determines that the facility owner, its heirs, successors and assigns has failed to construct or maintain the stormwater control measures in accordance with the project plans or has failed to undertake corrective action specified by the Town or by the inspecting engineer, or if the facility owner, its heirs, successors and assigns has failed to execute any documents required by the town in connection with this Agreement and the implementation of this Agreement, the Town is authorized to undertake such steps as may be reasonably necessary for the preservation, continuation or maintenance of the stormwater control measures including entry onto the Property to perform and performance of work and to levy and assess the expenses thereof as a lien against the Property and to collect such amounts in the same manner as real property taxes, and to take any and all other actions against the facility owner, its heirs, successors and assigns as may be allowed by local, county, state or federal law.

9. Whenever reference is made in this Agreement to the “the Town”, the same shall also be deemed to mean agents, officers, employees, contractors, and subcontractors of the consultants to the Town.

10. This Agreement is effective as of the ______ day of _____, 20 .

BY: ____
Title

TOWN OF WAWAYANDA
BY: ____
Title

STATE OF NEW YORK)
)SS:
COUNTY OF ORANGE)

On this day of 20 , before me, the undersigned, a Notary Public in and for said state, personal appeared ___________________________, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies) and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted executed the instrument.

____

Notary Public

STATE OF NEW YORK)
)SS:
COUNTY OF ORANGE)

On this day of 20 , before me, the undersigned, a Notary Public in and for said state, personal appeared ___________________________, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies) and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted executed the instrument.

____

Notary Public

TP-584 (9/15)

Department of Taxation and Finance

NEW YORK STATE

Combined Real Estate Transfer Tax Return, Credit Line Mortgage Certificate, and Certification of Exemption from the Payment of Estimated Personal Income Tax

Recording office time stamp

See Form TP-584-I, *Instructions for Form TP-584*, before completing this form. Print or type.

Schedule A – Information relating to conveyance

Grantor/Transferor

☐ Individual
☐ Corporation
☐ Partnership
☐ Estate/Trust
☐ Single member LLC
☐ Multi-member LLC
☐ Other

Name (if individual, last, first, middle initial) (☐ mark an X if more than one grantor)	Social Security number (SSN)
Mailing address	SSN
City / State / ZIP code	Employer Identification Number (EIN)
Single member's name if grantor is a single member LLC (see instructions)	Single member EIN or SSN

Grantee/Transferee

☐ Individual
☐ Corporation
☐ Partnership
☐ Estate/Trust
☐ Single member LLC
☐ Multi-member LLC
☐ Other

Name (if individual, last, first, middle initial) (☐ mark an X if more than one grantee)	SSN
Mailing address	SSN
City / State / ZIP code	EIN
Single member's name if grantee is a single member LLC (see instructions)	Single member EIN or SSN

Location and description of property conveyed

Tax map designation – Section, block & lot *(include dots and dashes)*	SWIS code (six digits)	Street address	City, town, or village	County

Type of property conveyed *(mark an X in applicable box)*

1 ☐ One- to three-family house
2 ☐ Residential cooperative
3 ☐ Residential condominium
4 ☐ Vacant land
5 ☐ Commercial/Industrial
6 ☐ Apartment building
7 ☐ Office building
8 ☐ Four-family dwelling
9 ☐ Other ______

Date of conveyance ____ ____ ____ (month / day / year)

Percentage of real property conveyed which is residential real property ______% *(see instructions)*

Condition of conveyance *(mark an X in all that apply)*

a. ☐ Conveyance of fee interest

b. ☐ Acquisition of a controlling interest (state percentage acquired ______%)

c. ☐ Transfer of a controlling interest (state percentage transferred ______%)

d. ☐ Conveyance to cooperative housing corporation

e. ☐ Conveyance pursuant to or in lieu of foreclosure or enforcement of security interest *(attach Form TP-584.1, Schedule E)*

f. ☐ Conveyance which consists of a mere change of identity or form of ownership or organization *(attach Form TP-584.1, Schedule F)*

g. ☐ Conveyance for which credit for tax previously paid will be claimed *(attach Form TP-584.1, Schedule G)*

h. ☐ Conveyance of cooperative apartment(s)

i. ☐ Syndication

j. ☐ Conveyance of air rights or development rights

k. ☐ Contract assignment

l. ☐ Option assignment or surrender

m. ☐ Leasehold assignment or surrender

n. ☐ Leasehold grant

o. ☐ Conveyance of an easement

p. ☐ Conveyance for which exemption from transfer tax claimed (complete *Schedule B, Part 3*)

q. ☐ Conveyance of property partly within and partly outside the state

r. ☐ Conveyance pursuant to divorce or separation

s. ☐ Other *(describe)* ______

For recording officer's use	Amount received	Date received	Transaction number
	Schedule B, Part 1 $ Schedule B, Part 2 $		

Page 2 of 4 TP-584 (9/19)

Schedule B – Real estate transfer tax return (Tax Law Article 31)

Part 1 – Computation of tax due

1 Enter amount of consideration for the conveyance *(if you are claiming a total exemption from tax, mark an X in the Exemption claimed box, enter consideration and proceed to Part 3)* ☐ **Exemption claimed**	1.	
2 Continuing lien deduction *(see instructions if property is taken subject to mortgage or lien)*	2.	
3 Taxable consideration *(subtract line 2 from line 1)*	3.	
4 Tax: $2 for each $500, or fractional part thereof, of consideration on line 3	4.	
5 Amount of credit claimed for tax previously paid *(see instructions and attach Form TP-584.1, Schedule G)*	5.	
6 Total tax due* *(subtract line 5 from line 4)*	6.	

Part 2 – Computation of additional tax due on the conveyance of residential real property for $1 million or more

1 Enter amount of consideration for conveyance *(from Part 1, line 1)*	1.	
2 Taxable consideration *(multiply line 1 by the percentage of the premises which is residential real property, as shown in Schedule A)*	2.	
3 Total additional transfer tax due* *(multiply line 2 by 1% (.01))*	3.	

Part 3 – Explanation of exemption claimed on Part 1, line 1 *(mark an X in all boxes that apply)*

The conveyance of real property is exempt from the real estate transfer tax for the following reason:

a. Conveyance is to the United Nations, the United States of America, New York State, or any of their instrumentalities, agencies, or political subdivisions (or any public corporation, including a public corporation created pursuant to agreement or compact with another state or Canada) ..... a ☐

b. Conveyance is to secure a debt or other obligation ..... b ☐

c. Conveyance is without additional consideration to confirm, correct, modify, or supplement a prior conveyance ..... c ☐

d. Conveyance of real property is without consideration and not in connection with a sale, including conveyances conveying realty as bona fide gifts ..... d ☐

e. Conveyance is given in connection with a tax sale ..... e ☐

f. Conveyance is a mere change of identity or form of ownership or organization where there is no change in beneficial ownership. (This exemption cannot be claimed for a conveyance to a cooperative housing corporation of real property comprising the cooperative dwelling or dwellings.) Attach Form TP-584.1, Schedule F ..... f ☐

g. Conveyance consists of deed of partition ..... g ☐

h. Conveyance is given pursuant to the federal Bankruptcy Act ..... h ☐

i. Conveyance consists of the execution of a contract to sell real property, without the use or occupancy of such property, or the granting of an option to purchase real property, without the use or occupancy of such property ..... i ☐

j. Conveyance of an option or contract to purchase real property with the use or occupancy of such property where the consideration is less than $200,000 and such property was used solely by the grantor as the grantor's personal residence and consists of a one-, two-, or three-family house, an individual residential condominium unit, or the sale of stock in a cooperative housing corporation in connection with the grant or transfer of a proprietary leasehold covering an individual residential cooperative apartment ..... j ☐

k. Conveyance is not a conveyance within the meaning of Tax Law, Article 31, § 1401(e) *(attach documents supporting such claim)* ..... k ☐

* The total tax (from Part 1, line 6 and Part 2, line 3 above) is due within 15 days from the date of conveyance. Make check(s) payable to the county clerk where the recording is to take place. For conveyances of real property within New York City, use Form TP-584-NYC. If a recording is not required, send this return and your check(s) made payable to the ***NYS Department of Taxation and Finance***, directly to the NYS Tax Department, RETT Return Processing, PO Box 5045, Albany NY 12205-5045. If not using U.S. Mail, see Publication 55, *Designated Private Delivery Services*.

Page 3 of 4 TP-584 (3/19)

Schedule C – Credit Line Mortgage Certificate (Tax Law Article 11)

Complete the following only if the interest being transferred is a fee simple interest.
This is to certify that: *(mark an X in the appropriate box)*

1. ☐ The real property being sold or transferred is not subject to an outstanding credit line mortgage.

2. ☐ The real property being sold or transferred is subject to an outstanding credit line mortgage. However, an exemption from the tax is claimed for the following reason:

   a ☐ The transfer of real property is a transfer of a fee simple interest to a person or persons who held a fee simple interest in the real property (whether as a joint tenant, a tenant in common or otherwise) immediately before the transfer.

   b ☐ The transfer of real property is (A) to a person or persons related by blood, marriage or adoption to the original obligor or to one or more of the original obligors or (B) to a person or entity where 50% or more of the beneficial interest in such real property after the transfer is held by the transferor or such related person or persons (as in the case of a transfer to a trustee for the benefit of a minor or the transfer to a trust for the benefit of the transferor).

   c ☐ The transfer of real property is a transfer to a trustee in bankruptcy, a receiver, assignee, or other officer of a court.

   d ☐ The maximum principal amount secured by the credit line mortgage is $3 million or more, and the real property being sold or transferred is not principally improved nor will it be improved by a one- to six-family owner-occupied residence or dwelling.

   Note: for purposes of determining whether the maximum principal amount secured is $3 million or more as described above, the amounts secured by two or more credit line mortgages may be aggregated under certain circumstances. See TSB-M-96(6)-R for more information regarding these aggregation requirements.

   e ☐ Other *(attach detailed explanation)*.

3. ☐ The real property being transferred is presently subject to an outstanding credit line mortgage. However, no tax is due for the following reason:

   a ☐ A certificate of discharge of the credit line mortgage is being offered at the time of recording the deed.

   b ☐ A check has been drawn payable for transmission to the credit line mortgagee or mortgagee's agent for the balance due, and a satisfaction of such mortgage will be recorded as soon as it is available.

4. ☐ The real property being transferred is subject to an outstanding credit line mortgage recorded in ________________ (insert liber and page or reel or other identification of the mortgage). The maximum principal amount of debt or obligation secured by the mortgage is ________________. No exemption from tax is claimed and the tax of ________________ is being paid herewith. *(Make check payable to county clerk where deed will be recorded.)*

Signature (both the grantors and grantees must sign)

The undersigned certify that the above information contained in Schedules A, B, and C, including any return, certification, schedule, or attachment, is to the best of their knowledge, true and complete, and authorize the person(s) submitting such form on their behalf to receive a copy for purposes of recording the deed or other instrument effecting the conveyance.

Grantor signature	Title	Grantee signature	Title
Grantor signature	Title	Grantee signature	Title

Reminder: Did you complete all of the required information in Schedules A, B, and C? Are you required to complete Schedule D? If you marked *e, f,* or *g* in Schedule A, did you complete Form TP-584.1? Have you attached your check(s) made payable to the county clerk where recording will take place? If no recording is required, send this return and your check(s), made payable to the ***NYS Department of Taxation and Finance***, directly to the NYS Tax Department, RETT Return Processing, PO Box 5045, Albany NY 12205-5045. If not using U.S. Mail, see Publication 55, *Designated Private Delivery Services*.

Page 4 of 4 **TP-584** (9/19)

Schedule D – Certification of exemption from the payment of estimated personal income tax (Tax Law, Article 22, § 663)

Complete the following only if a fee simple interest or a cooperative unit is being transferred by an individual or estate or trust.

If the property is being conveyed by a referee pursuant to a foreclosure proceeding, proceed to Part 2, mark an *X* in the second box under *Exemption for nonresident transferors/sellers*, and sign at bottom.

Part 1 – New York State residents

If you are a New York State resident transferor/seller listed in Form TP-584, Schedule A (or an attachment to Form TP-584), you must sign the certification below. If one or more transferor/seller of the real property or cooperative unit is a resident of New York State, **each** resident transferor/seller must sign in the space provided. If more space is needed, photocopy this Schedule D and submit as many schedules as necessary to accommodate all resident transferors/sellers.

Certification of resident transferors/sellers

This is to certify that at the time of the sale or transfer of the real property or cooperative unit, the transferor/seller as signed below was a resident of New York State, and therefore is not required to pay estimated personal income tax under Tax Law § 663(a) upon the sale or transfer of this real property or cooperative unit.

Signature	Print full name	Date
Signature	Print full name	Date
Signature	Print full name	Date
Signature	Print full name	Date

Note: A resident of New York State may still be required to pay estimated tax under Tax Law § 685(c), but not as a condition of recording a deed.

Part 2 – Nonresidents of New York State

If you are a nonresident of New York State listed as a transferor/seller in Form TP-584, Schedule A (or an attachment to Form TP-584) but are not required to pay estimated personal income tax because one of the exemptions below applies under Tax Law § 663(c), mark an *X* in the box of the appropriate exemption below. If any one of the exemptions below applies to the transferor/seller, that transferor/seller is not required to pay estimated personal income tax to New York State under Tax Law § 663. **Each** nonresident transferor/seller who qualifies under one of the exemptions below must sign in the space provided. If more space is needed, photocopy this Schedule D and submit as many schedules as necessary to accommodate all nonresident transferors/sellers.

If none of these exemption statements apply, you must complete Form IT-2663, *Nonresident Real Property Estimated Income Tax Payment Form*, or Form IT-2664, *Nonresident Cooperative Unit Estimated Income Tax Payment Form*. For more information, see *Payment of estimated personal income tax*, on Form TP-584-I, page 1.

Exemption for nonresident transferors/sellers

This is to certify that at the time of the sale or transfer of the real property or cooperative unit, the transferor/seller (grantor) of this real property or cooperative unit was a nonresident of New York State, but is not required to pay estimated personal income tax under Tax Law § 663 due to one of the following exemptions:

☐ The real property or cooperative unit being sold or transferred qualifies in total as the transferor's/seller's principal residence (within the meaning of Internal Revenue Code, section 121) from ________ to ________ (see instructions).
Date Date

☐ The transferor/seller is a mortgagor conveying the mortgaged property to a mortgagee in foreclosure, or in lieu of foreclosure with no additional consideration.

☐ The transferor or transferee is an agency or authority of the United States of America, an agency or authority of New York State, the Federal National Mortgage Association, the Federal Home Loan Mortgage Corporation, the Government National Mortgage Association, or a private mortgage insurance company.

Signature	Print full name	Date
Signature	Print full name	Date
Signature	Print full name	Date
Signature	Print full name	Date

Attachment 7

EnSol, Inc.

ENGINEERING + ENVIRONMENTAL

Geotechnical Borehole Logs

SOILTESTING, INC.
90 DONOVAN RD.
OXFORD, CT 06478
CT (203) 262-9328
NY (914) 946-4850

CLIENT:	Ensol, Inc.
PROJECT NO.	G70-1762-21
PROJECT NAME	1128 Dolsontown Rd
LOCATION	Wawayanda NY

SHEET 1 OF 1
HOLE NO. B-1

BORING LOCATIONS per Plan
OFFSET

FOREMAN - DRILLER: MK/ao
INSPECTOR

GROUND WATER OBSERVATIONS
AT 5' FT AFTER 0 HOURS
AT __ FT AFTER __ HOURS

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	
SIZE I.D.	4 ¼"	1 3/8"	
HAMMER WT.		140#	BIT
HAMMER FALL		30"	

DATE START 4/12/21
DATE FINISH 4/12/21
SURFACE ELEV. 457.0
GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12 - 18	N VALUE	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	6"	2'0"	1	2		5	moist		6" Topsoil; Brn F SAND, lit silt [SP]
							3	3			loose	2'0"	
		2	ss	24"	12"	4'0"	8	12		30	moist		Brn F SAND, lit silt, lit FC gravel [SP]
							18	14			compact		
5		3	ss	24"	20"	6'0"	3	4		11	wet		Brn F SAND & SILT, tr clay [SP/SM]
							7	8			compact		
		4	ss	24"	20"	8'0"	10	15		25	moist		SAME
							10	12			compact		
		5	ss	24"	10"	10'0"	14	17		33	moist		SAME
10							16	12			dense		
		6	ss	24"	18"	12'0"	7	8		20	wet		Grey FMC SAND & SILT, tr clay, lit FC gravel [SW/SM]
							12	10			compact		
		7	ss	24"	20"	14'0"	12	28		68	wet		SAME, tr cobbles
							40	26			v dense		
15		8	ss	24"	16"	16'0"	19	17		32	wet		Grey FMC SAND, sm silt, sm FC gravel, tr clay [SW/SM]
							15	17			dense		
20													
		9	ss	10"	6"	20'9"	41	100/4"		100	wet		SAME
											v dense		
		10	ss	24"	20"	25'0"	29	41		93	wet		SAME
25							52	60			v dense	25'0"	
													E.O.B 25'0"
30													
35													
40													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ________FT. USED ______________CASING THEN _______ CASING TO ______FT.   HOLE NO. B-1

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

SOILTESTING, INC. 90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	CLIENT: Ensol, Inc. PROJECT NO. G70-1762-21 PROJECT NAME 1128 Dolsontown Rd	SHEET 1 OF 1 HOLE NO. B-2 BORING LOCATIONS per Plan
FOREMAN - DRILLER MK/ao	LOCATION Wawayanda NY	
INSPECTOR		OFFSET

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	
SIZE I.D.	4 ¼"	1 3/8"	
HAMMER WT.		140#	BIT
HAMMER FALL		30"	

GROUND WATER OBSERVATIONS
AT 6' FT AFTER 0 HOURS
AT __ FT AFTER __ HOURS

DATE START 4/12/21
DATE FINISH 4/12/21
SURFACE ELEV. 455.7
GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC.	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12 - 18	N VALUE	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	20"	2'0"	1	2		5	moist		4" Topsoil; GreyBrn F SAND & SILT, tr clay, tr F grave
							3	5			loose		
		2	ss	24"	20"	4'0"	7	11		21	moist	2'3"	
							10	12			compact		
5		3	ss	24"	18"	6'0"	6	10		24	moist		GreyBrn F SAND & SILT, tr clay [SP/SM]
							14	13			compact		
		4	ss	24"	20"	8'0"	11	15		49	wet		Brn FMC SAND & SILT, tr FC gravel [SP/SM]
							34	21			dense		
		5	ss	24"	12"	10'0'	10	14		27	wet/moist		Grey F SAND & SILT, tr clay, lit FC gravel [SW/SM]
10							13	14			compact		
		6	ss	24"	18"	12'0'	6	8		19	wet		Grey FMC SAND & SILT, tr clay, lit FC GRAVEL [SP/SM]
							11				compact		
		7	ss	24"	20"	14'0'	15	25		57	wet		SAME
							32	27			v dense		
15		8	ss	24"	18"	16'0"	17	17		33	wet		
							16	17			dense		Grey FMC SAND, sm siltm sm FC gravel, tr clay [SW/SM]
20													
		9	ss	24"	20"	22'0"	27	39		80	wet		SAME
							41	60			v dense		
		10	ss	24"	18"	23'8"	24	37		86	wet		
							49	50/4"			v dense	23'8"	SAME
25													E. O B 23'8"
30													
35													
40													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ______ FT. USED ______ CASING THEN ______ CASING TO ______ FT. **HOLE NO. B-2**

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

SOILTESTING, INC. 90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	CLIENT: Ensol, Inc. PROJECT NO. G70-1762-21 PROJECT NAME 1128 Dolsontown Rd	SHEET 1 OF 1 HOLE NO. B-3 BORING LOCATIONS per Plan
FOREMAN - DRILLER PD/ak	LOCATION Wawayanda NY	
INSPECTOR		OFFSET
GROUND WATER OBSERVATIONS AT 4' FT AFTER 0 HOURS AT 2' FT AFTER 4 HOURS		DATE START 4/9/21 DATE FINISH 4/9/21 SURFACE ELEV. 456.0 GROUND WATER ELEV.

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	
SIZE I.D.	4 ¼"	1 3/8"	
HAMMER WT.		140#	BIT
HAMMER FALL		30"	

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12 - 18	N VALUE	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	18"	2'0"	2	2		5	moist	0'6"	Topsoil; DkBrnBrn SILT [ML]
							3	6			stiff		
		2	ss	24"	14"	4'0"	17	12		32	moist	2'0"	BrnLtBrn SILT [ML]
							20	25			hard		
5		3	ss	24"	18"	6'0"	28	21		35	wet	4'0"	Brn SILT & FM SAND, FC gravel [ML]
							14	11			hard		
		4	ss	24"	19"	8'0"	11	11		24	wet	7'0"	Brn FMC SAND & FC GRAVEL, lit silt [SW]
							13	15			compact		LtBrnBrn VFFMC SAND & FC GRAVEL, lit silt
		5	ss	11"	10"	8'11"	43	100/5"		100	vmoist		[SW]
10											v dense		
		6	ss	24"	20"	12'0"	33	70		143	moist	10'6"	LtBrn VFFMC SAND & FC GRAVEL, silt
							73	84			v dense		LtGrey VFFMC SAND & FC GRAVEL, silt, lit cobbles
		7	ss	11"	6"	12'11"	87	100/5"		100	moist/dry		[SW/SM]
15		8	ss	24"	18"	16'0"	14	17		42	moist		Grey VFFM SAND, F gravel, silt, sm cobbles, tr boulders
							25	20			dense		[SP/SM]
20													
		9	ss	24"	18"	22'0"	18	22		42	moist		Grey VFF SAND, FC gravel, sm silt [SW]
							20	22			dense		
25													
		10	ss	4"	3"	25'4"	100/4"			100	v dense	25'4"	Grey VFFM SAND, FC gravel, cobbles, lit silt, boulders
													E.O.B 25'4"
30													
													* POCKET PENETROMETER READING Tons/sqft
35													
40													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ________FT. USED ______________CASING THEN ______ CASING TO ______FT. HOLE NO. B-3

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST

WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE

SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM

PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

SOILTESTING, INC. 90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	CLIENT: Ensol, Inc.	SHEET 1 OF 1 HOLE NO. B-4
FOREMAN - DRILLER MK/ao	PROJECT NO. G70-1762-21 PROJECT NAME 1128 Dolsontown Rd LOCATION Wawayanda NY	BORING LOCATIONS per Plan
INSPECTOR		OFFSET
GROUND WATER OBSERVATIONS AT 6' FT AFTER 0 HOURS AT __ FT AFTER __ HOURS		DATE START 4/12/21 DATE FINISH 4/12/21 SURFACE ELEV. 453.4 GROUND WATER ELEV.

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	
SIZE I.D.	4 ¼"	1 3/8"	
HAMMER WT.		140#	BIT
HAMMER FALL		30"	

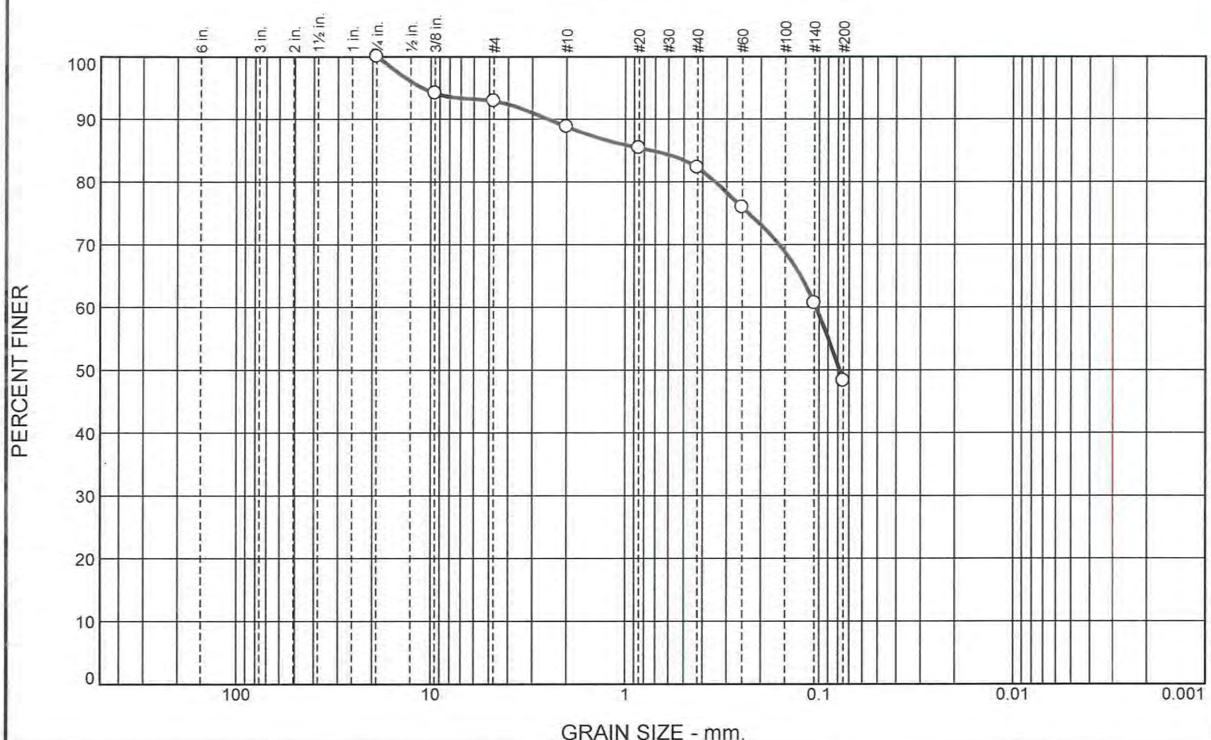
DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12- 18	N VALUE	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	16"	2'0"	1	1		4	moist		4" Topsoil, GreyBrn F SAND & SILT [SM]
							3	5			v loose		
		2	ss	24"	16"	4'0"	6	10		20	moist		SAME
							10	11			compact		
5		3	ss	24"	14"	6'0"	6	8		18	moist		GreyBrn F SAND & SILT [SP/SM]
							10	10			compact		
		4	ss	24"	6"	8'0"	4	5		10	wet		Brn F SAND, tr silt [SP]
							5	5			loose		
		5	ss	24"	12"	10'0"	5	5		13	wet		Brn FMC SAND, sm silt, sm FC gravel [SW/SM]
10							8	8			compact	9'6"	
		6	ss	24"	18"	12'0"	7	9		21	wet		Grey FMC SAND, sm silt, some FC gravel [SW/SM]
							12	13			compact		
		7	ss	24"	26"	14'0"	14	27		56	wet		Grey FMC SAND, sm silt, lit FC gravel tr clay
							29	30			v dense		
15		8	ss	24"	14"	16'0"	18	17		33	wet		SAME
							16	17			dense		
20													
		9	ss	15	10"	21'3"	31	40		90	wet		Gray FMC SAND, sm silt, sm FC gravel , tr clay [SW/SM]
							50/3"				v dense		
		10	ss	24"	20"	25'0"	24	37		87	wet		same
25							50	71			v dense	25'0"	
													E.O.B 25'0"
30													
35													
40													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ______ FT. USED __________ CASING THEN ______ CASING TO ______ FT. **HOLE NO. B-4**

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.1	4.1	6.6	33.9	48.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.375	94.1		
#4	92.9		
#10	88.8		
#20	85.4		
#40	82.2		
#60	75.9		
#140	60.6		
#200	48.3		

* (no specification provided)

Material Description

Brown and gray silty, clayey sand

Atterberg Limits

PL= 19 LL= 26 PI= 7

Coefficients

D_{90}= 2.4908 D_{85}= 0.7347 D_{60}= 0.1039
D_{50}= 0.0785 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC-SM AASHTO=

Remarks

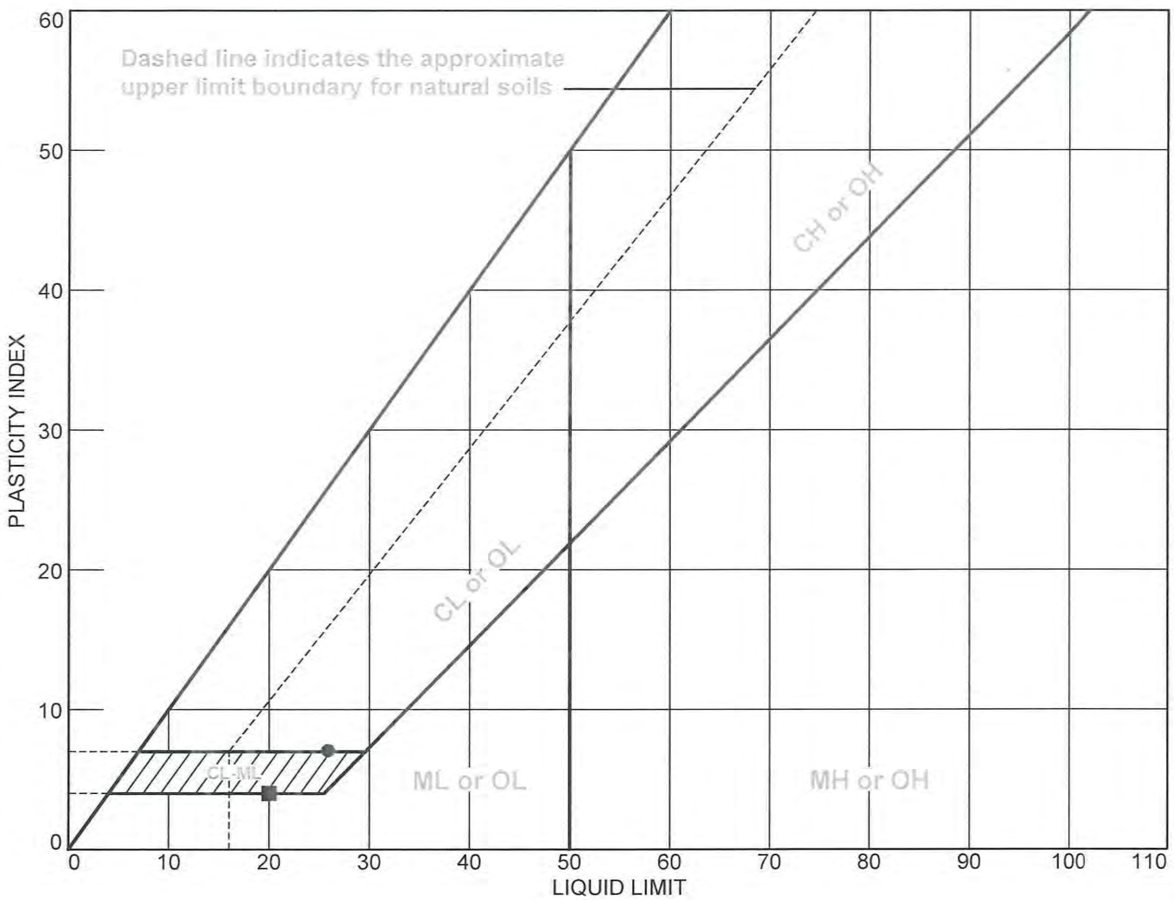
Moisture content=24.3%

Source of Sample: B-4 **Depth:** 4-10 ft.
Sample Number: S-3,S-4,S-5 Comp. **Date:** 6-22-2021

SKYLANDS TESTING, LLC Sparta, NJ	**Client:** Soiltesting, Inc. **Project:** 1128 Dolsontown Road Wawayanda, NY **Project No:** 21-065 **Figure**

Tested By: RS **Checked By:** VRS

ATTERBERG LIMITS REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-4	S-3,S-4,S-5 Comp.	4-10 ft.	24.3	19	26	7	SC-SM
■	B-5	S-5,S-6 Comp.	8-12 ft.	18.9	16	20	4	GP-GC

SKYLANDS TESTING, LLC

Sparta, NJ

Client: Soiltesting, Inc.
Project: 1128 Dolsontown Road
Wawayanda, NY
Project No.: 21-065 **Figure**

Tested By: EH **Checked By:** VRS

SOILTESTING, INC. 90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	CLIENT: **Ensol, Inc.** PROJECT NO. G70-1762-21 PROJECT NAME 1128 Dolsontown Rd	SHEET 1 OF 2 HOLE NO. B-5 BORING LOCATIONS per Plan
FOREMAN - DRILLER PD AK	LOCATION Wawayanda NY	
INSPECTOR		OFFSET
GROUND WATER OBSERVATIONS AT 6' FT AFTER 0 HOURS AT __ FT AFTER __ HOURS		DATE START 4/9/21 DATE FINISH 4/9/21 SURFACE ELEV. 457.7 GROUND WATER ELEV.

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	
SIZE I.D.	4 ¼"	1 3/8"	
HAMMER WT.		140#	BIT
HAMMER FALL		30"	

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12- 18	N VALUE	DENSITY OR CONSIST ____M OIST	STRATA CHANGE DEPTH ____ ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	16"	2'0"	3	3		6	moist	1'0"	Topsoil
							3	5			loose	2'0"	Brn SILT & FC GRAVEL, sm FM sand [ML]
		2	ss	24"	18"	4'0"	13	17		37	moist		Brn FMC SAND & FC GRAVEL, lit cobbles, silt [SW]
							20	22			dense		
5		3	ss	24"	20"	6'0"	18	19		33	moist/v moist		Brn FMC SAND & FC GRAVEL, lit cobbles, silt
							14	14			dense		
		4	ss	24"	18"	8'0"	14	15		29	wet		BrnGrey FMC SAND & FC GRAVEL, lit cobbles, silt
							14	15			compact		
		5	ss	24"	18"	10'0"	14	15		27	wet		Lt BrnBrn VFFMC & SAND, silt, FC gravel [SW/SM]
10							12	11			compact		
		6	ss	24"	20"	12'0"	5	15		34	wet/v moist	11'0"	SAME
							19	20			dense		BrnGray FMC SAND & FC GRAVEL, lit silt, cobbles [SW]
		7	ss	24"	18"	14'0"	20	23		50	wet	12'6"	
							27	25			dense	13'6"	Brn FMC SAND, FC gravel [SW]
15		8	ss	17"	15"	15'5"	29	32		132	wet		Brn VFF SAND, silt, FC gravel, cobbles, tr boulders [SP/SM]
							100/5"				v dense		
20													
		9	ss	18"	18"	21'6"	14	16		35	wet		Brn VFF SAND, silt, FC gravel, cobbles, tr boulders [SP/SM]
							19				dense		Bolders
25													
		10	ss	18"	18"	26'6"	51	25		52	wet		Grey VFFMC SAND, FC gravel, sm silt, cobbles, lit bolders
							27				v dense		[SW/SM]
30													Cobbles @ 29'
		11	ss	18"	18"	31'6"	8	10		30	wet	31'0"	GreyDkGrey FM SAND, sm silt, Tr C Sand [SW/SM]
							20				compact		Grey FMC SAND & F GRAVEL, sm silt
35													
		12	ss	18"	18"	36'6"	33	50		113	v moist		LtGrey VF SAND, silt, sm F gravel, cobbles [SP/SM]
							63				v dense		
40													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ______ FT. USED ________ CASING THEN ______ CASING TO ______ FT. **HOLE NO. B-5**

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

SOILTESTING, INC.	CLIENT: **Ensol, Inc.**	SHEET 2 OF 2

90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	PROJECT NO. G70-1762-21	HOLE NO. B-5
	PROJECT NAME 1128 Dolsontown Rd	BORING LOCATIONS per Plan
FOREMAN - DRILLER MK/ao	LOCATION Wawayanda NY	
INSPECTOR		OFFSET

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	
SIZE I.D.	4 ¼"	1 3/8"	
HAMMER WT.		140#	BIT
HAMMER FALL		30"	

GROUND WATER OBSERVATIONS
AT 6' FT AFTER 0 HOURS
AT __ FT AFTER __ HOURS

DATE START 4/12/21
DATE FINISH 4/12/21
SURFACE ELEV.
GROUND WATER ELEV.

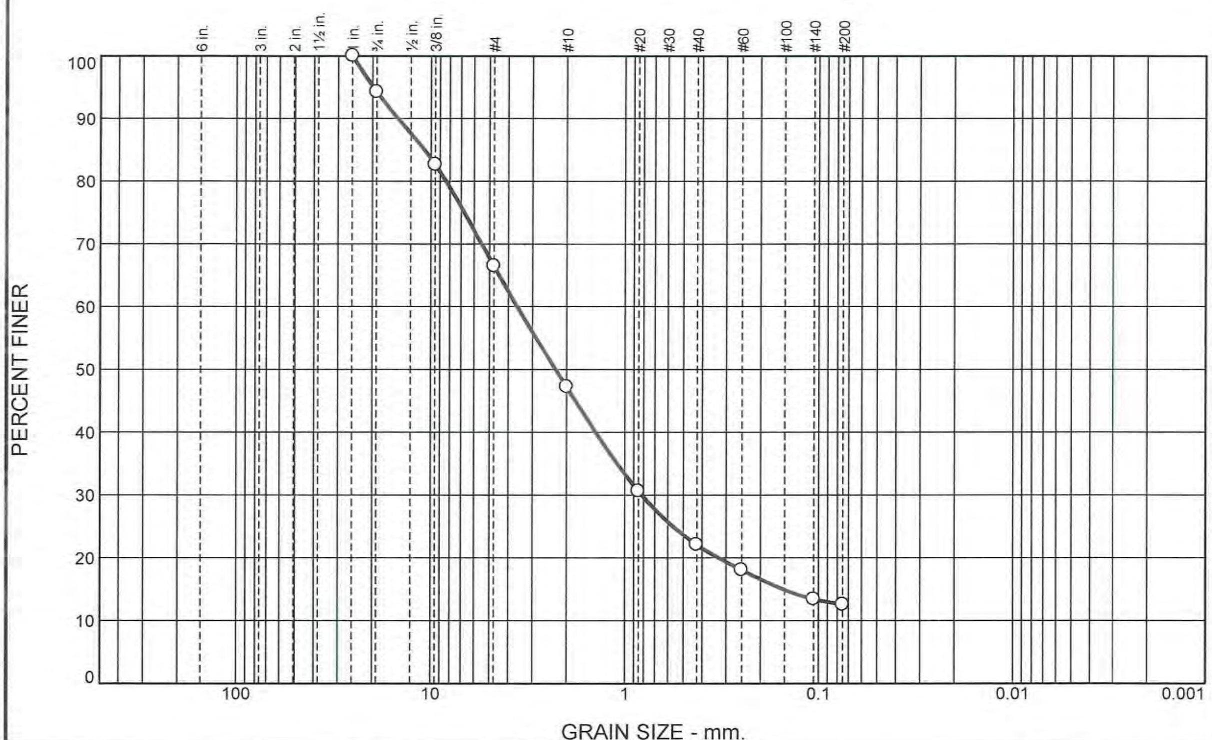
DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12 - 18	N VALUE	DENSITY OR CONSIST MOIST	STRATA CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		13	ss	19"	9"	40'9"	81	100/3"		100	wet		SAME
											v dense		
45													
		14	ss	18"	18"	46'6"	37	42		132	wet		LtGreyGrey SILT, sm VFFMC SAND, FC gravel, cobbles,
							90				v dense		tr boulders [ML]
50													
		15	ss	18"	18"	51'6"	35	41		99	wet		SAME
							58				v dense		
55													
		16	ss	18"	18"	56'6"	19	22		48	wet		GreyBrn VFF SAND, sm silt [SP/SM]
							26				dense		
60													
		17	ss	18"	18"	61'6"	20	28		73	wet		GreyBrn VFF SAND, lit silt [SP]
							45				v dense		Grey FMC SAND & FC GRAVEL, lit silt, cobbles [SW]
65													
		18	ss	18"	17"	66'6"	41	63		140	wet		Grey VFFMC SAND, silt, FC gravel, cobbles [SW/SM]
							77				v dense	67'0"	Auger refusal
													E.O.B 67'0"
70													*PP: Pocket Petrometer
75													
80													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ______ FT. USED ____________ CASING THEN ______ CASING TO ______ FT. **HOLE NO. B-5**

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	5.8	27.7	19.3	25.1	9.5	12.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	94.2		
.375	82.6		
#4	66.5		
#10	47.2		
#20	30.6		
#40	22.1		
#60	18.1		
#140	13.4		
#200	12.6		

* (no specification provided)

Material Description

Brown and gray silty sand with gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 14.8075 D_{85}= 10.8418 D_{60}= 3.6024
D_{50}= 2.2795 D_{30}= 0.8161 D_{15}= 0.1522
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

USCS based on dilatancy & plasticity per ASTM D2488

Source of Sample: B-5 **Depth:** 2-8 ft.
Sample Number: S-2,S-3,S-4 Comp. **Date:** 6-22-2021

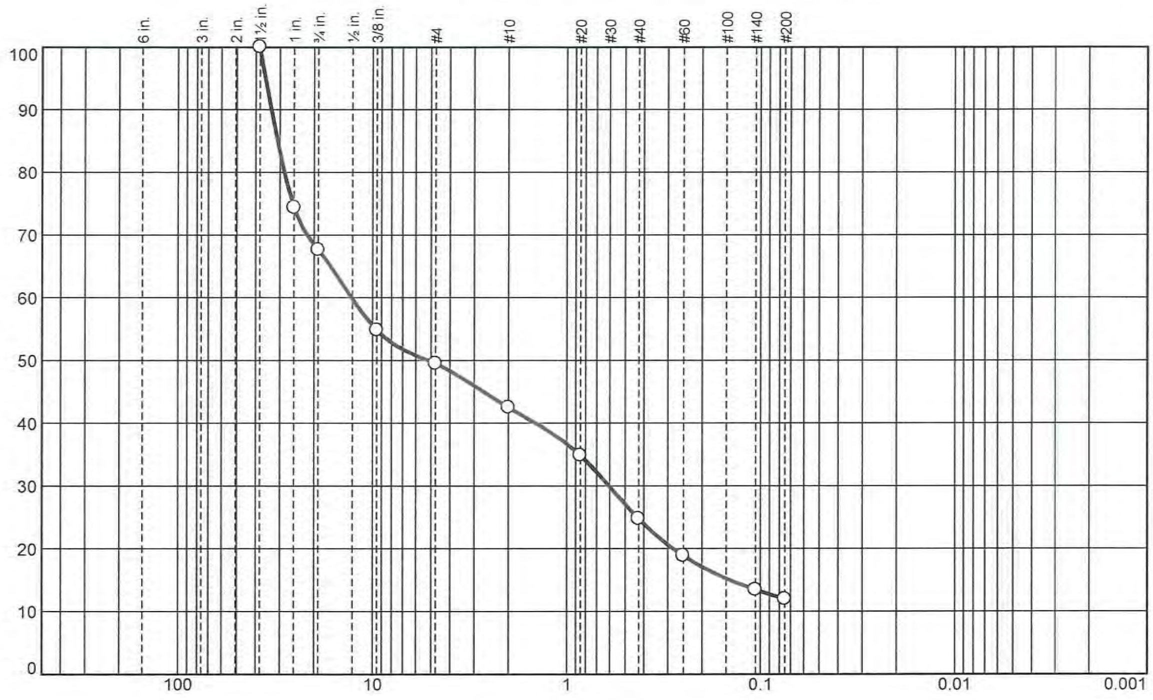
SKYLANDS TESTING, LLC

Sparta, NJ

Client: Soiltesting, Inc.
Project: 1128 Dolsontown Road
Wawayanda, NY
Project No: 21-065 **Figure**

Tested By: RS **Checked By:** VRS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	32.4	18.1	7.0	17.7	12.8	12.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1	74.4		
.75	67.6		
.375	54.8		
#4	49.5		
#10	42.5		
#20	34.9		
#40	24.8		
#60	18.9		
#140	13.5		
#200	12.0		

* (no specification provided)

Material Description

Brown and gray poorly graded gravel with silty clay and sand

Atterberg Limits

PL= 16 LL= 20 PI= 4

Coefficients

D_{90}= 33.2740 D_{85}= 30.9360 D_{60}= 12.8380
D_{50}= 5.1868 D_{30}= 0.6038 D_{15}= 0.1441
D_{10}= C_u= C_c=

Classification

USCS= GP-GC AASHTO=

Remarks

Moisture content=18.9%

Source of Sample: B-5 **Depth:** 8-12 ft.
Sample Number: S-5,S-6 Comp.

Date: 6-22-2021

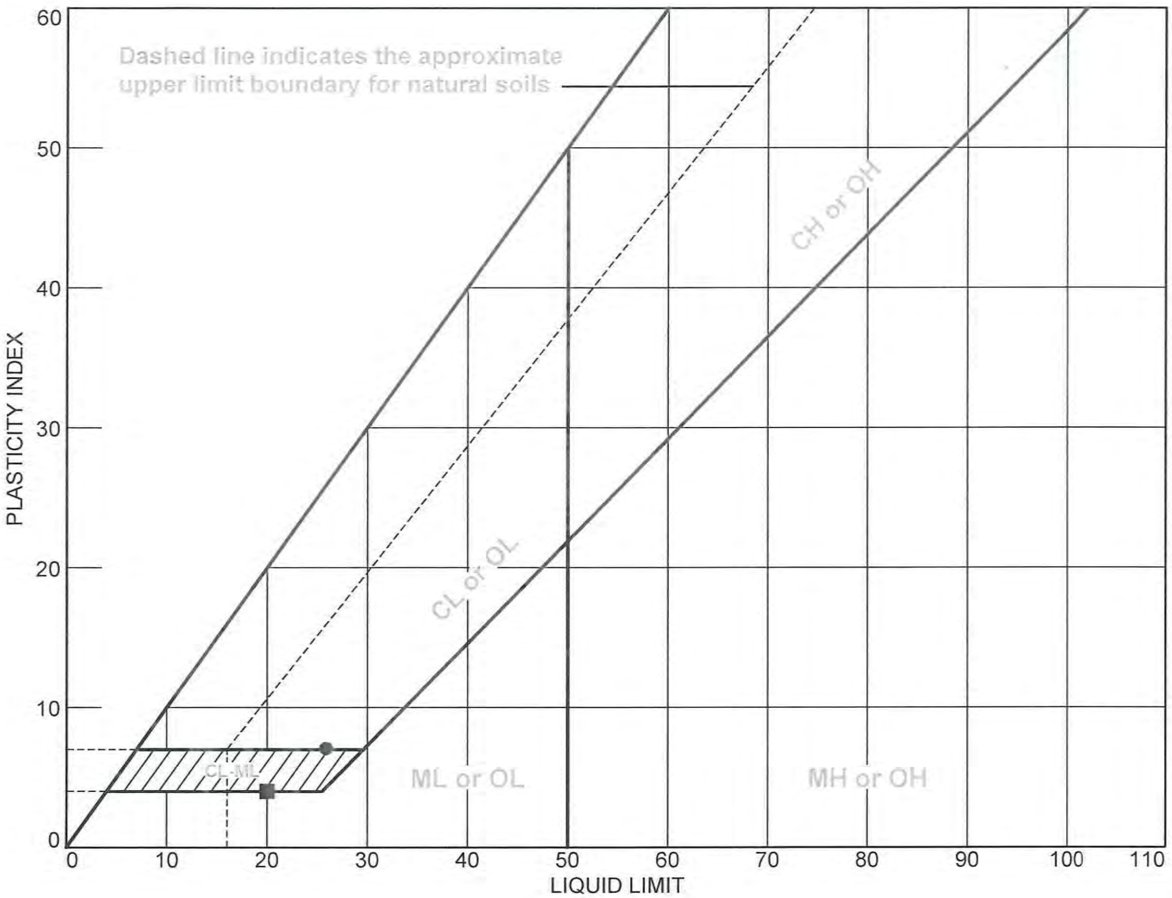
SKYLANDS TESTING, LLC

Sparta, NJ

Client: Soiltesting, Inc.
Project: 1128 Dolsontown Road
Wawayanda, NY
Project No: 21-065 **Figure**

Tested By: RS **Checked By:** VRS

ATTERBERG LIMITS REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-4	S-3,S-4,S-5 Comp.	4-10 ft.	24.3	19	26	7	SC-SM
■	B-5	S-5,S-6 Comp.	8-12 ft.	18.9	16	20	4	GP-GC

SKYLANDS TESTING, LLC

Sparta, NJ

Client: Soiltesting, Inc.
Project: 1128 Dolsontown Road
Wawayanda, NY
Project No.: 21-065 **Figure**

Tested By: EH **Checked By:** VRS

SOILTESTING, INC. 90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	CLIENT: Ensol, Inc.	SHEET 1 OF 1 HOLE NO. B-6
	PROJECT NO. G70-1762-21	
	PROJECT NAME 1128 Dolsontown Rd	BORING LOCATIONS per Plan
FOREMAN - DRILLER MK/ao	LOCATION Wawayanda NY	
INSPECTOR		OFFSET

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	
SIZE I.D.	4 ¼"	1 3/8"	
HAMMER WT.		140#	BIT
HAMMER FALL		30"	

GROUND WATER OBSERVATIONS
AT 8 FT AFTER 0 HOURS
AT __ FT AFTER __ HOURS

DATE START 4/13/21
DATE FINISH 4/13/21
SURFACE ELEV. 456.0
GROUND WATER ELEV.

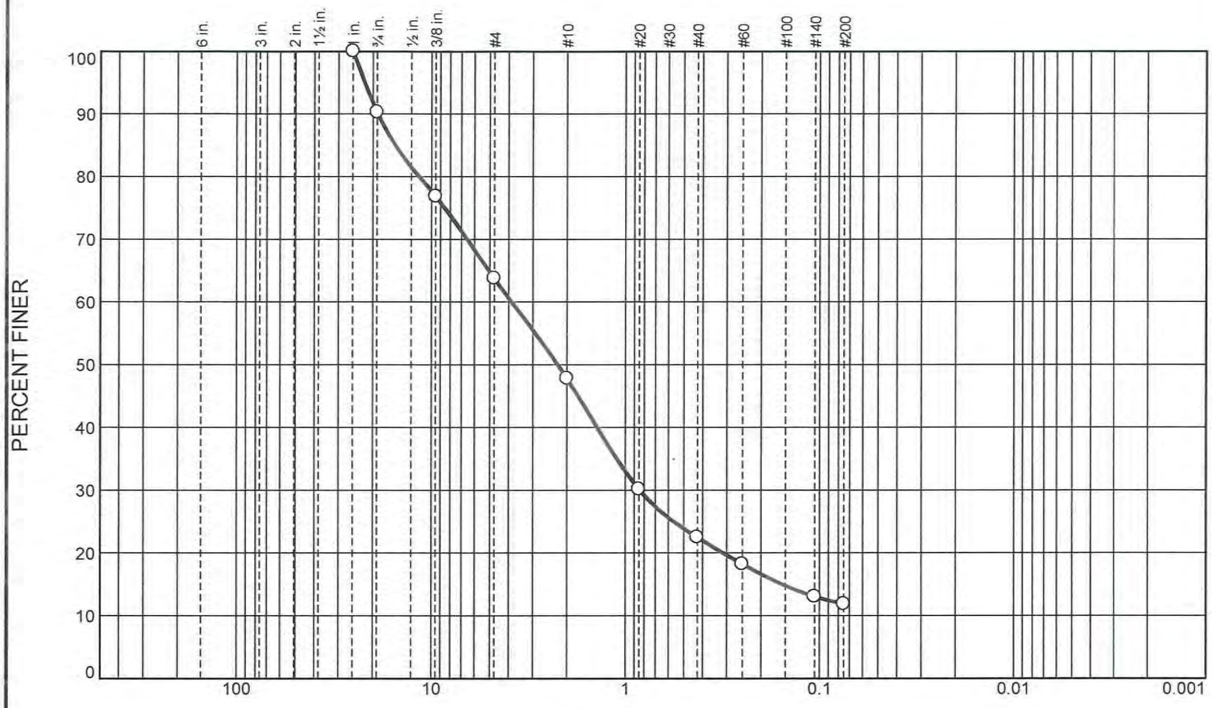
DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12 - 18	N VALUE	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	12"	2'0"	8	10		18	moist		Topsoil
							8	9			compact		Brn FMC SAND, sm clay, silt [SW/SC]
		2	ss	24"	8"	4'0"	16	8		18	moist		SAME
							10	11			compact		
5		3	ss	24"	18"	6'0"	12	14		26	moist		GrayBrn FMC SAND, sm FC gravel, lit silt [SW]
							12	11			compact		
		4	ss	24"	6"	8'0"	13	13		28	moist		SAME
							15	15			compact		
		5	ss	24"	0"	10'0"	14	12		24	wet		NO RECOVERY
10							12	11			compact		
		6	ss	24"	4"	12'0"	11	9		17	wet		Brn FMC SAND & FC gravel [SW]
							8	9			compact		
		7	ss	24"	12"	14'0"	7	9		18	wet		SAME
							9	9			compact		
15		8	ss	20"	18"	15'8"	23	32		84	wet		Brn FMC SAND & FC GRAVEL, tr cobbles [SW]
							52	50/2"			v dense		
20													
		9	ss	24"	18"	22'0"	21	21		43	wet		Brn FMC SAND, lit FC gravel [SW]
							22	26			dense		
		10	ss	24"	16"	24'0"	18	22		54	wet		Grey FMC SAND & FC GRAVEL, tr cobbles [SW]
25							32	29			v dense	24'0"	
													E.O.B. 24'0"
30													
35													
40													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ________ FT. USED ______________ CASING THEN ______ CASING TO ______ FT. HOLE NO. B-6

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND = 35 - 50% F = FINE

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	9.7	26.5	16.0	25.3	10.7	11.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	90.3		
.375	76.9		
#4	63.8		
#10	47.8		
#20	30.2		
#40	22.5		
#60	18.2		
#140	13.0		
#200	11.8		

* (no specification provided)

Material Description

Brown poorly graded sand with silt and gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 18.8609 D_{85}= 15.3652 D_{60}= 3.8647
D_{50}= 2.2312 D_{30}= 0.8409 D_{15}= 0.1554
D_{10}= C_u= C_c=

Classification

USCS= SP-SM AASHTO=

Remarks

USCS based on dilatancy & plasticity per ASTM D2488

Source of Sample: B-6 **Depth:** 4-8 & 10-14 ft.
Sample Number: S-3,S-4,S-6,S-7 Comp **Date:** 6-22-2021

SKYLANDS TESTING, LLC Sparta, NJ	**Client:** Soiltesting, Inc. **Project:** 1128 Dolsontown Road Wawayanda, NY **Project No:** 21-065 **Figure**

Tested By: RS **Checked By:** VRS

SOILTESTING, INC. 90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	CLIENT: Ensol, Inc. PROJECT NO. G70-1762-21 PROJECT NAME 1128 Dolsontown Rd	SHEET 1 OF 1 HOLE NO. B-7 BORING LOCATIONS per Plan
FOREMAN - DRILLER MK/ao	LOCATION Wawayanda NY	
INSPECTOR		OFFSET

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	
SIZE I.D.	4 ¼"	1 3/8"	
HAMMER WT.		140#	BIT
HAMMER FALL		30"	

GROUND WATER OBSERVATIONS
AT 13' FT AFTER 0 HOURS
AT __ FT AFTER __ HOURS

DATE START 4/13/21
DATE FINISH 4/13/21
SURFACE ELEV. 458.0
GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC.	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12 - 18	N VALUE	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		ss	ss	24"	10"	2'0"	3	6		10	moist		4" Topsoil; Brn F SAND, sm silt, lit FC gravel [SP/SM]
							4	18			loose		
		2	ss	24"	10"	4'0"	16	11		21	moist		SAME
							10	10			compact		
5		3	ss	24"	14"	6'0"	17	18		41	dry		Brn FMC SAND, sm FC gravel, tr silt, tr cobbles [SW]
							23	36			dense		
		4	ss	24"	16"	8'0"	41	25		43	dry		SAME
							18	19			dense		
		5	ss	24"	14"	10'0"	10	11		23	moist/wet		DkBrn FMC SAND, sm FC gravel, tr silt [SW]
10							12	12			compact		
		6	ss	24"	12"	12'0"	15	24		45	wet		Brn FMC SAND & FC GRAVEl, tr silt [SW]
							21	16			dense		
		7	ss	24"	16"	14'0"	20	14		26	wet		SAME
							12	10			compact		
15		8	ss	24"	16"	16'0"	14	20		43	wet		Brn FMC SAND, sm FC gravel, tr silt [SW]
							23	25			dense		
20													
		9	ss	24"	8"	22'0"	28	22		42	wet		Brn FMC SAND, sm silt, tr clay, lit FC gravel [SW/SM]
							20	23			dense		
		10	ss	24"	12"	24'0"	29	19		31	wet		GreyBrn FMC SAND & FC GRAVEL, tr silt [SW]
							12	14			dense	24'0"	
25													E.O.B 24'0"
30													
35													
40													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ________FT. USED ______________CASING THEN ________ CASING TO ______FT. **HOLE NO. B-7**

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

SOILTESTING, INC. 90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	CLIENT: Ensol, Inc.	SHEET 1 OF 1 HOLE NO. B-8
	PROJECT NO. G70-1762-21	
	PROJECT NAME 1128 Dolsontown Rd	BORING LOCATIONS per Plan
FOREMAN - DRILLER MK/ao	LOCATION Wawayanda NY	
INSPECTOR		OFFSET

	CASING	SAMPLER	CORE BAR
TYPE	HSA	SS	
SIZE I.D.	4 ¼"	1 3/8"	
HAMMER WT.		140#	BIT
HAMMER FALL		30"	

GROUND WATER OBSERVATIONS
AT 2'6" FT AFTER 0 HOURS
AT __ FT AFTER __ HOURS

DATE START 4/13/21
DATE FINISH 4/13/21
SURFACE ELEV. 449.7
GROUND WATER ELEV.

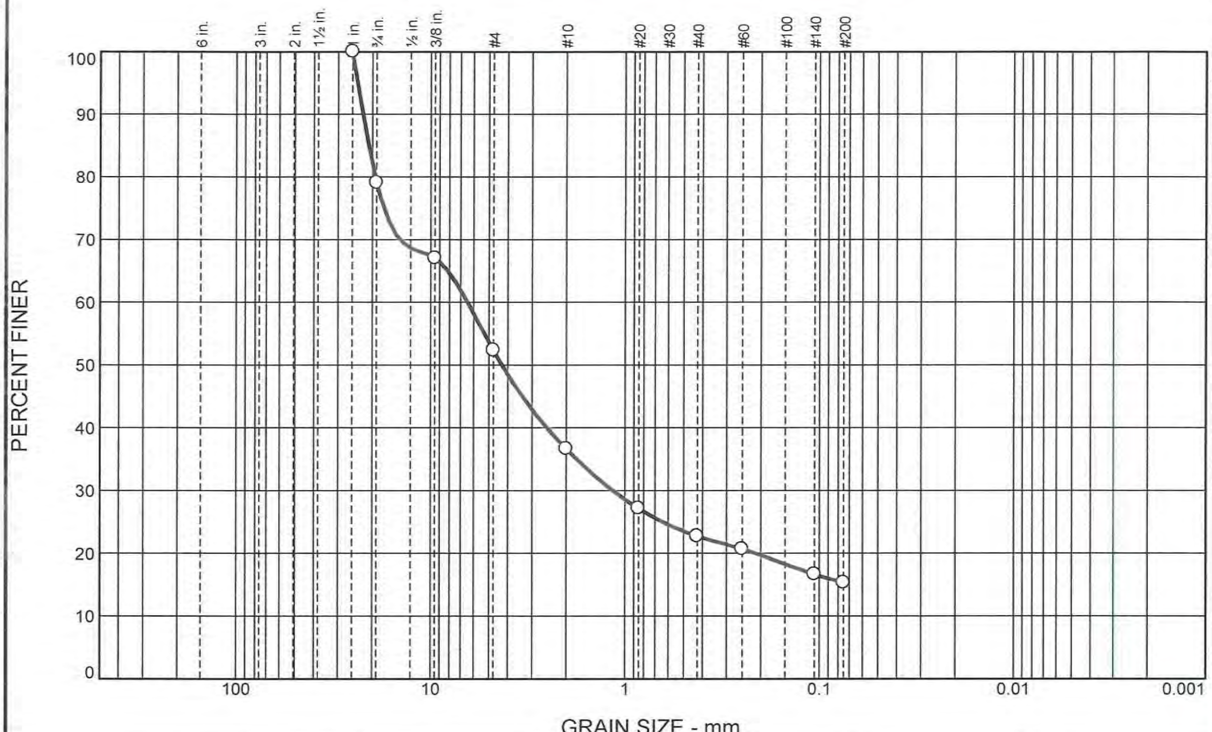
DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6	6 - 12	12 - 18	N VALUE	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	ss	24"	8"	2'0"	1	2		4	moist		4" Topsoil; Brn F SAND, sm silt, lit FC gravel
							2	2			v loose		
		2	ss	24"	14"	4'0"	5	11		31	wet		Grey FMC SAND, lit FC gravel, lit silt [SW]
							20	12			dense		
5		3	ss	24"	12"	6'0"	9	17		32	wet		Grey FMC SAND & FC gravel, tr silt
							15	15			dense		
		4	ss	24"	16"	8'0"	10	11		22	wet		Brn FMC SAND & FC GRAVEL, tr silt [SW]
							11	11			compact		
		5	ss	2"	0"	8'2"	100/2"			100	wet		No recovery
10											v dense		
		6	ss	24"	14"	12'0"	10	11		45	wet		Brn FMC SAND & FC GRAVEL, tr cobbles [SW]
							34	24			dense		
		7	ss	14"	10"	13'2"	26	49		149	wet		SAME
							100/2"				v dense	14'0"	
15		8	ss	24"	20"	16'0"	14	16		31	wet		Grey F SAND & SILT [SP/SM]
							15	17			dense		
20													
		9	ss	24"	20"	22'0"	11	10		29	wet		SAME
							19	15			compact		
		10	ss	24"	20"	24'0"	12	11		29	wet		
							18	15			compact	24'0"	SAME
25													E.O.B 24'0"
30													
35													
40													

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO ______ FT. USED ____________ CASING THEN ______ CASING TO ______ FT. HOLE NO. B-8

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	20.9	26.8	15.6	13.9	7.5	15.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	79.1		
.375	67.0		
#4	52.3		
#10	36.7		
#20	27.2		
#40	22.8		
#60	20.7		
#140	16.7		
#200	15.3		

* (no specification provided)

Material Description

Gray-brown silty gravel with sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 22.4203 D_{85}= 20.9434 D_{60}= 6.4557
D_{50}= 4.2926 D_{30}= 1.1507 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= GM AASHTO=

Remarks

USCS based on dilatancy & plasticity per ASTM D2488

Source of Sample: B-8 **Depth:** 2-8 ft.
Sample Number: S-2,S-3,S-4 Comp. **Date:** 6-22-2021

SKYLANDS TESTING, LLC

Sparta, NJ

Client: Soiltesting, Inc.
Project: 1128 Dolsontown Road
Wawayanda, NY
Project No: 21-065 **Figure**

Tested By: RS **Checked By:** VRS

Attachment 8

EnSol, Inc.

ENGINEERING + ENVIRONMENTAL

SHPO Correspondence

June 15, 2021

David Lenox
Project Manager
EnSol, Inc.
661 Main Street
Niagara Falls, NY 14301

Re: USACE
Dom-Mar Transfer and Recycling Facility: New Construction
1128 Dolsontown Rd, Middletown, NY 10940
20PR08024

Dear David Lenox:

Thank you for requesting the comments of the New York State Historic Preservation Office (SHPO). We have reviewed the submitted materials in accordance with Section 106 of the National Historic Preservation Act of 1966. These comments are those of the SHPO and relate only to Historic/Cultural resources.

SHPO has reviewed *Phase I Archaeological Investigation for the Dom-Mar Transfer & Recycling Center Town of Wawayanda, Orange County, New York* (Tracker Archaeology, April 2021). The investigation found no evidence of archaeological sites within the project's Area of Potential Effects (APE). However, as noted in the report, a New York State Museum-recorded archaeological site, NYSM 6169, is mapped within the project area. The site is described as "Cemetery." No other information is available. The mapped location must be considered approximate and, based on a review of historic USGS topographic maps, there may have been significant landscape modification in the recorded site's vicinity. Therefore, based on these factors, we recommend that the project will not adversely affect historic or archaeological properties listed or eligible for listing on the National Register of Historic Places conditioned on a commitment by the applicant to implement our Human Remains Discovery Protocol (attached) should any evidence of human remains or possible burial goods be encountered during construction.

If you have any questions, please don't hesitate to contact me.

Sincerely,

Philip A. Perazio, Historic Preservation Program Analyst - Archaeology Unit
Phone: 518-268-2175
e-mail: philip.perazio@parks.ny.gov via e-mail only

Attachment

cc: Ryan Elliott, EnSol; Brian Orzel, USACE; Charles Vandrei and David Witt, DEC

State Historic Preservation Office/
New York State Office of Parks, Recreation and Historic Preservation
Human Remains Discovery Protocol
(January 2021)

If human remains are encountered during construction or archaeological investigations, the New York State Historic Preservation Office (SHPO) recommends that the following protocol is implemented.

- Human remains shall be treated with dignity and respect. Should human remains or suspected human remains be encountered, work in the general area of the discovery shall stop immediately and the location shall be secured and protected from damage and disturbance.

- If skeletal remains are identified and the archaeologist is not able to conclusively determine if they are human, the remains and any associated materials shall be left in place. A qualified forensic anthropologist, bioarchaeologist or physical anthropologist shall assess the remains in situ to help determine if they are human.

- If the remains are determined to be human, law enforcement, the SHPO, the appropriate Indian Nations, and the involved state and federal agencies shall be notified immediately. If law enforcement determines that the burial site is not a criminal matter, no skeletal remains or associated materials shall be removed until appropriate consultation takes place.

- If human remains are determined to be Native American, they shall be left in place and protected from further disturbance until a plan for their avoidance or removal is developed. Please note that avoidance is the preferred option of the SHPO and the Indian Nations. The involved agency shall consult SHPO and the appropriate Indian Nations to develop a plan of action. Photographs of Native American human remains and associated materials should not be taken without consulting with the involved Indian Nations.

- If human remains are determined to be non-Native American, the remains shall be left in place and protected from further disturbance until a plan for their avoidance or removal is developed. Please note that avoidance is the preferred option of the SHPO. The involved agency shall consult SHPO and other appropriate parties to develop a plan of action.

- The SHPO recommends that burial information is not released to the public to protect burial sites from possible looting.