



Engineering
& Design

Storm Water Pollution Prevention Plan (SWPPP)

May 24, 2024

Marlboro on Hudson

Town of Marlborough, Ulster County, NY

Prepared for:

HAM, LLC
PO Box 546
Marlborough NY 12542

Prepared by:

A black ink signature of Connor P. McCormack is written over a circular professional seal. The seal contains the text "STATE OF NEW YORK" at the top, "CONNOR PATRICK MCCORMACK" in the center, and "REGISTERED PROFESSIONAL ENGINEER" at the bottom.

Connor P. McCormack, P.E.
New York Professional Engineer
License No. 103756 Digitally signed by Connor Patrick McCormack
Date: 2024.05.24 05:01:00-04'00'

Colliers Engineering & Design
555 Hudson Valley Avenue Suite 101
New Windsor New York 12553
Main: 877 627 3772
Colliersengineering.com

Project No. 24005017A

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I. EXECUTIVE SUMMARY

The applicant, Highland Avenue Marlboro, LLC, proposes to develop the remaining 24 residential units, clubhouse and pool that were proposed under the previously approved site plan. In addition, the remaining utilities, drainage improvements and the extension of Hudson Circle that have yet to be constructed are also proposed. The proposed development is largely unchanged from the previously approved site plan. The only significant change being the stormwater improvements that have been updated to conform to the latest standards set forth under NYSDEC SPDES General Permit for Construction Activity (GP- 0-20-001).

Herein, a hydrologic study revealed the need for post construction stormwater design, which is included within the Stormwater Pollution Prevention Plan (SWPPP) for the proposed development. Bioretention areas, pocket ponds, and construction management practices have all been utilized in the design to meet New York State Standards and requirements. As the proposed SWPPP provides reductions in peak flows for all required design storms within the study, and runoff reduction/water quality mitigation meeting the applicable standards has been provided for the new construction portion of the development, there should be no adverse impacts due to storm water, on-site or off-site, as a result of the proposed development.



II. INTRODUCTION

The existing site is a +/- 6.29-acre parcel in the Town of Marlborough with a frontage on South Street to the south and Highland Avenue to the west. The site is currently partially developed, containing 12 residential units. Also installed on the site are the associated utilities, stormwater management facilities parking and partially built Hudson Circle that circle the units. The site is largely cleared of trees and brush and the lawn areas are well maintained.

The parcel previously had site plan approval for a total of 36 units of which only 12 were built. During the first phase of construction, the utilities and stormwater facilities were installed for the intended 36 unit build out, since then construction stopped, and the site plan approval has expired. Colliers Engineering & Design was hired by the owner of the property to update the site plan for the latest New York State and Town codes and requirements for the original 36 unit build out (24 are proposed on this site plan). The site plan has largely remained the same as what was previously approved. This original approved design, modified in 2018, has been included as Appendix 16 for reference. It is our intent to use the previously accepted findings and methodology of that report wherever possible while also meeting the latest criteria requirements.

Under the previous stormwater requirements, the site was designed to treat water quality and to mitigate the peak flow of the design storms. Green Infrastructure Techniques and the Runoff Reduction Requirements were not included under the previous design. Because a large portion of the site drainage and stormwater mitigation has already been installed for the 36-unit development there is a very limited number of areas where these practices can be added. Additionally, upon review of the As-Built Survey, some of the installed stormwater basins and drainage structures were not constructed to the correct size or in the location of the approved site plan. These existing practices have been modified to meet the requirements for quality and quantity.

The size and nature of the development will require coverage under the NYSDEC SPDES General Permit for Construction Activity (GP- 0-20-001). Herein, a hydrologic study was conducted as part of the larger SWPPP for the proposed project. The intent of this study is to show the peak discharges have been attenuated, the required water quality has been treated and required runoff reduction via site planning and green infrastructure techniques are provided as required by the current permit and New York State Stormwater Design Manual, 2015 (NYSSMDM).

III. METHODOLOGY

1. The watersheds are divided into subareas, by topography, soils, and land use. A summary of the watershed areas, composite curve numbers, and travel times are shown in Table 1.
2. The current rainfall depths used for this analysis are those published by the Northeast Regional Climate Center for the project location for the 100, 10, and 1-year frequency storms as directed in the NYSSMDM. The Rainfall data has been included in Appendix 14 of this report.
3. Topographical mapping is taken from a survey titled "As-Built Survey for Pine View Corners" prepared by Colliers Engineering & Design, dated April 18, 2018, the 2003 Drainage and

Hydrology report prepared by Colliers Engineering & Design (Appendix 16) and best available mapping.

4. The required water quality volume (WQv) was calculated in accordance with Section 4.2 of the NYSSMDM. This is also the required RRV as per Section 4.3 of the NYSSMDM.
5. The provided RRV was calculated using the Green Infrastructure (GI) Worksheets, Version 1.6, provided by NYSDEC. The worksheets are included in Appendix 12 of this report.
6. The peak flows from the watersheds in the existing condition are computed using the runoff curve numbers taken from TR-55 to determine undeveloped peak runoff and runoff hydrographs at the design points. The existing peak flows are presented in the report.
7. In the post-development condition, the peak flows from the proposed development are computed using the runoff curve numbers taken from TR-55. The watersheds are adjusted for the proposed improvements and grading of the site. The runoff flows are hydraulically routed for updated travel times, diversions, and new storage structures, as necessary. The resulting proposed peak flows at the design point are presented in the report.
8. As the 2003 Drainage and Hydrology report utilized the hydrology software HEC-1, the same inputs have been included in the updated software for this project (HydroCAD) with the new rainfall data. This will account for any inconsistencies between the two sets of software.
9. A full Erosion & Sediment Control Plan (plans and construction sequencing) was designed in accordance with the New York State Standards and Specifications for Erosion and Sediment Control (aka the "bluebook") and is included in this report.
10. A long-term Operation & Maintenance Plan was developed for the proposed post-construction stormwater control practices and is included in this report.
11. Maps indicating the various drainage conditions are enclosed in this report. Schematic diagrams of the flow models in the existing and proposed conditions are included in the HydroCAD output within Appendix 2.
12. A Notice of Intent (NOI) for GP- 0-20-001 and MS4 SWPPP Acceptance form was prepared and included in Appendix 4 and 5 of this report.

IV. DISCUSSION

Description of Design Points

It is important to note that the same design points from the previously adopted Drainage and Hydrology point have been used for this report.

The design points evaluated in this report are described as follows:

Design Point 1 (DP-1) captures the runoff from the southeast portion of the site it is located in the drainage ditch that runs east along South Street.

Design Point 2 (DP-2) captures the runoff from the southwest portion of the site. Runoff flows from the site to a drain inlet at the corner of Highland Avenue and South Street.

Design Point 3 (DP-3) captures the stormwater runoff from the northern portion of the site to an existing drainage ditch on the northeast corner of the site.

The Design Point locations, the pre- and post-development land use, travel times flow paths, and watersheds are clearly identified on the watershed maps found in the appendix of this report. The pre-development (hereafter “existing”) and post-development (hereafter “proposed”) watershed characteristics can be found in Table 1 below.

Table 1: Watershed Characteristics

<u>Existing Conditions</u>			
	<u>Area</u>	<u>CN</u>	<u>Tc</u>
EWS-1	4.448	73	25.2
EWS-2	2.218	76	18.0
EWS-3	10.944	79	24.0
Totals	17.610	77.1	-

<u>Proposed Conditions</u>			
	<u>Area</u>	<u>CN</u>	<u>Tc</u>
WS-1	2.879	71	25.2
WS-1.1A	0.418	89	6.0
WS-1.1B	0.204	91	6.0
WS-1.1C	1.897	83	12.7
WS-2	1.570	82	17.6
WS-3	8.211	80	24.0
WS-3.1A	2.431	84	10.8
Totals	17.610	80	-

The minimum Tc of 6 minutes, or 0.10 hours, is shown above and noted on the watershed maps in the catchment areas where the composite travel time did not meet this minimum.

Hydrologic Soils:

The NRCS Web soil survey was used to collect general site hydrologic soil information regarding the project site. The NRCS Web Soil Survey shows the site situated wholly within hydrologic soil group (HSG) 'D' soil. The NRCS Web Soil Report is included in Appendix 11 of this report for reference. No recent soil testing was performed by Colliers Engineering & Design for this project.

Redevelopment

As defined in Chapter 9 of the NYSSMDM, redevelopment activity is disturbance and reconstruction of existing impervious surfaces. This includes impervious surfaces removed within the last five (5) years. Redevelopment is distinguished from new development in that new development refers to construction on land where there had not been previous construction. Redevelopment specifically applies to constructed areas with impervious surfaces.

According to the Design Manual, Redevelopment of previously developed sites is encouraged from a watershed protection standpoint because it often provides an opportunity to conserve natural resources in less impacted areas by targeting development to areas with existing services and infrastructure. At the same time, redevelopment provides an opportunity to correct existing problems and reduce pollutant discharges from older developed areas that were constructed without effective stormwater pollution controls. In this particular project it also gives us the opportunity to correct the previously installed stormwater mitigation practices that appear to have been built undersized according to the previously approved plan the as-built survey.

Site constraints associated with pre-developed project sites are another factor that makes it more difficult to provide standard stormwater practices (SMPs). The biggest constraints encountered on this site are primarily the presence of highly compacted, poorly drained soils and the depth to the restrictive layer that can be observed on site. Chapter 9 of the NYSSMDM sets forth alternative design criteria for certain redevelopment projects because the technical standards contained elsewhere in the Manual were primarily intended for new development projects and compliance with those standards may present a challenge to some redevelopment projects.

The existing site's residential units, parking areas and driveways, partially built Hudson Circle, concert sidewalks and compacted gravel surface will be part of the site's redevelopment area. The proposed development has proposed to remove some existing impervious areas, but the project will have a net increase in impervious areas. In total the proposed improvements will have a **net increase of 0.91 Acres of impervious area**. The newer design criteria Runoff Reduction has been sized to treat this increase in area. Although a new impervious area has been proposed in WS3.1A and WS2, due to the existing site limitations in this location the entirety of the required treatment has occurred in Watersheds 1.1A and 1.1B.

Zero-Net Increase:

The proposed storm water improvements for the site provide the required channel protection (CPv), overbank flood protection (Qp), and extreme flood protection (Qf). Peak flows have been reduced at the selected design point in the proposed condition for the 100, 10, and 1-year storms. These peak flow reductions can also be found in Table 2 below.

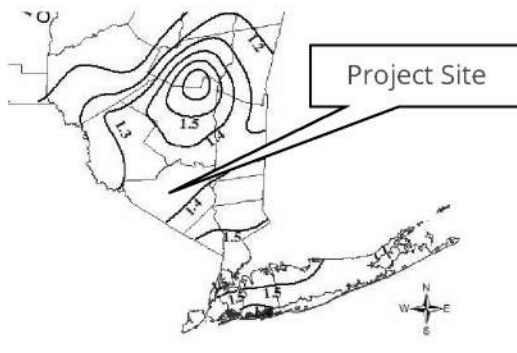
As is evident in the table below, attenuation of the peak flows by the utilization of SMP's with RRv capacity, and site planning, have effectively reduced the peak discharge while providing the required runoff reduction, which will be further discussed below.

Table 2: Present and Proposed Peak Flow Summary to the Design Point

	<u>Storm Events</u>	<u>Existing</u>	<u>Proposed</u>	<u>Diff.</u>	<u>Percent</u>
DP-1	1	1.74	0.93	-0.81	-46.55%
	10	6.30	5.20	-1.10	-17.46%
	100	15.72	15.69	-0.03	-0.19%
DP-2	1	1.28	1.26	-0.02	-1.56%
	10	4.08	3.72	-0.36	-8.82%
	100	9.62	7.79	-1.83	-19.02%
DP-3	1	6.97	6.34	-0.63	-9.04%
	10	19.98	19.26	-0.72	-3.60%
	100	44.72	44.72	-0.00	-0.0%

Water Quality Volume (WQv):

The Water Quality Volume (WQv) is designed to improve water quality sizing to capture and treat 90% of the average annual stormwater runoff volume. The WQv is directly related to the impervious cover created at a site. The 90% rainfall event value (P) used in the calculations (1.40") is shown below in the portion of Figure 4.1 from Section 4.2, page 4-3 in the NYSSMDM.



90% Rule:

$$WQ_v = [(P)(R_v)(A)] / 12$$

$$R_v = 0.05 + 0.009(I)$$

I = Impervious Cover (Percent)

Minimum $R_v = 0.2$

P = 90% Rainfall Event Number (See Figure 4.1)

A = site area in acres

Colliers Engineering & Design determined the total impervious area for the project site, both in the existing and proposed condition. The Runoff Coefficient "RRv" in the computation of Water Quality Volume WQv is dependent on the percent impervious cover. As per Section 4.2 of the NYSSMDM, 100% of the water quality volume shall be treated. However, because there were existing water quality treatments in place the RRv has only been sized for the new impervious that is proposed.

Table 3: Required Water Quality Calculation

Watershed	Area (A) Acres	90% Rainfall Event Number (P) Inches	Percent Impervious (I) %	Runoff Coefficient Rv	Required WQv Cf	Provided WQv Cf
1.1A	0.42	1.40	64%	0.63	1,342	1,342
1.1B	0.20	1.40	75%	0.73	737	737
1.1C	1.897	1.40	41%	0.42	4,050	4,199
3.1A	2.430	1.40	41%	0.42	5,187	5,966

* Only Subcatchment 1.1A & 1.1B are designed to treat the increase in impervious area and are the only watersheds with stormwater mitigations practices with RRv capacity. Watershed 1.1C and 3.1A will treat the remaining WQv.

The total required water quality volume per NYSDEC standards, for the new construction portion of the development, based on the proposed impervious area of 0.91 acres, is 4,820 cf or 0.111 Ac-ft. The areas being considered for new construction for the proposed development require a minimum runoff reduction of 1,324 cf (0.030 Ac-Ft) be reduced and total water quality be treated for the proposed improvements. The proposed design meets the minimum required RRv with 1,331 cf (0.031

Ac-ft) and provides a portion of the water quality volume. The remaining practices without RRv capacity treat 100% of the WQv set forth by the NYSDEC requirements. This aspect of the design has been met.

The application of site planning and green infrastructure to reduce water quality volume with runoff reduction practices can either reduce the required water quality volume to be treated or can completely account for the required water quality volume, which is recommended; the summary of this analysis can be found below. The combination of practices provided on site exceeds the minimum required water quality and runoff reduction for the proposed development.

Runoff Reduction Volume (RRv) through Site Planning:

The basic premise of runoff reduction is to recognize the water quality benefits of certain practices by allowing for a reduction in the water quality treatment volume. Runoff reduction is first achieved through better site design during the planning stages and has been implemented in the planning and design of this project as described in this report.

In accordance with Section 5.2 "Planning for Green Infrastructure: Reduction of Impervious Cover" of the NYSDEC Stormwater Management Design Manual, the proposed site plan has been designed to meet the planning techniques as follows:

Table 4: Site Planning

Preservation of undisturbed Areas	
Delineate and place into permanent conservation undisturbed forests, native vegetated areas, riparian corridors, wetlands, and natural terrain.	The proposed development is primarily limited to previously disturbed areas.
Preservations of Buffers	
Define, delineate and preserve naturally vegetated buffers along perennial streams, rivers, shorelines and wetlands.	The project is largely redevelopment. The existing buffers have been maintained wherever possible.
Reduction of Clearing & Grading	
Limit clearing and grading to the minimum amount needed for roads, driveways, foundations, utilities and stormwater management facilities.	The clearing limit was minimized and maximum slopes were utilized to catch up to grade where applicable.
Locating Development in Less Sensitive Areas	
Avoid sensitive resource areas such as floodplains, steep slopes, erodible soils, wetlands, mature forests and critical habitats by	N/A, the project is the continuation of an existing development.

locating development to fit the terrain in areas that will create the least impact.	
Open Space Design	
Use clustering, conservation design or open space design to reduce impervious cover, preserve more open space and protect water resources.	Not applicable to this project
Soil Restoration	
Restore the original properties and porosity of the soil by deep till and amendment with compost to reduce the generation of runoff and enhance the runoff reduction performance of post construction practices.	The areas of the site not proposed to contain impervious surfaces will be landscaped or used for stormwater purposes. As part of the design plan, the disturbed soils compacted during construction will be restored in accordance with NYSDEC regulations set forth in Section 5.1.6 of the Stormwater Management Design Manual (NYSSMDM). Following restoration, the soil in the lawn/landscaping areas will have the ability to infiltrate rainfall similar to the existing conditions and will slow stormwater runoff.
Roadway Reduction	
Minimize roadway widths and lengths to reduce site impervious area	Not applicable to this project
Sidewalk Reduction	
Minimize sidewalk lengths and widths to reduce site impervious area	Sidewalks have been proposed for safe passages of customers to and from the building.
Driveway Reduction	
Minimize driveway lengths and widths to reduce site impervious area	Driveway are proposed to access each building garage.
Cul-de-Sac Reduction	
Minimize the number of cul-de-sacs and incorporate landscaped areas to reduce their impervious cover.	Not applicable to this project
Building Footprint Reduction	

Reduce the impervious footprint of residences and commercial buildings by using alternate or taller buildings while maintaining the same floor to area ratio.	Building footprint was minimized to the end user's needs.
Parking Reduction	
Reduce imperviousness on parking lots by eliminating unneeded spaces, providing compact car spaces and efficient parking lanes, minimizing stall dimensions, using porous pavement surfaces in overflow parking areas, and using multi-storied parking decks where appropriate.	The proposed parking spaces match what was approved under the previous site plan conditions.

Green Infrastructure Techniques (GITs):

After considering the reductions through Site Planning mentioned above, RRV remains to be treated through GITs and/or Standard SMPs. Chapter 5 of the NYSSMDM outlines the various Green Infrastructure Techniques which can be implemented on-site to achieve runoff reduction. The GI Worksheets included in the Appendix of this report provide the calculations for the green infrastructure techniques chosen to treat the Runoff Reduction Volume for this project. Below is a brief description of each Green Infrastructure Technique along with a discussion regarding the feasibility of each technique with respect to this project.

Table 5: Green Infrastructure Feasibility

Conservation of Natural Areas	
Retain the pre-development hydrologic and water quality characteristics of undisturbed natural areas, stream and wetland buffers by restoring and/or permanently conserving these areas on a site.	No natural streams or wetlands are being disturbed on site.
Sheetflow to Riparian Buffers or Filter Strips	
Undisturbed natural areas such as forested conservation areas and stream buffers or vegetated filter strips and riparian buffers can be used to treat and control stormwater runoff from some areas of a development project.	Not applicable to this project.
Vegetated Open Swale	

The natural drainage paths, or properly designed vegetated channels, can be used instead of constructing underground storm sewers or concrete open channels to increase time of concentration, reduce the peak discharge, and provide infiltration.	An existing vegetate swale is on the site and will remain.
Tree Planting/Tree Box	
Plant or conserve trees to reduce stormwater runoff, increase nutrient uptake, and provide bank stabilization. Trees can be used for applications such as landscaping, stormwater management practice areas, conservation areas and erosion and sediment control.	Tree planting existing and are proposed through the site but has not been quantified.
Disconnection of Rooftop Runoff	
Direct runoff from residential rooftop areas and upland overland runoff flow to designated pervious areas to reduce runoff volumes and rates.	Where rooftops are not being gathered to be treated by bioretention areas this practice is used but has not been quantified.
Stream Daylighting for Redevelopment Projects	
Stream Daylight previously-culverted/piped streams to restore natural habitats, better attenuate runoff by increasing the storage size, promoting infiltration, and help reduce pollutant loads.	This strategy is not applicable to the project.
Rain Garden	
Manage and treat small volumes of stormwater runoff using a conditioned planting soil bed and planting materials to filter runoff stored within a shallow depression.	There are a few green locations proposed throughout the development but rain gardens have not been proposed due to poor on-site soils.
Green Roof	
Capture runoff by a layer of vegetation and soil installed on top of a conventional flat or sloped roof. The rooftop vegetation allows evaporation and evapotranspiration processes to reduce	The structural design of the proposed buildings does not allow for this technique.

volume and discharge rate of runoff entering conveyance system.	
Stormwater Planter	
Small landscaped stormwater treatment devices that can be designed as infiltration or filtering practices. Stormwater planters use soil infiltration and biogeochemical processes to decrease stormwater quantity and improve quality.	Green locations are proposed throughout the development but planters have not been proposed for treatment of the roof due to maneuvering limitations around the building area.
Rain Tank or Cistern	
Capture and store stormwater runoff to be used for irrigation systems or filtered and reused for non-contact activities.	Pump design and storage is not feasible with the architectural layout and mechanical design for the building and site.
Porous Pavement	
Pervious types of pavements that provide an alternative to conventional paved surfaces, designed to infiltrate rainfall through the surface, thereby reducing stormwater runoff from a site and providing some pollutant uptake in the underlying soils.	Most of the onsite pavement has already been installed and where the roadway will be expanded the existing subbase, binder and top course will be used.

The bioretention basins account for the runoff reduction as required and when coupled with the modified pocket ponds also provide the required water quality treatment to meet the state and local requirements. As the intent of the design manual calls for site planning, it is important to touch on these techniques partially implemented in the design.

Soil restoration efforts, including mechanical decompaction and compost amendment in accordance with Section 5.1.6 and Table 5.3 of the NYSSMDM, are proposed for areas to be disturbed for improvements that will not be impervious at final buildout.

Refer to Tables 5 and 6 above for the decision-making matrices utilized herein. The design for the project utilized standard SMPs with RRV capacity to meet the minimum runoff reduction volume and water quality for new construction and redevelopment respectively. NYSDEC Green Infrastructure (GI) worksheets can be found in Appendix 12 summarizing calculations.

Bioretention Basins with Underdrain (F-5):

The new construction portion of the proposed development causes an increase in impervious; as such the peak runoff must be mitigated. One of the alternatives utilized in the proposed

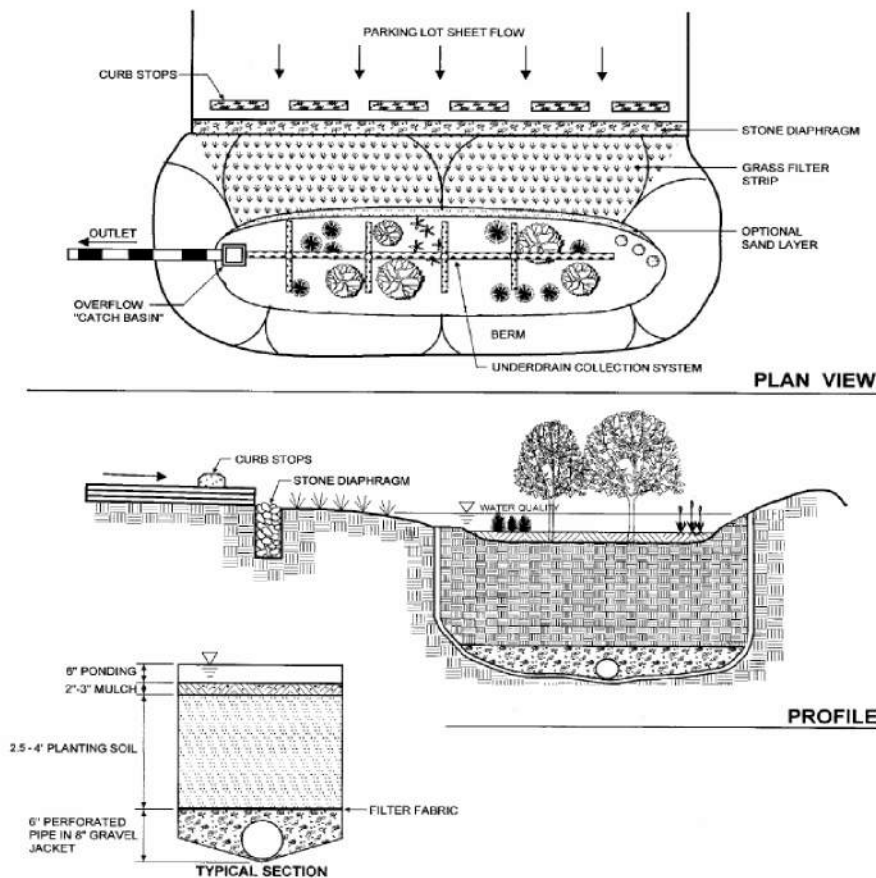
development is the use of bioretention with a proposed underdrain (F-5). Runoff from the development is proposed to be routed to a bioretention basin to provide runoff reduction capacity as well water quality treatment volume. The basins are proposed with a 3" mulch layer, 2.5 feet of soil media, and an 8-inch drainage layer with a 6-inch underdrain which ultimately connects to a detention pond to attenuate peak flows. Bioretention soils shall meet the design criteria outlined in Appendix H of the NYSSMDM; soil deep ripping and de-compaction shall be in accordance with the NYSDEC guidelines found in the appendix.

The sizing calculation for the bioretention system was completed in accordance with design requirements set forth in Section 6.4.4 of the NYSSMDM. An exception to the design is that grass filter strips have not been provided for pre-treatment of the sheet flow from the paved areas. Frequent observance of scour and destruction of existing bioretention areas have led the design to include properly sized riprap inlet protection at all curb cuts. Although the intent of the design requires grass filter strips, Colliers Engineering & Design believes longevity of the system design and maintenance of the mulch layer and vegetation will adequately treat the runoff from the proposed development and this design alteration will meet the long-term goals of the permit.

The stage/storage volume information of the bioretention areas can be found in the HydroCAD output within the appendix of this report. The NYSDEC GI worksheet for runoff reduction and water quality treatment can be found in the appendix for RRv capacity calculations (See NYSDEC GI

worksheet). A summary of the water quality provided in these facilities can be found in Table 3.

Figure 6.19 Bioretention (F-5)



New construction stormwater runoff will pass through a bioretention area adequately sized for the water quality event which then passes into the large, shallow detention basin prior to entering the control structure and then continue offsite. Redevelopment related construction stormwater will be treated by the modified pocket ponds that have been included below.

Pocket Ponds (P-5)

In accordance with the NYSDEC Stormwater Management Design Manual, Chapter 6, Section 6.1 a Pocket Pond (P-5) has been designed to treat the remaining WQv from the above mentioned Bioretention Areas.

The pocket pond does not receive runoff from an area that is considered a "Hot-Spot". The pond also receives runoff from a DA less than 5-acres in size. The bioretention areas will act as pretreatment for the practice.

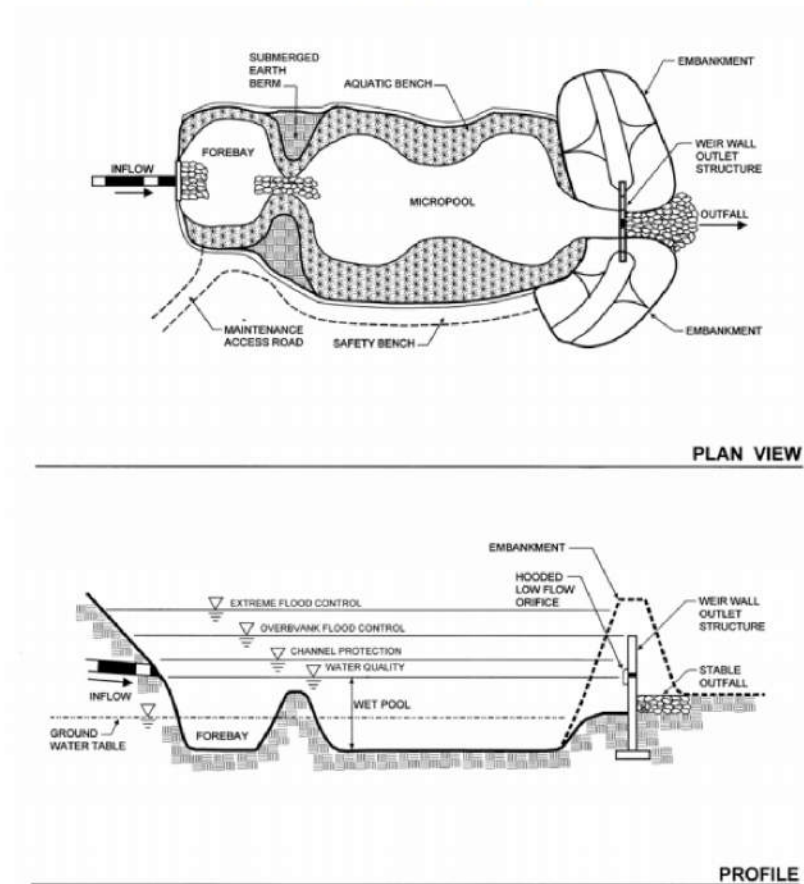
For treatment, the remaining WQv is detained within the pond shown below (1.1 and 3.1) The slopes of the pond will be graded to a 2h:1v slope to maintain what had previously been installed. This slope is not up to the current set of standards, but a fence has been proposed around the basin to restrict access for safety. The basin sizing chart has been included below.

New York State Stormwater Management Design Manual

Chapter 6: Performance Criteria

Section 6.1 Stormwater Ponds

Figure 6.5 Pocket Pond (P-5)



Detention Basin 1.1 (from HydroCAD Output)							
	ELEVATION	AREA (AC)	VOLUME PER contour interval (cf)	CUMULATIVE volume (cf)	VOLUME PER contour interval (ACFT)	CUMULATIVE volume (AcFT)	AREA (SF)
100-YR	363.00	0.056	0	0	0.000	0.000	2,452.00
	364.00	0.069	2,726	2,726	0.063	0.063	3,000.00
	365.00	0.082	3,276	6,002	0.075	0.138	3,551.00
	366.00	0.095	3,842	9,843	0.088	0.226	4,132.00
	367.00	0.109	4,436	14,279	0.102	0.328	4,739.00
	368.00	0.173	6,130	20,408	0.141	0.469	7,520.00
	369.00	0.195	8,008	28,416	0.184	0.652	8,496.00
	370.00	0.217	8,981	37,397	0.206	0.859	9,466.00

Detention Basin 3.1 (from HydroCAD Output)							
	ELEVATION	AREA (AC)	VOLUME PER contour interval (cf)	CUMULATIVE volume (cf)	VOLUME PER contour interval (ACFT)	CUMULATIVE volume (AcFT)	AREA (SF)
100-YR	365.00	0.055	0	0	0.000	0.000	0
	366.00	0.068	2,686	2,686	0.062	0.062	2,400.00
	367.00	0.082	3,280	5,966	0.075	0.137	2,971.00
	368.00	0.100	3,973	9,938	0.091	0.228	3,589.00
	369.00	0.117	4,722	14,660	0.108	0.337	4,356.00
	370.00	0.000	2,544	17,203	0.058	0.395	5,087.00

V. EROSION & SEDIMENT CONTROL

General Erosion Control Plan:

All work to be done in accordance with the New York Standards and Specifications for Erosion and Sediment Control. See the Erosion & Sediment Control Plan included in the appendix of this report which has general erosion and sediment control notes and a sequence of construction, which can also be found below.

The erosion control practices designed specifically for site phasing are to be implemented during construction. These include sediment traps, inlet protection, a stabilized construction entrance, staging areas, silt fence, temporary swales, temporary stockpiles, and temporary/permanent stabilization. The E&SC Plan and Details found in Appendix 15 of this report depict the location and size of the proposed erosion control practices to be used during construction.

A sediment trap detail and sizing criteria chart has been provided on the plan. This chart identifies overall required storage per the area of disturbance as well as sub-areas and dimensions of traps to be utilized. These sizes and volumes are required through the device can be relocated as practical by the Contractor (note: traps must be sized to provide 3,600 CF of storage per 1-acre of disturbance and tributary to each location).

Construction Sequence:

The applicant and the applicant's contractor are required to attend a preconstruction meeting with representatives from the City & Town Building Departments, Highway Departments, engineers, and any other parties deemed necessary to review all protocols, bonding requirements, agreements and the sequence and scheduling of the work being undertaken, as applicable.

Phase 1: Site Work.

Disturbance Area = 2.73 acres

Temp storage required = 3,600 cf per drainage acre = (9,828) cf

Temp storage provided = 47,333 cf.

1. The contractor is to install a construction entrance at the existing access from South Street and Highland Avenue into the site. Staging and supplies shall be placed near the existing entrances.
2. The contractor shall install all erosion control measures including inlet protection for existing catch basins, silt fence and sock, and stone outlet sediment trap.
3. The contractor shall install two (2) temporary sediment traps, temporary diversion swales, and silt fence as shown on the erosion and sediment control plan. Contractor to construct additional temporary diversion swales and sediment traps as needed to direct and capture runoff from disturbed areas. Locations and size are noted on the plan. These may vary depending on Contractor schedule and approach but 3,600 cf of storage must be provided at a minimum per

acre of upstream disturbance. Sediment traps shall be installed in accordance with the plans and details. Sediment traps and basins shall be sized in accordance with the New York Standards and Specifications for Erosion and Sediment Control Manual.

4. The Contractor shall grade the site and remove excess material as necessary. The existing pocket ponds will be excavated as required to provide the proper volume. The proposed bioretention basins shall be graded and over excavated with the planning media not being installed at this time. The contractor will then install any remaining site utilities and building pads.
5. Disturbed soil shall be temporarily stabilized as soon as practical. Materials stored in stockpiles shall be cordoned off with silt fence per the appropriate specifications and details. The Operator shall initiate stabilization measures as soon as practical in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than (14) days after the construction activity in that portion of the site has temporarily or permanently ceased.
 - a. 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). Stabilization shall be maintained per SPDES General Permit for stormwater runoff from construction activity, GP- 0-20-001 or as amended.
6. The contractor shall grade the remainder of Hudson circle and stabilize with subbase and binder course, then install the remaining concrete curbing. Once these areas have been stabilized the basin shall be over excavated to remove sediments and backfilled per the design requirements including gravel drainage layer, planting media, and top mulch.
7. After completion of building exterior, grade and spread topsoil on all lawn areas and seed, install sidewalks. Maintain all seeded and planted areas to insure a viable stabilized vegetative cover.
8. The project site must meet final stabilization criteria prior to removing all erosion and sediment control devices and closing out the project. Litter and construction debris shall be removed as practical throughout the life of the project.
 - 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 riprap or washed/crushed stone have been applied on all disturbed areas that are not covered by permanent structures, concrete or pavement.
9. Upon final stabilization being met, Contractor shall clear drainage pipes and structures of any sediment which may have accumulated.

10. Additional erosion control measures shall be installed, as may be necessary, required and/or requested by authorities, to prevent the incidental discharge of silt laden runoff from entering a water course or a drainage system. The general permit for stormwater discharges from construction activities states that it is unlawful for any person to cause or contribute to a violation of water quality standards.

For additional general Erosion and Sediment Control notes including seeding, please refer to the Erosion and Sediment Control Plans, included as Appendix 15 of this report.

VI. CHEMICAL, LITTER & DEBRIS CONTROL MEASURES

All parties involved in the construction process, including but not limited to, truck drivers, laborers, foremen, and operators, will be informed of spill prevention and litter control practices and procedures herein prior to construction activity. The project superintendent will inspect the site daily, at a minimum for litter and debris throughout the site and will specifically inspect storage areas prior to exiting the site. Specific prevention and control measures on the site will be employed as follows:

Petroleum Products

All on-site vehicles will be monitored for leaks and will receive preventive maintenance to reduce the chance of leakage. Equipment and vehicles should be stored on impervious surfaces to manage spills where practical. No vehicle maintenance, handling, or storage of petroleum products will occur within 100 feet of a wetland, waterway, or drainage facility. Petroleum products will be stored in tightly sealed containers that are clearly labeled. Any asphalt substances used on-site will be applied according to the manufacturer's recommendations. Storage facilities shall be located as far as practical from private residences, business, and public Right-of-Ways. Storage shall be in an isolated location, where practical, and in accordance with all federal, state, and local regulations.

Hazardous Substances (Paints, Solvents, etc.)

All containers will be tightly sealed and stored when not required for use. Excess materials will not be discharged to the storm sewer system, buried onsite, or disposed of in any other inappropriate fashion; but will be properly disposed according to manufacturer's instructions and/or state and local regulations (whichever is more stringent). No storage will occur within 100 feet of a wetland, waterway, or onsite drainage facility.

Fertilizers

Fertilizer will be applied per NYS Law and only in the minimum amounts recommended by the manufacturer. Once applied, the fertilizer will be worked into the soil to limit exposure to storm runoff and wind. Storage will be in a covered shed, and the contents of any partially used bags will be transferred into a sealable, plastic bin to avoid spills. No fertilizer storage shall occur within 100 feet of a wetland, waterway, or onsite drainage facility.

Debris & Litter Control

The Contractor shall provide covered dumpsters onsite and be placed in a practical location to promote use by all parties; this location should not interfere with site activity, ingress, and egress. Debris and litter shall be managed and placed in the onsite dumpsters to minimize unintended transport by the elements. This will reduce litter accumulation and improve worker safety. Dumpsters shall be emptied regularly by a licensed contractor to prevent overfilling and unsightly conditions and disposed of in accordance with federal, state, and local environmental regulations.

All construction waste shall be placed in dumpsters following the completion of construction. No trash or construction waste will be buried onsite. No construction materials shall be stored for extended periods onsite, except for those to be used for construction taking place within seven (7) calendar days, or within a practical time frame.

Concrete Washout

Concrete trucks will not be allowed to wash out or discharge surplus concrete or drum wash water within 100 feet of a wetland, waterway, or into any drainage structure already installed. A specific concrete washout location will be identified by the superintendent and will be relocated as appropriate to remain practical as the project is phased out.

Trucking Management (Dust & Sediment Control)

Concrete trucks shall not leave the project site except where directed. A stabilized construction entrance shall be installed and maintained and the specified entrance/exit location(s). The length of the stabilization blanket shall be extended if trucks leaving the site track sediment onto public Rights-of-Way. Crushed stone, as specified, shall be re-applied as necessary. A truck wash location shall be implemented and maintained, as necessary.

VII. OPERATION AND MAINTENANCE PLAN

Below is a summary of basic maintenance requirements associated with construction and ongoing activity. The site specific, operation and maintenance plan can be found in the Appendix of this report.

MAINTENANCE PLAN DURING CONSTRUCTION

During construction, the contractor is responsible for maintaining all permanent stormwater mitigation features including catch basins, pipes, and systems as well as temporary measures including silt fence, construction entrances, and sediment traps. Maintenance records should be kept identifying dates and activity, at a minimum.

LONG-TERM OPERATION & MAINTENANCE

After construction is complete, the property owner shall be responsible for the maintenance of the proposed stormwater mitigation features, including catch basins, drain/yard inlets, pipes, swales, bioretention areas, storm basins, and detention ponds. A complete Operation & Maintenance Plan is included within the Appendix of this report that details the inspection and maintenance requirements for each stormwater mitigation feature. Records shall be retained for a minimum of 5 years and shall be provided to the Municipal Stormwater Manager annually.

Lastly, the owner of a post-construction stormwater management practice shall erect or post, in the immediate vicinity of the stormwater management practice, a conspicuous and legible sign as directed by section 3.5 of the NYSSMDM. The sign should read:

STORMWATER MANAGEMENT PRACTICE – (Type of Practice)
Project Identification – SPDES Permit # NYR _____
Must Be Maintained In Accordance With O&M Plan
DO NOT REMOVE OR ALTER

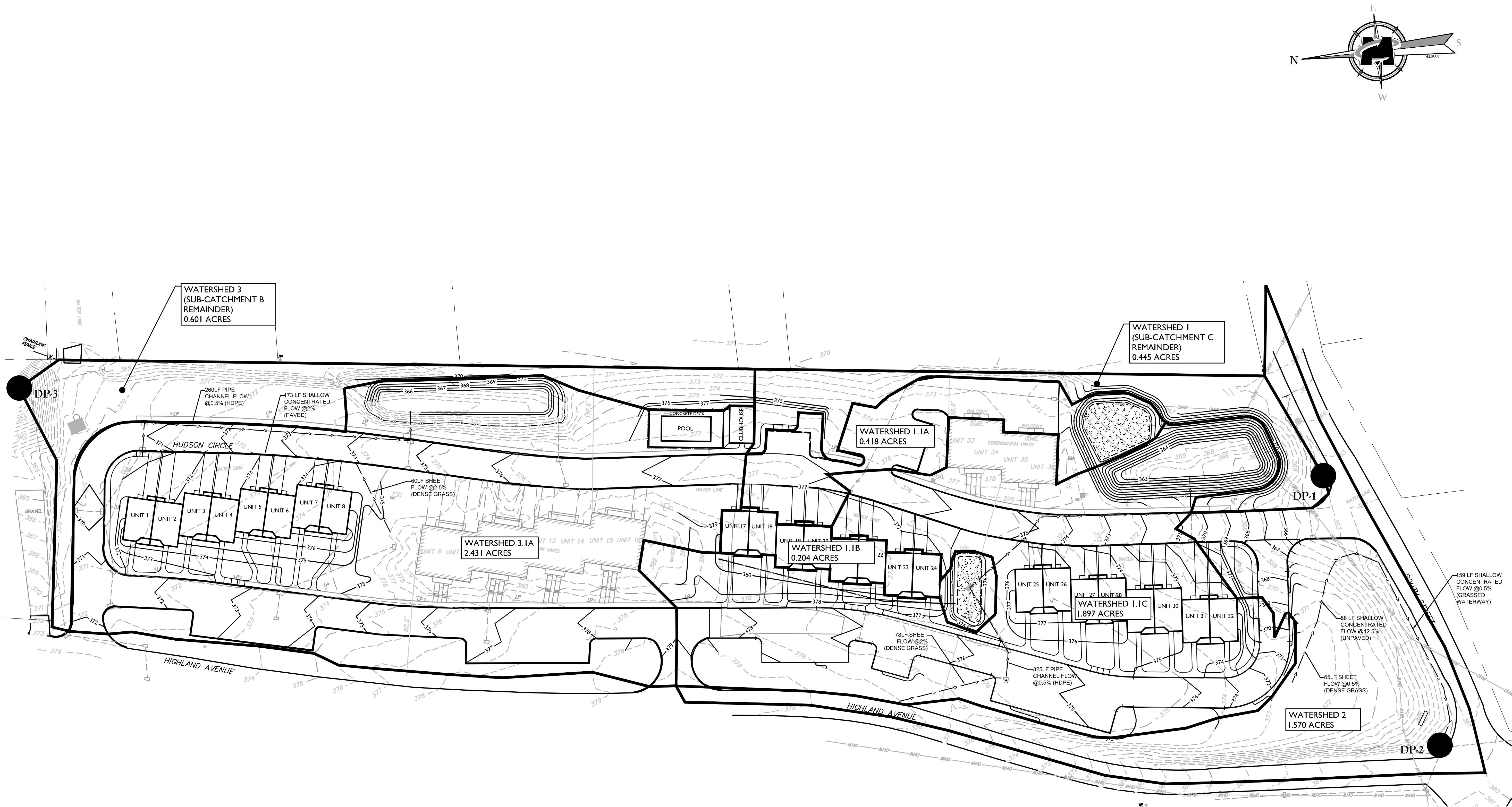
SUMMARY OF PROPOSED STORMWATER IMPROVEMENTS

The majority of the proposed project falls under the New York State definition of redevelopment and has provided a reduction in impervious area in the proposed conditions and similarly a reduction in the peak design storms. The portion categorized as new construction provides mitigation for peak flow and water quality/runoff reduction benefits are achieved through the proposed bioretention areas and the modified pocket ponds infiltration chambers to treat water quality and control quantity. The design utilizes practices that help maintain the existing hydrology.

VIII. CONCLUSION

As the proposed development has met required water quality mitigation and peak flow mitigation to applicable standards, there should be no adverse impacts due to storm water, on-site or off-site, as a result of the proposed development.

Appendix 1 | Watershed Maps



WATERSHED MAP
FOR
MARLBORO ON HUDSON

SECTION 108.12
BLOCK 8
LOT 23

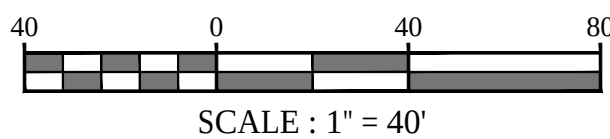
TOWN OF MARLBOROUGH
ULSTER COUNTY
NEW YORK STATE

NEW WINDSOR OFFICE
555 Hudson Valley Avenue
Suite 101
New Windsor, NY 12553
Phone: 845.564.4495
Fax: 845.567.1025

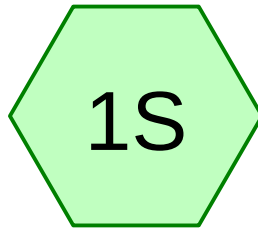
SCALE: AS SHOWN
DATE: 06/22/2018
DRAWN BY: CPM
CHECKED BY: ABF
PROJECT NUMBER: 030218F
DRAWING NAME: C-DRNG

SHEET TITLE:
WATERSHED MAP

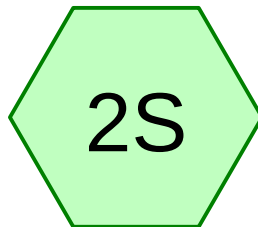
SHEET NUMBER:
01 of 01



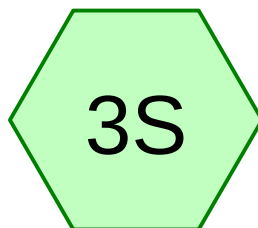
Appendix 2 | HydroCAD



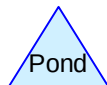
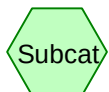
EWS-1



EWS-2



EWS-3



Routing Diagram for MH Hydro

Prepared by Maser Consulting PA, Printed 6/21/2018
HydroCAD® 10.00-14 s/n 08816 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 1S: EWS-1

Runoff = 1.74 cfs @ 12.41 hrs, Volume= 0.231 af, Depth> 0.62"

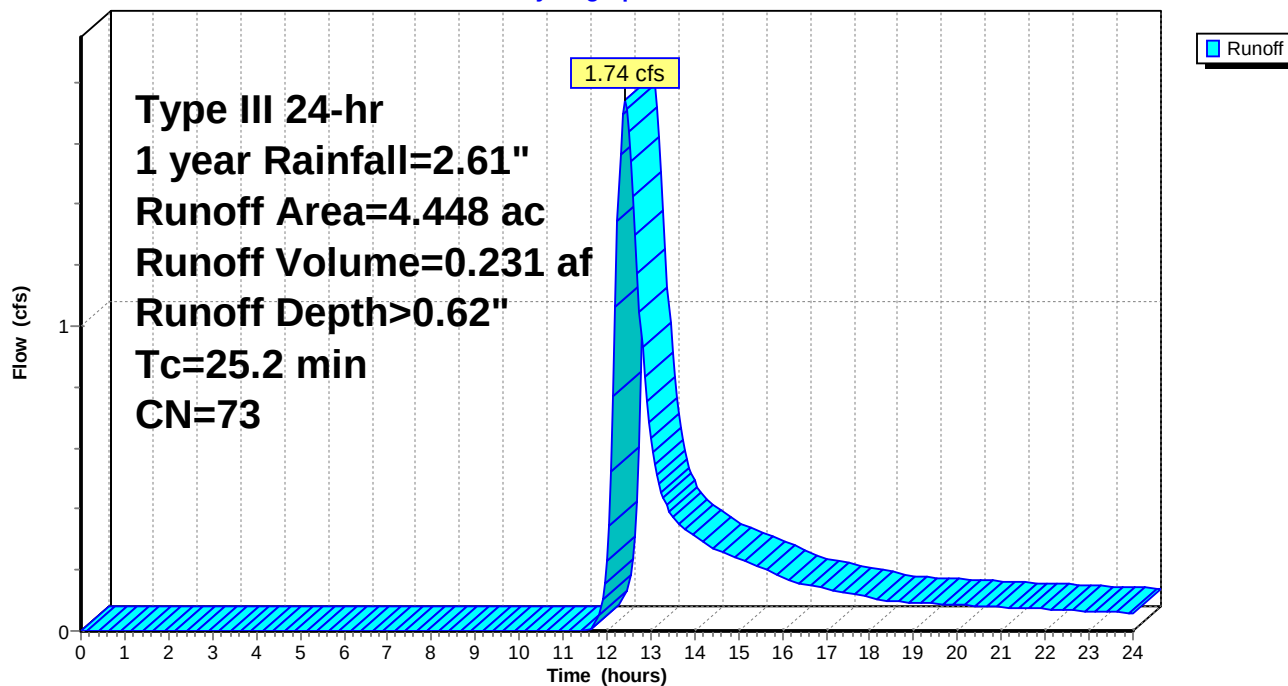
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year Rainfall=2.61"

Area (ac)	CN	Description
* 0.160	79	A, 1 acre lots, 20% imp, HSG C
* 0.303	70	B, Woods, Good, HSG C
* 0.559	70	C, Woods, Good, HSG C
* 0.720	77	D, Brush, Poor, HSG C
* 0.105	70	E, Woods, Good, HSG C
* 0.105	92	F, Roads and gutters
* 1.856	70	G, Woods, Good, HSG C
* 0.640	79	H, 1 acre lots, 20% imp, HSG C
4.448	73	Weighted Average
4.288		96.40% Pervious Area
0.160		3.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.2					Direct Entry, From Oct. 03 D&H,see appendix

Subcatchment 1S: EWS-1

Hydrograph



Summary for Subcatchment 2S: EWS-2

Runoff = 1.28 cfs @ 12.27 hrs, Volume= 0.140 af, Depth> 0.76"

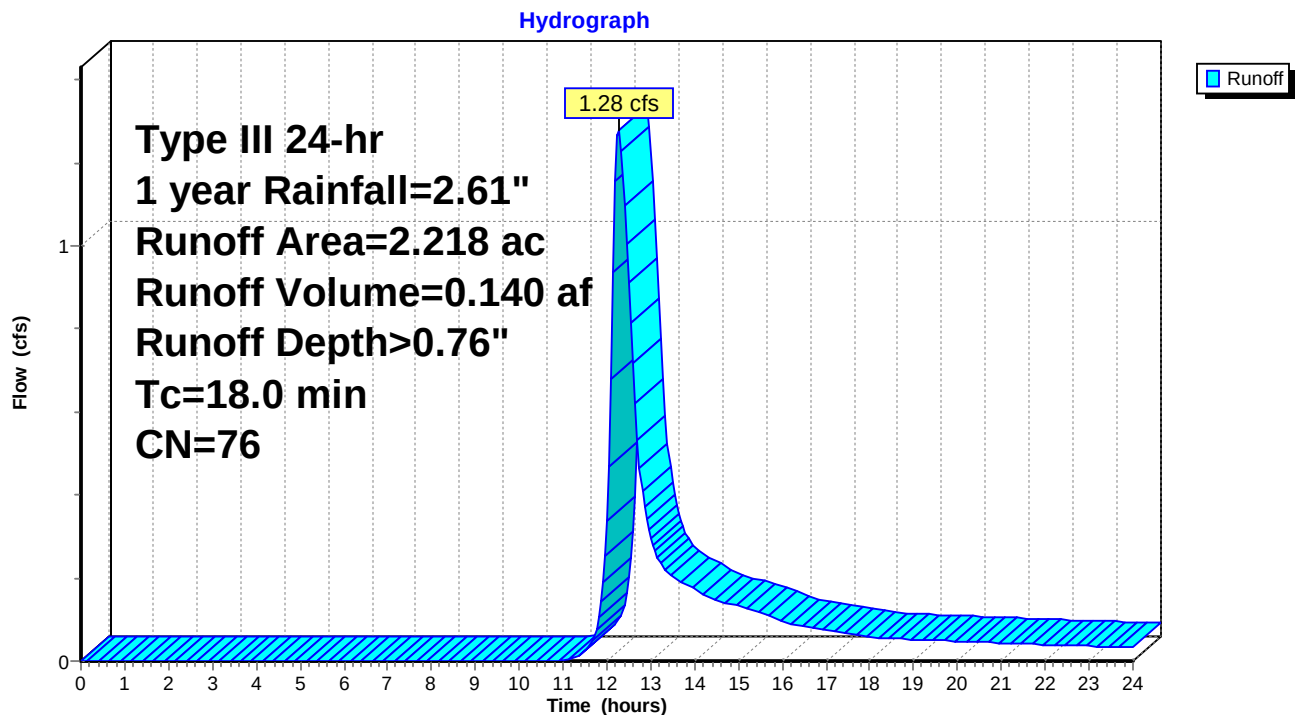
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Type III 24-hr 1 year Rainfall=2.61"

Area (ac)	CN	Description
* 0.442	92	A, Roads and Gutters
* 0.418	70	B, Woods, Good, HSG C
* 0.243	77	C, Brush, Poor, HSG C
* 0.920	70	D, Woods, Good, HSG C
* 0.195	77	E, Brush, Poor, HSG C
2.218	76	Weighted Average
2.218		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.0					Direct Entry, From Oct. 03 D&H, see appendix

Subcatchment 2S: EWS-2



Summary for Subcatchment 3S: EWS-3

Runoff = 6.97 cfs @ 12.36 hrs, Volume= 0.827 af, Depth> 0.91"

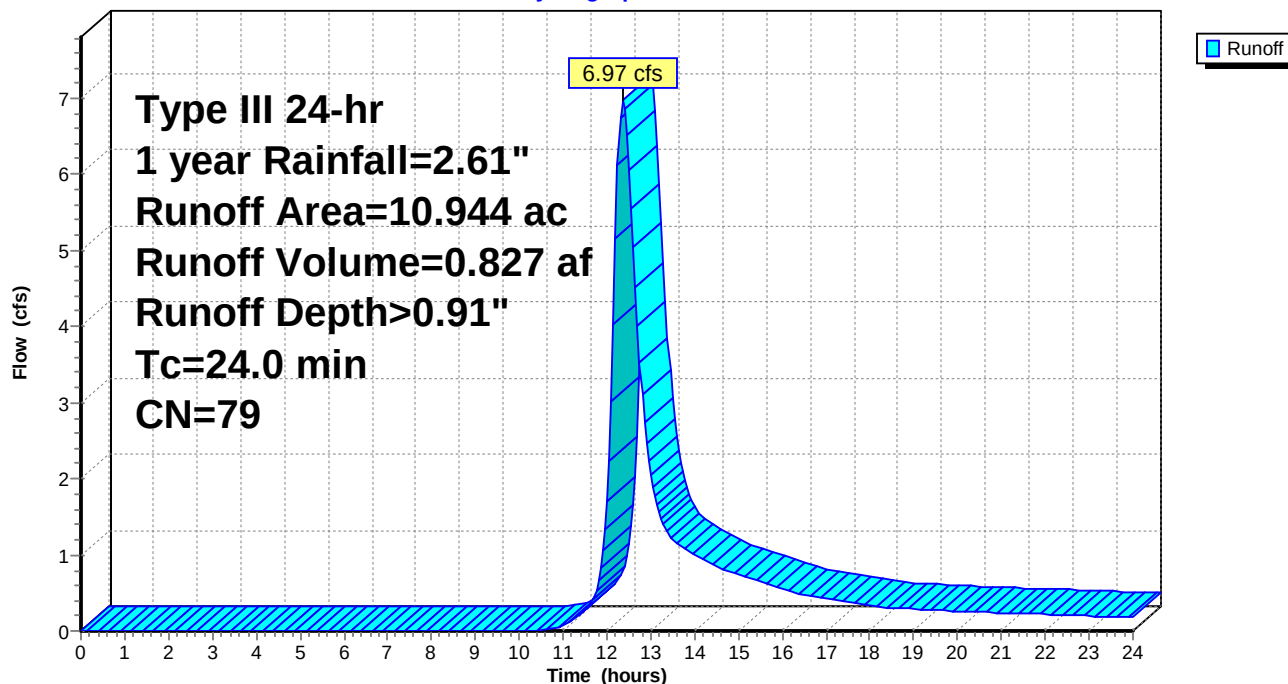
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year Rainfall=2.61"

Area (ac)	CN	Description
* 0.206	92	A, Roads and gutters
* 1.188	70	B, Woods, Good, HSG C
* 1.107	92	C, Roads and gutters
* 0.761	79	D, 1 acre lots, 20% imp, HSG C
* 2.619	77	E, 2 acre lots, 12% imp, HSG C
* 2.146	77	F, Brush, Poor, HSG C
* 0.699	77	G, Brush, Poor, HSG C
* 2.218	79	H, 1 acre lots, 20% imp, HSG C
10.944	79	Weighted Average
10.034		91.68% Pervious Area
0.910		8.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.0					Direct Entry, From Oct. 03 D&H, see appendix

Subcatchment 3S: EWS-3

Hydrograph



Summary for Subcatchment 1S: EWS-1

Runoff = 6.30 cfs @ 12.36 hrs, Volume= 0.741 af, Depth> 2.00"

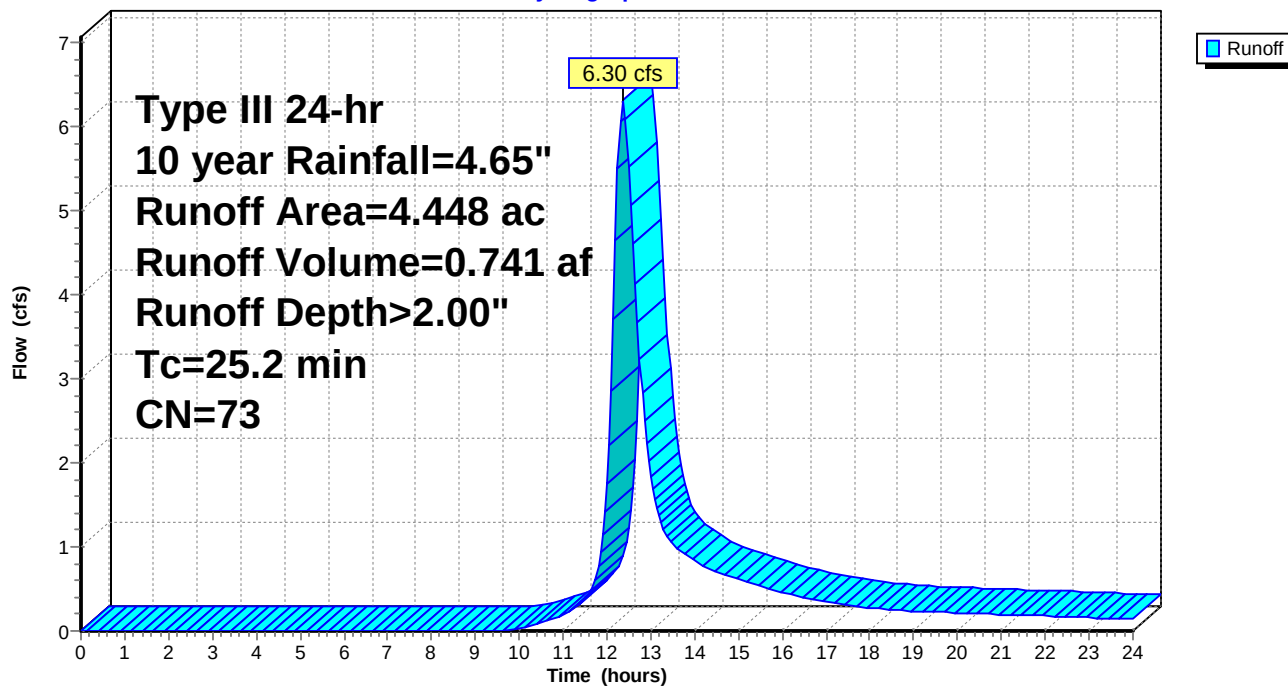
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=4.65"

Area (ac)	CN	Description
* 0.160	79	A, 1 acre lots, 20% imp, HSG C
* 0.303	70	B, Woods, Good, HSG C
* 0.559	70	C, Woods, Good, HSG C
* 0.720	77	D, Brush, Poor, HSG C
* 0.105	70	E, Woods, Good, HSG C
* 0.105	92	F, Roads and gutters
* 1.856	70	G, Woods, Good, HSG C
* 0.640	79	H, 1 acre lots, 20% imp, HSG C
4.448	73	Weighted Average
4.288		96.40% Pervious Area
0.160		3.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.2					Direct Entry, From Oct. 03 D&H,see appendix

Subcatchment 1S: EWS-1

Hydrograph



Summary for Subcatchment 2S: EWS-2

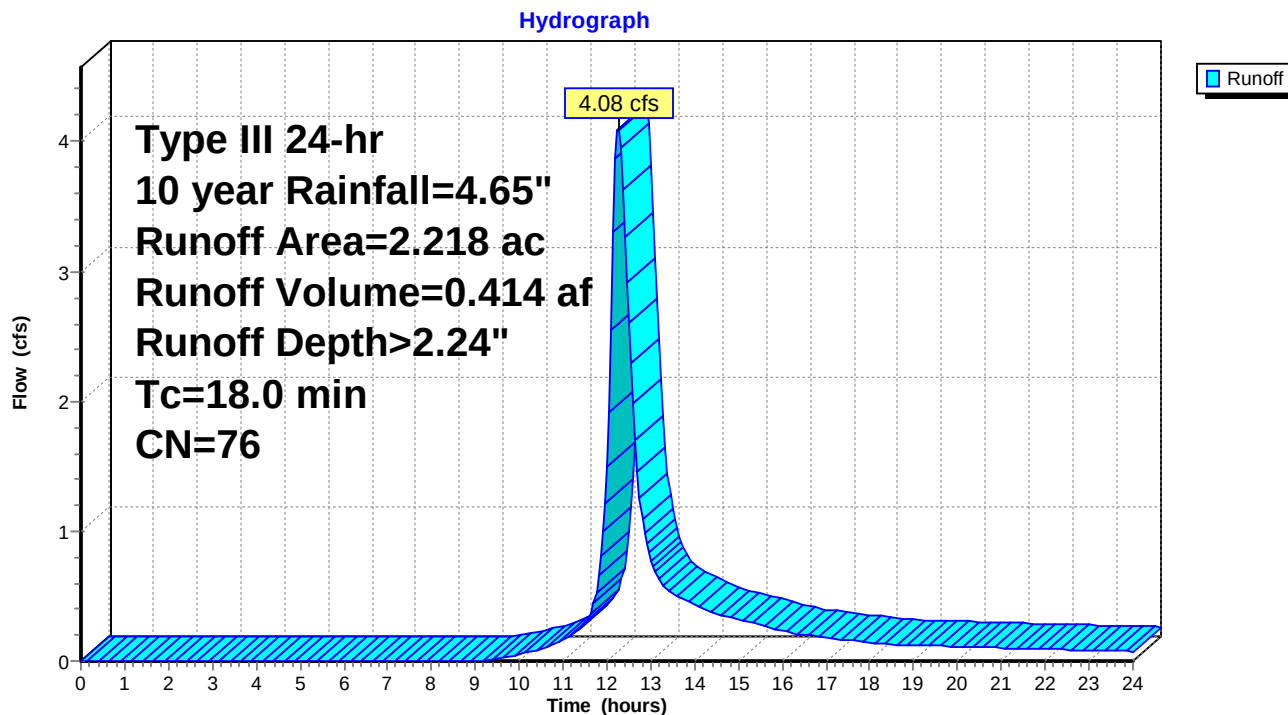
Runoff = 4.08 cfs @ 12.26 hrs, Volume= 0.414 af, Depth> 2.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=4.65"

Area (ac)	CN	Description
* 0.442	92	A, Roads and Gutters
* 0.418	70	B, Woods, Good, HSG C
* 0.243	77	C, Brush, Poor, HSG C
* 0.920	70	D, Woods, Good, HSG C
* 0.195	77	E, Brush, Poor, HSG C
2.218	76	Weighted Average
2.218		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.0					Direct Entry, From Oct. 03 D&H, see appendix

Subcatchment 2S: EWS-2



Summary for Subcatchment 3S: EWS-3

Runoff = 19.98 cfs @ 12.34 hrs, Volume= 2.272 af, Depth> 2.49"

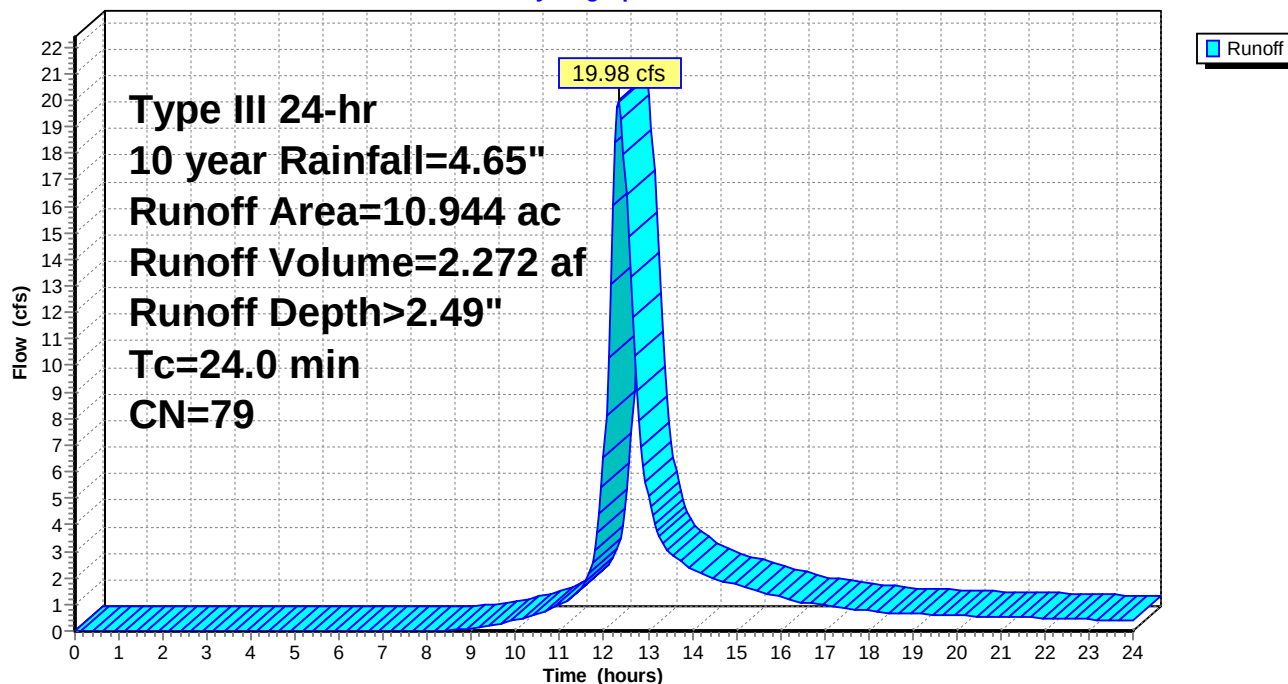
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=4.65"

Area (ac)	CN	Description
* 0.206	92	A, Roads and gutters
* 1.188	70	B, Woods, Good, HSG C
* 1.107	92	C, Roads and gutters
* 0.761	79	D, 1 acre lots, 20% imp, HSG C
* 2.619	77	E, 2 acre lots, 12% imp, HSG C
* 2.146	77	F, Brush, Poor, HSG C
* 0.699	77	G, Brush, Poor, HSG C
* 2.218	79	H, 1 acre lots, 20% imp, HSG C
10.944	79	Weighted Average
10.034		91.68% Pervious Area
0.910		8.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.0					Direct Entry, From Oct. 03 D&H, see appendix

Subcatchment 3S: EWS-3

Hydrograph



Summary for Subcatchment 1S: EWS-1

Runoff = 15.72 cfs @ 12.35 hrs, Volume= 1.824 af, Depth> 4.92"

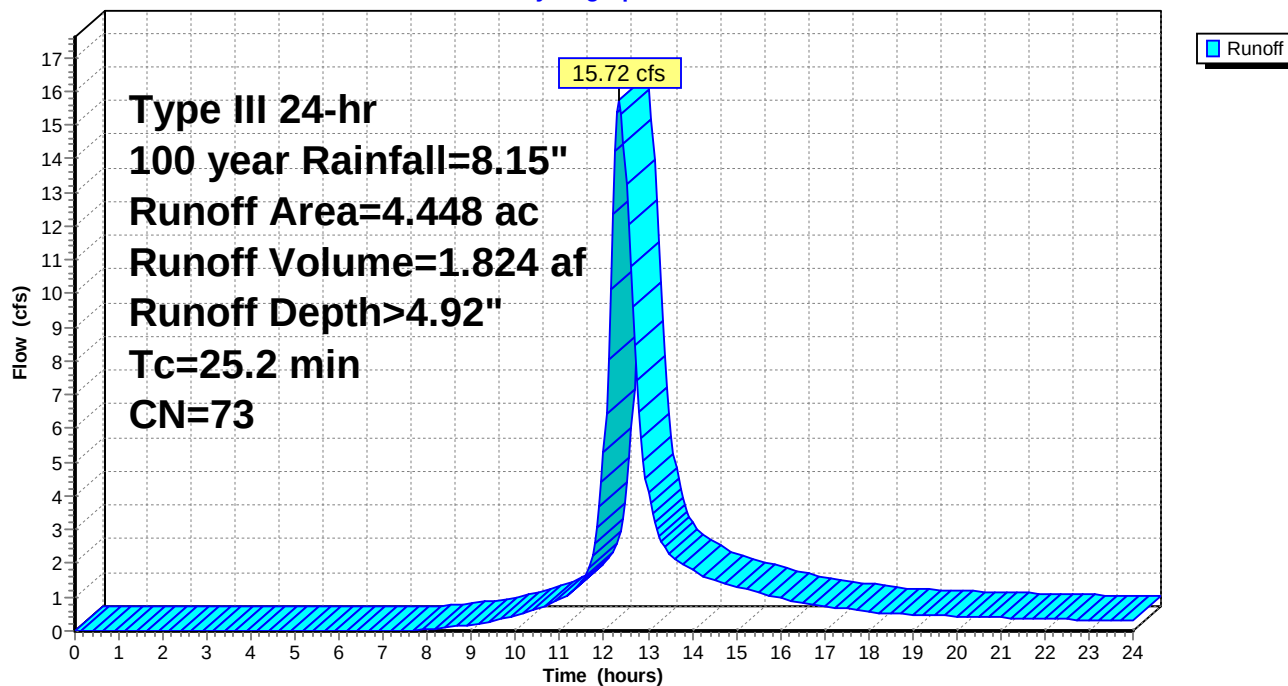
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=8.15"

Area (ac)	CN	Description
* 0.160	79	A, 1 acre lots, 20% imp, HSG C
* 0.303	70	B, Woods, Good, HSG C
* 0.559	70	C, Woods, Good, HSG C
* 0.720	77	D, Brush, Poor, HSG C
* 0.105	70	E, Woods, Good, HSG C
* 0.105	92	F, Roads and gutters
* 1.856	70	G, Woods, Good, HSG C
* 0.640	79	H, 1 acre lots, 20% imp, HSG C
4.448	73	Weighted Average
4.288		96.40% Pervious Area
0.160		3.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.2					Direct Entry, From Oct. 03 D&H,see appendix

Subcatchment 1S: EWS-1

Hydrograph



Summary for Subcatchment 2S: EWS-2

Runoff = 9.62 cfs @ 12.25 hrs, Volume= 0.976 af, Depth> 5.28"

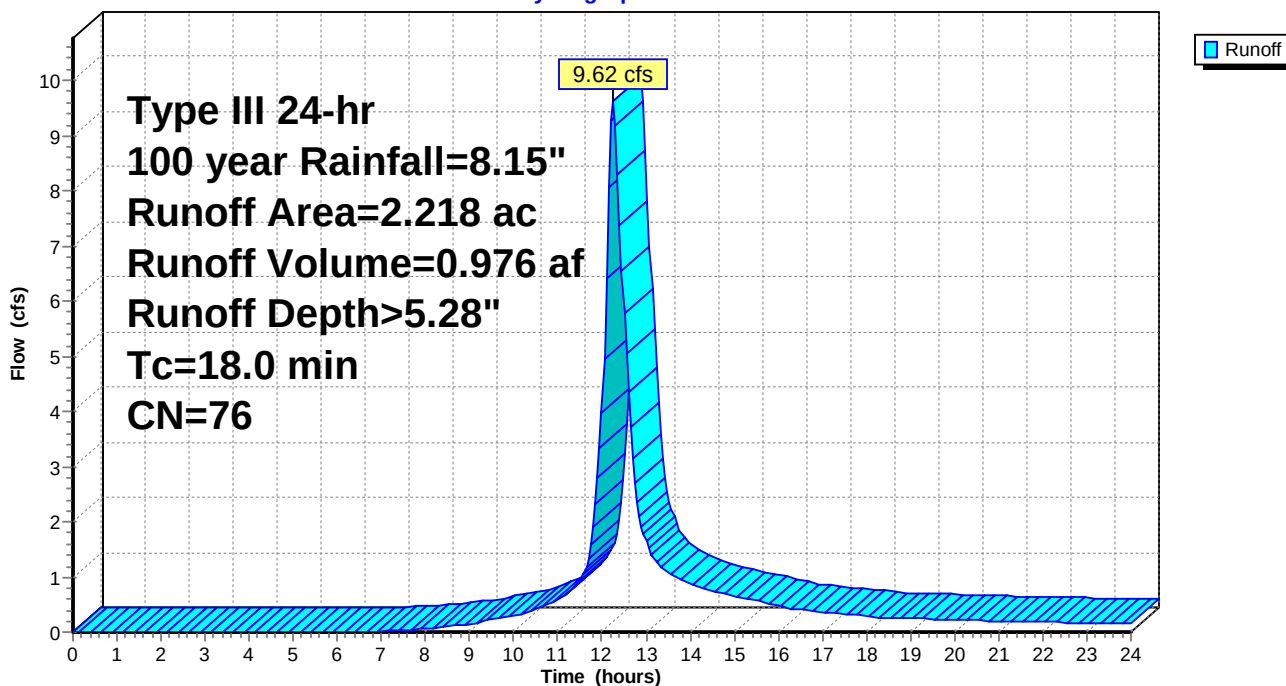
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=8.15"

Area (ac)	CN	Description
* 0.442	92	A, Roads and Gutters
* 0.418	70	B, Woods, Good, HSG C
* 0.243	77	C, Brush, Poor, HSG C
* 0.920	70	D, Woods, Good, HSG C
* 0.195	77	E, Brush, Poor, HSG C
2.218	76	Weighted Average
2.218		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.0					Direct Entry, From Oct. 03 D&H, see appendix

Subcatchment 2S: EWS-2

Hydrograph



Summary for Subcatchment 3S: EWS-3

Runoff = 44.72 cfs @ 12.32 hrs, Volume= 5.130 af, Depth> 5.62"

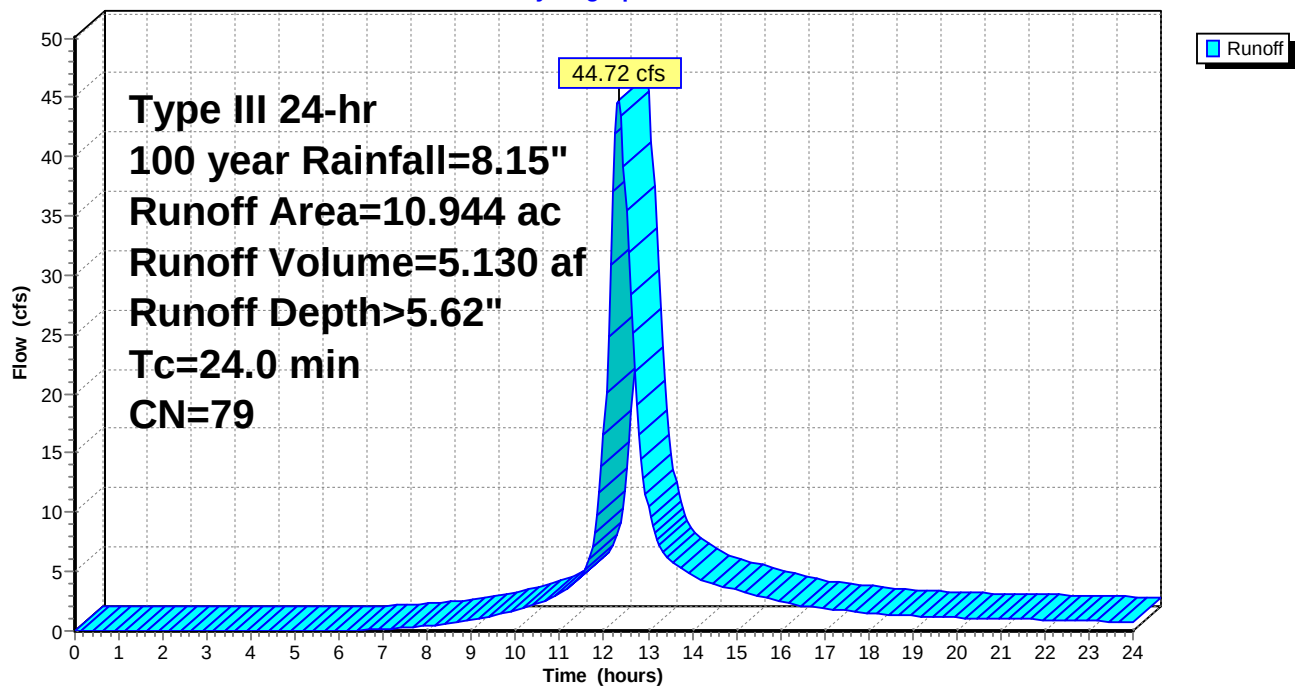
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=8.15"

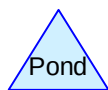
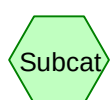
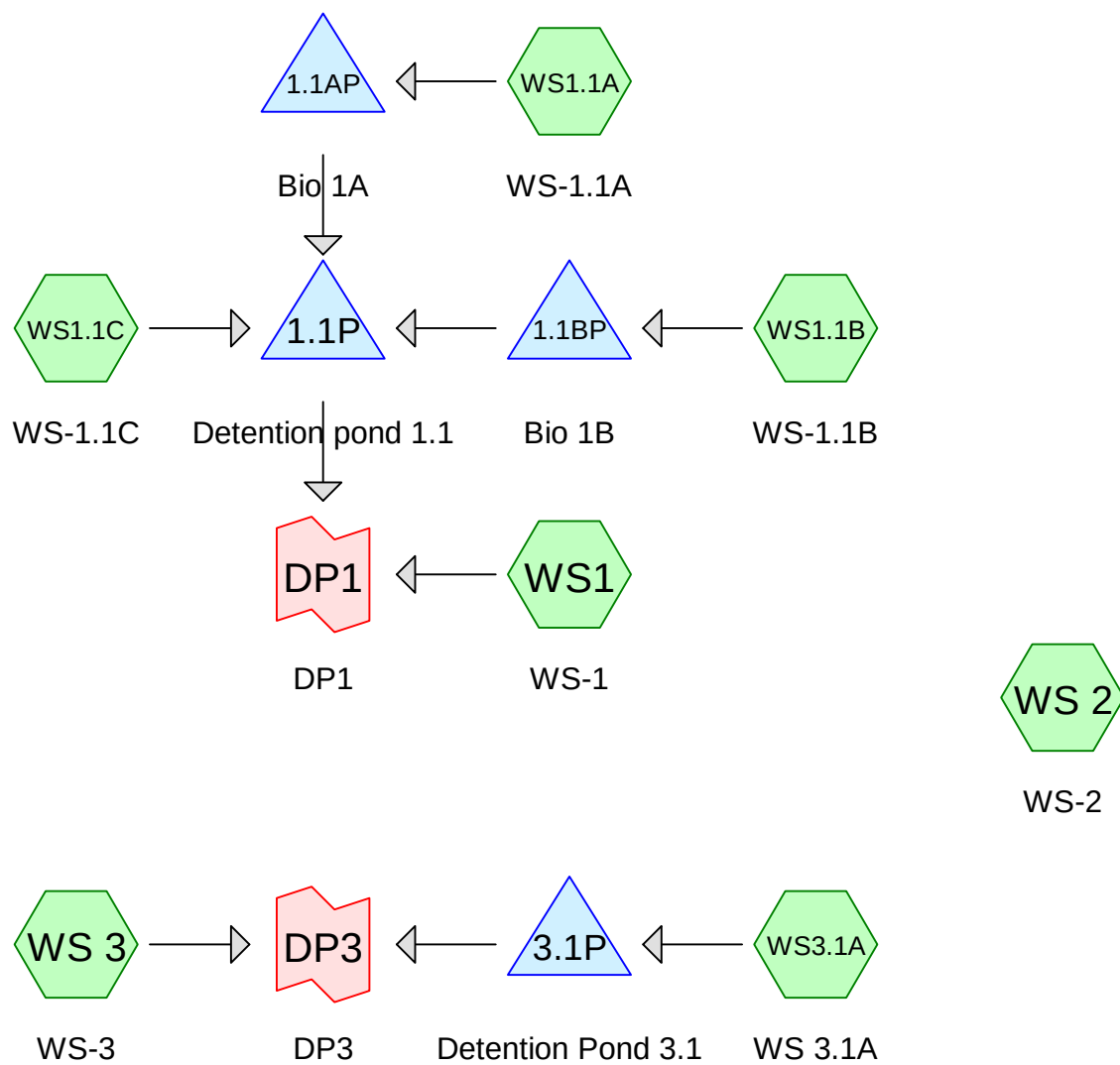
Area (ac)	CN	Description
* 0.206	92	A, Roads and gutters
* 1.188	70	B, Woods, Good, HSG C
* 1.107	92	C, Roads and gutters
* 0.761	79	D, 1 acre lots, 20% imp, HSG C
* 2.619	77	E, 2 acre lots, 12% imp, HSG C
* 2.146	77	F, Brush, Poor, HSG C
* 0.699	77	G, Brush, Poor, HSG C
* 2.218	79	H, 1 acre lots, 20% imp, HSG C
10.944	79	Weighted Average
10.034		91.68% Pervious Area
0.910		8.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.0					Direct Entry, From Oct. 03 D&H, see appendix

Subcatchment 3S: EWS-3

Hydrograph





Routing Diagram for MH Hydro
 Prepared by Maser Consulting PA, Printed 6/21/2018
 HydroCAD® 10.00-14 s/n 08816 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment WS 2: WS-2

Runoff = 1.46 cfs @ 12.25 hrs, Volume= 0.149 af, Depth> 1.14"

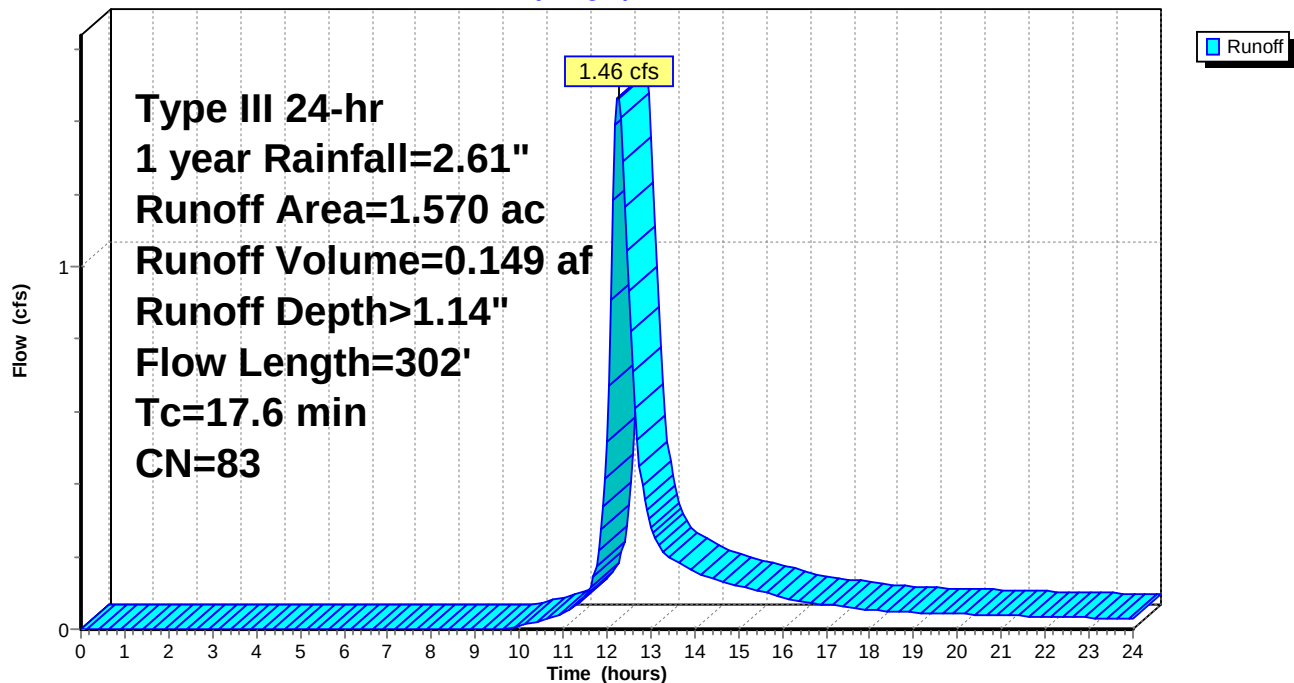
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year Rainfall=2.61"

Area (ac)	CN	Description
* 0.801	92	A, Roads and Gutters
0.509	74	>75% Grass cover, Good, HSG C
0.260	70	Brush, Fair, HSG C
1.570	83	Weighted Average
1.570		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.5	55	0.0050	0.06		Sheet Flow, Grass: Dense n= 0.240 P2= 3.17"
0.3	88	0.1250	5.69		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
1.8	159	0.0095	1.46		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
17.6	302	Total			

Subcatchment WS 2: WS-2

Hydrograph



Summary for Subcatchment WS 3: WS-3

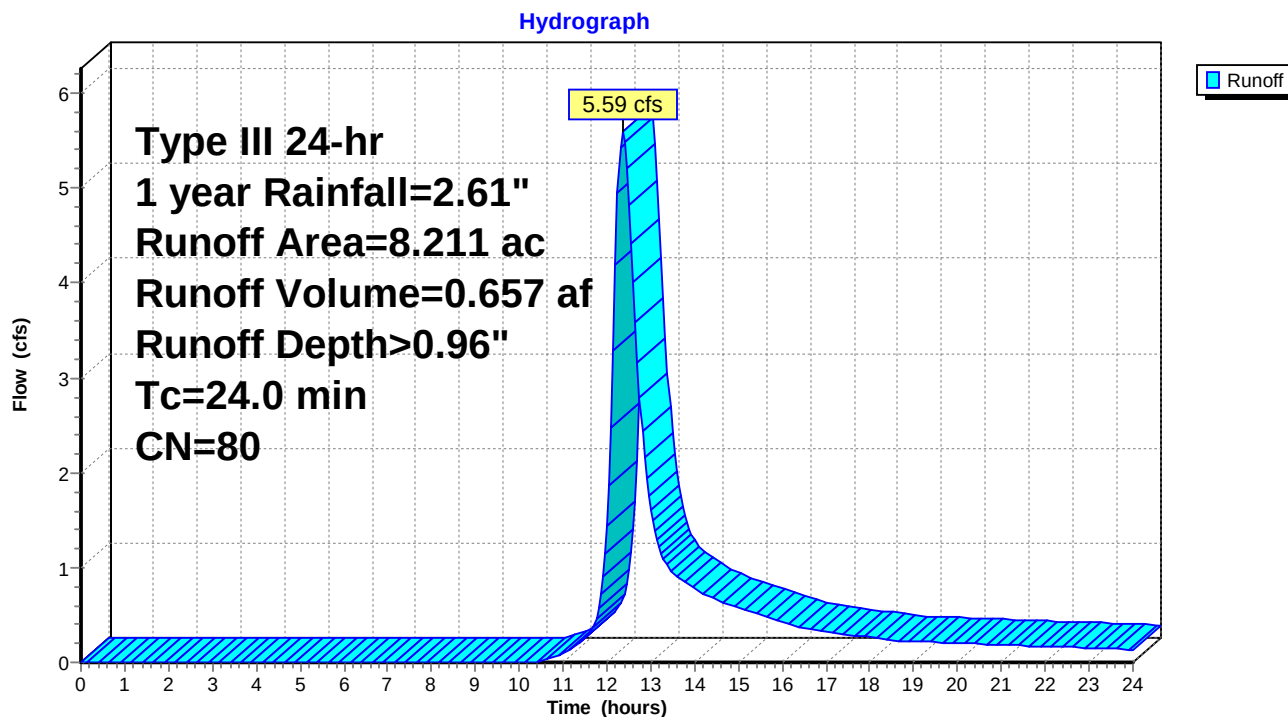
Runoff = 5.59 cfs @ 12.36 hrs, Volume= 0.657 af, Depth> 0.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year Rainfall=2.61"

Area (ac)	CN	Description
* 0.206	92	A, Roads and gutters
* 1.107	92	C, Roads and gutters
* 0.761	79	D, 1 acre lots, 20% imp, HSG C
* 2.619	77	E, 2 acre lots, 12% imp, HSG C
* 0.699	77	G, Brush, Poor, HSG C
* 2.218	79	H, 1 acre lots, 20% imp, HSG C
* 0.601	70	Remainder of B, Brush, Fair, HSG C
8.211	80	Weighted Average
7.301		88.92% Pervious Area
0.910		11.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.0					Direct Entry, From Oct. 03 D&H, see appendix

Subcatchment WS 3: WS-3



Summary for Subcatchment WS1: WS-1

Runoff = 0.93 cfs @ 12.42 hrs, Volume= 0.130 af, Depth> 0.54"

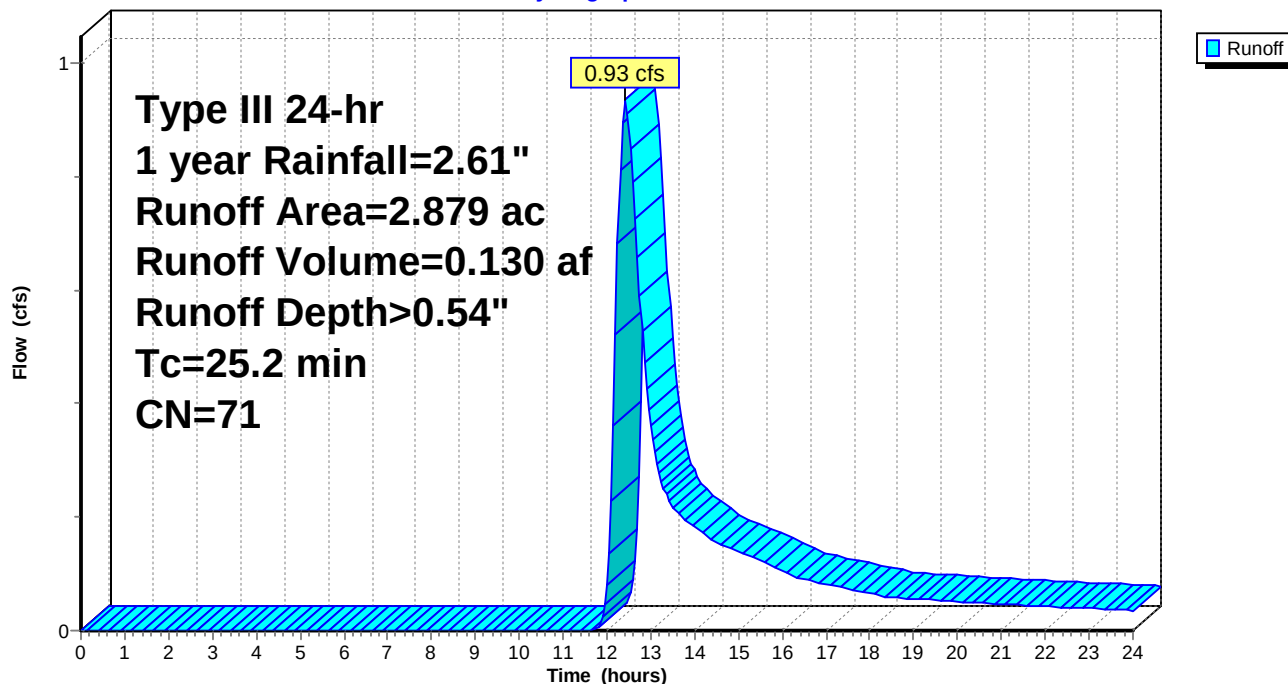
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year Rainfall=2.61"

Area (ac)	CN	Description
* 0.160	79	A, 1 acre lots, 20% imp, HSG C
* 0.303	70	B, Woods, Good, HSG C
* 0.455	70	C, Woods, Good, HSG C
* 0.105	92	F, Roads and gutters
* 1.856	70	E, Woods, Good, HSG C
2.879	71	Weighted Average
2.847		98.89% Pervious Area
0.032		1.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.2					Direct Entry, From Oct. 03 D&H,see appendix

Subcatchment WS1: WS-1

Hydrograph



Summary for Subcatchment WS1.1A: WS-1.1A

Runoff = 0.74 cfs @ 12.09 hrs, Volume= 0.054 af, Depth> 1.55"

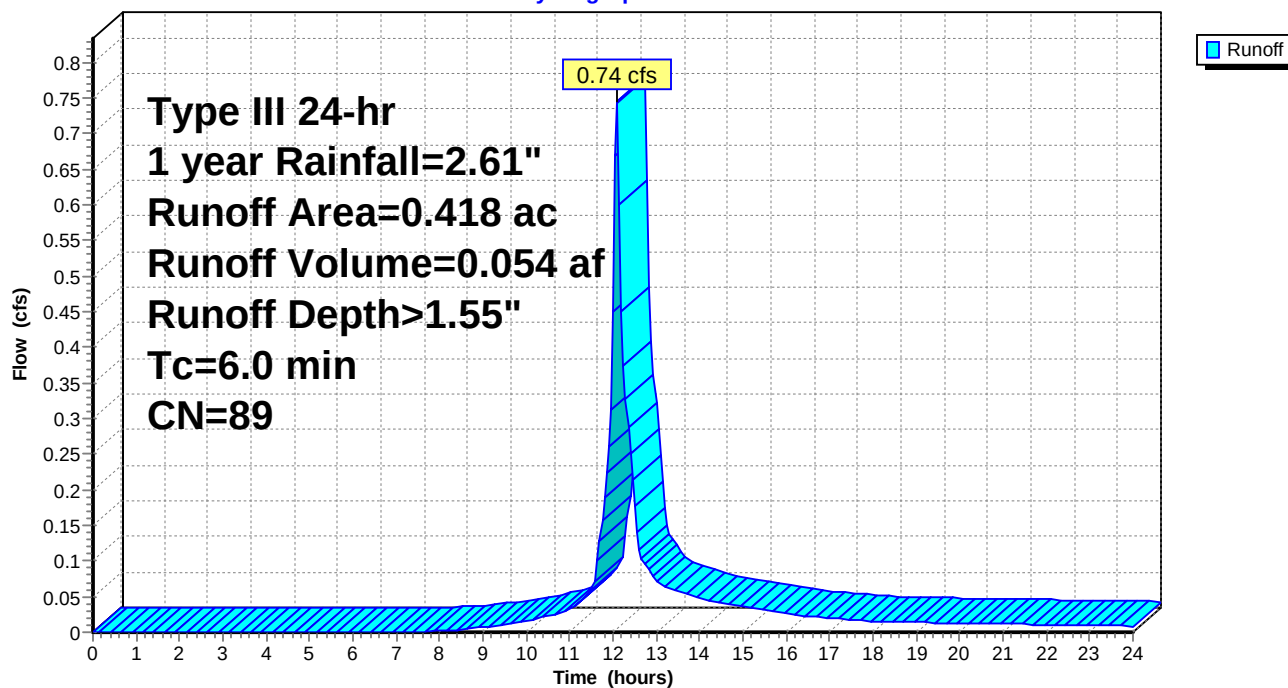
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year Rainfall=2.61"

Area (ac)	CN	Description
0.267	98	Paved parking, HSG C
0.151	74	>75% Grass cover, Good, HSG C
0.418	89	Weighted Average
0.151		36.12% Pervious Area
0.267		63.88% Impervious Area

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

Subcatchment WS1.1A: WS-1.1A

Hydrograph



Summary for Subcatchment WS1.1B: WS-1.1B

Runoff = 0.40 cfs @ 12.09 hrs, Volume= 0.029 af, Depth> 1.71"

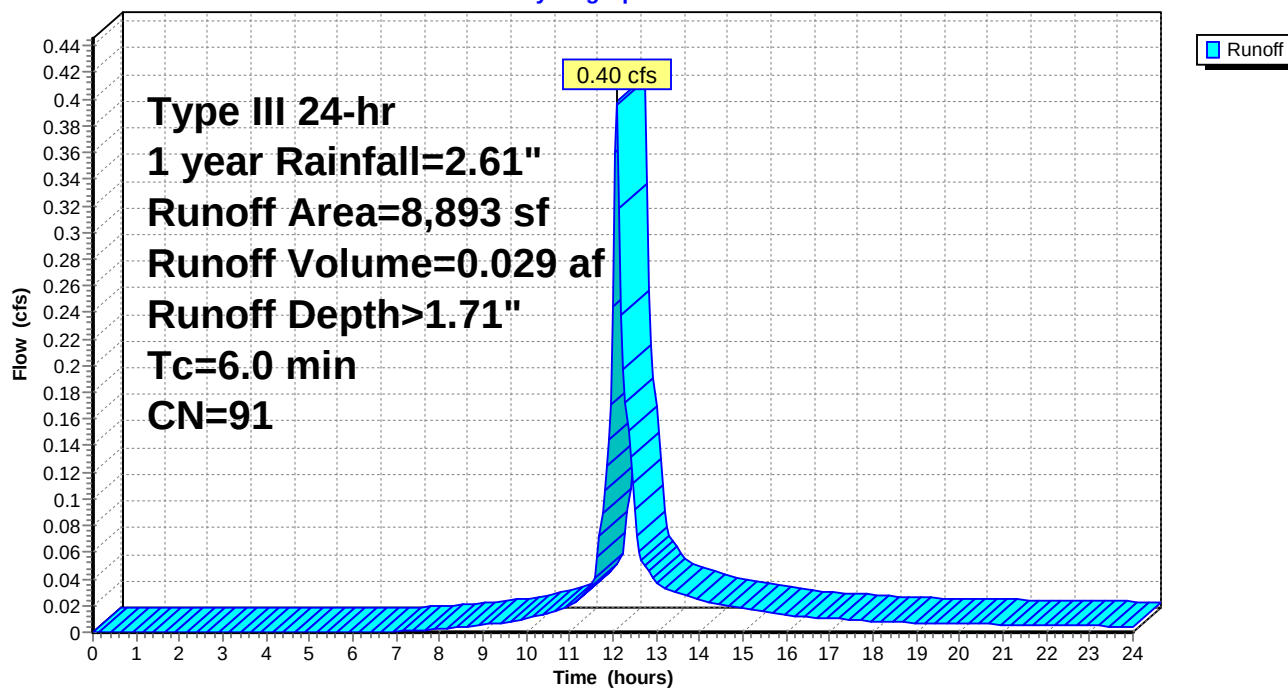
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year Rainfall=2.61"

Area (sf)	CN	Description
6,461	98	Roofs, HSG C
2,432	74	>75% Grass cover, Good, HSG C
8,893	91	Weighted Average
2,432		27.35% Pervious Area
6,461		72.65% Impervious Area

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

Subcatchment WS1.1B: WS-1.1B

Hydrograph



Summary for Subcatchment WS1.1C: WS-1.1C

Runoff = 1.99 cfs @ 12.18 hrs, Volume= 0.180 af, Depth> 1.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

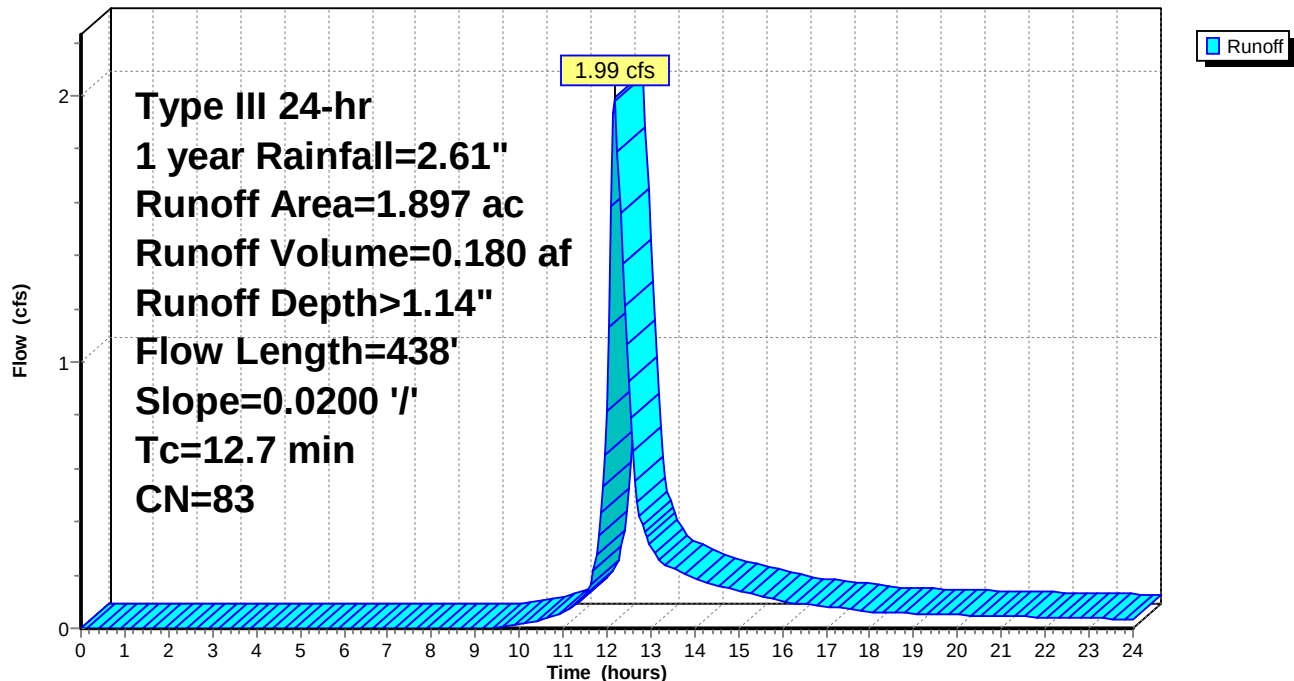
Type III 24-hr 1 year Rainfall=2.61"

Area (ac)	CN	Description
* 1.897	83	Townhouse
1.897		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	78	0.0200	0.11		Sheet Flow, Grass: Dense n= 0.240 P2= 3.17"
0.9	360	0.0200	6.69	3.76	Pipe Channel, HDPE 15.0" Round w/ 8.0" inside fill Area= 0.6 sf Perim= 3.1' r= 0.18' n= 0.010 PVC, smooth interior
12.7	438	Total			

Subcatchment WS1.1C: WS-1.1C

Hydrograph



Summary for Subcatchment WS3.1A: WS 3.1A

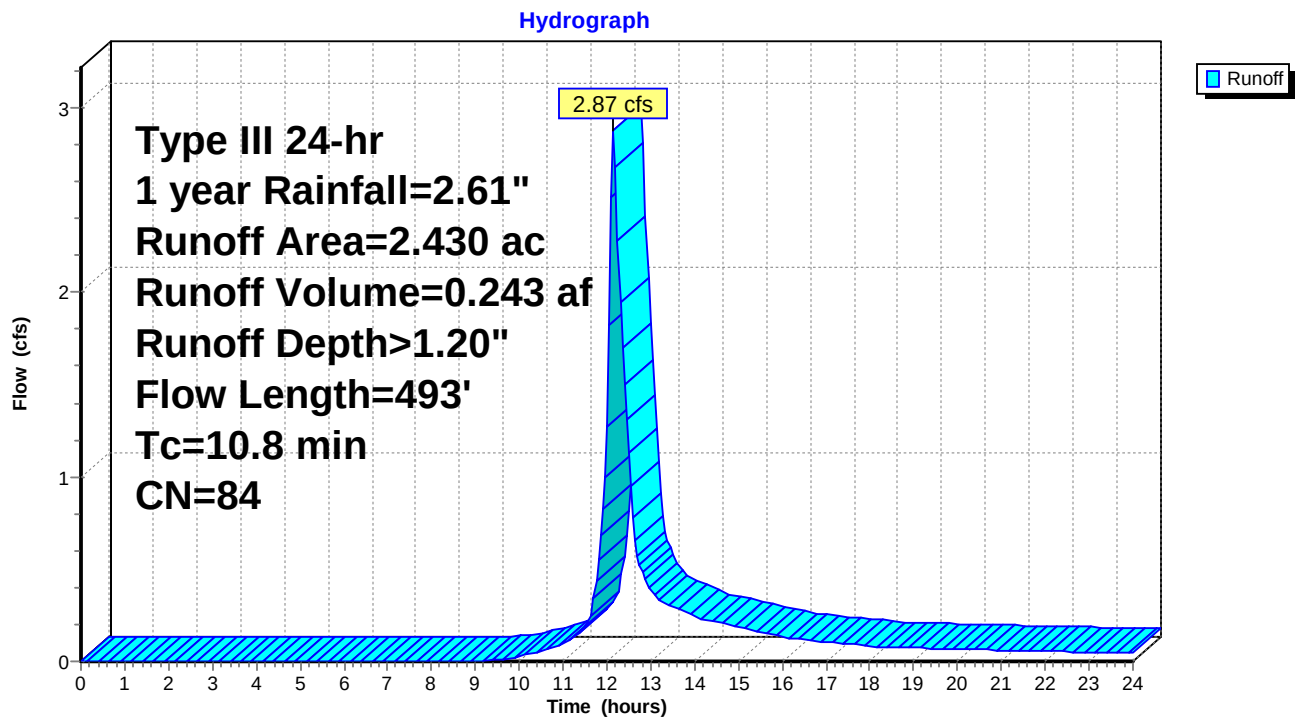
Runoff = 2.87 cfs @ 12.16 hrs, Volume= 0.243 af, Depth> 1.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 year Rainfall=2.61"

Area (ac)	CN	Description
* 2.430	84	Town homes, (taken form old report)
2.430		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	60	0.0250	0.11		Sheet Flow, Grass: Dense n= 0.240 P2= 3.17"
1.0	173	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.1	260	0.0050	3.93	3.48	Pipe Channel, hdpe 18.0" Round w/ 9.0" inside fill Area= 0.9 sf Perim= 3.9' r= 0.23' n= 0.010 PVC, smooth interior
10.8	493	Total			

Subcatchment WS3.1A: WS 3.1A



Summary for Pond 1.1AP: Bio 1A

Inflow Area = 0.418 ac, 63.88% Impervious, Inflow Depth > 1.55" for 1 year event
 Inflow = 0.74 cfs @ 12.09 hrs, Volume= 0.054 af
 Outflow = 0.31 cfs @ 12.33 hrs, Volume= 0.031 af, Atten= 58%, Lag= 14.0 min
 Primary = 0.31 cfs @ 12.33 hrs, Volume= 0.031 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 368.03' @ 12.33 hrs Surf.Area= 2,129 sf Storage= 1,056 cf

Plug-Flow detention time= 198.2 min calculated for 0.031 af (58% of inflow)
 Center-of-Mass det. time= 91.4 min (910.3 - 818.9)

Volume	Invert	Avail.Storage	Storage Description
#1	367.50'	5,941 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
367.50	1,830	0	0
368.00	2,117	987	987
369.00	2,477	2,297	3,284
370.00	2,838	2,658	5,941

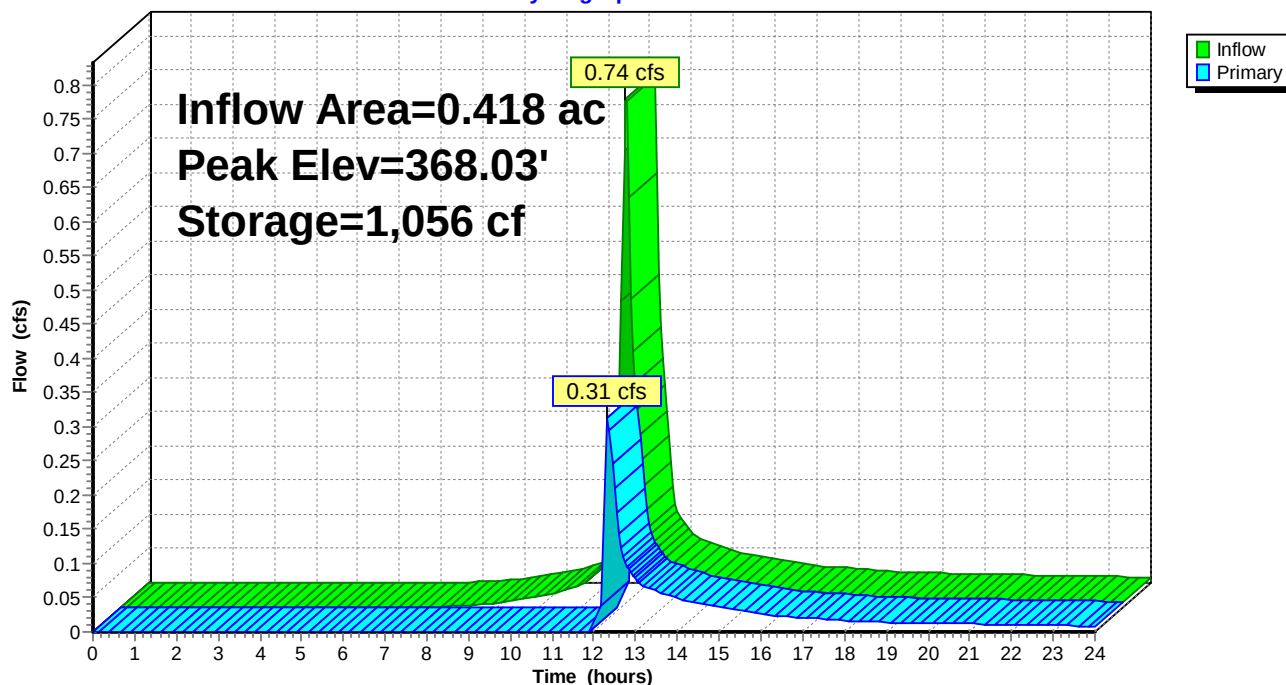
Device	Routing	Invert	Outlet Devices
#1	Primary	368.00'	20.0' long x 1.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.62 2.64 2.64 2.68 2.75 2.86 2.92 3.07 3.07 3.03 3.28 3.32

Primary OutFlow Max=0.31 cfs @ 12.33 hrs HW=368.03' TW=364.07' (Dynamic Tailwater)

↑ **1=Broad-Crested Rectangular Weir** (Weir Controls 0.31 cfs @ 0.47 fps)

Pond 1.1AP: Bio 1A

Hydrograph



Summary for Pond 1.1BP: Bio 1B

Inflow Area = 0.204 ac, 72.65% Impervious, Inflow Depth > 1.71" for 1 year event
 Inflow = 0.40 cfs @ 12.09 hrs, Volume= 0.029 af
 Outflow = 0.19 cfs @ 12.28 hrs, Volume= 0.017 af, Atten= 53%, Lag= 11.4 min
 Primary = 0.19 cfs @ 12.28 hrs, Volume= 0.017 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 375.53' @ 12.28 hrs Surf.Area= 1,189 sf Storage= 571 cf

Plug-Flow detention time= 197.4 min calculated for 0.017 af (58% of inflow)
 Center-of-Mass det. time= 91.3 min (901.1 - 809.8)

Volume	Invert	Avail.Storage	Storage Description
#1	375.00'	1,176 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

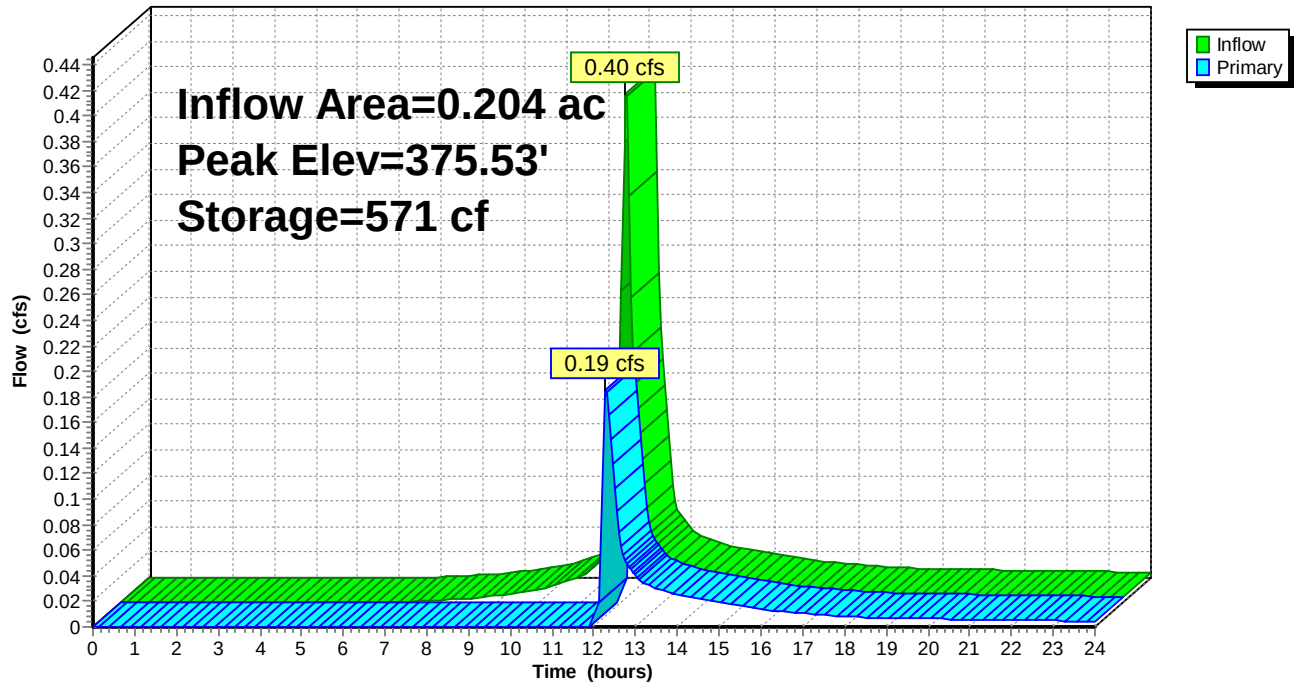
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
375.00	961	0	0
376.00	1,390	1,176	1,176

Device	Routing	Invert	Outlet Devices
#1	Primary	375.50'	12.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.18 cfs @ 12.28 hrs HW=375.53' TW=363.96' (Dynamic Tailwater)
 ↑1=Broad-Crested Rectangular Weir (Weir Controls 0.18 cfs @ 0.49 fps)

Pond 1.1BP: Bio 1B

Hydrograph



Summary for Pond 1.1P: Detention pond 1.1

Inflow Area = 2.519 ac, 16.49% Impervious, Inflow Depth > 1.08" for 1 year event
 Inflow = 2.17 cfs @ 12.25 hrs, Volume= 0.228 af
 Outflow = 0.28 cfs @ 13.82 hrs, Volume= 0.125 af, Atten= 87%, Lag= 94.1 min
 Primary = 0.28 cfs @ 13.82 hrs, Volume= 0.125 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 364.76' @ 13.82 hrs Surf.Area= 3,420 sf Storage= 5,176 cf

Plug-Flow detention time= 264.1 min calculated for 0.125 af (55% of inflow)
 Center-of-Mass det. time= 141.4 min (1,001.6 - 860.2)

Volume	Invert	Avail.Storage	Storage Description
#1	363.00'	37,397 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

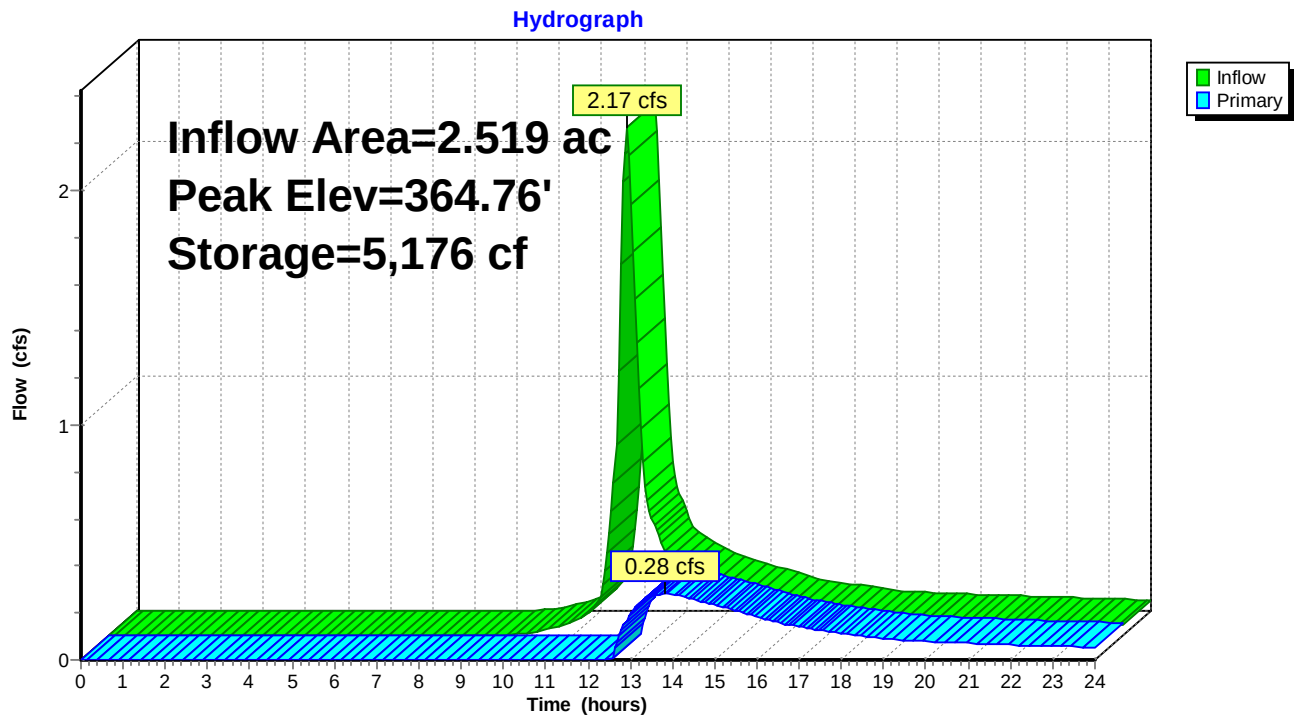
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
363.00	2,452	0	0
364.00	3,000	2,726	2,726
365.00	3,551	3,276	6,002
366.00	4,132	3,842	9,843
367.00	4,739	4,436	14,279
368.00	7,520	6,130	20,408
369.00	8,496	8,008	28,416
370.00	9,466	8,981	37,397

Device	Routing	Invert	Outlet Devices
#1	Primary	364.45'	6.0" W x 6.0" H Vert. Orifice/Grate C= 0.600
#2	Primary	367.25'	16.2" W x 11.0" H Vert. Orifice/Grate C= 0.600
#3	Primary	368.60'	12.0' long x 0.5' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00
			Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.28 cfs @ 13.82 hrs HW=364.76' TW=0.00' (Dynamic Tailwater)

1=Orifice/Grate (Orifice Controls 0.28 cfs @ 1.80 fps)
 2=Orifice/Grate (Controls 0.00 cfs)
 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 1.1P: Detention pond 1.1



Summary for Pond 3.1P: Detention Pond 3.1

Inflow Area = 2.430 ac, 0.00% Impervious, Inflow Depth > 1.20" for 1 year event
 Inflow = 2.87 cfs @ 12.16 hrs, Volume= 0.243 af
 Outflow = 1.02 cfs @ 12.53 hrs, Volume= 0.175 af, Atten= 64%, Lag= 22.5 min
 Primary = 1.02 cfs @ 12.53 hrs, Volume= 0.175 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 367.51' @ 12.53 hrs Surf.Area= 3,284 sf Storage= 4,256 cf

Plug-Flow detention time= 167.0 min calculated for 0.174 af (72% of inflow)
 Center-of-Mass det. time= 73.0 min (915.5 - 842.5)

Volume	Invert	Avail.Storage	Storage Description
#1	366.00'	14,648 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

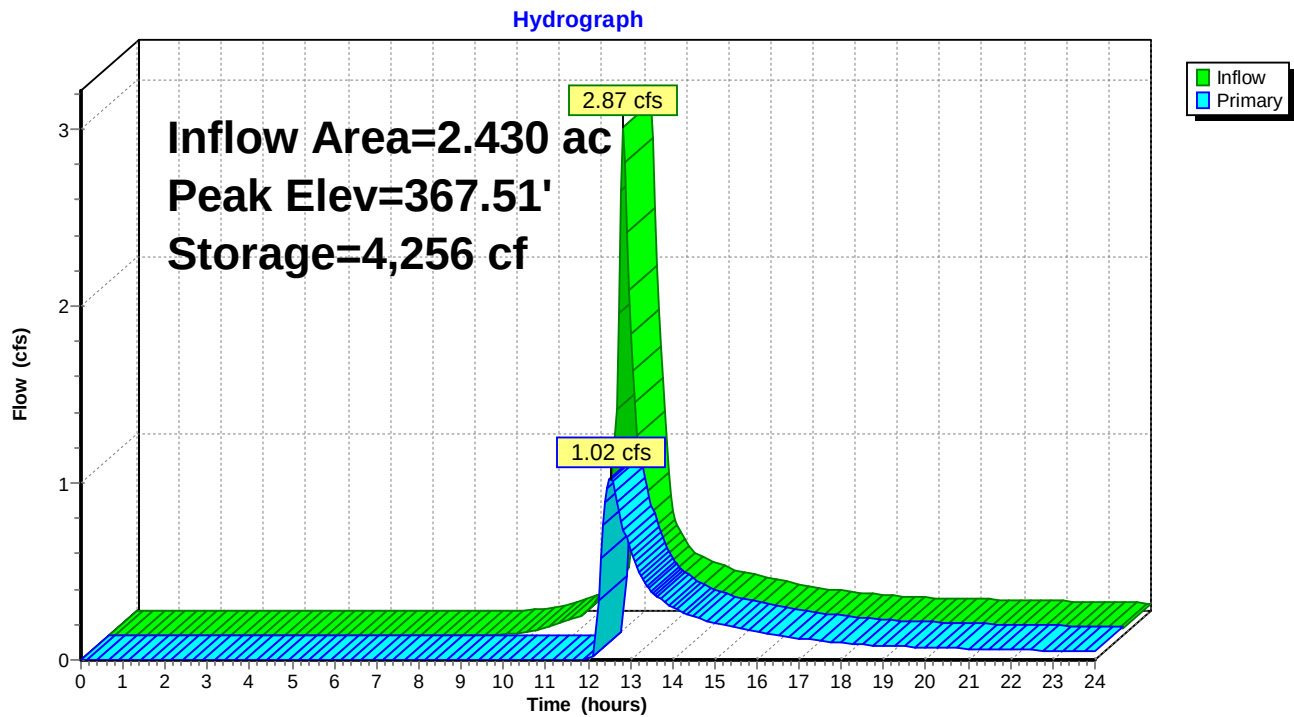
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
366.00	2,376	0	0
367.00	2,971	2,674	2,674
368.00	3,589	3,280	5,954
369.00	4,356	3,973	9,926
370.00	5,087	4,722	14,648

Device	Routing	Invert	Outlet Devices
#1	Primary	367.04'	12.0" W x 6.0" H Vert. Orifice/Grate C= 0.600
#2	Primary	368.25'	21.0" W x 11.0" H Vert. Orifice/Grate C= 0.600
#3	Primary	369.10'	12.0' long x 0.5' breadth Broad-Crested Rectangular Weir
Head (feet) 0.20 0.40 0.60 0.80 1.00			
Coef. (English) 2.80 2.92 3.08 3.30 3.32			

Primary OutFlow Max=1.02 cfs @ 12.53 hrs HW=367.50' TW=0.00' (Dynamic Tailwater)

1=Orifice/Grate (Orifice Controls 1.02 cfs @ 2.19 fps)
 2=Orifice/Grate (Controls 0.00 cfs)
 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 3.1P: Detention Pond 3.1

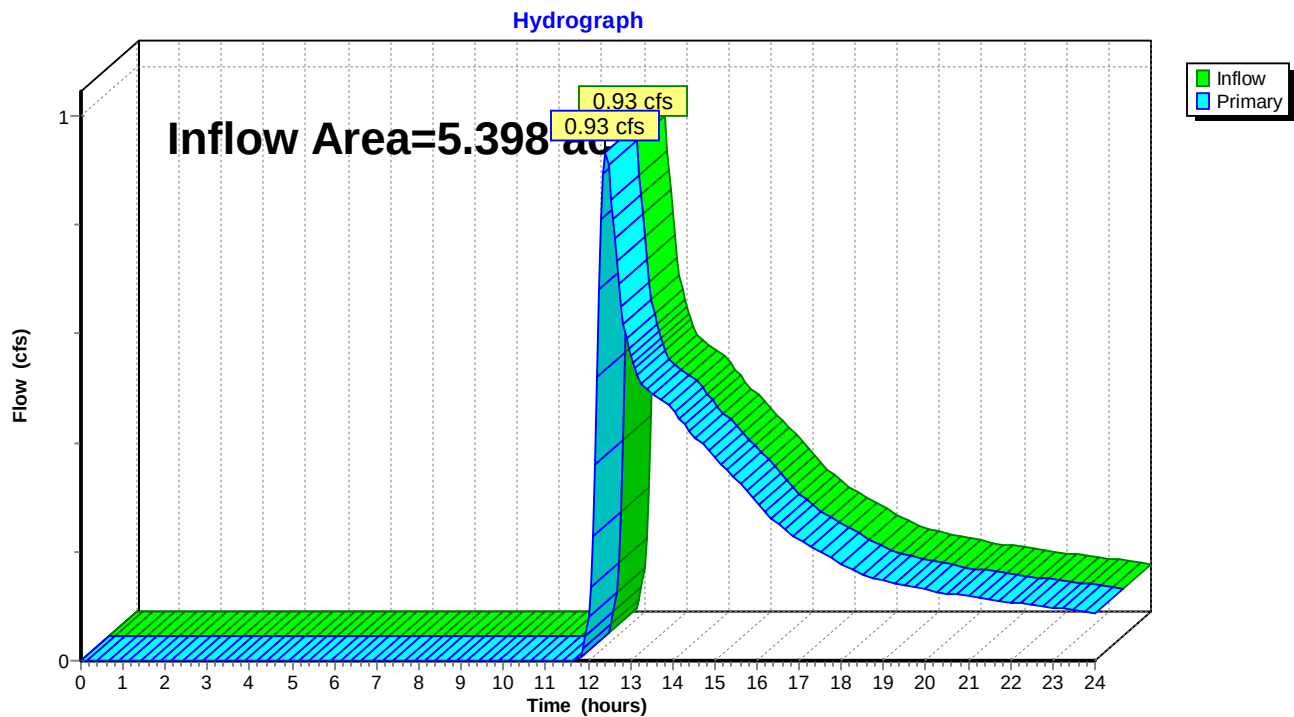


Summary for Link DP1: DP1

Inflow Area = 5.398 ac, 8.29% Impervious, Inflow Depth > 0.57" for 1 year event
 Inflow = 0.93 cfs @ 12.42 hrs, Volume= 0.255 af
 Primary = 0.93 cfs @ 12.42 hrs, Volume= 0.255 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP1: DP1

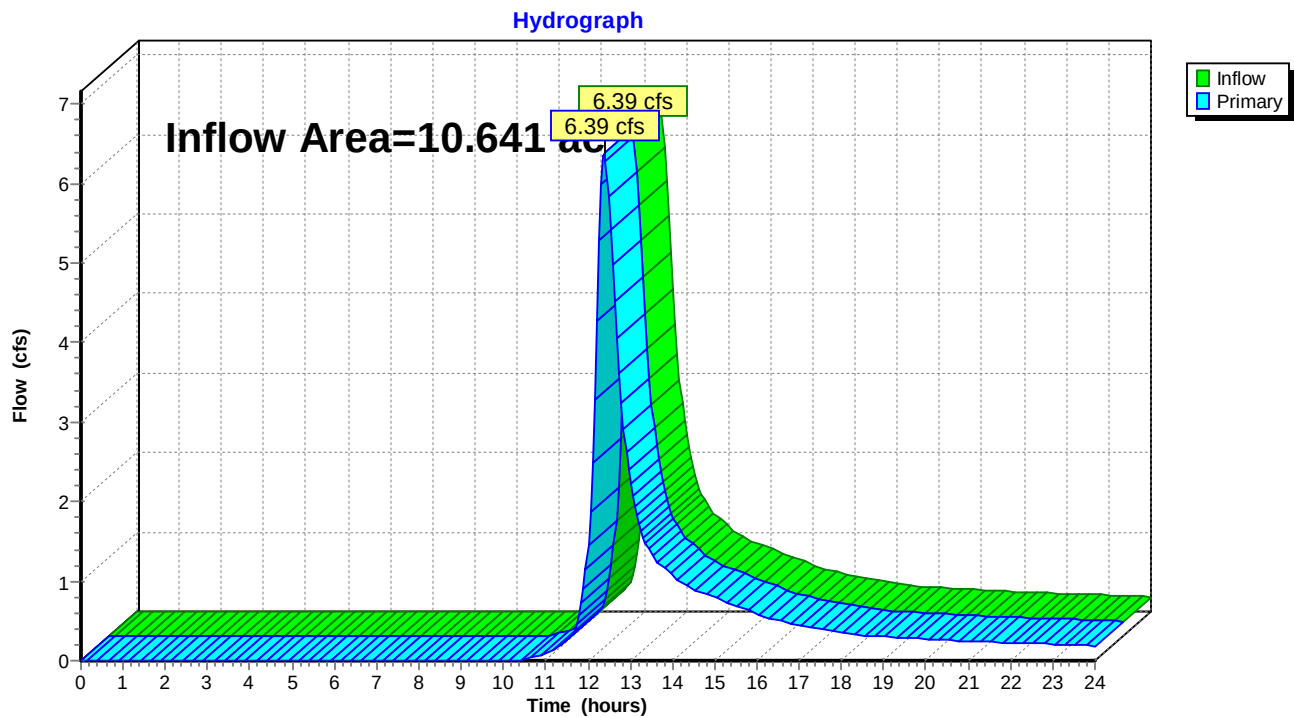


Summary for Link DP3: DP3

Inflow Area = 10.641 ac, 8.55% Impervious, Inflow Depth > 0.94" for 1 year event
 Inflow = 6.39 cfs @ 12.38 hrs, Volume= 0.832 af
 Primary = 6.39 cfs @ 12.38 hrs, Volume= 0.832 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP3: DP3



Summary for Subcatchment WS 2: WS-2

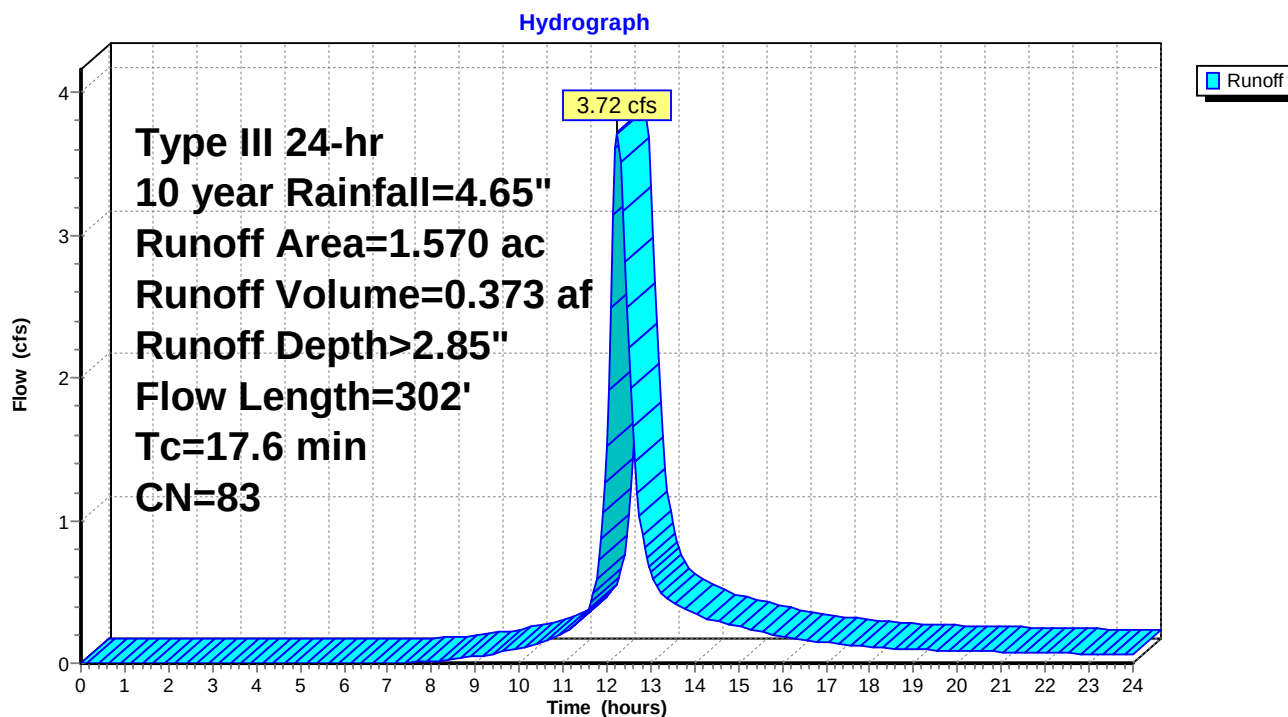
Runoff = 3.72 cfs @ 12.24 hrs, Volume= 0.373 af, Depth> 2.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=4.65"

Area (ac)	CN	Description
* 0.801	92	A, Roads and Gutters
0.509	74	>75% Grass cover, Good, HSG C
0.260	70	Brush, Fair, HSG C
1.570	83	Weighted Average
1.570		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.5	55	0.0050	0.06		Sheet Flow, Grass: Dense n= 0.240 P2= 3.17"
0.3	88	0.1250	5.69		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
1.8	159	0.0095	1.46		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
17.6	302	Total			

Subcatchment WS 2: WS-2



Summary for Subcatchment WS 3: WS-3

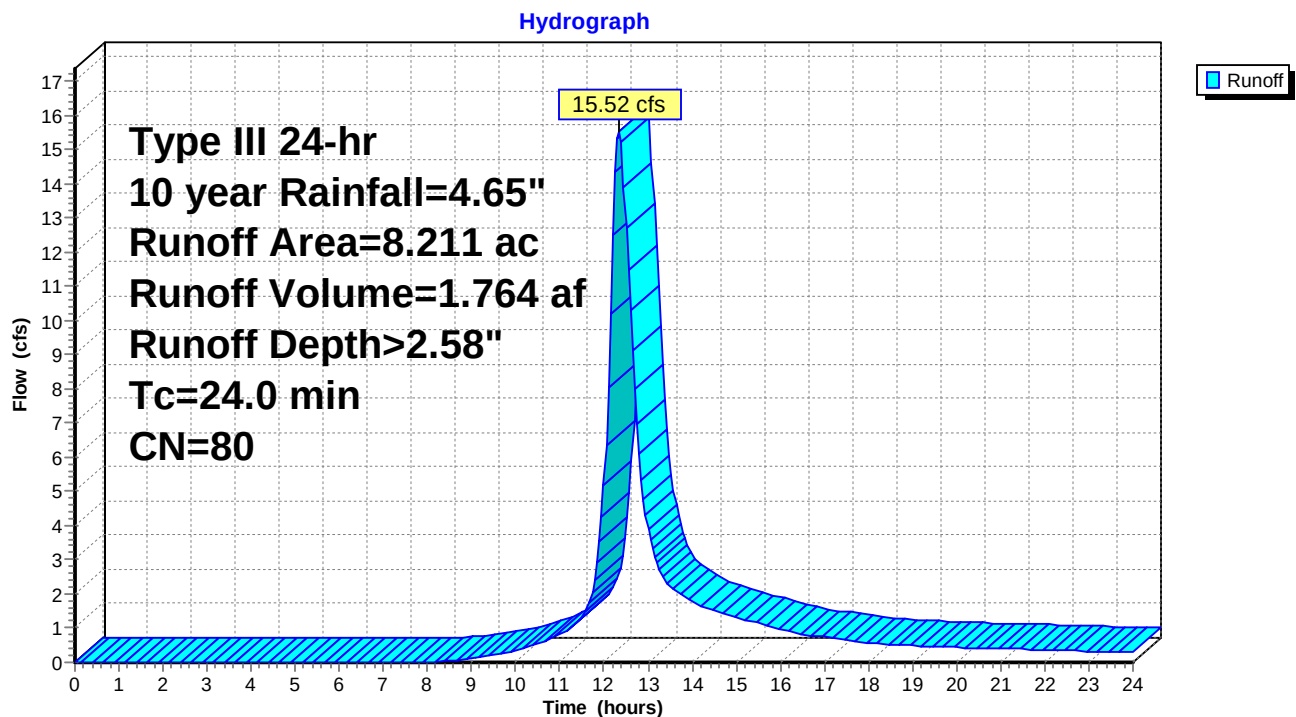
Runoff = 15.52 cfs @ 12.33 hrs, Volume= 1.764 af, Depth> 2.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=4.65"

Area (ac)	CN	Description
* 0.206	92	A, Roads and gutters
* 1.107	92	C, Roads and gutters
* 0.761	79	D, 1 acre lots, 20% imp, HSG C
* 2.619	77	E, 2 acre lots, 12% imp, HSG C
* 0.699	77	G, Brush, Poor, HSG C
* 2.218	79	H, 1 acre lots, 20% imp, HSG C
* 0.601	70	Remainder of B, Brush, Fair, HSG C
8.211	80	Weighted Average
7.301		88.92% Pervious Area
0.910		11.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.0					Direct Entry, From Oct. 03 D&H, see appendix

Subcatchment WS 3: WS-3



Summary for Subcatchment WS1: WS-1

Runoff = 3.73 cfs @ 12.37 hrs, Volume= 0.443 af, Depth> 1.84"

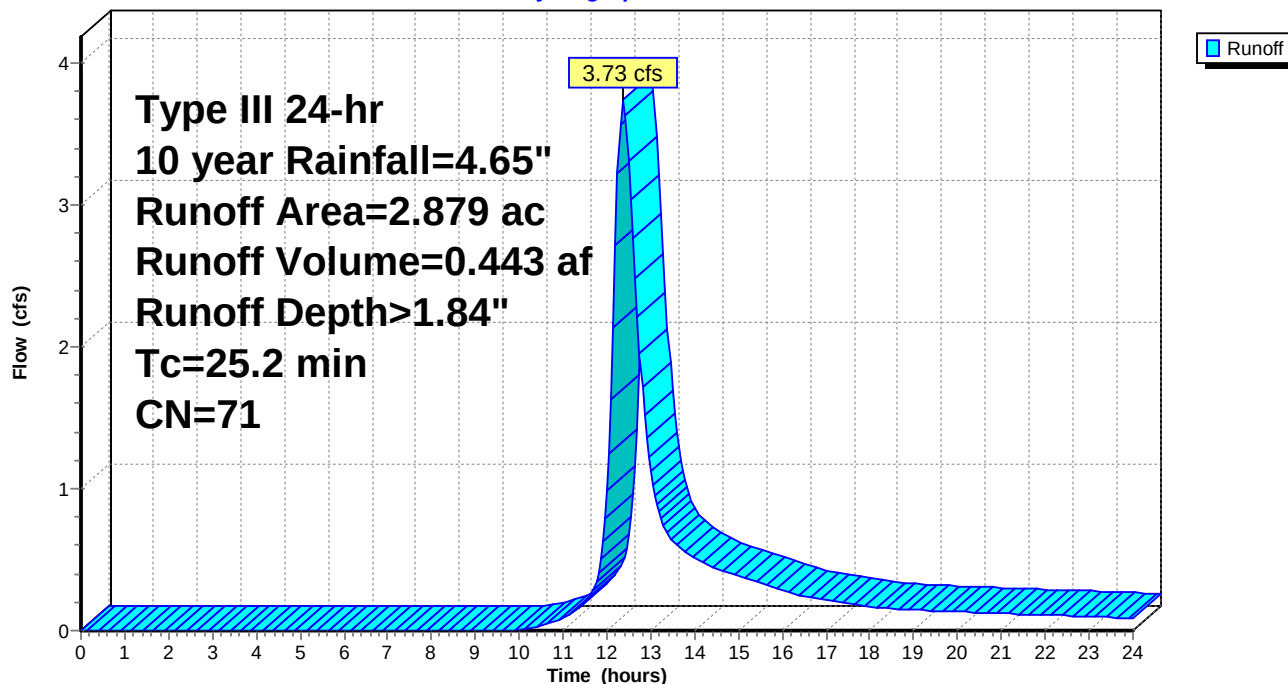
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=4.65"

Area (ac)	CN	Description
* 0.160	79	A, 1 acre lots, 20% imp, HSG C
* 0.303	70	B, Woods, Good, HSG C
* 0.455	70	C, Woods, Good, HSG C
* 0.105	92	F, Roads and gutters
* 1.856	70	E, Woods, Good, HSG C
2.879	71	Weighted Average
2.847		98.89% Pervious Area
0.032		1.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.2					Direct Entry, From Oct. 03 D&H,see appendix

Subcatchment WS1: WS-1

Hydrograph



Summary for Subcatchment WS1.1A: WS-1.1A

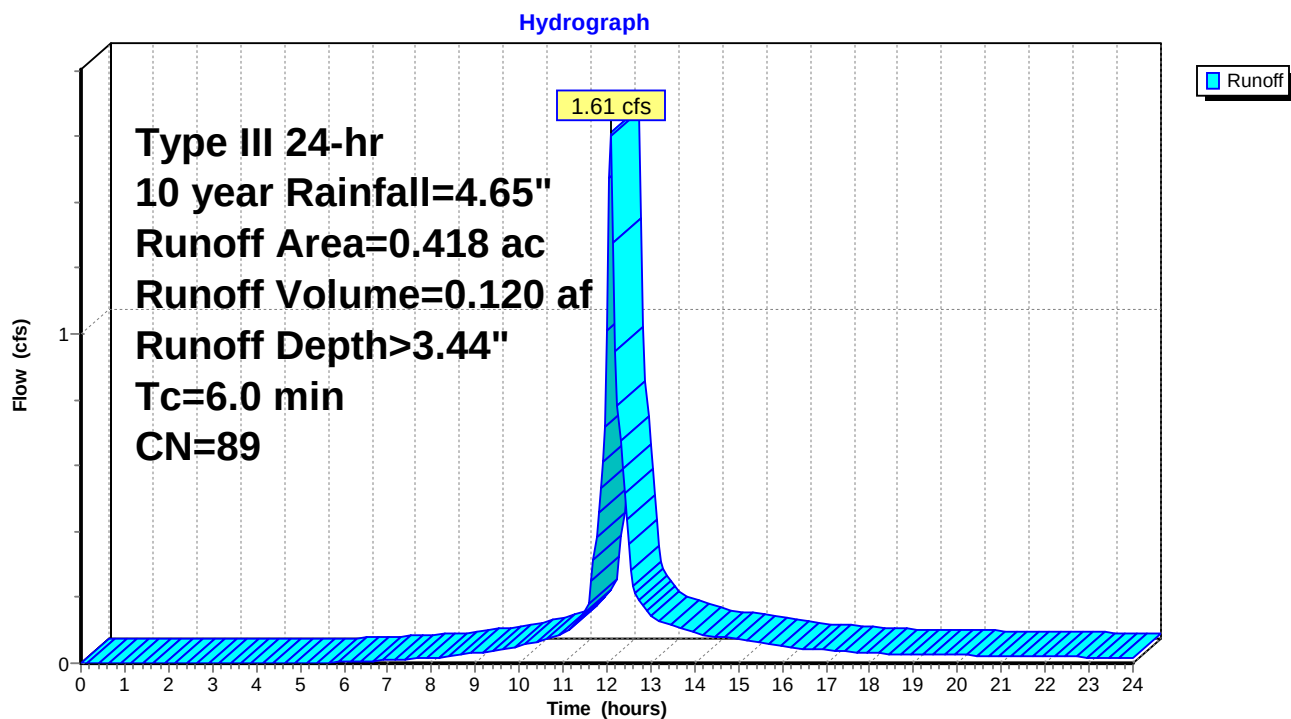
Runoff = 1.61 cfs @ 12.09 hrs, Volume= 0.120 af, Depth> 3.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=4.65"

Area (ac)	CN	Description
0.267	98	Paved parking, HSG C
0.151	74	>75% Grass cover, Good, HSG C
0.418	89	Weighted Average
0.151		36.12% Pervious Area
0.267		63.88% Impervious Area

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

Subcatchment WS1.1A: WS-1.1A



Summary for Subcatchment WS1.1B: WS-1.1B

Runoff = 0.82 cfs @ 12.09 hrs, Volume= 0.062 af, Depth> 3.64"

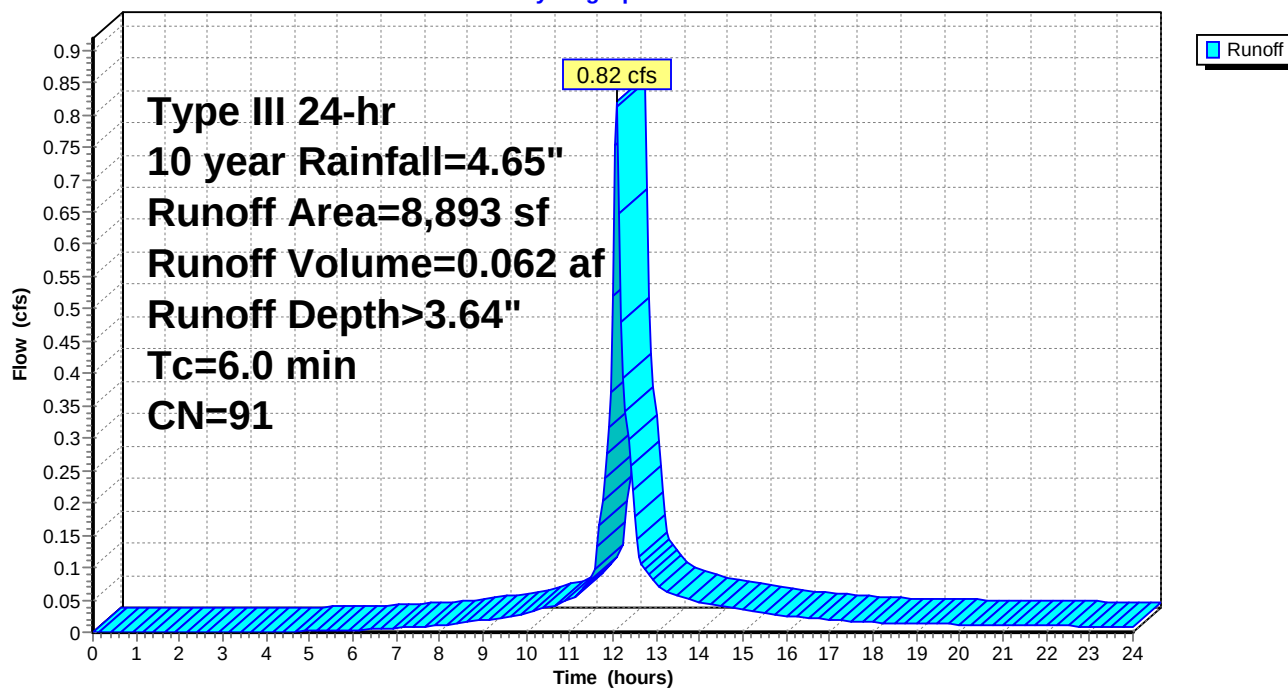
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=4.65"

Area (sf)	CN	Description
6,461	98	Roofs, HSG C
2,432	74	>75% Grass cover, Good, HSG C
8,893	91	Weighted Average
2,432		27.35% Pervious Area
6,461		72.65% Impervious Area

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

Subcatchment WS1.1B: WS-1.1B

Hydrograph



Summary for Subcatchment WS1.1C: WS-1.1C

Runoff = 5.05 cfs @ 12.18 hrs, Volume= 0.451 af, Depth> 2.85"

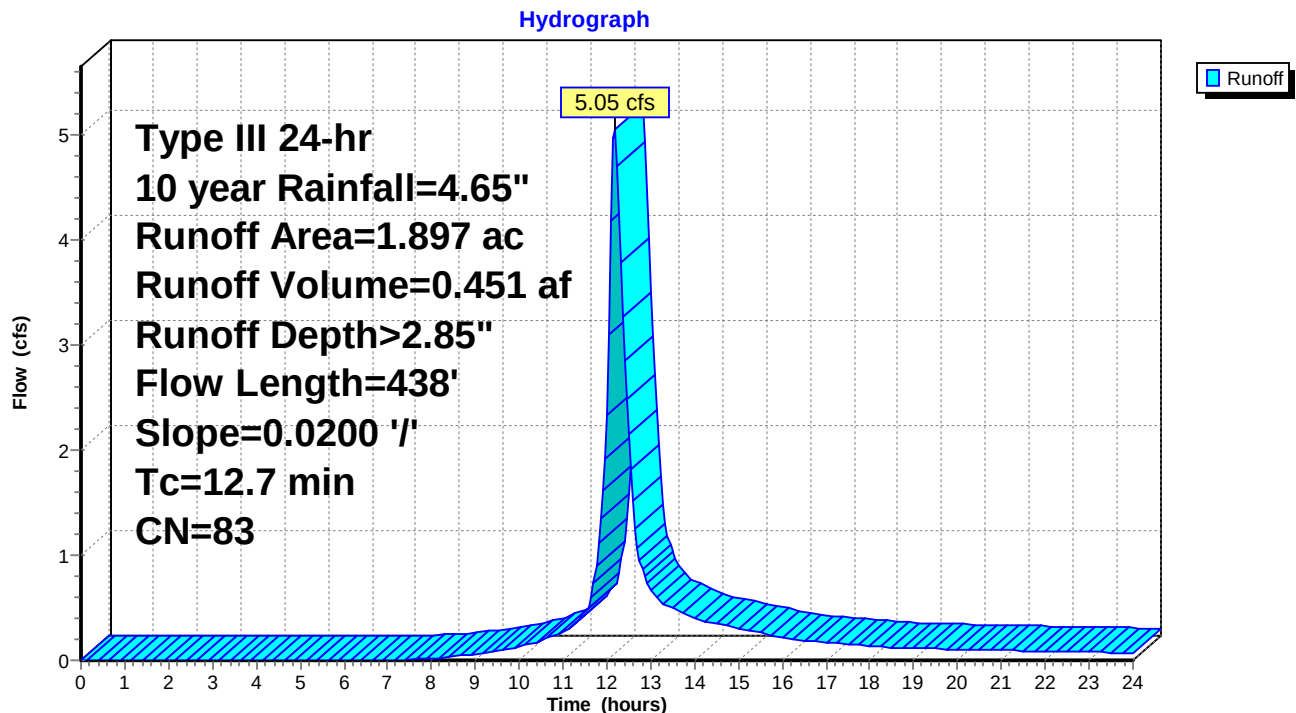
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Type III 24-hr 10 year Rainfall=4.65"

Area (ac)	CN	Description
* 1.897	83	Townhouse
1.897		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	78	0.0200	0.11		Sheet Flow, Grass: Dense n= 0.240 P2= 3.17"
0.9	360	0.0200	6.69	3.76	Pipe Channel, HDPE 15.0" Round w/ 8.0" inside fill Area= 0.6 sf Perim= 3.1' r= 0.18' n= 0.010 PVC, smooth interior
12.7	438	Total			

Subcatchment WS1.1C: WS-1.1C



Summary for Subcatchment WS3.1A: WS 3.1A

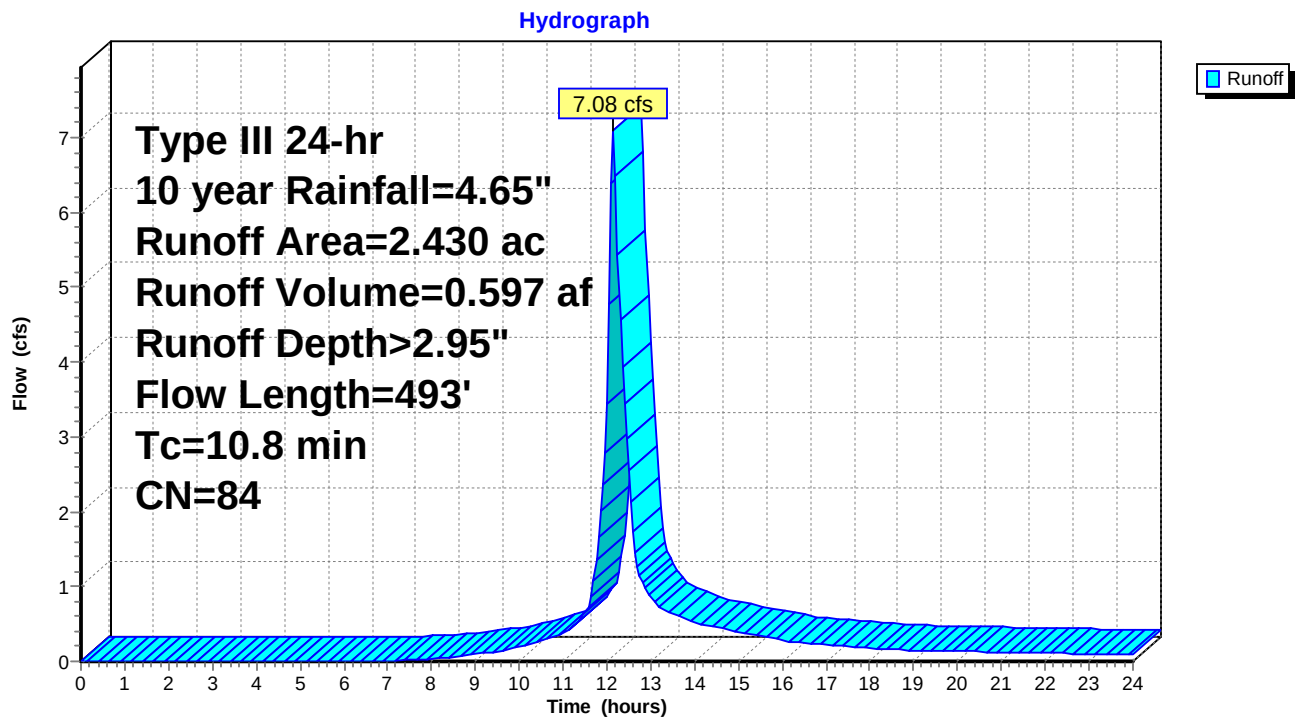
Runoff = 7.08 cfs @ 12.15 hrs, Volume= 0.597 af, Depth> 2.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year Rainfall=4.65"

Area (ac)	CN	Description
* 2.430	84	Town homes, (taken form old report)
2.430		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	60	0.0250	0.11		Sheet Flow, Grass: Dense n= 0.240 P2= 3.17"
1.0	173	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.1	260	0.0050	3.93	3.48	Pipe Channel, hdpe 18.0" Round w/ 9.0" inside fill Area= 0.9 sf Perim= 3.9' r= 0.23' n= 0.010 PVC, smooth interior
10.8	493	Total			

Subcatchment WS3.1A: WS 3.1A



Summary for Pond 1.1AP: Bio 1A

Inflow Area = 0.418 ac, 63.88% Impervious, Inflow Depth > 3.44" for 10 year event
 Inflow = 1.61 cfs @ 12.09 hrs, Volume= 0.120 af
 Outflow = 1.54 cfs @ 12.11 hrs, Volume= 0.097 af, Atten= 4%, Lag= 1.5 min
 Primary = 1.54 cfs @ 12.11 hrs, Volume= 0.097 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 368.10' @ 12.11 hrs Surf.Area= 2,151 sf Storage= 1,190 cf

Plug-Flow detention time= 116.1 min calculated for 0.097 af (81% of inflow)
 Center-of-Mass det. time= 44.0 min (840.5 - 796.5)

Volume	Invert	Avail.Storage	Storage Description
#1	367.50'	5,941 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
367.50	1,830	0	0
368.00	2,117	987	987
369.00	2,477	2,297	3,284
370.00	2,838	2,658	5,941

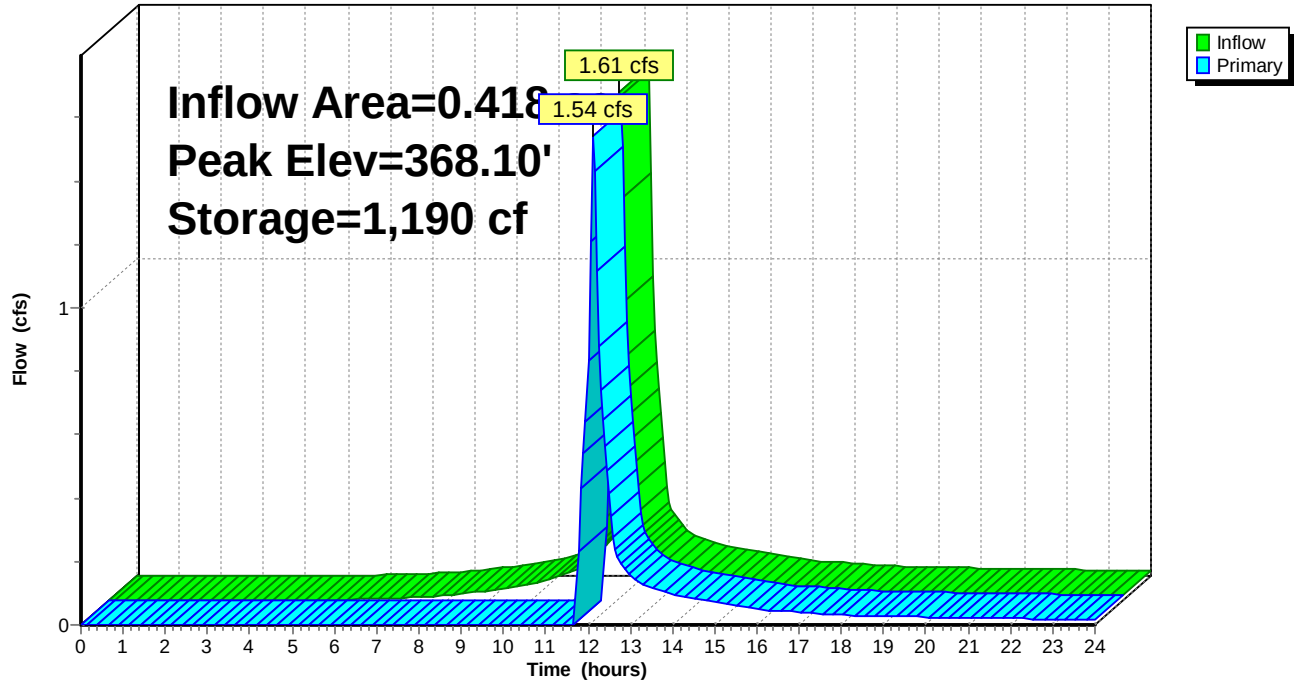
Device	Routing	Invert	Outlet Devices
#1	Primary	368.00'	20.0' long x 1.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.62 2.64 2.64 2.68 2.75 2.86 2.92 3.07 3.07 3.03 3.28 3.32

Primary OutFlow Max=1.50 cfs @ 12.11 hrs HW=368.09' TW=365.10' (Dynamic Tailwater)

↑ **1=Broad-Crested Rectangular Weir** (Weir Controls 1.50 cfs @ 0.80 fps)

Pond 1.1AP: Bio 1A

Hydrograph



Summary for Pond 1.1BP: Bio 1B

Inflow Area = 0.204 ac, 72.65% Impervious, Inflow Depth > 3.64" for 10 year event
 Inflow = 0.82 cfs @ 12.09 hrs, Volume= 0.062 af
 Outflow = 0.79 cfs @ 12.11 hrs, Volume= 0.050 af, Atten= 3%, Lag= 1.4 min
 Primary = 0.79 cfs @ 12.11 hrs, Volume= 0.050 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 375.58' @ 12.11 hrs Surf.Area= 1,211 sf Storage= 632 cf

Plug-Flow detention time= 121.6 min calculated for 0.049 af (80% of inflow)
 Center-of-Mass det. time= 48.0 min (836.7 - 788.8)

Volume	Invert	Avail.Storage	Storage Description
#1	375.00'	1,176 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

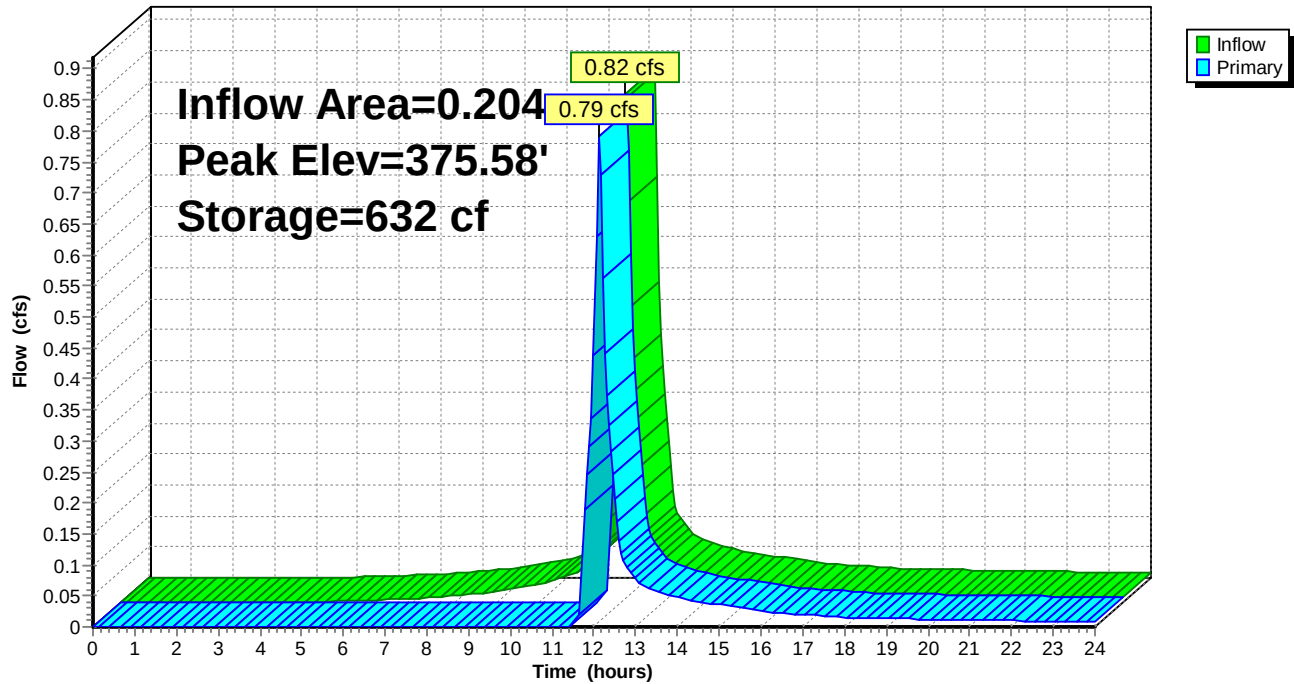
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
375.00	961	0	0
376.00	1,390	1,176	1,176

Device	Routing	Invert	Outlet Devices
#1	Primary	375.50'	12.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.77 cfs @ 12.11 hrs HW=375.58' TW=365.09' (Dynamic Tailwater)
 ↑1=Broad-Crested Rectangular Weir (Weir Controls 0.77 cfs @ 0.80 fps)

Pond 1.1BP: Bio 1B

Hydrograph



Summary for Pond 1.1P: Detention pond 1.1

Inflow Area = 2.519 ac, 16.49% Impervious, Inflow Depth > 2.85" for 10 year event
 Inflow = 7.15 cfs @ 12.15 hrs, Volume= 0.597 af
 Outflow = 1.59 cfs @ 12.66 hrs, Volume= 0.490 af, Atten= 78%, Lag= 30.3 min
 Primary = 1.59 cfs @ 12.66 hrs, Volume= 0.490 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 366.45' @ 12.66 hrs Surf.Area= 4,407 sf Storage= 11,779 cf

Plug-Flow detention time= 150.9 min calculated for 0.489 af (82% of inflow)
 Center-of-Mass det. time= 80.7 min (906.3 - 825.7)

Volume	Invert	Avail.Storage	Storage Description
#1	363.00'	37,397 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

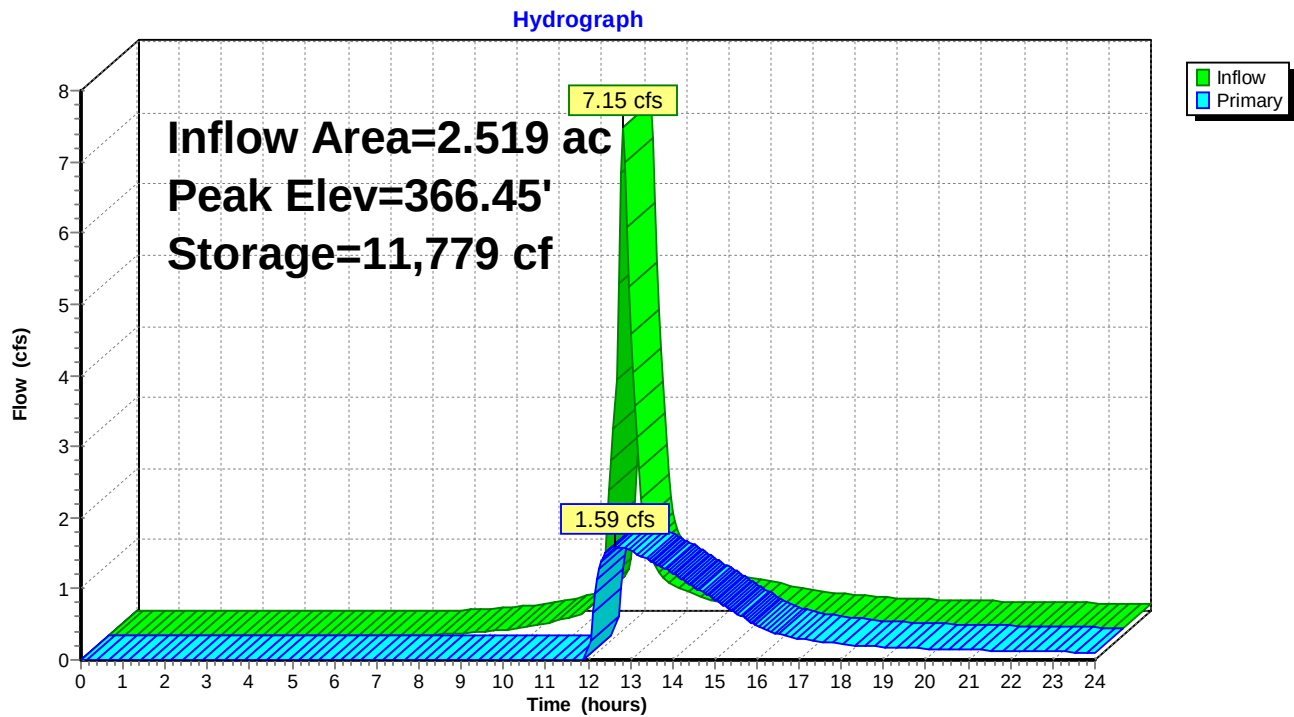
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
363.00	2,452	0	0
364.00	3,000	2,726	2,726
365.00	3,551	3,276	6,002
366.00	4,132	3,842	9,843
367.00	4,739	4,436	14,279
368.00	7,520	6,130	20,408
369.00	8,496	8,008	28,416
370.00	9,466	8,981	37,397

Device	Routing	Invert	Outlet Devices
#1	Primary	364.45'	6.0" W x 6.0" H Vert. Orifice/Grate C= 0.600
#2	Primary	367.25'	16.2" W x 11.0" H Vert. Orifice/Grate C= 0.600
#3	Primary	368.60'	12.0' long x 0.5' breadth Broad-Crested Rectangular Weir
Head (feet) 0.20 0.40 0.60 0.80 1.00			
Coef. (English) 2.80 2.92 3.08 3.30 3.32			

Primary OutFlow Max=1.59 cfs @ 12.66 hrs HW=366.45' TW=0.00' (Dynamic Tailwater)

1=Orifice/Grate (Orifice Controls 1.59 cfs @ 6.37 fps)
 2=Orifice/Grate (Controls 0.00 cfs)
 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 1.1P: Detention pond 1.1



Summary for Pond 3.1P: Detention Pond 3.1

Inflow Area = 2.430 ac, 0.00% Impervious, Inflow Depth > 2.95" for 10 year event
 Inflow = 7.08 cfs @ 12.15 hrs, Volume= 0.597 af
 Outflow = 3.92 cfs @ 12.36 hrs, Volume= 0.526 af, Atten= 45%, Lag= 12.3 min
 Primary = 3.92 cfs @ 12.36 hrs, Volume= 0.526 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 368.60' @ 12.36 hrs Surf.Area= 4,050 sf Storage= 8,248 cf

Plug-Flow detention time= 98.5 min calculated for 0.525 af (88% of inflow)
 Center-of-Mass det. time= 45.0 min (861.8 - 816.8)

Volume	Invert	Avail.Storage	Storage Description
#1	366.00'	14,648 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

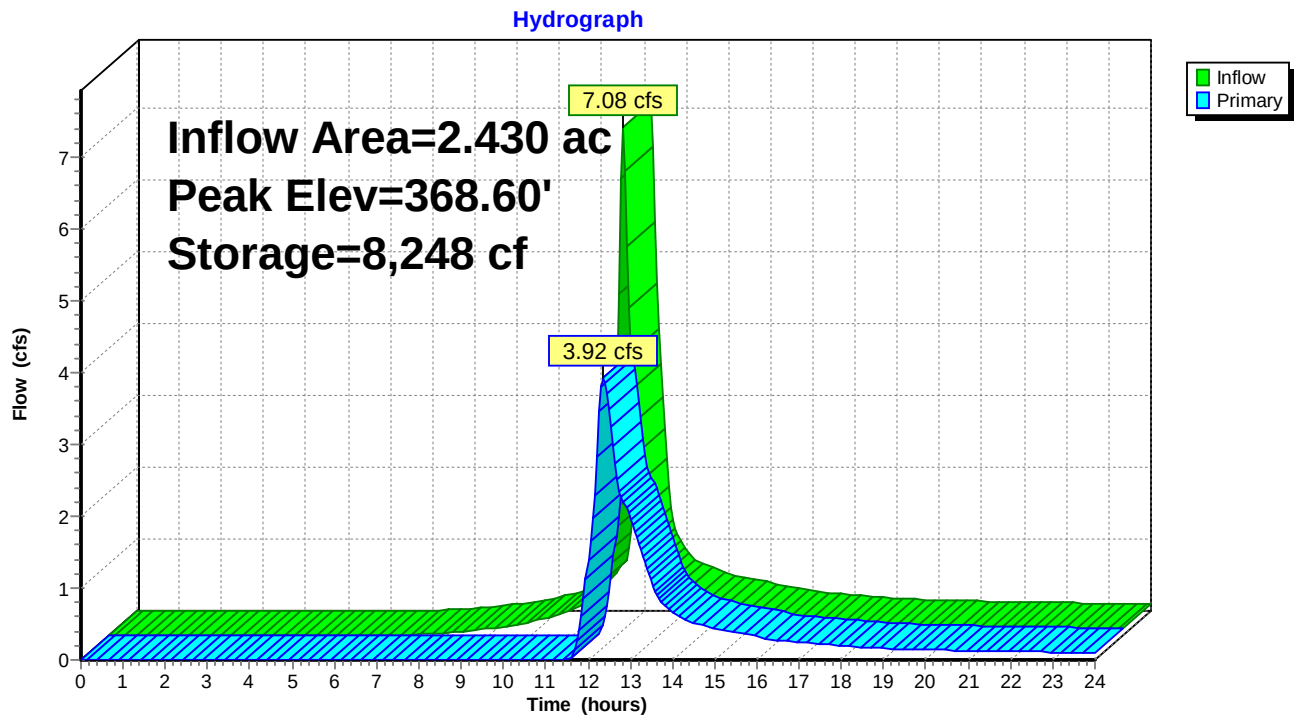
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
366.00	2,376	0	0
367.00	2,971	2,674	2,674
368.00	3,589	3,280	5,954
369.00	4,356	3,973	9,926
370.00	5,087	4,722	14,648

Device	Routing	Invert	Outlet Devices
#1	Primary	367.04'	12.0" W x 6.0" H Vert. Orifice/Grate C= 0.600
#2	Primary	368.25'	21.0" W x 11.0" H Vert. Orifice/Grate C= 0.600
#3	Primary	369.10'	12.0' long x 0.5' breadth Broad-Crested Rectangular Weir
Head (feet) 0.20 0.40 0.60 0.80 1.00			
Coef. (English) 2.80 2.92 3.08 3.30 3.32			

Primary OutFlow Max=3.91 cfs @ 12.36 hrs HW=368.60' TW=0.00' (Dynamic Tailwater)

↑ **1=Orifice/Grate** (Orifice Controls 2.75 cfs @ 5.50 fps)
 — **2=Orifice/Grate** (Orifice Controls 1.16 cfs @ 1.90 fps)
 — **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3.1P: Detention Pond 3.1

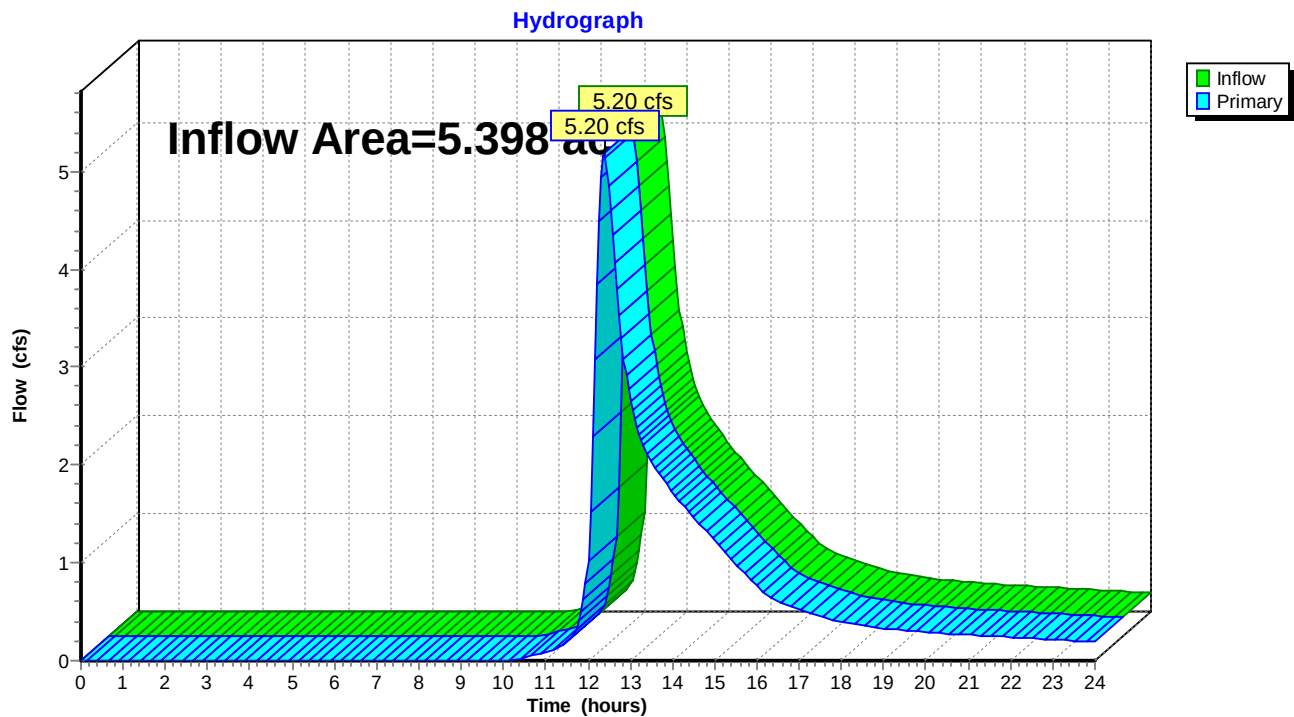


Summary for Link DP1: DP1

Inflow Area = 5.398 ac, 8.29% Impervious, Inflow Depth > 2.07" for 10 year event
 Inflow = 5.20 cfs @ 12.39 hrs, Volume= 0.933 af
 Primary = 5.20 cfs @ 12.39 hrs, Volume= 0.933 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP1: DP1

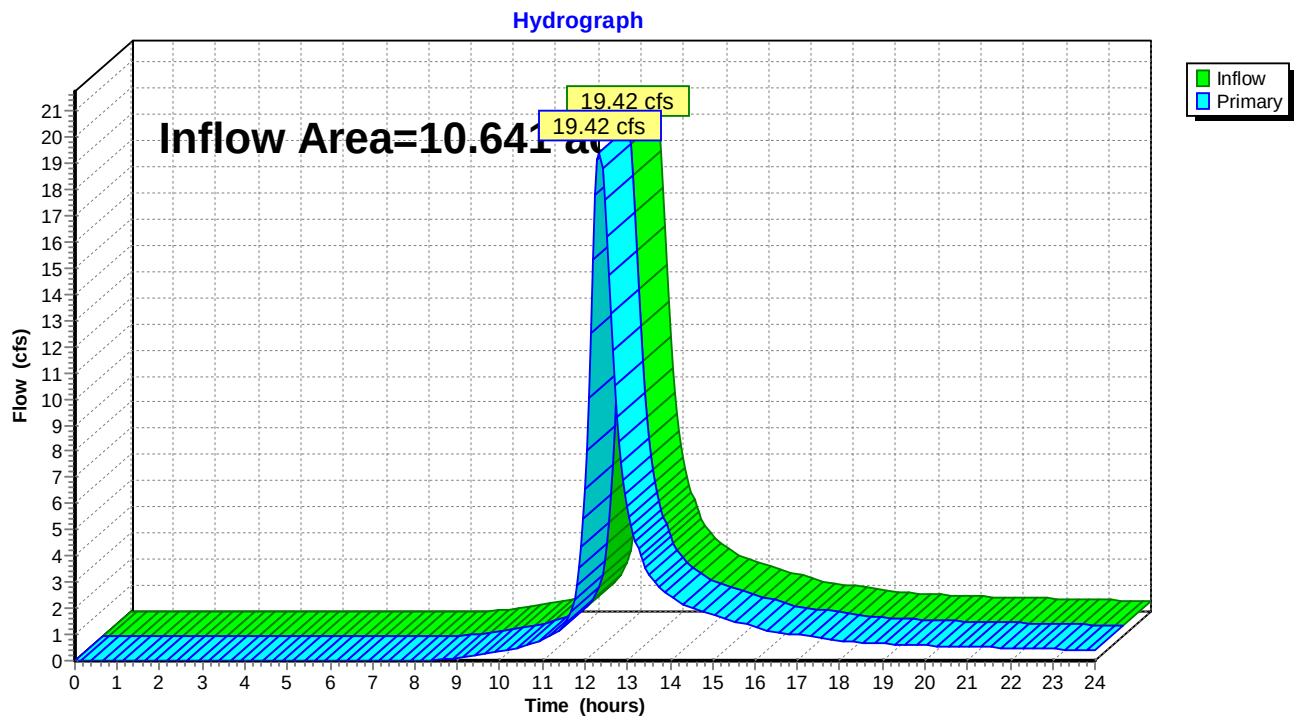


Summary for Link DP3: DP3

Inflow Area = 10.641 ac, 8.55% Impervious, Inflow Depth > 2.58" for 10 year event
 Inflow = 19.42 cfs @ 12.34 hrs, Volume= 2.290 af
 Primary = 19.42 cfs @ 12.34 hrs, Volume= 2.290 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP3: DP3



Summary for Subcatchment WS 2: WS-2

Runoff = 7.79 cfs @ 12.24 hrs, Volume= 0.799 af, Depth> 6.10"

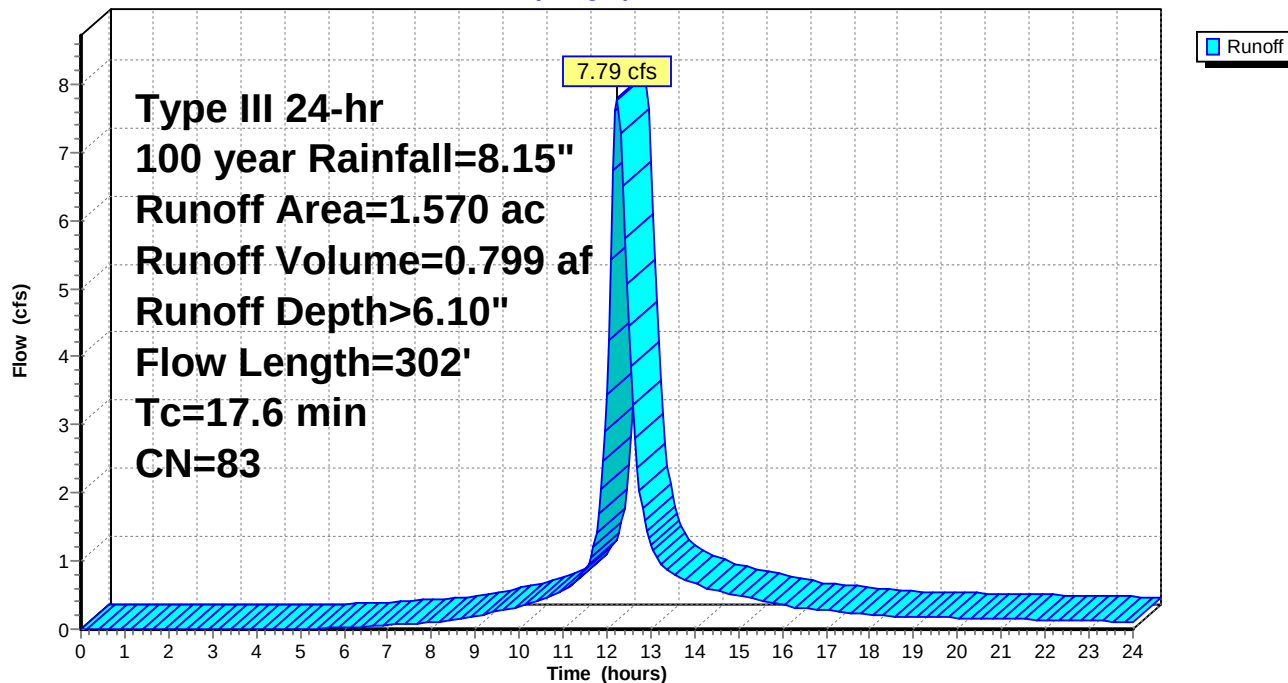
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=8.15"

Area (ac)	CN	Description
* 0.801	92	A, Roads and Gutters
0.509	74	>75% Grass cover, Good, HSG C
0.260	70	Brush, Fair, HSG C
1.570	83	Weighted Average
1.570		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.5	55	0.0050	0.06		Sheet Flow, Grass: Dense n= 0.240 P2= 3.17"
0.3	88	0.1250	5.69		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
1.8	159	0.0095	1.46		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
17.6	302	Total			

Subcatchment WS 2: WS-2

Hydrograph



Summary for Subcatchment WS 3: WS-3

Runoff = 34.17 cfs @ 12.32 hrs, Volume= 3.929 af, Depth> 5.74"

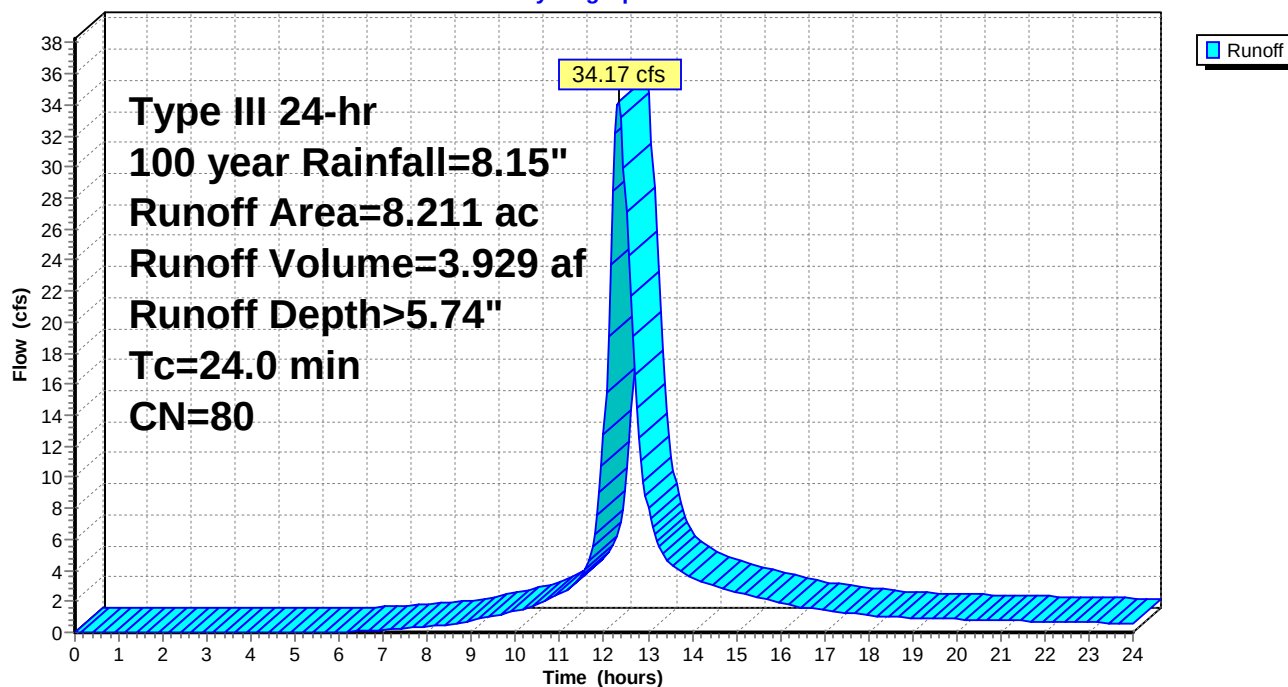
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=8.15"

Area (ac)	CN	Description
* 0.206	92	A, Roads and gutters
* 1.107	92	C, Roads and gutters
* 0.761	79	D, 1 acre lots, 20% imp, HSG C
* 2.619	77	E, 2 acre lots, 12% imp, HSG C
* 0.699	77	G, Brush, Poor, HSG C
* 2.218	79	H, 1 acre lots, 20% imp, HSG C
* 0.601	70	Remainder of B, Brush, Fair, HSG C
8.211	80	Weighted Average
7.301		88.92% Pervious Area
0.910		11.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.0					Direct Entry, From Oct. 03 D&H, see appendix

Subcatchment WS 3: WS-3

Hydrograph



Summary for Subcatchment WS1: WS-1

Runoff = 9.70 cfs @ 12.35 hrs, Volume= 1.125 af, Depth> 4.69"

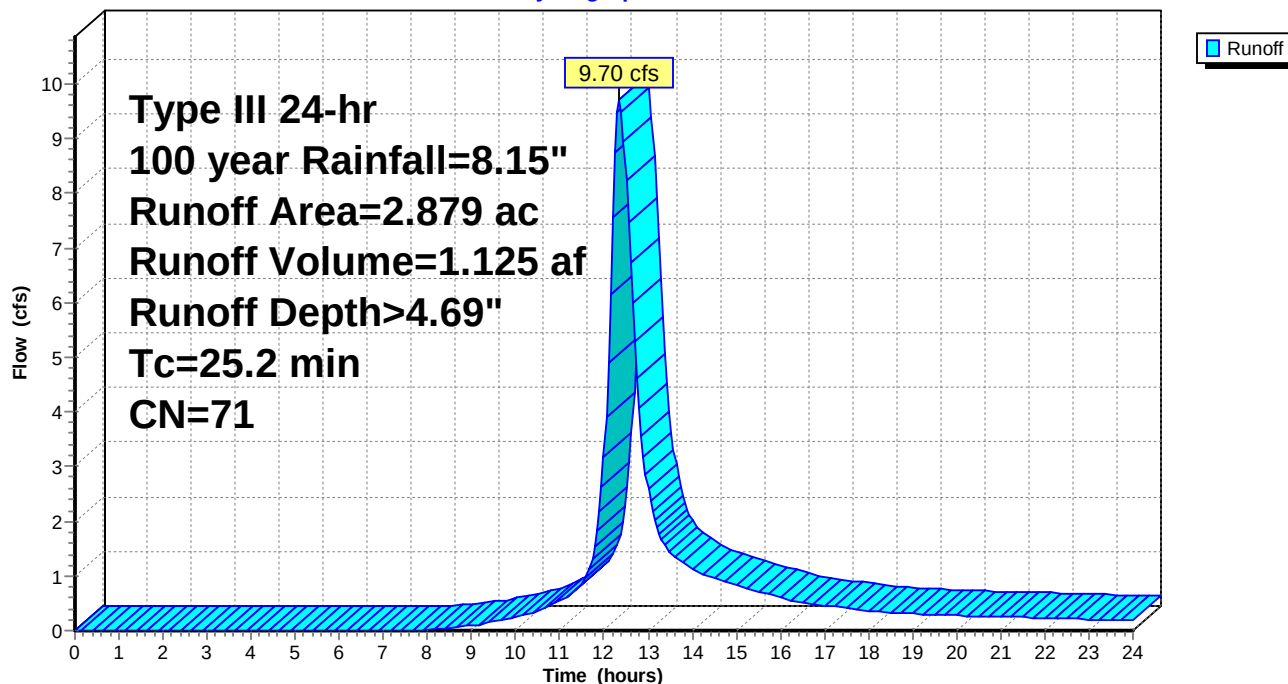
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=8.15"

Area (ac)	CN	Description
* 0.160	79	A, 1 acre lots, 20% imp, HSG C
* 0.303	70	B, Woods, Good, HSG C
* 0.455	70	C, Woods, Good, HSG C
* 0.105	92	F, Roads and gutters
* 1.856	70	E, Woods, Good, HSG C
2.879	71	Weighted Average
2.847		98.89% Pervious Area
0.032		1.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.2					Direct Entry, From Oct. 03 D&H,see appendix

Subcatchment WS1: WS-1

Hydrograph



Summary for Subcatchment WS1.1A: WS-1.1A

Runoff = 3.08 cfs @ 12.09 hrs, Volume= 0.238 af, Depth> 6.83"

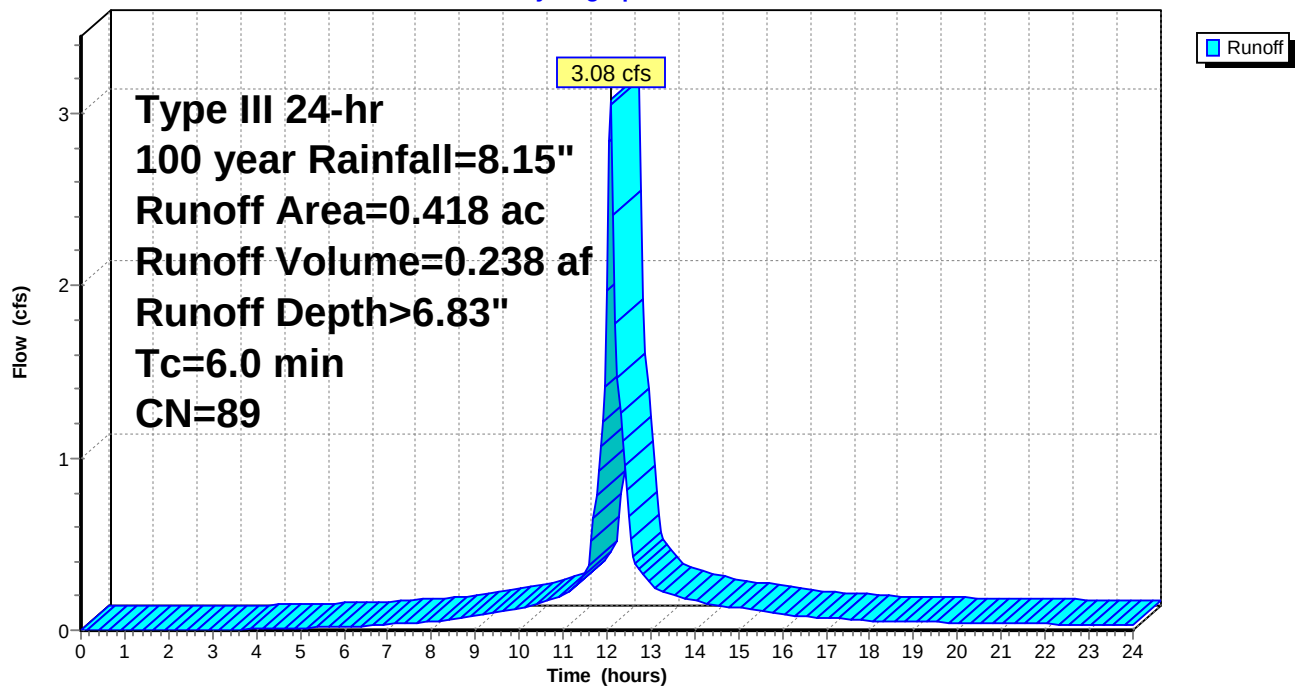
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=8.15"

Area (ac)	CN	Description
0.267	98	Paved parking, HSG C
0.151	74	>75% Grass cover, Good, HSG C
0.418	89	Weighted Average
0.151		36.12% Pervious Area
0.267		63.88% Impervious Area

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

Subcatchment WS1.1A: WS-1.1A

Hydrograph



Summary for Subcatchment WS1.1B: WS-1.1B

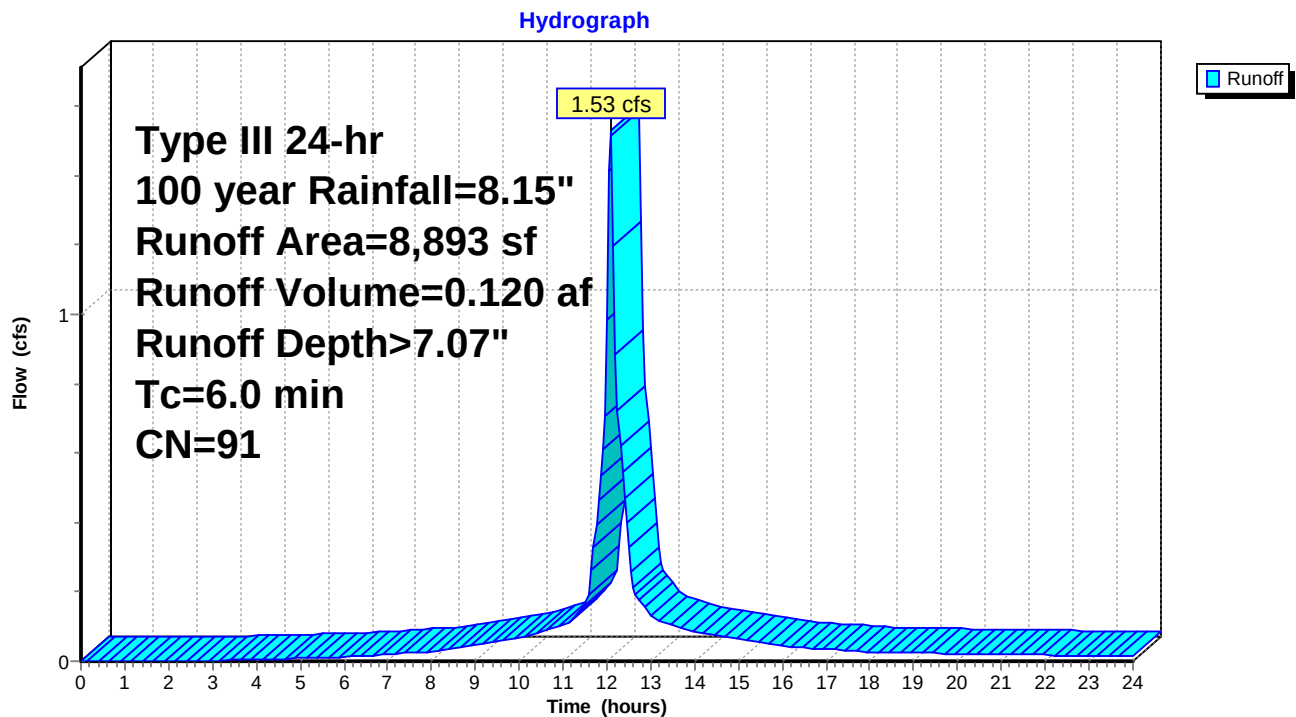
Runoff = 1.53 cfs @ 12.09 hrs, Volume= 0.120 af, Depth> 7.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=8.15"

Area (sf)	CN	Description
6,461	98	Roofs, HSG C
2,432	74	>75% Grass cover, Good, HSG C
8,893	91	Weighted Average
2,432		27.35% Pervious Area
6,461		72.65% Impervious Area

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

Subcatchment WS1.1B: WS-1.1B



Summary for Subcatchment WS1.1C: WS-1.1C

Runoff = 10.63 cfs @ 12.17 hrs, Volume= 0.966 af, Depth> 6.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

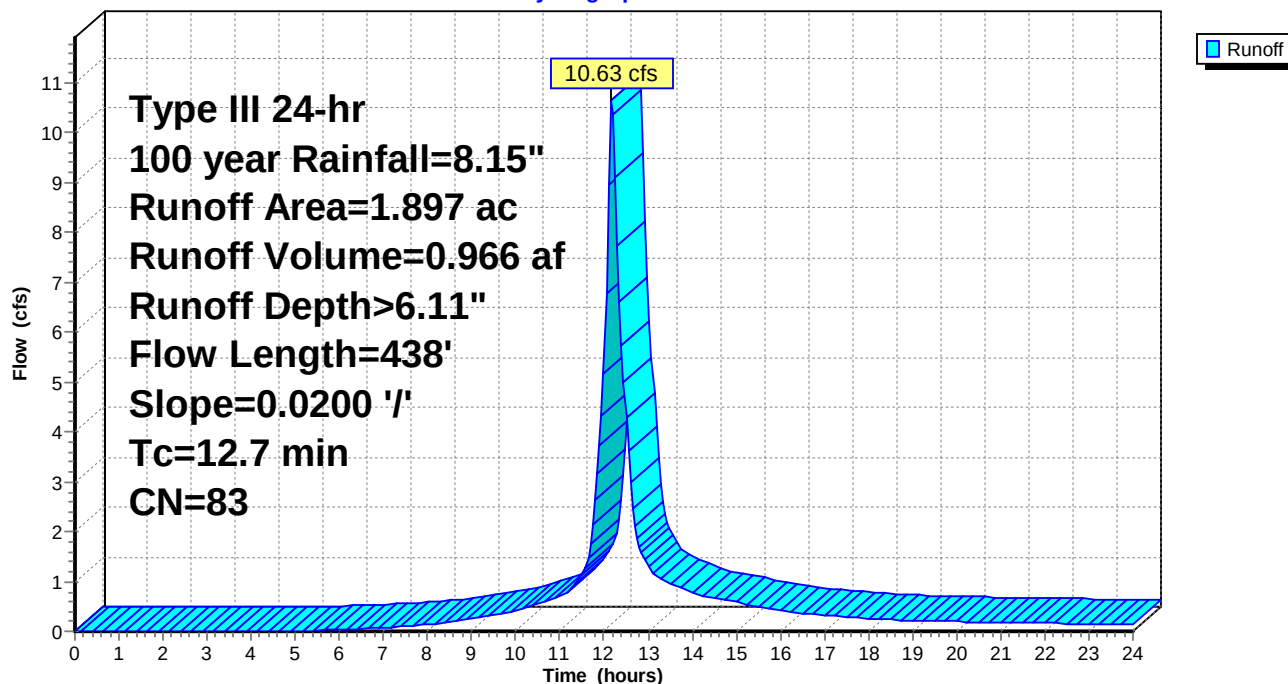
Type III 24-hr 100 year Rainfall=8.15"

Area (ac)	CN	Description
* 1.897	83	Townhouse
1.897		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	78	0.0200	0.11		Sheet Flow, Grass: Dense n= 0.240 P2= 3.17"
0.9	360	0.0200	6.69	3.76	Pipe Channel, HDPE 15.0" Round w/ 8.0" inside fill Area= 0.6 sf Perim= 3.1' r= 0.18' n= 0.010 PVC, smooth interior
12.7	438	Total			

Subcatchment WS1.1C: WS-1.1C

Hydrograph



Summary for Subcatchment WS3.1A: WS 3.1A

Runoff = 14.57 cfs @ 12.15 hrs, Volume= 1.262 af, Depth> 6.23"

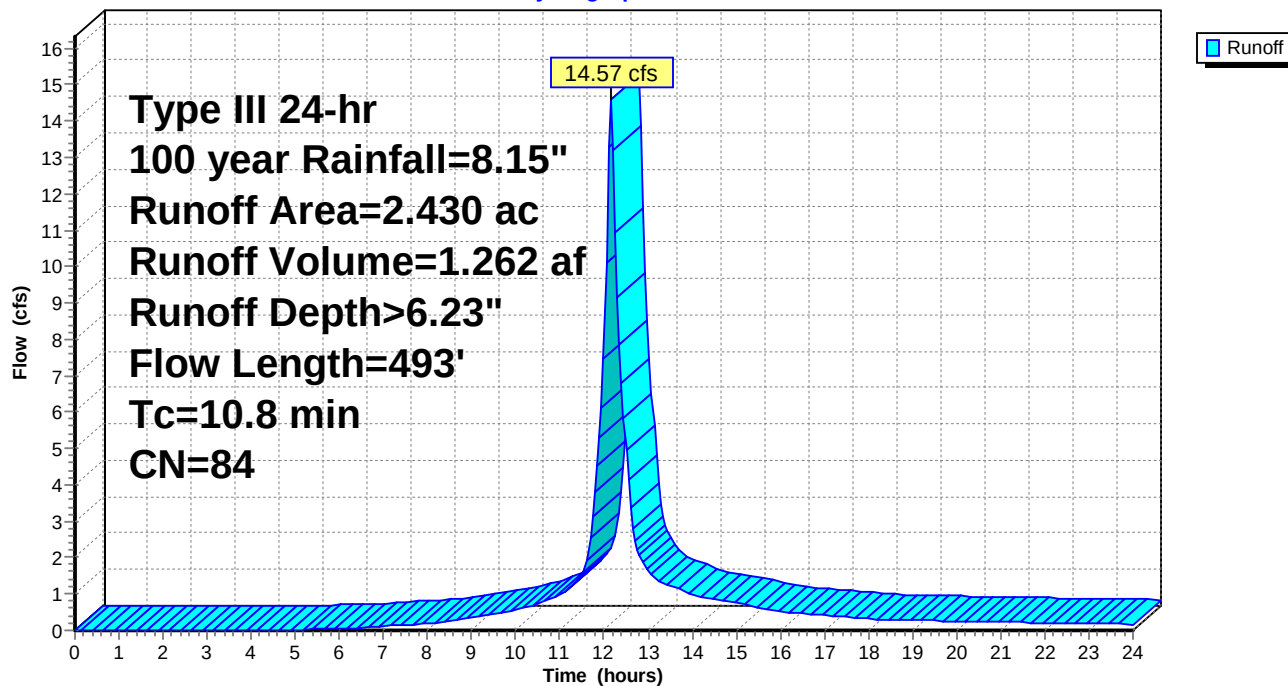
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=8.15"

Area (ac)	CN	Description
* 2.430	84	Town homes, (taken form old report)
2.430		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	60	0.0250	0.11		Sheet Flow, Grass: Dense n= 0.240 P2= 3.17"
1.0	173	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.1	260	0.0050	3.93	3.48	Pipe Channel, hdpe 18.0" Round w/ 9.0" inside fill Area= 0.9 sf Perim= 3.9' r= 0.23' n= 0.010 PVC, smooth interior
10.8	493	Total			

Subcatchment WS3.1A: WS 3.1A

Hydrograph



Summary for Pond 1.1AP: Bio 1A

Inflow Area = 0.418 ac, 63.88% Impervious, Inflow Depth > 6.83" for 100 year event
 Inflow = 3.08 cfs @ 12.09 hrs, Volume= 0.238 af
 Outflow = 3.00 cfs @ 12.11 hrs, Volume= 0.215 af, Atten= 2%, Lag= 1.2 min
 Primary = 3.00 cfs @ 12.11 hrs, Volume= 0.215 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 368.18' @ 12.49 hrs Surf.Area= 2,181 sf Storage= 1,370 cf

Plug-Flow detention time= 80.1 min calculated for 0.215 af (90% of inflow)
 Center-of-Mass det. time= 33.0 min (811.1 - 778.1)

Volume	Invert	Avail.Storage	Storage Description
#1	367.50'	5,941 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
367.50	1,830	0	0
368.00	2,117	987	987
369.00	2,477	2,297	3,284
370.00	2,838	2,658	5,941

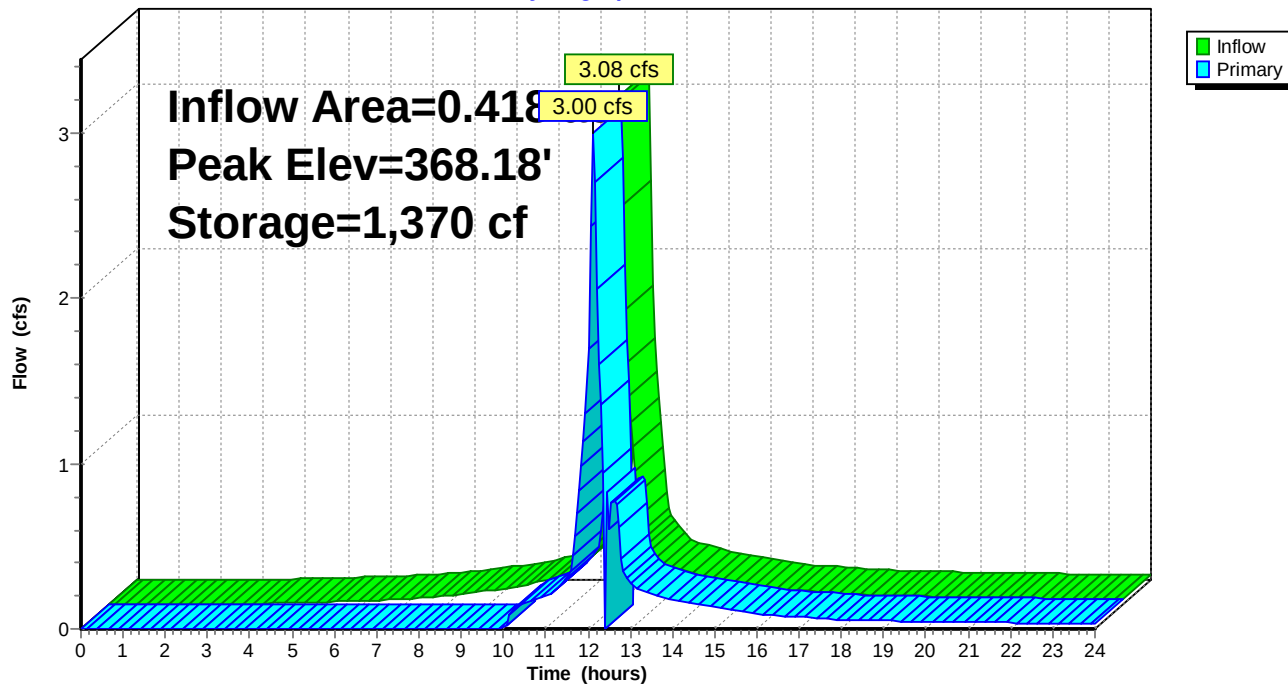
Device	Routing	Invert	Outlet Devices
#1	Primary	368.00'	20.0' long x 1.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.62 2.64 2.64 2.68 2.75 2.86 2.92 3.07 3.07 3.03 3.28 3.32

Primary OutFlow Max=2.95 cfs @ 12.11 hrs HW=368.15' TW=367.06' (Dynamic Tailwater)

↑ **1=Broad-Crested Rectangular Weir** (Weir Controls 2.95 cfs @ 1.00 fps)

Pond 1.1AP: Bio 1A

Hydrograph



Summary for Pond 1.1BP: Bio 1B

Inflow Area = 0.204 ac, 72.65% Impervious, Inflow Depth > 7.07" for 100 year event
 Inflow = 1.53 cfs @ 12.09 hrs, Volume= 0.120 af
 Outflow = 1.50 cfs @ 12.11 hrs, Volume= 0.108 af, Atten= 2%, Lag= 1.2 min
 Primary = 1.50 cfs @ 12.11 hrs, Volume= 0.108 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 375.63' @ 12.11 hrs Surf.Area= 1,229 sf Storage= 685 cf

Plug-Flow detention time= 84.7 min calculated for 0.108 af (89% of inflow)
 Center-of-Mass det. time= 36.0 min (807.6 - 771.6)

Volume	Invert	Avail.Storage	Storage Description
#1	375.00'	1,176 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

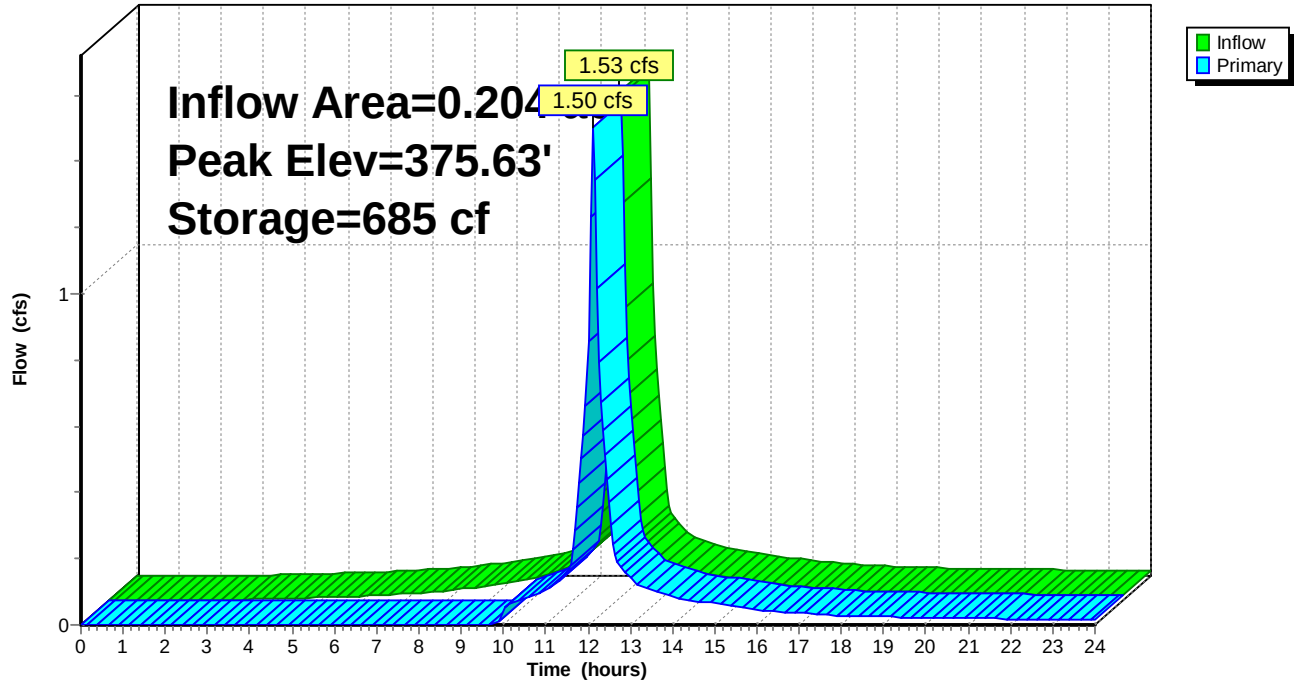
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
375.00	961	0	0
376.00	1,390	1,176	1,176

Device	Routing	Invert	Outlet Devices
#1	Primary	375.50'	12.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=1.47 cfs @ 12.11 hrs HW=375.62' TW=367.05' (Dynamic Tailwater)
 ↑ **1=Broad-Crested Rectangular Weir** (Weir Controls 1.47 cfs @ 0.99 fps)

Pond 1.1BP: Bio 1B

Hydrograph



Summary for Pond 1.1P: Detention pond 1.1

[80] Warning: Exceeded Pond 1.1AP by 0.06' @ 12.35 hrs (2.25 cfs 0.022 af)

Inflow Area = 2.519 ac, 16.49% Impervious, Inflow Depth > 6.14" for 100 year event
 Inflow = 14.53 cfs @ 12.15 hrs, Volume= 1.289 af
 Outflow = 6.11 cfs @ 12.44 hrs, Volume= 1.175 af, Atten= 58%, Lag= 17.4 min
 Primary = 6.11 cfs @ 12.44 hrs, Volume= 1.175 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 368.18' @ 12.44 hrs Surf.Area= 7,693 sf Storage= 21,756 cf

Plug-Flow detention time= 120.2 min calculated for 1.175 af (91% of inflow)
 Center-of-Mass det. time= 77.1 min (879.6 - 802.5)

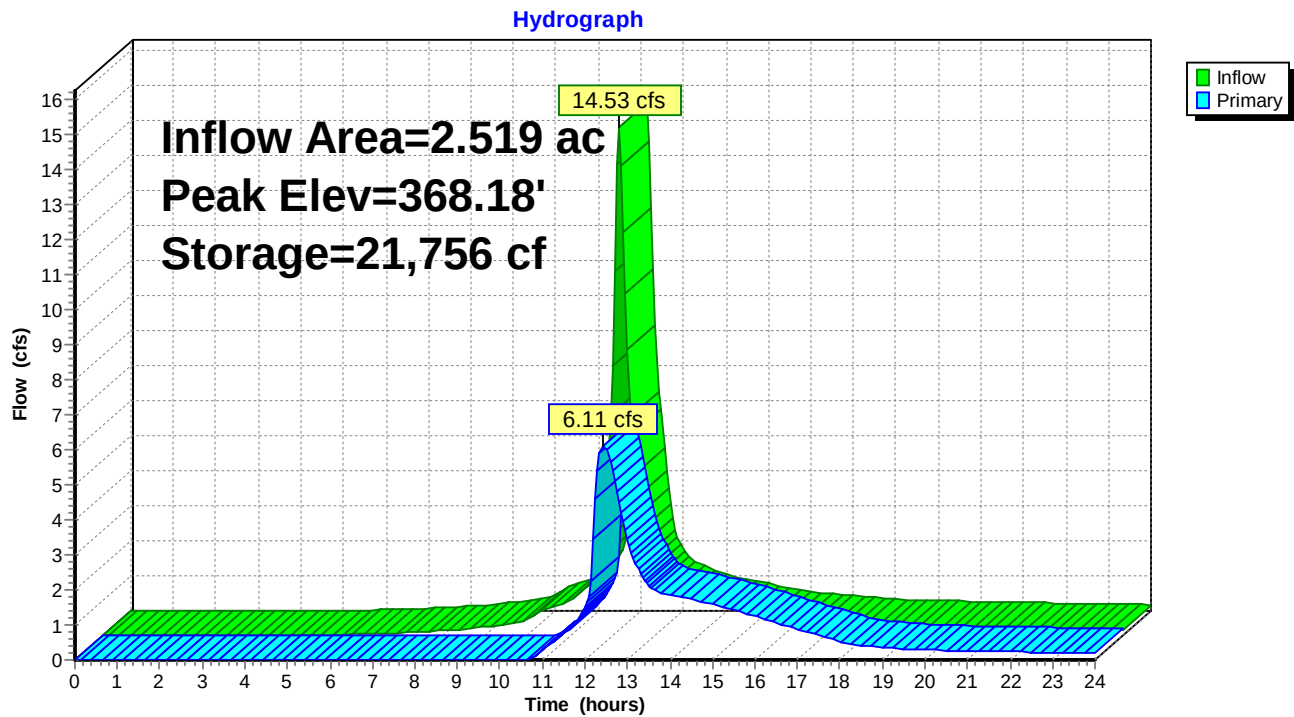
Volume	Invert	Avail.Storage	Storage Description
#1	363.00'	37,397 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
363.00	2,452	0	0
364.00	3,000	2,726	2,726
365.00	3,551	3,276	6,002
366.00	4,132	3,842	9,843
367.00	4,739	4,436	14,279
368.00	7,520	6,130	20,408
369.00	8,496	8,008	28,416
370.00	9,466	8,981	37,397

Device	Routing	Invert	Outlet Devices
#1	Primary	364.45'	6.0" W x 6.0" H Vert. Orifice/Grate C= 0.600
#2	Primary	367.25'	16.2" W x 11.0" H Vert. Orifice/Grate C= 0.600
#3	Primary	368.60'	12.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=6.10 cfs @ 12.44 hrs HW=368.18' TW=0.00' (Dynamic Tailwater)

- 1=Orifice/Grate (Orifice Controls 2.24 cfs @ 8.98 fps)
- 2=Orifice/Grate (Orifice Controls 3.86 cfs @ 3.12 fps)
- 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 1.1P: Detention pond 1.1



Summary for Pond 3.1P: Detention Pond 3.1

Inflow Area = 2.430 ac, 0.00% Impervious, Inflow Depth > 6.23" for 100 year event
 Inflow = 14.57 cfs @ 12.15 hrs, Volume= 1.262 af
 Outflow = 12.78 cfs @ 12.22 hrs, Volume= 1.187 af, Atten= 12%, Lag= 4.3 min
 Primary = 12.78 cfs @ 12.22 hrs, Volume= 1.187 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 369.32' @ 12.22 hrs Surf.Area= 4,591 sf Storage= 11,364 cf

Plug-Flow detention time= 65.4 min calculated for 1.185 af (94% of inflow)
 Center-of-Mass det. time= 34.2 min (830.1 - 795.9)

Volume	Invert	Avail.Storage	Storage Description
#1	366.00'	14,648 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

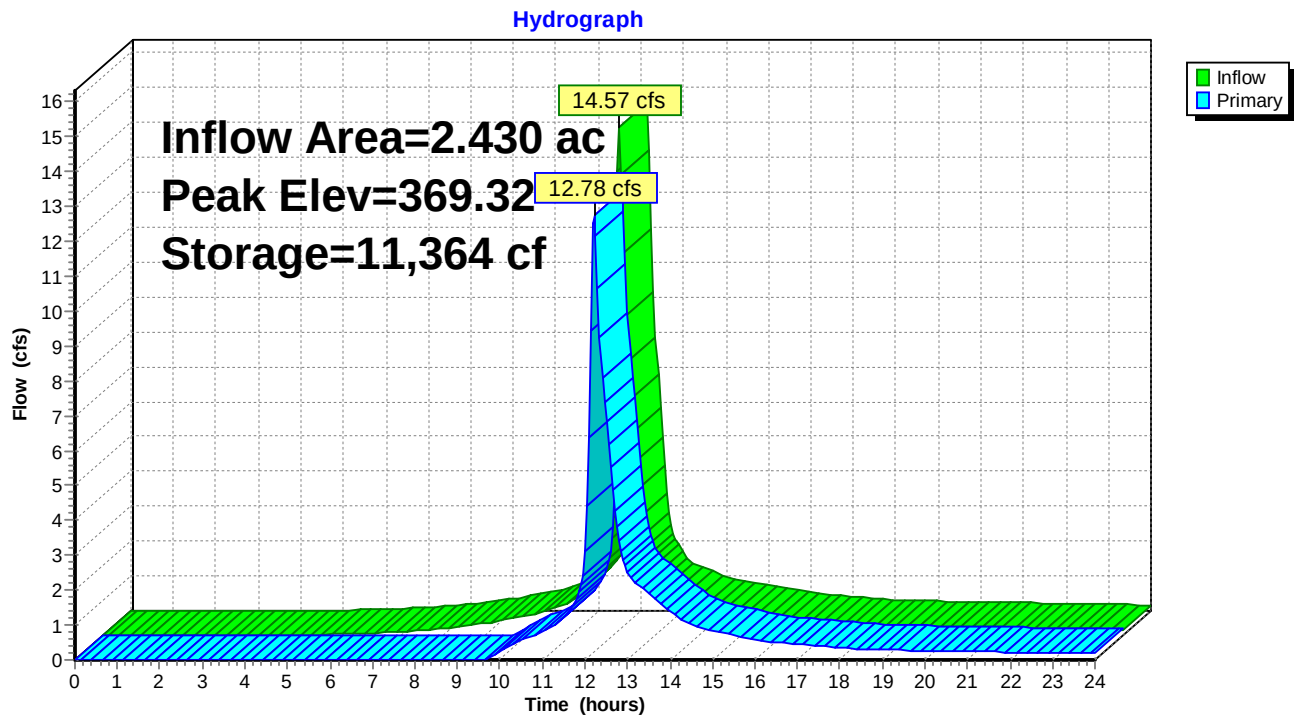
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
366.00	2,376	0	0
367.00	2,971	2,674	2,674
368.00	3,589	3,280	5,954
369.00	4,356	3,973	9,926
370.00	5,087	4,722	14,648

Device	Routing	Invert	Outlet Devices
#1	Primary	367.04'	12.0" W x 6.0" H Vert. Orifice/Grate C= 0.600
#2	Primary	368.25'	21.0" W x 11.0" H Vert. Orifice/Grate C= 0.600
#3	Primary	369.10'	12.0' long x 0.5' breadth Broad-Crested Rectangular Weir
Head (feet) 0.20 0.40 0.60 0.80 1.00			
Coef. (English) 2.80 2.92 3.08 3.30 3.32			

Primary OutFlow Max=12.37 cfs @ 12.22 hrs HW=369.31' TW=0.00' (Dynamic Tailwater)

↑ **1=Orifice/Grate** (Orifice Controls 3.42 cfs @ 6.83 fps)
 — **2=Orifice/Grate** (Orifice Controls 5.81 cfs @ 3.62 fps)
 — **3=Broad-Crested Rectangular Weir** (Weir Controls 3.15 cfs @ 1.27 fps)

Pond 3.1P: Detention Pond 3.1

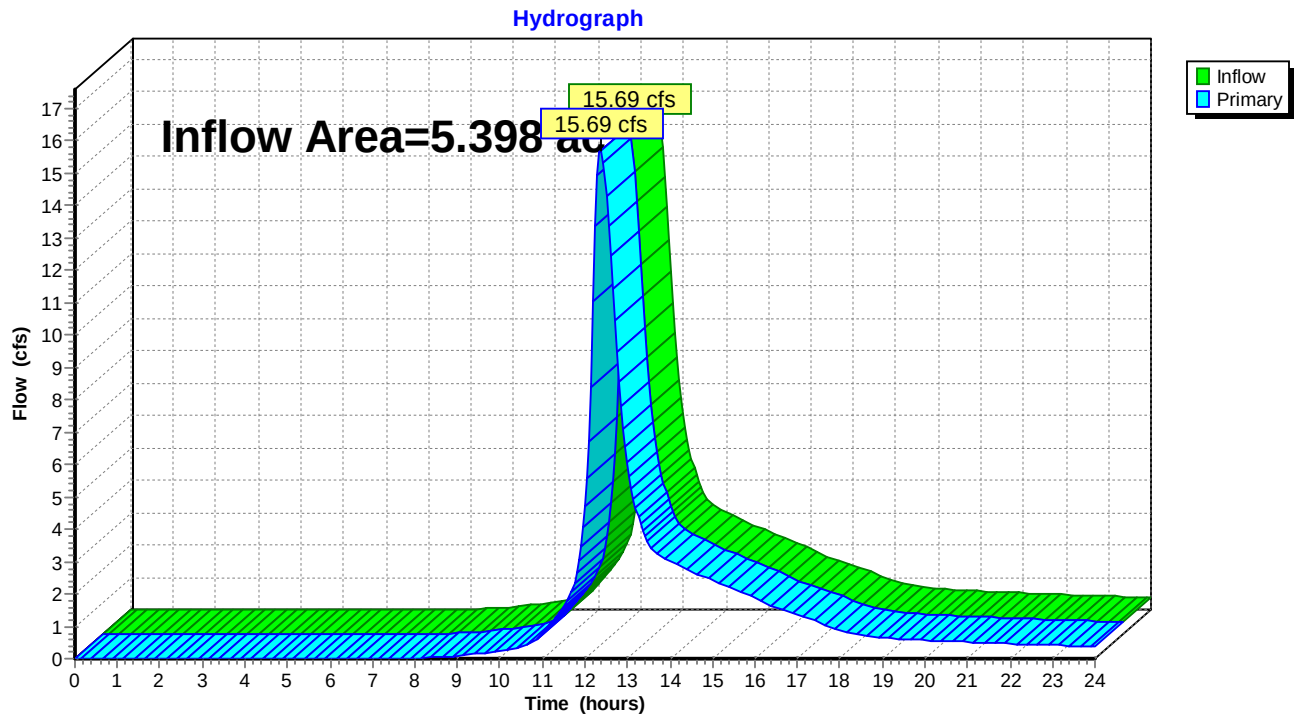


Summary for Link DP1: DP1

Inflow Area = 5.398 ac, 8.29% Impervious, Inflow Depth > 5.11" for 100 year event
 Inflow = 15.69 cfs @ 12.37 hrs, Volume= 2.300 af
 Primary = 15.69 cfs @ 12.37 hrs, Volume= 2.300 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP1: DP1

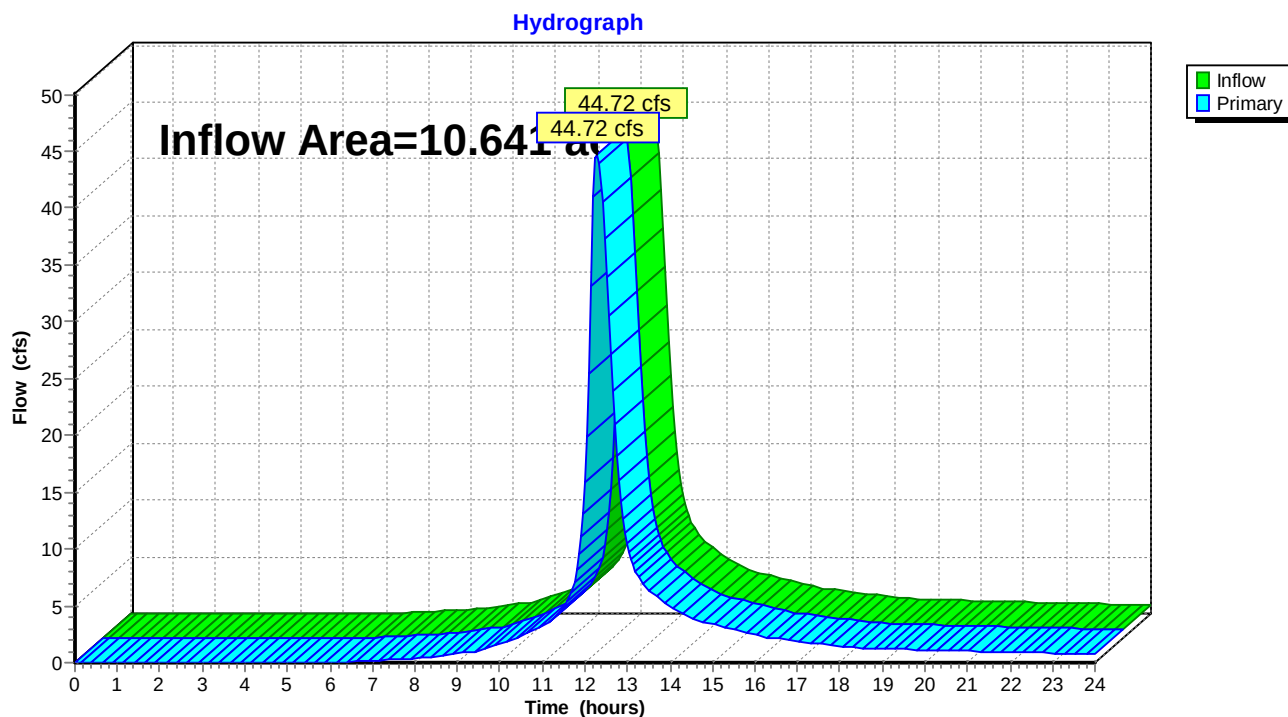


Summary for Link DP3: DP3

Inflow Area = 10.641 ac, 8.55% Impervious, Inflow Depth > 5.77" for 100 year event
 Inflow = 44.72 cfs @ 12.28 hrs, Volume= 5.117 af
 Primary = 44.72 cfs @ 12.28 hrs, Volume= 5.117 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP3: DP3



Appendix 3 | GP- 0-20-001



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

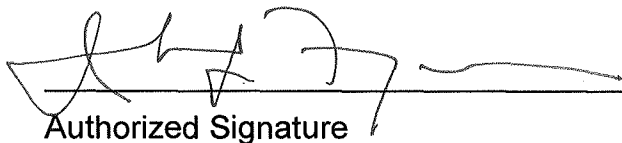
Issued Pursuant to Article 17, Titles 7, 8 and Article 70
of the Environmental Conservation Law

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**

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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

Discharges 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.** *Discharges from dewatering activities, including discharges 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 Discharges.** The following *discharges* 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 *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.

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 *discharges* 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 *discharges* 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 *discharges* 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 *discharges* 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 *discharges*; 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 *discharges* 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. *Discharges after construction activities* have been completed and the site has undergone *final stabilization*;
2. *Discharges* 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 *discharges* 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 *discharges* 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. *Discharges 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 *discharges* from *construction activities* and that it is unlawful for any person to cause or contribute to a violation of *water quality standards*. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations"

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

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

B. Required SWPPP Contents

1. Erosion and sediment control component - All SWPPPs prepared pursuant to this permit shall include erosion and sediment control practices designed in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated 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

- I. 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; and all areas disturbed as of the project shutdown date have achieved *final stabilization*; and all temporary, structural erosion and sediment control measures have been removed; and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational;
 - c. A new *owner or operator* has obtained coverage under this permit in accordance with Part II.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 sources*. It is a calculation of the maximum amount of a pollutant that a waterbody can receive on a daily basis and still meet *water quality standards*, and an allocation of that amount to the pollutant's sources. A TMDL stipulates wasteload allocations (WLAs) for *point source* discharges, load allocations (LAs) for *nonpoint sources*, and a margin of safety (MOS).

Trained Contractor - means an employee from the contracting (construction) company, identified in Part III.A.6., that has received four (4) hours of Department endorsed

training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the *trained contractor* shall receive four (4) hours of training every three (3) years.

It can also mean an employee from the contracting (construction) company, identified in Part III.A.6., that meets the *qualified inspector* qualifications (e.g. licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, 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 <u>not</u> located in one of the watersheds listed in Appendix C or <u>not directly discharging</u> 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 <u>not</u> located in one of the watersheds listed in Appendix C and <u>not</u> directly discharging to one of the 303(d) segments listed in Appendix E • Construction of a barn or other <i>agricultural building</i>, 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

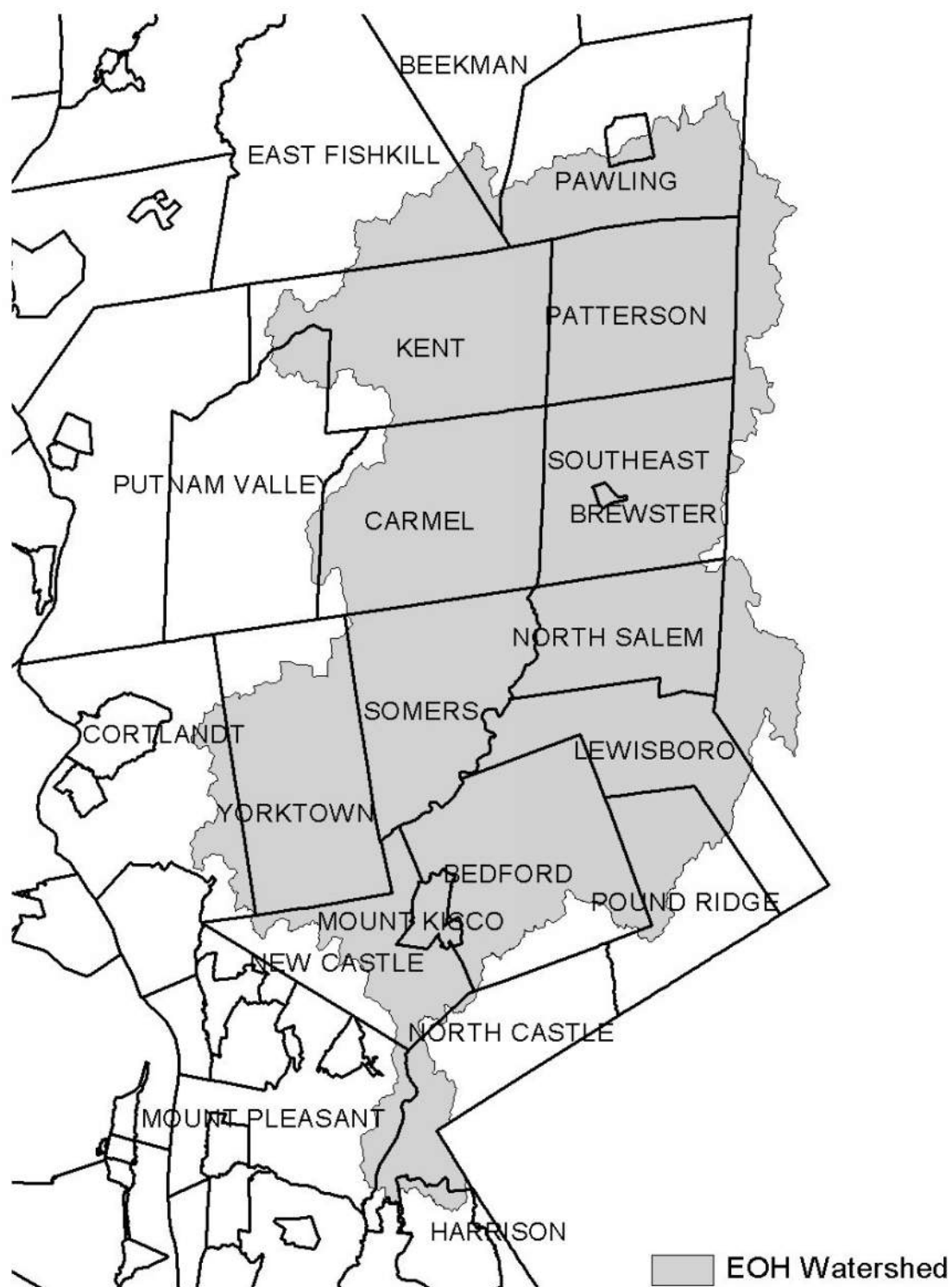
Figure 1 - New York City Watershed East of the Hudson



Figure 3 - Greenwood Lake Watershed

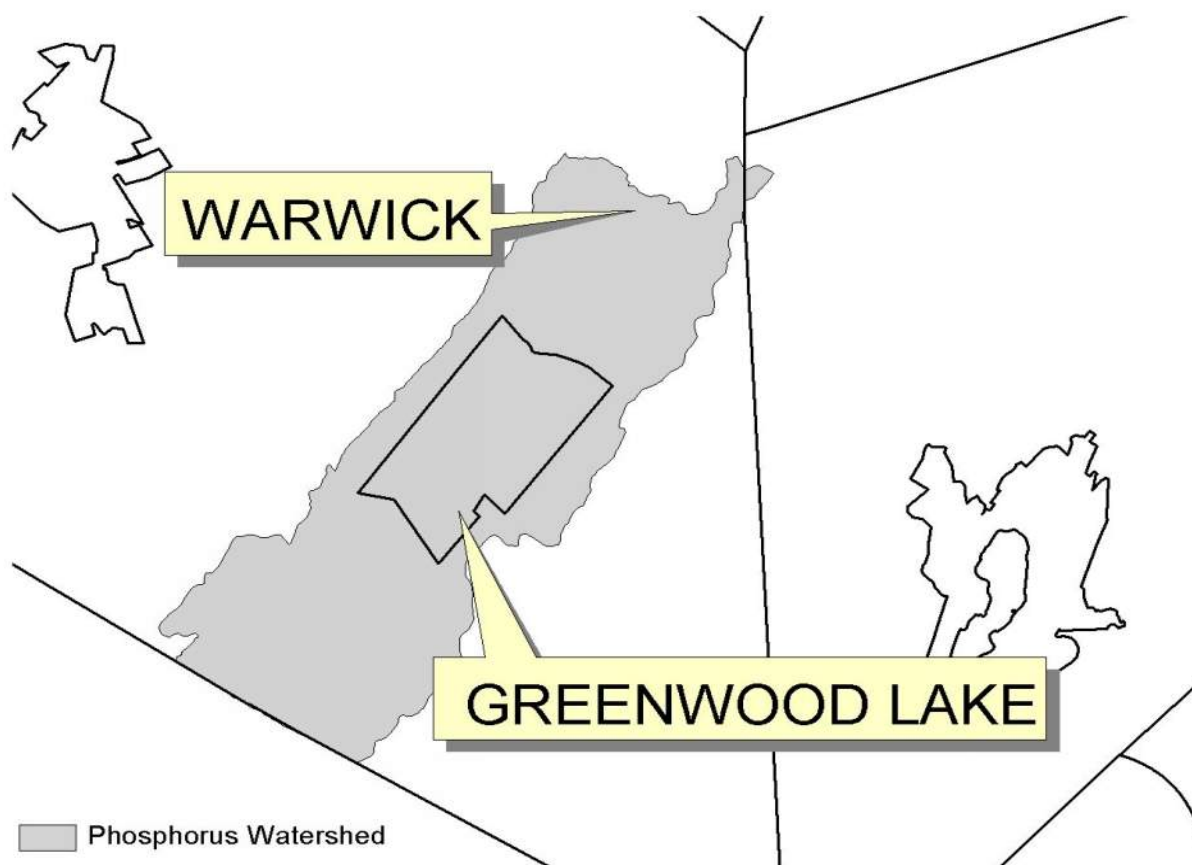


Figure 4 - Oscawana Lake Watershed

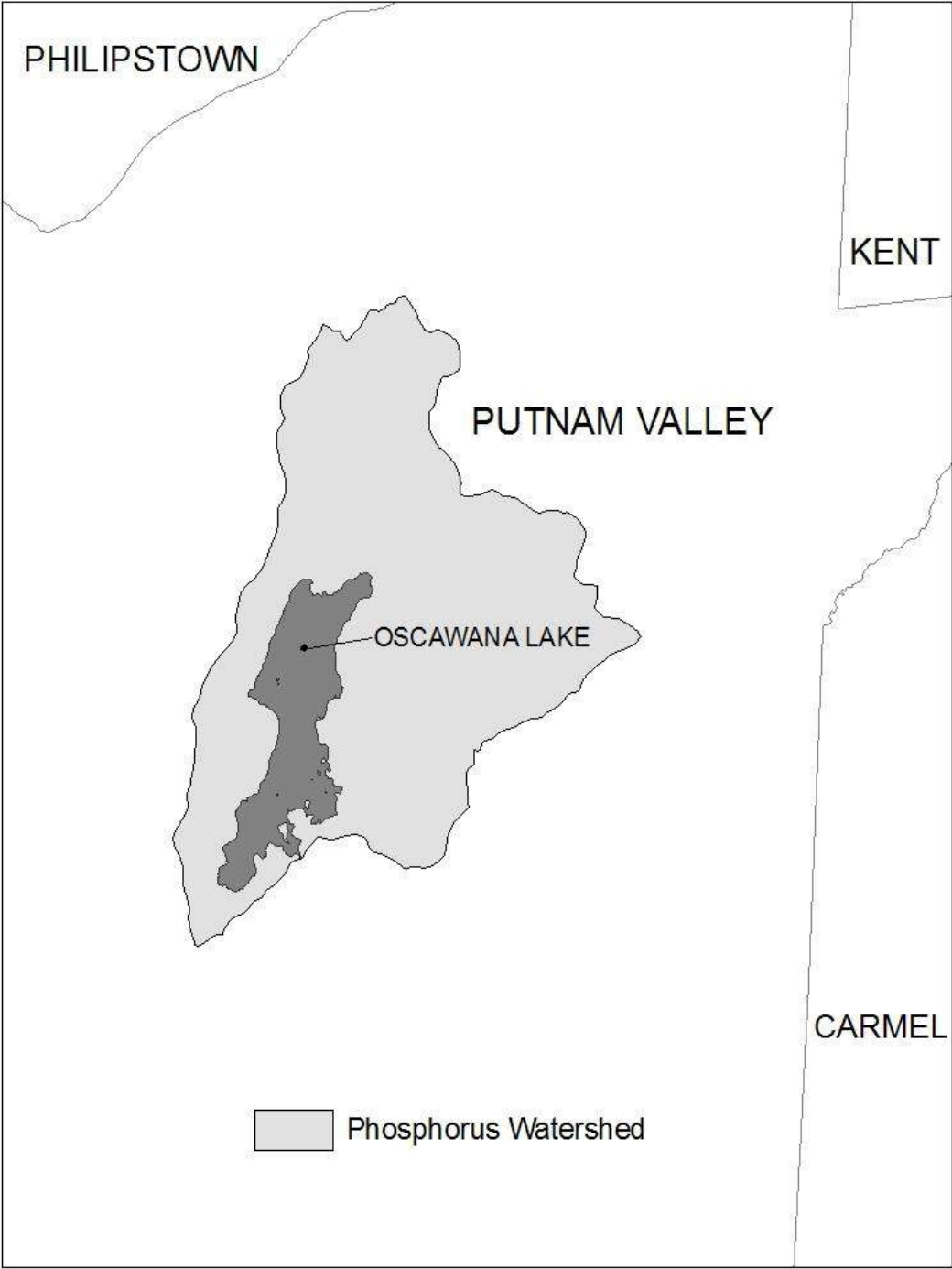
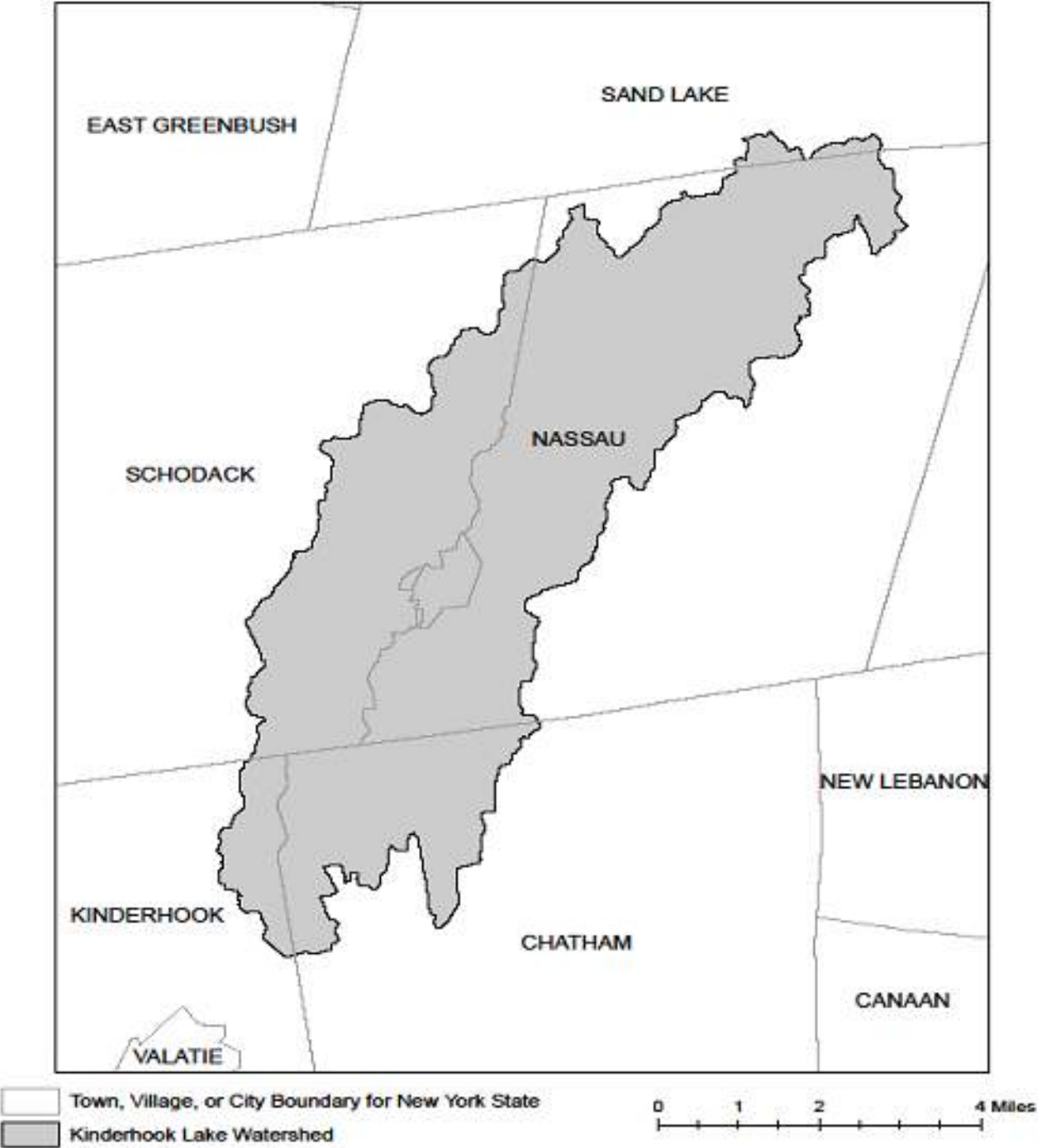


Figure 5 - Kinderhook Lake Watershed



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

<u>Region</u>	<u>COVERING THE FOLLOWING COUNTIES:</u>	<u>DIVISION OF ENVIRONMENTAL PERMITS (DEP) PERMIT ADMINISTRATORS</u>	<u>DIVISION OF WATER (DOW) WATER (SPDES) PROGRAM</u>
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

Appendix 4 | MS4 SWPPP Acceptance Form



Department of
Environmental
Conservation

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

MS4 Stormwater Pollution Prevention Plan (SWPPP) Acceptance Form

for

Construction Activities Seeking Authorization Under SPDES General Permit

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

I. Project Owner/Operator Information

1. Owner/Operator Name: Marlboro on Hudson, LLC

2. Contact Person: Anthony Russo

3. Street Address:

4. City/State/Zip:

II. Project Site Information

5. Project/Site Name: Marlboro on Hudson

6. Street Address: Hudson Circle

7. City/State/Zip: Town of Marlborough / New York / 12542

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: Town of Marlborough

12. MS4 SPDES Permit Identification Number: NYR20A

13. Contact Person:

14. Street Address:

15. City/State/Zip:

16. Telephone Number:

MS4 SWPPP Acceptance Form - continued

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

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

Printed Name:

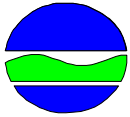
Title/Position:

Signature:

Date:

VI. Additional Information

Appendix 5 | Notice of Intent

NOTICE OF INTENT**New York State Department of Environmental Conservation****Division of Water****625 Broadway, 4th Floor****Albany, New York 12233-3505**
NYR
 (for DEC use only)

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

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

**-IMPORTANT-
 RETURN THIS FORM TO THE ADDRESS ABOVE**

OWNER/OPERATOR MUST SIGN FORM

Owner/Operator Information

Owner/Operator (Company Name/Private Owner Name/Municipality Name)

M a r l b o r o o n H u d s o n , L L C

Owner/Operator Contact Person Last Name (NOT CONSULTANT)

R u s s o

Owner/Operator Contact Person First Name

A n t h o n y

Owner/Operator Mailing Address

P . 0 . B o x 5 4 6

City

T o w n o f M a r l b o r o

State

N Y

Zip

1 2 5 4 2 -

Phone (Owner/Operator)

8 4 5 - 4 5 3 - 4 3 6 2

Fax (Owner/Operator)

- - -

Email (Owner/Operator)

a r u s s o 5 9 6 @ a o l . c o m

FED TAX ID

- (not required for individuals)

Project Site Information

Project/Site Name

M a r l b o r o o n H u d s o n

Street Address (NOT P.O. BOX)

H u d s o n C i r c l e

Side of Street

☐ North ☐ South ☐ East ☐ West

City/Town/Village (THAT ISSUES BUILDING PERMIT)

T o w n o f M a r l b o r o u g h

State Zip

N Y 1 2 5 4 2 -

County

U l s t e r

DEC Region

3

Name of Nearest Cross Street

S o u t h S t r e e t

Distance to Nearest Cross Street (Feet)

0

Project In Relation to Cross Street

☐ North ☒ South ☐ East ☐ WestTax Map Numbers
Section-Block-Parcel

1 0 8 . 1 2 - 8 - 2 3

Tax Map Numbers

1 0 8 . 1 2 - 8 - 2 3

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

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

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

X Coordinates (Easting)

7 3 9 8 0 3

Y Coordinates (Northing)

4 1 6 1 7 8 4

2. What is the nature of this construction project?

☐ New Construction☒ Redevelopment with increase in impervious area☐ Redevelopment with no increase in impervious area

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

SELECT ONLY ONE CHOICE FOR EACH

Pre-Development Existing Land Use

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

[illegible]

Post-Development Future Land Use

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

[illegible]

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

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

Total Site Area

			6	.	2

Total Area To Be Disturbed

			2	.	7

**Existing Impervious
Area To Be Disturbed**

			0	.	1

**Future Impervious
Area Within
Disturbed Area**

					.	9

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

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

A			%

B		
		0 %

c		
1	0	0

%

D			%

7. Is this a phased project? ☐ Yes ☐ No

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

Start Date

	9	/		1	/	2	0	1	8

End Date

	9	/		1	/	2	0	1	9

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

Name

L	a	t	t	i	n	t	o	w	n	C	r	e	e	k																

9a. Type of waterbody identified in Question 9?

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

9b. How was the wetland identified?

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

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

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

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

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

					.	

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

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

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

[illegible]

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

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

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

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

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

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

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

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

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

[illegible]

SWPPP Preparer

[illegible]

Contact Name (Last, Space, First)

[illegible]

Mailing Address

[illegible]

City

[illegible]

State Zip

N	Y	1	2	5	5	3	-			

Phone

8	4	5	5	5	4	4	4	4	4	9	5

Fax

8	4	5	5	6	0	7	0	2	0	2	5

Email

c	o	n	n	o	r	.	m	c	c	o	r	m	a	c	k	@	c	o	l	l	i	e	r	s	e	n	g	.	c	o	m

[illegible]

SWPPP Preparer Certification

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

First Name

[illegible]

MI

P

Last Name

M	c	C	O	r	m	a	c	k

Signature

Date _____

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

☒ Yes ☐ No

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

Temporary Structural

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

Biotechnical

- **Brush Matting**
- **Wattling**

Other

[illegible]

Vegetative Measures

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

Permanent Structural

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

Post-construction Stormwater Management Practice (SMP) Requirements

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

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

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

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

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

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

Total WQv Required

. acre-feet

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

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

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

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

RR Techniques (Area Reduction)	Total Contributing Area (acres)	Total Contributing Impervious Area (acres)
☐ Conservation of Natural Areas (RR-1) ...	.	and/or .
☐ Sheetflow to Riparian Buffers/Filter Strips (RR-2)	.	and/or .
☐ Tree Planting/Tree Pit (RR-3)	.	and/or .
☐ Disconnection of Rooftop Runoff (RR-4) ..	.	and/or .
RR Techniques (Volume Reduction)		
☐ Vegetated Swale (RR-5)		
☐ Rain Garden (RR-6)		
☐ Stormwater Planter (RR-7)		
☐ Rain Barrel/Cistern (RR-8)		
☐ Porous Pavement (RR-9)		
☐ Green Roof (RR-10)		
Standard SMPs with RRv Capacity		
☐ Infiltration Trench (I-1)		
☐ Infiltration Basin (I-2)		
☐ Dry Well (I-3)		
☐ Underground Infiltration System (I-4)		
☒ Bioretention (F-5)	0	4 2
☐ Dry Swale (O-1)		
Standard SMPs		
☐ Micropool Extended Detention (P-1)		
☐ Wet Pond (P-2)		
☐ Wet Extended Detention (P-3)		
☐ Multiple Pond System (P-4)		
☒ Pocket Pond (P-5)	1	7 7 4
☐ Surface Sand Filter (F-1)		
☐ Underground Sand Filter (F-2)		
☐ Perimeter Sand Filter (F-3)		
☐ Organic Filter (F-4)		
☐ Shallow Wetland (W-1)		
☐ Extended Detention Wetland (W-2)		
☐ Pond/Wetland System (W-3)		
☐ Pocket Wetland (W-4)		
☐ Wet Swale (O-2)		

Alternative SMP

Total Contributing
Impervious Area(acres)

[illegible]

[illegible][illegible]

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

Total RRv provided

0	3	1

acre-feet

☐ Yes ☒ No

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

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

Minimum RRV Required

0	3	0

.
acre-feet

☒ Yes ☐ No

If Yes, go to question 33.

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

Page 10 of 14

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

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

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

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

WQv Provided

0 . 2 5 0 acre-feet

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

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

0 . 2 8 1

35. Is the sum of the RRV provided (#30) and the WQv provided (#33a) greater than or equal to the total WQv required (#28)? ☒ Yes ☐ No

If Yes, go to question 36.

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

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

CPv Required

. acre-feet

CPv Provided

. 2 8 1 acre-feet

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

- ☐ Site discharges directly to tidal waters or a fifth order or larger stream.
- ☐ Reduction of the total CPv is achieved on site through runoff reduction techniques or infiltration systems.

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

Total Overbank Flood Control Criteria (Qp)

Pre-Development

3 0 . 3 6 CFS

Post-development

2 8 . 1 8 CFS

Total Extreme Flood Control Criteria (Qf)

Pre-Development

7 0 . 0 6 CFS

Post-development

6 8 . 2 0 CFS

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

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

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

☒ Yes ☐ No

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

[illegible]

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

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

- [illegible]

41. Does this project require a US Army Corps of Engineers Wetland Permit? ☐ ☐ ☐ ☐ ☐ ☐

☐ Yes ☒ No

If Yes, Indicate Size of Impact.

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

☒ Yes ☐ No

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

☐ Yes ☒ No

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

Owner/Operator Certification

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

Print First Name

MI

Print Last Name

Owner/Operator Signature

Date

		/			/				

Appendix 6 | Draft NOT

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

(NOTE: Submit completed form to address above)

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

Please indicate your permit identification number: NYR ____ _

I. Owner or Operator Information

1. Owner/Operator Name: Marlboro on Hudson, LLC.

2. Street Address: PO Box 546

3. City/State/Zip: Marlborough NY 12542

4. Contact Person: Anthony Russo

4a. Telephone: 845-453-4362

4b. Contact Person E-Mail: arusso596@aol.com

II. Project Site Information

5. Project/Site Name: Marlboro on Hudson

6. Street Address: Hudson Circle

7. City/Zip: Town of Marlborough/12528

8. County: Ulster County

III. Reason for Termination

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

9b. ☐ Permit coverage has been transferred to new owner/operator. Indicate new owner/operator's permit identification number: NYR ____ _

(Note: Permit coverage can not be terminated by owner identified in I.1. above until new owner/operator obtains coverage under the general permit)

9c. ☐ Other (Explain on Page 2)

IV. Final Site Information:

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

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

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

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

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

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

- ☐ Post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain practice(s) have been deeded to the municipality.
- ☐ Executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s).
- ☐ For post-construction stormwater management practices that are privately owned, a mechanism is in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the owner or operator's deed of record.
- ☐ For post-construction stormwater management practices that are owned by a public or private institution (e.g. school, university or hospital), government agency or authority, or public utility; policy and procedures are in place that ensures operation and maintenance of the practice(s) in accordance with the operation and maintenance plan.

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

11. Is this project subject to the requirements of a regulated, traditional land use control MS4? ☐ yes
☐ no
(If Yes, complete section VI - "MS4 Acceptance" statement)

V. Additional Information/Explanation:
(Use this section to answer questions 9c. and 10b., if applicable)

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

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

Printed Name: _____

Title/Position: _____

Signature: _____

Date: _____

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

VII. Qualified Inspector Certification - Final Stabilization:

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

Printed Name:

Title/Position:

Signature:

Date:

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

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

Printed Name:

Title/Position:

Signature:

Date:

IX. Owner or Operator Certification

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

Printed Name:

Title/Position:

Signature:

Date:

(NYS DEC Notice of Termination - January 2015)

Appendix 7 | GP20-Contractor Certification Form

CONTRACTOR'S CERTIFICATION
Pursuant to
NYS DEC GENERAL PERMIT GP-0-20-001

Pursuant to the SPDES General Permit for Stormwater Discharges from Construction Activity (Permit GP-0-20-001) Part III.a.6, all contractors and subcontractors implementing all, or a portion of the Stormwater Pollution Prevention Plan (SWPPP) shall sign a copy of the following certification statement before undertaking any construction activity at the site identification in the SWPPP:

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

Signature

Print Name

Date

Contracting Firm Information:

Contracting Firm Name:

Address:

Telephone Number:

Address of Site:

Name of trained individual responsible for SWPPP implementation, and who shall be on site on a daily basis when soil disturbance activities are being performed:

Name: _____

Title: _____

Appendix 8 | Appendix H – Construction Site Log Book

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION
ACTIVITIES

CONSTRUCTION SITE LOG BOOK

Table of Contents

- I. Pre-Construction Meeting Documents
 - a. Preamble to Site Assessment and Inspections
 - b. Operator's Certification
 - c. Qualified Professional's Credentials & Certification
 - d. Pre-Construction Site Assessment Checklist
- II. Construction Duration Inspections
 - a. Directions
 - b. Modification to the SWPPP
- III. Monthly Summary Reports
- IV. Monitoring, Reporting, and Three-Month Status Reports
 - a. Operator's Compliance Response Form

Properly completing forms such as those contained in Appendix H meet the inspection requirement of NYS-DEC SPDES GP for Construction Activities. Completed forms shall be kept on site at all times and made available to authorities upon request.

I. PRE-CONSTRUCTION MEETING DOCUMENTS

Project Name _____
Permit No. _____ Date of Authorization _____
Name of Operator _____
Prime Contractor _____

a. Preamble to Site Assessment and Inspections

The Following Information To Be Read By All Person's Involved in The Construction of Stormwater Related Activities:

The Operator agrees to have a qualified professional¹ conduct an assessment of the site prior to the commencement of construction² and certify in this inspection report that the appropriate erosion and sediment controls described in the SWPPP have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction.

Prior to the commencement of construction, the Operator shall certify in this site logbook that the SWPPP has been prepared in accordance with the State's standards and meets all Federal, State and local erosion and sediment control requirements.

When construction starts, site inspections shall be conducted by the qualified professional at least every 7 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater (Construction Duration Inspections). The Operator shall maintain a record of all inspection reports in this site logbook. The site logbook shall be maintained on site and be made available to the permitting authorities upon request. The Operator shall post at the site, in a publicly accessible location, a summary of the site inspection activities on a monthly basis (Monthly Summary Report).

The operator shall also prepare a written summary of compliance with this general permit at a minimum frequency of every three months (Operator's Compliance Response Form), while coverage exists. The summary should address the status of achieving each component of the SWPPP.

Prior to filing the Notice of Termination or the end of permit term, the Operator shall have a qualified professional perform a final site inspection. The qualified professional shall certify that the site has undergone final stabilization³ using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed. In addition, the Operator must identify and certify that all permanent structures described in the SWPPP have been constructed and provide the owner(s) with an operation and maintenance plan that ensures the structure(s) continuously functions as designed.

1 "Qualified Professional means a person knowledgeable in the principles and practice of erosion and sediment controls, such as a Certified Professional in Erosion and Sediment Control (CPESC), soil scientist, licensed engineer or someone working under the direction and supervision of a licensed engineer (person must have experience in the principles and practices of erosion and sediment control).

2 "Commencement of construction" means the initial removal of vegetation and disturbance of soils associated with clearing, grading or excavating activities or other construction activities.

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

b. Operators Certification

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. Further, I hereby certify that the SWPPP meets all Federal, State, and local erosion and sediment control requirements. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law.

Name (please print): _____

Title _____ **Date:** _____

Address: _____

Phone: _____ **Email:** _____

Signature: _____

c. Qualified Professional's Credentials & Certification

"I hereby certify that I meet the criteria set forth in the General Permit to conduct site inspections for this project and that the appropriate erosion and sediment controls described in the SWPPP and as described in the following Pre-construction Site Assessment Checklist have been adequately installed or implemented, ensuring the overall preparedness of this site for the commencement of construction."

Name (please print): _____

Title _____ **Date:** _____

Address: _____

Phone: _____ **Email:** _____

Signature: _____

d. Pre-construction Site Assessment Checklist

(NOTE: Provide comments below as necessary)

1. Notice of Intent, SWPPP, and Contractors Certification:

Yes No NA

- ☒ ☐ ☐ Has a Notice of Intent been filed with the NYS Department of Conservation?
- ☐ ☐ ☐ Is the SWPPP on-site? Where? _____
- ☐ ☐ ☐ Is the Plan current? What is the latest revision date? _____
- ☐ ☐ ☐ Is a copy of the NOI (with brief description) onsite? Where? _____
- ☐ ☐ ☐ Have all contractors involved with stormwater related activities signed a contractor's certification?

2. Resource Protection

Yes No NA

- ☐ ☐ ☐ Are construction limits clearly flagged or fenced?
- ☐ ☐ ☐ Important trees and associated rooting zones, on-site septic system absorption fields, existing vegetated areas suitable for filter strips, especially in perimeter areas, have been flagged for protection.
- ☐ ☐ ☐ Creek crossings installed prior to land-disturbing activity, including clearing and blasting.

3. Surface Water Protection

Yes No NA

- ☐ ☐ ☐ Clean stormwater runoff has been diverted from areas to be disturbed.
- ☐ ☐ ☐ Bodies of water located either on site or in the vicinity of the site have been identified and protected.
- ☐ ☐ ☐ Appropriate practices to protect on-site or downstream surface water are installed.
- ☐ ☐ ☐ Are clearing and grading operations divided into areas <5 acres?

4. Stabilized Construction Entrance

Yes No NA

- ☐ ☐ ☐ A temporary construction entrance to capture mud and debris from construction vehicles before they enter the public highway has been installed.
- ☐ ☐ ☐ Other access areas (entrances, construction routes, equipment parking areas) are stabilized immediately as work takes place with gravel or other cover.
- ☐ ☐ ☐ Sediment tracked onto public streets is removed or cleaned on a regular basis.

5. Perimeter Sediment Controls

Yes No NA

- ☐ ☐ ☐ Silt fence material and installation comply with the standard drawing and specifications.
- ☐ ☐ ☐ Silt fences are installed at appropriate spacing intervals
- ☐ ☐ ☐ Sediment/detention basin was installed as first land disturbing activity.
- ☐ ☐ ☐ Sediment traps and barriers are installed.

6. Pollution Prevention for Waste and Hazardous Materials

Yes No NA

- ☐ ☐ ☐ The Operator or designated representative has been assigned to implement the spill prevention avoidance and response plan.
- ☐ ☐ ☐ The plan is contained in the SWPPP on page _____
- ☐ ☐ ☐ Appropriate materials to control spills are onsite. Where? _____

II. CONSTRUCTION DURATION INSPECTIONS

a. Directions:

Inspection Forms will be filled out during the entire construction phase of the project.

Required Elements:

- (1) On a site map, indicate the extent of all disturbed site areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period;
- (2) Indicate on a site map all areas of the site that have undergone temporary or permanent stabilization;
- (3) Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period;
- (4) Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of sediment storage volume (for example, 10 percent, 20 percent, 50 percent);
- (5) Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems (earthen berms or silt fencing) and containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated riser pipes to pass water; and
- (6) Immediately report to the Operator any deficiencies that are identified with the implementation of the SWPPP.

SITE PLAN/SKETCH

Inspector (print name)

Date of Inspection

Qualified Professional (print name)

Qualified Professional Signature

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate and complete.

Maintaining Water Quality**Yes No NA**

- ☐ ☐ ☐ Is there an increase in turbidity causing a substantial visible contrast to natural conditions?
- ☐ ☐ ☐ Is there residue from oil and floating substances, visible oil film, or globules or grease?
- ☐ ☐ ☐ All disturbance is within the limits of the approved plans.
- ☐ ☐ ☐ Have receiving lake/bay, stream, and/or wetland been impacted by silt from project?

Housekeeping**1. General Site Conditions****Yes No NA**

- ☐ ☐ ☐ Is construction site litter and debris appropriately managed?
- ☐ ☐ ☐ Are facilities and equipment necessary for implementation of erosion and sediment control in working order and/or properly maintained?
- ☐ ☐ ☐ Is construction impacting the adjacent property?
- ☐ ☐ ☐ Is dust adequately controlled?

2. Temporary Stream Crossing**Yes No NA**

- ☐ ☐ ☐ Maximum diameter pipes necessary to span creek without dredging are installed.
- ☐ ☐ ☐ Installed non-woven geotextile fabric beneath approaches.
- ☐ ☐ ☐ Is fill composed of aggregate (no earth or soil)?
- ☐ ☐ ☐ Rock on approaches is clean enough to remove mud from vehicles & prevent sediment from entering stream during high flow.

Runoff Control Practices**1. Excavation Dewatering****Yes No NA**

- ☐ ☐ ☐ Upstream and downstream berms (sandbags, inflatable dams, etc.) are installed per plan.
- ☐ ☐ ☐ Clean water from upstream pool is being pumped to the downstream pool.
- ☐ ☐ ☐ Sediment laden water from work area is being discharged to a silt-trapping device.
- ☐ ☐ ☐ Constructed upstream berm with one-foot minimum freeboard.

2. Level Spreader**Yes No NA**

- ☐ ☐ ☐ Installed per plan.
- ☐ ☐ ☐ Constructed on undisturbed soil, not on fill, receiving only clear, non-sediment laden flow.
- ☐ ☐ ☐ Flow sheets out of level spreader without erosion on downstream edge.

3. Interceptor Dikes and Swales**Yes No NA**

- ☐ ☐ ☐ Installed per plan with minimum side slopes 2H:1V or flatter.
- ☐ ☐ ☐ Stabilized by geotextile fabric, seed, or mulch with no erosion occurring.
- ☐ ☐ ☐ Sediment-laden runoff directed to sediment trapping structure

4. Stone Check Dam

Yes No NA

- ☐ ☐ ☐ Is channel stable? (flow is not eroding soil underneath or around the structure).
☐ ☐ ☐ Check is in good condition (rocks in place and no permanent pools behind the structure).
☐ ☐ ☐ Has accumulated sediment been removed?

5. Rock Outlet Protection

Yes No NA

- ☐ ☐ ☐ Installed per plan.
☐ ☐ ☐ Installed concurrently with pipe installation.

Soil Stabilization

1. Topsoil and Spoil Stockpiles

Yes No NA

- ☐ ☐ ☐ Stockpiles are stabilized with vegetation and/or mulch.
☐ ☐ ☐ Sediment control is installed at the toe of the slope.

2. Revegetation

Yes No NA

- ☐ ☐ ☐ Temporary seedings and mulch have been applied to idle areas.
☐ ☐ ☐ 4 inches minimum of topsoil has been applied under permanent seedings

Sediment Control Practices

1. Stabilized Construction Entrance

Yes No NA

- ☐ ☐ ☐ Stone is clean enough to effectively remove mud from vehicles.
☐ ☐ ☐ Installed per standards and specifications?
☐ ☐ ☐ Does all traffic use the stabilized entrance to enter and leave site?
☐ ☐ ☐ Is adequate drainage provided to prevent ponding at entrance?

2. Silt Fence

Yes No NA

- ☐ ☐ ☐ Installed on Contour, 10 feet from toe of slope (not across conveyance channels).
☐ ☐ ☐ Joints constructed by wrapping the two ends together for continuous support.
☐ ☐ ☐ Fabric buried 6 inches minimum.
☐ ☐ ☐ Posts are stable, fabric is tight and without rips or frayed areas.
Sediment accumulation is ____% of design capacity.

Sediment Control Practices (continued)**3. Storm Drain Inlet Protection (Use for Stone & Block; Filter Fabric; Curb; or, Excavated practices)****Yes No NA**

- ☐ ☐ ☐ Installed concrete blocks lengthwise so open ends face outward, not upward.
- ☐ ☐ ☐ Placed wire screen between No. 3 crushed stone and concrete blocks.
- ☐ ☐ ☐ Drainage area is 1 acre or less.
- ☐ ☐ ☐ Excavated area is 900 cubic feet.
- ☐ ☐ ☐ Excavated side slopes should be 2:1.
- ☐ ☐ ☐ 2" x 4" frame is constructed and structurally sound.
- ☐ ☐ ☐ Posts 3-foot maximum spacing between posts.
- ☐ ☐ ☐ Fabric is embedded 1 to 1.5 feet below ground and secured to frame/posts with staples at max 8-inch spacing.
- ☐ ☐ ☐ Posts are stable, fabric is tight and without rips or frayed areas.
- Sediment accumulation ____% of design capacity.

4. Temporary Sediment Trap**Yes No NA**

- ☐ ☐ ☐ Outlet structure is constructed per the approved plan or drawing.
- ☐ ☐ ☐ Geotextile fabric has been placed beneath rock fill.
- Sediment accumulation is ____% of design capacity.

5. Temporary Sediment Basin**Yes No NA**

- ☐ ☐ ☐ Basin and outlet structure constructed per the approved plan.
- ☐ ☐ ☐ Basin side slopes are stabilized with seed/mulch.
- ☐ ☐ ☐ Drainage structure flushed and basin surface restored upon removal of sediment basin facility.
- Sediment accumulation is ____% of design capacity.

Note: Not all erosion and sediment control practices are included in this listing. Add additional pages to this list as required by site specific design.

Construction inspection checklists for post-development stormwater management practices can be found in Appendix F of the New York Stormwater Management Design Manual.

b. Modifications to the SWPPP (To be completed as described below)

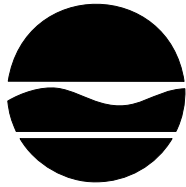
There is a significant change in design, construction, operation, or maintenance which may have a significant effect on the potential for the discharge of pollutants to the waters of the United States and which has not otherwise been addressed in the SWPPP; or

a. Eliminating or significantly minimizing pollutants from sources identified in the SWPPP and as required by this permit; or

3. Additionally, the SWPPP shall be amended to identify any new contractor or subcontractor that will implement any measure of the SWPPP.

[illegible]

Appendix 9 | NYSDEC Construction Stormwater Inspection Manual



**NEW YORK STATE DEPARTMENT OF
ENVIRONMENTAL CONSERVATION**

Construction Stormwater Inspection Manual
Primarily for Government Inspectors Evaluating Compliance with Construction
Stormwater Control Requirements

**New York State
Department of Environmental Conservation**

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Version 1.05 (8/27/07)

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1.0 INTRODUCTION AND PURPOSE

The New York State Department of Environmental Conservation Division of Water (DOW) considers there to be two types of inspections germane to construction stormwater; compliance inspections and self-inspections.

This manual is for use by DOW and other regulatory oversight construction stormwater inspectors in performing compliance inspections, as well as for site operators in performing self inspections. The manual should be used in conjunction with the *New York State Standards and Specifications for Erosion and Sediment Control*, August 2005.

1.1 Compliance Inspections

Regulatory compliance inspections are performed by regulatory oversight authorities such as DOW staff, or representatives of DOW and local municipal construction stormwater inspectors. These inspections are intended to determine compliance with the state or local requirements for control of construction stormwater through erosion and sediment control and post construction practices. Compliance inspections focus on determinations of compliance with legal and water quality standards. Typically, compliance inspections can be further sub-categorized to include comprehensive inspections, and follow-up or reconnaissance inspections.

Compliance inspectors will focus on determining whether:

- the project is causing water quality standard violations;
- the required Stormwater Pollution Prevention Plan (SWPPP) includes appropriate erosion and sediment controls and, to some extent, post construction controls;
- the owner/operator is complying with the SWPPP;
- where required, self-inspections are being properly performed; and
- where self-inspections are required, the owner/operator responds appropriately to the self-inspector's reports.

1.1.1 Comprehensive Inspection

Comprehensive inspections are designed to verify permittee compliance with all applicable regulatory requirements, effluent controls, and compliance schedules. This inspection involves records reviews, visual observations, and evaluations of management practices, effluents, and receiving waters.

Comprehensive inspections should be conducted according to a neutral or random inspection scheme, or in accordance with established priorities. A neutral monitoring scheme provides some objective basis for scheduling inspections and sampling visits by establishing a system (whether complex factor-based, alphabetic, or geographic) for setting priorities to ensure that a particular facility is not unfairly selected for inspection or sampling. The selection of which

facility to inspect must be made without bias to ensure that the regulatory oversight authority, if challenged for being arbitrary and capricious manner, can reasonably defend itself.

A neutral inspection scheme should set the criteria the inspector uses to choose which facilities to inspect, but the schedule for the actual inspection should remain confidential, and may be kept separate from the neutral plan.

A routine comprehensive compliance inspection is most effective when it is unannounced or conducted with very little advance warning.

1.1.2 Reconnaissance Inspection

A reconnaissance inspection is performed in lieu of, or following a comprehensive inspection to obtain a preliminary overview of an owner/operator's compliance program, to respond to a citizen complaint, or to assess a non-permitted site. The inspector performs a brief (generally about an hour) visual inspection of the site, discharges and receiving waters. A reconnaissance inspection uses the inspector's experience and judgement to summarize potential compliance problems, without conducting a full comprehensive inspection. The objective of a reconnaissance inspection is to expand inspection coverage without increasing inspection resource expenditures. The reconnaissance inspection is the shortest and least resource intensive of all inspections.

Reconnaissance inspections may be initiated in response to known or suspected violations, a public complaint, a violation of regulatory requirements, or as follow-up to verify that necessary actions were taken in response to a previous inspection.

1.2 Self-inspections

For some projects, the site owner/operator is required by their State Pollutant Discharge Elimination System (SPDES) Permit and/or local requirements to have a qualified professional¹ perform a "self-inspection" at the site. In self-inspections, the qualified professional determines whether the site is being managed in accordance with the SWPPP, and whether the SWPPP's recommended erosion and sediment controls are effective. If activities are not in accordance with the SWPPP, or if the SWPPP erosion and sediment controls are not effective, the qualified professional inspecting the site recommends corrections to the owner/operator.

¹ A "Qualified professional" is a person knowledgeable in the principles and practice of erosion and sediment controls, such as a licensed professional engineer, Certified Professional in Erosion and Sediment Control (CPESC), licensed landscape architect or soil scientist.

2.0 PRE-INSPECTION ACTIVITIES

2.1 Regulatory Oversight Authorities

This section is intended for inspectors with regulatory oversight authority such as agents of the DOW or a local municipality, or others acting on their behalf, such as county Soil and Water Conservation District staff. Examples of other regulatory oversight authorities include: the United States Environmental Protection Agency (EPA); New York City Department of Environmental Protection (DEP), Adirondack Park Agency (APA); the Lake George Park Commission (LGPC), and the Skaneateles Lake Watershed Authority (SLWA). Before arriving on-site to conduct the inspection, considerations concerning communication, documentation and equipment must be made.

Regulatory oversight authority is granted by state or local law to government agencies or, depending upon the particular law, an authorized representative of state or local government. SPDES rules 6 NYCRR 750-2.3 and Environmental Conservation Law 17-0303(6) and 17-0829(a) all allow for authorized representatives of the (NYSDEC) commissioner to perform all the duties of an inspector.

2.1.1 Communication

Coordination with Other Entities

Where appropriate, prior to selecting sites for inspection, compliance inspectors should communicate with other regulatory oversight authorities to avoid unnecessary duplication or to coordinate follow-up to inspections performed by other regulatory oversight authorities.

Announced vs. Unannounced Inspection

Inspections may be announced or unannounced. Each method has its own advantages and disadvantages. Unannounced inspections are preferred, however many job sites are not continuously manned, or not always staffed by someone who is familiar with the SWPPP, thus necessitating an announced inspection. As an alternative, when an announced inspection is necessary, inspectors should try to give as little advanced warning as possible (24 hours is suggested).

Itinerary

For obvious safety reasons, inspectors should be sure to inform someone in their office which site or sites they will be visiting prior to leaving the to perform inspections.

2.1.2 Documentation

Data Review

The inspector should review any available information such as:

- Notice of Intent
- Stormwater Pollution Prevention Plan
- Past inspection records
- Phasing plan

- Construction sequence
- Inspection and Maintenance schedules
- Site specific issues
- Consent Orders
- Access agreements

Inspection Form

The inspector should have copies of, and be familiar with, the inspection form used by their regulatory oversight authority (example in Attachment 1) before leaving the office. Static information such as name, location and permit number can be entered onto the inspection form prior to arriving at the inspection site.

Credentials

Inspectors should always carry proper identification to prove that they are employed by an entity with jurisdictional authority. Failure to display proper credentials may be legal grounds for denial of entry to a site.

2.1.3 Equipment

Personal Protective Equipment

DOW employees must conform to the DOW Health and Safety policy as it relates to personal protective equipment. Other regulatory oversight authorities should have their own safety policies or, if not, may wish to consult the OSHA health and safety tool at:

www.osha.gov/dep/etools/ehasp/ to develop a health and safety plan.

The following is a list of some of the most common health and safety gear that may be needed:

- Hard hat (Class G, Type1 or better)
- Safety toe shoes
- Reflective vest
- Hearing protection (to achieve 85 dBA - 8 hr TWA)
- Safety glasses with side shields

If the construction is on an industrial site or a hazardous waste site, special training may be required prior to entering the site. The inspector should consult with OSHA or NYSDEC prior to entering such a site.

Monitoring Equipment

The following is a list of some equipment that may be helpful to document facts and verify compliance:

- Digital Camera
- Measuring tape or wheel
- Hand level or clinometer
- Turbidity meter (in limited circumstances)

2.2 Permittee's Self-inspection

This section is intended for qualified professionals who conduct site self-inspections on behalf of owner/operators. Self-inspectors are responsible for performing inspections in accordance with permit requirements and reporting to site owners and operators the results and any recommendations resulting from the inspection.

Prior to conducting inspections, qualified professionals should ensure familiarity with the Stormwater Pollution Prevention Plan and previous inspection reports.

3.0 ON-SITE INSPECTION PROCESS

3.1 Compliance Inspections

3.1.1 Professionalism

Don't Pretend to Possess Knowledge

Unless the inspector has experience with a particular management practice, do not pretend to possess knowledge. Inspectors cannot be expert in all areas; their job is to collect information, not to demonstrate superior wisdom. Site operators are often willing to talk to someone who is inquisitive and interested. Within reason, asking questions to obtain new information about a management practice, construction technique or piece of equipment is one of the inspector's main roles in an inspection.

Don't Recommend Solutions

The inspector should not recommend solutions or endorse products. The solution to a compliance problem may appear obvious based on the inspector's experience. However, the responsibility should be placed on the site owner to implement a workable solution to a compliance problem that meets NYSDEC standards. The inspector should refer the site operator to the New York Standards and Specifications for Erosion and Sediment Control (the Blue Book) or the New York State Stormwater Management Design Manual (the Design Manual).

Key advice must be offered carefully. One experienced stormwater inspector suggests saying: "I can't direct you or make recommendations, but what we've seen work in other situations is ..."

The way inspectors present themselves is important to the effectiveness of the inspection. An inspector cannot be overly familiar, but will be more effective if able to establish a minimum level of communication.

3.1.2 Safety

DOW employees must conform to Division health and safety policies when on a construction site. Other regulatory oversight authorities should have their own safety policies or, if not, may

wish to consult the OSHA health and safety tool at:

www.osha.gov/dep/etools/ehasp to develop a health and safety plan.

Some general protections for construction sites are:

- Beware of heavy equipment, avoid operator blind spots and make sure of operator eye contact around heavy equipment.
- Avoid walking on rock rip-rap if possible. Loose rock presents a slip hazard.
- Stay out of confined spaces like tanks, trenches and foundation holes.
- Avoid lightning danger. Monitor weather conditions, get out of water, avoid open areas and high points, do not huddle in groups or near trees.
- Protect yourself from sun and heat exposure. Use sun screen or shading clothing. Remain hydrated by drinking water, watching for signs of heat cramps, exhaustion (fatigue, nausea, dizziness, headache, cool or moist skin), or stroke (high body temperature; red, hot and dry skin)
- Protect yourself from cold weather. Wear multiple layers of thin clothing. Wear a warm hat. Drink warm fluids or eat hot foods, and keep dry.
- Avoid scaffolding in excess of 4 feet above grade.
- Beware of ticks, stinging insects, snakes and poison ivy or sumac.

3.1.3 Legal access

DOW has general powers, set forth under ECL 17-0303, subparagraph 6, to enter premises for inspections. In addition, ECL 3-0301.2 conveys general statutory authority granting the DOW the power to access private property to fulfill DOW obligations under the law.

ECL 15-0305 gives the DOW the authority to enter at all times in or upon any property, public or private, for the purpose of inspecting or investigating conditions affecting the construction of improvements to or developments of water resources for the public health, safety or welfare.

ECL 17-0829 allows an authorized DOW representative, upon presentation of their credentials, to enter upon any premises where any effluent source is located, or in which records are required to be maintained. The representative may at reasonable times have access to, and sample discharges/pollutants to the waters or to publicly owned treatment plants where the effluent source is located. This subparagraph provides DOW representatives performing their duties authority to enter a site to pursue administrative violations. Pursuing criminal violations may require a warrant or the owner's permission to enter the site.

For sites that are permitted, DOW has authority under the permit to enter the site.

If the owner/operator's representatives onsite deny access, the inspector *should not* physically force entry. Under these circumstances the attorney representing the inspector should be immediately notified and consideration should be given to soliciting the aid of a law officer to obtain entry.

DOW staff have the right to enter at any reasonable time. If no one is available, and the site is fenced or posted, DOW staff should make all reasonable efforts to identify, contact and notify the owner that the DOW is entering the site. If the inspector has made all reasonable efforts to contact site owners, but was unable to do so, the site can then be accessed. All efforts should be taken not to cause any damage to the facility.

Other regulatory oversight authorities should seek advice on their legal authorities to enter a job site. Municipalities that have adopted Article 6 of the New York State Sample Local Law for Stormwater Management and Erosion and Sediment Control (NYSDEC, 2004, updated 2006) will have legal authority to enter sites in accordance with that chapter and any other existing municipal authority .

Agents of DOW have authority similar DOW staff authority to enter sites. However, DOW staff enjoy significant personal liability protections as state employees. That liability protection may not be the same for authorized representatives of DOW. For authorized representatives of DOW (or other regulatory oversight authorities), it is prudent to obtain permission to enter the site. If such permission is denied, the authorized representatives should inform the appropriate DOW contact, usually the regional water manager.

3.1.4 Find the Legally Responsible Party (Construction Manager, Self-inspector)

The first action a compliance inspector should take upon entering a construction site is to find the construction trailer or the construction or project manager if they are available. The inspector should present appropriate identification to the site's responsible party and state the reason for the inspection; construction stormwater complaint response or neutral construction stormwater inspection. If the inspection is initiated as a response to a complaint, frequently the responsible party will ask who made the complaint. DOW keeps private individual complainants confidential. If the complainant is another regulatory oversight authority, DOW tends to make that known to the site's responsible party.

3.1.5 On-site records review (NOI, SWPPP, Self-inspection Reports, Permit)

Generally, the compliance inspector should next review the on-site records. Verify that a copy of the construction stormwater permit and NOI are on-site. Verify that the acreage, site conditions, and receiving water listed on the NOI are accurate. Compare the on-site documentation with documentation already submitted to, or obtained by the compliance inspector.

If the SWPPP has not been reviewed in the office, verify that it exists and contains the minimum required components (16 for a basic plan and 22 for a full plan). On-site review of the SWPPP should determine if: there is an appropriate phasing plan; the acreage disturbed in each phase, construction sequence for each phase; proposed implementation of erosion and sediment control measures; and, where required, post construction controls. For each of the erosion and sediment control practices, the SWPPP must show design details in accordance with the NYS Standards for Erosion and Sediment Controls. The SWPPP must also include provisions for maintenance of practices during construction. On-site review of post construction controls is generally limited to verification that the proposed stormwater management practices are shown on the site plan.

Where self-inspections are required, self-inspection reports are a significant tool for the compliance inspector to determine the performance history of the site. The self-inspection reports should be done with the required frequency. Self-inspection reports must include all the details required by the permit. Generally, it is desirable for permit information to be shown on a site plan. The compliance inspector should become familiar with the report and use that familiarity to judge whether the self-inspections are being performed correctly and that the site operator is correcting deficiencies noted in the report.

3.1.6 Walk the Site

During wet weather conditions, it may be advantageous to observe the receiving waters prior to walking the rest of the site. At some point during the inspection, the receiving water conditions must be observed and noted. It is critical to note if there is a substantial visible contrast to natural conditions, or evidence of deposition, streambank erosion, construction debris or waste materials (e.g. concrete washdown) in the receiving stream.

Each inspector should evaluate actual implementation and maintenance of practices on-site compared to how implementation and maintenance is detailed in the SWPPP. At a minimum, the compliance inspector should observe all areas of active construction. Observing equipment or materials storage, recently stabilized areas, or stockpile areas is also appropriate to evaluate the effectiveness of management practices.

3.1.7 Taking Photographs

Evidence of poor receiving water conditions and poor or ineffective practices should be documented with digital photographs. Those photographs should be logged date stamped and stored on media that cannot be edited (e.g. write only CDs). Photos should also be appended to the site inspector's report.

It is also beneficial to take photographs of good practices for educational and technology transfer reasons.

3.1.8 Exit Interview

Clearly communicate expectations and consequences. If it is clear from the inspection that the owner/operator must modify the SWPPP, or modify management practices within an assigned period (e.g. 24 hours, 48 hours, one week, two weeks), then that finding should be communicated at the time of the exit interview. The inspector should assign the period based on factors such as how long it would reasonably take to complete such modifications and the level of risk to water quality associated with failure to make such modifications.

The inspector should make clear that NYSDEC reserves rights to future enforcement actions. If the inspector's supervisor or enforcement coordinator determines additional enforcement actions are necessary, the inspector *should not* reassure the owner/operator that the current situation is acceptable.

3.2 Non-permitted Site Inspections

For sites not authorized in accordance with state or local laws, the process will be abbreviated. First verify the need for authorization and observe receiving waters to detect water quality standard violations. If there is a violation, notify the owner of the violation or other compliance actions in response to their illicit activity. For DOW staff, Attachment 2 or a similar notice can be used to notify the site owner/operator that stormwater authorization is required.

3.3 Self-inspections

The role of the self-inspector is to verify that the site is complying with stormwater requirements. In particular, the self-inspector verifies that the SWPPP is being properly implemented. The self-inspector also documents SWPPP implementation so regulatory agencies can review implementation activities.

It is not the role of the self-inspector to report directly to regulatory authorities.

Appendix H of *The New York Standards and Specifications for Erosion and Sediment Control* - August 2005 (the Blue Book) includes a Construction Duration Inspection checklist that can be used by the owner/operators qualified professional for self-inspections. The Blue Book is available on the NYSDEC website.

3.3.1 Purpose

The self inspector should ensure that the project's SWPPP is being properly implemented. This includes ensuring that the erosion and sediment control practices are properly installed and being maintained in accordance with the SWPPP/Blue Book.

The project must be properly phased to limit the disturbance to less than five acres, and the construction sequence for each phase must be followed. The SWPPP must also be modified to address evolving circumstances. Finally, and most importantly, receiving waters must be protected.

If a soil disturbance will be greater than five acres at any given time, the site operator must obtain written permission from the DOW regional office.

3.3.2 Pre-construction Conference

The parties responsible for various aspects of stormwater compliance should be identified at the pre-construction conference. Responsible parties may include, but are not limited to, owner's engineer, owner/operator/permittee, contractors, and subcontractors.

Typical responsibilities include: installation of erosion and sediment control (E & SC) practices; maintenance of E & SC practices, inspection of E&SC practices, installation of post construction stormwater management practices (SMPs), inspection of post construction SMPs, SWPPP revisions, and contractor direction.

All parties should clearly know what is expected of them. Responsible parties should complete the Pre-construction Site Assessment Checklist provided in Appendix H of the Blue Book.

3.3.3 Inspection Preparation

The inspector should review the project's SWPPP (including the phasing plan, construction sequence and site specific issues) and the last few inspection reports (if the inspector has them available).

3.3.4 Self-inspection Components

Inspect installation, performance and maintenance of all E&SC practices

The self inspector should inspect all areas that are under active construction or disturbance and areas that are vulnerable to erosion. The self-inspector should also inspect areas that will be disturbed prior to the next inspection for measures required prior to construction (e.g. silt barriers, stabilized construction entrance, diversions). Finally, self-inspectors should inspect post-construction controls during and after installation.

Identify site deficiencies and corrective measures

The self-inspector's reports must be maintained in a log book on site and the log book must be made available to the regulatory authorities. Although the legal responsibility for filing a Notice of Termination lies with the owner/operator, the self-inspector may also be called upon to perform a final site inspection, including post construction SMPs, prior to filing the Notice of Termination.

4.0 POST-INSPECTION ACTIVITIES

4.1 Regulatory Oversight Authorities

This section is intended for inspectors with regulatory oversight authority such as agents of the DOW or a local municipality, or others acting on their behalf (such as County Soil and Water Conservation District staff.) Upon completion of an inspection, inspection results should be documented for the record.

4.1.1 Written Notification

The inspector should inform the permittee or the on-site representative of their inspection results in writing by sending the permittee a complete, signed copy of the inspection report. The inspection report should be transmitted under a cover letter which elaborates on any deficiencies noted in the inspection report. It is not a good idea to commend exceptional efforts by the owner/operator in a letter, because such letters tend to undermine enforcement efforts when compliance status at a site degrades.

The inspector should consider providing a copy of the cover letter and inspection report to other parties with including:

- Permittee
- Contractor(s)
- Other regulatory oversight authorities
- Other parties present during the inspection (e.g. SWPPP preparer, permittee's self-inspector, etc.)

For DOW staff, an example of the inspection cover letter is included as Attachment 3.

4.1.2 Inspection Tracking

DOW staff must enter their inspection results into the electronic *Water Compliance System*.

Local municipalities and other regulatory oversight authorities are encouraged to develop an electronic tracking system in which to record their inspections.

4.2 Permittee's Self-inspections

This section is intended for qualified professionals who conduct site inspections for permittees in accordance with a SPDES permit or local requirements.

4.2.1 Written Records

Inspection Reports

The inspector shall prepare a written report summarizing inspection results. The inspection report is then provided to the permittee, or the permittee's duly authorized representative, and to the contractor responsible for implementing stormwater controls on-site in order to correct deficiencies noted in the inspection report. Finally, the inspection report must be added to the site log book that is required to be maintained on-site, and be available to regulatory oversight authorities for review.

4.2.2 Stormwater Pollution Prevention Plan Revisions

The inspector must inform the permittee of his/her duty to amend the Stormwater Pollution Prevention Plan (SWPPP) whenever an inspection proves the SWPPP to be ineffective in:

- Eliminating or significantly minimizing pollutants from on-site sources
- Achieving the general objectives of controlling pollutants in stormwater discharges from permitted construction activity
- Eliminating discharges that cause a substantial visible contrast to natural conditions

ATTACHMENT 1

Construction Stormwater Compliance Inspection Report

Project Name and Location:	Date:	Page 1 of 2
Municipality: County:	Permit # (if any): NYR	
	Entry Time:	Exit Time:
On-site Representative(s) and contact information:	Weather Conditions:	
Name and Address of SPDES Permittee/Title/Phone/Fax Numbers: Contacted: Yes ☐ No ☐		

INSPECTION CHECKLIST

SPDES Authority

Yes No N/A

1. ☐ ☐ ☐ Is a copy of the NOI posted at the construction site for public viewing?
2. ☐ ☐ ☐ Is an up-to-date copy of the signed SWPPP retained at the construction site?
3. ☐ ☐ ☐ Is a copy of the SPDES General Permit retained at the construction site?

Law, rule or permit citation

SWPPP Content

Yes No N/A

4. ☐ ☐ ☐ Does the SWPPP describe and identify the erosion & sediment control measures to be employed?
5. ☐ ☐ ☐ Does the SWPPP provide a maintenance schedule for the erosion & sediment control measures?
6. ☐ ☐ ☐ Does the SWPPP describe and identify the post-construction SW control measures to be employed?
7. ☐ ☐ ☐ Does the SWPPP identify the contractor(s) and subcontractor(s) responsible for each measure?
8. ☐ ☐ ☐ Does the SWPPP include all the necessary 'CONTRACTOR CERTIFICATION' statements?
9. ☐ ☐ ☐ Is the SWPPP signed/certified by the permittee?

Law, rule or permit citation

Recordkeeping

Yes No N/A

10. ☐ ☐ ☐ Are inspections performed as required by the permit (every 7 days and after ½" rain event)?
11. ☐ ☐ ☐ Are the site inspections performed by a qualified professional?
12. ☐ ☐ ☐ Are all required reports properly signed/certified?
13. ☐ ☐ ☐ Does the SWPPP include copies of the monthly/quarterly written summaries of compliance status?

Law, rule or permit citation

Visual Observations

Yes No N/A

14. ☐ ☐ ☐ Are all erosion and sediment control measures installed/constructed?
15. ☐ ☐ ☐ Are all erosion and sediment control measures maintained properly?
16. ☐ ☐ ☐ Have all disturbances of 5 acres or more been approved prior to the disturbance?
17. ☐ ☐ ☐ Are stabilization measures initiated in inactive areas?
18. ☐ ☐ ☐ Are permanent stormwater control measures implemented?
19. ☐ ☐ ☐ Was there a discharge into the receiving water on the day of inspection?
20. ☐ ☐ ☐ Are receiving waters free of there evidence of turbidity, sedimentation, or oil ? (If no , complete Page 2)

Law, rule or permit citation

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

Water Quality Observations

Describe the discharge(s) [source(s), impact on receiving water(s), etc.] _____

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

Describe any other water quality standards or permit violations _____

Additional Comments: _____

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

☐ Photographs attached

ATTACHMENT 2

***** NOTICE *****

On March 10, 2003, provisions of the Federal Clean Water Act went into effect that apply to many construction operations.

If your construction operations result in the disturbance of one acre or greater and stormwater runoff from your site reaches surface waters (i.e., lake, stream, road side ditch, swale, storm sewer system, etc.), the stormwater runoff from your site must be covered by a State Pollutant Discharge Elimination System (SPDES) Permit issued by the New York State Department of Environmental Conservation (NYSDEC).

To facilitate your compliance with the law, NYSDEC has issued a General Permit which may be applicable to your project. To obtain coverage under this General Permit, you need to prepare a Stormwater Pollution Prevention Plan (SWPPP) and then file a Notice of Intent (NOI) to the NYSDEC headquarters in Albany. The NOI form is available on the DEC website. You may also obtain a copy of the NOI form at the nearest NYSDEC regional offices.

When you file your NOI you are certifying that you have developed a SWPPP and that it will be implemented prior to commencing construction. When you submit the NOI you need to indicate if your SWPPP is in conformance with published NYSDEC technical standards; if it is, your SPDES permit coverage will be effective in as few as five business days. If your SWPPP does not conform to the DEC technical standards, coverage will not be available for at least 60 business days.

Failure to have the required permit can result in legal actions which include Stop Work Orders and/or monetary penalties of up to \$37,500/day

If your construction operations are already in progress and you are not covered by an appropriate NYSDEC permit contact the NYSDEC Regional Water Engineer as soon as possible. If your construction field operations have not yet commenced, review the NOI and the General Permit on the DEC's website or at the DEC regional office for your area. When you are comfortable that you understand and comply with the requirements, file your NOI.

The requirement to file an NOI does not replace any local requirements. Developers/Contractors are directed to contact the Local Code Enforcement Officer or Stormwater Management Officer for local requirements.

ATTACHMENT 3

<< Date >>

Mr. John Smith
123 Main Street
Ferracane, NY 12345

**Re: Stormwater Inspection
SPDES Permit Identification No. NYR10Z000 (through SPDES No. GP-02-01)
Blowing Leaves Subdivision
Gasper (T), Eaton (Co.)**

Dear Mr. Smith:

On the afternoon of << date >> I conducted an inspection of the construction activities associated with the Blowing Leaves Subdivision located on County Route 1 in the town of Gasper, Eaton County. The inspection was conducted in the presence of you and Mr. Samuel Siltfence of Acme Excavating Co., Inc. The purpose of the inspection was to verify compliance with the *State Pollutant Discharge Elimination System (SPDES) General Permit for Storm Water Discharges from Construction Activity* ("the general permit").

The overall rating for the project at the time of the inspection was ***unsatisfactory***. A copy of my inspection report is attached for your information. In addition to the report, I would like to elaborate on the following:

SPDES Authority

- In accordance with subdivision 750-2.1 (a) of Title 6 of the Official Compilation of Codes, Rules, and Regulations of the State of New York (6 NYCRR), a copy of your permit must be retained at the construction site. You did not have a copy of the general permit at the site. **Your failure to retain a copy of the general permit at the construction site is a violation of 6 NYCRR Part 750-2.1 (a).** Please retain a copy of the general permit at the site from this point forward.

SWPPP Content

- In accordance with Part III.E.2. of the general permit, contractors and subcontractors must certify that they understand the terms and conditions of the general permit and the SWPPP before undertaking any construction activity at the site. Your SWPPP does not include a certification statement from Acme Excavating Co., Inc. **The failure of your contractor to sign this certification before undertaking construction activity at the site is a violation of Part III.E.2. of the general permit.** Please obtain copies of all necessary certifications and provide copies of them to each party who holds a copy of your SWPPP.
- In accordance with Part V.H.2. of the general permit, SWPPP's must be certified by the permittee. Your SWPPP was not certified by you. **Your failure to certify your SWPPP is a**

Mr. John Smith
Re: SPDES Inspection
Blowing Leaves Subdivision
Gasper (T), Eaton (Co.)

<< Date >>

violation of Part V.H.2. of the general permit. Please certify your SWPPP.

Recordkeeping

- In accordance with Parts III.D.3.a. and III.D.3.b. of the general permit, permittees must have a qualified professional conduct site inspections within 24 hours of the end of 0.5" or greater rain events and at least once per week. A review of your records revealed that your "self-inspections" are only being conducted about two or three times per month. **Your failure to have a qualified professional conduct inspections at the required frequency is a violation of Part III.D.3.b. of the general permit.** Please immediately direct your qualified professional to conduct your site inspections at the required frequency.
- Although the frequency of self-inspections does not meet requirements, the quality of them is very good. Your qualified professional has accurately noted the same SWPPP deficiencies and necessary maintenance activities that I also observed, and prepared thorough sketches on the self-inspection site maps.
- In accordance with Part V.H.2. of the general permit, the permittee must certify all reports required by the permit. A review of your records showed that your self-inspection reports were not certified. **Your failure to certify your self-inspection reports is a violation of Part V.H.2. of the general permit.** Please sign and certify any and all existing and future self-inspection reports.

Visual Observations

- In accordance with Parts III.A.2. and III.A.3. of the general permit, all erosion and sediment controls (E&SC) measures must be installed (as detailed in the SWPPP) prior to the initiation of construction. During the inspection, I noted all of your E&SC measures have been correctly installed at the right times and locations.
- In accordance with Part V.L. of the general permit, all of the E&SC measures at your site must be maintained properly. While on site I observed that, among other things, the section of silt fence in place parallel to County Route 1 is in various stages of disrepair. **The failure of your contractor to adequately maintain the E&SC measures currently in place at your site is a violation of Part V.L. of the general permit.** Please direct your contractor to repair this silt fence immediately and to diligently maintain all of the other required E&SC measures as they are brought to his attention by your qualified professional.
- This inspection was conducted during a rain event which resulted in a stormwater discharge to the municipal separate storm sewer system (MS4) being operated by the Eaton County Department of Public Works. Your discharge was visibly turbid whereas upstream water MS4 was clear. As a result, the discharge from the MS4 outfall into Karimipour Creek was causing

Mr. John Smith

<< Date >>

Re: SPDES Inspection
Blowing Leaves Subdivision
Gasper (T), Eaton (Co.)

slight turbidity. Please be advised that the narrative water quality standard for turbidity in Karimipour Creek is “no increase that will cause a substantial visible contrast to natural conditions.” I attribute the lack of maintenance of your E&SC measures to be the primary cause of the turbid discharge. Please be reminded that the general permit does not authorize you cause or contribute to a condition in contravention of any water quality standards.

If you have any questions or comments, please feel free to contact me at (999) 456-5432.

Sincerely,

Hector D. Inspector, CPESC
Environmental Program Specialist 2

HDI:ms
Attachment

cc w/att.: Chester Checkdam, (T) Gasper Code Enforcement Officer
Samuel Siltfence, Acme Excavating Co., Inc.

Appendix 10 | NYSDEC Deep Ripping and Decompaction



**New York State
DEPARTMENT OF ENVIRONMENTAL CONSERVATION**

Division of Water

Deep-Ripping and Decompaction

April 2008

**New York State
Department of Environmental Conservation**

Document Prepared by:

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

Alternative Stormwater Management Deep-Ripping and Decompaction

Description

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

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

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



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

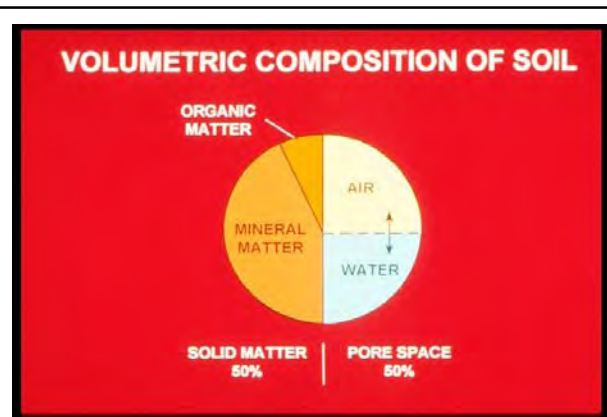


Fig. 2. About 50% of the volume of undisturbed loam surface soil is pore space, when soil is in good condition for plant growth. Brady, 2002.

Recommended Application of Practice

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

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

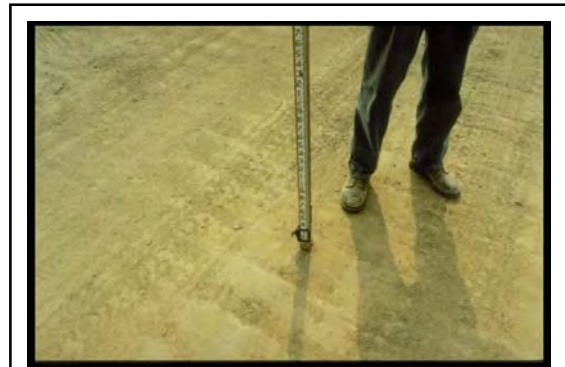


Fig. 3. Construction site with significant compaction of the deep basal till subsoil extends 24 inches below this exposed cut-and-fill work surface.

Benefits

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

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

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

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

Feasibility / Limitations

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

Soil

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

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

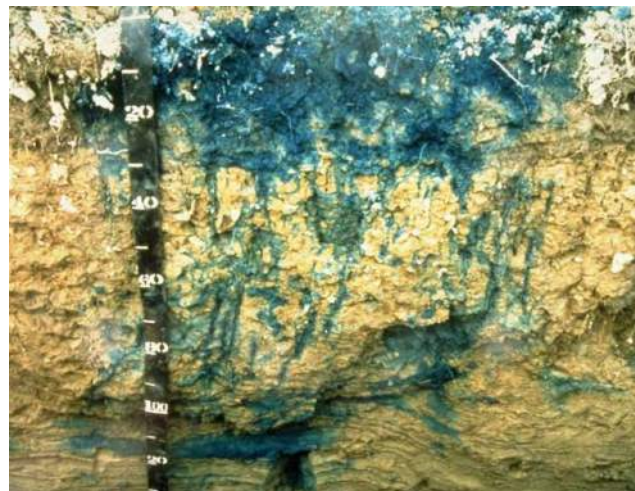


Fig. 4. Profile (in centimeters) displaying the infiltration test result of the natural undisturbed horizons of a soil in Hydrologic Soil Group C.

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

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

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

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

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

Slope

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

Local Weather/Timing/Soil Moisture

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

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

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



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

Design Guidance

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

- 1) Deep rip the affected thickness of exposed subsoil material (see Figure 10 and 11), aggressively fracturing it before the protected topsoil is reapplied on the site (see Figure 12); and
- 2) Decompact (deep subsoil), simultaneously through the restored topsoil layer and the upper half of the affected subsoil (Figure 13). The second phase, “decompaction,” mitigates the partial recompaction which occurs during the heavy process of topsoil spreading/grading. Prior to deep ripping and decompacting the site, all construction activity, including construction equipment and material storage, site cleanup and trafficking (Figure 14), should be finished; and the site closed off to further disturbance. Likewise, once the practice is underway and the area’s soil permeability and

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

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

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

Implements

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



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



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

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

Pulling-Power of Equipment

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

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

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

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



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



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

Depth and Patterns of Movement

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

There may be construction sites where the depth of the exposed subsoil's compression is moderate, e.g.: 12 inches, rather than deep. This can be verified by using a $\frac{3}{4}$ inch cone penetrometer and a shovel to test the subsoil for its level of compaction, incrementally, every three inches of increasing depth. Once the full thickness of the subsoil's compacted zone is finally "pieced" and there is a significant drop in the psi measurements of the soil penetrometer, the depth/thickness of compaction is determined. This is repeated at several representative locations of the construction site. If the thickness of the site's subsoil compaction is verified as, for example, ten inches, then the Phase 1 Deep Ripping can be correspondingly reduced to the implement's minimum operable depth of 12 inches. However, the Phase 2 simultaneous Decomposition (subsoiling) of an 11 inch thick layer of replaced topsoil and the upper subsoil should run at the subsoiling implements full operating depth.



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



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

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

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

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

Large, Unobstructed Areas

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

- The first series (pattern) of passes is applied lengthwise, parallel with the longest spread of the site; gradually progressing across the site's width, with each successive pass.
- The second series runs obliquely, crossing the first series at an angle of about 45 degrees.
- The third series runs at right angle (or 90 degrees), to the first series to complete the fracturing and shattering on severely compacted sites, and avoid leaving large unbroken blocks of compressed soil material. (In certain instances, the third series may be optional, depending on how thoroughly the first two series loosen the material and eliminate large chunks/blocks of material as verified by tests with a $\frac{3}{4}$ -inch cone penetrometer.)



Fig. 12. Moderately dry topsoil is being replaced on the affected site now that Phase 1 deep ripping of the compressed subsoil is complete.



Fig. 13. The same deep, angled-leg subsoiler shown in Fig. 7 is engaged at maximum depth for Phase 2, decompaction (deep soiling), of the replaced topsoil and the upper subsoil materials.

Corridors

In long corridors of limited width and less maneuverability than larger sites, e.g.: along compacted areas used as temporary construction access, a modified series of pattern passes are used.

- First, apply the same initial lengthwise, parallel series of passes described above.

- A second series of passes makes a broad “S” shaped pattern of rips, continually and gradually alternating the “S” curves between opposite edges inside the compacted corridor.
- The third and final series again uses the broad, alternating S pattern, but it is “flip-flopped” to continually cross the previous S pattern along the corridor’s centerline. This final series of the S pattern curves back along the edge areas skipped by the second series.

Maintenance and Cost

Once the two-phase practice of Deep Ripping and Decomposition is completed, two items are essential for maintaining a site’s soil porosity and permeability for infiltration. They are: planting and maintaining the appropriate ground cover with deep roots to maintain the soil structure (see Figure 15); and keeping the site free of traffic or other weight loads.

Note that site-specific choice of an appropriate vegetative ground-cover seed mix, including the proper seeding ratio of one or more perennial species with a deep taproot system and the proper amount of lime and soil nutrients (fertilizer mix) adapted to the soil-needs, are basic to the final practice of landscaping, i.e: surface tillage, seeding/planting/fertilizing and culti-packing or mulching is applied. The "maintenance" of an effectively deep-ripped and decompacted area is generally limited to the successful perennial (long-term) landscape ground cover; as long as no weight-bearing force of soil compaction is applied.



Fig. 14. The severely compacted soil of a temporary construction yard used daily by heavy equipment for four months; shown before deep ripping, topsoil replacement, and decompaction.



Fig. 15. The same site as Fig. 14 after deep ripping of the exposed subsoil, topsoil replacement, decompaction through the topsoil and upper subsoil and final surface tillage and revegetation to maintain soil permeability and infiltration.

The Deep Ripping and Decompaction practice is, by necessity, more extensive than periodic subsoiling of farmland. The cost of deep ripping and decompacting (deep subsoiling), will vary according to the depth and severity of soil-material compression and the relative amount of tractor and implement time that is required. In some instances, depending on open maneuverability, two-to-three acres of compacted project area may be deep-ripped in one day. In other situations of more severe compaction and - or less maneuverability, as little as one acre may be fully ripped in a day. Generally, if the Phase 1) Deep Ripping is fully effective, the Phase 2) Decompaction should be completed in $\frac{2}{3}$ to $\frac{3}{4}$ of the time required for Phase 1.

Using the example of two acres of Phase 1) Deep Ripping in one day, at \$1800 per day, the net cost is \$900 per acre. If the Phase 2) Decompacting or deep subsoiling takes $\frac{3}{4}$ the time as Phase 1, it costs \$675 per acre for a combined total of \$1575 per acre to complete the practice (these figures do not include the cost of the separate practice of topsoil stripping and replacement). Due to the many variables, it must be recognized that cost will be determined by the specific conditions or constraints of the site and the availability of proper equipment.

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Internet Access:

- Examples of implements:
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http://salesmanual.deere.com/sales/salesmanual/en_NA/primary_tillage/2008/feature/rippers/915v_pattern_frame.html?sbu=ag&link=prodcut Last visited March 08.
- Soils data of USDA Natural Resources Conservation Service. NRCS Web Soil Survey. <http://websoilsurvey.nrcs.usda.gov/app/> and *USDA-NRCS Official Soil Series Descriptions; View by Name*. <http://ortho.ftw.nrcs.usda.gov/cgi-bin/osd/osdname.cgi> . Last visited Jan. 08.
- Soil penetrometer information. Access by internet searches of: *Diagnosing Soil Compaction using a Penetrometer (soil compaction tester)*, PSU Extension; as well as *Dickey-john Soil Compaction Tester*.
<http://www.dickey-johnproducts.com/pdf/SoilCompactionTest.pdf> and <http://cropsoil.psu.edu/Extension/Facts/uc178pdf> Last visited Sept. 07

Appendix 11 | NRCS Soil Report



United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for **Ulster County, New York**



June 18, 2018

Custom Soil Resource Report Soil Map



Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 16, Feb 24, 2018

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

Date(s) aerial images were photographed: Oct 7, 2013—Feb 26, 2017

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BOD	Bath-Nassau-Rock outcrop complex, hilly	6.2	100.0%
Totals for Area of Interest		6.2	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Custom Soil Resource Report

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Ulster County, New York

BOD—Bath-Nassau-Rock outcrop complex, hilly

Map Unit Setting

National map unit symbol: 9xfv
Elevation: 600 to 1,800 feet
Mean annual precipitation: 41 to 62 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 110 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Bath and similar soils: 40 percent
Nassau and similar soils: 25 percent
Rock outcrop: 15 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bath

Setting

Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from gray and brown siltstone, sandstone, and shale

Typical profile

H1 - 0 to 6 inches: gravelly silt loam
H2 - 6 to 28 inches: gravelly loam
H3 - 28 to 48 inches: very gravelly loam
H4 - 48 to 52 inches: bedrock

Properties and qualities

Slope: 10 to 25 percent
Depth to restrictive feature: 26 to 38 inches to fragipan; 40 to 80 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 24 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Nassau

Setting

Landform: Benches, ridges, till plains

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Channery loamy till derived mainly from local slate or shale

Typical profile

H1 - 0 to 6 inches: channery silt loam

H2 - 6 to 16 inches: very channery silt loam

H3 - 16 to 20 inches: unweathered bedrock

Properties and qualities

Slope: 10 to 25 percent

Depth to restrictive feature: 10 to 20 inches to lithic bedrock

Natural drainage class: Somewhat excessively drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Very low (about 1.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: D

Hydric soil rating: No

Description of Rock Outcrop

Typical profile

H1 - 0 to 60 inches: unweathered bedrock

Properties and qualities

Slope: 10 to 25 percent

Depth to restrictive feature: 0 inches to lithic bedrock

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydric soil rating: Unranked

Minor Components

Hudson

Percent of map unit: 5 percent

Hydric soil rating: No

Manlius

Percent of map unit: 5 percent

Hydric soil rating: No

Custom Soil Resource Report

Mardin

Percent of map unit: 5 percent

Hydric soil rating: No

Volusia

Percent of map unit: 5 percent

Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group (Marlboro on Hudson Soil Map)

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Custom Soil Resource Report
Map—Hydrologic Soil Group (Marlboro on Hudson Soil Map)



Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points

 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 16, Feb 24, 2018

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

Date(s) aerial images were photographed: Oct 7, 2013—Feb 26, 2017

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

Table—Hydrologic Soil Group (Marlboro on Hudson Soil Map)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BOD	Bath-Nassau-Rock outcrop complex, hilly	C	6.2	100.0%
Totals for Area of Interest			6.2	100.0%

Rating Options—Hydrologic Soil Group (Marlboro on Hudson Soil Map)*Aggregation Method:* Dominant Condition*Component Percent Cutoff:* None Specified*Tie-break Rule:* Higher

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Custom Soil Resource Report

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Appendix 12 | NYSDEC GI WorkSheets

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

Design Point: 1
P= 1.40 inch *Manually enter P, Total Area and Impervious Cover.*

Breakdown of Subcatchments						
Catchment Number	Total Area (Acres)	Impervious Area (Acres)	Percent Impervious %	Rv	WQv (ft ³)	Description
1	0.42	0.27	64%	0.63	1,342	Bioretention
2	0.20	0.15	75%	0.73	737	Bioretention
3	1.90	0.49	26%	0.28	2,741	
4						
5						
6						
7						
8						
9						
10						
Subtotal (1-30)	2.52	0.91	36%	0.38	4,820	Subtotal 1
Total	2.52	0.91	36%	0.38	4,820	Initial WQv

0.11 af

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

Recalculate WQv after application of Area Reduction Techniques					
	Total Area (Acres)	Impervious Area (Acres)	Percent Impervious %	Runoff Coefficient Rv	WQv (ft ³)
"<<Initial WQv"	2.52	0.91	36%	0.38	4,820
Subtract Area	0.00	0.00			
WQv adjusted after Area Reductions	2.52	0.91	36%	0.38	4,820
Disconnection of Rooftops		0.00			
Adjusted WQv after Area Reduction and Rooftop Disconnect	2.52	0.91	36%	0.38	4,820
WQv reduced by Area Reduction techniques					0

0.11 af

0.00 af

Total Water Quality Volume Calculation

$$WQv(\text{acre-feet}) = [(P)(Rv)(A)] / 12$$

All Subcatchments						
Catchment	Total Area (Acres)	Impervious Cover (Acres)	Percent Impervious %	Runoff Coefficient Rv	WQv (ft ³)	Description
1	0.42	0.27	0.64	0.63	1341.65	Bioretention
2	0.20	0.15	0.75	0.73	737	Bioretention
3	1.90	0.49	0.26	0.28	2741.48	
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

Runoff Reduction Volume and Treated volumes						
	Runoff Reduction Techniques/Standard SMPs		Total Contributing Area	Total Contributing Impervious Area	WQv Reduced (RRv)	WQv Treated
			(acres)	(acres)	cf	cf
Area/Volume Reduction	Conservation of Natural Areas	RR-1	0.00	0.00		
	Sheetflow to Riparian Buffers/Filter Strips	RR-2	0.00	0.00		
	Tree Planting/Tree Pit	RR-3	0.00	0.00		
	Disconnection of Rooftop Runoff	RR-4		0.00		
	Vegetated Swale	RR-5	0.00	0.00	0	
	Rain Garden	RR-6	0.00	0.00	0	
	Stormwater Planter	RR-7	0.00	0.00	0	
	Rain Barrel/Cistern	RR-8	0.00	0.00	0	
	Porous Pavement	RR-9	0.00	0.00	0	
	Green Roof (Intensive & Extensive)	RR-10	0.00	0.00	0	
Standard SMPs w/RRv Capacity	Infiltration Trench	I-1	0.00	0.00	0	0
	Infiltration Basin	I-2	0.00	0.00	0	0
	Dry Well	I-3	0.00	0.00	0	0
	Underground Infiltration System	I-4	0.00			
	Bioretention & Infiltration Bioretention	F-5	0.62	0.42	1331	748
	Dry swale	O-1	0.00	0.00	0	0
Standard SMPs	Micropool Extended Detention (P-1)	P-1				
	Wet Pond (P-2)	P-2				
	Wet Extended Detention (P-3)	P-3				
	Multiple Pond system (P-4)	P-4				
	Pocket Pond (p-5)	P-5				
	Surface Sand filter (F-1)	F-1				
	Underground Sand filter (F-2)	F-2				
	Perimeter Sand Filter (F-3)	F-3				
	Organic Filter (F-4)	F-4				
	Shallow Wetland (W-1)	W-1				
	Extended Detention Wetland (W-2)	W-2				
	Pond/Wetland System (W-3)	W-3				
	Pocket Wetland (W-4)	W-4				
	Wet Swale (O-2)	O-2				
Totals by Area Reduction →			0.00	0.00	0	
Totals by Volume Reduction →			0.00	0.00	0	
Totals by Standard SMP w/RRV →			0.62	0.42	1331	748
Totals by Standard SMP →			0.00	0.00		0
Totals (Area + Volume + all SMPs) →			0.62	0.42	1,331	748
	Impervious Cover v	error				
	Total Area v	error				

Minimum RRv

Enter the Soils Data for the site		
Soil Group	Acres	S
A		55%
B		40%
C	2.52	30%
D		20%
Total Area	2.515	
Calculate the Minimum RRv		
S =	0.30	
Impervious =	0.91	acre
Precipitation	1.4	in
Rv	0.95	
Minimum RRv	1,324	ft3
	0.03	af

NOI QUESTIONS

#	NOI Question	Reported Value	
		cf	af
28	Total Water Quality Volume (WQv) Required	4820	0.111
30	Total RRV Provided	1331	0.031
31	Is RRV Provided $\geq$ WQv Required?	No	
32	Minimum RRV	1324	0.030
32a	Is RRV Provided $\geq$ Minimum RRV Required?	Yes	
33a	Total WQv Treated	748	0.017
34	Sum of Volume Reduced & Treated	2079	0.048
34	Sum of Volume Reduced and Treated	2079	0.048
35	Is Sum RRV Provided and WQv Provided $\geq$ WQv Required?	No	

Contact Regional Office

Apply Peak Flow Attenuation			
36	Channel Protection	C_{pv}	
37	Overbank	Q_p	
37	Extreme Flood Control	Q_f	
	Are Quantity Control requirements met?	Yes	Plan Completed

Bioretention Worksheet

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

$$A_f = WQ_v * (d_f) / [k * (h_f + d_f)(t_f)]$$

A_f	Required Surface Area (ft ²)		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 &
WQ_v	Water Quality Volume (ft ³)		
d_f	Depth of the Soil Medium (feet)	k	
h_f	Average height of water above the planter bed		
t_f	Volume Through the Filter Media (days)		

Design Point:		1					
Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	Total Area (Acres)	Impervious Area (Acres)	Percent Impervious %	Rv	WQv (ft ³)	Precipitation (in)	Description
1	0.42	0.27	0.64	0.63	1341.65	1.40	Bioretention
Enter Impervious Area Reduced by Disconnection of Rooftops		0.00	64%	0.63	1,342	<<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		C					
Soil Infiltration Rate		0.00	in/hour	Okay			
Using Underdrains?		Yes Okay					
Calculate the Minimum Filter Area							
				Value	Units	Notes	
WQv				1,342	ft ³		
Enter Depth of Soil Media				d_f	2.5	ft	2.5-4 ft
Enter Hydraulic Conductivity				k	0.5	ft/day	
Enter Average Height of Ponding				h_f	0.5	ft	6 inches max.
Enter Filter Time				t_f	2	days	
Required Filter Area				A_f	1118	ft²	
Determine Actual Bio-Retention Area							
Filter Width		42.5	ft				
Filter Length		43	ft				
Filter Area		1827.5	ft ²				
Actual Volume Provided		2193	ft ³				
Determine Runoff Reduction							
Is the Bioretention contributing flow to another practice?			No	Select Practice			
RRv		877					
RRv applied		877	ft³	This is 40% of the storage provided or WQv whichever is less.			
Volume Treated		464	ft ³	This is the portion of the WQv that is not reduced in the practice.			
Volume Directed		0	ft ³	This volume is directed another practice			
Sizing V		OK	Check to be sure Area provided $\geq A_f$				

Bioretention Worksheet

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

$$A_f = WQ_v * (d_f) / [k * (h_f + d_f)(t_f)]$$

A_f	Required Surface Area (ft ²)
WQ_v	Water Quality Volume (ft ³)
d_f	Depth of the Soil Medium (feet)
h_f	Average height of water above the planter bed
t_f	Volume Through the Filter Media (days)

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 & Schueler, 1996)

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
2	0.20	0.15	0.75	0.73	736.89	1.40	Bioretention
Enter Impervious Area Reduced by Disconnection of Rooftops		0.00	75%	0.73	737	<<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		C					
Soil Infiltration Rate		0.00	in/hour	Okay			
Using Underdrains?		Yes Okay					
Calculate the Minimum Filter Area							
				Value	Units	Notes	
WQv				737	ft ³		
Enter Depth of Soil Media				d_f	2.5	ft	2.5-4 ft
Enter Hydraulic Conductivity				k	0.5	ft/day	
Enter Average Height of Ponding				h_f	0.5	ft	6 inches max.
Enter Filter Time				t_f	2	days	
Required Filter Area				A_f	614	ft²	
Determine Actual Bio-Retention Area							
Filter Width		35	ft				
Filter Length		27	ft				
Filter Area		945	ft ²				
Actual Volume Provided		1134	ft ³				
Determine Runoff Reduction							
Is the Bioretention contributing flow to another practice?			No	Select Practice			
RRv		454					
RRv applied		454	ft³	This is 40% of the storage provided or WQv whichever is less.			
Volume Treated		283	ft ³	This is the portion of the WQv that is not reduced in the practice.			
Volume Directed		0	ft ³	This volume is directed another practice			
Sizing V		OK	Check to be sure Area provided $\geq A_f$				

Appendix 13 | Stormwater-OandM-Plan



Engineers
Planners
Surveyors
Landscape Architects
Environmental Scientists

STORMWATER OPERATION & MAINTENANCE PLAN

MARLBORO ON HUDSON.

Prepared For

Marlboro On Hudson, LLC
11 Racquet Road
Newburgh, NY 12553

Prepared By

Maser Consulting P.A.
555 Hudson Valley Av, Suite 101
New Windsor , NY 12553
845.564.4495

JUNE 2018

MC PROJECT NO. 030218F



Project Description

The applicant, Highland Avenue Marlboro, LLC proposes to develop the remaining 24 residential units, clubhouse and pool that were proposed under the previously approved site plan, along with the remaining utilities, drainage improvements and the extension of Hudson Circle that have yet to be constructed. The proposed development is largely unchanged from the previously approved site plan. The only significant changes being the stormwater improvements that have been updated to conform to the latest standards set forth under the New York State Stormwater Design Manual, dated January 2015. The site plan has also been slightly altered to conform to the latest Town of Marlborough Code and Zoning.

Site Drainage

A State Pollutant Discharge Elimination System Permit (SPDES GP 0-15-002) is required from the New York State Department of Environmental Conservation (NYSDEC) and a Storm Water Pollution Prevention Plan (SWPPP) has been prepared for review/approval by the Town of Marlborough (an MS4 community). The site improvements made to the parcel are considered redevelopment and will increase previous area on the site. The study provides the proposed improvements and provides measures that will be used to control potential impacts due to storm water runoff.

Constructed Stormwater Control Practices

Catch Basins:

Catch basins on-site are utilized to collect stormwater run-off and melting snow from the paved parking areas, driveway and sidewalks. These are located along the centerline of roadside swales.

Drain/Yard Inlets:

Drain/yard inlets are located within the landscaped areas and are utilized to collect overland stormwater run-off and snow melt.

Roof leaders:

Roof leaders are utilized to collect stormwater run-off from the roof and discharge it into the subsurface chamber system.

Bioretention Basin

These are shallow stormwater depressions which capture run-off from a surrounding drainage area (six inch deep surface ponding area) and then utilize an engineered soil strata and vegetation for treatment.



Typical Maintenance for Stormwater Practices

As a consequence of its function, the stormwater conveyance system collects and transports runoff that may contain certain pollutants. Maintaining catch basins, stormwater inlets, and the basins on a regular basis will remove pollutants, prevent clogging of the downstream conveyance system, restore catch basins' sediment trapping capacity, and ensure the system functions properly to avoid flooding.

Catch Basins:

Catch basins should be inspected monthly and after heavy rain fall to ensure they are functioning properly. Typical maintenance of catch basins includes removal of debris from the grate and sump. This can be done manually or using a vehicle equipped with a vacuum pump. Catch basins should be cleaned out at least one (1) time per year. A good time to clean out catch basins is in the spring to remove the build-up of leaves, sand used for traction, dirt, and other debris that accumulates during winter months.

Drain/Yard Inlets:

Drain/yard inlets, similar to the catch basins, require typical maintenance which includes removal of debris from the grate and sump manually. For this site, use of a vac truck may cause damage to the lawn areas around these structures. Inspections of the structures should occur monthly and after heavy rain fall to ensure they are still functioning properly. These should be cleaned out at least one (1) time per year.

Roof leaders:

Roof leaders, similar to the catch basins, require typical maintenance which includes removal of debris manually. Inspections of the leaders should occur monthly and after heavy rain fall to ensure they are still functioning properly. These should be cleaned out at least one (1) time per year.

Bioretention Areas:

These areas should be inspected monthly and after heavy rain fall to ensure they are functioning properly. Typical maintenance of the bio-retention areas include removal of debris, weeding (especially in the first couple of years while the plants are establishing their root systems) and mulching. Any areas devoid of mulch shall be re-mulched on an annual basis. Dead or diseased plant material shall be replaced immediately.

Silt/Sediment removal from the filter bed shall be conducted when the accumulation exceeds one inch or every five to six years. If the filter bed ponds water at the surface for more than 48 hours, the top 4-6 inches (below the mulch) of material shall be removed and replaced with fresh material. Any plant material removed during clean-out shall be replaced in-kind.

See Design Plans and Details for the components of the soil mixture for the filter bed.

Stormwater Basins:



These basins should be inspected monthly (this includes the inlets pipes, rip-rap, embankments, outlet control structure, emergency spillway and fencing) and after heavy rain fall to ensure proper functionality.

Long-term Stormwater Basin maintenance requires the following:

- Mowing grass, at least twice yearly. Grass clippings and other debris must be removed from the basin area after each cutting. Removal of woody brush and trees. Reestablish good grass cover in areas where woody material has been removed.
- Leaves shall be removed as needed from the basin and outlet control structure.
- Restore and reseed eroded any areas and gullies along embankment areas. Reoccurring erosion should be inspected by a licensed professional engineer to determine probable cause and remedial action that may be necessary.
- General maintenance and repairs of the stormwater outlet and inlet structures.
- Sediment removal from forebay and micropool every five to six years or when 50% full.
- The emergency spillway must remain free of debris and maintain the design elevation in order to convey stormwater during a catastrophic storm event.

Summary

In general, any deficiencies identified during the regular inspections or otherwise for all the stormwater management facilities should be corrected immediately. See appendices for forms to record inspection and maintenance work for the stormwater facilities.



APPENDIX A

GENERAL INSPECTION FORMS

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:

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		

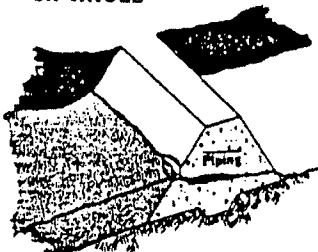
Comments:

Actions to be Taken:

31 **FIGURES 5.3.1**
INSPECTION GUIDELINES -
EMBANKMENT UPSTREAM SLOPE

PROBLEM

SINKHOLE



PROBABLE CAUSE

Piping or internal erosion of embankment materials or foundation causes a sinkhole. The cave-in of an eroded cavern can result in a sink hole. A small hole in the wall of an outlet pipe can develop a sink hole. Dirty water at the exit indicates erosion of the dam.

POSSIBLE CONSEQUENCES

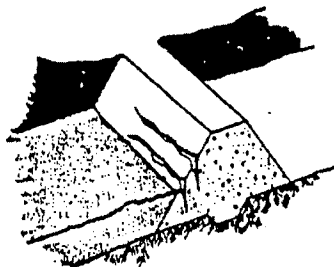
HAZARDOUS

Piping can empty a reservoir through a small hole in the wall or can lead to failure of a dam as soil pipes erode through the foundation or a pervious part of the dam.

RECOMMENDED ACTIONS

Inspect other parts of the dam for seepage or more sink holes. Identify exact cause of sink holes. Check seepage and leakage outflows for dirty water. A qualified engineer should inspect the conditions and recommend further actions to be taken.
ENGINEER REQUIRED

LARGE CRACKS



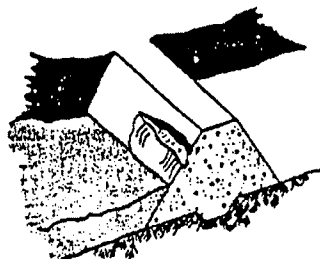
A portion of the embankment has moved because of loss of strength, or the foundation may have moved, causing embankment movement.

HAZARDOUS

Indicates onset of massive slide or settlement caused by foundation failure.

Depending on embankment involved, draw reservoir level down. A qualified engineer should inspect the conditions and recommend further actions to be taken.
ENGINEER REQUIRED

SLIDE, SLUMP OR SLIP



Earth or rocks move down the slope along a slippage surface because of too steep a slope, or the foundation moves. Also, look for slides movement in reservoir basin.

HAZARDOUS

A series of slides can lead to obstruction of the outlet or failure of the dam.

Evaluate extent of the slide. Monitor slide. (See Chapter 6.) Draw the reservoir level down if safety of dam is threatened. A qualified engineer should inspect the conditions and recommend further actions to be taken.
ENGINEER REQUIRED

SCARPS, BENCHES, OVERSTEEP AREAS

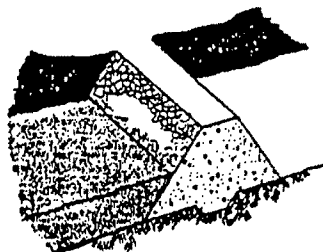
Wave action, local settlement, or ice action cause soil and rock to erode and slide to the lower part of the slope forming a bench.

Erosion lessens the width and possible height of the embankment and could lead to increased seepage or overtopping of the dam.

Determine exact cause of scarps. Do necessary earthwork, restore embankment to original slope and provide adequate protection (bedding and riprap). See Chapter 7.

32 PROBLEM

BROKEN DOWN MISSING RIPRAP



PROBABLE CAUSE

Poor quality riprap has deteriorated. Wave action or ice action has displaced riprap. Round and similar-sized rocks have rolled downhill.

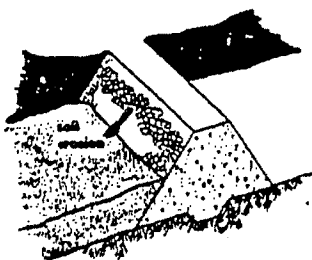
POSSIBLE CONSEQUENCES

Wave action against these unprotected areas decreases embankment width.

RECOMMEND ACTIONS

Re-establish normal slope. Place bedding and competent riprap. (See Chapter 7.)

EROSION BEHIND POORLY GRADED RIPRAP



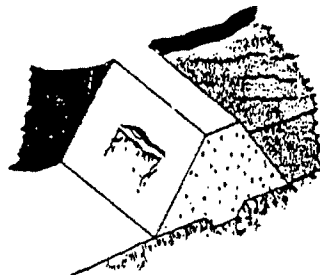
Similar-sized rocks allow waves to pass between them and erode small gravel particles and soil.

Soil is eroded away from behind the riprap. This allows riprap to settle, providing less protection and decreased embankment width.

Re-establish effective slope protection. Place bedding material. **ENGINEER REQUIRED** for design for gradation and size for rock for bedding and riprap. A qualified engineer should inspect the conditions and recommend further actions to be taken.

Figures 5.3.2
Inspection Guidelines -
Downstream Slope

SLIDE/SLOUGH



1. Lack of or loss of strength of embankment material.
2. Loss of strength can be attributed to infiltration of water into the embankment or loss of support by the foundation.

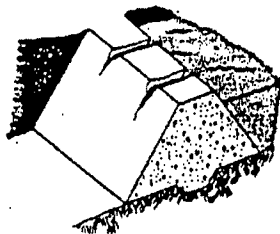
HAZARDOUS

Massive slide cuts through crest or upstream slope reducing freeboard and cross section. Structural collapse or overtopping can result.

1. Measure extent and displacement of slide.
 2. If continued movement is seen, begin lowering water level until movement stops.
 3. Have a qualified engineer inspect the condition and recommend further action.
- ENGINEER REQUIRED**

PROBLEM

TRANSVERSE CRACKING



PROBABLE CAUSE

Differential settlement of the embankment also leads to transverse cracking (e.g., center settles more than abutments).

POSSIBLE CONSEQUENCES

HAZARDOUS

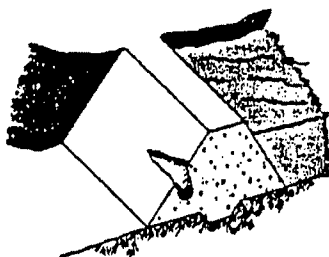
Settlement or shrinkage cracks can lead to seepage of reservoir water through the dam. Shrinkage cracks allow water to enter the embankment. This promotes saturation and increases freeze-thaw action.

RECOMMENDED ACTIONS

1. If necessary, plug upstream end of crack to prevent flows from the reservoir.
2. A qualified engineer should inspect the conditions and recommend further actions to be taken.

ENGINEER REQUIRED

CAVE IN/COLLAPSE



1. Lack of adequate compaction.
2. Rodent hole below.
3. Piping through embankment or foundation.

HAZARDOUS

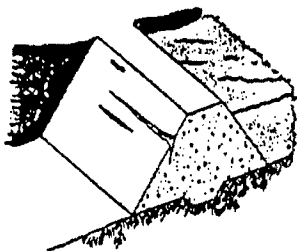
Indicates possible wash out of embankment.

1. Inspect for and immediately repair rodent holes. Control rodents to prevent future damage.

2. Have a qualified engineer inspect the condition and recommend further action.

ENGINEER REQUIRED

LONGITUDINAL CRACKING

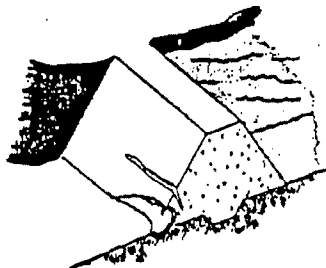


1. Drying and shrinkage of surface material.
2. Downstream movement of settlement of embankment.

1. Can be an early warning of a potential slide.
2. Shrinkage cracks allow water to enter the embankment and freezing will further crack the embankment.
3. Settlement or slide showing loss of strength in embankment can lead to failure.

1. If cracks are from drying, dress area with well-compacted material to keep surface water out and natural moisture in.
2. If cracks are extensive, a qualified engineer should inspect the conditions and recommend further actions to be taken.

ENGINEER REQUIRED

SLUMP
(LOCALIZED CONDITION)

Preceded by erosion undercutting a portion of the slope. Can also be found on steep slopes.

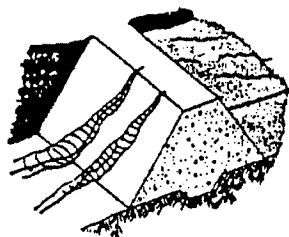
Can expose impervious zone to erosion and lead to further slumps.

1. Inspect area for seepage.
2. Monitor for progressive failure.
3. Have a qualified engineer inspect the condition and recommend further action.

ENGINEER REQUIRED

34 PROBLEM

EROSION



PROBABLE CAUSE

Water from intense rainstorms or snow-melt carries surface material down the slope, resulting in continuous troughs.

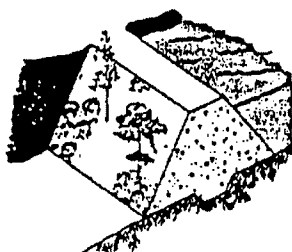
POSSIBLE CONSEQUENCES

Can be hazardous if allowed to continue. Erosion can lead to eventual deterioration of the downstream slope and failure of the structure.

RECOMMENDED ACTIONS

1. The preferred method to protect eroded areas is rock or riprap.
2. Re-establishing protective grasses can be adequate if the problem is detected early.

TREES/OBSCURING BRUSH

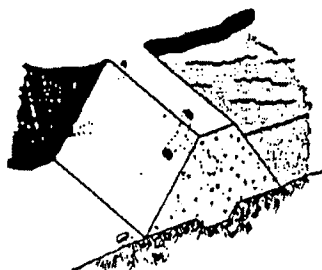


Natural vegetation in area.

Large tree roots can create seepage paths. Bushes can obscure visual inspection and harbor rodents.

1. Remove all large, deep-rooted trees and shrubs on or near the embankment. Properly backfill void. (See Chapter 7.)
2. Control vegetation on the embankment that obscures visual inspection. (See Chapter 7.)

RODENT ACTIVITY

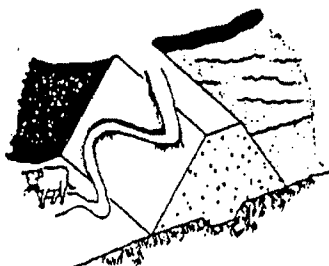


Over-abundance of rodents. Holes, tunnels and caverns are caused by animal burrowings. Certain habitats like cattail type plants and trees close to the reservoir encourage these animals.

Can reduce length of seepage path, and lead to piping failure. If tunnel exists through most of the dam, it can lead to failure of the dam.

1. Control rodents to prevent more damage.
2. Backfill existing rodent holes.
3. Remove rodents. Determine exact location of digging and extent of tunneling. Remove habitat and repair damages. (See Chapter 7.)

LIVESTOCK/CATTLE TRAFFIC



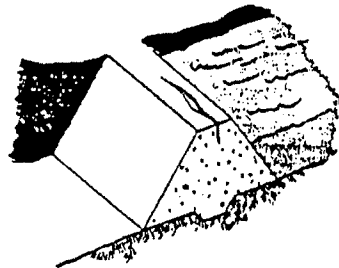
Excessive travel by livestock especially harmful to slope when wet.

Creates areas bare of erosion protection and causes erosion channels. Allows water to stand. Area susceptible to drying cracks.

1. Fence livestock outside embankment area.
2. Repair erosion protection, i.e., riprap, grass.

PROBLEM

LONGITUDINAL CRACK



PROBABLE CAUSE

1. Uneven settlement between adjacent sections or zones within the embankment.
2. Foundation failure causing loss of support to embankment.
3. Initial stages of embankment slide.

POSSIBLE CONSEQUENCES

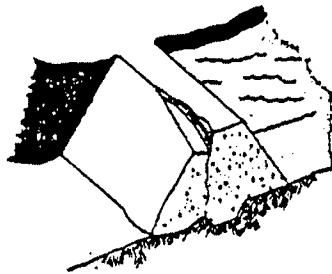
HAZARDOUS

1. Creates local area of low strength within embankment. Could be the point of initiation of future structural movement, deformation, or failure.
2. Provides entrance point for surface run-off into embankment, allowing saturation of adjacent embankment area, and possible lubrication which could lead to localized failure.

RECOMMENDED ACTIONS

1. Inspect crack and carefully record location, length, depth, width, alignment, and other pertinent physical features. Immediately stake out limits of cracking. Monitor frequently.
 2. Engineer should determine cause of cracking and supervise steps necessary to reduce danger to dam and correct condition.
 3. Effectively seal the cracks at the crest's surface to prevent infiltration by surface water.
 4. Continue to routinely monitor crest for evidence of further cracking.
- ENGINEER REQUIRED**

VERTICAL DISPLACEMENT



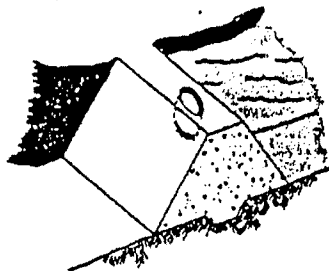
1. Vertical movement between adjacent sections of the embankment.
2. Structural deformation or failure caused by structural stress or instability, or by failure of the foundation.

HAZARDOUS

1. Provides local area of low strength within embankment which could cause future movement.
2. Leads to structural instability or failure.
3. Provides entrance point for surface water that could further lubricate failure plane.
4. Reduces available embankment cross section.

1. Carefully inspect displacement and record its location, vertical and horizontal displacement, length, and other physical features. Immediately stake out limits of cracking.
 2. Engineer should determine cause of displacement and supervise all steps necessary to reduce danger to dam and correct condition.
 3. Excavate area to the bottom of the displacement. Backfill excavation using competent material and correct construction techniques, and under supervision of engineer.
 4. Continue to monitor areas routinely for evidence of future cracking or movement. (See Chapter 6.)
- ENGINEER REQUIRED**

CAVE-IN ON CREST



1. Rodent activity.
2. Hole in outlet conduit is causing erosion of embankment material.
3. Internal erosion or piping of embankment material by seepage.
4. Breakdown of dispersive clays within embankment by seepage waters.

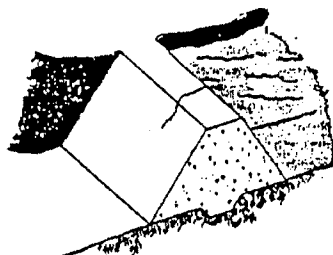
HAZARDOUS

1. Void within dam could cause localized caving, sloughing, instability, or reduced embankment cross section.
2. Entrance point for surface water.

1. Carefully inspect and record location and physical characteristics (depth, width, length) of cave in.
 2. Engineer should determine cause of cave in and supervise all steps necessary to reduce threat to dam and correct condition.
 3. Excavate cave in, slope sides of excavation, and backfill hole with competent material using proper construction techniques. (See Chapter 7.) This should be supervised by engineer.
- ENGINEER REQUIRED**

PROBLEM

TRANSVERSE CRACKING



PROBABLE CAUSE

1. Uneven movement between adjacent segments of the embankment.
2. Deformation caused by structural stress or instability.

POSSIBLE CONSEQUENCES

HAZARDOUS

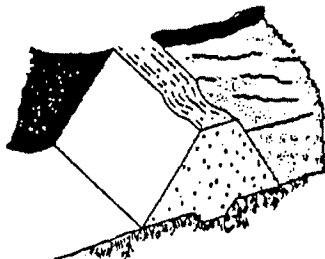
1. Can provide a path for seepage through the embankment cross section.
2. Provides local area of low strength within embankment. Future structural movement, deformation or failure could begin.
3. Provides entrance point for surface runoff to enter embankment.

RECOMMENDED ACTIONS

1. Inspect crack and carefully record crack location, length, depth, width, and other pertinent physical features. Stake out limits of cracking.
2. Engineer should determine cause of cracking and supervise all steps necessary to reduce danger to dam and correct condition.
3. Excavate crest along crack to a point below the bottom of the crack. Then backfilling excavation using competent material and correct construction techniques. This will seal the crack against seepage and surface runoff. (See Chapter 7.) This should be supervised by engineer.
4. Continue to monitor crest routinely for evidence of future cracking. (See Chapter 6.)

ENGINEER REQUIRED

CREST MISALIGNMENT



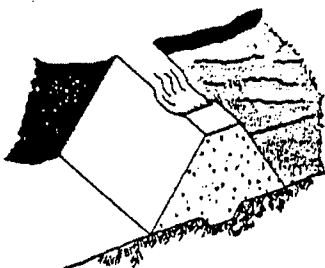
1. Movement between adjacent parts of the structure.
2. Uneven deflection of dam under loading by reservoir.
3. Structural deformation or failure near area of misalignment.

1. Area of misalignment is usually accompanied by low area in crest which reduces freeboard.
2. Can produce local areas of low embankment strength which may lead to failure.

1. Establish monuments across crest to determine exact amount, location, and extent of misalignment.
2. Engineer should determine cause of misalignment and supervise all steps necessary to reduce threat to dam and correct condition.
3. Monitor crest monuments on a scheduled basis following remedial action to detect possible future movement. (See Chapter 6.)

ENGINEER REQUIRED

LOW AREA IN CREST OF DAM



1. Excessive settlement in the embankment or foundation directly beneath the low area in the crest.
2. Internal erosion of embankment material.
3. Foundation spreading to upstream and/or downstream direction.
4. Prolonged wind erosion of crest area.
5. Improper final grading following construction.

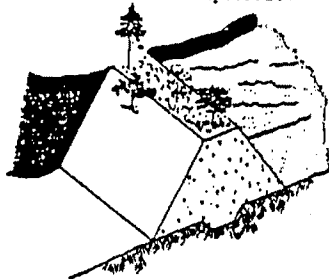
Reduces freeboard available to pass flood flows safely through spillway.

1. Establish monuments along length of crest to determine exact amount, location, and extent of settlement in crest.
2. Engineer should determine cause of low area and supervise all steps necessary to reduce possible threat of the dam and correct condition.
3. Re-establish uniform crest elevation over crest length by placing fill in low area using proper construction techniques. This should be supervised by engineer.
4. Re-establish monuments across crest of dam and monitor monuments on a routine basis to detect possible future settlement.

ENGINEER REQUIRED

PROBLEM

OBSCURING VEGETATION



PROBABLE CAUSE

Neglect of dam and lack of proper maintenance procedures.

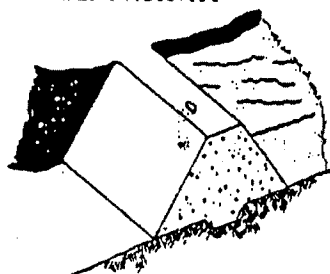
POSSIBLE CONSEQUENCES

1. Obscures large parts of the dam, preventing adequate, accurate visual inspection of all parts of the dam. Problems which threaten the integrity of the dam can develop and remain undetected until they progress to a point that threatens the dam's safety.
2. Associated root systems develop and penetrate into the dam's cross section. When the vegetation dies, the decaying root systems can provide paths for seepage. This reduces the effective seepage path through the embankment and could lead to possible piping situations.
3. Prevents easy access to all parts of the dam for operation, maintenance, and inspection.
4. Provides habitat for rodents.

RECOMMENDED ACTIONS

1. Remove all damaging growth from the dam. This would include removal of trees, bushes, brush, conifers, and growth other than grass. Grass should be encouraged on all segments of the dam to prevent erosion by surface runoff. Root systems should also be removed to the maximum practical extent. The void which results from removing the root system should be backfilled with well-competent, well-compacted material.
2. Future undesirable growth should be removed by cutting or spraying, as part of an annual maintenance program. (See Chapter 7.)
3. All cutting or debris resulting from the vegetative removal should be immediately taken from the dam and properly disposed of outside the reservoir basin.

RODENT ACTIVITY

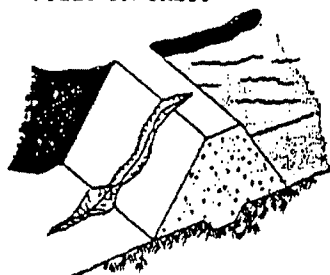


Burrowing animals.

1. Entrance point for surface runoff to enter dam. Could saturate adjacent portions of the dam.
2. Especially dangerous if hole penetrates dam below phreatic line. During periods of high storage, seepage path through the dam would be greatly reduced and a piping situation could develop.

1. Completely backfill the hole with competent, well-compacted material.
2. Initiate a rodent control program to reduce the burrowing animal population and to prevent future damage to the dam. (See Chapter 7.)

GULLY ON CREST

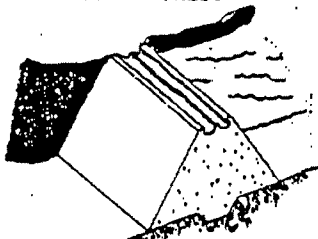


1. Poor grading and improper drainage of crest. Improper drainage causes surface runoff to collect and drain off crest at low point in upstream or downstream shoulder.
2. Inadequate spillway capacity which has caused dam to overtop.

1. Can reduce available freeboard.
2. Reduces cross-sectional area of dam.
3. Inhibits access to all parts of the crest and dam.
4. Can result in a hazardous condition if due to overtopping.

1. Restore freeboard to dam by adding fill material in low area, using proper construction techniques. (See Chapter 7.)
2. Regrading crest to provide proper drainage of surface runoff.
3. If gully was caused by overtopping, provide adequate spillway which meets current design standards. This should be done by engineer.
4. Re-establish protective cover.

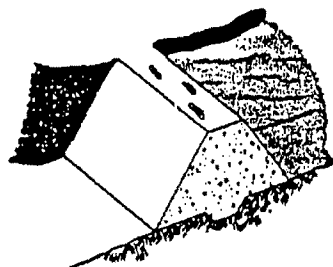
RUTS ALONG CREST



Heavy vehicle traffic without adequate or proper maintenance or proper crest surfacing.

1. Inhibits easy access to all parts of crest.
2. Allows continued development of rutting.
3. Allows standing water to collect and saturate crest of dam.
4. Operating and maintenance vehicles can get stuck.

1. Drain standing water from ruts.
2. Regrade and recompact crest to restore integrity and provide proper drainage to upstream slope. (See Chapter 7.)
3. Provide gravel or roadbase material to accommodate traffic.
4. Do periodic maintenance and regrading to prevent reforming of ruts.

PROBLEM**PUDDLING ON CREST-
POOR DRAINAGE****PROBABLE CAUSE**

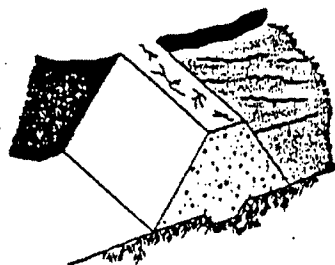
1. Poor grading and improper drainage of crest.
2. Localized consolidation or settlement on crest allows puddles to develop.

POSSIBLE CONSEQUENCES

1. Cause localized saturation of the crest.
2. Inhibits access to all parts of the dam and crest.
3. Becomes progressively worse if not corrected.

RECOMMENDED ACTIONS

1. Drain standing water from puddles.
2. Regrade and recompact crest to restore integrity and provide proper drainage to upstream slope. (See Chapter 7.)
3. Provide gravel or roadbase material to accommodate traffic.
4. Do periodic maintenance and regrading to prevent reformation of low areas.

DRYING CRACKS

Material on the crest of dam expands and contracts with alternate wetting and drying of weather cycles. Drying cracks are usually short, shallow, narrow, and many.

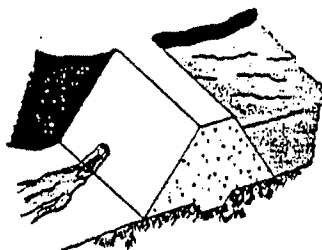
Provides point of entrance for surface runoff and surface moisture, causing saturation of adjacent embankment areas. This saturation, and later drying of the dam, could cause further cracking.

1. Seal surface of cracks with a tight, impervious material. (See Chapter 7.)
2. Routinely grade crest to provide proper drainage and fill cracks. -OR-
3. Cover crest with non-plastic (not clay) material to prevent large moisture content variations.

**Figures 5.3.4
Inspection Guidelines -
Embankment Seepage Areas**

PROBLEM

**EXCESSIVE QUANTITY
AND/OR MUDDY WATER
EXITING FROM A POINT**



PROBABLE CAUSE

1. Water has created an open pathway, channel, or pipe through the dam. The water is eroding and carrying embankment material.
2. Large amounts of water have accumulated in the downstream slope. Water and embankment materials are exiting at one point. Surface agitation may be causing the muddy water.
3. Rodents, frost action or poor construction have allowed water to create an open pathway or pipe through the embankment.

POSSIBLE CONSEQUENCES

HAZARDOUS

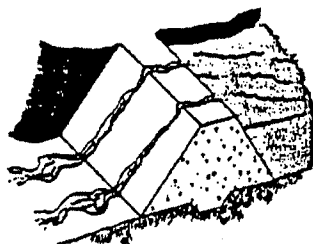
1. Continued flows can saturate parts of the embankment and lead to slides in the area.
2. Continued flows can further erode embankment materials and lead to failure of the dam.

RECOMMENDED ACTIONS

1. Begin measuring outflow quantity and establishing whether water is getting muddier, staying the same, or clearing up.
2. If quantity of flow is increasing the water level in the reservoir should be lowered until the flow stabilizes or stops.
3. Search for opening on upstream side and plug if possible.
4. A qualified engineer should inspect the condition and recommend further actions to be taken.

ENGINEER REQUIRED

**STREAM OF WATER
EXITING THROUGH CRACKS
NEAR THE CREST**



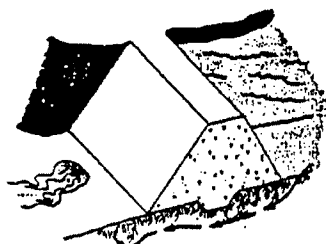
1. Severe drying has caused shrinkage of embankment material.
2. Settlement in the embankment or foundation is causing the transverse cracks.

HAZARDOUS

Flow through the crack can cause failure of the dam.

1. Plug the upstream side of the crack to stop the flow.
2. The water level in the reservoir should be lowered until it is below the level of the cracks.
3. A qualified engineer should inspect the condition and recommend further actions to be taken.

**SEEPAGE WATER
EXITING AS A BOIL
IN THE FOUNDATION**



Some part of the foundation material is supplying a flow path. This could be caused by a sand or gravel layer in the foundation.

HAZARDOUS

Increased flows can lead to erosion of the foundation and failure of the dam.

1. Examine the boil for transportation of foundation materials.
2. If soil particles are moving downstream, sandbags or earth should be used to create a dike around the boil. The pressures created by the water level within the dike may control flow velocities and temporarily prevent further erosion.
3. If erosion is becoming greater, the reservoir level should be lowered.
4. A qualified engineer should inspect the condition and recommend further actions to be taken.

ENGINEER REQUIRED

PROBLEM**SEEPAGE EXITING AT ABUTMENT CONTACT****PROBABLE CAUSE**

1. Water flowing through pathways in the abutment.
2. Water flowing through the embankment.

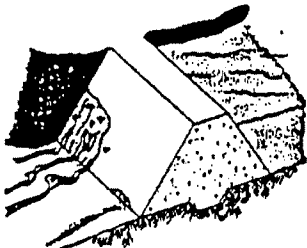
POSSIBLE CONSEQUENCES**HAZARDOUS**

Can lead to erosion of embankment materials and failure of the dam.

RECOMMENDED ACTIONS

1. Study leakage area to determine quantity of flow and extent of saturation.
2. Inspect daily for developing slides.
3. Water level in reservoir may need to be lowered to assure the safety of the embankment.
4. A qualified engineer should inspect the conditions and recommend further actions to be taken.

ENGINEER REQUIRED

LARGE AREA WET OR PRODUCING FLOW

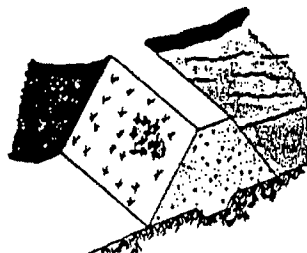
A seepage path has developed through the abutment or embankment materials and failure of the dam can occur.

HAZARDOUS

1. Increased flows could lead to erosion of embankment material and failure of the dam.
2. Saturation of the embankment can lead to local slides which could cause failure of the dam.

1. Stake out the saturated area and monitor for growth or shrinking.
2. Measure any outflows as accurately as possible.
3. Reservoir level may need to be lowered if saturated areas increase in size at a fixed storage level or if flow increases.
4. A qualified engineer should inspect the condition and recommend further actions to be taken.

ENGINEER REQUIRED

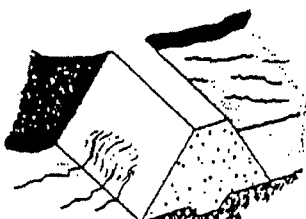
MARKED CHANGE IN VEGETATION

1. Embankment material are supplying flow paths.
2. Natural seeding by wind.
3. Change in seed type during early post construction seeding.

Can show a saturated area.

1. Use probe and shovel to establish if the materials in this area are wetter than surrounding areas.
2. If areas shows wetness, when surrounding areas do not, a qualified engineer should inspect the condition and recommend further actions to be taken.

ENGINEER REQUIRED

BULGE IN LARGE WET AREA

Downstream embankment materials have begun to move.

HAZARDOUS

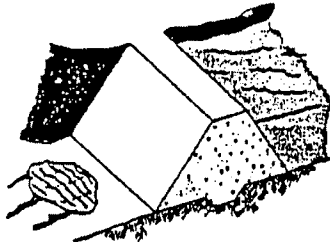
Failure of the embankment result from massive sliding can follow these early movements.

1. Compare embankment cross section to the end of construction condition to see if observed condition may reflect end of construction.
2. Stake out affected area and accurately measure outflow.
3. A qualified engineer should inspect the condition and recommend further actions to be taken.

ENGINEER REQUIRED

41 PROBLEM

TRAMPOLINE EFFECT IN LARGE SOGGY AREA



PROBABLE CAUSE

1. Water moving rapidly through the embankment or foundation is being controlled or contained by a well-established turf root system.

POSSIBLE CONSEQUENCES

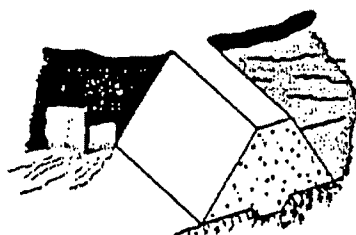
Condition shows excessive seepage in the area. If control layer of turf is destroyed, rapid erosion of foundation materials could result in failure of the dam.

RECOMMENDED ACTIONS

1. Carefully inspect the area for outflow quantity and any transported material.
2. A qualified engineer should inspect the condition and recommend further actions to be taken.

ENGINEER REQUIRED

LEAKAGE FROM ABUTMENTS BEYOND THE DAM

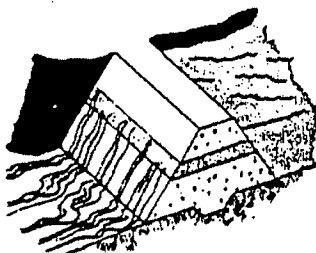


Water moving through cracks and fissures in the abutment materials.

Can lead to rapid erosion of abutment and evacuation of the reservoir. Can lead to massive slides near or downstream from the dam.

1. Carefully inspect the area to determine quantity of flow and amount of transported material.
2. A qualified engineer or geologist should inspect the condition and recommend further actions to be taken.

WET AREA IN HORIZONTAL BAND



Frost layer or layer of sandy material in original construction.

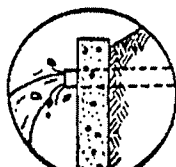
HAZARDOUS

1. Wetting of areas below the area of excessive seepage can lead to localized instability of the embankment. (SLIDES)
2. Excessive flows can lead to accelerated erosion of embankment materials and failure of the dam.

1. Determine as closely as possible the flow being produced.
2. If flow increases, reservoir level should be reduced until flow stabilizes or stops.
3. Stake out the exact area involved.
4. Using hand tools, try to identify the material allowing the flow.
5. A qualified engineer should inspect the condition and recommend further actions to be taken.

ENGINEER REQUIRED

LARGE INCREASE IN FLOW OR SEDIMENT IN DRAIN OUTFALL



A shortened seepage path or increased storage levels.

HAZARDOUS

1. Higher velocity flows can cause erosion of drain then embankment materials.
2. Can lead to piping failure.

1. Accurately measure outflow quantity and determine amount of increase over previous flow.
2. Collect jar samples to compare turbidity.
3. If either quantity or turbidity has increased by 25%, a qualified engineer should evaluate the condition and recommend further actions.

ENGINEER REQUIRED

Appendix 14 | Precipitation Tables 41.6°N, 73

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	73.981 degrees West
Latitude	41.600 degrees North
Elevation	0 feet
Date/Time	Wed, 06 Jun 2018 16:22:55 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.32	0.49	0.61	0.80	1.00	1.25	1yr	0.87	1.17	1.43	1.75	2.14	2.61	2.96	1yr	2.31	2.84	3.30	3.97	4.59	1yr
2yr	0.38	0.59	0.73	0.97	1.21	1.51	2yr	1.05	1.41	1.73	2.13	2.59	3.15	3.56	2yr	2.79	3.42	3.92	4.62	5.25	2yr
5yr	0.45	0.70	0.88	1.18	1.51	1.90	5yr	1.30	1.74	2.18	2.68	3.26	3.93	4.49	5yr	3.48	4.32	4.95	5.72	6.47	5yr
10yr	0.51	0.80	1.01	1.37	1.78	2.26	10yr	1.54	2.04	2.60	3.19	3.87	4.65	5.35	10yr	4.12	5.15	5.91	6.72	7.57	10yr
25yr	0.59	0.95	1.21	1.67	2.22	2.84	25yr	1.92	2.53	3.29	4.03	4.87	5.81	6.77	25yr	5.14	6.51	7.49	8.33	9.34	25yr
50yr	0.68	1.09	1.40	1.96	2.63	3.38	50yr	2.27	2.97	3.92	4.80	5.78	6.88	8.08	50yr	6.09	7.77	8.96	9.81	10.95	50yr
100yr	0.77	1.25	1.61	2.29	3.12	4.03	100yr	2.69	3.50	4.68	5.73	6.88	8.15	9.66	100yr	7.22	9.29	10.72	11.55	12.84	100yr
200yr	0.88	1.44	1.87	2.68	3.70	4.81	200yr	3.19	4.12	5.58	6.84	8.19	9.66	11.55	200yr	8.55	11.10	12.85	13.60	15.07	200yr
500yr	1.07	1.75	2.29	3.32	4.65	6.07	500yr	4.01	5.11	7.05	8.63	10.31	12.11	14.63	500yr	10.71	14.07	16.33	16.90	18.63	500yr

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.44	0.53	0.72	0.88	1.06	1yr	0.76	1.03	1.23	1.55	1.97	2.28	2.43	1yr	2.01	2.34	2.89	3.41	4.02	1yr
2yr	0.37	0.57	0.70	0.95	1.18	1.39	2yr	1.01	1.36	1.58	2.02	2.54	3.06	3.46	2yr	2.71	3.33	3.78	4.50	5.13	2yr
5yr	0.42	0.64	0.80	1.09	1.39	1.62	5yr	1.20	1.59	1.84	2.37	2.95	3.65	4.15	5yr	3.23	3.99	4.59	5.29	6.05	5yr
10yr	0.46	0.71	0.88	1.23	1.59	1.82	10yr	1.38	1.78	2.06	2.66	3.30	4.14	4.76	10yr	3.66	4.58	5.26	5.96	6.84	10yr
25yr	0.54	0.81	1.01	1.45	1.90	2.09	25yr	1.64	2.04	2.38	2.97	3.82	4.88	5.71	25yr	4.32	5.50	6.28	6.97	8.09	25yr
50yr	0.60	0.91	1.13	1.63	2.19	2.32	50yr	1.89	2.27	2.68	3.31	4.28	5.53	6.57	50yr	4.89	6.32	7.16	7.84	9.18	50yr
100yr	0.68	1.02	1.28	1.85	2.53	2.60	100yr	2.19	2.54	3.02	3.68	4.82	6.25	7.56	100yr	5.53	7.27	8.18	8.80	10.44	100yr
200yr	0.77	1.15	1.46	2.12	2.95	2.89	200yr	2.55	2.83	3.39	4.12	5.40	7.05	8.70	200yr	6.24	8.37	9.34	9.87	11.87	200yr
500yr	0.92	1.36	1.75	2.55	3.62	3.36	500yr	3.13	3.28	3.98	4.77	6.32	8.28	10.50	500yr	7.33	10.10	11.13	11.46	14.11	500yr

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.35	0.54	0.67	0.89	1.10	1.33	1yr	0.95	1.30	1.50	1.92	2.39	2.87	3.22	1yr	2.54	3.09	3.66	4.25	4.95	1yr
2yr	0.40	0.62	0.76	1.03	1.27	1.52	2yr	1.09	1.48	1.72	2.22	2.77	3.28	3.68	2yr	2.91	3.54	4.10	4.77	5.41	2yr
5yr	0.49	0.76	0.94	1.29	1.64	1.94	5yr	1.41	1.90	2.23	2.86	3.61	4.22	4.85	5yr	3.74	4.67	5.33	6.18	6.91	5yr
10yr	0.58	0.89	1.11	1.55	2.00	2.36	10yr	1.72	2.30	2.72	3.50	4.43	5.16	6.00	10yr	4.57	5.77	6.58	7.54	8.35	10yr
25yr	0.73	1.10	1.37	1.96	2.58	3.05	25yr	2.23	2.99	3.57	4.73	5.80	6.75	7.93	25yr	5.97	7.63	8.72	9.85	10.73	25yr
50yr	0.86	1.31	1.63	2.34	3.15	3.73	50yr	2.72	3.65	4.38	5.85	7.11	8.27	9.82	50yr	7.32	9.44	10.82	12.07	12.98	50yr
100yr	1.02	1.54	1.93	2.79	3.83	4.56	100yr	3.30	4.45	5.37	7.24	8.73	10.16	12.15	100yr	8.99	11.68	13.44	14.81	15.71	100yr
200yr	1.21	1.82	2.30	3.33	4.65	5.55	200yr	4.01	5.43	6.60	8.96	10.71	12.47	15.02	200yr	11.03	14.45	16.72	18.20	19.01	200yr
500yr	1.52	2.26	2.91	4.23	6.02	7.23	500yr	5.19	7.07	8.65	11.90	14.04	16.37	19.92	500yr	14.49	19.15	22.35	23.94	24.48	500yr

Appendix 15 | Erosion & sediment Control Plans

Appendix 16 | Highland Avenue Drainage and Hydrology Report October 2003

Highland Avenue Development

Tax Lot **108.12-8-23**

Town of Marlborough, Ulster County

Drainage and Hydrology Report

October 17, 2003



Andrew B. Fetherston, P.E., CPESC
N.Y.S. License No. 073555



Consulting, Municipal & Environmental Engineers
Planners * Surveyors * Landscape Architects

One Crosfield Avenue, Suite 1, West Nyack, NY 10994
Tel: 845.727.1160 * Fax: 845.727.1162
www.maserconsulting.com

PROJECT: Highland Avenue Development
Town of Marlborough, NY
MC Project No. 03-0218B

SCOPE: Drainage and Hydrology Report

DATE: October 17, 2003

INTRODUCTION:

The proposed construction of new buildings, driveways, parking areas and site improvements on this 6.2-acre site requires the study of the impacts on watercourses in and around the site. This study reviews the existing drainage conditions as well as the proposed improvements to provide measures that will be used to control any potential impacts due to stormwater runoff.

The site is divided topographically into 2 watersheds. Stormwater runoff flows from the northern portion of the site to an existing drainage ditch on the northeast corner of the site. Stormwater runoff from the southern portion of the site flows toward an existing drainage ditch on the southeast corner of the site. There are no NYSDEC wetlands on or bordering the site, and no flood plains have been identified on the FEMA mapping prepared for the Town. Federal wetlands have been located on the property. Application shall be made for Nationwide permit(s) for areas to be disturbed (filled).

The site as designed is subject to SPDES Phase II permitting through the NYSDEC. The on and off-site areas have been broken into subareas based on land use. Mitigation for the increase in peak flow and to provide water quality benefits shall be accomplished using two (2) "Pocket Ponds". Pocket Ponds are described in the New York State Stormwater Management Design Manual as a stormwater pond designed for treatment of small drainage area (< 5 acres) runoff and which has little or no baseflow available to maintain water elevations and relies on ground water to maintain a permanent pool. The Pocket Ponds designed for the site provide the required Water Quality, Channel Protection, Overbank Flood Protection, and Extreme Flood Protection.

METHODOLOGY:

1. The watersheds are divided into subareas, by topography and land use. The hydrologic soil type "C" is constant throughout the site. Tabulations of areas and land use descriptions are shown on the enclosed maps and tables. A summary of the watershed areas, composite curve numbers, and lag times are shown in the Summary Table.
2. The peak flows from the watersheds in the existing condition are computed to determine undeveloped peak runoff and runoff hydrographs at the design points. The existing peak flows are presented in the Summary Table.
3. In the after development condition, the peak flows from the proposed development are computed by using the runoff curve numbers taken from TR-55. The watersheds are adjusted for the proposed improvements and grading of the site. The runoff flows are hydraulically routed for updated travel times, diversions, and new storage structures as necessary. The resulting, proposed peak flows at each design point are presented on the Summary Table.

4. Maps indicating the various drainage conditions are enclosed in this report. Schematic diagrams of the flow models in the existing and proposed conditions are enclosed in the HEC-1 output.

5. The methods used are those presented in the US Army Corps of Engineers HEC-1 computer program using a shortened printout for convenience. The 100, 50, 25, 10, 5, 2 and 1-year frequency storms are studied. The SCS type III - 24-hour storm distribution (Ulster) is used throughout. Soil types and hydrologic groups are based on soil maps from the Ulster County Soil Survey. Onsite topographical mapping is taken from site-specific mapping, while offsite areas have been modeled using USGS quadrangles.

Table 1: Input Data

Drainage Area Name	Existing Drainage Area (Ac)	Proposed Drainage Area (Ac)	Existing CN	Proposed CN	Existing Lag	Proposed Lag
1	4.448	3.463	73.27	72.26	0.25	0.25
1a		2.432		84.31		0.09
2	2.218	1.113	75.77	81.76	0.18	0.18
3	10.944	8.379	78.14	79.27	0.24	0.24
3a		2.223		84.31		0.08

Table 2: Existing and Proposed Peak Flow Summary to the Design Point.

Design Point Name	Storm Event (Yr)	Existing Peak Flow (Cfs)	Proposed Peak Flow (Cfs)	Net Change (Cfs)	Percent Change Over Prior Conditions
1	1	4 3.56	4	0	0.0
	2	5	5	0	0.0
	5	8	8	0	0.0
	10	10 9.81	10	0	0.0
	25	12	11	-1	-8.3
	50	13	13	0	0.0
	100	16 15.30	16	0	0.0
2	1	6 2.42	6	0	0.0
	2	8	7	-1	-12.5
	5	12	10	-2	-16.7
	10	16 6.17	13	-3	-18.8
	25	18	15	-3	-16.7
	50	21	17	-4	-19.0
	100	25 9.37	21	-4	-16.0
3	1	13 11.77	12	-1	-7.7
	2	16	15	-1	-6.3
	5	23	23	0	0.0
	10	30 28.67	30	0	0.0
	25	34	34	0	0.0
	50	38	38	0	0.0
	100	45 42.75	45	0	0.0

DESCRIPTION:

The design points evaluated in this report are described as follows: Design Point 1 represents the total peak flow from watershed 1 in the existing condition. After development, Design point 1 represents the sum of the hydrographs from watershed 1 and the reservoir routed hydrograph from pond 1. Design Point 1 is located in the drainage channel on the southeast corner of the site where the flows leave the site and enter the Town's drainage ditch along South Street. Design Point 2 is located in the drainage channel on the southwest corner of the site where the hydrographs from Design Point 1 combine with the hydrograph from watershed 2. Design Point 3 is located in an existing drainage channel north of the site. After development, Design point 3 represents the sum of the hydrographs from watershed 3 and the reservoir routed hydrograph from pond 3.

SCS Soils:

The Soil Survey of Rockland County, New York, Sheets 17 and 20, show the site to be situated in the areas labeled, "Wc," "WeB," "WeC," "WeD," and "WuB". The hydrologic soil types are shown in the curve number calculations.

DISCUSSION:

Townhouse Curve Number:

Maser Consulting determined the total impervious area for the site. The percent impervious cover was equated to a dense residential land use in TR-55. The percent impervious was determined to be 41% - between Residential 1/4 acre and Residential 1/8 acre. A numerical interpolation was performed to determine the curve number for the 41 percent impervious, townhouse land use.

Site Impervious Cover Calculation:

Impervious Cover		
Units, Drives, Walks, Sidewalks	49788	Sf
Road	55200	Sf
Parking	5184	Sf
Pool	3139	Sf
Total	113311	Sf
Total	2.60	Ac
Site Area	6.29	Ac
% Impervious	41%	

Townhouse CN Calculation:

Land Use	CN	Percent Impervious
Residential 1/8 Acre	90	65
Residential 1/4 Acre	83	38
Townhouse	84.31	41

Zero-Net Increase:

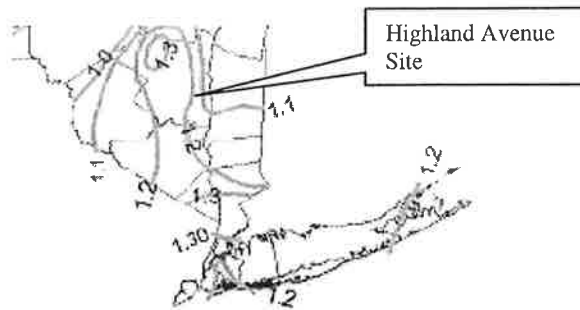
The proposed improvements to the site provide mitigation of peak flows for channel protection and flood control per SPDES. A zero net increase in peak flow is accomplished by two (2) Pocket Ponds. As shown in the attached HEC-1 model, the proposed peak flow for all storms studied is

maintained or reduced in the proposed condition. For example, at Design Point 1, the peak flow after development is maintained at 16 cfs during the 100-year storm.

Pocket Pond:

A Stormwater Pond is proposed to provide water quality treatment in keeping with the requirements in the New York State Stormwater Management Design Manual (NYSSMDM). Maser Consulting proposes a Pocket Pond (Design P-5) for the site. A Pocket Pond is a stormwater pond design adapted for the treatment of runoff from small drainage areas that have little or no baseflow available to maintain water elevations and relies on ground water to maintain a permanent pool. An illustration is provided below.

To the maximum extent practicable, the first flush of stormwater runoff from the majority of the site (parking, proposed building rooftops, landscaped areas and drives) shall be directed to an to the ponds designed to treat the Water Quality Volume. The 90% rainfall event value (P) used in the calculations (1.15) is shown below in the portion of figure 4.1 from page 4.2 in the



90% Rule:

$$WQ_v = [(P)(R_v)(A)] / 12$$

$$R_V = 0.05 + 0.009(1)$$

I = Impervious Cover (Percent)

Minimum $R_v = 0.2$

P = 90% Rainfall Event Number (See Figure 4.1)

A = site area in acres

Water Quality Volume (Wqv) Calculations:

Watershed 1.1				Watershed 3.1		
I	41.0	%		I	41.0	%
P	1.15	In		P	1.15	In
A	2.43	Acres		A	2.22	Acres
Rv	0.42			Rv	0.42	
Wqv	4,254	Cf		Wqv	3,889	Cf

The Runoff Coefficient “Rv” in the computation of Water Quality Volume WQv is dependent on the percent impervious cover. The computation of Rv using the value of new impervious (41%) is 0.42. The water quality volume shall be stored in the permanent pool. As such, the HEC-1 model reservoir routing begins at the normal pool level.

Stormwater Pond Volume Calculation:

Pond 1					
Elevation	Area (Ac)	Volume Per Contour Interval (Cf)	Cumulative Volume (Cf)	Volume Per Contour Interval (Acft)	Cumulative Volume (Acft)
363.00	0.056	0	0	0.000	0.000
364.00	0.070	2,744	2,744	0.063	0.063
364.45	Water Quality Volume		4,254		
365.00	0.085	3,376	6,120	0.078	0.141
366.00	0.101	4,051	10,171	0.093	0.234
367.00	0.118	4,770	14,941	0.110	0.343
368.00	0.135	5,510	20,451	0.127	0.470
369.00	0.153	6,273	26,724	0.144	0.614
370.00	0.171	7,057	33,781	0.162	0.776
Pond 3					
Elevation	Area (Ac)	Volume Per Contour Interval (Cf)	Cumulative Volume (Cf)	Volume Per Contour Interval (Acft)	Cumulative Volume (Acft)
365.00	0.000	0	0	0.000	0.000
366.00	0.052	1,133	1,133	0.026	0.026
367.00	0.068	2,614	3,746	0.060	0.060
367.04	Water Quality Volume		3,889		
368.00	0.082	3,267	7,013	0.075	0.135
369.00	0.100	3,964	10,977	0.091	0.226
370.00	0.120	4,792	15,769	0.110	0.336

Construction Sequence:

The pond may be used as a temporary sediment basin during construction. Direct access shall be provided to the pond for maintenance and rehabilitation. The pond proposed shall include dewatering methods in the event of failure. Dewatering is accomplished with a valved pipe system.

SUMMARY OF PROPOSED STORMWATER IMPROVEMENTS:

Maintenance of or reductions in peak flow have been provided at the site for all storm events studied.

The pond proposed meets the criteria set in the NYSSMDM. Runoff from the most impervious portions of the site (driveways, parking areas, landscaped areas and the buildings) shall be treated in the pond.

The combination of a peak flow reductions, water quality volume treatment and vegetated cover should provide long-term treatment of runoff in keeping with the relevant standards.

CONCLUSION:

As the proposed stormwater management plan allows for the maintenance or reductions in peak flows for a wide variety of storms at the design points studied, and water quality mitigation meeting the applicable standards, there should be no adverse impacts due to stormwater, either on-site or off-site, as a result of the proposed site development.

Submitted By:

Andrew B. Fetherston, P.E., CPESC

Existing Curve Numbers						
Watershed 1						
Subarea	Area (Ac)	Land Use	Condition	Soil Group	Curve Numbers	Product
A	0.160	Residential	1 Acre	C	79	12.640
B	0.303	Woods	Good	C	70	21.210
C	0.559	Woods	Good	C	70	39.130
D	0.720	Brush	Poor	C	77	55.440
E	0.105	Woods	Good	C	70	7.350
F	0.105	Road & Gutter		C	92	9.660
G	1.856	Woods	Good	C	70	129.920
H	0.640	Residential	1 Acre	C	79	50.560
	4.448				73.27	325.910
Watershed 2						
Subarea	Area (Ac)	Land Use	Condition	Soil Group	Curve Numbers	Product
A	0.442	Road & Gutter		C	92	40.664
B	0.418	Woods	Good	C	70	29.260
C	0.243	Brush	Poor	C	77	18.711
D	0.920	Woods	Good	C	70	64.400
E	0.195	Brush	Poor	C	77	15.015
	2.218				75.77	168.050
Watershed 3						
Subarea	Area (Ac)	Land Use	Condition	Soil Group	Curve Numbers	Product
A	0.206	Road & Gutter		C	92	18.952
B	1.188	Woods	Good	C	70	83.160
C	1.107	Road & Gutter		C	92	101.844
D	0.761	Residential	1 Acre	C	79	60.119
E	2.619	Residential	2 Acre	C	77	201.663
F	2.146	Brush	Poor	C	77	165.242
G	0.699	Woods	Good	C	70	48.930
H	2.218	Residential	1 Acre	C	79	175.222
	10.944				78.14	855.132
Proposed Curve Numbers						
Watershed 1						
Subarea	Area (Ac)	Land Use	Condition	Soil Group	Curve Numbers	Product
A	0.160	Residential	1 Acre	C	79	12.640
B	0.303	Woods	Good	C	70	21.210
C (Onsite)	0.349	Woods	Good	C	70	24.430
D (Onsite)	0.155	Open Space	Good	C	74	11.470
E	1.856	Woods	Good	C	70	129.920
F	0.640	Residential	1 Acre	C	79	50.560
	3.463				72.26	250.230
Watershed 1.1						
Subarea	Area (Ac)	Land Use	Condition	Soil Group	Curve Numbers	Product
A (Onsite)	2.432	Townhouse		C	84.31	205.036

Proposed Curve Numbers Watershed 2						
Subarea	Area (Ac)	Land Use	Condition	Soil Group	Curve Numbers	Product
F	0.093	Open Space	Good	C	74	6.882
G	0.092	Impervious		C	98	9.016
I	0.133	Woods	Good	C	70	9.310
J	0.199	Woods	Good	C	70	13.930
K	0.035	Woods	Good	C	70	2.450
L	0.439	Road & Gutter		C	92	40.388
M	0.122	Open Space	Good	C	74	9.028
	1.113				81.76	91.004
Watershed 3						
Subarea	Area (Ac)	Land Use	Condition	Soil Group	Curve Numbers	Product
A	0.206	Road & Gutter		C	92	18.952
B	0.057	Woods	Good	C	70	3.990
C	0.080	Open Space	Good	C	74	5.920
D	0.069	Impervious		C	98	6.762
E	0.240	Open Space	Good	C	74	17.760
F	0.132	Woods	Good	C	70	9.240
G	0.699	Woods	Good	C	70	48.930
H	2.218	Residential	1 Acre	C	79	175.222
I	1.087	Road & Gutter		C	92	100.004
J	0.761	Residential	1 Acre	C	79	60.119
K	2.619	Residential	2 Acre	C	77	201.663
L	0.211	Open Space	Good	C	74	15.614
	8.379				79.27	664.176
Watershed 3.1						
Subarea	Area (Ac)	Land Use	Condition	Soil Group	Curve Numbers	Product
A (Onsite)	2.223	Townhouse		C	84.31	187.416

Scs Tr-55 Travel Time Computations								
Ws1 Ex								
Sheet Flow								
Length (Ft)	Elev2	Elev1	Slope Percent	Manning N	2 Yr Prp (Inches)			Travel Time (Hrs)
125.00	405.0	400.0	4.000	0.400	3.300			0.319
Shallow Concentrated Flow (Un-Paved Path)								
Length (Ft)	Elev2	Elev1	Slope Percent					Travel Time (Hrs)
160.00	400.0	370.0	18.750					0.006
Shallow Concentrated Flow (Un-Paved Path)								
Length (Ft)	Elev2	Elev1	Slope Percent					Travel Time (Hrs)
284.00	370.0	364.0	2.113					0.034
Open Channel Flow - Channel Section								
Length (Ft)	Elev2	Elev1	Slope Percent	Manning N	Top Width (Ft)	Height (Ft)	Side Slope (Ft/Ft)	Travel Time (Hrs)
157.00	364.0	363.0	0.637	0.100	4.000	1.000	2.000	0.063
Total Length (Ft)			Total Delta Y (Ft)	Average Velocity (Fps)				Total Travel Time (Hrs)
726.00			42.000	0.478				0.42

								Lag	0.25
Scs Tr-55 Travel Time Computations									
Ws2 Ex									
Sheet Flow									
Length (Ft)	Elev2	Elev1	Slope Percent	Manning N	2 Yr Prp (Inches)				Travel Time (Hrs)
100.00	376.0	372.0	4.000	0.400	3.300				0.267
Shallow Concentrated Flow (Un-Paved Path)									
Length (Ft)	Elev2	Elev1	Slope Percent						Travel Time (Hrs)
350.00	372.0	359.0	3.714						0.031
Total Length (Ft)			Total Delta Y (Ft)	Average Velocity (Fps)					Total Travel Time (Hrs)
450.00			17.000	0.419					0.30
								Lag	0.18
Scs Tr-55 Travel Time Computations									
Ws3 Ex									
Sheet Flow									
Length (Ft)	Elev2	Elev1	Slope Percent	Manning N	2 Yr Prp (Inches)				Travel Time (Hrs)
125.00	405.0	400.0	4.000	0.400	3.300				0.319
Shallow Concentrated Flow (Un-Paved Path)									
Length (Ft)	Elev2	Elev1	Slope Percent						Travel Time (Hrs)
160.00	400.0	370.0	18.750						0.006
Shallow Concentrated Flow (Un-Paved Path)									
Length (Ft)	Elev2	Elev1	Slope Percent						Travel Time (Hrs)
505.00	370.0	362.0	1.584						0.069
Open Channel Flow - Channel Section									
Length (Ft)	Elev2	Elev1	Slope Percent	Manning N	Top Width (Ft)	Height (Ft)	Side Slope (Ft/Ft)		Travel Time (Hrs)
13.00	356.0	351.0	38.462	0.100	4.000	1.000	2.000		0.001
Total Length (Ft)			Total Delta Y (Ft)	Average Velocity (Fps)					Total Travel Time (Hrs)
803.00			48.000	0.564					0.40
								Lag	0.24
Scs Tr-55 Travel Time Computations									
Ws3.1 Proposed									
Sheet Flow									
Length (Ft)	Elev2	Elev1	Slope Percent	Manning N	2 Yr Prp (Inches)				Travel Time (Hrs)
25.00	378.0	377.8	0.800	0.200	3.300				0.096
Shallow Concentrated Flow (Un-Paved Path)									
Length (Ft)	Elev2	Elev1	Slope Percent						Travel Time (Hrs)
85.00	377.8	376.9	1.059						0.014
Shallow Concentrated Flow (Paved Path)									

Length (Ft)	Elev2	Elev1	Slope Percent				Travel Time (Hrs)
223.00	376.9	373.5	1.525				0.025
Open Channel Flow - Pipe Section							
Length (Ft)	Elev2	Elev1	Slope Percent	Manning N	Diameter (In)		Travel Time (Hrs)
45.00	370.0	366.0	8.889	0.012	15.000		0.001
Total Length (Ft)			Total Delta Y (Ft)	Average Velocity (Fps)			Total Travel Time (Hrs)
333.00			4.500	0.684			0.14
						Lag	0.08
Scs Tr-55 Travel Time Computations							
Ws1.1 Proposed							
Sheet Flow							
Length (Ft)	Elev2	Elev1	Slope Percent	Manning N	2 Yr Prp (Inches)		Travel Time (Hrs)
25.00	378.0	377.8	0.800	0.200	3.300		0.096
Shallow Concentrated Flow (Un-Paved Path)							
Length (Ft)	Elev2	Elev1	Slope Percent				Travel Time (Hrs)
88.00	377.8	377.3	0.568				0.020
Shallow Concentrated Flow (Paved Path)							
Length (Ft)	Elev2	Elev1	Slope Percent				Travel Time (Hrs)
198.40	377.3	374.5	1.411				0.023
Open Channel Flow - Pipe Section							
Length (Ft)	Elev2	Elev1	Slope Percent	Manning N	Diameter (In)		Travel Time (Hrs)
239.00	371.0	364.0	2.929	0.012	15.000		0.007
Total Length (Ft)			Total Delta Y (Ft)	Average Velocity (Fps)			Total Travel Time (Hrs)
550.40			10.500	1.047			0.15
						Lag	0.09

Rainfall Depth and Ratios of Precipitation for use in HEC-1:

Storm Event (Yr)	Rainfall Depth (In) *	Ratio
100	8.0	1.00
50	7.0	0.88
25	6.5	0.81
10	6.0	0.75
5	5.0	0.63
2	4.0	0.50
1	3.5	0.44

* From NYS Guidelines for Urban Erosion and Sediment Control

HEC-1 Flood Hydrograph Package Annotations		
<u>Card</u>	<u>Units</u>	<u>Description</u>
BA	Sq. Miles	Drainage Area
HC		Hydrograph Combination Point
ID		Job Title Description
IN		Time Interval For Input Data
IO		Printed Output Control
IT		Defines Time Interval Used, And Number Of Ordinates
JR		Hydrograph Precipitation Ordinate Multiplier
KK		Station Computation Identifier
KM		Message Field
KO		Hydrograph Drawn At This Station
LS		Runoff Curve Number
PB	Inches	Basin (Watershed) Average Precipitation
PC		Cumulative Precipitation Time Series
RM		Muskingum Routing & Coefficient
RS		Number Of Steps Used For Storage Routing & Starting Elev.
SA	Acres	Reservoir Surface Area For Corresponding Se Elevations
SE	Feet	Reservoir Elevation, Corresponding To Sa Above
SL	Feet	Low Level Outlet Data: Centerline Elev., Pipe Area (Orifice Equation)
SQ	Cfs	Discharge Corresponding To Se Elevations And Sa Areas
SS	Feet	Weir Data: Crest Elev., Spillway Length, Discharge Coefficient
UD	Hours	Scs Lag Time
ZZ		End Of Job

Highland Avenue Development Drainage and Hydrology Report

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* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
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* VERSION 4.1 *
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* U.S. ARMY CORPS OF ENGINEERS *
* HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET *
* DAVIS, CALIFORNIA 95616 *
* (916) 756-1104 *
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE, SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1

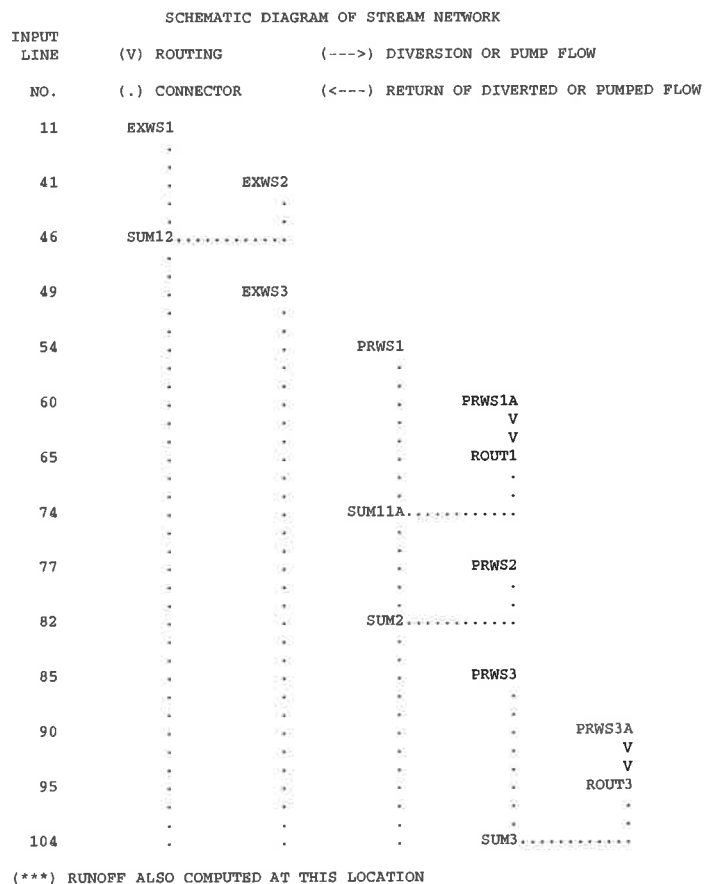
HEC-1 INPUT

PAGE 1

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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
1 ID WATERSHED ANALYSIS - PREPARED FOR DIORIO - HIGHLAND AVENUE
2 ID TOWN OF MARLBOROUGH, NY, MC PROJECT # 03-0218B
3 ID FILENAME: DIORIO.IH1 DATE: OCTOBER 13, 2003
4 ID STORM EVENTS STUDIED: 1, 2, 5, 10, 25, 50, 100-YEAR, 24 HOUR, TYPE III DISTRIB
5 ID
6 ID RAINFALL DEPTHS FROM NYS GUIDELINES FOR URBAN EROSION AND SEDIMENT CONTROL
  *DIAGRAM
7 IO 5 0
8 IT 3 0 600
9 JR PREC 0.44 0.5 0.63 0.75 0.81 0.88 1
10 IN 6 0
11 KK EXWS1EXISTING WATERSHED 1
12 KO 21
13 PB 8
14 PC 0 0.001 0.002 0.003 0.004 0.005 0.006 0.007 0.008 0.009
15 PC 0.01 0.011 0.012 0.013 0.014 0.015 0.016 0.017 0.018 0.019
16 PC 0.02 0.021 0.022 0.023 0.024 0.026 0.027 0.028 0.029 0.03
17 PC 0.031 0.032 0.034 0.035 0.036 0.037 0.038 0.04 0.041 0.042
18 PC 0.043 0.045 0.046 0.047 0.049 0.05 0.051 0.053 0.054 0.055
19 PC 0.057 0.058 0.06 0.061 0.063 0.064 0.066 0.067 0.069 0.07
20 PC 0.072 0.074 0.075 0.077 0.079 0.08 0.082 0.084 0.085 0.087
21 PC 0.089 0.091 0.093 0.095 0.097 0.1 0.103 0.106 0.109 0.112
22 PC 0.115 0.118 0.121 0.124 0.127 0.13 0.134 0.137 0.14 0.144
23 PC 0.148 0.151 0.155 0.159 0.163 0.167 0.171 0.176 0.18 0.185
24 PC 0.189 0.194 0.199 0.205 0.21 0.216 0.222 0.228 0.235 0.242
25 PC 0.25 0.258 0.266 0.276 0.287 0.298 0.312 0.328 0.363 0.416
26 PC 0.5 0.584 0.638 0.673 0.689 0.702 0.714 0.725 0.734 0.743
27 PC 0.751 0.758 0.766 0.772 0.779 0.785 0.79 0.796 0.801 0.806
28 PC 0.811 0.816 0.821 0.825 0.829 0.834 0.838 0.842 0.845 0.849
29 PC 0.853 0.857 0.86 0.864 0.867 0.87 0.874 0.877 0.88 0.883
30 PC 0.886 0.889 0.892 0.895 0.898 0.9 0.903 0.906 0.908 0.91
31 PC 0.911 0.913 0.915 0.917 0.919 0.92 0.922 0.924 0.925 0.927
32 PC 0.929 0.93 0.932 0.933 0.935 0.936 0.938 0.939 0.941 0.942
33 PC 0.944 0.945 0.946 0.948 0.949 0.951 0.952 0.953 0.955 0.956
34 PC 0.957 0.958 0.96 0.961 0.962 0.963 0.965 0.966 0.967 0.968
35 PC 0.969 0.971 0.972 0.973 0.974 0.975 0.976 0.977 0.978 0.979
36 PC 0.981 0.982 0.983 0.984 0.985 0.986 0.987 0.988 0.989 0.99
37 PC 0.991 0.992 0.993 0.994 0.995 0.996 0.997 0.998 0.999 1
38 BA 0.0069 5
39 LS 73.27
40 UD 0.25
41 KK EXWS2EXISTING CONDITIONS WATERSHED 2
42 KO 21
43 BA 0.0034 7
44 LS 75.77
45 UD 0.18
46 KK SUM12SUM EXISTING WATERSHEDS 1 + 2
47 KO 21
48 HC 2
49 KK EXWS3EXISTING CONDITIONS WATERSHED 3
50 KO 21
51 BA 0.0171
52 LS 78.14
53 UD 0.24
54 KK PRWS1PROPOSED CONDITIONS WATERSHED 1
55 KO 21
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1 *****
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* (916) 756-1104 *
* *****
  
```

WATERSHED ANALYSIS - PREPARED FOR DIORIO - HIGHLAND AVENUE
TOWN OF MARLBOROUGH, NY, MC PROJECT # 03-0218B
FILENAME: DIORIO.IH1 DATE: OCTOBER 13, 2003
STORM EVENTS STUDIED: 1, 2, 5, 10, 25, 50, 100-YEAR, 24 HOUR, TYPE III DISTRIB

RAINFALL OEPTHS FROM NYS GUIOELINES FOR URBAN EROSION AND SEDIMENT CONTROL

```

7 IO      OUTPUT CONTROL VARIABLES
          IPRNT      5 PRINT CONTROL
          IPLOT      0 PLOT CONTROL
          QSCAL      0. HYDROGRAPH PLOT SCALE

IT        HYDROGRAPH TIME DATA
          NMIN       3 MINUTES IN COMPUTATION INTERVAL
          IDATE      1 0 STARTING DATE
          ITIME      0000 STARTING TIME
          NQ         600 NUMBER OF HYDROGRAPH ORDINATES
          NDDATE     2 0 ENDING DATE
          NDTIME     0557 ENDING TIME
          ICENT      19 CENTURY MARK

          COMPUTATION INTERVAL .05 HOURS
          TOTAL TIME BASE 29.95 HOURS

ENGLISH UNITS
DRAINAGE AREA      SQUARE MILES
PRECIPITATION DEPTH INCHES
LENGTH, ELEVATION FEET
FLOW               CUBIC FEET PER SECOND
STORAGE VOLUME     ACRE-FeET
SURFACE AREA       ACRES
TEMPERATURE        DEGREES FAHRENHEIT

JP        MULTI-PLAN OPTION
          NPLAN      1 NUMBER OF PLANS

JR        MULTI-RATIO OPTION
          RATIOS OF PRECIPITATION
          .44 .50 .63 .75 .81 .88 1.00
  
```

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION						
				RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6	RATIO 7
				.44	.50	.63	.75	.81	.88	1.00
HYDROGRAPH AT	EXWS1	.01	1 FLOW	4.	5.	8.	10.	12.	13.	16.
+			TIME	12.35	12.35	12.30	12.30	12.30	12.30	12.30
HYDROGRAPH AT	EXWS2	.00	1 FLOW	2.	3.	5.	6.	7.	8.	9.
+			TIME	12.25	12.25	12.25	12.25	12.25	12.20	12.20
2 COMBINED AT	SUM12	.01	1 FLOW	6.	8.	12.	16.	18.	21.	25.
+			TIME	12.30	12.30	12.30	12.30	12.30	12.30	12.25
HYDROGRAPH AT	EXWS3	.02	1 FLOW	13.	16.	23.	30.	34.	38.	45.
+			TIME	12.30	12.30	12.30	12.30	12.30	12.30	12.30
HYDROGRAPH AT	PRWS1	.01	1 FLOW	3.	4.	6.	8.	9.	10.	12.
+			TIME	12.35	12.35	12.30	12.30	12.30	12.30	12.30
HYDROGRAPH AT	PRWS1A	.00	1 FLOW	5.	6.	8.	10.	10.	12.	14.
+			TIME	12.15	12.15	12.15	12.15	12.15	12.15	12.15
ROUTED TO	ROUT1	.00	1 FLOW	1.	2.	2.	2.	3.	3.	5.
+			TIME	12.50	12.50	12.50	12.50	12.50	12.50	12.45
** PEAK STAGES IN FEET **										
1	STAGE			366.02	366.32	366.99	367.56	367.80	368.06	368.47
	TIME			12.50	12.50	12.55	12.50	12.50	12.50	12.45

Highland Avenue Development Drainage and Hydrology Report

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2 COMBINED AT	SUM11A	.01	1	FLOW	4.	5.	8.	10.	11.	13.	16.
+				TIME	12.35	12.35	12.35	12.35	12.35	12.35	12.35
HYDROGRAPH AT	PRWS2	.00	1	FLOW	2.	2.	3.	4.	4.	4.	5.
+				TIME	12.25	12.25	12.20	12.20	12.20	12.20	12.20
2 COMBINED AT	SUM2	.01	1	FLOW	6.	7.	10.	13.	15.	17.	21.
+				TIME	12.30	12.30	12.30	12.30	12.30	12.30	12.30
HYDROGRAPH AT	PRWS3	.01	1	FLOW	10.	13.	18.	24.	26.	29.	35.
+				TIME	12.30	12.30	12.30	12.30	12.30	12.30	12.30
HYDROGRAPH AT	PRWS3A	.00	1	FLOW	4.	5.	7.	9.	9.	10.	12.
+				TIME	12.15	12.15	12.15	12.15	12.15	12.15	12.15
ROUTED TO	ROUT3	.00	1	FLOW	2.	3.	5.	7.	8.	9.	11.
+				TIME	12.35	12.40	12.30	12.25	12.25	12.25	12.20
** PEAK STAGES IN FEET **											
1	STAGE	368.11	368.31	368.62	368.78	368.85	368.91	369.01			
	TIME	12.35	12.40	12.30	12.25	12.25	12.25	12.20			

2 COMBINED AT	SUM3	.02	1	FLOW	12.	15.	23.	30.	34.	38.	45.
+				TIME	12.30	12.30	12.30	12.30	12.30	12.25	12.25
1	SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION ROUT1 (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)										

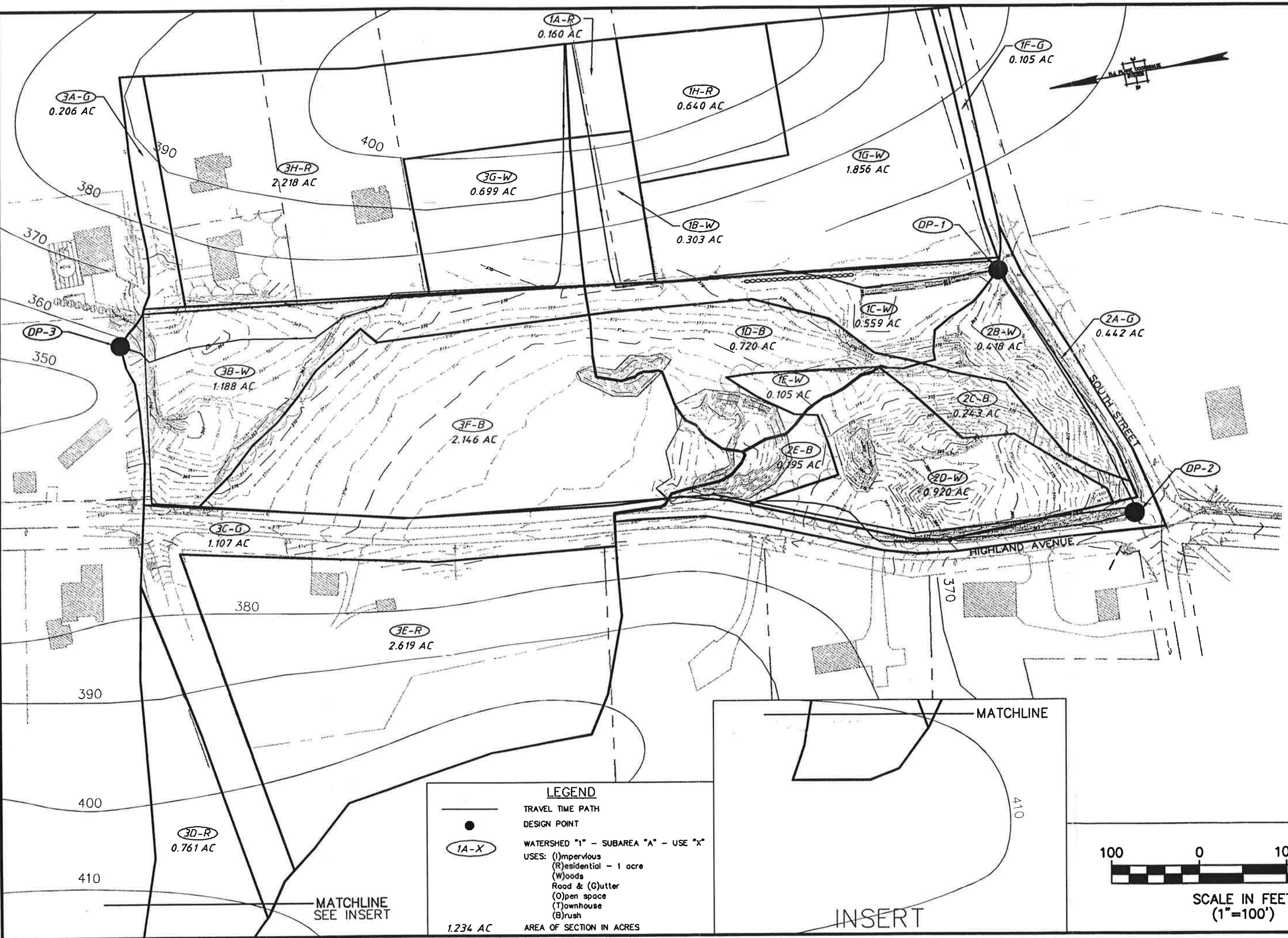
PLAN 1		INITIAL VALUE		SPILLWAY CREST		TOP OF DAM		
	ELEVATION	364.75		367.25		368.60		
	STORAGE	0.		0.		1.		
	OUTFLOW	0.		2.		5.		
	RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
	.44	366.02	.00	0.	1.	.00	12.50	.00
	.50	366.32	.00	0.	2.	.00	12.50	.00
	.63	366.99	.00	0.	2.	.00	12.55	.00
	.75	367.56	.00	0.	2.	.00	12.50	.00
	.81	367.80	.00	0.	3.	.00	12.50	.00
	.88	368.06	.00	0.	3.	.00	12.50	.00
	1.00	368.47	.00	1.	5.	.00	12.45	.00

1	SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION ROUT3 (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)										

PLAN 1	INITIAL VALUE		SPILLWAY CREST		TOP OF DAM			
	ELEVATION	367.30	368.25	368.50				
	STORAGE	0.	0.	0.				
	OUTFLOW	0.	2.	3.				
	RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
	.44	368.11	.00	0.	2.	.00	12.35	.00
	.50	368.31	.00	0.	3.	.00	12.40	.00
	.63	368.62	.12	0.	5.	.30	12.30	.00
	.75	368.78	.28	0.	7.	.45	12.25	.00
	.81	368.85	.35	0.	8.	.50	12.25	.00
	.88	368.91	.41	0.	9.	.55	12.25	.00
	1.00	369.01	.51	0.	11.	.60	12.20	.00

*** NORMAL END OF HEC-1 ***

10/22/2003 01:35:28 PM, jibaker, West Nyack Office



NEW YORK OFFICE
Suite 1
One Crossfield Avenue
West Nyack, N.Y. 10994
Phone (845) 727-1160
Fax (845) 727-1162
E-mail: solutions@maserconsulting.com

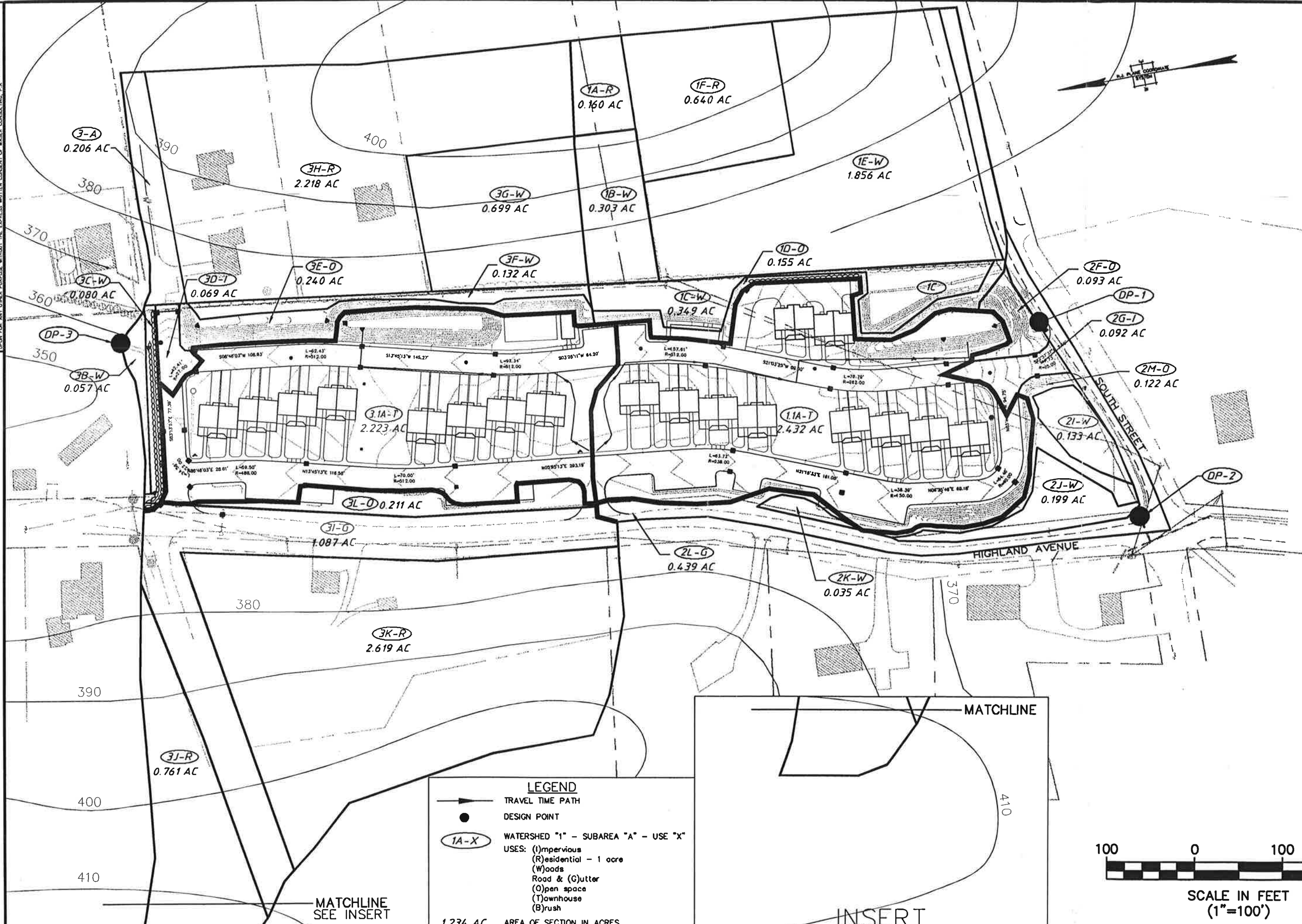
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State of N.Y. Certificate of Authorization: 0000172

**EXISTING WATERSHED MAP
FOR
HIGHLAND AVENUE DEVELOPMENT**

DATE: 10/14/03
LATEST REVISION:
JOB NUMBER: 03-0218A
SCALE: 1"=100'
INDEX NUMBER: NY002132

**TAX LOT 108.12-8-23
TOWN OF MARLBOROUGH
ULSTER COUNTY, NEW YORK**

10/22/2003 01:35:10 PM, jibaker, West Nyack Office



DATE: 10/14/03
LATEST REVISION:
JOB NUMBER: 03-0218A
SCALE: 1"=100'
SHEET NUMBER: NY002132

PROPOSED WATERSHED MAP
FOR
HIGHLAND AVENUE DEVELOPMENT

NEW YORK OFFICE
Suite 1
One Crossfield Avenue
West Nyack, N.Y. 10994
Phone (845) 727-1160
Fax (845) 727-1162
E-mail: solutions@maserconsulting.com

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