

PRELIMINARY Stormwater Pollution Prevention Plan (SWPPP)

Prepared for:
**Proposed World Headquarters of Jehovah's Witnesses
Town of Warwick
Orange County, New York**

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Table of Contents

Section 1 Introduction	1-1
A. Objectives	1-1
B. Owner’s Responsibilities	1-1
C. Contractor’s Responsibilities	1-2
D. Existing Site Description	1-2
Waterbodies, Wetlands, and Drainage Structures.....	1-7
Environmentally Sensitive Areas.....	1-11
Utilities and Easements.....	1-11
Soils.....	1-15
ESB—Erie.....	1-15
HLC—Hollis soils, sloping.....	1-15
HLD—Hollis.....	1-15
ROC—Rock Outcrop-Hollis complex, sloping	1-15
SXC—Swartswood and Mardin	1-16
SXD—Swartswood and Mardin	1-16
E. Proposed Project Description.....	1-19
Permits and Approvals.....	1-23
Section 2 Pollution Control During Construction.....	2-1
A. Pollution Control.....	2-1
Spill Prevention.....	2-1
Material Management Practices.....	2-1
Material Management Regarding Hazardous Products	2-1
Specific Material Management Practices.....	2-1
B. Erosion and Sediment Control	2-2
Temporary Stabilization.....	2-2
Permanent Stabilization	2-7
C. Sequence of Construction	2-8
Section 3 Post-Construction Water Quality and Quantity Control	3-1
A. Regulations	3-1
New York State Department of Environmental Conservation (NYSDEC)	
Criteria	3-1
Additional Design Criteria.....	3-5
B. Stormwater Management Approach	3-5
New Construction	3-5
Step 1: Green Infrastructure Practices (GIPs) used in Planning Stage	3-5
Step 2: Water Quality Volume Calculation	3-6
Step 3: GIPs and Standard SMPs used for Run-off Reduction.....	3-6
Step 4: Standard Stormwater Practices used for Remainder of WQv	3-8

Step 5: Volume and Peak Rate Control	3-8
Redevelopment	3-8
C. Water Quality Analysis.....	3-19
New Construction	3-19
Redevelopment	3-22
Drainage Area DA-1B1	3-22
Drainage Area DA-1B2	3-23
Drainage Area DA-1D1	3-23
Drainage Area DA-2A3	3-24
Drainage Area DA-2B1	3-24
Drainage Area DA-2B2	3-25
Drainage Area DA-2B3	3-25
Drainage Area DA-2B5	3-26
Drainage Area DA-2B6	3-26
D. Water Quantity Analysis.....	3-27
Pre-Developed Condition Hydrology	3-27
Design Point 1—DP-1	3-27
Design Point 2—DP-2	3-28
Design Point 3—DP-3	3-28
Design Point 4—DP-4	3-28
Design Point 5—DP-5	3-28
Design Point 6—DP-6	3-29
Post-Developed Condition Hydrology.....	3-33
Design Point 1—DP-1	3-33
Design Point 2—DP-2	3-34
Design Point 3—DP-3	3-35
Design Point 4—DP-4	3-35
Design Point 5—DP-5	3-35
Design Point 6—DP-6	3-35
Water Quantity Analysis Summary	3-40
Channel Protection Volume (Cpv) Summary	3-40
Section 4 Inspection and Maintenance.....	4-1
A. Inspections and Record Keeping During Construction	4-1
Record Forms.....	4-1
Inspections	4-2
Erosion and Sediment Control Practices.....	4-3
Stabilized Construction Entrance/Exit.....	4-3
Silt Fence	4-3
Sump Pit.....	4-3
Clean Material Stockpile Detail.....	4-3
Storm Drain Inlet Protection.....	4-3
Dust Control.....	4-4
Soil Stabilization.....	4-4
Perimeter Dike/Swale	4-4
Temporary Sediment Basin or Sediment Trap.....	4-4

Containment for Temporary Fueling Area	4-4
B. Post-Construction Operation and Maintenance	4-4

List of Appendices

- Appendix A Contractor's Certification, Owner's Certification, NOI,
MS4 SWPPP Acceptance Form
- Appendix B Construction Duration Inspection Form
- Appendix C Inspection and Maintenance Forms for Post-Construction Practices
- Appendix D Pre-Developed Conditions Calculations/Output
- Appendix E Post-Developed Conditions Calculations/Output
- Appendix F Soil Boring Logs
- Appendix G Water Quality Volume Worksheets

List of Tables

Table 1-1 Project-Site Soil Types	1-16
Table 1-2 Permits and Approvals	1-23
Table 2-1 ESCM #1: Phase Construction Activity	2-2
Table 2-2 ESCM #2: Existing Vegetation Protection	2-2
Table 2-3 ESCM #3: Topsoil	2-3
Table 2-4 ESCM #4: Silt Fence	2-3
Table 2-5 ESCM #5: Earth Dike	2-3
Table 2-6 ESCM #6: Temporary Stabilization (Seeding)	2-3
Table 2-7 ESCM #7: Hydromulching	2-4
Table 2-8 ESCM #8: Mulching (Hay/Straw)	2-4
Table 2-9 ESCM #9: Dust Control (Sprinkling)	2-4
Table 2-10 ESCM #10: Storm Drain Inlet Protection (Before Paving)	2-4
Table 2-11 ESCM #11: Stabilized Construction Exits (Before Paving)	2-5
Table 2-12 ESCM #12: Waste Materials (Including Recyclable and Hazardous)	2-5
Table 2-13 ESCM #13: Combined Staging and Material Storage Area	2-5
Table 2-14 ESCM #14: Concrete Washout	2-6
Table 2-15 ESCM #15: Temporary Sump Pit	2-6
Table 2-16 ESCM #16: Sanitary Waste	2-6
Table 2-17 ESCM #17: Sediment Trap (Temporary)	2-6
Table 2-18 ESCM #18: Permanent Seeding	2-7
Table 2-19 ESCM #19: Outfall Protection (Riprap)	2-7
Table 2-20 ESCM #20: Flow-Thru Stormwater Planter	2-7
Table 2-21 Sequence of Construction	2-8
Table 3-1 Summary of Water Quality Volume for New Construction	3-19
Table 3-2 Summary of Water Quality Volume for Redevelopment in DA-1B1	3-22
Table 3-3 Summary of Water Quality Volume for Redevelopment in DA-1B2	3-23
Table 3-4 Summary of Water Quality Volume for Redevelopment in DA-1D1	3-23
Table 3-5 Summary of Water Quality Volume for Redevelopment in DA-1D2	3-24
Table 3-6 Summary of Water Quality Volume for Redevelopment in DA-2A3	3-24
Table 3-7 Summary of Water Quality Volume for Redevelopment in DA-2B1	3-25
Table 3-8 Summary of Water Quality Volume for Redevelopment in DA-2B2	3-25
Table 3-9 Summary of Water Quality Volume for Redevelopment in DA-2B3	3-25
Table 3-10 Summary of Water Quality Volume for Redevelopment in DA-2B5	3-26
Table 3-11 Summary of Water Quality Volume for Redevelopment in DA-2B6	3-26
Table 3-12 Rainfall Depths, 24-Hour Storm Duration	3-27
Table 3-13 Pre-Developed Analysis Summary	3-33
Table 3-14 Post-Developed Analysis Summary	3-39
Table 3-15 Pre- and Post-Developed Peak Flow Comparison	3-40
Table 3-16 Channel Protection Volume Summary	3-41

List of Figures

Figure 1-1 Vegetative Cover.....	1-5
Figure 1-2 Wetlands and Waterbodies.....	1-9
Figure 1-3 Existing Utilities and Easements.....	1-13
Figure 1-4 Drainage Area Soils	1-17
Figure 1-5 Proposed Site Plan.....	1-21
Figure 3-1 Sole-Source Aquifer Map	3-3
Figure 3-2 Water Table Near Proposed Grade	3-9
Figure 3-3 Bedrock Near Proposed Grade.....	3-11
Figure 3-4 Stormwater Hotspots.....	3-13
Figure 3-5 Steep Slopes	3-15
Figure 3-6 Redevelopment Areas	3-17
Figure 3-7 Rainfall Contour Map	3-21
Figure 3-8 Existing Condition Watershed Map.....	3-31
Figure 3-9 Proposed Condition Watershed Map	3-37

List of Drawings

Cover Sheet.....	C-001
Existing Conditions Watershed Plan	C-009
Proposed Conditions Watershed Plan.....	C-010
Erosion & Sediment Control Details	CE501
Erosion & Sediment Control Details	CE502
Erosion & Sediment Control Details	CE503
Grading & Drainage Plan.....	CG101
Grading & Drainage Plan.....	CG102
Grading & Drainage Plan.....	CG103
Grading & Drainage Plan.....	CG104
Grading & Drainage Details	CG501
Grading & Drainage Details	CG502

NOTE: Blank pages occur behind every color page and every 11-by-17-inch page in this SWPPP. Although these are counted in the numbering, no number is printed on them.

The Watchtower Bible and Tract Society of New York, Inc., proposes to locate its World Headquarters on Long Meadow Road (CR-84) approximately one mile northwest of the intersection with Sterling Mine Road (CR-72) in the Town of Warwick, Orange County, New York. This preliminary Stormwater Pollution Prevention Plan (SWPPP) has been prepared in support of the Final Environmental Impact Statement (FEIS) for the project. The SWPPP will be finalized before it is submitted to the New York State Department of Environmental Conservation (NYSDEC) to obtain coverage under the State Pollutant Discharge Elimination System (SPDES) General Permit (GP-0-10-001) for Stormwater Discharges from Construction Activity.

This Section presents the objectives of the SWPPP and provides a description of the existing site including soils and drainage area, as well as the proposed project.

A. Objectives

The objectives of this SWPPP are to:

1. Outline Owner and Contractor responsibilities to maintain compliance with SPDES GP-0-10-001, including required inspections, maintenance, forms, and certifications.
2. Outline measures to install, inspect, and maintain erosion and sediment control measures for the proposed project. The objective of these measures is to eliminate or significantly minimize pollutant discharges to the adjacent surface water bodies during construction activities.
3. Describe the post-construction water quality treatment practices that are designed to capture and treat the stormwater runoff from the proposed project drainage areas.
4. Specify post-construction stormwater management structures on site such that the proposed peak flows do not exceed the pre-development peak flows, thus providing channel protection, overbank flood control, and control of the peak discharge control from the extreme storm event.

B. Owner's Responsibilities

Watchtower Bible and Tract Society of New York, Inc., the "Owner," is responsible to ensure that the Contractor installs and maintains the erosion and sediment control measures in accordance with this SWPPP. The Owner is also responsible to ensure that the appropriate forms and certifications contained herein are completed prior to and throughout the duration of construction activities. A separate SWPPP was prepared for the demolition of the existing building, which was approved on October 18, 2011 under site identification number NYR 10U822. The Owner will keep a copy of this document, associated attachments, and any inspection reports generated on site for the duration of the project and for a minimum of five years from the date that the site achieves final stabilization.

The Owner will also 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 appropriate NYSDEC Office.

The Owner will maintain a copy of the SPDES GP-0-10-001, Notice of Intent (NOI), NOI acknowledgement letter, SWPPP and Acceptance Form, and inspection reports at the construction site until all disturbed areas have achieved final stabilization and the NOT has been submitted to NYSDEC. The documents will be maintained in a secure location, such as a job trailer, on-site construction office, or

mailbox with lock that is accessible during normal working hours to an individual performing a compliance inspection.

C. Contractor's Responsibilities

The Contractor is responsible for reading this entire SWPPP and related project specifications and reviewing all forms, certifications, and contract drawings to become familiar with all aspects related to the SPDES GP-0-10-001. The Contractor will retain a signed copy of this SWPPP and all associated attachments on site from the initiation of proposed construction activities to the date of final stabilization. The Contractor is responsible for completing the certification contained herein prior to the commencement of proposed construction activities. The certification will be signed by a president or any person who performs similar decision-making functions and by the on-site individual having responsibility for the firm. Each of the subcontractors involved in the implementation of erosion and sediment control measures must also complete a certification. The Contractor is responsible for each of the subcontractors employed by the Contractor that are involved in the implementation of erosion and sediment controls.

It is the duty of the Contractor to properly install and maintain all erosion and sediment control measures on the site as per this SWPPP. The Contractor will also be responsible for the inspection of all erosion and sediment control measures for the proposed Project Site by a qualified inspector as per this SWPPP. Should the Owner, an Owner's representative, or any local authority having jurisdiction deem that the SWPPP or the Contractor's implementation of the SWPPP proves to be ineffective in eliminating or significantly minimizing the pollutants or achieving the goals of the SPDES GP-0-10-001, the Contractor will be required to take necessary action to conform to the objectives of the permit at no additional cost to the Owner.

The Contractor will inspect and report the disturbed and stabilized areas for the duration of the project as indicated on the Construction Duration Inspection Form contained herein. It is the duty of the Contractor to properly inspect and maintain all erosion and sediment control measures installed on the site as per this SWPPP. Any revision to the SWPPP in design, construction activities, inspection, or maintenance will be reflected by the Contractor in the on-site copy of the SWPPP in a timely manner. At the beginning of this work, the Contractor must designate a qualified inspector in conformance with this SWPPP and the requirements of the SPDES GP-0-10-001. On a monthly basis, copies of all inspection forms and maintenance records will be organized and filed accordingly by the Contractor.

D. Existing Site Description

The property consists of 7 land parcels that include approximately 253 acres on either side of Long Meadow Road (CR-84) in the Town of Warwick. The site is further segmented by portions of Old Sterling Mine Road, King's Drive, the Ringwood River, and an electrical utility easement. Large industrial buildings, an entrance road (King's Drive), parking lots, and a non-operational wastewater treatment facility, formerly owned by the International Nickel Company (INCO), are located to the southwest of Long Meadow Road (CR-84).

The site is made up of:

- 225.1 acres of forest.
- 7.8 acres of meadow/brushland.
- 4.42 acres of wetland (1.05 on the southwest side of Long Meadow Road [CR-84] delineated by PS&SPC and 3.37 acres on the northeast side of Long Meadow Road [CR-84] shown on the National Wetlands Inventory)

- 6.8 acres of roads, pavement, structures, and other impervious surfaces.
- 8.9 acres of landscaped and open area.

The property also encompasses a water treatment plant operated by United Water—a separate property of 3.5 acres.

A 100-foot-wide Orange and Rockland Utilities, Inc., easement bisects the properties on both sides of Long Meadow Road (CR-84). Electricity is supplied to the site by an existing on-site substation. Other existing utilities on-site include a water main that is located in a twenty-foot easement along Sterling Forest Lake (Blue Lake).

The property is bordered on the north by a large IBM facility and a wastewater treatment plant operated by United Water (Blue Lake STP). A residential development is located approximately 1,800 feet from the southeast boundary. Otherwise the bordering properties are located within the state park systems of New York (Sterling Forest State Park) and New Jersey (Ringwood State Park). Figure 1-1 Vegetative Cover depicts vegetative cover of the existing site.

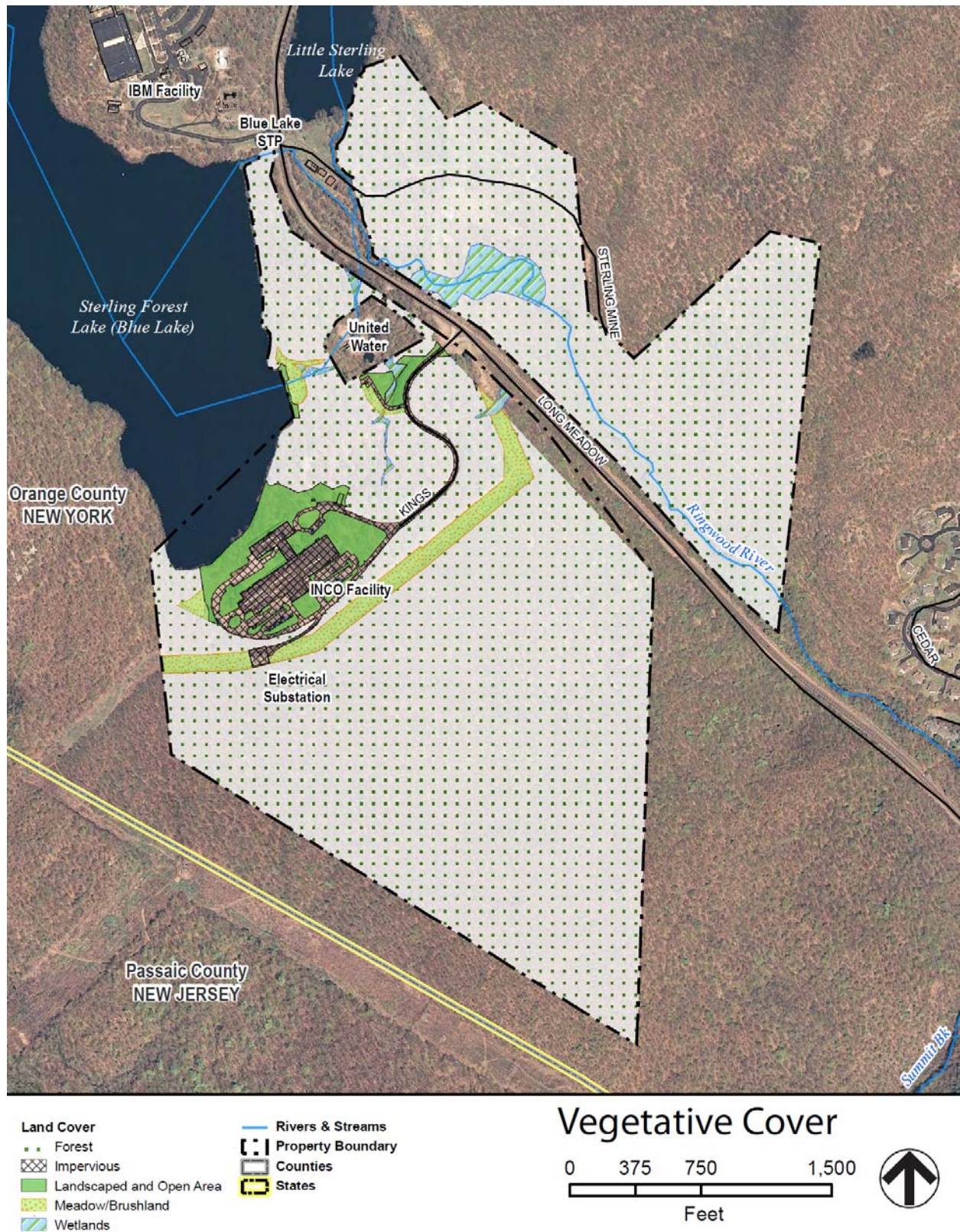


Figure 1-1 Vegetative Cover

Waterbodies, Wetlands, and Drainage Structures

Stormwater runoff from the Project Site discharges directly to Blue Lake, on-site wetlands, the Ringwood River, and/or unnamed tributaries to the Ringwood River. There are also intermittent streams on the site which receive runoff. All runoff in the subject area eventually contributes to the Ringwood River which flows southerly, eventually reaching the Wanaque Reservoir public water supply in New Jersey.

A portion of the stormwater is collected on the property through a series of catch basins. An existing closed drainage system conveys runoff from the catch basins and discharges untreated stormwater directly into Blue Lake. Additionally, runoff from a wooded area in the northwest portion of the Project Site drains by overland flow to the lake. The southwestern wooded area of the site drains by overland flow to an intermittent stream on the south side of the property. However, the majority of runoff discharges to the Ringwood River by means of six separate culverts under Long Meadow Road (CR-84). The portion of property that lies on the northeast side of Long Meadow Road drains by overland flow to the Ringwood River.

Based upon a review of the NYSDEC Environmental Resource Mapper and correspondence with NYSDEC, dated November 30, 2009, the stream centerline of Blue Lake and the Ringwood River (including tributaries) are classified as state-protected streams. Blue Lake is designated as Class A, with best usage as a source for drinking water, and primary and secondary contact for recreation and fishing. Blue Lake and surrounding wetlands are also classified as Open Waters of the United States—under the jurisdiction of the United States Army Corps of Engineers (USACE). The Ringwood River and its tributaries are classified as Class C(T) and C, respectively, which indicates that they are suitable for fishing. The (T) signifies that these waters are trout waters and that thermal criteria apply. On-site wetlands are Waters of the United States—under the jurisdiction of the USACE—see Figure 1-2 Wetlands and Waterbodies.



Figure 1-2 Wetlands and Waterbodies

Based on a review of the Flood Insurance Rate Map (FIRM) for the Town of Warwick, New York, (Panels 36031 and 36036) dated August 3, 2009, a portion of the zone subject to inundation by the 1-percent annual-chance flood (100-year floodplain) for the Ringwood River lies within the property on the northeast side of Long Meadow Road.

Environmentally Sensitive Areas

The Project Site is not located in any designated Critical Environmental Areas (CEA).

Utilities and Easements

The Project Site includes potable water, wastewater, and electrical power utilities. Potable water is supplied by the water treatment plant owned and operated by United Water. The source water for the plant is Blue Lake. No water supply wells are located on the site. A potable water pipeline consisting of 8-inch, 12-inch, and 16-inch-diameter cast-iron pipe is installed in a 20-foot-wide easement along Blue Lake. The pipeline originates at the plant and generally follows the south shore of the lake; it then continues uphill and connects to the floating ground storage tank located approximately 1,300 feet from the westernmost edge of the property. The pipeline is tapped at two locations to provide water to the property. A looped pipe system is installed on site.

The exiting 8-inch clay gravity sewer main originates on the north side of the INCO building and carries flow in a northeasterly direction to the non-operational wastewater treatment plant. A second lined 8-inch pipeline runs parallel to the sewer main and carries industrial waste to the wastewater treatment plant. The plant has not been in service since the facility was abandoned.

The Orange & Rockland electrical utility easement traverses the property on both sides of Long Meadow Road (CR-84). The easement is 100 feet wide and includes an electrical substation and several utility poles that support overhead power lines—see Figure 1-3 Existing Utilities and Easements.

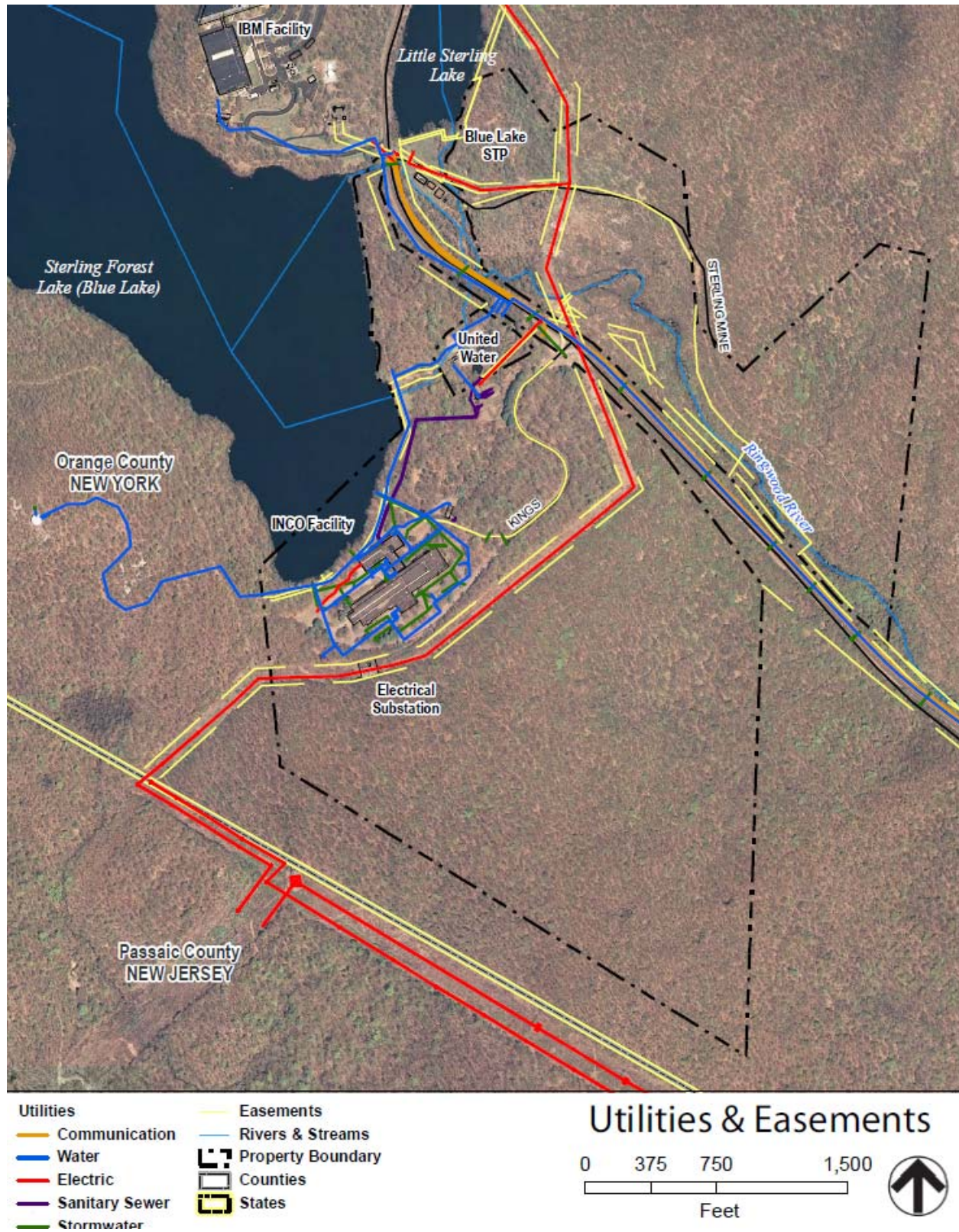


Figure 1-3 Existing Utilities and Easements

Soils

Based on a review of the United States Department of Agriculture Natural Resource Conservation Service (USDA NRCS) Soil Survey of Orange County, New York, nine soil types are encountered on the Project Site and consist mainly of gravelly loam or gravelly silt loam. Of the nine soil types encountered on the property, six are within the drainage area—see Figure 1-4 Drainage Area Soils.

Hydrologic soil group (HSG) designations (A, B, C and D) are used to classify soils with respect to their relative potential to generate runoff. These designations are based on estimates of run-off 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.

- HSG A soils have a low potential for runoff and have high infiltration rates.
- HSG B soils have moderate infiltration rates.
- HSG C soils have low infiltration rates and a moderate potential for runoff.
- HSG D soils have the highest potential for runoff.

NRCS uses the K factor to indicate erosion potential of soil types. The higher the value, the more susceptible the soil is to erosion.

The soil types encountered in the drainage area are described below and listed in Table 1-1 Hydrologic Soil Group Classifications.

ESB—Erie

A small area (2.1 acres) of Erie (ESB) is found in the drainage area. Erie soils are deep, somewhat poorly drained soils, with slopes ranging from 3 to 8 percent. A fragipan is present at approximately 46 inches deep, which results in a perched water table during the spring and other wet periods. The K factor for ESB soils range from 0.17 to 0.32, which indicates a moderate potential for erosion.

HLC—Hollis soils, sloping

A limited area (5.3 acres) of Hollis soils are found in the drainage area. These soils are shallow, well- to excessively-drained with slopes ranging from 8 to 15 percent. Depth to underlying hard granitic bedrock is typically 18 inches. There is usually no perched water table except for poorly jointed areas, which may exhibit brief wet periods in early spring.

HLD—Hollis

A limited area (4.6 acres) of Hollis (HLD) soils is found in the drainage area. Hollis soils are shallow, well- to excessively-drained soils with slopes ranging from 8 to 15 percent. Depth to underlying hard granitic bedrock is typically 18 inches. There is usually no perched water table except for poorly jointed areas, which may exhibit brief wet periods in early spring. The K factor ranges from 0.20 to 0.43, which indicates a moderate-to-high potential for erosion.

ROC—Rock Outcrop-Hollis complex, sloping

A moderately sized area (10.1 acres) of Rock Outcrop-Hollis complex (ROC) is found in the drainage area. This complex is comprised of exposed bedrock and shallow, somewhat excessively-drained to well-drained Hollis soils, with slopes ranging from 3 to 15 percent, but dominantly 8 to 15 percent. Depth to underlying hard granitic bedrock is typically 14 inches for areas of Hollis soils. There is usually no perched water table except for poorly jointed areas, which may exhibit brief wet periods in early spring.

SXC—Swartswood and Mardin

The majority of the drainage area (94.0 acres) is located within the Swartswood and Mardin soils (SXC) which are very stony, sloping (8 to 15 percent), and well-drained soils located on hills and till plains. In both soils, the water table is perched above a dense, subsurface horizontal layer of hard soil or fragipan in the spring. Permeability is moderate above this layer in both soils. It is slow or moderately slow in the pan and substratum in the Swartswood soil and is slow or very slow in the Mardin soil. Available water capacity is low to moderate. The K factor for SXC soils ranges from 0.17 to 0.28, which indicates a low-to-medium potential for erosion.

SXD—Swartswood and Mardin

A relatively limited area (6.9 acres) of Swartswood and Mardin soils (SXD) is found in the drainage area. These soils are very stony, moderately steep, and consist of well-drained and moderately well-drained Swartswood soil and moderately well-drained Mardin soil. The slope is predominantly 15 to 25 percent but ranges from 15 to 35 percent. In both soils, the water table is perched above the fragipan in the spring. Permeability is moderate above the pan in both soils. It is slow or moderately slow in the pan and substratum in the Swartswood soil and slow or very slow in the Mardin soil. Available water capacity is low to moderate. The K factor for SXD soils ranges from 0.24 to 0.32, which indicates a moderate potential for erosion.

Table 1-1 Project-Site Soil Types

Hydrologic Soil Group Classifications			
Soil Map Unit Symbol	Soil Name	Hydrologic Soil Group⁽¹⁾	K Factor
AC	Alden extremely stone soils	D	--
ESB ⁽¹⁾	Erie extremely stony soils, gently sloping	C	0.17 to 0.32
HLC ⁽¹⁾	Hollis soils, sloping	C	0.20 to 0.43
HLD ⁽¹⁾	Hollis soils, moderately steep	D	0.20 to 0.43
ROC ⁽¹⁾	Rock outcrop-Hollis complex, sloping	C	0.20 to 0.43
ROD	Rock outcrop-Hollis complex, moderately steep	D	--
SXC ⁽¹⁾	Swartswood and Mardin very stony soils, sloping	C	0.24 to 0.32
SXD ⁽¹⁾	Swartswood and Mardin very stony soils, moderately steep	C	0.24 to 0.32
UH	Udorthents, smoothed	A/D	--
Notes: (1) Indicates soils within the drainage area.			

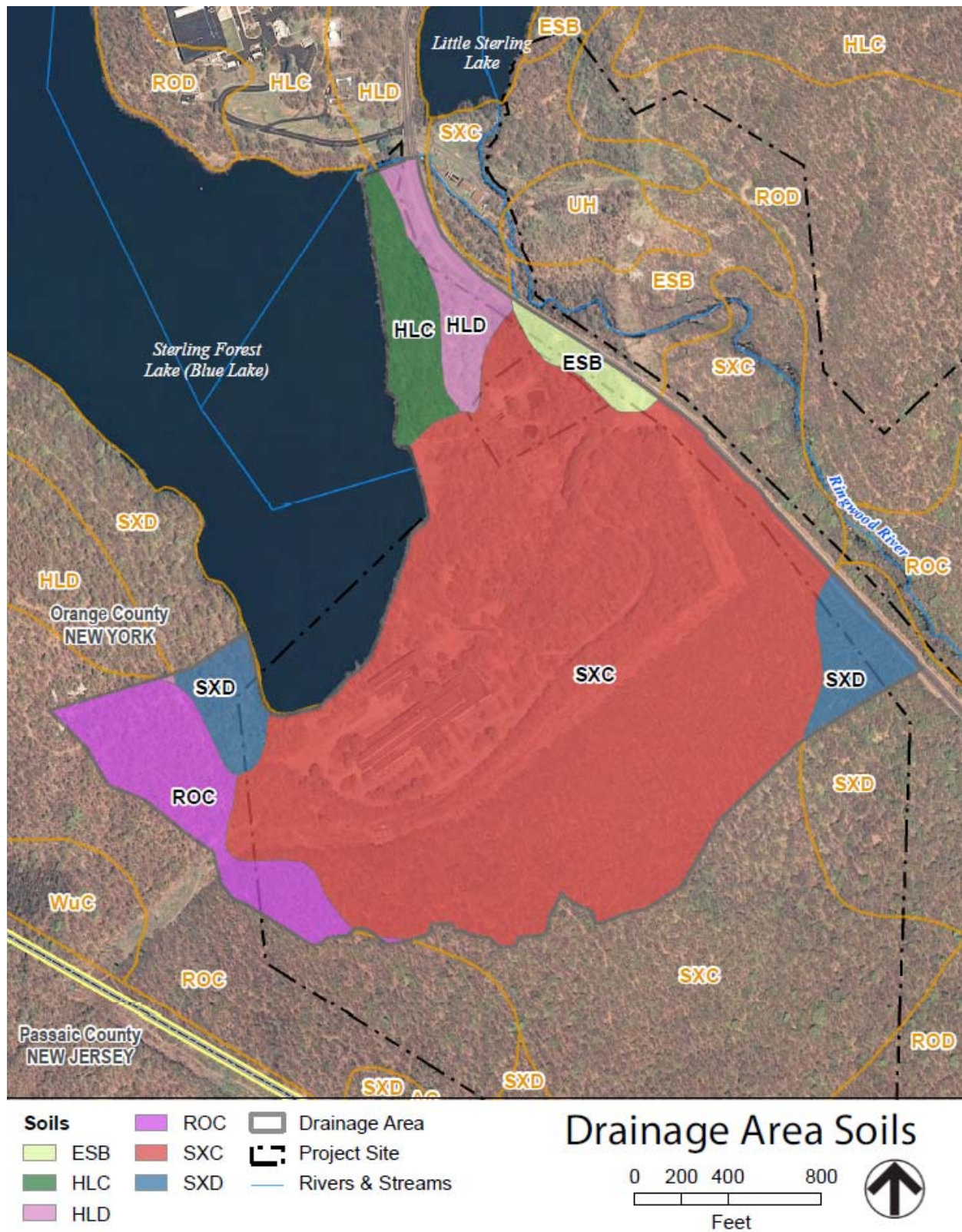


Figure 1-4 Drainage Area Soils

E. Proposed Project Description

Approximately 45 acres of the 253-acre property will be disturbed to accommodate approximately 1,140,000 square feet of building space and 366,000 square feet of parking space. The existing buildings and parking lots will be demolished under the proposed plan. The construction will be limited to the parcels located southwest of Long Meadow Road (CR-84). The portion of property that lies northeast of Long Meadow Road (CR-84) consists of woods, wetlands, and steep slopes and will not be disturbed by the proposed plan.

The overall landscaping concept for the site is to keep as much of the existing vegetation as possible and to restore disturbed areas to their native state of woods or meadow. There is very little lawn (three narrow areas along the riparian buffer with a view to the lake); instead, the majority of the site will be planted with native trees and shrubs, including boulder gardens, a native species meadow wildflower and grass mix mimicking the existing woods. These measures will greatly reduce the runoff potential when compared to a “traditional lawn” approach—see Landscaping Plan on Drawing L-001.

The project consists of eight main buildings and several ancillary buildings as described below:

- Administration offices/service building consisting of 445,000 square feet of building area for offices and home services, and main lobby entry for receiving visitors and conducting tours. An additional 11,000 square feet of space will be allocated for parking.
- Four residence buildings with 494,000 square feet of total building area.
- Maintenance building including 147,000 square feet of building area including the powerhouse and recreational facilities. Parking facilities encompassing 280,000 square feet will be included with this building.
- Vehicle maintenance building consisting of 35,000 square feet of total building area.
- Visitor parking building with 92,000 square feet of total building area.
- Accessory buildings consisting of several small outbuildings, each less than 8,000 square feet, for recreation, waste separation, visitor conveniences, and maintenance areas.

A portion of the existing entrance drive will be reconstructed along the existing centerline and a secondary access drive will be constructed 500 feet southeast of the existing drive. Utility systems will also be constructed to serve the new facility, which will include the installation of a 6-inch sanitary force main up to the Blue Lake Wastewater Treatment Plant (STP) located 1,500 feet northwest of the main entrance drive on the northeast side of Long Meadow Road. The proposed force main will be installed using directional drilling where it crosses under wetlands and at the crossing at Long Meadow Road. In addition, a new 8-inch water main will supply potable water to the proposed development. The main will connect to an existing 16-inch main that runs along Blue Lake in an easement owned by United Water—see Figure 1-5 Proposed Site Plan.



Figure 1-5 Proposed Site Plan

Permits and Approvals

The following permits and approvals are anticipated for the proposed plan:

Table 1-2 Permits and Approvals

Type of Approval	Agency
Special Use Permit	Town of Warwick Planning Board
Site Plan	Town of Warwick Planning Board
Possible (non-use) variances a) Incursion of portion of one building into Ridgeline Overlay District b) Height of roadway lighting	Town of Warwick Planning Board
Blasting Permit	Town of Warwick Planning Board
Building Permit	Town of Warwick Planning Board
Architectural Review	Town of Warwick Architectural Review Board
Water, Sewer, Road Access	Orange County Department of Public Works
Stormwater SPDES Permit	NYS DEC
MS4 Acceptance Form	NYS DEC
Article 15—Protection of Waters Permit	NYS DEC
GML 239 Review	Orange County Planning Department
NWP 33—Temporary Construction, Access and Dewatering	USACE
NWP 39—Commercial and Institutional Developments	USACE



This Section identifies the pollution control measures that will be implemented during and after construction to mitigate erosion and sediment deposition. Additionally, the sequence of construction activities is presented.

A. Pollution Control

Spill Prevention

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

Material Management Practices

- An effort will be made to store only enough products required to reasonably complete the job.
- All materials stored within the Project Site will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
- Products will be stored in their original containers with the original manufacturer's label.
- Substances will not be mixed with one another unless recommended by the manufacturer.
- When possible, all of a product will be used before disposing of the container.
- Manufacturers' recommendations for proper use and disposal will be followed.
- The project overseer will daily inspect to ensure proper use and disposal of materials.

Material Management Regarding Hazardous Products

- Products will be kept in the original containers unless they are not re-sealable.
- Original labels and material safety data will be retained.
- Surplus product will be disposed of according to the manufacturer's recommendation or according to local and/or state recommended methods of proper disposal.
- Material Safety Data Sheets for all hazardous products will be within the project area for the duration of the construction.

Specific Material Management Practices

- **Petroleum Products**—All project-related vehicles will be monitored for leaks and receive regular preventative maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers which are clearly labeled.
- **Fertilizers**—Fertilizers will only be applied in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked into the soil to limit the exposure to stormwater. Fertilizer will be stored in a covered or other contained area.

- **Paint**—All containers will be tightly sealed and stored when not required for use. Excess paint will not be discharged to the storm sewer system, but will be properly disposed of according to manufacturer's instructions or local and/or state regulations.
- **Concrete Trucks**—Concrete trucks will be washed within the Project Site utilizing a closed-loop recycling proprietary system that prevents washout wastewater from infiltrating into the ground. An area will be provided to collect and contain any concrete material washed from the trucks for recovery and disposal at a later time. No concrete material will be discharged from the property at any time during construction.

B. Erosion and Sediment Control

For a plan view and layout of applicable erosion and sediment control measures (ESCM) and details, see the attached Drawings CE-101, CE-102, CE-103, CE-104, CE-105, CE-106, CE-107, CE501, CE502 and CE503.

Temporary Stabilization

The following temporary stabilization practices shown in Tables 2-1 to 2-20 will be in effect for the duration of the construction project:

Table 2-1 ESCM #1: Phase Construction Activity

Description	In order to minimize the overall amount of disturbed soil that will be subject to potential erosion at one time, the project will be phased. Each phase will disturb a maximum of 10 acres at one time with written authorization from the Department of Environmental Protection (DEC). Additional phases will begin only when the prior phase is near completion and exposed soil has been stabilized. Refer to Drawing C-008 for overall phasing plan.
Installation Schedule	The sequence of construction is detailed in Section C below.
Maintenance and Inspection	Each construction phase area will be inspected twice every seven calendar days to ensure that all erosion control measures are in place and well maintained. Once a phase is completed, an additional inspection will occur to ensure that temporary or permanent stabilization is in place.

Table 2-2 ESCM #2: Existing Vegetation Protection

Description	The preserved area of existing vegetation will be surrounded by a temporary orange-colored plastic mesh fence, and all trees on the perimeter of the protected area will be marked with a brightly colored ribbon. The fencing will be 4 feet tall and have openings no larger than 2 by 2 inches. Posts will be spaced a maximum of 10 feet apart. The temporary fencing will be installed at the drip/spread line of the trees, and undergrowth vegetation to be protected. Vehicles and equipment will not be able to enter the protected area. Refer to Drawings L-002, L-003 and L-501 for Tree Preservation Plan and Details.
Installation Schedule	Protection of existing vegetation will be implemented before construction begins.
Maintenance and Inspection	The area will be inspected weekly to ensure the temporary fence is intact and the trees are marked.

Table 2-3 ESCM #3: Topsoil

Description	Topsoil removed from the proposed construction areas will be stockpiled to create berms at different locations throughout the site. The stockpiles are in an area that will not interfere with construction phases and will be at least 15 feet from areas of concentrated flows or pavement. The slope of the stockpile will be roughened by equipment tracking and will not exceed 2:1 to prevent erosion. A silt fence will be installed at each stockpile. The area of each stockpile is included in the total area of disturbance for each construction phase (included in 10-acre limit).
Installation Schedule	Topsoil stockpiles will be created during grading activities. The silt fence will be installed immediately after the stockpile has been established.
Maintenance and Inspection	The stockpile will be inspected for erosion twice every seven calendar days and immediately after rain events. Areas on or around the stockpile that have eroded will be stabilized immediately with erosion controls.

Table 2-4 ESCM #4: Silt Fence

Description	Silt fence will be installed at locations shown on the plans.
Installation Schedule	Silt fence will be installed before construction begins and around the visual barrier berm once it is started.
Maintenance and Inspection	The silt fence will be inspected twice every seven calendar days and immediately after rain events to ensure the fence is intact and no gaps exist where stormwater can pass. Sediment will be removed once it reaches one-third the height of the fence.

Table 2-5 ESCM #5: Earth Dike

Description	Temporary earth dikes will be constructed to route stormwater runoff at locations shown on the plans. The dikes will be constructed of compacted soil and will have a top width of 2 feet, a height of 18 inches and 2:1 side slopes. The dikes will be stabilized to prevent erosion by hydroseeding and mulching within 7 days of being constructed.
Installation Schedule	Construction will occur during phase of construction as shown on the plans.
Maintenance and Inspection	The dikes will be inspected twice every seven calendar days and after rain events. Dikes will be maintained to their original height. Any erosion damage will be repaired.

Table 2-6 ESCM #6: Temporary Stabilization (Seeding)

Description	Temporary vegetative cover will be established for areas of exposed soil where construction will cease for more the 7 days. During spring, summer, or early fall, seed with rye grass at 30 lbs/acre will be used. During late fall or early winter, seed Certified "Aroostook" winter rye at 100 lbs/acre will be used.
Installation Schedule	Temporary stabilization measures will be applied to portions of the site where construction activities will temporarily cease for more than 7 days.
Maintenance and Inspection	Areas will be inspected weekly and after rain events until a dense cover of vegetation has become established. If failure is noticed at the seeded area, the area will be reseeded, fertilized, and mulched immediately.

Table 2-7 ESCM #7: Hydromulching

Description	Wood-fiber hydromulching will provide protection to exposed soils during short periods of construction. Hydromulch will be applied in areas that have been seeded for temporary or permanent stabilization. Straw mulch and wood fibers will be mixed with a tackifier and applied uniformly by machine.
Installation Schedule	Hydromulch will be applied to exposed soils during short periods of construction and seeded areas.
Maintenance and Inspection	Areas will be inspected to check for movement of mulch or erosion twice every seven calendar days and after rain events. If there is any damage, the surface will be repaired and mulch reapplied.

Table 2-8 ESCM #8: Mulching (Hay/Straw)

Description	Hay/straw mulch will be used to provide protection to exposed soils awaiting permanent seeding or the establishment of shrub planting. Hay/straw mulch will be applied in areas that have been seeded for temporary or permanent stabilization. Mulch is to be installed at 2 tons per acre. Where wind or areas of concentrated water are a concern, mulch anchoring will be used.
Installation Schedule	Mulch will be applied to exposed soils during short periods of construction and seeded areas.
Maintenance and Inspection	Areas will be inspected to check for movement of mulch or erosion twice every seven calendar days and after rain events. If there is any damage, the surface will be repaired and mulch reapplied.

Table 2-9 ESCM #9: Dust Control (Sprinkling)

Description	Dust from the site will be controlled by using a mobile water truck to apply water to disturbed areas that are dry and susceptible to creating dust.
Installation Schedule	Dust control will be implemented as needed once site grading has been initiated and during windy conditions while site grading is occurring.
Maintenance and Inspection	Spraying of disturbed areas will start after grading activities commence. Spraying will be performed at least once per day during dry months or as needed to control dust.

Table 2-10 ESCM #10: Storm Drain Inlet Protection (Before Paving)

Description	Existing and newly constructed drain inlets will be protected using various methods, including silt fence, sediment bag and filter fabric.
Installation Schedule	For existing drain inlets, protection methods will be installed prior to commencement of construction. For proposed drain inlets, protection methods will be implemented around the inlets once they are installed.
Maintenance and Inspection	The measures implemented for the protection of storm drains will be checked on a weekly basis and after rain events. Any damaged will be corrected or replaced immediately. Excess sedimentation will also be removed in a timely manner.

Table 2-11 ESCM #11: Stabilized Construction Exits (Before Paving)

Description	Stone anti-tracking pads will be installed at all exits to prevent the off-site transport of sediment by construction vehicles. The stabilized exits will be at least 50 feet long, a minimum of 12 feet wide, flared at the end closest to the paved road and will consist of 6-inch-thick layer of crushed stone, or reclaimed or recycled concrete equivalent. The crushed stone/concrete will be placed over a layer of geotextile filter fabric. Orange mesh fence will be installed along the length of the construction exit to keep construction vehicles from circumventing the tracking pads.
Installation Schedule	Installation will occur before construction begins and will remain in place until subgrade is installed.
Maintenance and Inspection	The stabilized exit will be inspected weekly and after rain events or heavy use. All sediment tracked, spilled, dropped, or washed onto the road will be swept up on a daily basis.

Table 2-12 ESCM #12: Waste Materials (Including Recyclable and Hazardous)

Description	All waste materials will be collected and disposed of in trash dumpsters located in the combined staging and material storage area. Dumpsters will have secure watertight lids, and will be placed away from stormwater conveyance and drains. Wood pallets, cardboard boxes, and other recyclable construction scraps will be disposed of in a designated dumpster for recycling. All hazardous waste materials, such as oil filters, petroleum products, paint, and equipment maintenance fluids, will be stored in structurally sound and sealed shipping containers. A hazardous-materials storage area will be designated in the materials storage area. Secondary containment will be provided by spill pallets. No hazardous material will be disposed of in the on-site dumpsters.
Installation Schedule	Dumpsters will be installed once the staging area is established.
Maintenance and Inspection	Dumpsters will be emptied weekly or as needed. Material Safety Data Sheets (MSDS) and emergency contact numbers will be maintained in the office trailer.

Table 2-13 ESCM #13: Combined Staging and Material Storage Area

Description	Construction equipment and maintenance materials will be stored at the combined staging area and material storage area. Silt fence will be installed around the perimeter to designate the staging and materials storage area.
Installation Schedule	Installation will occur after grading and before any infrastructure is constructed.
Maintenance and Inspection	Combined staging and storage area will be inspected weekly and after rain events. Area will be kept clean.

Table 2-14 ESCM #14: Concrete Washout

Description	Construction washout areas will be installed at the temporary concrete batch plant location. A proprietary washout recycle unit will be utilized. Signs will be posted marking the location of the washout areas.
Installation Schedule	Installation will occur before the use of concrete truck for roadway or building.
Maintenance and Inspection	Washout areas will be inspected daily to insure that all concrete washout is being discharged into the proprietary unit.

Table 2-15 ESCM #15: Temporary Sump Pit

Description	The water table may be encountered during the construction of building foundations, and dewatering measures may need to be implemented to provide a dry base for construction. A temporary pit will be constructed to trap and filter water for pumping to a temporary sediment basin. The sump pit will consist of a 24- or 36-inch perforated vertical standpipe (corrugated plastic or PVC) in the center with a 12-inch base of NYS DOT #2 aggregate.
Installation Schedule	Sump pits will be installed prior to the use of dewatering pumps.
Maintenance and Inspection	Sump pits will be inspected on a daily basis during dewatering operations to ensure no clogging of gravel has occurred. If so, the sump pit will be excavated and new gravel deposited.

Table 2-16 ESCM #16: Sanitary Waste

Description	Six portable toilets will be provided at the site near each phase of construction. The toilets will be located away from concentrated flow paths and traffic flow.
Installation Schedule	Portable toilets will be brought to the site during mobilization activities.
Maintenance and Inspection	Sanitary waste will be collected from the portable toilets a minimum of three times per week. Holding tanks will be inspected weekly for evidence of leaking. Any tanks with leaks will be removed and replaced.

Table 2-17 ESCM #17: Sediment Trap (Temporary)

Description	Temporary sediment traps will be constructed for use during construction. The slopes of the traps will be stabilized using appropriate erosion control methods. Sizing of the traps will be according to the <i>New York Standards and Specifications for Erosion and Sediment Control</i>
Installation Schedule	Sediment traps will be constructed before site grading begins within the contributing area.
Maintenance and Inspection	The sediment traps will be inspected twice every seven calendar days and immediately after rain events. The banks will be checked for erosion, seepage, and structural damage. Any damage will be repaired immediately. Accumulated sediments will be removed when one-half of the volume of sediment capacity storage is reached.

Permanent Stabilization

The following permanent stabilization practices will be in effect after construction of the project:

Table 2-18 ESCM #18: Permanent Seeding

Description	All disturbed areas not stabilized with pavement or buildings will be seeded to provide perennial vegetative cover.
Installation Schedule	Permanent seeding will occur, at the most, 7 days after final grading of each phase. Optimum timing for a general seed mixture is early spring. Permanent seeding may be made at other times of the year if properly mulched and sufficient moisture is provided. Refer to <i>New York Standards and Specifications for Erosion and Sediment Control</i> for appropriate seed mixtures. Hydromulch will be applied immediately following seeding.
Maintenance and Inspection	Areas will be inspected twice every seven calendar days and after rain events until a dense cover of vegetation has become established. If failure is noticed at the seeded area, the area will be reseeded, fertilized, and mulched immediately. After construction is completed at the site, permanently stabilized areas will be monitored until final stabilization is reached.

Table 2-19 ESCM #19: Outfall Protection (Riprap)

Description	All pipe conduit outlets will utilize riprap protection to reduce the depth, velocity, and energy of water. Filter fabric will be placed between riprap and the underlying soil.
Installation Schedule	Installation will occur after outlet conduit s installed.
Maintenance and Inspection	Area will be inspected after high flows for evidence of scour beneath the riprap or for dislodged stones. Repairs will be made immediately.

Table 2-20 ESCM #20: Flow-Thru Stormwater Planter

Description	Stormwater runoff from the new visitor parking decks is routed through a series of planters. The planters provide water quality treatment in areas where standard methods are not feasible. Each planter can receive runoff from a maximum of 15,000 sq ft.
Installation Schedule	Planters will be installed during the construction of the building and will be put online after final stabilization of the surrounding disturbed areas.
Maintenance and Inspection	Planters will be inspected after major rain events to verify that proper drainage is occurring. If the infiltration rate is reduced, then additional compost and gravelly sand will be added and the area re-tilled.

C. Sequence of Construction

The SWPPP presents temporary and permanent sediment and erosion control measures that are in compliance with the project's SPDES General Permit for construction activity. To the extent feasible, all temporary sediment and erosion control measures will be installed before associated project areas are disturbed with soil disturbing activities to follow. Total disturbance during construction will be kept at a 10-acre maximum at any given time, based upon NYSDEC regulations. No mass clearing and grading of the site will occur. The re-development project will be divided into 13 phases in order to remain in compliance with NYSDEC regulations.

The following sequence of construction shown in Table 2-21 is currently planned:

Table 2-21 Sequence of Construction

Estimated Duration of Activity	Phase and Area of Disturbance	Construction Activity
	Phase 1 —7.5 Acres	<u>Construction Road Access, Vehicle Maintenance Building, Utility Installation</u> 1. Construction entrance on existing entrance road. 2. Construction entrance off of Long Meadow Road and install road to connect to existing entrance road. 3. Excavate and install foundation of Vehicle Maintenance Building. 4. Clear and grade recreation area for stockpile of materials. 5. Install electrical and utility loop from vehicle maintenance building along south easement to C Residence Building. 6. Install temporary haul road from Vehicle Maintenance Building along south easement to C Residence Building. 7. Install water and electrical utilities to bus parking and recreation area. 8. Install construction trailers and temporary parking area. 9. Stabilize all areas.
	Phase 2 —10.0 Acres	<u>Staging Areas</u> 1. Clear, excavate, and grade Administration Offices/Services Building footprint. 2. Install rock crushing/screening on the Administration Offices/Services Building footprint. 3. Construction staging on the Administration Offices/Services Building footprint. 4. Clear and grade bus parking area. 5. Stockpile excavated material in recreation area. 6. Site grading at Vehicle Maintenance Building. 7. Stabilize all areas.
	Phase 3 —5.7 Acres	<u>Temporary Concrete Batch Plant</u> 1. Site grading around Vehicle Maintenance Building. 2. Install temporary concrete batch plant in bus parking area. 3. Stockpile materials in recreation area. 4. Stabilize all areas.

Estimated Duration of Activity	Phase and Area of Disturbance	Construction Activity
	Phase 4 —9.0 Acres	<u>Maintenance and Vehicle Maintenance Buildings</u> 1. Clear, blast, excavate, and grade portion of Maintenance Building. 2. Stockpile materials in recreation area. 3. Final grading for the Vehicle Maintenance Building. 4. Final grading for the temporary concrete batch plant. 5. Stabilize all areas.
	Phase 5 —8.0 Acres	<u>Temporary Housing, C Residence, Utility Install</u> 1. Install temporary housing in the recreation area. 2. Excavate, blast, and install foundation of C Residence Building. 3. Install major storm/sewer runs. 4. Stabilize all areas.
	Phase 6 —5.7 Acres	<u>C Residence, D Residence, Maintenance Building</u> 1. Final grading for the C Residence Building. 2. Excavate and install foundation of D Residence Building. 3. Excavate, blast, and install foundation for portion of Maintenance Building. 4. Stabilize all areas.
	Phase 7 —5.3 Acres	<u>D Residence, Maintenance Building, Main Entrance</u> 1. Final grading for the D Residence Building. 2. Install foundation for portion of Maintenance Building. 3. Install 11 stations of main entrance road. 4. Stabilize all areas.
	Phase 8 —9.1 Acres	<u>Maintenance Building, Visitor Parking Structure</u> 1. Final grading for the Maintenance Building. 2. Excavate and install foundation of visitor parking structure. 3. Construct berm south of D and B Residence Buildings. 4. Construct berm south of Maintenance Building. 5. Stabilize all areas.
	Phase 9 —8.0 Acres	<u>Visitor Parking Structure, Administration Offices/Services Building, A Residence</u> 1. Final grading for visitor parking structure. 2. Excavate and install foundation of Administration Offices/Services Building. 3. Excavate, blast, and install foundation of A Residence Building. 4. Install tunnel from A Residence to Administration Offices/Services Buildings. 5. Install tunnel from A Residence to C Residence Buildings. 6. Stabilize all areas.

Estimated Duration of Activity	Phase and Area of Disturbance	Construction Activity
	Phase 10 —4.4 Acres	<u>Services Building, Residence A</u> 1. Final grading for Administration Offices/Services Building and A Residence Building. 2. Install center drive from A Residence to C and D Residence Buildings. 3. Stabilize all areas.
	Phase 11 —5.5 Acres	<u>Administration Offices/Services Building, B Residence</u> 1. Excavate and install foundation of Administration Offices/Services Building. 2. Excavate, blast, and install foundation of B Residence Building. 3. Install tunnel from Maintenance Building to B Residence Building. 4. Install tunnel from B Residence to D Residence Buildings. 5. Stabilize all areas.
	Phase 12 —7.1 Acres	<u>Administration Offices/Services Building, B Residence</u> 1. Final grading for Administration Services/Office Building 2. Final grading for B Residence Building. 3. Install center drive to Administration Offices/Services Building. 4. Install 9 stations of main road to Administration Offices/Services Building. 5. Remove temporary concrete batch plant. 6. Install bus parking. 7. Stabilize all areas.
	Phase 13 —2.1 Acres	<u>Recreation Area</u> 1. Remove temporary housing. 2. Install recreation courts and parking. 3. Final grading of recreation area. 4. Stabilize all areas.



This Section discusses the post-construction water quality and quantity control measures that will be employed for the proposed project. Stormwater regulations and design criteria, which have a bearing on the design, are also identified along with a discussion of the stormwater management approach for the proposed project.

A. Regulations

New York State Department of Environmental Conservation (NYSDEC) Criteria

The design criteria for stormwater management established for the project is in accordance with the *New York State Stormwater Management Design Manual (NYSSMDM)* dated August 2010, and the “State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity” (GP-0-10-001, January 29, 2010). As outlined in the *NYSSMDM*, the following stormwater sizing criteria were used for the proposed project:

- The Water Quality Volume (WQv) was sized to capture and treat 90 percent of the annual stormwater runoff volume. The WQv is directly related to the amount of impervious cover created at the site. Impervious cover includes: paved and gravel road surfaces, parking lots and sidewalks, as well as rooftops and other impermeable surfaces.
- Run-Off Reduction Volume (RRv) of the WQv was achieved by the use of green infrastructure techniques that reduce contributing area or run-off volume to the maximum extent possible.
- Channel Protection Volume (Cpv) was achieved by 12-hour extended detention (detention time is reduced from 24 to 12 hours for trout waters) of the post-developed 1-year, 24-hour storm event; remaining after run-off reduction.
- Overbank Flood Control (Qp) will control the peak discharge from the 10-year storm to 10-year pre-development rates.
- Extreme Flood Control (Qf) will control the peak discharge from the 100-year storm to 100-year pre-development rates and provide safe passage of the 100-year storm event.

Watershed and regional factors also have an impact on the stormwater management design. The project is located within the Highlands Sole Source Aquifer (SSA), which is a main source of drinking water for the community. Thus, stormwater treatment measures were designed according to guidelines established by the *NYSSMDM* to protect groundwater—see Figure 3-1 Sole-Source Aquifer Map.

The project includes the Vehicle Maintenance Building. Stormwater runoff from this area of the site will be treated according to the guidelines established by the *NYSSMDM* for stormwater hotspots.

The project is located within the regulated Municipal Separate Storm Sewer System (MS4) for the Town of Warwick, but it is not located in the Phosphorous Limiting Basin for Greenwood Lake.

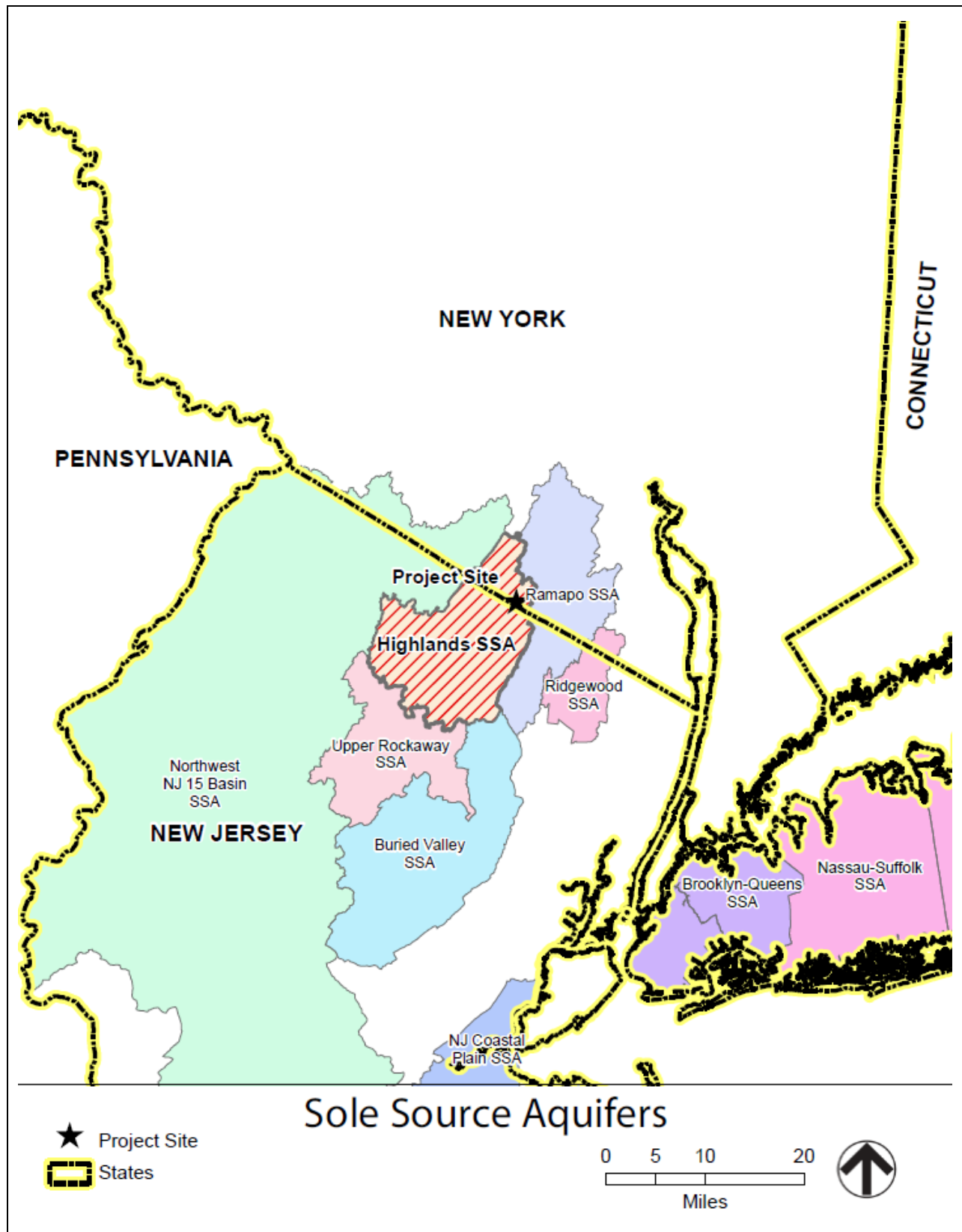


Figure 3-1 Sole-Source Aquifer Map

Additional Design Criteria

The on-site stormwater collection system will be designed to convey the 10-year storm event with safe conveyance of the 100-year storm event.

B. Stormwater Management Approach

New Construction

Criteria for new construction will be applied to portions of the project that lie outside of the existing developed area. The five-step approach outlined in the *NYSSMDM* has been used for site planning and the selection of stormwater management practices (SMPs). These five steps are:

1. Site planning to preserve natural features and reduce impervious cover.
2. Calculation of the water quality volume for the site.
3. Incorporation of green infrastructure techniques and standard SMPs with runoff reduction volume (RRv) capacity.
4. Use of standard SMPs where applicable, to treat the portion of water quality volume not addressed by green infrastructure practices or standard SMPs with RRv capacity.
5. Design of volume and peak rate control practices where required.

Step 1: Green Infrastructure Practices (GIPs) used in Planning Stage

- **Preservation of Undisturbed Areas:** The entire site encompasses 253 acres and includes federally protected wetlands, NYSDEC-classified streams, lake banks, areas of steep slopes and undisturbed forests. The proposed project will disturb 45 acres, or 18 percent of the entire property, and is located such that impacts to environmentally sensitive areas are avoided or minimized. There will be limited disturbance of eastern deciduous hardwood forest (Appalachian oak hickory forest); however, the remaining undisturbed areas will be protected during construction.
- **Preservation of Buffers:** Naturally vegetated buffers will remain undisturbed for most of the on-site wetlands. There will be limited permanent impact to the on-site wetland located just north of the proposed visitor parking garage. The wetland area and associated buffers that are temporarily disturbed will be replanted and restored. The riparian buffer along Sterling Forest Lake (Blue Lake) adjacent to the proposed project will be replanted and restored to protect the lake and treat runoff from landscaped areas and sidewalks. No disturbance is proposed near the Ringwood River or its buffer.
- **Reduction of Clearing and Grading:** The footprint of the proposed project is limited to the minimum by reducing the amount of roads, drives, and infrastructure. Specific measures include minimizing the amount of surface parking by providing multi-level parking, minimizing roadway and sidewalk widths, and ensuring that utilities and services are centrally located where possible. Additionally, approximately one-third of the proposed project will be located in previously disturbed areas of the site, limiting the need for additional clearing.
- **Locating Development in Less Sensitive Areas:** The project is located to avoid or minimize impacts to sensitive areas. Project disturbance is located entirely outside of the 100-year floodplain. Disturbance to steep slopes will be minimized and limited to approximately 0.5 acres. The majority of the area to be developed is over Swartswood and Mardin soils, which are very stony, sloping, and have a moderate potential for runoff (HSG C). Overall, the site will be designed to blend and adapt to the existing topography. However, to accomplish this along with the goal of reducing site disturbance,

the Owner is proposing significant excavation for the installation of parking structures, basements, footings, and foundations. The natural hydrology for the majority of the site will be maintained by ensuring the undisturbed natural upstream areas continue to feed existing wetlands and streams.

- **Open-Space Design:** The proposed site was planned using clustering to reduce impervious cover, preserve open space, and protect environmental resources. Additionally, the proposed project will be constructed in previously disturbed areas of the site thereby preserving the maximum amount of undisturbed open space.
- **Soil Restoration:** The soil will be restored during the landscaping phase of the construction project as required by the *NYSSMDM* and the *NYSDEC* guide, *Deep Ripping and De-compaction*. Soil restoration will be performed on all disturbed areas that are designated as pervious and will include the addition of compost, tilling, rock removal and the application of topsoil prior to landscaping.
- **Roadway Reduction:** Roadway widths and lengths were minimized to reduce the amount of impervious surface area on-site. An entrance drive with “cul-de-sac” will be provided as opposed to a looped driveway. Also, widths were minimized by providing a 20-foot-wide driveway with mountable curbs and adjacent sidewalks to satisfy the 26-foot-wide fire access road requirement.
- **Sidewalk Reduction:** Impervious sidewalk surfaces were reduced by providing common walkways to access pedestrian areas. Additionally, below-grade tunnels are used to connect the residence buildings to the Administration Offices/Services Building, further reducing the amount of impervious sidewalk cover.
- **Building Footprint Reduction:** Building footprints were reduced by increasing building heights to the extent possible without violating the Ridgeline Overlay District requirements. The proposed project makes use of multi-level parking structures and multi-story residential and office buildings.
- **Parking Reduction:** Impervious parking area was reduced by incorporating 870 parking spaces in multi-level parking garages. The equivalent surface area required for this number of spaces would be approximately 8 acres; thus, the use of parking garages significantly reduces the impervious area required by surface parking. Additionally, efficient parking lanes will be used along the residential access drive, and permeable paving will be implemented along the residential access drive, at the entrance to the Administration Offices/Services Building, and at recreation area drives and parking.

Step 2: Water Quality Volume Calculation

The Water Quality Volume (WQv) for areas of the project designated as new construction was sized to capture and treat 90 percent of the annual stormwater runoff volume. The WQv is directly related to the amount of impervious cover created at the site. Impervious cover includes: paved and gravel road surfaces, parking lots and sidewalks, as well as rooftops and other impermeable surfaces.

Step 3: GIPs and Standard SMPs used for Run-off Reduction

The following green infrastructure practices and standard stormwater management practices will be implemented throughout the site to reduce and treat stormwater runoff—see SWPPP Drawing C-007, “Stormwater Management Plan” for the locations of these practices.

- **Sheetflow to Riparian Buffers:** The riparian buffer along Blue Lake adjacent to the proposed project, as well as the buffer along the wetland between the proposed visitor parking garage and existing United Water Water Treatment Plant will be replanted and restored. The buffers will treat sheetflow from adjacent sidewalks and landscaped areas.
- **Rooftop Disconnection:** Rooftop runoff from pavilions at picnic areas will be disconnected and directed to adjacent pervious areas.

- **Green Roof:** The proposed project will incorporate approximately 151,000 square feet of green roofs constructed at the Residence Buildings, Maintenance Building, Administration Offices/Services Building and Vehicle Maintenance Building.
- **Stormwater Planters:** Flow-through planters will be used to filter runoff from the upper and lower decks of the visitor parking garage and the roof of the Maintenance Building.
- **Porous Pavement:** The residential area driveway will be constructed with pervious concrete pavers, which will filter stormwater runoff from adjacent concrete sidewalks. In addition, pervious concrete pavers at the Administration Offices/Services Building driveway will treat runoff from adjacent concrete sidewalks and covered walkways.
- **Perimeter Sand Filters:** Sand filters will be constructed at stormwater hotspots to treat runoff from parking lots adjacent to the Vehicle Maintenance Building and disposal facility.
- **Bioretention:** Four bioretention ponds will be included in two of the drainage basins to treat stormwater prior to discharging to the stormwater system. The areas that will be treated include the main entrance road, the bus parking and recreation parking areas, and the secondary entrance road.

Some GIPs were evaluated and deemed not feasible for the proposed project for the following reasons:

- **Conservation of Natural Areas:** The Project Sponsor is not placing any land in a permanent conservation easement. However, the Project Sponsor will follow an open-space design to preserve as much open space as possible and to ensure conservation of preserved lands to further the Town's open space goals. The property includes several constraints that preclude development beyond what is currently proposed. The 700-ft Ridgeline Overlay District and the Southern Wallkill Biodiversity Plan (SWBP) cover most of the property southwest of Long Meadow Road (CR 84). The SWBP also covers the parcels on the northeast side of Long Meadow Road. Furthermore, the property to the northeast of Long Meadow Road (CR 84) includes the Ringwood River and steep slopes. These constraints all serve to limit the amount of further development possible on this site beyond the Proposed Project. Further, additional development, even of a minor nature, would be subject to review and approval by the Planning Board.
- **Vegetated Open Swale:** This practice was not used due to steep slopes along the entrance driveway and the secondary access driveway. The maximum recommended slope for this practice is 4 percent—proposed swales range in slope from 6 to 10 percent.
- **Stream Daylighting:** This practice is not applicable to the proposed project.
- **Rain Garden:** This practice was deemed not feasible because it is only suitable to treat roof areas of 1,000 square feet or less. The size of the proposed roof areas makes this impracticable.
- **Cisterns:** An analysis was performed to determine the feasibility of this practice. However, a water balance could not be achieved, especially during winter months.

Standard SMPs with RRv Capacity Deemed Not Feasible for Application on Proposed Project

- **Infiltration Practices:** To determine suitable locations for infiltration practices, preliminary subsurface investigations were performed, which included 26 soil borings, 18 test pits, installation of 4 piezometers, and 3 infiltration tests. The investigations revealed that a high water table is present in some locations. A high water table precludes these practices that require a minimum separation from groundwater to protect the sole-source aquifer. Steep slopes also preclude the use of these practices. The stormwater hotspot at the Vehicle Maintenance Building also prohibits the use of infiltration practices due to the potential to contaminate groundwater—see Clough Harbour Associates (CHA) “Final Geotechnical Engineering Report” in DEIS Appendix B-1, Figure 4, “Groundwater Contour Plan,” and Figure 3, “Bedrock Contour Plan.”

- **Dry Swale:** This practice was not used due to steep slopes along the entrance driveway and secondary access driveway. The maximum recommended slope for this practice is 4-percent—proposed swales range in slope from 6 to 10 percent.

Step 4: Standard Stormwater Practices used for Remainder of WQv

Physical limitations of the site, including a high-water table, the presence of bedrock, stormwater hotspots, and steep slopes, preclude the use of some green infrastructure practices as described above. Thus, standard stormwater practices were applied to the portion of water quality volume that could not be treated using green infrastructure practices. Water table elevations and depth to bedrock were measured in particular areas of the site based on data obtained from soil borings and infiltration tests. Refer to Figure 3-2 Water Table Near Proposed Grade, Figure 3-3 Bedrock Near Proposed Grade, Figure 3-4 Stormwater Hotspots, and Figure 3-5 Steep Slopes. The following standard stormwater practices were used:

- **Bioretention:** This practice was used to treat landscaped areas, paved areas at bus parking, and the visitor picnic area.
- **Sand Filters:** The proposed project includes the Vehicle Maintenance Building that qualifies as a stormwater hotspot. Sand filters were used to treat the surrounding parking areas. This practice prevents the contamination of groundwater.

Step 5: Volume and Peak Rate Control

- Underground storage chambers as well as existing wetlands and depressions will be used to attenuate peak flows.

Redevelopment

Where an existing impervious area is reconstructed and physical constraints of the site do not allow meeting the required elements for standard practices, redevelopment criteria were applied to size stormwater infrastructure. These criteria are outlined in Chapter 9 of the *NYSSMDM*.

As determined by the geotechnical investigation, a high-water table and shallow bedrock (less than 5 feet below proposed grade) are present in much of the existing development. A high-water table precludes practices such as ponds, wetlands, dry swales, filtration, and infiltration basins that require a minimum separation from groundwater to protect the sole-source aquifer. Areas where shallow bedrock is present also preclude the use of infiltration practices.

Therefore, it was determined that a portion of the Project Site meets the criteria for redevelopment since these areas include existing impervious cover that will be disturbed and reconstructed, and the physical constraints of the site do not allow the use of standard stormwater practices in these areas. For the proposed project, application of redevelopment criteria will be limited to existing impervious areas that will be demolished and reconstructed in basins DA-1B1, DA-1B2, DA-1D1, DA-1D2, DA-2A3, DA-2B1, DA-2B2, DA-2B3 DA-2B5 and DA-2B6. These basins include the former International Nickel Company (INCO) facility buildings, parking, and entrance driveway—see Figure 3-6 Redevelopment Areas.

Although redevelopment criteria are used to meet water quality volumes, these criteria were not used for water quantity controls. All peak discharges meet or are below the pre-development run-off rates.

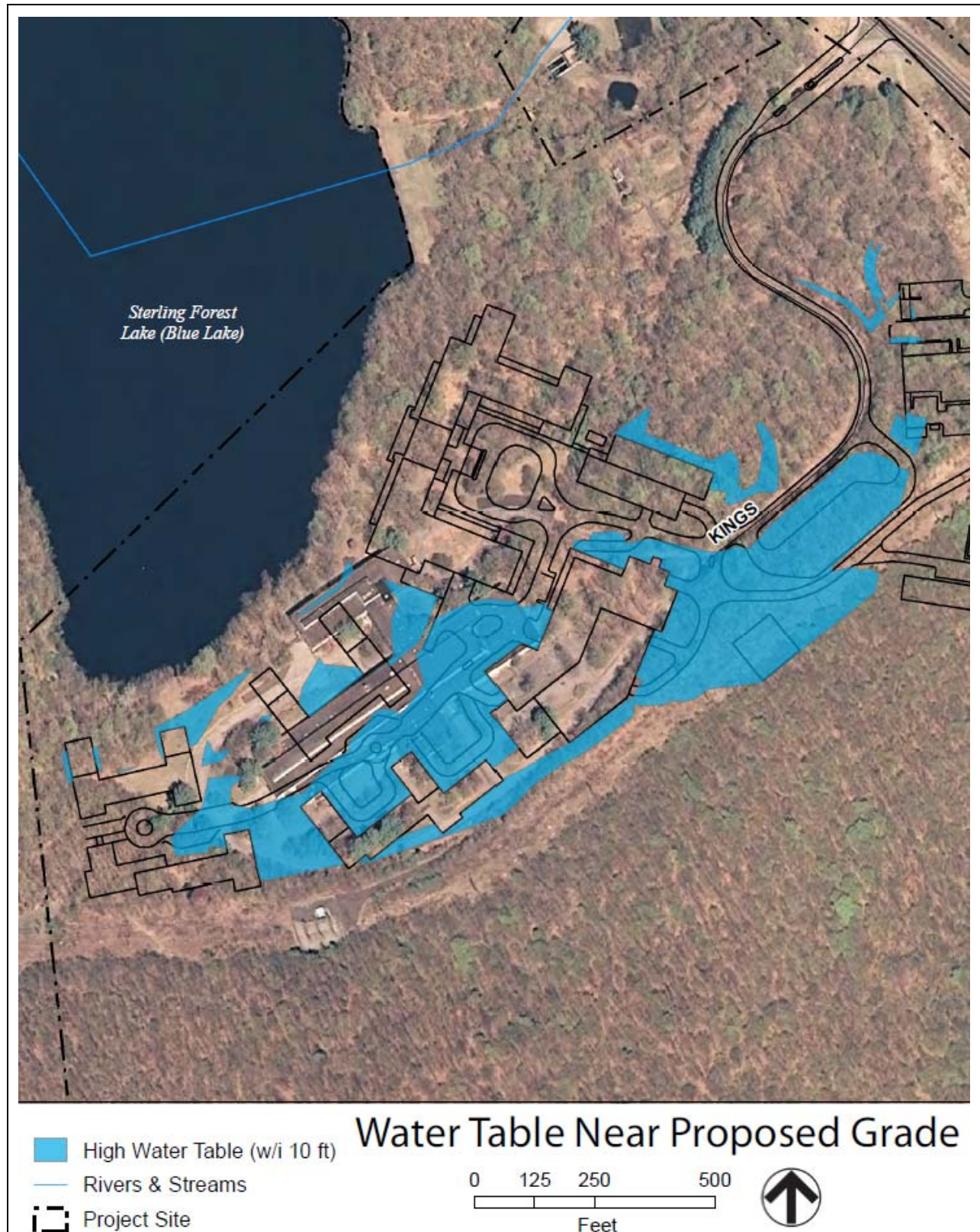


Figure 3-2 Water Table Near Proposed Grade

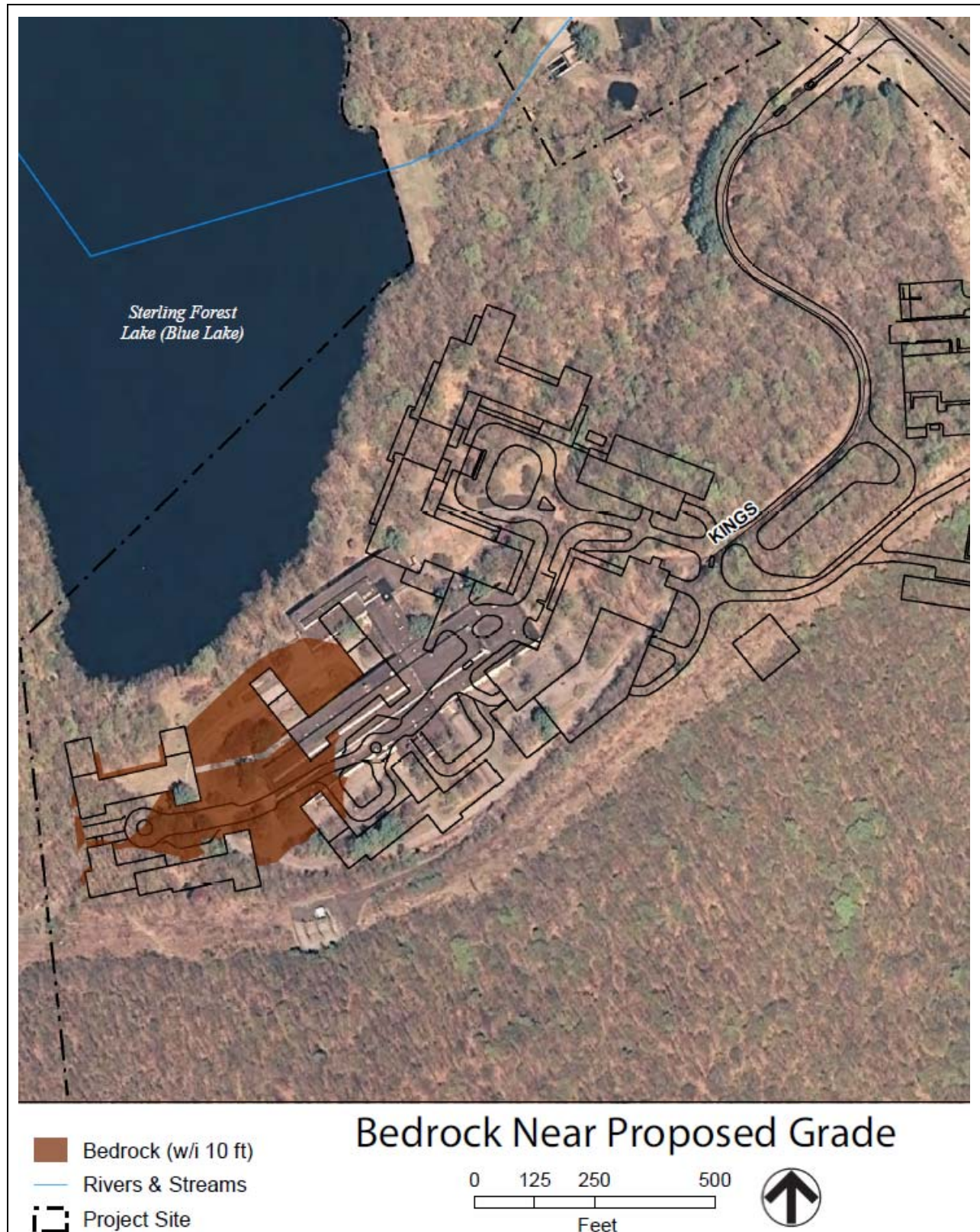


Figure 3-3 Bedrock Near Proposed Grade

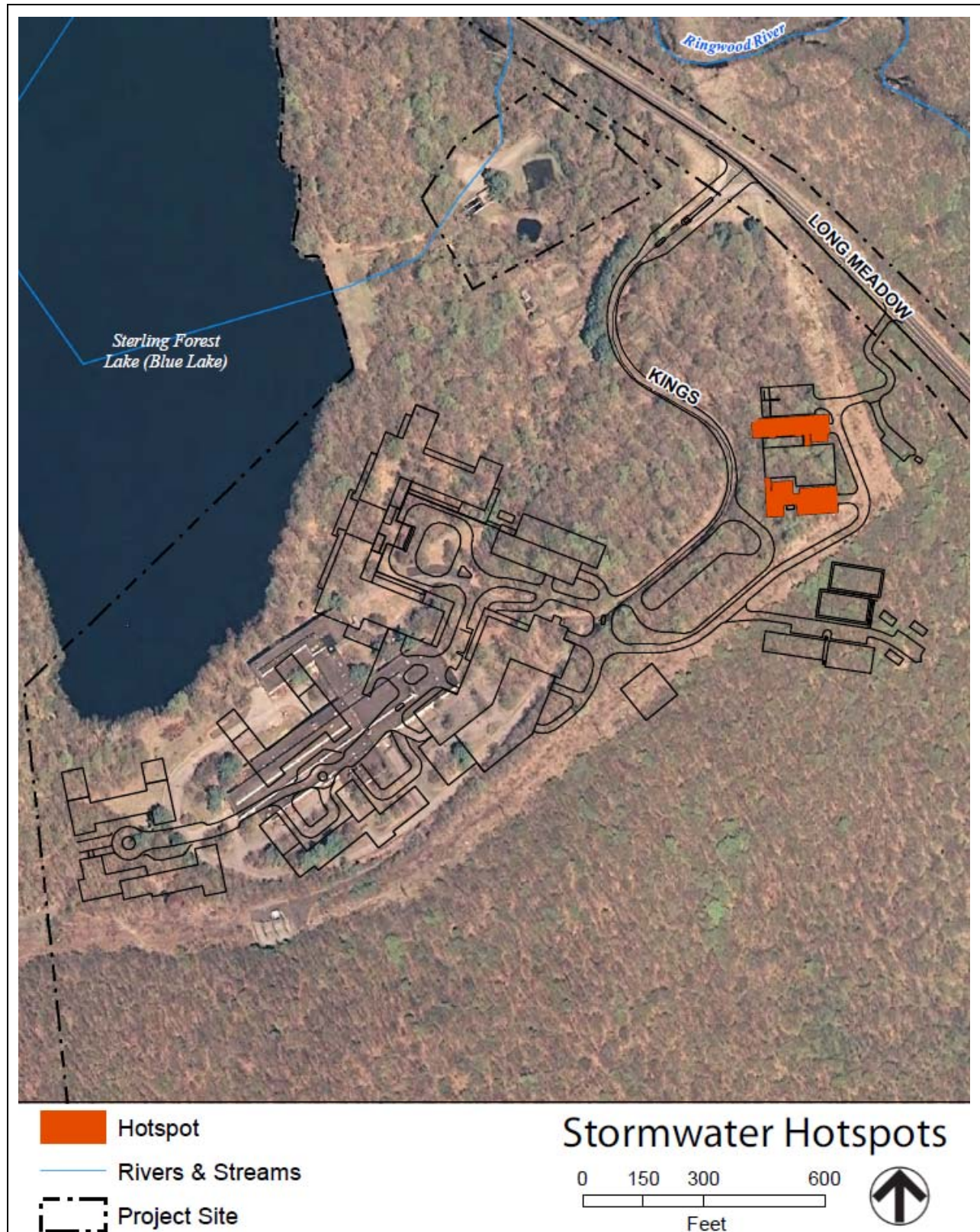


Figure 3-4 Stormwater Hotspots

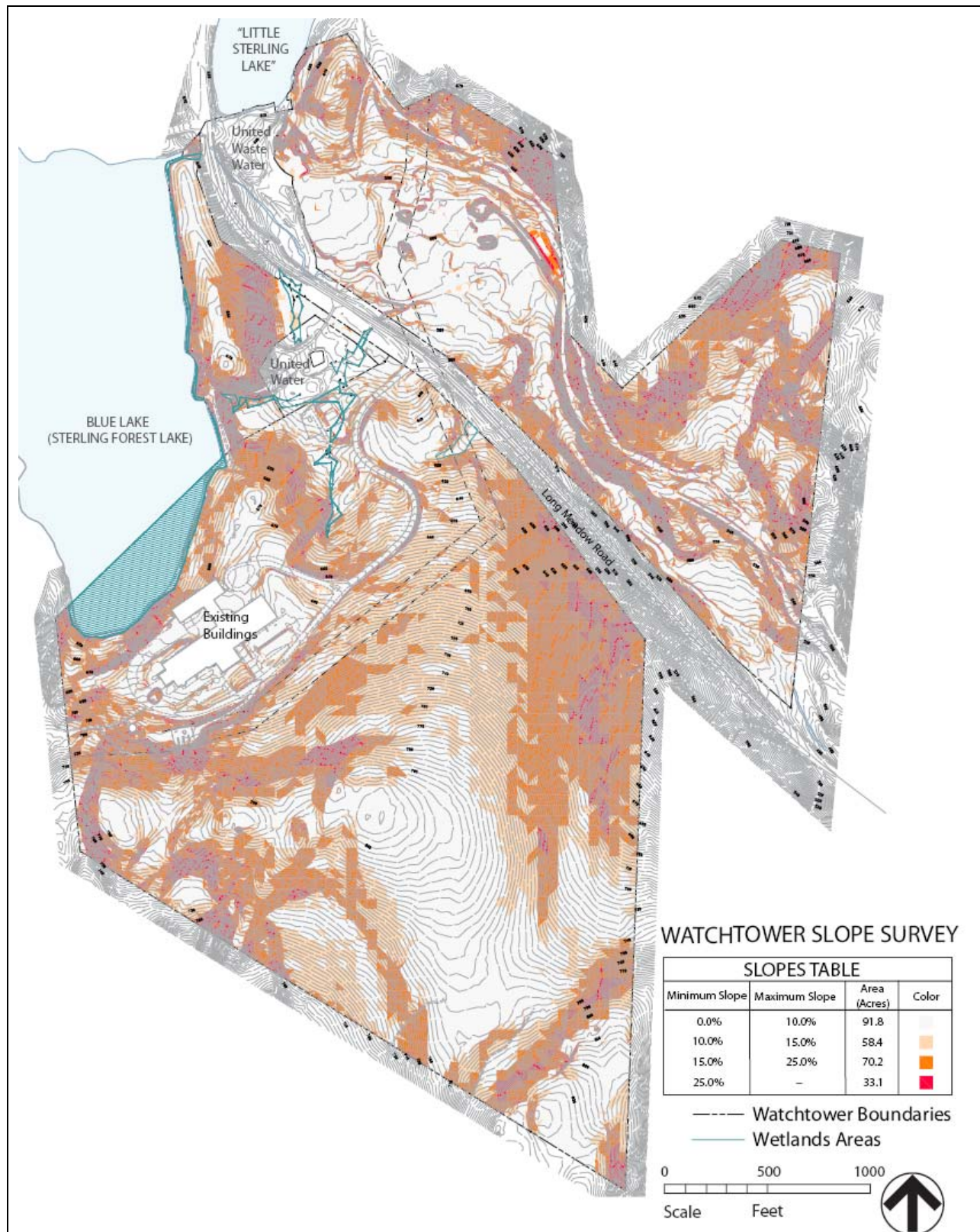


Figure 3-5 Steep Slopes

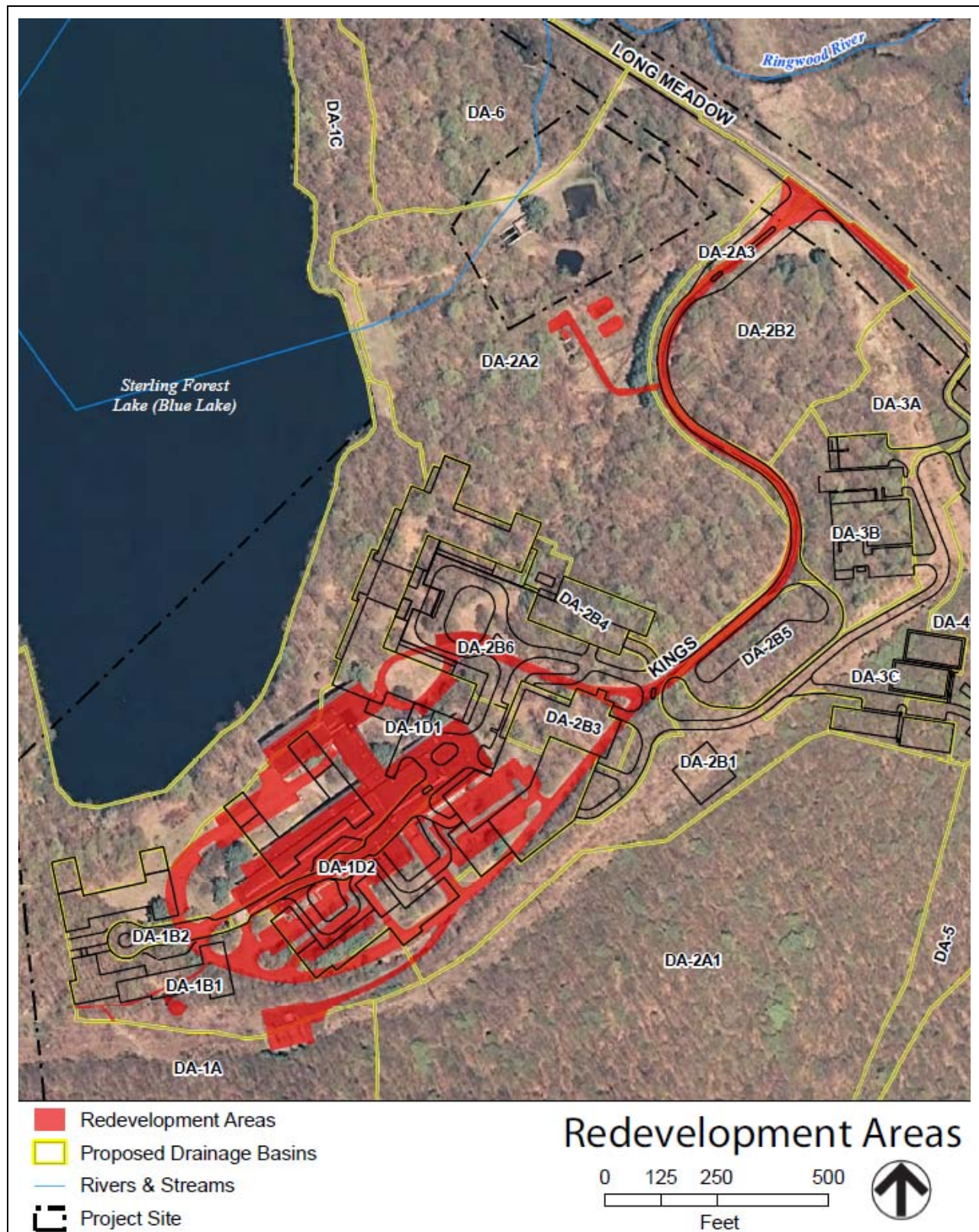


Figure 3-6 Redevelopment Areas

C. Water Quality Analysis

New Construction

The required water quality volume (WQv) for the drainage areas was computed using the Runoff Frequency Spectrum (RFS) method, discussed in the *NYSSMDM*. The equation used to compute WQv is presented below.

$$WQv = \{(P) (Rv) (A)\} / 12$$

Where:

WQv = Water quality volume (acre-feet)

P = 90% rainfall event (inches)

Rv = $0.05 + 0.009 (I)$, where I is the percent impervious cover

A = Site area (acres)

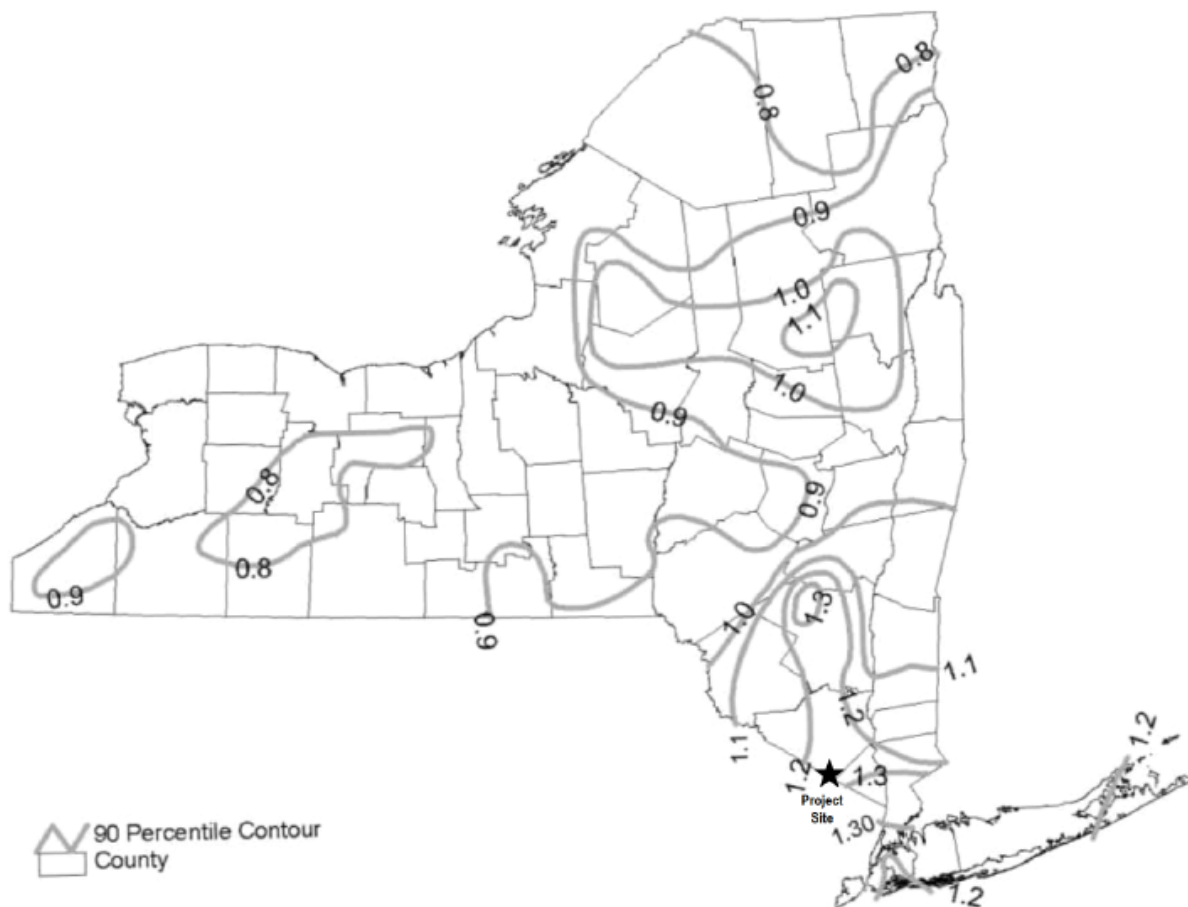
For the Project Site, 90 percent of the annual runoff is generated by storms of 1.25 inches of rainfall or less. (See Figure 3-7 Rainfall Contour Map.) A summary of WQv is provided in Table 3-1 and detailed calculation sheets are included in SWPPP Appendix G.

Table 3-1 Summary of Water Quality Volume for New Construction

Design Point	Drainage Area	Area (acres)	WQv Impervious Area (acres)	Required WQv (ft ³)	WQv Green Practices (ft ³)	WQv Standard Practices (ft ³)	WQv Alternative Practices (ft ³)	Total WQv Provided
DP-1	DA-1A	24.01	0.00 ⁽³⁾	0 ⁽²⁾	0	0	0	0
DP-1	DA-1B1 ⁽¹⁾	--	--	--	--	--	--	--
DP-1	DA-1B2 ⁽¹⁾	--	--	--	--	--	--	--
DP-1	DA-1C	3.31	0.00 ⁽³⁾	0 ⁽²⁾	0	0	0	0
DP-1	DA-1D1 ⁽¹⁾	--	--	--	--	--	--	--
DP-1	DA-1D2 ⁽¹⁾	--	--	--	--	--	--	--
DP-2	DA-2A1	20.92	0.00 ⁽³⁾	0 ⁽²⁾	0	0	0	0
DP-2	DA-2A2 ⁽²⁾	--	--	--	--	--	--	--
DP-2	DA-2A3 ⁽¹⁾	--	--	--	--	--	--	--
DP-2	DA-2B1 ⁽¹⁾	--	--	--	--	--	--	--
DP-2	DA-2B2 ⁽¹⁾	--	--	--	--	--	--	--
DP-2	DA-2B3 ⁽¹⁾	--	--	--	--	--	--	--
DP-2	DA-2B4	0.87	0.78	3,402	3,402	--	--	3,402
DP-2	DA-2B5 ⁽¹⁾	--	--	--	--	--	--	--
DP-2	DA-2B6 ⁽¹⁾	--	--	--	--	--	--	--
DP-3	DA-3A	1.81	0.17	1,105	1,105	--	--	1,105

Design Point	Drainage Area	Area (acres)	WQv Impervious Area (acres)	Required WQv (ft ³)	WQv Green Practices (ft ³)	WQv Standard Practices (ft ³)	WQv Alternative Practices (ft ³)	Total WQv Provided
DP-3	DA-3B	2.31	1.18	5,343	--	5,343	--	5,343
DP-3	DA-3C	2.66	1.18	5,423	--	6,289	--	6,289
DP-4	DA-4	5.05	0.39 ⁽³⁾	1,692	1,692	0	0	1,692
DP-5	DA-5	9.68	0.00	0 ⁽²⁾	0	0	0	0
DP-6	DA-6	8.09	0.00	0 ⁽²⁾	0	0	0	0
Total		78.71	3.31	16,965	6,199	11,632	0	17,831

1. Refer to Redevelopment section for sizing
2. Drainage Area is undisturbed from predevelopment condition
3. Excludes contributing and impervious areas where treatment is not feasible



Source: NYS Stormwater Management Design Manual, August 2010

Rainfall Contour Map



NOT TO SCALE

Figure 3-7 Rainfall Contour Map

Redevelopment

For portions of the project that meet the redevelopment criteria, the WQv can be met by alternative sizing options as described in Section 9.3.2.B of the *NYSSMDM*. The following basins use one of these redevelopment options to meet WQv sizing for a portion or their impervious area: DA-1B1, DA-1B2, DA-1D1, DA-1D2, DA-2A3, DA-2B1, DA-2B2, DA-2B3, DA-2B5 and DA-2B6. Meeting the RRv sizing criteria is not required for redevelopment projects.

The specific redevelopment WQv sizing options are the following:

- Option I—Plan proposes a reduction of existing impervious cover by a minimum of 25 percent of the total disturbed, impervious area.
- Option II—Plan proposes that a minimum of 25 percent of the WQv from the disturbed, impervious area is captured and treated by the implementation of standard practices or reduced by application of GIPs. If redevelopment results in the creation of additional impervious area, treatment is required for 25 percent of the existing impervious area, plus 100 percent of the *additional* impervious area.
- Option III—Plan proposes the use of alternative practices to treat 75 percent of the WQv from the disturbed, impervious area as well as any additional runoff from tributary areas that are not within the disturbed, impervious area.
- Option IV—Plan proposes a weighted average of a combination of Options I, II, and III. Alternative practices should be sized based on the following calculation. Section 9.5 of the *NYSSMDM* lists several alternative stormwater management practices that provide a level of water quality treatment acceptable for redevelopment projects.

$$\begin{array}{c} \% \text{ WQv by} \\ \text{Alternative} \\ \text{Practice} \end{array} = (25\% - \begin{array}{c} \% \text{ WQv by} \\ \text{IC} \\ \text{Reduction} \end{array} + \begin{array}{c} \% \text{ WQv by} \\ \text{Standard} \\ \text{Practices} \end{array} + \begin{array}{c} \% \text{ WQv by} \\ \text{Runoff} \\ \text{Reduction} \end{array}) \times 3$$

Drainage Area DA-1B1

Drainage Area DA-1B1 is located at the southwest portion of the proposed development where a portion of the existing INCO building, parking area, gravel road, water tank, and electrical substation are currently constructed. The existing impervious areas either sheetflow or are conveyed by pipe without any treatment to Blue Lake. The entire existing impervious area will be disturbed and reconstructed as either pervious or impervious surface. The basin consists of two proposed residence buildings (C and D), a portion of the loop road and adjacent sidewalk. DA-1B1 has the following characteristics:

Table 3-2 Summary of Water Quality Volume for Redevelopment in DA-1B1

Drainage Area (acres)	Existing Impervious Area (acres)	Proposed Impervious Area (acres)	WQv Sizing Option	Total Required WQv (cu ft)	Total Provided WQv (cu ft)	Treatment Practice(s)
4.69	1.36	1.37 ⁽¹⁾	Option II	1,522	1,780	Green Roof

1. Accounts for proposed green roofs

The existing impervious area includes 1.36 acres, which requires 5,862 cubic feet of WQv. Choosing to use Option II reduces the WQv of the existing impervious area by 75 percent resulting in a modified WQv of 1,466 cubic feet. The additional proposed impervious area results in a 0.01-acre increase, which

requires 56 cubic feet of treatment. The total WQv required is 1,522 cubic feet. Implementing green roof coverage at the C and D Residence Buildings results in a provided WQv of 1,780 cubic feet.

Drainage Area DA-1B2

DA-1B2 consists of the driveway and roundabout inside DA-1B1 and is comprised of pervious pavers. Runoff will infiltrate through the pavers and into the ground. DA-1B2 has the following characteristics:

Table 3-3 Summary of Water Quality Volume for Redevelopment in DA-1B2

Drainage Area (acres)	Existing Impervious Area (acres)	Proposed Impervious Area (acres)	WQv Sizing Option	Total Required WQv (cu ft)	Total Provided WQv (cu ft)	Treatment Practice(s)
0.30	0.07	0.29 ⁽¹⁾	Option II	1,019	1,246	Permeable Pavers

1. Accounts for proposed permeable pavers

The existing impervious area includes 0.07 acres, which results in 302 cubic feet of WQv. Choosing to use Option II reduces the WQv of the existing impervious area by 75 percent resulting in a modified WQv of 75 cubic feet. The additional proposed impervious area results in a 0.22-acre increase, which requires 944 cubic feet of additional treatment. The total WQv required is 1,019 cubic feet. Implementing pervious paver coverage along the roadway results in a provided WQv of 1,246 cubic feet.

Drainage Area DA-1D1

Drainage Area DA-1D1 is located to the northeast of Drainage Area DA-1B1 and will include two residence buildings (A and B). Portions of the Administration Offices/Services Building and Maintenance Building will also be included in this basin. DA-1D1 has the following characteristics:

Table 3-4 Summary of Water Quality Volume for Redevelopment in DA-1D1

Drainage Area (acres)	Existing Impervious Area (acres)	Proposed Impervious Area (acres)	WQv Sizing Option	Total Required WQv (cu ft)	Total Provided WQv (cu ft)	Treatment Practice(s)
8.82	4.37	5.99 ⁽¹⁾	Option II	11,701	11,701	Green Roof

1. Accounts for proposed green roofs

The existing impervious area includes 4.37 acres, which results in 18,837 cubic feet of WQv. Choosing to use Option II reduces the WQv of the existing impervious area by 75 percent resulting in a modified WQv of 4,709 cubic feet. The additional proposed impervious area results in a 1.62-acre increase, which requires 6,992 cubic feet of additional treatment. The total WQv required is 11,701 cubic feet. Implementing green roofs on the buildings results in a provided WQv of 11,701 cubic feet.

Drainage Area DA-1D2

DA-1D2 consists of the driveway inside DA-1D1 and is comprised of pervious pavers. Runoff will infiltrate through the pavers and into the ground. DA-1D2 has the following characteristics:

Table 3-5 Summary of Water Quality Volume for Redevelopment in DA-1D2

Drainage Area (acres)	Existing Impervious Area (acres)	Proposed Impervious Area (acres)	WQv Sizing Option	Total Required WQv (cu ft)	Total Provided WQv (cu ft)	Treatment Practice(s)
0.44	0.39	0.39 ⁽¹⁾	Option II	420	1,677	Pervious Pavers

1. Accounts for proposed permeable pavers

The existing impervious area includes 0.39 acres, which results in 1,681 cubic feet of WQv. Choosing to use Option II reduces the WQv of the existing impervious area by 75 percent resulting in a modified WQv of 420 cubic feet. The proposed impervious area results in no net increase in impervious area. Therefore, the total WQv required is 420 cubic feet. Implementing pervious paver coverage along the roadway results in a provided WQv of 1,677 cubic feet.

Drainage Area DA-2A3

Drainage Area DA-2A3 is located in the northeast portion of the watershed and will include a portion of the driveway entrance. This driveway entrance is proposed to be widened under the proposed conditions. DA-2A2 has the following characteristics:

Table 3-6 Summary of Water Quality Volume for Redevelopment in DA-2A3

Drainage Area (acres)	Existing Impervious Area (acres)	Proposed Impervious Area (acres)	WQv Sizing Option	Total Required WQv (cu ft)	Total Provided WQv (cu ft)	Treatment Practice(s)
0.77	0.26	0.28	Option II	362	362	Riparian Buffer Strip

The existing impervious area includes 0.26 acres, which results in 1,121 cubic feet of WQv. Choosing to use Option II reduces the WQv of the existing impervious area by 75 percent resulting in a modified WQv of 280 cubic feet. The additional proposed impervious area results in an increase in impervious area of 0.02 acres. This results in an additional 82 cubic feet of WQv. Therefore, the total WQv required is 362 cubic feet. Conveying the runoff from the roadway to the riparian buffer provides 362 cubic feet of WQv treatment.

Drainage Area DA-2B1

Drainage Area DA-2B1 is located behind the residence parking garage. All runoff flows overland to a storm collection system which outlets to (DP-2) and into the Ringwood River. The basin has the following characteristics:

Table 3-7 Summary of Water Quality Volume for Redevelopment in DA-2B1

Drainage Area (acres)	Existing Impervious Area (acres)	Proposed Impervious Area (acres)	WQv Sizing Option	Total Required WQv (cu ft)	Total Provided WQv (cu ft)	Treatment Practice(s)
3.21	0.16	0.45 ⁽¹⁾	Option II	1,423	1,423	Pervious Pavers & Bioretention

1. Accounts for proposed permeable pavers

The existing impervious area includes 0.16 acre, which results in 690 cubic feet of WQv. Choosing to use Option II reduces the WQv of the existing impervious area by 75 percent resulting in a modified WQv of 172 cubic feet. The proposed impervious area results in an increase in impervious area of 0.29 acres, which corresponds to 1,250 cubic feet of WQv. Therefore, the total WQv required is 1,423 cubic feet. Implementing pervious paver coverage along the roadway and constructing a bioretention facility results in a provided WQv of 1,423 cubic feet.

Drainage Area DA-2B2

Drainage Area DA-2B2 is located south of the intersection of Kings Drive and Long Meadow Road (CR-84) and consists of brush, woods, and pavement. The basin has the following characteristics:

Table 3-8 Summary of Water Quality Volume for Redevelopment in DA-2B2

Drainage Area (acres)	Existing Impervious Area (acres)	Proposed Impervious Area (acres)	WQv Sizing Option	Total Required WQv (cu ft)	Total Provided WQv (cu ft)	Treatment Practice(s)
4.47	0.50	0.56	Option II	785	785	Wet Vault & Dry Detention Pond

The existing impervious area includes 0.50 acre, which results in 2,155 cubic feet of WQv. Choosing to use Option II reduces the WQv of the existing impervious area by 75 percent resulting in a modified WQv of 539 cubic feet. The proposed impervious area results in an increase in impervious area of 0.06 acres, which corresponds to 246 cubic feet of additional WQv. Therefore, the total WQv required is 785 cubic feet. Implementing a wet vault and a dry detention pond along the roadway results in a provided WQv of 785 cubic feet.

Drainage Area DA-2B3

Drainage Area DA-2B3 is located in the central portion of the watershed and will include a portion of the powerhouse. The basin has the following characteristics:

Table 3-9 Summary of Water Quality Volume for Redevelopment in DA-2B3

Drainage Area (acres)	Existing Impervious Area (acres)	Proposed Impervious Area (acres)	WQv Sizing Option	Total Required WQv (cu ft)	Total Provided WQv (cu ft)	Treatment Practice(s)
0.75	0.08	0.75 ⁽¹⁾	Option II	2,974	3,233	Green Roof & Stormwater Planter

1. Accounts for proposed green roofs

The existing impervious area includes 0.08 acre, which results in 345 cubic feet of WQv. Choosing to use Option II reduces the WQv of the existing impervious area by 75 percent resulting in a modified WQv of 86 cubic feet. The proposed impervious area results in an increase in impervious area of 0.67 acre, which corresponds to 2,888 cubic feet of additional WQv. Therefore, the total WQv required is 2,974 cubic feet. Implementing a green roof and three new stormwater planters results in a provided WQv of 3,233 cubic feet.

Drainage Area DA-2B5

Drainage Area DA-2B5 consists of the bus parking area. Runoff from this area flows overland to a bioretention facility and is then conveyed via the proposed stormwater network. The basin has the following characteristics:

Table 3-10 Summary of Water Quality Volume for Redevelopment in DA-2B5

Drainage Area (acres)	Existing Impervious Area (acres)	Proposed Impervious Area (acres)	WQv Sizing Option	Total Required WQv (cu ft)	Total Provided WQv (cu ft)	Treatment Practice(s)
1.31	0.09	0.86	Option II	3,416	3,809	Bioretention

The existing impervious area includes 0.09 acres, which results in 388 cubic feet of WQv. Choosing to use Option II reduces the WQv of the existing impervious area by 75 percent resulting in a modified WQv of 97 cubic feet. The proposed impervious area results in an increase in impervious area of 0.77 acre, which corresponds to 3,319 cubic feet of additional storage. Therefore, the total WQv required is 3,416 cubic feet. Incorporating a bioretention facility near the bus parking lot results in a provided WQv of 3,809 cubic feet.

Drainage Area DA-2B6

Drainage Area DA-2B6 consists of the main part of the driveway and drop-off roundabout located near the proposed Administration Offices/Services Building. Runoff will either infiltrate through the proposed pervious pavers or will be collected by the proposed stormwater collection system. The basin has the following characteristics:

Table 3-11 Summary of Water Quality Volume for Redevelopment in DA-2B6

Drainage Area (acres)	Existing Impervious Area (acres)	Proposed Impervious Area (acres)	WQv Sizing Option	Total Required WQv (cu ft)	Total Provided WQv (cu ft)	Treatment Practice(s)
3.71	0.77	2.25 ⁽¹⁾	Option II	7,205	7,205	Pervious Pavers and Proprietary Practice

1. Accounts for proposed permeable pavers

The existing impervious area includes 0.77 acre, which results in 3,319 cubic feet of WQv. Choosing to use Option II reduces the WQv of the existing impervious area by 75 percent resulting in a modified WQv of 830 cubic feet. The proposed impervious area results in an increase in impervious area of 1.48 acres, which corresponds to 6,375 cubic feet of additional WQv. Therefore, the total WQv required is 7,205 cubic feet. Implementing pervious paver coverage along the roadway results in a provided WQv of 1,987 cubic feet and an additional 5,218 cubic feet is treated by a proprietary practice.

Refer to SWPPP Drawing C-010, “Proposed Conditions Watershed Map” for the location and type of specific practices.

D. Water Quantity Analysis

In order to determine the potential impacts associated with the project, existing and proposed condition hydrographs were generated using a Type III rainfall distribution based on Appendix B of the *Technical Release 55 Manual (TR-55)*. Rainfall depths for the design storm events were referenced from Chapter 4 of the *NYSSMDM*. The 24-hour rainfall depths for the 1-, 10-, and 100-year design storm events for the Project Site are listed in Table 3-12.

Table 3-12 Rainfall Depths, 24-Hour Storm Duration

Storm Event	Rainfall Depth (inches)
1-year	3.0
10-year	5.0
100-year	7.8

Run-off curve numbers (CN) and times of concentration (Tc) were computed using the NRCS TR-55 methodology. Additionally, peak stormwater flows for the existing and proposed conditions were computed using *HydroCAD’s Stormwater Modeling Systems*, Version 9.1 (which is based on NRCS TR-20 methodology).

Pre-Developed Condition Hydrology

Approximately 123 acres of drainage area contribute flow to six drainage points. The existing watershed generally consists of woods with some areas of wetlands, including the existing INCO complex, asphalt roads, parking lots, and grassed areas. For the purpose of the existing condition analysis, six design points, DP-1 through DP-6, were defined to characterize the current drainage patterns within the watershed. A summary of the peak flow rates are shown on Table 3-13. The drainage areas and drainage points are shown on Figure 3-8 Existing Condition Watershed Map.

Design Point 1—DP-1

DP-1 is located at Blue Lake. The contributing drainage area of approximately 40.7 acres is divided into three sub-areas (DA-1A, DA-1B, and DA-1C) and consists primarily of woods and the previously developed INCO facility. Due to the nature of the drainage patterns to Blue Lake, the entire Lake is considered to be one design point (DP-1).

Drainage Area DA-1A is located in the southwestern corner of the watershed and is located around Blue Lake. The drainage area generally consists of steeply sloped woods, which drain to the north by overland flow directly to Blue Lake.

Drainage Area DA-1B includes a portion of steeply sloped woods and the existing INCO buildings, asphalt roads, parking lots, and grassed areas. Runoff generally flows in a northwesterly direction from the wooded areas and is conveyed by overland flow to the storm system located around the INCO facility. Ultimately, runoff is collected and conveyed through 15- and 24-inch storm sewer pipelines, which drain directly to Blue Lake.

Drainage Area DA-1C is located along Blue Lake to the north of the dam's emergency spillway. This drainage area consists primarily of woods. All runoff is conveyed via overland flow directly to Blue Lake.

Design Point 2—DP-2

DP-2 is located at an existing 48-inch culvert northwest of the existing entry driveway. Runoff is conveyed under Long Meadow Road (CR-84) in a northeasterly direction where it discharges to the Ringwood River. The contributing drainage area is divided into four drainage areas (DA-2A1, DA-2A2, DA-2B1 and, DA-2B) and includes approximately 42.4 acres of woods, wetlands, existing asphalt roads, and small buildings. It also includes the water treatment facility owned by United Water.

Drainage Area DA-2A1 is located in the central portion of the watershed and consists of woods, wetlands, existing asphalt roads, and small buildings. Runoff drains in a northeasterly direction by overland flow to the wetland depression area located along Long Meadow Road (CR-84). All runoff is conveyed through the 48-inch culvert (DP-2) and ultimately discharges into the Ringwood River.

Drainage Area DA-2A2 is located in the southern portion of the watershed and primarily consists of woods and a 100-foot-wide existing power-line easement. Runoff drains in a northerly direction by overland flow to a 36-by-26-inch concrete culvert located under the existing access road (driveway) to DA-2A1. Runoff is then conveyed to the wetland depression area and ultimately under Long Meadow Road (CR-84) through the 48-inch culvert (DP-2) and into the Ringwood River.

Drainage Area DA-2B is located to the east of the driveway entrance and consists of woods and open space. Runoff drains in a northwesterly direction by overland flow to a 30-by-42-inch culvert located under the existing driveway. Runoff is then conveyed to the wetland depression area and ultimately under Long Meadow Road (CR-84) through the 48-inch culvert (DP-2) and into the Ringwood River.

Design Point 3—DP-3

DP-3 is located at an existing 24-inch culvert, which also passes under Long Meadow Road (CR-84) and is located approximately 300 feet to the southeast of the existing driveway entrance. DP-3 collects runoff from one drainage area (DA-3), which consists of approximately 12.9 acres of woods, wetlands, and a portion of Long Meadow Road (CR-84). Runoff from the drainage area generally flows overland in a northerly direction to a swale parallel to the existing roadway where it is collected and conveyed through a small wetland area to the 24-inch culvert and ultimately discharges to the Ringwood River.

Design Point 4—DP-4

DP-4 is located at a second existing 24-inch culvert that conveys runoff under Long Meadow Road (CR-84) approximately 700 feet to the southeast of DP-3. DP-4 collects runoff from one drainage area (DA-4), which consists of approximately 8.9 acres of woods and a portion of Long Meadow Road. An L-shaped headwall at the 24-inch culvert prevents contributing flow from bypassing the culvert and continuing in the ditch parallel with Long Meadow Road (CR-84). All runoff ultimately discharges to the Ringwood River.

Design Point 5—DP-5

DP-5 is located at a third existing 24-inch culvert and conveys runoff under Long Meadow Road (CR-84) approximately 550 feet to the southeast of DP-4. DP-5 collects runoff from one contributing drainage area (DA-5), which consists of approximately 10.0 acres of woods and a portion of Long Meadow Road (CR-84). An L-shaped headwall at this 24-inch culvert prevents contributing flow from bypassing this culvert, similar to DP-4.

Design Point 6—DP-6

DP-6 is located in the small northern corner of the watershed, along the eastern side of Long Meadow Road (CR-84), just downstream of the existing primary spillway for the Blue Lake Dam. DP-6 collects runoff from one drainage area (DA-6), which consists of approximately 8.1 acres of mostly wooded land with a small portion of Long Meadow Road.

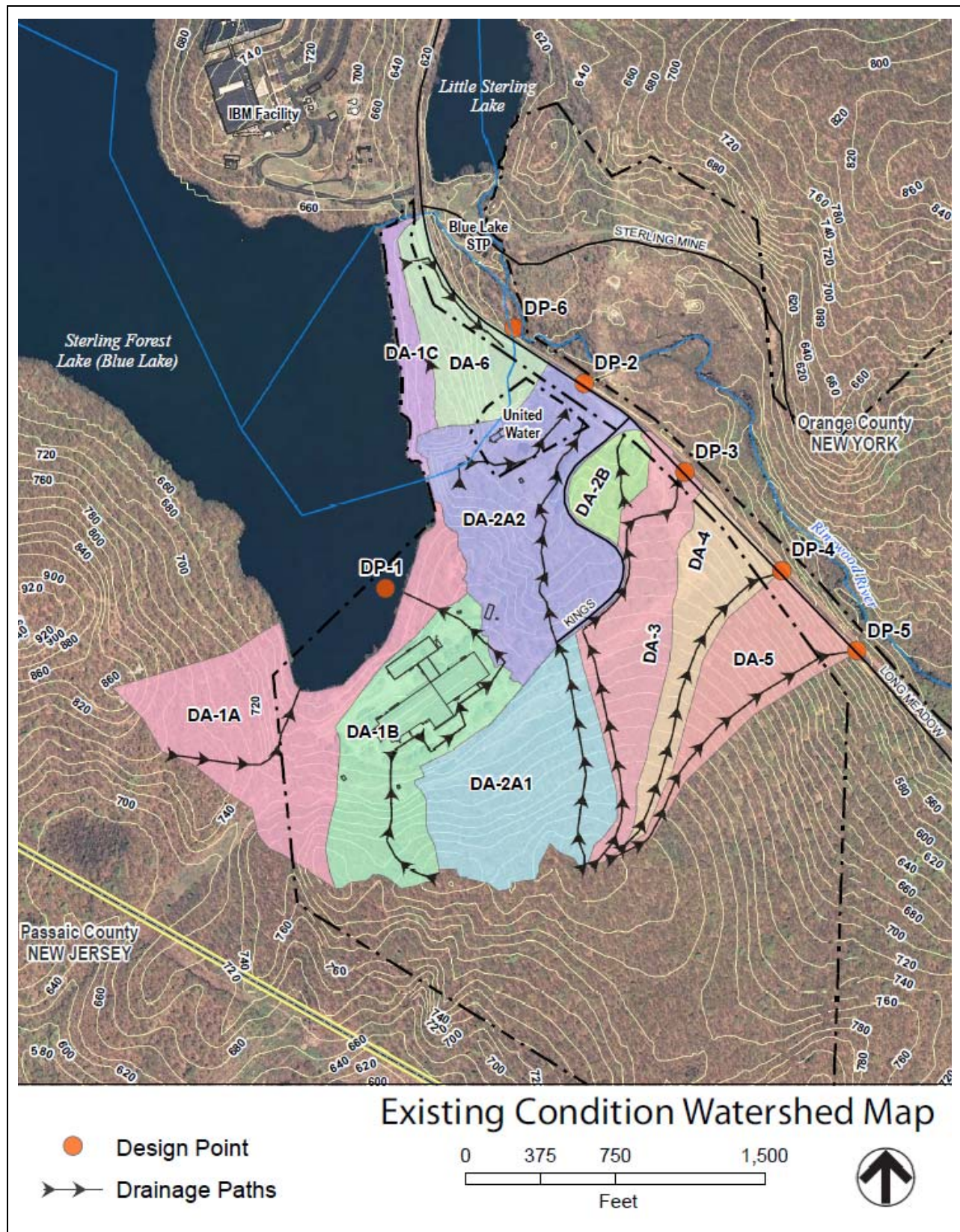


Figure 3-8 Existing Condition Watershed Map

Table 3-13 Pre-Developed Analysis Summary

Design Point	Drainage Area	Area (Acres)	Tc (mins)	Curve Number	Peak Flow Rates (cfs)		
					1-year	10-year	100-year
DP-1	DA-1A	20.54	25	73	12	33	68
	DA-1B	16.88	31	81	14	33	60
	DA-1C	3.30	13	77	3	8	15
	Subtotal:	40.72	--	--	28	71	137
DP-2	DA-2A1	17.40	57	70	5	16	35
	DA-2A2	21.73	22	73	13	37	77
	DA-2B	3.29	25	71	2	5	10
	Subtotal:	42.42	--	--	1	15	51
DP-3	DA-3	12.86	52	69	4	12	27
DP-4	DA-4	8.87	44	70	3	10	21
DP-5	DA-5	9.97	47	71	4	11	23
DP-6	DA-6	8.09	11	78	7	14	19

Post-Developed Condition Hydrology

The overall drainage area for the proposed project will be the same as the existing drainage area, except that sub-catchment areas will change. The six design points identified for the existing drainage area will remain and no additional culverts or drainage structures will be added at the final points of discharge. A summary of the peak flow rates is shown on Table 3-14. The proposed drainage area and associated sub-catchment areas are described below and shown on Figure 3-9 Proposed Condition Watershed Map.

Design Point 1—DP-1

Under proposed conditions, the contributing drainage area for DP-1 is approximately 41.6 acres and will be divided into six sub-areas (DA-1A, DA-1B1, DA-1B2, DA-1C, DA-1D1 and DA-1D2). This area consists primarily of woods and the previously developed INCO facility. Due to the nature of the drainage patterns to Blue Lake, the entire Lake is considered to be one design point (DP-1).

Drainage Area DA-1A is located in the southwestern corner of the watershed and is located around Blue Lake. The drainage area generally consists of steeply sloped woods which drain to the north by overland flow directly to Blue Lake. This drainage area will not be disturbed by the proposed project.

Drainage Area DA-1B1 includes a portion of steeply sloped woods and the existing INCO buildings, asphalt roads, parking lots, and grassed areas, which will be reconstructed to include two residence buildings (C and D). Runoff will generally flow in a northwesterly direction, from the wooded areas and will be conveyed through a proposed 12-inch and existing 15-inch stormwater pipe directly to Blue Lake. DA-1B2 consists of the driveway and roundabout inside DA-1B1 and is comprised of pervious pavers. Runoff will infiltrate through the pavers and into the ground.

Drainage Area DA-1C is located along Blue Lake to the north of the dam's emergency spillway. This drainage area consists primarily of woods. All runoff is conveyed via overland flow directly to Blue Lake. This drainage area will not be disturbed by the proposed project.

Drainage Area DA-1D1 is located to the northeast of Drainage Area DA-1B1 and will include two residence buildings (A and B). Portions of the Administration Offices/Services Building and maintenance building will also be included in this basin. Runoff will be conveyed in a northwesterly direction through a proposed 12-inch and an existing 24-inch stormwater pipe and headwall directly to Sterling Forest Lake (Blue Lake_). DA-1D2 consists of the driveway inside DA-1D1 and is comprised of pervious pavers. Runoff will infiltrate through the pavers and into the ground.

Design Point 2—DP-2

DP-2 is located at an existing 48-inch culvert northwest of the existing entry driveway. Runoff is conveyed under Long Meadow Road (CR-84) in a northeasterly direction where it discharges to the Ringwood River. The contributing drainage area is divided into nine drainage areas (DA-2A1, DA-2A2, DA-2A3, DA-2B1, DA-2B2, DA-2B3, DA-2B4, DA-2B5 and DA-2B6) and includes approximately 51.8 acres of woods, wetlands, existing asphalt roads, and proposed development. It also includes the water treatment facility owned by United Water.

Drainage Area DA-2A1 is located in the southern portion of the watershed and primarily consists of woods and a 100-foot-wide existing power-line easement. Runoff drains in a northerly direction by overland flow to a 36-by-26-inch concrete culvert located under the existing access road (driveway) to DA-2A2. Runoff is then conveyed to the wetland depression area and ultimately under Long Meadow Road (CR-84) through the 48-inch culvert (DP-2) and into the Ringwood River. This drainage area will not be disturbed by the proposed project.

Drainage Area DA-2A2 is located in the central portion of the watershed and consists of woods, wetlands, existing asphalt roads, and small buildings. Runoff drains in a northeasterly direction by overland flow to the wetland depression area located along Long Meadow Road. All runoff is conveyed through the 48-inch culvert (DP-2) and ultimately discharges into the Ringwood River. This drainage area will not be disturbed by the proposed project.

Drainage Area DA-2A3 is located in the northeast portion of the watershed and will include a portion of the driveway entrance. Runoff is conveyed in a northwesterly direction through a combination of overland flow to the wetlands depression area located near Long Meadow Road (CR-84).

Drainage Area DA-2B1 is located behind the residence parking garage. All runoff flows overland to a storm collection system which outlets to DP-2 and into the Ringwood River.

Drainage Area DA-2B2 is located south of the intersection of Kings Drive and Long Meadow Road (CR-84) and consists of brush, woods, and pavement. Runoff drains in a northerly direction by overland flow to the wetland depression area and ultimately under Long Meadow Road (CR-84) through the 48-inch culvert (DP-2) and into the Ringwood River.

Drainage Area DA-2B3 is located in the central portion of the watershed and will include a portion of the powerhouse. Runoff is conveyed in a northeasterly direction through the proposed stormwater collection system and ultimately discharges at DP-2 located near Long Meadow Road (CR-84).

Drainage Area DA-2B4 is located in the central portion of the watershed and consists of the visitor parking buildings. Runoff is conveyed in a northerly direction to the wetland depression area located near Long Meadow Road (CR-84) and discharges at DP-2.

Drainage Area DA-2B5 consists of the bus parking area. Runoff from this area flows overland to a bioretention facility and is then conveyed via the proposed stormwater network to DP-2.

Drainage Area DA-2B6 consists of the main part of the driveway and drop-off roundabout located near the proposed Administration Offices/Services Building. Runoff will either infiltrate through proposed

pervious pavers or will be collected by the proposed stormwater collection system and ultimately conveyed to DP-2.

Design Point 3—DP-3

DP-3 is located at an existing 24-inch culvert which also passes under Long Meadow Road (CR-84) and is located approximately 300 feet to the southeast of the existing driveway entrance. Under proposed conditions, DP-3 will collect runoff from three sub-basins (DA-3A, DA-3B, and DA-3C), which will include the Vehicle Maintenance Building and a portion of the recreation area.

Drainage Area DA-3A is located along Long Meadow Road (CR-84). Runoff is conveyed in an easterly direction by overland flow, through the 24-inch culvert under Long Meadow Road (CR-84) and ultimately to the Ringwood River. This drainage area will not be disturbed by the proposed project.

Drainage Area DA-3B is located south of DA-3A and will include the Vehicle Maintenance Building. Runoff is conveyed in an easterly direction to a proposed bioretention pond.

Drainage Area DA-3C is located at the recreation area and includes the tennis courts. Runoff is conveyed through a combination of overland flow and a 12-inch stormwater pipe to the 24-inch culvert under Long Meadow Road (CR-84) and ultimately to the Ringwood River.

Design Point 4—DP-4

DP-4 is located at a second existing 24-inch culvert that conveys runoff under Long Meadow Road (CR-84) approximately 700 feet to the southeast of DP-3. DP-4 will collect runoff from one drainage area (DA-4), which consists of approximately 5.1 acres of woods and a portion of Long Meadow Road (CR-84). An L-shaped headwall at the 24-inch culvert prevents contributing flow from bypassing the culvert and continuing in the ditch parallel with Long Meadow Road (CR-84). All runoff ultimately discharges to the Ringwood River. This drainage area will not be disturbed by the proposed project.

Design Point 5—DP-5

DP-5 is located at a third existing 24-inch culvert and conveys runoff under Long Meadow Road (CR-84) approximately 550 feet to the southeast of DP-4. DP-5 will collect runoff from one contributing drainage area (DA-5), which consists of approximately 9.7 acres of woods and a portion of Long Meadow Road (CR-84). An L-shaped headwall at this 24-inch culvert prevents contributing flow from bypassing this culvert, similar to DP-4. This drainage area will not be disturbed by the proposed project.

Design Point 6—DP-6

DP-6 is located in the small northern corner of the watershed, along the eastern side of Long Meadow Road (CR-84), just downstream of the existing primary spillway for the Blue Lake Dam. DP-6 will collect runoff from one drainage area (DA-6), which consists of approximately 8.1 acres of mostly wooded land with a small portion of Long Meadow Road (CR-84).

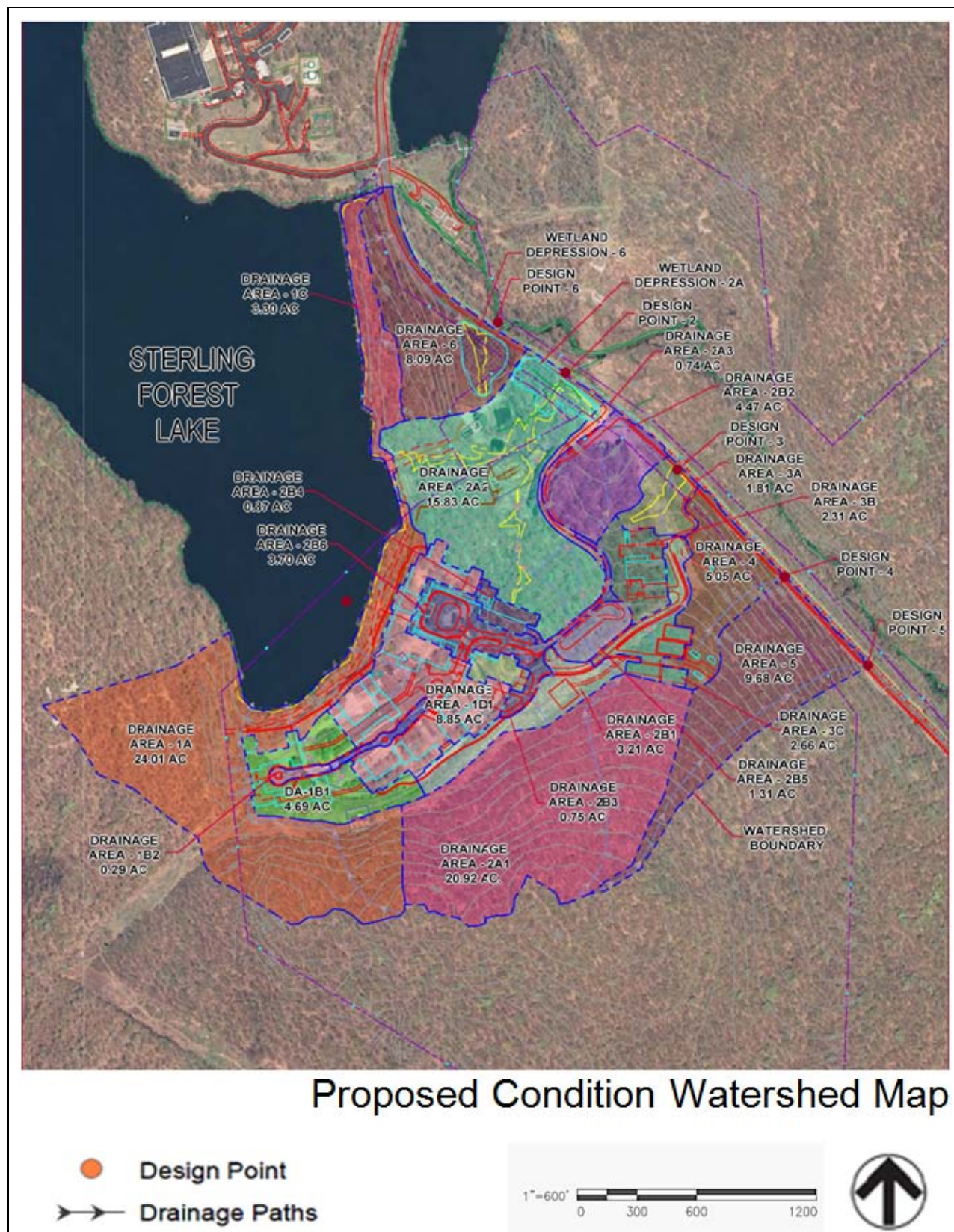


Figure 3-9 Proposed Condition Watershed Map

Table 3-14 Post-Developed Analysis Summary

Design Point	Drainage Area	Area (Acres)	T _c (hours)	Curve Number	Peak Flow Rates (cfs)		
					1-year	10-year	100-year
DP-1	DA-1A	24.0	28	73	13	37	76
	DA-1B1	4.7	10	76	5	12	24
	DA-1B2	0.3	5	74	0	1	2
	DA-1C	3.3	13	77	3	8	16
	DA-1D1	8.9	15	82	11	24	44
	DA-1D2	0.4	5	74	0	1	2
	Subtotal:	41.5	-	-	27	71	136
DP-2	DA-2A1	20.9	45	70	7	23	49
	DA-2A2	15.8	16	72	10	30	62
	DA-2A3	0.7	5	82	1	3	5
	DA-2B1	3.2	6	75	3	9	18
	DA-2B2	4.5	16	74	3	9	18
	DA-2B3	0.8	5	91	2	3	6
	DA-2B4	0.9	5	91	2	4	7
	DA-2B5	1.3	5	89	3	6	10
	DA-2B6	3.7	5	86	7	15	27
	Subtotal:	51.8	-	-	1	12	51
DP-3	DA-3A	1.8	12	71	1	4	8
	DA-3B	2.1	5	81	3	7	14
	DA-3C	2.8	11	79	3	8	15
	Subtotal:	6.7	-	-	4	11	24
DP-4	DA-4	5.0	23	72	3	8	17
DP-5	DA-5	9.7	45	71	4	11	23
DP-6	DA-6	8.1	11	78	7	14	19

Water Quantity Analysis Summary

Table 3-15 provides a summary of the peaks flows by design point for each storm event. Post-developed peak flow at all the design points has been maintained at or below the existing peak flow rates. As green roofs, porous pavement or pervious asphalt, and stormwater planters do not have standard CN values associated with them, they have been modeled under the assumption of impervious cover reduction only. A modified CN, to account for storage, has been calculated based on SCS Methodology in the TR-55 using the following equation:

$$S = (1000/CN) - 10$$

Where:

S = Storage over practice (in)

CN = Modified Curve Number

Due to this assumption, green roofs have been designed to store approximately 4.7 inches of water over the area of the total green roof. This storage value computes to an average CN value of 68. Porous pavement has been designed to store approximately 3.6 inches of water of the total area of the porous pavement. This storage value computes to an average CN value of 74. Stormwater planters have been designed to store a minimum of 6.6 inches of water over the area of the stormwater planter. This storage value computes to an average CN of 60. Bioretention facilities have been assigned a CN value of 61 which is equivalent to a vegetated area on HSG B soils.

Table 3-15 Pre- and Post-Developed Peak Flow Comparison

Design Point	1-Year Storm (cfs)			10-Year Storm (cfs)			100-Year Storm (cfs)		
	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ
DP-1	28	27	-1	71	71	0	137	136	-1
DP-2	1	1	0	15	12	-3	51	51	0
DP-3	4	4	0	12	11	-1	27	25	-2
DP-4	3	3	0	10	8	-2	21	17	-4
DP-5	4	4	0	11	11	0	23	23	0
DP-6	7	7	0	14	14	0	19	19	0
Total	47	45	-1	133	127	-5	279	274	-5

Channel Protection Volume (Cpv) Summary

Section 9.3.2 of the *NYSSMDM* states: “Channel protection for a redevelopment project is not required if there is no increase in impervious area or changes to hydrology that increase the discharge rate. This criterion, as defined in Chapter 4 of this Manual, is not based on a pre versus post-development comparison. However, for a redevelopment project this requirement is relaxed. If the hydrology and hydraulic study shows that the post-construction 1-year 24 hour discharge rate and velocity are less than or equal to the pre-construction discharge rate, providing 24 hour detention of the 1-year storm to meet the channel protection criteria is not required.”

Table 3-16 lists the Cpv requirements for each design point after accounting for the reduction provided by the storage capacity of the green infrastructure practices. Design Point 1 contains drainage areas where redevelopment criteria are being applied. As shown in Table 3-15, the post-construction discharge flow rate is less than the pre-construction flow rate, thus Channel Protection Volume (Cpv) is not required for Design Point 1. Hydraulic modeling will be provided to ensure that the Cpv velocity is below existing rates and is non-erosive. Design Points 2, 3, and 4 will include underground chambers that will provide the required Cpv. Design Points 5 and 6 do not include new construction and will not be disturbed as part of the proposed project; thus, Cpv is not required for these areas.

Table 3-16 Channel Protection Volume Summary

Design Point	1-Year Storm (ac-ft)			Comments
	Required Cpv	RRv Provided by GIP	Additional Cpv Required	
DP-1	1.47	1.47	0	(Redevelopment) Cpv provided by RRv practices
DP-2	1.68	0.34	1.34*	*Cpv provided by underground chambers
DP-3	0.57	0.19	0.38*	*Cpv provided by underground chambers
DP-4	0.31	0.04	0.27*	*Cpv provided by underground chambers
DP-5	NA	-	-	Cpv not required (undisturbed area)
DP-6	NA	-	-	Cpv not required (undisturbed area)

✱

A. Inspections and Record Keeping During Construction

Once the contract has been let, the name, address, and phone number of responsible parties for maintenance will be provided to the New York State Department of Environmental Conservation (NYSDEC). The following is a description of the maintenance and inspection practices that will be implemented as part of the project. Maintenance and inspection is important to ensure that the stabilization and structural practices that are part of the SWPPP continue to be effective in preventing sediment and other pollutants from entering the stormwater system. It is the responsibility of the Owner or operator to ensure that inspections are completed in accordance with NYSDEC regulations and the State Pollutant Discharge Elimination System (SPDES) General Permit (GP-0-10-001).

Record Forms

As a part of the SWPPP inspection and maintenance activities during construction, forms provided in SWPPP Appendices B and C will be updated and kept on site, including:

- Construction Duration Inspection Form
- Inspection and Maintenance Forms for Post-Construction Practices.

Inspections will be conducted by the qualified inspector according to the schedule required by the SPDES GP 0-10-001 and as described below. During each inspection, the qualified inspector will record the areas of disturbance, deficiencies in erosion and sediment control practices, required maintenance, and areas of temporary or permanent stabilization. The need for modifications to the “Erosion and Sediment Control Plan” will be identified and implemented immediately.

The “Construction Duration Inspection Form” will be completed by a qualified inspector to fully document each inspection. A qualified inspector is a person 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), licensed landscape architect, or other NYSDEC-endorsed individuals. It also means someone working under the direct supervision of the licensed professional engineer or licensed landscape architect, provided the person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that an individual performing the site inspection has received four hours of training, which has been endorsed by the NYSDEC, from a Soil and Water Conservation District, CPESC, Inc., or other NYSDEC-endorsed entity, in proper erosion and sediment control principles no later than two years from the date SPDES GP-0-10-001 is issued. After receiving the initial training, an individual working under the direct supervision of the licensed professional engineer or licensed landscape architect shall receive four hours of training every three years.

Inspections

Inspections will be conducted by the qualified inspector according to the following schedule:

1. When construction activities are ongoing, the qualified inspector will conduct a site inspection at least once every seven (7) calendar days.
2. When construction activities are ongoing and the Owner or operator has received authorization in accordance with Part II.C.3 of GP-0-10-001 to disturb greater than five acres of soil at any one time, the qualified inspector will conduct at least two site inspections every seven calendar days. When performing two inspections every seven calendar days, the inspections will be separated by a minimum of two full calendar days.
3. If soil disturbance activities have been temporarily suspended (e.g., winter shutdown) and temporary stabilization measures have been applied to disturbed areas, the qualified inspector will conduct a site inspection at least once every thirty (30) calendar days. The Owner or operator will notify the Town of Warwick MS4 stormwater contact person in writing prior to reducing the frequency of inspections.
4. If soil disturbance activities have been shut down with partial project completion, the qualified inspector may stop conducting inspections if areas disturbed as of the project shutdown date have achieved final stabilization, and 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 will notify the Town of Warwick MS4 stormwater contact person in writing prior to the shutdown. If soil disturbance activities have not resumed within two years from the date of shutdown, the Owner or operator will have the qualified inspector(s) perform a final inspection and certify that disturbed areas have achieved final stabilization, and temporary structural erosion and sediment control measures have been removed, and that 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 Notice of Termination (NOT). The Owner or operator shall then submit the completed NOT form in accordance with NYSDEC regulations.

During each inspection, the qualified inspector will inspect 1) all erosion and sediment control practices to ensure integrity and effectiveness, 2) all post-construction stormwater management practices under construction to ensure that they are constructed in conformance with the SPPP, 3) all areas of disturbance that have not achieved final stabilization, 4) all points of discharge to natural surface water bodies located within, or immediately adjacent to the property boundaries of the construction site, and 5) all points of discharge from the construction site.

The qualified inspector will fill out the “Construction Duration Inspection Form” as directed below:

- Include qualified inspector’s name, date and time of inspection, current construction phase, approximate area of disturbance, inspection number and NOI ID number.
- Provide a list of immediate action items and inspection summary along with a summary of site conditions at the time of inspection.
- Check YES or NO to indicate if immediate action is required regarding any of the listed stormwater practices.
- Provide photographs, as necessary, to document the inspection findings.

Erosion and Sediment Control Practices

Maintenance described below shall be completed in accordance with the *New York State Standards and Specifications for Erosion and Sediment Control*. Any material removed from erosion and sediment control measure shall be properly disposed.

Measures will be maintained in good working order; if repairs are found to be necessary, the qualified inspector will notify the Owner or operator and appropriate contractor (and subcontractor) of any corrective actions needed within one business day. The contractor (or subcontractor) will begin implementing the corrective actions within one business day of this notification and will complete the corrective actions in a reasonable time frame.

Disturbed areas and materials storage areas will be inspected for evidence of potential pollutants entering stormwater systems. Within one business day of the completion of the inspection, the qualified inspector will notify the Owner or operator and the appropriate contractor (or subcontractor) of any corrective actions that need to be taken. The contractor (or subcontractor) will begin implementing the corrective actions within one business day of this notification and will complete the corrective actions in a reasonable time frame.

The following are the maintenance requirements for each practice that will be implemented at the site:

Stabilized Construction Entrance/Exit

The stabilized construction entrance/exit will be maintained in a condition that will prevent the tracking or flow of sediment onto public rights-of-way. Sediment spilled, dropped, washed, or tracked onto public streets will be removed on a daily basis; streets will be swept as needed. The gravel pad will be replaced as necessary.

Silt Fence

Maintenance of silt fence will be performed as needed. If silt fence is knocked down, it will be replaced immediately. When a silt fence appears deteriorated or ineffective and/or built-up sediment reaches one-third the height of the fence, the silt fence will be replaced and/or cleaned accordingly. When “bulges” of material develop on the fence, they will be removed. Sediment removed from silt fences will be properly disposed.

Sump Pit

The sump pit will be inspected for proper control of runoff and sediment materials. Clean water will be pumped to a grassy area. If the contractor notices any visible contrast in the water, proper filtration will be provided to release off site.

Clean Material Stockpile Detail

The silt fencing around stockpile will be inspected for bulges and proper installation. The soil stockpile will be stabilized with hydromulch or rolled erosion control blanket.

Storm Drain Inlet Protection

Maintenance and inspection of the filter fabric cloth beneath inlet grates in paved areas and the filter fabric drop inlet protection around the drop inlet will be conducted. The filter fabric cloth will be cleaned to allow water to pass and prevent clogging the drainage structure. The drainage inlet protection will be inspected for integrity and visible sediment buildup. Collected sediment will be removed from the drainage inlet protection and will be disposed of properly in accordance with applicable local, state, and federal requirements.

Dust Control

Maintain dust control measures through dry-weather periods until disturbed areas are stabilized.

Soil Stabilization

To ensure that the site is properly seeded and stabilized, the Contractor must initiate stabilization measures as soon as practicable in areas of the site where construction activities have permanently ceased and in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased. The Contractor will be responsible for the maintenance of the vegetated cover for the duration of construction activities. The areas will be monitored to ensure that vegetation achieves good coverage over the entire disturbed section. Additional seeding will be completed as needed. Watering will be provided as needed.

In areas where soil disturbance activity has been temporarily or permanently ceased, temporary and/or permanent soil stabilization measures will be installed and/or implemented within seven days from the date the soil disturbance activity ceased. The soil stabilization measures selected will be in conformance with the most current version of the technical standard, *New York State Standards and Specifications for Erosion and Sediment Control*.

Perimeter Dike/Swale

The dike/swale will be properly stabilized with rolled erosion control blanket or other stabilization measures. Any rilling or areas of cutting will be immediately stabilized. Further investigation as to the cause will also be performed to determine if other upstream erosion and sediment control measures are needed. When accumulated sediment reaches a depth of one-third of the total depth of the swale, this material will be removed and properly disposed.

Temporary Sediment Basin or Sediment Trap

Any rilling and erosion of the basin side slopes will be evaluated and adequate stabilization will be provided. Rolled erosion control blankets or other stabilization practices will be installed on the side slopes. The outlet structure will be inspected for damage, accumulation of sediment, trash and debris, and overall performance. If sediment-laden stormwater is leaving the basin then additional erosion and sediment control practices may be required.

Containment for Temporary Fueling Area

During construction a temporary fueling area will be located near the bus parking staging area. The downstream catch basins will have a temporary insert to filter any petroleum out of the stormwater runoff. NYSDEC and United States Environmental Protection Agency (EPA) regulations will be followed with regard to the spill prevention plan.

B. Post-Construction Operation and Maintenance

Following completion of construction, a long-term inspection and maintenance program will be implemented to ensure the proper function of the stormwater management system. The program will be carried out by the facilities manager. A detailed checklist for post-construction stormwater management practices is included in the SWPPP in Appendix C. The maintenance program will include the following:

1. Litter and debris will be removed from catch basins, vegetated swales, ponds, and the outlet control structures.
2. The stormwater management system will be inspected after each major storm event (greater than 2-year, 24-hour storm, or 3.25 inches in 24 hours) to ensure the small orifices and inlets remain open.

3. Silt will be cleaned from catch basins and other drainage structures when the depth exceeds half of the depth of the sump.
4. Eroded areas and gullies will be restored and re-seeded as soon as possible.

In addition to inspection and maintenance of the stormwater management system, inspection of the overall site for areas of potential contamination will also be noted. Maintenance is already an important goal of the Owner as demonstrated by the neat grounds and impeccable cleanliness at other facilities operated by the Owner. Maintenance of existing landscaped areas at these facilities is performed consistently throughout the year. This will be continued with the proposed project.

Potential pollutants, such as petroleum products and chemicals, will be properly stored in tightly sealed containers and/or in a covered area or contained area. *

SWPPP—APPENDIX A

Contractor's Certification

Owner's Certification

NOI

MS4 SWPPP Acceptance Form

CONTRACTOR'S CERTIFICATION

"I hereby certify that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the owner or operator must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings. "

SIGNED:	_____	DATE:	_____
NAME:	_____		
FIRM:	_____		
ADDRESS:	_____		

PHONE:	_____		
SITE:	_____		
SWPPP IMPLEMENTER'S NAME	_____		
SWPPP IMPLEMENTER'S TITLE	_____		
CONTRACTOR'S SCOPE	_____		
TRAINED CONTRACTOR'S NAME	_____		
TRAINED CONTRACTOR'S TITLE	_____		

*The SWPPP Implementer must be a trained contractor responsible for SWPPP implementation, an employee of the firm who has received training in accordance with SPDES GP-0-10-001.

OWNER'S CERTIFICATION

"I hereby certify that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the owner or operator must comply with the terms and conditions of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings."

SIGNED: _____ DATE: _____

NAME: _____

FIRM: _____

ADDRESS: _____

PHONE: _____

SITE: _____

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-0-10-001

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)

W a t c h t o w e r B i b l e & T r a c t S o c i e t y o f N Y

Owner/Operator Contact Person Last Name (NOT CONSULTANT)

D e v i n e

Owner/Operator Contact Person First Name

R i c h a r d

Owner/Operator Mailing Address

2 5 C o l u m b i a H e i g h t s

City

B r o o k l y n

State

N Y

Zip

1 1 2 0 1 - 2 4 8 3

Phone (Owner/Operator)

7 1 8 - 5 6 0 - 5 0 0 0

Fax (Owner/Operator)

7 1 8 - 5 6 0 - 8 8 2 7

Email (Owner/Operator)

r d e v i n e @ j w . o r g

FED TAX ID

1 1 - 1 7 5 3 5 7 7 (not required for individuals)

Project Site Information

Project/Site Name

Headquarters of Jehovah's Witnesses

Street Address (NOT P.O. BOX)

100 Kings Dr

Side of Street

☒ North ☐ South ☐ East ☐ West

City/Town/Village (THAT ISSUES BUILDING PERMIT)

Town of Warwick

State

NY

Zip

10990 -

County

Orange

DEC Region

3

Name of Nearest Cross Street

Long Meadow Road (CR - 84)

Distance to Nearest Cross Street (Feet)

00080

Project In Relation to Cross Street

☐ North ☐ South ☐ East ☒ West

Tax Map Numbers

Section-Block-Parcel

85 - 1 - 4 . 2

Tax Map Numbers

85 - 1 - 5 . 2

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)

5 6 2 5 7 0

Y Coordinates (Northing)

4 5 5 6 6 2 9

2. What is the nature of this construction project?

- ☐ New Construction
- ☒ Redevelopment with increase in imperviousness
- ☐ Redevelopment with no increase in imperviousness

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

SELECT ONLY ONE CHOICE FOR EACH

**Pre-Development
Existing Land Use**

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

**Post-Development
Future Land Use**

- ☐ SINGLE FAMILY HOME
☐ SINGLE FAMILY SUBDIVISION
☐ 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

Number of Lots

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

4. Will future use of this site be an agricultural property as defined by the NYS Agriculture and Markets Law ?

☐ Yes ☒ No

5. Is this a project which does not require coverage under the General Permit (e.g. Project done under an Individual SPDES Permit, or department approved remediation)?

☐ Yes ☒ No

6. Is this property owned by a state authority, state agency, federal government or local government?

☐ Yes ☒ No

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

Total Site Acreage	Acreage To Be Disturbed	Existing Impervious Area Within Disturbed	Future Impervious Area Within Disturbed
2 5 3 . 0	4 5 . 0	6 . 8	1 3 . 0

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

☒ Yes ☐ No

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

A	B	C	D
0 %	0 %	8 4 %	1 6 %

10. Is this a phased project?

☐ Yes ☒ No

11. Enter the planned start and end dates of the disturbance

Start Date

04 / 01 / 2012

End Date

03 / 31 / 2016

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

Name

R i n g w o o d R i v e r

12a. Type of waterbody identified in Question 12?

- ☐ Wetland / State Jurisdiction On Site (Answer 12b)
- ☐ Wetland / State Jurisdiction Off Site
- ☒ Wetland / Federal Jurisdiction On Site (Answer 12b)
- ☐ 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

12b. How was the wetland identified?

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

13. Has the surface waterbody(ies) in question 12 been identified as a 303(d) segment in Appendix E of GP-0-10-001?

☐ Yes ☒ No

14. Is this project located in one of the Watersheds identified in Appendix C of GP-0-10-001?

☐ Yes ☒ No

15. Is the project located in one of the watershed areas associated with AA and AA-S classified waters? **If no, skip question 16.**

☐ Yes ☒ No

☐ Yes ☒ No

16. 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? **If Yes, what is the acreage to be disturbed?**

☐ Yes ☒ No

.

☐ Yes ☒ No

☒ Yes ☐ No ☐ Unknown

[illegible]

☐ Yes ☒ No ☐ Unknown

☒ Yes ☐ No

☒ Yes ☐ No

☒ Yes ☐ No

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

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

SWPPP Preparer

Harvey Castro

Contact Name (Last, Space, First)

Castro, Harvey

Mailing Address

900 Red Mills Road

City

Wallkill

State

NY

Zip

12589 -

Phone

845 - 744 - 6000

Fax

845 - 744 - 9440

Email

hcastro@jw.org

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-0-10-001. 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.

[illegible]

7

[illegible]

Janey Castro

1	1	/	0	9	/	2	0	1	1

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

Water Quality and Quantity Control

Important: Completion of Questions 27-35 is not required if response to Question 22 is No.

Post-Construction Stormwater Management Practices

27. Indicate **all** Stormwater Management Practice(s) that will be installed/constructed on this site:

Ponds

- ☐ **Micropool Extended Detention (P-1)**
- ☐ **Wet Pond (P-2)**
- ☐ **Wet Extended Detention (P-3)**
- ☐ **Multiple Pond System (P-4)**
- ☐ **Pocket Pond (P-5)**

Wetlands

- ☐ Shallow Wetland (W-1)
- ☐ Extended Detention Wetland (W-2)
- ☐ Pond/Wetland System (W-3)
- ☐ Pocket Wetland (W-4)

Filtering

- ☐ Surface Sand Filter (F-1)
- ☐ Underground Sand Filter (F-2)
- ☒ Perimeter Sand Filter (F-3)
- ☐ Organic Filter (F-4)
- ☒ Bioretention (F-5)
- ☐ Other

Infiltration

- Infiltration Trench (I-1)
- Infiltration Basin (I-2)
- Dry Well (I-3)
- Underground Infiltration System

Open Channels

- ☐ Dry Swale (0-1)
- ☐ Wet Swale (0-2)

Alternative Practice

- ☐ Rain Garden
- ☐ Cistern
- ☒ Green Roof
- ☒ Stormwater Planters
- ☒ Permeable Paving (Modular Block)

Verified Proprietary Practice

- ☐ Hydrodynamic
- ☒ Wet Vault
- ☐ Media Filter

28. Describe other stormwater management practices not listed above or explain any deviations from the technical standards.

Disconnection of rooftops, underground stormwater detention units and restored riparian/wetland buffers will be utilized.

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

☒ Yes ☐ No

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

[illegible]

30. Provide the total water quality volume required and the total provided for the site.

WQv Required
 1 . 0 7 8 acre-feet

WQv Provided
 1 . 1 3 6 acre-feet

31. Provide the following Unified Stormwater Sizing Criteria for the site.

Total Channel Protection Storage Volume (CPv) - Extended detention of post-developed 1 year, 24 hour storm event

CPv Required
 4 . 0 2 acre-feet

CPv Provided
 4 . 0 2 acre-feet

31a. The need to provide for channel protection has been waived because:

☐ **Site discharges directly to fourth order stream or larger**

Total Overbank Flood Control Criteria (Qp) - Peak discharge rate for the 10 year storm

Pre-Development
 1 3 3 . 0 CFS

Post-development
 1 2 7 . 0 CFS

Total Extreme Flood Control Criteria (Qf) - Peak discharge rate for the 100 year storm

Pre-Development
 2 7 9 . 0 CFS

Post-development
 2 7 4 . 0 CFS

31b. The need to provide for flood control has been waived because:

☐ **Site discharges directly to fourth order stream or larger**

☐ **Downstream analysis reveals that flood control is not required**

IMPORTANT: For questions 31 and 32, impervious area should be calculated considering the project site and all offsite areas that drain to the post-construction stormwater management practice(s). (Total Drainage Area = Project Site + Offsite areas)

32. Pre-Construction Impervious Area - As a percent of the Total Drainage Area enter the percentage of the existing impervious areas before construction begins.

5 . 5 %

33. Post-Construction Impervious Area - As a percent of the Total Drainage Area, enter the percentage of the future impervious areas that will be created/remain on the site after completion of construction.

1 3 %

34. Indicate the total number of post-construction stormwater management practices to be installed/constructed.

2 7

35. Provide the total number of stormwater discharge points from the site. (include discharges to either surface waters or to separate storm sewer systems)

0 6

DEC Permits

☐ Air Pollution Control	☒ Navigable Waters Protection / Article 15
☐ Coastal Erosion	☐ Water Quality Certificate
☐ Hazardous Waste	☐ Dam Safety
☐ Long Island Wells	☐ Water Supply
☐ Mined Land Reclamation	☐ Freshwater Wetlands/Article 24
☐ Other SPDES	☐ Tidal Wetlands
☐ Solid Waste	☐ Wild, Scenic and Recreational Rivers
☐ None	☐ Stream Bed or Bank Protection / Article 15
☐ Other	

[illegible]

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

☒ Yes ☐ No

If Yes, Indicate Size of Impact.

				0	.	5

38. Is this project subject to the requirements of a regulated, traditional land use control MS4?

☒ Yes ☐ No

(If No, skip question 39)

39. 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

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

N	Y	D						

N	Y	R						

Owner/Operator Certification

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

Print First Name

[illegible]

MI

Print Last Name

D	e	v	i	n	e

Owner/Operator Signature



Date _____

1	1	/	0	9	/	2	0	1	1



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

MS4 Stormwater Pollution Prevention Plan (SWPPP) Acceptance Form
for

Construction Activities Seeking Authorization Under SPDES General Permit

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

I. Project Owner/Operator Information

1. Owner/Operator Name: Watchtower Bible & Tract Society of New York

2. Contact Person: Richard Devine

3. Street Address: 25 Columbia Heights

4. City/State/Zip: Brooklyn, NY 11201-2483

II. Project Site Information

5. Project/Site Name: Headquarters of Jehovah's Witnesses

6. Street Address: 1 Kings Drive

7. City/State/Zip: Tuxedo, New York 10987-5500

III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance Information

8. SWPPP Reviewed by:

9. Title/Position:

10. Date Final SWPPP Reviewed and Accepted:

IV. Regulated MS4 Information

11. Name of MS4:

12. MS4 SPDES Permit Identification Number: NYR20A _____

13. Contact Person:

14. Street Address:

15. City/State/Zip:

16. Telephone Number:

(NYS DEC - MS4 SWPPP Acceptance Form - January 2010)

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

SWPPP—APPENDIX B

Construction Duration Inspection Form

Date: _____

Time: _____

INSPECTION NO.: _____

NOI ID NO.: _____

The qualified inspector shall inspect all erosion and sediment control practices to ensure integrity and effectiveness, all post-construction stormwater management practices under construction to ensure that they are constructed in conformance with the SPPP, all areas of disturbance that have not achieved final stabilization, all points of discharge to natural surface water bodies located within, or immediately adjacent to the property boundaries of the construction site, and all points of discharge from the construction site.

IMMEDIATE ACTION ITEMS / INSPECTION SUMMARY:

[illegible]

1. SITE CONDITIONS: *Description of weather and soil conditions at time of inspection. Description of the condition of runoff at all points of discharge from the construction site.*

2. NATURAL SURFACE WATERBODIES: *Description of the condition of all natural surface water bodies located within, or immediately adjacent to, the property boundaries of the construction site which receive runoff from the disturbed areas.*

☐ **YES** ☐ **NO** Is there immediate action required regarding natural surface water bodies?

3. VEGETATION PROTECTION MEASURES: *Fencing to be at least 3 feet tall and have openings no larger than 2 inches by 2 inches. Posts will be spaced a maximum of 6 feet apart. The temporary fencing will be installed at the drip/spread line of the trees, and undergrowth vegetation to be protected. Vehicles and equipment will not be able to enter the protected area.*

☐ **YES** ☐ **NO** Is there immediate action required regarding vegetation protection measures?

4. TEMPORARY TOPSOIL STOCKPILES: *Stockpiles should be located at least 15 feet from areas of concentrated flows or pavement. The slope of the stockpile will be roughened by equipment tracking and will not exceed 2:1 to prevent erosion. A silt fence will be installed at the toe of each stockpile. The area of each stockpile is included in the total area of disturbance for each construction phase (included in 10-acre limit).*

☐ **YES** ☐ **NO** Is there immediate action required regarding temporary topsoil stockpiles?

5. SILT FENCE: *Ensure the fence is installed properly, intact and has no gaps or tears exist where stormwater can pass. Sediment should be removed once it reaches one-third the height of the fence.*

☐ **YES** ☐ **NO** Is there immediate action required regarding silt fence?

6. DIVERSION SWALES: *Dikes and swales will be maintained to their original height. Any erosion damage will be repaired.*

☐ **YES** ☐ **NO** Is there immediate action required regarding diversion swales?

7. DISTURBED AREAS: *Temporary vegetative cover (mulch, mulch and seed, hydromulch) will be established for areas of exposed soil where construction will cease for more the 7 days. If failure is noticed at the seeded area, the area will be reseeded, fertilized, and mulched immediately.*

☐ **YES** ☐ **NO** Is there immediate action required regarding disturbed areas?

8. DUST CONTROL: *Dust control will be implemented as needed once site grading has been initiated and during windy conditions while site grading is occurring.*

☐ **YES** ☐ **NO** Is there immediate action required regarding dust control?

9. INLET PROTECTION: *Existing and newly constructed drain inlets will be protected with filter fabric or stone and block inlet protection. Storm grate filter sacks will be installed on inlets in existing pavement and installed on inlets in newly paved areas. Any damaged will be corrected or replaced immediately. Excess sedimentation will also be removed in a timely manner.*

☐ **YES** ☐ **NO** Is there immediate action required regarding inlet protection?

10. STABILIZED CONSTRUCTION ENTRANCE: *The stabilized exits will be at least 50 feet long, a minimum of 12 feet wide, flared at the end closest to the paved road and will consist of 6-inch-thick layer of crushed stone. The crushed stone will be placed over a layer of geotextile filter fabric. Orange mesh fence will be installed along the length of the construction exit to keep construction vehicles from circumventing the tracking pads. All sediment tracked, spilled, dropped, or washed onto the road will be swept up on a daily basis.*

☐ **YES** ☐ **NO** Is there immediate action required regarding the stabilized construction entrance?

10. WASTE MATERIALS: *All waste materials are collected and disposed of in trash dumpsters. All hazardous waste materials stored in a structurally sound and sealed shipping container and designated as such. Dumpsters to be emptied weekly or as needed.*

☐ **YES** ☐ **NO** Is there immediate action required regarding waste materials handling or storage?

WATCHTOWER Warwick

11. SUMP PITS: *Ensure no clogging of gravel has occurred. If so, the sump pit will be excavated and new gravel deposited.*

☐ **YES** ☐ **NO** Is there immediate action required regarding sump pits?

12. SANITARY WASTE: *Holding tanks will be inspected for evidence of leaking. Any tanks with leaks will be removed and replaced.*

☐ **YES** ☐ **NO** Is there immediate action required regarding sanitary waste removal or storage?

13. OUTFALL PROTECTION: *Area will be inspected after high flows for evidence of scour beneath the riprap or for dislodged stones. Repairs will be made immediately.*

☐ **YES** ☐ **NO** Is there immediate action required regarding outfall protection?

14. GRASSED WATERWAY: *Ensure that permanent swales or waterways will be permanently stabilized with erosion control blankets to convey runoff without damage from erosion or flooding.*

☐ **YES** ☐ **NO** Is there immediate action required regarding grassed waterways?

WATCHTOWER Warwick

15. TEMPORARY SEDIMENT TRAP: *The banks will be checked for erosion, seepage, and structural damage. Any damage will be repaired immediately. Accumulated sediments will be removed when one-half of the volume of sediment capacity storage is reached.*

☐ **YES** ☐ **NO** Is there immediate action required regarding the temporary sediment traps?

16. LEVEL SPREADER: *The downstream end will be checked for erosion and stabilized.*

☐ **YES** ☐ **NO** Is there immediate action required regarding level spreaders?

17. CHECK DAM: *Dams will be checked to make sure that flow is not eroding soil underneath or around the structure and to ensure that rocks or fiber rolls are in place. Accumulated sediment will be removed.*

☐ **YES** ☐ **NO** Is there immediate action required regarding check dams?

18. PORTABLE SEDIMENT TANK OR DEWATERING BAG: *Sediment tanks will be cleaned out when one third of the tank is filled with sediment. Dewatering bags should be replaced when the bag is half full of sediment or when the sediment has reduced the flow rate of the pump discharge to an impractical point. Sediment collected from tanks or bags will be disposed of in sediment traps/basins.*

☐ **YES** ☐ **NO** Is there immediate action required regarding sediment tanks or dewatering bags?

18. STORMWATER MANAGEMENT CONSTRUCTION: *Stormwater basins constructed according to the specifications on the detailed plans. All upstream areas should be stabilized prior to directing runoff to the stormwater management practices.*

☐ **YES** ☐ **NO** Is there immediate action required regarding stormwater management practices?

[illegible]**ADDITIONAL NOTES:**

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

WATCHTOWER Warwick
INSPECTION PHOTOS:



Photo # 1 – Description Here....



Photo # 2 – Description Here....

SWPPP—APPENDIX C

Inspection and Maintenance Forms for Post-Construction Practices

Bioretention Ponds

Green Roofs

Perimeter Sand Filters

Pervious Pavers

Stormwater Planters

Stormwater Detention Areas

Underground Chambers

Proprietary Wet Vault

BIORETENTION INSPECTION AND MAINTENANCE CHECKLIST		
Project Name:	Location:	
Site Status:	Weather Condition:	
Inspector:	Date:	Time:
Maintenance Item	Satisfactory/ Unsatisfactory	Comments
1. Debris Cleanout (Monthly)		
Bioretention and contributing areas clean of debris		
No dumping of yard wastes into practice		
Litter (branches, etc.) have been removed		
2. Vegetation (Monthly)		
Plant height not less than design water depth		
Fertilized per specifications		
Plant composition according to approved plans		
No placement of inappropriate plants		
Grass height not greater than 6 inches		
No evidence of erosion		
3. Check Dams/Energy Dissipaters/Sumps (Annual, After Major Storms)		
No evidence of sediment buildup		
Sumps should not be more than 50% full of sediment		
No evidence of erosion at downstream toe of drop structure		
4. Dewatering (Monthly)		
Dewaters between storms		
No evidence of standing water		
5. Sediment Deposition (Annual)		
Swale clean of sediments		
Sediments should not be > 20% of swale design depth		

BIORETENTION INSPECTION AND MAINTENANCE CHECKLIST		
Project Name:	Location:	
Site Status:	Weather Condition:	
Inspector:	Date:	Time:
Maintenance Item	Satisfactory/ Unsatisfactory	Comments
6. Outlet/Overflow Spillway (Annual, After Major Storms)		
Good condition, no need for repair		
No evidence of erosion		
No evidence of any blockages		
7. Integrity of Filter Bed (Annual)		
Filter bed has not been blocked or filled inappropriately		

Comments:

Actions to be Taken:

GREEN ROOFS INSPECTION AND MAINTENANCE CHECKLIST		
Project Name:		Location:
Site Status:		Weather Condition:
Inspector:	Date:	Time:
Maintenance Item	Satisfactory/ Unsatisfactory	Comments
1. Vegetation (Monthly for first year)		
Watering		
Fertilizing		
2. Vegetation/Drainage/Leaks (Bi-Annually)		
Weeding of invasive species		
Clear roof drains		
Check for leaks or other structural concerns		
Safety		
Membrane inspection		

Comments:

Actions to be Taken:

PERIMETER SAND FILTER INSPECTION AND MAINTENANCE CHECKLIST		
Project Name:	Location:	
Site Status:	Weather Condition:	
Inspector:	Date:	Time:
Maintenance Item	Satisfactory/ Unsatisfactory	Comments
1. Debris Cleanout (Monthly)		
Contributing areas clean of debris		
Filtration facility clean of debris		
Inlet and outlets clear of debris		
2. Oil and Grease (Monthly)		
No evidence of filter surface clogging		
Activities in drainage area minimize oil and grease entry		
3. Vegetation (Monthly)		
Contributing drainage area stabilized		
No evidence of erosion		
Area mowed and clipping removed		
4. Water Retention Where Required (Monthly)		
Water holding chambers at normal pool		
No evidence of leakage		
5. Sediment Deposition (Annual)		
Filter chamber free of sediments		
Sedimentation chamber not more than half full of sediments		
6. Structural Components (Annual)		
No evidence of structural deterioration		
Any grates are in good condition		
No evidence of spalling or cracking of structural parts		
7. Outlet/Overflow Spillway (Annual)		

PERIMETER SAND FILTER INSPECTION AND MAINTENANCE CHECKLIST		
Project Name:	Location:	
Site Status:	Weather Condition:	
Inspector:	Date:	Time:
Maintenance Item	Satisfactory/ Unsatisfactory	Comments
Good condition, no need for repairs		
No evidence of erosion (if draining into a natural channel)		
8. Overall Function of Facility (Annual)		
Evidence of flow bypassing facility		
No noticeable odors outside of facility		

Comments:

Actions to be Taken:

POROUS PAVEMENT INSPECTION AND MAINTENANCE CHECKLIST		
Project Name:		Location:
Site Status:		Weather Condition:
Inspector:	Date:	Time:
Maintenance Item	Satisfactory/ Unsatisfactory	Comments
1. Ensure that paving area is clean of debris (Monthly)		
2. Ensure that paving dewaterers between storms (Monthly and after storms >0.5 in.)		
3. Ensure that the area is clean of sediments (Monthly)		
4. Mow upland and adjacent areas, and seed bare areas (As needed)		
5. Vacuum sweep frequently to keep surface free of sediments (3 to 4 times a year)		
6. Inspect the surface for deterioration or spalling (Annual)		

Comments:

Actions to be Taken:

STORMWATER PLANTERS INSPECTION AND MAINTENANCE CHECKLIST		
Project Name:		Location:
Site Status:		Weather Condition:
Inspector:	Date:	Time:
Maintenance Item	Satisfactory/ Unsatisfactory	Comments
1. Debris and trash removal (monthly)		
2. Pruning and plant thinning (seasonally)		
3. Removal of dead or dying vegetation (seasonally)		
4. Erosion repair (seasonally and after 1-year storms)		
5. Removal of sediment buildup (monthly and after 1-year storms)		
6. Surface ponding (monthly and after 1-year storms)		

Comments:

Actions to be Taken:

STORMWATER DETENTION AREA INSPECTION AND MAINTENANCE CHECKLIST		
Project Name:	Location:	
Site Status:	Weather Condition:	
Inspector:	Date:	Time:
Maintenance Item	Satisfactory/ Unsatisfactory	Comments
1. Dry Pond Areas		
Vegetation adequate		
Undesirable vegetative growth		
Undesirable wood vegetation		
Low flow channels clear of obstructions		
Standing water or wet spots		
Sediment and/or trash accumulation		
Other (specify)		
2. Condition of Outfalls (Annual, After Major Storms)		
Riprap failures		
Slope erosion		
Storm drain pipes		
Endwalls / Headwalls		
Other (specify)		
3. Other (Monthly)		
Complaints from residents		
Aesthetics		
Signs of hydrocarbon build-up		
Any public hazards		

Comments:

Actions to be Taken:

UNDERGROUND INFILTRATION/DETENTION INSPECTION AND MAINTENANCE CHECKLIST (FOR STORMTECH MC-3500 MODEL)		
Project Name:	Location:	
Site Status:	Weather Condition:	
Inspector:	Date:	Time:
Maintenance Item	Satisfactory/ Unsatisfactory	Comments
Debris Cleanout (Bi-Annually)		
Step 1 - Measure depth of sediment at inspection port and at manhole access to Isolator Row		
Step 2 - If sediment is at or above 3 inches, clean debris with JetVac process		
Step 3 – Vacuum manhole sump as required		
Step 4 – Inspect and clean manholes and catch basins upstream of the system		

Comments:

Actions to be Taken:

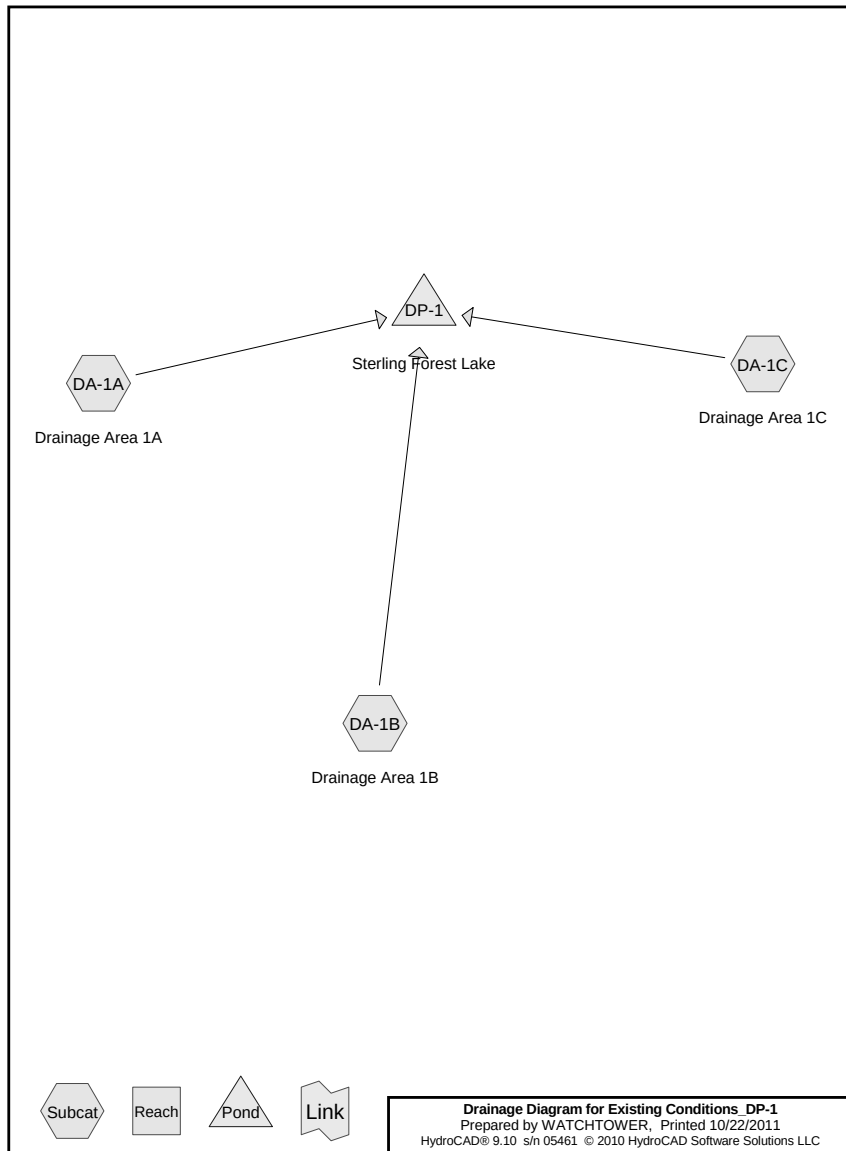
WATER QUALITY WET VAULT (HANCOR SWQ UNIT)		
Project Name:	Location:	
Site Status:	Weather Condition:	
Inspector:	Date:	Time:
Maintenance Item	Satisfactory/ Unsatisfactory	Comments
Debris Cleanout (Bi-Annually)		
Step 1 - Measure depth of sediment at inspection at manhole		
Step 2 - If sediment is greater than 20% of the total storage volume, clean debris with JetVac process		
Step 3 – Vacuum manhole sump as required		
Step 4 – Inspect and clean manholes and catch basins upstream of the system		
Step 5 – Pressure Wash chamber if needed		
Step 6 – Refill unit with water		

Comments:

Actions to be Taken:

SWPPP—APPENDIX D

Pre-Developed Conditions Calculations/Output



Existing Conditions_DP-1

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.830	65	Brush, Good, HSG C (DA-1A, DA-1B)
13.950	70	Woods, Good, HSG C (DA-1A, DA-1B)
0.170	73	Brush, Good, HSG D (DA-1A)
5.580	74	>75% Grass cover, Good, HSG C (DA-1A, DA-1B)
13.060	77	Woods, Good, HSG D (DA-1A, DA-1B, DA-1C)
0.120	80	>75% Grass cover, Good, HSG D (DA-1C)
6.010	98	Paved parking, HSG C (DA-1B)
40.720	77	TOTAL AREA

Notes Listing (all nodes)		
Line#	Node Number	Notes
1	DP-1	All runoff is conveyed directly into Sterling Forest Lake or through the existing storm collection system into Sterling Forest Lake.

Time span=5.00-30.00 hrs, dt=0.05 hrs, 501 points		
Runoff by SCS TR-20 method, UH=SCS		
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method		
Subcatchment DA-1A: Drainage Area 1A	Runoff Area=20.540 ac	0.00% Impervious Runoff Depth=0.86"
	Flow Length=868'	Tc=24.8 min CN=73 Runoff=11.61 cfs 1.467 af
Subcatchment DA-1B: Drainage Area 1B	Runoff Area=16.880 ac	35.60% Impervious Runoff Depth=1.31"
	Flow Length=2,298'	Tc=31.4 min CN=81 Runoff=14.18 cfs 1.848 af
Subcatchment DA-1C: Drainage Area 1C	Runoff Area=3.300 ac	0.00% Impervious Runoff Depth=1.07"
	Flow Length=187'	Tc=13.0 min CN=77 Runoff=3.14 cfs 0.295 af
Pond DP-1: Sterling Forest Lake	Inflow=27.56 cfs	3.610 af
	Primary=27.56 cfs	3.610 af
Total Runoff Area = 40.720 ac Runoff Volume = 3.610 af Average Runoff Depth = 1.06"		
85.24% Pervious = 34.710 ac 14.76% Impervious = 6.010 ac		

Summary for Subcatchment DA-1A: Drainage Area 1A

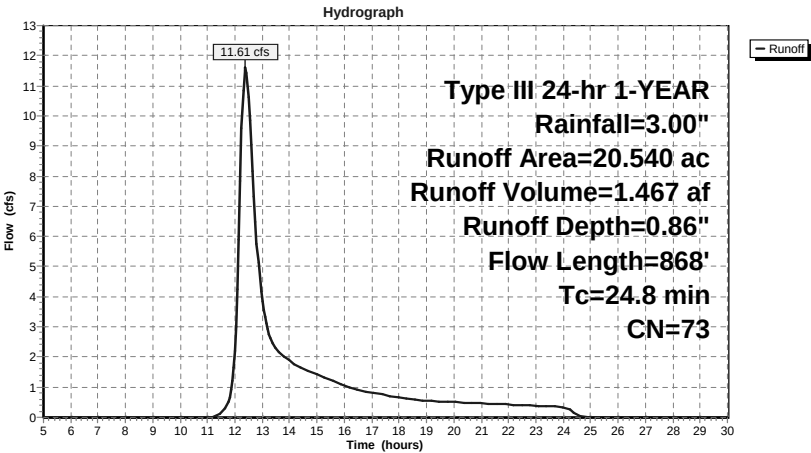
Runoff = 11.61 cfs @ 12.39 hrs, Volume= 1.467 af, Depth= 0.86"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
* 9.310	70	Woods, Good, HSG C
* 8.960	77	Woods, Good, HSG D
* 0.840	65	Brush, Good, HSG C
* 0.170	73	Brush, Good, HSG D
1.260	74	>75% Grass cover, Good, HSG C
20.540	73	Weighted Average
20.540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.1740	0.11		Sheet Flow, Woods Woods: Dense underbrush n= 0.800 P2= 3.50"
3.9	183	0.0970	0.78		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
1.4	88	0.1850	1.08		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
0.8	60	0.2560	1.26		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
0.6	51	0.2970	1.36		Shallow Concentrated Flow, Woods Forest w/Heavy Litter Kv= 2.5 fps
0.2	71	0.2500	5.86	2,687.86	Channel Flow, Woods Area= 459.0 sf Perim= 82.0' r= 5.60' n= 0.400 Sheet flow: Woods+light brush
0.5	80	0.1350	2.93	1,005.38	Channel Flow, Woods Area= 343.0 sf Perim= 109.0' r= 3.15' n= 0.400 Sheet flow: Woods+light brush
0.9	99	0.0970	1.85	322.05	Channel Flow, Woods Area= 174.0 sf Perim= 86.0' r= 2.02' n= 0.400 Sheet flow: Woods+light brush
1.5	136	0.1520	1.56	189.05	Channel Flow, Woods Area= 121.0 sf Perim= 108.0' r= 1.12' n= 0.400 Sheet flow: Woods+light brush
24.8	868	Total			

Subcatchment DA-1A: Drainage Area 1A



Existing Conditions_DP-1

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 7

Hydrograph for Subcatchment DA-1A: Drainage Area 1A

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.17	0.00	0.00	18.00	2.78	0.73	0.65
5.25	0.18	0.00	0.00	18.25	2.80	0.73	0.61
5.50	0.19	0.00	0.00	18.50	2.81	0.74	0.58
5.75	0.20	0.00	0.00	18.75	2.82	0.75	0.57
6.00	0.22	0.00	0.00	19.00	2.83	0.75	0.55
6.25	0.23	0.00	0.00	19.25	2.84	0.76	0.54
6.50	0.24	0.00	0.00	19.50	2.85	0.77	0.53
6.75	0.26	0.00	0.00	19.75	2.86	0.77	0.51
7.00	0.27	0.00	0.00	20.00	2.87	0.78	0.50
7.25	0.29	0.00	0.00	20.25	2.88	0.78	0.49
7.50	0.30	0.00	0.00	20.50	2.89	0.79	0.48
7.75	0.32	0.00	0.00	20.75	2.90	0.80	0.47
8.00	0.34	0.00	0.00	21.00	2.91	0.80	0.46
8.25	0.36	0.00	0.00	21.25	2.92	0.81	0.45
8.50	0.39	0.00	0.00	21.50	2.93	0.81	0.44
8.75	0.41	0.00	0.00	21.75	2.93	0.82	0.43
9.00	0.44	0.00	0.00	22.00	2.94	0.82	0.42
9.25	0.47	0.00	0.00	22.25	2.95	0.83	0.41
9.50	0.50	0.00	0.00	22.50	2.96	0.83	0.40
9.75	0.53	0.00	0.00	22.75	2.97	0.84	0.39
10.00	0.57	0.00	0.00	23.00	2.97	0.84	0.38
10.25	0.61	0.00	0.00	23.25	2.98	0.85	0.37
10.50	0.65	0.00	0.00	23.50	2.99	0.85	0.36
10.75	0.70	0.00	0.00	23.75	2.99	0.85	0.35
11.00	0.75	0.00	0.00	24.00	3.00	0.86	0.34
11.25	0.81	0.00	0.02	24.25	3.00	0.86	0.25
11.50	0.89	0.01	0.14	24.50	3.00	0.86	0.07
11.75	1.07	0.03	0.50	24.75	3.00	0.86	0.02
12.00	1.50	0.13	2.20	25.00	3.00	0.86	0.00
12.25	1.93	0.29	9.59	25.25	3.00	0.86	0.00
12.50	2.11	0.37	10.60	25.50	3.00	0.86	0.00
12.75	2.19	0.41	6.49	25.75	3.00	0.86	0.00
13.00	2.25	0.44	3.84	26.00	3.00	0.86	0.00
13.25	2.30	0.46	2.76	26.25	3.00	0.86	0.00
13.50	2.35	0.49	2.27	26.50	3.00	0.86	0.00
13.75	2.39	0.51	2.05	26.75	3.00	0.86	0.00
14.00	2.43	0.53	1.87	27.00	3.00	0.86	0.00
14.25	2.47	0.55	1.71	27.25	3.00	0.86	0.00
14.50	2.50	0.57	1.59	27.50	3.00	0.86	0.00
14.75	2.53	0.59	1.50	27.75	3.00	0.86	0.00
15.00	2.56	0.60	1.42	28.00	3.00	0.86	0.00
15.25	2.59	0.62	1.33	28.25	3.00	0.86	0.00
15.50	2.61	0.63	1.24	28.50	3.00	0.86	0.00
15.75	2.64	0.64	1.15	28.75	3.00	0.86	0.00
16.00	2.66	0.66	1.06	29.00	3.00	0.86	0.00
16.25	2.68	0.67	0.97	29.25	3.00	0.86	0.00
16.50	2.70	0.68	0.90	29.50	3.00	0.86	0.00
16.75	2.71	0.69	0.86	29.75	3.00	0.86	0.00
17.00	2.73	0.70	0.82	30.00	3.00	0.86	0.00
17.25	2.74	0.70	0.77				
17.50	2.76	0.71	0.73				
17.75	2.77	0.72	0.69				

Existing Conditions_DP-1

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 8

Summary for Subcatchment DA-1B: Drainage Area 1B

Runoff = 14.18 cfs @ 12.45 hrs, Volume= 1.848 af, Depth= 1.31"

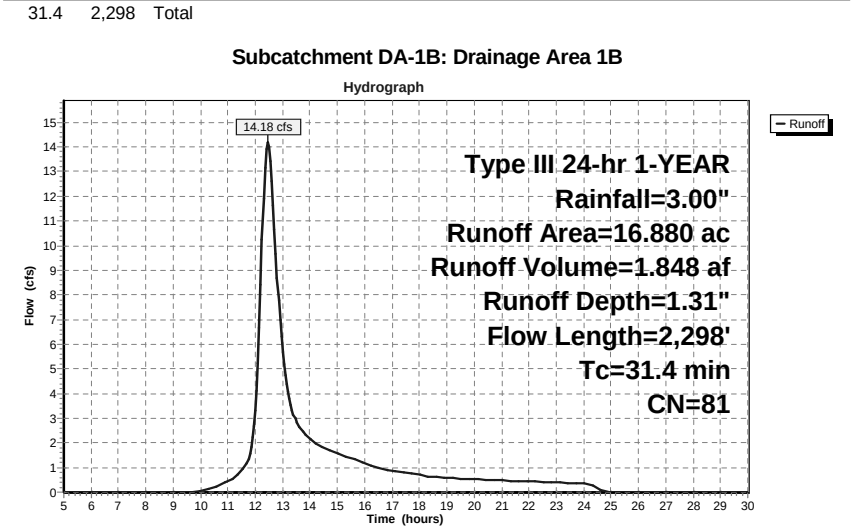
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
4.640	70	Woods, Good, HSG C
0.920	77	Woods, Good, HSG D
0.990	65	Brush, Good, HSG C
4.320	74	>75% Grass cover, Good, HSG C
6.010	98	Paved parking, HSG C
16.880	81	Weighted Average
10.870		64.40% Pervious Area
6.010		35.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	100	0.1200	0.10		Sheet Flow, Woods: Dense underbrush n= 0.800 P2= 3.50"
3.9	208	0.1250	0.88		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
3.3	225	0.2130	1.15		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
2.9	138	0.1020	0.80		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
0.4	126	0.0560	4.80		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.3	143	0.0600	8.48	2.96	Pipe Channel, 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013
0.4	107	0.0100	4.54	3.56	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.6	219	0.0100	5.94	10.50	Pipe Channel, 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.3	109	0.0100	5.94	10.50	Pipe Channel, 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.5	196	0.0100	6.38	13.91	Pipe Channel, 20.0" Round Area= 2.2 sf Perim= 5.2' r= 0.42' n= 0.013
0.3	121	0.0100	6.38	13.91	Pipe Channel, 20.0" Round Area= 2.2 sf Perim= 5.2' r= 0.42' n= 0.013
0.8	303	0.0100	6.38	13.91	Pipe Channel, 20.0" Round Area= 2.2 sf Perim= 5.2' r= 0.42' n= 0.013
0.2	303	0.0900	21.60	67.87	Pipe Channel,

24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50'
n= 0.013



Hydrograph for Subcatchment DA-1B: Drainage Area 1B

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.17	0.00	0.00	18.00	2.78	1.15	0.70
5.25	0.18	0.00	0.00	18.25	2.80	1.16	0.65
5.50	0.19	0.00	0.00	18.50	2.81	1.17	0.62
5.75	0.20	0.00	0.00	18.75	2.82	1.18	0.60
6.00	0.22	0.00	0.00	19.00	2.83	1.18	0.58
6.25	0.23	0.00	0.00	19.25	2.84	1.19	0.57
6.50	0.24	0.00	0.00	19.50	2.85	1.20	0.56
6.75	0.26	0.00	0.00	19.75	2.86	1.21	0.54
7.00	0.27	0.00	0.00	20.00	2.87	1.22	0.53
7.25	0.29	0.00	0.00	20.25	2.88	1.22	0.51
7.50	0.30	0.00	0.00	20.50	2.89	1.23	0.50
7.75	0.32	0.00	0.00	20.75	2.90	1.24	0.49
8.00	0.34	0.00	0.00	21.00	2.91	1.24	0.48
8.25	0.36	0.00	0.00	21.25	2.92	1.25	0.47
8.50	0.39	0.00	0.00	21.50	2.93	1.26	0.46
8.75	0.41	0.00	0.00	21.75	2.93	1.26	0.45
9.00	0.44	0.00	0.00	22.00	2.94	1.27	0.44
9.25	0.47	0.00	0.00	22.25	2.95	1.28	0.43
9.50	0.50	0.00	0.00	22.50	2.96	1.28	0.42
9.75	0.53	0.00	0.02	22.75	2.97	1.29	0.41
10.00	0.57	0.00	0.07	23.00	2.97	1.29	0.40
10.25	0.61	0.01	0.13	23.25	2.98	1.30	0.39
10.50	0.65	0.01	0.21	23.50	2.99	1.30	0.38
10.75	0.70	0.02	0.32	23.75	2.99	1.31	0.37
11.00	0.75	0.03	0.45	24.00	3.00	1.31	0.35
11.25	0.81	0.04	0.61	24.25	3.00	1.31	0.31
11.50	0.89	0.07	0.86	24.50	3.00	1.31	0.13
11.75	1.07	0.12	1.36	24.75	3.00	1.31	0.04
12.00	1.50	0.31	3.31	25.00	3.00	1.31	0.01
12.25	1.93	0.56	10.23	25.25	3.00	1.31	0.00
12.50	2.11	0.67	14.00	25.50	3.00	1.31	0.00
12.75	2.19	0.73	9.66	25.75	3.00	1.31	0.00
13.00	2.25	0.77	5.70	26.00	3.00	1.31	0.00
13.25	2.30	0.80	3.78	26.25	3.00	1.31	0.00
13.50	2.35	0.84	2.87	26.50	3.00	1.31	0.00
13.75	2.39	0.87	2.43	26.75	3.00	1.31	0.00
14.00	2.43	0.89	2.16	27.00	3.00	1.31	0.00
14.25	2.47	0.92	1.95	27.25	3.00	1.31	0.00
14.50	2.50	0.94	1.79	27.50	3.00	1.31	0.00
14.75	2.53	0.97	1.67	27.75	3.00	1.31	0.00
15.00	2.56	0.99	1.57	28.00	3.00	1.31	0.00
15.25	2.59	1.01	1.47	28.25	3.00	1.31	0.00
15.50	2.61	1.02	1.37	28.50	3.00	1.31	0.00
15.75	2.64	1.04	1.27	28.75	3.00	1.31	0.00
16.00	2.66	1.06	1.17	29.00	3.00	1.31	0.00
16.25	2.68	1.07	1.07	29.25	3.00	1.31	0.00
16.50	2.70	1.08	0.99	29.50	3.00	1.31	0.00
16.75	2.71	1.10	0.93	29.75	3.00	1.31	0.00
17.00	2.73	1.11	0.88	30.00	3.00	1.31	0.00
17.25	2.74	1.12	0.84				
17.50	2.76	1.13	0.79				
17.75	2.77	1.14	0.75				

Existing Conditions_DP-1

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 11

Summary for Subcatchment DA-1C: Drainage Area 1C

Runoff = 3.14 cfs @ 12.19 hrs, Volume= 0.295 af, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

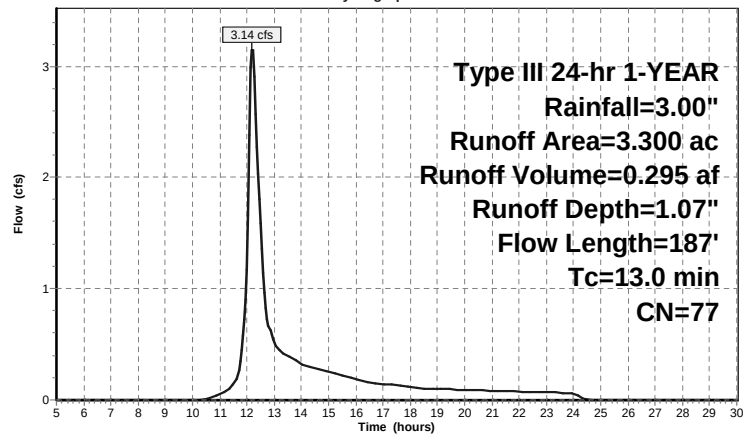
Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
3.180	77	Woods, Good, HSG D
0.120	80	>75% Grass cover, Good, HSG D
3.300	77	Weighted Average
3.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	82	0.0490	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.8	105	0.1800	2.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.0	187	Total			

Subcatchment DA-1C: Drainage Area 1C

Hydrograph

**Existing Conditions_DP-1**

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 12

Hydrograph for Subcatchment DA-1C: Drainage Area 1C

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.17	0.00	0.00	18.00	2.78	0.92	0.11
5.25	0.18	0.00	0.00	18.25	2.80	0.93	0.11
5.50	0.19	0.00	0.00	18.50	2.81	0.94	0.10
5.75	0.20	0.00	0.00	18.75	2.82	0.95	0.10
6.00	0.22	0.00	0.00	19.00	2.83	0.95	0.10
6.25	0.23	0.00	0.00	19.25	2.84	0.96	0.10
6.50	0.24	0.00	0.00	19.50	2.85	0.97	0.09
6.75	0.26	0.00	0.00	19.75	2.86	0.98	0.09
7.00	0.27	0.00	0.00	20.00	2.87	0.98	0.09
7.25	0.29	0.00	0.00	20.25	2.88	0.99	0.09
7.50	0.30	0.00	0.00	20.50	2.89	1.00	0.09
7.75	0.32	0.00	0.00	20.75	2.90	1.00	0.08
8.00	0.34	0.00	0.00	21.00	2.91	1.01	0.08
8.25	0.36	0.00	0.00	21.25	2.92	1.01	0.08
8.50	0.39	0.00	0.00	21.50	2.93	1.02	0.08
8.75	0.41	0.00	0.00	21.75	2.93	1.03	0.08
9.00	0.44	0.00	0.00	22.00	2.94	1.03	0.08
9.25	0.47	0.00	0.00	22.25	2.95	1.04	0.07
9.50	0.50	0.00	0.00	22.50	2.96	1.04	0.07
9.75	0.53	0.00	0.00	22.75	2.97	1.05	0.07
10.00	0.57	0.00	0.00	23.00	2.97	1.05	0.07
10.25	0.61	0.00	0.00	23.25	2.98	1.06	0.07
10.50	0.65	0.00	0.01	23.50	2.99	1.06	0.06
10.75	0.70	0.00	0.03	23.75	2.99	1.07	0.06
11.00	0.75	0.01	0.05	24.00	3.00	1.07	0.06
11.25	0.81	0.01	0.08	24.25	3.00	1.07	0.01
11.50	0.89	0.03	0.14	24.50	3.00	1.07	0.00
11.75	1.07	0.06	0.34	24.75	3.00	1.07	0.00
12.00	1.50	0.21	1.17	25.00	3.00	1.07	0.00
12.25	1.93	0.41	2.91	25.25	3.00	1.07	0.00
12.50	2.11	0.51	1.58	25.50	3.00	1.07	0.00
12.75	2.19	0.55	0.73	25.75	3.00	1.07	0.00
13.00	2.25	0.59	0.53	26.00	3.00	1.07	0.00
13.25	2.30	0.62	0.43	26.25	3.00	1.07	0.00
13.50	2.35	0.65	0.39	26.50	3.00	1.07	0.00
13.75	2.39	0.67	0.36	26.75	3.00	1.07	0.00
14.00	2.43	0.70	0.33	27.00	3.00	1.07	0.00
14.25	2.47	0.72	0.30	27.25	3.00	1.07	0.00
14.50	2.50	0.74	0.28	27.50	3.00	1.07	0.00
14.75	2.53	0.76	0.27	27.75	3.00	1.07	0.00
15.00	2.56	0.78	0.25	28.00	3.00	1.07	0.00
15.25	2.59	0.80	0.23	28.25	3.00	1.07	0.00
15.50	2.61	0.81	0.22	28.50	3.00	1.07	0.00
15.75	2.64	0.83	0.20	28.75	3.00	1.07	0.00
16.00	2.66	0.84	0.18	29.00	3.00	1.07	0.00
16.25	2.68	0.85	0.17	29.25	3.00	1.07	0.00
16.50	2.70	0.87	0.16	29.50	3.00	1.07	0.00
16.75	2.71	0.88	0.15	29.75	3.00	1.07	0.00
17.00	2.73	0.89	0.14	30.00	3.00	1.07	0.00
17.25	2.74	0.90	0.14				
17.50	2.76	0.91	0.13				
17.75	2.77	0.92	0.12				

Summary for Pond DP-1: Sterling Forest Lake

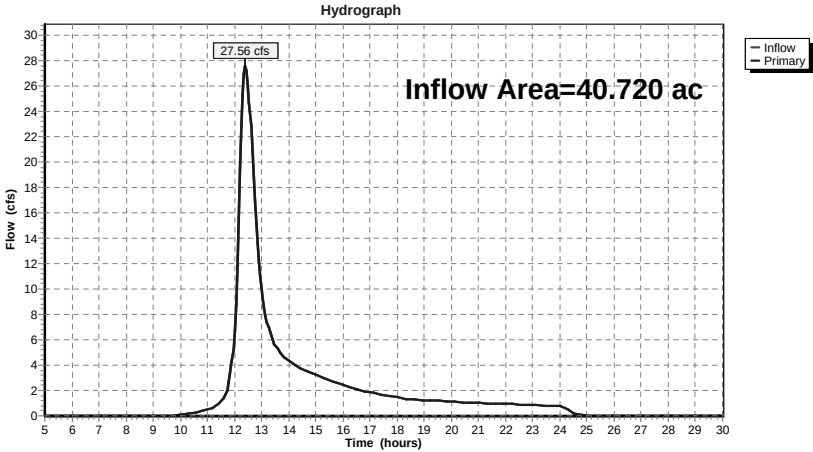
All runoff is conveyed directly into Sterling Forest Lake or through the existing storm collection system into Sterling Forest Lake.

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

Inflow Area = 40.720 ac, 14.76% Impervious, Inflow Depth = 1.06" for 1-YEAR event
Inflow = 27.56 cfs @ 12.41 hrs, Volume= 3.610 af
Primary = 27.56 cfs @ 12.41 hrs, Volume= 3.610 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

Pond DP-1: Sterling Forest Lake



Hydrograph for Pond DP-1: Sterling Forest Lake

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
5.00	0.00		0.00	18.00	1.46		1.46
5.25	0.00		0.00	18.25	1.37		1.37
5.50	0.00		0.00	18.50	1.30		1.30
5.75	0.00		0.00	18.75	1.27		1.27
6.00	0.00		0.00	19.00	1.23		1.23
6.25	0.00		0.00	19.25	1.21		1.21
6.50	0.00		0.00	19.50	1.18		1.18
6.75	0.00		0.00	19.75	1.15		1.15
7.00	0.00		0.00	20.00	1.12		1.12
7.25	0.00		0.00	20.25	1.09		1.09
7.50	0.00		0.00	20.50	1.07		1.07
7.75	0.00		0.00	20.75	1.04		1.04
8.00	0.00		0.00	21.00	1.02		1.02
8.25	0.00		0.00	21.25	1.00		1.00
8.50	0.00		0.00	21.50	0.98		0.98
8.75	0.00		0.00	21.75	0.96		0.96
9.00	0.00		0.00	22.00	0.93		0.93
9.25	0.00		0.00	22.25	0.91		0.91
9.50	0.00		0.00	22.50	0.89		0.89
9.75	0.02		0.02	22.75	0.87		0.87
10.00	0.07		0.07	23.00	0.85		0.85
10.25	0.13		0.13	23.25	0.82		0.82
10.50	0.22		0.22	23.50	0.80		0.80
10.75	0.34		0.34	23.75	0.78		0.78
11.00	0.50		0.50	24.00	0.76		0.76
11.25	0.70		0.70	24.25	0.57		0.57
11.50	1.14		1.14	24.50	0.20		0.20
11.75	2.20		2.20	24.75	0.06		0.06
12.00	6.67		6.67	25.00	0.02		0.02
12.25	22.73		22.73	25.25	0.00		0.00
12.50	26.18		26.18	25.50	0.00		0.00
12.75	16.88		16.88	25.75	0.00		0.00
13.00	10.07		10.07	26.00	0.00		0.00
13.25	6.97		6.97	26.25	0.00		0.00
13.50	5.53		5.53	26.50	0.00		0.00
13.75	4.84		4.84	26.75	0.00		0.00
14.00	4.37		4.37	27.00	0.00		0.00
14.25	3.96		3.96	27.25	0.00		0.00
14.50	3.66		3.66	27.50	0.00		0.00
14.75	3.44		3.44	27.75	0.00		0.00
15.00	3.24		3.24	28.00	0.00		0.00
15.25	3.04		3.04	28.25	0.00		0.00
15.50	2.83		2.83	28.50	0.00		0.00
15.75	2.63		2.63	28.75	0.00		0.00
16.00	2.42		2.42	29.00	0.00		0.00
16.25	2.21		2.21	29.25	0.00		0.00
16.50	2.05		2.05	29.50	0.00		0.00
16.75	1.94		1.94	29.75	0.00		0.00
17.00	1.84		1.84	30.00	0.00		0.00
17.25	1.75		1.75				
17.50	1.65		1.65				
17.75	1.56		1.56				

Existing Conditions_DP-1

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 15

Time span=5.00-30.00 hrs, dt=0.05 hrs, 501 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-1A: Drainage Area 1A Runoff Area=20.540 ac 0.00% Impervious Runoff Depth=2.28"
Flow Length=868' Tc=24.8 min CN=73 Runoff=33.38 cfs 3.903 af

Subcatchment DA-1B: Drainage Area 1B Runoff Area=16.880 ac 35.60% Impervious Runoff Depth=2.99"
Flow Length=2,298' Tc=31.4 min CN=81 Runoff=32.65 cfs 4.199 af

Subcatchment DA-1C: Drainage Area 1C Runoff Area=3.300 ac 0.00% Impervious Runoff Depth=2.62"
Flow Length=187' Tc=13.0 min CN=77 Runoff=8.01 cfs 0.721 af

Pond DP-1: Sterling Forest Lake Inflow=70.21 cfs 8.824 af
Primary=70.21 cfs 8.824 af

Total Runoff Area = 40.720 ac Runoff Volume = 8.824 af Average Runoff Depth = 2.60"
85.24% Pervious = 34.710 ac 14.76% Impervious = 6.010 ac

Existing Conditions_DP-1

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 16

Summary for Subcatchment DA-1A: Drainage Area 1A

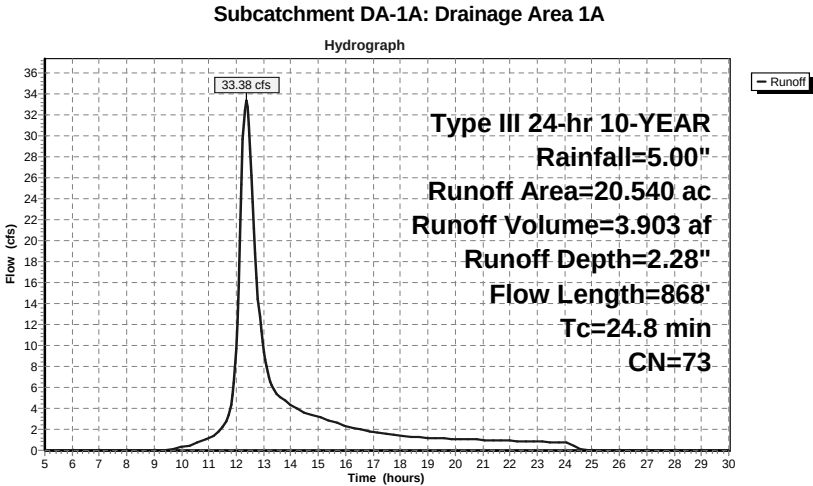
Runoff = 33.38 cfs @ 12.36 hrs, Volume= 3.903 af, Depth= 2.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
* 9.310	70	Woods, Good, HSG C
* 8.960	77	Woods, Good, HSG D
* 0.840	65	Brush, Good, HSG C
* 0.170	73	Brush, Good, HSG D
1.260	74	>75% Grass cover, Good, HSG C
20.540	73	Weighted Average
20.540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.1740	0.11		Sheet Flow, Woods Woods: Dense underbrush n= 0.800 P2= 3.50"
3.9	183	0.0970	0.78		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
1.4	88	0.1850	1.08		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
0.8	60	0.2560	1.26		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
0.6	51	0.2970	1.36		Shallow Concentrated Flow, Woods Forest w/Heavy Litter Kv= 2.5 fps
0.2	71	0.2500	5.86	2,687.86	Channel Flow, Woods Area= 459.0 sf Perim= 82.0' r= 5.60' n= 0.400 Sheet flow: Woods+light brush
0.5	80	0.1350	2.93	1,005.38	Channel Flow, Woods Area= 343.0 sf Perim= 109.0' r= 3.15' n= 0.400 Sheet flow: Woods+light brush
0.9	99	0.0970	1.85	322.05	Channel Flow, Woods Area= 174.0 sf Perim= 86.0' r= 2.02' n= 0.400 Sheet flow: Woods+light brush
1.5	136	0.1520	1.56	189.05	Channel Flow, Woods Area= 121.0 sf Perim= 108.0' r= 1.12' n= 0.400 Sheet flow: Woods+light brush
24.8	868	Total			



Hydrograph for Subcatchment DA-1A: Drainage Area 1A

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.28	0.00	0.00	18.00	4.64	2.00	1.41
5.25	0.30	0.00	0.00	18.25	4.66	2.02	1.32
5.50	0.32	0.00	0.00	18.50	4.68	2.03	1.26
5.75	0.34	0.00	0.00	18.75	4.70	2.05	1.23
6.00	0.36	0.00	0.00	19.00	4.72	2.06	1.20
6.25	0.38	0.00	0.00	19.25	4.73	2.07	1.17
6.50	0.40	0.00	0.00	19.50	4.75	2.09	1.14
6.75	0.43	0.00	0.00	19.75	4.77	2.10	1.11
7.00	0.45	0.00	0.00	20.00	4.79	2.11	1.08
7.25	0.48	0.00	0.00	20.25	4.80	2.13	1.05
7.50	0.51	0.00	0.00	20.50	4.82	2.14	1.03
7.75	0.54	0.00	0.00	20.75	4.83	2.15	1.01
8.00	0.57	0.00	0.00	21.00	4.85	2.16	0.99
8.25	0.60	0.00	0.00	21.25	4.86	2.17	0.97
8.50	0.64	0.00	0.00	21.50	4.88	2.18	0.94
8.75	0.68	0.00	0.00	21.75	4.89	2.19	0.92
9.00	0.73	0.00	0.00	22.00	4.90	2.21	0.90
9.25	0.78	0.00	0.00	22.25	4.92	2.22	0.88
9.50	0.83	0.00	0.05	22.50	4.93	2.23	0.86
9.75	0.89	0.01	0.15	22.75	4.94	2.24	0.83
10.00	0.95	0.01	0.28	23.00	4.95	2.24	0.81
10.25	1.01	0.02	0.44	23.25	4.97	2.25	0.79
10.50	1.08	0.03	0.64	23.50	4.98	2.26	0.77
10.75	1.16	0.04	0.89	23.75	4.99	2.27	0.75
11.00	1.25	0.06	1.18	24.00	5.00	2.28	0.72
11.25	1.36	0.09	1.56	24.25	5.00	2.28	0.54
11.50	1.49	0.13	2.22	24.50	5.00	2.28	0.15
11.75	1.78	0.23	3.64	24.75	5.00	2.28	0.03
12.00	2.50	0.57	9.72	25.00	5.00	2.28	0.01
12.25	3.22	1.00	29.69	25.25	5.00	2.28	0.00
12.50	3.51	1.19	28.75	25.50	5.00	2.28	0.00
12.75	3.64	1.28	16.48	25.75	5.00	2.28	0.00
13.00	3.75	1.35	9.38	26.00	5.00	2.28	0.00
13.25	3.84	1.41	6.56	26.25	5.00	2.28	0.00
13.50	3.92	1.47	5.31	26.50	5.00	2.28	0.00
13.75	3.99	1.52	4.74	26.75	5.00	2.28	0.00
14.00	4.06	1.57	4.30	27.00	5.00	2.28	0.00
14.25	4.11	1.61	3.90	27.25	5.00	2.28	0.00
14.50	4.17	1.65	3.60	27.50	5.00	2.28	0.00
14.75	4.22	1.69	3.38	27.75	5.00	2.28	0.00
15.00	4.27	1.72	3.18	28.00	5.00	2.28	0.00
15.25	4.32	1.76	2.98	28.25	5.00	2.28	0.00
15.50	4.36	1.79	2.77	28.50	5.00	2.28	0.00
15.75	4.40	1.82	2.56	28.75	5.00	2.28	0.00
16.00	4.43	1.84	2.35	29.00	5.00	2.28	0.00
16.25	4.46	1.87	2.14	29.25	5.00	2.28	0.00
16.50	4.49	1.89	1.99	29.50	5.00	2.28	0.00
16.75	4.52	1.91	1.89	29.75	5.00	2.28	0.00
17.00	4.55	1.93	1.79	30.00	5.00	2.28	0.00
17.25	4.57	1.95	1.70				
17.50	4.60	1.97	1.60				
17.75	4.62	1.99	1.51				

Existing Conditions_DP-1

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 19

Summary for Subcatchment DA-1B: Drainage Area 1B

Runoff = 32.65 cfs @ 12.43 hrs, Volume= 4.199 af, Depth= 2.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
4.640	70	Woods, Good, HSG C
0.920	77	Woods, Good, HSG D
0.990	65	Brush, Good, HSG C
4.320	74	>75% Grass cover, Good, HSG C
6.010	98	Paved parking, HSG C
16.880	81	Weighted Average
10.870		64.40% Pervious Area
6.010		35.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	100	0.1200	0.10		Sheet Flow, Woods: Dense underbrush n= 0.800 P2= 3.50"
3.9	208	0.1250	0.88		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
3.3	225	0.2130	1.15		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
2.9	138	0.1020	0.80		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
0.4	126	0.0560	4.80		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.3	143	0.0600	8.48	2.96	Pipe Channel, 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013
0.4	107	0.0100	4.54	3.56	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.6	219	0.0100	5.94	10.50	Pipe Channel, 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.3	109	0.0100	5.94	10.50	Pipe Channel, 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.5	196	0.0100	6.38	13.91	Pipe Channel, 20.0" Round Area= 2.2 sf Perim= 5.2' r= 0.42' n= 0.013
0.3	121	0.0100	6.38	13.91	Pipe Channel, 20.0" Round Area= 2.2 sf Perim= 5.2' r= 0.42' n= 0.013
0.8	303	0.0100	6.38	13.91	Pipe Channel, 20.0" Round Area= 2.2 sf Perim= 5.2' r= 0.42' n= 0.013
0.2	303	0.0900	21.60	67.87	Pipe Channel,

Existing Conditions_DP-1

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Type III 24-hr 10-YEAR Rainfall=5.00"

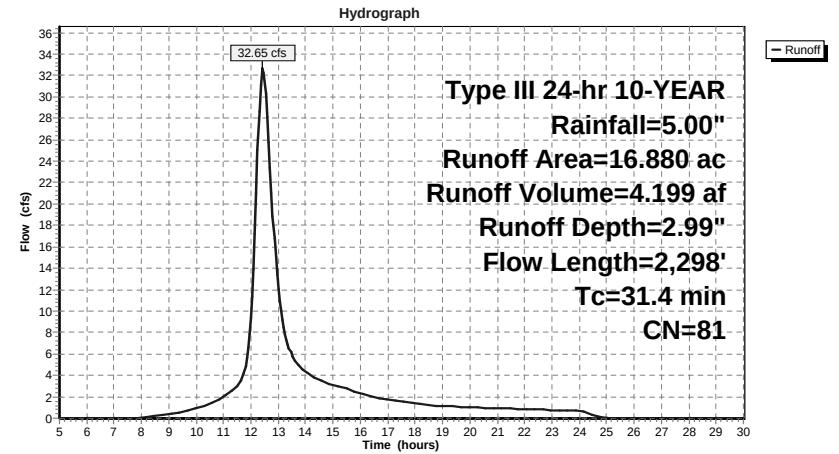
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Page 20

24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50'

n= 0.013

31.4 2,298 Total

Subcatchment DA-1B: Drainage Area 1B

Existing Conditions_DP-1

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 21

Hydrograph for Subcatchment DA-1B: Drainage Area 1B

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.28	0.00	0.00	18.00	4.64	2.67	1.36
5.25	0.30	0.00	0.00	18.25	4.66	2.69	1.27
5.50	0.32	0.00	0.00	18.50	4.68	2.70	1.20
5.75	0.34	0.00	0.00	18.75	4.70	2.72	1.16
6.00	0.36	0.00	0.00	19.00	4.72	2.74	1.13
6.25	0.38	0.00	0.00	19.25	4.73	2.75	1.10
6.50	0.40	0.00	0.00	19.50	4.75	2.77	1.08
6.75	0.43	0.00	0.00	19.75	4.77	2.78	1.05
7.00	0.45	0.00	0.00	20.00	4.79	2.80	1.02
7.25	0.48	0.00	0.00	20.25	4.80	2.81	0.99
7.50	0.51	0.00	0.00	20.50	4.82	2.82	0.97
7.75	0.54	0.00	0.03	20.75	4.83	2.84	0.95
8.00	0.57	0.00	0.07	21.00	4.85	2.85	0.93
8.25	0.60	0.01	0.13	21.25	4.86	2.86	0.91
8.50	0.64	0.01	0.19	21.50	4.88	2.88	0.89
8.75	0.68	0.02	0.27	21.75	4.89	2.89	0.87
9.00	0.73	0.03	0.37	22.00	4.90	2.90	0.85
9.25	0.78	0.04	0.49	22.25	4.92	2.91	0.82
9.50	0.83	0.05	0.62	22.50	4.93	2.92	0.80
9.75	0.89	0.06	0.77	22.75	4.94	2.93	0.78
10.00	0.95	0.08	0.93	23.00	4.95	2.95	0.76
10.25	1.01	0.10	1.11	23.25	4.97	2.96	0.74
10.50	1.08	0.13	1.34	23.50	4.98	2.97	0.72
10.75	1.16	0.16	1.63	23.75	4.99	2.98	0.70
11.00	1.25	0.20	1.97	24.00	5.00	2.99	0.68
11.25	1.36	0.24	2.36	24.25	5.00	2.99	0.59
11.50	1.49	0.31	3.03	24.50	5.00	2.99	0.26
11.75	1.78	0.47	4.34	24.75	5.00	2.99	0.08
12.00	2.50	0.94	9.32	25.00	5.00	2.99	0.02
12.25	3.22	1.49	25.06	25.25	5.00	2.99	0.01
12.50	3.51	1.72	31.82	25.50	5.00	2.99	0.00
12.75	3.64	1.83	21.04	25.75	5.00	2.99	0.00
13.00	3.75	1.91	12.09	26.00	5.00	2.99	0.00
13.25	3.84	1.99	7.87	26.25	5.00	2.99	0.00
13.50	3.92	2.05	5.88	26.50	5.00	2.99	0.00
13.75	3.99	2.11	4.92	26.75	5.00	2.99	0.00
14.00	4.06	2.17	4.36	27.00	5.00	2.99	0.00
14.25	4.11	2.22	3.92	27.25	5.00	2.99	0.00
14.50	4.17	2.27	3.58	27.50	5.00	2.99	0.00
14.75	4.22	2.31	3.33	27.75	5.00	2.99	0.00
15.00	4.27	2.35	3.12	28.00	5.00	2.99	0.00
15.25	4.32	2.39	2.92	28.25	5.00	2.99	0.00
15.50	4.36	2.43	2.71	28.50	5.00	2.99	0.00
15.75	4.40	2.46	2.51	28.75	5.00	2.99	0.00
16.00	4.43	2.49	2.31	29.00	5.00	2.99	0.00
16.25	4.46	2.51	2.10	29.25	5.00	2.99	0.00
16.50	4.49	2.54	1.94	29.50	5.00	2.99	0.00
16.75	4.52	2.57	1.82	29.75	5.00	2.99	0.00
17.00	4.55	2.59	1.73	30.00	5.00	2.99	0.00
17.25	4.57	2.61	1.63				
17.50	4.60	2.63	1.54				
17.75	4.62	2.65	1.45				

Existing Conditions_DP-1

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 22

Summary for Subcatchment DA-1C: Drainage Area 1C

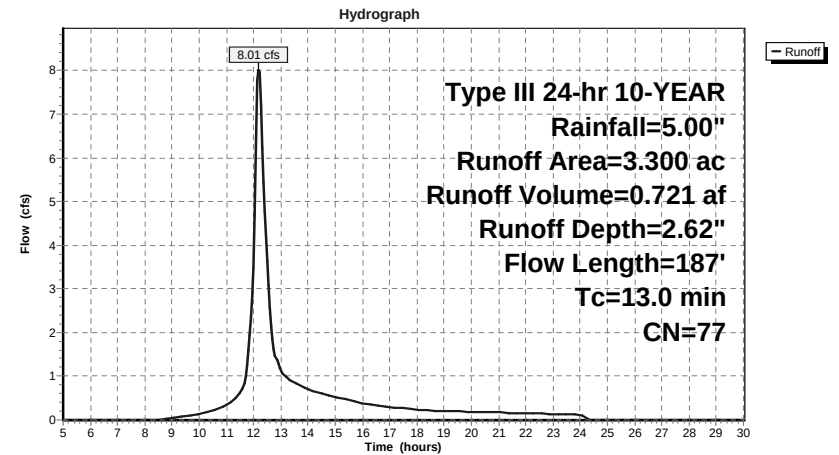
Runoff = 8.01 cfs @ 12.18 hrs, Volume= 0.721 af, Depth= 2.62"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
3.180	77	Woods, Good, HSG D
0.120	80	>75% Grass cover, Good, HSG D
3.300	77	Weighted Average
3.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	82	0.0490	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.8	105	0.1800	2.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.0	187	Total			

Subcatchment DA-1C: Drainage Area 1C

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 23

Hydrograph for Subcatchment DA-1C: Drainage Area 1C

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.28	0.00	0.00	18.00	4.64	2.32	0.23
5.25	0.30	0.00	0.00	18.25	4.66	2.34	0.22
5.50	0.32	0.00	0.00	18.50	4.68	2.36	0.21
5.75	0.34	0.00	0.00	18.75	4.70	2.37	0.21
6.00	0.36	0.00	0.00	19.00	4.72	2.39	0.20
6.25	0.38	0.00	0.00	19.25	4.73	2.40	0.20
6.50	0.40	0.00	0.00	19.50	4.75	2.42	0.19
6.75	0.43	0.00	0.00	19.75	4.77	2.43	0.19
7.00	0.45	0.00	0.00	20.00	4.79	2.44	0.18
7.25	0.48	0.00	0.00	20.25	4.80	2.46	0.18
7.50	0.51	0.00	0.00	20.50	4.82	2.47	0.17
7.75	0.54	0.00	0.00	20.75	4.83	2.48	0.17
8.00	0.57	0.00	0.00	21.00	4.85	2.50	0.17
8.25	0.60	0.00	0.00	21.25	4.86	2.51	0.16
8.50	0.64	0.00	0.01	21.50	4.88	2.52	0.16
8.75	0.68	0.00	0.02	21.75	4.89	2.53	0.16
9.00	0.73	0.01	0.04	22.00	4.90	2.54	0.15
9.25	0.78	0.01	0.06	22.25	4.92	2.55	0.15
9.50	0.83	0.02	0.08	22.50	4.93	2.56	0.14
9.75	0.89	0.03	0.11	22.75	4.94	2.57	0.14
10.00	0.95	0.04	0.14	23.00	4.95	2.59	0.14
10.25	1.01	0.05	0.17	23.25	4.97	2.60	0.13
10.50	1.08	0.07	0.22	23.50	4.98	2.60	0.13
10.75	1.16	0.09	0.28	23.75	4.99	2.61	0.13
11.00	1.25	0.12	0.34	24.00	5.00	2.62	0.12
11.25	1.36	0.15	0.44	24.25	5.00	2.62	0.03
11.50	1.49	0.21	0.63	24.50	5.00	2.62	0.00
11.75	1.78	0.33	1.27	24.75	5.00	2.62	0.00
12.00	2.50	0.74	3.48	25.00	5.00	2.62	0.00
12.25	3.22	1.23	7.20	25.25	5.00	2.62	0.00
12.50	3.51	1.44	3.63	25.50	5.00	2.62	0.00
12.75	3.64	1.54	1.62	25.75	5.00	2.62	0.00
13.00	3.75	1.62	1.16	26.00	5.00	2.62	0.00
13.25	3.84	1.69	0.93	26.25	5.00	2.62	0.00
13.50	3.92	1.75	0.85	26.50	5.00	2.62	0.00
13.75	3.99	1.80	0.77	26.75	5.00	2.62	0.00
14.00	4.06	1.86	0.70	27.00	5.00	2.62	0.00
14.25	4.11	1.90	0.64	27.25	5.00	2.62	0.00
14.50	4.17	1.95	0.60	27.50	5.00	2.62	0.00
14.75	4.22	1.99	0.56	27.75	5.00	2.62	0.00
15.00	4.27	2.03	0.53	28.00	5.00	2.62	0.00
15.25	4.32	2.06	0.49	28.25	5.00	2.62	0.00
15.50	4.36	2.10	0.45	28.50	5.00	2.62	0.00
15.75	4.40	2.13	0.42	28.75	5.00	2.62	0.00
16.00	4.43	2.15	0.38	29.00	5.00	2.62	0.00
16.25	4.46	2.18	0.35	29.25	5.00	2.62	0.00
16.50	4.49	2.20	0.33	29.50	5.00	2.62	0.00
16.75	4.52	2.23	0.31	29.75	5.00	2.62	0.00
17.00	4.55	2.25	0.30	30.00	5.00	2.62	0.00
17.25	4.57	2.27	0.28				
17.50	4.60	2.29	0.26				
17.75	4.62	2.31	0.25				

Existing Conditions_DP-1

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 24

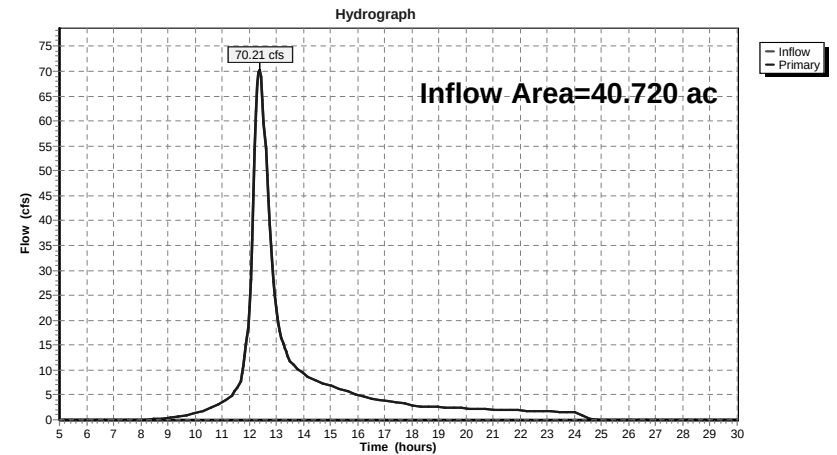
Summary for Pond DP-1: Sterling Forest Lake

All runoff is conveyed directly into Sterling Forest Lake or through the existing storm collection system into Sterling Forest Lake.

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

Inflow Area = 40.720 ac, 14.76% Impervious, Inflow Depth = 2.60" for 10-YEAR event
 Inflow = 70.21 cfs @ 12.38 hrs, Volume= 8.824 af
 Primary = 70.21 cfs @ 12.38 hrs, Volume= 8.824 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

Pond DP-1: Sterling Forest Lake

Existing Conditions_DP-1

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 25

Hydrograph for Pond DP-1: Sterling Forest Lake

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
5.00	0.00		0.00	18.00	3.01		3.01
5.25	0.00		0.00	18.25	2.81		2.81
5.50	0.00		0.00	18.50	2.68		2.68
5.75	0.00		0.00	18.75	2.60		2.60
6.00	0.00		0.00	19.00	2.53		2.53
6.25	0.00		0.00	19.25	2.47		2.47
6.50	0.00		0.00	19.50	2.41		2.41
6.75	0.00		0.00	19.75	2.35		2.35
7.00	0.00		0.00	20.00	2.29		2.29
7.25	0.00		0.00	20.25	2.23		2.23
7.50	0.00		0.00	20.50	2.17		2.17
7.75	0.03		0.03	20.75	2.13		2.13
8.00	0.07		0.07	21.00	2.08		2.08
8.25	0.13		0.13	21.25	2.04		2.04
8.50	0.20		0.20	21.50	1.99		1.99
8.75	0.29		0.29	21.75	1.94		1.94
9.00	0.41		0.41	22.00	1.90		1.90
9.25	0.55		0.55	22.25	1.85		1.85
9.50	0.75		0.75	22.50	1.81		1.81
9.75	1.02		1.02	22.75	1.76		1.76
10.00	1.35		1.35	23.00	1.71		1.71
10.25	1.72		1.72	23.25	1.67		1.67
10.50	2.20		2.20	23.50	1.62		1.62
10.75	2.79		2.79	23.75	1.57		1.57
11.00	3.49		3.49	24.00	1.53		1.53
11.25	4.36		4.36	24.25	1.16		1.16
11.50	5.87		5.87	24.50	0.41		0.41
11.75	9.25		9.25	24.75	0.11		0.11
12.00	22.53		22.53	25.00	0.03		0.03
12.25	61.95		61.95	25.25	0.01		0.01
12.50	64.19		64.19	25.50	0.00		0.00
12.75	39.14		39.14	25.75	0.00		0.00
13.00	22.63		22.63	26.00	0.00		0.00
13.25	15.36		15.36	26.25	0.00		0.00
13.50	12.03		12.03	26.50	0.00		0.00
13.75	10.43		10.43	26.75	0.00		0.00
14.00	9.36		9.36	27.00	0.00		0.00
14.25	8.46		8.46	27.25	0.00		0.00
14.50	7.78		7.78	27.50	0.00		0.00
14.75	7.28		7.28	27.75	0.00		0.00
15.00	6.83		6.83	28.00	0.00		0.00
15.25	6.38		6.38	28.25	0.00		0.00
15.50	5.94		5.94	28.50	0.00		0.00
15.75	5.49		5.49	28.75	0.00		0.00
16.00	5.03		5.03	29.00	0.00		0.00
16.25	4.59		4.59	29.25	0.00		0.00
16.50	4.26		4.26	29.50	0.00		0.00
16.75	4.02		4.02	29.75	0.00		0.00
17.00	3.82		3.82	30.00	0.00		0.00
17.25	3.61		3.61				
17.50	3.41		3.41				
17.75	3.21		3.21				

Existing Conditions_DP-1

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 26

Time span=5.00-30.00 hrs, dt=0.05 hrs, 501 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-1A: Drainage Area 1A Runoff Area=20.540 ac 0.00% Impervious Runoff Depth=4.63"
Flow Length=868' Tc=24.8 min CN=73 Runoff=68.48 cfs 7.930 af

Subcatchment DA-1B: Drainage Area 1B Runoff Area=16.880 ac 35.60% Impervious Runoff Depth=5.55"
Flow Length=2,298' Tc=31.4 min CN=81 Runoff=60.01 cfs 7.812 af

Subcatchment DA-1C: Drainage Area 1C Runoff Area=3.300 ac 0.00% Impervious Runoff Depth=5.09"
Flow Length=187' Tc=13.0 min CN=77 Runoff=15.48 cfs 1.400 af

Pond DP-1: Sterling Forest Lake

Inflow=136.45 cfs 17.143 af

Primary=136.45 cfs 17.143 af

Total Runoff Area = 40.720 ac Runoff Volume = 17.143 af Average Runoff Depth = 5.05"
85.24% Pervious = 34.710 ac 14.76% Impervious = 6.010 ac

Summary for Subcatchment DA-1A: Drainage Area 1A

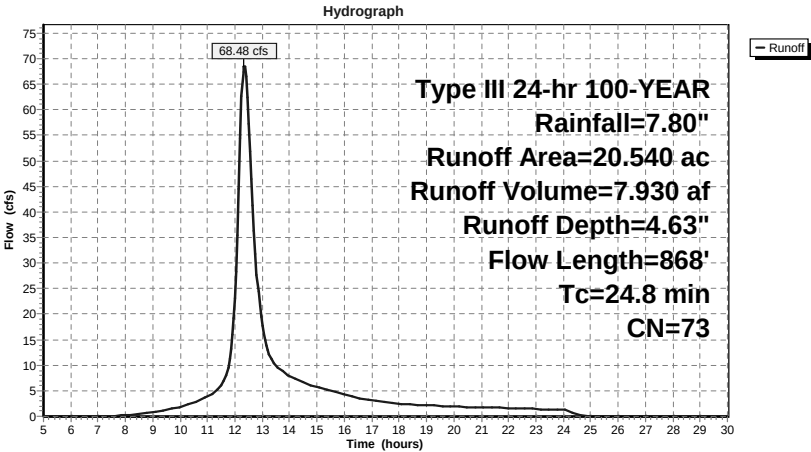
Runoff = 68.48 cfs @ 12.34 hrs, Volume= 7.930 af, Depth= 4.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
* 9.310	70	Woods, Good, HSG C
* 8.960	77	Woods, Good, HSG D
* 0.840	65	Brush, Good, HSG C
* 0.170	73	Brush, Good, HSG D
1.260	74	>75% Grass cover, Good, HSG C
20.540	73	Weighted Average
20.540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.1740	0.11		Sheet Flow, Woods Woods: Dense underbrush n= 0.800 P2= 3.50"
3.9	183	0.0970	0.78		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
1.4	88	0.1850	1.08		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
0.8	60	0.2560	1.26		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
0.6	51	0.2970	1.36		Shallow Concentrated Flow, Woods Forest w/Heavy Litter Kv= 2.5 fps
0.2	71	0.2500	5.86	2,687.86	Channel Flow, Woods Area= 459.0 sf Perim= 82.0' r= 5.60' n= 0.400 Sheet flow: Woods+light brush
0.5	80	0.1350	2.93	1,005.38	Channel Flow, Woods Area= 343.0 sf Perim= 109.0' r= 3.15' n= 0.400 Sheet flow: Woods+light brush
0.9	99	0.0970	1.85	322.05	Channel Flow, Woods Area= 174.0 sf Perim= 86.0' r= 2.02' n= 0.400 Sheet flow: Woods+light brush
1.5	136	0.1520	1.56	189.05	Channel Flow, Woods Area= 121.0 sf Perim= 108.0' r= 1.12' n= 0.400 Sheet flow: Woods+light brush
24.8	868	Total			

Subcatchment DA-1A: Drainage Area 1A



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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 29

Hydrograph for Subcatchment DA-1A: Drainage Area 1A

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.44	0.00	0.00	18.00	7.24	4.14	2.51
5.25	0.47	0.00	0.00	18.25	7.27	4.17	2.34
5.50	0.50	0.00	0.00	18.50	7.30	4.19	2.24
5.75	0.53	0.00	0.00	18.75	7.33	4.22	2.17
6.00	0.56	0.00	0.00	19.00	7.36	4.25	2.12
6.25	0.59	0.00	0.00	19.25	7.39	4.27	2.07
6.50	0.63	0.00	0.00	19.50	7.41	4.29	2.02
6.75	0.67	0.00	0.00	19.75	7.44	4.32	1.97
7.00	0.71	0.00	0.00	20.00	7.46	4.34	1.91
7.25	0.75	0.00	0.00	20.25	7.49	4.36	1.86
7.50	0.79	0.00	0.01	20.50	7.51	4.38	1.82
7.75	0.84	0.00	0.07	20.75	7.54	4.40	1.78
8.00	0.89	0.01	0.16	21.00	7.56	4.42	1.74
8.25	0.94	0.01	0.26	21.25	7.58	4.44	1.70
8.50	1.00	0.02	0.40	21.50	7.61	4.46	1.66
8.75	1.07	0.03	0.56	21.75	7.63	4.48	1.62
9.00	1.14	0.04	0.76	22.00	7.65	4.50	1.59
9.25	1.21	0.05	0.99	22.25	7.67	4.52	1.55
9.50	1.29	0.07	1.25	22.50	7.69	4.54	1.51
9.75	1.38	0.09	1.54	22.75	7.71	4.55	1.47
10.00	1.47	0.12	1.87	23.00	7.73	4.57	1.43
10.25	1.58	0.15	2.22	23.25	7.75	4.59	1.39
10.50	1.69	0.19	2.70	23.50	7.77	4.60	1.35
10.75	1.81	0.24	3.29	23.75	7.78	4.62	1.31
11.00	1.95	0.30	3.96	24.00	7.80	4.63	1.27
11.25	2.11	0.37	4.77	24.25	7.80	4.63	0.95
11.50	2.32	0.48	6.30	24.50	7.80	4.63	0.26
11.75	2.77	0.72	9.56	24.75	7.80	4.63	0.06
12.00	3.90	1.46	23.05	25.00	7.80	4.63	0.01
12.25	5.03	2.30	62.58	25.25	7.80	4.63	0.00
12.50	5.48	2.66	57.17	25.50	7.80	4.63	0.00
12.75	5.69	2.83	31.74	25.75	7.80	4.63	0.00
13.00	5.85	2.96	17.69	26.00	7.80	4.63	0.00
13.25	5.99	3.08	12.20	26.25	7.80	4.63	0.00
13.50	6.11	3.18	9.79	26.50	7.80	4.63	0.00
13.75	6.22	3.28	8.69	26.75	7.80	4.63	0.00
14.00	6.33	3.36	7.86	27.00	7.80	4.63	0.00
14.25	6.42	3.44	7.10	27.25	7.80	4.63	0.00
14.50	6.51	3.51	6.54	27.50	7.80	4.63	0.00
14.75	6.59	3.58	6.13	27.75	7.80	4.63	0.00
15.00	6.66	3.65	5.75	28.00	7.80	4.63	0.00
15.25	6.73	3.71	5.37	28.25	7.80	4.63	0.00
15.50	6.80	3.76	4.98	28.50	7.80	4.63	0.00
15.75	6.86	3.81	4.60	28.75	7.80	4.63	0.00
16.00	6.91	3.86	4.21	29.00	7.80	4.63	0.00
16.25	6.96	3.90	3.83	29.25	7.80	4.63	0.00
16.50	7.01	3.94	3.56	29.50	7.80	4.63	0.00
16.75	7.05	3.98	3.37	29.75	7.80	4.63	0.00
17.00	7.09	4.02	3.20	30.00	7.80	4.63	0.00
17.25	7.13	4.05	3.02				
17.50	7.17	4.08	2.85				
17.75	7.21	4.11	2.68				

Existing Conditions_DP-1

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 30

Summary for Subcatchment DA-1B: Drainage Area 1B

Runoff = 60.01 cfs @ 12.42 hrs, Volume= 7.812 af, Depth= 5.55"

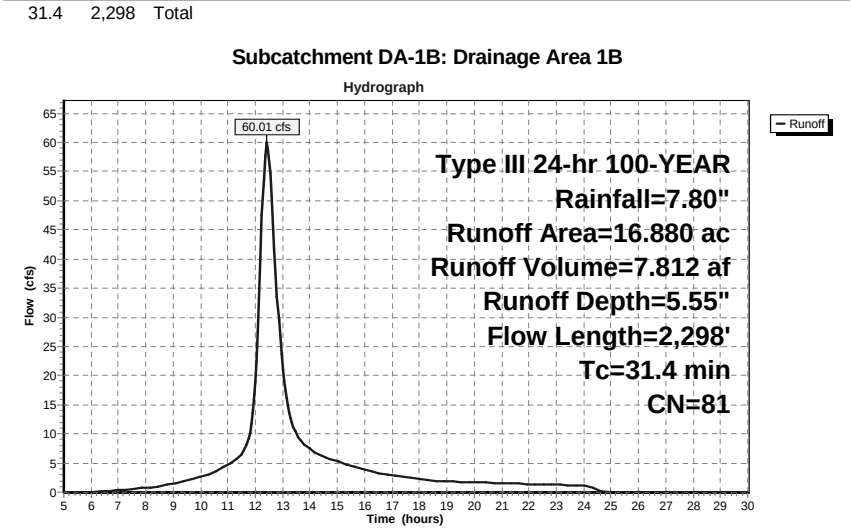
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
4.640	70	Woods, Good, HSG C
0.920	77	Woods, Good, HSG D
0.990	65	Brush, Good, HSG C
4.320	74	>75% Grass cover, Good, HSG C
6.010	98	Paved parking, HSG C
16.880	81	Weighted Average
10.870		64.40% Pervious Area
6.010		35.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	100	0.1200	0.10		Sheet Flow, Woods: Dense underbrush n= 0.800 P2= 3.50"
3.9	208	0.1250	0.88		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
3.3	225	0.2130	1.15		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
2.9	138	0.1020	0.80		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
0.4	126	0.0560	4.80		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.3	143	0.0600	8.48	2.96	Pipe Channel, 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013
0.4	107	0.0100	4.54	3.56	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.6	219	0.0100	5.94	10.50	Pipe Channel, 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.3	109	0.0100	5.94	10.50	Pipe Channel, 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.5	196	0.0100	6.38	13.91	Pipe Channel, 20.0" Round Area= 2.2 sf Perim= 5.2' r= 0.42' n= 0.013
0.3	121	0.0100	6.38	13.91	Pipe Channel, 20.0" Round Area= 2.2 sf Perim= 5.2' r= 0.42' n= 0.013
0.8	303	0.0100	6.38	13.91	Pipe Channel, 20.0" Round Area= 2.2 sf Perim= 5.2' r= 0.42' n= 0.013
0.2	303	0.0900	21.60	67.87	Pipe Channel,

24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50'
n= 0.013



Hydrograph for Subcatchment DA-1B: Drainage Area 1B

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.44	0.00	0.00	18.00	7.24	5.03	2.28
5.25	0.47	0.00	0.00	18.25	7.27	5.06	2.13
5.50	0.50	0.00	0.00	18.50	7.30	5.08	2.02
5.75	0.53	0.00	0.02	18.75	7.33	5.11	1.95
6.00	0.56	0.00	0.06	19.00	7.36	5.14	1.89
6.25	0.59	0.01	0.11	19.25	7.39	5.16	1.84
6.50	0.63	0.01	0.17	19.50	7.41	5.19	1.80
6.75	0.67	0.02	0.23	19.75	7.44	5.21	1.75
7.00	0.71	0.02	0.31	20.00	7.46	5.24	1.71
7.25	0.75	0.03	0.40	20.25	7.49	5.26	1.66
7.50	0.79	0.04	0.50	20.50	7.51	5.29	1.62
7.75	0.84	0.05	0.61	20.75	7.54	5.31	1.58
8.00	0.89	0.06	0.72	21.00	7.56	5.33	1.55
8.25	0.94	0.08	0.85	21.25	7.58	5.35	1.51
8.50	1.00	0.10	1.01	21.50	7.61	5.37	1.48
8.75	1.07	0.12	1.21	21.75	7.63	5.39	1.44
9.00	1.14	0.15	1.44	22.00	7.65	5.41	1.41
9.25	1.21	0.18	1.70	22.25	7.67	5.43	1.37
9.50	1.29	0.21	1.99	22.50	7.69	5.45	1.34
9.75	1.38	0.26	2.30	22.75	7.71	5.47	1.30
10.00	1.47	0.30	2.63	23.00	7.73	5.49	1.27
10.25	1.58	0.35	2.98	23.25	7.75	5.50	1.23
10.50	1.69	0.42	3.44	23.50	7.77	5.52	1.20
10.75	1.81	0.49	4.01	23.75	7.78	5.54	1.16
11.00	1.95	0.57	4.66	24.00	7.80	5.55	1.13
11.25	2.11	0.68	5.40	24.25	7.80	5.55	0.97
11.50	2.32	0.82	6.69	24.50	7.80	5.55	0.43
11.75	2.77	1.14	9.25	24.75	7.80	5.55	0.13
12.00	3.90	2.04	18.88	25.00	7.80	5.55	0.04
12.25	5.03	3.01	47.44	25.25	7.80	5.55	0.01
12.50	5.48	3.41	57.93	25.50	7.80	5.55	0.00
12.75	5.69	3.60	37.47	25.75	7.80	5.55	0.00
13.00	5.85	3.75	21.23	26.00	7.80	5.55	0.00
13.25	5.99	3.87	13.65	26.25	7.80	5.55	0.00
13.50	6.11	3.99	10.12	26.50	7.80	5.55	0.00
13.75	6.22	4.09	8.42	26.75	7.80	5.55	0.00
14.00	6.33	4.18	7.43	27.00	7.80	5.55	0.00
14.25	6.42	4.27	6.67	27.25	7.80	5.55	0.00
14.50	6.51	4.35	6.08	27.50	7.80	5.55	0.00
14.75	6.59	4.42	5.65	27.75	7.80	5.55	0.00
15.00	6.66	4.49	5.28	28.00	7.80	5.55	0.00
15.25	6.73	4.56	4.93	28.25	7.80	5.55	0.00
15.50	6.80	4.62	4.58	28.50	7.80	5.55	0.00
15.75	6.86	4.67	4.23	28.75	7.80	5.55	0.00
16.00	6.91	4.72	3.89	29.00	7.80	5.55	0.00
16.25	6.96	4.77	3.54	29.25	7.80	5.55	0.00
16.50	7.01	4.81	3.26	29.50	7.80	5.55	0.00
16.75	7.05	4.85	3.06	29.75	7.80	5.55	0.00
17.00	7.09	4.89	2.90	30.00	7.80	5.55	0.00
17.25	7.13	4.93	2.74				
17.50	7.17	4.96	2.59				
17.75	7.21	5.00	2.44				

Existing Conditions_DP-1

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 33

Summary for Subcatchment DA-1C: Drainage Area 1C

Runoff = 15.48 cfs @ 12.18 hrs, Volume= 1.400 af, Depth= 5.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

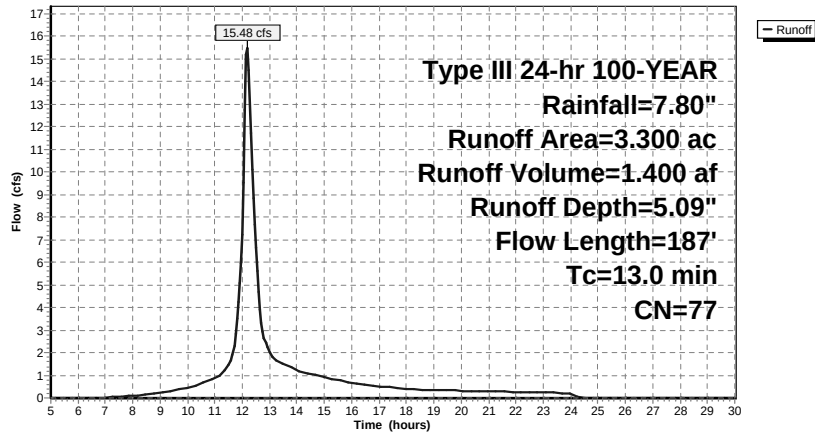
Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
3.180	77	Woods, Good, HSG D
0.120	80	>75% Grass cover, Good, HSG D
3.300	77	Weighted Average
3.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	82	0.0490	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.8	105	0.1800	2.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.0	187	Total			

Subcatchment DA-1C: Drainage Area 1C

Hydrograph

**Existing Conditions_DP-1**

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 34

Hydrograph for Subcatchment DA-1C: Drainage Area 1C

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.44	0.00	0.00	18.00	7.24	4.58	0.40
5.25	0.47	0.00	0.00	18.25	7.27	4.61	0.38
5.50	0.50	0.00	0.00	18.50	7.30	4.64	0.37
5.75	0.53	0.00	0.00	18.75	7.33	4.66	0.36
6.00	0.56	0.00	0.00	19.00	7.36	4.69	0.35
6.25	0.59	0.00	0.00	19.25	7.39	4.71	0.34
6.50	0.63	0.00	0.00	19.50	7.41	4.74	0.33
6.75	0.67	0.00	0.01	19.75	7.44	4.76	0.32
7.00	0.71	0.00	0.03	20.00	7.46	4.79	0.31
7.25	0.75	0.01	0.04	20.25	7.49	4.81	0.31
7.50	0.79	0.01	0.06	20.50	7.51	4.83	0.30
7.75	0.84	0.02	0.08	20.75	7.54	4.85	0.29
8.00	0.89	0.03	0.10	21.00	7.56	4.87	0.29
8.25	0.94	0.04	0.12	21.25	7.58	4.89	0.28
8.50	1.00	0.05	0.15	21.50	7.61	4.91	0.27
8.75	1.07	0.06	0.19	21.75	7.63	4.93	0.27
9.00	1.14	0.08	0.24	22.00	7.65	4.95	0.26
9.25	1.21	0.11	0.29	22.25	7.67	4.97	0.25
9.50	1.29	0.13	0.34	22.50	7.69	4.99	0.25
9.75	1.38	0.16	0.40	22.75	7.71	5.01	0.24
10.00	1.47	0.20	0.46	23.00	7.73	5.03	0.23
10.25	1.58	0.24	0.53	23.25	7.75	5.04	0.23
10.50	1.69	0.29	0.64	23.50	7.77	5.06	0.22
10.75	1.81	0.35	0.76	23.75	7.78	5.08	0.21
11.00	1.95	0.42	0.89	24.00	7.80	5.09	0.21
11.25	2.11	0.51	1.09	24.25	7.80	5.09	0.05
11.50	2.32	0.63	1.49	24.50	7.80	5.09	0.00
11.75	2.77	0.92	2.86	24.75	7.80	5.09	0.00
12.00	3.90	1.73	7.22	25.00	7.80	5.09	0.00
12.25	5.03	2.65	13.68	25.25	7.80	5.09	0.00
12.50	5.48	3.03	6.63	25.50	7.80	5.09	0.00
12.75	5.69	3.21	2.91	25.75	7.80	5.09	0.00
13.00	5.85	3.35	2.07	26.00	7.80	5.09	0.00
13.25	5.99	3.47	1.65	26.25	7.80	5.09	0.00
13.50	6.11	3.58	1.49	26.50	7.80	5.09	0.00
13.75	6.22	3.68	1.36	26.75	7.80	5.09	0.00
14.00	6.33	3.77	1.23	27.00	7.80	5.09	0.00
14.25	6.42	3.85	1.12	27.25	7.80	5.09	0.00
14.50	6.51	3.92	1.05	27.50	7.80	5.09	0.00
14.75	6.59	4.00	0.98	27.75	7.80	5.09	0.00
15.00	6.66	4.06	0.92	28.00	7.80	5.09	0.00
15.25	6.73	4.13	0.85	28.25	7.80	5.09	0.00
15.50	6.80	4.18	0.79	28.50	7.80	5.09	0.00
15.75	6.86	4.24	0.72	28.75	7.80	5.09	0.00
16.00	6.91	4.29	0.66	29.00	7.80	5.09	0.00
16.25	6.96	4.33	0.60	29.25	7.80	5.09	0.00
16.50	7.01	4.37	0.57	29.50	7.80	5.09	0.00
16.75	7.05	4.41	0.54	29.75	7.80	5.09	0.00
17.00	7.09	4.45	0.51	30.00	7.80	5.09	0.00
17.25	7.13	4.49	0.49				
17.50	7.17	4.52	0.46				
17.75	7.21	4.55	0.43				

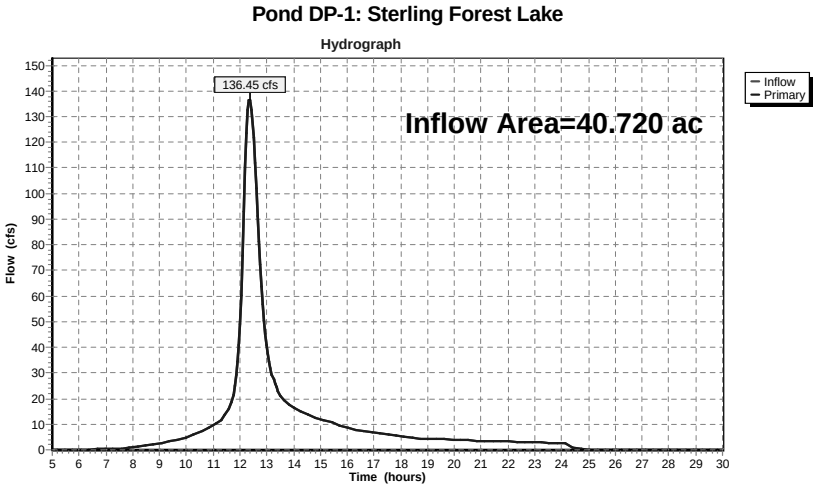
Summary for Pond DP-1: Sterling Forest Lake

All runoff is conveyed directly into Sterling Forest Lake or through the existing storm collection system into Sterling Forest Lake.

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

Inflow Area = 40.720 ac, 14.76% Impervious, Inflow Depth = 5.05" for 100-YEAR event
Inflow = 136.45 cfs @ 12.36 hrs, Volume= 17.143 af
Primary = 136.45 cfs @ 12.36 hrs, Volume= 17.143 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs



Hydrograph for Pond DP-1: Sterling Forest Lake

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
5.00	0.00		0.00	18.00	5.19		5.19
5.25	0.00		0.00	18.25	4.85		4.85
5.50	0.00		0.00	18.50	4.62		4.62
5.75	0.02		0.02	18.75	4.48		4.48
6.00	0.06		0.06	19.00	4.36		4.36
6.25	0.11		0.11	19.25	4.25		4.25
6.50	0.17		0.17	19.50	4.15		4.15
6.75	0.25		0.25	19.75	4.04		4.04
7.00	0.34		0.34	20.00	3.93		3.93
7.25	0.44		0.44	20.25	3.83		3.83
7.50	0.57		0.57	20.50	3.74		3.74
7.75	0.75		0.75	20.75	3.65		3.65
8.00	0.98		0.98	21.00	3.57		3.57
8.25	1.23		1.23	21.25	3.49		3.49
8.50	1.56		1.56	21.50	3.41		3.41
8.75	1.97		1.97	21.75	3.33		3.33
9.00	2.44		2.44	22.00	3.25		3.25
9.25	2.98		2.98	22.25	3.17		3.17
9.50	3.58		3.58	22.50	3.09		3.09
9.75	4.24		4.24	22.75	3.01		3.01
10.00	4.95		4.95	23.00	2.93		2.93
10.25	5.74		5.74	23.25	2.85		2.85
10.50	6.77		6.77	23.50	2.77		2.77
10.75	8.05		8.05	23.75	2.69		2.69
11.00	9.50		9.50	24.00	2.61		2.61
11.25	11.27		11.27	24.25	1.97		1.97
11.50	14.48		14.48	24.50	0.69		0.69
11.75	21.66		21.66	24.75	0.19		0.19
12.00	49.15		49.15	25.00	0.05		0.05
12.25	123.71		123.71	25.25	0.01		0.01
12.50	121.74		121.74	25.50	0.00		0.00
12.75	72.12		72.12	25.75	0.00		0.00
13.00	40.99		40.99	26.00	0.00		0.00
13.25	27.51		27.51	26.25	0.00		0.00
13.50	21.40		21.40	26.50	0.00		0.00
13.75	18.47		18.47	26.75	0.00		0.00
14.00	16.53		16.53	27.00	0.00		0.00
14.25	14.89		14.89	27.25	0.00		0.00
14.50	13.67		13.67	27.50	0.00		0.00
14.75	12.76		12.76	27.75	0.00		0.00
15.00	11.95		11.95	28.00	0.00		0.00
15.25	11.15		11.15	28.25	0.00		0.00
15.50	10.35		10.35	28.50	0.00		0.00
15.75	9.56		9.56	28.75	0.00		0.00
16.00	8.75		8.75	29.00	0.00		0.00
16.25	7.98		7.98	29.25	0.00		0.00
16.50	7.40		7.40	29.50	0.00		0.00
16.75	6.98		6.98	29.75	0.00		0.00
17.00	6.61		6.61	30.00	0.00		0.00
17.25	6.25		6.25				
17.50	5.90		5.90				
17.75	5.54		5.54				

Existing Conditions_DP-2

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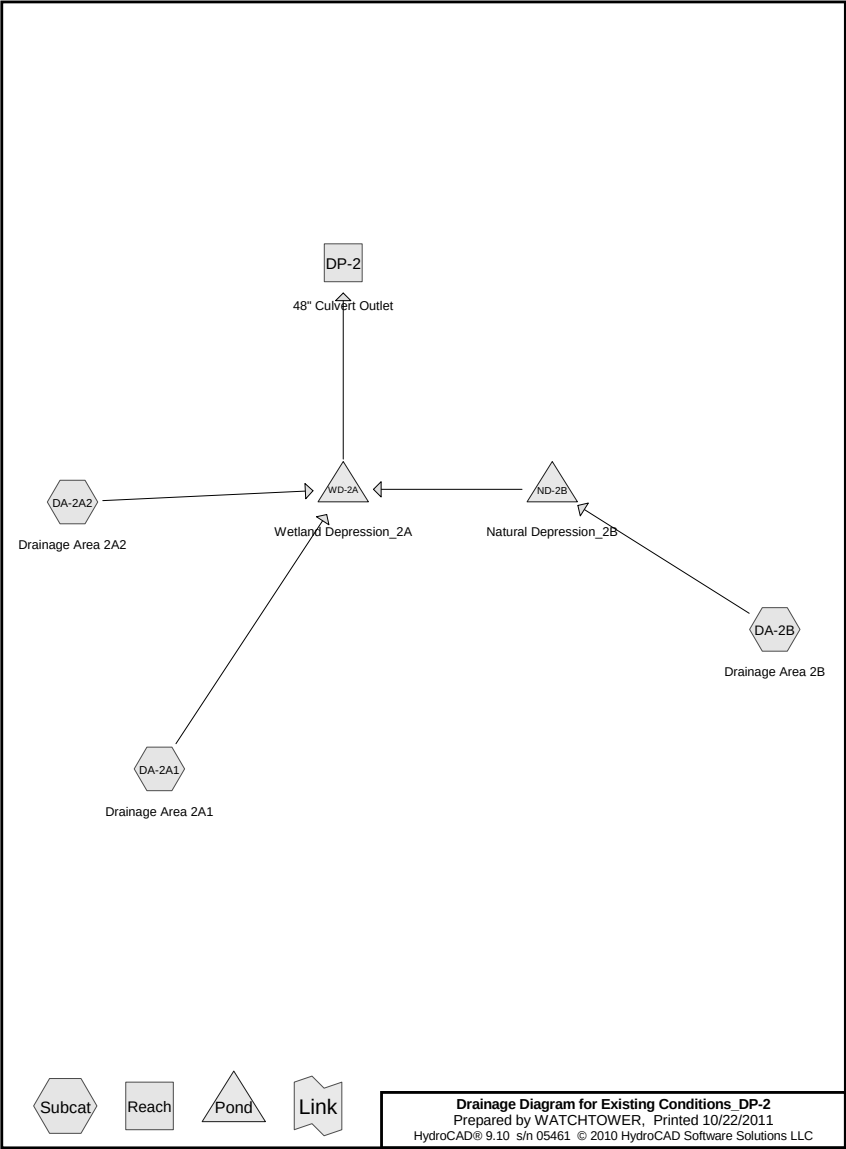
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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.350	65	Brush, Good, HSG C (DA-2A1)
34.460	70	Woods, Good, HSG C (DA-2A1, DA-2A2, DA-2B)
3.250	74	>75% Grass cover, Good, HSG C (DA-2A2, DA-2B)
2.160	98	Pavement & Roofs, HSG C (DA-2A1, DA-2A2)
0.200	98	Water Surface, HSG C (DA-2A2)
42.420	72	TOTAL AREA



Existing Conditions_DP-2

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Page 3

Notes Listing (all nodes)

Line#	Node Number	Notes
1	DP-2	Assume the DP-2 is at the tail end of the pipe, therefore the full length of the culvert (73') has not been specified. The culvert outlet elevation has replaced the inlet elevation so as to not overtop Wetland Depression_1. Outlet elevation has been replaced to mimic the existing slope on the culvert pipe.
2	WD-2A	Assume a broad-crested weir for the additional overflow over Long Meadow Road.

Existing Conditions_DP-2

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 4

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 3

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment DA-2A1: Drainage Area 2A1 Runoff Area=17.400 ac 1.21% Impervious Runoff Depth=0.71"
Flow Length=2,505' Tc=56.9 min CN=70 Runoff=5.11 cfs 1.036 af

Subcatchment DA-2A2: Drainage Area 2A2 Runoff Area=21.730 ac 9.89% Impervious Runoff Depth=0.86"
Flow Length=2,118' Tc=21.9 min CN=73 Runoff=12.97 cfs 1.553 af

Subcatchment DA-2B: Drainage Area 2B Runoff Area=3.290 ac 0.00% Impervious Runoff Depth=0.76"
Flow Length=300' Tc=24.8 min CN=71 Runoff=1.60 cfs 0.208 af

Reach DP-2: 48" Culvert Outlet Inflow=1.18 cfs 0.915 af
Outflow=1.18 cfs 0.915 af

Pond ND-2B: Natural Depression_2B Peak Elev=588.51' Storage=0.012 af Inflow=1.60 cfs 0.208 af
42.0" x 30.0" Box Culvert n=0.011 L=73.0' S=0.0144 '/ Outflow=1.59 cfs 0.205 af

Pond WD-2A: Wetland Depression_2A Peak Elev=588.51' Storage=93.604 cf Inflow=16.29 cfs 2.794 af
48.0" Round Culvert n=0.013 L=73.0' S=0.1142 '/ Outflow=1.18 cfs 0.915 af

Total Runoff Area = 42.420 ac Runoff Volume = 2.797 af Average Runoff Depth = 0.79"
94.44% Pervious = 40.060 ac 5.56% Impervious = 2.360 ac

Summary for Subcatchment DA-2A1: Drainage Area 2A1

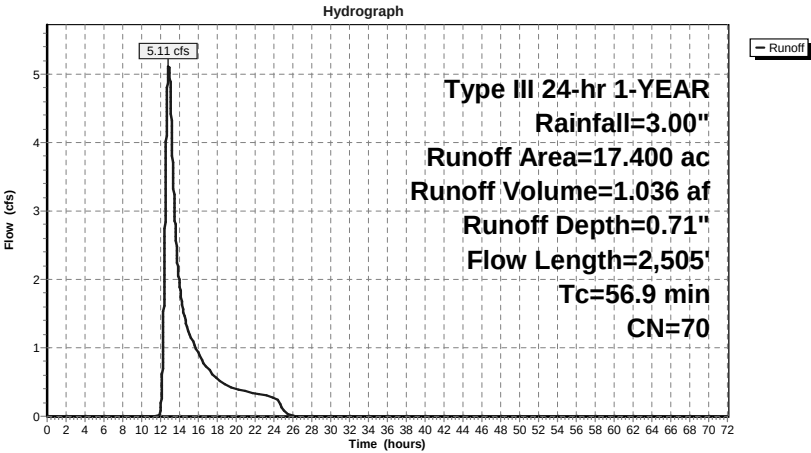
Runoff = 5.11 cfs @ 12.84 hrs, Volume= 1.036 af, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
2.350	65	Brush, Good, HSG C
* 0.210	98	Pavement & Roofs, HSG C
14.840	70	Woods, Good, HSG C
17.400	70	Weighted Average
17.190		98.79% Pervious Area
0.210		1.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
43.9	150	0.0270	0.06		Sheet Flow, Woods: Dense underbrush n= 0.800 P2= 3.50"
2.7	294	0.1360	1.84		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
6.4	685	0.1260	1.77		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	70	0.0097	11.26	141.47	Pipe Channel, 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.013
0.3	516	0.0980	25.07	3,710.15	Channel Flow, Area= 148.0 sf Perim= 72.0' r= 2.06' n= 0.030 Earth, grassed & winding
3.5	790	0.0350	3.81	236.24	Channel Flow, Area= 62.0 sf Perim= 54.0' r= 1.15' n= 0.080 Earth, long dense weeds
56.9	2,505	Total			

Subcatchment DA-2A1: Drainage Area 2A1



Existing Conditions_DP-2

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 7

Hydrograph for Subcatchment DA-2A1: Drainage Area 2A1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	3.00	0.71	0.00
1.00	0.03	0.00	0.00	53.00	3.00	0.71	0.00
2.00	0.06	0.00	0.00	54.00	3.00	0.71	0.00
3.00	0.09	0.00	0.00	55.00	3.00	0.71	0.00
4.00	0.13	0.00	0.00	56.00	3.00	0.71	0.00
5.00	0.17	0.00	0.00	57.00	3.00	0.71	0.00
6.00	0.22	0.00	0.00	58.00	3.00	0.71	0.00
7.00	0.27	0.00	0.00	59.00	3.00	0.71	0.00
8.00	0.34	0.00	0.00	60.00	3.00	0.71	0.00
9.00	0.44	0.00	0.00	61.00	3.00	0.71	0.00
10.00	0.57	0.00	0.00	62.00	3.00	0.71	0.00
11.00	0.75	0.00	0.00	63.00	3.00	0.71	0.00
12.00	1.50	0.08	0.12	64.00	3.00	0.71	0.00
13.00	2.25	0.34	4.90	65.00	3.00	0.71	0.00
14.00	2.43	0.42	1.93	66.00	3.00	0.71	0.00
15.00	2.56	0.49	1.23	67.00	3.00	0.71	0.00
16.00	2.66	0.53	0.93	68.00	3.00	0.71	0.00
17.00	2.73	0.57	0.69	69.00	3.00	0.71	0.00
18.00	2.78	0.60	0.56	70.00	3.00	0.71	0.00
19.00	2.83	0.62	0.45	71.00	3.00	0.71	0.00
20.00	2.87	0.64	0.40	72.00	3.00	0.71	0.00
21.00	2.91	0.66	0.37				
22.00	2.94	0.68	0.34				
23.00	2.97	0.70	0.31				
24.00	3.00	0.71	0.28				
25.00	3.00	0.71	0.08				
26.00	3.00	0.71	0.01				
27.00	3.00	0.71	0.00				
28.00	3.00	0.71	0.00				
29.00	3.00	0.71	0.00				
30.00	3.00	0.71	0.00				
31.00	3.00	0.71	0.00				
32.00	3.00	0.71	0.00				
33.00	3.00	0.71	0.00				
34.00	3.00	0.71	0.00				
35.00	3.00	0.71	0.00				
36.00	3.00	0.71	0.00				
37.00	3.00	0.71	0.00				
38.00	3.00	0.71	0.00				
39.00	3.00	0.71	0.00				
40.00	3.00	0.71	0.00				
41.00	3.00	0.71	0.00				
42.00	3.00	0.71	0.00				
43.00	3.00	0.71	0.00				
44.00	3.00	0.71	0.00				
45.00	3.00	0.71	0.00				
46.00	3.00	0.71	0.00				
47.00	3.00	0.71	0.00				
48.00	3.00	0.71	0.00				
49.00	3.00	0.71	0.00				
50.00	3.00	0.71	0.00				
51.00	3.00	0.71	0.00				

Existing Conditions_DP-2

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 8

Summary for Subcatchment DA-2A2: Drainage Area 2A2

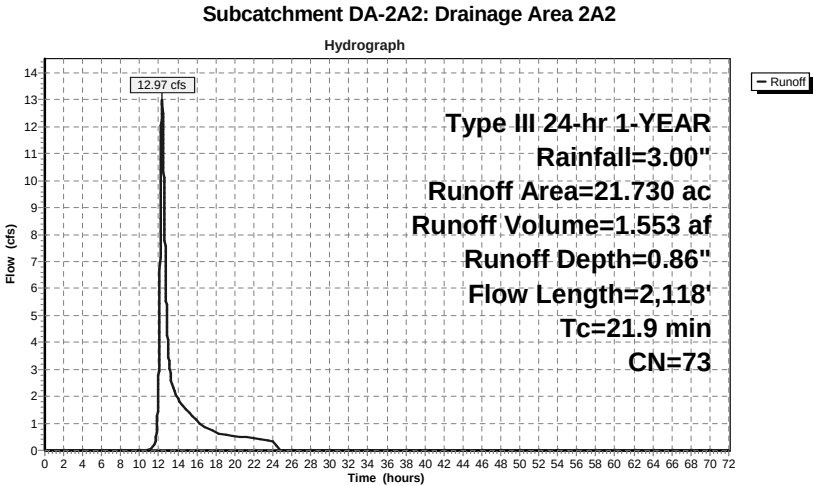
Runoff = 12.97 cfs @ 12.34 hrs, Volume= 1.553 af, Depth= 0.86"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
16.820	70	Woods, Good, HSG C
2.760	74	>75% Grass cover, Good, HSG C
* 1.950	98	Pavement & Roofs, HSG C
0.200	98	Water Surface, HSG C
21.730	73	Weighted Average
19.580		90.11% Pervious Area
2.150		9.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
2.5	230	0.0960	1.55		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.6	220	0.0180	5.69	48.34	Channel Flow, Area= 8.5 sf Perim= 17.1' r= 0.50' n= 0.022 Earth, clean & straight
4.4	673	0.0360	2.56	25.55	Channel Flow, Area= 10.0 sf Perim= 16.2' r= 0.62' n= 0.080 Earth, long dense weeds
0.1	105	0.0980	25.07	3,710.15	Channel Flow, Area= 148.0 sf Perim= 72.0' r= 2.06' n= 0.030 Earth, grassed & winding
3.5	790	0.0350	3.81	236.24	Channel Flow, Area= 62.0 sf Perim= 54.0' r= 1.15' n= 0.080 Earth, long dense weeds
21.9	2,118	Total			



Hydrograph for Subcatchment DA-2A2: Drainage Area 2A2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	3.00	0.86	0.00
1.00	0.03	0.00	0.00	53.00	3.00	0.86	0.00
2.00	0.06	0.00	0.00	54.00	3.00	0.86	0.00
3.00	0.09	0.00	0.00	55.00	3.00	0.86	0.00
4.00	0.13	0.00	0.00	56.00	3.00	0.86	0.00
5.00	0.17	0.00	0.00	57.00	3.00	0.86	0.00
6.00	0.22	0.00	0.00	58.00	3.00	0.86	0.00
7.00	0.27	0.00	0.00	59.00	3.00	0.86	0.00
8.00	0.34	0.00	0.00	60.00	3.00	0.86	0.00
9.00	0.44	0.00	0.00	61.00	3.00	0.86	0.00
10.00	0.57	0.00	0.00	62.00	3.00	0.86	0.00
11.00	0.75	0.00	0.00	63.00	3.00	0.86	0.00
12.00	1.50	0.13	2.78	64.00	3.00	0.86	0.00
13.00	2.25	0.44	3.70	65.00	3.00	0.86	0.00
14.00	2.43	0.53	1.95	66.00	3.00	0.86	0.00
15.00	2.56	0.60	1.48	67.00	3.00	0.86	0.00
16.00	2.66	0.66	1.10	68.00	3.00	0.86	0.00
17.00	2.73	0.70	0.86	69.00	3.00	0.86	0.00
18.00	2.78	0.73	0.68	70.00	3.00	0.86	0.00
19.00	2.83	0.75	0.58	71.00	3.00	0.86	0.00
20.00	2.87	0.78	0.53	72.00	3.00	0.86	0.00
21.00	2.91	0.80	0.48				
22.00	2.94	0.82	0.44				
23.00	2.97	0.84	0.40				
24.00	3.00	0.86	0.36				
25.00	3.00	0.86	0.00				
26.00	3.00	0.86	0.00				
27.00	3.00	0.86	0.00				
28.00	3.00	0.86	0.00				
29.00	3.00	0.86	0.00				
30.00	3.00	0.86	0.00				
31.00	3.00	0.86	0.00				
32.00	3.00	0.86	0.00				
33.00	3.00	0.86	0.00				
34.00	3.00	0.86	0.00				
35.00	3.00	0.86	0.00				
36.00	3.00	0.86	0.00				
37.00	3.00	0.86	0.00				
38.00	3.00	0.86	0.00				
39.00	3.00	0.86	0.00				
40.00	3.00	0.86	0.00				
41.00	3.00	0.86	0.00				
42.00	3.00	0.86	0.00				
43.00	3.00	0.86	0.00				
44.00	3.00	0.86	0.00				
45.00	3.00	0.86	0.00				
46.00	3.00	0.86	0.00				
47.00	3.00	0.86	0.00				
48.00	3.00	0.86	0.00				
49.00	3.00	0.86	0.00				
50.00	3.00	0.86	0.00				
51.00	3.00	0.86	0.00				

Existing Conditions_DP-2

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 11

Summary for Subcatchment DA-2B: Drainage Area 2B

Runoff = 1.60 cfs @ 12.40 hrs, Volume= 0.208 af, Depth= 0.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

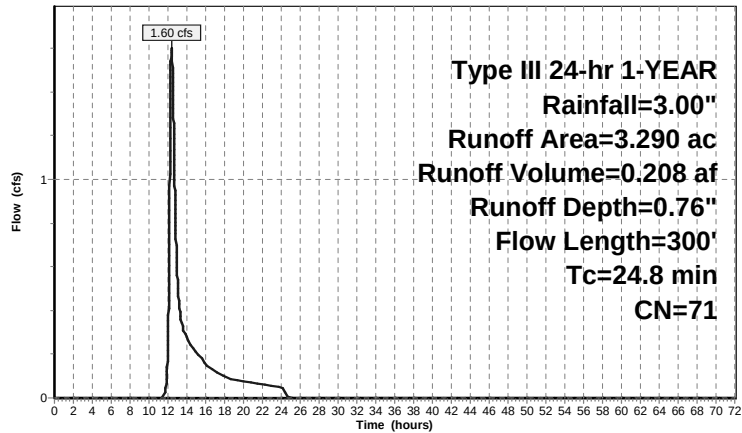
Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
0.490	74	>75% Grass cover, Good, HSG C
2.800	70	Woods, Good, HSG C
3.290	71	Weighted Average
3.290		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.6	100	0.0630	0.07		Sheet Flow, Woods: Dense underbrush n= 0.800 P2= 3.50"
2.2	200	0.0900	1.50		Shallow Concentrated Flow, CIRCLE Woodland Kv= 5.0 fps
24.8	300	Total			

Subcatchment DA-2B: Drainage Area 2B

Hydrograph

**Existing Conditions_DP-2**

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 12

Hydrograph for Subcatchment DA-2B: Drainage Area 2B

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	3.00	0.76	0.00
1.00	0.03	0.00	0.00	53.00	3.00	0.76	0.00
2.00	0.06	0.00	0.00	54.00	3.00	0.76	0.00
3.00	0.09	0.00	0.00	55.00	3.00	0.76	0.00
4.00	0.13	0.00	0.00	56.00	3.00	0.76	0.00
5.00	0.17	0.00	0.00	57.00	3.00	0.76	0.00
6.00	0.22	0.00	0.00	58.00	3.00	0.76	0.00
7.00	0.27	0.00	0.00	59.00	3.00	0.76	0.00
8.00	0.34	0.00	0.00	60.00	3.00	0.76	0.00
9.00	0.44	0.00	0.00	61.00	3.00	0.76	0.00
10.00	0.57	0.00	0.00	62.00	3.00	0.76	0.00
11.00	0.75	0.00	0.00	63.00	3.00	0.76	0.00
12.00	1.50	0.10	0.24	64.00	3.00	0.76	0.00
13.00	2.25	0.37	0.55	65.00	3.00	0.76	0.00
14.00	2.43	0.46	0.28	66.00	3.00	0.76	0.00
15.00	2.56	0.52	0.21	67.00	3.00	0.76	0.00
16.00	2.66	0.57	0.16	68.00	3.00	0.76	0.00
17.00	2.73	0.61	0.12	69.00	3.00	0.76	0.00
18.00	2.78	0.64	0.10	70.00	3.00	0.76	0.00
19.00	2.83	0.66	0.08	71.00	3.00	0.76	0.00
20.00	2.87	0.69	0.07	72.00	3.00	0.76	0.00
21.00	2.91	0.71	0.07				
22.00	2.94	0.73	0.06				
23.00	2.97	0.74	0.06				
24.00	3.00	0.76	0.05				
25.00	3.00	0.76	0.00				
26.00	3.00	0.76	0.00				
27.00	3.00	0.76	0.00				
28.00	3.00	0.76	0.00				
29.00	3.00	0.76	0.00				
30.00	3.00	0.76	0.00				
31.00	3.00	0.76	0.00				
32.00	3.00	0.76	0.00				
33.00	3.00	0.76	0.00				
34.00	3.00	0.76	0.00				
35.00	3.00	0.76	0.00				
36.00	3.00	0.76	0.00				
37.00	3.00	0.76	0.00				
38.00	3.00	0.76	0.00				
39.00	3.00	0.76	0.00				
40.00	3.00	0.76	0.00				
41.00	3.00	0.76	0.00				
42.00	3.00	0.76	0.00				
43.00	3.00	0.76	0.00				
44.00	3.00	0.76	0.00				
45.00	3.00	0.76	0.00				
46.00	3.00	0.76	0.00				
47.00	3.00	0.76	0.00				
48.00	3.00	0.76	0.00				
49.00	3.00	0.76	0.00				
50.00	3.00	0.76	0.00				
51.00	3.00	0.76	0.00				

Summary for Reach DP-2: 48" Culvert Outlet

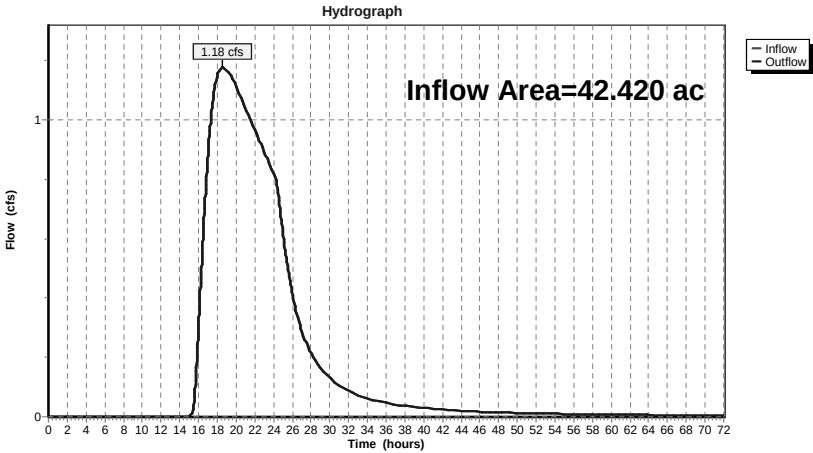
Assume the DP-2 is at the tail end of the pipe, therefore the full length of the culvert (73') has not been specified. The culvert outlet elevation has replaced the inlet elevation so as to not overtop Wetland Depression_1. Outlet elevation has been replaced to mimick the existing slope on the culvert pipe.

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

Inflow Area = 42.420 ac, 5.56% Impervious, Inflow Depth > 0.26" for 1-YEAR event
Inflow = 1.18 cfs @ 18.55 hrs, Volume= 0.915 af
Outflow = 1.18 cfs @ 18.55 hrs, Volume= 0.915 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Reach DP-2: 48" Culvert Outlet



Hydrograph for Reach DP-2: 48" Culvert Outlet

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	52.00	0.01		0.01
1.00	0.00		0.00	53.00	0.01		0.01
2.00	0.00		0.00	54.00	0.01		0.01
3.00	0.00		0.00	55.00	0.01		0.01
4.00	0.00		0.00	56.00	0.01		0.01
5.00	0.00		0.00	57.00	0.01		0.01
6.00	0.00		0.00	58.00	0.01		0.01
7.00	0.00		0.00	59.00	0.01		0.01
8.00	0.00		0.00	60.00	0.01		0.01
9.00	0.00		0.00	61.00	0.01		0.01
10.00	0.00		0.00	62.00	0.01		0.01
11.00	0.00		0.00	63.00	0.01		0.01
12.00	0.00		0.00	64.00	0.01		0.01
13.00	0.00		0.00	65.00	0.01		0.01
14.00	0.00		0.00	66.00	0.01		0.01
15.00	0.00		0.00	67.00	0.00		0.00
16.00	0.31		0.31	68.00	0.00		0.00
17.00	0.88		0.88	69.00	0.00		0.00
18.00	1.15		1.15	70.00	0.00		0.00
19.00	1.17		1.17	71.00	0.00		0.00
20.00	1.11		1.11	72.00	0.00		0.00
21.00	1.04		1.04				
22.00	0.97		0.97				
23.00	0.89		0.89				
24.00	0.82		0.82				
25.00	0.62		0.62				
26.00	0.41		0.41				
27.00	0.29		0.29				
28.00	0.21		0.21				
29.00	0.16		0.16				
30.00	0.13		0.13				
31.00	0.11		0.11				
32.00	0.09		0.09				
33.00	0.07		0.07				
34.00	0.06		0.06				
35.00	0.05		0.05				
36.00	0.05		0.05				
37.00	0.04		0.04				
38.00	0.04		0.04				
39.00	0.03		0.03				
40.00	0.03		0.03				
41.00	0.03		0.03				
42.00	0.02		0.02				
43.00	0.02		0.02				
44.00	0.02		0.02				
45.00	0.02		0.02				
46.00	0.02		0.02				
47.00	0.02		0.02				
48.00	0.01		0.01				
49.00	0.01		0.01				
50.00	0.01		0.01				
51.00	0.01		0.01				

Summary for Pond ND-2B: Natural Depression_2B

Inflow Area = 3.290 ac, 0.00% Impervious, Inflow Depth = 0.76" for 1-YEAR event
Inflow = 1.60 cfs @ 12.40 hrs, Volume= 0.208 af
Outflow = 1.59 cfs @ 12.41 hrs, Volume= 0.205 af, Atten= 0%, Lag= 1.1 min
Primary = 1.59 cfs @ 12.41 hrs, Volume= 0.205 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 588.51' @ 18.55 hrs Surf.Area= 0.033 ac Storage= 0.012 af

Plug-Flow detention time= 37.4 min calculated for 0.205 af (99% of inflow)
Center-of-Mass det. time= 29.8 min (924.2 - 894.4)

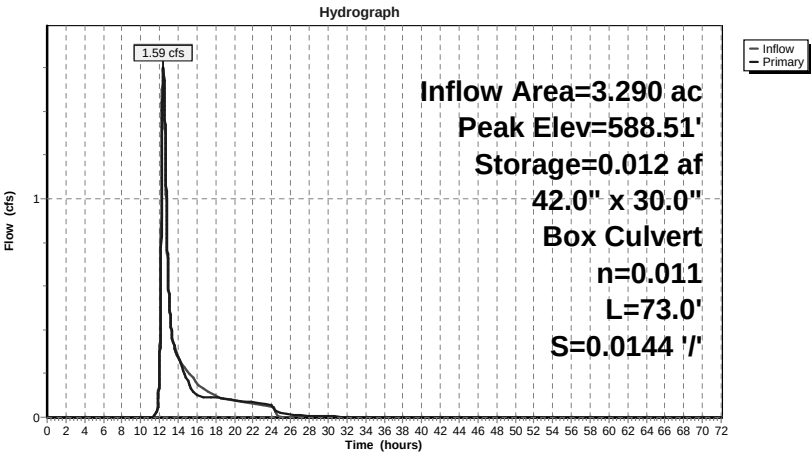
Volume	Invert	Avail.Storage	Storage Description
#1	587.80'	0.578 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
587.80	0.000	0.000	0.000
592.80	0.231	0.578	0.578

Device	Routing	Invert	Outlet Devices
#1	Primary	587.83'	42.0" W x 30.0" H Box 30x42 CMP L= 73.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 587.83' / 586.78" S= 0.0144 '/ S= 0.0144 '/ n= 0.011 Concrete pipe, straight & clean

Primary OutFlow Max=1.59 cfs @ 12.41 hrs HW=588.10' TW=586.30' (Dynamic Tailwater)
1=30x42 CMP (Inlet Controls 1.59 cfs @ 1.67 fps)

Pond ND-2B: Natural Depression_2B



Existing Conditions_DP-2

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Page 17

Hydrograph for Pond ND-2B: Natural Depression_2B

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	587.80	0.00
2.00	0.00	0.000	587.80	0.00
4.00	0.00	0.000	587.80	0.00
6.00	0.00	0.000	587.80	0.00
8.00	0.00	0.000	587.80	0.00
10.00	0.00	0.000	587.80	0.00
12.00	0.24	0.000	587.90	0.22
14.00	0.28	0.000	587.92	0.27
16.00	0.16	0.006	588.33	0.10
18.00	0.10	0.011	588.50	0.09
20.00	0.07	0.011	588.50	0.08
22.00	0.06	0.010	588.47	0.07
24.00	0.05	0.010	588.44	0.06
26.00	0.00	0.007	588.36	0.01
28.00	0.00	0.006	588.29	0.01
30.00	0.00	0.005	588.26	0.00
32.00	0.00	0.004	588.24	0.00
34.00	0.00	0.004	588.22	0.00
36.00	0.00	0.004	588.21	0.00
38.00	0.00	0.004	588.20	0.00
40.00	0.00	0.004	588.20	0.00
42.00	0.00	0.004	588.19	0.00
44.00	0.00	0.003	588.19	0.00
46.00	0.00	0.003	588.18	0.00
48.00	0.00	0.003	588.18	0.00
50.00	0.00	0.003	588.18	0.00
52.00	0.00	0.003	588.17	0.00
54.00	0.00	0.003	588.17	0.00
56.00	0.00	0.003	588.17	0.00
58.00	0.00	0.003	588.17	0.00
60.00	0.00	0.003	588.17	0.00
62.00	0.00	0.003	588.17	0.00
64.00	0.00	0.003	588.17	0.00
66.00	0.00	0.003	588.16	0.00
68.00	0.00	0.003	588.16	0.00
70.00	0.00	0.003	588.16	0.00
72.00	0.00	0.003	588.16	0.00

Existing Conditions_DP-2

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 18

Summary for Pond WD-2A: Wetland Depression_2A

Assume a broad-crested weir for the additional overflow over Long Meadow Road.

Inflow Area = 42.420 ac, 5.56% Impervious, Inflow Depth = 0.79" for 1-YEAR event
 Inflow = 16.29 cfs @ 12.38 hrs, Volume= 2.794 af
 Outflow = 1.18 cfs @ 18.55 hrs, Volume= 0.915 af, Atten= 93%, Lag= 369.9 min
 Primary = 1.18 cfs @ 18.55 hrs, Volume= 0.915 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 588.51' @ 18.55 hrs Surf.Area= 46,393 sf Storage= 93,604 cf

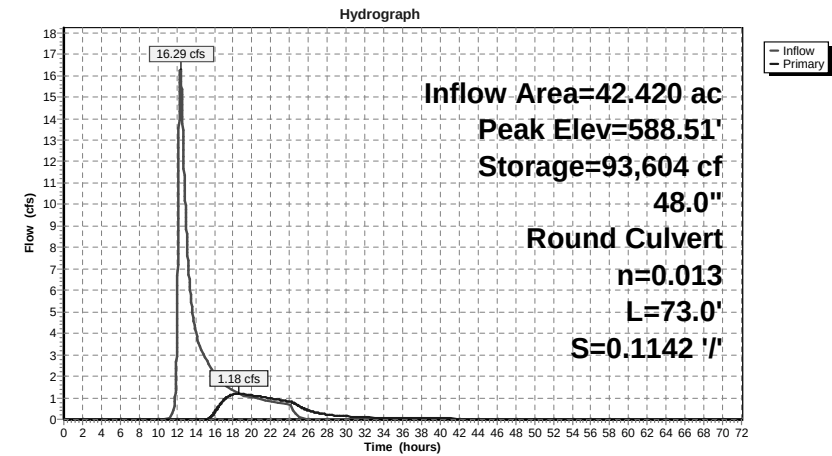
Plug-Flow detention time= 629.2 min calculated for 0.915 af (33% of inflow)
 Center-of-Mass det. time= 471.7 min (1,375.2 - 903.5)

Volume	Invert	Avail.Storage	Storage Description
#1	585.00'	324,441 cf	Custom Stage Data (Prismatic) Listed below
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
585.00	0	0	0
586.00	15,950	7,975	7,975
589.00	52,400	102,525	110,500
592.00	82,504	202,356	312,856
592.14	83,000	11,585	324,441

Device	Routing	Invert	Outlet Devices
#1	Primary	588.14'	48.0" Round Culvert L= 73.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 588.14' / 579.80' S= 0.1142 '/' Cc= 0.900 n= 0.013

Primary OutFlow Max=1.18 cfs @ 18.55 hrs HW=588.51' TW=0.00' (Dynamic Tailwater)
 ←**1=Culvert** (Inlet Controls 1.18 cfs @ 2.06 fps)

Pond WD-2A: Wetland Depression_2A



Hydrograph for Pond WD-2A: Wetland Depression_2A

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	585.00	0.00
2.00	0.00	0	585.00	0.00
4.00	0.00	0	585.00	0.00
6.00	0.00	0	585.00	0.00
8.00	0.00	0	585.00	0.00
10.00	0.00	0	585.00	0.00
12.00	3.12	1,851	585.23	0.00
14.00	4.15	66,488	587.71	0.00
16.00	2.14	87,429	588.32	0.31
18.00	1.32	93,463	588.50	1.15
20.00	1.01	93,248	588.50	1.11
22.00	0.85	92,407	588.47	0.97
24.00	0.69	91,506	588.44	0.82
26.00	0.02	88,458	588.36	0.41
28.00	0.01	86,386	588.29	0.21
30.00	0.00	85,218	588.26	0.13
32.00	0.00	84,471	588.24	0.09
34.00	0.00	83,953	588.22	0.06
36.00	0.00	83,572	588.21	0.05
38.00	0.00	83,281	588.20	0.04
40.00	0.00	83,051	588.20	0.03
42.00	0.00	82,865	588.19	0.02
44.00	0.00	82,712	588.19	0.02
46.00	0.00	82,583	588.18	0.02
48.00	0.00	82,474	588.18	0.01
50.00	0.00	82,379	588.18	0.01
52.00	0.00	82,297	588.17	0.01
54.00	0.00	82,224	588.17	0.01
56.00	0.00	82,160	588.17	0.01
58.00	0.00	82,103	588.17	0.01
60.00	0.00	82,052	588.17	0.01
62.00	0.00	82,006	588.17	0.01
64.00	0.00	81,964	588.17	0.01
66.00	0.00	81,926	588.16	0.01
68.00	0.00	81,891	588.16	0.00
70.00	0.00	81,859	588.16	0.00
72.00	0.00	81,829	588.16	0.00

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 3
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment DA-2A1: Drainage Area 2A1 Runoff Area=17.400 ac 1.21% Impervious Runoff Depth=2.04"
Flow Length=2,505' Tc=56.9 min CN=70 Runoff=16.45 cfs 2.953 af

Subcatchment DA-2A2: Drainage Area 2A2 Runoff Area=21.730 ac 9.89% Impervious Runoff Depth=2.28"
Flow Length=2,118' Tc=21.9 min CN=73 Runoff=37.29 cfs 4.130 af

Subcatchment DA-2B: Drainage Area 2B Runoff Area=3.290 ac 0.00% Impervious Runoff Depth=2.12"
Flow Length=300' Tc=24.8 min CN=71 Runoff=4.94 cfs 0.580 af

Reach DP-2: 48" Culvert Outlet Inflow=14.98 cfs 5.781 af
Outflow=14.98 cfs 5.781 af

Pond ND-2B: Natural Depression 2B Peak Elev=589.50' Storage=0.067 af Inflow=4.94 cfs 0.580 af
42.0" x 30.0" Box Culvert n=0.011 L=73.0' S=0.0144 ' / ' Outflow=4.90 cfs 0.577 af

Pond WD-2A: Wetland Depression 2A Peak Elev=589.50' Storage=144,281 cf Inflow=49.45 cfs 7.659 af
48.0" Round Culvert n=0.013 L=73.0' S=0.1142 ' / ' Outflow=14.98 cfs 5.781 af

Total Runoff Area = 42.420 ac Runoff Volume = 7.662 af Average Runoff Depth = 2.17"
94.44% Pervious = 40.060 ac 5.56% Impervious = 2.360 ac

Summary for Subcatchment DA-2A1: Drainage Area 2A1

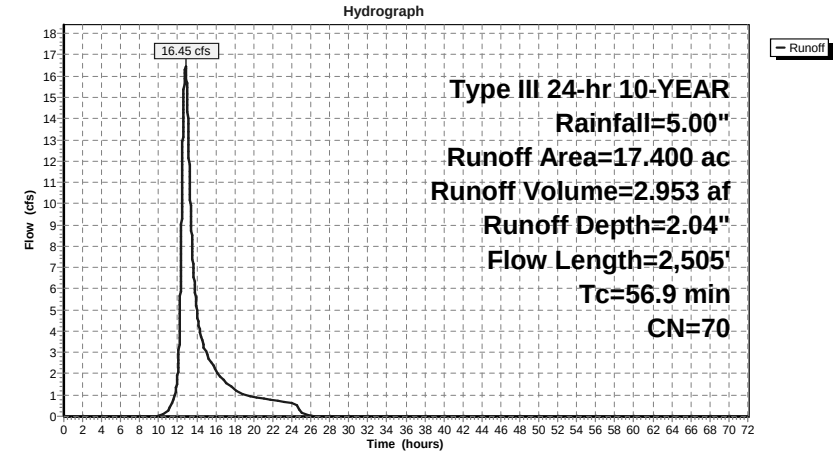
Runoff = 16.45 cfs @ 12.83 hrs, Volume= 2.953 af, Depth= 2.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
2.350	65	Brush, Good, HSG C
* 0.210	98	Pavement & Roofs, HSG C
14.840	70	Woods, Good, HSG C
17.400	70	Weighted Average
17.190		98.79% Pervious Area
0.210		1.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
43.9	150	0.0270	0.06		Sheet Flow, Woods: Dense underbrush n= 0.800 P2= 3.50"
2.7	294	0.1360	1.84		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
6.4	685	0.1260	1.77		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	70	0.0097	11.26	141.47	Pipe Channel, 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.013
0.3	516	0.0980	25.07	3,710.15	Channel Flow, Area= 148.0 sf Perim= 72.0' r= 2.06' n= 0.030 Earth, grassed & winding
3.5	790	0.0350	3.81	236.24	Channel Flow, Area= 62.0 sf Perim= 54.0' r= 1.15' n= 0.080 Earth, long dense weeds
56.9	2,505	Total			

Subcatchment DA-2A1: Drainage Area 2A1



Hydrograph for Subcatchment DA-2A1: Drainage Area 2A1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	5.00	2.04	0.00
1.00	0.05	0.00	0.00	53.00	5.00	2.04	0.00
2.00	0.10	0.00	0.00	54.00	5.00	2.04	0.00
3.00	0.15	0.00	0.00	55.00	5.00	2.04	0.00
4.00	0.22	0.00	0.00	56.00	5.00	2.04	0.00
5.00	0.28	0.00	0.00	57.00	5.00	2.04	0.00
6.00	0.36	0.00	0.00	58.00	5.00	2.04	0.00
7.00	0.45	0.00	0.00	59.00	5.00	2.04	0.00
8.00	0.57	0.00	0.00	60.00	5.00	2.04	0.00
9.00	0.73	0.00	0.00	61.00	5.00	2.04	0.00
10.00	0.95	0.00	0.00	62.00	5.00	2.04	0.00
11.00	1.25	0.03	0.30	63.00	5.00	2.04	0.00
12.00	2.50	0.46	2.03	64.00	5.00	2.04	0.00
13.00	3.75	1.17	14.97	65.00	5.00	2.04	0.00
14.00	4.06	1.37	5.00	66.00	5.00	2.04	0.00
15.00	4.27	1.51	2.97	67.00	5.00	2.04	0.00
16.00	4.43	1.62	2.19	68.00	5.00	2.04	0.00
17.00	4.55	1.71	1.61	69.00	5.00	2.04	0.00
18.00	4.64	1.77	1.28	70.00	5.00	2.04	0.00
19.00	4.72	1.83	1.02	71.00	5.00	2.04	0.00
20.00	4.79	1.88	0.91	72.00	5.00	2.04	0.00
21.00	4.85	1.92	0.82				
22.00	4.90	1.97	0.75				
23.00	4.95	2.00	0.68				
24.00	5.00	2.04	0.61				
25.00	5.00	2.04	0.18				
26.00	5.00	2.04	0.01				
27.00	5.00	2.04	0.00				
28.00	5.00	2.04	0.00				
29.00	5.00	2.04	0.00				
30.00	5.00	2.04	0.00				
31.00	5.00	2.04	0.00				
32.00	5.00	2.04	0.00				
33.00	5.00	2.04	0.00				
34.00	5.00	2.04	0.00				
35.00	5.00	2.04	0.00				
36.00	5.00	2.04	0.00				
37.00	5.00	2.04	0.00				
38.00	5.00	2.04	0.00				
39.00	5.00	2.04	0.00				
40.00	5.00	2.04	0.00				
41.00	5.00	2.04	0.00				
42.00	5.00	2.04	0.00				
43.00	5.00	2.04	0.00				
44.00	5.00	2.04	0.00				
45.00	5.00	2.04	0.00				
46.00	5.00	2.04	0.00				
47.00	5.00	2.04	0.00				
48.00	5.00	2.04	0.00				
49.00	5.00	2.04	0.00				
50.00	5.00	2.04	0.00				
51.00	5.00	2.04	0.00				

Summary for Subcatchment DA-2A2: Drainage Area 2A2

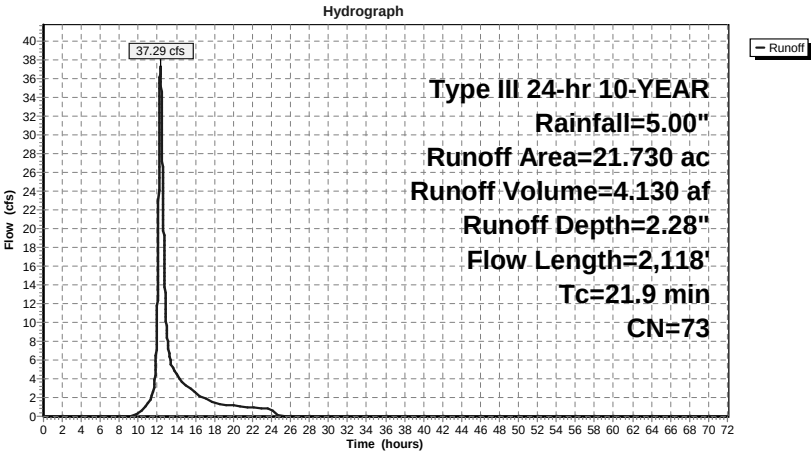
Runoff = 37.29 cfs @ 12.31 hrs, Volume= 4.130 af, Depth= 2.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
16.820	70	Woods, Good, HSG C
2.760	74	>75% Grass cover, Good, HSG C
* 1.950	98	Pavement & Roofs, HSG C
0.200	98	Water Surface, HSG C
21.730	73	Weighted Average
19.580		90.11% Pervious Area
2.150		9.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
2.5	230	0.0960	1.55		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.6	220	0.0180	5.69	48.34	Channel Flow, Area= 8.5 sf Perim= 17.1' r= 0.50' n= 0.022 Earth, clean & straight
4.4	673	0.0360	2.56	25.55	Channel Flow, Area= 10.0 sf Perim= 16.2' r= 0.62' n= 0.080 Earth, long dense weeds
0.1	105	0.0980	25.07	3,710.15	Channel Flow, Area= 148.0 sf Perim= 72.0' r= 2.06' n= 0.030 Earth, grassed & winding
3.5	790	0.0350	3.81	236.24	Channel Flow, Area= 62.0 sf Perim= 54.0' r= 1.15' n= 0.080 Earth, long dense weeds
21.9	2,118	Total			

Subcatchment DA-2A2: Drainage Area 2A2



Existing Conditions_DP-2

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 27

Hydrograph for Subcatchment DA-2A2: Drainage Area 2A2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	5.00	2.28	0.00
1.00	0.05	0.00	0.00	53.00	5.00	2.28	0.00
2.00	0.10	0.00	0.00	54.00	5.00	2.28	0.00
3.00	0.15	0.00	0.00	55.00	5.00	2.28	0.00
4.00	0.22	0.00	0.00	56.00	5.00	2.28	0.00
5.00	0.28	0.00	0.00	57.00	5.00	2.28	0.00
6.00	0.36	0.00	0.00	58.00	5.00	2.28	0.00
7.00	0.45	0.00	0.00	59.00	5.00	2.28	0.00
8.00	0.57	0.00	0.00	60.00	5.00	2.28	0.00
9.00	0.73	0.00	0.00	61.00	5.00	2.28	0.00
10.00	0.95	0.01	0.32	62.00	5.00	2.28	0.00
11.00	1.25	0.06	1.31	63.00	5.00	2.28	0.00
12.00	2.50	0.57	11.80	64.00	5.00	2.28	0.00
13.00	3.75	1.35	8.91	65.00	5.00	2.28	0.00
14.00	4.06	1.57	4.47	66.00	5.00	2.28	0.00
15.00	4.27	1.72	3.32	67.00	5.00	2.28	0.00
16.00	4.43	1.84	2.44	68.00	5.00	2.28	0.00
17.00	4.55	1.93	1.88	69.00	5.00	2.28	0.00
18.00	4.64	2.00	1.47	70.00	5.00	2.28	0.00
19.00	4.72	2.06	1.26	71.00	5.00	2.28	0.00
20.00	4.79	2.11	1.14	72.00	5.00	2.28	0.00
21.00	4.85	2.16	1.04				
22.00	4.90	2.21	0.95				
23.00	4.95	2.24	0.86				
24.00	5.00	2.28	0.76				
25.00	5.00	2.28	0.00				
26.00	5.00	2.28	0.00				
27.00	5.00	2.28	0.00				
28.00	5.00	2.28	0.00				
29.00	5.00	2.28	0.00				
30.00	5.00	2.28	0.00				
31.00	5.00	2.28	0.00				
32.00	5.00	2.28	0.00				
33.00	5.00	2.28	0.00				
34.00	5.00	2.28	0.00				
35.00	5.00	2.28	0.00				
36.00	5.00	2.28	0.00				
37.00	5.00	2.28	0.00				
38.00	5.00	2.28	0.00				
39.00	5.00	2.28	0.00				
40.00	5.00	2.28	0.00				
41.00	5.00	2.28	0.00				
42.00	5.00	2.28	0.00				
43.00	5.00	2.28	0.00				
44.00	5.00	2.28	0.00				
45.00	5.00	2.28	0.00				
46.00	5.00	2.28	0.00				
47.00	5.00	2.28	0.00				
48.00	5.00	2.28	0.00				
49.00	5.00	2.28	0.00				
50.00	5.00	2.28	0.00				
51.00	5.00	2.28	0.00				

Existing Conditions_DP-2

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 28

Summary for Subcatchment DA-2B: Drainage Area 2B

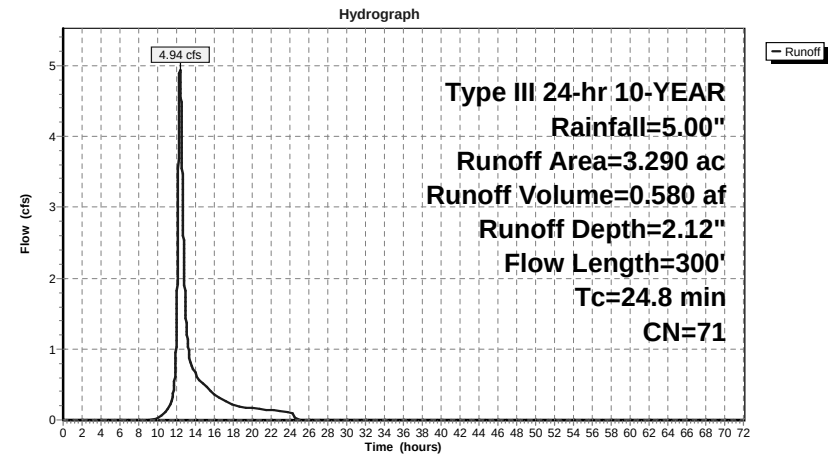
Runoff = 4.94 cfs @ 12.37 hrs, Volume= 0.580 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
0.490	74	>75% Grass cover, Good, HSG C
2.800	70	Woods, Good, HSG C
3.290	71	Weighted Average
3.290		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.6	100	0.0630	0.07		Sheet Flow, Woods: Dense underbrush n= 0.800 P2= 3.50"
2.2	200	0.0900	1.50		Shallow Concentrated Flow, CIRCLE Woodland Kv= 5.0 fps
24.8	300	Total			

Subcatchment DA-2B: Drainage Area 2B

Existing Conditions_DP-2

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 29

Hydrograph for Subcatchment DA-2B: Drainage Area 2B

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	5.00	2.12	0.00
1.00	0.05	0.00	0.00	53.00	5.00	2.12	0.00
2.00	0.10	0.00	0.00	54.00	5.00	2.12	0.00
3.00	0.15	0.00	0.00	55.00	5.00	2.12	0.00
4.00	0.22	0.00	0.00	56.00	5.00	2.12	0.00
5.00	0.28	0.00	0.00	57.00	5.00	2.12	0.00
6.00	0.36	0.00	0.00	58.00	5.00	2.12	0.00
7.00	0.45	0.00	0.00	59.00	5.00	2.12	0.00
8.00	0.57	0.00	0.00	60.00	5.00	2.12	0.00
9.00	0.73	0.00	0.00	61.00	5.00	2.12	0.00
10.00	0.95	0.00	0.02	62.00	5.00	2.12	0.00
11.00	1.25	0.04	0.14	63.00	5.00	2.12	0.00
12.00	2.50	0.49	1.37	64.00	5.00	2.12	0.00
13.00	3.75	1.23	1.42	65.00	5.00	2.12	0.00
14.00	4.06	1.43	0.66	66.00	5.00	2.12	0.00
15.00	4.27	1.58	0.49	67.00	5.00	2.12	0.00
16.00	4.43	1.70	0.36	68.00	5.00	2.12	0.00
17.00	4.55	1.78	0.28	69.00	5.00	2.12	0.00
18.00	4.64	1.85	0.22	70.00	5.00	2.12	0.00
19.00	4.72	1.90	0.18	71.00	5.00	2.12	0.00
20.00	4.79	1.96	0.17	72.00	5.00	2.12	0.00
21.00	4.85	2.00	0.15				
22.00	4.90	2.04	0.14				
23.00	4.95	2.08	0.13				
24.00	5.00	2.12	0.11				
25.00	5.00	2.12	0.00				
26.00	5.00	2.12	0.00				
27.00	5.00	2.12	0.00				
28.00	5.00	2.12	0.00				
29.00	5.00	2.12	0.00				
30.00	5.00	2.12	0.00				
31.00	5.00	2.12	0.00				
32.00	5.00	2.12	0.00				
33.00	5.00	2.12	0.00				
34.00	5.00	2.12	0.00				
35.00	5.00	2.12	0.00				
36.00	5.00	2.12	0.00				
37.00	5.00	2.12	0.00				
38.00	5.00	2.12	0.00				
39.00	5.00	2.12	0.00				
40.00	5.00	2.12	0.00				
41.00	5.00	2.12	0.00				
42.00	5.00	2.12	0.00				
43.00	5.00	2.12	0.00				
44.00	5.00	2.12	0.00				
45.00	5.00	2.12	0.00				
46.00	5.00	2.12	0.00				
47.00	5.00	2.12	0.00				
48.00	5.00	2.12	0.00				
49.00	5.00	2.12	0.00				
50.00	5.00	2.12	0.00				
51.00	5.00	2.12	0.00				

Existing Conditions_DP-2

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 30

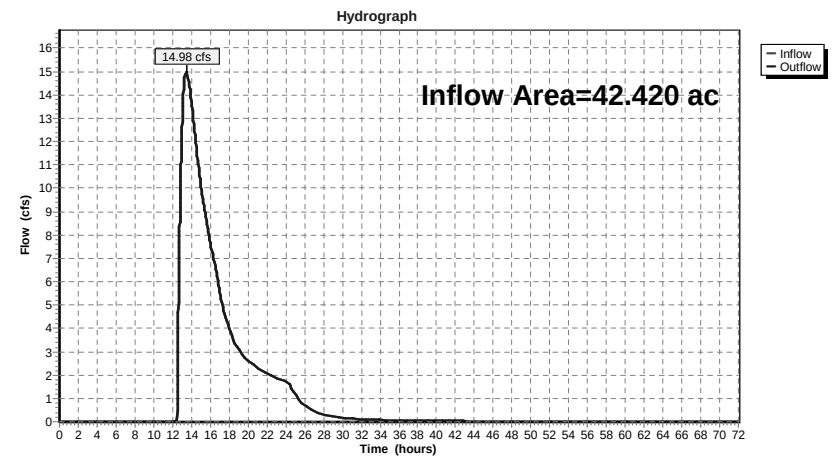
Summary for Reach DP-2: 48" Culvert Outlet

Assume the DP-2 is at the tail end of the pipe, therefore the full length of the culvert (73') has not been specified. The culvert outlet elevation has replaced the inlet elevation so as to not overtop Wetland Depression_1. Outlet elevation has been replaced to mimick the existing slope on the culvert pipe.

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

Inflow Area = 42.420 ac, 5.56% Impervious, Inflow Depth > 1.64" for 10-YEAR event
 Inflow = 14.98 cfs @ 13.46 hrs, Volume= 5.781 af
 Outflow = 14.98 cfs @ 13.46 hrs, Volume= 5.781 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Reach DP-2: 48" Culvert Outlet

Existing Conditions_DP-2

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 31

Hydrograph for Reach DP-2: 48" Culvert Outlet

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	52.00	0.01		0.01
1.00	0.00		0.00	53.00	0.01		0.01
2.00	0.00		0.00	54.00	0.01		0.01
3.00	0.00		0.00	55.00	0.01		0.01
4.00	0.00		0.00	56.00	0.01		0.01
5.00	0.00		0.00	57.00	0.01		0.01
6.00	0.00		0.00	58.00	0.01		0.01
7.00	0.00		0.00	59.00	0.01		0.01
8.00	0.00		0.00	60.00	0.01		0.01
9.00	0.00		0.00	61.00	0.01		0.01
10.00	0.00		0.00	62.00	0.01		0.01
11.00	0.00		0.00	63.00	0.01		0.01
12.00	0.00		0.00	64.00	0.01		0.01
13.00	12.57		12.57	65.00	0.01		0.01
14.00	13.70		13.70	66.00	0.01		0.01
15.00	10.16		10.16	67.00	0.01		0.01
16.00	7.66		7.66	68.00	0.00		0.00
17.00	5.56		5.56	69.00	0.00		0.00
18.00	3.97		3.97	70.00	0.00		0.00
19.00	3.09		3.09	71.00	0.00		0.00
20.00	2.61		2.61	72.00	0.00		0.00
21.00	2.31		2.31				
22.00	2.08		2.08				
23.00	1.89		1.89				
24.00	1.72		1.72				
25.00	1.19		1.19				
26.00	0.70		0.70				
27.00	0.45		0.45				
28.00	0.31		0.31				
29.00	0.23		0.23				
30.00	0.17		0.17				
31.00	0.14		0.14				
32.00	0.11		0.11				
33.00	0.09		0.09				
34.00	0.08		0.08				
35.00	0.06		0.06				
36.00	0.06		0.06				
37.00	0.05		0.05				
38.00	0.04		0.04				
39.00	0.04		0.04				
40.00	0.03		0.03				
41.00	0.03		0.03				
42.00	0.03		0.03				
43.00	0.02		0.02				
44.00	0.02		0.02				
45.00	0.02		0.02				
46.00	0.02		0.02				
47.00	0.02		0.02				
48.00	0.02		0.02				
49.00	0.01		0.01				
50.00	0.01		0.01				
51.00	0.01		0.01				

Existing Conditions_DP-2

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 32

Summary for Pond ND-2B: Natural Depression_2B

[87] Warning: Oscillations may require Finer Routing or smaller dt

Inflow Area = 3.290 ac, 0.00% Impervious, Inflow Depth = 2.12" for 10-YEAR event
 Inflow = 4.94 cfs @ 12.37 hrs, Volume= 0.580 af
 Outflow = 4.90 cfs @ 12.38 hrs, Volume= 0.577 af, Atten= 1%, Lag= 1.1 min
 Primary = 4.90 cfs @ 12.38 hrs, Volume= 0.577 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 589.50' @ 13.46 hrs Surf.Area= 0.079 ac Storage= 0.067 af

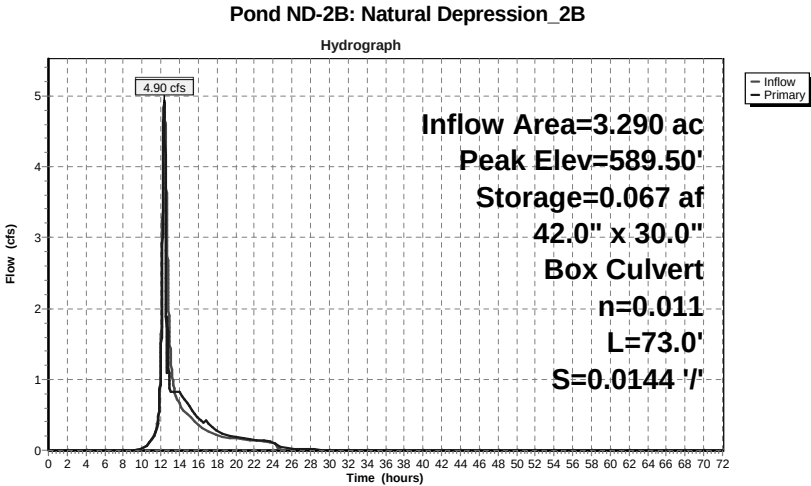
Plug-Flow detention time= 42.1 min calculated for 0.577 af (99% of inflow)

Center-of-Mass det. time= 39.0 min (901.5 - 862.5)

Volume	Invert	Avail.Storage	Storage Description
#1	587.80'	0.578 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
587.80	0.000	0.000	0.000
592.80	0.231	0.578	0.578

Device	Routing	Invert	Outlet Devices
#1	Primary	587.83'	42.0" W x 30.0" H Box 30x42 CMP L= 73.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 587.83' / 586.78' S= 0.0144 ' /' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean

Primary OutFlow Max=4.90 cfs @ 12.38 hrs HW=588.41' TW=587.81' (Dynamic Tailwater)↑ **1=30x42 CMP** (Inlet Controls 4.90 cfs @ 2.43 fps)



Hydrograph for Pond ND-2B: Natural Depression_2B

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	587.80	0.00
2.00	0.00	0.000	587.80	0.00
4.00	0.00	0.000	587.80	0.00
6.00	0.00	0.000	587.80	0.00
8.00	0.00	0.000	587.80	0.00
10.00	0.02	0.000	587.84	0.02
12.00	1.37	0.002	588.06	1.27
14.00	0.66	0.062	589.44	0.82
16.00	0.36	0.039	589.10	0.46
18.00	0.22	0.024	588.82	0.27
20.00	0.17	0.018	588.69	0.19
22.00	0.14	0.016	588.63	0.15
24.00	0.11	0.014	588.58	0.12
26.00	0.00	0.009	588.42	0.02
28.00	0.00	0.006	588.33	0.01
30.00	0.00	0.005	588.28	0.00
32.00	0.00	0.005	588.25	0.00
34.00	0.00	0.004	588.23	0.00
36.00	0.00	0.004	588.22	0.00
38.00	0.00	0.004	588.21	0.00
40.00	0.00	0.004	588.20	0.00
42.00	0.00	0.004	588.19	0.00
44.00	0.00	0.004	588.19	0.00
46.00	0.00	0.003	588.19	0.00
48.00	0.00	0.003	588.18	0.00
50.00	0.00	0.003	588.18	0.00
52.00	0.00	0.003	588.18	0.00
54.00	0.00	0.003	588.17	0.00
56.00	0.00	0.003	588.17	0.00
58.00	0.00	0.003	588.17	0.00
60.00	0.00	0.003	588.17	0.00
62.00	0.00	0.003	588.17	0.00
64.00	0.00	0.003	588.17	0.00
66.00	0.00	0.003	588.16	0.00
68.00	0.00	0.003	588.16	0.00
70.00	0.00	0.003	588.16	0.00
72.00	0.00	0.003	588.16	0.00

Existing Conditions_DP-2

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 35

Summary for Pond WD-2A: Wetland Depression_2A

Assume a broad-crested weir for the additional overflow over Long Meadow Road.

Inflow Area = 42.420 ac, 5.56% Impervious, Inflow Depth = 2.17" for 10-YEAR event
 Inflow = 49.45 cfs @ 12.35 hrs, Volume= 7.659 af
 Outflow = 14.98 cfs @ 13.46 hrs, Volume= 5.781 af, Atten= 70%, Lag= 66.6 min
 Primary = 14.98 cfs @ 13.46 hrs, Volume= 5.781 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 589.50' @ 13.46 hrs Surf.Area= 57,425 sf Storage= 144,281 cf

Plug-Flow detention time= 238.4 min calculated for 5.780 af (75% of inflow)
 Center-of-Mass det. time= 147.2 min (1,021.0 - 873.7)

Volume	Invert	Avail.Storage	Storage Description
#1	585.00'	324,441 cf	Custom Stage Data (Prismatic) Listed below
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
585.00	0	0	0
586.00	15,950	7,975	7,975
589.00	52,400	102,525	110,500
592.00	82,504	202,356	312,856
592.14	83,000	11,585	324,441

Device	Routing	Invert	Outlet Devices
#1	Primary	588.14'	48.0" Round Culvert L= 73.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 588.14' / 579.80' S= 0.1142 '/' Cc= 0.900 n= 0.013

Primary OutFlow Max=14.98 cfs @ 13.46 hrs HW=589.50' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 14.98 cfs @ 3.97 fps)

Existing Conditions_DP-2

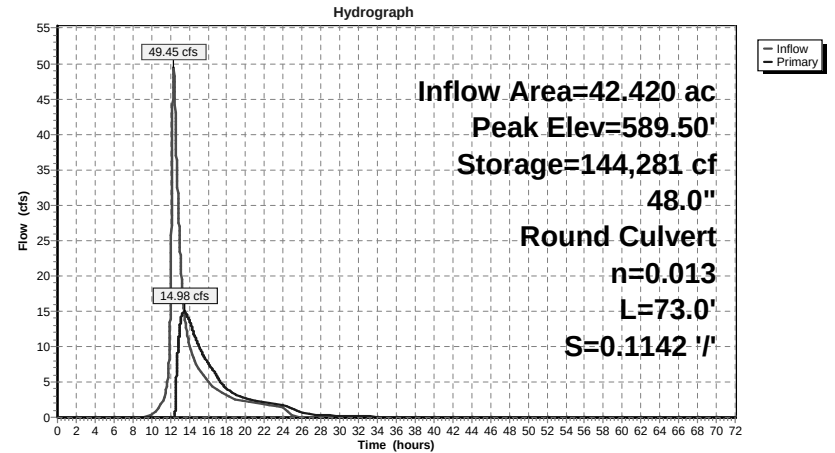
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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 36

Pond WD-2A: Wetland Depression_2A

Existing Conditions_DP-2

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 37

Hydrograph for Pond WD-2A: Wetland Depression_2A

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	585.00	0.00
2.00	0.00	0	585.00	0.00
4.00	0.00	0	585.00	0.00
6.00	0.00	0	585.00	0.00
8.00	0.00	0	585.00	0.00
10.00	0.34	361	585.05	0.00
12.00	15.10	20,710	586.37	0.00
14.00	10.30	140,003	589.44	13.70
16.00	5.10	116,909	589.10	7.66
18.00	3.03	104,322	588.82	3.97
20.00	2.24	99,846	588.69	2.61
22.00	1.85	97,789	588.63	2.08
24.00	1.50	96,221	588.58	1.72
26.00	0.04	90,682	588.42	0.70
28.00	0.01	87,458	588.33	0.31
30.00	0.00	85,843	588.28	0.17
32.00	0.00	84,880	588.25	0.11
34.00	0.00	84,241	588.23	0.08
36.00	0.00	83,786	588.22	0.06
38.00	0.00	83,445	588.21	0.04
40.00	0.00	83,182	588.20	0.03
42.00	0.00	82,972	588.19	0.03
44.00	0.00	82,800	588.19	0.02
46.00	0.00	82,657	588.19	0.02
48.00	0.00	82,537	588.18	0.02
50.00	0.00	82,434	588.18	0.01
52.00	0.00	82,344	588.18	0.01
54.00	0.00	82,266	588.17	0.01
56.00	0.00	82,198	588.17	0.01
58.00	0.00	82,136	588.17	0.01
60.00	0.00	82,082	588.17	0.01
62.00	0.00	82,033	588.17	0.01
64.00	0.00	81,988	588.17	0.01
66.00	0.00	81,948	588.16	0.01
68.00	0.00	81,911	588.16	0.00
70.00	0.00	81,878	588.16	0.00
72.00	0.00	81,847	588.16	0.00

Existing Conditions_DP-2

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 38

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 3

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment DA-2A1: Drainage Area 2A1 Runoff Area=17.400 ac 1.21% Impervious Runoff Depth=4.29"
Flow Length=2,505' Tc=56.9 min CN=70 Runoff=35.48 cfs 6.225 af

Subcatchment DA-2A2: Drainage Area 2A2 Runoff Area=21.730 ac 9.89% Impervious Runoff Depth=4.63"
Flow Length=2,118' Tc=21.9 min CN=73 Runoff=76.66 cfs 8.390 af

Subcatchment DA-2B: Drainage Area 2B Runoff Area=3.290 ac 0.00% Impervious Runoff Depth=4.41"
Flow Length=300' Tc=24.8 min CN=71 Runoff=10.45 cfs 1.208 af

Reach DP-2: 48" Culvert Outlet
Inflow=51.44 cfs 13.940 af
Outflow=51.44 cfs 13.940 af

Pond ND-2B: Natural Depression_2B Peak Elev=590.88' Storage=0.219 af Inflow=10.45 cfs 1.208 af
42.0" x 30.0" Box Culvert n=0.011 L=73.0' S=0.0144 '/' Outflow=6.13 cfs 1.205 af

Pond WD-2A: Wetland Depression_2A Peak Elev=590.87' Storage=236,722 cf Inflow=99.99 cfs 15.820 af
48.0" Round Culvert n=0.013 L=73.0' S=0.1142 '/' Outflow=51.44 cfs 13.940 af

Total Runoff Area = 42.420 ac Runoff Volume = 15.823 af Average Runoff Depth = 4.48"
94.44% Pervious = 40.060 ac 5.56% Impervious = 2.360 ac

Summary for Subcatchment DA-2A1: Drainage Area 2A1

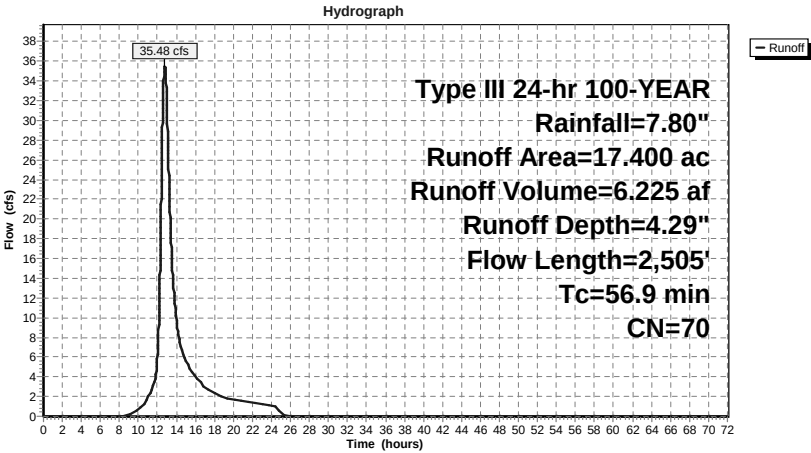
Runoff = 35.48 cfs @ 12.77 hrs, Volume= 6.225 af, Depth= 4.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
2.350	65	Brush, Good, HSG C
* 0.210	98	Pavement & Roofs, HSG C
14.840	70	Woods, Good, HSG C
17.400	70	Weighted Average
17.190		98.79% Pervious Area
0.210		1.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
43.9	150	0.0270	0.06		Sheet Flow, Woods: Dense underbrush n= 0.800 P2= 3.50"
2.7	294	0.1360	1.84		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
6.4	685	0.1260	1.77		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	70	0.0097	11.26	141.47	Pipe Channel, 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.013
0.3	516	0.0980	25.07	3,710.15	Channel Flow, Area= 148.0 sf Perim= 72.0' r= 2.06' n= 0.030 Earth, grassed & winding
3.5	790	0.0350	3.81	236.24	Channel Flow, Area= 62.0 sf Perim= 54.0' r= 1.15' n= 0.080 Earth, long dense weeds
56.9	2,505	Total			

Subcatchment DA-2A1: Drainage Area 2A1



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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 41

Hydrograph for Subcatchment DA-2A1: Drainage Area 2A1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	7.80	4.29	0.00
1.00	0.08	0.00	0.00	53.00	7.80	4.29	0.00
2.00	0.16	0.00	0.00	54.00	7.80	4.29	0.00
3.00	0.24	0.00	0.00	55.00	7.80	4.29	0.00
4.00	0.34	0.00	0.00	56.00	7.80	4.29	0.00
5.00	0.44	0.00	0.00	57.00	7.80	4.29	0.00
6.00	0.56	0.00	0.00	58.00	7.80	4.29	0.00
7.00	0.71	0.00	0.00	59.00	7.80	4.29	0.00
8.00	0.89	0.00	0.00	60.00	7.80	4.29	0.00
9.00	1.14	0.02	0.14	61.00	7.80	4.29	0.00
10.00	1.47	0.08	0.74	62.00	7.80	4.29	0.00
11.00	1.95	0.22	1.89	63.00	7.80	4.29	0.00
12.00	3.90	1.26	6.14	64.00	7.80	4.29	0.00
13.00	5.85	2.69	31.45	65.00	7.80	4.29	0.00
14.00	6.33	3.07	9.74	66.00	7.80	4.29	0.00
15.00	6.66	3.34	5.58	67.00	7.80	4.29	0.00
16.00	6.91	3.54	4.06	68.00	7.80	4.29	0.00
17.00	7.09	3.70	2.97	69.00	7.80	4.29	0.00
18.00	7.24	3.82	2.34	70.00	7.80	4.29	0.00
19.00	7.36	3.92	1.86	71.00	7.80	4.29	0.00
20.00	7.46	4.01	1.65	72.00	7.80	4.29	0.00
21.00	7.56	4.09	1.49				
22.00	7.65	4.16	1.36				
23.00	7.73	4.23	1.23				
24.00	7.80	4.29	1.11				
25.00	7.80	4.29	0.32				
26.00	7.80	4.29	0.02				
27.00	7.80	4.29	0.00				
28.00	7.80	4.29	0.00				
29.00	7.80	4.29	0.00				
30.00	7.80	4.29	0.00				
31.00	7.80	4.29	0.00				
32.00	7.80	4.29	0.00				
33.00	7.80	4.29	0.00				
34.00	7.80	4.29	0.00				
35.00	7.80	4.29	0.00				
36.00	7.80	4.29	0.00				
37.00	7.80	4.29	0.00				
38.00	7.80	4.29	0.00				
39.00	7.80	4.29	0.00				
40.00	7.80	4.29	0.00				
41.00	7.80	4.29	0.00				
42.00	7.80	4.29	0.00				
43.00	7.80	4.29	0.00				
44.00	7.80	4.29	0.00				
45.00	7.80	4.29	0.00				
46.00	7.80	4.29	0.00				
47.00	7.80	4.29	0.00				
48.00	7.80	4.29	0.00				
49.00	7.80	4.29	0.00				
50.00	7.80	4.29	0.00				
51.00	7.80	4.29	0.00				

Existing Conditions_DP-2

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 42

Summary for Subcatchment DA-2A2: Drainage Area 2A2

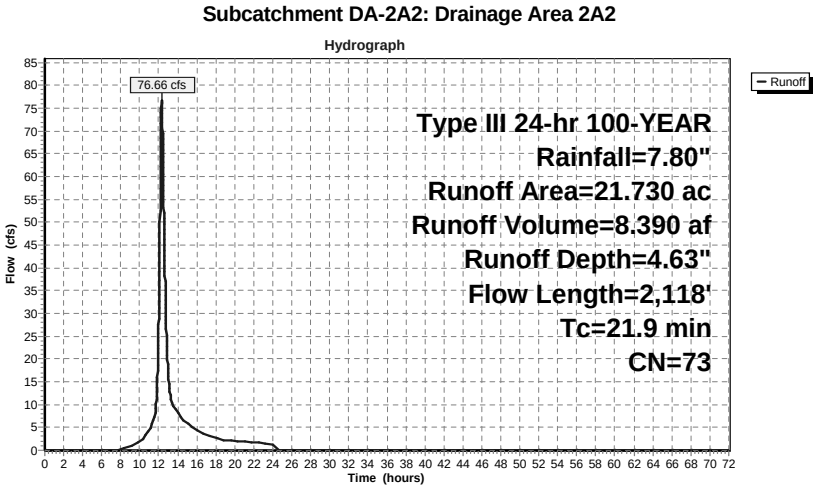
Runoff = 76.66 cfs @ 12.29 hrs, Volume= 8.390 af, Depth= 4.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
16.820	70	Woods, Good, HSG C
2.760	74	>75% Grass cover, Good, HSG C
* 1.950	98	Pavement & Roofs, HSG C
0.200	98	Water Surface, HSG C
21.730	73	Weighted Average
19.580		90.11% Pervious Area
2.150		9.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
2.5	230	0.0960	1.55		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.6	220	0.0180	5.69	48.34	Channel Flow, Area= 8.5 sf Perim= 17.1' r= 0.50' n= 0.022 Earth, clean & straight
4.4	673	0.0360	2.56	25.55	Channel Flow, Area= 10.0 sf Perim= 16.2' r= 0.62' n= 0.080 Earth, long dense weeds
0.1	105	0.0980	25.07	3,710.15	Channel Flow, Area= 148.0 sf Perim= 72.0' r= 2.06' n= 0.030 Earth, grassed & winding
3.5	790	0.0350	3.81	236.24	Channel Flow, Area= 62.0 sf Perim= 54.0' r= 1.15' n= 0.080 Earth, long dense weeds
21.9	2,118	Total			



Hydrograph for Subcatchment DA-2A2: Drainage Area 2A2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	7.80	4.63	0.00
1.00	0.08	0.00	0.00	53.00	7.80	4.63	0.00
2.00	0.16	0.00	0.00	54.00	7.80	4.63	0.00
3.00	0.24	0.00	0.00	55.00	7.80	4.63	0.00
4.00	0.34	0.00	0.00	56.00	7.80	4.63	0.00
5.00	0.44	0.00	0.00	57.00	7.80	4.63	0.00
6.00	0.56	0.00	0.00	58.00	7.80	4.63	0.00
7.00	0.71	0.00	0.00	59.00	7.80	4.63	0.00
8.00	0.89	0.01	0.18	60.00	7.80	4.63	0.00
9.00	1.14	0.04	0.84	61.00	7.80	4.63	0.00
10.00	1.47	0.12	2.04	62.00	7.80	4.63	0.00
11.00	1.95	0.30	4.31	63.00	7.80	4.63	0.00
12.00	3.90	1.46	27.67	64.00	7.80	4.63	0.00
13.00	5.85	2.96	16.72	65.00	7.80	4.63	0.00
14.00	6.33	3.36	8.17	66.00	7.80	4.63	0.00
15.00	6.66	3.65	6.00	67.00	7.80	4.63	0.00
16.00	6.91	3.86	4.38	68.00	7.80	4.63	0.00
17.00	7.09	4.02	3.35	69.00	7.80	4.63	0.00
18.00	7.24	4.14	2.62	70.00	7.80	4.63	0.00
19.00	7.36	4.25	2.23	71.00	7.80	4.63	0.00
20.00	7.46	4.34	2.01	72.00	7.80	4.63	0.00
21.00	7.56	4.42	1.84				
22.00	7.65	4.50	1.67				
23.00	7.73	4.57	1.51				
24.00	7.80	4.63	1.34				
25.00	7.80	4.63	0.00				
26.00	7.80	4.63	0.00				
27.00	7.80	4.63	0.00				
28.00	7.80	4.63	0.00				
29.00	7.80	4.63	0.00				
30.00	7.80	4.63	0.00				
31.00	7.80	4.63	0.00				
32.00	7.80	4.63	0.00				
33.00	7.80	4.63	0.00				
34.00	7.80	4.63	0.00				
35.00	7.80	4.63	0.00				
36.00	7.80	4.63	0.00				
37.00	7.80	4.63	0.00				
38.00	7.80	4.63	0.00				
39.00	7.80	4.63	0.00				
40.00	7.80	4.63	0.00				
41.00	7.80	4.63	0.00				
42.00	7.80	4.63	0.00				
43.00	7.80	4.63	0.00				
44.00	7.80	4.63	0.00				
45.00	7.80	4.63	0.00				
46.00	7.80	4.63	0.00				
47.00	7.80	4.63	0.00				
48.00	7.80	4.63	0.00				
49.00	7.80	4.63	0.00				
50.00	7.80	4.63	0.00				
51.00	7.80	4.63	0.00				

Existing Conditions_DP-2

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 45

Summary for Subcatchment DA-2B: Drainage Area 2B

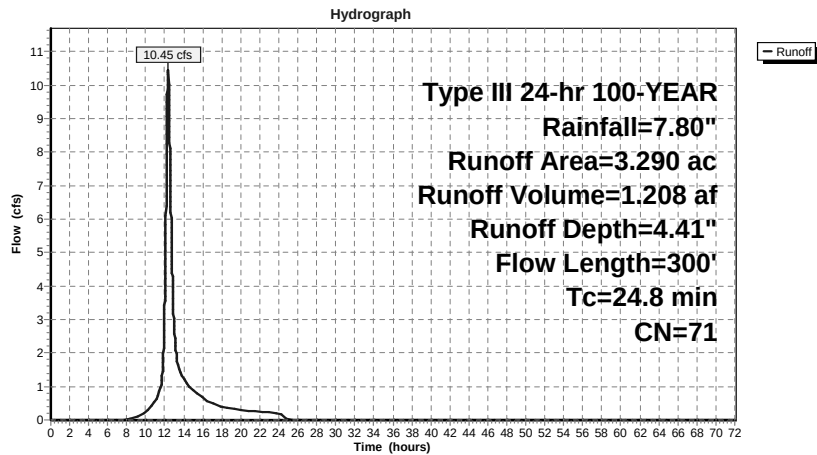
Runoff = 10.45 cfs @ 12.34 hrs, Volume= 1.208 af, Depth= 4.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
0.490	74	>75% Grass cover, Good, HSG C
2.800	70	Woods, Good, HSG C
3.290	71	Weighted Average
3.290		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.6	100	0.0630	0.07		Sheet Flow, Woods: Dense underbrush n= 0.800 P2= 3.50"
2.2	200	0.0900	1.50		Shallow Concentrated Flow, CIRCLE Woodland Kv= 5.0 fps
24.8	300	Total			

Subcatchment DA-2B: Drainage Area 2B**Existing Conditions_DP-2**

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 46

Hydrograph for Subcatchment DA-2B: Drainage Area 2B

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	7.80	4.41	0.00
1.00	0.08	0.00	0.00	53.00	7.80	4.41	0.00
2.00	0.16	0.00	0.00	54.00	7.80	4.41	0.00
3.00	0.24	0.00	0.00	55.00	7.80	4.41	0.00
4.00	0.34	0.00	0.00	56.00	7.80	4.41	0.00
5.00	0.44	0.00	0.00	57.00	7.80	4.41	0.00
6.00	0.56	0.00	0.00	58.00	7.80	4.41	0.00
7.00	0.71	0.00	0.00	59.00	7.80	4.41	0.00
8.00	0.89	0.00	0.00	60.00	7.80	4.41	0.00
9.00	1.14	0.02	0.08	61.00	7.80	4.41	0.00
10.00	1.47	0.09	0.25	62.00	7.80	4.41	0.00
11.00	1.95	0.25	0.56	63.00	7.80	4.41	0.00
12.00	3.90	1.33	3.42	64.00	7.80	4.41	0.00
13.00	5.85	2.78	2.74	65.00	7.80	4.41	0.00
14.00	6.33	3.16	1.22	66.00	7.80	4.41	0.00
15.00	6.66	3.44	0.90	67.00	7.80	4.41	0.00
16.00	6.91	3.65	0.66	68.00	7.80	4.41	0.00
17.00	7.09	3.80	0.50	69.00	7.80	4.41	0.00
18.00	7.24	3.92	0.39	70.00	7.80	4.41	0.00
19.00	7.36	4.03	0.33	71.00	7.80	4.41	0.00
20.00	7.46	4.12	0.30	72.00	7.80	4.41	0.00
21.00	7.56	4.20	0.27				
22.00	7.65	4.28	0.25				
23.00	7.73	4.34	0.22				
24.00	7.80	4.41	0.20				
25.00	7.80	4.41	0.00				
26.00	7.80	4.41	0.00				
27.00	7.80	4.41	0.00				
28.00	7.80	4.41	0.00				
29.00	7.80	4.41	0.00				
30.00	7.80	4.41	0.00				
31.00	7.80	4.41	0.00				
32.00	7.80	4.41	0.00				
33.00	7.80	4.41	0.00				
34.00	7.80	4.41	0.00				
35.00	7.80	4.41	0.00				
36.00	7.80	4.41	0.00				
37.00	7.80	4.41	0.00				
38.00	7.80	4.41	0.00				
39.00	7.80	4.41	0.00				
40.00	7.80	4.41	0.00				
41.00	7.80	4.41	0.00				
42.00	7.80	4.41	0.00				
43.00	7.80	4.41	0.00				
44.00	7.80	4.41	0.00				
45.00	7.80	4.41	0.00				
46.00	7.80	4.41	0.00				
47.00	7.80	4.41	0.00				
48.00	7.80	4.41	0.00				
49.00	7.80	4.41	0.00				
50.00	7.80	4.41	0.00				
51.00	7.80	4.41	0.00				

Summary for Reach DP-2: 48" Culvert Outlet

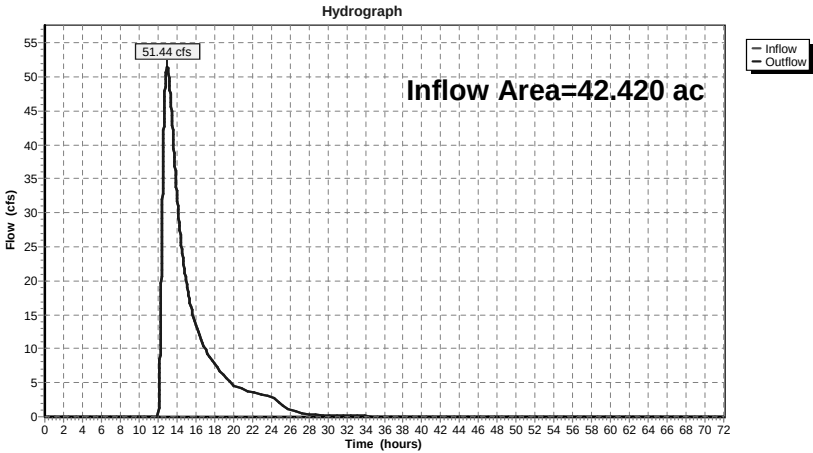
Assume the DP-2 is at the tail end of the pipe, therefore the full length of the culvert (73') has not been specified. The culvert outlet elevation has replaced the inlet elevation so as to not overtop Wetland Depression_1. Outlet elevation has been replaced to mimick the existing slope on the culvert pipe.

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

Inflow Area = 42.420 ac, 5.56% Impervious, Inflow Depth = 3.94" for 100-YEAR event
Inflow = 51.44 cfs @ 12.99 hrs, Volume= 13.940 af
Outflow = 51.44 cfs @ 12.99 hrs, Volume= 13.940 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Reach DP-2: 48" Culvert Outlet



Hydrograph for Reach DP-2: 48" Culvert Outlet

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	52.00	0.01		0.01
1.00	0.00		0.00	53.00	0.01		0.01
2.00	0.00		0.00	54.00	0.01		0.01
3.00	0.00		0.00	55.00	0.01		0.01
4.00	0.00		0.00	56.00	0.01		0.01
5.00	0.00		0.00	57.00	0.01		0.01
6.00	0.00		0.00	58.00	0.01		0.01
7.00	0.00		0.00	59.00	0.01		0.01
8.00	0.00		0.00	60.00	0.01		0.01
9.00	0.00		0.00	61.00	0.01		0.01
10.00	0.00		0.00	62.00	0.01		0.01
11.00	0.00		0.00	63.00	0.01		0.01
12.00	0.00		0.00	64.00	0.01		0.01
13.00	51.44		51.44	65.00	0.01		0.01
14.00	32.85		32.85	66.00	0.01		0.01
15.00	19.77		19.77	67.00	0.01		0.01
16.00	13.63		13.63	68.00	0.01		0.01
17.00	9.98		9.98	69.00	0.00		0.00
18.00	7.71		7.71	70.00	0.00		0.00
19.00	6.05		6.05	71.00	0.00		0.00
20.00	4.68		4.68	72.00	0.00		0.00
21.00	4.03		4.03				
22.00	3.62		3.62				
23.00	3.28		3.28				
24.00	2.96		2.96				
25.00	1.89		1.89				
26.00	1.00		1.00				
27.00	0.60		0.60				
28.00	0.39		0.39				
29.00	0.28		0.28				
30.00	0.21		0.21				
31.00	0.16		0.16				
32.00	0.13		0.13				
33.00	0.10		0.10				
34.00	0.08		0.08				
35.00	0.07		0.07				
36.00	0.06		0.06				
37.00	0.05		0.05				
38.00	0.05		0.05				
39.00	0.04		0.04				
40.00	0.04		0.04				
41.00	0.03		0.03				
42.00	0.03		0.03				
43.00	0.03		0.03				
44.00	0.02		0.02				
45.00	0.02		0.02				
46.00	0.02		0.02				
47.00	0.02		0.02				
48.00	0.02		0.02				
49.00	0.02		0.02				
50.00	0.01		0.01				
51.00	0.01		0.01				

Summary for Pond ND-2B: Natural Depression_2B

[87] Warning: Oscillations may require Finer Routing or smaller dt

Inflow Area = 3.290 ac, 0.00% Impervious, Inflow Depth = 4.41" for 100-YEAR event
Inflow = 10.45 cfs @ 12.34 hrs, Volume= 1.208 af
Outflow = 6.13 cfs @ 12.32 hrs, Volume= 1.205 af, Atten= 41%, Lag= 0.0 min
Primary = 6.13 cfs @ 12.32 hrs, Volume= 1.205 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 590.88' @ 12.99 hrs Surf.Area= 0.142 ac Storage= 0.219 af

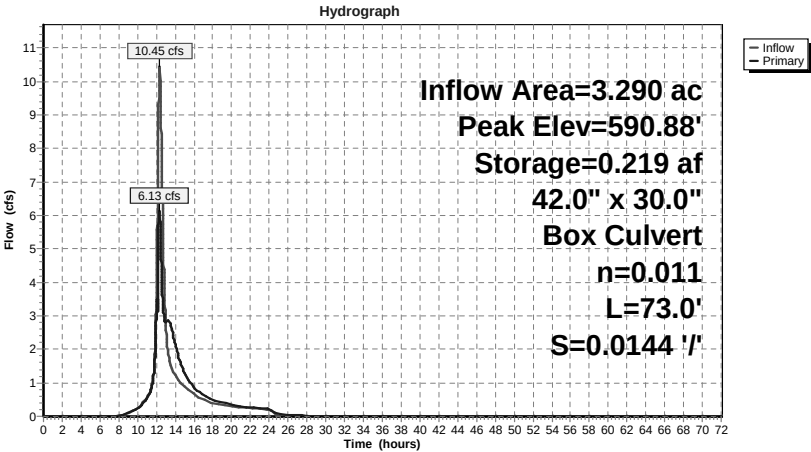
Plug-Flow detention time= 39.9 min calculated for 1.205 af (100% of inflow)
Center-of-Mass det. time= 38.7 min (879.9 - 841.2)

Volume	Invert	Avail.Storage	Storage Description
#1	587.80'	0.578 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
587.80	0.000	0.000	0.000
592.80	0.231	0.578	0.578

Device	Routing	Invert	Outlet Devices
#1	Primary	587.83'	42.0" W x 30.0" H Box 30x42 CMP L= 73.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 587.83' / 586.78' S= 0.0144 '/ Cc= 0.900 n= 0.011 Concrete pipe, straight & clean

Primary OutFlow Max=6.13 cfs @ 12.32 hrs HW=589.62' TW=589.57' (Dynamic Tailwater)
1=30x42 CMP (Outlet Controls 6.13 cfs @ 1.30 fps)

Pond ND-2B: Natural Depression_2B



Existing Conditions_DP-2

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 51

Hydrograph for Pond ND-2B: Natural Depression_2B

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	587.80	0.00
2.00	0.00	0.000	587.80	0.00
4.00	0.00	0.000	587.80	0.00
6.00	0.00	0.000	587.80	0.00
8.00	0.00	0.000	587.83	0.00
10.00	0.25	0.000	587.91	0.24
12.00	3.42	0.005	588.27	2.96
14.00	1.22	0.137	590.24	2.16
16.00	0.66	0.062	589.44	0.87
18.00	0.39	0.039	589.10	0.48
20.00	0.30	0.027	588.88	0.34
22.00	0.25	0.023	588.79	0.27
24.00	0.20	0.020	588.72	0.22
26.00	0.00	0.011	588.48	0.04
28.00	0.00	0.007	588.35	0.01
30.00	0.00	0.006	588.29	0.01
32.00	0.00	0.005	588.26	0.00
34.00	0.00	0.004	588.24	0.00
36.00	0.00	0.004	588.22	0.00
38.00	0.00	0.004	588.21	0.00
40.00	0.00	0.004	588.20	0.00
42.00	0.00	0.004	588.20	0.00
44.00	0.00	0.004	588.19	0.00
46.00	0.00	0.003	588.19	0.00
48.00	0.00	0.003	588.18	0.00
50.00	0.00	0.003	588.18	0.00
52.00	0.00	0.003	588.18	0.00
54.00	0.00	0.003	588.17	0.00
56.00	0.00	0.003	588.17	0.00
58.00	0.00	0.003	588.17	0.00
60.00	0.00	0.003	588.17	0.00
62.00	0.00	0.003	588.17	0.00
64.00	0.00	0.003	588.17	0.00
66.00	0.00	0.003	588.16	0.00
68.00	0.00	0.003	588.16	0.00
70.00	0.00	0.003	588.16	0.00
72.00	0.00	0.003	588.16	0.00

Existing Conditions_DP-2

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 52

Summary for Pond WD-2A: Wetland Depression_2A

Assume a broad-crested weir for the additional overflow over Long Meadow Road.

Inflow Area = 42.420 ac, 5.56% Impervious, Inflow Depth = 4.48" for 100-YEAR event
 Inflow = 99.99 cfs @ 12.34 hrs, Volume= 15.820 af
 Outflow = 51.44 cfs @ 12.99 hrs, Volume= 13.940 af, Atten= 49%, Lag= 39.3 min
 Primary = 51.44 cfs @ 12.99 hrs, Volume= 13.940 af

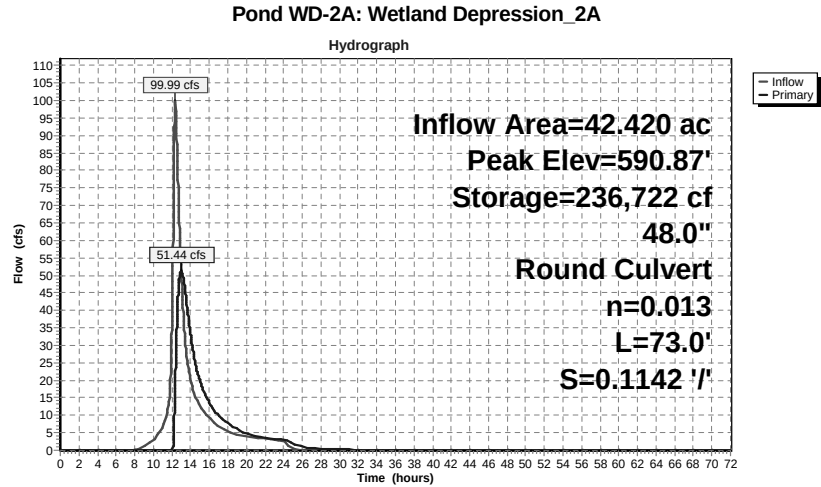
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 590.87' @ 12.99 hrs Surf.Area= 71,178 sf Storage= 236,722 cf

Plug-Flow detention time= 151.8 min calculated for 13.940 af (88% of inflow)
 Center-of-Mass det. time= 96.0 min (949.0 - 853.0)

Volume	Invert	Avail.Storage	Storage Description
#1	585.00'	324,441 cf	Custom Stage Data (Prismatic) Listed below
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
585.00	0	0	0
586.00	15,950	7,975	7,975
589.00	52,400	102,525	110,500
592.00	82,504	202,356	312,856
592.14	83,000	11,585	324,441

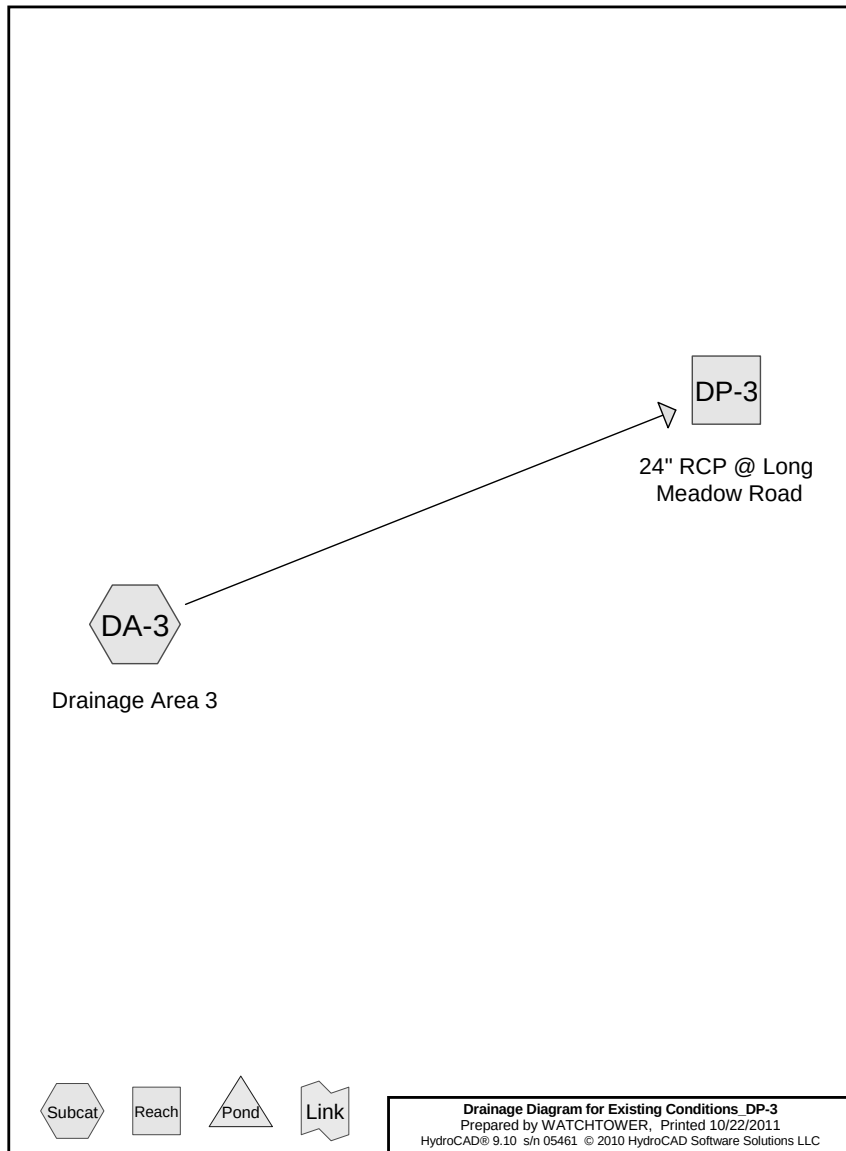
Device	Routing	Invert	Outlet Devices
#1	Primary	588.14'	48.0" Round Culvert L= 73.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 588.14' / 579.80' S= 0.1142 ' S= 0.1142 ' Cc= 0.900 n= 0.013

Primary OutFlow Max=51.44 cfs @ 12.99 hrs HW=590.87' TW=0.00' (Dynamic Tailwater)
 1=Culvert (Inlet Controls 51.44 cfs @ 5.63 fps)



Hydrograph for Pond WD-2A: Wetland Depression_2A

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	585.00	0.00
2.00	0.00	0	585.00	0.00
4.00	0.00	0	585.00	0.00
6.00	0.00	0	585.00	0.00
8.00	0.18	164	585.02	0.00
10.00	3.02	9,183	586.04	0.00
12.00	36.77	75,041	587.96	0.00
14.00	20.07	193,840	590.24	32.85
16.00	9.31	139,777	589.43	13.63
18.00	5.44	117,150	589.10	7.71
20.00	4.01	106,379	588.88	4.68
22.00	3.30	103,243	588.79	3.62
24.00	2.66	101,079	588.72	2.96
26.00	0.06	92,602	588.48	1.00
28.00	0.01	88,265	588.35	0.39
30.00	0.01	86,281	588.29	0.21
32.00	0.00	85,154	588.26	0.13
34.00	0.00	84,428	588.24	0.08
36.00	0.00	83,922	588.22	0.06
38.00	0.00	83,548	588.21	0.05
40.00	0.00	83,263	588.20	0.04
42.00	0.00	83,037	588.20	0.03
44.00	0.00	82,854	588.19	0.02
46.00	0.00	82,702	588.19	0.02
48.00	0.00	82,575	588.18	0.02
50.00	0.00	82,466	588.18	0.01
52.00	0.00	82,373	588.18	0.01
54.00	0.00	82,291	588.17	0.01
56.00	0.00	82,220	588.17	0.01
58.00	0.00	82,156	588.17	0.01
60.00	0.00	82,099	588.17	0.01
62.00	0.00	82,049	588.17	0.01
64.00	0.00	82,003	588.17	0.01
66.00	0.00	81,961	588.16	0.01
68.00	0.00	81,923	588.16	0.01
70.00	0.00	81,888	588.16	0.00
72.00	0.00	81,857	588.16	0.00



Existing Conditions_DP-3

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.420	65	Brush, Good, HSG C (DA-3)
10.270	70	Woods, Good, HSG C (DA-3)
0.170	98	Paved roads, HSG C (DA-3)
12.860	69	TOTAL AREA

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-3: Drainage Area 3 Runoff Area=12.860 ac 1.32% Impervious Runoff Depth>0.59"
Flow Length=2,302' Tc=51.6 min CN=69 Runoff=3.68 cfs 0.627 af

Reach DP-3: 24" RCP @ Long Meadow Avg. Flow Depth=0.42' Max Vel=7.57 fps Inflow=3.68 cfs 0.627 af
24.0" Round Pipe n=0.013 L=62.0' S=0.0273 '/' Capacity=37.35 cfs Outflow=3.68 cfs 0.627 af

Total Runoff Area = 12.860 ac Runoff Volume = 0.627 af Average Runoff Depth = 0.59"
98.68% Pervious = 12.690 ac 1.32% Impervious = 0.170 ac

Summary for Subcatchment DA-3: Drainage Area 3

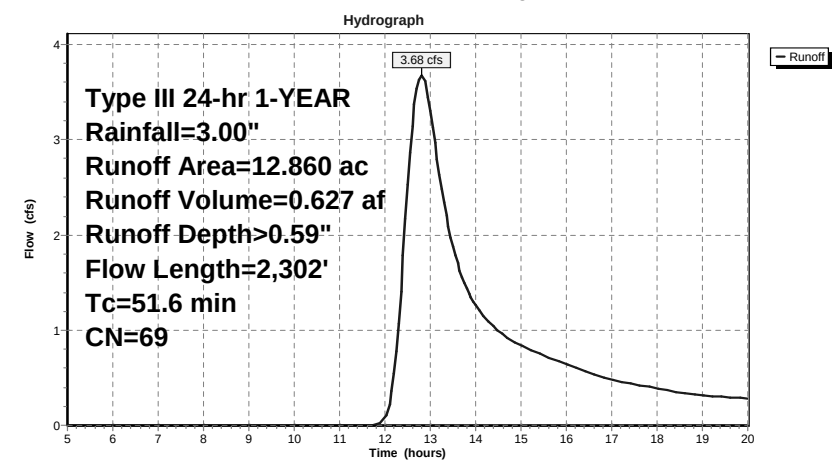
Runoff = 3.68 cfs @ 12.81 hrs, Volume= 0.627 af, Depth> 0.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
10.270	70	Woods, Good, HSG C
2.420	65	Brush, Good, HSG C
* 0.170	98	Paved roads, HSG C
12.860	69	Weighted Average
12.690		98.68% Pervious Area
0.170		1.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.1	100	0.0400	0.06		Sheet Flow, Woods: Dense underbrush n= 0.800 P2= 3.50"
22.3	1,140	0.1160	0.85		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
0.8	542	0.0810	11.22	276.04	Channel Flow, Area= 24.6 sf Perim= 22.5' r= 1.09' n= 0.040 Earth, cobble bottom, clean sides
1.4	520	0.0630	6.26	175.26	Channel Flow, Area= 28.0 sf Perim= 18.0' r= 1.56' n= 0.080 Earth, long dense weeds
51.6	2,302	Total			

Subcatchment DA-3: Drainage Area 3



Hydrograph for Subcatchment DA-3: Drainage Area 3

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.17	0.00	0.00	18.00	2.78	0.56	0.39
5.25	0.18	0.00	0.00	18.25	2.80	0.56	0.36
5.50	0.19	0.00	0.00	18.50	2.81	0.57	0.34
5.75	0.20	0.00	0.00	18.75	2.82	0.57	0.33
6.00	0.22	0.00	0.00	19.00	2.83	0.58	0.31
6.25	0.23	0.00	0.00	19.25	2.84	0.59	0.30
6.50	0.24	0.00	0.00	19.50	2.85	0.59	0.30
6.75	0.26	0.00	0.00	19.75	2.86	0.60	0.29
7.00	0.27	0.00	0.00	20.00	2.87	0.60	0.28
7.25	0.29	0.00	0.00				
7.50	0.30	0.00	0.00				
7.75	0.32	0.00	0.00				
8.00	0.34	0.00	0.00				
8.25	0.36	0.00	0.00				
8.50	0.39	0.00	0.00				
8.75	0.41	0.00	0.00				
9.00	0.44	0.00	0.00				
9.25	0.47	0.00	0.00				
9.50	0.50	0.00	0.00				
9.75	0.53	0.00	0.00				
10.00	0.57	0.00	0.00				
10.25	0.61	0.00	0.00				
10.50	0.65	0.00	0.00				
10.75	0.70	0.00	0.00				
11.00	0.75	0.00	0.00				
11.25	0.81	0.00	0.00				
11.50	0.89	0.00	0.00				
11.75	1.07	0.01	0.00				
12.00	1.50	0.07	0.08				
12.25	1.93	0.19	0.78				
12.50	2.11	0.26	2.53				
12.75	2.19	0.29	3.64				
13.00	2.25	0.31	3.30				
13.25	2.30	0.33	2.49				
13.50	2.35	0.35	1.87				
13.75	2.39	0.37	1.49				
14.00	2.43	0.39	1.26				
14.25	2.47	0.41	1.11				
14.50	2.50	0.42	0.99				
14.75	2.53	0.44	0.90				
15.00	2.56	0.45	0.84				
15.25	2.59	0.46	0.78				
15.50	2.61	0.47	0.74				
15.75	2.64	0.49	0.69				
16.00	2.66	0.50	0.64				
16.25	2.68	0.50	0.60				
16.50	2.70	0.51	0.55				
16.75	2.71	0.52	0.51				
17.00	2.73	0.53	0.48				
17.25	2.74	0.54	0.46				
17.50	2.76	0.54	0.43				
17.75	2.77	0.55	0.41				

Summary for Reach DP-3: 24" RCP @ Long Meadow Road

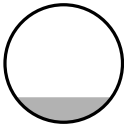
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 12.860 ac, 1.32% Impervious, Inflow Depth > 0.59" for 1-YEAR event
Inflow = 3.68 cfs @ 12.81 hrs, Volume= 0.627 af
Outflow = 3.68 cfs @ 12.81 hrs, Volume= 0.627 af, Atten= 0%, Lag= 0.2 min

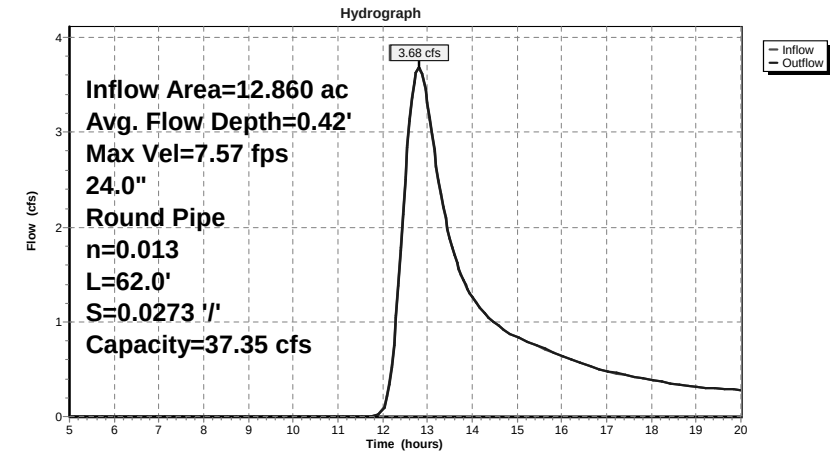
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.57 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 4.57 fps, Avg. Travel Time= 0.2 min

Peak Storage= 30 cf @ 12.81 hrs
Average Depth at Peak Storage= 0.42'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 37.35 cfs

24.0" Round Pipe
n= 0.013
Length= 62.0' Slope= 0.0273 '/'
Inlet Invert= 593.70', Outlet Invert= 592.01'



Reach DP-3: 24" RCP @ Long Meadow Road



Hydrograph for Reach DP-3: 24" RCP @ Long Meadow Road

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	0.00	0	593.70	0.00
5.50	0.00	0	593.70	0.00
6.00	0.00	0	593.70	0.00
6.50	0.00	0	593.70	0.00
7.00	0.00	0	593.70	0.00
7.50	0.00	0	593.70	0.00
8.00	0.00	0	593.70	0.00
8.50	0.00	0	593.70	0.00
9.00	0.00	0	593.70	0.00
9.50	0.00	0	593.70	0.00
10.00	0.00	0	593.70	0.00
10.50	0.00	0	593.70	0.00
11.00	0.00	0	593.70	0.00
11.50	0.00	0	593.70	0.00
12.00	0.08	2	593.77	0.07
12.50	2.53	23	594.05	2.50
13.00	3.30	28	594.10	3.31
13.50	1.87	19	594.00	1.88
14.00	1.26	14	593.95	1.26
14.50	0.99	12	593.92	0.99
15.00	0.84	11	593.91	0.84
15.50	0.74	10	593.89	0.74
16.00	0.64	9	593.88	0.64
16.50	0.55	8	593.87	0.55
17.00	0.48	7	593.86	0.48
17.50	0.43	7	593.85	0.43
18.00	0.39	6	593.84	0.39
18.50	0.34	6	593.84	0.34
19.00	0.31	5	593.83	0.31
19.50	0.30	5	593.83	0.30
20.00	0.28	5	593.82	0.28

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-3: Drainage Area 3 Runoff Area=12.860 ac 1.32% Impervious Runoff Depth>1.76"
Flow Length=2,302' Tc=51.6 min CN=69 Runoff=12.30 cfs 1.891 af

Reach DP-3: 24" RCP @ Long Avg. Flow Depth=0.79' Max Vel=10.66 fps Inflow=12.30 cfs 1.891 af
24.0" Round Pipe n=0.013 L=62.0' S=0.0273 ' /' Capacity=37.35 cfs Outflow=12.29 cfs 1.891 af

Total Runoff Area = 12.860 ac Runoff Volume = 1.891 af Average Runoff Depth = 1.76"
98.68% Pervious = 12.690 ac 1.32% Impervious = 0.170 ac

Summary for Subcatchment DA-3: Drainage Area 3

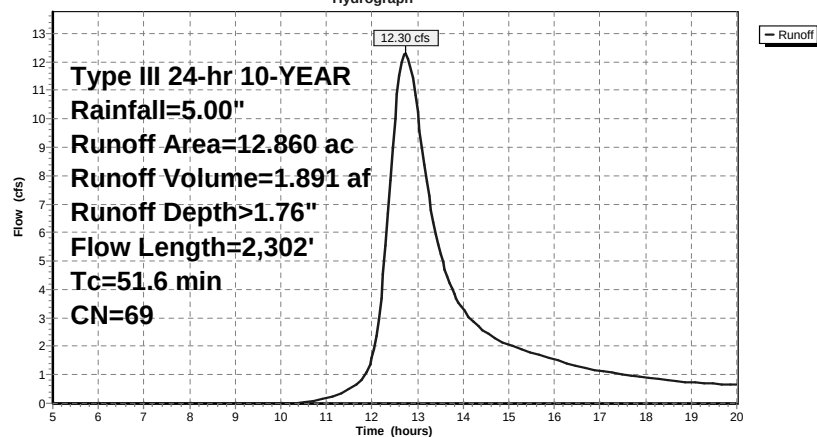
Runoff = 12.30 cfs @ 12.74 hrs, Volume= 1.891 af, Depth> 1.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
10.270	70	Woods, Good, HSG C
2.420	65	Brush, Good, HSG C
* 0.170	98	Paved roads, HSG C
12.860	69	Weighted Average
12.690		98.68% Pervious Area
0.170		1.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.1	100	0.0400	0.06		Sheet Flow, Woods: Dense underbrush n= 0.800 P2= 3.50"
22.3	1,140	0.1160	0.85		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
0.8	542	0.0810	11.22	276.04	Channel Flow, Area= 24.6 sf Perim= 22.5' r= 1.09' n= 0.040 Earth, cobble bottom, clean sides
1.4	520	0.0630	6.26	175.26	Channel Flow, Area= 28.0 sf Perim= 18.0' r= 1.56' n= 0.080 Earth, long dense weeds
51.6	2,302	Total			

Hydrograph



Hydrograph for Subcatchment DA-3: Drainage Area 3

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.28	0.00	0.00
5.25	0.30	0.00	0.00
5.50	0.32	0.00	0.00
5.75	0.34	0.00	0.00
6.00	0.36	0.00	0.00
6.25	0.38	0.00	0.00
6.50	0.40	0.00	0.00
6.75	0.43	0.00	0.00
7.00	0.45	0.00	0.00
7.25	0.48	0.00	0.00
7.50	0.51	0.00	0.00
7.75	0.54	0.00	0.00
8.00	0.57	0.00	0.00
8.25	0.60	0.00	0.00
8.50	0.64	0.00	0.00
8.75	0.68	0.00	0.00
9.00	0.73	0.00	0.00
9.25	0.78	0.00	0.00
9.50	0.83	0.00	0.00
9.75	0.89	0.00	0.00
10.00	0.95	0.00	0.00
10.25	1.01	0.00	0.01
10.50	1.08	0.01	0.03
10.75	1.16	0.01	0.09
11.00	1.25	0.03	0.19
11.25	1.36	0.04	0.31
11.50	1.49	0.07	0.49
11.75	1.78	0.14	0.79
12.00	2.50	0.42	1.59
12.25	3.22	0.79	4.54
12.50	3.51	0.96	10.00
12.75	3.64	1.04	12.29
13.00	3.75	1.11	10.22
13.25	3.84	1.16	7.29
13.50	3.92	1.21	5.25
13.75	3.99	1.26	4.03
14.00	4.06	1.30	3.30
14.25	4.11	1.34	2.83
14.50	4.17	1.38	2.49
14.75	4.22	1.41	2.24
15.00	4.27	1.45	2.05
15.25	4.32	1.48	1.90
15.50	4.36	1.50	1.78
15.75	4.40	1.53	1.66
16.00	4.43	1.55	1.54
16.25	4.46	1.58	1.42
16.50	4.49	1.60	1.31
16.75	4.52	1.62	1.21
17.00	4.55	1.64	1.14
17.25	4.57	1.65	1.07
17.50	4.60	1.67	1.02
17.75	4.62	1.69	0.96

Summary for Reach DP-3: 24" RCP @ Long Meadow Road

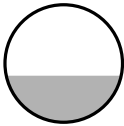
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 12.860 ac, 1.32% Impervious, Inflow Depth > 1.76" for 10-YEAR event
Inflow = 12.30 cfs @ 12.74 hrs, Volume= 1.891 af
Outflow = 12.29 cfs @ 12.74 hrs, Volume= 1.891 af, Atten= 0%, Lag= 0.2 min

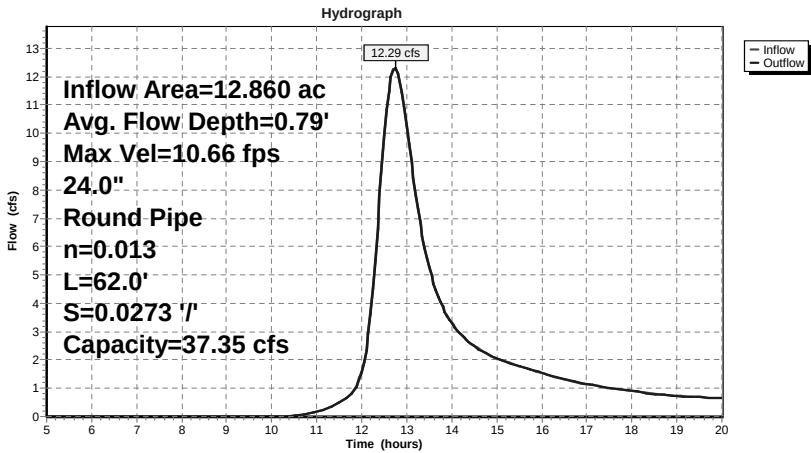
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.66 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.68 fps, Avg. Travel Time= 0.2 min

Peak Storage= 72 cf @ 12.74 hrs
Average Depth at Peak Storage= 0.79'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 37.35 cfs

24.0" Round Pipe
n= 0.013
Length= 62.0' Slope= 0.0273 '/
Inlet Invert= 593.70', Outlet Invert= 592.01'



Reach DP-3: 24" RCP @ Long Meadow Road



Hydrograph for Reach DP-3: 24" RCP @ Long Meadow Road

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	0.00	0	593.70	0.00
5.50	0.00	0	593.70	0.00
6.00	0.00	0	593.70	0.00
6.50	0.00	0	593.70	0.00
7.00	0.00	0	593.70	0.00
7.50	0.00	0	593.70	0.00
8.00	0.00	0	593.70	0.00
8.50	0.00	0	593.70	0.00
9.00	0.00	0	593.70	0.00
9.50	0.00	0	593.70	0.00
10.00	0.00	0	593.70	0.00
10.50	0.03	1	593.74	0.03
11.00	0.19	4	593.80	0.18
11.50	0.49	7	593.86	0.49
12.00	1.59	17	593.98	1.57
12.50	10.00	61	594.41	9.95
13.00	10.22	63	594.42	10.26
13.50	5.25	39	594.21	5.27
14.00	3.30	28	594.10	3.30
14.50	2.49	23	594.05	2.49
15.00	2.05	20	594.02	2.05
15.50	1.78	18	594.00	1.78
16.00	1.54	16	593.98	1.54
16.50	1.31	15	593.96	1.31
17.00	1.14	13	593.94	1.14
17.50	1.02	12	593.93	1.02
18.00	0.90	11	593.91	0.90
18.50	0.80	10	593.90	0.80
19.00	0.73	10	593.89	0.73
19.50	0.69	9	593.89	0.69
20.00	0.65	9	593.88	0.65

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-3: Drainage Area 3 Runoff Area=12.860 ac 1.32% Impervious Runoff Depth>3.83"
Flow Length=2,302' Tc=51.6 min CN=69 Runoff=27.01 cfs 4.104 af

Reach DP-3: 24" RCP @ Long Avg. Flow Depth=1.26' Max Vel=12.95 fps Inflow=27.01 cfs 4.104 af
24.0" Round Pipe n=0.013 L=62.0' S=0.0273 ' / ' Capacity=37.35 cfs Outflow=27.01 cfs 4.104 af

Total Runoff Area = 12.860 ac Runoff Volume = 4.104 af Average Runoff Depth = 3.83"
98.68% Pervious = 12.690 ac 1.32% Impervious = 0.170 ac

Summary for Subcatchment DA-3: Drainage Area 3

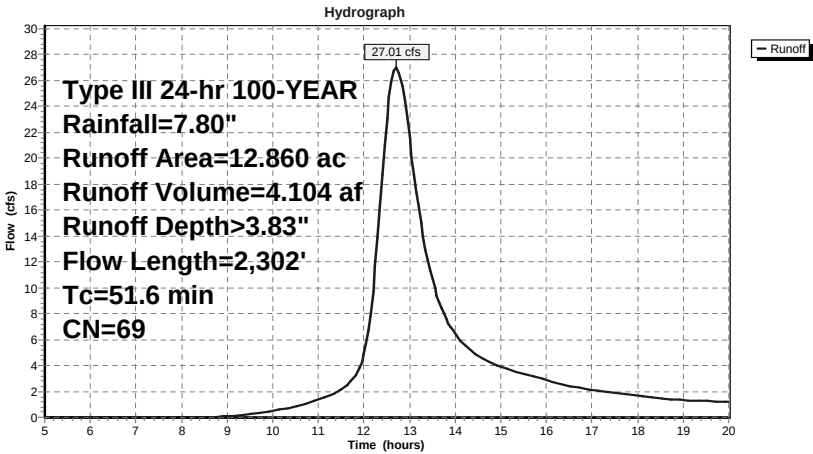
Runoff = 27.01 cfs @ 12.71 hrs, Volume= 4.104 af, Depth> 3.83"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
10.270	70	Woods, Good, HSG C
2.420	65	Brush, Good, HSG C
* 0.170	98	Paved roads, HSG C
12.860	69	Weighted Average
12.690		98.68% Pervious Area
0.170		1.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.1	100	0.0400	0.06		Sheet Flow, Woods: Dense underbrush n= 0.800 P2= 3.50"
22.3	1,140	0.1160	0.85		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
0.8	542	0.0810	11.22	276.04	Channel Flow, Area= 24.6 sf Perim= 22.5' r= 1.09' n= 0.040 Earth, cobble bottom, clean sides
1.4	520	0.0630	6.26	175.26	Channel Flow, Area= 28.0 sf Perim= 18.0' r= 1.56' n= 0.080 Earth, long dense weeds
51.6	2,302	Total			

Subcatchment DA-3: Drainage Area 3



Hydrograph for Subcatchment DA-3: Drainage Area 3

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.44	0.00	0.00	18.00	7.24	3.71	1.67
5.25	0.47	0.00	0.00	18.25	7.27	3.74	1.56
5.50	0.50	0.00	0.00	18.50	7.30	3.76	1.47
5.75	0.53	0.00	0.00	18.75	7.33	3.79	1.39
6.00	0.56	0.00	0.00	19.00	7.36	3.81	1.34
6.25	0.59	0.00	0.00	19.25	7.39	3.83	1.30
6.50	0.63	0.00	0.00	19.50	7.41	3.86	1.26
6.75	0.67	0.00	0.00	19.75	7.44	3.88	1.23
7.00	0.71	0.00	0.00	20.00	7.46	3.90	1.20
7.25	0.75	0.00	0.00				
7.50	0.79	0.00	0.00				
7.75	0.84	0.00	0.00				
8.00	0.89	0.00	0.00				
8.25	0.94	0.00	0.00				
8.50	1.00	0.00	0.00				
8.75	1.07	0.01	0.03				
9.00	1.14	0.01	0.08				
9.25	1.21	0.02	0.15				
9.50	1.29	0.03	0.25				
9.75	1.38	0.05	0.37				
10.00	1.47	0.07	0.51				
10.25	1.58	0.09	0.67				
10.50	1.69	0.12	0.86				
10.75	1.81	0.15	1.08				
11.00	1.95	0.20	1.36				
11.25	2.11	0.26	1.70				
11.50	2.32	0.34	2.15				
11.75	2.77	0.55	2.89				
12.00	3.90	1.20	4.90				
12.25	5.03	1.98	11.67				
12.50	5.48	2.31	23.08				
12.75	5.69	2.47	26.86				
13.00	5.85	2.60	21.59				
13.25	5.99	2.70	15.02				
13.50	6.11	2.80	10.61				
13.75	6.22	2.89	7.99				
14.00	6.33	2.97	6.44				
14.25	6.42	3.04	5.46				
14.50	6.51	3.11	4.77				
14.75	6.59	3.18	4.26				
15.00	6.66	3.24	3.87				
15.25	6.73	3.30	3.59				
15.50	6.80	3.35	3.35				
15.75	6.86	3.40	3.11				
16.00	6.91	3.44	2.88				
16.25	6.96	3.48	2.65				
16.50	7.01	3.52	2.44				
16.75	7.05	3.56	2.25				
17.00	7.09	3.59	2.11				
17.25	7.13	3.62	1.99				
17.50	7.17	3.65	1.88				
17.75	7.21	3.68	1.77				

Summary for Reach DP-3: 24" RCP @ Long Meadow Road

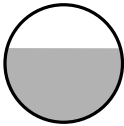
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 12.860 ac, 1.32% Impervious, Inflow Depth > 3.83" for 100-YEAR event
Inflow = 27.01 cfs @ 12.71 hrs, Volume= 4.104 af
Outflow = 27.01 cfs @ 12.71 hrs, Volume= 4.104 af, Atten= 0%, Lag= 0.1 min

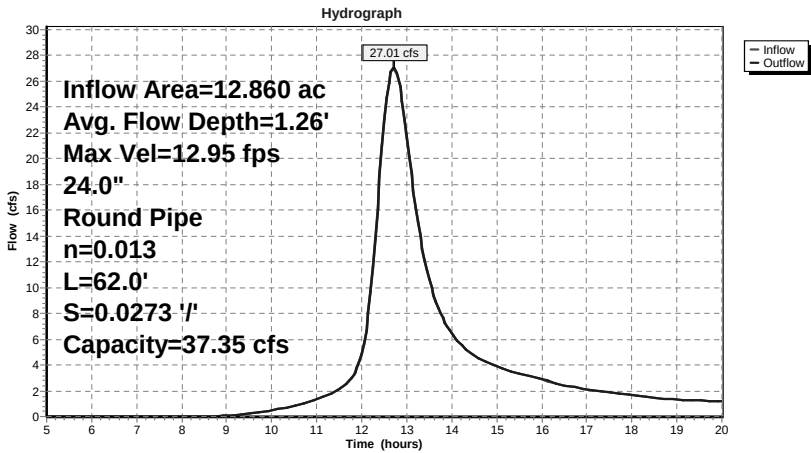
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 12.95 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 6.60 fps, Avg. Travel Time= 0.2 min

Peak Storage= 129 cf @ 12.71 hrs
Average Depth at Peak Storage= 1.26'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 37.35 cfs

24.0" Round Pipe
n= 0.013
Length= 62.0' Slope= 0.0273 '/'
Inlet Invert= 593.70', Outlet Invert= 592.01'

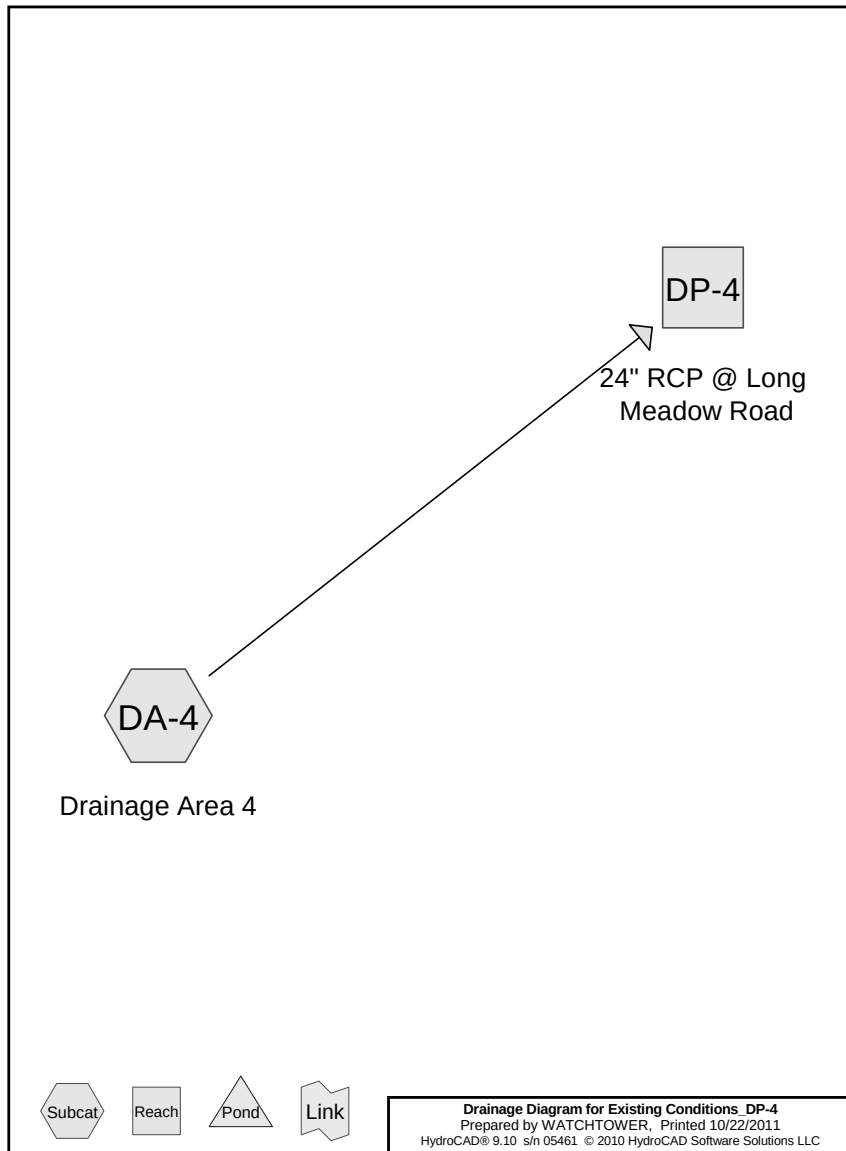


Reach DP-3: 24" RCP @ Long Meadow Road



Hydrograph for Reach DP-3: 24" RCP @ Long Meadow Road

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	0.00	0	593.70	0.00
5.50	0.00	0	593.70	0.00
6.00	0.00	0	593.70	0.00
6.50	0.00	0	593.70	0.00
7.00	0.00	0	593.70	0.00
7.50	0.00	0	593.70	0.00
8.00	0.00	0	593.70	0.00
8.50	0.00	0	593.71	0.00
9.00	0.08	2	593.77	0.08
9.50	0.25	5	593.82	0.25
10.00	0.51	8	593.86	0.51
10.50	0.86	11	593.91	0.85
11.00	1.36	15	593.96	1.36
11.50	2.15	21	594.02	2.14
12.00	4.90	37	594.19	4.86
12.50	23.08	114	594.84	22.98
13.00	21.59	109	594.79	21.65
13.50	10.61	64	594.43	10.65
14.00	6.44	45	594.26	6.46
14.50	4.77	36	594.18	4.77
15.00	3.87	31	594.14	3.88
15.50	3.35	28	594.10	3.35
16.00	2.88	25	594.08	2.89
16.50	2.44	23	594.05	2.44
17.00	2.11	20	594.02	2.11
17.50	1.88	19	594.00	1.88
18.00	1.67	17	593.99	1.67
18.50	1.47	16	593.97	1.47
19.00	1.34	15	593.96	1.34
19.50	1.26	14	593.95	1.26
20.00	1.20	14	593.95	1.20



Existing Conditions_DP-4

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.020	65	Brush, Good, HSG C (DA-4)
7.640	70	Woods, Good, HSG C (DA-4)
0.210	98	Paved roads, HSG C (DA-4)
8.870	70	TOTAL AREA

Time span=5.00-20.00 hrs, dt=0.01 hrs, 1501 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-4: Drainage Area 4 Runoff Area=8.870 ac 2.37% Impervious Runoff Depth>0.63"
Flow Length=1,660' Tc=43.9 min CN=70 Runoff=3.04 cfs 0.465 af

Reach DP-4: 24" RCP @ Long Meadow Avg. Flow Depth=0.36' Max Vel=7.74 fps Inflow=3.04 cfs 0.465 af
24.0" Round Pipe n=0.013 L=61.0' S=0.0341 '/ Capacity=41.77 cfs Outflow=3.04 cfs 0.465 af

Total Runoff Area = 8.870 ac Runoff Volume = 0.465 af Average Runoff Depth = 0.63"
97.63% Pervious = 8.660 ac 2.37% Impervious = 0.210 ac

Summary for Subcatchment DA-4: Drainage Area 4

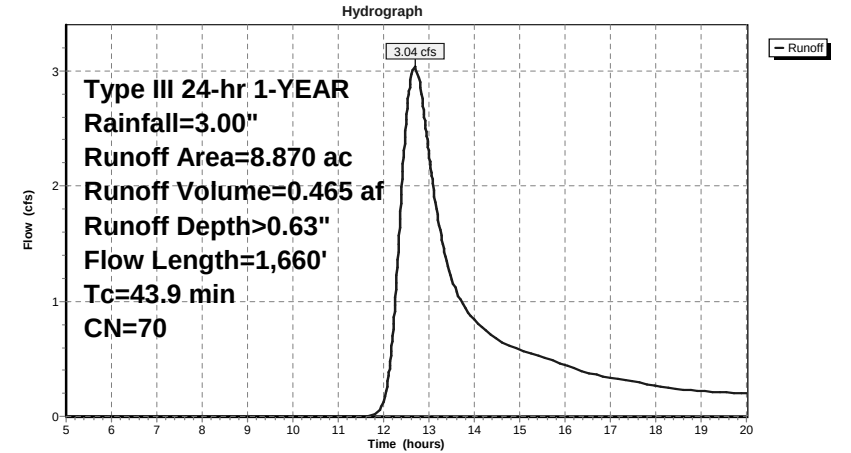
Runoff = 3.04 cfs @ 12.68 hrs, Volume= 0.465 af, Depth> 0.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
7.640	70	Woods, Good, HSG C
1.020	65	Brush, Good, HSG C
* 0.210	98	Paved roads, HSG C
8.870	70	Weighted Average
8.660		97.63% Pervious Area
0.210		2.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.1000	0.09		Sheet Flow, circle Woods: Dense underbrush n= 0.800 P2= 3.50"
21.9	1,120	0.1160	0.85		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
3.2	440	0.2100	2.29		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
43.9	1,660	Total			

Subcatchment DA-4: Drainage Area 4



Existing Conditions_DP-4

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 5

Hydrograph for Subcatchment DA-4: Drainage Area 4

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.17	0.00	0.00	15.40	2.60	0.51	0.53
5.20	0.18	0.00	0.00	15.60	2.62	0.52	0.50
5.40	0.19	0.00	0.00	15.80	2.64	0.52	0.47
5.60	0.20	0.00	0.00	16.00	2.66	0.53	0.45
5.80	0.21	0.00	0.00	16.20	2.67	0.54	0.42
6.00	0.22	0.00	0.00	16.40	2.69	0.55	0.39
6.20	0.23	0.00	0.00	16.60	2.70	0.56	0.37
6.40	0.24	0.00	0.00	16.80	2.72	0.56	0.35
6.60	0.25	0.00	0.00	17.00	2.73	0.57	0.34
6.80	0.26	0.00	0.00	17.20	2.74	0.58	0.32
7.00	0.27	0.00	0.00	17.40	2.75	0.58	0.31
7.20	0.28	0.00	0.00	17.60	2.76	0.59	0.30
7.40	0.30	0.00	0.00	17.80	2.77	0.59	0.28
7.60	0.31	0.00	0.00	18.00	2.78	0.60	0.27
7.80	0.33	0.00	0.00	18.20	2.79	0.60	0.26
8.00	0.34	0.00	0.00	18.40	2.80	0.61	0.24
8.20	0.36	0.00	0.00	18.60	2.81	0.61	0.23
8.40	0.38	0.00	0.00	18.80	2.82	0.62	0.23
8.60	0.40	0.00	0.00	19.00	2.83	0.62	0.22
8.80	0.42	0.00	0.00	19.20	2.84	0.63	0.22
9.00	0.44	0.00	0.00	19.40	2.85	0.63	0.21
9.20	0.46	0.00	0.00	19.60	2.86	0.64	0.21
9.40	0.49	0.00	0.00	19.80	2.86	0.64	0.20
9.60	0.51	0.00	0.00	20.00	2.87	0.64	0.20
9.80	0.54	0.00	0.00				
10.00	0.57	0.00	0.00				
10.20	0.60	0.00	0.00				
10.40	0.63	0.00	0.00				
10.60	0.67	0.00	0.00				
10.80	0.71	0.00	0.00				
11.00	0.75	0.00	0.00				
11.20	0.80	0.00	0.00				
11.40	0.86	0.00	0.00				
11.60	0.94	0.00	0.00				
11.80	1.12	0.02	0.02				
12.00	1.50	0.08	0.13				
12.20	1.88	0.20	0.70				
12.40	2.06	0.26	1.99				
12.60	2.14	0.30	2.94				
12.80	2.20	0.32	2.89				
13.00	2.25	0.34	2.28				
13.20	2.29	0.36	1.72				
13.40	2.33	0.38	1.33				
13.60	2.37	0.39	1.09				
13.80	2.40	0.41	0.94				
14.00	2.43	0.42	0.84				
14.20	2.46	0.44	0.76				
14.40	2.49	0.45	0.70				
14.60	2.51	0.46	0.65				
14.80	2.54	0.47	0.61				
15.00	2.56	0.49	0.58				
15.20	2.58	0.50	0.55				

Existing Conditions_DP-4

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 6

Summary for Reach DP-4: 24" RCP @ Long Meadow Road

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 8.870 ac, 2.37% Impervious, Inflow Depth > 0.63" for 1-YEAR event
 Inflow = 3.04 cfs @ 12.68 hrs, Volume= 0.465 af
 Outflow = 3.04 cfs @ 12.69 hrs, Volume= 0.465 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Max. Velocity= 7.74 fps, Min. Travel Time= 0.1 min

Avg. Velocity = 4.48 fps, Avg. Travel Time= 0.2 min

Peak Storage= 24 cf @ 12.69 hrs

Average Depth at Peak Storage= 0.36'

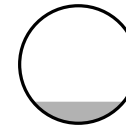
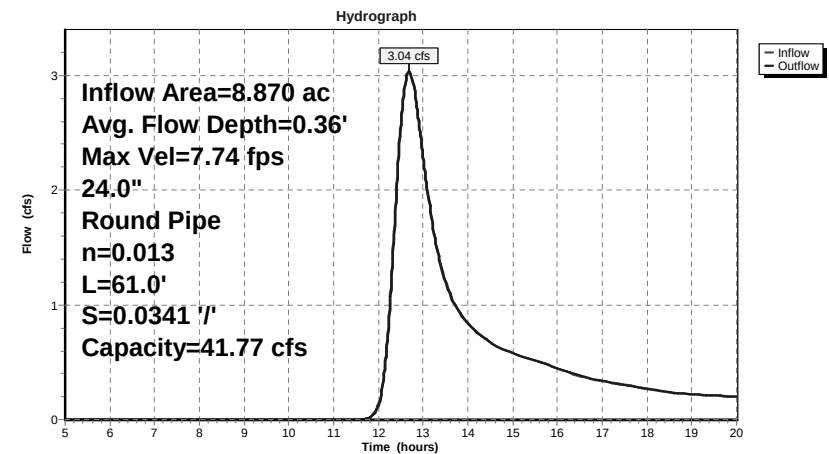
Bank-Full Depth= 2.00', Capacity at Bank-Full= 41.77 cfs

24.0" Round Pipe

n= 0.013

Length= 61.0' Slope= 0.0341 1'

Inlet Invert= 569.01', Outlet Invert= 566.93'

**Reach DP-4: 24" RCP @ Long Meadow Road**

Existing Conditions_DP-4

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 7

Hydrograph for Reach DP-4: 24" RCP @ Long Meadow Road

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	0.00	0	569.01	0.00
5.50	0.00	0	569.01	0.00
6.00	0.00	0	569.01	0.00
6.50	0.00	0	569.01	0.00
7.00	0.00	0	569.01	0.00
7.50	0.00	0	569.01	0.00
8.00	0.00	0	569.01	0.00
8.50	0.00	0	569.01	0.00
9.00	0.00	0	569.01	0.00
9.50	0.00	0	569.01	0.00
10.00	0.00	0	569.01	0.00
10.50	0.00	0	569.01	0.00
11.00	0.00	0	569.01	0.00
11.50	0.00	0	569.01	0.00
12.00	0.13	3	569.09	0.12
12.50	2.58	21	569.35	2.56
13.00	2.28	20	569.33	2.29
13.50	1.20	12	569.24	1.20
14.00	0.84	10	569.21	0.84
14.50	0.67	8	569.19	0.67
15.00	0.58	8	569.17	0.58
15.50	0.51	7	569.17	0.51
16.00	0.45	6	569.16	0.45
16.50	0.38	6	569.14	0.38
17.00	0.34	5	569.14	0.34
17.50	0.30	5	569.13	0.30
18.00	0.27	4	569.12	0.27
18.50	0.24	4	569.12	0.24
19.00	0.22	4	569.11	0.22
19.50	0.21	4	569.11	0.21
20.00	0.20	4	569.11	0.20

Existing Conditions_DP-4

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 8

Time span=5.00-20.00 hrs, dt=0.01 hrs, 1501 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-4: Drainage Area 4Runoff Area=8.870 ac 2.37% Impervious Runoff Depth>1.85"
Flow Length=1,660' Tc=43.9 min CN=70 Runoff=9.74 cfs 1.364 af**Reach DP-4: 24" RCP @ Long Meadow**Avg. Flow Depth=0.66' Max Vel=10.84 fps Inflow=9.74 cfs 1.364 af
24.0" Round Pipe n=0.013 L=61.0' S=0.0341 '/ Capacity=41.77 cfs Outflow=9.74 cfs 1.364 af**Total Runoff Area = 8.870 ac Runoff Volume = 1.364 af Average Runoff Depth = 1.85"**
97.63% Pervious = 8.660 ac 2.37% Impervious = 0.210 ac

Existing Conditions_DP-4

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 9

Summary for Subcatchment DA-4: Drainage Area 4

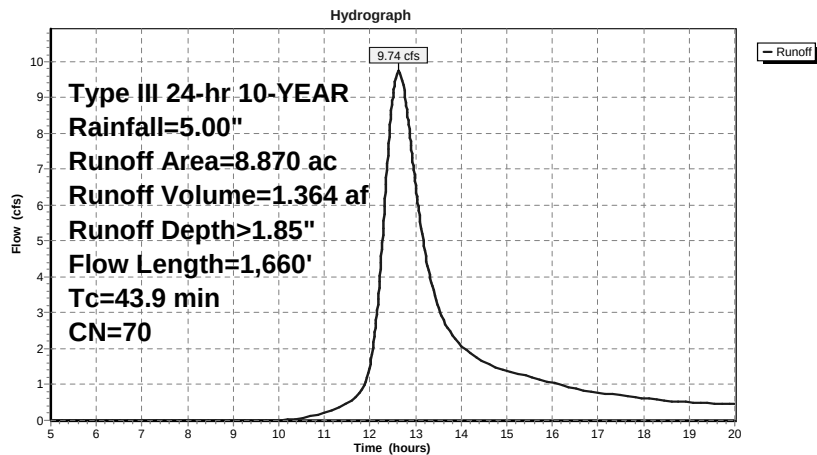
Runoff = 9.74 cfs @ 12.63 hrs, Volume= 1.364 af, Depth> 1.85"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
7.640	70	Woods, Good, HSG C
1.020	65	Brush, Good, HSG C
* 0.210	98	Paved roads, HSG C
8.870	70	Weighted Average
8.660		97.63% Pervious Area
0.210		2.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.1000	0.09		Sheet Flow, circle Woods: Dense underbrush n= 0.800 P2= 3.50"
21.9	1,120	0.1160	0.85		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
3.2	440	0.2100	2.29		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
43.9	1,660	Total			

Subcatchment DA-4: Drainage Area 4**Existing Conditions_DP-4**

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 10

Hydrograph for Subcatchment DA-4: Drainage Area 4

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.28	0.00	0.00	15.40	4.34	1.56	1.25
5.20	0.30	0.00	0.00	15.60	4.37	1.58	1.18
5.40	0.31	0.00	0.00	15.80	4.40	1.61	1.12
5.60	0.33	0.00	0.00	16.00	4.43	1.62	1.05
5.80	0.34	0.00	0.00	16.20	4.46	1.64	0.98
6.00	0.36	0.00	0.00	16.40	4.48	1.66	0.92
6.20	0.38	0.00	0.00	16.60	4.50	1.68	0.86
6.40	0.39	0.00	0.00	16.80	4.53	1.69	0.81
6.60	0.41	0.00	0.00	17.00	4.55	1.71	0.78
6.80	0.43	0.00	0.00	17.20	4.57	1.72	0.74
7.00	0.45	0.00	0.00	17.40	4.59	1.74	0.71
7.20	0.47	0.00	0.00	17.60	4.61	1.75	0.68
7.40	0.50	0.00	0.00	17.80	4.62	1.76	0.65
7.60	0.52	0.00	0.00	18.00	4.64	1.77	0.62
7.80	0.54	0.00	0.00	18.20	4.66	1.78	0.59
8.00	0.57	0.00	0.00	18.40	4.67	1.80	0.56
8.20	0.60	0.00	0.00	18.60	4.69	1.81	0.54
8.40	0.63	0.00	0.00	18.80	4.70	1.82	0.52
8.60	0.66	0.00	0.00	19.00	4.72	1.83	0.50
8.80	0.69	0.00	0.00	19.20	4.73	1.84	0.49
9.00	0.73	0.00	0.00	19.40	4.74	1.85	0.48
9.20	0.77	0.00	0.00	19.60	4.76	1.86	0.47
9.40	0.81	0.00	0.00	19.80	4.77	1.87	0.46
9.60	0.85	0.00	0.00	20.00	4.79	1.88	0.45
9.80	0.90	0.00	0.00				
10.00	0.95	0.00	0.00				
10.20	1.00	0.00	0.02				
10.40	1.05	0.01	0.04				
10.60	1.11	0.01	0.09				
10.80	1.18	0.02	0.14				
11.00	1.25	0.03	0.21				
11.20	1.33	0.05	0.29				
11.40	1.43	0.07	0.40				
11.60	1.57	0.10	0.55				
11.80	1.87	0.19	0.82				
12.00	2.50	0.46	1.53				
12.20	3.13	0.79	3.69				
12.40	3.43	0.96	7.55				
12.60	3.57	1.05	9.67				
12.80	3.67	1.11	8.77				
13.00	3.75	1.17	6.55				
13.20	3.82	1.21	4.76				
13.40	3.89	1.25	3.58				
13.60	3.95	1.29	2.84				
13.80	4.00	1.33	2.39				
14.00	4.06	1.37	2.09				
14.20	4.10	1.40	1.88				
14.40	4.15	1.43	1.70				
14.60	4.19	1.46	1.57				
14.80	4.23	1.49	1.47				
15.00	4.27	1.51	1.39				
15.20	4.31	1.54	1.32				

Summary for Reach DP-4: 24" RCP @ Long Meadow Road

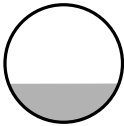
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 8.870 ac, 2.37% Impervious, Inflow Depth > 1.85" for 10-YEAR event
Inflow = 9.74 cfs @ 12.63 hrs, Volume= 1.364 af
Outflow = 9.74 cfs @ 12.64 hrs, Volume= 1.364 af, Atten= 0%, Lag= 0.2 min

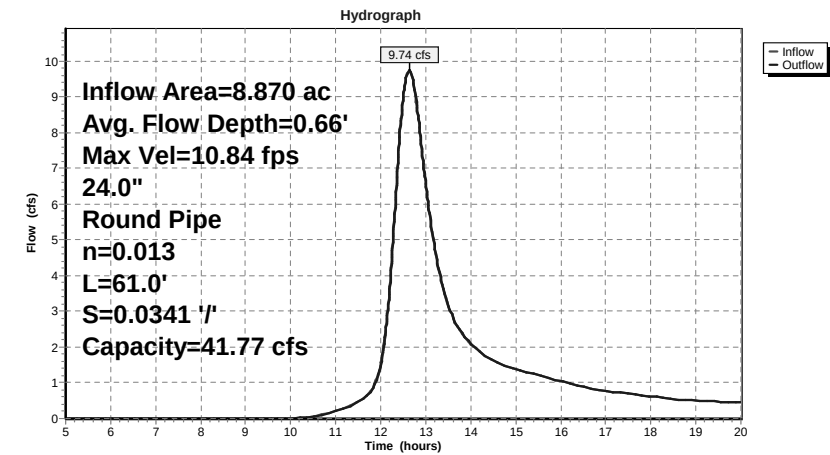
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 10.84 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.55 fps, Avg. Travel Time= 0.2 min

Peak Storage= 55 cf @ 12.63 hrs
Average Depth at Peak Storage= 0.66'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 41.77 cfs

24.0" Round Pipe
n= 0.013
Length= 61.0' Slope= 0.0341 '/'
Inlet Invert= 569.01', Outlet Invert= 566.93'



Reach DP-4: 24" RCP @ Long Meadow Road



Hydrograph for Reach DP-4: 24" RCP @ Long Meadow Road

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	0.00	0	569.01	0.00
5.50	0.00	0	569.01	0.00
6.00	0.00	0	569.01	0.00
6.50	0.00	0	569.01	0.00
7.00	0.00	0	569.01	0.00
7.50	0.00	0	569.01	0.00
8.00	0.00	0	569.01	0.00
8.50	0.00	0	569.01	0.00
9.00	0.00	0	569.01	0.00
9.50	0.00	0	569.01	0.00
10.00	0.00	0	569.02	0.00
10.50	0.06	2	569.07	0.06
11.00	0.21	4	569.11	0.21
11.50	0.47	6	569.16	0.46
12.00	1.53	15	569.27	1.51
12.50	9.02	52	569.64	8.99
13.00	6.55	41	569.55	6.58
13.50	3.17	25	569.38	3.18
14.00	2.09	18	569.31	2.10
14.50	1.63	15	569.28	1.63
15.00	1.39	14	569.26	1.39
15.50	1.22	13	569.24	1.22
16.00	1.05	11	569.23	1.05
16.50	0.89	10	569.21	0.89
17.00	0.78	9	569.20	0.78
17.50	0.70	9	569.19	0.70
18.00	0.62	8	569.18	0.62
18.50	0.55	7	569.17	0.55
19.00	0.50	7	569.16	0.50
19.50	0.48	7	569.16	0.48
20.00	0.45	6	569.16	0.45

Time span=5.00-20.00 hrs, dt=0.01 hrs, 1501 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-4: Drainage Area 4 Runoff Area=8.870 ac 2.37% Impervious Runoff Depth>3.95"
Flow Length=1,660' Tc=43.9 min CN=70 Runoff=20.95 cfs 2.918 af

Reach DP-4: 24" RCP @ Long Avg. Flow Depth=1.00' Max Vel=13.31 fps Inflow=20.95 cfs 2.918 af
24.0" Round Pipe n=0.013 L=61.0' S=0.0341 ' Capacity=41.77 cfs Outflow=20.95 cfs 2.918 af

Total Runoff Area = 8.870 ac Runoff Volume = 2.918 af Average Runoff Depth = 3.95"
97.63% Pervious = 8.660 ac 2.37% Impervious = 0.210 ac

Summary for Subcatchment DA-4: Drainage Area 4

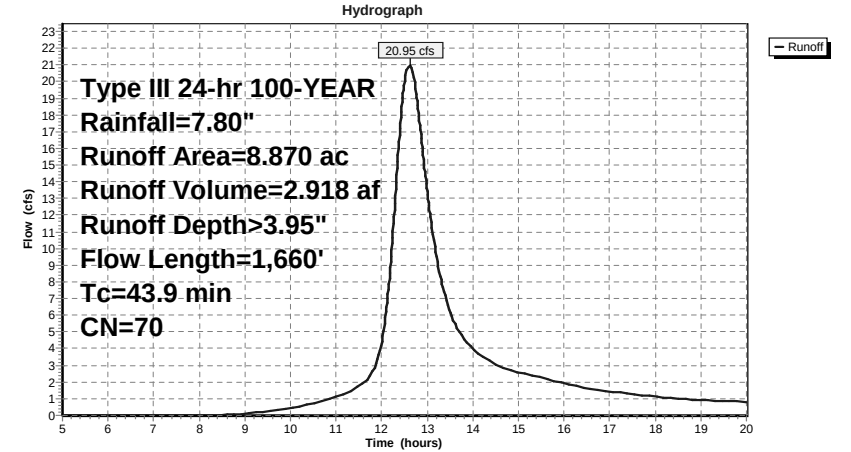
Runoff = 20.95 cfs @ 12.63 hrs, Volume= 2.918 af, Depth> 3.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
7.640	70	Woods, Good, HSG C
1.020	65	Brush, Good, HSG C
* 0.210	98	Paved roads, HSG C
8.870	70	Weighted Average
8.660		97.63% Pervious Area
0.210		2.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.1000	0.09		Sheet Flow, circle Woods: Dense underbrush n= 0.800 P2= 3.50"
21.9	1,120	0.1160	0.85		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
3.2	440	0.2100	2.29		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
43.9	1,660	Total			

Subcatchment DA-4: Drainage Area 4



Existing Conditions_DP-4

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 15

Hydrograph for Subcatchment DA-4: Drainage Area 4

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.44	0.00	0.00	15.40	6.77	3.43	2.32
5.20	0.47	0.00	0.00	15.60	6.82	3.47	2.19
5.40	0.49	0.00	0.00	15.80	6.87	3.51	2.07
5.60	0.51	0.00	0.00	16.00	6.91	3.54	1.94
5.80	0.54	0.00	0.00	16.20	6.95	3.58	1.81
6.00	0.56	0.00	0.00	16.40	6.99	3.61	1.69
6.20	0.59	0.00	0.00	16.60	7.03	3.64	1.58
6.40	0.61	0.00	0.00	16.80	7.06	3.67	1.50
6.60	0.64	0.00	0.00	17.00	7.09	3.70	1.43
6.80	0.67	0.00	0.00	17.20	7.13	3.72	1.36
7.00	0.71	0.00	0.00	17.40	7.16	3.75	1.30
7.20	0.74	0.00	0.00	17.60	7.19	3.77	1.25
7.40	0.77	0.00	0.00	17.80	7.21	3.80	1.19
7.60	0.81	0.00	0.00	18.00	7.24	3.82	1.13
7.80	0.85	0.00	0.00	18.20	7.26	3.84	1.07
8.00	0.89	0.00	0.00	18.40	7.29	3.86	1.02
8.20	0.93	0.00	0.00	18.60	7.31	3.88	0.98
8.40	0.98	0.00	0.01	18.80	7.33	3.90	0.94
8.60	1.03	0.01	0.03	19.00	7.36	3.92	0.92
8.80	1.08	0.01	0.07	19.20	7.38	3.94	0.90
9.00	1.14	0.02	0.11	19.40	7.40	3.95	0.88
9.20	1.20	0.02	0.16	19.60	7.42	3.97	0.86
9.40	1.26	0.03	0.22	19.80	7.44	3.99	0.84
9.60	1.33	0.05	0.29	20.00	7.46	4.01	0.82
9.80	1.40	0.06	0.37				
10.00	1.47	0.08	0.46				
10.20	1.55	0.10	0.55				
10.40	1.64	0.12	0.66				
10.60	1.74	0.15	0.79				
10.80	1.84	0.18	0.94				
11.00	1.95	0.22	1.12				
11.20	2.08	0.27	1.32				
11.40	2.24	0.34	1.58				
11.60	2.45	0.43	1.95				
11.80	2.91	0.67	2.61				
12.00	3.90	1.26	4.34				
12.20	4.89	1.95	9.18				
12.40	5.35	2.30	17.16				
12.60	5.56	2.46	20.91				
12.80	5.72	2.59	18.35				
13.00	5.85	2.69	13.41				
13.20	5.96	2.77	9.56				
13.40	6.06	2.86	7.08				
13.60	6.16	2.93	5.54				
13.80	6.25	3.00	4.60				
14.00	6.33	3.07	4.00				
14.20	6.40	3.13	3.56				
14.40	6.47	3.18	3.21				
14.60	6.54	3.24	2.94				
14.80	6.60	3.29	2.75				
15.00	6.66	3.34	2.59				
15.20	6.72	3.39	2.45				

Existing Conditions_DP-4

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 16

Summary for Reach DP-4: 24" RCP @ Long Meadow Road

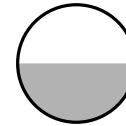
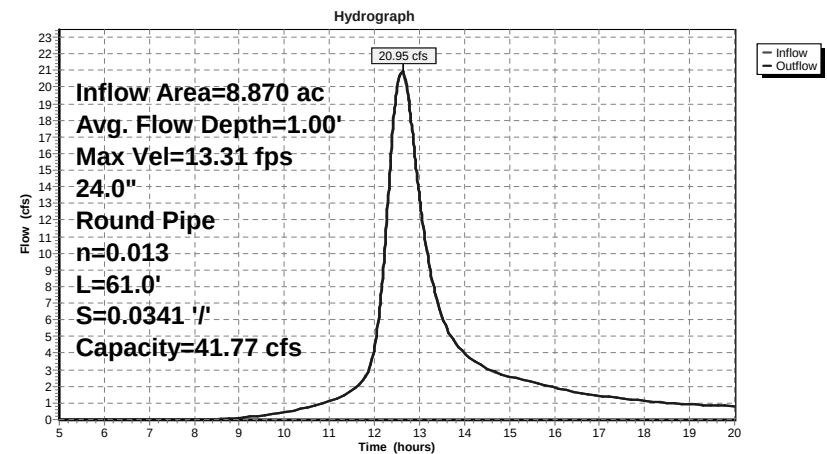
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 8.870 ac, 2.37% Impervious, Inflow Depth > 3.95" for 100-YEAR event
Inflow = 20.95 cfs @ 12.63 hrs, Volume= 2.918 af
Outflow = 20.95 cfs @ 12.63 hrs, Volume= 2.918 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 13.31 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 6.45 fps, Avg. Travel Time= 0.2 min

Peak Storage= 96 cf @ 12.63 hrs
Average Depth at Peak Storage= 1.00'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 41.77 cfs

24.0" Round Pipe
n= 0.013
Length= 61.0' Slope= 0.0341 '/'
Inlet Invert= 569.01', Outlet Invert= 566.93'

**Reach DP-4: 24" RCP @ Long Meadow Road**

Existing Conditions_DP-4

Prepared by WATCHTOWER

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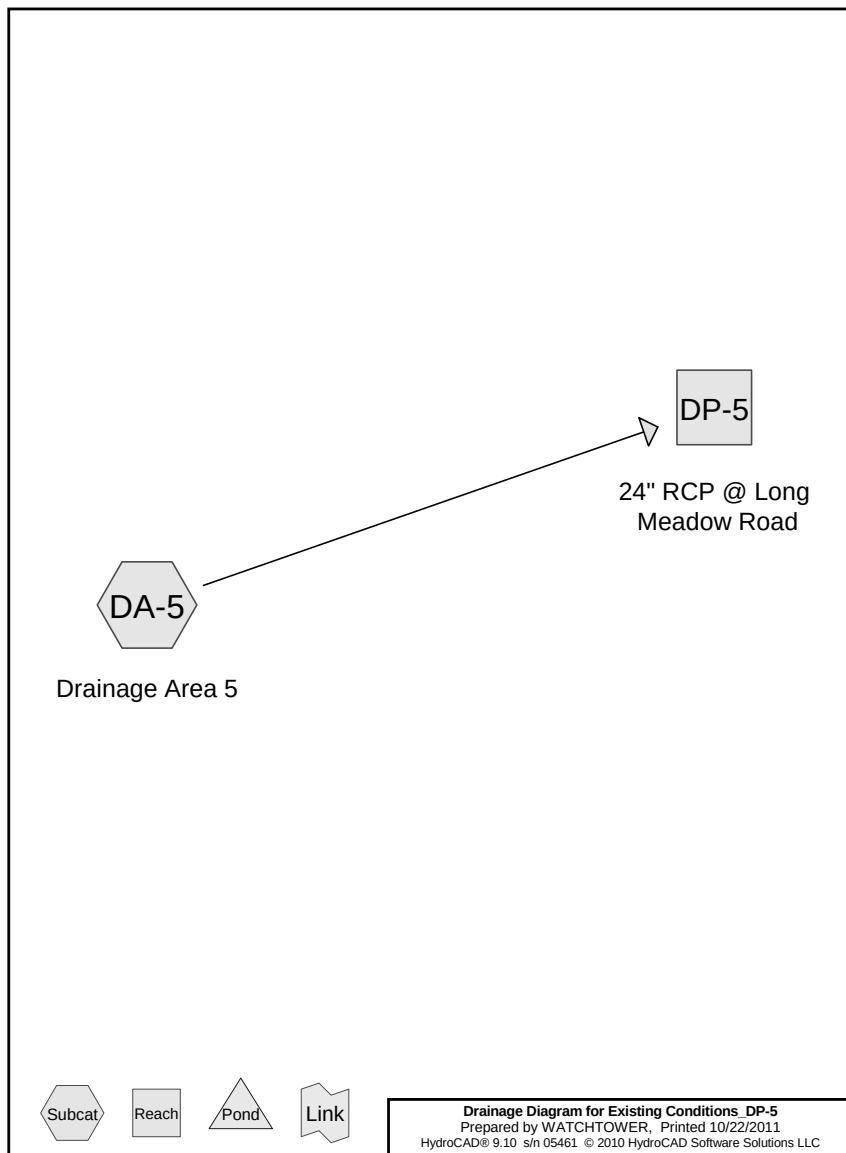
Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 17

Hydrograph for Reach DP-4: 24" RCP @ Long Meadow Road

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	0.00	0	569.01	0.00
5.50	0.00	0	569.01	0.00
6.00	0.00	0	569.01	0.00
6.50	0.00	0	569.01	0.00
7.00	0.00	0	569.01	0.00
7.50	0.00	0	569.01	0.00
8.00	0.00	0	569.01	0.00
8.50	0.02	1	569.04	0.02
9.00	0.11	2	569.08	0.11
9.50	0.26	4	569.12	0.25
10.00	0.46	6	569.16	0.46
10.50	0.72	9	569.19	0.72
11.00	1.12	12	569.24	1.12
11.50	1.74	16	569.29	1.74
12.00	4.34	31	569.44	4.31
12.50	19.93	92	569.98	19.89
13.00	13.41	69	569.79	13.46
13.50	6.22	40	569.53	6.24
14.00	4.00	29	569.43	4.00
14.50	3.06	24	569.38	3.07
15.00	2.59	21	569.35	2.60
15.50	2.26	19	569.33	2.26
16.00	1.94	17	569.30	1.94
16.50	1.63	15	569.28	1.63
17.00	1.43	14	569.26	1.43
17.50	1.28	13	569.25	1.28
18.00	1.13	12	569.24	1.13
18.50	1.00	11	569.22	1.00
19.00	0.92	10	569.21	0.92
19.50	0.87	10	569.21	0.87
20.00	0.82	10	569.20	0.82



Existing Conditions_DP-5

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
9.780	70	Woods, Good, HSG C (DA-5)
0.190	98	Paved roads, HSG C (DA-5)
9.970	71	TOTAL AREA

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-5: Drainage Area 5 Runoff Area=9.970 ac 1.91% Impervious Runoff Depth>0.67"
Flow Length=1,676' Tc=46.5 min CN=71 Runoff=3.58 cfs 0.558 af

Reach DP-5: 24" RCP @ Long Meadow Avg. Flow Depth=0.40' Max Vel=8.13 fps Inflow=3.58 cfs 0.558 af
24.0" Round Pipe n=0.013 L=61.0' S=0.0341 '/' Capacity=41.77 cfs Outflow=3.58 cfs 0.558 af

Total Runoff Area = 9.970 ac Runoff Volume = 0.558 af Average Runoff Depth = 0.67"
98.09% Pervious = 9.780 ac 1.91% Impervious = 0.190 ac

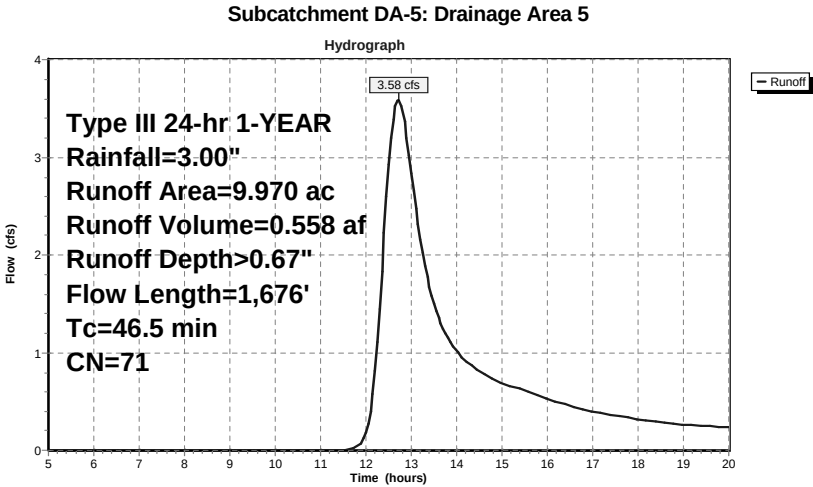
Summary for Subcatchment DA-5: Drainage Area 5

Runoff = 3.58 cfs @ 12.72 hrs, Volume= 0.558 af, Depth> 0.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
9.780	70	Woods, Good, HSG C
* 0.190	98	Paved roads, HSG C
9.970	71	Weighted Average
9.780		98.09% Pervious Area
0.190		1.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8	100	0.0500	0.07		Sheet Flow, Woods: Dense underbrush n= 0.800 P2= 3.50"
4.1	150	0.0600	0.61		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
11.2	546	0.1060	0.81		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
3.9	500	0.1800	2.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
2.5	380	0.2530	2.51		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
46.5	1,676	Total			



Hydrograph for Subcatchment DA-5: Drainage Area 5

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.17	0.00	0.00	18.00	2.78	0.64	0.32
5.25	0.18	0.00	0.00	18.25	2.80	0.65	0.30
5.50	0.19	0.00	0.00	18.50	2.81	0.65	0.28
5.75	0.20	0.00	0.00	18.75	2.82	0.66	0.27
6.00	0.22	0.00	0.00	19.00	2.83	0.66	0.26
6.25	0.23	0.00	0.00	19.25	2.84	0.67	0.25
6.50	0.24	0.00	0.00	19.50	2.85	0.68	0.25
6.75	0.26	0.00	0.00	19.75	2.86	0.68	0.24
7.00	0.27	0.00	0.00	20.00	2.87	0.69	0.23
7.25	0.29	0.00	0.00				
7.50	0.30	0.00	0.00				
7.75	0.32	0.00	0.00				
8.00	0.34	0.00	0.00				
8.25	0.36	0.00	0.00				
8.50	0.39	0.00	0.00				
8.75	0.41	0.00	0.00				
9.00	0.44	0.00	0.00				
9.25	0.47	0.00	0.00				
9.50	0.50	0.00	0.00				
9.75	0.53	0.00	0.00				
10.00	0.57	0.00	0.00				
10.25	0.61	0.00	0.00				
10.50	0.65	0.00	0.00				
10.75	0.70	0.00	0.00				
11.00	0.75	0.00	0.00				
11.25	0.81	0.00	0.00				
11.50	0.89	0.00	0.00				
11.75	1.07	0.01	0.02				
12.00	1.50	0.10	0.18				
12.25	1.93	0.24	1.10				
12.50	2.11	0.31	2.93				
12.75	2.19	0.34	3.57				
13.00	2.25	0.37	2.83				
13.25	2.30	0.40	2.02				
13.50	2.35	0.42	1.50				
13.75	2.39	0.44	1.19				
14.00	2.43	0.46	1.02				
14.25	2.47	0.48	0.90				
14.50	2.50	0.49	0.81				
14.75	2.53	0.51	0.74				
15.00	2.56	0.52	0.69				
15.25	2.59	0.54	0.65				
15.50	2.61	0.55	0.61				
15.75	2.64	0.56	0.57				
16.00	2.66	0.57	0.53				
16.25	2.68	0.58	0.49				
16.50	2.70	0.59	0.45				
16.75	2.71	0.60	0.42				
17.00	2.73	0.61	0.40				
17.25	2.74	0.62	0.38				
17.50	2.76	0.63	0.36				
17.75	2.77	0.63	0.34				

Summary for Reach DP-5: 24" RCP @ Long Meadow Road

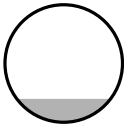
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 9.970 ac, 1.91% Impervious, Inflow Depth > 0.67" for 1-YEAR event
Inflow = 3.58 cfs @ 12.72 hrs, Volume= 0.558 af
Outflow = 3.58 cfs @ 12.72 hrs, Volume= 0.558 af, Atten= 0%, Lag= 0.2 min

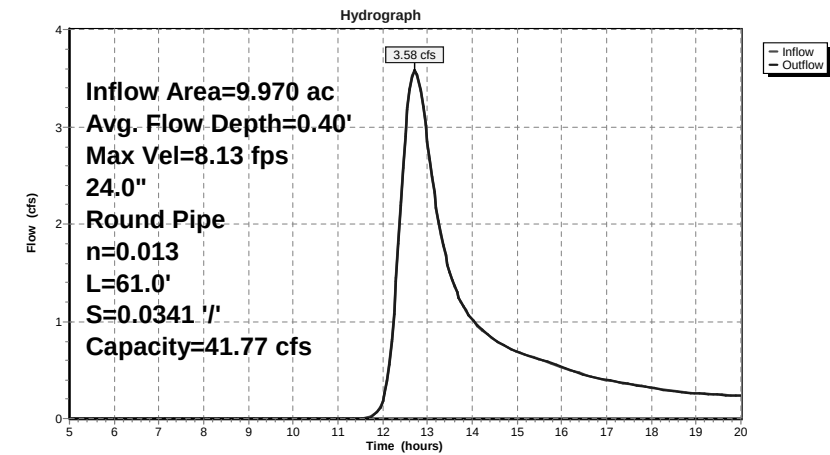
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.13 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 4.68 fps, Avg. Travel Time= 0.2 min

Peak Storage= 27 cf @ 12.72 hrs
Average Depth at Peak Storage= 0.40'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 41.77 cfs

24.0" Round Pipe
n= 0.013
Length= 61.0' Slope= 0.0341 '/'
Inlet Invert= 569.01', Outlet Invert= 566.93'



Reach DP-5: 24" RCP @ Long Meadow Road



Hydrograph for Reach DP-5: 24" RCP @ Long Meadow Road

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	0.00	0	569.01	0.00
5.50	0.00	0	569.01	0.00
6.00	0.00	0	569.01	0.00
6.50	0.00	0	569.01	0.00
7.00	0.00	0	569.01	0.00
7.50	0.00	0	569.01	0.00
8.00	0.00	0	569.01	0.00
8.50	0.00	0	569.01	0.00
9.00	0.00	0	569.01	0.00
9.50	0.00	0	569.01	0.00
10.00	0.00	0	569.01	0.00
10.50	0.00	0	569.01	0.00
11.00	0.00	0	569.01	0.00
11.50	0.00	0	569.01	0.00
12.00	0.18	3	569.10	0.18
12.50	2.93	23	569.37	2.91
13.00	2.83	23	569.36	2.85
13.50	1.50	15	569.27	1.51
14.00	1.02	11	569.23	1.02
14.50	0.81	9	569.20	0.81
15.00	0.69	8	569.19	0.69
15.50	0.61	8	569.18	0.61
16.00	0.53	7	569.17	0.53
16.50	0.45	6	569.16	0.45
17.00	0.40	6	569.15	0.40
17.50	0.36	5	569.14	0.36
18.00	0.32	5	569.13	0.32
18.50	0.28	5	569.13	0.28
19.00	0.26	4	569.12	0.26
19.50	0.25	4	569.12	0.25
20.00	0.23	4	569.12	0.23

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-5: Drainage Area 5 Runoff Area=9.970 ac 1.91% Impervious Runoff Depth>1.92"
Flow Length=1,676' Tc=46.5 min CN=71 Runoff=11.06 cfs 1.595 af

Reach DP-5: 24" RCP @ Long Avg. Flow Depth=0.70' Max Vel=11.23 fps Inflow=11.06 cfs 1.595 af
24.0" Round Pipe n=0.013 L=61.0' S=0.0341 ' / ' Capacity=41.77 cfs Outflow=11.05 cfs 1.595 af

Total Runoff Area = 9.970 ac Runoff Volume = 1.595 af Average Runoff Depth = 1.92"
98.09% Pervious = 9.780 ac 1.91% Impervious = 0.190 ac

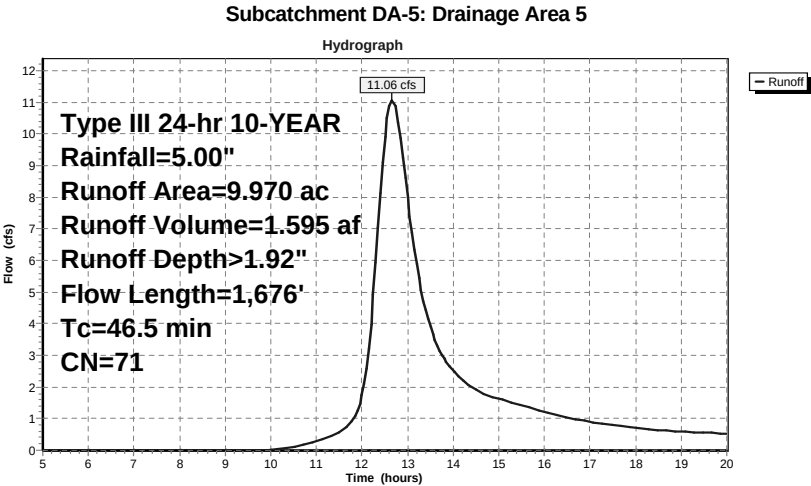
Summary for Subcatchment DA-5: Drainage Area 5

Runoff = 11.06 cfs @ 12.66 hrs, Volume= 1.595 af, Depth> 1.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
9.780	70	Woods, Good, HSG C
* 0.190	98	Paved roads, HSG C
9.970	71	Weighted Average
9.780		98.09% Pervious Area
0.190		1.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8	100	0.0500	0.07		Sheet Flow, Woods: Dense underbrush n= 0.800 P2= 3.50"
4.1	150	0.0600	0.61		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
11.2	546	0.1060	0.81		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
3.9	500	0.1800	2.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
2.5	380	0.2530	2.51		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
46.5	1,676	Total			



Hydrograph for Subcatchment DA-5: Drainage Area 5

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.28	0.00	0.00	18.00	4.64	1.85	0.72
5.25	0.30	0.00	0.00	18.25	4.66	1.86	0.67
5.50	0.32	0.00	0.00	18.50	4.68	1.88	0.63
5.75	0.34	0.00	0.00	18.75	4.70	1.89	0.60
6.00	0.36	0.00	0.00	19.00	4.72	1.90	0.58
6.25	0.38	0.00	0.00	19.25	4.73	1.92	0.57
6.50	0.40	0.00	0.00	19.50	4.75	1.93	0.55
6.75	0.43	0.00	0.00	19.75	4.77	1.94	0.54
7.00	0.45	0.00	0.00	20.00	4.79	1.96	0.52
7.25	0.48	0.00	0.00				
7.50	0.51	0.00	0.00				
7.75	0.54	0.00	0.00				
8.00	0.57	0.00	0.00				
8.25	0.60	0.00	0.00				
8.50	0.64	0.00	0.00				
8.75	0.68	0.00	0.00				
9.00	0.73	0.00	0.00				
9.25	0.78	0.00	0.00				
9.50	0.83	0.00	0.00				
9.75	0.89	0.00	0.00				
10.00	0.95	0.00	0.01				
10.25	1.01	0.01	0.05				
10.50	1.08	0.02	0.10				
10.75	1.16	0.03	0.18				
11.00	1.25	0.04	0.28				
11.25	1.36	0.06	0.40				
11.50	1.49	0.10	0.57				
11.75	1.78	0.18	0.87				
12.00	2.50	0.49	1.74				
12.25	3.22	0.89	4.90				
12.50	3.51	1.07	9.91				
12.75	3.64	1.16	10.77				
13.00	3.75	1.23	8.00				
13.25	3.84	1.28	5.45				
13.50	3.92	1.34	3.90				
13.75	3.99	1.39	3.01				
14.00	4.06	1.43	2.51				
14.25	4.11	1.47	2.17				
14.50	4.17	1.51	1.93				
14.75	4.22	1.55	1.75				
15.00	4.27	1.58	1.62				
15.25	4.32	1.61	1.52				
15.50	4.36	1.64	1.42				
15.75	4.40	1.67	1.32				
16.00	4.43	1.70	1.22				
16.25	4.46	1.72	1.12				
16.50	4.49	1.74	1.03				
16.75	4.52	1.76	0.96				
17.00	4.55	1.78	0.90				
17.25	4.57	1.80	0.85				
17.50	4.60	1.82	0.81				
17.75	4.62	1.83	0.76				

Summary for Reach DP-5: 24" RCP @ Long Meadow Road

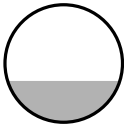
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 9.970 ac, 1.91% Impervious, Inflow Depth > 1.92" for 10-YEAR event
Inflow = 11.06 cfs @ 12.66 hrs, Volume= 1.595 af
Outflow = 11.05 cfs @ 12.67 hrs, Volume= 1.595 af, Atten= 0%, Lag= 0.2 min

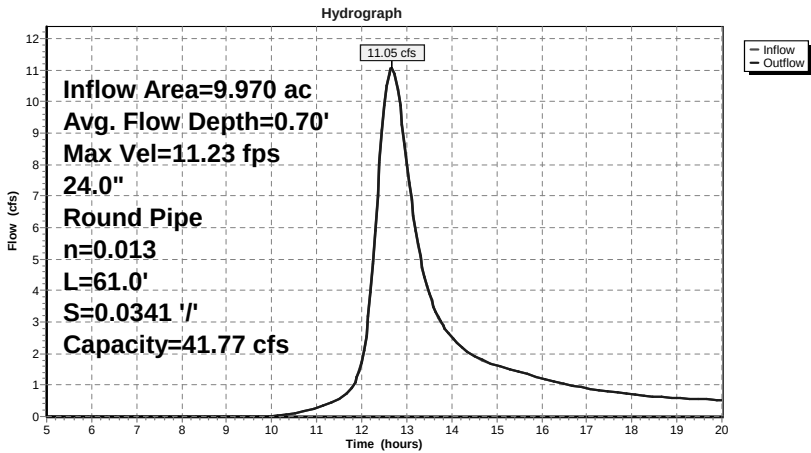
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.23 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.76 fps, Avg. Travel Time= 0.2 min

Peak Storage= 60 cf @ 12.66 hrs
Average Depth at Peak Storage= 0.70'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 41.77 cfs

24.0" Round Pipe
n= 0.013
Length= 61.0' Slope= 0.0341 '/'
Inlet Invert= 569.01', Outlet Invert= 566.93'



Reach DP-5: 24" RCP @ Long Meadow Road



Hydrograph for Reach DP-5: 24" RCP @ Long Meadow Road

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	0.00	0	569.01	0.00
5.50	0.00	0	569.01	0.00
6.00	0.00	0	569.01	0.00
6.50	0.00	0	569.01	0.00
7.00	0.00	0	569.01	0.00
7.50	0.00	0	569.01	0.00
8.00	0.00	0	569.01	0.00
8.50	0.00	0	569.01	0.00
9.00	0.00	0	569.01	0.00
9.50	0.00	0	569.01	0.00
10.00	0.01	0	569.04	0.01
10.50	0.10	2	569.08	0.10
11.00	0.28	4	569.13	0.28
11.50	0.57	7	569.17	0.57
12.00	1.74	16	569.29	1.72
12.50	9.91	55	569.67	9.87
13.00	8.00	48	569.60	8.03
13.50	3.90	29	569.42	3.91
14.00	2.51	21	569.34	2.51
14.50	1.93	17	569.30	1.93
15.00	1.62	15	569.28	1.62
15.50	1.42	14	569.26	1.42
16.00	1.22	13	569.24	1.22
16.50	1.03	11	569.23	1.04
17.00	0.90	10	569.21	0.90
17.50	0.81	9	569.20	0.81
18.00	0.72	9	569.19	0.72
18.50	0.63	8	569.18	0.63
19.00	0.58	8	569.17	0.58
19.50	0.55	7	569.17	0.55
20.00	0.52	7	569.17	0.52

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-5: Drainage Area 5 Runoff Area=9.970 ac 1.91% Impervious Runoff Depth>4.05"
Flow Length=1,676' Tc=46.5 min CN=71 Runoff=23.43 cfs 3.369 af

Reach DP-5: 24" RCP @ Long Avg. Flow Depth=1.07' Max Vel=13.68 fps Inflow=23.43 cfs 3.369 af
24.0" Round Pipe n=0.013 L=61.0' S=0.0341 ' Capacity=41.77 cfs Outflow=23.42 cfs 3.368 af

Total Runoff Area = 9.970 ac Runoff Volume = 3.369 af Average Runoff Depth = 4.05"
98.09% Pervious = 9.780 ac 1.91% Impervious = 0.190 ac

Summary for Subcatchment DA-5: Drainage Area 5

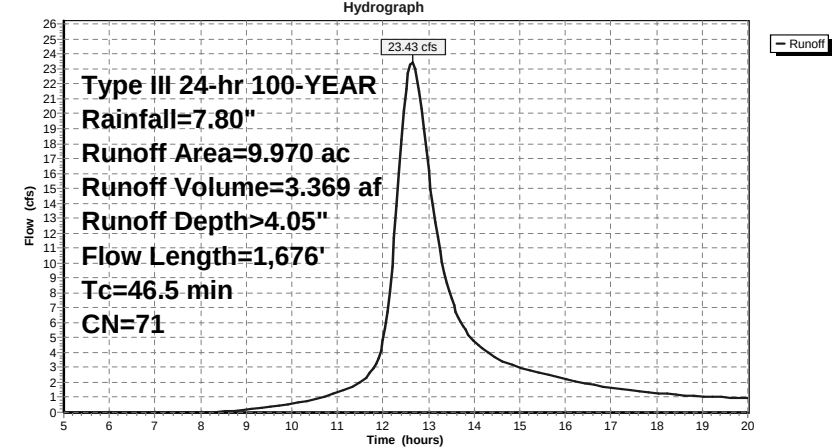
Runoff = 23.43 cfs @ 12.64 hrs, Volume= 3.369 af, Depth> 4.05"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
9.780	70	Woods, Good, HSG C
* 0.190	98	Paved roads, HSG C
9.970	71	Weighted Average
9.780		98.09% Pervious Area
0.190		1.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.8	100	0.0500	0.07		Sheet Flow, Woods: Dense underbrush n= 0.800 P2= 3.50"
4.1	150	0.0600	0.61		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
11.2	546	0.1060	0.81		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
3.9	500	0.1800	2.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
2.5	380	0.2530	2.51		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
46.5	1,676	Total			

Subcatchment DA-5: Drainage Area 5



Hydrograph for Subcatchment DA-5: Drainage Area 5

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.44	0.00	0.00	18.00	7.24	3.92	1.30
5.25	0.47	0.00	0.00	18.25	7.27	3.95	1.22
5.50	0.50	0.00	0.00	18.50	7.30	3.98	1.14
5.75	0.53	0.00	0.00	18.75	7.33	4.00	1.09
6.00	0.56	0.00	0.00	19.00	7.36	4.03	1.05
6.25	0.59	0.00	0.00	19.25	7.39	4.05	1.02
6.50	0.63	0.00	0.00	19.50	7.41	4.07	0.99
6.75	0.67	0.00	0.00	19.75	7.44	4.10	0.97
7.00	0.71	0.00	0.00	20.00	7.46	4.12	0.94
7.25	0.75	0.00	0.00				
7.50	0.79	0.00	0.00				
7.75	0.84	0.00	0.00				
8.00	0.89	0.00	0.00				
8.25	0.94	0.00	0.01				
8.50	1.00	0.01	0.05				
8.75	1.07	0.01	0.09				
9.00	1.14	0.02	0.16				
9.25	1.21	0.03	0.24				
9.50	1.29	0.05	0.33				
9.75	1.38	0.07	0.44				
10.00	1.47	0.09	0.57				
10.25	1.58	0.12	0.71				
10.50	1.69	0.15	0.87				
10.75	1.81	0.20	1.07				
11.00	1.95	0.25	1.32				
11.25	2.11	0.31	1.61				
11.50	2.32	0.41	2.02				
11.75	2.77	0.63	2.72				
12.00	3.90	1.33	4.78				
12.25	5.03	2.14	11.69				
12.50	5.48	2.48	21.65				
12.75	5.69	2.65	22.48				
13.00	5.85	2.78	16.21				
13.25	5.99	2.89	10.83				
13.50	6.11	2.99	7.60				
13.75	6.22	3.08	5.78				
14.00	6.33	3.16	4.76				
14.25	6.42	3.24	4.09				
14.50	6.51	3.31	3.60				
14.75	6.59	3.38	3.24				
15.00	6.66	3.44	3.00				
15.25	6.73	3.50	2.79				
15.50	6.80	3.55	2.60				
15.75	6.86	3.60	2.42				
16.00	6.91	3.65	2.24				
16.25	6.96	3.69	2.06				
16.50	7.01	3.73	1.89				
16.75	7.05	3.77	1.75				
17.00	7.09	3.80	1.64				
17.25	7.13	3.84	1.55				
17.50	7.17	3.87	1.47				
17.75	7.21	3.90	1.38				

Summary for Reach DP-5: 24" RCP @ Long Meadow Road

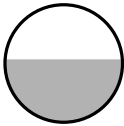
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 9.970 ac, 1.91% Impervious, Inflow Depth > 4.05" for 100-YEAR event
Inflow = 23.43 cfs @ 12.64 hrs, Volume= 3.369 af
Outflow = 23.42 cfs @ 12.64 hrs, Volume= 3.368 af, Atten= 0%, Lag= 0.1 min

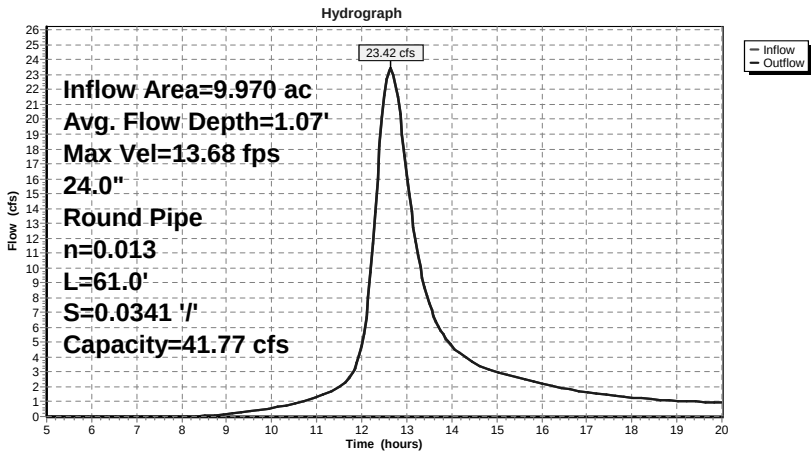
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 13.68 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 6.67 fps, Avg. Travel Time= 0.2 min

Peak Storage= 104 cf @ 12.64 hrs
Average Depth at Peak Storage= 1.07'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 41.77 cfs

24.0" Round Pipe
n= 0.013
Length= 61.0' Slope= 0.0341 '/'
Inlet Invert= 569.01', Outlet Invert= 566.93'

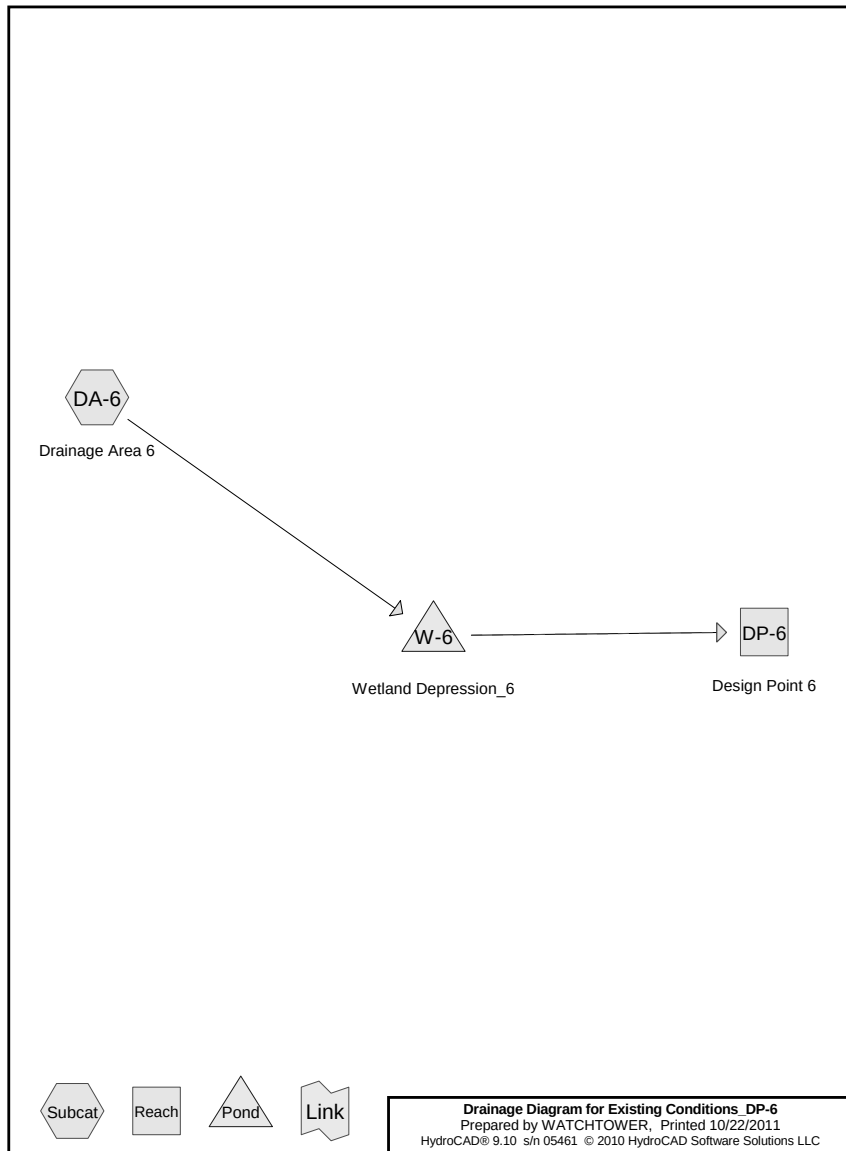


Reach DP-5: 24" RCP @ Long Meadow Road



Hydrograph for Reach DP-5: 24" RCP @ Long Meadow Road

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	0.00	0	569.01	0.00
5.50	0.00	0	569.01	0.00
6.00	0.00	0	569.01	0.00
6.50	0.00	0	569.01	0.00
7.00	0.00	0	569.01	0.00
7.50	0.00	0	569.01	0.00
8.00	0.00	0	569.02	0.00
8.50	0.05	1	569.06	0.04
9.00	0.16	3	569.10	0.16
9.50	0.33	5	569.14	0.33
10.00	0.57	7	569.17	0.56
10.50	0.87	10	569.21	0.87
11.00	1.32	13	569.25	1.32
11.50	2.02	18	569.31	2.01
12.00	4.78	33	569.47	4.74
12.50	21.65	98	570.03	21.59
13.00	16.21	79	569.88	16.27
13.50	7.60	46	569.59	7.63
14.00	4.76	33	569.47	4.76
14.50	3.60	27	569.41	3.60
15.00	3.00	24	569.37	3.00
15.50	2.60	21	569.35	2.61
16.00	2.24	19	569.32	2.24
16.50	1.89	17	569.30	1.89
17.00	1.64	16	569.28	1.64
17.50	1.47	14	569.27	1.47
18.00	1.30	13	569.25	1.30
18.50	1.14	12	569.24	1.15
19.00	1.05	11	569.23	1.05
19.50	0.99	11	569.22	0.99
20.00	0.94	11	569.22	0.94



Existing Conditions_DP-6

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.810	73	Woods, Fair, HSG C (DA-6)
5.640	77	Woods, Good, HSG D (DA-6)
0.640	98	Paved parking & Roads, HSG C (DA-6)
8.090	78	TOTAL AREA

Notes Listing (all nodes)

Line#	Node Number	Notes
1	DP-6	Assume the DP-2 is at the tail end of the pipe, therefore the full length of the culvert (73') has not been specified. The culvert outlet elevation has replaced the inlet elevation so as to not overtop Wetland Depression_1. Outlet elevation has been replaced to mimick the existing slope on the culvert pipe.

Time span=1.00-60.00 hrs, dt=0.01 hrs, 5901 points x 3
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment DA-6: Drainage Area 6 Runoff Area=8.090 ac 7.91% Impervious Runoff Depth=1.13"
Flow Length=642' Tc=10.7 min CN=78 Runoff=8.86 cfs 0.761 af

Reach DP-6: Design Point 6 Avg. Flow Depth=0.35' Max Vel=13.91 fps Inflow=7.38 cfs 0.761 af
48.0" Round Pipe n=0.013 L=1.0' S=0.1100 '/ Capacity=476.41 cfs Outflow=7.38 cfs 0.761 af

Pond W-6: Wetland Depression_6 Peak Elev=584.12' Storage=0.032 af Inflow=8.86 cfs 0.761 af
Primary=7.38 cfs 0.761 af Secondary=0.00 cfs 0.000 af Outflow=7.38 cfs 0.761 af

Total Runoff Area = 8.090 ac Runoff Volume = 0.761 af Average Runoff Depth = 1.13"
92.09% Pervious = 7.450 ac 7.91% Impervious = 0.640 ac

Existing Conditions_DP-6

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 5

Summary for Subcatchment DA-6: Drainage Area 6

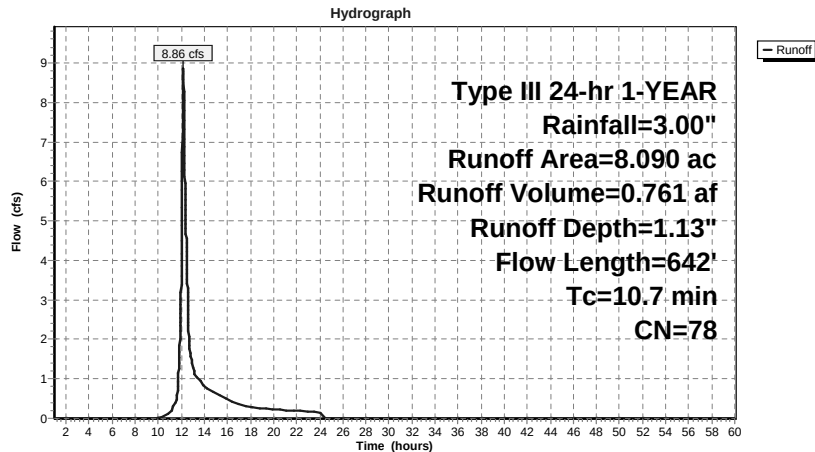
Runoff = 8.86 cfs @ 12.16 hrs, Volume= 0.761 af, Depth= 1.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-60.00 hrs, dt= 0.01 hrs

Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
5.640	77	Woods, Good, HSG D
1.810	73	Woods, Fair, HSG C
* 0.640	98	Paved parking & Roads, HSG C
8.090	78	Weighted Average
7.450		92.09% Pervious Area
0.640		7.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	87	0.1030	0.15		Sheet Flow, 87' SH Woods: Light underbrush n= 0.400 P2= 3.50"
0.3	48	0.3330	2.89		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.9	507	0.0730	9.66	164.21	Channel Flow, Area= 17.0 sf Perim= 22.0' r= 0.77' n= 0.035 Earth, dense weeds
10.7	642	Total			

Subcatchment DA-6: Drainage Area 6**Existing Conditions_DP-6**

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 6

Hydrograph for Subcatchment DA-6: Drainage Area 6

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.03	0.00	0.00	53.00	3.00	1.13	0.00
2.00	0.06	0.00	0.00	54.00	3.00	1.13	0.00
3.00	0.09	0.00	0.00	55.00	3.00	1.13	0.00
4.00	0.13	0.00	0.00	56.00	3.00	1.13	0.00
5.00	0.17	0.00	0.00	57.00	3.00	1.13	0.00
6.00	0.22	0.00	0.00	58.00	3.00	1.13	0.00
7.00	0.27	0.00	0.00	59.00	3.00	1.13	0.00
8.00	0.34	0.00	0.00	60.00	3.00	1.13	0.00
9.00	0.44	0.00	0.00				
10.00	0.57	0.00	0.00				
11.00	0.75	0.01	0.17				
12.00	1.50	0.23	3.60				
13.00	2.25	0.63	1.30				
14.00	2.43	0.74	0.82				
15.00	2.56	0.83	0.63				
16.00	2.66	0.89	0.46				
17.00	2.73	0.94	0.36				
18.00	2.78	0.98	0.28				
19.00	2.83	1.01	0.25				
20.00	2.87	1.04	0.23				
21.00	2.91	1.06	0.21				
22.00	2.94	1.09	0.19				
23.00	2.97	1.11	0.17				
24.00	3.00	1.13	0.15				
25.00	3.00	1.13	0.00				
26.00	3.00	1.13	0.00				
27.00	3.00	1.13	0.00				
28.00	3.00	1.13	0.00				
29.00	3.00	1.13	0.00				
30.00	3.00	1.13	0.00				
31.00	3.00	1.13	0.00				
32.00	3.00	1.13	0.00				
33.00	3.00	1.13	0.00				
34.00	3.00	1.13	0.00				
35.00	3.00	1.13	0.00				
36.00	3.00	1.13	0.00				
37.00	3.00	1.13	0.00				
38.00	3.00	1.13	0.00				
39.00	3.00	1.13	0.00				
40.00	3.00	1.13	0.00				
41.00	3.00	1.13	0.00				
42.00	3.00	1.13	0.00				
43.00	3.00	1.13	0.00				
44.00	3.00	1.13	0.00				
45.00	3.00	1.13	0.00				
46.00	3.00	1.13	0.00				
47.00	3.00	1.13	0.00				
48.00	3.00	1.13	0.00				
49.00	3.00	1.13	0.00				
50.00	3.00	1.13	0.00				
51.00	3.00	1.13	0.00				
52.00	3.00	1.13	0.00				

Summary for Reach DP-6: Design Point 6

Assume the DP-2 is at the tail end of the pipe, therefore the full length of the culvert (73') has not been specified. The culvert outlet elevation has replaced the inlet elevation so as to not overtop Wetland Depression_1. Outlet elevation has been replaced to mimick the existing slope on the culvert pipe.

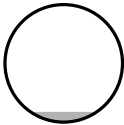
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 8.090 ac, 7.91% Impervious, Inflow Depth = 1.13" for 1-YEAR event
Inflow = 7.38 cfs @ 12.24 hrs, Volume= 0.761 af
Outflow = 7.38 cfs @ 12.24 hrs, Volume= 0.761 af, Atten= 0%, Lag= 0.0 min

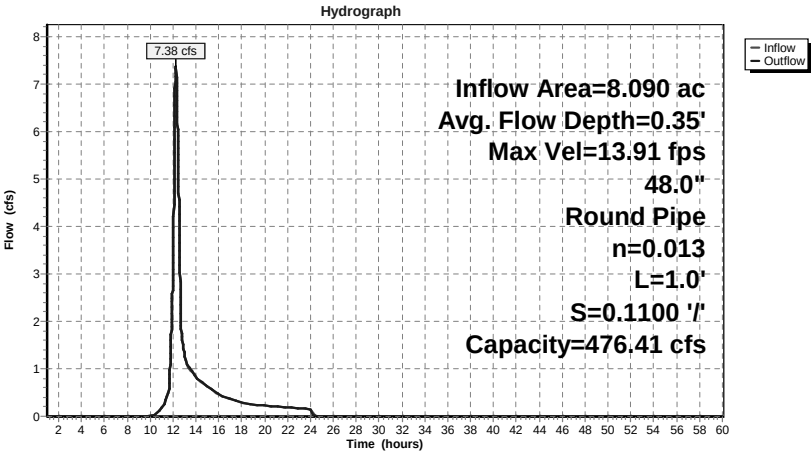
Routing by Dyn-Stor-Ind method, Time Span= 1.00-60.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 13.91 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 5.85 fps, Avg. Travel Time= 0.0 min

Peak Storage= 1 cf @ 12.24 hrs
Average Depth at Peak Storage= 0.35'
Bank-Full Depth= 4.00', Capacity at Bank-Full= 476.41 cfs

48.0" Round Pipe
n= 0.013
Length= 1.0' Slope= 0.1100 '/'
Inlet Invert= 579.80', Outlet Invert= 579.69'



Reach DP-6: Design Point 6



Existing Conditions_DP-6

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 9

Hydrograph for Reach DP-6: Design Point 6

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
1.00	0.00	0	579.80	0.00
3.00	0.00	0	579.80	0.00
5.00	0.00	0	579.80	0.00
7.00	0.00	0	579.80	0.00
9.00	0.00	0	579.80	0.00
11.00	0.17	0	579.86	0.17
13.00	1.31	0	579.95	1.30
15.00	0.64	0	579.91	0.63
17.00	0.37	0	579.88	0.36
19.00	0.26	0	579.87	0.25
21.00	0.22	0	579.86	0.21
23.00	0.18	0	579.86	0.17
25.00	0.00	0	579.80	0.00
27.00	0.00	0	579.80	0.00
29.00	0.00	0	579.80	0.00
31.00	0.00	0	579.80	0.00
33.00	0.00	0	579.80	0.00
35.00	0.00	0	579.80	0.00
37.00	0.00	0	579.80	0.00
39.00	0.00	0	579.80	0.00
41.00	0.00	0	579.80	0.00
43.00	0.00	0	579.80	0.00
45.00	0.00	0	579.80	0.00
47.00	0.00	0	579.80	0.00
49.00	0.00	0	579.80	0.00
51.00	0.00	0	579.80	0.00
53.00	0.00	0	579.80	0.00
55.00	0.00	0	579.80	0.00
57.00	0.00	0	579.80	0.00
59.00	0.00	0	579.80	0.00

Existing Conditions_DP-6

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 10

Summary for Pond W-6: Wetland Depression .6

Inflow Area = 8.090 ac, 7.91% Impervious, Inflow Depth = 1.13" for 1-YEAR event
 Inflow = 8.86 cfs @ 12.16 hrs, Volume= 0.761 af
 Outflow = 7.38 cfs @ 12.24 hrs, Volume= 0.761 af, Atten= 17%, Lag= 4.8 min
 Primary = 7.38 cfs @ 12.24 hrs, Volume= 0.761 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-60.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 584.12' @ 12.24 hrs Surf.Area= 0.104 ac Storage= 0.032 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 0.8 min (858.0 - 857.1)

Volume	Invert	Avail.Storage	Storage Description
#1	583.40'	3.751 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
583.40	0.000	0.000	0.000
584.00	0.071	0.021	0.021
589.00	1.421	3.730	3.751

Device	Routing	Invert	Outlet Devices
#1	Primary	582.73'	24.0" Round Culvert L= 78.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 582.73' / 582.33' S= 0.0051 ' /' Cc= 0.900 n= 0.013
#2	Secondary	588.90'	10.0' long x 18.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

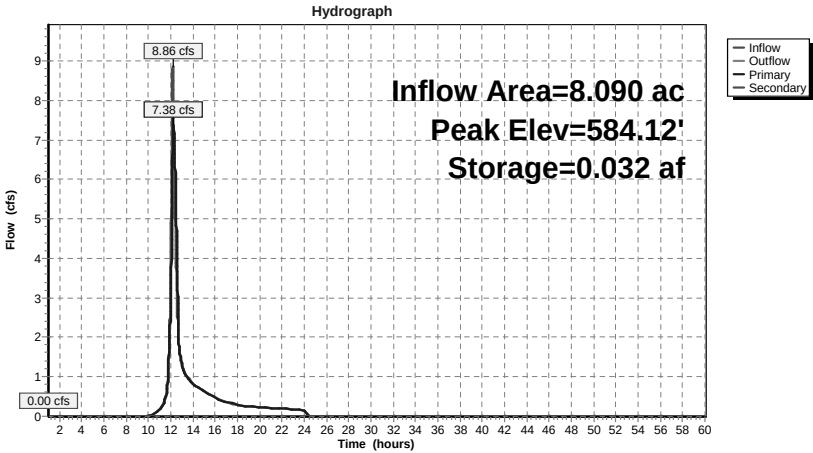
Primary OutFlow Max=7.37 cfs @ 12.24 hrs HW=584.12' TW=580.15' (Dynamic Tailwater)

1=Culvert (Barrel Controls 7.37 cfs @ 4.45 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=583.40' TW=579.80' (Dynamic Tailwater)

2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond W-6: Wetland Depression_6



Hydrograph for Pond W-6: Wetland Depression_6

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
1.00	0.00	0.000	583.40	0.00	0.00	0.00
3.00	0.00	0.000	583.40	0.00	0.00	0.00
5.00	0.00	0.000	583.40	0.00	0.00	0.00
7.00	0.00	0.000	583.40	0.00	0.00	0.00
9.00	0.00	0.000	583.40	0.00	0.00	0.00
11.00	0.17	0.000	583.40	0.17	0.17	0.00
13.00	1.30	0.000	583.40	1.31	1.31	0.00
15.00	0.63	0.000	583.40	0.64	0.64	0.00
17.00	0.36	0.000	583.40	0.37	0.37	0.00
19.00	0.25	0.000	583.40	0.26	0.26	0.00
21.00	0.21	0.000	583.40	0.22	0.22	0.00
23.00	0.17	0.000	583.40	0.18	0.18	0.00
25.00	0.00	0.000	583.40	0.00	0.00	0.00
27.00	0.00	0.000	583.40	0.00	0.00	0.00
29.00	0.00	0.000	583.40	0.00	0.00	0.00
31.00	0.00	0.000	583.40	0.00	0.00	0.00
33.00	0.00	0.000	583.40	0.00	0.00	0.00
35.00	0.00	0.000	583.40	0.00	0.00	0.00
37.00	0.00	0.000	583.40	0.00	0.00	0.00
39.00	0.00	0.000	583.40	0.00	0.00	0.00
41.00	0.00	0.000	583.40	0.00	0.00	0.00
43.00	0.00	0.000	583.40	0.00	0.00	0.00
45.00	0.00	0.000	583.40	0.00	0.00	0.00
47.00	0.00	0.000	583.40	0.00	0.00	0.00
49.00	0.00	0.000	583.40	0.00	0.00	0.00
51.00	0.00	0.000	583.40	0.00	0.00	0.00
53.00	0.00	0.000	583.40	0.00	0.00	0.00
55.00	0.00	0.000	583.40	0.00	0.00	0.00
57.00	0.00	0.000	583.40	0.00	0.00	0.00
59.00	0.00	0.000	583.40	0.00	0.00	0.00

Time span=1.00-60.00 hrs, dt=0.01 hrs, 5901 points x 3
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment DA-6: Drainage Area 6 Runoff Area=8.090 ac 7.91% Impervious Runoff Depth=2.71"
Flow Length=642' Tc=10.7 min CN=78 Runoff=21.96 cfs 1.828 af

Reach DP-6: Design Point 6 Avg. Flow Depth=0.47' Max Vel=16.84 fps Inflow=13.93 cfs 1.828 af
48.0" Round Pipe n=0.013 L=1.0' S=0.1100 '/ Capacity=476.41 cfs Outflow=13.93 cfs 1.828 af

Pond W-6: Wetland Depression_6 Peak Elev=584.86' Storage=0.183 af Inflow=21.96 cfs 1.828 af
Primary=13.93 cfs 1.828 af Secondary=0.00 cfs 0.000 af Outflow=13.93 cfs 1.828 af

Total Runoff Area = 8.090 ac Runoff Volume = 1.828 af Average Runoff Depth = 2.71"
92.09% Pervious = 7.450 ac 7.91% Impervious = 0.640 ac

Summary for Subcatchment DA-6: Drainage Area 6

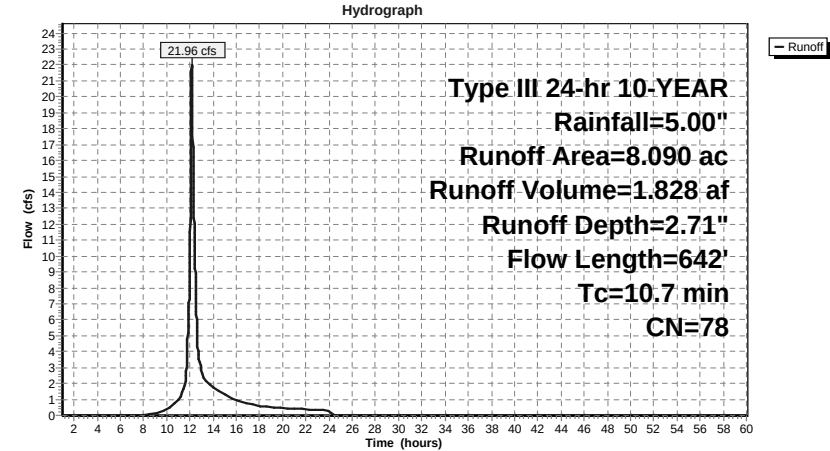
Runoff = 21.96 cfs @ 12.15 hrs, Volume= 1.828 af, Depth= 2.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
5.640	77	Woods, Good, HSG D
1.810	73	Woods, Fair, HSG C
* 0.640	98	Paved parking & Roads, HSG C
8.090	78	Weighted Average
7.450		92.09% Pervious Area
0.640		7.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	87	0.1030	0.15		Sheet Flow, 87' SH
					Woods: Light underbrush n= 0.400 P2= 3.50"
0.3	48	0.3330	2.89		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
0.9	507	0.0730	9.66	164.21	Channel Flow,
					Area= 17.0 sf Perim= 22.0' r= 0.77'
					n= 0.035 Earth, dense weeds
10.7	642	Total			

Subcatchment DA-6: Drainage Area 6



Existing Conditions_DP-6

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 15

Hydrograph for Subcatchment DA-6: Drainage Area 6

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.05	0.00	0.00	53.00	5.00	2.71	0.00
2.00	0.10	0.00	0.00	54.00	5.00	2.71	0.00
3.00	0.15	0.00	0.00	55.00	5.00	2.71	0.00
4.00	0.22	0.00	0.00	56.00	5.00	2.71	0.00
5.00	0.28	0.00	0.00	57.00	5.00	2.71	0.00
6.00	0.36	0.00	0.00	58.00	5.00	2.71	0.00
7.00	0.45	0.00	0.00	59.00	5.00	2.71	0.00
8.00	0.57	0.00	0.00	60.00	5.00	2.71	0.00
9.00	0.73	0.01	0.13				
10.00	0.95	0.05	0.39				
11.00	1.25	0.13	0.93				
12.00	2.50	0.79	10.10				
13.00	3.75	1.69	2.79				
14.00	4.06	1.93	1.72				
15.00	4.27	2.11	1.30				
16.00	4.43	2.24	0.93				
17.00	4.55	2.33	0.74				
18.00	4.64	2.41	0.57				
19.00	4.72	2.47	0.50				
20.00	4.79	2.53	0.45				
21.00	4.85	2.58	0.41				
22.00	4.90	2.63	0.38				
23.00	4.95	2.67	0.34				
24.00	5.00	2.71	0.30				
25.00	5.00	2.71	0.00				
26.00	5.00	2.71	0.00				
27.00	5.00	2.71	0.00				
28.00	5.00	2.71	0.00				
29.00	5.00	2.71	0.00				
30.00	5.00	2.71	0.00				
31.00	5.00	2.71	0.00				
32.00	5.00	2.71	0.00				
33.00	5.00	2.71	0.00				
34.00	5.00	2.71	0.00				
35.00	5.00	2.71	0.00				
36.00	5.00	2.71	0.00				
37.00	5.00	2.71	0.00				
38.00	5.00	2.71	0.00				
39.00	5.00	2.71	0.00				
40.00	5.00	2.71	0.00				
41.00	5.00	2.71	0.00				
42.00	5.00	2.71	0.00				
43.00	5.00	2.71	0.00				
44.00	5.00	2.71	0.00				
45.00	5.00	2.71	0.00				
46.00	5.00	2.71	0.00				
47.00	5.00	2.71	0.00				
48.00	5.00	2.71	0.00				
49.00	5.00	2.71	0.00				
50.00	5.00	2.71	0.00				
51.00	5.00	2.71	0.00				
52.00	5.00	2.71	0.00				

Existing Conditions_DP-6

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 16

Summary for Reach DP-6: Design Point 6

Assume the DP-2 is at the tail end of the pipe, therefore the full length of the culvert (73') has not been specified. The culvert outlet elevation has replaced the inlet elevation so as to not overtop Wetland Depression_1. Outlet elevation has been replaced to mimick the existing slope on the culvert pipe.

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 8.090 ac, 7.91% Impervious, Inflow Depth = 2.71" for 10-YEAR event
 Inflow = 13.93 cfs @ 12.31 hrs, Volume= 1.828 af
 Outflow = 13.93 cfs @ 12.31 hrs, Volume= 1.828 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-60.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 16.84 fps, Min. Travel Time= 0.0 min

Avg. Velocity = 7.08 fps, Avg. Travel Time= 0.0 min

Peak Storage= 1 cf @ 12.31 hrs

Average Depth at Peak Storage= 0.47'

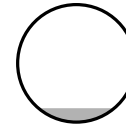
Bank-Full Depth= 4.00', Capacity at Bank-Full= 476.41 cfs

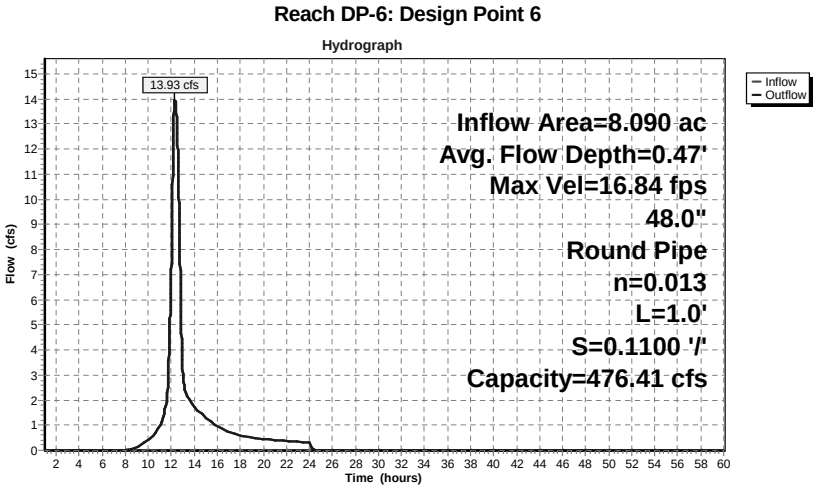
48.0" Round Pipe

n= 0.013

Length= 1.0' Slope= 0.1100 '/

Inlet Invert= 579.80', Outlet Invert= 579.69'





Hydrograph for Reach DP-6: Design Point 6

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
1.00	0.00	0	579.80	0.00
3.00	0.00	0	579.80	0.00
5.00	0.00	0	579.80	0.00
7.00	0.00	0	579.80	0.00
9.00	0.13	0	579.85	0.13
11.00	0.93	0	579.93	0.93
13.00	3.01	0	580.03	3.01
15.00	1.30	0	579.95	1.30
17.00	0.74	0	579.92	0.74
19.00	0.50	0	579.90	0.50
21.00	0.41	0	579.89	0.41
23.00	0.34	0	579.88	0.34
25.00	0.00	0	579.80	0.00
27.00	0.00	0	579.80	0.00
29.00	0.00	0	579.80	0.00
31.00	0.00	0	579.80	0.00
33.00	0.00	0	579.80	0.00
35.00	0.00	0	579.80	0.00
37.00	0.00	0	579.80	0.00
39.00	0.00	0	579.80	0.00
41.00	0.00	0	579.80	0.00
43.00	0.00	0	579.80	0.00
45.00	0.00	0	579.80	0.00
47.00	0.00	0	579.80	0.00
49.00	0.00	0	579.80	0.00
51.00	0.00	0	579.80	0.00
53.00	0.00	0	579.80	0.00
55.00	0.00	0	579.80	0.00
57.00	0.00	0	579.80	0.00
59.00	0.00	0	579.80	0.00

Summary for Pond W-6: Wetland Depression_6

Inflow Area = 8.090 ac, 7.91% Impervious, Inflow Depth = 2.71" for 10-YEAR event
Inflow = 21.96 cfs @ 12.15 hrs, Volume= 1.828 af
Outflow = 13.93 cfs @ 12.31 hrs, Volume= 1.828 af, Atten= 37%, Lag= 9.5 min
Primary = 13.93 cfs @ 12.31 hrs, Volume= 1.828 af
Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-60.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 584.86' @ 12.31 hrs Surf.Area= 0.304 ac Storage= 0.183 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 3.2 min (834.6 - 831.5)

Volume	Invert	Avail.Storage	Storage Description
#1	583.40'	3.751 af	Custom Stage Data (Prismatic) Listed below (Recalc)

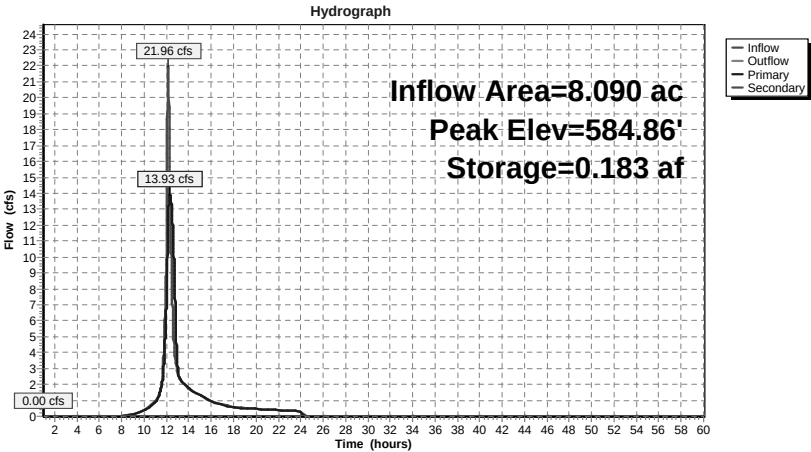
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
583.40	0.000	0.000	0.000
584.00	0.071	0.021	0.021
589.00	1.421	3.730	3.751

Device	Routing	Invert	Outlet Devices
#1	Primary	582.73'	24.0" Round Culvert L= 78.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 582.73' / 582.33' S= 0.0051 ' S Cc= 0.900 n= 0.013
#2	Secondary	588.90'	10.0' long x 18.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=13.93 cfs @ 12.31 hrs HW=584.86' TW=580.27' (Dynamic Tailwater)
1=Culvert (Barrel Controls 13.93 cfs @ 5.17 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=583.40' TW=579.80' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond W-6: Wetland Depression_6



Existing Conditions_DP-6

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 21

Hydrograph for Pond W-6: Wetland Depression_6

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
1.00	0.00	0.000	583.40	0.00	0.00	0.00
3.00	0.00	0.000	583.40	0.00	0.00	0.00
5.00	0.00	0.000	583.40	0.00	0.00	0.00
7.00	0.00	0.000	583.40	0.00	0.00	0.00
9.00	0.13	0.000	583.40	0.13	0.13	0.00
11.00	0.93	0.000	583.40	0.93	0.93	0.00
13.00	2.79	0.002	583.56	3.01	3.01	0.00
15.00	1.30	0.000	583.40	1.30	1.30	0.00
17.00	0.74	0.000	583.40	0.74	0.74	0.00
19.00	0.50	0.000	583.40	0.50	0.50	0.00
21.00	0.41	0.000	583.40	0.41	0.41	0.00
23.00	0.34	0.000	583.40	0.34	0.34	0.00
25.00	0.00	0.000	583.40	0.00	0.00	0.00
27.00	0.00	0.000	583.40	0.00	0.00	0.00
29.00	0.00	0.000	583.40	0.00	0.00	0.00
31.00	0.00	0.000	583.40	0.00	0.00	0.00
33.00	0.00	0.000	583.40	0.00	0.00	0.00
35.00	0.00	0.000	583.40	0.00	0.00	0.00
37.00	0.00	0.000	583.40	0.00	0.00	0.00
39.00	0.00	0.000	583.40	0.00	0.00	0.00
41.00	0.00	0.000	583.40	0.00	0.00	0.00
43.00	0.00	0.000	583.40	0.00	0.00	0.00
45.00	0.00	0.000	583.40	0.00	0.00	0.00
47.00	0.00	0.000	583.40	0.00	0.00	0.00
49.00	0.00	0.000	583.40	0.00	0.00	0.00
51.00	0.00	0.000	583.40	0.00	0.00	0.00
53.00	0.00	0.000	583.40	0.00	0.00	0.00
55.00	0.00	0.000	583.40	0.00	0.00	0.00
57.00	0.00	0.000	583.40	0.00	0.00	0.00
59.00	0.00	0.000	583.40	0.00	0.00	0.00

Existing Conditions_DP-6

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 22

Time span=1.00-60.00 hrs, dt=0.01 hrs, 5901 points x 3

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment DA-6: Drainage Area 6Runoff Area=8.090 ac 7.91% Impervious Runoff Depth=5.21"
Flow Length=642' Tc=10.7 min CN=78 Runoff=41.90 cfs 3.510 af**Reach DP-6: Design Point 6**Avg. Flow Depth=0.55' Max Vel=18.57 fps Inflow=19.33 cfs 3.510 af
48.0" Round Pipe n=0.013 L=1.0' S=0.1100 '/ Capacity=476.41 cfs Outflow=19.33 cfs 3.510 af**Pond W-6: Wetland Depression_6**Peak Elev=585.78' Storage=0.577 af Inflow=41.90 cfs 3.510 af
Primary=19.33 cfs 3.510 af Secondary=0.00 cfs 0.000 af Outflow=19.33 cfs 3.510 af**Total Runoff Area = 8.090 ac Runoff Volume = 3.510 af Average Runoff Depth = 5.21"**
92.09% Pervious = 7.450 ac 7.91% Impervious = 0.640 ac

Existing Conditions_DP-6

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 23

Summary for Subcatchment DA-6: Drainage Area 6

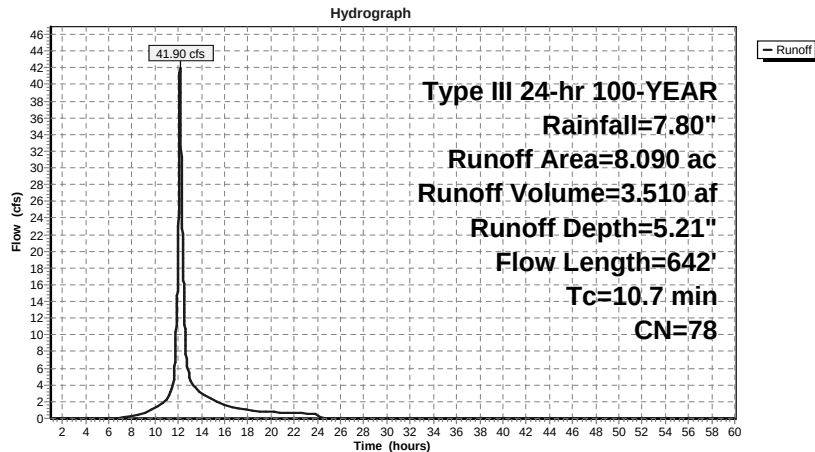
Runoff = 41.90 cfs @ 12.14 hrs, Volume= 3.510 af, Depth= 5.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-60.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
5.640	77	Woods, Good, HSG D
1.810	73	Woods, Fair, HSG C
* 0.640	98	Paved parking & Roads, HSG C
8.090	78	Weighted Average
7.450		92.09% Pervious Area
0.640		7.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	87	0.1030	0.15		Sheet Flow, 87' SH Woods: Light underbrush n= 0.400 P2= 3.50"
0.3	48	0.3330	2.89		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.9	507	0.0730	9.66	164.21	Channel Flow, Area= 17.0 sf Perim= 22.0' r= 0.77' n= 0.035 Earth, dense weeds
10.7	642	Total			

Subcatchment DA-6: Drainage Area 6**Existing Conditions_DP-6**

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 24

Hydrograph for Subcatchment DA-6: Drainage Area 6

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.08	0.00	0.00	53.00	7.80	5.21	0.00
2.00	0.16	0.00	0.00	54.00	7.80	5.21	0.00
3.00	0.24	0.00	0.00	55.00	7.80	5.21	0.00
4.00	0.34	0.00	0.00	56.00	7.80	5.21	0.00
5.00	0.44	0.00	0.00	57.00	7.80	5.21	0.00
6.00	0.56	0.00	0.00	58.00	7.80	5.21	0.00
7.00	0.71	0.01	0.10	59.00	7.80	5.21	0.00
8.00	0.89	0.03	0.29	60.00	7.80	5.21	0.00
9.00	1.14	0.10	0.66				
10.00	1.47	0.22	1.23				
11.00	1.95	0.46	2.33				
12.00	3.90	1.81	20.40				
13.00	5.85	3.45	4.92				
14.00	6.33	3.87	3.00				
15.00	6.66	4.17	2.25				
16.00	6.91	4.39	1.61				
17.00	7.09	4.56	1.26				
18.00	7.24	4.69	0.98				
19.00	7.36	4.80	0.86				
20.00	7.46	4.90	0.77				
21.00	7.56	4.99	0.70				
22.00	7.65	5.07	0.64				
23.00	7.73	5.14	0.57				
24.00	7.80	5.21	0.51				
25.00	7.80	5.21	0.00				
26.00	7.80	5.21	0.00				
27.00	7.80	5.21	0.00				
28.00	7.80	5.21	0.00				
29.00	7.80	5.21	0.00				
30.00	7.80	5.21	0.00				
31.00	7.80	5.21	0.00				
32.00	7.80	5.21	0.00				
33.00	7.80	5.21	0.00				
34.00	7.80	5.21	0.00				
35.00	7.80	5.21	0.00				
36.00	7.80	5.21	0.00				
37.00	7.80	5.21	0.00				
38.00	7.80	5.21	0.00				
39.00	7.80	5.21	0.00				
40.00	7.80	5.21	0.00				
41.00	7.80	5.21	0.00				
42.00	7.80	5.21	0.00				
43.00	7.80	5.21	0.00				
44.00	7.80	5.21	0.00				
45.00	7.80	5.21	0.00				
46.00	7.80	5.21	0.00				
47.00	7.80	5.21	0.00				
48.00	7.80	5.21	0.00				
49.00	7.80	5.21	0.00				
50.00	7.80	5.21	0.00				
51.00	7.80	5.21	0.00				
52.00	7.80	5.21	0.00				

Existing Conditions_DP-6

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 25

Summary for Reach DP-6: Design Point 6

Assume the DP-2 is at the tail end of the pipe, therefore the full length of the culvert (73') has not been specified. The culvert outlet elevation has replaced the inlet elevation so as to not overtop Wetland Depression_1. Outlet elevation has been replaced to mimick the existing slope on the culvert pipe.

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 8.090 ac, 7.91% Impervious, Inflow Depth = 5.21" for 100-YEAR event
Inflow = 19.33 cfs @ 12.41 hrs, Volume= 3.510 af
Outflow = 19.33 cfs @ 12.41 hrs, Volume= 3.510 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-60.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 18.57 fps, Min. Travel Time= 0.0 min

Avg. Velocity= 8.23 fps, Avg. Travel Time= 0.0 min

Peak Storage= 1 cf @ 12.41 hrs

Average Depth at Peak Storage= 0.55'

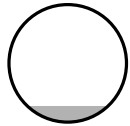
Bank-Full Depth= 4.00', Capacity at Bank-Full= 476.41 cfs

48.0" Round Pipe

n= 0.013

Length= 1.0' Slope= 0.1100 '/'

Inlet Invert= 579.80', Outlet Invert= 579.69'

**Existing Conditions_DP-6**

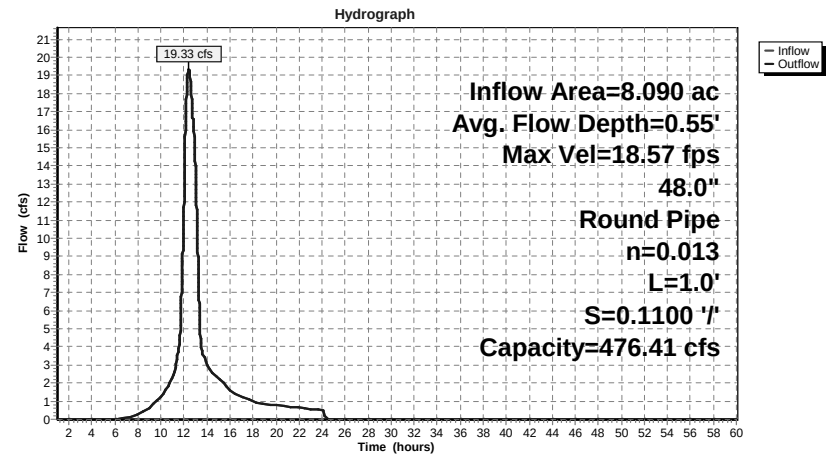
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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 26

Reach DP-6: Design Point 6

Existing Conditions_DP-6

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 27

Hydrograph for Reach DP-6: Design Point 6

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
1.00	0.00	0	579.80	0.00
3.00	0.00	0	579.80	0.00
5.00	0.00	0	579.80	0.00
7.00	0.10	0	579.84	0.10
9.00	0.66	0	579.91	0.66
11.00	2.31	0	580.00	2.31
13.00	13.75	1	580.27	13.75
15.00	2.26	0	580.00	2.26
17.00	1.26	0	579.95	1.26
19.00	0.86	0	579.93	0.86
21.00	0.70	0	579.91	0.70
23.00	0.57	0	579.90	0.57
25.00	0.00	0	579.80	0.00
27.00	0.00	0	579.80	0.00
29.00	0.00	0	579.80	0.00
31.00	0.00	0	579.80	0.00
33.00	0.00	0	579.80	0.00
35.00	0.00	0	579.80	0.00
37.00	0.00	0	579.80	0.00
39.00	0.00	0	579.80	0.00
41.00	0.00	0	579.80	0.00
43.00	0.00	0	579.80	0.00
45.00	0.00	0	579.80	0.00
47.00	0.00	0	579.80	0.00
49.00	0.00	0	579.80	0.00
51.00	0.00	0	579.80	0.00
53.00	0.00	0	579.80	0.00
55.00	0.00	0	579.80	0.00
57.00	0.00	0	579.80	0.00
59.00	0.00	0	579.80	0.00

Existing Conditions_DP-6

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 28

Summary for Pond W-6: Wetland Depression .6

Inflow Area = 8.090 ac, 7.91% Impervious, Inflow Depth = 5.21" for 100-YEAR event
 Inflow = 41.90 cfs @ 12.14 hrs, Volume= 3.510 af
 Outflow = 19.33 cfs @ 12.41 hrs, Volume= 3.510 af, Atten= 54%, Lag= 15.8 min
 Primary = 19.33 cfs @ 12.41 hrs, Volume= 3.510 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-60.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 585.78' @ 12.41 hrs Surf.Area= 0.552 ac Storage= 0.577 af

Plug-Flow detention time= 7.8 min calculated for 3.509 af (100% of inflow)

Center-of-Mass det. time= 7.7 min (820.6 - 812.8)

Volume	Invert	Avail.Storage	Storage Description
#1	583.40'	3.751 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
583.40	0.000	0.000	0.000
584.00	0.071	0.021	0.021
589.00	1.421	3.730	3.751

Device	Routing	Invert	Outlet Devices
#1	Primary	582.73'	24.0" Round Culvert L= 78.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 582.73' / 582.33' S= 0.0051 ' /' Cc= 0.900 n= 0.013
#2	Secondary	588.90'	10.0' long x 18.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

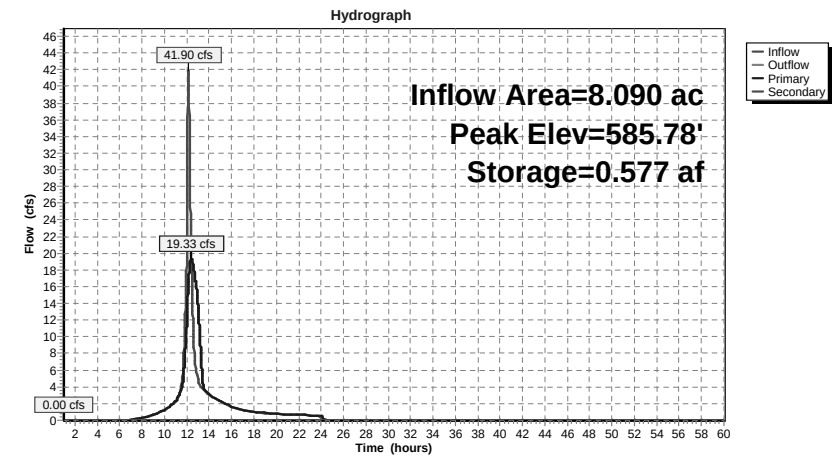
Primary OutFlow Max=19.33 cfs @ 12.41 hrs HW=585.78' TW=580.35' (Dynamic Tailwater)

1=Culvert (Barrel Controls 19.33 cfs @ 6.15 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=583.40' TW=579.80' (Dynamic Tailwater)

2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond W-6: Wetland Depression_6

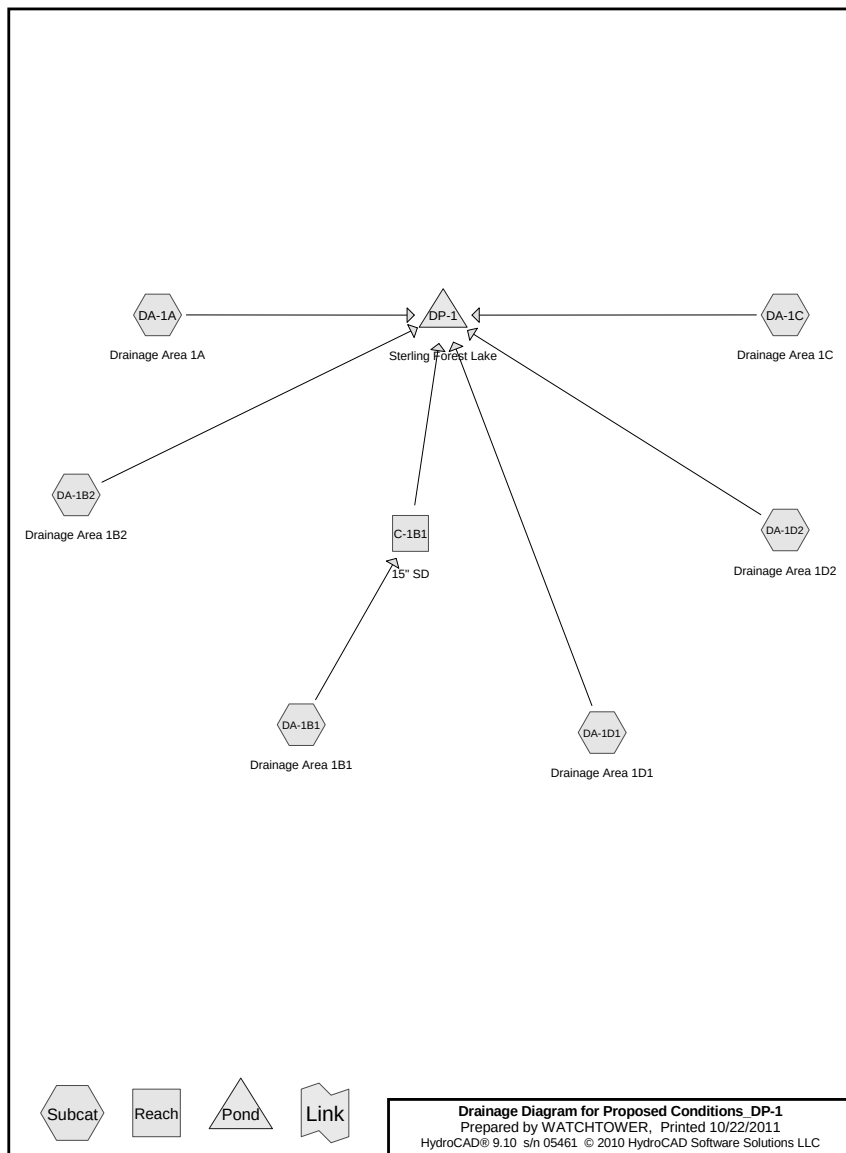


Hydrograph for Pond W-6: Wetland Depression_6

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
1.00	0.00	0.000	583.40	0.00	0.00	0.00
3.00	0.00	0.000	583.40	0.00	0.00	0.00
5.00	0.00	0.000	583.40	0.00	0.00	0.00
7.00	0.10	0.000	583.40	0.10	0.10	0.00
9.00	0.66	0.000	583.40	0.66	0.66	0.00
11.00	2.33	0.000	583.45	2.31	2.31	0.00
13.00	4.92	0.177	584.84	13.75	13.75	0.00
15.00	2.25	0.000	583.44	2.26	2.26	0.00
17.00	1.26	0.000	583.40	1.26	1.26	0.00
19.00	0.86	0.000	583.40	0.86	0.86	0.00
21.00	0.70	0.000	583.40	0.70	0.70	0.00
23.00	0.57	0.000	583.40	0.57	0.57	0.00
25.00	0.00	0.000	583.40	0.00	0.00	0.00
27.00	0.00	0.000	583.40	0.00	0.00	0.00
29.00	0.00	0.000	583.40	0.00	0.00	0.00
31.00	0.00	0.000	583.40	0.00	0.00	0.00
33.00	0.00	0.000	583.40	0.00	0.00	0.00
35.00	0.00	0.000	583.40	0.00	0.00	0.00
37.00	0.00	0.000	583.40	0.00	0.00	0.00
39.00	0.00	0.000	583.40	0.00	0.00	0.00
41.00	0.00	0.000	583.40	0.00	0.00	0.00
43.00	0.00	0.000	583.40	0.00	0.00	0.00
45.00	0.00	0.000	583.40	0.00	0.00	0.00
47.00	0.00	0.000	583.40	0.00	0.00	0.00
49.00	0.00	0.000	583.40	0.00	0.00	0.00
51.00	0.00	0.000	583.40	0.00	0.00	0.00
53.00	0.00	0.000	583.40	0.00	0.00	0.00
55.00	0.00	0.000	583.40	0.00	0.00	0.00
57.00	0.00	0.000	583.40	0.00	0.00	0.00
59.00	0.00	0.000	583.40	0.00	0.00	0.00

SWPPP—APPENDIX E

Post-Developed Conditions Calculations/Output



Proposed Conditions_DP-1

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.600	65	Brush, Good, HSG C (DA-1A)
2.572	68	Green Roof - (DA-1D1)
0.413	68	Green Roof - Extensive (DA-1B1)
9.980	70	Woods, Good, HSG C (DA-1A, DA-1B1)
0.170	73	Brush, Good, HSG D (DA-1A)
8.925	74	>75% Grass cover, Good, HSG C (DA-1A, DA-1B1, DA-1D1)
0.678	74	Pervious Pavers (DA-1B2, DA-1D2)
13.690	77	Woods, Good, HSG D (DA-1A, DA-1C)
0.120	80	>75% Grass cover, Good, HSG D (DA-1C)
3.420	98	Paved parking, HSG C (DA-1D1)
0.960	98	Unconnected pavement, HSG C (DA-1B1)
41.528	76	TOTAL AREA

Notes Listing (all nodes)		
Line#	Node Number	Notes
1	Project	Green Roofs and Porous Pavement or Pervious Asphalt have been modeled under the assumption of impervious cover reduction only. Therefore, a modified CN to account for storage has been calculated based on SCS Methodology in the TR-55 using the following equation:
2		S = (1000/CN) - 10
3		Due to this assumption, Green Roofs have been designed to store approximately 4.7 inches of water over the area of the total green roof. This storage value computes to an average CN value of 68. Porous Pavement has been designed to store approximately 3.6 inches of water of the total are of the porous pavement. This storage value computes to an average CN value of 74.
4	DP-1	All runoff is conveyed directly into Sterling Forest Lake or through the existing storm collection system into Sterling Forest Lake.

Time span=2.00-50.00 hrs, dt=0.01 hrs, 4801 points	
Runoff by SCS TR-20 method, UH=SCS	
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method	
Reach C-1B1: 15" SD	Avg. Flow Depth=0.49' Max Vel=10.30 fps Inflow=4.59 cfs 0.397 af 15.0" Round Pipe n=0.012 L=55.0' S=0.0409 'l' Capacity=14.15 cfs Outflow=4.59 cfs 0.397 af
Subcatchment DA-1A: Drainage Area 1A	Runoff Area=24.005 ac 0.00% Impervious Runoff Depth=0.86" Flow Length=1,450' Tc=27.8 min CN=73 Runoff=12.96 cfs 1.715 af
Subcatchment DA-1B1: Drainage Area 1B1	Runoff Area=4.693 ac 20.46% Impervious Runoff Depth=1.02" Flow Length=593' Tc=10.3 min UI Adjusted CN=76 Runoff=4.59 cfs 0.397 af
Subcatchment DA-1B2: Drainage Area 1B2	Runoff Area=0.289 ac 0.00% Impervious Runoff Depth=0.91" Tc=5.0 min CN=74 Runoff=0.30 cfs 0.022 af
Subcatchment DA-1C: Drainage Area 1C	Runoff Area=3.300 ac 0.00% Impervious Runoff Depth=1.07" Flow Length=187' Tc=13.0 min CN=77 Runoff=3.17 cfs 0.295 af
Subcatchment DA-1D1: Drainage Area 1D1	Runoff Area=8.852 ac 38.64% Impervious Runoff Depth=1.38" Flow Length=450' Tc=14.6 min CN=82 Runoff=10.83 cfs 1.017 af
Subcatchment DA-1D2: Drainage Area 1D2	Runoff Area=0.389 ac 0.00% Impervious Runoff Depth=0.91" Tc=5.0 min CN=74 Runoff=0.40 cfs 0.029 af
Pond DP-1: Sterling Forest Lake	Inflow=26.82 cfs 3.475 af Primary=26.82 cfs 3.475 af
Total Runoff Area = 41.528 ac Runoff Volume = 3.475 af Average Runoff Depth = 1.00"	
89.45% Pervious = 37.148 ac 10.55% Impervious = 4.380 ac	

Summary for Reach C-1B1: 15" SD

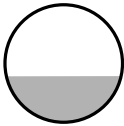
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 4.693 ac, 20.46% Impervious, Inflow Depth = 1.02" for 1-YEAR event
Inflow = 4.59 cfs @ 12.15 hrs, Volume= 0.397 af
Outflow = 4.59 cfs @ 12.15 hrs, Volume= 0.397 af, Atten= 0%, Lag= 0.1 min

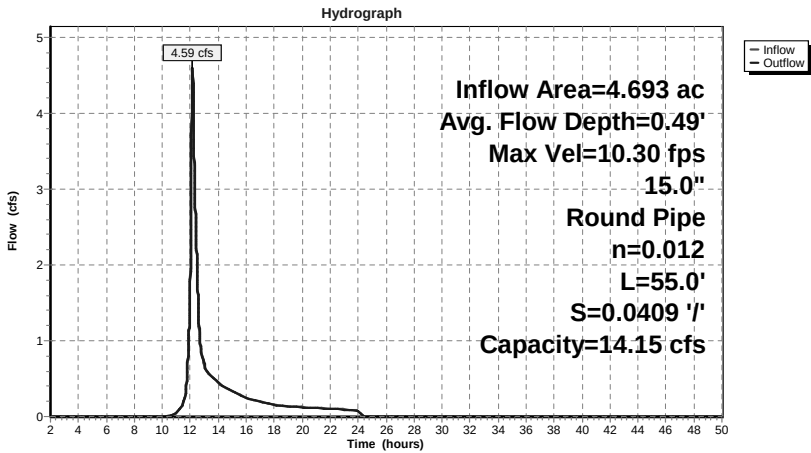
Routing by Stor-Ind+Trans method, Time Span= 2.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 10.30 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 4.16 fps, Avg. Travel Time= 0.2 min

Peak Storage= 25 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.49'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 14.15 cfs

15.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 55.0' Slope= 0.0409 '/'
Inlet Invert= 644.31', Outlet Invert= 642.06'



Reach C-1B1: 15" SD



Hydrograph for Reach C-1B1: 15" SD

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
2.00	0.00	0	644.31	0.00
3.00	0.00	0	644.31	0.00
4.00	0.00	0	644.31	0.00
5.00	0.00	0	644.31	0.00
6.00	0.00	0	644.31	0.00
7.00	0.00	0	644.31	0.00
8.00	0.00	0	644.31	0.00
9.00	0.00	0	644.31	0.00
10.00	0.00	0	644.31	0.00
11.00	0.05	1	644.36	0.05
12.00	1.81	12	644.61	1.78
13.00	0.69	6	644.50	0.69
14.00	0.44	5	644.46	0.44
15.00	0.34	4	644.44	0.34
16.00	0.25	3	644.42	0.25
17.00	0.20	3	644.41	0.20
18.00	0.15	2	644.40	0.15
19.00	0.14	2	644.40	0.14
20.00	0.12	2	644.39	0.12
21.00	0.11	2	644.39	0.11
22.00	0.10	2	644.39	0.10
23.00	0.09	2	644.38	0.09
24.00	0.08	1	644.38	0.08
25.00	0.00	0	644.31	0.00
26.00	0.00	0	644.31	0.00
27.00	0.00	0	644.31	0.00
28.00	0.00	0	644.31	0.00
29.00	0.00	0	644.31	0.00
30.00	0.00	0	644.31	0.00
31.00	0.00	0	644.31	0.00
32.00	0.00	0	644.31	0.00
33.00	0.00	0	644.31	0.00
34.00	0.00	0	644.31	0.00
35.00	0.00	0	644.31	0.00
36.00	0.00	0	644.31	0.00
37.00	0.00	0	644.31	0.00
38.00	0.00	0	644.31	0.00
39.00	0.00	0	644.31	0.00
40.00	0.00	0	644.31	0.00
41.00	0.00	0	644.31	0.00
42.00	0.00	0	644.31	0.00
43.00	0.00	0	644.31	0.00
44.00	0.00	0	644.31	0.00
45.00	0.00	0	644.31	0.00
46.00	0.00	0	644.31	0.00
47.00	0.00	0	644.31	0.00
48.00	0.00	0	644.31	0.00
49.00	0.00	0	644.31	0.00
50.00	0.00	0	644.31	0.00

Summary for Subcatchment DA-1A: Drainage Area 1A

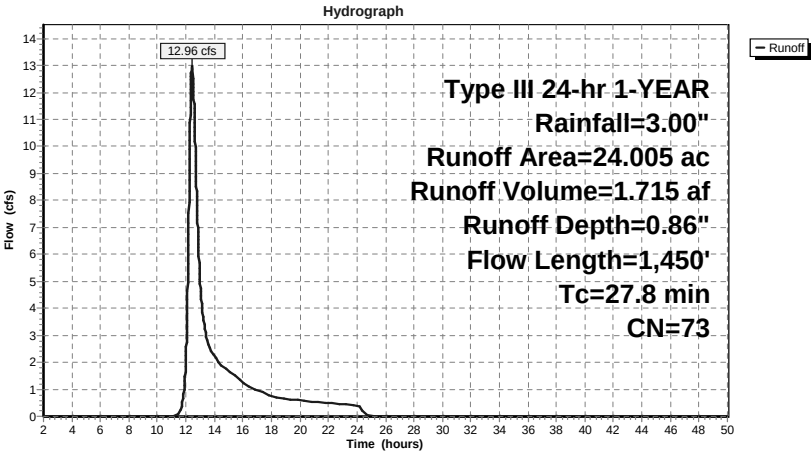
Runoff = 12.96 cfs @ 12.44 hrs, Volume= 1.715 af, Depth= 0.86"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
* 9.880	70	Woods, Good, HSG C
* 10.510	77	Woods, Good, HSG D
* 0.600	65	Brush, Good, HSG C
* 0.170	73	Brush, Good, HSG D
2.845	74	>75% Grass cover, Good, HSG C
24.005	73	Weighted Average
24.005		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	100	0.1200	0.10		Sheet Flow, Woods Woods: Dense underbrush n= 0.800 P2= 3.50"
3.9	208	0.1250	0.88		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
2.8	193	0.2130	1.15		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
2.6	409	0.0020	2.59	49.27	Channel Flow, Woods Area= 19.0 sf Perim= 15.0' r= 1.27' n= 0.030 Earth, grassed & winding
0.8	390	0.1460	8.08	218.12	Channel Flow, Woods Area= 27.0 sf Perim= 45.0' r= 0.60' n= 0.050 Mountain streams w/large boulders
0.2	150	0.1520	15.62	1,890.49	Channel Flow, Area= 121.0 sf Perim= 108.0' r= 1.12' n= 0.040 Earth, cobble bottom, clean sides
27.8	1,450	Total			

Subcatchment DA-1A: Drainage Area 1A



Proposed Conditions_DP-1

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 9

Hydrograph for Subcatchment DA-1A: Drainage Area 1A

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
2.00	0.06	0.00	0.00	28.00	3.00	0.86	0.00
2.50	0.08	0.00	0.00	28.50	3.00	0.86	0.00
3.00	0.09	0.00	0.00	29.00	3.00	0.86	0.00
3.50	0.11	0.00	0.00	29.50	3.00	0.86	0.00
4.00	0.13	0.00	0.00	30.00	3.00	0.86	0.00
4.50	0.15	0.00	0.00	30.50	3.00	0.86	0.00
5.00	0.17	0.00	0.00	31.00	3.00	0.86	0.00
5.50	0.19	0.00	0.00	31.50	3.00	0.86	0.00
6.00	0.22	0.00	0.00	32.00	3.00	0.86	0.00
6.50	0.24	0.00	0.00	32.50	3.00	0.86	0.00
7.00	0.27	0.00	0.00	33.00	3.00	0.86	0.00
7.50	0.30	0.00	0.00	33.50	3.00	0.86	0.00
8.00	0.34	0.00	0.00	34.00	3.00	0.86	0.00
8.50	0.39	0.00	0.00	34.50	3.00	0.86	0.00
9.00	0.44	0.00	0.00	35.00	3.00	0.86	0.00
9.50	0.50	0.00	0.00	35.50	3.00	0.86	0.00
10.00	0.57	0.00	0.00	36.00	3.00	0.86	0.00
10.50	0.65	0.00	0.00	36.50	3.00	0.86	0.00
11.00	0.75	0.00	0.00	37.00	3.00	0.86	0.00
11.50	0.89	0.01	0.14	37.50	3.00	0.86	0.00
12.00	1.50	0.13	2.13	38.00	3.00	0.86	0.00
12.50	2.11	0.37	12.57	38.50	3.00	0.86	0.00
13.00	2.25	0.44	4.96	39.00	3.00	0.86	0.00
13.50	2.35	0.49	2.78	39.50	3.00	0.86	0.00
14.00	2.43	0.53	2.23	40.00	3.00	0.86	0.00
14.50	2.50	0.57	1.88	40.50	3.00	0.86	0.00
15.00	2.56	0.60	1.67	41.00	3.00	0.86	0.00
15.50	2.61	0.63	1.47	41.50	3.00	0.86	0.00
16.00	2.66	0.66	1.26	42.00	3.00	0.86	0.00
16.50	2.70	0.68	1.07	42.50	3.00	0.86	0.00
17.00	2.73	0.70	0.96	43.00	3.00	0.86	0.00
17.50	2.76	0.71	0.87	43.50	3.00	0.86	0.00
18.00	2.78	0.73	0.77	44.00	3.00	0.86	0.00
18.50	2.81	0.74	0.68	44.50	3.00	0.86	0.00
19.00	2.83	0.75	0.65	45.00	3.00	0.86	0.00
19.50	2.85	0.77	0.62	45.50	3.00	0.86	0.00
20.00	2.87	0.78	0.59	46.00	3.00	0.86	0.00
20.50	2.89	0.79	0.56	46.50	3.00	0.86	0.00
21.00	2.91	0.80	0.54	47.00	3.00	0.86	0.00
21.50	2.93	0.81	0.52	47.50	3.00	0.86	0.00
22.00	2.94	0.82	0.49	48.00	3.00	0.86	0.00
22.50	2.96	0.83	0.47	48.50	3.00	0.86	0.00
23.00	2.97	0.84	0.45	49.00	3.00	0.86	0.00
23.50	2.99	0.85	0.42	49.50	3.00	0.86	0.00
24.00	3.00	0.86	0.40	50.00	3.00	0.86	0.00
24.50	3.00	0.86	0.11				
25.00	3.00	0.86	0.01				
25.50	3.00	0.86	0.00				
26.00	3.00	0.86	0.00				
26.50	3.00	0.86	0.00				
27.00	3.00	0.86	0.00				
27.50	3.00	0.86	0.00				

Proposed Conditions_DP-1

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 10

Summary for Subcatchment DA-1B1: Drainage Area 1B1

Runoff = 4.59 cfs @ 12.15 hrs, Volume= 0.397 af, Depth= 1.02"

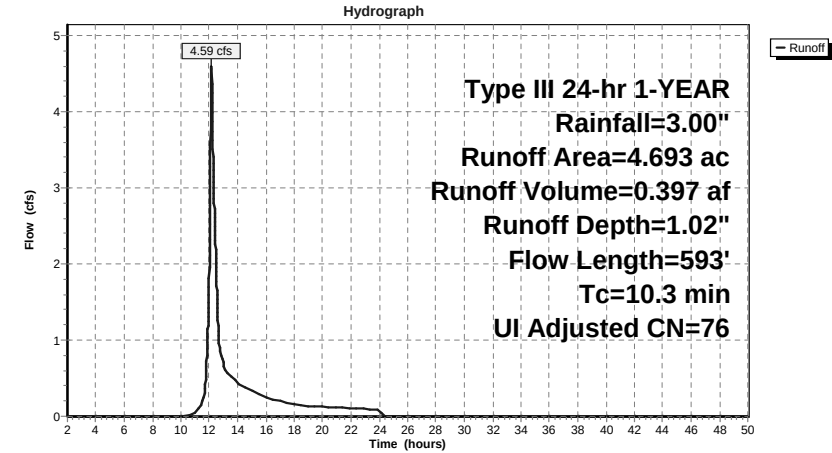
Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-50.00 hrs, dt= 0.01 hrs

Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
0.960	98	Unconnected pavement, HSG C
3.220	74	>75% Grass cover, Good, HSG C
0.100	70	Woods, Good, HSG C
* 0.413	68	Green Roof - Extensive
4.693	78	Weighted Average, UI Adjusted CN = 76
3.733		79.54% Pervious Area
0.960		20.46% Impervious Area
0.960		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0490	0.17		Sheet Flow, 4.9% Grass: Dense n= 0.240 P2= 3.50"
0.2	23	0.0490	1.55		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.6	470	0.0839	13.14	10.32	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
10.3	593	Total			

Subcatchment DA-1B1: Drainage Area 1B1



Hydrograph for Subcatchment DA-1B1: Drainage Area 1B1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
2.00	0.06	0.00	0.00	28.00	3.00	1.02	0.00
2.50	0.08	0.00	0.00	28.50	3.00	1.02	0.00
3.00	0.09	0.00	0.00	29.00	3.00	1.02	0.00
3.50	0.11	0.00	0.00	29.50	3.00	1.02	0.00
4.00	0.13	0.00	0.00	30.00	3.00	1.02	0.00
4.50	0.15	0.00	0.00	30.50	3.00	1.02	0.00
5.00	0.17	0.00	0.00	31.00	3.00	1.02	0.00
5.50	0.19	0.00	0.00	31.50	3.00	1.02	0.00
6.00	0.22	0.00	0.00	32.00	3.00	1.02	0.00
6.50	0.24	0.00	0.00	32.50	3.00	1.02	0.00
7.00	0.27	0.00	0.00	33.00	3.00	1.02	0.00
7.50	0.30	0.00	0.00	33.50	3.00	1.02	0.00
8.00	0.34	0.00	0.00	34.00	3.00	1.02	0.00
8.50	0.39	0.00	0.00	34.50	3.00	1.02	0.00
9.00	0.44	0.00	0.00	35.00	3.00	1.02	0.00
9.50	0.50	0.00	0.00	35.50	3.00	1.02	0.00
10.00	0.57	0.00	0.00	36.00	3.00	1.02	0.00
10.50	0.65	0.00	0.00	36.50	3.00	1.02	0.00
11.00	0.75	0.00	0.05	37.00	3.00	1.02	0.00
11.50	0.89	0.02	0.18	37.50	3.00	1.02	0.00
12.00	1.50	0.19	1.81	38.00	3.00	1.02	0.00
12.50	2.11	0.47	1.90	38.50	3.00	1.02	0.00
13.00	2.25	0.55	0.69	39.00	3.00	1.02	0.00
13.50	2.35	0.61	0.53	39.50	3.00	1.02	0.00
14.00	2.43	0.65	0.44	40.00	3.00	1.02	0.00
14.50	2.50	0.70	0.39	40.50	3.00	1.02	0.00
15.00	2.56	0.73	0.34	41.00	3.00	1.02	0.00
15.50	2.61	0.76	0.30	41.50	3.00	1.02	0.00
16.00	2.66	0.79	0.25	42.00	3.00	1.02	0.00
16.50	2.70	0.82	0.22	42.50	3.00	1.02	0.00
17.00	2.73	0.84	0.20	43.00	3.00	1.02	0.00
17.50	2.76	0.86	0.18	43.50	3.00	1.02	0.00
18.00	2.78	0.87	0.15	44.00	3.00	1.02	0.00
18.50	2.81	0.89	0.14	44.50	3.00	1.02	0.00
19.00	2.83	0.90	0.14	45.00	3.00	1.02	0.00
19.50	2.85	0.92	0.13	45.50	3.00	1.02	0.00
20.00	2.87	0.93	0.12	46.00	3.00	1.02	0.00
20.50	2.89	0.94	0.12	46.50	3.00	1.02	0.00
21.00	2.91	0.95	0.11	47.00	3.00	1.02	0.00
21.50	2.93	0.97	0.11	47.50	3.00	1.02	0.00
22.00	2.94	0.98	0.10	48.00	3.00	1.02	0.00
22.50	2.96	0.99	0.10	48.50	3.00	1.02	0.00
23.00	2.97	1.00	0.09	49.00	3.00	1.02	0.00
23.50	2.99	1.01	0.09	49.50	3.00	1.02	0.00
24.00	3.00	1.02	0.08	50.00	3.00	1.02	0.00
24.50	3.00	1.02	0.00				
25.00	3.00	1.02	0.00				
25.50	3.00	1.02	0.00				
26.00	3.00	1.02	0.00				
26.50	3.00	1.02	0.00				
27.00	3.00	1.02	0.00				
27.50	3.00	1.02	0.00				

Summary for Subcatchment DA-1B2: Drainage Area 1B2

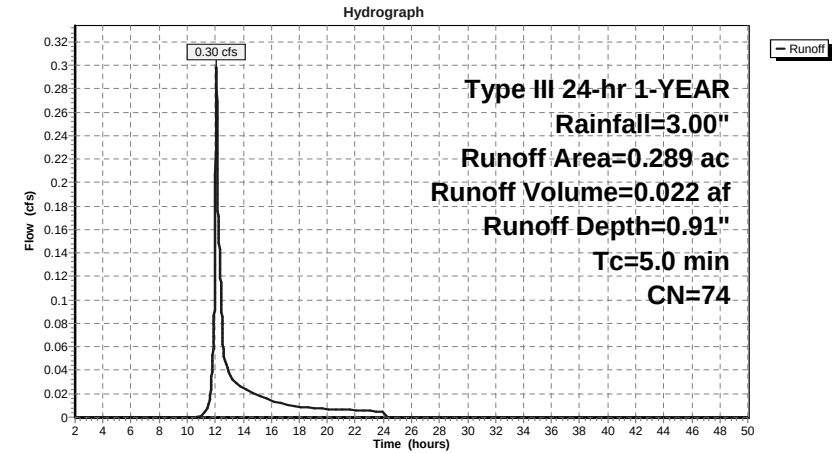
Runoff = 0.30 cfs @ 12.08 hrs, Volume= 0.022 af, Depth= 0.91"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
* 0.289	74	Pervious Pavers
0.289		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, User Defined Min.

Subcatchment DA-1B2: Drainage Area 1B2



Hydrograph for Subcatchment DA-1B2: Drainage Area 1B2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
2.00	0.06	0.00	0.00	28.00	3.00	0.91	0.00
2.50	0.08	0.00	0.00	28.50	3.00	0.91	0.00
3.00	0.09	0.00	0.00	29.00	3.00	0.91	0.00
3.50	0.11	0.00	0.00	29.50	3.00	0.91	0.00
4.00	0.13	0.00	0.00	30.00	3.00	0.91	0.00
4.50	0.15	0.00	0.00	30.50	3.00	0.91	0.00
5.00	0.17	0.00	0.00	31.00	3.00	0.91	0.00
5.50	0.19	0.00	0.00	31.50	3.00	0.91	0.00
6.00	0.22	0.00	0.00	32.00	3.00	0.91	0.00
6.50	0.24	0.00	0.00	32.50	3.00	0.91	0.00
7.00	0.27	0.00	0.00	33.00	3.00	0.91	0.00
7.50	0.30	0.00	0.00	33.50	3.00	0.91	0.00
8.00	0.34	0.00	0.00	34.00	3.00	0.91	0.00
8.50	0.39	0.00	0.00	34.50	3.00	0.91	0.00
9.00	0.44	0.00	0.00	35.00	3.00	0.91	0.00
9.50	0.50	0.00	0.00	35.50	3.00	0.91	0.00
10.00	0.57	0.00	0.00	36.00	3.00	0.91	0.00
10.50	0.65	0.00	0.00	36.50	3.00	0.91	0.00
11.00	0.75	0.00	0.00	37.00	3.00	0.91	0.00
11.50	0.89	0.01	0.01	37.50	3.00	0.91	0.00
12.00	1.50	0.15	0.16	38.00	3.00	0.91	0.00
12.50	2.11	0.40	0.08	38.50	3.00	0.91	0.00
13.00	2.25	0.47	0.04	39.00	3.00	0.91	0.00
13.50	2.35	0.53	0.03	39.50	3.00	0.91	0.00
14.00	2.43	0.57	0.02	40.00	3.00	0.91	0.00
14.50	2.50	0.61	0.02	40.50	3.00	0.91	0.00
15.00	2.56	0.64	0.02	41.00	3.00	0.91	0.00
15.50	2.61	0.67	0.02	41.50	3.00	0.91	0.00
16.00	2.66	0.70	0.01	42.00	3.00	0.91	0.00
16.50	2.70	0.72	0.01	42.50	3.00	0.91	0.00
17.00	2.73	0.74	0.01	43.00	3.00	0.91	0.00
17.50	2.76	0.76	0.01	43.50	3.00	0.91	0.00
18.00	2.78	0.77	0.01	44.00	3.00	0.91	0.00
18.50	2.81	0.79	0.01	44.50	3.00	0.91	0.00
19.00	2.83	0.80	0.01	45.00	3.00	0.91	0.00
19.50	2.85	0.82	0.01	45.50	3.00	0.91	0.00
20.00	2.87	0.83	0.01	46.00	3.00	0.91	0.00
20.50	2.89	0.84	0.01	46.50	3.00	0.91	0.00
21.00	2.91	0.85	0.01	47.00	3.00	0.91	0.00
21.50	2.93	0.86	0.01	47.50	3.00	0.91	0.00
22.00	2.94	0.87	0.01	48.00	3.00	0.91	0.00
22.50	2.96	0.88	0.01	48.50	3.00	0.91	0.00
23.00	2.97	0.89	0.01	49.00	3.00	0.91	0.00
23.50	2.99	0.90	0.01	49.50	3.00	0.91	0.00
24.00	3.00	0.91	0.00	50.00	3.00	0.91	0.00
24.50	3.00	0.91	0.00				
25.00	3.00	0.91	0.00				
25.50	3.00	0.91	0.00				
26.00	3.00	0.91	0.00				
26.50	3.00	0.91	0.00				
27.00	3.00	0.91	0.00				
27.50	3.00	0.91	0.00				

Proposed Conditions_DP-1

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 15

Summary for Subcatchment DA-1C: Drainage Area 1C

Runoff = 3.17 cfs @ 12.19 hrs, Volume= 0.295 af, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-50.00 hrs, dt= 0.01 hrs

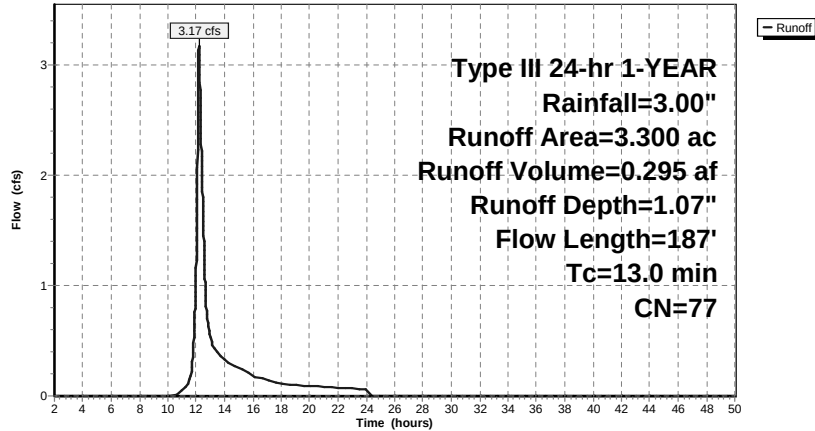
Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
3.180	77	Woods, Good, HSG D
0.120	80	>75% Grass cover, Good, HSG D
3.300	77	Weighted Average
3.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	82	0.0490	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.8	105	0.1800	2.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.0	187	Total			

Subcatchment DA-1C: Drainage Area 1C

Hydrograph

**Proposed Conditions_DP-1**

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 16

Hydrograph for Subcatchment DA-1C: Drainage Area 1C

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
2.00	0.06	0.00	0.00	28.00	3.00	1.07	0.00
2.50	0.08	0.00	0.00	28.50	3.00	1.07	0.00
3.00	0.09	0.00	0.00	29.00	3.00	1.07	0.00
3.50	0.11	0.00	0.00	29.50	3.00	1.07	0.00
4.00	0.13	0.00	0.00	30.00	3.00	1.07	0.00
4.50	0.15	0.00	0.00	30.50	3.00	1.07	0.00
5.00	0.17	0.00	0.00	31.00	3.00	1.07	0.00
5.50	0.19	0.00	0.00	31.50	3.00	1.07	0.00
6.00	0.22	0.00	0.00	32.00	3.00	1.07	0.00
6.50	0.24	0.00	0.00	32.50	3.00	1.07	0.00
7.00	0.27	0.00	0.00	33.00	3.00	1.07	0.00
7.50	0.30	0.00	0.00	33.50	3.00	1.07	0.00
8.00	0.34	0.00	0.00	34.00	3.00	1.07	0.00
8.50	0.39	0.00	0.00	34.50	3.00	1.07	0.00
9.00	0.44	0.00	0.00	35.00	3.00	1.07	0.00
9.50	0.50	0.00	0.00	35.50	3.00	1.07	0.00
10.00	0.57	0.00	0.00	36.00	3.00	1.07	0.00
10.50	0.65	0.00	0.01	36.50	3.00	1.07	0.00
11.00	0.75	0.01	0.05	37.00	3.00	1.07	0.00
11.50	0.89	0.03	0.14	37.50	3.00	1.07	0.00
12.00	1.50	0.21	1.16	38.00	3.00	1.07	0.00
12.50	2.11	0.51	1.58	38.50	3.00	1.07	0.00
13.00	2.25	0.59	0.53	39.00	3.00	1.07	0.00
13.50	2.35	0.65	0.39	39.50	3.00	1.07	0.00
14.00	2.43	0.70	0.33	40.00	3.00	1.07	0.00
14.50	2.50	0.74	0.28	40.50	3.00	1.07	0.00
15.00	2.56	0.78	0.25	41.00	3.00	1.07	0.00
15.50	2.61	0.81	0.22	41.50	3.00	1.07	0.00
16.00	2.66	0.84	0.18	42.00	3.00	1.07	0.00
16.50	2.70	0.87	0.16	42.50	3.00	1.07	0.00
17.00	2.73	0.89	0.14	43.00	3.00	1.07	0.00
17.50	2.76	0.91	0.13	43.50	3.00	1.07	0.00
18.00	2.78	0.92	0.11	44.00	3.00	1.07	0.00
18.50	2.81	0.94	0.10	44.50	3.00	1.07	0.00
19.00	2.83	0.95	0.10	45.00	3.00	1.07	0.00
19.50	2.85	0.97	0.09	45.50	3.00	1.07	0.00
20.00	2.87	0.98	0.09	46.00	3.00	1.07	0.00
20.50	2.89	1.00	0.09	46.50	3.00	1.07	0.00
21.00	2.91	1.01	0.08	47.00	3.00	1.07	0.00
21.50	2.93	1.02	0.08	47.50	3.00	1.07	0.00
22.00	2.94	1.03	0.08	48.00	3.00	1.07	0.00
22.50	2.96	1.04	0.07	48.50	3.00	1.07	0.00
23.00	2.97	1.05	0.07	49.00	3.00	1.07	0.00
23.50	2.99	1.06	0.06	49.50	3.00	1.07	0.00
24.00	3.00	1.07	0.06	50.00	3.00	1.07	0.00
24.50	3.00	1.07	0.00				
25.00	3.00	1.07	0.00				
25.50	3.00	1.07	0.00				
26.00	3.00	1.07	0.00				
26.50	3.00	1.07	0.00				
27.00	3.00	1.07	0.00				
27.50	3.00	1.07	0.00				

Proposed Conditions_DP-1

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 17

Summary for Subcatchment DA-1D1: Drainage Area 1D1

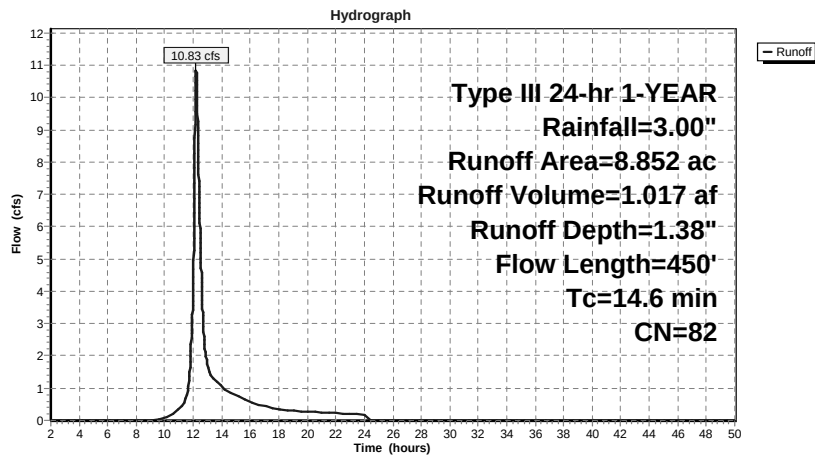
Runoff = 10.83 cfs @ 12.21 hrs, Volume= 1.017 af, Depth= 1.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-50.00 hrs, dt= 0.01 hrs

Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
3.420	98	Paved parking, HSG C
2.860	74	>75% Grass cover, Good, HSG C
* 2.572	68	Green Roof -
8.852	82	Weighted Average
5.432		61.36% Pervious Area
3.420		38.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.0260	0.14		Sheet Flow, Grass: Dense n= 0.240 P2= 3.50"
1.1	220	0.0510	3.39		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
1.2	130	0.1410	1.88		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
14.6	450	Total			

Subcatchment DA-1D1: Drainage Area 1D1**Proposed Conditions_DP-1**

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 18

Hydrograph for Subcatchment DA-1D1: Drainage Area 1D1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
2.00	0.06	0.00	0.00	28.00	3.00	1.38	0.00
2.50	0.08	0.00	0.00	28.50	3.00	1.38	0.00
3.00	0.09	0.00	0.00	29.00	3.00	1.38	0.00
3.50	0.11	0.00	0.00	29.50	3.00	1.38	0.00
4.00	0.13	0.00	0.00	30.00	3.00	1.38	0.00
4.50	0.15	0.00	0.00	30.50	3.00	1.38	0.00
5.00	0.17	0.00	0.00	31.00	3.00	1.38	0.00
5.50	0.19	0.00	0.00	31.50	3.00	1.38	0.00
6.00	0.22	0.00	0.00	32.00	3.00	1.38	0.00
6.50	0.24	0.00	0.00	32.50	3.00	1.38	0.00
7.00	0.27	0.00	0.00	33.00	3.00	1.38	0.00
7.50	0.30	0.00	0.00	33.50	3.00	1.38	0.00
8.00	0.34	0.00	0.00	34.00	3.00	1.38	0.00
8.50	0.39	0.00	0.00	34.50	3.00	1.38	0.00
9.00	0.44	0.00	0.00	35.00	3.00	1.38	0.00
9.50	0.50	0.00	0.03	35.50	3.00	1.38	0.00
10.00	0.57	0.01	0.10	36.00	3.00	1.38	0.00
10.50	0.65	0.02	0.21	36.50	3.00	1.38	0.00
11.00	0.75	0.04	0.37	37.00	3.00	1.38	0.00
11.50	0.89	0.08	0.73	37.50	3.00	1.38	0.00
12.00	1.50	0.35	4.22	38.00	3.00	1.38	0.00
12.50	2.11	0.72	5.64	38.50	3.00	1.38	0.00
13.00	2.25	0.82	1.76	39.00	3.00	1.38	0.00
13.50	2.35	0.89	1.26	39.50	3.00	1.38	0.00
14.00	2.43	0.95	1.05	40.00	3.00	1.38	0.00
14.50	2.50	1.00	0.90	40.50	3.00	1.38	0.00
15.00	2.56	1.04	0.79	41.00	3.00	1.38	0.00
15.50	2.61	1.08	0.69	41.50	3.00	1.38	0.00
16.00	2.66	1.12	0.57	42.00	3.00	1.38	0.00
16.50	2.70	1.14	0.50	42.50	3.00	1.38	0.00
17.00	2.73	1.17	0.45	43.00	3.00	1.38	0.00
17.50	2.76	1.19	0.40	43.50	3.00	1.38	0.00
18.00	2.78	1.21	0.35	44.00	3.00	1.38	0.00
18.50	2.81	1.23	0.32	44.50	3.00	1.38	0.00
19.00	2.83	1.25	0.31	45.00	3.00	1.38	0.00
19.50	2.85	1.26	0.29	45.50	3.00	1.38	0.00
20.00	2.87	1.28	0.28	46.00	3.00	1.38	0.00
20.50	2.89	1.29	0.26	46.50	3.00	1.38	0.00
21.00	2.91	1.31	0.25	47.00	3.00	1.38	0.00
21.50	2.93	1.32	0.24	47.50	3.00	1.38	0.00
22.00	2.94	1.33	0.23	48.00	3.00	1.38	0.00
22.50	2.96	1.35	0.22	48.50	3.00	1.38	0.00
23.00	2.97	1.36	0.21	49.00	3.00	1.38	0.00
23.50	2.99	1.37	0.20	49.50	3.00	1.38	0.00
24.00	3.00	1.38	0.18	50.00	3.00	1.38	0.00
24.50	3.00	1.38	0.00				
25.00	3.00	1.38	0.00				
25.50	3.00	1.38	0.00				
26.00	3.00	1.38	0.00				
26.50	3.00	1.38	0.00				
27.00	3.00	1.38	0.00				
27.50	3.00	1.38	0.00				

Summary for Subcatchment DA-1D2: Drainage Area 1D2

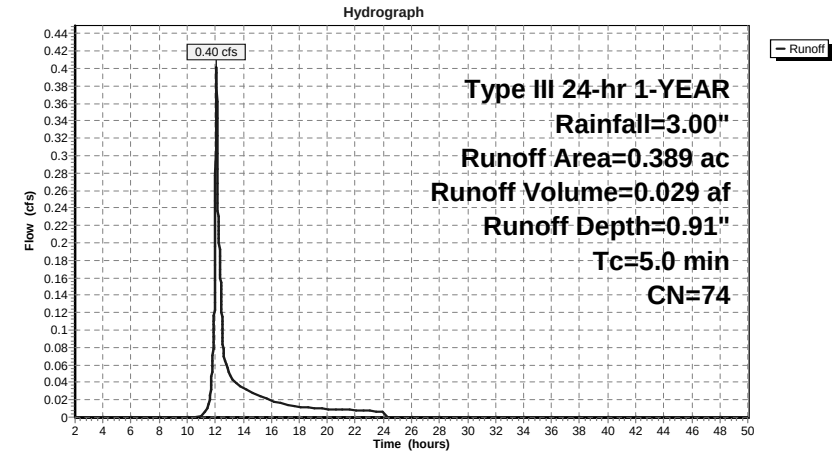
Runoff = 0.40 cfs @ 12.08 hrs, Volume= 0.029 af, Depth= 0.91"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
* 0.389	74	Pervious Pavers
0.389		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, User Defined Min.

Subcatchment DA-1D2: Drainage Area 1D2



Hydrograph for Subcatchment DA-1D2: Drainage Area 1D2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
2.00	0.06	0.00	0.00	28.00	3.00	0.91	0.00
2.50	0.08	0.00	0.00	28.50	3.00	0.91	0.00
3.00	0.09	0.00	0.00	29.00	3.00	0.91	0.00
3.50	0.11	0.00	0.00	29.50	3.00	0.91	0.00
4.00	0.13	0.00	0.00	30.00	3.00	0.91	0.00
4.50	0.15	0.00	0.00	30.50	3.00	0.91	0.00
5.00	0.17	0.00	0.00	31.00	3.00	0.91	0.00
5.50	0.19	0.00	0.00	31.50	3.00	0.91	0.00
6.00	0.22	0.00	0.00	32.00	3.00	0.91	0.00
6.50	0.24	0.00	0.00	32.50	3.00	0.91	0.00
7.00	0.27	0.00	0.00	33.00	3.00	0.91	0.00
7.50	0.30	0.00	0.00	33.50	3.00	0.91	0.00
8.00	0.34	0.00	0.00	34.00	3.00	0.91	0.00
8.50	0.39	0.00	0.00	34.50	3.00	0.91	0.00
9.00	0.44	0.00	0.00	35.00	3.00	0.91	0.00
9.50	0.50	0.00	0.00	35.50	3.00	0.91	0.00
10.00	0.57	0.00	0.00	36.00	3.00	0.91	0.00
10.50	0.65	0.00	0.00	36.50	3.00	0.91	0.00
11.00	0.75	0.00	0.00	37.00	3.00	0.91	0.00
11.50	0.89	0.01	0.01	37.50	3.00	0.91	0.00
12.00	1.50	0.15	0.22	38.00	3.00	0.91	0.00
12.50	2.11	0.40	0.11	38.50	3.00	0.91	0.00
13.00	2.25	0.47	0.05	39.00	3.00	0.91	0.00
13.50	2.35	0.53	0.04	39.50	3.00	0.91	0.00
14.00	2.43	0.57	0.03	40.00	3.00	0.91	0.00
14.50	2.50	0.61	0.03	40.50	3.00	0.91	0.00
15.00	2.56	0.64	0.03	41.00	3.00	0.91	0.00
15.50	2.61	0.67	0.02	41.50	3.00	0.91	0.00
16.00	2.66	0.70	0.02	42.00	3.00	0.91	0.00
16.50	2.70	0.72	0.02	42.50	3.00	0.91	0.00
17.00	2.73	0.74	0.02	43.00	3.00	0.91	0.00
17.50	2.76	0.76	0.01	43.50	3.00	0.91	0.00
18.00	2.78	0.77	0.01	44.00	3.00	0.91	0.00
18.50	2.81	0.79	0.01	44.50	3.00	0.91	0.00
19.00	2.83	0.80	0.01	45.00	3.00	0.91	0.00
19.50	2.85	0.82	0.01	45.50	3.00	0.91	0.00
20.00	2.87	0.83	0.01	46.00	3.00	0.91	0.00
20.50	2.89	0.84	0.01	46.50	3.00	0.91	0.00
21.00	2.91	0.85	0.01	47.00	3.00	0.91	0.00
21.50	2.93	0.86	0.01	47.50	3.00	0.91	0.00
22.00	2.94	0.87	0.01	48.00	3.00	0.91	0.00
22.50	2.96	0.88	0.01	48.50	3.00	0.91	0.00
23.00	2.97	0.89	0.01	49.00	3.00	0.91	0.00
23.50	2.99	0.90	0.01	49.50	3.00	0.91	0.00
24.00	3.00	0.91	0.01	50.00	3.00	0.91	0.00
24.50	3.00	0.91	0.00				
25.00	3.00	0.91	0.00				
25.50	3.00	0.91	0.00				
26.00	3.00	0.91	0.00				
26.50	3.00	0.91	0.00				
27.00	3.00	0.91	0.00				
27.50	3.00	0.91	0.00				

Summary for Pond DP-1: Sterling Forest Lake

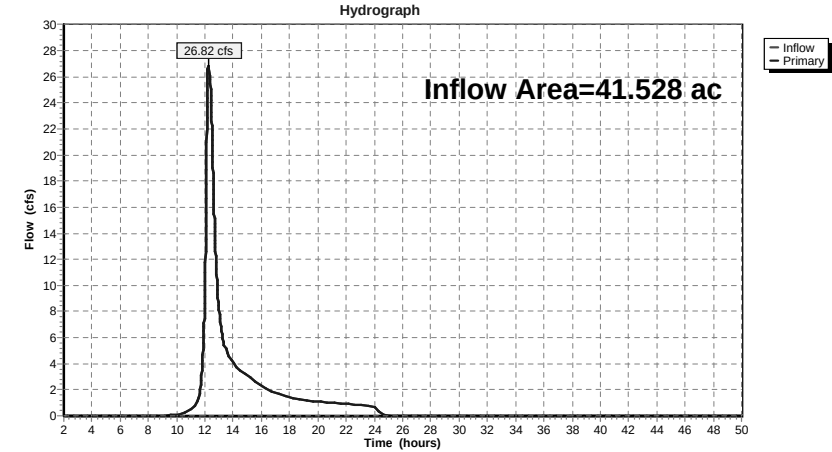
All runoff is conveyed directly into Sterling Forest Lake or through the existing storm collection system into Sterling Forest Lake.

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

Inflow Area = 41.528 ac, 10.55% Impervious, Inflow Depth = 1.00" for 1-YEAR event
Inflow = 26.82 cfs @ 12.25 hrs, Volume= 3.475 af
Primary = 26.82 cfs @ 12.25 hrs, Volume= 3.475 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 2.00-50.00 hrs, dt= 0.01 hrs

Pond DP-1: Sterling Forest Lake



Hydrograph for Pond DP-1: Sterling Forest Lake

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
2.00	0.00		0.00	28.00	0.00		0.00
2.50	0.00		0.00	28.50	0.00		0.00
3.00	0.00		0.00	29.00	0.00		0.00
3.50	0.00		0.00	29.50	0.00		0.00
4.00	0.00		0.00	30.00	0.00		0.00
4.50	0.00		0.00	30.50	0.00		0.00
5.00	0.00		0.00	31.00	0.00		0.00
5.50	0.00		0.00	31.50	0.00		0.00
6.00	0.00		0.00	32.00	0.00		0.00
6.50	0.00		0.00	32.50	0.00		0.00
7.00	0.00		0.00	33.00	0.00		0.00
7.50	0.00		0.00	33.50	0.00		0.00
8.00	0.00		0.00	34.00	0.00		0.00
8.50	0.00		0.00	34.50	0.00		0.00
9.00	0.00		0.00	35.00	0.00		0.00
9.50	0.03		0.03	35.50	0.00		0.00
10.00	0.10		0.10	36.00	0.00		0.00
10.50	0.22		0.22	36.50	0.00		0.00
11.00	0.47		0.47	37.00	0.00		0.00
11.50	1.21		1.21	37.50	0.00		0.00
12.00	9.67		9.67	38.00	0.00		0.00
12.50	21.89		21.89	38.50	0.00		0.00
13.00	8.03		8.03	39.00	0.00		0.00
13.50	5.03		5.03	39.50	0.00		0.00
14.00	4.11		4.11	40.00	0.00		0.00
14.50	3.50		3.50	40.50	0.00		0.00
15.00	3.10		3.10	41.00	0.00		0.00
15.50	2.71		2.71	41.50	0.00		0.00
16.00	2.30		2.30	42.00	0.00		0.00
16.50	1.98		1.98	42.50	0.00		0.00
17.00	1.78		1.78	43.00	0.00		0.00
17.50	1.59		1.59	43.50	0.00		0.00
18.00	1.41		1.41	44.00	0.00		0.00
18.50	1.27		1.27	44.50	0.00		0.00
19.00	1.21		1.21	45.00	0.00		0.00
19.50	1.15		1.15	45.50	0.00		0.00
20.00	1.10		1.10	46.00	0.00		0.00
20.50	1.05		1.05	46.50	0.00		0.00
21.00	1.00		1.00	47.00	0.00		0.00
21.50	0.96		0.96	47.50	0.00		0.00
22.00	0.92		0.92	48.00	0.00		0.00
22.50	0.87		0.87	48.50	0.00		0.00
23.00	0.83		0.83	49.00	0.00		0.00
23.50	0.78		0.78	49.50	0.00		0.00
24.00	0.74		0.74	50.00	0.00		0.00
24.50	0.12		0.12				
25.00	0.01		0.01				
25.50	0.00		0.00				
26.00	0.00		0.00				
26.50	0.00		0.00				
27.00	0.00		0.00				
27.50	0.00		0.00				

Proposed Conditions_DP-1

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 23

Time span=2.00-50.00 hrs, dt=0.01 hrs, 4801 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Reach C-1B1: 15" SDAvg. Flow Depth=0.89' Max Vel=12.95 fps Inflow=12.05 cfs 0.992 af
15.0" Round Pipe n=0.012 L=55.0' S=0.0409 '/ Capacity=14.15 cfs Outflow=12.04 cfs 0.992 af**Subcatchment DA-1A: Drainage Area 1A** Runoff Area=24.005 ac 0.00% Impervious Runoff Depth=2.28"
Flow Length=1,450' Tc=27.8 min CN=73 Runoff=37.24 cfs 4.562 af**Subcatchment DA-1B1: Drainage Area 1B1** Runoff Area=4.693 ac 20.46% Impervious Runoff Depth=2.54"
Flow Length=593' Tc=10.3 min UI Adjusted CN=76 Runoff=12.05 cfs 0.992 af**Subcatchment DA-1B2: Drainage Area 1B2** Runoff Area=0.289 ac 0.00% Impervious Runoff Depth=2.36"
Tc=5.0 min CN=74 Runoff=0.83 cfs 0.057 af**Subcatchment DA-1C: Drainage Area 1C** Runoff Area=3.300 ac 0.00% Impervious Runoff Depth=2.62"
Flow Length=187' Tc=13.0 min CN=77 Runoff=8.10 cfs 0.721 af**Subcatchment DA-1D1: Drainage Area 1D1** Runoff Area=8.852 ac 38.64% Impervious Runoff Depth=3.08"
Flow Length=450' Tc=14.6 min CN=82 Runoff=24.39 cfs 2.271 af**Subcatchment DA-1D2: Drainage Area 1D2** Runoff Area=0.389 ac 0.00% Impervious Runoff Depth=2.36"
Tc=5.0 min CN=74 Runoff=1.11 cfs 0.077 af**Pond DP-1: Sterling Forest Lake**Inflow=70.53 cfs 8.680 af
Primary=70.53 cfs 8.680 afTotal Runoff Area = 41.528 ac Runoff Volume = 8.680 af Average Runoff Depth = 2.51"
89.45% Pervious = 37.148 ac 10.55% Impervious = 4.380 ac**Proposed Conditions_DP-1**

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 24

Summary for Reach C-1B1: 15" SD

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 4.693 ac, 20.46% Impervious, Inflow Depth = 2.54" for 10-YEAR event
Inflow = 12.05 cfs @ 12.14 hrs, Volume = 0.992 af
Outflow = 12.04 cfs @ 12.15 hrs, Volume = 0.992 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 2.00-50.00 hrs, dt= 0.01 hrs

Max. Velocity= 12.95 fps, Min. Travel Time= 0.1 min

Avg. Velocity = 5.12 fps, Avg. Travel Time= 0.2 min

Peak Storage= 51 cf @ 12.15 hrs

Average Depth at Peak Storage= 0.89'

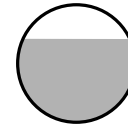
Bank-Full Depth= 1.25', Capacity at Bank-Full= 14.15 cfs

15.0" Round Pipe

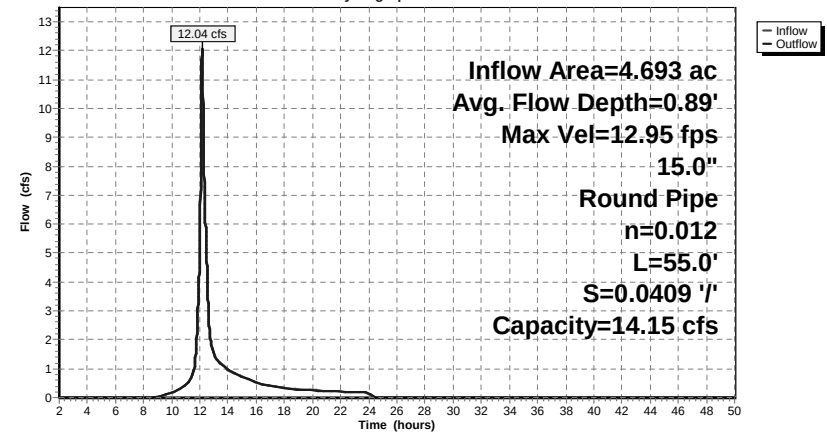
n= 0.012 Concrete pipe, finished

Length= 55.0' Slope= 0.0409 '/

Inlet Invert= 644.31', Outlet Invert= 642.06'

**Reach C-1B1: 15" SD**

Hydrograph



Proposed Conditions_DP-1

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 25

Hydrograph for Reach C-1B1: 15" SD

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
2.00	0.00	0	644.31	0.00
3.00	0.00	0	644.31	0.00
4.00	0.00	0	644.31	0.00
5.00	0.00	0	644.31	0.00
6.00	0.00	0	644.31	0.00
7.00	0.00	0	644.31	0.00
8.00	0.00	0	644.31	0.00
9.00	0.04	1	644.36	0.03
10.00	0.17	2	644.41	0.17
11.00	0.46	5	644.46	0.46
12.00	5.50	28	644.85	5.42
13.00	1.54	11	644.59	1.54
14.00	0.96	8	644.53	0.96
15.00	0.73	7	644.50	0.73
16.00	0.52	5	644.47	0.52
17.00	0.41	4	644.46	0.41
18.00	0.32	4	644.44	0.32
19.00	0.28	3	644.43	0.28
20.00	0.25	3	644.43	0.25
21.00	0.23	3	644.42	0.23
22.00	0.21	3	644.42	0.21
23.00	0.19	3	644.41	0.19
24.00	0.17	2	644.41	0.17
25.00	0.00	0	644.31	0.00
26.00	0.00	0	644.31	0.00
27.00	0.00	0	644.31	0.00
28.00	0.00	0	644.31	0.00
29.00	0.00	0	644.31	0.00
30.00	0.00	0	644.31	0.00
31.00	0.00	0	644.31	0.00
32.00	0.00	0	644.31	0.00
33.00	0.00	0	644.31	0.00
34.00	0.00	0	644.31	0.00
35.00	0.00	0	644.31	0.00
36.00	0.00	0	644.31	0.00
37.00	0.00	0	644.31	0.00
38.00	0.00	0	644.31	0.00
39.00	0.00	0	644.31	0.00
40.00	0.00	0	644.31	0.00
41.00	0.00	0	644.31	0.00
42.00	0.00	0	644.31	0.00
43.00	0.00	0	644.31	0.00
44.00	0.00	0	644.31	0.00
45.00	0.00	0	644.31	0.00
46.00	0.00	0	644.31	0.00
47.00	0.00	0	644.31	0.00
48.00	0.00	0	644.31	0.00
49.00	0.00	0	644.31	0.00
50.00	0.00	0	644.31	0.00

Proposed Conditions_DP-1

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 26

Summary for Subcatchment DA-1A: Drainage Area 1A

Runoff = 37.24 cfs @ 12.39 hrs, Volume= 4.562 af, Depth= 2.28"

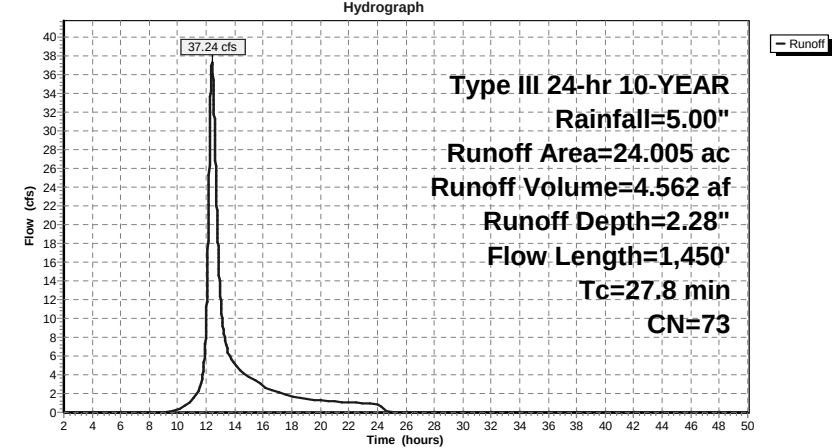
Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-50.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
* 9.880	70	Woods, Good, HSG C
* 10.510	77	Woods, Good, HSG D
* 0.600	65	Brush, Good, HSG C
* 0.170	73	Brush, Good, HSG D
2.845	74	>75% Grass cover, Good, HSG C
24.005	73	Weighted Average
24.005		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	100	0.1200	0.10		Sheet Flow, Woods Woods: Dense underbrush n= 0.800 P2= 3.50"
3.9	208	0.1250	0.88		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
2.8	193	0.2130	1.15		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
2.6	409	0.0020	2.59	49.27	Channel Flow, Woods Area= 19.0 sf Perim= 15.0' r= 1.27' n= 0.030 Earth, grassed & winding
0.8	390	0.1460	8.08	218.12	Channel Flow, Woods Area= 27.0 sf Perim= 45.0' r= 0.60' n= 0.050 Mountain streams w/large boulders
0.2	150	0.1520	15.62	1,890.49	Channel Flow, Area= 121.0 sf Perim= 108.0' r= 1.12' n= 0.040 Earth, cobble bottom, clean sides
27.8	1,450	Total			

Subcatchment DA-1A: Drainage Area 1A



Hydrograph for Subcatchment DA-1A: Drainage Area 1A

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
2.00	0.10	0.00	0.00	28.00	5.00	2.28	0.00
2.50	0.13	0.00	0.00	28.50	5.00	2.28	0.00
3.00	0.15	0.00	0.00	29.00	5.00	2.28	0.00
3.50	0.18	0.00	0.00	29.50	5.00	2.28	0.00
4.00	0.22	0.00	0.00	30.00	5.00	2.28	0.00
4.50	0.25	0.00	0.00	30.50	5.00	2.28	0.00
5.00	0.28	0.00	0.00	31.00	5.00	2.28	0.00
5.50	0.32	0.00	0.00	31.50	5.00	2.28	0.00
6.00	0.36	0.00	0.00	32.00	5.00	2.28	0.00
6.50	0.40	0.00	0.00	32.50	5.00	2.28	0.00
7.00	0.45	0.00	0.00	33.00	5.00	2.28	0.00
7.50	0.51	0.00	0.00	33.50	5.00	2.28	0.00
8.00	0.57	0.00	0.00	34.00	5.00	2.28	0.00
8.50	0.64	0.00	0.00	34.50	5.00	2.28	0.00
9.00	0.73	0.00	0.00	35.00	5.00	2.28	0.00
9.50	0.83	0.00	0.04	35.50	5.00	2.28	0.00
10.00	0.95	0.01	0.30	36.00	5.00	2.28	0.00
10.50	1.08	0.03	0.70	36.50	5.00	2.28	0.00
11.00	1.25	0.06	1.32	37.00	5.00	2.28	0.00
11.50	1.49	0.13	2.44	37.50	5.00	2.28	0.00
12.00	2.50	0.57	9.87	38.00	5.00	2.28	0.00
12.50	3.51	1.19	34.74	38.50	5.00	2.28	0.00
13.00	3.75	1.35	12.25	39.00	5.00	2.28	0.00
13.50	3.92	1.47	6.52	39.50	5.00	2.28	0.00
14.00	4.06	1.57	5.13	40.00	5.00	2.28	0.00
14.50	4.17	1.65	4.27	40.50	5.00	2.28	0.00
15.00	4.27	1.72	3.76	41.00	5.00	2.28	0.00
15.50	4.36	1.79	3.28	41.50	5.00	2.28	0.00
16.00	4.43	1.84	2.79	42.00	5.00	2.28	0.00
16.50	4.49	1.89	2.36	42.50	5.00	2.28	0.00
17.00	4.55	1.93	2.11	43.00	5.00	2.28	0.00
17.50	4.60	1.97	1.89	43.50	5.00	2.28	0.00
18.00	4.64	2.00	1.67	44.00	5.00	2.28	0.00
18.50	4.68	2.03	1.49	44.50	5.00	2.28	0.00
19.00	4.72	2.06	1.41	45.00	5.00	2.28	0.00
19.50	4.75	2.09	1.34	45.50	5.00	2.28	0.00
20.00	4.79	2.11	1.27	46.00	5.00	2.28	0.00
20.50	4.82	2.14	1.21	46.50	5.00	2.28	0.00
21.00	4.85	2.16	1.16	47.00	5.00	2.28	0.00
21.50	4.88	2.18	1.11	47.50	5.00	2.28	0.00
22.00	4.90	2.21	1.06	48.00	5.00	2.28	0.00
22.50	4.93	2.23	1.01	48.50	5.00	2.28	0.00
23.00	4.95	2.24	0.95	49.00	5.00	2.28	0.00
23.50	4.98	2.26	0.90	49.50	5.00	2.28	0.00
24.00	5.00	2.28	0.85	50.00	5.00	2.28	0.00
24.50	5.00	2.28	0.24				
25.00	5.00	2.28	0.02				
25.50	5.00	2.28	0.00				
26.00	5.00	2.28	0.00				
26.50	5.00	2.28	0.00				
27.00	5.00	2.28	0.00				
27.50	5.00	2.28	0.00				

Summary for Subcatchment DA-1B1: Drainage Area 1B1

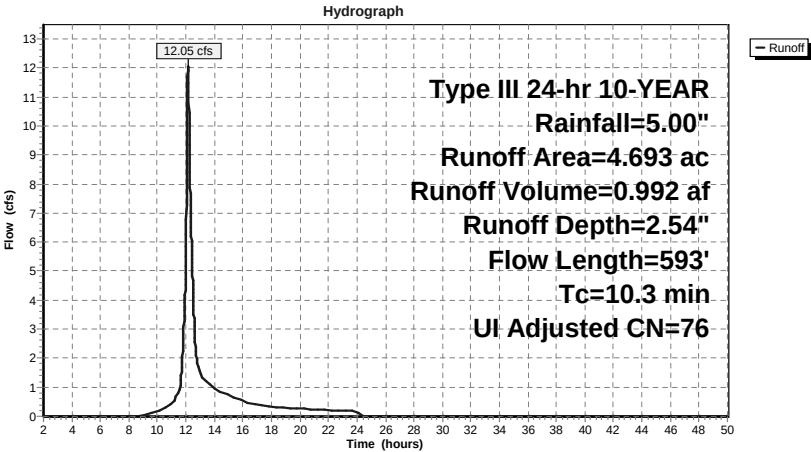
Runoff = 12.05 cfs @ 12.14 hrs, Volume= 0.992 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
0.960	98	Unconnected pavement, HSG C
3.220	74	>75% Grass cover, Good, HSG C
0.100	70	Woods, Good, HSG C
* 0.413	68	Green Roof - Extensive
4.693	78	Weighted Average, UI Adjusted CN = 76
3.733		79.54% Pervious Area
0.960		20.46% Impervious Area
0.960		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0490	0.17		Sheet Flow, 4.9% Grass: Dense n= 0.240 P2= 3.50"
0.2	23	0.0490	1.55		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.6	470	0.0839	13.14	10.32	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
10.3	593	Total			

Subcatchment DA-1B1: Drainage Area 1B1



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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 31

Hydrograph for Subcatchment DA-1B1: Drainage Area 1B1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
2.00	0.10	0.00	0.00	28.00	5.00	2.54	0.00
2.50	0.13	0.00	0.00	28.50	5.00	2.54	0.00
3.00	0.15	0.00	0.00	29.00	5.00	2.54	0.00
3.50	0.18	0.00	0.00	29.50	5.00	2.54	0.00
4.00	0.22	0.00	0.00	30.00	5.00	2.54	0.00
4.50	0.25	0.00	0.00	30.50	5.00	2.54	0.00
5.00	0.28	0.00	0.00	31.00	5.00	2.54	0.00
5.50	0.32	0.00	0.00	31.50	5.00	2.54	0.00
6.00	0.36	0.00	0.00	32.00	5.00	2.54	0.00
6.50	0.40	0.00	0.00	32.50	5.00	2.54	0.00
7.00	0.45	0.00	0.00	33.00	5.00	2.54	0.00
7.50	0.51	0.00	0.00	33.50	5.00	2.54	0.00
8.00	0.57	0.00	0.00	34.00	5.00	2.54	0.00
8.50	0.64	0.00	0.00	34.50	5.00	2.54	0.00
9.00	0.73	0.00	0.04	35.00	5.00	2.54	0.00
9.50	0.83	0.01	0.09	35.50	5.00	2.54	0.00
10.00	0.95	0.03	0.17	36.00	5.00	2.54	0.00
10.50	1.08	0.06	0.29	36.50	5.00	2.54	0.00
11.00	1.25	0.10	0.46	37.00	5.00	2.54	0.00
11.50	1.49	0.18	0.88	37.50	5.00	2.54	0.00
12.00	2.50	0.69	5.50	38.00	5.00	2.54	0.00
12.50	3.51	1.37	4.38	38.50	5.00	2.54	0.00
13.00	3.75	1.55	1.54	39.00	5.00	2.54	0.00
13.50	3.92	1.68	1.16	39.50	5.00	2.54	0.00
14.00	4.06	1.78	0.96	40.00	5.00	2.54	0.00
14.50	4.17	1.87	0.83	40.50	5.00	2.54	0.00
15.00	4.27	1.95	0.73	41.00	5.00	2.54	0.00
15.50	4.36	2.02	0.63	41.50	5.00	2.54	0.00
16.00	4.43	2.07	0.52	42.00	5.00	2.54	0.00
16.50	4.49	2.12	0.46	42.50	5.00	2.54	0.00
17.00	4.55	2.17	0.41	43.00	5.00	2.54	0.00
17.50	4.60	2.21	0.37	43.50	5.00	2.54	0.00
18.00	4.64	2.24	0.32	44.00	5.00	2.54	0.00
18.50	4.68	2.27	0.30	44.50	5.00	2.54	0.00
19.00	4.72	2.30	0.28	45.00	5.00	2.54	0.00
19.50	4.75	2.33	0.27	45.50	5.00	2.54	0.00
20.00	4.79	2.36	0.25	46.00	5.00	2.54	0.00
20.50	4.82	2.39	0.24	46.50	5.00	2.54	0.00
21.00	4.85	2.41	0.23	47.00	5.00	2.54	0.00
21.50	4.88	2.43	0.22	47.50	5.00	2.54	0.00
22.00	4.90	2.46	0.21	48.00	5.00	2.54	0.00
22.50	4.93	2.48	0.20	48.50	5.00	2.54	0.00
23.00	4.95	2.50	0.19	49.00	5.00	2.54	0.00
23.50	4.98	2.52	0.18	49.50	5.00	2.54	0.00
24.00	5.00	2.54	0.17	50.00	5.00	2.54	0.00
24.50	5.00	2.54	0.00				
25.00	5.00	2.54	0.00				
25.50	5.00	2.54	0.00				
26.00	5.00	2.54	0.00				
26.50	5.00	2.54	0.00				
27.00	5.00	2.54	0.00				
27.50	5.00	2.54	0.00				

Proposed Conditions_DP-1

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 32

Summary for Subcatchment DA-1B2: Drainage Area 1B2

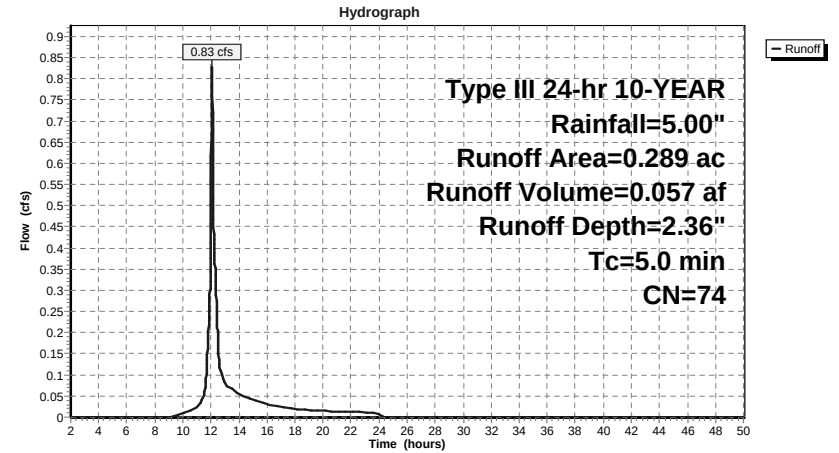
Runoff = 0.83 cfs @ 12.08 hrs, Volume= 0.057 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-50.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
* 0.289	74	Pervious Pavers
0.289		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, User Defined Min.

Subcatchment DA-1B2: Drainage Area 1B2

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 33

Hydrograph for Subcatchment DA-1B2: Drainage Area 1B2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
2.00	0.10	0.00	0.00	28.00	5.00	2.36	0.00
2.50	0.13	0.00	0.00	28.50	5.00	2.36	0.00
3.00	0.15	0.00	0.00	29.00	5.00	2.36	0.00
3.50	0.18	0.00	0.00	29.50	5.00	2.36	0.00
4.00	0.22	0.00	0.00	30.00	5.00	2.36	0.00
4.50	0.25	0.00	0.00	30.50	5.00	2.36	0.00
5.00	0.28	0.00	0.00	31.00	5.00	2.36	0.00
5.50	0.32	0.00	0.00	31.50	5.00	2.36	0.00
6.00	0.36	0.00	0.00	32.00	5.00	2.36	0.00
6.50	0.40	0.00	0.00	32.50	5.00	2.36	0.00
7.00	0.45	0.00	0.00	33.00	5.00	2.36	0.00
7.50	0.51	0.00	0.00	33.50	5.00	2.36	0.00
8.00	0.57	0.00	0.00	34.00	5.00	2.36	0.00
8.50	0.64	0.00	0.00	34.50	5.00	2.36	0.00
9.00	0.73	0.00	0.00	35.00	5.00	2.36	0.00
9.50	0.83	0.00	0.00	35.50	5.00	2.36	0.00
10.00	0.95	0.02	0.01	36.00	5.00	2.36	0.00
10.50	1.08	0.04	0.02	36.50	5.00	2.36	0.00
11.00	1.25	0.07	0.02	37.00	5.00	2.36	0.00
11.50	1.49	0.14	0.05	37.50	5.00	2.36	0.00
12.00	2.50	0.61	0.50	38.00	5.00	2.36	0.00
12.50	3.51	1.25	0.19	38.50	5.00	2.36	0.00
13.00	3.75	1.42	0.08	39.00	5.00	2.36	0.00
13.50	3.92	1.54	0.07	39.50	5.00	2.36	0.00
14.00	4.06	1.64	0.05	40.00	5.00	2.36	0.00
14.50	4.17	1.72	0.05	40.50	5.00	2.36	0.00
15.00	4.27	1.80	0.04	41.00	5.00	2.36	0.00
15.50	4.36	1.86	0.04	41.50	5.00	2.36	0.00
16.00	4.43	1.92	0.03	42.00	5.00	2.36	0.00
16.50	4.49	1.97	0.03	42.50	5.00	2.36	0.00
17.00	4.55	2.01	0.02	43.00	5.00	2.36	0.00
17.50	4.60	2.05	0.02	43.50	5.00	2.36	0.00
18.00	4.64	2.08	0.02	44.00	5.00	2.36	0.00
18.50	4.68	2.11	0.02	44.50	5.00	2.36	0.00
19.00	4.72	2.14	0.02	45.00	5.00	2.36	0.00
19.50	4.75	2.17	0.02	45.50	5.00	2.36	0.00
20.00	4.79	2.19	0.02	46.00	5.00	2.36	0.00
20.50	4.82	2.22	0.01	46.50	5.00	2.36	0.00
21.00	4.85	2.24	0.01	47.00	5.00	2.36	0.00
21.50	4.88	2.27	0.01	47.50	5.00	2.36	0.00
22.00	4.90	2.29	0.01	48.00	5.00	2.36	0.00
22.50	4.93	2.31	0.01	48.50	5.00	2.36	0.00
23.00	4.95	2.33	0.01	49.00	5.00	2.36	0.00
23.50	4.98	2.35	0.01	49.50	5.00	2.36	0.00
24.00	5.00	2.36	0.01	50.00	5.00	2.36	0.00
24.50	5.00	2.36	0.00				
25.00	5.00	2.36	0.00				
25.50	5.00	2.36	0.00				
26.00	5.00	2.36	0.00				
26.50	5.00	2.36	0.00				
27.00	5.00	2.36	0.00				
27.50	5.00	2.36	0.00				

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 34

Summary for Subcatchment DA-1C: Drainage Area 1C

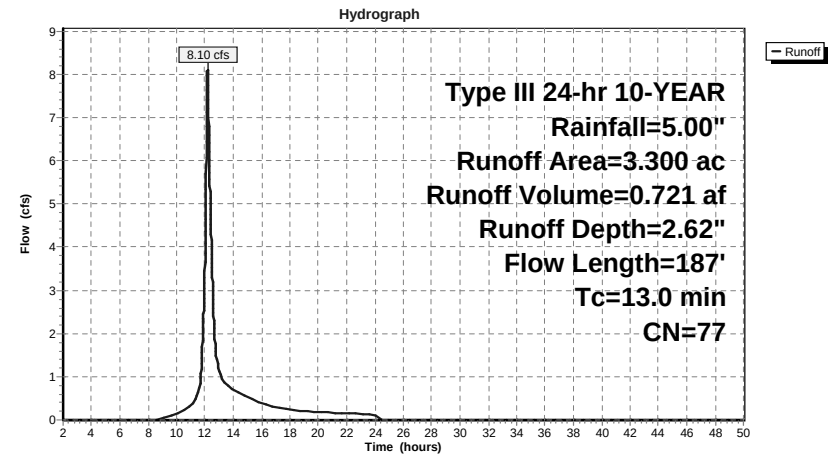
Runoff = 8.10 cfs @ 12.18 hrs, Volume= 0.721 af, Depth= 2.62"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-50.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
3.180	77	Woods, Good, HSG D
0.120	80	>75% Grass cover, Good, HSG D
3.300	77	Weighted Average
3.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	82	0.0490	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.8	105	0.1800	2.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.0	187	Total			

Subcatchment DA-1C: Drainage Area 1C

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 35

Hydrograph for Subcatchment DA-1C: Drainage Area 1C

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
2.00	0.10	0.00	0.00	28.00	5.00	2.62	0.00
2.50	0.13	0.00	0.00	28.50	5.00	2.62	0.00
3.00	0.15	0.00	0.00	29.00	5.00	2.62	0.00
3.50	0.18	0.00	0.00	29.50	5.00	2.62	0.00
4.00	0.22	0.00	0.00	30.00	5.00	2.62	0.00
4.50	0.25	0.00	0.00	30.50	5.00	2.62	0.00
5.00	0.28	0.00	0.00	31.00	5.00	2.62	0.00
5.50	0.32	0.00	0.00	31.50	5.00	2.62	0.00
6.00	0.36	0.00	0.00	32.00	5.00	2.62	0.00
6.50	0.40	0.00	0.00	32.50	5.00	2.62	0.00
7.00	0.45	0.00	0.00	33.00	5.00	2.62	0.00
7.50	0.51	0.00	0.00	33.50	5.00	2.62	0.00
8.00	0.57	0.00	0.00	34.00	5.00	2.62	0.00
8.50	0.64	0.00	0.01	34.50	5.00	2.62	0.00
9.00	0.73	0.01	0.04	35.00	5.00	2.62	0.00
9.50	0.83	0.02	0.08	35.50	5.00	2.62	0.00
10.00	0.95	0.04	0.14	36.00	5.00	2.62	0.00
10.50	1.08	0.07	0.22	36.50	5.00	2.62	0.00
11.00	1.25	0.12	0.34	37.00	5.00	2.62	0.00
11.50	1.49	0.21	0.63	37.50	5.00	2.62	0.00
12.00	2.50	0.74	3.46	38.00	5.00	2.62	0.00
12.50	3.51	1.44	3.63	38.50	5.00	2.62	0.00
13.00	3.75	1.62	1.16	39.00	5.00	2.62	0.00
13.50	3.92	1.75	0.85	39.50	5.00	2.62	0.00
14.00	4.06	1.86	0.70	40.00	5.00	2.62	0.00
14.50	4.17	1.95	0.60	40.50	5.00	2.62	0.00
15.00	4.27	2.03	0.53	41.00	5.00	2.62	0.00
15.50	4.36	2.10	0.45	41.50	5.00	2.62	0.00
16.00	4.43	2.15	0.38	42.00	5.00	2.62	0.00
16.50	4.49	2.20	0.33	42.50	5.00	2.62	0.00
17.00	4.55	2.25	0.30	43.00	5.00	2.62	0.00
17.50	4.60	2.29	0.26	43.50	5.00	2.62	0.00
18.00	4.64	2.32	0.23	44.00	5.00	2.62	0.00
18.50	4.68	2.36	0.21	44.50	5.00	2.62	0.00
19.00	4.72	2.39	0.20	45.00	5.00	2.62	0.00
19.50	4.75	2.42	0.19	45.50	5.00	2.62	0.00
20.00	4.79	2.44	0.18	46.00	5.00	2.62	0.00
20.50	4.82	2.47	0.17	46.50	5.00	2.62	0.00
21.00	4.85	2.50	0.17	47.00	5.00	2.62	0.00
21.50	4.88	2.52	0.16	47.50	5.00	2.62	0.00
22.00	4.90	2.54	0.15	48.00	5.00	2.62	0.00
22.50	4.93	2.56	0.14	48.50	5.00	2.62	0.00
23.00	4.95	2.59	0.14	49.00	5.00	2.62	0.00
23.50	4.98	2.60	0.13	49.50	5.00	2.62	0.00
24.00	5.00	2.62	0.12	50.00	5.00	2.62	0.00
24.50	5.00	2.62	0.00				
25.00	5.00	2.62	0.00				
25.50	5.00	2.62	0.00				
26.00	5.00	2.62	0.00				
26.50	5.00	2.62	0.00				
27.00	5.00	2.62	0.00				
27.50	5.00	2.62	0.00				

Proposed Conditions_DP-1

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 36

Summary for Subcatchment DA-1D1: Drainage Area 1D1

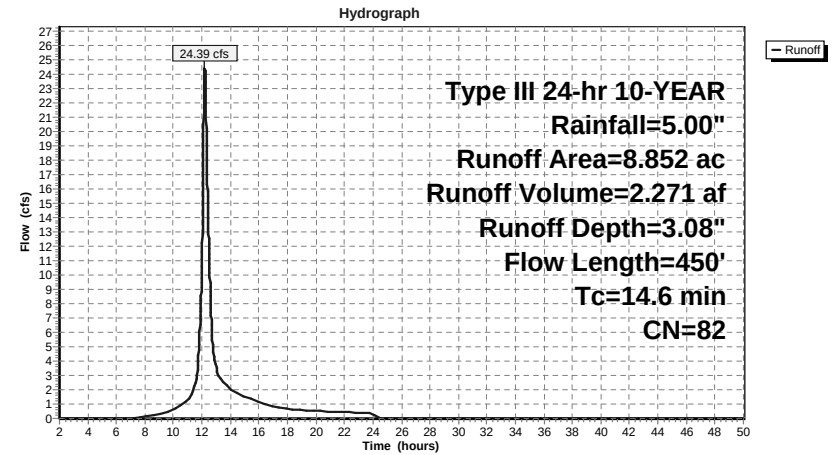
Runoff = 24.39 cfs @ 12.20 hrs, Volume= 2.271 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-50.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
3.420	98	Paved parking, HSG C
2.860	74	>75% Grass cover, Good, HSG C
* 2.572	68	Green Roof -
8.852	82	Weighted Average
5.432		61.36% Pervious Area
3.420		38.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.0260	0.14		Sheet Flow , Grass: Dense n= 0.240 P2= 3.50"
1.1	220	0.0510	3.39		Shallow Concentrated Flow , Grassed Waterway Kv= 15.0 fps
1.2	130	0.1410	1.88		Shallow Concentrated Flow , Woodland Kv= 5.0 fps
14.6	450	Total			

Subcatchment DA-1D1: Drainage Area 1D1

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 37

Hydrograph for Subcatchment DA-1D1: Drainage Area 1D1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
2.00	0.10	0.00	0.00	28.00	5.00	3.08	0.00
2.50	0.13	0.00	0.00	28.50	5.00	3.08	0.00
3.00	0.15	0.00	0.00	29.00	5.00	3.08	0.00
3.50	0.18	0.00	0.00	29.50	5.00	3.08	0.00
4.00	0.22	0.00	0.00	30.00	5.00	3.08	0.00
4.50	0.25	0.00	0.00	30.50	5.00	3.08	0.00
5.00	0.28	0.00	0.00	31.00	5.00	3.08	0.00
5.50	0.32	0.00	0.00	31.50	5.00	3.08	0.00
6.00	0.36	0.00	0.00	32.00	5.00	3.08	0.00
6.50	0.40	0.00	0.00	32.50	5.00	3.08	0.00
7.00	0.45	0.00	0.00	33.00	5.00	3.08	0.00
7.50	0.51	0.00	0.04	33.50	5.00	3.08	0.00
8.00	0.57	0.01	0.10	34.00	5.00	3.08	0.00
8.50	0.64	0.02	0.18	34.50	5.00	3.08	0.00
9.00	0.73	0.03	0.30	35.00	5.00	3.08	0.00
9.50	0.83	0.06	0.46	35.50	5.00	3.08	0.00
10.00	0.95	0.09	0.65	36.00	5.00	3.08	0.00
10.50	1.08	0.15	0.93	36.50	5.00	3.08	0.00
11.00	1.25	0.22	1.32	37.00	5.00	3.08	0.00
11.50	1.49	0.34	2.23	37.50	5.00	3.08	0.00
12.00	2.50	1.00	10.60	38.00	5.00	3.08	0.00
12.50	3.51	1.79	11.82	38.50	5.00	3.08	0.00
13.00	3.75	1.99	3.56	39.00	5.00	3.08	0.00
13.50	3.92	2.13	2.51	39.50	5.00	3.08	0.00
14.00	4.06	2.25	2.08	40.00	5.00	3.08	0.00
14.50	4.17	2.35	1.76	40.50	5.00	3.08	0.00
15.00	4.27	2.44	1.55	41.00	5.00	3.08	0.00
15.50	4.36	2.51	1.33	41.50	5.00	3.08	0.00
16.00	4.43	2.57	1.11	42.00	5.00	3.08	0.00
16.50	4.49	2.63	0.96	42.50	5.00	3.08	0.00
17.00	4.55	2.68	0.87	43.00	5.00	3.08	0.00
17.50	4.60	2.72	0.77	43.50	5.00	3.08	0.00
18.00	4.64	2.76	0.67	44.00	5.00	3.08	0.00
18.50	4.68	2.79	0.61	44.50	5.00	3.08	0.00
19.00	4.72	2.83	0.59	45.00	5.00	3.08	0.00
19.50	4.75	2.86	0.56	45.50	5.00	3.08	0.00
20.00	4.79	2.89	0.53	46.00	5.00	3.08	0.00
20.50	4.82	2.92	0.50	46.50	5.00	3.08	0.00
21.00	4.85	2.94	0.48	47.00	5.00	3.08	0.00
21.50	4.88	2.97	0.46	47.50	5.00	3.08	0.00
22.00	4.90	2.99	0.44	48.00	5.00	3.08	0.00
22.50	4.93	3.02	0.42	48.50	5.00	3.08	0.00
23.00	4.95	3.04	0.39	49.00	5.00	3.08	0.00
23.50	4.98	3.06	0.37	49.50	5.00	3.08	0.00
24.00	5.00	3.08	0.35	50.00	5.00	3.08	0.00
24.50	5.00	3.08	0.01				
25.00	5.00	3.08	0.00				
25.50	5.00	3.08	0.00				
26.00	5.00	3.08	0.00				
26.50	5.00	3.08	0.00				
27.00	5.00	3.08	0.00				
27.50	5.00	3.08	0.00				

Proposed Conditions_DP-1

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 38

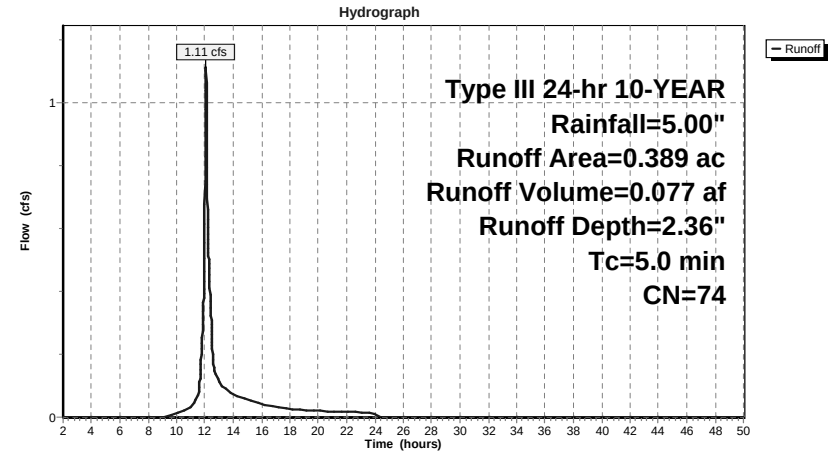
Summary for Subcatchment DA-1D2: Drainage Area 1D2

Runoff = 1.11 cfs @ 12.08 hrs, Volume= 0.077 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
* 0.389	74	Pervious Pavers
0.389		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, User Defined Min.

Subcatchment DA-1D2: Drainage Area 1D2

Proposed Conditions_DP-1

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 39

Hydrograph for Subcatchment DA-1D2: Drainage Area 1D2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
2.00	0.10	0.00	0.00	28.00	5.00	2.36	0.00
2.50	0.13	0.00	0.00	28.50	5.00	2.36	0.00
3.00	0.15	0.00	0.00	29.00	5.00	2.36	0.00
3.50	0.18	0.00	0.00	29.50	5.00	2.36	0.00
4.00	0.22	0.00	0.00	30.00	5.00	2.36	0.00
4.50	0.25	0.00	0.00	30.50	5.00	2.36	0.00
5.00	0.28	0.00	0.00	31.00	5.00	2.36	0.00
5.50	0.32	0.00	0.00	31.50	5.00	2.36	0.00
6.00	0.36	0.00	0.00	32.00	5.00	2.36	0.00
6.50	0.40	0.00	0.00	32.50	5.00	2.36	0.00
7.00	0.45	0.00	0.00	33.00	5.00	2.36	0.00
7.50	0.51	0.00	0.00	33.50	5.00	2.36	0.00
8.00	0.57	0.00	0.00	34.00	5.00	2.36	0.00
8.50	0.64	0.00	0.00	34.50	5.00	2.36	0.00
9.00	0.73	0.00	0.00	35.00	5.00	2.36	0.00
9.50	0.83	0.00	0.00	35.50	5.00	2.36	0.00
10.00	0.95	0.02	0.01	36.00	5.00	2.36	0.00
10.50	1.08	0.04	0.02	36.50	5.00	2.36	0.00
11.00	1.25	0.07	0.03	37.00	5.00	2.36	0.00
11.50	1.49	0.14	0.07	37.50	5.00	2.36	0.00
12.00	2.50	0.61	0.68	38.00	5.00	2.36	0.00
12.50	3.51	1.25	0.25	38.50	5.00	2.36	0.00
13.00	3.75	1.42	0.11	39.00	5.00	2.36	0.00
13.50	3.92	1.54	0.09	39.50	5.00	2.36	0.00
14.00	4.06	1.64	0.07	40.00	5.00	2.36	0.00
14.50	4.17	1.72	0.06	40.50	5.00	2.36	0.00
15.00	4.27	1.80	0.06	41.00	5.00	2.36	0.00
15.50	4.36	1.86	0.05	41.50	5.00	2.36	0.00
16.00	4.43	1.92	0.04	42.00	5.00	2.36	0.00
16.50	4.49	1.97	0.04	42.50	5.00	2.36	0.00
17.00	4.55	2.01	0.03	43.00	5.00	2.36	0.00
17.50	4.60	2.05	0.03	43.50	5.00	2.36	0.00
18.00	4.64	2.08	0.02	44.00	5.00	2.36	0.00
18.50	4.68	2.11	0.02	44.50	5.00	2.36	0.00
19.00	4.72	2.14	0.02	45.00	5.00	2.36	0.00
19.50	4.75	2.17	0.02	45.50	5.00	2.36	0.00
20.00	4.79	2.19	0.02	46.00	5.00	2.36	0.00
20.50	4.82	2.22	0.02	46.50	5.00	2.36	0.00
21.00	4.85	2.24	0.02	47.00	5.00	2.36	0.00
21.50	4.88	2.27	0.02	47.50	5.00	2.36	0.00
22.00	4.90	2.29	0.02	48.00	5.00	2.36	0.00
22.50	4.93	2.31	0.02	48.50	5.00	2.36	0.00
23.00	4.95	2.33	0.02	49.00	5.00	2.36	0.00
23.50	4.98	2.35	0.01	49.50	5.00	2.36	0.00
24.00	5.00	2.36	0.01	50.00	5.00	2.36	0.00
24.50	5.00	2.36	0.00				
25.00	5.00	2.36	0.00				
25.50	5.00	2.36	0.00				
26.00	5.00	2.36	0.00				
26.50	5.00	2.36	0.00				
27.00	5.00	2.36	0.00				
27.50	5.00	2.36	0.00				

Proposed Conditions_DP-1

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 40

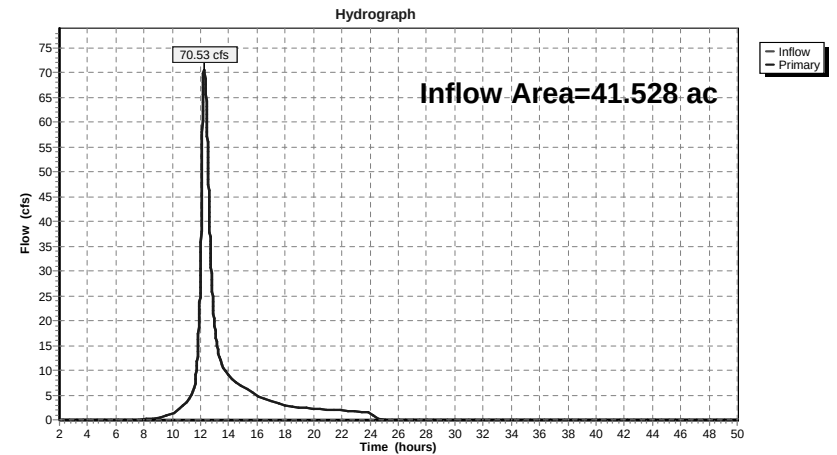
Summary for Pond DP-1: Sterling Forest Lake

All runoff is conveyed directly into Sterling Forest Lake or through the existing storm collection system into Sterling Forest Lake.

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

Inflow Area = 41.528 ac, 10.55% Impervious, Inflow Depth = 2.51" for 10-YEAR event
 Inflow = 70.53 cfs @ 12.24 hrs, Volume= 8.680 af
 Primary = 70.53 cfs @ 12.24 hrs, Volume= 8.680 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 2.00-50.00 hrs, dt= 0.01 hrs

Pond DP-1: Sterling Forest Lake

Proposed Conditions_DP-1

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 41

Hydrograph for Pond DP-1: Sterling Forest Lake

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
2.00	0.00		0.00	28.00	0.00		0.00
2.50	0.00		0.00	28.50	0.00		0.00
3.00	0.00		0.00	29.00	0.00		0.00
3.50	0.00		0.00	29.50	0.00		0.00
4.00	0.00		0.00	30.00	0.00		0.00
4.50	0.00		0.00	30.50	0.00		0.00
5.00	0.00		0.00	31.00	0.00		0.00
5.50	0.00		0.00	31.50	0.00		0.00
6.00	0.00		0.00	32.00	0.00		0.00
6.50	0.00		0.00	32.50	0.00		0.00
7.00	0.00		0.00	33.00	0.00		0.00
7.50	0.04		0.04	33.50	0.00		0.00
8.00	0.10		0.10	34.00	0.00		0.00
8.50	0.19		0.19	34.50	0.00		0.00
9.00	0.37		0.37	35.00	0.00		0.00
9.50	0.68		0.68	35.50	0.00		0.00
10.00	1.27		1.27	36.00	0.00		0.00
10.50	2.17		2.17	36.50	0.00		0.00
11.00	3.49		3.49	37.00	0.00		0.00
11.50	6.30		6.30	37.50	0.00		0.00
12.00	30.54		30.54	38.00	0.00		0.00
12.50	55.05		55.05	38.50	0.00		0.00
13.00	18.70		18.70	39.00	0.00		0.00
13.50	11.19		11.19	39.50	0.00		0.00
14.00	8.99		8.99	40.00	0.00		0.00
14.50	7.57		7.57	40.50	0.00		0.00
15.00	6.66		6.66	41.00	0.00		0.00
15.50	5.78		5.78	41.50	0.00		0.00
16.00	4.87		4.87	42.00	0.00		0.00
16.50	4.17		4.17	42.50	0.00		0.00
17.00	3.75		3.75	43.00	0.00		0.00
17.50	3.35		3.35	43.50	0.00		0.00
18.00	2.94		2.94	44.00	0.00		0.00
18.50	2.65		2.65	44.50	0.00		0.00
19.00	2.52		2.52	45.00	0.00		0.00
19.50	2.39		2.39	45.50	0.00		0.00
20.00	2.27		2.27	46.00	0.00		0.00
20.50	2.16		2.16	46.50	0.00		0.00
21.00	2.07		2.07	47.00	0.00		0.00
21.50	1.98		1.98	47.50	0.00		0.00
22.00	1.89		1.89	48.00	0.00		0.00
22.50	1.80		1.80	48.50	0.00		0.00
23.00	1.70		1.70	49.00	0.00		0.00
23.50	1.61		1.61	49.50	0.00		0.00
24.00	1.52		1.52	50.00	0.00		0.00
24.50	0.25		0.25				
25.00	0.02		0.02				
25.50	0.00		0.00				
26.00	0.00		0.00				
26.50	0.00		0.00				
27.00	0.00		0.00				
27.50	0.00		0.00				

Proposed Conditions_DP-1

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 42

Time span=2.00-50.00 hrs, dt=0.01 hrs, 4801 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Reach C-1B1: 15" SD Avg. Flow Depth=1.25' Max Vel=13.15 fps Inflow=23.62 cfs 1.946 af
 15.0" Round Pipe n=0.012 L=55.0' S=0.0409 '/' Capacity=14.15 cfs Outflow=15.71 cfs 1.946 af

Subcatchment DA-1A: Drainage Area 1A Runoff Area=24.005 ac 0.00% Impervious Runoff Depth=4.63"
 Flow Length=1,450' Tc=27.8 min CN=73 Runoff=76.42 cfs 9.268 af

Subcatchment DA-1B1: Drainage Area 1B1 Runoff Area=4.693 ac 20.46% Impervious Runoff Depth=4.98"
 Flow Length=593' Tc=10.3 min UI Adjusted CN=76 Runoff=23.62 cfs 1.946 af

Subcatchment DA-1B2: Drainage Area 1B2 Runoff Area=0.289 ac 0.00% Impervious Runoff Depth=4.75"
 Tc=5.0 min CN=74 Runoff=1.66 cfs 0.114 af

Subcatchment DA-1C: Drainage Area 1C Runoff Area=3.300 ac 0.00% Impervious Runoff Depth=5.09"
 Flow Length=187' Tc=13.0 min CN=77 Runoff=15.66 cfs 1.400 af

Subcatchment DA-1D1: Drainage Area 1D1 Runoff Area=8.852 ac 38.64% Impervious Runoff Depth=5.67"
 Flow Length=450' Tc=14.6 min CN=82 Runoff=44.20 cfs 4.183 af

Subcatchment DA-1D2: Drainage Area 1D2 Runoff Area=0.389 ac 0.00% Impervious Runoff Depth=4.75"
 Tc=5.0 min CN=74 Runoff=2.24 cfs 0.154 af

Pond DP-1: Sterling Forest Lake Inflow=135.83 cfs 17.065 af
 Primary=135.83 cfs 17.065 af

Total Runoff Area = 41.528 ac Runoff Volume = 17.065 af Average Runoff Depth = 4.93"
89.45% Pervious = 37.148 ac 10.55% Impervious = 4.380 ac

Summary for Reach C-1B1: 15" SD

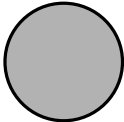
[52] Hint: Inlet/Outlet conditions not evaluated
[55] Hint: Peak inflow is 167% of Manning's capacity
[76] Warning: Detained 0.118 af (Pond w/culvert advised)
[85] Warning: Oscillations may require Finer Routing>1

Inflow Area = 4.693 ac, 20.46% Impervious, Inflow Depth = 4.98" for 100-YEAR event
Inflow = 23.62 cfs @ 12.14 hrs, Volume= 1.946 af
Outflow = 15.71 cfs @ 12.60 hrs, Volume= 1.946 af, Atten= 33%, Lag= 27.3 min

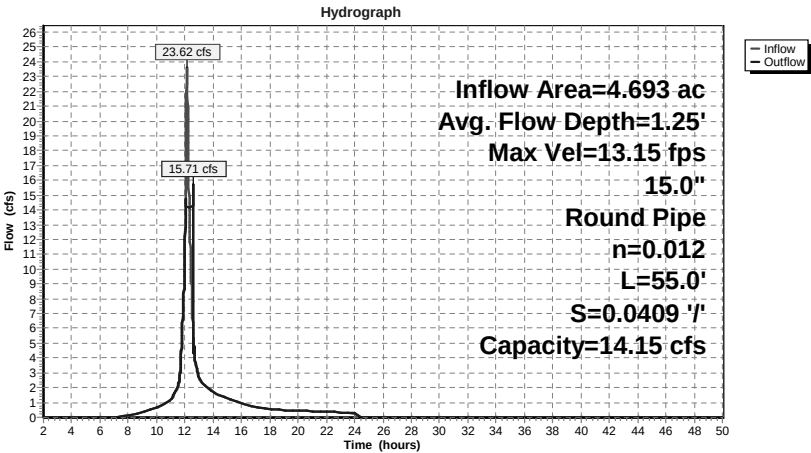
Routing by Stor-Ind+Trans method, Time Span= 2.00-50.00 hrs, dt= 0.01 hrs
Max. Velocity= 13.15 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.88 fps, Avg. Travel Time= 0.2 min

Peak Storage= 67 cf @ 12.05 hrs
Average Depth at Peak Storage= 1.25'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 14.15 cfs

15.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 55.0' Slope= 0.0409 '/'
Inlet Invert= 644.31', Outlet Invert= 642.06'



Reach C-1B1: 15" SD



Proposed Conditions_DP-1

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 45

Hydrograph for Reach C-1B1: 15" SD

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
2.00	0.00	0	644.31	0.00
3.00	0.00	0	644.31	0.00
4.00	0.00	0	644.31	0.00
5.00	0.00	0	644.31	0.00
6.00	0.00	0	644.31	0.00
7.00	0.02	1	644.35	0.02
8.00	0.12	2	644.39	0.12
9.00	0.31	4	644.44	0.31
10.00	0.62	6	644.49	0.62
11.00	1.23	10	644.56	1.23
12.00	11.48	49	645.16	11.35
13.00	2.76	17	644.68	2.77
14.00	1.70	12	644.60	1.70
15.00	1.28	10	644.56	1.28
16.00	0.91	8	644.52	0.91
17.00	0.72	7	644.50	0.72
18.00	0.56	5	644.48	0.56
19.00	0.49	5	644.47	0.49
20.00	0.44	5	644.46	0.44
21.00	0.40	4	644.45	0.40
22.00	0.36	4	644.45	0.36
23.00	0.33	4	644.44	0.33
24.00	0.29	3	644.43	0.29
25.00	0.00	0	644.31	0.00
26.00	0.00	0	644.31	0.00
27.00	0.00	0	644.31	0.00
28.00	0.00	0	644.31	0.00
29.00	0.00	0	644.31	0.00
30.00	0.00	0	644.31	0.00
31.00	0.00	0	644.31	0.00
32.00	0.00	0	644.31	0.00
33.00	0.00	0	644.31	0.00
34.00	0.00	0	644.31	0.00
35.00	0.00	0	644.31	0.00
36.00	0.00	0	644.31	0.00
37.00	0.00	0	644.31	0.00
38.00	0.00	0	644.31	0.00
39.00	0.00	0	644.31	0.00
40.00	0.00	0	644.31	0.00
41.00	0.00	0	644.31	0.00
42.00	0.00	0	644.31	0.00
43.00	0.00	0	644.31	0.00
44.00	0.00	0	644.31	0.00
45.00	0.00	0	644.31	0.00
46.00	0.00	0	644.31	0.00
47.00	0.00	0	644.31	0.00
48.00	0.00	0	644.31	0.00
49.00	0.00	0	644.31	0.00
50.00	0.00	0	644.31	0.00

Proposed Conditions_DP-1

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 46

Summary for Subcatchment DA-1A: Drainage Area 1A

Runoff = 76.42 cfs @ 12.39 hrs, Volume= 9.268 af, Depth= 4.63"

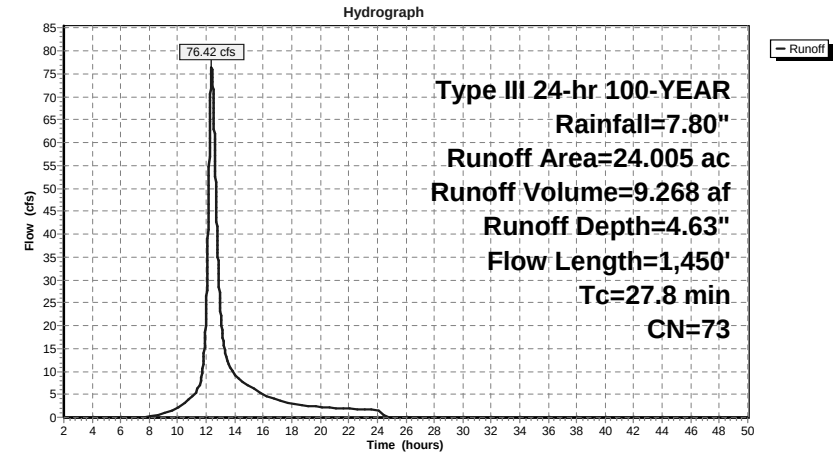
Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-50.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
* 9.880	70	Woods, Good, HSG C
* 10.510	77	Woods, Good, HSG D
* 0.600	65	Brush, Good, HSG C
* 0.170	73	Brush, Good, HSG D
2.845	74	>75% Grass cover, Good, HSG C
24.005	73	Weighted Average
24.005		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	100	0.1200	0.10		Sheet Flow, Woods Woods: Dense underbrush n= 0.800 P2= 3.50"
3.9	208	0.1250	0.88		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
2.8	193	0.2130	1.15		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
2.6	409	0.0020	2.59	49.27	Channel Flow, Woods Area= 19.0 sf Perim= 15.0' r= 1.27' n= 0.030 Earth, grassed & winding
0.8	390	0.1460	8.08	218.12	Channel Flow, Woods Area= 27.0 sf Perim= 45.0' r= 0.60' n= 0.050 Mountain streams w/large boulders
0.2	150	0.1520	15.62	1,890.49	Channel Flow, Area= 121.0 sf Perim= 108.0' r= 1.12' n= 0.040 Earth, cobble bottom, clean sides
27.8	1,450	Total			

Subcatchment DA-1A: Drainage Area 1A



Hydrograph for Subcatchment DA-1A: Drainage Area 1A

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
2.00	0.16	0.00	0.00	28.00	7.80	4.63	0.00
2.50	0.20	0.00	0.00	28.50	7.80	4.63	0.00
3.00	0.24	0.00	0.00	29.00	7.80	4.63	0.00
3.50	0.29	0.00	0.00	29.50	7.80	4.63	0.00
4.00	0.34	0.00	0.00	30.00	7.80	4.63	0.00
4.50	0.39	0.00	0.00	30.50	7.80	4.63	0.00
5.00	0.44	0.00	0.00	31.00	7.80	4.63	0.00
5.50	0.50	0.00	0.00	31.50	7.80	4.63	0.00
6.00	0.56	0.00	0.00	32.00	7.80	4.63	0.00
6.50	0.63	0.00	0.00	32.50	7.80	4.63	0.00
7.00	0.71	0.00	0.00	33.00	7.80	4.63	0.00
7.50	0.79	0.00	0.01	33.50	7.80	4.63	0.00
8.00	0.89	0.01	0.16	34.00	7.80	4.63	0.00
8.50	1.00	0.02	0.43	34.50	7.80	4.63	0.00
9.00	1.14	0.04	0.85	35.00	7.80	4.63	0.00
9.50	1.29	0.07	1.41	35.50	7.80	4.63	0.00
10.00	1.47	0.12	2.11	36.00	7.80	4.63	0.00
10.50	1.69	0.19	3.05	36.50	7.80	4.63	0.00
11.00	1.95	0.30	4.47	37.00	7.80	4.63	0.00
11.50	2.32	0.48	7.01	37.50	7.80	4.63	0.00
12.00	3.90	1.46	23.68	38.00	7.80	4.63	0.00
12.50	5.48	2.66	69.73	38.50	7.80	4.63	0.00
13.00	5.85	2.96	23.26	39.00	7.80	4.63	0.00
13.50	6.11	3.18	12.06	39.50	7.80	4.63	0.00
14.00	6.33	3.36	9.38	40.00	7.80	4.63	0.00
14.50	6.51	3.51	7.77	40.50	7.80	4.63	0.00
15.00	6.66	3.65	6.80	41.00	7.80	4.63	0.00
15.50	6.80	3.76	5.90	41.50	7.80	4.63	0.00
16.00	6.91	3.86	5.00	42.00	7.80	4.63	0.00
16.50	7.01	3.94	4.22	42.50	7.80	4.63	0.00
17.00	7.09	4.02	3.77	43.00	7.80	4.63	0.00
17.50	7.17	4.08	3.37	43.50	7.80	4.63	0.00
18.00	7.24	4.14	2.97	44.00	7.80	4.63	0.00
18.50	7.30	4.19	2.64	44.50	7.80	4.63	0.00
19.00	7.36	4.25	2.49	45.00	7.80	4.63	0.00
19.50	7.41	4.29	2.37	45.50	7.80	4.63	0.00
20.00	7.46	4.34	2.25	46.00	7.80	4.63	0.00
20.50	7.51	4.38	2.14	46.50	7.80	4.63	0.00
21.00	7.56	4.42	2.04	47.00	7.80	4.63	0.00
21.50	7.61	4.46	1.95	47.50	7.80	4.63	0.00
22.00	7.65	4.50	1.86	48.00	7.80	4.63	0.00
22.50	7.69	4.54	1.77	48.50	7.80	4.63	0.00
23.00	7.73	4.57	1.68	49.00	7.80	4.63	0.00
23.50	7.77	4.60	1.59	49.50	7.80	4.63	0.00
24.00	7.80	4.63	1.50	50.00	7.80	4.63	0.00
24.50	7.80	4.63	0.42				
25.00	7.80	4.63	0.03				
25.50	7.80	4.63	0.00				
26.00	7.80	4.63	0.00				
26.50	7.80	4.63	0.00				
27.00	7.80	4.63	0.00				
27.50	7.80	4.63	0.00				

Summary for Subcatchment DA-1B1: Drainage Area 1B1

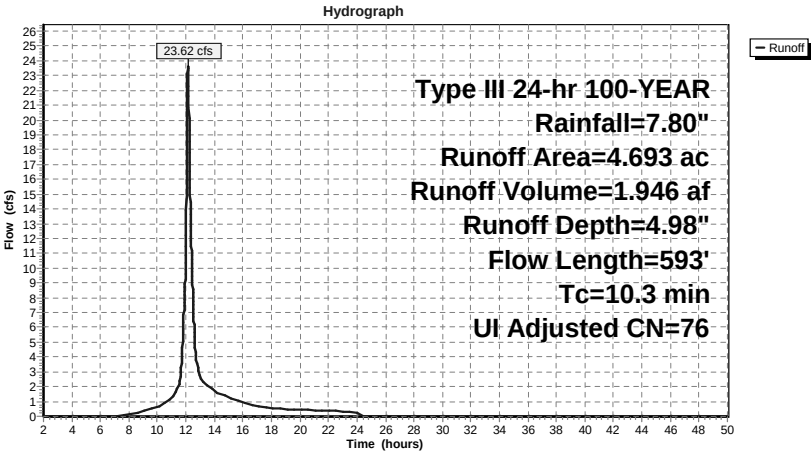
Runoff = 23.62 cfs @ 12.14 hrs, Volume= 1.946 af, Depth= 4.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
0.960	98	Unconnected pavement, HSG C
3.220	74	>75% Grass cover, Good, HSG C
0.100	70	Woods, Good, HSG C
* 0.413	68	Green Roof - Extensive
4.693	78	Weighted Average, UI Adjusted CN = 76
3.733		79.54% Pervious Area
0.960		20.46% Impervious Area
0.960		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0490	0.17		Sheet Flow, 4.9% Grass: Dense n= 0.240 P2= 3.50"
0.2	23	0.0490	1.55		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.6	470	0.0839	13.14	10.32	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
10.3	593	Total			

Subcatchment DA-1B1: Drainage Area 1B1



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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 51

Hydrograph for Subcatchment DA-1B1: Drainage Area 1B1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
2.00	0.16	0.00	0.00	28.00	7.80	4.98	0.00
2.50	0.20	0.00	0.00	28.50	7.80	4.98	0.00
3.00	0.24	0.00	0.00	29.00	7.80	4.98	0.00
3.50	0.29	0.00	0.00	29.50	7.80	4.98	0.00
4.00	0.34	0.00	0.00	30.00	7.80	4.98	0.00
4.50	0.39	0.00	0.00	30.50	7.80	4.98	0.00
5.00	0.44	0.00	0.00	31.00	7.80	4.98	0.00
5.50	0.50	0.00	0.00	31.50	7.80	4.98	0.00
6.00	0.56	0.00	0.00	32.00	7.80	4.98	0.00
6.50	0.63	0.00	0.00	32.50	7.80	4.98	0.00
7.00	0.71	0.00	0.02	33.00	7.80	4.98	0.00
7.50	0.79	0.01	0.07	33.50	7.80	4.98	0.00
8.00	0.89	0.02	0.12	34.00	7.80	4.98	0.00
8.50	1.00	0.04	0.20	34.50	7.80	4.98	0.00
9.00	1.14	0.07	0.31	35.00	7.80	4.98	0.00
9.50	1.29	0.11	0.46	35.50	7.80	4.98	0.00
10.00	1.47	0.18	0.62	36.00	7.80	4.98	0.00
10.50	1.69	0.27	0.88	36.50	7.80	4.98	0.00
11.00	1.95	0.39	1.23	37.00	7.80	4.98	0.00
11.50	2.32	0.59	2.13	37.50	7.80	4.98	0.00
12.00	3.90	1.66	11.48	38.00	7.80	4.98	0.00
12.50	5.48	2.93	8.04	38.50	7.80	4.98	0.00
13.00	5.85	3.25	2.76	39.00	7.80	4.98	0.00
13.50	6.11	3.48	2.07	39.50	7.80	4.98	0.00
14.00	6.33	3.66	1.70	40.00	7.80	4.98	0.00
14.50	6.51	3.82	1.46	40.50	7.80	4.98	0.00
15.00	6.66	3.96	1.28	41.00	7.80	4.98	0.00
15.50	6.80	4.08	1.10	41.50	7.80	4.98	0.00
16.00	6.91	4.18	0.91	42.00	7.80	4.98	0.00
16.50	7.01	4.26	0.80	42.50	7.80	4.98	0.00
17.00	7.09	4.34	0.72	43.00	7.80	4.98	0.00
17.50	7.17	4.41	0.64	43.50	7.80	4.98	0.00
18.00	7.24	4.47	0.56	44.00	7.80	4.98	0.00
18.50	7.30	4.52	0.51	44.50	7.80	4.98	0.00
19.00	7.36	4.58	0.49	45.00	7.80	4.98	0.00
19.50	7.41	4.63	0.46	45.50	7.80	4.98	0.00
20.00	7.46	4.67	0.44	46.00	7.80	4.98	0.00
20.50	7.51	4.72	0.42	46.50	7.80	4.98	0.00
21.00	7.56	4.76	0.40	47.00	7.80	4.98	0.00
21.50	7.61	4.80	0.38	47.50	7.80	4.98	0.00
22.00	7.65	4.84	0.36	48.00	7.80	4.98	0.00
22.50	7.69	4.88	0.35	48.50	7.80	4.98	0.00
23.00	7.73	4.91	0.33	49.00	7.80	4.98	0.00
23.50	7.77	4.95	0.31	49.50	7.80	4.98	0.00
24.00	7.80	4.98	0.29	50.00	7.80	4.98	0.00
24.50	7.80	4.98	0.00				
25.00	7.80	4.98	0.00				
25.50	7.80	4.98	0.00				
26.00	7.80	4.98	0.00				
26.50	7.80	4.98	0.00				
27.00	7.80	4.98	0.00				
27.50	7.80	4.98	0.00				

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 52

Summary for Subcatchment DA-1B2: Drainage Area 1B2

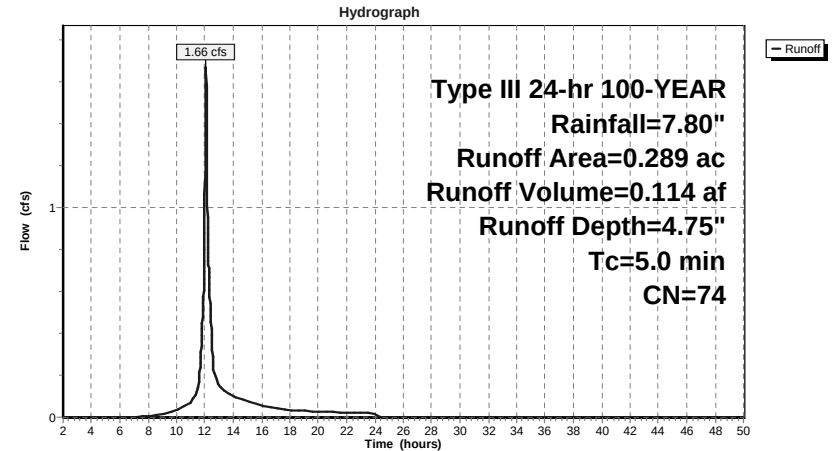
Runoff = 1.66 cfs @ 12.07 hrs, Volume= 0.114 af, Depth= 4.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-50.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
* 0.289	74	Pervious Pavers
0.289		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, User Defined Min.

Subcatchment DA-1B2: Drainage Area 1B2

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 53

Hydrograph for Subcatchment DA-1B2: Drainage Area 1B2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
2.00	0.16	0.00	0.00	28.00	7.80	4.75	0.00
2.50	0.20	0.00	0.00	28.50	7.80	4.75	0.00
3.00	0.24	0.00	0.00	29.00	7.80	4.75	0.00
3.50	0.29	0.00	0.00	29.50	7.80	4.75	0.00
4.00	0.34	0.00	0.00	30.00	7.80	4.75	0.00
4.50	0.39	0.00	0.00	30.50	7.80	4.75	0.00
5.00	0.44	0.00	0.00	31.00	7.80	4.75	0.00
5.50	0.50	0.00	0.00	31.50	7.80	4.75	0.00
6.00	0.56	0.00	0.00	32.00	7.80	4.75	0.00
6.50	0.63	0.00	0.00	32.50	7.80	4.75	0.00
7.00	0.71	0.00	0.00	33.00	7.80	4.75	0.00
7.50	0.79	0.00	0.00	33.50	7.80	4.75	0.00
8.00	0.89	0.01	0.01	34.00	7.80	4.75	0.00
8.50	1.00	0.02	0.01	34.50	7.80	4.75	0.00
9.00	1.14	0.05	0.02	35.00	7.80	4.75	0.00
9.50	1.29	0.09	0.02	35.50	7.80	4.75	0.00
10.00	1.47	0.14	0.03	36.00	7.80	4.75	0.00
10.50	1.69	0.22	0.05	36.50	7.80	4.75	0.00
11.00	1.95	0.33	0.07	37.00	7.80	4.75	0.00
11.50	2.32	0.51	0.13	37.50	7.80	4.75	0.00
12.00	3.90	1.52	1.06	38.00	7.80	4.75	0.00
12.50	5.48	2.75	0.35	38.50	7.80	4.75	0.00
13.00	5.85	3.06	0.15	39.00	7.80	4.75	0.00
13.50	6.11	3.28	0.12	39.50	7.80	4.75	0.00
14.00	6.33	3.46	0.10	40.00	7.80	4.75	0.00
14.50	6.51	3.61	0.09	40.50	7.80	4.75	0.00
15.00	6.66	3.75	0.08	41.00	7.80	4.75	0.00
15.50	6.80	3.87	0.06	41.50	7.80	4.75	0.00
16.00	6.91	3.96	0.05	42.00	7.80	4.75	0.00
16.50	7.01	4.05	0.05	42.50	7.80	4.75	0.00
17.00	7.09	4.12	0.04	43.00	7.80	4.75	0.00
17.50	7.17	4.19	0.04	43.50	7.80	4.75	0.00
18.00	7.24	4.25	0.03	44.00	7.80	4.75	0.00
18.50	7.30	4.30	0.03	44.50	7.80	4.75	0.00
19.00	7.36	4.36	0.03	45.00	7.80	4.75	0.00
19.50	7.41	4.40	0.03	45.50	7.80	4.75	0.00
20.00	7.46	4.45	0.03	46.00	7.80	4.75	0.00
20.50	7.51	4.49	0.03	46.50	7.80	4.75	0.00
21.00	7.56	4.54	0.02	47.00	7.80	4.75	0.00
21.50	7.61	4.58	0.02	47.50	7.80	4.75	0.00
22.00	7.65	4.61	0.02	48.00	7.80	4.75	0.00
22.50	7.69	4.65	0.02	48.50	7.80	4.75	0.00
23.00	7.73	4.68	0.02	49.00	7.80	4.75	0.00
23.50	7.77	4.72	0.02	49.50	7.80	4.75	0.00
24.00	7.80	4.75	0.02	50.00	7.80	4.75	0.00
24.50	7.80	4.75	0.00				
25.00	7.80	4.75	0.00				
25.50	7.80	4.75	0.00				
26.00	7.80	4.75	0.00				
26.50	7.80	4.75	0.00				
27.00	7.80	4.75	0.00				
27.50	7.80	4.75	0.00				

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 54

Summary for Subcatchment DA-1C: Drainage Area 1C

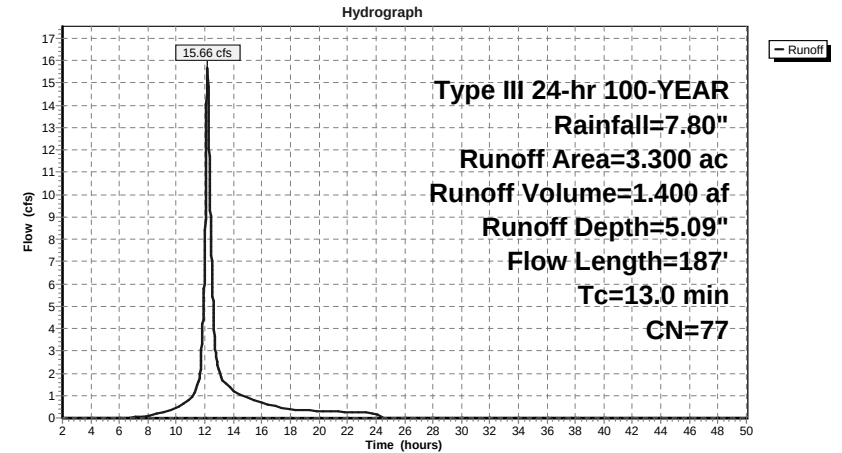
Runoff = 15.66 cfs @ 12.18 hrs, Volume= 1.400 af, Depth= 5.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-50.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
3.180	77	Woods, Good, HSG D
0.120	80	>75% Grass cover, Good, HSG D
3.300	77	Weighted Average
3.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	82	0.0490	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.8	105	0.1800	2.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.0	187	Total			

Subcatchment DA-1C: Drainage Area 1C

Proposed Conditions_DP-1

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 55

Hydrograph for Subcatchment DA-1C: Drainage Area 1C

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
2.00	0.16	0.00	0.00	28.00	7.80	5.09	0.00
2.50	0.20	0.00	0.00	28.50	7.80	5.09	0.00
3.00	0.24	0.00	0.00	29.00	7.80	5.09	0.00
3.50	0.29	0.00	0.00	29.50	7.80	5.09	0.00
4.00	0.34	0.00	0.00	30.00	7.80	5.09	0.00
4.50	0.39	0.00	0.00	30.50	7.80	5.09	0.00
5.00	0.44	0.00	0.00	31.00	7.80	5.09	0.00
5.50	0.50	0.00	0.00	31.50	7.80	5.09	0.00
6.00	0.56	0.00	0.00	32.00	7.80	5.09	0.00
6.50	0.63	0.00	0.00	32.50	7.80	5.09	0.00
7.00	0.71	0.00	0.03	33.00	7.80	5.09	0.00
7.50	0.79	0.01	0.06	33.50	7.80	5.09	0.00
8.00	0.89	0.03	0.10	34.00	7.80	5.09	0.00
8.50	1.00	0.05	0.15	34.50	7.80	5.09	0.00
9.00	1.14	0.08	0.24	35.00	7.80	5.09	0.00
9.50	1.29	0.13	0.34	35.50	7.80	5.09	0.00
10.00	1.47	0.20	0.46	36.00	7.80	5.09	0.00
10.50	1.69	0.29	0.64	36.50	7.80	5.09	0.00
11.00	1.95	0.42	0.89	37.00	7.80	5.09	0.00
11.50	2.32	0.63	1.48	37.50	7.80	5.09	0.00
12.00	3.90	1.73	7.18	38.00	7.80	5.09	0.00
12.50	5.48	3.03	6.63	38.50	7.80	5.09	0.00
13.00	5.85	3.35	2.07	39.00	7.80	5.09	0.00
13.50	6.11	3.58	1.49	39.50	7.80	5.09	0.00
14.00	6.33	3.77	1.23	40.00	7.80	5.09	0.00
14.50	6.51	3.92	1.05	40.50	7.80	5.09	0.00
15.00	6.66	4.06	0.92	41.00	7.80	5.09	0.00
15.50	6.80	4.18	0.79	41.50	7.80	5.09	0.00
16.00	6.91	4.29	0.66	42.00	7.80	5.09	0.00
16.50	7.01	4.37	0.57	42.50	7.80	5.09	0.00
17.00	7.09	4.45	0.51	43.00	7.80	5.09	0.00
17.50	7.17	4.52	0.46	43.50	7.80	5.09	0.00
18.00	7.24	4.58	0.40	44.00	7.80	5.09	0.00
18.50	7.30	4.64	0.37	44.50	7.80	5.09	0.00
19.00	7.36	4.69	0.35	45.00	7.80	5.09	0.00
19.50	7.41	4.74	0.33	45.50	7.80	5.09	0.00
20.00	7.46	4.79	0.31	46.00	7.80	5.09	0.00
20.50	7.51	4.83	0.30	46.50	7.80	5.09	0.00
21.00	7.56	4.87	0.29	47.00	7.80	5.09	0.00
21.50	7.61	4.91	0.27	47.50	7.80	5.09	0.00
22.00	7.65	4.95	0.26	48.00	7.80	5.09	0.00
22.50	7.69	4.99	0.25	48.50	7.80	5.09	0.00
23.00	7.73	5.03	0.23	49.00	7.80	5.09	0.00
23.50	7.77	5.06	0.22	49.50	7.80	5.09	0.00
24.00	7.80	5.09	0.21	50.00	7.80	5.09	0.00
24.50	7.80	5.09	0.00				
25.00	7.80	5.09	0.00				
25.50	7.80	5.09	0.00				
26.00	7.80	5.09	0.00				
26.50	7.80	5.09	0.00				
27.00	7.80	5.09	0.00				
27.50	7.80	5.09	0.00				

Proposed Conditions_DP-1

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 56

Summary for Subcatchment DA-1D1: Drainage Area 1D1

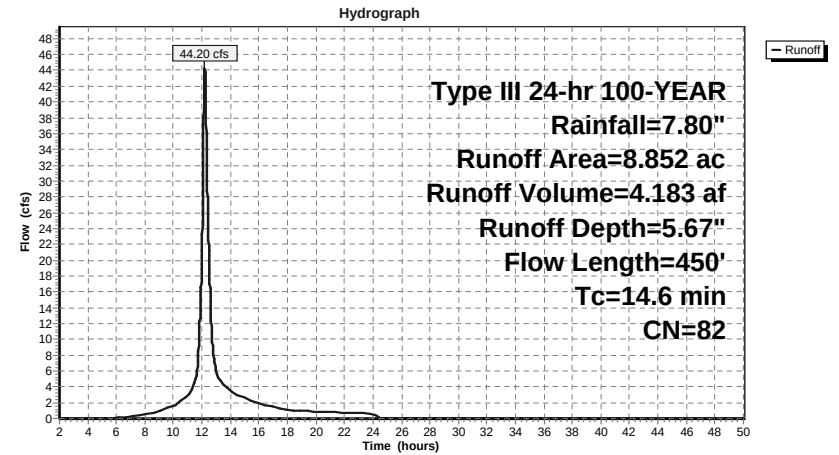
Runoff = 44.20 cfs @ 12.19 hrs, Volume= 4.183 af, Depth= 5.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-50.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
3.420	98	Paved parking, HSG C
2.860	74	>75% Grass cover, Good, HSG C
* 2.572	68	Green Roof -
8.852	82	Weighted Average
5.432		61.36% Pervious Area
3.420		38.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.0260	0.14		Sheet Flow, Grass: Dense n= 0.240 P2= 3.50"
1.1	220	0.0510	3.39		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
1.2	130	0.1410	1.88		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
14.6	450	Total			

Subcatchment DA-1D1: Drainage Area 1D1

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 57

Hydrograph for Subcatchment DA-1D1: Drainage Area 1D1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
2.00	0.16	0.00	0.00	28.00	7.80	5.67	0.00
2.50	0.20	0.00	0.00	28.50	7.80	5.67	0.00
3.00	0.24	0.00	0.00	29.00	7.80	5.67	0.00
3.50	0.29	0.00	0.00	29.50	7.80	5.67	0.00
4.00	0.34	0.00	0.00	30.00	7.80	5.67	0.00
4.50	0.39	0.00	0.00	30.50	7.80	5.67	0.00
5.00	0.44	0.00	0.00	31.00	7.80	5.67	0.00
5.50	0.50	0.00	0.03	31.50	7.80	5.67	0.00
6.00	0.56	0.01	0.09	32.00	7.80	5.67	0.00
6.50	0.63	0.02	0.16	32.50	7.80	5.67	0.00
7.00	0.71	0.03	0.25	33.00	7.80	5.67	0.00
7.50	0.79	0.05	0.37	33.50	7.80	5.67	0.00
8.00	0.89	0.08	0.50	34.00	7.80	5.67	0.00
8.50	1.00	0.11	0.69	34.50	7.80	5.67	0.00
9.00	1.14	0.17	0.97	35.00	7.80	5.67	0.00
9.50	1.29	0.24	1.29	35.50	7.80	5.67	0.00
10.00	1.47	0.33	1.66	36.00	7.80	5.67	0.00
10.50	1.69	0.45	2.20	36.50	7.80	5.67	0.00
11.00	1.95	0.62	2.94	37.00	7.80	5.67	0.00
11.50	2.32	0.87	4.68	37.50	7.80	5.67	0.00
12.00	3.90	2.12	20.29	38.00	7.80	5.67	0.00
12.50	5.48	3.51	20.60	38.50	7.80	5.67	0.00
13.00	5.85	3.85	6.07	39.00	7.80	5.67	0.00
13.50	6.11	4.09	4.26	39.50	7.80	5.67	0.00
14.00	6.33	4.29	3.50	40.00	7.80	5.67	0.00
14.50	6.51	4.45	2.96	40.50	7.80	5.67	0.00
15.00	6.66	4.60	2.60	41.00	7.80	5.67	0.00
15.50	6.80	4.73	2.23	41.50	7.80	5.67	0.00
16.00	6.91	4.83	1.86	42.00	7.80	5.67	0.00
16.50	7.01	4.92	1.61	42.50	7.80	5.67	0.00
17.00	7.09	5.00	1.44	43.00	7.80	5.67	0.00
17.50	7.17	5.08	1.28	43.50	7.80	5.67	0.00
18.00	7.24	5.14	1.12	44.00	7.80	5.67	0.00
18.50	7.30	5.20	1.02	44.50	7.80	5.67	0.00
19.00	7.36	5.25	0.97	45.00	7.80	5.67	0.00
19.50	7.41	5.30	0.92	45.50	7.80	5.67	0.00
20.00	7.46	5.35	0.88	46.00	7.80	5.67	0.00
20.50	7.51	5.40	0.83	46.50	7.80	5.67	0.00
21.00	7.56	5.44	0.80	47.00	7.80	5.67	0.00
21.50	7.61	5.49	0.76	47.50	7.80	5.67	0.00
22.00	7.65	5.53	0.72	48.00	7.80	5.67	0.00
22.50	7.69	5.57	0.69	48.50	7.80	5.67	0.00
23.00	7.73	5.60	0.65	49.00	7.80	5.67	0.00
23.50	7.77	5.64	0.61	49.50	7.80	5.67	0.00
24.00	7.80	5.67	0.58	50.00	7.80	5.67	0.00
24.50	7.80	5.67	0.01				
25.00	7.80	5.67	0.00				
25.50	7.80	5.67	0.00				
26.00	7.80	5.67	0.00				
26.50	7.80	5.67	0.00				
27.00	7.80	5.67	0.00				
27.50	7.80	5.67	0.00				

Proposed Conditions_DP-1

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 58

Summary for Subcatchment DA-1D2: Drainage Area 1D2

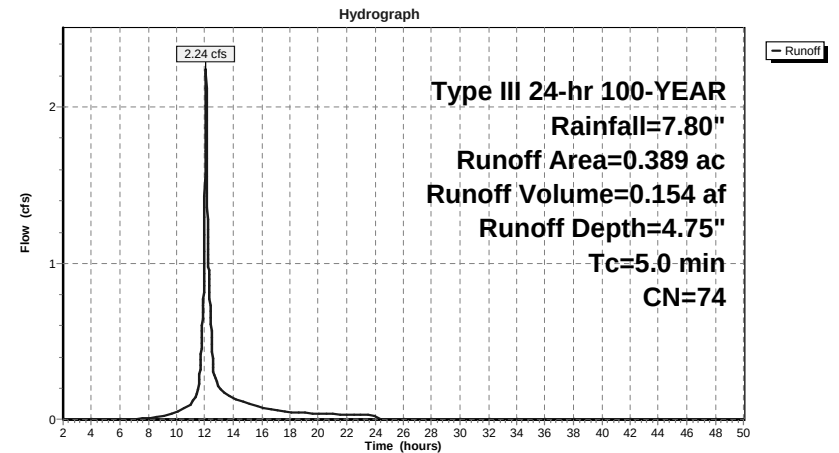
Runoff = 2.24 cfs @ 12.07 hrs, Volume= 0.154 af, Depth= 4.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 2.00-50.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
* 0.389	74	Pervious Pavers
0.389		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, User Defined Min.

Subcatchment DA-1D2: Drainage Area 1D2

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 59

Hydrograph for Subcatchment DA-1D2: Drainage Area 1D2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
2.00	0.16	0.00	0.00	28.00	7.80	4.75	0.00
2.50	0.20	0.00	0.00	28.50	7.80	4.75	0.00
3.00	0.24	0.00	0.00	29.00	7.80	4.75	0.00
3.50	0.29	0.00	0.00	29.50	7.80	4.75	0.00
4.00	0.34	0.00	0.00	30.00	7.80	4.75	0.00
4.50	0.39	0.00	0.00	30.50	7.80	4.75	0.00
5.00	0.44	0.00	0.00	31.00	7.80	4.75	0.00
5.50	0.50	0.00	0.00	31.50	7.80	4.75	0.00
6.00	0.56	0.00	0.00	32.00	7.80	4.75	0.00
6.50	0.63	0.00	0.00	32.50	7.80	4.75	0.00
7.00	0.71	0.00	0.00	33.00	7.80	4.75	0.00
7.50	0.79	0.00	0.00	33.50	7.80	4.75	0.00
8.00	0.89	0.01	0.01	34.00	7.80	4.75	0.00
8.50	1.00	0.02	0.01	34.50	7.80	4.75	0.00
9.00	1.14	0.05	0.02	35.00	7.80	4.75	0.00
9.50	1.29	0.09	0.03	35.50	7.80	4.75	0.00
10.00	1.47	0.14	0.05	36.00	7.80	4.75	0.00
10.50	1.69	0.22	0.07	36.50	7.80	4.75	0.00
11.00	1.95	0.33	0.10	37.00	7.80	4.75	0.00
11.50	2.32	0.51	0.18	37.50	7.80	4.75	0.00
12.00	3.90	1.52	1.43	38.00	7.80	4.75	0.00
12.50	5.48	2.75	0.47	38.50	7.80	4.75	0.00
13.00	5.85	3.06	0.20	39.00	7.80	4.75	0.00
13.50	6.11	3.28	0.16	39.50	7.80	4.75	0.00
14.00	6.33	3.46	0.13	40.00	7.80	4.75	0.00
14.50	6.51	3.61	0.12	40.50	7.80	4.75	0.00
15.00	6.66	3.75	0.10	41.00	7.80	4.75	0.00
15.50	6.80	3.87	0.09	41.50	7.80	4.75	0.00
16.00	6.91	3.96	0.07	42.00	7.80	4.75	0.00
16.50	7.01	4.05	0.06	42.50	7.80	4.75	0.00
17.00	7.09	4.12	0.06	43.00	7.80	4.75	0.00
17.50	7.17	4.19	0.05	43.50	7.80	4.75	0.00
18.00	7.24	4.25	0.04	44.00	7.80	4.75	0.00
18.50	7.30	4.30	0.04	44.50	7.80	4.75	0.00
19.00	7.36	4.36	0.04	45.00	7.80	4.75	0.00
19.50	7.41	4.40	0.04	45.50	7.80	4.75	0.00
20.00	7.46	4.45	0.04	46.00	7.80	4.75	0.00
20.50	7.51	4.49	0.03	46.50	7.80	4.75	0.00
21.00	7.56	4.54	0.03	47.00	7.80	4.75	0.00
21.50	7.61	4.58	0.03	47.50	7.80	4.75	0.00
22.00	7.65	4.61	0.03	48.00	7.80	4.75	0.00
22.50	7.69	4.65	0.03	48.50	7.80	4.75	0.00
23.00	7.73	4.68	0.03	49.00	7.80	4.75	0.00
23.50	7.77	4.72	0.02	49.50	7.80	4.75	0.00
24.00	7.80	4.75	0.02	50.00	7.80	4.75	0.00
24.50	7.80	4.75	0.00				
25.00	7.80	4.75	0.00				
25.50	7.80	4.75	0.00				
26.00	7.80	4.75	0.00				
26.50	7.80	4.75	0.00				
27.00	7.80	4.75	0.00				
27.50	7.80	4.75	0.00				

Proposed Conditions_DP-1

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 60

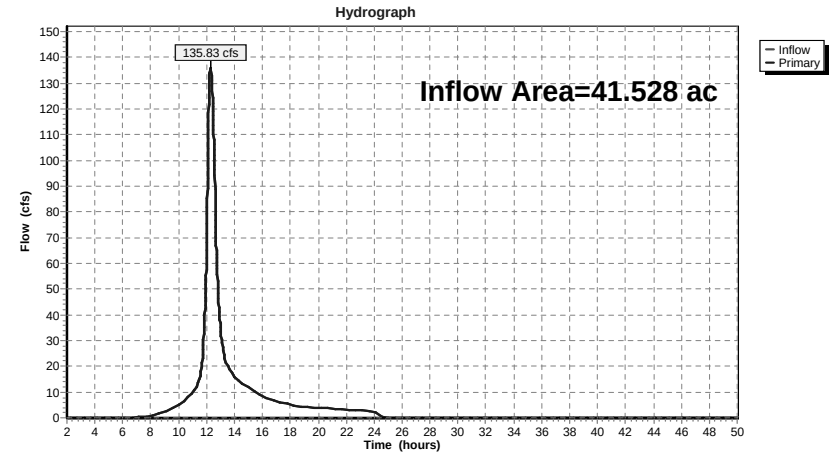
Summary for Pond DP-1: Sterling Forest Lake

All runoff is conveyed directly into Sterling Forest Lake or through the existing storm collection system into Sterling Forest Lake.

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

Inflow Area = 41.528 ac, 10.55% Impervious, Inflow Depth = 4.93" for 100-YEAR event
Inflow = 135.83 cfs @ 12.27 hrs, Volume= 17.065 af
Primary = 135.83 cfs @ 12.27 hrs, Volume= 17.065 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 2.00-50.00 hrs, dt= 0.01 hrs

Pond DP-1: Sterling Forest Lake

Proposed Conditions_DP-1

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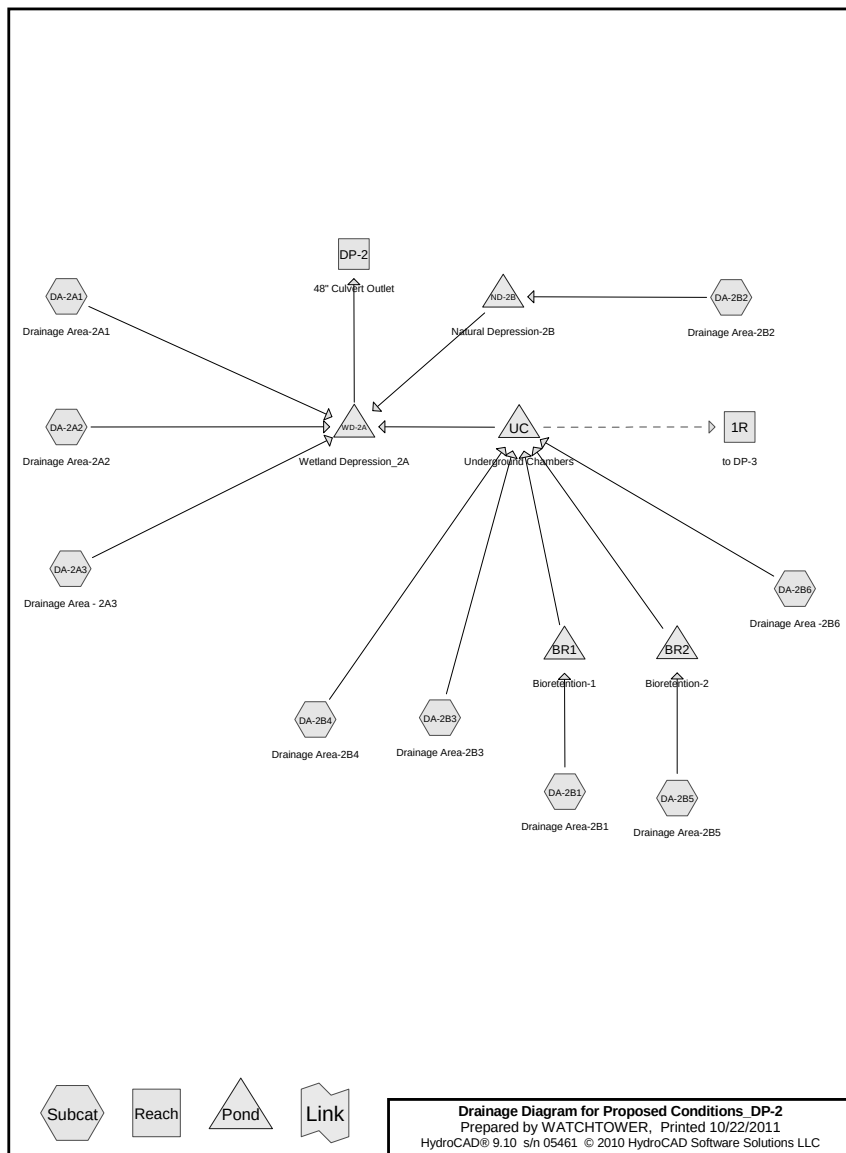
Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 61

Hydrograph for Pond DP-1: Sterling Forest Lake

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
2.00	0.00		0.00	28.00	0.00		0.00
2.50	0.00		0.00	28.50	0.00		0.00
3.00	0.00		0.00	29.00	0.00		0.00
3.50	0.00		0.00	29.50	0.00		0.00
4.00	0.00		0.00	30.00	0.00		0.00
4.50	0.00		0.00	30.50	0.00		0.00
5.00	0.00		0.00	31.00	0.00		0.00
5.50	0.03		0.03	31.50	0.00		0.00
6.00	0.09		0.09	32.00	0.00		0.00
6.50	0.16		0.16	32.50	0.00		0.00
7.00	0.30		0.30	33.00	0.00		0.00
7.50	0.50		0.50	33.50	0.00		0.00
8.00	0.89		0.89	34.00	0.00		0.00
8.50	1.51		1.51	34.50	0.00		0.00
9.00	2.40		2.40	35.00	0.00		0.00
9.50	3.55		3.55	35.50	0.00		0.00
10.00	4.93		4.93	36.00	0.00		0.00
10.50	6.89		6.89	36.50	0.00		0.00
11.00	9.70		9.70	37.00	0.00		0.00
11.50	15.61		15.61	37.50	0.00		0.00
12.00	64.99		64.99	38.00	0.00		0.00
12.50	111.92		111.92	38.50	0.00		0.00
13.00	34.52		34.52	39.00	0.00		0.00
13.50	20.16		20.16	39.50	0.00		0.00
14.00	16.05		16.05	40.00	0.00		0.00
14.50	13.44		13.44	40.50	0.00		0.00
15.00	11.77		11.77	41.00	0.00		0.00
15.50	10.17		10.17	41.50	0.00		0.00
16.00	8.56		8.56	42.00	0.00		0.00
16.50	7.31		7.31	42.50	0.00		0.00
17.00	6.55		6.55	43.00	0.00		0.00
17.50	5.84		5.84	43.50	0.00		0.00
18.00	5.12		5.12	44.00	0.00		0.00
18.50	4.61		4.61	44.50	0.00		0.00
19.00	4.37		4.37	45.00	0.00		0.00
19.50	4.15		4.15	45.50	0.00		0.00
20.00	3.94		3.94	46.00	0.00		0.00
20.50	3.75		3.75	46.50	0.00		0.00
21.00	3.58		3.58	47.00	0.00		0.00
21.50	3.42		3.42	47.50	0.00		0.00
22.00	3.26		3.26	48.00	0.00		0.00
22.50	3.10		3.10	48.50	0.00		0.00
23.00	2.94		2.94	49.00	0.00		0.00
23.50	2.77		2.77	49.50	0.00		0.00
24.00	2.61		2.61	50.00	0.00		0.00
24.50	0.44		0.44				
25.00	0.03		0.03				
25.50	0.00		0.00				
26.00	0.00		0.00				
26.50	0.00		0.00				
27.00	0.00		0.00				
27.50	0.00		0.00				



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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.189	60	Storm Planter (DA-2B3, DA-2B4)
0.140	61	Bioretention Sand Soil Medium, HSG C (DA-2B1, DA-2B5)
1.177	65	Brush, Good, HSG C (DA-2A1, DA-2B2)
0.061	68	Green Roof (DA-2B3)
33.907	70	Woods, Good, HSG C (DA-2A1, DA-2A2, DA-2B2)
0.465	72	Woods/grass comb., Good, HSG C (DA-2A3)
1.262	73	Woods/grass comb., Good, HSG C (DA-2B2)
4.171	74	>75% Grass cover, Good, HSG C (DA-2A1, DA-2B1, DA-2B4, DA-2B5)
1.451	74	Open Space (DA-2B6)
0.461	74	Pervious Pavers (DA-2B6)
0.310	74	Porous Asphalt (DA-2B1)
2.715	74	Woods/grass comb., Good, HSG C (DA-2A2)
3.132	98	Paved parking, HSG C (DA-2A3, DA-2B1, DA-2B4, DA-2B5, DA-2B6)
0.557	98	Paved roads, HSG C (DA-2B2)
0.582	98	Pavement & Roofs, HSG C (DA-2A2)
0.620	98	Roofs, HSG C (DA-2B4)
0.600	98	Unconnected roofs, HSG C (DA-2B3)
51.800	74	TOTAL AREA

Proposed Conditions_DP-2

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Page 3

Notes Listing (all nodes)

Line#	Node Number	Notes
1	Project	Green Roofs, Porous Pavement or Pervious Asphalt, and Stormwater Planters have been modeled under the assumption of impervious cover reduction only. Therefore, a modified CN to account for storage has been calculated based on SCS Methodology in the TR-55 using the following equation:
2		$S = (1000/CN) - 10$
3		Due to this assumption, Green Roofs have been designed to store approximately 4.7 inches of water over the area of the total green roof. This storage value computes to an average CN value of 68. Porous Pavement has been designed to store approximately 3.6 inches of water of the total area of the porous pavement. This storage value computes to an average CN value of 74. Stormwater Planters have been designed to store a minimum of 6.6 inches of water over the area of the stormwater planter. This storage value computes to an average CN of 60.
4	DP-2	Assume the DP-2 is at the tail end of the pipe, therefore the full length of the culvert (73') has not been specified. The culvert outlet elevation has replaced the inlet elevation so as to not overtop Wetland Depression_1. Outlet elevation has been replaced to mimic the existing slope on the culvert pipe.
5	WD-2A	Assume a broad-crested weir for the additional overflow over Long Meadow Road.

Proposed Conditions_DP-2

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 4

Time span=1.00-80.00 hrs, dt=0.01 hrs, 7901 points x 3

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Reach 1R: to DP-3	Inflow=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af
Pond BR1: Bioretention-1	Peak Elev=669.74' Storage=0.036 af Inflow=3.46 cfs 0.257 af Outflow=3.17 cfs 0.233 af
Pond BR2: Bioretention-2	Peak Elev=659.70' Storage=0.066 af Inflow=3.01 cfs 0.207 af Outflow=2.26 cfs 0.160 af
Subcatchment DA-2A1: Drainage Area-2A1	Runoff Area=20.920 ac 0.00% Impervious Runoff Depth=0.71" Flow Length=2,699' Tc=44.9 min CN=70 Runoff=7.08 cfs 1.245 af
Subcatchment DA-2A2: Drainage Area-2A2	Runoff Area=15.830 ac 3.68% Impervious Runoff Depth=0.81" Flow Length=1,444' Tc=15.8 min CN=72 Runoff=9.97 cfs 1.066 af
Subcatchment DA-2A3: Drainage Area - 2A3	Runoff Area=0.744 ac 37.50% Impervious Runoff Depth=1.38" Tc=5.0 min CN=82 Runoff=1.24 cfs 0.085 af
Subcatchment DA-2B1: Drainage Area-2B1	Runoff Area=3.210 ac 4.36% Impervious Runoff Depth=0.96" Flow Length=346' Tc=5.7 min CN=75 Runoff=3.46 cfs 0.257 af
Subcatchment DA-2B2: Drainage Area-2B2	Runoff Area=4.470 ac 12.46% Impervious Runoff Depth=0.91" Flow Length=300' Tc=16.4 min CN=74 Runoff=3.21 cfs 0.338 af
Subcatchment DA-2B3: Drainage Area-2B3	Runoff Area=0.750 ac 80.00% Impervious Runoff Depth=2.07" Tc=5.0 min CN=91 Runoff=1.86 cfs 0.129 af
Subcatchment DA-2B4: Drainage Area-2B4	Runoff Area=0.866 ac 79.10% Impervious Runoff Depth=2.07" Tc=5.0 min CN=91 Runoff=2.15 cfs 0.149 af
Subcatchment DA-2B5: Drainage Area-2B5	Runoff Area=1.310 ac 65.65% Impervious Runoff Depth=1.90" Tc=5.0 min CN=89 Runoff=3.01 cfs 0.207 af
Subcatchment DA-2B6: Drainage Area -2B6	Runoff Area=3.700 ac 48.32% Impervious Runoff Depth=1.66" Tc=5.0 min CN=86 Runoff=7.48 cfs 0.513 af
Reach DP-2: 48" Culvert Outlet	Avg. Flow Depth=0.11' Max Vel=6.85 fps Inflow=0.71 cfs 0.521 af 48.0" Round Pipe n=0.013 L=1.0' S=0.1100 '/' Capacity=476.41 cfs Outflow=0.71 cfs 0.521 af
Pond ND-2B: Natural Depression-2B	Peak Elev=591.63' Storage=0.338 af Inflow=3.21 cfs 0.338 af Outflow=0.00 cfs 0.000 af
Pond UC: Underground Chambers	Peak Elev=617.00' Storage=1.184 af Inflow=15.97 cfs 1.184 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af
Pond WD-2A: Wetland Depression_2A	Peak Elev=588.42' Storage=90.772 cf Inflow=12.86 cfs 2.397 af 48.0" Round Culvert n=0.013 L=73.0' S=0.1142 '/' Outflow=0.71 cfs 0.521 af

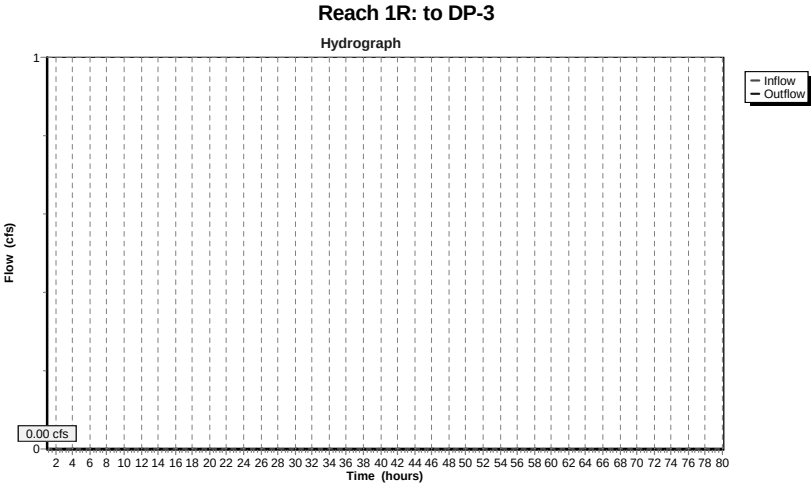
Total Runoff Area = 51.800 ac Runoff Volume = 3.991 af Average Runoff Depth = 0.92"
89.40% Pervious = 46.309 ac 10.60% Impervious = 5.491 ac

Summary for Reach 1R: to DP-3

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

Inflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs / 3



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Page 7

Hydrograph for Reach 1R: to DP-3

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
1.00	0.00		0.00	53.00	0.00		0.00
2.00	0.00		0.00	54.00	0.00		0.00
3.00	0.00		0.00	55.00	0.00		0.00
4.00	0.00		0.00	56.00	0.00		0.00
5.00	0.00		0.00	57.00	0.00		0.00
6.00	0.00		0.00	58.00	0.00		0.00
7.00	0.00		0.00	59.00	0.00		0.00
8.00	0.00		0.00	60.00	0.00		0.00
9.00	0.00		0.00	61.00	0.00		0.00
10.00	0.00		0.00	62.00	0.00		0.00
11.00	0.00		0.00	63.00	0.00		0.00
12.00	0.00		0.00	64.00	0.00		0.00
13.00	0.00		0.00	65.00	0.00		0.00
14.00	0.00		0.00	66.00	0.00		0.00
15.00	0.00		0.00	67.00	0.00		0.00
16.00	0.00		0.00	68.00	0.00		0.00
17.00	0.00		0.00	69.00	0.00		0.00
18.00	0.00		0.00	70.00	0.00		0.00
19.00	0.00		0.00	71.00	0.00		0.00
20.00	0.00		0.00	72.00	0.00		0.00
21.00	0.00		0.00	73.00	0.00		0.00
22.00	0.00		0.00	74.00	0.00		0.00
23.00	0.00		0.00	75.00	0.00		0.00
24.00	0.00		0.00	76.00	0.00		0.00
25.00	0.00		0.00	77.00	0.00		0.00
26.00	0.00		0.00	78.00	0.00		0.00
27.00	0.00		0.00	79.00	0.00		0.00
28.00	0.00		0.00	80.00	0.00		0.00
29.00	0.00		0.00				
30.00	0.00		0.00				
31.00	0.00		0.00				
32.00	0.00		0.00				
33.00	0.00		0.00				
34.00	0.00		0.00				
35.00	0.00		0.00				
36.00	0.00		0.00				
37.00	0.00		0.00				
38.00	0.00		0.00				
39.00	0.00		0.00				
40.00	0.00		0.00				
41.00	0.00		0.00				
42.00	0.00		0.00				
43.00	0.00		0.00				
44.00	0.00		0.00				
45.00	0.00		0.00				
46.00	0.00		0.00				
47.00	0.00		0.00				
48.00	0.00		0.00				
49.00	0.00		0.00				
50.00	0.00		0.00				
51.00	0.00		0.00				
52.00	0.00		0.00				

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Page 8

Summary for Pond BR1: Bioretention-1

Inflow Area = 3.210 ac, 4.36% Impervious, Inflow Depth = 0.96" for 1-YEAR event
 Inflow = 3.46 cfs @ 12.09 hrs, Volume= 0.257 af
 Outflow = 3.17 cfs @ 12.13 hrs, Volume= 0.233 af, Atten= 8%, Lag= 2.1 min
 Primary = 3.17 cfs @ 12.13 hrs, Volume= 0.233 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 669.74' @ 12.13 hrs Surf.Area= 0.049 ac Storage= 0.036 af

Plug-Flow detention time= 68.9 min calculated for 0.232 af (90% of inflow)

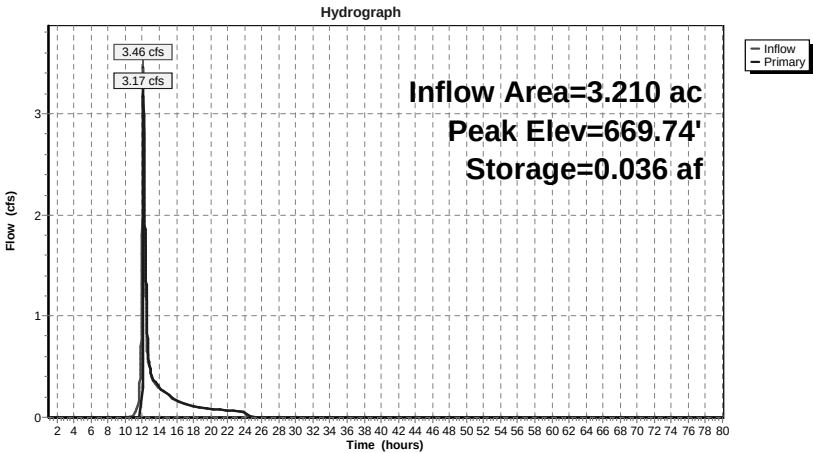
Center-of-Mass det. time= 22.2 min (884.8 - 862.6)

Volume	Invert	Avail.Storage	Storage Description
#1	669.00'	0.049 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
669.00	0.049	0.000	0.000
670.00	0.049	0.049	0.049

Device	Routing	Invert	Outlet Devices
#1	Primary	669.50'	1.0" x 1.0" Horiz. Orifice/Grate X 20.00 columns X 20 rows C= 0.600 in 24.0" x 24.0" Grate Limited to weir flow at low heads

Primary OutFlow Max=3.17 cfs @ 12.13 hrs HW=669.74' TW=615.30' (Dynamic Tailwater)↑**1=Orifice/Grate** (Weir Controls 3.17 cfs @ 1.62 fps)

Pond BR1: Bioretention-1



Hydrograph for Pond BR1: Bioretention-1

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0.000	669.00	0.00
3.00	0.00	0.000	669.00	0.00
5.00	0.00	0.000	669.00	0.00
7.00	0.00	0.000	669.00	0.00
9.00	0.00	0.000	669.00	0.00
11.00	0.03	0.000	669.01	0.00
13.00	0.42	0.028	669.57	0.45
15.00	0.22	0.027	669.54	0.23
17.00	0.13	0.026	669.53	0.13
19.00	0.09	0.026	669.52	0.09
21.00	0.07	0.025	669.52	0.08
23.00	0.06	0.025	669.52	0.06
25.00	0.00	0.025	669.50	0.00
27.00	0.00	0.025	669.50	0.00
29.00	0.00	0.025	669.50	0.00
31.00	0.00	0.025	669.50	0.00
33.00	0.00	0.025	669.50	0.00
35.00	0.00	0.025	669.50	0.00
37.00	0.00	0.025	669.50	0.00
39.00	0.00	0.025	669.50	0.00
41.00	0.00	0.025	669.50	0.00
43.00	0.00	0.025	669.50	0.00
45.00	0.00	0.025	669.50	0.00
47.00	0.00	0.025	669.50	0.00
49.00	0.00	0.025	669.50	0.00
51.00	0.00	0.025	669.50	0.00
53.00	0.00	0.025	669.50	0.00
55.00	0.00	0.025	669.50	0.00
57.00	0.00	0.025	669.50	0.00
59.00	0.00	0.025	669.50	0.00
61.00	0.00	0.025	669.50	0.00
63.00	0.00	0.025	669.50	0.00
65.00	0.00	0.025	669.50	0.00
67.00	0.00	0.025	669.50	0.00
69.00	0.00	0.025	669.50	0.00
71.00	0.00	0.025	669.50	0.00
73.00	0.00	0.025	669.50	0.00
75.00	0.00	0.025	669.50	0.00
77.00	0.00	0.025	669.50	0.00
79.00	0.00	0.025	669.50	0.00

Summary for Pond BR2: Bioretention-2

Inflow Area = 1.310 ac, 65.65% Impervious, Inflow Depth = 1.90" for 1-YEAR event
Inflow = 3.01 cfs @ 12.07 hrs, Volume= 0.207 af
Outflow = 2.26 cfs @ 12.14 hrs, Volume= 0.160 af, Atten= 25%, Lag= 3.9 min
Primary = 2.26 cfs @ 12.14 hrs, Volume= 0.160 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 659.70' @ 12.14 hrs Surf.Area= 0.095 ac Storage= 0.066 af

Plug-Flow detention time= 138.5 min calculated for 0.160 af (77% of inflow)
Center-of-Mass det. time= 55.8 min (868.5 - 812.7)

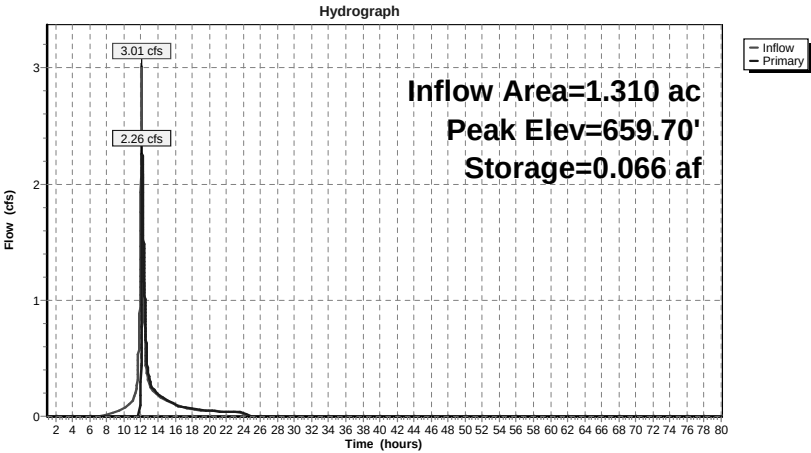
Volume	Invert	Avail.Storage	Storage Description
#1	659.00'	0.095 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
659.00	0.095	0.000	0.000
660.00	0.095	0.095	0.095

Device	Routing	Invert	Outlet Devices
#1	Primary	659.50'	1.0" x 1.0" Horiz. Orifice/Grate X 20.00 columns X 20 rows C= 0.600 in 24.0" x 24.0" Grate Limited to weir flow at low heads

Primary OutFlow Max=2.26 cfs @ 12.14 hrs HW=659.70' TW=615.32' (Dynamic Tailwater)
1=Orifice/Grate (Weir Controls 2.26 cfs @ 1.45 fps)

Pond BR2: Bioretention-2



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Page 13

Hydrograph for Pond BR2: Bioretention-2

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0.000	659.00	0.00
3.00	0.00	0.000	659.00	0.00
5.00	0.00	0.000	659.00	0.00
7.00	0.00	0.000	659.00	0.00
9.00	0.03	0.003	659.03	0.00
11.00	0.14	0.015	659.16	0.00
13.00	0.27	0.052	659.55	0.31
15.00	0.13	0.050	659.53	0.14
17.00	0.08	0.049	659.52	0.08
19.00	0.05	0.049	659.52	0.05
21.00	0.04	0.049	659.51	0.04
23.00	0.03	0.049	659.51	0.04
25.00	0.00	0.048	659.50	0.00
27.00	0.00	0.048	659.50	0.00
29.00	0.00	0.048	659.50	0.00
31.00	0.00	0.048	659.50	0.00
33.00	0.00	0.048	659.50	0.00
35.00	0.00	0.048	659.50	0.00
37.00	0.00	0.048	659.50	0.00
39.00	0.00	0.048	659.50	0.00
41.00	0.00	0.048	659.50	0.00
43.00	0.00	0.048	659.50	0.00
45.00	0.00	0.048	659.50	0.00
47.00	0.00	0.048	659.50	0.00
49.00	0.00	0.048	659.50	0.00
51.00	0.00	0.048	659.50	0.00
53.00	0.00	0.048	659.50	0.00
55.00	0.00	0.048	659.50	0.00
57.00	0.00	0.048	659.50	0.00
59.00	0.00	0.048	659.50	0.00
61.00	0.00	0.048	659.50	0.00
63.00	0.00	0.048	659.50	0.00
65.00	0.00	0.048	659.50	0.00
67.00	0.00	0.048	659.50	0.00
69.00	0.00	0.048	659.50	0.00
71.00	0.00	0.048	659.50	0.00
73.00	0.00	0.048	659.50	0.00
75.00	0.00	0.048	659.50	0.00
77.00	0.00	0.048	659.50	0.00
79.00	0.00	0.048	659.50	0.00

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 14

Summary for Subcatchment DA-2A1: Drainage Area-2A1

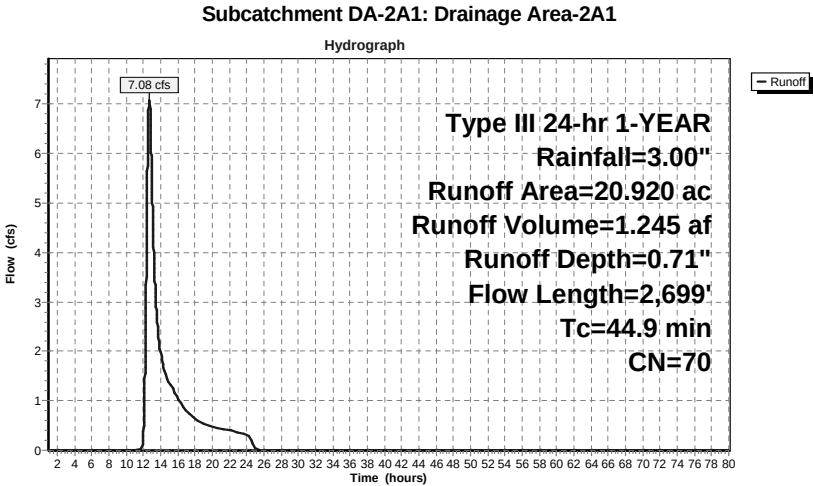
Runoff = 7.08 cfs @ 12.72 hrs, Volume= 1.245 af, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs

Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
0.910	65	Brush, Good, HSG C
18.990	70	Woods, Good, HSG C
1.020	74	>75% Grass cover, Good, HSG C
20.920	70	Weighted Average
20.920		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.0	95	0.0400	0.06		Sheet Flow, circle Woods: Dense underbrush n= 0.800 P2= 3.50"
16.6	830	0.1110	0.83		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
0.4	225	0.0140	8.44	75.92	Channel Flow, Area= 9.0 sf Perim= 8.3' r= 1.08' n= 0.022 Earth, clean & straight
0.2	375	0.1230	40.09	503.78	Pipe Channel, 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.013
0.1	280	0.1210	60.79	71,307.97	Channel Flow, Area= 1,173.0 sf Perim= 177.0' r= 6.63' n= 0.030 Earth, grassed & winding
0.3	104	0.0980	6.38	395.30	Channel Flow, Area= 62.0 sf Perim= 54.0' r= 1.15' n= 0.080 Earth, long dense weeds
1.3	790	0.0350	10.05	422.20	Channel Flow, Area= 42.0 sf Perim= 29.5' r= 1.42' n= 0.035 Earth, dense weeds
44.9	2,699	Total			



Hydrograph for Subcatchment DA-2A1: Drainage Area-2A1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.03	0.00	0.00	53.00	3.00	0.71	0.00
2.00	0.06	0.00	0.00	54.00	3.00	0.71	0.00
3.00	0.09	0.00	0.00	55.00	3.00	0.71	0.00
4.00	0.13	0.00	0.00	56.00	3.00	0.71	0.00
5.00	0.17	0.00	0.00	57.00	3.00	0.71	0.00
6.00	0.22	0.00	0.00	58.00	3.00	0.71	0.00
7.00	0.27	0.00	0.00	59.00	3.00	0.71	0.00
8.00	0.34	0.00	0.00	60.00	3.00	0.71	0.00
9.00	0.44	0.00	0.00	61.00	3.00	0.71	0.00
10.00	0.57	0.00	0.00	62.00	3.00	0.71	0.00
11.00	0.75	0.00	0.00	63.00	3.00	0.71	0.00
12.00	1.50	0.08	0.30	64.00	3.00	0.71	0.00
13.00	2.25	0.34	5.44	65.00	3.00	0.71	0.00
14.00	2.43	0.42	1.99	66.00	3.00	0.71	0.00
15.00	2.56	0.49	1.38	67.00	3.00	0.71	0.00
16.00	2.66	0.53	1.06	68.00	3.00	0.71	0.00
17.00	2.73	0.57	0.80	69.00	3.00	0.71	0.00
18.00	2.78	0.60	0.64	70.00	3.00	0.71	0.00
19.00	2.83	0.62	0.52	71.00	3.00	0.71	0.00
20.00	2.87	0.64	0.47	72.00	3.00	0.71	0.00
21.00	2.91	0.66	0.43	73.00	3.00	0.71	0.00
22.00	2.94	0.68	0.40	74.00	3.00	0.71	0.00
23.00	2.97	0.70	0.36	75.00	3.00	0.71	0.00
24.00	3.00	0.71	0.32	76.00	3.00	0.71	0.00
25.00	3.00	0.71	0.05	77.00	3.00	0.71	0.00
26.00	3.00	0.71	0.00	78.00	3.00	0.71	0.00
27.00	3.00	0.71	0.00	79.00	3.00	0.71	0.00
28.00	3.00	0.71	0.00	80.00	3.00	0.71	0.00
29.00	3.00	0.71	0.00				
30.00	3.00	0.71	0.00				
31.00	3.00	0.71	0.00				
32.00	3.00	0.71	0.00				
33.00	3.00	0.71	0.00				
34.00	3.00	0.71	0.00				
35.00	3.00	0.71	0.00				
36.00	3.00	0.71	0.00				
37.00	3.00	0.71	0.00				
38.00	3.00	0.71	0.00				
39.00	3.00	0.71	0.00				
40.00	3.00	0.71	0.00				
41.00	3.00	0.71	0.00				
42.00	3.00	0.71	0.00				
43.00	3.00	0.71	0.00				
44.00	3.00	0.71	0.00				
45.00	3.00	0.71	0.00				
46.00	3.00	0.71	0.00				
47.00	3.00	0.71	0.00				
48.00	3.00	0.71	0.00				
49.00	3.00	0.71	0.00				
50.00	3.00	0.71	0.00				
51.00	3.00	0.71	0.00				
52.00	3.00	0.71	0.00				

Proposed Conditions_DP-2

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 17

Summary for Subcatchment DA-2A2: Drainage Area-2A2

Runoff = 9.97 cfs @ 12.24 hrs, Volume= 1.066 af, Depth= 0.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs

Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
12.533	70	Woods, Good, HSG C
* 2.715	74	Woods/grass comb., Good, HSG C
* 0.582	98	Pavement & Roofs, HSG C
15.830	72	Weighted Average
15.248		96.32% Pervious Area
0.582		3.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		Sheet Flow, n= 0.400 P2= 3.50"
2.5	230	0.0960	1.55		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.9	220	0.0180	4.17	41.73	Channel Flow, Area= 10.0 sf Perim= 20.1' r= 0.50' n= 0.030 Earth, grassed & winding
0.3	104	0.0980	6.38	395.30	Channel Flow, Area= 62.0 sf Perim= 54.0' r= 1.15' n= 0.080 Earth, long dense weeds
1.3	790	0.0350	10.05	422.20	Channel Flow, Area= 42.0 sf Perim= 29.5' r= 1.42' n= 0.035
15.8	1,444				Total

Proposed Conditions_DP-2

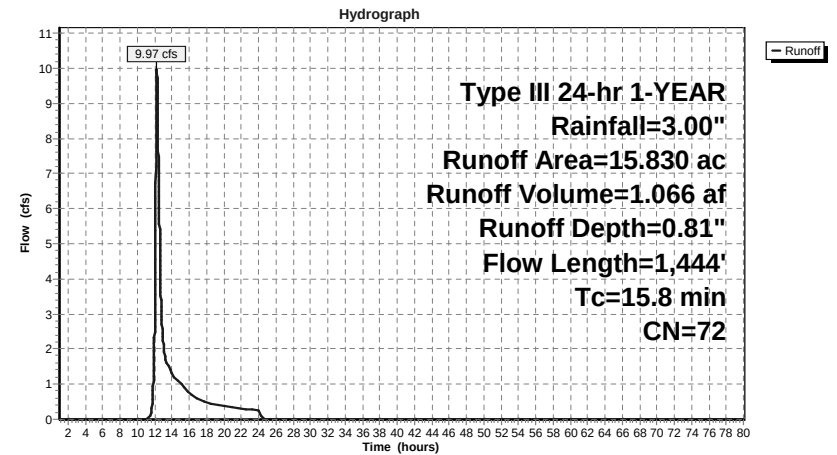
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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 18

Subcatchment DA-2A2: Drainage Area-2A2

Proposed Conditions_DP-2

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 19

Hydrograph for Subcatchment DA-2A2: Drainage Area-2A2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.03	0.00	0.00	53.00	3.00	0.81	0.00
2.00	0.06	0.00	0.00	54.00	3.00	0.81	0.00
3.00	0.09	0.00	0.00	55.00	3.00	0.81	0.00
4.00	0.13	0.00	0.00	56.00	3.00	0.81	0.00
5.00	0.17	0.00	0.00	57.00	3.00	0.81	0.00
6.00	0.22	0.00	0.00	58.00	3.00	0.81	0.00
7.00	0.27	0.00	0.00	59.00	3.00	0.81	0.00
8.00	0.34	0.00	0.00	60.00	3.00	0.81	0.00
9.00	0.44	0.00	0.00	61.00	3.00	0.81	0.00
10.00	0.57	0.00	0.00	62.00	3.00	0.81	0.00
11.00	0.75	0.00	0.00	63.00	3.00	0.81	0.00
12.00	1.50	0.11	2.64	64.00	3.00	0.81	0.00
13.00	2.25	0.40	2.16	65.00	3.00	0.81	0.00
14.00	2.43	0.49	1.32	66.00	3.00	0.81	0.00
15.00	2.56	0.56	1.01	67.00	3.00	0.81	0.00
16.00	2.66	0.61	0.75	68.00	3.00	0.81	0.00
17.00	2.73	0.65	0.59	69.00	3.00	0.81	0.00
18.00	2.78	0.68	0.46	70.00	3.00	0.81	0.00
19.00	2.83	0.71	0.41	71.00	3.00	0.81	0.00
20.00	2.87	0.73	0.37	72.00	3.00	0.81	0.00
21.00	2.91	0.75	0.34	73.00	3.00	0.81	0.00
22.00	2.94	0.77	0.31	74.00	3.00	0.81	0.00
23.00	2.97	0.79	0.28	75.00	3.00	0.81	0.00
24.00	3.00	0.81	0.25	76.00	3.00	0.81	0.00
25.00	3.00	0.81	0.00	77.00	3.00	0.81	0.00
26.00	3.00	0.81	0.00	78.00	3.00	0.81	0.00
27.00	3.00	0.81	0.00	79.00	3.00	0.81	0.00
28.00	3.00	0.81	0.00	80.00	3.00	0.81	0.00
29.00	3.00	0.81	0.00				
30.00	3.00	0.81	0.00				
31.00	3.00	0.81	0.00				
32.00	3.00	0.81	0.00				
33.00	3.00	0.81	0.00				
34.00	3.00	0.81	0.00				
35.00	3.00	0.81	0.00				
36.00	3.00	0.81	0.00				
37.00	3.00	0.81	0.00				
38.00	3.00	0.81	0.00				
39.00	3.00	0.81	0.00				
40.00	3.00	0.81	0.00				
41.00	3.00	0.81	0.00				
42.00	3.00	0.81	0.00				
43.00	3.00	0.81	0.00				
44.00	3.00	0.81	0.00				
45.00	3.00	0.81	0.00				
46.00	3.00	0.81	0.00				
47.00	3.00	0.81	0.00				
48.00	3.00	0.81	0.00				
49.00	3.00	0.81	0.00				
50.00	3.00	0.81	0.00				
51.00	3.00	0.81	0.00				
52.00	3.00	0.81	0.00				

Proposed Conditions_DP-2

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 20

Summary for Subcatchment DA-2A3: Drainage Area - 2A3

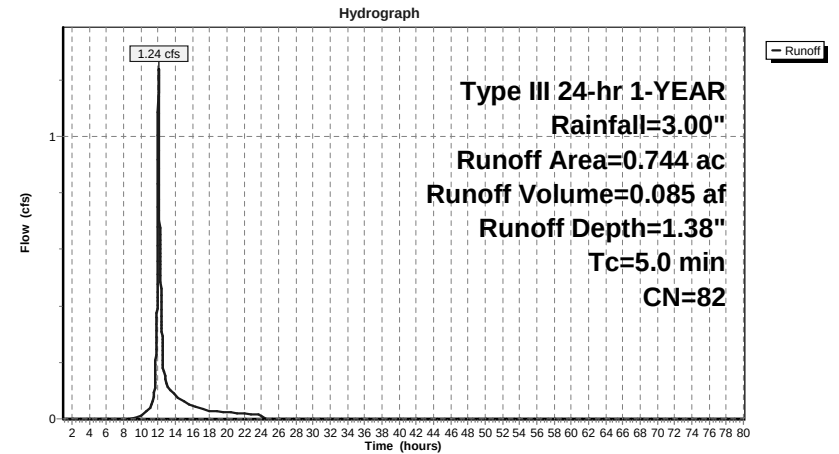
Runoff = 1.24 cfs @ 12.08 hrs, Volume= 0.085 af, Depth= 1.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs

Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
0.279	98	Paved parking, HSG C
0.465	72	Woods/grass comb., Good, HSG C
0.744	82	Weighted Average
0.465		62.50% Pervious Area
0.279		37.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, User Defined Min.

Subcatchment DA-2A3: Drainage Area - 2A3

Proposed Conditions_DP-2

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 21

Hydrograph for Subcatchment DA-2A3: Drainage Area - 2A3

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.03	0.00	0.00	53.00	3.00	1.38	0.00
2.00	0.06	0.00	0.00	54.00	3.00	1.38	0.00
3.00	0.09	0.00	0.00	55.00	3.00	1.38	0.00
4.00	0.13	0.00	0.00	56.00	3.00	1.38	0.00
5.00	0.17	0.00	0.00	57.00	3.00	1.38	0.00
6.00	0.22	0.00	0.00	58.00	3.00	1.38	0.00
7.00	0.27	0.00	0.00	59.00	3.00	1.38	0.00
8.00	0.34	0.00	0.00	60.00	3.00	1.38	0.00
9.00	0.44	0.00	0.00	61.00	3.00	1.38	0.00
10.00	0.57	0.01	0.01	62.00	3.00	1.38	0.00
11.00	0.75	0.04	0.04	63.00	3.00	1.38	0.00
12.00	1.50	0.35	0.75	64.00	3.00	1.38	0.00
13.00	2.25	0.82	0.13	65.00	3.00	1.38	0.00
14.00	2.43	0.95	0.08	66.00	3.00	1.38	0.00
15.00	2.56	1.04	0.06	67.00	3.00	1.38	0.00
16.00	2.66	1.12	0.05	68.00	3.00	1.38	0.00
17.00	2.73	1.17	0.04	69.00	3.00	1.38	0.00
18.00	2.78	1.21	0.03	70.00	3.00	1.38	0.00
19.00	2.83	1.25	0.03	71.00	3.00	1.38	0.00
20.00	2.87	1.28	0.02	72.00	3.00	1.38	0.00
21.00	2.91	1.31	0.02	73.00	3.00	1.38	0.00
22.00	2.94	1.33	0.02	74.00	3.00	1.38	0.00
23.00	2.97	1.36	0.02	75.00	3.00	1.38	0.00
24.00	3.00	1.38	0.02	76.00	3.00	1.38	0.00
25.00	3.00	1.38	0.00	77.00	3.00	1.38	0.00
26.00	3.00	1.38	0.00	78.00	3.00	1.38	0.00
27.00	3.00	1.38	0.00	79.00	3.00	1.38	0.00
28.00	3.00	1.38	0.00	80.00	3.00	1.38	0.00
29.00	3.00	1.38	0.00				
30.00	3.00	1.38	0.00				
31.00	3.00	1.38	0.00				
32.00	3.00	1.38	0.00				
33.00	3.00	1.38	0.00				
34.00	3.00	1.38	0.00				
35.00	3.00	1.38	0.00				
36.00	3.00	1.38	0.00				
37.00	3.00	1.38	0.00				
38.00	3.00	1.38	0.00				
39.00	3.00	1.38	0.00				
40.00	3.00	1.38	0.00				
41.00	3.00	1.38	0.00				
42.00	3.00	1.38	0.00				
43.00	3.00	1.38	0.00				
44.00	3.00	1.38	0.00				
45.00	3.00	1.38	0.00				
46.00	3.00	1.38	0.00				
47.00	3.00	1.38	0.00				
48.00	3.00	1.38	0.00				
49.00	3.00	1.38	0.00				
50.00	3.00	1.38	0.00				
51.00	3.00	1.38	0.00				
52.00	3.00	1.38	0.00				

Proposed Conditions_DP-2

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 22

Summary for Subcatchment DA-2B1: Drainage Area-2B1

Runoff = 3.46 cfs @ 12.09 hrs, Volume= 0.257 af, Depth= 0.96"

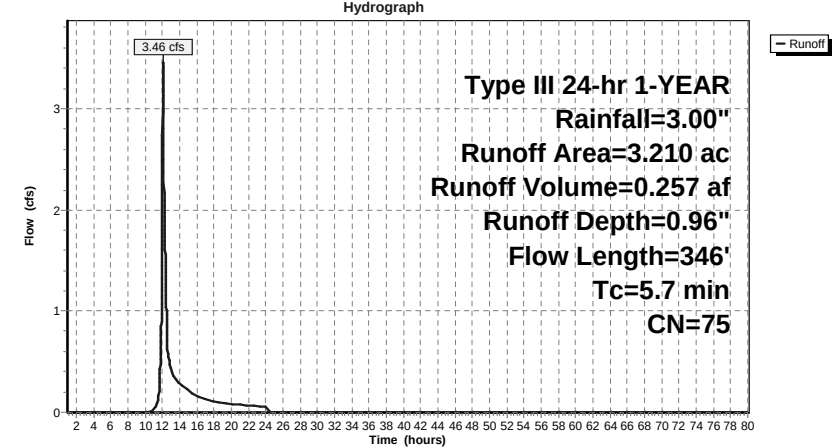
Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs

Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
0.140	98	Paved parking, HSG C
2.710	74	>75% Grass cover, Good, HSG C
* 0.050	61	Bioretention Sand Soil Medium, HSG C
* 0.310	74	Porous Asphalt
3.210	75	Weighted Average
3.070		95.64% Pervious Area
0.140		4.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	100	0.2100	0.31		Sheet Flow, Grass: Dense n= 0.240 P2= 3.50"
0.1	18	0.2100	3.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	93	0.0650	14.22	142.21	Channel Flow, Area= 10.0 sf Perim= 11.0' r= 0.91' n= 0.025 Earth, clean & winding
0.2	135	0.0440	12.47	22.03	Pipe Channel, 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
5.7	346	Total			

Subcatchment DA-2B1: Drainage Area-2B1



Hydrograph for Subcatchment DA-2B1: Drainage Area-2B1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.03	0.00	0.00	53.00	3.00	0.96	0.00
2.00	0.06	0.00	0.00	54.00	3.00	0.96	0.00
3.00	0.09	0.00	0.00	55.00	3.00	0.96	0.00
4.00	0.13	0.00	0.00	56.00	3.00	0.96	0.00
5.00	0.17	0.00	0.00	57.00	3.00	0.96	0.00
6.00	0.22	0.00	0.00	58.00	3.00	0.96	0.00
7.00	0.27	0.00	0.00	59.00	3.00	0.96	0.00
8.00	0.34	0.00	0.00	60.00	3.00	0.96	0.00
9.00	0.44	0.00	0.00	61.00	3.00	0.96	0.00
10.00	0.57	0.00	0.00	62.00	3.00	0.96	0.00
11.00	0.75	0.00	0.03	63.00	3.00	0.96	0.00
12.00	1.50	0.17	1.80	64.00	3.00	0.96	0.00
13.00	2.25	0.51	0.42	65.00	3.00	0.96	0.00
14.00	2.43	0.61	0.28	66.00	3.00	0.96	0.00
15.00	2.56	0.69	0.22	67.00	3.00	0.96	0.00
16.00	2.66	0.74	0.16	68.00	3.00	0.96	0.00
17.00	2.73	0.79	0.13	69.00	3.00	0.96	0.00
18.00	2.78	0.82	0.10	70.00	3.00	0.96	0.00
19.00	2.83	0.85	0.09	71.00	3.00	0.96	0.00
20.00	2.87	0.88	0.08	72.00	3.00	0.96	0.00
21.00	2.91	0.90	0.07	73.00	3.00	0.96	0.00
22.00	2.94	0.92	0.07	74.00	3.00	0.96	0.00
23.00	2.97	0.94	0.06	75.00	3.00	0.96	0.00
24.00	3.00	0.96	0.05	76.00	3.00	0.96	0.00
25.00	3.00	0.96	0.00	77.00	3.00	0.96	0.00
26.00	3.00	0.96	0.00	78.00	3.00	0.96	0.00
27.00	3.00	0.96	0.00	79.00	3.00	0.96	0.00
28.00	3.00	0.96	0.00	80.00	3.00	0.96	0.00
29.00	3.00	0.96	0.00				
30.00	3.00	0.96	0.00				
31.00	3.00	0.96	0.00				
32.00	3.00	0.96	0.00				
33.00	3.00	0.96	0.00				
34.00	3.00	0.96	0.00				
35.00	3.00	0.96	0.00				
36.00	3.00	0.96	0.00				
37.00	3.00	0.96	0.00				
38.00	3.00	0.96	0.00				
39.00	3.00	0.96	0.00				
40.00	3.00	0.96	0.00				
41.00	3.00	0.96	0.00				
42.00	3.00	0.96	0.00				
43.00	3.00	0.96	0.00				
44.00	3.00	0.96	0.00				
45.00	3.00	0.96	0.00				
46.00	3.00	0.96	0.00				
47.00	3.00	0.96	0.00				
48.00	3.00	0.96	0.00				
49.00	3.00	0.96	0.00				
50.00	3.00	0.96	0.00				
51.00	3.00	0.96	0.00				
52.00	3.00	0.96	0.00				

Proposed Conditions_DP-2

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 25

Summary for Subcatchment DA-2B2: Drainage Area-2B2

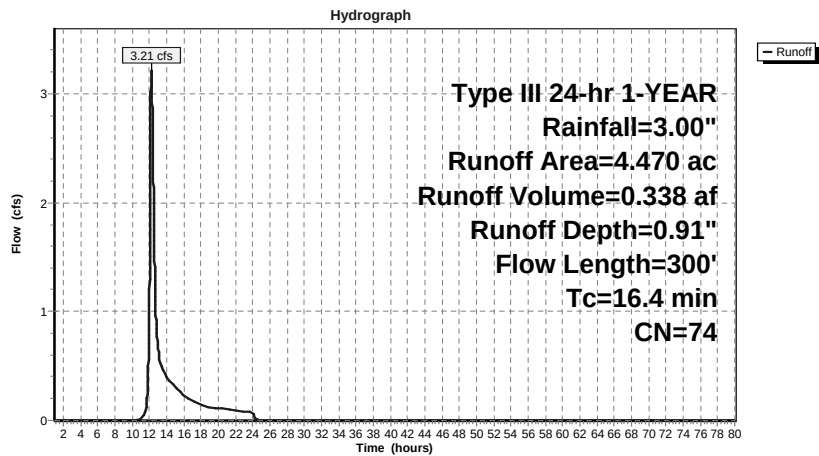
Runoff = 3.21 cfs @ 12.25 hrs, Volume= 0.338 af, Depth= 0.91"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs

Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
* 1.262	73	Woods/grass comb., Good, HSG C
2.384	70	Woods, Good, HSG C
0.557	98	Paved roads , HSG C
0.267	65	Brush, Good, HSG C
4.470	74	Weighted Average
3.913		87.54% Pervious Area
0.557		12.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0500	0.12		Sheet Flow, n= 0.400 P2= 3.50"
2.2	200	0.0900	1.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
16.4	300	Total			

Subcatchment DA-2B2: Drainage Area-2B2**Proposed Conditions_DP-2**

Prepared by WATCHTOWER

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 26

Hydrograph for Subcatchment DA-2B2: Drainage Area-2B2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.03	0.00	0.00	53.00	3.00	0.91	0.00
2.00	0.06	0.00	0.00	54.00	3.00	0.91	0.00
3.00	0.09	0.00	0.00	55.00	3.00	0.91	0.00
4.00	0.13	0.00	0.00	56.00	3.00	0.91	0.00
5.00	0.17	0.00	0.00	57.00	3.00	0.91	0.00
6.00	0.22	0.00	0.00	58.00	3.00	0.91	0.00
7.00	0.27	0.00	0.00	59.00	3.00	0.91	0.00
8.00	0.34	0.00	0.00	60.00	3.00	0.91	0.00
9.00	0.44	0.00	0.00	61.00	3.00	0.91	0.00
10.00	0.57	0.00	0.00	62.00	3.00	0.91	0.00
11.00	0.75	0.00	0.00	63.00	3.00	0.91	0.00
12.00	1.50	0.15	0.93	64.00	3.00	0.91	0.00
13.00	2.25	0.47	0.68	65.00	3.00	0.91	0.00
14.00	2.43	0.57	0.40	66.00	3.00	0.91	0.00
15.00	2.56	0.64	0.31	67.00	3.00	0.91	0.00
16.00	2.66	0.70	0.23	68.00	3.00	0.91	0.00
17.00	2.73	0.74	0.18	69.00	3.00	0.91	0.00
18.00	2.78	0.77	0.14	70.00	3.00	0.91	0.00
19.00	2.83	0.80	0.12	71.00	3.00	0.91	0.00
20.00	2.87	0.83	0.11	72.00	3.00	0.91	0.00
21.00	2.91	0.85	0.10	73.00	3.00	0.91	0.00
22.00	2.94	0.87	0.09	74.00	3.00	0.91	0.00
23.00	2.97	0.89	0.08	75.00	3.00	0.91	0.00
24.00	3.00	0.91	0.08	76.00	3.00	0.91	0.00
25.00	3.00	0.91	0.00	77.00	3.00	0.91	0.00
26.00	3.00	0.91	0.00	78.00	3.00	0.91	0.00
27.00	3.00	0.91	0.00	79.00	3.00	0.91	0.00
28.00	3.00	0.91	0.00	80.00	3.00	0.91	0.00
29.00	3.00	0.91	0.00				
30.00	3.00	0.91	0.00				
31.00	3.00	0.91	0.00				
32.00	3.00	0.91	0.00				
33.00	3.00	0.91	0.00				
34.00	3.00	0.91	0.00				
35.00	3.00	0.91	0.00				
36.00	3.00	0.91	0.00				
37.00	3.00	0.91	0.00				
38.00	3.00	0.91	0.00				
39.00	3.00	0.91	0.00				
40.00	3.00	0.91	0.00				
41.00	3.00	0.91	0.00				
42.00	3.00	0.91	0.00				
43.00	3.00	0.91	0.00				
44.00	3.00	0.91	0.00				
45.00	3.00	0.91	0.00				
46.00	3.00	0.91	0.00				
47.00	3.00	0.91	0.00				
48.00	3.00	0.91	0.00				
49.00	3.00	0.91	0.00				
50.00	3.00	0.91	0.00				
51.00	3.00	0.91	0.00				
52.00	3.00	0.91	0.00				

Proposed Conditions_DP-2

Prepared by WATCHTOWER

HydroCAD® 9.10 s/n 05461 © 2010 HydroCAD Software Solutions LLC

Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 27

Summary for Subcatchment DA-2B3: Drainage Area-2B3

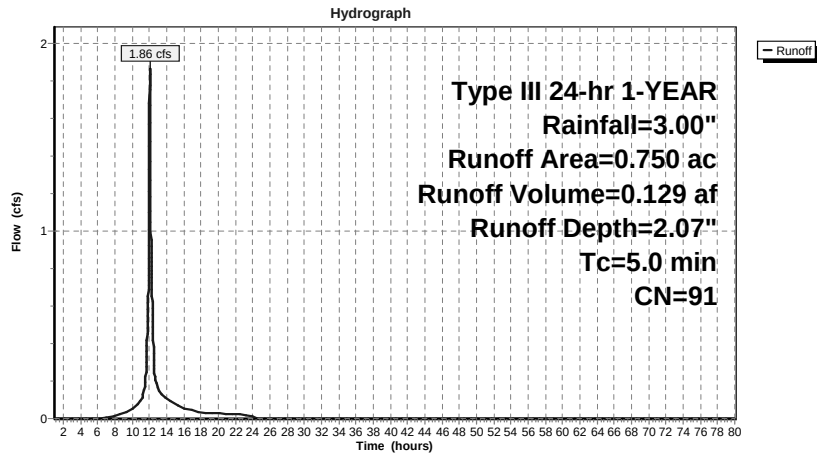
Runoff = 1.86 cfs @ 12.07 hrs, Volume= 0.129 af, Depth= 2.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs

Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
0.600	98	Unconnected roofs, HSG C
* 0.089	60	Storm Planter
* 0.061	68	Green Roof
0.750	91	Weighted Average
0.150		20.00% Pervious Area
0.600		80.00% Impervious Area
0.600		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, User Def Min.

Subcatchment DA-2B3: Drainage Area-2B3**Proposed Conditions_DP-2**

Prepared by WATCHTOWER

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 28

Hydrograph for Subcatchment DA-2B3: Drainage Area-2B3

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.03	0.00	0.00	53.00	3.00	2.07	0.00
2.00	0.06	0.00	0.00	54.00	3.00	2.07	0.00
3.00	0.09	0.00	0.00	55.00	3.00	2.07	0.00
4.00	0.13	0.00	0.00	56.00	3.00	2.07	0.00
5.00	0.17	0.00	0.00	57.00	3.00	2.07	0.00
6.00	0.22	0.00	0.00	58.00	3.00	2.07	0.00
7.00	0.27	0.01	0.01	59.00	3.00	2.07	0.00
8.00	0.34	0.02	0.01	60.00	3.00	2.07	0.00
9.00	0.44	0.05	0.03	61.00	3.00	2.07	0.00
10.00	0.57	0.10	0.05	62.00	3.00	2.07	0.00
11.00	0.75	0.20	0.09	63.00	3.00	2.07	0.00
12.00	1.50	0.74	1.21	64.00	3.00	2.07	0.00
13.00	2.25	1.38	0.16	65.00	3.00	2.07	0.00
14.00	2.43	1.55	0.10	66.00	3.00	2.07	0.00
15.00	2.56	1.67	0.08	67.00	3.00	2.07	0.00
16.00	2.66	1.75	0.06	68.00	3.00	2.07	0.00
17.00	2.73	1.82	0.04	69.00	3.00	2.07	0.00
18.00	2.78	1.87	0.03	70.00	3.00	2.07	0.00
19.00	2.83	1.91	0.03	71.00	3.00	2.07	0.00
20.00	2.87	1.95	0.03	72.00	3.00	2.07	0.00
21.00	2.91	1.99	0.03	73.00	3.00	2.07	0.00
22.00	2.94	2.02	0.02	74.00	3.00	2.07	0.00
23.00	2.97	2.05	0.02	75.00	3.00	2.07	0.00
24.00	3.00	2.07	0.02	76.00	3.00	2.07	0.00
25.00	3.00	2.07	0.00	77.00	3.00	2.07	0.00
26.00	3.00	2.07	0.00	78.00	3.00	2.07	0.00
27.00	3.00	2.07	0.00	79.00	3.00	2.07	0.00
28.00	3.00	2.07	0.00	80.00	3.00	2.07	0.00
29.00	3.00	2.07	0.00				
30.00	3.00	2.07	0.00				
31.00	3.00	2.07	0.00				
32.00	3.00	2.07	0.00				
33.00	3.00	2.07	0.00				
34.00	3.00	2.07	0.00				
35.00	3.00	2.07	0.00				
36.00	3.00	2.07	0.00				
37.00	3.00	2.07	0.00				
38.00	3.00	2.07	0.00				
39.00	3.00	2.07	0.00				
40.00	3.00	2.07	0.00				
41.00	3.00	2.07	0.00				
42.00	3.00	2.07	0.00				
43.00	3.00	2.07	0.00				
44.00	3.00	2.07	0.00				
45.00	3.00	2.07	0.00				
46.00	3.00	2.07	0.00				
47.00	3.00	2.07	0.00				
48.00	3.00	2.07	0.00				
49.00	3.00	2.07	0.00				
50.00	3.00	2.07	0.00				
51.00	3.00	2.07	0.00				
52.00	3.00	2.07	0.00				

Summary for Subcatchment DA-2B4: Drainage Area-2B4

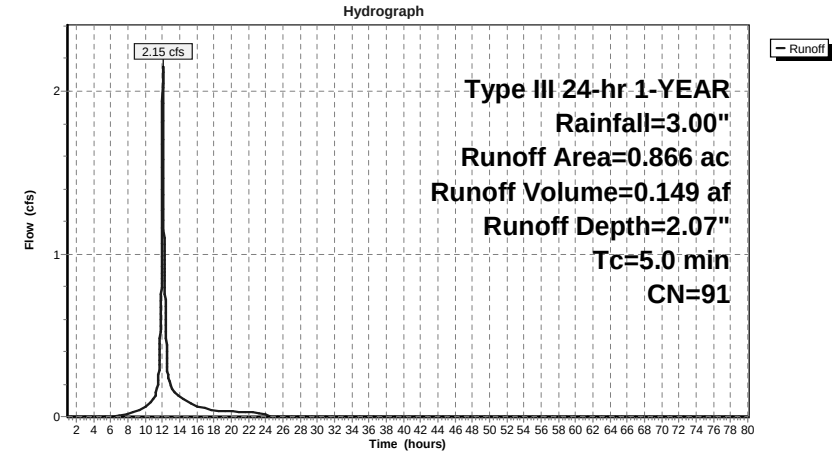
Runoff = 2.15 cfs @ 12.07 hrs, Volume= 0.149 af, Depth= 2.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
0.620	98	Roofs, HSG C
* 0.100	60	Storm Planter
0.065	98	Paved parking, HSG C
0.081	74	>75% Grass cover, Good, HSG C
0.866	91	Weighted Average
0.181		20.90% Pervious Area
0.685		79.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, User Def Min.

Subcatchment DA-2B4: Drainage Area-2B4



Hydrograph for Subcatchment DA-2B4: Drainage Area-2B4

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.03	0.00	0.00	53.00	3.00	2.07	0.00
2.00	0.06	0.00	0.00	54.00	3.00	2.07	0.00
3.00	0.09	0.00	0.00	55.00	3.00	2.07	0.00
4.00	0.13	0.00	0.00	56.00	3.00	2.07	0.00
5.00	0.17	0.00	0.00	57.00	3.00	2.07	0.00
6.00	0.22	0.00	0.00	58.00	3.00	2.07	0.00
7.00	0.27	0.01	0.01	59.00	3.00	2.07	0.00
8.00	0.34	0.02	0.02	60.00	3.00	2.07	0.00
9.00	0.44	0.05	0.03	61.00	3.00	2.07	0.00
10.00	0.57	0.10	0.06	62.00	3.00	2.07	0.00
11.00	0.75	0.20	0.11	63.00	3.00	2.07	0.00
12.00	1.50	0.74	1.40	64.00	3.00	2.07	0.00
13.00	2.25	1.38	0.19	65.00	3.00	2.07	0.00
14.00	2.43	1.55	0.12	66.00	3.00	2.07	0.00
15.00	2.56	1.67	0.09	67.00	3.00	2.07	0.00
16.00	2.66	1.75	0.06	68.00	3.00	2.07	0.00
17.00	2.73	1.82	0.05	69.00	3.00	2.07	0.00
18.00	2.78	1.87	0.04	70.00	3.00	2.07	0.00
19.00	2.83	1.91	0.04	71.00	3.00	2.07	0.00
20.00	2.87	1.95	0.03	72.00	3.00	2.07	0.00
21.00	2.91	1.99	0.03	73.00	3.00	2.07	0.00
22.00	2.94	2.02	0.03	74.00	3.00	2.07	0.00
23.00	2.97	2.05	0.02	75.00	3.00	2.07	0.00
24.00	3.00	2.07	0.02	76.00	3.00	2.07	0.00
25.00	3.00	2.07	0.00	77.00	3.00	2.07	0.00
26.00	3.00	2.07	0.00	78.00	3.00	2.07	0.00
27.00	3.00	2.07	0.00	79.00	3.00	2.07	0.00
28.00	3.00	2.07	0.00	80.00	3.00	2.07	0.00
29.00	3.00	2.07	0.00				
30.00	3.00	2.07	0.00				
31.00	3.00	2.07	0.00				
32.00	3.00	2.07	0.00				
33.00	3.00	2.07	0.00				
34.00	3.00	2.07	0.00				
35.00	3.00	2.07	0.00				
36.00	3.00	2.07	0.00				
37.00	3.00	2.07	0.00				
38.00	3.00	2.07	0.00				
39.00	3.00	2.07	0.00				
40.00	3.00	2.07	0.00				
41.00	3.00	2.07	0.00				
42.00	3.00	2.07	0.00				
43.00	3.00	2.07	0.00				
44.00	3.00	2.07	0.00				
45.00	3.00	2.07	0.00				
46.00	3.00	2.07	0.00				
47.00	3.00	2.07	0.00				
48.00	3.00	2.07	0.00				
49.00	3.00	2.07	0.00				
50.00	3.00	2.07	0.00				
51.00	3.00	2.07	0.00				
52.00	3.00	2.07	0.00				

Proposed Conditions_DP-2

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 31

Summary for Subcatchment DA-2B5: Drainage Area-2B5

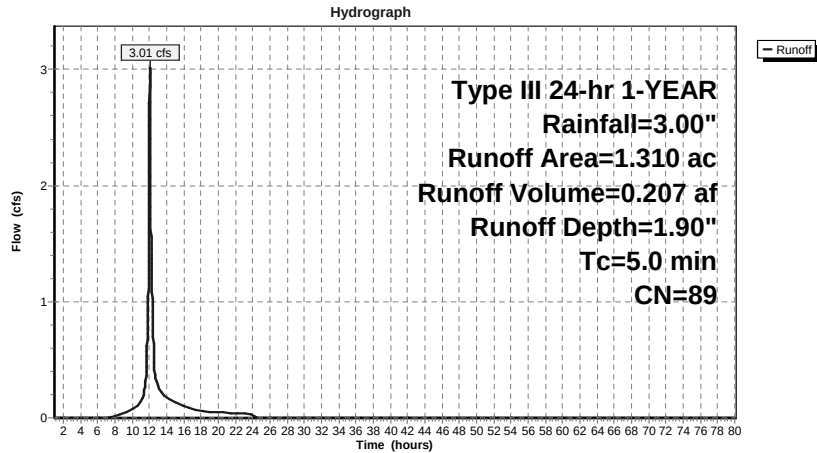
Runoff = 3.01 cfs @ 12.07 hrs, Volume= 0.207 af, Depth= 1.90"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs

Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
0.860	98	Paved parking, HSG C
0.360	74	>75% Grass cover, Good, HSG C
* 0.090	61	Bioretention Sand Soil Medium, HSG C
1.310	89	Weighted Average
0.450		34.35% Pervious Area
0.860		65.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, User Defined Min.

Subcatchment DA-2B5: Drainage Area-2B5**Proposed Conditions_DP-2**

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 32

Hydrograph for Subcatchment DA-2B5: Drainage Area-2B5

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.03	0.00	0.00	53.00	3.00	1.90	0.00
2.00	0.06	0.00	0.00	54.00	3.00	1.90	0.00
3.00	0.09	0.00	0.00	55.00	3.00	1.90	0.00
4.00	0.13	0.00	0.00	56.00	3.00	1.90	0.00
5.00	0.17	0.00	0.00	57.00	3.00	1.90	0.00
6.00	0.22	0.00	0.00	58.00	3.00	1.90	0.00
7.00	0.27	0.00	0.00	59.00	3.00	1.90	0.00
8.00	0.34	0.01	0.01	60.00	3.00	1.90	0.00
9.00	0.44	0.03	0.03	61.00	3.00	1.90	0.00
10.00	0.57	0.07	0.07	62.00	3.00	1.90	0.00
11.00	0.75	0.15	0.14	63.00	3.00	1.90	0.00
12.00	1.50	0.63	1.93	64.00	3.00	1.90	0.00
13.00	2.25	1.24	0.27	65.00	3.00	1.90	0.00
14.00	2.43	1.40	0.18	66.00	3.00	1.90	0.00
15.00	2.56	1.51	0.13	67.00	3.00	1.90	0.00
16.00	2.66	1.59	0.09	68.00	3.00	1.90	0.00
17.00	2.73	1.66	0.08	69.00	3.00	1.90	0.00
18.00	2.78	1.71	0.06	70.00	3.00	1.90	0.00
19.00	2.83	1.75	0.05	71.00	3.00	1.90	0.00
20.00	2.87	1.78	0.05	72.00	3.00	1.90	0.00
21.00	2.91	1.82	0.04	73.00	3.00	1.90	0.00
22.00	2.94	1.85	0.04	74.00	3.00	1.90	0.00
23.00	2.97	1.88	0.03	75.00	3.00	1.90	0.00
24.00	3.00	1.90	0.03	76.00	3.00	1.90	0.00
25.00	3.00	1.90	0.00	77.00	3.00	1.90	0.00
26.00	3.00	1.90	0.00	78.00	3.00	1.90	0.00
27.00	3.00	1.90	0.00	79.00	3.00	1.90	0.00
28.00	3.00	1.90	0.00	80.00	3.00	1.90	0.00
29.00	3.00	1.90	0.00				
30.00	3.00	1.90	0.00				
31.00	3.00	1.90	0.00				
32.00	3.00	1.90	0.00				
33.00	3.00	1.90	0.00				
34.00	3.00	1.90	0.00				
35.00	3.00	1.90	0.00				
36.00	3.00	1.90	0.00				
37.00	3.00	1.90	0.00				
38.00	3.00	1.90	0.00				
39.00	3.00	1.90	0.00				
40.00	3.00	1.90	0.00				
41.00	3.00	1.90	0.00				
42.00	3.00	1.90	0.00				
43.00	3.00	1.90	0.00				
44.00	3.00	1.90	0.00				
45.00	3.00	1.90	0.00				
46.00	3.00	1.90	0.00				
47.00	3.00	1.90	0.00				
48.00	3.00	1.90	0.00				
49.00	3.00	1.90	0.00				
50.00	3.00	1.90	0.00				
51.00	3.00	1.90	0.00				
52.00	3.00	1.90	0.00				

Summary for Subcatchment DA-2B6: Drainage Area -2B6

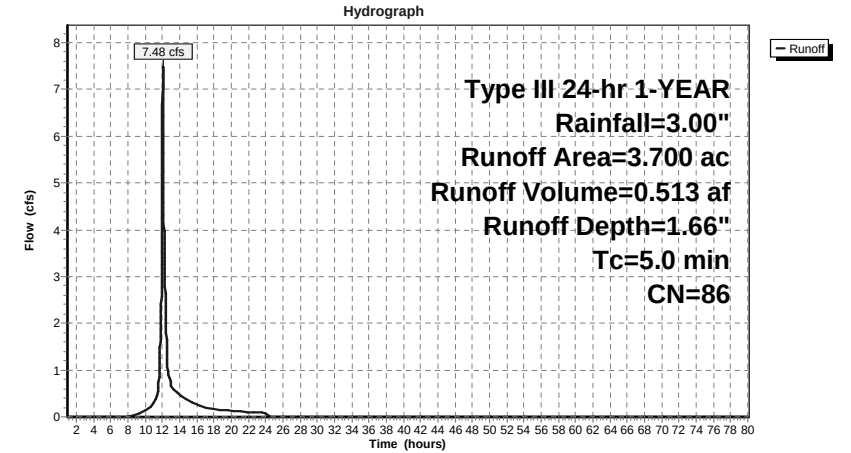
Runoff = 7.48 cfs @ 12.07 hrs, Volume= 0.513 af, Depth= 1.66"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
* 0.461	74	Pervious Pavers
* 1.451	74	Open Space
1.788	98	Paved parking, HSG C
3.700	86	Weighted Average
1.912		51.68% Pervious Area
1.788		48.32% Impervious Area

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

Subcatchment DA-2B6: Drainage Area -2B6



Hydrograph for Subcatchment DA-2B6: Drainage Area -2B6

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.03	0.00	0.00	53.00	3.00	1.66	0.00
2.00	0.06	0.00	0.00	54.00	3.00	1.66	0.00
3.00	0.09	0.00	0.00	55.00	3.00	1.66	0.00
4.00	0.13	0.00	0.00	56.00	3.00	1.66	0.00
5.00	0.17	0.00	0.00	57.00	3.00	1.66	0.00
6.00	0.22	0.00	0.00	58.00	3.00	1.66	0.00
7.00	0.27	0.00	0.00	59.00	3.00	1.66	0.00
8.00	0.34	0.00	0.00	60.00	3.00	1.66	0.00
9.00	0.44	0.01	0.05	61.00	3.00	1.66	0.00
10.00	0.57	0.03	0.13	62.00	3.00	1.66	0.00
11.00	0.75	0.09	0.29	63.00	3.00	1.66	0.00
12.00	1.50	0.49	4.69	64.00	3.00	1.66	0.00
13.00	2.25	1.04	0.71	65.00	3.00	1.66	0.00
14.00	2.43	1.19	0.46	66.00	3.00	1.66	0.00
15.00	2.56	1.29	0.35	67.00	3.00	1.66	0.00
16.00	2.66	1.37	0.25	68.00	3.00	1.66	0.00
17.00	2.73	1.43	0.20	69.00	3.00	1.66	0.00
18.00	2.78	1.48	0.15	70.00	3.00	1.66	0.00
19.00	2.83	1.52	0.14	71.00	3.00	1.66	0.00
20.00	2.87	1.55	0.12	72.00	3.00	1.66	0.00
21.00	2.91	1.58	0.11	73.00	3.00	1.66	0.00
22.00	2.94	1.61	0.10	74.00	3.00	1.66	0.00
23.00	2.97	1.64	0.09	75.00	3.00	1.66	0.00
24.00	3.00	1.66	0.08	76.00	3.00	1.66	0.00
25.00	3.00	1.66	0.00	77.00	3.00	1.66	0.00
26.00	3.00	1.66	0.00	78.00	3.00	1.66	0.00
27.00	3.00	1.66	0.00	79.00	3.00	1.66	0.00
28.00	3.00	1.66	0.00	80.00	3.00	1.66	0.00
29.00	3.00	1.66	0.00				
30.00	3.00	1.66	0.00				
31.00	3.00	1.66	0.00				
32.00	3.00	1.66	0.00				
33.00	3.00	1.66	0.00				
34.00	3.00	1.66	0.00				
35.00	3.00	1.66	0.00				
36.00	3.00	1.66	0.00				
37.00	3.00	1.66	0.00				
38.00	3.00	1.66	0.00				
39.00	3.00	1.66	0.00				
40.00	3.00	1.66	0.00				
41.00	3.00	1.66	0.00				
42.00	3.00	1.66	0.00				
43.00	3.00	1.66	0.00				
44.00	3.00	1.66	0.00				
45.00	3.00	1.66	0.00				
46.00	3.00	1.66	0.00				
47.00	3.00	1.66	0.00				
48.00	3.00	1.66	0.00				
49.00	3.00	1.66	0.00				
50.00	3.00	1.66	0.00				
51.00	3.00	1.66	0.00				
52.00	3.00	1.66	0.00				

Summary for Reach DP-2: 48" Culvert Outlet

Assume the DP-2 is at the tail end of the pipe, therefore the full length of the culvert (73') has not been specified. The culvert outlet elevation has replaced the inlet elevation so as to not overtop Wetland Depression_1. Outlet elevation has been replaced to mimick the existing slope on the culvert pipe.

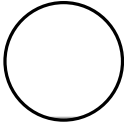
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 51.800 ac, 10.60% Impervious, Inflow Depth > 0.12" for 1-YEAR event
Inflow = 0.71 cfs @ 22.23 hrs, Volume= 0.521 af
Outflow = 0.71 cfs @ 22.23 hrs, Volume= 0.521 af, Atten= 0%, Lag= 0.0 min

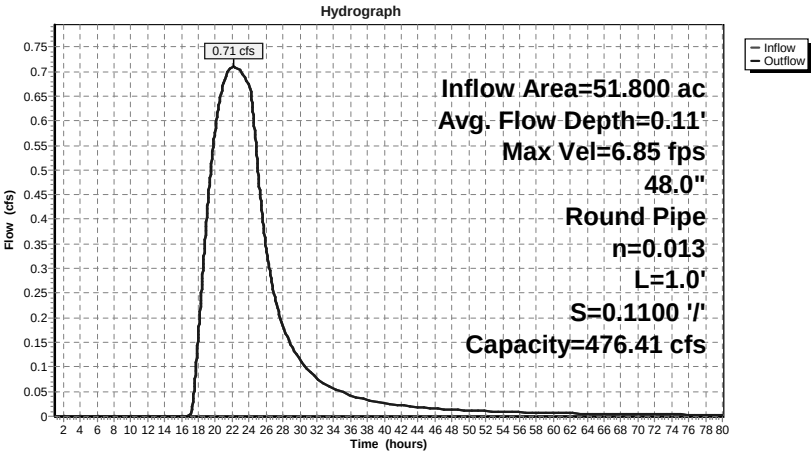
Routing by Dyn-Stor-Ind method, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 6.85 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 3.86 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 22.23 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 4.00', Capacity at Bank-Full= 476.41 cfs

48.0" Round Pipe
n= 0.013
Length= 1.0' Slope= 0.1100 '/'
Inlet Invert= 579.80', Outlet Invert= 579.69'



Reach DP-2: 48" Culvert Outlet



Proposed Conditions_DP-2

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 37

Hydrograph for Reach DP-2: 48" Culvert Outlet

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
1.00	0.00	0	579.80	0.00
3.00	0.00	0	579.80	0.00
5.00	0.00	0	579.80	0.00
7.00	0.00	0	579.80	0.00
9.00	0.00	0	579.80	0.00
11.00	0.00	0	579.80	0.00
13.00	0.00	0	579.80	0.00
15.00	0.00	0	579.80	0.00
17.00	0.00	0	579.80	0.00
19.00	0.41	0	579.89	0.41
21.00	0.68	0	579.91	0.68
23.00	0.70	0	579.91	0.70
25.00	0.51	0	579.90	0.51
27.00	0.25	0	579.87	0.25
29.00	0.14	0	579.85	0.14
31.00	0.09	0	579.84	0.09
33.00	0.07	0	579.84	0.07
35.00	0.05	0	579.83	0.05
37.00	0.04	0	579.82	0.04
39.00	0.03	0	579.82	0.03
41.00	0.02	0	579.81	0.02
43.00	0.02	0	579.81	0.02
45.00	0.02	0	579.81	0.02
47.00	0.01	0	579.81	0.01
49.00	0.01	0	579.81	0.01
51.00	0.01	0	579.81	0.01
53.00	0.01	0	579.81	0.01
55.00	0.01	0	579.80	0.01
57.00	0.01	0	579.80	0.01
59.00	0.01	0	579.80	0.01
61.00	0.01	0	579.80	0.01
63.00	0.01	0	579.80	0.01
65.00	0.01	0	579.80	0.01
67.00	0.00	0	579.80	0.00
69.00	0.00	0	579.80	0.00
71.00	0.00	0	579.80	0.00
73.00	0.00	0	579.80	0.00
75.00	0.00	0	579.80	0.00
77.00	0.00	0	579.80	0.00
79.00	0.00	0	579.80	0.00

Proposed Conditions_DP-2

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 38

Summary for Pond ND-2B: Natural Depression-2B

Inflow Area = 4.470 ac, 12.46% Impervious, Inflow Depth = 0.91" for 1-YEAR event
 Inflow = 3.21 cfs @ 12.25 hrs, Volume= 0.338 af
 Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 591.63' @ 24.94 hrs Surf.Area= 0.177 ac Storage= 0.338 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	587.80'	0.578 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
587.80	0.000	0.000	0.000
592.80	0.231	0.578	0.578

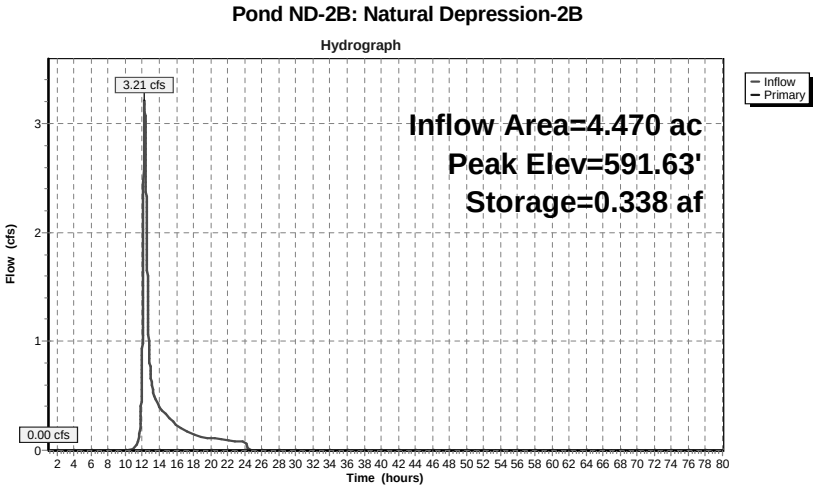
Device	Routing	Invert	Outlet Devices
#1	Primary	587.83'	42.0" W x 30.0" H Box Culvert L= 73.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 587.83' / 586.78' S= 0.0144 '/' Cc= 0.900 n= 0.011
#2	Device 1	592.00'	2.3" Vert. Orifice/Grate C= 0.600
#3	Device 1	594.00'	12.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=587.80' TW=585.00' (Dynamic Tailwater)

1=Culvert (Controls 0.00 cfs)

2=Orifice/Grate (Controls 0.00 cfs)

3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)



Hydrograph for Pond ND-2B: Natural Depression-2B				
Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0.000	587.80	0.00
3.00	0.00	0.000	587.80	0.00
5.00	0.00	0.000	587.80	0.00
7.00	0.00	0.000	587.80	0.00
9.00	0.00	0.000	587.80	0.00
11.00	0.00	0.000	587.82	0.00
13.00	0.68	0.163	590.46	0.00
15.00	0.31	0.233	590.98	0.00
17.00	0.18	0.272	591.23	0.00
19.00	0.12	0.296	591.38	0.00
21.00	0.10	0.315	591.49	0.00
23.00	0.08	0.330	591.58	0.00
25.00	0.00	0.338	591.63	0.00
27.00	0.00	0.338	591.63	0.00
29.00	0.00	0.338	591.63	0.00
31.00	0.00	0.338	591.63	0.00
33.00	0.00	0.338	591.63	0.00
35.00	0.00	0.338	591.63	0.00
37.00	0.00	0.338	591.63	0.00
39.00	0.00	0.338	591.63	0.00
41.00	0.00	0.338	591.63	0.00
43.00	0.00	0.338	591.63	0.00
45.00	0.00	0.338	591.63	0.00
47.00	0.00	0.338	591.63	0.00
49.00	0.00	0.338	591.63	0.00
51.00	0.00	0.338	591.63	0.00
53.00	0.00	0.338	591.63	0.00
55.00	0.00	0.338	591.63	0.00
57.00	0.00	0.338	591.63	0.00
59.00	0.00	0.338	591.63	0.00
61.00	0.00	0.338	591.63	0.00
63.00	0.00	0.338	591.63	0.00
65.00	0.00	0.338	591.63	0.00
67.00	0.00	0.338	591.63	0.00
69.00	0.00	0.338	591.63	0.00
71.00	0.00	0.338	591.63	0.00
73.00	0.00	0.338	591.63	0.00
75.00	0.00	0.338	591.63	0.00
77.00	0.00	0.338	591.63	0.00
79.00	0.00	0.338	591.63	0.00

Summary for Pond UC: Underground Chambers

Inflow Area = 9.836 ac, 41.41% Impervious, Inflow Depth = 1.44" for 1-YEAR event
Inflow = 15.97 cfs @ 12.09 hrs, Volume= 1.184 af
Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 617.00' @ 55.97 hrs Surf.Area= 0.591 ac Storage= 1.184 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1A	614.25'	0.781 af	139.83'W x 184.02'L x 5.50'H Field A 3.249 af Overall - 1.298 af Embedded = 1.951 af x 40.0% Voids
#2A	615.00'	1.298 af	StormTech MC-3500 b x 500 Inside #1 Effective Size= 71.0"W x 45.0"H => 15.77 sf x 7.17'L = 113.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
		2.078 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	619.00'	18.0" Vert. Orifice/Grate X 3.00 C= 0.600
#2	Secondary	618.00'	12.0" Vert. Orifice/Grate X 3.00 C= 0.600

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=614.25' TW=585.00' (Dynamic Tailwater)
1=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=614.25' TW=0.00' (Dynamic Tailwater)
2=Orifice/Grate (Controls 0.00 cfs)

Pond UC: Underground Chambers - Chamber Wizard Field A

Chamber Model = StormTech MC-3500 b
Effective Size= 71.0"W x 45.0"H => 15.77 sf x 7.17'L = 113.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap

77.0" Wide + 6.0" Spacing = 83.0" C-C

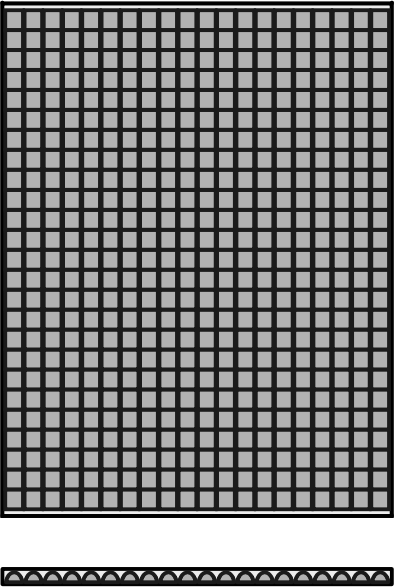
25 Chambers/Row x 7.17' Long = 179.25' + 28.6" End Stone x 2 = 184.02' Base Length
20 Rows x 77.0" Wide + 6.0" Spacing x 19 + 12.0" Side Stone x 2 = 139.83' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

500 Chambers x 113.0 cf = 56,521.1 cf Chamber Storage

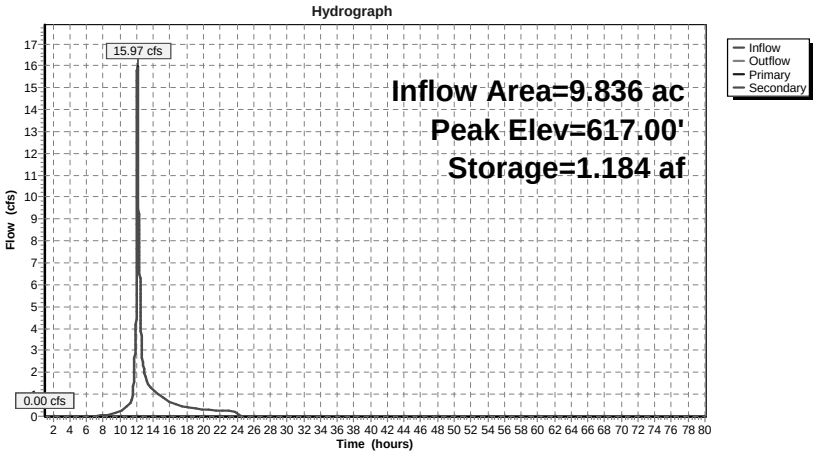
141,524.2 cf Field - 56,521.1 cf Chambers = 85,003.0 cf Stone x 40.0% Voids = 34,001.2 cf Stone Storage

Stone + Chamber Storage = 90,522.3 cf = 2.078 af

500 Chambers
5,241.6 cy Field
3,148.3 cy Stone



Pond UC: Underground Chambers



Hydrograph for Pond UC: Underground Chambers

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
1.00	0.00	0.000	614.25	0.00	0.00	0.00
3.00	0.00	0.000	614.25	0.00	0.00	0.00
5.00	0.00	0.000	614.25	0.00	0.00	0.00
7.00	0.01	0.001	614.25	0.00	0.00	0.00
9.00	0.11	0.008	614.28	0.00	0.00	0.00
11.00	0.49	0.051	614.46	0.00	0.00	0.00
13.00	1.82	0.688	615.99	0.00	0.00	0.00
15.00	0.89	0.890	616.39	0.00	0.00	0.00
17.00	0.51	1.000	616.61	0.00	0.00	0.00
19.00	0.35	1.067	616.75	0.00	0.00	0.00
21.00	0.29	1.119	616.86	0.00	0.00	0.00
23.00	0.24	1.162	616.96	0.00	0.00	0.00
25.00	0.00	1.184	617.00	0.00	0.00	0.00
27.00	0.00	1.184	617.00	0.00	0.00	0.00
29.00	0.00	1.184	617.00	0.00	0.00	0.00
31.00	0.00	1.184	617.00	0.00	0.00	0.00
33.00	0.00	1.184	617.00	0.00	0.00	0.00
35.00	0.00	1.184	617.00	0.00	0.00	0.00
37.00	0.00	1.184	617.00	0.00	0.00	0.00
39.00	0.00	1.184	617.00	0.00	0.00	0.00
41.00	0.00	1.184	617.00	0.00	0.00	0.00
43.00	0.00	1.184	617.00	0.00	0.00	0.00
45.00	0.00	1.184	617.00	0.00	0.00	0.00
47.00	0.00	1.184	617.00	0.00	0.00	0.00
49.00	0.00	1.184	617.00	0.00	0.00	0.00
51.00	0.00	1.184	617.00	0.00	0.00	0.00
53.00	0.00	1.184	617.00	0.00	0.00	0.00
55.00	0.00	1.184	617.00	0.00	0.00	0.00
57.00	0.00	1.184	617.00	0.00	0.00	0.00
59.00	0.00	1.184	617.00	0.00	0.00	0.00
61.00	0.00	1.184	617.00	0.00	0.00	0.00
63.00	0.00	1.184	617.00	0.00	0.00	0.00
65.00	0.00	1.184	617.00	0.00	0.00	0.00
67.00	0.00	1.184	617.00	0.00	0.00	0.00
69.00	0.00	1.184	617.00	0.00	0.00	0.00
71.00	0.00	1.184	617.00	0.00	0.00	0.00
73.00	0.00	1.184	617.00	0.00	0.00	0.00
75.00	0.00	1.184	617.00	0.00	0.00	0.00
77.00	0.00	1.184	617.00	0.00	0.00	0.00
79.00	0.00	1.184	617.00	0.00	0.00	0.00

Summary for Pond WD-2A: Wetland Depression_2A

Assume a broad-crested weir for the additional overflow over Long Meadow Road.

Inflow Area = 51.800 ac, 10.60% Impervious, Inflow Depth = 0.56" for 1-YEAR event
Inflow = 12.86 cfs @ 12.30 hrs, Volume= 2.397 af
Outflow = 0.71 cfs @ 22.23 hrs, Volume= 0.521 af, Atten= 94%, Lag= 595.7 min
Primary = 0.71 cfs @ 22.23 hrs, Volume= 0.521 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 588.42' @ 22.23 hrs Surf.Area= 45,386 sf Storage= 90,772 cf

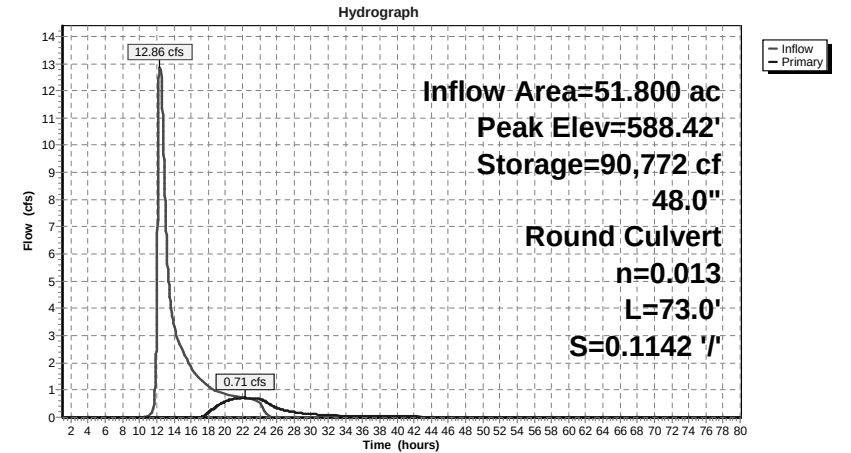
Plug-Flow detention time= 797.1 min calculated for 0.521 af (22% of inflow)
Center-of-Mass det. time= 633.1 min (1,531.8 - 898.7)

Volume	Invert	Avail.Storage	Storage Description
#1	585.00'	324,441 cf	Custom Stage Data (Prismatic) Listed below
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
585.00	0	0	0
586.00	15,950	7,975	7,975
589.00	52,400	102,525	110,500
592.00	82,504	202,356	312,856
592.14	83,000	11,585	324,441

Device	Routing	Invert	Outlet Devices
#1	Primary	588.14'	48.0" Round Culvert L= 73.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 588.14' / 579.80' S= 0.1142 '/' Cc= 0.900 n= 0.013

Primary OutFlow Max=0.71 cfs @ 22.23 hrs HW=588.42' TW=579.91' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.71 cfs @ 1.81 fps)

Pond WD-2A: Wetland Depression_2A



Proposed Conditions_DP-2

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Page 47

Hydrograph for Pond WD-2A: Wetland Depression_2A

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0	585.00	0.00
3.00	0.00	0	585.00	0.00
5.00	0.00	0	585.00	0.00
7.00	0.00	0	585.00	0.00
9.00	0.00	0	585.00	0.00
11.00	0.04	94	585.01	0.00
13.00	7.72	40,107	586.94	0.00
15.00	2.45	67,850	587.75	0.00
17.00	1.42	81,399	588.15	0.00
19.00	0.95	88,405	588.35	0.41
21.00	0.79	90,546	588.42	0.68
23.00	0.66	90,709	588.42	0.70
25.00	0.05	89,269	588.38	0.51
27.00	0.00	86,764	588.31	0.25
29.00	0.00	85,416	588.27	0.14
31.00	0.00	84,585	588.24	0.09
33.00	0.00	84,022	588.23	0.07
35.00	0.00	83,616	588.21	0.05
37.00	0.00	83,308	588.20	0.04
39.00	0.00	83,068	588.20	0.03
41.00	0.00	82,876	588.19	0.02
43.00	0.00	82,717	588.19	0.02
45.00	0.00	82,585	588.18	0.02
47.00	0.00	82,473	588.18	0.01
49.00	0.00	82,376	588.18	0.01
51.00	0.00	82,293	588.17	0.01
53.00	0.00	82,219	588.17	0.01
55.00	0.00	82,154	588.17	0.01
57.00	0.00	82,097	588.17	0.01
59.00	0.00	82,045	588.17	0.01
61.00	0.00	81,999	588.17	0.01
63.00	0.00	81,957	588.16	0.01
65.00	0.00	81,918	588.16	0.01
67.00	0.00	81,883	588.16	0.00
69.00	0.00	81,851	588.16	0.00
71.00	0.00	81,822	588.16	0.00
73.00	0.00	81,794	588.16	0.00
75.00	0.00	81,769	588.16	0.00
77.00	0.00	81,746	588.16	0.00
79.00	0.00	81,724	588.16	0.00

Proposed Conditions_DP-2

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 48

Time span=1.00-80.00 hrs, dt=0.01 hrs, 7901 points x 3

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Reach 1R: to DP-3Inflow=2.22 cfs 0.988 af
Outflow=2.22 cfs 0.988 af**Pond BR1: Bioretention-1**Peak Elev=669.99' Storage=0.049 af Inflow=9.30 cfs 0.655 af
Outflow=8.97 cfs 0.631 af**Pond BR2: Bioretention-2**Peak Elev=659.84' Storage=0.079 af Inflow=5.83 cfs 0.412 af
Outflow=5.09 cfs 0.364 af**Subcatchment DA-2A1: Drainage Area-2A1** Runoff Area=20.920 ac 0.00% Impervious Runoff Depth=2.04"
Flow Length=2,699' Tc=44.9 min CN=70 Runoff=22.67 cfs 3.550 af**Subcatchment DA-2A2: Drainage Area-2A2** Runoff Area=15.830 ac 3.68% Impervious Runoff Depth=2.20"
Flow Length=1,444' Tc=15.8 min CN=72 Runoff=29.80 cfs 2.899 af**Subcatchment DA-2A3: Drainage Area - 2A3** Runoff Area=0.744 ac 37.50% Impervious Runoff Depth=3.08"
Tc=5.0 min CN=82 Runoff=2.78 cfs 0.191 af**Subcatchment DA-2B1: Drainage Area-2B1** Runoff Area=3.210 ac 4.36% Impervious Runoff Depth=2.45"
Flow Length=346' Tc=5.7 min CN=75 Runoff=9.30 cfs 0.655 af**Subcatchment DA-2B2: Drainage Area-2B2** Runoff Area=4.470 ac 12.46% Impervious Runoff Depth=2.36"
Flow Length=300' Tc=16.4 min CN=74 Runoff=9.00 cfs 0.881 af**Subcatchment DA-2B3: Drainage Area-2B3** Runoff Area=0.750 ac 80.00% Impervious Runoff Depth=3.98"
Tc=5.0 min CN=91 Runoff=3.47 cfs 0.249 af**Subcatchment DA-2B4: Drainage Area-2B4** Runoff Area=0.866 ac 79.10% Impervious Runoff Depth=3.98"
Tc=5.0 min CN=91 Runoff=4.01 cfs 0.287 af**Subcatchment DA-2B5: Drainage Area-2B5** Runoff Area=1.310 ac 65.65% Impervious Runoff Depth=3.77"
Tc=5.0 min CN=89 Runoff=5.83 cfs 0.412 af**Subcatchment DA-2B6: Drainage Area -2B6** Runoff Area=3.700 ac 48.32% Impervious Runoff Depth=3.47"
Tc=5.0 min CN=86 Runoff=15.37 cfs 1.069 af**Reach DP-2: 48" Culvert Outlet** Avg. Flow Depth=0.44' Max Vel=16.14 fps Inflow=12.11 cfs 5.222 af
48.0" Round Pipe n=0.013 L=1.0' S=0.1100 '/' Capacity=476.41 cfs Outflow=12.11 cfs 5.222 af**Pond ND-2B: Natural Depression-2B**Peak Elev=594.10' Storage=0.578 af Inflow=9.00 cfs 0.881 af
Outflow=1.12 cfs 0.467 af**Pond UC: Underground Chambers**Peak Elev=618.44' Storage=1.760 af Inflow=35.98 cfs 2.600 af
Primary=0.00 cfs 0.000 af Secondary=2.22 cfs 0.988 af Outflow=2.22 cfs 0.988 af**Pond WD-2A: Wetland Depression_2A** Peak Elev=589.36' Storage=134,447 cf Inflow=41.02 cfs 7.107 af
48.0" Round Culvert n=0.013 L=73.0' S=0.1142 '/' Outflow=12.11 cfs 5.222 af

Total Runoff Area = 51.800 ac Runoff Volume = 10.193 af Average Runoff Depth = 2.36"

89.40% Pervious = 46.309 ac 10.60% Impervious = 5.491 ac

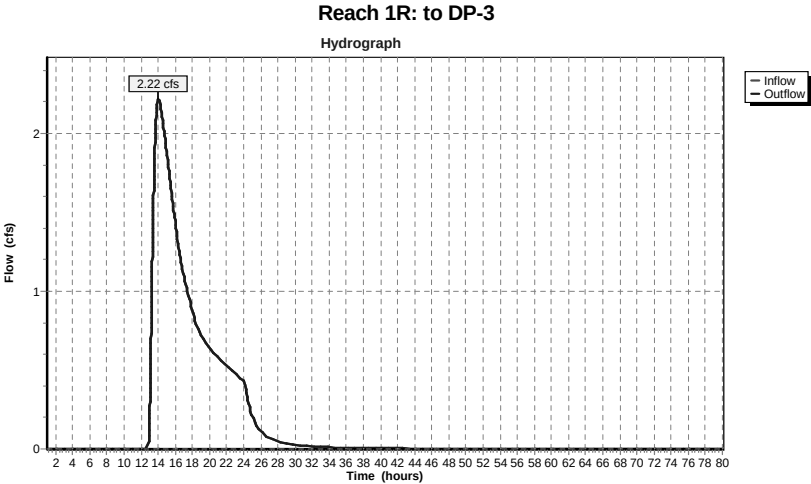
Summary for Reach 1R: to DP-3

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

Inflow = 2.22 cfs @ 14.01 hrs, Volume= 0.988 af

Outflow = 2.22 cfs @ 14.01 hrs, Volume= 0.988 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs / 3



Proposed Conditions_DP-2

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 51

Hydrograph for Reach 1R: to DP-3

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
1.00	0.00		0.00	53.00	0.00		0.00
2.00	0.00		0.00	54.00	0.00		0.00
3.00	0.00		0.00	55.00	0.00		0.00
4.00	0.00		0.00	56.00	0.00		0.00
5.00	0.00		0.00	57.00	0.00		0.00
6.00	0.00		0.00	58.00	0.00		0.00
7.00	0.00		0.00	59.00	0.00		0.00
8.00	0.00		0.00	60.00	0.00		0.00
9.00	0.00		0.00	61.00	0.00		0.00
10.00	0.00		0.00	62.00	0.00		0.00
11.00	0.00		0.00	63.00	0.00		0.00
12.00	0.00		0.00	64.00	0.00		0.00
13.00	0.25		0.25	65.00	0.00		0.00
14.00	2.22		2.22	66.00	0.00		0.00
15.00	1.88		1.88	67.00	0.00		0.00
16.00	1.43		1.43	68.00	0.00		0.00
17.00	1.10		1.10	69.00	0.00		0.00
18.00	0.87		0.87	70.00	0.00		0.00
19.00	0.72		0.72	71.00	0.00		0.00
20.00	0.64		0.64	72.00	0.00		0.00
21.00	0.58		0.58	73.00	0.00		0.00
22.00	0.53		0.53	74.00	0.00		0.00
23.00	0.48		0.48	75.00	0.00		0.00
24.00	0.43		0.43	76.00	0.00		0.00
25.00	0.21		0.21	77.00	0.00		0.00
26.00	0.11		0.11	78.00	0.00		0.00
27.00	0.07		0.07	79.00	0.00		0.00
28.00	0.05		0.05	80.00	0.00		0.00
29.00	0.03		0.03				
30.00	0.03		0.03				
31.00	0.02		0.02				
32.00	0.02		0.02				
33.00	0.01		0.01				
34.00	0.01		0.01				
35.00	0.01		0.01				
36.00	0.01		0.01				
37.00	0.01		0.01				
38.00	0.01		0.01				
39.00	0.01		0.01				
40.00	0.00		0.00				
41.00	0.00		0.00				
42.00	0.00		0.00				
43.00	0.00		0.00				
44.00	0.00		0.00				
45.00	0.00		0.00				
46.00	0.00		0.00				
47.00	0.00		0.00				
48.00	0.00		0.00				
49.00	0.00		0.00				
50.00	0.00		0.00				
51.00	0.00		0.00				
52.00	0.00		0.00				

Proposed Conditions_DP-2

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 52

Summary for Pond BR1: Bioretention-1

Inflow Area = 3.210 ac, 4.36% Impervious, Inflow Depth = 2.45" for 10-YEAR event
 Inflow = 9.30 cfs @ 12.09 hrs, Volume= 0.655 af
 Outflow = 8.97 cfs @ 12.11 hrs, Volume= 0.631 af, Atten= 4%, Lag= 1.3 min
 Primary = 8.97 cfs @ 12.11 hrs, Volume= 0.631 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 669.99' @ 12.11 hrs Surf.Area= 0.049 ac Storage= 0.049 af

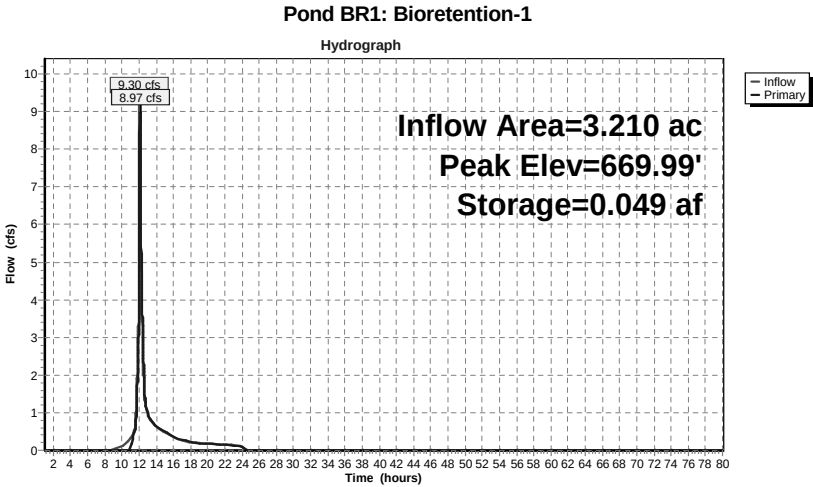
Plug-Flow detention time= 33.1 min calculated for 0.631 af (96% of inflow)

Center-of-Mass det. time= 12.1 min (846.7 - 834.6)

Volume	Invert	Avail.Storage	Storage Description
#1	669.00'	0.049 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
669.00	0.049	0.000	0.000
670.00	0.049	0.049	0.049

Device	Routing	Invert	Outlet Devices
#1	Primary	669.50'	1.0" x 1.0" Horiz. Orifice/Grate X 20.00 columns X 20 rows C= 0.600 in 24.0" x 24.0" Grate Limited to weir flow at low heads

Primary OutFlow Max=8.96 cfs @ 12.11 hrs HW=669.99' TW=616.40' (Dynamic Tailwater)↑**1=Orifice/Grate** (Weir Controls 8.96 cfs @ 2.29 fps)



Hydrograph for Pond BR1: Bioretention-1

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0.000	669.00	0.00
3.00	0.00	0.000	669.00	0.00
5.00	0.00	0.000	669.00	0.00
7.00	0.00	0.000	669.00	0.00
9.00	0.02	0.000	669.00	0.00
11.00	0.30	0.021	669.43	0.00
13.00	0.95	0.030	669.61	1.00
15.00	0.48	0.028	669.57	0.49
17.00	0.27	0.027	669.55	0.28
19.00	0.19	0.026	669.54	0.19
21.00	0.16	0.026	669.53	0.16
23.00	0.13	0.026	669.53	0.13
25.00	0.00	0.025	669.50	0.00
27.00	0.00	0.025	669.50	0.00
29.00	0.00	0.025	669.50	0.00
31.00	0.00	0.025	669.50	0.00
33.00	0.00	0.025	669.50	0.00
35.00	0.00	0.025	669.50	0.00
37.00	0.00	0.025	669.50	0.00
39.00	0.00	0.025	669.50	0.00
41.00	0.00	0.025	669.50	0.00
43.00	0.00	0.025	669.50	0.00
45.00	0.00	0.025	669.50	0.00
47.00	0.00	0.025	669.50	0.00
49.00	0.00	0.025	669.50	0.00
51.00	0.00	0.025	669.50	0.00
53.00	0.00	0.025	669.50	0.00
55.00	0.00	0.025	669.50	0.00
57.00	0.00	0.025	669.50	0.00
59.00	0.00	0.025	669.50	0.00
61.00	0.00	0.025	669.50	0.00
63.00	0.00	0.025	669.50	0.00
65.00	0.00	0.025	669.50	0.00
67.00	0.00	0.025	669.50	0.00
69.00	0.00	0.025	669.50	0.00
71.00	0.00	0.025	669.50	0.00
73.00	0.00	0.025	669.50	0.00
75.00	0.00	0.025	669.50	0.00
77.00	0.00	0.025	669.50	0.00
79.00	0.00	0.025	669.50	0.00

Summary for Pond BR2: Bioretention-2

Inflow Area = 1.310 ac, 65.65% Impervious, Inflow Depth = 3.77" for 10-YEAR event
Inflow = 5.83 cfs @ 12.07 hrs, Volume= 0.412 af
Outflow = 5.09 cfs @ 12.11 hrs, Volume= 0.364 af, Atten= 13%, Lag= 2.5 min
Primary = 5.09 cfs @ 12.11 hrs, Volume= 0.364 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 659.84' @ 12.11 hrs Surf.Area= 0.095 ac Storage= 0.079 af

Plug-Flow detention time= 92.6 min calculated for 0.364 af (88% of inflow)
Center-of-Mass det. time= 38.8 min (832.2 - 793.5)

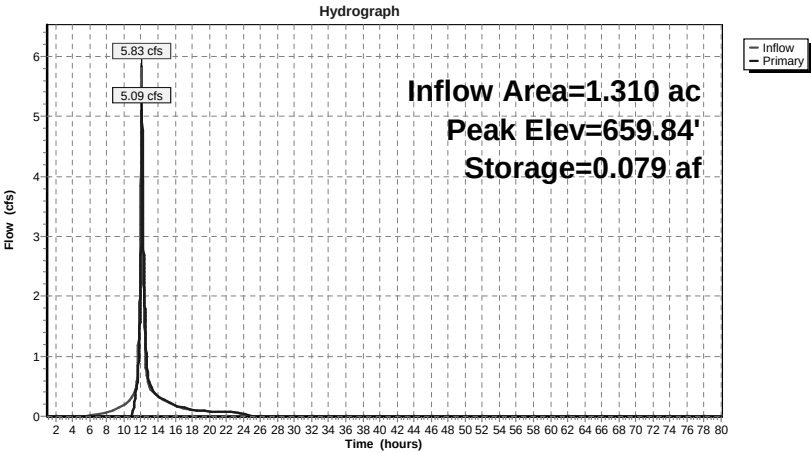
Volume	Invert	Avail.Storage	Storage Description
#1	659.00'	0.095 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
659.00	0.095	0.000	0.000
660.00	0.095	0.095	0.095

Device	Routing	Invert	Outlet Devices
#1	Primary	659.50'	1.0" x 1.0" Horiz. Orifice/Grate X 20.00 columns X 20 rows C= 0.600 in 24.0" x 24.0" Grate Limited to weir flow at low heads

Primary OutFlow Max=5.08 cfs @ 12.11 hrs HW=659.84' TW=616.44' (Dynamic Tailwater)
1=Orifice/Grate (Weir Controls 5.08 cfs @ 1.89 fps)

Pond BR2: Bioretention-2



Proposed Conditions_DP-2

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 57

Hydrograph for Pond BR2: Bioretention-2

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0.000	659.00	0.00
3.00	0.00	0.000	659.00	0.00
5.00	0.00	0.000	659.00	0.00
7.00	0.03	0.003	659.03	0.00
9.00	0.11	0.014	659.15	0.00
11.00	0.32	0.047	659.49	0.00
13.00	0.49	0.055	659.58	0.55
15.00	0.24	0.052	659.54	0.25
17.00	0.13	0.050	659.53	0.14
19.00	0.09	0.050	659.52	0.09
21.00	0.08	0.049	659.52	0.08
23.00	0.06	0.049	659.52	0.06
25.00	0.00	0.048	659.50	0.00
27.00	0.00	0.048	659.50	0.00
29.00	0.00	0.048	659.50	0.00
31.00	0.00	0.048	659.50	0.00
33.00	0.00	0.048	659.50	0.00
35.00	0.00	0.048	659.50	0.00
37.00	0.00	0.048	659.50	0.00
39.00	0.00	0.048	659.50	0.00
41.00	0.00	0.048	659.50	0.00
43.00	0.00	0.048	659.50	0.00
45.00	0.00	0.048	659.50	0.00
47.00	0.00	0.048	659.50	0.00
49.00	0.00	0.048	659.50	0.00
51.00	0.00	0.048	659.50	0.00
53.00	0.00	0.048	659.50	0.00
55.00	0.00	0.048	659.50	0.00
57.00	0.00	0.048	659.50	0.00
59.00	0.00	0.048	659.50	0.00
61.00	0.00	0.048	659.50	0.00
63.00	0.00	0.048	659.50	0.00
65.00	0.00	0.048	659.50	0.00
67.00	0.00	0.048	659.50	0.00
69.00	0.00	0.048	659.50	0.00
71.00	0.00	0.048	659.50	0.00
73.00	0.00	0.048	659.50	0.00
75.00	0.00	0.048	659.50	0.00
77.00	0.00	0.048	659.50	0.00
79.00	0.00	0.048	659.50	0.00

Proposed Conditions_DP-2

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 58

Summary for Subcatchment DA-2A1: Drainage Area-2A1

Runoff = 22.67 cfs @ 12.63 hrs, Volume= 3.550 af, Depth= 2.04"

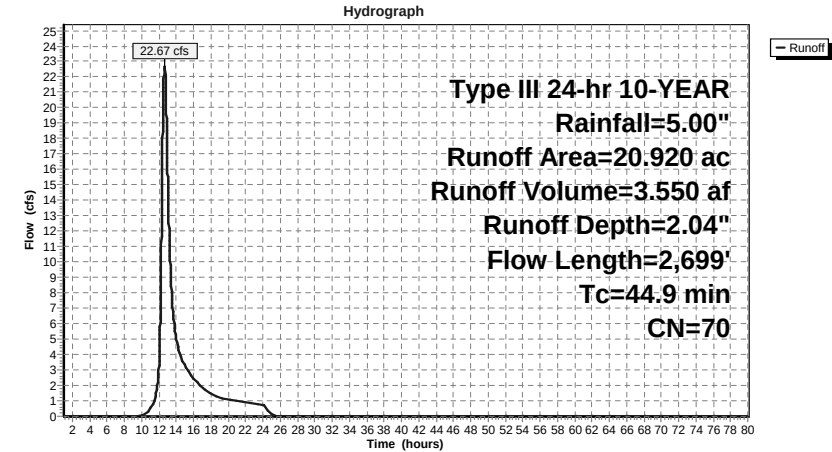
Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
0.910	65	Brush, Good, HSG C
18.990	70	Woods, Good, HSG C
1.020	74	>75% Grass cover, Good, HSG C
20.920	70	Weighted Average
20.920		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.0	95	0.0400	0.06		Sheet Flow, circle Woods: Dense underbrush n= 0.800 P2= 3.50"
16.6	830	0.1110	0.83		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
0.4	225	0.0140	8.44	75.92	Channel Flow, Area= 9.0 sf Perim= 8.3' r= 1.08' n= 0.022 Earth, clean & straight
0.2	375	0.1230	40.09	503.78	Pipe Channel, 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.013
0.1	280	0.1210	60.79	71,307.97	Channel Flow, Area= 1,173.0 sf Perim= 177.0' r= 6.63' n= 0.030 Earth, grassed & winding
0.3	104	0.0980	6.38	395.30	Channel Flow, Area= 62.0 sf Perim= 54.0' r= 1.15' n= 0.080 Earth, long dense weeds
1.3	790	0.0350	10.05	422.20	Channel Flow, Area= 42.0 sf Perim= 29.5' r= 1.42' n= 0.035 Earth, dense weeds
44.9	2,699	Total			

Subcatchment DA-2A1: Drainage Area-2A1



Hydrograph for Subcatchment DA-2A1: Drainage Area-2A1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.05	0.00	0.00	53.00	5.00	2.04	0.00
2.00	0.10	0.00	0.00	54.00	5.00	2.04	0.00
3.00	0.15	0.00	0.00	55.00	5.00	2.04	0.00
4.00	0.22	0.00	0.00	56.00	5.00	2.04	0.00
5.00	0.28	0.00	0.00	57.00	5.00	2.04	0.00
6.00	0.36	0.00	0.00	58.00	5.00	2.04	0.00
7.00	0.45	0.00	0.00	59.00	5.00	2.04	0.00
8.00	0.57	0.00	0.00	60.00	5.00	2.04	0.00
9.00	0.73	0.00	0.00	61.00	5.00	2.04	0.00
10.00	0.95	0.00	0.01	62.00	5.00	2.04	0.00
11.00	1.25	0.03	0.48	63.00	5.00	2.04	0.00
12.00	2.50	0.46	3.52	64.00	5.00	2.04	0.00
13.00	3.75	1.17	15.74	65.00	5.00	2.04	0.00
14.00	4.06	1.37	5.00	66.00	5.00	2.04	0.00
15.00	4.27	1.51	3.29	67.00	5.00	2.04	0.00
16.00	4.43	1.62	2.49	68.00	5.00	2.04	0.00
17.00	4.55	1.71	1.84	69.00	5.00	2.04	0.00
18.00	4.64	1.77	1.47	70.00	5.00	2.04	0.00
19.00	4.72	1.83	1.19	71.00	5.00	2.04	0.00
20.00	4.79	1.88	1.07	72.00	5.00	2.04	0.00
21.00	4.85	1.92	0.98	73.00	5.00	2.04	0.00
22.00	4.90	1.97	0.89	74.00	5.00	2.04	0.00
23.00	4.95	2.00	0.81	75.00	5.00	2.04	0.00
24.00	5.00	2.04	0.72	76.00	5.00	2.04	0.00
25.00	5.00	2.04	0.11	77.00	5.00	2.04	0.00
26.00	5.00	2.04	0.00	78.00	5.00	2.04	0.00
27.00	5.00	2.04	0.00	79.00	5.00	2.04	0.00
28.00	5.00	2.04	0.00	80.00	5.00	2.04	0.00
29.00	5.00	2.04	0.00				
30.00	5.00	2.04	0.00				
31.00	5.00	2.04	0.00				
32.00	5.00	2.04	0.00				
33.00	5.00	2.04	0.00				
34.00	5.00	2.04	0.00				
35.00	5.00	2.04	0.00				
36.00	5.00	2.04	0.00				
37.00	5.00	2.04	0.00				
38.00	5.00	2.04	0.00				
39.00	5.00	2.04	0.00				
40.00	5.00	2.04	0.00				
41.00	5.00	2.04	0.00				
42.00	5.00	2.04	0.00				
43.00	5.00	2.04	0.00				
44.00	5.00	2.04	0.00				
45.00	5.00	2.04	0.00				
46.00	5.00	2.04	0.00				
47.00	5.00	2.04	0.00				
48.00	5.00	2.04	0.00				
49.00	5.00	2.04	0.00				
50.00	5.00	2.04	0.00				
51.00	5.00	2.04	0.00				
52.00	5.00	2.04	0.00				

Summary for Subcatchment DA-2A2: Drainage Area-2A2

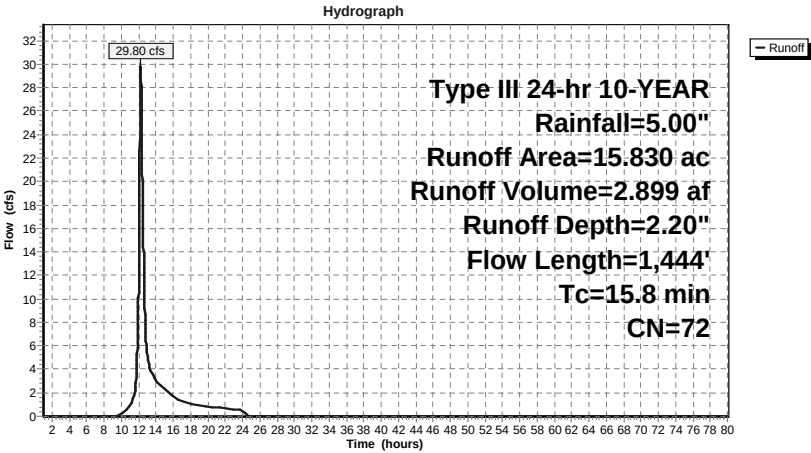
Runoff = 29.80 cfs @ 12.22 hrs, Volume= 2.899 af, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
12.533	70	Woods, Good, HSG C
* 2.715	74	Woods/grass comb., Good, HSG C
* 0.582	98	Pavement & Roofs, HSG C
15.830	72	Weighted Average
15.248		96.32% Pervious Area
0.582		3.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		Sheet Flow, n= 0.400 P2= 3.50"
2.5	230	0.0960	1.55		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.9	220	0.0180	4.17	41.73	Channel Flow, Area= 10.0 sf Perim= 20.1' r= 0.50' n= 0.030 Earth, grassed & winding
0.3	104	0.0980	6.38	395.30	Channel Flow, Area= 62.0 sf Perim= 54.0' r= 1.15' n= 0.080 Earth, long dense weeds
1.3	790	0.0350	10.05	422.20	Channel Flow, Area= 42.0 sf Perim= 29.5' r= 1.42' n= 0.035
15.8	1,444	Total			

Subcatchment DA-2A2: Drainage Area-2A2



Proposed Conditions_DP-2

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 63

Hydrograph for Subcatchment DA-2A2: Drainage Area-2A2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.05	0.00	0.00	53.00	5.00	2.20	0.00
2.00	0.10	0.00	0.00	54.00	5.00	2.20	0.00
3.00	0.15	0.00	0.00	55.00	5.00	2.20	0.00
4.00	0.22	0.00	0.00	56.00	5.00	2.20	0.00
5.00	0.28	0.00	0.00	57.00	5.00	2.20	0.00
6.00	0.36	0.00	0.00	58.00	5.00	2.20	0.00
7.00	0.45	0.00	0.00	59.00	5.00	2.20	0.00
8.00	0.57	0.00	0.00	60.00	5.00	2.20	0.00
9.00	0.73	0.00	0.00	61.00	5.00	2.20	0.00
10.00	0.95	0.01	0.20	62.00	5.00	2.20	0.00
11.00	1.25	0.05	0.93	63.00	5.00	2.20	0.00
12.00	2.50	0.53	11.03	64.00	5.00	2.20	0.00
13.00	3.75	1.29	5.23	65.00	5.00	2.20	0.00
14.00	4.06	1.50	3.07	66.00	5.00	2.20	0.00
15.00	4.27	1.65	2.31	67.00	5.00	2.20	0.00
16.00	4.43	1.77	1.68	68.00	5.00	2.20	0.00
17.00	4.55	1.86	1.31	69.00	5.00	2.20	0.00
18.00	4.64	1.92	1.03	70.00	5.00	2.20	0.00
19.00	4.72	1.98	0.89	71.00	5.00	2.20	0.00
20.00	4.79	2.03	0.81	72.00	5.00	2.20	0.00
21.00	4.85	2.08	0.74	73.00	5.00	2.20	0.00
22.00	4.90	2.12	0.67	74.00	5.00	2.20	0.00
23.00	4.95	2.16	0.61	75.00	5.00	2.20	0.00
24.00	5.00	2.20	0.54	76.00	5.00	2.20	0.00
25.00	5.00	2.20	0.00	77.00	5.00	2.20	0.00
26.00	5.00	2.20	0.00	78.00	5.00	2.20	0.00
27.00	5.00	2.20	0.00	79.00	5.00	2.20	0.00
28.00	5.00	2.20	0.00	80.00	5.00	2.20	0.00
29.00	5.00	2.20	0.00				
30.00	5.00	2.20	0.00				
31.00	5.00	2.20	0.00				
32.00	5.00	2.20	0.00				
33.00	5.00	2.20	0.00				
34.00	5.00	2.20	0.00				
35.00	5.00	2.20	0.00				
36.00	5.00	2.20	0.00				
37.00	5.00	2.20	0.00				
38.00	5.00	2.20	0.00				
39.00	5.00	2.20	0.00				
40.00	5.00	2.20	0.00				
41.00	5.00	2.20	0.00				
42.00	5.00	2.20	0.00				
43.00	5.00	2.20	0.00				
44.00	5.00	2.20	0.00				
45.00	5.00	2.20	0.00				
46.00	5.00	2.20	0.00				
47.00	5.00	2.20	0.00				
48.00	5.00	2.20	0.00				
49.00	5.00	2.20	0.00				
50.00	5.00	2.20	0.00				
51.00	5.00	2.20	0.00				
52.00	5.00	2.20	0.00				

Proposed Conditions_DP-2

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 64

Summary for Subcatchment DA-2A3: Drainage Area - 2A3

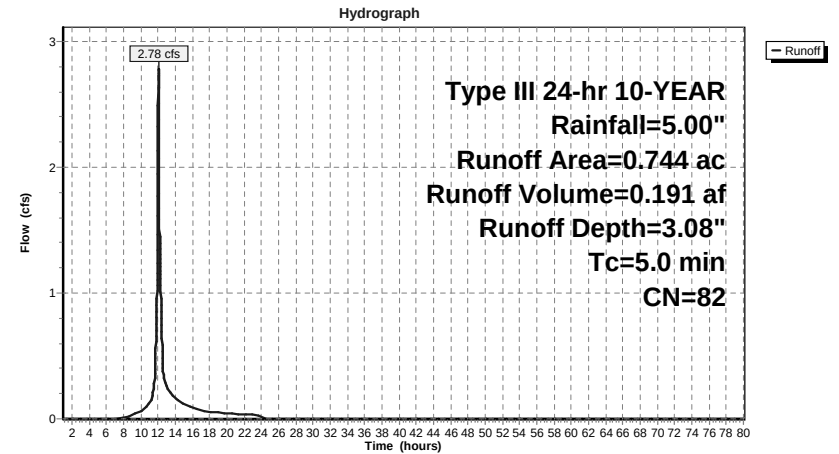
Runoff = 2.78 cfs @ 12.07 hrs, Volume= 0.191 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
0.279	98	Paved parking, HSG C
0.465	72	Woods/grass comb., Good, HSG C
0.744	82	Weighted Average
0.465		62.50% Pervious Area
0.279		37.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, User Defined Min.

Subcatchment DA-2A3: Drainage Area - 2A3

Proposed Conditions_DP-2

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 65

Hydrograph for Subcatchment DA-2A3: Drainage Area - 2A3

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.05	0.00	0.00	53.00	5.00	3.08	0.00
2.00	0.10	0.00	0.00	54.00	5.00	3.08	0.00
3.00	0.15	0.00	0.00	55.00	5.00	3.08	0.00
4.00	0.22	0.00	0.00	56.00	5.00	3.08	0.00
5.00	0.28	0.00	0.00	57.00	5.00	3.08	0.00
6.00	0.36	0.00	0.00	58.00	5.00	3.08	0.00
7.00	0.45	0.00	0.00	59.00	5.00	3.08	0.00
8.00	0.57	0.01	0.01	60.00	5.00	3.08	0.00
9.00	0.73	0.03	0.03	61.00	5.00	3.08	0.00
10.00	0.95	0.09	0.06	62.00	5.00	3.08	0.00
11.00	1.25	0.22	0.12	63.00	5.00	3.08	0.00
12.00	2.50	1.00	1.77	64.00	5.00	3.08	0.00
13.00	3.75	1.99	0.25	65.00	5.00	3.08	0.00
14.00	4.06	2.25	0.16	66.00	5.00	3.08	0.00
15.00	4.27	2.44	0.12	67.00	5.00	3.08	0.00
16.00	4.43	2.57	0.09	68.00	5.00	3.08	0.00
17.00	4.55	2.68	0.07	69.00	5.00	3.08	0.00
18.00	4.64	2.76	0.05	70.00	5.00	3.08	0.00
19.00	4.72	2.83	0.05	71.00	5.00	3.08	0.00
20.00	4.79	2.89	0.04	72.00	5.00	3.08	0.00
21.00	4.85	2.94	0.04	73.00	5.00	3.08	0.00
22.00	4.90	2.99	0.04	74.00	5.00	3.08	0.00
23.00	4.95	3.04	0.03	75.00	5.00	3.08	0.00
24.00	5.00	3.08	0.03	76.00	5.00	3.08	0.00
25.00	5.00	3.08	0.00	77.00	5.00	3.08	0.00
26.00	5.00	3.08	0.00	78.00	5.00	3.08	0.00
27.00	5.00	3.08	0.00	79.00	5.00	3.08	0.00
28.00	5.00	3.08	0.00	80.00	5.00	3.08	0.00
29.00	5.00	3.08	0.00				
30.00	5.00	3.08	0.00				
31.00	5.00	3.08	0.00				
32.00	5.00	3.08	0.00				
33.00	5.00	3.08	0.00				
34.00	5.00	3.08	0.00				
35.00	5.00	3.08	0.00				
36.00	5.00	3.08	0.00				
37.00	5.00	3.08	0.00				
38.00	5.00	3.08	0.00				
39.00	5.00	3.08	0.00				
40.00	5.00	3.08	0.00				
41.00	5.00	3.08	0.00				
42.00	5.00	3.08	0.00				
43.00	5.00	3.08	0.00				
44.00	5.00	3.08	0.00				
45.00	5.00	3.08	0.00				
46.00	5.00	3.08	0.00				
47.00	5.00	3.08	0.00				
48.00	5.00	3.08	0.00				
49.00	5.00	3.08	0.00				
50.00	5.00	3.08	0.00				
51.00	5.00	3.08	0.00				
52.00	5.00	3.08	0.00				

Proposed Conditions_DP-2

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 66

Summary for Subcatchment DA-2B1: Drainage Area-2B1

Runoff = 9.30 cfs @ 12.09 hrs, Volume= 0.655 af, Depth= 2.45"

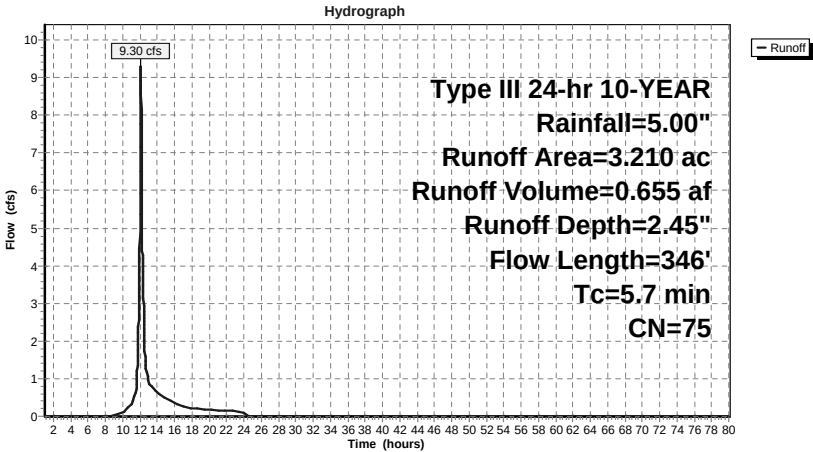
Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
0.140	98	Paved parking, HSG C
2.710	74	>75% Grass cover, Good, HSG C
* 0.050	61	Bioretention Sand Soil Medium, HSG C
* 0.310	74	Porous Asphalt
3.210	75	Weighted Average
3.070		95.64% Pervious Area
0.140		4.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	100	0.2100	0.31		Sheet Flow, Grass: Dense n= 0.240 P2= 3.50"
0.1	18	0.2100	3.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	93	0.0650	14.22	142.21	Channel Flow, Area= 10.0 sf Perim= 11.0' r= 0.91' n= 0.025 Earth, clean & winding
0.2	135	0.0440	12.47	22.03	Pipe Channel, 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
5.7	346	Total			

Subcatchment DA-2B1: Drainage Area-2B1



Hydrograph for Subcatchment DA-2B1: Drainage Area-2B1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.05	0.00	0.00	53.00	5.00	2.45	0.00
2.00	0.10	0.00	0.00	54.00	5.00	2.45	0.00
3.00	0.15	0.00	0.00	55.00	5.00	2.45	0.00
4.00	0.22	0.00	0.00	56.00	5.00	2.45	0.00
5.00	0.28	0.00	0.00	57.00	5.00	2.45	0.00
6.00	0.36	0.00	0.00	58.00	5.00	2.45	0.00
7.00	0.45	0.00	0.00	59.00	5.00	2.45	0.00
8.00	0.57	0.00	0.00	60.00	5.00	2.45	0.00
9.00	0.73	0.00	0.02	61.00	5.00	2.45	0.00
10.00	0.95	0.02	0.11	62.00	5.00	2.45	0.00
11.00	1.25	0.09	0.30	63.00	5.00	2.45	0.00
12.00	2.50	0.65	5.37	64.00	5.00	2.45	0.00
13.00	3.75	1.48	0.95	65.00	5.00	2.45	0.00
14.00	4.06	1.71	0.62	66.00	5.00	2.45	0.00
15.00	4.27	1.87	0.48	67.00	5.00	2.45	0.00
16.00	4.43	2.00	0.34	68.00	5.00	2.45	0.00
17.00	4.55	2.09	0.27	69.00	5.00	2.45	0.00
18.00	4.64	2.16	0.21	70.00	5.00	2.45	0.00
19.00	4.72	2.22	0.19	71.00	5.00	2.45	0.00
20.00	4.79	2.28	0.17	72.00	5.00	2.45	0.00
21.00	4.85	2.33	0.16	73.00	5.00	2.45	0.00
22.00	4.90	2.37	0.14	74.00	5.00	2.45	0.00
23.00	4.95	2.41	0.13	75.00	5.00	2.45	0.00
24.00	5.00	2.45	0.11	76.00	5.00	2.45	0.00
25.00	5.00	2.45	0.00	77.00	5.00	2.45	0.00
26.00	5.00	2.45	0.00	78.00	5.00	2.45	0.00
27.00	5.00	2.45	0.00	79.00	5.00	2.45	0.00
28.00	5.00	2.45	0.00	80.00	5.00	2.45	0.00
29.00	5.00	2.45	0.00				
30.00	5.00	2.45	0.00				
31.00	5.00	2.45	0.00				
32.00	5.00	2.45	0.00				
33.00	5.00	2.45	0.00				
34.00	5.00	2.45	0.00				
35.00	5.00	2.45	0.00				
36.00	5.00	2.45	0.00				
37.00	5.00	2.45	0.00				
38.00	5.00	2.45	0.00				
39.00	5.00	2.45	0.00				
40.00	5.00	2.45	0.00				
41.00	5.00	2.45	0.00				
42.00	5.00	2.45	0.00				
43.00	5.00	2.45	0.00				
44.00	5.00	2.45	0.00				
45.00	5.00	2.45	0.00				
46.00	5.00	2.45	0.00				
47.00	5.00	2.45	0.00				
48.00	5.00	2.45	0.00				
49.00	5.00	2.45	0.00				
50.00	5.00	2.45	0.00				
51.00	5.00	2.45	0.00				
52.00	5.00	2.45	0.00				

Proposed Conditions_DP-2

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 69

Summary for Subcatchment DA-2B2: Drainage Area-2B2

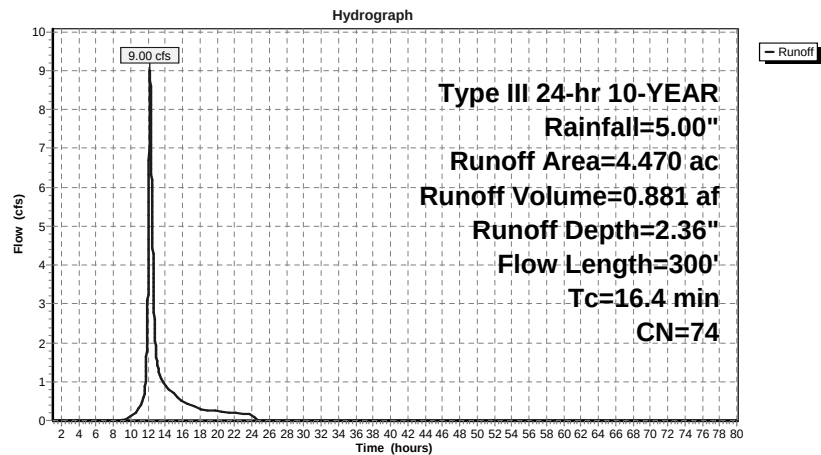
Runoff = 9.00 cfs @ 12.23 hrs, Volume= 0.881 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
* 1.262	73	Woods/grass comb., Good, HSG C
2.384	70	Woods, Good, HSG C
0.557	98	Paved roads , HSG C
0.267	65	Brush, Good, HSG C
4.470	74	Weighted Average
3.913		87.54% Pervious Area
0.557		12.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0500	0.12		Sheet Flow, n= 0.400 P2= 3.50"
2.2	200	0.0900	1.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
16.4	300	Total			

Subcatchment DA-2B2: Drainage Area-2B2**Proposed Conditions_DP-2**

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 70

Hydrograph for Subcatchment DA-2B2: Drainage Area-2B2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.05	0.00	0.00	53.00	5.00	2.36	0.00
2.00	0.10	0.00	0.00	54.00	5.00	2.36	0.00
3.00	0.15	0.00	0.00	55.00	5.00	2.36	0.00
4.00	0.22	0.00	0.00	56.00	5.00	2.36	0.00
5.00	0.28	0.00	0.00	57.00	5.00	2.36	0.00
6.00	0.36	0.00	0.00	58.00	5.00	2.36	0.00
7.00	0.45	0.00	0.00	59.00	5.00	2.36	0.00
8.00	0.57	0.00	0.00	60.00	5.00	2.36	0.00
9.00	0.73	0.00	0.00	61.00	5.00	2.36	0.00
10.00	0.95	0.02	0.10	62.00	5.00	2.36	0.00
11.00	1.25	0.07	0.33	63.00	5.00	2.36	0.00
12.00	2.50	0.61	3.38	64.00	5.00	2.36	0.00
13.00	3.75	1.42	1.58	65.00	5.00	2.36	0.00
14.00	4.06	1.64	0.91	66.00	5.00	2.36	0.00
15.00	4.27	1.80	0.68	67.00	5.00	2.36	0.00
16.00	4.43	1.92	0.50	68.00	5.00	2.36	0.00
17.00	4.55	2.01	0.39	69.00	5.00	2.36	0.00
18.00	4.64	2.08	0.30	70.00	5.00	2.36	0.00
19.00	4.72	2.14	0.26	71.00	5.00	2.36	0.00
20.00	4.79	2.19	0.24	72.00	5.00	2.36	0.00
21.00	4.85	2.24	0.22	73.00	5.00	2.36	0.00
22.00	4.90	2.29	0.20	74.00	5.00	2.36	0.00
23.00	4.95	2.33	0.18	75.00	5.00	2.36	0.00
24.00	5.00	2.36	0.16	76.00	5.00	2.36	0.00
25.00	5.00	2.36	0.00	77.00	5.00	2.36	0.00
26.00	5.00	2.36	0.00	78.00	5.00	2.36	0.00
27.00	5.00	2.36	0.00	79.00	5.00	2.36	0.00
28.00	5.00	2.36	0.00	80.00	5.00	2.36	0.00
29.00	5.00	2.36	0.00				
30.00	5.00	2.36	0.00				
31.00	5.00	2.36	0.00				
32.00	5.00	2.36	0.00				
33.00	5.00	2.36	0.00				
34.00	5.00	2.36	0.00				
35.00	5.00	2.36	0.00				
36.00	5.00	2.36	0.00				
37.00	5.00	2.36	0.00				
38.00	5.00	2.36	0.00				
39.00	5.00	2.36	0.00				
40.00	5.00	2.36	0.00				
41.00	5.00	2.36	0.00				
42.00	5.00	2.36	0.00				
43.00	5.00	2.36	0.00				
44.00	5.00	2.36	0.00				
45.00	5.00	2.36	0.00				
46.00	5.00	2.36	0.00				
47.00	5.00	2.36	0.00				
48.00	5.00	2.36	0.00				
49.00	5.00	2.36	0.00				
50.00	5.00	2.36	0.00				
51.00	5.00	2.36	0.00				
52.00	5.00	2.36	0.00				

Summary for Subcatchment DA-2B3: Drainage Area-2B3

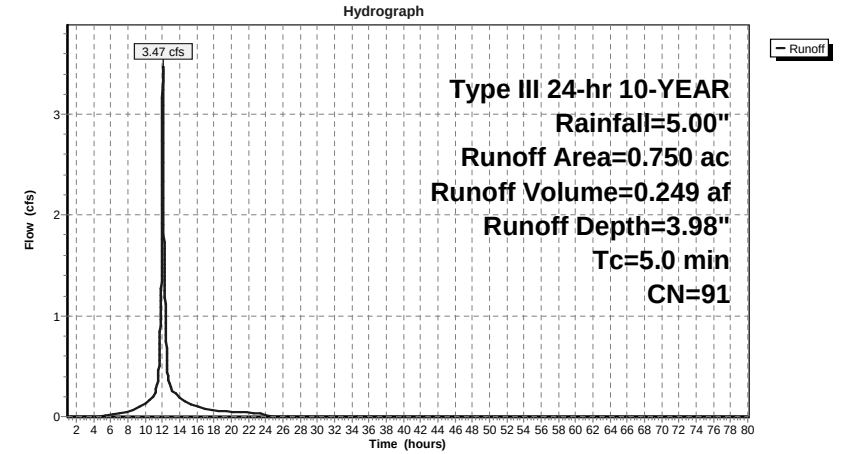
Runoff = 3.47 cfs @ 12.07 hrs, Volume= 0.249 af, Depth= 3.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
0.600	98	Unconnected roofs, HSG C
* 0.089	60	Storm Planter
* 0.061	68	Green Roof
0.750	91	Weighted Average
0.150		20.00% Pervious Area
0.600		80.00% Impervious Area
0.600		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, User Def Min.

Subcatchment DA-2B3: Drainage Area-2B3



Hydrograph for Subcatchment DA-2B3: Drainage Area-2B3

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.05	0.00	0.00	53.00	5.00	3.98	0.00
2.00	0.10	0.00	0.00	54.00	5.00	3.98	0.00
3.00	0.15	0.00	0.00	55.00	5.00	3.98	0.00
4.00	0.22	0.00	0.00	56.00	5.00	3.98	0.00
5.00	0.28	0.01	0.01	57.00	5.00	3.98	0.00
6.00	0.36	0.02	0.02	58.00	5.00	3.98	0.00
7.00	0.45	0.05	0.03	59.00	5.00	3.98	0.00
8.00	0.57	0.10	0.04	60.00	5.00	3.98	0.00
9.00	0.73	0.19	0.08	61.00	5.00	3.98	0.00
10.00	0.95	0.32	0.12	62.00	5.00	3.98	0.00
11.00	1.25	0.54	0.20	63.00	5.00	3.98	0.00
12.00	2.50	1.61	2.30	64.00	5.00	3.98	0.00
13.00	3.75	2.78	0.29	65.00	5.00	3.98	0.00
14.00	4.06	3.07	0.18	66.00	5.00	3.98	0.00
15.00	4.27	3.28	0.14	67.00	5.00	3.98	0.00
16.00	4.43	3.43	0.10	68.00	5.00	3.98	0.00
17.00	4.55	3.54	0.08	69.00	5.00	3.98	0.00
18.00	4.64	3.63	0.06	70.00	5.00	3.98	0.00
19.00	4.72	3.71	0.05	71.00	5.00	3.98	0.00
20.00	4.79	3.77	0.05	72.00	5.00	3.98	0.00
21.00	4.85	3.83	0.04	73.00	5.00	3.98	0.00
22.00	4.90	3.89	0.04	74.00	5.00	3.98	0.00
23.00	4.95	3.94	0.04	75.00	5.00	3.98	0.00
24.00	5.00	3.98	0.03	76.00	5.00	3.98	0.00
25.00	5.00	3.98	0.00	77.00	5.00	3.98	0.00
26.00	5.00	3.98	0.00	78.00	5.00	3.98	0.00
27.00	5.00	3.98	0.00	79.00	5.00	3.98	0.00
28.00	5.00	3.98	0.00	80.00	5.00	3.98	0.00
29.00	5.00	3.98	0.00				
30.00	5.00	3.98	0.00				
31.00	5.00	3.98	0.00				
32.00	5.00	3.98	0.00				
33.00	5.00	3.98	0.00				
34.00	5.00	3.98	0.00				
35.00	5.00	3.98	0.00				
36.00	5.00	3.98	0.00				
37.00	5.00	3.98	0.00				
38.00	5.00	3.98	0.00				
39.00	5.00	3.98	0.00				
40.00	5.00	3.98	0.00				
41.00	5.00	3.98	0.00				
42.00	5.00	3.98	0.00				
43.00	5.00	3.98	0.00				
44.00	5.00	3.98	0.00				
45.00	5.00	3.98	0.00				
46.00	5.00	3.98	0.00				
47.00	5.00	3.98	0.00				
48.00	5.00	3.98	0.00				
49.00	5.00	3.98	0.00				
50.00	5.00	3.98	0.00				
51.00	5.00	3.98	0.00				
52.00	5.00	3.98	0.00				

Proposed Conditions_DP-2

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 73

Summary for Subcatchment DA-2B4: Drainage Area-2B4

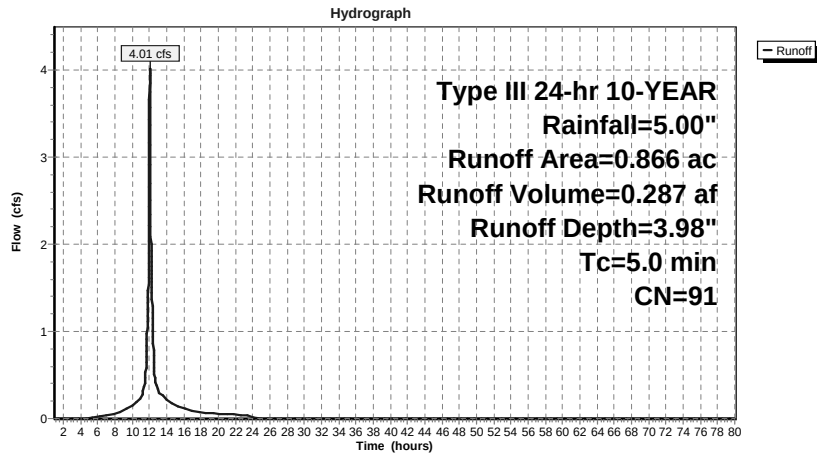
Runoff = 4.01 cfs @ 12.07 hrs, Volume= 0.287 af, Depth= 3.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
0.620	98	Roofs, HSG C
* 0.100	60	Storm Planter
0.065	98	Paved parking, HSG C
0.081	74	>75% Grass cover, Good, HSG C
0.866	91	Weighted Average
0.181		20.90% Pervious Area
0.685		79.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, User Def Min.

Subcatchment DA-2B4: Drainage Area-2B4**Proposed Conditions_DP-2**

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 74

Hydrograph for Subcatchment DA-2B4: Drainage Area-2B4

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.05	0.00	0.00	53.00	5.00	3.98	0.00
2.00	0.10	0.00	0.00	54.00	5.00	3.98	0.00
3.00	0.15	0.00	0.00	55.00	5.00	3.98	0.00
4.00	0.22	0.00	0.00	56.00	5.00	3.98	0.00
5.00	0.28	0.01	0.01	57.00	5.00	3.98	0.00
6.00	0.36	0.02	0.02	58.00	5.00	3.98	0.00
7.00	0.45	0.05	0.03	59.00	5.00	3.98	0.00
8.00	0.57	0.10	0.05	60.00	5.00	3.98	0.00
9.00	0.73	0.19	0.09	61.00	5.00	3.98	0.00
10.00	0.95	0.32	0.14	62.00	5.00	3.98	0.00
11.00	1.25	0.54	0.24	63.00	5.00	3.98	0.00
12.00	2.50	1.61	2.66	64.00	5.00	3.98	0.00
13.00	3.75	2.78	0.33	65.00	5.00	3.98	0.00
14.00	4.06	3.07	0.21	66.00	5.00	3.98	0.00
15.00	4.27	3.28	0.16	67.00	5.00	3.98	0.00
16.00	4.43	3.43	0.11	68.00	5.00	3.98	0.00
17.00	4.55	3.54	0.09	69.00	5.00	3.98	0.00
18.00	4.64	3.63	0.07	70.00	5.00	3.98	0.00
19.00	4.72	3.71	0.06	71.00	5.00	3.98	0.00
20.00	4.79	3.77	0.06	72.00	5.00	3.98	0.00
21.00	4.85	3.83	0.05	73.00	5.00	3.98	0.00
22.00	4.90	3.89	0.05	74.00	5.00	3.98	0.00
23.00	4.95	3.94	0.04	75.00	5.00	3.98	0.00
24.00	5.00	3.98	0.04	76.00	5.00	3.98	0.00
25.00	5.00	3.98	0.00	77.00	5.00	3.98	0.00
26.00	5.00	3.98	0.00	78.00	5.00	3.98	0.00
27.00	5.00	3.98	0.00	79.00	5.00	3.98	0.00
28.00	5.00	3.98	0.00	80.00	5.00	3.98	0.00
29.00	5.00	3.98	0.00				
30.00	5.00	3.98	0.00				
31.00	5.00	3.98	0.00				
32.00	5.00	3.98	0.00				
33.00	5.00	3.98	0.00				
34.00	5.00	3.98	0.00				
35.00	5.00	3.98	0.00				
36.00	5.00	3.98	0.00				
37.00	5.00	3.98	0.00				
38.00	5.00	3.98	0.00				
39.00	5.00	3.98	0.00				
40.00	5.00	3.98	0.00				
41.00	5.00	3.98	0.00				
42.00	5.00	3.98	0.00				
43.00	5.00	3.98	0.00				
44.00	5.00	3.98	0.00				
45.00	5.00	3.98	0.00				
46.00	5.00	3.98	0.00				
47.00	5.00	3.98	0.00				
48.00	5.00	3.98	0.00				
49.00	5.00	3.98	0.00				
50.00	5.00	3.98	0.00				
51.00	5.00	3.98	0.00				
52.00	5.00	3.98	0.00				

Summary for Subcatchment DA-2B5: Drainage Area-2B5

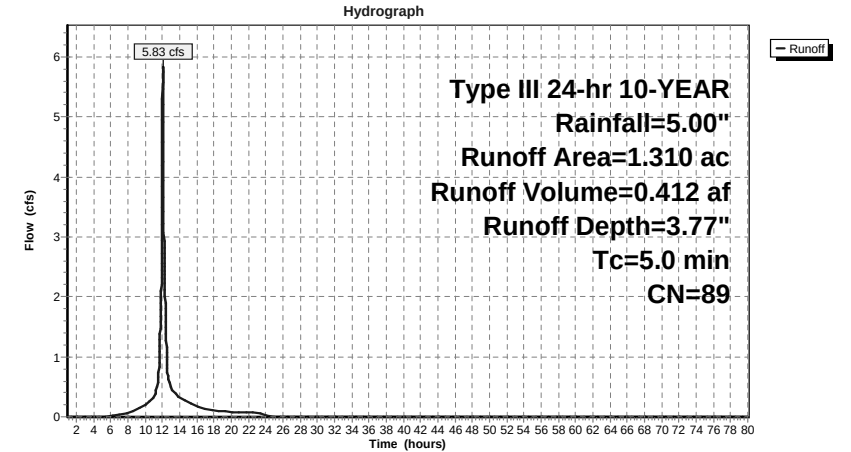
Runoff = 5.83 cfs @ 12.07 hrs, Volume= 0.412 af, Depth= 3.77"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
0.860	98	Paved parking, HSG C
0.360	74	>75% Grass cover, Good, HSG C
* 0.090	61	Bioretention Sand Soil Medium, HSG C
1.310	89	Weighted Average
0.450		34.35% Pervious Area
0.860		65.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, User Defined Min.

Subcatchment DA-2B5: Drainage Area-2B5



Hydrograph for Subcatchment DA-2B5: Drainage Area-2B5

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.05	0.00	0.00	53.00	5.00	3.77	0.00
2.00	0.10	0.00	0.00	54.00	5.00	3.77	0.00
3.00	0.15	0.00	0.00	55.00	5.00	3.77	0.00
4.00	0.22	0.00	0.00	56.00	5.00	3.77	0.00
5.00	0.28	0.00	0.00	57.00	5.00	3.77	0.00
6.00	0.36	0.01	0.02	58.00	5.00	3.77	0.00
7.00	0.45	0.03	0.03	59.00	5.00	3.77	0.00
8.00	0.57	0.07	0.06	60.00	5.00	3.77	0.00
9.00	0.73	0.14	0.11	61.00	5.00	3.77	0.00
10.00	0.95	0.25	0.19	62.00	5.00	3.77	0.00
11.00	1.25	0.45	0.32	63.00	5.00	3.77	0.00
12.00	2.50	1.45	3.84	64.00	5.00	3.77	0.00
13.00	3.75	2.59	0.49	65.00	5.00	3.77	0.00
14.00	4.06	2.87	0.32	66.00	5.00	3.77	0.00
15.00	4.27	3.08	0.24	67.00	5.00	3.77	0.00
16.00	4.43	3.23	0.17	68.00	5.00	3.77	0.00
17.00	4.55	3.34	0.13	69.00	5.00	3.77	0.00
18.00	4.64	3.43	0.10	70.00	5.00	3.77	0.00
19.00	4.72	3.50	0.09	71.00	5.00	3.77	0.00
20.00	4.79	3.57	0.08	72.00	5.00	3.77	0.00
21.00	4.85	3.63	0.08	73.00	5.00	3.77	0.00
22.00	4.90	3.68	0.07	74.00	5.00	3.77	0.00
23.00	4.95	3.73	0.06	75.00	5.00	3.77	0.00
24.00	5.00	3.77	0.05	76.00	5.00	3.77	0.00
25.00	5.00	3.77	0.00	77.00	5.00	3.77	0.00
26.00	5.00	3.77	0.00	78.00	5.00	3.77	0.00
27.00	5.00	3.77	0.00	79.00	5.00	3.77	0.00
28.00	5.00	3.77	0.00	80.00	5.00	3.77	0.00
29.00	5.00	3.77	0.00				
30.00	5.00	3.77	0.00				
31.00	5.00	3.77	0.00				
32.00	5.00	3.77	0.00				
33.00	5.00	3.77	0.00				
34.00	5.00	3.77	0.00				
35.00	5.00	3.77	0.00				
36.00	5.00	3.77	0.00				
37.00	5.00	3.77	0.00				
38.00	5.00	3.77	0.00				
39.00	5.00	3.77	0.00				
40.00	5.00	3.77	0.00				
41.00	5.00	3.77	0.00				
42.00	5.00	3.77	0.00				
43.00	5.00	3.77	0.00				
44.00	5.00	3.77	0.00				
45.00	5.00	3.77	0.00				
46.00	5.00	3.77	0.00				
47.00	5.00	3.77	0.00				
48.00	5.00	3.77	0.00				
49.00	5.00	3.77	0.00				
50.00	5.00	3.77	0.00				
51.00	5.00	3.77	0.00				
52.00	5.00	3.77	0.00				

Summary for Subcatchment DA-2B6: Drainage Area -2B6

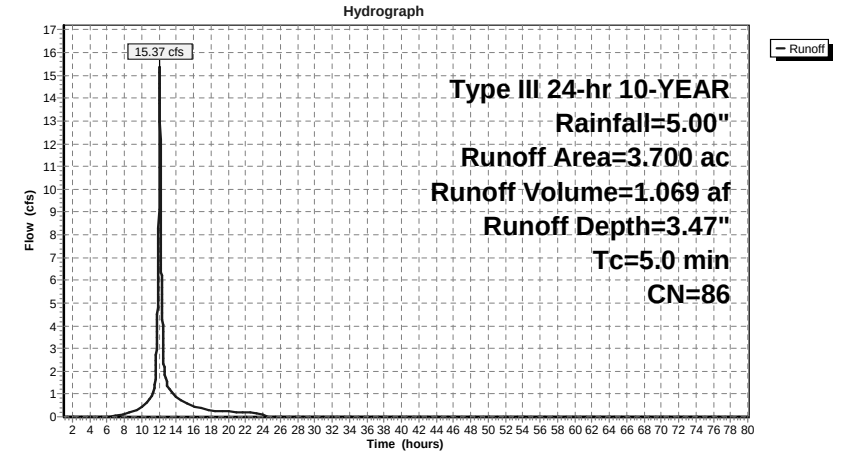
Runoff = 15.37 cfs @ 12.07 hrs, Volume= 1.069 af, Depth= 3.47"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
* 0.461	74	Pervious Pavers
* 1.451	74	Open Space
1.788	98	Paved parking, HSG C
3.700	86	Weighted Average
1.912		51.68% Pervious Area
1.788		48.32% Impervious Area

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

Subcatchment DA-2B6: Drainage Area -2B6



Hydrograph for Subcatchment DA-2B6: Drainage Area -2B6

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.05	0.00	0.00	53.00	5.00	3.47	0.00
2.00	0.10	0.00	0.00	54.00	5.00	3.47	0.00
3.00	0.15	0.00	0.00	55.00	5.00	3.47	0.00
4.00	0.22	0.00	0.00	56.00	5.00	3.47	0.00
5.00	0.28	0.00	0.00	57.00	5.00	3.47	0.00
6.00	0.36	0.00	0.01	58.00	5.00	3.47	0.00
7.00	0.45	0.01	0.05	59.00	5.00	3.47	0.00
8.00	0.57	0.03	0.11	60.00	5.00	3.47	0.00
9.00	0.73	0.08	0.24	61.00	5.00	3.47	0.00
10.00	0.95	0.17	0.42	62.00	5.00	3.47	0.00
11.00	1.25	0.33	0.78	63.00	5.00	3.47	0.00
12.00	2.50	1.24	9.99	64.00	5.00	3.47	0.00
13.00	3.75	2.32	1.34	65.00	5.00	3.47	0.00
14.00	4.06	2.60	0.86	66.00	5.00	3.47	0.00
15.00	4.27	2.79	0.65	67.00	5.00	3.47	0.00
16.00	4.43	2.94	0.46	68.00	5.00	3.47	0.00
17.00	4.55	3.05	0.37	69.00	5.00	3.47	0.00
18.00	4.64	3.13	0.28	70.00	5.00	3.47	0.00
19.00	4.72	3.20	0.25	71.00	5.00	3.47	0.00
20.00	4.79	3.27	0.23	72.00	5.00	3.47	0.00
21.00	4.85	3.32	0.21	73.00	5.00	3.47	0.00
22.00	4.90	3.38	0.19	74.00	5.00	3.47	0.00
23.00	4.95	3.42	0.17	75.00	5.00	3.47	0.00
24.00	5.00	3.47	0.15	76.00	5.00	3.47	0.00
25.00	5.00	3.47	0.00	77.00	5.00	3.47	0.00
26.00	5.00	3.47	0.00	78.00	5.00	3.47	0.00
27.00	5.00	3.47	0.00	79.00	5.00	3.47	0.00
28.00	5.00	3.47	0.00	80.00	5.00	3.47	0.00
29.00	5.00	3.47	0.00				
30.00	5.00	3.47	0.00				
31.00	5.00	3.47	0.00				
32.00	5.00	3.47	0.00				
33.00	5.00	3.47	0.00				
34.00	5.00	3.47	0.00				
35.00	5.00	3.47	0.00				
36.00	5.00	3.47	0.00				
37.00	5.00	3.47	0.00				
38.00	5.00	3.47	0.00				
39.00	5.00	3.47	0.00				
40.00	5.00	3.47	0.00				
41.00	5.00	3.47	0.00				
42.00	5.00	3.47	0.00				
43.00	5.00	3.47	0.00				
44.00	5.00	3.47	0.00				
45.00	5.00	3.47	0.00				
46.00	5.00	3.47	0.00				
47.00	5.00	3.47	0.00				
48.00	5.00	3.47	0.00				
49.00	5.00	3.47	0.00				
50.00	5.00	3.47	0.00				
51.00	5.00	3.47	0.00				
52.00	5.00	3.47	0.00				

Summary for Reach DP-2: 48" Culvert Outlet

Assume the DP-2 is at the tail end of the pipe, therefore the full length of the culvert (73') has not been specified. The culvert outlet elevation has replaced the inlet elevation so as to not overtop Wetland Depression_1. Outlet elevation has been replaced to mimick the existing slope on the culvert pipe.

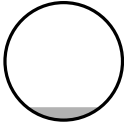
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 51.800 ac, 10.60% Impervious, Inflow Depth > 1.21" for 10-YEAR event
Inflow = 12.11 cfs @ 13.45 hrs, Volume= 5.222 af
Outflow = 12.11 cfs @ 13.46 hrs, Volume= 5.222 af, Atten= 0%, Lag= 0.1 min

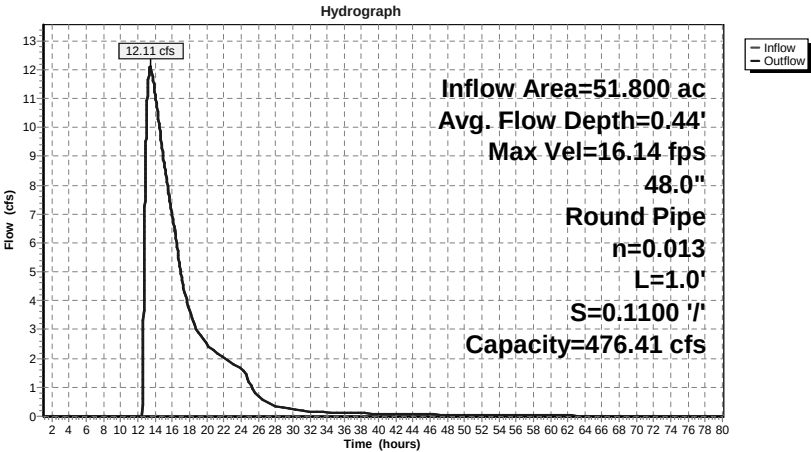
Routing by Dyn-Stor-Ind method, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 16.14 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 5.21 fps, Avg. Travel Time= 0.0 min

Peak Storage= 1 cf @ 13.46 hrs
Average Depth at Peak Storage= 0.44'
Bank-Full Depth= 4.00', Capacity at Bank-Full= 476.41 cfs

48.0" Round Pipe
n= 0.013
Length= 1.0' Slope= 0.1100 '/'
Inlet Invert= 579.80', Outlet Invert= 579.69'



Reach DP-2: 48" Culvert Outlet



Proposed Conditions_DP-2

Prepared by WATCHTOWER

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 81

Hydrograph for Reach DP-2: 48" Culvert Outlet

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
1.00	0.00	0	579.80	0.00
3.00	0.00	0	579.80	0.00
5.00	0.00	0	579.80	0.00
7.00	0.00	0	579.80	0.00
9.00	0.00	0	579.80	0.00
11.00	0.00	0	579.80	0.00
13.00	10.18	1	580.20	10.18
15.00	8.87	1	580.18	8.87
17.00	4.91	0	580.09	4.91
19.00	2.92	0	580.02	2.92
21.00	2.23	0	580.00	2.23
23.00	1.83	0	579.98	1.83
25.00	1.14	0	579.94	1.14
27.00	0.48	0	579.89	0.48
29.00	0.28	0	579.87	0.28
31.00	0.20	0	579.86	0.20
33.00	0.15	0	579.85	0.15
35.00	0.13	0	579.85	0.13
37.00	0.11	0	579.85	0.11
39.00	0.09	0	579.84	0.09
41.00	0.08	0	579.84	0.08
43.00	0.07	0	579.84	0.07
45.00	0.07	0	579.84	0.07
47.00	0.06	0	579.83	0.06
49.00	0.05	0	579.83	0.05
51.00	0.04	0	579.82	0.04
53.00	0.04	0	579.82	0.04
55.00	0.03	0	579.82	0.03
57.00	0.03	0	579.82	0.03
59.00	0.02	0	579.81	0.02
61.00	0.02	0	579.81	0.02
63.00	0.02	0	579.81	0.02
65.00	0.02	0	579.81	0.02
67.00	0.01	0	579.81	0.01
69.00	0.01	0	579.81	0.01
71.00	0.01	0	579.81	0.01
73.00	0.01	0	579.81	0.01
75.00	0.01	0	579.81	0.01
77.00	0.01	0	579.81	0.01
79.00	0.01	0	579.80	0.01

Proposed Conditions_DP-2

Prepared by WATCHTOWER

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Type III 24-hr 10-YEAR Rainfall=5.00"

Printed 10/22/2011

Page 82

Summary for Pond ND-2B: Natural Depression-2B

[93] Warning: Storage range exceeded by 1.30'

[87] Warning: Oscillations may require Finer Routing or smaller dt

Inflow Area = 4.470 ac, 12.46% Impervious, Inflow Depth = 2.36" for 10-YEAR event
 Inflow = 9.00 cfs @ 12.23 hrs, Volume= 0.881 af
 Outflow = 1.12 cfs @ 13.96 hrs, Volume= 0.467 af, Atten= 88%, Lag= 103.8 min
 Primary = 1.12 cfs @ 13.96 hrs, Volume= 0.467 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 594.10' @ 13.96 hrs Surf.Area= 0.231 ac Storage= 0.578 af

Plug-Flow detention time= 722.4 min calculated for 0.467 af (53% of inflow)
 Center-of-Mass det. time= 604.5 min (1,451.6 - 847.1)

Volume	Invert	Avail.Storage	Storage Description
#1	587.80'	0.578 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
587.80	0.000	0.000	0.000
592.80	0.231	0.578	0.578

Device	Routing	Invert	Outlet Devices
#1	Primary	587.83'	42.0" W x 30.0" H Box Culvert L= 73.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 587.83' / 586.78' S= 0.0144 '/ Cc= 0.900 n= 0.011
#2	Device 1	592.00'	2.3" Vert. Orifice/Grate C= 0.600
#3	Device 1	594.00'	12.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

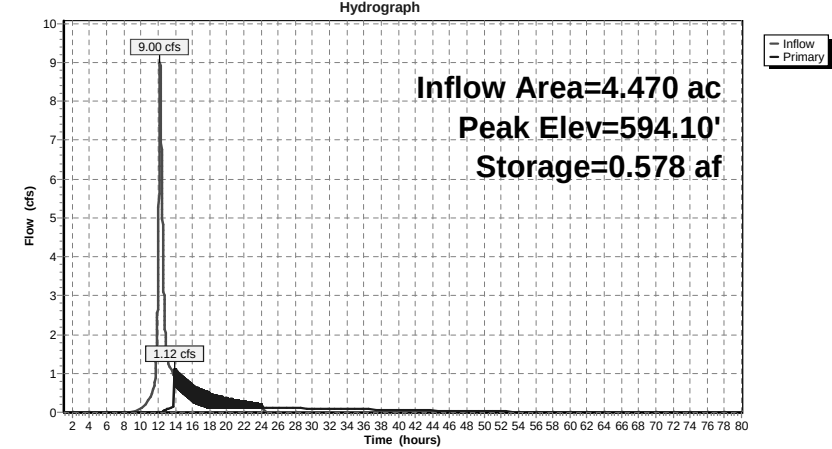
Primary OutFlow Max=1.12 cfs @ 13.96 hrs HW=594.10' TW=589.31' (Dynamic Tailwater)

1=Culvert (Passes 1.12 cfs of 90.11 cfs potential flow)

2=Orifice/Grate (Orifice Controls 0.20 cfs @ 6.81 fps)

3=Broad-Crested Rectangular Weir (Weir Controls 0.92 cfs @ 0.79 fps)

Pond ND-2B: Natural Depression-2B



Hydrograph for Pond ND-2B: Natural Depression-2B

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0.000	587.80	0.00
3.00	0.00	0.000	587.80	0.00
5.00	0.00	0.000	587.80	0.00
7.00	0.00	0.000	587.80	0.00
9.00	0.00	0.000	587.81	0.00
11.00	0.33	0.020	588.73	0.00
13.00	1.58	0.496	592.43	0.08
15.00	0.68	0.578	594.08	0.88
17.00	0.39	0.578	594.05	0.58
19.00	0.26	0.578	594.04	0.41
21.00	0.22	0.578	594.03	0.32
23.00	0.18	0.578	594.01	0.24
25.00	0.00	0.571	592.77	0.11
27.00	0.00	0.552	592.69	0.11
29.00	0.00	0.535	592.61	0.10
31.00	0.00	0.519	592.54	0.09
33.00	0.00	0.505	592.47	0.09
35.00	0.00	0.491	592.41	0.08
37.00	0.00	0.479	592.35	0.07
39.00	0.00	0.468	592.30	0.06
41.00	0.00	0.458	592.25	0.06
43.00	0.00	0.450	592.21	0.05
45.00	0.00	0.442	592.18	0.04
47.00	0.00	0.437	592.15	0.03
49.00	0.00	0.432	592.12	0.02
51.00	0.00	0.429	592.11	0.02
53.00	0.00	0.426	592.09	0.01
55.00	0.00	0.424	592.08	0.01
57.00	0.00	0.422	592.07	0.01
59.00	0.00	0.421	592.07	0.01
61.00	0.00	0.419	592.06	0.01
63.00	0.00	0.418	592.06	0.01
65.00	0.00	0.417	592.05	0.00
67.00	0.00	0.417	592.05	0.00
69.00	0.00	0.416	592.04	0.00
71.00	0.00	0.416	592.04	0.00
73.00	0.00	0.415	592.04	0.00
75.00	0.00	0.415	592.04	0.00
77.00	0.00	0.414	592.03	0.00
79.00	0.00	0.414	592.03	0.00

Summary for Pond UC: Underground Chambers

Inflow Area = 9.836 ac, 41.41% Impervious, Inflow Depth = 3.17" for 10-YEAR event
Inflow = 35.98 cfs @ 12.08 hrs, Volume= 2.600 af
Outflow = 2.22 cfs @ 14.01 hrs, Volume= 0.988 af, Atten= 94%, Lag= 115.4 min
Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
Secondary = 2.22 cfs @ 14.01 hrs, Volume= 0.988 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 618.44' @ 14.01 hrs Surf.Area= 0.591 ac Storage= 1.760 af

Plug-Flow detention time= 381.2 min calculated for 0.988 af (38% of inflow)
Center-of-Mass det. time= 255.6 min (1,070.0 - 814.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	614.25'	0.781 af	139.83'W x 184.02'L x 5.50'H Field A 3.249 af Overall - 1.298 af Embedded = 1.951 af x 40.0% Voids
#2A	615.00'	1.298 af	StormTech MC-3500 b x 500 Inside #1 Effective Size= 71.0"W x 45.0"H => 15.77 sf x 7.17'L = 113.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
		2.078 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	619.00'	18.0" Vert. Orifice/Grate X 3.00 C= 0.600
#2	Secondary	618.00'	12.0" Vert. Orifice/Grate X 3.00 C= 0.600

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=614.25' TW=585.00' (Dynamic Tailwater)
└─1=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=2.22 cfs @ 14.01 hrs HW=618.44' TW=0.00' (Dynamic Tailwater)
└─2=Orifice/Grate (Orifice Controls 2.22 cfs @ 2.25 fps)

Pond UC: Underground Chambers - Chamber Wizard Field A

Chamber Model = StormTech MC-3500 b
Effective Size= 71.0"W x 45.0"H => 15.77 sf x 7.17'L = 113.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap

77.0" Wide + 6.0" Spacing = 83.0" C-C

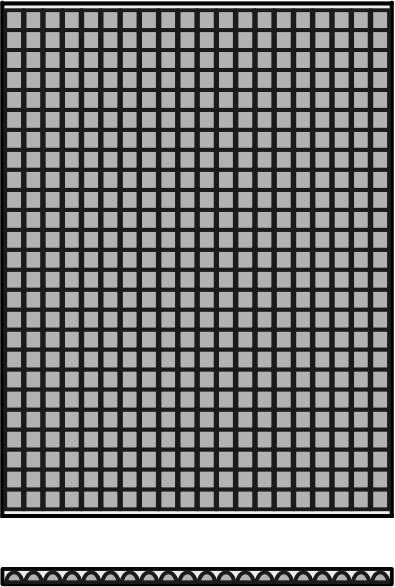
25 Chambers/Row x 7.17' Long = 179.25' + 28.6" End Stone x 2 = 184.02' Base Length
20 Rows x 77.0" Wide + 6.0" Spacing x 19 + 12.0" Side Stone x 2 = 139.83' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

500 Chambers x 113.0 cf = 56,521.1 cf Chamber Storage

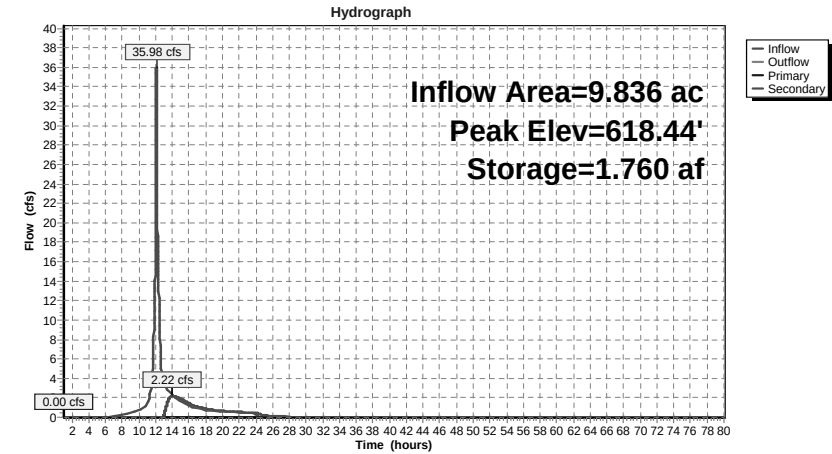
141,524.2 cf Field - 56,521.1 cf Chambers = 85,003.0 cf Stone x 40.0% Voids = 34,001.2 cf Stone Storage

Stone + Chamber Storage = 90,522.3 cf = 2.078 af

500 Chambers
5,241.6 cy Field
3,148.3 cy Stone



Pond UC: Underground Chambers



Hydrograph for Pond UC: Underground Chambers

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
1.00	0.00	0.000	614.25	0.00	0.00	0.00
3.00	0.00	0.000	614.25	0.00	0.00	0.00
5.00	0.02	0.001	614.25	0.00	0.00	0.00
7.00	0.11	0.009	614.29	0.00	0.00	0.00
9.00	0.41	0.047	614.45	0.00	0.00	0.00
11.00	1.22	0.168	614.96	0.00	0.00	0.00
13.00	3.51	1.661	618.14	0.25	0.00	0.25
15.00	1.69	1.749	618.40	1.88	0.00	1.88
17.00	0.95	1.717	618.30	1.10	0.00	1.10
19.00	0.65	1.697	618.24	0.72	0.00	0.72
21.00	0.54	1.688	618.21	0.58	0.00	0.58
23.00	0.44	1.681	618.19	0.48	0.00	0.48
25.00	0.01	1.656	618.13	0.21	0.00	0.21
27.00	0.00	1.637	618.07	0.07	0.00	0.07
29.00	0.00	1.629	618.05	0.03	0.00	0.03
31.00	0.00	1.624	618.04	0.02	0.00	0.02
33.00	0.00	1.622	618.03	0.01	0.00	0.01
35.00	0.00	1.620	618.03	0.01	0.00	0.01
37.00	0.00	1.618	618.02	0.01	0.00	0.01
39.00	0.00	1.617	618.02	0.01	0.00	0.01
41.00	0.00	1.617	618.02	0.00	0.00	0.00
43.00	0.00	1.616	618.02	0.00	0.00	0.00
45.00	0.00	1.615	618.01	0.00	0.00	0.00
47.00	0.00	1.615	618.01	0.00	0.00	0.00
49.00	0.00	1.614	618.01	0.00	0.00	0.00
51.00	0.00	1.614	618.01	0.00	0.00	0.00
53.00	0.00	1.614	618.01	0.00	0.00	0.00
55.00	0.00	1.614	618.01	0.00	0.00	0.00
57.00	0.00	1.613	618.01	0.00	0.00	0.00
59.00	0.00	1.613	618.01	0.00	0.00	0.00
61.00	0.00	1.613	618.01	0.00	0.00	0.00
63.00	0.00	1.613	618.01	0.00	0.00	0.00
65.00	0.00	1.613	618.01	0.00	0.00	0.00
67.00	0.00	1.613	618.01	0.00	0.00	0.00
69.00	0.00	1.612	618.01	0.00	0.00	0.00
71.00	0.00	1.612	618.01	0.00	0.00	0.00
73.00	0.00	1.612	618.01	0.00	0.00	0.00
75.00	0.00	1.612	618.01	0.00	0.00	0.00
77.00	0.00	1.612	618.01	0.00	0.00	0.00
79.00	0.00	1.612	618.01	0.00	0.00	0.00

Summary for Pond WD-2A: Wetland Depression_2A

Assume a broad-crested weir for the additional overflow over Long Meadow Road.

Inflow Area =	51.800 ac, 10.60% Impervious, Inflow Depth = 1.65" for 10-YEAR event
Inflow =	41.02 cfs @ 12.27 hrs, Volume= 7.107 af
Outflow =	12.11 cfs @ 13.45 hrs, Volume= 5.222 af, Atten= 70%, Lag= 71.3 min
Primary =	12.11 cfs @ 13.45 hrs, Volume= 5.222 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 589.36' @ 13.45 hrs Surf.Area= 55,963 sf Storage= 134,447 cf

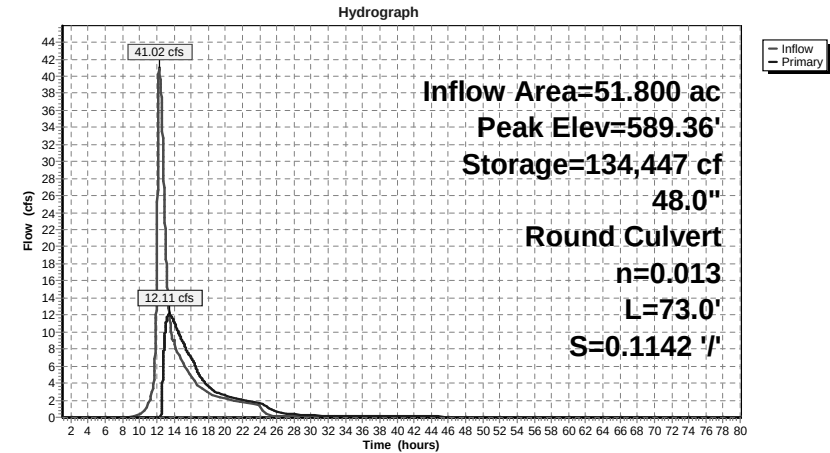
Plug-Flow detention time= 296.5 min calculated for 5.221 af (73% of inflow)
Center-of-Mass det. time= 173.3 min (1,079.4 - 906.1)

Volume	Invert	Avail.Storage	Storage Description
#1	585.00'	324,441 cf	Custom Stage Data (Prismatic) Listed below
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
585.00	0	0	0
586.00	15,950	7,975	7,975
589.00	52,400	102,525	110,500
592.00	82,504	202,356	312,856
592.14	83,000	11,585	324,441

Device	Routing	Invert	Outlet Devices
#1	Primary	588.14'	48.0" Round Culvert L= 73.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 588.14' / 579.80' S= 0.1142 '/' Cc= 0.900 n= 0.013

Primary OutFlow Max=12.11 cfs @ 13.45 hrs HW=589.36' TW=580.24' (Dynamic Tailwater)
1=Culvert (Inlet Controls 12.11 cfs @ 3.75 fps)

Pond WD-2A: Wetland Depression_2A



Proposed Conditions_DP-2

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 91

Hydrograph for Pond WD-2A: Wetland Depression_2A

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0	585.00	0.00
3.00	0.00	0	585.00	0.00
5.00	0.00	0	585.00	0.00
7.00	0.00	0	585.00	0.00
9.00	0.03	83	585.01	0.00
11.00	1.54	3,228	585.40	0.00
13.00	21.31	127,280	589.25	10.18
15.00	6.61	122,044	589.17	8.87
17.00	3.81	107,028	588.90	4.91
19.00	2.54	100,943	588.72	2.92
21.00	2.07	98,366	588.64	2.23
23.00	1.69	96,750	588.60	1.83
25.00	0.22	93,362	588.50	1.14
27.00	0.11	89,000	588.37	0.48
29.00	0.10	87,143	588.32	0.28
31.00	0.09	86,162	588.29	0.20
33.00	0.09	85,562	588.27	0.15
35.00	0.08	85,154	588.26	0.13
37.00	0.07	84,850	588.25	0.11
39.00	0.06	84,605	588.24	0.09
41.00	0.06	84,392	588.24	0.08
43.00	0.05	84,197	588.23	0.07
45.00	0.04	84,012	588.22	0.07
47.00	0.03	83,828	588.22	0.06
49.00	0.02	83,641	588.21	0.05
51.00	0.02	83,460	588.21	0.04
53.00	0.01	83,293	588.20	0.04
55.00	0.01	83,140	588.20	0.03
57.00	0.01	83,002	588.20	0.03
59.00	0.01	82,877	588.19	0.02
61.00	0.01	82,766	588.19	0.02
63.00	0.01	82,666	588.19	0.02
65.00	0.00	82,576	588.18	0.02
67.00	0.00	82,494	588.18	0.01
69.00	0.00	82,421	588.18	0.01
71.00	0.00	82,354	588.18	0.01
73.00	0.00	82,293	588.17	0.01
75.00	0.00	82,238	588.17	0.01
77.00	0.00	82,187	588.17	0.01
79.00	0.00	82,140	588.17	0.01

Proposed Conditions_DP-2

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 92

Time span=1.00-80.00 hrs, dt=0.01 hrs, 7901 points x 3

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Reach 1R: to DP-3Inflow=19.45 cfs 2.704 af
Outflow=19.45 cfs 2.704 af**Pond BR1: Bioretention-1**Peak Elev=671.56' Storage=0.049 af Inflow=18.44 cfs 1.300 af
Outflow=19.21 cfs 1.276 af**Pond BR2: Bioretention-2**Peak Elev=659.98' Storage=0.093 af Inflow=9.74 cfs 0.709 af
Outflow=8.76 cfs 0.661 af**Subcatchment DA-2A1: Drainage Area-2A1** Runoff Area=20.920 ac 0.00% Impervious Runoff Depth=4.29"
Flow Length=2,699' Tc=44.9 min CN=70 Runoff=48.95 cfs 7.484 af**Subcatchment DA-2A2: Drainage Area-2A2** Runoff Area=15.830 ac 3.68% Impervious Runoff Depth=4.52"
Flow Length=1,444' Tc=15.8 min CN=72 Runoff=62.16 cfs 5.962 af**Subcatchment DA-2A3: Drainage Area - 2A3** Runoff Area=0.744 ac 37.50% Impervious Runoff Depth=5.67"
Tc=5.0 min CN=82 Runoff=5.02 cfs 0.352 af**Subcatchment DA-2B1: Drainage Area-2B1** Runoff Area=3.210 ac 4.36% Impervious Runoff Depth=4.86"
Flow Length=346' Tc=5.7 min CN=75 Runoff=18.44 cfs 1.300 af**Subcatchment DA-2B2: Drainage Area-2B2** Runoff Area=4.470 ac 12.46% Impervious Runoff Depth=4.75"
Flow Length=300' Tc=16.4 min CN=74 Runoff=18.19 cfs 1.768 af**Subcatchment DA-2B3: Drainage Area-2B3** Runoff Area=0.750 ac 80.00% Impervious Runoff Depth=6.73"
Tc=5.0 min CN=91 Runoff=5.69 cfs 0.420 af**Subcatchment DA-2B4: Drainage Area-2B4** Runoff Area=0.866 ac 79.10% Impervious Runoff Depth=6.73"
Tc=5.0 min CN=91 Runoff=6.58 cfs 0.485 af**Subcatchment DA-2B5: Drainage Area-2B5** Runoff Area=1.310 ac 65.65% Impervious Runoff Depth=6.49"
Tc=5.0 min CN=89 Runoff=9.74 cfs 0.709 af**Subcatchment DA-2B6: Drainage Area -2B6** Runoff Area=3.700 ac 48.32% Impervious Runoff Depth=6.14"
Tc=5.0 min CN=86 Runoff=26.51 cfs 1.892 af**Reach DP-2: 48" Culvert Outlet** Avg. Flow Depth=0.91' Max Vel=25.19 fps Inflow=54.32 cfs 13.687 af
48.0" Round Pipe n=0.013 L=1.0' S=0.1100 '/' Capacity=476.41 cfs Outflow=54.32 cfs 13.687 af**Pond ND-2B: Natural Depression-2B** Peak Elev=594.87' Storage=0.578 af Inflow=18.19 cfs 1.768 af
Outflow=25.94 cfs 1.355 af**Pond UC: Underground Chambers** Peak Elev=621.44' Storage=2.078 af Inflow=65.83 cfs 4.735 af
Primary=33.18 cfs 0.420 af Secondary=19.45 cfs 2.704 af Outflow=52.62 cfs 3.123 af**Pond WD-2A: Wetland Depression_2A** Peak Elev=590.97' Storage=243.104 cf Inflow=137.00 cfs 15.572 af
48.0" Round Culvert n=0.013 L=73.0' S=0.1142 '/' Outflow=54.32 cfs 13.687 af

Total Runoff Area = 51.800 ac Runoff Volume = 20.373 af Average Runoff Depth = 4.72"

89.40% Pervious = 46.309 ac 10.60% Impervious = 5.491 ac

Summary for Reach 1R: to DP-3

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

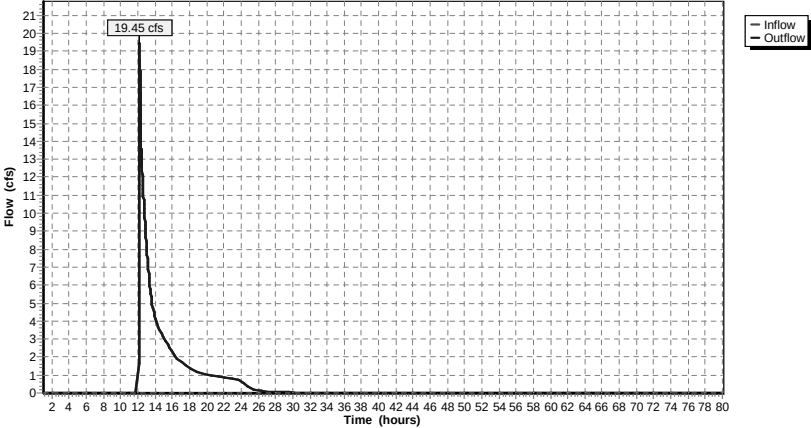
Inflow = 19.45 cfs @ 12.18 hrs, Volume= 2.704 af

Outflow = 19.45 cfs @ 12.18 hrs, Volume= 2.704 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs / 3

Reach 1R: to DP-3

Hydrograph



Proposed Conditions_DP-2

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 95

Hydrograph for Reach 1R: to DP-3

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
1.00	0.00		0.00	53.00	0.00		0.00
2.00	0.00		0.00	54.00	0.00		0.00
3.00	0.00		0.00	55.00	0.00		0.00
4.00	0.00		0.00	56.00	0.00		0.00
5.00	0.00		0.00	57.00	0.00		0.00
6.00	0.00		0.00	58.00	0.00		0.00
7.00	0.00		0.00	59.00	0.00		0.00
8.00	0.00		0.00	60.00	0.00		0.00
9.00	0.00		0.00	61.00	0.00		0.00
10.00	0.00		0.00	62.00	0.00		0.00
11.00	0.00		0.00	63.00	0.00		0.00
12.00	0.00		0.00	64.00	0.00		0.00
13.00	8.22		8.22	65.00	0.00		0.00
14.00	4.22		4.22	66.00	0.00		0.00
15.00	3.07		3.07	67.00	0.00		0.00
16.00	2.28		2.28	68.00	0.00		0.00
17.00	1.75		1.75	69.00	0.00		0.00
18.00	1.39		1.39	70.00	0.00		0.00
19.00	1.16		1.16	71.00	0.00		0.00
20.00	1.03		1.03	72.00	0.00		0.00
21.00	0.94		0.94	73.00	0.00		0.00
22.00	0.85		0.85	74.00	0.00		0.00
23.00	0.77		0.77	75.00	0.00		0.00
24.00	0.69		0.69	76.00	0.00		0.00
25.00	0.28		0.28	77.00	0.00		0.00
26.00	0.14		0.14	78.00	0.00		0.00
27.00	0.08		0.08	79.00	0.00		0.00
28.00	0.05		0.05	80.00	0.00		0.00
29.00	0.04		0.04				
30.00	0.03		0.03				
31.00	0.02		0.02				
32.00	0.02		0.02				
33.00	0.01		0.01				
34.00	0.01		0.01				
35.00	0.01		0.01				
36.00	0.01		0.01				
37.00	0.01		0.01				
38.00	0.01		0.01				
39.00	0.01		0.01				
40.00	0.01		0.01				
41.00	0.00		0.00				
42.00	0.00		0.00				
43.00	0.00		0.00				
44.00	0.00		0.00				
45.00	0.00		0.00				
46.00	0.00		0.00				
47.00	0.00		0.00				
48.00	0.00		0.00				
49.00	0.00		0.00				
50.00	0.00		0.00				
51.00	0.00		0.00				
52.00	0.00		0.00				

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 96

Summary for Pond BR1: Bioretention-1

[93] Warning: Storage range exceeded by 1.56'

[90] Warning: Qout>Qin may require Finer Routing or smaller dt

[87] Warning: Oscillations may require Finer Routing or smaller dt

Inflow Area = 3.210 ac, 4.36% Impervious, Inflow Depth = 4.86" for 100-YEAR event
 Inflow = 18.44 cfs @ 12.08 hrs, Volume= 1.300 af
 Outflow = 19.21 cfs @ 12.09 hrs, Volume= 1.276 af, Atten= 0%, Lag= 0.4 min
 Primary = 19.21 cfs @ 12.09 hrs, Volume= 1.276 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 671.56' @ 12.09 hrs Surf.Area= 0.049 ac Storage= 0.049 af

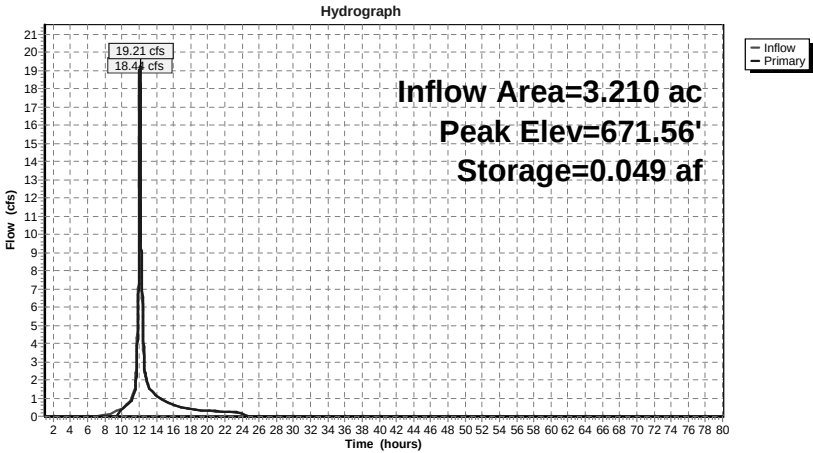
Plug-Flow detention time= 20.1 min calculated for 1.276 af (98% of inflow)
 Center-of-Mass det. time= 8.8 min (823.7 - 814.9)

Volume	Invert	Avail.Storage	Storage Description
#1	669.00'	0.049 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
669.00	0.049	0.000	0.000
670.00	0.049	0.049	0.049

Device	Routing	Invert	Outlet Devices
#1	Primary	669.50'	1.0" x 1.0" Horiz. Orifice/Grate X 20.00 columns X 20 rows C= 0.600 in 24.0" x 24.0" Grate Limited to weir flow at low heads

Primary OutFlow Max=19.12 cfs @ 12.09 hrs HW=671.54' TW=618.54' (Dynamic Tailwater)
 ↳ **1=Orifice/Grate** (Orifice Controls 19.12 cfs @ 6.88 fps)

Pond BR1: Bioretention-1



Hydrograph for Pond BR1: Bioretention-1

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0.000	669.00	0.00
3.00	0.00	0.000	669.00	0.00
5.00	0.00	0.000	669.00	0.00
7.00	0.01	0.000	669.00	0.00
9.00	0.20	0.014	669.29	0.00
11.00	0.84	0.029	669.60	0.81
13.00	1.73	0.033	669.67	1.80
15.00	0.85	0.030	669.60	0.86
17.00	0.48	0.028	669.57	0.48
19.00	0.33	0.027	669.55	0.33
21.00	0.27	0.027	669.55	0.27
23.00	0.22	0.027	669.54	0.22
25.00	0.00	0.025	669.50	0.00
27.00	0.00	0.025	669.50	0.00
29.00	0.00	0.025	669.50	0.00
31.00	0.00	0.025	669.50	0.00
33.00	0.00	0.025	669.50	0.00
35.00	0.00	0.025	669.50	0.00
37.00	0.00	0.025	669.50	0.00
39.00	0.00	0.025	669.50	0.00
41.00	0.00	0.025	669.50	0.00
43.00	0.00	0.025	669.50	0.00
45.00	0.00	0.025	669.50	0.00
47.00	0.00	0.025	669.50	0.00
49.00	0.00	0.025	669.50	0.00
51.00	0.00	0.025	669.50	0.00
53.00	0.00	0.025	669.50	0.00
55.00	0.00	0.025	669.50	0.00
57.00	0.00	0.025	669.50	0.00
59.00	0.00	0.025	669.50	0.00
61.00	0.00	0.025	669.50	0.00
63.00	0.00	0.025	669.50	0.00
65.00	0.00	0.025	669.50	0.00
67.00	0.00	0.025	669.50	0.00
69.00	0.00	0.025	669.50	0.00
71.00	0.00	0.025	669.50	0.00
73.00	0.00	0.025	669.50	0.00
75.00	0.00	0.025	669.50	0.00
77.00	0.00	0.025	669.50	0.00
79.00	0.00	0.025	669.50	0.00

Summary for Pond BR2: Bioretention-2

Inflow Area = 1.310 ac, 65.65% Impervious, Inflow Depth = 6.49" for 100-YEAR event
Inflow = 9.74 cfs @ 12.07 hrs, Volume= 0.709 af
Outflow = 8.76 cfs @ 12.11 hrs, Volume= 0.661 af, Atten= 10%, Lag= 2.2 min
Primary = 8.76 cfs @ 12.11 hrs, Volume= 0.661 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 659.98' @ 12.11 hrs Surf.Area= 0.095 ac Storage= 0.093 af

Plug-Flow detention time= 66.9 min calculated for 0.661 af (93% of inflow)
Center-of-Mass det. time= 30.9 min (809.8 - 778.9)

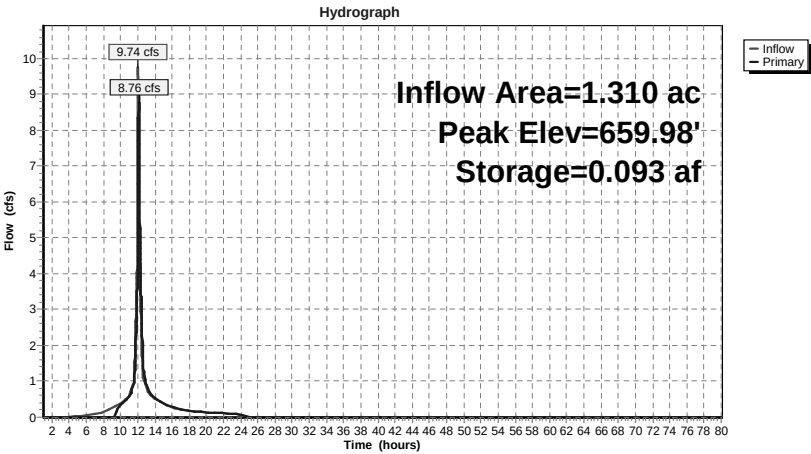
Volume	Invert	Avail.Storage	Storage Description
#1	659.00'	0.095 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
659.00	0.095	0.000	0.000
660.00	0.095	0.095	0.095

Device	Routing	Invert	Outlet Devices
#1	Primary	659.50'	1.0" x 1.0" Horiz. Orifice/Grate X 20.00 columns X 20 rows C= 0.600 in 24.0" x 24.0" Grate Limited to weir flow at low heads

Primary OutFlow Max=8.75 cfs @ 12.11 hrs HW=659.98' TW=618.90' (Dynamic Tailwater)
1=Orifice/Grate (Weir Controls 8.75 cfs @ 2.27 fps)

Pond BR2: Bioretention-2



Proposed Conditions_DP-2

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 101

Hydrograph for Pond BR2: Bioretention-2

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0.000	659.00	0.00
3.00	0.00	0.000	659.00	0.00
5.00	0.04	0.003	659.03	0.00
7.00	0.10	0.013	659.14	0.00
9.00	0.25	0.039	659.41	0.00
11.00	0.60	0.055	659.58	0.57
13.00	0.80	0.057	659.60	0.88
15.00	0.39	0.053	659.56	0.40
17.00	0.22	0.051	659.54	0.22
19.00	0.15	0.051	659.53	0.15
21.00	0.12	0.050	659.53	0.12
23.00	0.10	0.050	659.52	0.10
25.00	0.00	0.048	659.50	0.01
27.00	0.00	0.048	659.50	0.00
29.00	0.00	0.048	659.50	0.00
31.00	0.00	0.048	659.50	0.00
33.00	0.00	0.048	659.50	0.00
35.00	0.00	0.048	659.50	0.00
37.00	0.00	0.048	659.50	0.00
39.00	0.00	0.048	659.50	0.00
41.00	0.00	0.048	659.50	0.00
43.00	0.00	0.048	659.50	0.00
45.00	0.00	0.048	659.50	0.00
47.00	0.00	0.048	659.50	0.00
49.00	0.00	0.048	659.50	0.00
51.00	0.00	0.048	659.50	0.00
53.00	0.00	0.048	659.50	0.00
55.00	0.00	0.048	659.50	0.00
57.00	0.00	0.048	659.50	0.00
59.00	0.00	0.048	659.50	0.00
61.00	0.00	0.048	659.50	0.00
63.00	0.00	0.048	659.50	0.00
65.00	0.00	0.048	659.50	0.00
67.00	0.00	0.048	659.50	0.00
69.00	0.00	0.048	659.50	0.00
71.00	0.00	0.048	659.50	0.00
73.00	0.00	0.048	659.50	0.00
75.00	0.00	0.048	659.50	0.00
77.00	0.00	0.048	659.50	0.00
79.00	0.00	0.048	659.50	0.00

Proposed Conditions_DP-2

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 102

Summary for Subcatchment DA-2A1: Drainage Area-2A1

Runoff = 48.95 cfs @ 12.62 hrs, Volume= 7.484 af, Depth= 4.29"

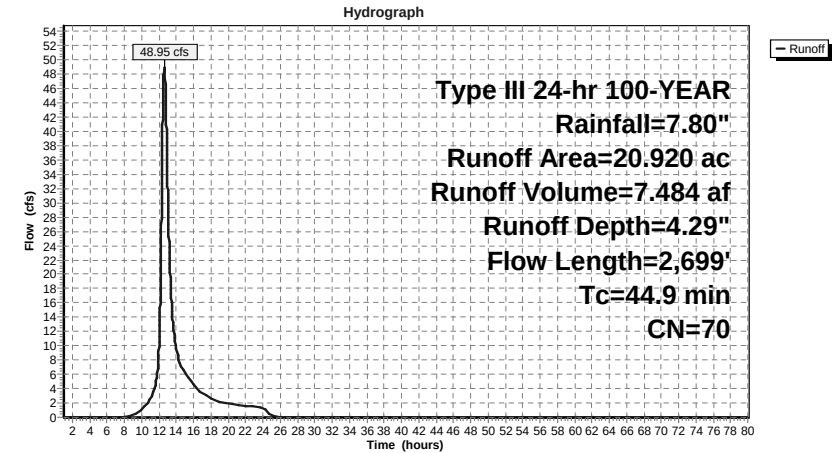
Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
0.910	65	Brush, Good, HSG C
18.990	70	Woods, Good, HSG C
1.020	74	>75% Grass cover, Good, HSG C
20.920	70	Weighted Average
20.920		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.0	95	0.0400	0.06		Sheet Flow, circle Woods: Dense underbrush n= 0.800 P2= 3.50"
16.6	830	0.1110	0.83		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
0.4	225	0.0140	8.44	75.92	Channel Flow, Area= 9.0 sf Perim= 8.3' r= 1.08' n= 0.022 Earth, clean & straight
0.2	375	0.1230	40.09	503.78	Pipe Channel, 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.013
0.1	280	0.1210	60.79	71,307.97	Channel Flow, Area= 1,173.0 sf Perim= 177.0' r= 6.63' n= 0.030 Earth, grassed & winding
0.3	104	0.0980	6.38	395.30	Channel Flow, Area= 62.0 sf Perim= 54.0' r= 1.15' n= 0.080 Earth, long dense weeds
1.3	790	0.0350	10.05	422.20	Channel Flow, Area= 42.0 sf Perim= 29.5' r= 1.42' n= 0.035 Earth, dense weeds
44.9	2,699	Total			

Subcatchment DA-2A1: Drainage Area-2A1



Hydrograph for Subcatchment DA-2A1: Drainage Area-2A1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.08	0.00	0.00	53.00	7.80	4.29	0.00
2.00	0.16	0.00	0.00	54.00	7.80	4.29	0.00
3.00	0.24	0.00	0.00	55.00	7.80	4.29	0.00
4.00	0.34	0.00	0.00	56.00	7.80	4.29	0.00
5.00	0.44	0.00	0.00	57.00	7.80	4.29	0.00
6.00	0.56	0.00	0.00	58.00	7.80	4.29	0.00
7.00	0.71	0.00	0.00	59.00	7.80	4.29	0.00
8.00	0.89	0.00	0.00	60.00	7.80	4.29	0.00
9.00	1.14	0.02	0.25	61.00	7.80	4.29	0.00
10.00	1.47	0.08	1.07	62.00	7.80	4.29	0.00
11.00	1.95	0.22	2.62	63.00	7.80	4.29	0.00
12.00	3.90	1.26	10.02	64.00	7.80	4.29	0.00
13.00	5.85	2.69	32.28	65.00	7.80	4.29	0.00
14.00	6.33	3.07	9.57	66.00	7.80	4.29	0.00
15.00	6.66	3.34	6.15	67.00	7.80	4.29	0.00
16.00	6.91	3.54	4.60	68.00	7.80	4.29	0.00
17.00	7.09	3.70	3.38	69.00	7.80	4.29	0.00
18.00	7.24	3.82	2.68	70.00	7.80	4.29	0.00
19.00	7.36	3.92	2.17	71.00	7.80	4.29	0.00
20.00	7.46	4.01	1.95	72.00	7.80	4.29	0.00
21.00	7.56	4.09	1.77	73.00	7.80	4.29	0.00
22.00	7.65	4.16	1.61	74.00	7.80	4.29	0.00
23.00	7.73	4.23	1.46	75.00	7.80	4.29	0.00
24.00	7.80	4.29	1.30	76.00	7.80	4.29	0.00
25.00	7.80	4.29	0.19	77.00	7.80	4.29	0.00
26.00	7.80	4.29	0.01	78.00	7.80	4.29	0.00
27.00	7.80	4.29	0.00	79.00	7.80	4.29	0.00
28.00	7.80	4.29	0.00	80.00	7.80	4.29	0.00
29.00	7.80	4.29	0.00				
30.00	7.80	4.29	0.00				
31.00	7.80	4.29	0.00				
32.00	7.80	4.29	0.00				
33.00	7.80	4.29	0.00				
34.00	7.80	4.29	0.00				
35.00	7.80	4.29	0.00				
36.00	7.80	4.29	0.00				
37.00	7.80	4.29	0.00				
38.00	7.80	4.29	0.00				
39.00	7.80	4.29	0.00				
40.00	7.80	4.29	0.00				
41.00	7.80	4.29	0.00				
42.00	7.80	4.29	0.00				
43.00	7.80	4.29	0.00				
44.00	7.80	4.29	0.00				
45.00	7.80	4.29	0.00				
46.00	7.80	4.29	0.00				
47.00	7.80	4.29	0.00				
48.00	7.80	4.29	0.00				
49.00	7.80	4.29	0.00				
50.00	7.80	4.29	0.00				
51.00	7.80	4.29	0.00				
52.00	7.80	4.29	0.00				

Summary for Subcatchment DA-2A2: Drainage Area-2A2

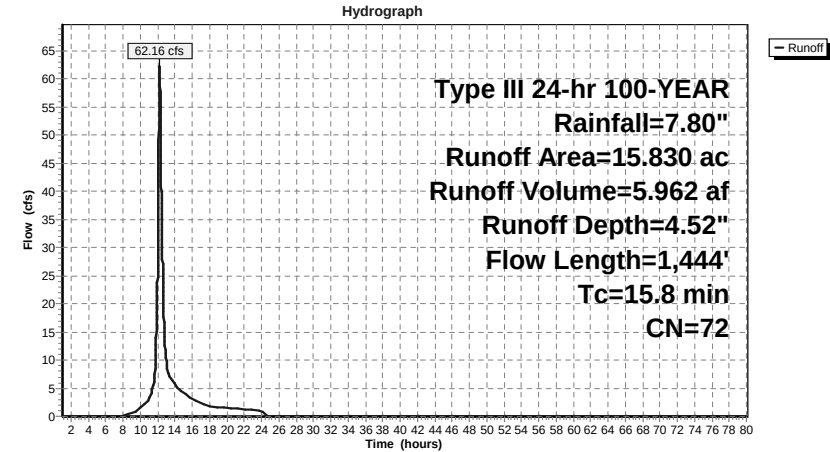
Runoff = 62.16 cfs @ 12.22 hrs, Volume= 5.962 af, Depth= 4.52"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
12.533	70	Woods, Good, HSG C
* 2.715	74	Woods/grass comb., Good, HSG C
* 0.582	98	Pavement & Roofs, HSG C
15.830	72	Weighted Average
15.248		96.32% Pervious Area
0.582		3.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.1000	0.15		Sheet Flow, n= 0.400 P2= 3.50"
2.5	230	0.0960	1.55		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.9	220	0.0180	4.17	41.73	Channel Flow, Area= 10.0 sf Perim= 20.1' r= 0.50' n= 0.030 Earth, grassed & winding
0.3	104	0.0980	6.38	395.30	Channel Flow, Area= 62.0 sf Perim= 54.0' r= 1.15' n= 0.080 Earth, long dense weeds
1.3	790	0.0350	10.05	422.20	Channel Flow, Area= 42.0 sf Perim= 29.5' r= 1.42' n= 0.035
15.8	1,444	Total			

Subcatchment DA-2A2: Drainage Area-2A2



Proposed Conditions_DP-2

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 107

Hydrograph for Subcatchment DA-2A2: Drainage Area-2A2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.08	0.00	0.00	53.00	7.80	4.52	0.00
2.00	0.16	0.00	0.00	54.00	7.80	4.52	0.00
3.00	0.24	0.00	0.00	55.00	7.80	4.52	0.00
4.00	0.34	0.00	0.00	56.00	7.80	4.52	0.00
5.00	0.44	0.00	0.00	57.00	7.80	4.52	0.00
6.00	0.56	0.00	0.00	58.00	7.80	4.52	0.00
7.00	0.71	0.00	0.00	59.00	7.80	4.52	0.00
8.00	0.89	0.00	0.10	60.00	7.80	4.52	0.00
9.00	1.14	0.03	0.58	61.00	7.80	4.52	0.00
10.00	1.47	0.11	1.45	62.00	7.80	4.52	0.00
11.00	1.95	0.27	3.16	63.00	7.80	4.52	0.00
12.00	3.90	1.39	25.76	64.00	7.80	4.52	0.00
13.00	5.85	2.87	9.83	65.00	7.80	4.52	0.00
14.00	6.33	3.26	5.64	66.00	7.80	4.52	0.00
15.00	6.66	3.54	4.21	67.00	7.80	4.52	0.00
16.00	6.91	3.75	3.04	68.00	7.80	4.52	0.00
17.00	7.09	3.91	2.36	69.00	7.80	4.52	0.00
18.00	7.24	4.03	1.84	70.00	7.80	4.52	0.00
19.00	7.36	4.14	1.59	71.00	7.80	4.52	0.00
20.00	7.46	4.23	1.44	72.00	7.80	4.52	0.00
21.00	7.56	4.31	1.31	73.00	7.80	4.52	0.00
22.00	7.65	4.39	1.19	74.00	7.80	4.52	0.00
23.00	7.73	4.46	1.07	75.00	7.80	4.52	0.00
24.00	7.80	4.52	0.95	76.00	7.80	4.52	0.00
25.00	7.80	4.52	0.00	77.00	7.80	4.52	0.00
26.00	7.80	4.52	0.00	78.00	7.80	4.52	0.00
27.00	7.80	4.52	0.00	79.00	7.80	4.52	0.00
28.00	7.80	4.52	0.00	80.00	7.80	4.52	0.00
29.00	7.80	4.52	0.00				
30.00	7.80	4.52	0.00				
31.00	7.80	4.52	0.00				
32.00	7.80	4.52	0.00				
33.00	7.80	4.52	0.00				
34.00	7.80	4.52	0.00				
35.00	7.80	4.52	0.00				
36.00	7.80	4.52	0.00				
37.00	7.80	4.52	0.00				
38.00	7.80	4.52	0.00				
39.00	7.80	4.52	0.00				
40.00	7.80	4.52	0.00				
41.00	7.80	4.52	0.00				
42.00	7.80	4.52	0.00				
43.00	7.80	4.52	0.00				
44.00	7.80	4.52	0.00				
45.00	7.80	4.52	0.00				
46.00	7.80	4.52	0.00				
47.00	7.80	4.52	0.00				
48.00	7.80	4.52	0.00				
49.00	7.80	4.52	0.00				
50.00	7.80	4.52	0.00				
51.00	7.80	4.52	0.00				
52.00	7.80	4.52	0.00				

Proposed Conditions_DP-2

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 108

Summary for Subcatchment DA-2A3: Drainage Area - 2A3

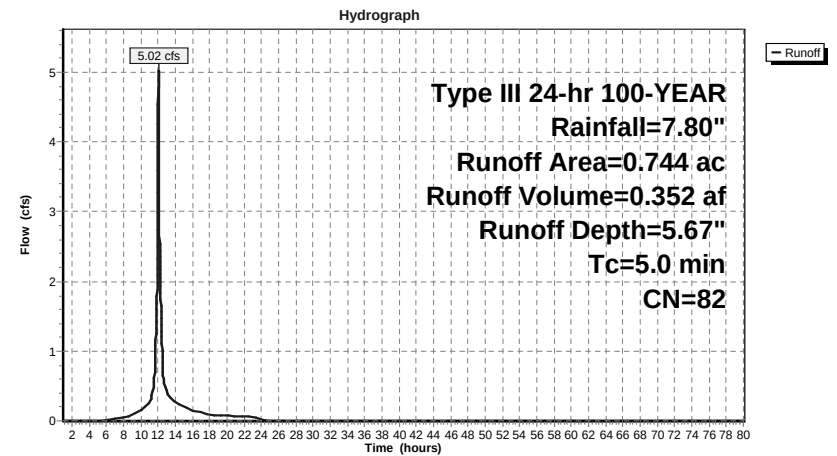
Runoff = 5.02 cfs @ 12.07 hrs, Volume= 0.352 af, Depth= 5.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
0.279	98	Paved parking, HSG C
0.465	72	Woods/grass comb., Good, HSG C
0.744	82	Weighted Average
0.465		62.50% Pervious Area
0.279		37.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, User Defined Min.

Subcatchment DA-2A3: Drainage Area - 2A3

Proposed Conditions_DP-2

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 109

Hydrograph for Subcatchment DA-2A3: Drainage Area - 2A3

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.08	0.00	0.00	53.00	7.80	5.67	0.00
2.00	0.16	0.00	0.00	54.00	7.80	5.67	0.00
3.00	0.24	0.00	0.00	55.00	7.80	5.67	0.00
4.00	0.34	0.00	0.00	56.00	7.80	5.67	0.00
5.00	0.44	0.00	0.00	57.00	7.80	5.67	0.00
6.00	0.56	0.01	0.01	58.00	7.80	5.67	0.00
7.00	0.71	0.03	0.02	59.00	7.80	5.67	0.00
8.00	0.89	0.08	0.05	60.00	7.80	5.67	0.00
9.00	1.14	0.17	0.09	61.00	7.80	5.67	0.00
10.00	1.47	0.33	0.15	62.00	7.80	5.67	0.00
11.00	1.95	0.62	0.27	63.00	7.80	5.67	0.00
12.00	3.90	2.12	3.28	64.00	7.80	5.67	0.00
13.00	5.85	3.85	0.43	65.00	7.80	5.67	0.00
14.00	6.33	4.29	0.28	66.00	7.80	5.67	0.00
15.00	6.66	4.60	0.21	67.00	7.80	5.67	0.00
16.00	6.91	4.83	0.15	68.00	7.80	5.67	0.00
17.00	7.09	5.00	0.12	69.00	7.80	5.67	0.00
18.00	7.24	5.14	0.09	70.00	7.80	5.67	0.00
19.00	7.36	5.25	0.08	71.00	7.80	5.67	0.00
20.00	7.46	5.35	0.07	72.00	7.80	5.67	0.00
21.00	7.56	5.44	0.07	73.00	7.80	5.67	0.00
22.00	7.65	5.53	0.06	74.00	7.80	5.67	0.00
23.00	7.73	5.60	0.05	75.00	7.80	5.67	0.00
24.00	7.80	5.67	0.05	76.00	7.80	5.67	0.00
25.00	7.80	5.67	0.00	77.00	7.80	5.67	0.00
26.00	7.80	5.67	0.00	78.00	7.80	5.67	0.00
27.00	7.80	5.67	0.00	79.00	7.80	5.67	0.00
28.00	7.80	5.67	0.00	80.00	7.80	5.67	0.00
29.00	7.80	5.67	0.00				
30.00	7.80	5.67	0.00				
31.00	7.80	5.67	0.00				
32.00	7.80	5.67	0.00				
33.00	7.80	5.67	0.00				
34.00	7.80	5.67	0.00				
35.00	7.80	5.67	0.00				
36.00	7.80	5.67	0.00				
37.00	7.80	5.67	0.00				
38.00	7.80	5.67	0.00				
39.00	7.80	5.67	0.00				
40.00	7.80	5.67	0.00				
41.00	7.80	5.67	0.00				
42.00	7.80	5.67	0.00				
43.00	7.80	5.67	0.00				
44.00	7.80	5.67	0.00				
45.00	7.80	5.67	0.00				
46.00	7.80	5.67	0.00				
47.00	7.80	5.67	0.00				
48.00	7.80	5.67	0.00				
49.00	7.80	5.67	0.00				
50.00	7.80	5.67	0.00				
51.00	7.80	5.67	0.00				
52.00	7.80	5.67	0.00				

Proposed Conditions_DP-2

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 110

Summary for Subcatchment DA-2B1: Drainage Area-2B1

Runoff = 18.44 cfs @ 12.08 hrs, Volume= 1.300 af, Depth= 4.86"

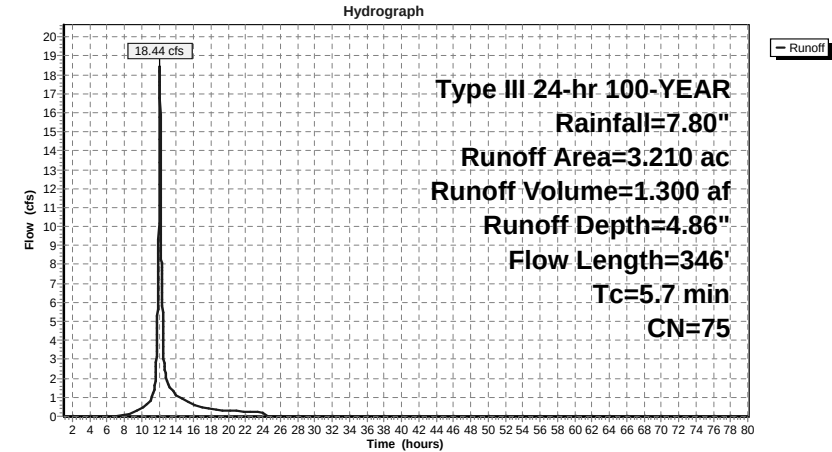
Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
0.140	98	Paved parking, HSG C
2.710	74	>75% Grass cover, Good, HSG C
* 0.050	61	Bioretention Sand Soil Medium, HSG C
* 0.310	74	Porous Asphalt
3.210	75	Weighted Average
3.070		95.64% Pervious Area
0.140		4.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	100	0.2100	0.31		Sheet Flow, Grass: Dense n= 0.240 P2= 3.50"
0.1	18	0.2100	3.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	93	0.0650	14.22	142.21	Channel Flow, Area= 10.0 sf Perim= 11.0' r= 0.91' n= 0.025 Earth, clean & winding
0.2	135	0.0440	12.47	22.03	Pipe Channel, 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
5.7	346	Total			

Subcatchment DA-2B1: Drainage Area-2B1



Hydrograph for Subcatchment DA-2B1: Drainage Area-2B1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.08	0.00	0.00	53.00	7.80	4.86	0.00
2.00	0.16	0.00	0.00	54.00	7.80	4.86	0.00
3.00	0.24	0.00	0.00	55.00	7.80	4.86	0.00
4.00	0.34	0.00	0.00	56.00	7.80	4.86	0.00
5.00	0.44	0.00	0.00	57.00	7.80	4.86	0.00
6.00	0.56	0.00	0.00	58.00	7.80	4.86	0.00
7.00	0.71	0.00	0.01	59.00	7.80	4.86	0.00
8.00	0.89	0.01	0.07	60.00	7.80	4.86	0.00
9.00	1.14	0.06	0.20	61.00	7.80	4.86	0.00
10.00	1.47	0.16	0.41	62.00	7.80	4.86	0.00
11.00	1.95	0.36	0.84	63.00	7.80	4.86	0.00
12.00	3.90	1.59	11.13	64.00	7.80	4.86	0.00
13.00	5.85	3.15	1.73	65.00	7.80	4.86	0.00
14.00	6.33	3.56	1.11	66.00	7.80	4.86	0.00
15.00	6.66	3.85	0.85	67.00	7.80	4.86	0.00
16.00	6.91	4.07	0.60	68.00	7.80	4.86	0.00
17.00	7.09	4.23	0.48	69.00	7.80	4.86	0.00
18.00	7.24	4.36	0.37	70.00	7.80	4.86	0.00
19.00	7.36	4.47	0.33	71.00	7.80	4.86	0.00
20.00	7.46	4.56	0.30	72.00	7.80	4.86	0.00
21.00	7.56	4.65	0.27	73.00	7.80	4.86	0.00
22.00	7.65	4.73	0.25	74.00	7.80	4.86	0.00
23.00	7.73	4.80	0.22	75.00	7.80	4.86	0.00
24.00	7.80	4.86	0.20	76.00	7.80	4.86	0.00
25.00	7.80	4.86	0.00	77.00	7.80	4.86	0.00
26.00	7.80	4.86	0.00	78.00	7.80	4.86	0.00
27.00	7.80	4.86	0.00	79.00	7.80	4.86	0.00
28.00	7.80	4.86	0.00	80.00	7.80	4.86	0.00
29.00	7.80	4.86	0.00				
30.00	7.80	4.86	0.00				
31.00	7.80	4.86	0.00				
32.00	7.80	4.86	0.00				
33.00	7.80	4.86	0.00				
34.00	7.80	4.86	0.00				
35.00	7.80	4.86	0.00				
36.00	7.80	4.86	0.00				
37.00	7.80	4.86	0.00				
38.00	7.80	4.86	0.00				
39.00	7.80	4.86	0.00				
40.00	7.80	4.86	0.00				
41.00	7.80	4.86	0.00				
42.00	7.80	4.86	0.00				
43.00	7.80	4.86	0.00				
44.00	7.80	4.86	0.00				
45.00	7.80	4.86	0.00				
46.00	7.80	4.86	0.00				
47.00	7.80	4.86	0.00				
48.00	7.80	4.86	0.00				
49.00	7.80	4.86	0.00				
50.00	7.80	4.86	0.00				
51.00	7.80	4.86	0.00				
52.00	7.80	4.86	0.00				

Proposed Conditions_DP-2

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 113

Summary for Subcatchment DA-2B2: Drainage Area-2B2

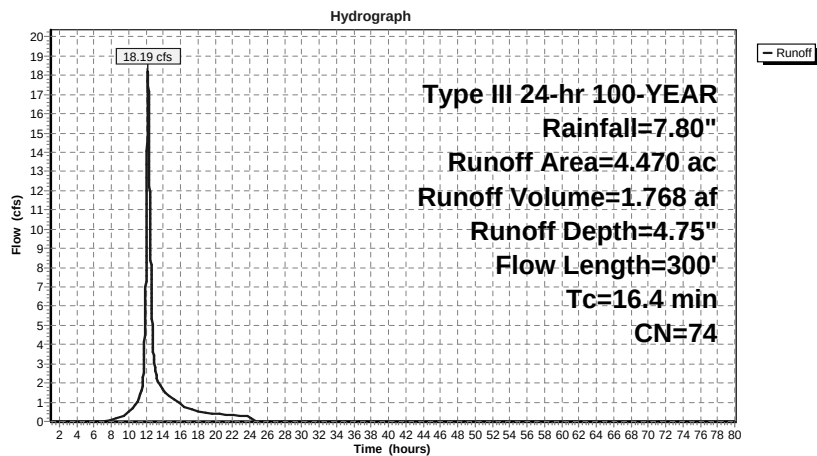
Runoff = 18.19 cfs @ 12.23 hrs, Volume= 1.768 af, Depth= 4.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
* 1.262	73	Woods/grass comb., Good, HSG C
2.384	70	Woods, Good, HSG C
0.557	98	Paved roads , HSG C
0.267	65	Brush, Good, HSG C
4.470	74	Weighted Average
3.913		87.54% Pervious Area
0.557		12.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0500	0.12		Sheet Flow, n= 0.400 P2= 3.50"
2.2	200	0.0900	1.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
16.4	300	Total			

Subcatchment DA-2B2: Drainage Area-2B2**Proposed Conditions_DP-2**

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 114

Hydrograph for Subcatchment DA-2B2: Drainage Area-2B2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.08	0.00	0.00	53.00	7.80	4.75	0.00
2.00	0.16	0.00	0.00	54.00	7.80	4.75	0.00
3.00	0.24	0.00	0.00	55.00	7.80	4.75	0.00
4.00	0.34	0.00	0.00	56.00	7.80	4.75	0.00
5.00	0.44	0.00	0.00	57.00	7.80	4.75	0.00
6.00	0.56	0.00	0.00	58.00	7.80	4.75	0.00
7.00	0.71	0.00	0.00	59.00	7.80	4.75	0.00
8.00	0.89	0.01	0.06	60.00	7.80	4.75	0.00
9.00	1.14	0.05	0.22	61.00	7.80	4.75	0.00
10.00	1.47	0.14	0.48	62.00	7.80	4.75	0.00
11.00	1.95	0.33	0.99	63.00	7.80	4.75	0.00
12.00	3.90	1.52	7.56	64.00	7.80	4.75	0.00
13.00	5.85	3.06	2.91	65.00	7.80	4.75	0.00
14.00	6.33	3.46	1.64	66.00	7.80	4.75	0.00
15.00	6.66	3.75	1.22	67.00	7.80	4.75	0.00
16.00	6.91	3.96	0.88	68.00	7.80	4.75	0.00
17.00	7.09	4.12	0.68	69.00	7.80	4.75	0.00
18.00	7.24	4.25	0.53	70.00	7.80	4.75	0.00
19.00	7.36	4.36	0.46	71.00	7.80	4.75	0.00
20.00	7.46	4.45	0.42	72.00	7.80	4.75	0.00
21.00	7.56	4.54	0.38	73.00	7.80	4.75	0.00
22.00	7.65	4.61	0.34	74.00	7.80	4.75	0.00
23.00	7.73	4.68	0.31	75.00	7.80	4.75	0.00
24.00	7.80	4.75	0.28	76.00	7.80	4.75	0.00
25.00	7.80	4.75	0.00	77.00	7.80	4.75	0.00
26.00	7.80	4.75	0.00	78.00	7.80	4.75	0.00
27.00	7.80	4.75	0.00	79.00	7.80	4.75	0.00
28.00	7.80	4.75	0.00	80.00	7.80	4.75	0.00
29.00	7.80	4.75	0.00				
30.00	7.80	4.75	0.00				
31.00	7.80	4.75	0.00				
32.00	7.80	4.75	0.00				
33.00	7.80	4.75	0.00				
34.00	7.80	4.75	0.00				
35.00	7.80	4.75	0.00				
36.00	7.80	4.75	0.00				
37.00	7.80	4.75	0.00				
38.00	7.80	4.75	0.00				
39.00	7.80	4.75	0.00				
40.00	7.80	4.75	0.00				
41.00	7.80	4.75	0.00				
42.00	7.80	4.75	0.00				
43.00	7.80	4.75	0.00				
44.00	7.80	4.75	0.00				
45.00	7.80	4.75	0.00				
46.00	7.80	4.75	0.00				
47.00	7.80	4.75	0.00				
48.00	7.80	4.75	0.00				
49.00	7.80	4.75	0.00				
50.00	7.80	4.75	0.00				
51.00	7.80	4.75	0.00				
52.00	7.80	4.75	0.00				

Proposed Conditions_DP-2

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 115

Summary for Subcatchment DA-2B3: Drainage Area-2B3

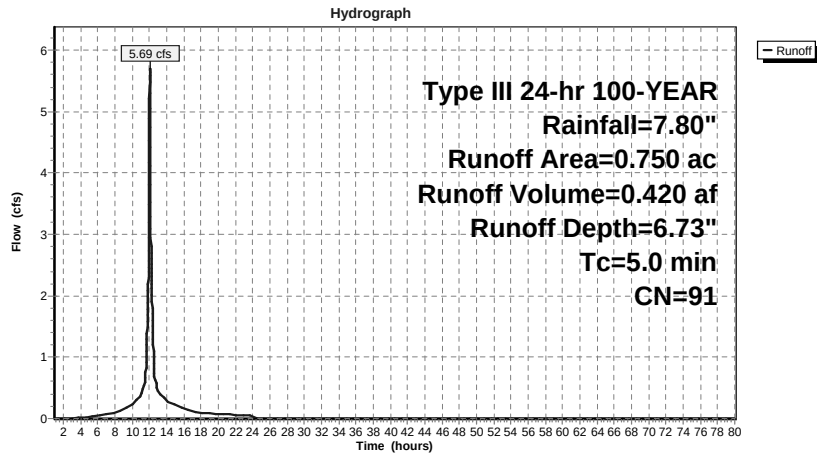
Runoff = 5.69 cfs @ 12.07 hrs, Volume= 0.420 af, Depth= 6.73"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
0.600	98	Unconnected roofs, HSG C
* 0.089	60	Storm Planter
* 0.061	68	Green Roof
0.750	91	Weighted Average
0.150		20.00% Pervious Area
0.600		80.00% Impervious Area
0.600		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, User Def Min.

Subcatchment DA-2B3: Drainage Area-2B3**Proposed Conditions_DP-2**

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 116

Hydrograph for Subcatchment DA-2B3: Drainage Area-2B3

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.08	0.00	0.00	53.00	7.80	6.73	0.00
2.00	0.16	0.00	0.00	54.00	7.80	6.73	0.00
3.00	0.24	0.00	0.00	55.00	7.80	6.73	0.00
4.00	0.34	0.02	0.02	56.00	7.80	6.73	0.00
5.00	0.44	0.05	0.03	57.00	7.80	6.73	0.00
6.00	0.56	0.10	0.04	58.00	7.80	6.73	0.00
7.00	0.71	0.17	0.07	59.00	7.80	6.73	0.00
8.00	0.89	0.28	0.10	60.00	7.80	6.73	0.00
9.00	1.14	0.46	0.16	61.00	7.80	6.73	0.00
10.00	1.47	0.72	0.23	62.00	7.80	6.73	0.00
11.00	1.95	1.12	0.36	63.00	7.80	6.73	0.00
12.00	3.90	2.92	3.81	64.00	7.80	6.73	0.00
13.00	5.85	4.81	0.46	65.00	7.80	6.73	0.00
14.00	6.33	5.28	0.29	66.00	7.80	6.73	0.00
15.00	6.66	5.61	0.22	67.00	7.80	6.73	0.00
16.00	6.91	5.85	0.16	68.00	7.80	6.73	0.00
17.00	7.09	6.03	0.12	69.00	7.80	6.73	0.00
18.00	7.24	6.17	0.10	70.00	7.80	6.73	0.00
19.00	7.36	6.29	0.08	71.00	7.80	6.73	0.00
20.00	7.46	6.40	0.08	72.00	7.80	6.73	0.00
21.00	7.56	6.49	0.07	73.00	7.80	6.73	0.00
22.00	7.65	6.58	0.06	74.00	7.80	6.73	0.00
23.00	7.73	6.66	0.06	75.00	7.80	6.73	0.00
24.00	7.80	6.73	0.05	76.00	7.80	6.73	0.00
25.00	7.80	6.73	0.00	77.00	7.80	6.73	0.00
26.00	7.80	6.73	0.00	78.00	7.80	6.73	0.00
27.00	7.80	6.73	0.00	79.00	7.80	6.73	0.00
28.00	7.80	6.73	0.00	80.00	7.80	6.73	0.00
29.00	7.80	6.73	0.00				
30.00	7.80	6.73	0.00				
31.00	7.80	6.73	0.00				
32.00	7.80	6.73	0.00				
33.00	7.80	6.73	0.00				
34.00	7.80	6.73	0.00				
35.00	7.80	6.73	0.00				
36.00	7.80	6.73	0.00				
37.00	7.80	6.73	0.00				
38.00	7.80	6.73	0.00				
39.00	7.80	6.73	0.00				
40.00	7.80	6.73	0.00				
41.00	7.80	6.73	0.00				
42.00	7.80	6.73	0.00				
43.00	7.80	6.73	0.00				
44.00	7.80	6.73	0.00				
45.00	7.80	6.73	0.00				
46.00	7.80	6.73	0.00				
47.00	7.80	6.73	0.00				
48.00	7.80	6.73	0.00				
49.00	7.80	6.73	0.00				
50.00	7.80	6.73	0.00				
51.00	7.80	6.73	0.00				
52.00	7.80	6.73	0.00				

Proposed Conditions_DP-2

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 117

Summary for Subcatchment DA-2B4: Drainage Area-2B4

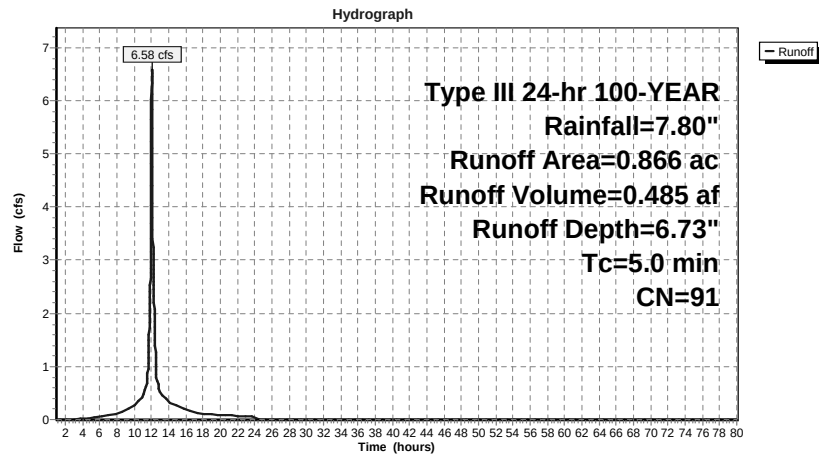
Runoff = 6.58 cfs @ 12.07 hrs, Volume= 0.485 af, Depth= 6.73"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
0.620	98	Roofs, HSG C
* 0.100	60	Storm Planter
0.065	98	Paved parking, HSG C
0.081	74	>75% Grass cover, Good, HSG C
0.866	91	Weighted Average
0.181		20.90% Pervious Area
0.685		79.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, User Def Min.

Subcatchment DA-2B4: Drainage Area-2B4**Proposed Conditions_DP-2**

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 118

Hydrograph for Subcatchment DA-2B4: Drainage Area-2B4

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.08	0.00	0.00	53.00	7.80	6.73	0.00
2.00	0.16	0.00	0.00	54.00	7.80	6.73	0.00
3.00	0.24	0.00	0.01	55.00	7.80	6.73	0.00
4.00	0.34	0.02	0.02	56.00	7.80	6.73	0.00
5.00	0.44	0.05	0.03	57.00	7.80	6.73	0.00
6.00	0.56	0.10	0.05	58.00	7.80	6.73	0.00
7.00	0.71	0.17	0.08	59.00	7.80	6.73	0.00
8.00	0.89	0.28	0.11	60.00	7.80	6.73	0.00
9.00	1.14	0.46	0.18	61.00	7.80	6.73	0.00
10.00	1.47	0.72	0.26	62.00	7.80	6.73	0.00
11.00	1.95	1.12	0.42	63.00	7.80	6.73	0.00
12.00	3.90	2.92	4.40	64.00	7.80	6.73	0.00
13.00	5.85	4.81	0.53	65.00	7.80	6.73	0.00
14.00	6.33	5.28	0.34	66.00	7.80	6.73	0.00
15.00	6.66	5.61	0.26	67.00	7.80	6.73	0.00
16.00	6.91	5.85	0.18	68.00	7.80	6.73	0.00
17.00	7.09	6.03	0.14	69.00	7.80	6.73	0.00
18.00	7.24	6.17	0.11	70.00	7.80	6.73	0.00
19.00	7.36	6.29	0.10	71.00	7.80	6.73	0.00
20.00	7.46	6.40	0.09	72.00	7.80	6.73	0.00
21.00	7.56	6.49	0.08	73.00	7.80	6.73	0.00
22.00	7.65	6.58	0.07	74.00	7.80	6.73	0.00
23.00	7.73	6.66	0.07	75.00	7.80	6.73	0.00
24.00	7.80	6.73	0.06	76.00	7.80	6.73	0.00
25.00	7.80	6.73	0.00	77.00	7.80	6.73	0.00
26.00	7.80	6.73	0.00	78.00	7.80	6.73	0.00
27.00	7.80	6.73	0.00	79.00	7.80	6.73	0.00
28.00	7.80	6.73	0.00	80.00	7.80	6.73	0.00
29.00	7.80	6.73	0.00				
30.00	7.80	6.73	0.00				
31.00	7.80	6.73	0.00				
32.00	7.80	6.73	0.00				
33.00	7.80	6.73	0.00				
34.00	7.80	6.73	0.00				
35.00	7.80	6.73	0.00				
36.00	7.80	6.73	0.00				
37.00	7.80	6.73	0.00				
38.00	7.80	6.73	0.00				
39.00	7.80	6.73	0.00				
40.00	7.80	6.73	0.00				
41.00	7.80	6.73	0.00				
42.00	7.80	6.73	0.00				
43.00	7.80	6.73	0.00				
44.00	7.80	6.73	0.00				
45.00	7.80	6.73	0.00				
46.00	7.80	6.73	0.00				
47.00	7.80	6.73	0.00				
48.00	7.80	6.73	0.00				
49.00	7.80	6.73	0.00				
50.00	7.80	6.73	0.00				
51.00	7.80	6.73	0.00				
52.00	7.80	6.73	0.00				

Summary for Subcatchment DA-2B5: Drainage Area-2B5

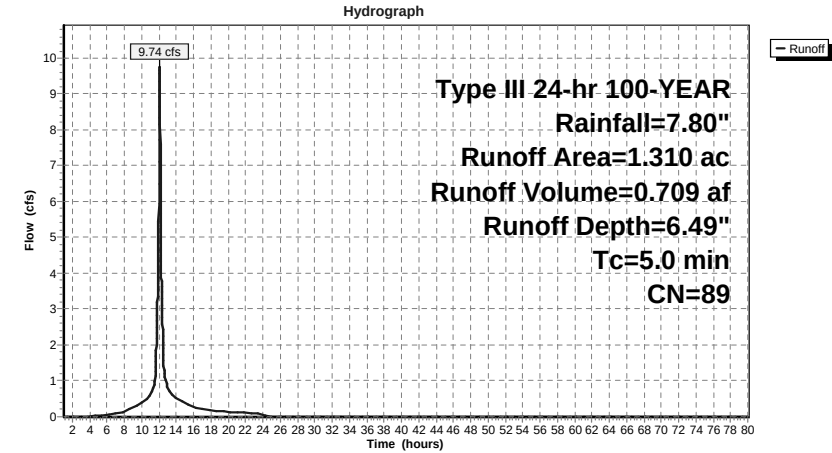
Runoff = 9.74 cfs @ 12.07 hrs, Volume= 0.709 af, Depth= 6.49"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
0.860	98	Paved parking, HSG C
0.360	74	>75% Grass cover, Good, HSG C
* 0.090	61	Bioretention Sand Soil Medium, HSG C
1.310	89	Weighted Average
0.450		34.35% Pervious Area
0.860		65.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, User Defined Min.

Subcatchment DA-2B5: Drainage Area-2B5



Hydrograph for Subcatchment DA-2B5: Drainage Area-2B5

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.08	0.00	0.00
2.00	0.16	0.00	0.00
3.00	0.24	0.00	0.00
4.00	0.34	0.01	0.02
5.00	0.44	0.03	0.04
6.00	0.56	0.06	0.06
7.00	0.71	0.12	0.10
8.00	0.89	0.22	0.15
9.00	1.14	0.37	0.25
10.00	1.47	0.61	0.37
11.00	1.95	0.99	0.60
12.00	3.90	2.73	6.50
13.00	5.85	4.59	0.80
14.00	6.33	5.05	0.51
15.00	6.66	5.38	0.39
16.00	6.91	5.62	0.27
17.00	7.09	5.80	0.22
18.00	7.24	5.94	0.16
19.00	7.36	6.06	0.15
20.00	7.46	6.16	0.13
21.00	7.56	6.26	0.12
22.00	7.65	6.34	0.11
23.00	7.73	6.42	0.10
24.00	7.80	6.49	0.09
25.00	7.80	6.49	0.00
26.00	7.80	6.49	0.00
27.00	7.80	6.49	0.00
28.00	7.80	6.49	0.00
29.00	7.80	6.49	0.00
30.00	7.80	6.49	0.00
31.00	7.80	6.49	0.00
32.00	7.80	6.49	0.00
33.00	7.80	6.49	0.00
34.00	7.80	6.49	0.00
35.00	7.80	6.49	0.00
36.00	7.80	6.49	0.00
37.00	7.80	6.49	0.00
38.00	7.80	6.49	0.00
39.00	7.80	6.49	0.00
40.00	7.80	6.49	0.00
41.00	7.80	6.49	0.00
42.00	7.80	6.49	0.00
43.00	7.80	6.49	0.00
44.00	7.80	6.49	0.00
45.00	7.80	6.49	0.00
46.00	7.80	6.49	0.00
47.00	7.80	6.49	0.00
48.00	7.80	6.49	0.00
49.00	7.80	6.49	0.00
50.00	7.80	6.49	0.00
51.00	7.80	6.49	0.00
52.00	7.80	6.49	0.00

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
53.00	7.80	6.49	0.00
54.00	7.80	6.49	0.00
55.00	7.80	6.49	0.00
56.00	7.80	6.49	0.00
57.00	7.80	6.49	0.00
58.00	7.80	6.49	0.00
59.00	7.80	6.49	0.00
60.00	7.80	6.49	0.00
61.00	7.80	6.49	0.00
62.00	7.80	6.49	0.00
63.00	7.80	6.49	0.00
64.00	7.80	6.49	0.00
65.00	7.80	6.49	0.00
66.00	7.80	6.49	0.00
67.00	7.80	6.49	0.00
68.00	7.80	6.49	0.00
69.00	7.80	6.49	0.00
70.00	7.80	6.49	0.00
71.00	7.80	6.49	0.00
72.00	7.80	6.49	0.00
73.00	7.80	6.49	0.00
74.00	7.80	6.49	0.00
75.00	7.80	6.49	0.00
76.00	7.80	6.49	0.00
77.00	7.80	6.49	0.00
78.00	7.80	6.49	0.00
79.00	7.80	6.49	0.00
80.00	7.80	6.49	0.00

Summary for Subcatchment DA-2B6: Drainage Area -2B6

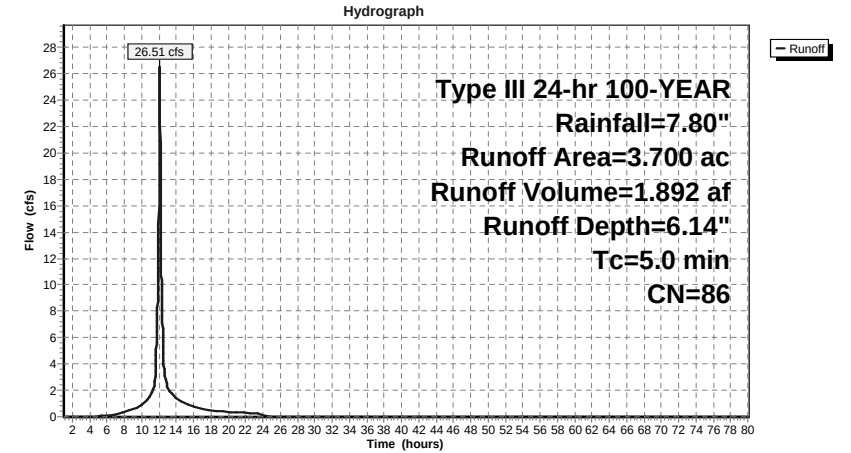
Runoff = 26.51 cfs @ 12.07 hrs, Volume= 1.892 af, Depth= 6.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
* 0.461	74	Pervious Pavers
* 1.451	74	Open Space
1.788	98	Paved parking, HSG C
3.700	86	Weighted Average
1.912		51.68% Pervious Area
1.788		48.32% Impervious Area

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

Subcatchment DA-2B6: Drainage Area -2B6



Hydrograph for Subcatchment DA-2B6: Drainage Area -2B6

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.08	0.00	0.00	53.00	7.80	6.14	0.00
2.00	0.16	0.00	0.00	54.00	7.80	6.14	0.00
3.00	0.24	0.00	0.00	55.00	7.80	6.14	0.00
4.00	0.34	0.00	0.00	56.00	7.80	6.14	0.00
5.00	0.44	0.01	0.05	57.00	7.80	6.14	0.00
6.00	0.56	0.03	0.11	58.00	7.80	6.14	0.00
7.00	0.71	0.07	0.20	59.00	7.80	6.14	0.00
8.00	0.89	0.14	0.33	60.00	7.80	6.14	0.00
9.00	1.14	0.27	0.58	61.00	7.80	6.14	0.00
10.00	1.47	0.48	0.91	62.00	7.80	6.14	0.00
11.00	1.95	0.81	1.54	63.00	7.80	6.14	0.00
12.00	3.90	2.46	17.54	64.00	7.80	6.14	0.00
13.00	5.85	4.27	2.21	65.00	7.80	6.14	0.00
14.00	6.33	4.72	1.41	66.00	7.80	6.14	0.00
15.00	6.66	5.04	1.07	67.00	7.80	6.14	0.00
16.00	6.91	5.28	0.75	68.00	7.80	6.14	0.00
17.00	7.09	5.46	0.60	69.00	7.80	6.14	0.00
18.00	7.24	5.60	0.46	70.00	7.80	6.14	0.00
19.00	7.36	5.71	0.41	71.00	7.80	6.14	0.00
20.00	7.46	5.81	0.37	72.00	7.80	6.14	0.00
21.00	7.56	5.91	0.34	73.00	7.80	6.14	0.00
22.00	7.65	5.99	0.30	74.00	7.80	6.14	0.00
23.00	7.73	6.07	0.27	75.00	7.80	6.14	0.00
24.00	7.80	6.14	0.24	76.00	7.80	6.14	0.00
25.00	7.80	6.14	0.00	77.00	7.80	6.14	0.00
26.00	7.80	6.14	0.00	78.00	7.80	6.14	0.00
27.00	7.80	6.14	0.00	79.00	7.80	6.14	0.00
28.00	7.80	6.14	0.00	80.00	7.80	6.14	0.00
29.00	7.80	6.14	0.00				
30.00	7.80	6.14	0.00				
31.00	7.80	6.14	0.00				
32.00	7.80	6.14	0.00				
33.00	7.80	6.14	0.00				
34.00	7.80	6.14	0.00				
35.00	7.80	6.14	0.00				
36.00	7.80	6.14	0.00				
37.00	7.80	6.14	0.00				
38.00	7.80	6.14	0.00				
39.00	7.80	6.14	0.00				
40.00	7.80	6.14	0.00				
41.00	7.80	6.14	0.00				
42.00	7.80	6.14	0.00				
43.00	7.80	6.14	0.00				
44.00	7.80	6.14	0.00				
45.00	7.80	6.14	0.00				
46.00	7.80	6.14	0.00				
47.00	7.80	6.14	0.00				
48.00	7.80	6.14	0.00				
49.00	7.80	6.14	0.00				
50.00	7.80	6.14	0.00				
51.00	7.80	6.14	0.00				
52.00	7.80	6.14	0.00				

Summary for Reach DP-2: 48" Culvert Outlet

Assume the DP-2 is at the tail end of the pipe, therefore the full length of the culvert (73') has not been specified. The culvert outlet elevation has replaced the inlet elevation so as to not overtop Wetland Depression_1. Outlet elevation has been replaced to mimick the existing slope on the culvert pipe.

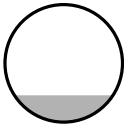
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 51.800 ac, 10.60% Impervious, Inflow Depth > 3.17" for 100-YEAR event
Inflow = 54.32 cfs @ 12.89 hrs, Volume= 13.687 af
Outflow = 54.32 cfs @ 12.89 hrs, Volume= 13.687 af, Atten= 0%, Lag= 0.0 min

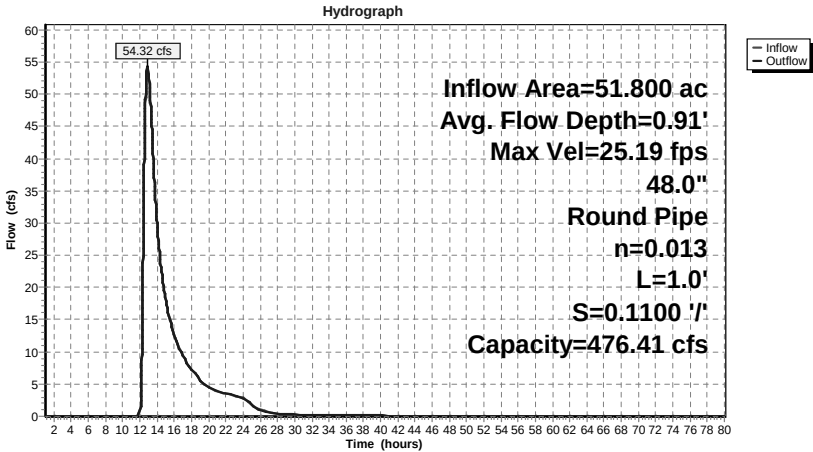
Routing by Dyn-Stor-Ind method, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 25.19 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 5.90 fps, Avg. Travel Time= 0.0 min

Peak Storage= 2 cf @ 12.89 hrs
Average Depth at Peak Storage= 0.91'
Bank-Full Depth= 4.00', Capacity at Bank-Full= 476.41 cfs

48.0" Round Pipe
n= 0.013
Length= 1.0' Slope= 0.1100 '/
Inlet Invert= 579.80', Outlet Invert= 579.69'



Reach DP-2: 48" Culvert Outlet



Proposed Conditions_DP-2

Prepared by WATCHTOWER

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Type III 24-hr 100-YEAR Rainfall=7.80"

Printed 10/22/2011

Page 125

Hydrograph for Reach DP-2: 48" Culvert Outlet

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
1.00	0.00	0	579.80	0.00
3.00	0.00	0	579.80	0.00
5.00	0.00	0	579.80	0.00
7.00	0.00	0	579.80	0.00
9.00	0.00	0	579.80	0.00
11.00	0.00	0	579.80	0.00
13.00	53.52	2	580.71	53.52
15.00	18.01	1	580.33	18.01
17.00	9.37	1	580.19	9.37
19.00	5.55	0	580.10	5.55
21.00	3.89	0	580.06	3.89
23.00	3.18	0	580.03	3.18
25.00	1.77	0	579.98	1.77
27.00	0.60	0	579.91	0.60
29.00	0.32	0	579.88	0.32
31.00	0.22	0	579.86	0.22
33.00	0.16	0	579.85	0.16
35.00	0.13	0	579.85	0.13
37.00	0.11	0	579.85	0.11
39.00	0.10	0	579.84	0.10
41.00	0.08	0	579.84	0.08
43.00	0.07	0	579.84	0.07
45.00	0.07	0	579.84	0.07
47.00	0.06	0	579.83	0.06
49.00	0.05	0	579.83	0.05
51.00	0.04	0	579.82	0.04
53.00	0.04	0	579.82	0.04
55.00	0.03	0	579.82	0.03
57.00	0.03	0	579.82	0.03
59.00	0.02	0	579.81	0.02
61.00	0.02	0	579.81	0.02
63.00	0.02	0	579.81	0.02
65.00	0.02	0	579.81	0.02
67.00	0.01	0	579.81	0.01
69.00	0.01	0	579.81	0.01
71.00	0.01	0	579.81	0.01
73.00	0.01	0	579.81	0.01
75.00	0.01	0	579.81	0.01
77.00	0.01	0	579.81	0.01
79.00	0.01	0	579.80	0.01

Proposed Conditions_DP-2

Prepared by WATCHTOWER

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Type III 24-hr 100-YEAR Rainfall=7.80"

Printed 10/22/2011

Page 126

Summary for Pond ND-2B: Natural Depression-2B

[93] Warning: Storage range exceeded by 2.07'

[90] Warning: Qout>Qin may require Finer Routing or smaller dt

[87] Warning: Oscillations may require Finer Routing or smaller dt

Inflow Area = 4.470 ac, 12.46% Impervious, Inflow Depth = 4.75" for 100-YEAR event
 Inflow = 18.19 cfs @ 12.23 hrs, Volume= 1.768 af
 Outflow = 25.94 cfs @ 12.26 hrs, Volume= 1.355 af, Atten= 0%, Lag= 2.1 min
 Primary = 25.94 cfs @ 12.26 hrs, Volume= 1.355 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 594.87' @ 12.26 hrs Surf.Area= 0.231 ac Storage= 0.578 af

Plug-Flow detention time= 305.6 min calculated for 1.354 af (77% of inflow)
 Center-of-Mass det. time= 222.0 min (1,049.0 - 827.0)

Volume	Invert	Avail.Storage	Storage Description
#1	587.80'	0.578 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
587.80	0.000	0.000	0.000
592.80	0.231	0.578	0.578

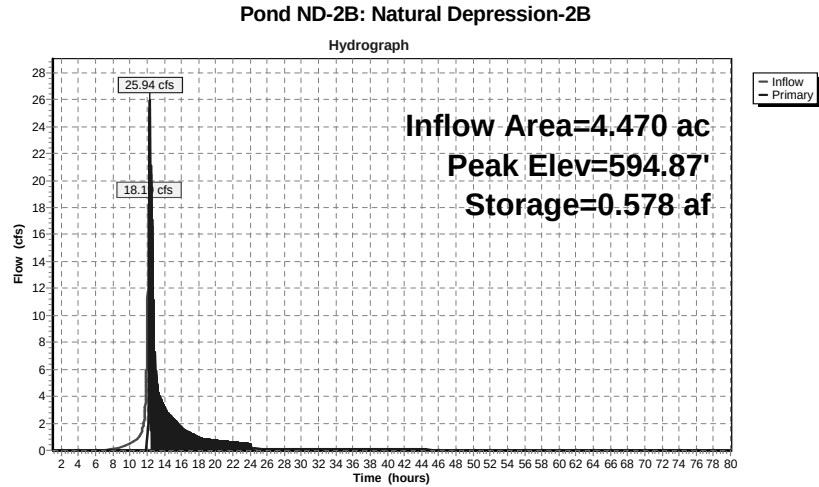
Device	Routing	Invert	Outlet Devices
#1	Primary	587.83'	42.0" W x 30.0" H Box Culvert L= 73.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 587.83' / 586.78' S= 0.0144 '/ Cc= 0.900 n= 0.011
#2	Device 1	592.00'	2.3" Vert. Orifice/Grate C= 0.600
#3	Device 1	594.00'	12.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=25.94 cfs @ 12.26 hrs HW=594.87' TW=589.42' (Dynamic Tailwater)

1=Culvert (Passes 25.94 cfs of 96.83 cfs potential flow)

2=Orifice/Grate (Orifice Controls 0.23 cfs @ 8.03 fps)

3=Broad-Crested Rectangular Weir (Weir Controls 25.70 cfs @ 2.45 fps)



Hydrograph for Pond ND-2B: Natural Depression-2B

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0.000	587.80	0.00
3.00	0.00	0.000	587.80	0.00
5.00	0.00	0.000	587.80	0.00
7.00	0.00	0.000	587.80	0.00
9.00	0.22	0.013	588.54	0.00
11.00	0.99	0.100	589.88	0.00
13.00	2.91	0.578	594.31	5.67
15.00	1.22	0.578	594.17	2.33
17.00	0.68	0.578	594.11	1.25
19.00	0.46	0.578	594.07	0.80
21.00	0.38	0.578	594.06	0.64
23.00	0.31	0.578	594.05	0.50
25.00	0.00	0.571	592.77	0.11
27.00	0.00	0.553	592.69	0.11
29.00	0.00	0.536	592.62	0.10
31.00	0.00	0.520	592.54	0.09
33.00	0.00	0.505	592.48	0.09
35.00	0.00	0.492	592.41	0.08
37.00	0.00	0.479	592.36	0.07
39.00	0.00	0.468	592.30	0.06
41.00	0.00	0.458	592.25	0.06
43.00	0.00	0.450	592.21	0.05
45.00	0.00	0.443	592.18	0.04
47.00	0.00	0.437	592.15	0.03
49.00	0.00	0.432	592.13	0.02
51.00	0.00	0.429	592.11	0.02
53.00	0.00	0.426	592.09	0.01
55.00	0.00	0.424	592.08	0.01
57.00	0.00	0.422	592.07	0.01
59.00	0.00	0.421	592.07	0.01
61.00	0.00	0.419	592.06	0.01
63.00	0.00	0.418	592.06	0.01
65.00	0.00	0.418	592.05	0.00
67.00	0.00	0.417	592.05	0.00
69.00	0.00	0.416	592.04	0.00
71.00	0.00	0.416	592.04	0.00
73.00	0.00	0.415	592.04	0.00
75.00	0.00	0.415	592.04	0.00
77.00	0.00	0.414	592.03	0.00
79.00	0.00	0.414	592.03	0.00

Summary for Pond UC: Underground Chambers

[93] Warning: Storage range exceeded by 1.69'

[87] Warning: Oscillations may require Finer Routing or smaller dt

Inflow Area = 9.836 ac, 41.41% Impervious, Inflow Depth = 5.78" for 100-YEAR event

Inflow = 65.83 cfs @ 12.07 hrs, Volume= 4.735 af

Outflow = 52.62 cfs @ 12.18 hrs, Volume= 3.123 af, Atten= 20%, Lag= 6.5 min

Primary = 33.18 cfs @ 12.18 hrs, Volume= 0.420 af

Secondary = 19.45 cfs @ 12.18 hrs, Volume= 2.704 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 621.44' @ 12.18 hrs Surf.Area= 0.591 ac Storage= 2.078 af

Plug-Flow detention time= 208.5 min calculated for 3.123 af (66% of inflow)

Center-of-Mass det. time= 110.6 min (908.1 - 797.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	614.25'	0.781 af	139.83'W x 184.02'L x 5.50'H Field A 3.249 af Overall - 1.298 af Embedded = 1.951 af x 40.0% Voids
#2A	615.00'	1.298 af	StormTech MC-3500 b x 500 Inside #1 Effective Size= 71.0"W x 45.0"H => 15.77 sf x 7.17'L = 113.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
		2.078 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	619.00'	18.0" Vert. Orifice/Grate X 3.00 C= 0.600
#2	Secondary	618.00'	12.0" Vert. Orifice/Grate X 3.00 C= 0.600

Primary OutFlow Max=32.55 cfs @ 12.18 hrs HW=621.38' TW=589.01' (Dynamic Tailwater)

↳ **1=Orifice/Grate** (Orifice Controls 32.55 cfs @ 6.14 fps)

Secondary OutFlow Max=19.25 cfs @ 12.18 hrs HW=621.38' TW=0.00' (Dynamic Tailwater)

↳ **2=Orifice/Grate** (Orifice Controls 19.25 cfs @ 8.17 fps)

Pond UC: Underground Chambers - Chamber Wizard Field A

Chamber Model = StormTech MC-3500 b

Effective Size= 71.0"W x 45.0"H => 15.77 sf x 7.17'L = 113.0 cf

Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap

77.0" Wide + 6.0" Spacing = 83.0" C-C

25 Chambers/Row x 7.17' Long = 179.25' + 28.6" End Stone x 2 = 184.02' Base Length

20 Rows x 77.0" Wide + 6.0" Spacing x 19 + 12.0" Side Stone x 2 = 139.83' Base Width

9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

500 Chambers x 113.0 cf = 56,521.1 cf Chamber Storage

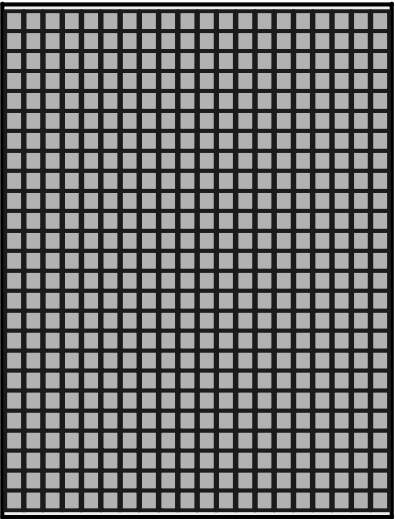
141,524.2 cf Field - 56,521.1 cf Chambers = 85,003.0 cf Stone x 40.0% Voids = 34,001.2 cf Stone Storage

Stone + Chamber Storage = 90,522.3 cf = 2.078 af

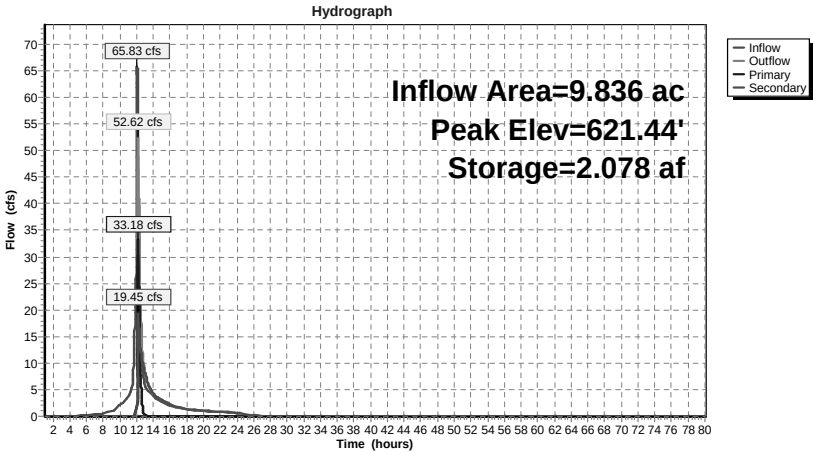
500 Chambers

5,241.6 cy Field

3,148.3 cy Stone



Pond UC: Underground Chambers



Hydrograph for Pond UC: Underground Chambers

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
1.00	0.00	0.000	614.25	0.00	0.00	0.00
3.00	0.01	0.000	614.25	0.00	0.00	0.00
5.00	0.11	0.008	614.28	0.00	0.00	0.00
7.00	0.35	0.043	614.43	0.00	0.00	0.00
9.00	0.92	0.139	614.84	0.00	0.00	0.00
11.00	3.70	0.495	615.61	0.00	0.00	0.00
13.00	5.88	1.907	619.03	8.23	0.01	8.22
15.00	2.81	1.785	618.52	3.07	0.00	3.07
17.00	1.57	1.744	618.38	1.75	0.00	1.75
19.00	1.07	1.720	618.31	1.16	0.00	1.16
21.00	0.88	1.709	618.27	0.94	0.00	0.94
23.00	0.72	1.700	618.25	0.77	0.00	0.77
25.00	0.01	1.664	618.15	0.28	0.00	0.28
27.00	0.00	1.639	618.08	0.08	0.00	0.08
29.00	0.00	1.630	618.05	0.04	0.00	0.04
31.00	0.00	1.625	618.04	0.02	0.00	0.02
33.00	0.00	1.622	618.03	0.01	0.00	0.01
35.00	0.00	1.620	618.03	0.01	0.00	0.01
37.00	0.00	1.619	618.02	0.01	0.00	0.01
39.00	0.00	1.618	618.02	0.01	0.00	0.01
41.00	0.00	1.617	618.02	0.00	0.00	0.00
43.00	0.00	1.616	618.02	0.00	0.00	0.00
45.00	0.00	1.615	618.02	0.00	0.00	0.00
47.00	0.00	1.615	618.01	0.00	0.00	0.00
49.00	0.00	1.615	618.01	0.00	0.00	0.00
51.00	0.00	1.614	618.01	0.00	0.00	0.00
53.00	0.00	1.614	618.01	0.00	0.00	0.00
55.00	0.00	1.614	618.01	0.00	0.00	0.00
57.00	0.00	1.613	618.01	0.00	0.00	0.00
59.00	0.00	1.613	618.01	0.00	0.00	0.00
61.00	0.00	1.613	618.01	0.00	0.00	0.00
63.00	0.00	1.613	618.01	0.00	0.00	0.00
65.00	0.00	1.613	618.01	0.00	0.00	0.00
67.00	0.00	1.613	618.01	0.00	0.00	0.00
69.00	0.00	1.612	618.01	0.00	0.00	0.00
71.00	0.00	1.612	618.01	0.00	0.00	0.00
73.00	0.00	1.612	618.01	0.00	0.00	0.00
75.00	0.00	1.612	618.01	0.00	0.00	0.00
77.00	0.00	1.612	618.01	0.00	0.00	0.00
79.00	0.00	1.612	618.01	0.00	0.00	0.00

Summary for Pond WD-2A: Wetland Depression_2A

Assume a broad-crested weir for the additional overflow over Long Meadow Road.

Inflow Area = 51.800 ac, 10.60% Impervious, Inflow Depth = 3.61" for 100-YEAR event
Inflow = 137.00 cfs @ 12.26 hrs, Volume= 15.572 af
Outflow = 54.32 cfs @ 12.89 hrs, Volume= 13.687 af, Atten= 60%, Lag= 37.6 min
Primary = 54.32 cfs @ 12.89 hrs, Volume= 13.687 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-80.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 590.97' @ 12.89 hrs Surf.Area= 72,127 sf Storage= 243,104 cf

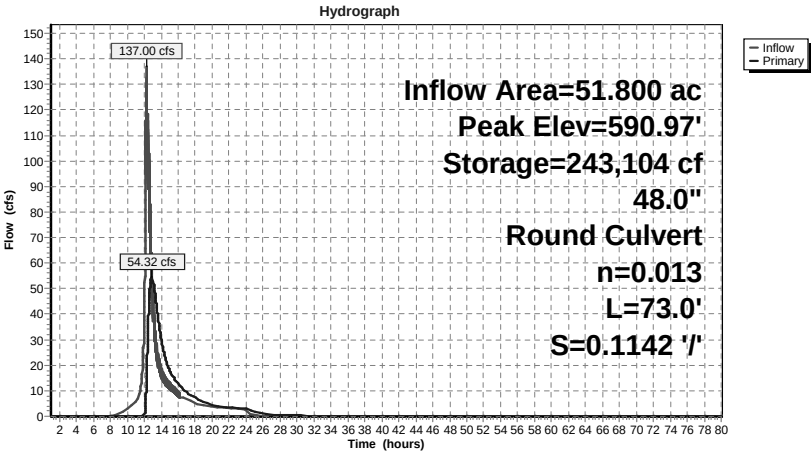
Plug-Flow detention time= 166.3 min calculated for 13.687 af (88% of inflow)
Center-of-Mass det. time= 99.2 min (960.8 - 861.6)

Volume	Invert	Avail.Storage	Storage Description
#1	585.00'	324,441 cf	Custom Stage Data (Prismatic) Listed below
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
585.00	0	0	0
586.00	15,950	7,975	7,975
589.00	52,400	102,525	110,500
592.00	82,504	202,356	312,856
592.14	83,000	11,585	324,441

Device	Routing	Invert	Outlet Devices
#1	Primary	588.14'	48.0" Round Culvert L= 73.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 588.14' / 579.80' S= 0.1142 '/' Cc= 0.900 n= 0.013

Primary OutFlow Max=54.32 cfs @ 12.89 hrs HW=590.97' TW=580.71' (Dynamic Tailwater)
1=Culvert (Inlet Controls 54.32 cfs @ 5.72 fps)

Pond WD-2A: Wetland Depression_2A



Proposed Conditions_DP-2

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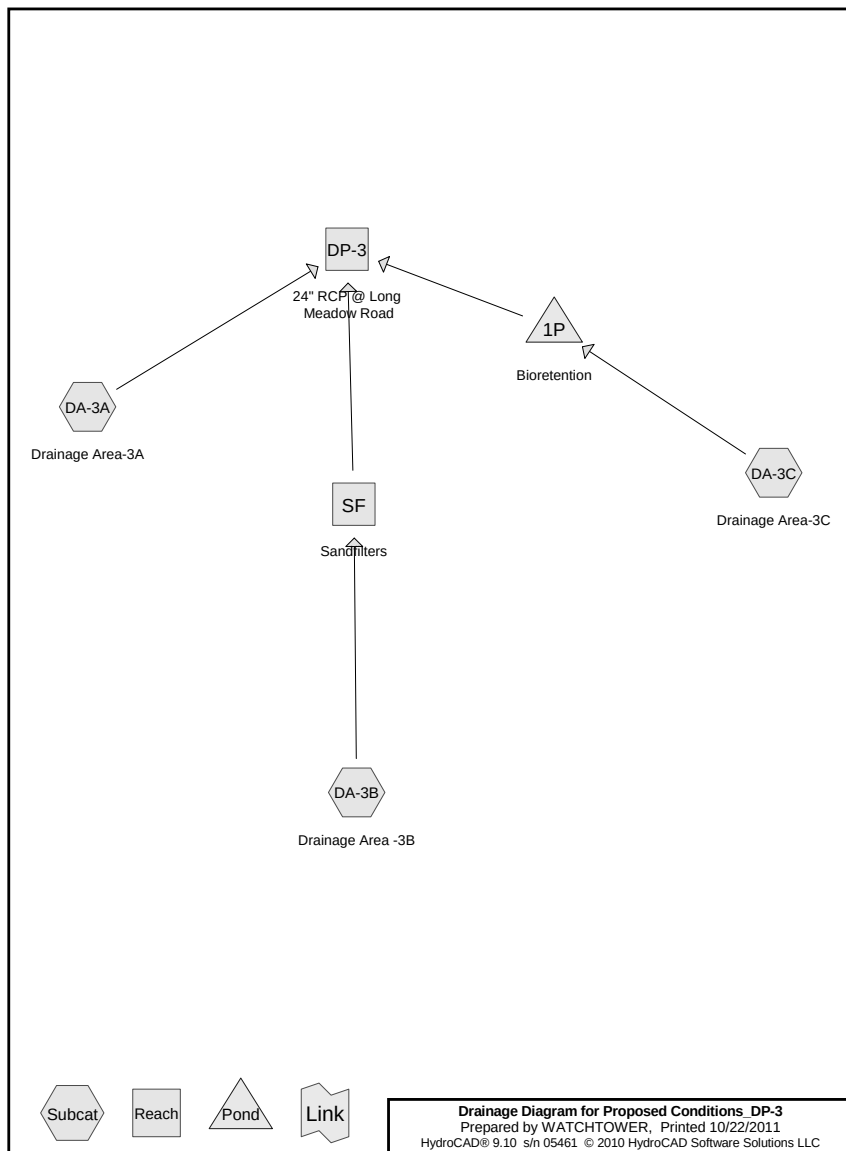
Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 135

Hydrograph for Pond WD-2A: Wetland Depression_2A

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	0	585.00	0.00
3.00	0.00	0	585.00	0.00
5.00	0.00	0	585.00	0.00
7.00	0.02	71	585.01	0.00
9.00	0.92	1,867	585.23	0.00
11.00	6.04	22,960	586.44	0.00
13.00	48.22	241,329	590.94	53.52
15.00	12.89	153,847	589.64	18.01
17.00	7.11	124,075	589.20	9.37
19.00	4.65	108,719	588.95	5.55
21.00	3.78	104,080	588.81	3.89
23.00	3.09	101,840	588.75	3.18
25.00	0.30	96,454	588.59	1.77
27.00	0.11	90,018	588.40	0.60
29.00	0.10	87,608	588.33	0.32
31.00	0.09	86,412	588.30	0.22
33.00	0.09	85,710	588.27	0.16
35.00	0.08	85,248	588.26	0.13
37.00	0.07	84,913	588.25	0.11
39.00	0.06	84,648	588.24	0.10
41.00	0.06	84,423	588.24	0.08
43.00	0.05	84,221	588.23	0.07
45.00	0.04	84,030	588.23	0.07
47.00	0.03	83,843	588.22	0.06
49.00	0.02	83,654	588.21	0.05
51.00	0.02	83,471	588.21	0.04
53.00	0.01	83,302	588.20	0.04
55.00	0.01	83,148	588.20	0.03
57.00	0.01	83,008	588.20	0.03
59.00	0.01	82,883	588.19	0.02
61.00	0.01	82,771	588.19	0.02
63.00	0.01	82,670	588.19	0.02
65.00	0.00	82,579	588.18	0.02
67.00	0.00	82,498	588.18	0.01
69.00	0.00	82,424	588.18	0.01
71.00	0.00	82,357	588.18	0.01
73.00	0.00	82,296	588.17	0.01
75.00	0.00	82,240	588.17	0.01
77.00	0.00	82,189	588.17	0.01
79.00	0.00	82,142	588.17	0.01



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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.180	30	Sandpit (DA-3C)
0.790	65	Brush, Good, HSG C (DA-3A, DA-3C)
0.420	68	Green Roof, HSG C (DA-3B)
1.320	70	Woods, Good, HSG C (DA-3A, DA-3B, DA-3C)
0.760	72	Restored Woods (DA-3B)
1.070	74	>75% Grass cover, Good, HSG C (DA-3A, DA-3B, DA-3C)
0.020	74	Bioretention (DA-3C)
0.060	74	Open Space (DA-3B)
0.170	74	Pavers, HSG C (DA-3A, DA-3C)
1.780	98	Paved parking, HSG C (DA-3B, DA-3C)
0.160	98	Paved roads, HSG C (DA-3A)
6.730	77	TOTAL AREA

Proposed Conditions_DP-3

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Page 3

Notes Listing (all nodes)

Line#	Node Number	Notes
1	Project	Green Roofs, Porous Pavement or Pervious Asphalt, and Stormwater Planters have been modeled under the assumption of impervious cover reduction only. Therefore, a modified CN to account for storage has been calculated based on SCS Methodology in the TR-55 using the following equation: $S = (1000/CN) - 10$
2		Due to this assumption, Green Roofs have been designed to store approximately 4.7 inches of water over the area of the total green roof. This storage value computes to an average CN value of 68. Porous Pavement has been designed to store approximately 3.6 inches of water of the total are of the porous pavement. This storage value computes to an average CN value of 74. Stormwater Planters have been designed to store a minimum of 6.6 inches of water over the area of the stormwater planter. This storage value computes to an average CN of 60.
3		
4	DA-3B	An initial abstraction was calculated for the volume intercepted by the Green Roof. Assuming 1" of storage in depression and an average of 20% porosity in the subsoil yeilds approximately 0.183cu-ft of storage per 1ft x 1ft x 0.5ft of subsoil stratum. Using this results yields an initial abstraction (Ia) of 2.196 inches. Using Table 5-1 in the TR-55 this corresponds to a CN of 48. Therefore for all Green Roofs a CN of 48 has been used.

Proposed Conditions_DP-3

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 4

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 1P: Bioretention	Peak Elev=619.41' Storage=0.141 af Inflow=3.21 cfs 0.255 af Discarded=0.20 cfs 0.145 af Primary=0.00 cfs 0.000 af Outflow=0.20 cfs 0.145 af
Subcatchment DA-3A: Drainage Area-3A	Runoff Area=1.810 ac 8.84% Impervious Runoff Depth>0.68" Flow Length=330' Tc=11.8 min CN=71 Runoff=1.16 cfs 0.103 af
Subcatchment DA-3B: Drainage Area -3B	Runoff Area=2.120 ac 35.85% Impervious Runoff Depth>1.21" Tc=5.0 min CN=81 Runoff=3.24 cfs 0.214 af
Subcatchment DA-3C: Drainage Area-3C	Runoff Area=2.800 ac 36.43% Impervious Runoff Depth>1.09" Flow Length=530' Tc=10.9 min CN=79 Runoff=3.21 cfs 0.255 af
Reach DP-3: 24" RCP @ Long Meadow	Avg. Flow Depth=0.45' Max Vel=7.80 fps Inflow=4.06 cfs 0.318 af 24.0" Round Pipe n=0.013 L=62.0' S=0.0273 ' Capacity=37.35 cfs Outflow=4.05 cfs 0.317 af
Reach SF: Sandfilters	Inflow=3.24 cfs 0.214 af Outflow=3.24 cfs 0.214 af
Total Runoff Area = 6.730 ac Runoff Volume = 0.572 af Average Runoff Depth = 1.02" 71.17% Pervious = 4.790 ac 28.83% Impervious = 1.940 ac	

Summary for Pond 1P: Bioretention

Inflow Area = 2.800 ac, 36.43% Impervious, Inflow Depth > 1.09" for 1-YEAR event
Inflow = 3.21 cfs @ 12.16 hrs, Volume= 0.255 af
Outflow = 0.20 cfs @ 11.80 hrs, Volume= 0.145 af, Atten= 94%, Lag= 0.0 min
Discarded = 0.20 cfs @ 11.80 hrs, Volume= 0.145 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 619.41' @ 15.39 hrs Surf.Area= 0.100 ac Storage= 0.141 af

Plug-Flow detention time= 208.2 min calculated for 0.145 af (57% of inflow)
Center-of-Mass det. time= 127.1 min (939.7 - 812.6)

Volume	Invert	Avail.Storage	Storage Description
#1	618.00'	0.600 af	Custom Stage Data (Prismatic) Listed below (Recalc)

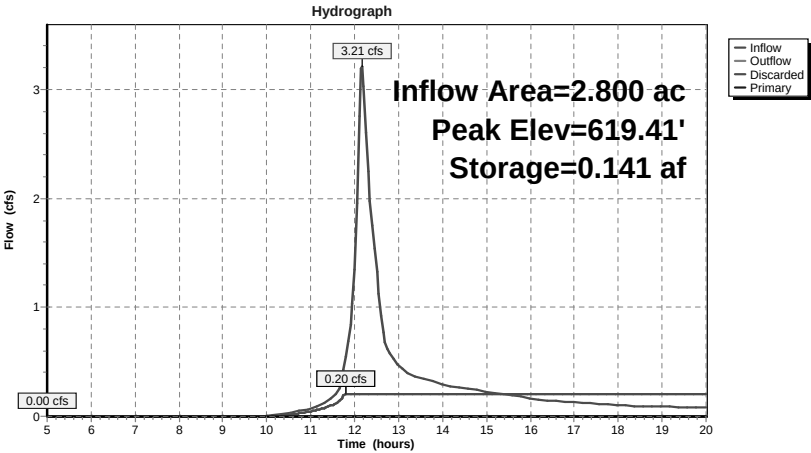
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
618.00	0.100	0.000	0.000
624.00	0.100	0.600	0.600

Device	Routing	Invert	Outlet Devices
#1	Primary	618.00'	12.0" Round Culvert L= 50.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 618.00' / 617.50' S= 0.0100 '/' Cc= 0.900 n= 0.013
#2	Device 1	619.50'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Discarded	618.00'	2.000 in/hr Exfiltration over Horizontal area

Discarded OutFlow Max=0.20 cfs @ 11.80 hrs HW=618.07' (Free Discharge)
3=Exfiltration (Exfiltration Controls 0.20 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=618.00' (Free Discharge)
1=Culvert (Controls 0.00 cfs)
2=Orifice/Grate (Controls 0.00 cfs)

Pond 1P: Bioretention



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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 7

Hydrograph for Pond 1P: Bioretention

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
5.00	0.00	0.000	618.00	0.00	0.00	0.00
5.50	0.00	0.000	618.00	0.00	0.00	0.00
6.00	0.00	0.000	618.00	0.00	0.00	0.00
6.50	0.00	0.000	618.00	0.00	0.00	0.00
7.00	0.00	0.000	618.00	0.00	0.00	0.00
7.50	0.00	0.000	618.00	0.00	0.00	0.00
8.00	0.00	0.000	618.00	0.00	0.00	0.00
8.50	0.00	0.000	618.00	0.00	0.00	0.00
9.00	0.00	0.000	618.00	0.00	0.00	0.00
9.50	0.00	0.000	618.00	0.00	0.00	0.00
10.00	0.00	0.000	618.00	0.00	0.00	0.00
10.50	0.03	0.000	618.00	0.01	0.01	0.00
11.00	0.07	0.001	618.01	0.05	0.05	0.00
11.50	0.17	0.003	618.03	0.11	0.11	0.00
12.00	1.34	0.018	618.18	0.20	0.20	0.00
12.50	1.33	0.102	619.02	0.20	0.20	0.00
13.00	0.47	0.123	619.23	0.20	0.20	0.00
13.50	0.35	0.131	619.31	0.20	0.20	0.00
14.00	0.29	0.136	619.36	0.20	0.20	0.00
14.50	0.26	0.139	619.39	0.20	0.20	0.00
15.00	0.23	0.141	619.41	0.20	0.20	0.00
15.50	0.19	0.141	619.41	0.20	0.20	0.00
16.00	0.16	0.140	619.40	0.20	0.20	0.00
16.50	0.14	0.138	619.38	0.20	0.20	0.00
17.00	0.13	0.136	619.36	0.20	0.20	0.00
17.50	0.12	0.132	619.32	0.20	0.20	0.00
18.00	0.10	0.128	619.28	0.20	0.20	0.00
18.50	0.09	0.124	619.24	0.20	0.20	0.00
19.00	0.09	0.119	619.19	0.20	0.20	0.00
19.50	0.08	0.115	619.15	0.20	0.20	0.00
20.00	0.08	0.110	619.10	0.20	0.20	0.00

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 8

Summary for Subcatchment DA-3A: Drainage Area-3A

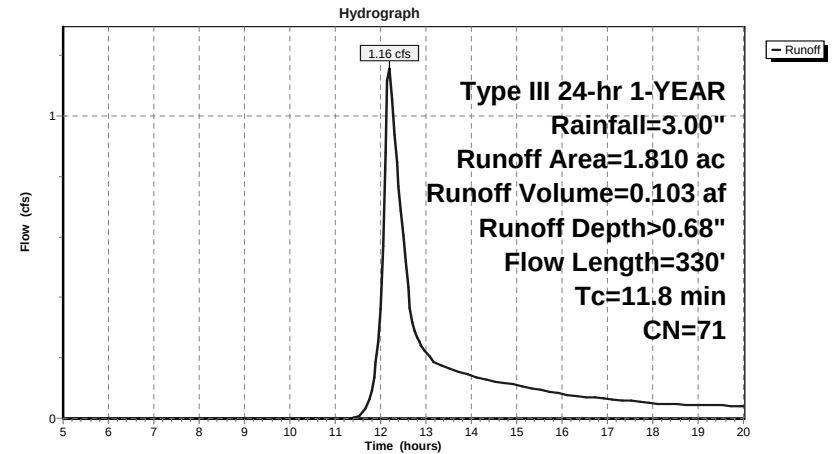
Runoff = 1.16 cfs @ 12.19 hrs, Volume= 0.103 af, Depth> 0.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
0.890	70	Woods, Good, HSG C
0.610	65	Brush, Good, HSG C
0.160	98	Paved roads, HSG C
0.010	74	Pavers, HSG C
0.140	74	>75% Grass cover, Good, HSG C
1.810	71	Weighted Average
1.650		91.16% Pervious Area
0.160		8.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.5	230	0.0630	7.47	70.93	Channel Flow, Area= 9.5 sf Perim= 16.2' r= 0.59' n= 0.035 Earth, dense weeds
11.8	330	Total			

Subcatchment DA-3A: Drainage Area-3A

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 9

Hydrograph for Subcatchment DA-3A: Drainage Area-3A

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.17	0.00	0.00	18.00	2.78	0.64	0.05
5.25	0.18	0.00	0.00	18.25	2.80	0.65	0.05
5.50	0.19	0.00	0.00	18.50	2.81	0.65	0.05
5.75	0.20	0.00	0.00	18.75	2.82	0.66	0.05
6.00	0.22	0.00	0.00	19.00	2.83	0.66	0.04
6.25	0.23	0.00	0.00	19.25	2.84	0.67	0.04
6.50	0.24	0.00	0.00	19.50	2.85	0.68	0.04
6.75	0.26	0.00	0.00	19.75	2.86	0.68	0.04
7.00	0.27	0.00	0.00	20.00	2.87	0.69	0.04
7.25	0.29	0.00	0.00				
7.50	0.30	0.00	0.00				
7.75	0.32	0.00	0.00				
8.00	0.34	0.00	0.00				
8.25	0.36	0.00	0.00				
8.50	0.39	0.00	0.00				
8.75	0.41	0.00	0.00				
9.00	0.44	0.00	0.00				
9.25	0.47	0.00	0.00				
9.50	0.50	0.00	0.00				
9.75	0.53	0.00	0.00				
10.00	0.57	0.00	0.00				
10.25	0.61	0.00	0.00				
10.50	0.65	0.00	0.00				
10.75	0.70	0.00	0.00				
11.00	0.75	0.00	0.00				
11.25	0.81	0.00	0.00				
11.50	0.89	0.00	0.01				
11.75	1.07	0.01	0.06				
12.00	1.50	0.10	0.36				
12.25	1.93	0.24	1.06				
12.50	2.11	0.31	0.61				
12.75	2.19	0.34	0.29				
13.00	2.25	0.37	0.22				
13.25	2.30	0.40	0.18				
13.50	2.35	0.42	0.17				
13.75	2.39	0.44	0.15				
14.00	2.43	0.46	0.14				
14.25	2.47	0.48	0.13				
14.50	2.50	0.49	0.12				
14.75	2.53	0.51	0.12				
15.00	2.56	0.52	0.11				
15.25	2.59	0.54	0.10				
15.50	2.61	0.55	0.10				
15.75	2.64	0.56	0.09				
16.00	2.66	0.57	0.08				
16.25	2.68	0.58	0.07				
16.50	2.70	0.59	0.07				
16.75	2.71	0.60	0.07				
17.00	2.73	0.61	0.06				
17.25	2.74	0.62	0.06				
17.50	2.76	0.63	0.06				
17.75	2.77	0.63	0.05				

Proposed Conditions_DP-3

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 10

Summary for Subcatchment DA-3B: Drainage Area -3B

An initial abstraction was calculated for the volume intercepted by the Green Roof. Assuming 1" of storage in depression and an average of 20% porosity in the subsoil yields approximately 0.183cu-ft of storage per 1ft x 1ft x 0.5ft of subsoil stratum. Using this results yields an initial abstraction (Ia) of 2.196 inches. Using Table 5-1 in the TR-55 this corresponds to a CN of 48. Therefore for all Green Roofs a CN of 48 has been used.

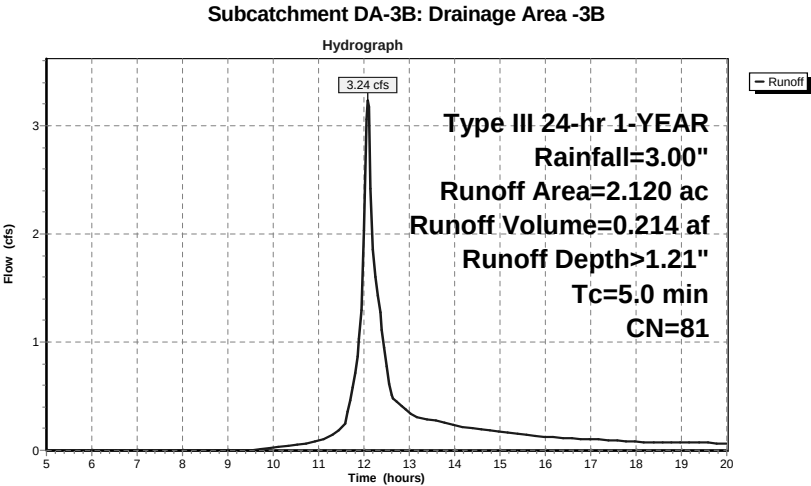
[49] Hint: Tc<2dt may require smaller dt

Runoff = 3.24 cfs @ 12.08 hrs, Volume= 0.214 af, Depth> 1.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description			
* 0.420	68	Green Roof, HSG C			
0.040	74	>75% Grass cover, Good, HSG C			
0.760	98	Paved parking, HSG C			
0.080	70	Woods, Good, HSG C			
* 0.760	72	Restored Woods			
* 0.060	74	Open Space			
2.120	81	Weighted Average			
1.360		64.15% Pervious Area			
0.760		35.85% Impervious Area			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, User Def Min.



Hydrograph for Subcatchment DA-3B: Drainage Area -3B

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.17	0.00	0.00	18.00	2.78	1.15	0.08
5.25	0.18	0.00	0.00	18.25	2.80	1.16	0.08
5.50	0.19	0.00	0.00	18.50	2.81	1.17	0.07
5.75	0.20	0.00	0.00	18.75	2.82	1.18	0.07
6.00	0.22	0.00	0.00	19.00	2.83	1.18	0.07
6.25	0.23	0.00	0.00	19.25	2.84	1.19	0.07
6.50	0.24	0.00	0.00	19.50	2.85	1.20	0.07
6.75	0.26	0.00	0.00	19.75	2.86	1.21	0.07
7.00	0.27	0.00	0.00	20.00	2.87	1.22	0.06
7.25	0.29	0.00	0.00				
7.50	0.30	0.00	0.00				
7.75	0.32	0.00	0.00				
8.00	0.34	0.00	0.00				
8.25	0.36	0.00	0.00				
8.50	0.39	0.00	0.00				
8.75	0.41	0.00	0.00				
9.00	0.44	0.00	0.00				
9.25	0.47	0.00	0.00				
9.50	0.50	0.00	0.00				
9.75	0.53	0.00	0.01				
10.00	0.57	0.00	0.02				
10.25	0.61	0.01	0.03				
10.50	0.65	0.01	0.05				
10.75	0.70	0.02	0.07				
11.00	0.75	0.03	0.09				
11.25	0.81	0.04	0.13				
11.50	0.89	0.07	0.19				
11.75	1.07	0.12	0.58				
12.00	1.50	0.31	2.03				
12.25	1.93	0.56	1.61				
12.50	2.11	0.67	0.77				
12.75	2.19	0.73	0.44				
13.00	2.25	0.77	0.35				
13.25	2.30	0.80	0.30				
13.50	2.35	0.84	0.28				
13.75	2.39	0.87	0.25				
14.00	2.43	0.89	0.23				
14.25	2.47	0.92	0.21				
14.50	2.50	0.94	0.20				
14.75	2.53	0.97	0.19				
15.00	2.56	0.99	0.18				
15.25	2.59	1.01	0.16				
15.50	2.61	1.02	0.15				
15.75	2.64	1.04	0.14				
16.00	2.66	1.06	0.13				
16.25	2.68	1.07	0.12				
16.50	2.70	1.08	0.11				
16.75	2.71	1.10	0.11				
17.00	2.73	1.11	0.10				
17.25	2.74	1.12	0.10				
17.50	2.76	1.13	0.09				
17.75	2.77	1.14	0.08				

Summary for Subcatchment DA-3C: Drainage Area-3C

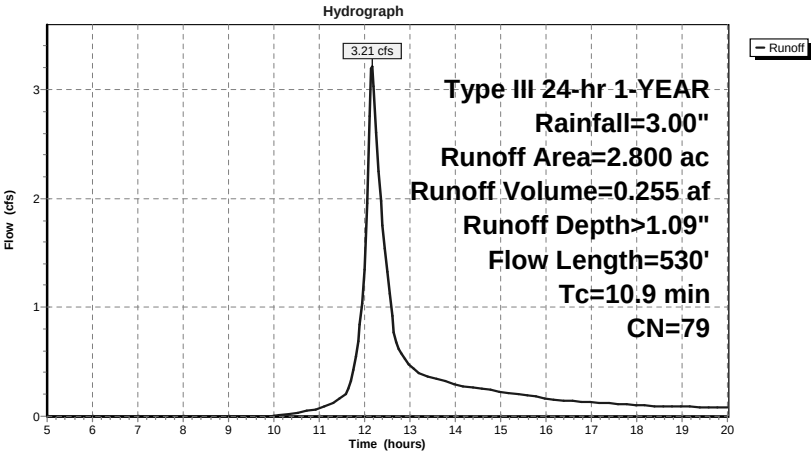
Runoff = 3.21 cfs @ 12.16 hrs, Volume= 0.255 af, Depth> 1.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
0.890	74	>75% Grass cover, Good, HSG C
* 0.180	30	Sandpit
1.020	98	Paved parking, HSG C
* 0.160	74	Pavers, HSG C
0.350	70	Woods, Good, HSG C
0.180	65	Brush, Good, HSG C
* 0.020	74	Bioretention
2.800	79	Weighted Average
1.780		63.57% Pervious Area
1.020		36.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	100	0.1300	0.17		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.2	430	0.0740	6.16	18.49	Channel Flow, Area= 3.0 sf Perim= 6.3' r= 0.48' n= 0.040 Earth, cobble bottom, clean sides
10.9	530	Total			

Subcatchment DA-3C: Drainage Area-3C



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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 15

Hydrograph for Subcatchment DA-3C: Drainage Area-3C

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.17	0.00	0.00	18.00	2.78	1.03	0.10
5.25	0.18	0.00	0.00	18.25	2.80	1.04	0.10
5.50	0.19	0.00	0.00	18.50	2.81	1.05	0.09
5.75	0.20	0.00	0.00	18.75	2.82	1.06	0.09
6.00	0.22	0.00	0.00	19.00	2.83	1.07	0.09
6.25	0.23	0.00	0.00	19.25	2.84	1.07	0.09
6.50	0.24	0.00	0.00	19.50	2.85	1.08	0.08
6.75	0.26	0.00	0.00	19.75	2.86	1.09	0.08
7.00	0.27	0.00	0.00	20.00	2.87	1.10	0.08
7.25	0.29	0.00	0.00				
7.50	0.30	0.00	0.00				
7.75	0.32	0.00	0.00				
8.00	0.34	0.00	0.00				
8.25	0.36	0.00	0.00				
8.50	0.39	0.00	0.00				
8.75	0.41	0.00	0.00				
9.00	0.44	0.00	0.00				
9.25	0.47	0.00	0.00				
9.50	0.50	0.00	0.00				
9.75	0.53	0.00	0.00				
10.00	0.57	0.00	0.00				
10.25	0.61	0.00	0.02				
10.50	0.65	0.01	0.03				
10.75	0.70	0.01	0.05				
11.00	0.75	0.02	0.07				
11.25	0.81	0.03	0.11				
11.50	0.89	0.04	0.17				
11.75	1.07	0.09	0.43				
12.00	1.50	0.26	1.34				
12.25	1.93	0.48	2.61				
12.50	2.11	0.59	1.33				
12.75	2.19	0.64	0.62				
13.00	2.25	0.67	0.47				
13.25	2.30	0.71	0.39				
13.50	2.35	0.74	0.35				
13.75	2.39	0.77	0.32				
14.00	2.43	0.79	0.29				
14.25	2.47	0.82	0.27				
14.50	2.50	0.84	0.26				
14.75	2.53	0.86	0.24				
15.00	2.56	0.88	0.23				
15.25	2.59	0.90	0.21				
15.50	2.61	0.92	0.19				
15.75	2.64	0.93	0.18				
16.00	2.66	0.94	0.16				
16.25	2.68	0.96	0.15				
16.50	2.70	0.97	0.14				
16.75	2.71	0.98	0.14				
17.00	2.73	0.99	0.13				
17.25	2.74	1.00	0.12				
17.50	2.76	1.01	0.12				
17.75	2.77	1.02	0.11				

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 16

Summary for Reach DP-3: 24" RCP @ Long Meadow Road

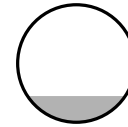
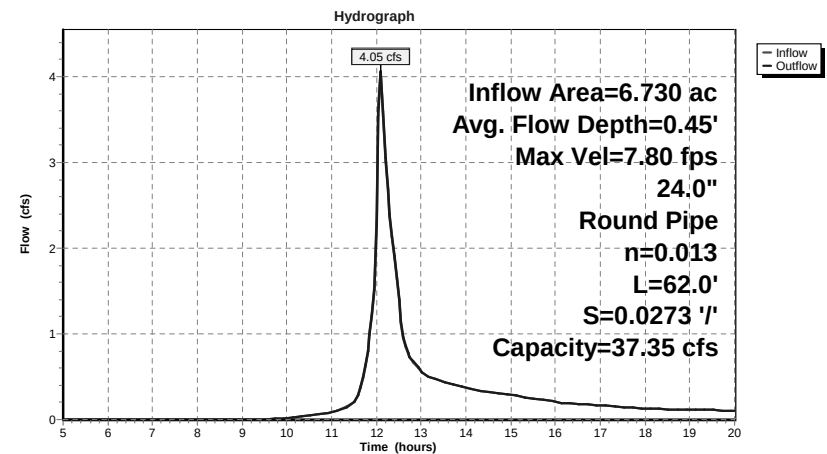
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 6.730 ac, 28.83% Impervious, Inflow Depth > 0.57" for 1-YEAR event
 Inflow = 4.06 cfs @ 12.10 hrs, Volume= 0.318 af
 Outflow = 4.05 cfs @ 12.10 hrs, Volume= 0.317 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 7.80 fps, Min. Travel Time= 0.1 min
 Avg. Velocity = 3.26 fps, Avg. Travel Time= 0.3 min

Peak Storage= 32 cf @ 12.10 hrs
 Average Depth at Peak Storage= 0.45'
 Bank-Full Depth= 2.00', Capacity at Bank-Full= 37.35 cfs

24.0" Round Pipe
 n= 0.013
 Length= 62.0' Slope= 0.0273 '/'
 Inlet Invert= 593.70', Outlet Invert= 592.01'

**Reach DP-3: 24" RCP @ Long Meadow Road**

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 17

Hydrograph for Reach DP-3: 24" RCP @ Long Meadow Road

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	0.00	0	593.70	0.00
5.50	0.00	0	593.70	0.00
6.00	0.00	0	593.70	0.00
6.50	0.00	0	593.70	0.00
7.00	0.00	0	593.70	0.00
7.50	0.00	0	593.70	0.00
8.00	0.00	0	593.70	0.00
8.50	0.00	0	593.70	0.00
9.00	0.00	0	593.70	0.00
9.50	0.00	0	593.71	0.00
10.00	0.02	1	593.74	0.02
10.50	0.05	1	593.75	0.05
11.00	0.09	2	593.77	0.09
11.50	0.20	4	593.80	0.20
12.00	2.39	22	594.04	2.31
12.50	1.38	15	593.96	1.40
13.00	0.56	8	593.87	0.57
13.50	0.44	7	593.85	0.45
14.00	0.37	6	593.84	0.37
14.50	0.32	5	593.83	0.32
15.00	0.29	5	593.82	0.29
15.50	0.25	5	593.82	0.25
16.00	0.21	4	593.81	0.21
16.50	0.18	4	593.80	0.18
17.00	0.17	3	593.80	0.17
17.50	0.15	3	593.79	0.15
18.00	0.13	3	593.79	0.13
18.50	0.12	3	593.78	0.12
19.00	0.11	3	593.78	0.11
19.50	0.11	3	593.78	0.11
20.00	0.10	2	593.78	0.10

Proposed Conditions_DP-3

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Type III 24-hr 1-YEAR Rainfall=3.00"

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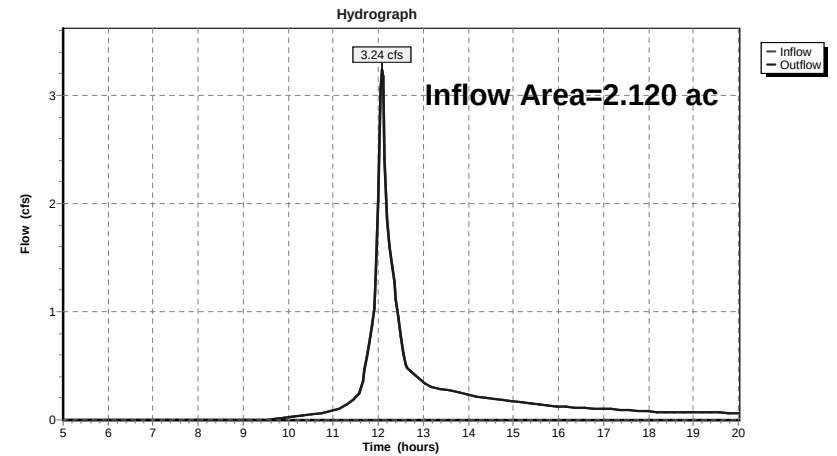
Page 18

Summary for Reach SF: Sandfilters

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

Inflow Area = 2.120 ac, 35.85% Impervious, Inflow Depth > 1.21" for 1-YEAR event
 Inflow = 3.24 cfs @ 12.08 hrs, Volume= 0.214 af
 Outflow = 3.24 cfs @ 12.08 hrs, Volume= 0.214 af, Atten= 0%, Lag= 0.0 min

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

Reach SF: Sandfilters

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 19

Hydrograph for Reach SF: Sandfilters

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
5.00	0.00		0.00	18.00	0.08		0.08
5.25	0.00		0.00	18.25	0.08		0.08
5.50	0.00		0.00	18.50	0.07		0.07
5.75	0.00		0.00	18.75	0.07		0.07
6.00	0.00		0.00	19.00	0.07		0.07
6.25	0.00		0.00	19.25	0.07		0.07
6.50	0.00		0.00	19.50	0.07		0.07
6.75	0.00		0.00	19.75	0.07		0.07
7.00	0.00		0.00	20.00	0.06		0.06
7.25	0.00		0.00				
7.50	0.00		0.00				
7.75	0.00		0.00				
8.00	0.00		0.00				
8.25	0.00		0.00				
8.50	0.00		0.00				
8.75	0.00		0.00				
9.00	0.00		0.00				
9.25	0.00		0.00				
9.50	0.00		0.00				
9.75	0.01		0.01				
10.00	0.02		0.02				
10.25	0.03		0.03				
10.50	0.05		0.05				
10.75	0.07		0.07				
11.00	0.09		0.09				
11.25	0.13		0.13				
11.50	0.19		0.19				
11.75	0.58		0.58				
12.00	2.03		2.03				
12.25	1.61		1.61				
12.50	0.77		0.77				
12.75	0.44		0.44				
13.00	0.35		0.35				
13.25	0.30		0.30				
13.50	0.28		0.28				
13.75	0.25		0.25				
14.00	0.23		0.23				
14.25	0.21		0.21				
14.50	0.20		0.20				
14.75	0.19		0.19				
15.00	0.18		0.18				
15.25	0.16		0.16				
15.50	0.15		0.15				
15.75	0.14		0.14				
16.00	0.13		0.13				
16.25	0.12		0.12				
16.50	0.11		0.11				
16.75	0.11		0.11				
17.00	0.10		0.10				
17.25	0.10		0.10				
17.50	0.09		0.09				
17.75	0.08		0.08				

Proposed Conditions_DP-3

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 20

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 1P: Bioretention Peak Elev=619.87' Storage=0.187 af Inflow=7.75 cfs 0.609 af
Discarded=0.20 cfs 0.172 af Primary=4.21 cfs 0.291 af Outflow=4.41 cfs 0.463 af

Subcatchment DA-3A: Drainage Area-3A Runoff Area=1.810 ac 8.84% Impervious Runoff Depth>1.95"
Flow Length=330' Tc=11.8 min CN=71 Runoff=3.63 cfs 0.294 af

Subcatchment DA-3B: Drainage Area-3B Runoff Area=2.120 ac 35.85% Impervious Runoff Depth>2.79"
Tc=5.0 min CN=81 Runoff=7.41 cfs 0.493 af

Subcatchment DA-3C: Drainage Area-3C Runoff Area=2.800 ac 36.43% Impervious Runoff Depth>2.61"
Flow Length=530' Tc=10.9 min CN=79 Runoff=7.75 cfs 0.609 af

Reach DP-3: 24" RCP @ Long Avg. Flow Depth=0.76' Max Vel=10.43 fps Inflow=11.61 cfs 1.078 af
24.0" Round Pipe n=0.013 L=62.0' S=0.0273 ' S=0.0273 ' Capacity=37.35 cfs Outflow=11.42 cfs 1.078 af

Reach SF: Sandfilters Inflow=7.41 cfs 0.493 af
Outflow=7.41 cfs 0.493 af

Total Runoff Area = 6.730 ac Runoff Volume = 1.396 af Average Runoff Depth = 2.49"
71.17% Pervious = 4.790 ac 28.83% Impervious = 1.940 ac

Summary for Pond 1P: Bioretention

Inflow Area = 2.800 ac, 36.43% Impervious, Inflow Depth > 2.61" for 10-YEAR event
Inflow = 7.75 cfs @ 12.16 hrs, Volume= 0.609 af
Outflow = 4.41 cfs @ 12.36 hrs, Volume= 0.463 af, Atten= 43%, Lag= 12.1 min
Discarded = 0.20 cfs @ 10.65 hrs, Volume= 0.172 af
Primary = 4.21 cfs @ 12.36 hrs, Volume= 0.291 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 619.87' @ 12.36 hrs Surf.Area= 0.100 ac Storage= 0.187 af

Plug-Flow detention time= 92.0 min calculated for 0.461 af (76% of inflow)
Center-of-Mass det. time= 33.9 min (826.9 - 793.1)

Volume	Invert	Avail.Storage	Storage Description
#1	618.00'	0.600 af	Custom Stage Data (Prismatic) Listed below (Recalc)

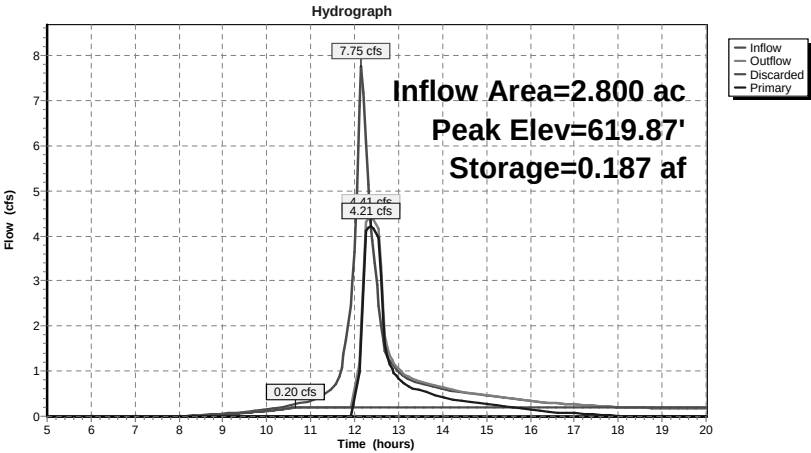
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
618.00	0.100	0.000	0.000
624.00	0.100	0.600	0.600

Device	Routing	Invert	Outlet Devices
#1	Primary	618.00'	12.0" Round Culvert L= 50.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 618.00' / 617.50' S= 0.0100 '/' Cc= 0.900 n= 0.013
#2	Device 1	619.50'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Discarded	618.00'	2.000 in/hr Exfiltration over Horizontal area

Discarded OutFlow Max=0.20 cfs @ 10.65 hrs HW=618.06' (Free Discharge)
3=Exfiltration (Exfiltration Controls 0.20 cfs)

Primary OutFlow Max=4.20 cfs @ 12.36 hrs HW=619.87' (Free Discharge)
1=Culvert (Barrel Controls 4.20 cfs @ 5.35 fps)
2=Orifice/Grate (Passes 4.20 cfs of 11.54 cfs potential flow)

Pond 1P: Bioretention



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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 23

Hydrograph for Pond 1P: Bioretention

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
5.00	0.00	0.000	618.00	0.00	0.00	0.00
5.50	0.00	0.000	618.00	0.00	0.00	0.00
6.00	0.00	0.000	618.00	0.00	0.00	0.00
6.50	0.00	0.000	618.00	0.00	0.00	0.00
7.00	0.00	0.000	618.00	0.00	0.00	0.00
7.50	0.00	0.000	618.00	0.00	0.00	0.00
8.00	0.00	0.000	618.00	0.00	0.00	0.00
8.50	0.03	0.000	618.00	0.01	0.01	0.00
9.00	0.06	0.001	618.01	0.04	0.04	0.00
9.50	0.10	0.002	618.02	0.07	0.07	0.00
10.00	0.15	0.003	618.03	0.12	0.12	0.00
10.50	0.24	0.005	618.05	0.18	0.18	0.00
11.00	0.35	0.009	618.09	0.20	0.20	0.00
11.50	0.63	0.020	618.20	0.20	0.20	0.00
12.00	3.64	0.078	618.78	0.20	0.20	0.00
12.50	2.91	0.178	619.78	4.27	0.20	4.07
13.00	0.99	0.156	619.56	1.04	0.20	0.84
13.50	0.74	0.154	619.54	0.76	0.20	0.56
14.00	0.61	0.153	619.53	0.63	0.20	0.43
14.50	0.52	0.153	619.53	0.54	0.20	0.33
15.00	0.46	0.152	619.52	0.47	0.20	0.27
15.50	0.39	0.152	619.52	0.41	0.20	0.21
16.00	0.33	0.151	619.51	0.34	0.20	0.14
16.50	0.29	0.151	619.51	0.29	0.20	0.09
17.00	0.26	0.150	619.50	0.26	0.20	0.06
17.50	0.23	0.150	619.50	0.24	0.20	0.03
18.00	0.20	0.150	619.50	0.21	0.20	0.00
18.50	0.19	0.150	619.50	0.20	0.20	0.00
19.00	0.18	0.149	619.49	0.20	0.20	0.00
19.50	0.17	0.148	619.48	0.20	0.20	0.00
20.00	0.16	0.146	619.46	0.20	0.20	0.00

Proposed Conditions_DP-3

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 24

Summary for Subcatchment DA-3A: Drainage Area-3A

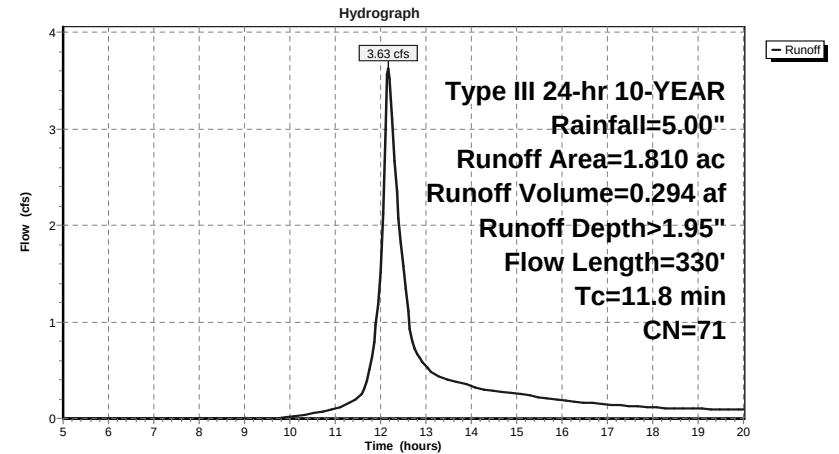
Runoff = 3.63 cfs @ 12.17 hrs, Volume= 0.294 af, Depth> 1.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
0.890	70	Woods, Good, HSG C
0.610	65	Brush, Good, HSG C
* 0.160	98	Paved roads, HSG C
* 0.010	74	Pavers, HSG C
0.140	74	>75% Grass cover, Good, HSG C
1.810	71	Weighted Average
1.650		91.16% Pervious Area
0.160		8.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.5	230	0.0630	7.47	70.93	Channel Flow, Area= 9.5 sf Perim= 16.2' r= 0.59' n= 0.035 Earth, dense weeds
11.8	330	Total			

Subcatchment DA-3A: Drainage Area-3A

Proposed Conditions_DP-3

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 25

Hydrograph for Subcatchment DA-3A: Drainage Area-3A

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.28	0.00	0.00	18.00	4.64	1.85	0.11
5.25	0.30	0.00	0.00	18.25	4.66	1.86	0.11
5.50	0.32	0.00	0.00	18.50	4.68	1.88	0.10
5.75	0.34	0.00	0.00	18.75	4.70	1.89	0.10
6.00	0.36	0.00	0.00	19.00	4.72	1.90	0.10
6.25	0.38	0.00	0.00	19.25	4.73	1.92	0.10
6.50	0.40	0.00	0.00	19.50	4.75	1.93	0.09
6.75	0.43	0.00	0.00	19.75	4.77	1.94	0.09
7.00	0.45	0.00	0.00	20.00	4.79	1.96	0.09
7.25	0.48	0.00	0.00				
7.50	0.51	0.00	0.00				
7.75	0.54	0.00	0.00				
8.00	0.57	0.00	0.00				
8.25	0.60	0.00	0.00				
8.50	0.64	0.00	0.00				
8.75	0.68	0.00	0.00				
9.00	0.73	0.00	0.00				
9.25	0.78	0.00	0.00				
9.50	0.83	0.00	0.00				
9.75	0.89	0.00	0.01				
10.00	0.95	0.00	0.02				
10.25	1.01	0.01	0.03				
10.50	1.08	0.02	0.05				
10.75	1.16	0.03	0.07				
11.00	1.25	0.04	0.10				
11.25	1.36	0.06	0.14				
11.50	1.49	0.10	0.22				
11.75	1.78	0.18	0.50				
12.00	2.50	0.49	1.51				
12.25	3.22	0.89	3.10				
12.50	3.51	1.07	1.58				
12.75	3.64	1.16	0.72				
13.00	3.75	1.23	0.54				
13.25	3.84	1.28	0.44				
13.50	3.92	1.34	0.40				
13.75	3.99	1.39	0.37				
14.00	4.06	1.43	0.33				
14.25	4.11	1.47	0.30				
14.50	4.17	1.51	0.29				
14.75	4.22	1.55	0.27				
15.00	4.27	1.58	0.25				
15.25	4.32	1.61	0.24				
15.50	4.36	1.64	0.22				
15.75	4.40	1.67	0.20				
16.00	4.43	1.70	0.18				
16.25	4.46	1.72	0.17				
16.50	4.49	1.74	0.16				
16.75	4.52	1.76	0.15				
17.00	4.55	1.78	0.15				
17.25	4.57	1.80	0.14				
17.50	4.60	1.82	0.13				
17.75	4.62	1.83	0.12				

Proposed Conditions_DP-3

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 26

Summary for Subcatchment DA-3B: Drainage Area -3B

An initial abstraction was calculated for the volume intercepted by the Green Roof. Assuming 1" of storage in depression and an average of 20% porosity in the subsoil yields approximately 0.183cu-ft of storage per 1ft x 1ft x 0.5ft of subsoil stratum. Using this results yields an initial abstraction (Ia) of 2.196 inches. Using Table 5-1 in the TR-55 this corresponds to a CN of 48. Therefore for all Green Roofs a CN of 48 has been used.

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

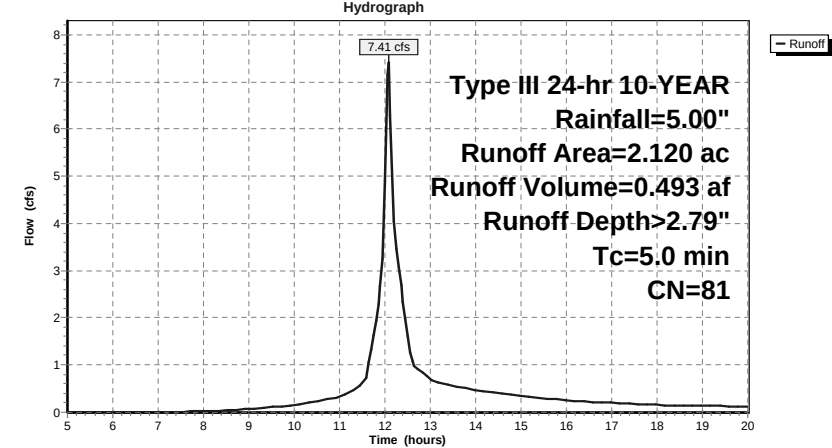
Runoff = 7.41 cfs @ 12.08 hrs, Volume= 0.493 af, Depth> 2.79"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description			
* 0.420	68	Green Roof, HSG C			
0.040	74	>75% Grass cover, Good, HSG C			
0.760	98	Paved parking, HSG C			
0.080	70	Woods, Good, HSG C			
* 0.760	72	Restored Woods			
* 0.060	74	Open Space			
2.120	81	Weighted Average			
1.360		64.15% Pervious Area			
0.760		35.85% Impervious Area			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, User Def Min.

Subcatchment DA-3B: Drainage Area -3B



Hydrograph for Subcatchment DA-3B: Drainage Area -3B

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.28	0.00	0.00	18.00	4.64	2.67	0.15
5.25	0.30	0.00	0.00	18.25	4.66	2.69	0.15
5.50	0.32	0.00	0.00	18.50	4.68	2.70	0.14
5.75	0.34	0.00	0.00	18.75	4.70	2.72	0.14
6.00	0.36	0.00	0.00	19.00	4.72	2.74	0.14
6.25	0.38	0.00	0.00	19.25	4.73	2.75	0.13
6.50	0.40	0.00	0.00	19.50	4.75	2.77	0.13
6.75	0.43	0.00	0.00	19.75	4.77	2.78	0.13
7.00	0.45	0.00	0.00	20.00	4.79	2.80	0.12
7.25	0.48	0.00	0.00				
7.50	0.51	0.00	0.01				
7.75	0.54	0.00	0.01				
8.00	0.57	0.00	0.02				
8.25	0.60	0.01	0.03				
8.50	0.64	0.01	0.04				
8.75	0.68	0.02	0.05				
9.00	0.73	0.03	0.07				
9.25	0.78	0.04	0.09				
9.50	0.83	0.05	0.11				
9.75	0.89	0.06	0.13				
10.00	0.95	0.08	0.15				
10.25	1.01	0.10	0.19				
10.50	1.08	0.13	0.23				
10.75	1.16	0.16	0.27				
11.00	1.25	0.20	0.32				
11.25	1.36	0.24	0.44				
11.50	1.49	0.31	0.60				
11.75	1.78	0.47	1.63				
12.00	2.50	0.94	4.92				
12.25	3.22	1.49	3.45				
12.50	3.51	1.72	1.61				
12.75	3.64	1.83	0.90				
13.00	3.75	1.91	0.71				
13.25	3.84	1.99	0.61				
13.50	3.92	2.05	0.56				
13.75	3.99	2.11	0.51				
14.00	4.06	2.17	0.46				
14.25	4.11	2.22	0.43				
14.50	4.17	2.27	0.40				
14.75	4.22	2.31	0.38				
15.00	4.27	2.35	0.35				
15.25	4.32	2.39	0.32				
15.50	4.36	2.43	0.30				
15.75	4.40	2.46	0.27				
16.00	4.43	2.49	0.25				
16.25	4.46	2.51	0.23				
16.50	4.49	2.54	0.22				
16.75	4.52	2.57	0.21				
17.00	4.55	2.59	0.20				
17.25	4.57	2.61	0.19				
17.50	4.60	2.63	0.18				
17.75	4.62	2.65	0.16				

Summary for Subcatchment DA-3C: Drainage Area-3C

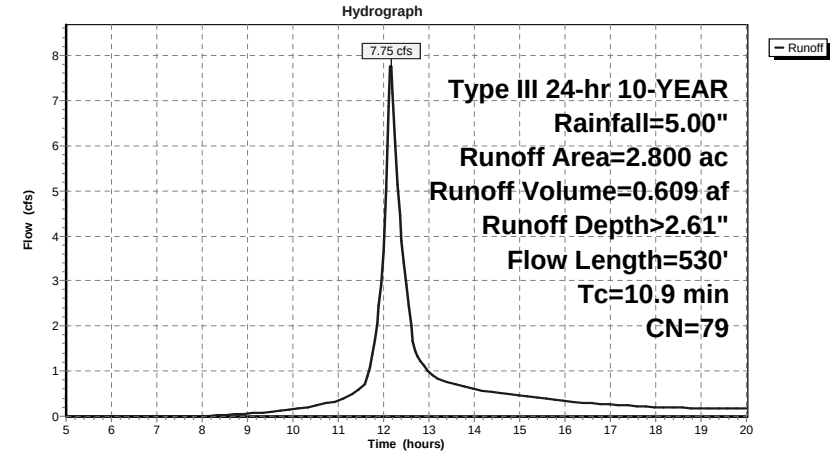
Runoff = 7.75 cfs @ 12.16 hrs, Volume= 0.609 af, Depth> 2.61"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
0.890	74	>75% Grass cover, Good, HSG C
* 0.180	30	Sandpit
1.020	98	Paved parking, HSG C
* 0.160	74	Pavers, HSG C
0.350	70	Woods, Good, HSG C
0.180	65	Brush, Good, HSG C
* 0.020	74	Bioretention
2.800	79	Weighted Average
1.780		63.57% Pervious Area
1.020		36.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	100	0.1300	0.17		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.2	430	0.0740	6.16	18.49	Channel Flow, Area= 3.0 sf Perim= 6.3' r= 0.48' n= 0.040 Earth, cobble bottom, clean sides
10.9	530	Total			

Subcatchment DA-3C: Drainage Area-3C



Proposed Conditions_DP-3

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 31

Hydrograph for Subcatchment DA-3C: Drainage Area-3C

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.28	0.00	0.00	18.00	4.64	2.49	0.20
5.25	0.30	0.00	0.00	18.25	4.66	2.51	0.19
5.50	0.32	0.00	0.00	18.50	4.68	2.53	0.19
5.75	0.34	0.00	0.00	18.75	4.70	2.54	0.18
6.00	0.36	0.00	0.00	19.00	4.72	2.56	0.18
6.25	0.38	0.00	0.00	19.25	4.73	2.57	0.17
6.50	0.40	0.00	0.00	19.50	4.75	2.59	0.17
6.75	0.43	0.00	0.00	19.75	4.77	2.60	0.16
7.00	0.45	0.00	0.00	20.00	4.79	2.62	0.16
7.25	0.48	0.00	0.00				
7.50	0.51	0.00	0.00				
7.75	0.54	0.00	0.00				
8.00	0.57	0.00	0.00				
8.25	0.60	0.00	0.01				
8.50	0.64	0.00	0.03				
8.75	0.68	0.01	0.04				
9.00	0.73	0.01	0.06				
9.25	0.78	0.02	0.08				
9.50	0.83	0.03	0.10				
9.75	0.89	0.04	0.13				
10.00	0.95	0.06	0.15				
10.25	1.01	0.07	0.19				
10.50	1.08	0.09	0.24				
10.75	1.16	0.12	0.29				
11.00	1.25	0.15	0.35				
11.25	1.36	0.19	0.45				
11.50	1.49	0.25	0.63				
11.75	1.78	0.40	1.36				
12.00	2.50	0.84	3.64				
12.25	3.22	1.35	6.06				
12.50	3.51	1.57	2.91				
12.75	3.64	1.68	1.31				
13.00	3.75	1.76	0.99				
13.25	3.84	1.83	0.81				
13.50	3.92	1.90	0.74				
13.75	3.99	1.96	0.67				
14.00	4.06	2.01	0.61				
14.25	4.11	2.06	0.56				
14.50	4.17	2.10	0.52				
14.75	4.22	2.15	0.49				
15.00	4.27	2.19	0.46				
15.25	4.32	2.22	0.43				
15.50	4.36	2.26	0.39				
15.75	4.40	2.29	0.36				
16.00	4.43	2.32	0.33				
16.25	4.46	2.34	0.30				
16.50	4.49	2.37	0.29				
16.75	4.52	2.39	0.27				
17.00	4.55	2.42	0.26				
17.25	4.57	2.44	0.24				
17.50	4.60	2.46	0.23				
17.75	4.62	2.48	0.22				

Proposed Conditions_DP-3

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 32

Summary for Reach DP-3: 24" RCP @ Long Meadow Road

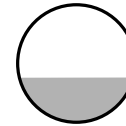
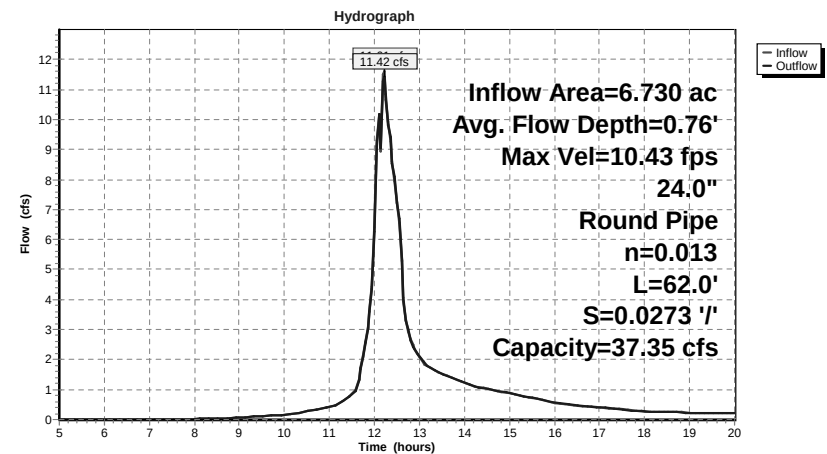
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 6.730 ac, 28.83% Impervious, Inflow Depth > 1.92" for 10-YEAR event
 Inflow = 11.61 cfs @ 12.21 hrs, Volume= 1.078 af
 Outflow = 11.42 cfs @ 12.22 hrs, Volume= 1.078 af, Atten= 2%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 10.43 fps, Min. Travel Time= 0.1 min
 Avg. Velocity = 4.17 fps, Avg. Travel Time= 0.2 min

Peak Storage= 68 cf @ 12.22 hrs
 Average Depth at Peak Storage= 0.76'
 Bank-Full Depth= 2.00', Capacity at Bank-Full= 37.35 cfs

24.0" Round Pipe
 n= 0.013
 Length= 62.0' Slope= 0.0273 '/
 Inlet Invert= 593.70', Outlet Invert= 592.01'

**Reach DP-3: 24" RCP @ Long Meadow Road**

Proposed Conditions_DP-3

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 33

Hydrograph for Reach DP-3: 24" RCP @ Long Meadow Road

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	0.00	0	593.70	0.00
5.50	0.00	0	593.70	0.00
6.00	0.00	0	593.70	0.00
6.50	0.00	0	593.70	0.00
7.00	0.00	0	593.70	0.00
7.50	0.01	0	593.72	0.01
8.00	0.02	1	593.73	0.02
8.50	0.04	1	593.75	0.04
9.00	0.07	2	593.76	0.07
9.50	0.11	3	593.78	0.11
10.00	0.17	4	593.80	0.17
10.50	0.28	5	593.82	0.28
11.00	0.42	7	593.85	0.42
11.50	0.82	10	593.90	0.81
12.00	6.42	44	594.26	6.27
12.50	7.26	49	594.29	7.21
13.00	2.09	20	594.02	2.07
13.50	1.52	16	593.98	1.52
14.00	1.22	14	593.95	1.22
14.50	1.02	12	593.93	1.02
15.00	0.87	11	593.91	0.88
15.50	0.72	10	593.89	0.73
16.00	0.57	8	593.87	0.57
16.50	0.47	7	593.86	0.47
17.00	0.41	6	593.85	0.41
17.50	0.34	6	593.83	0.34
18.00	0.27	5	593.82	0.27
18.50	0.25	5	593.82	0.25
19.00	0.24	4	593.81	0.24
19.50	0.22	4	593.81	0.22
20.00	0.21	4	593.81	0.21

Proposed Conditions_DP-3

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Type III 24-hr 10-YEAR Rainfall=5.00"

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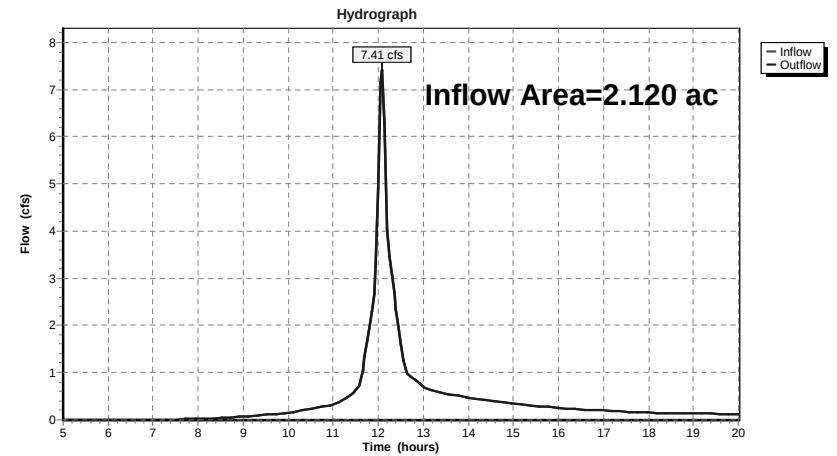
Page 34

Summary for Reach SF: Sandfilters

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

Inflow Area = 2.120 ac, 35.85% Impervious, Inflow Depth > 2.79" for 10-YEAR event
 Inflow = 7.41 cfs @ 12.08 hrs, Volume= 0.493 af
 Outflow = 7.41 cfs @ 12.08 hrs, Volume= 0.493 af, Atten= 0%, Lag= 0.0 min

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

Reach SF: Sandfilters

Proposed Conditions_DP-3

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 35

Hydrograph for Reach SF: Sandfilters

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
5.00	0.00		0.00	18.00	0.15		0.15
5.25	0.00		0.00	18.25	0.15		0.15
5.50	0.00		0.00	18.50	0.14		0.14
5.75	0.00		0.00	18.75	0.14		0.14
6.00	0.00		0.00	19.00	0.14		0.14
6.25	0.00		0.00	19.25	0.13		0.13
6.50	0.00		0.00	19.50	0.13		0.13
6.75	0.00		0.00	19.75	0.13		0.13
7.00	0.00		0.00	20.00	0.12		0.12
7.25	0.00		0.00				
7.50	0.01		0.01				
7.75	0.01		0.01				
8.00	0.02		0.02				
8.25	0.03		0.03				
8.50	0.04		0.04				
8.75	0.05		0.05				
9.00	0.07		0.07				
9.25	0.09		0.09				
9.50	0.11		0.11				
9.75	0.13		0.13				
10.00	0.15		0.15				
10.25	0.19		0.19				
10.50	0.23		0.23				
10.75	0.27		0.27				
11.00	0.32		0.32				
11.25	0.44		0.44				
11.50	0.60		0.60				
11.75	1.63		1.63				
12.00	4.92		4.92				
12.25	3.45		3.45				
12.50	1.61		1.61				
12.75	0.90		0.90				
13.00	0.71		0.71				
13.25	0.61		0.61				
13.50	0.56		0.56				
13.75	0.51		0.51				
14.00	0.46		0.46				
14.25	0.43		0.43				
14.50	0.40		0.40				
14.75	0.38		0.38				
15.00	0.35		0.35				
15.25	0.32		0.32				
15.50	0.30		0.30				
15.75	0.27		0.27				
16.00	0.25		0.25				
16.25	0.23		0.23				
16.50	0.22		0.22				
16.75	0.21		0.21				
17.00	0.20		0.20				
17.25	0.19		0.19				
17.50	0.18		0.18				
17.75	0.16		0.16				

Proposed Conditions_DP-3

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 36

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 1P: Bioretention Peak Elev=621.53' Storage=0.353 af Inflow=14.58 cfs 1.166 af
Discarded=0.20 cfs 0.201 af Primary=6.27 cfs 0.815 af Outflow=6.47 cfs 1.016 af

Subcatchment DA-3A: Drainage Area-3A Runoff Area=1.810 ac 8.84% Impervious Runoff Depth>4.10"
Flow Length=330' Tc=11.8 min CN=71 Runoff=7.68 cfs 0.619 af

Subcatchment DA-3B: Drainage Area-3B Runoff Area=2.120 ac 35.85% Impervious Runoff Depth>5.23"
Tc=5.0 min CN=81 Runoff=13.63 cfs 0.925 af

Subcatchment DA-3C: Drainage Area-3C Runoff Area=2.800 ac 36.43% Impervious Runoff Depth>5.00"
Flow Length=530' Tc=10.9 min CN=79 Runoff=14.58 cfs 1.166 af

Reach DP-3: 24" RCP @ Long Avg. Flow Depth=1.18' Max Vel=12.67 fps Inflow=24.38 cfs 2.359 af
24.0" Round Pipe n=0.013 L=62.0' S=0.0273 ' /' Capacity=37.35 cfs Outflow=24.32 cfs 2.359 af

Reach SF: Sandfilters Inflow=13.63 cfs 0.925 af
Outflow=13.63 cfs 0.925 af

Total Runoff Area = 6.730 ac Runoff Volume = 2.710 af Average Runoff Depth = 4.83"
71.17% Pervious = 4.790 ac 28.83% Impervious = 1.940 ac

Summary for Pond 1P: Bioretention

Inflow Area = 2.800 ac, 36.43% Impervious, Inflow Depth > 5.00" for 100-YEAR event
Inflow = 14.58 cfs @ 12.15 hrs, Volume= 1.166 af
Outflow = 6.47 cfs @ 12.43 hrs, Volume= 1.016 af, Atten= 56%, Lag= 16.6 min
Discarded = 0.20 cfs @ 9.05 hrs, Volume= 0.201 af
Primary = 6.27 cfs @ 12.43 hrs, Volume= 0.815 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 621.53' @ 12.43 hrs Surf.Area= 0.100 ac Storage= 0.353 af

Plug-Flow detention time= 66.7 min calculated for 1.016 af (87% of inflow)
Center-of-Mass det. time= 27.4 min (805.3 - 777.9)

Volume	Invert	Avail.Storage	Storage Description
#1	618.00'	0.600 af	Custom Stage Data (Prismatic) Listed below (Recalc)

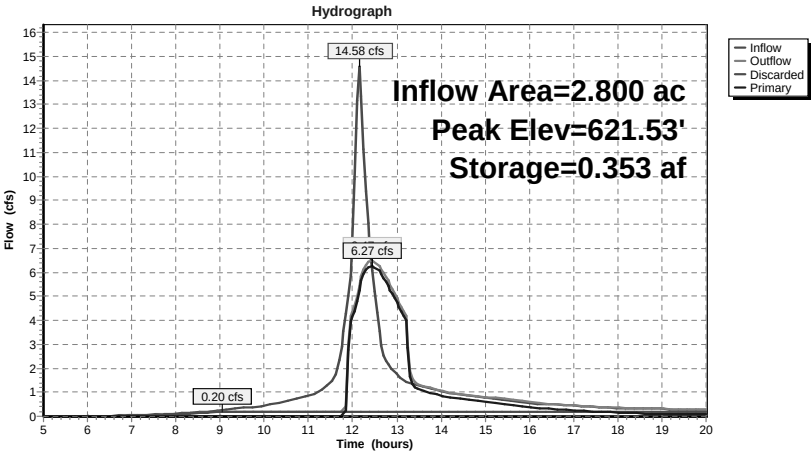
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
618.00	0.100	0.000	0.000
624.00	0.100	0.600	0.600

Device	Routing	Invert	Outlet Devices
#1	Primary	618.00'	12.0" Round Culvert L= 50.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 618.00' / 617.50' S= 0.0100 '/' Cc= 0.900 n= 0.013
#2	Device 1	619.50'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Discarded	618.00'	2.000 in/hr Exfiltration over Horizontal area

Discarded OutFlow Max=0.20 cfs @ 9.05 hrs HW=618.06' (Free Discharge)
3=Exfiltration (Exfiltration Controls 0.20 cfs)

Primary OutFlow Max=6.26 cfs @ 12.43 hrs HW=621.53' (Free Discharge)
1=Culvert (Barrel Controls 6.26 cfs @ 7.97 fps)
2=Orifice/Grate (Passes 6.26 cfs of 109.77 cfs potential flow)

Pond 1P: Bioretention



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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 39

Hydrograph for Pond 1P: Bioretention

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
5.00	0.00	0.000	618.00	0.00	0.00	0.00
5.50	0.00	0.000	618.00	0.00	0.00	0.00
6.00	0.00	0.000	618.00	0.00	0.00	0.00
6.50	0.02	0.000	618.00	0.01	0.01	0.00
7.00	0.05	0.001	618.01	0.03	0.03	0.00
7.50	0.08	0.002	618.02	0.06	0.06	0.00
8.00	0.11	0.003	618.03	0.09	0.09	0.00
8.50	0.17	0.004	618.04	0.13	0.13	0.00
9.00	0.25	0.006	618.06	0.20	0.20	0.00
9.50	0.34	0.010	618.10	0.20	0.20	0.00
10.00	0.45	0.018	618.18	0.20	0.20	0.00
10.50	0.62	0.031	618.31	0.20	0.20	0.00
11.00	0.84	0.053	618.53	0.20	0.20	0.00
11.50	1.41	0.089	618.89	0.20	0.20	0.00
12.00	7.22	0.181	619.81	4.32	0.20	4.12
12.50	5.18	0.350	621.50	6.43	0.20	6.23
13.00	1.73	0.223	620.23	4.93	0.20	4.73
13.50	1.28	0.157	619.57	1.31	0.20	1.11
14.00	1.05	0.156	619.56	1.07	0.20	0.87
14.50	0.90	0.156	619.56	0.92	0.20	0.72
15.00	0.79	0.155	619.55	0.81	0.20	0.61
15.50	0.68	0.154	619.54	0.70	0.20	0.50
16.00	0.56	0.153	619.53	0.58	0.20	0.38
16.50	0.49	0.152	619.52	0.50	0.20	0.30
17.00	0.44	0.152	619.52	0.45	0.20	0.25
17.50	0.39	0.152	619.52	0.40	0.20	0.20
18.00	0.34	0.151	619.51	0.35	0.20	0.15
18.50	0.31	0.151	619.51	0.32	0.20	0.12
19.00	0.30	0.151	619.51	0.30	0.20	0.10
19.50	0.28	0.151	619.51	0.29	0.20	0.09
20.00	0.27	0.151	619.51	0.27	0.20	0.07

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 40

Summary for Subcatchment DA-3A: Drainage Area-3A

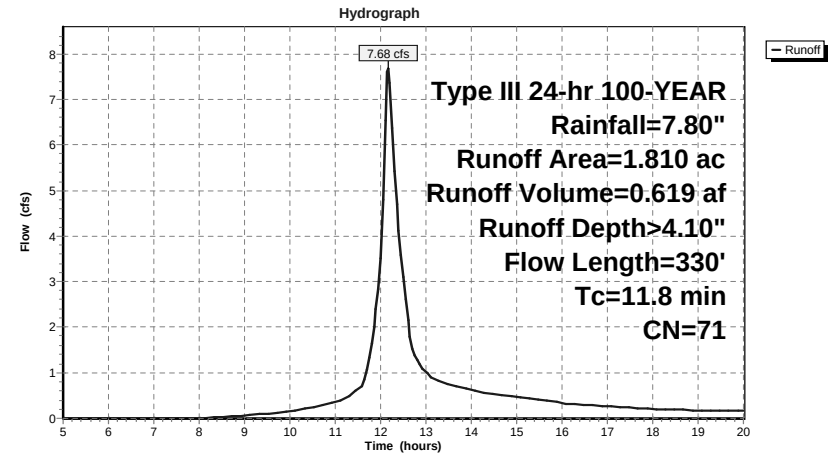
Runoff = 7.68 cfs @ 12.17 hrs, Volume= 0.619 af, Depth> 4.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
0.890	70	Woods, Good, HSG C
0.610	65	Brush, Good, HSG C
0.160	98	Paved roads, HSG C
0.010	74	Pavers, HSG C
0.140	74	>75% Grass cover, Good, HSG C
1.810	71	Weighted Average
1.650		91.16% Pervious Area
0.160		8.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0900	0.15		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.5	230	0.0630	7.47	70.93	Channel Flow, Area= 9.5 sf Perim= 16.2' r= 0.59' n= 0.035 Earth, dense weeds
11.8	330	Total			

Subcatchment DA-3A: Drainage Area-3A

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 41

Hydrograph for Subcatchment DA-3A: Drainage Area-3A

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.44	0.00	0.00	18.00	7.24	3.92	0.20
5.25	0.47	0.00	0.00	18.25	7.27	3.95	0.19
5.50	0.50	0.00	0.00	18.50	7.30	3.98	0.19
5.75	0.53	0.00	0.00	18.75	7.33	4.00	0.18
6.00	0.56	0.00	0.00	19.00	7.36	4.03	0.18
6.25	0.59	0.00	0.00	19.25	7.39	4.05	0.17
6.50	0.63	0.00	0.00	19.50	7.41	4.07	0.17
6.75	0.67	0.00	0.00	19.75	7.44	4.10	0.17
7.00	0.71	0.00	0.00	20.00	7.46	4.12	0.16
7.25	0.75	0.00	0.00				
7.50	0.79	0.00	0.00				
7.75	0.84	0.00	0.00				
8.00	0.89	0.00	0.01				
8.25	0.94	0.00	0.02				
8.50	1.00	0.01	0.03				
8.75	1.07	0.01	0.04				
9.00	1.14	0.02	0.06				
9.25	1.21	0.03	0.08				
9.50	1.29	0.05	0.10				
9.75	1.38	0.07	0.13				
10.00	1.47	0.09	0.16				
10.25	1.58	0.12	0.19				
10.50	1.69	0.15	0.24				
10.75	1.81	0.20	0.29				
11.00	1.95	0.25	0.35				
11.25	2.11	0.31	0.45				
11.50	2.32	0.41	0.64				
11.75	2.77	0.63	1.32				
12.00	3.90	1.33	3.51				
12.25	5.03	2.14	6.37				
12.50	5.48	2.48	3.09				
12.75	5.69	2.65	1.38				
13.00	5.85	2.78	1.02				
13.25	5.99	2.89	0.82				
13.50	6.11	2.99	0.75				
13.75	6.22	3.08	0.69				
14.00	6.33	3.16	0.62				
14.25	6.42	3.24	0.56				
14.50	6.51	3.31	0.53				
14.75	6.59	3.38	0.50				
15.00	6.66	3.44	0.47				
15.25	6.73	3.50	0.43				
15.50	6.80	3.55	0.40				
15.75	6.86	3.60	0.37				
16.00	6.91	3.65	0.34				
16.25	6.96	3.69	0.31				
16.50	7.01	3.73	0.29				
16.75	7.05	3.77	0.28				
17.00	7.09	3.80	0.26				
17.25	7.13	3.84	0.25				
17.50	7.17	3.87	0.23				
17.75	7.21	3.90	0.22				

Proposed Conditions_DP-3

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 42

Summary for Subcatchment DA-3B: Drainage Area -3B

An initial abstraction was calculated for the volume intercepted by the Green Roof. Assuming 1" of storage in depression and an average of 20% porosity in the subsoil yields approximately 0.183cu-ft of storage per 1ft x 1ft x 0.5ft of subsoil stratum. Using this results yields an initial abstraction (Ia) of 2.196 inches. Using Table 5-1 in the TR-55 this corresponds to a CN of 48. Therefore for all Green Roofs a CN of 48 has been used.

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

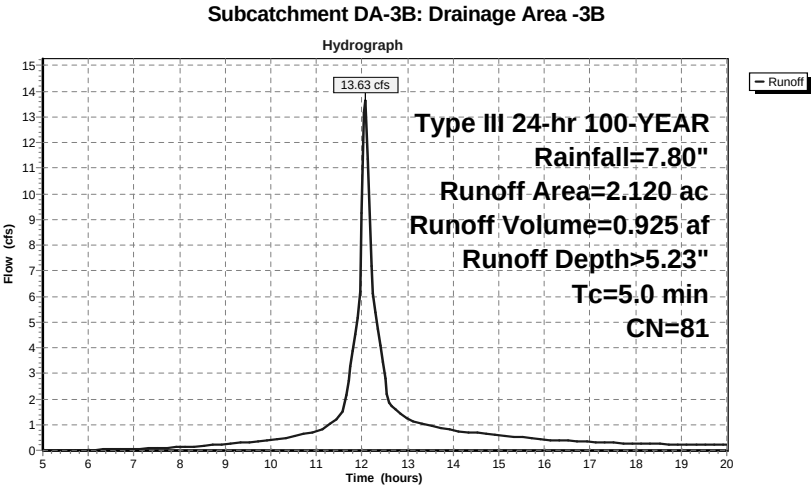
Runoff = 13.63 cfs @ 12.07 hrs, Volume= 0.925 af, Depth> 5.23"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
* 0.420	68	Green Roof, HSG C
0.040	74	>75% Grass cover, Good, HSG C
0.760	98	Paved parking, HSG C
0.080	70	Woods, Good, HSG C
* 0.760	72	Restored Woods
* 0.060	74	Open Space
2.120	81	Weighted Average
1.360		64.15% Pervious Area
0.760		35.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, User Def Min.



Hydrograph for Subcatchment DA-3B: Drainage Area -3B

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.44	0.00	0.00	18.00	7.24	5.03	0.26
5.25	0.47	0.00	0.00	18.25	7.27	5.06	0.25
5.50	0.50	0.00	0.00	18.50	7.30	5.08	0.24
5.75	0.53	0.00	0.01	18.75	7.33	5.11	0.23
6.00	0.56	0.00	0.02	19.00	7.36	5.14	0.23
6.25	0.59	0.01	0.03	19.25	7.39	5.16	0.22
6.50	0.63	0.01	0.03	19.50	7.41	5.19	0.22
6.75	0.67	0.02	0.05	19.75	7.44	5.21	0.21
7.00	0.71	0.02	0.06	20.00	7.46	5.24	0.20
7.25	0.75	0.03	0.07				
7.50	0.79	0.04	0.08				
7.75	0.84	0.05	0.10				
8.00	0.89	0.06	0.12				
8.25	0.94	0.08	0.14				
8.50	1.00	0.10	0.17				
8.75	1.07	0.12	0.20				
9.00	1.14	0.15	0.24				
9.25	1.21	0.18	0.27				
9.50	1.29	0.21	0.31				
9.75	1.38	0.26	0.36				
10.00	1.47	0.30	0.40				
10.25	1.58	0.35	0.47				
10.50	1.69	0.42	0.55				
10.75	1.81	0.49	0.64				
11.00	1.95	0.57	0.73				
11.25	2.11	0.68	0.96				
11.50	2.32	0.82	1.26				
11.75	2.77	1.14	3.28				
12.00	3.90	2.04	9.23				
12.25	5.03	3.01	6.09				
12.50	5.48	3.41	2.79				
12.75	5.69	3.60	1.55				
13.00	5.85	3.75	1.21				
13.25	5.99	3.87	1.04				
13.50	6.11	3.99	0.96				
13.75	6.22	4.09	0.87				
14.00	6.33	4.18	0.78				
14.25	6.42	4.27	0.72				
14.50	6.51	4.35	0.68				
14.75	6.59	4.42	0.63				
15.00	6.66	4.49	0.59				
15.25	6.73	4.56	0.55				
15.50	6.80	4.62	0.50				
15.75	6.86	4.67	0.46				
16.00	6.91	4.72	0.42				
16.25	6.96	4.77	0.39				
16.50	7.01	4.81	0.37				
16.75	7.05	4.85	0.35				
17.00	7.09	4.89	0.33				
17.25	7.13	4.93	0.31				
17.50	7.17	4.96	0.29				
17.75	7.21	5.00	0.27				

Summary for Subcatchment DA-3C: Drainage Area-3C

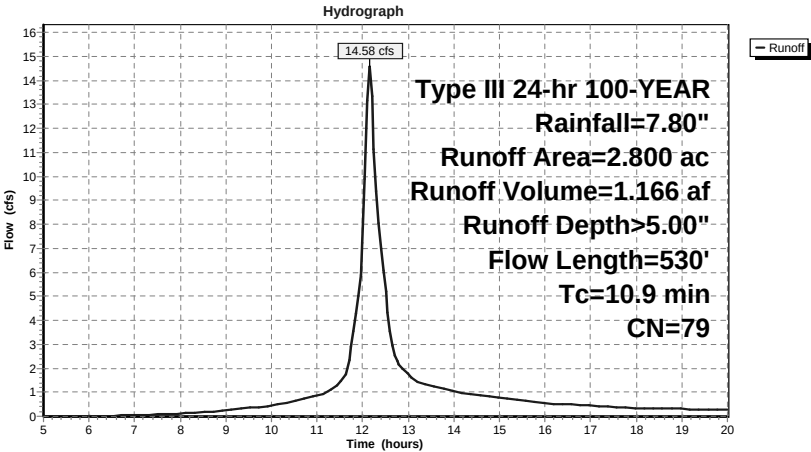
Runoff = 14.58 cfs @ 12.15 hrs, Volume= 1.166 af, Depth> 5.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
0.890	74	>75% Grass cover, Good, HSG C
* 0.180	30	Sandpit
1.020	98	Paved parking, HSG C
* 0.160	74	Pavers, HSG C
0.350	70	Woods, Good, HSG C
0.180	65	Brush, Good, HSG C
* 0.020	74	Bioretention
2.800	79	Weighted Average
1.780		63.57% Pervious Area
1.020		36.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	100	0.1300	0.17		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.2	430	0.0740	6.16	18.49	Channel Flow, Area= 3.0 sf Perim= 6.3' r= 0.48' n= 0.040 Earth, cobble bottom, clean sides
10.9	530	Total			

Subcatchment DA-3C: Drainage Area-3C



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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 47

Hydrograph for Subcatchment DA-3C: Drainage Area-3C

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.44	0.00	0.00	18.00	7.24	4.80	0.34
5.25	0.47	0.00	0.00	18.25	7.27	4.83	0.32
5.50	0.50	0.00	0.00	18.50	7.30	4.86	0.31
5.75	0.53	0.00	0.00	18.75	7.33	4.89	0.31
6.00	0.56	0.00	0.00	19.00	7.36	4.91	0.30
6.25	0.59	0.00	0.01	19.25	7.39	4.94	0.29
6.50	0.63	0.00	0.02	19.50	7.41	4.96	0.28
6.75	0.67	0.01	0.03	19.75	7.44	4.99	0.28
7.00	0.71	0.01	0.05	20.00	7.46	5.01	0.27
7.25	0.75	0.02	0.06				
7.50	0.79	0.02	0.08				
7.75	0.84	0.03	0.09				
8.00	0.89	0.04	0.11				
8.25	0.94	0.06	0.14				
8.50	1.00	0.07	0.17				
8.75	1.07	0.09	0.21				
9.00	1.14	0.11	0.25				
9.25	1.21	0.14	0.29				
9.50	1.29	0.17	0.34				
9.75	1.38	0.21	0.40				
10.00	1.47	0.25	0.45				
10.25	1.58	0.29	0.52				
10.50	1.69	0.35	0.62				
10.75	1.81	0.42	0.73				
11.00	1.95	0.49	0.84				
11.25	2.11	0.59	1.05				
11.50	2.32	0.72	1.41				
11.75	2.77	1.02	2.91				
12.00	3.90	1.88	7.22				
12.25	5.03	2.83	11.15				
12.50	5.48	3.22	5.18				
12.75	5.69	3.40	2.31				
13.00	5.85	3.55	1.73				
13.25	5.99	3.67	1.41				
13.50	6.11	3.78	1.28				
13.75	6.22	3.88	1.17				
14.00	6.33	3.97	1.05				
14.25	6.42	4.06	0.96				
14.50	6.51	4.13	0.90				
14.75	6.59	4.21	0.84				
15.00	6.66	4.28	0.79				
15.25	6.73	4.34	0.73				
15.50	6.80	4.40	0.68				
15.75	6.86	4.45	0.62				
16.00	6.91	4.50	0.56				
16.25	6.96	4.55	0.52				
16.50	7.01	4.59	0.49				
16.75	7.05	4.63	0.47				
17.00	7.09	4.67	0.44				
17.25	7.13	4.71	0.42				
17.50	7.17	4.74	0.39				
17.75	7.21	4.77	0.37				

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 48

Summary for Reach DP-3: 24" RCP @ Long Meadow Road

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 6.730 ac, 28.83% Impervious, Inflow Depth > 4.21" for 100-YEAR event
 Inflow = 24.38 cfs @ 12.10 hrs, Volume= 2.359 af
 Outflow = 24.32 cfs @ 12.10 hrs, Volume= 2.359 af, Atten= 0%, Lag= 0.1 min

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

Max. Velocity= 12.67 fps, Min. Travel Time= 0.1 min

Avg. Velocity = 4.91 fps, Avg. Travel Time= 0.2 min

Peak Storage= 119 cf @ 12.10 hrs

Average Depth at Peak Storage= 1.18'

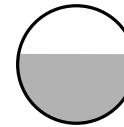
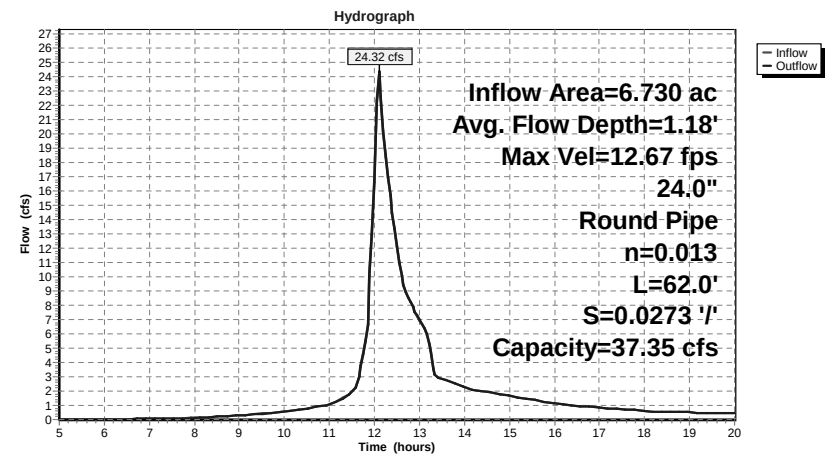
Bank-Full Depth= 2.00', Capacity at Bank-Full= 37.35 cfs

24.0" Round Pipe

n= 0.013

Length= 62.0' Slope= 0.0273 '/'

Inlet Invert= 593.70', Outlet Invert= 592.01'

**Reach DP-3: 24" RCP @ Long Meadow Road**

Proposed Conditions_DP-3

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 49

Hydrograph for Reach DP-3: 24" RCP @ Long Meadow Road

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	0.00	0	593.70	0.00
5.50	0.00	0	593.72	0.00
6.00	0.02	1	593.73	0.02
6.50	0.03	1	593.75	0.03
7.00	0.06	2	593.76	0.06
7.50	0.08	2	593.77	0.08
8.00	0.12	3	593.78	0.12
8.50	0.20	4	593.80	0.20
9.00	0.30	5	593.83	0.29
9.50	0.42	7	593.85	0.42
10.00	0.56	8	593.87	0.56
10.50	0.79	10	593.90	0.79
11.00	1.09	13	593.93	1.08
11.50	1.90	19	594.01	1.89
12.00	16.87	90	594.64	16.59
12.50	12.11	71	594.48	12.15
13.00	6.96	47	594.28	6.97
13.50	2.82	25	594.07	2.82
14.00	2.27	21	594.03	2.27
14.50	1.93	19	594.01	1.93
15.00	1.67	17	593.99	1.67
15.50	1.40	15	593.96	1.40
16.00	1.13	13	593.94	1.13
16.50	0.96	12	593.92	0.96
17.00	0.84	11	593.91	0.84
17.50	0.73	10	593.89	0.73
18.00	0.61	9	593.88	0.61
18.50	0.54	8	593.87	0.54
19.00	0.51	8	593.86	0.51
19.50	0.47	7	593.86	0.47
20.00	0.44	7	593.85	0.44

Proposed Conditions_DP-3

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Type III 24-hr 100-YEAR Rainfall=7.80"

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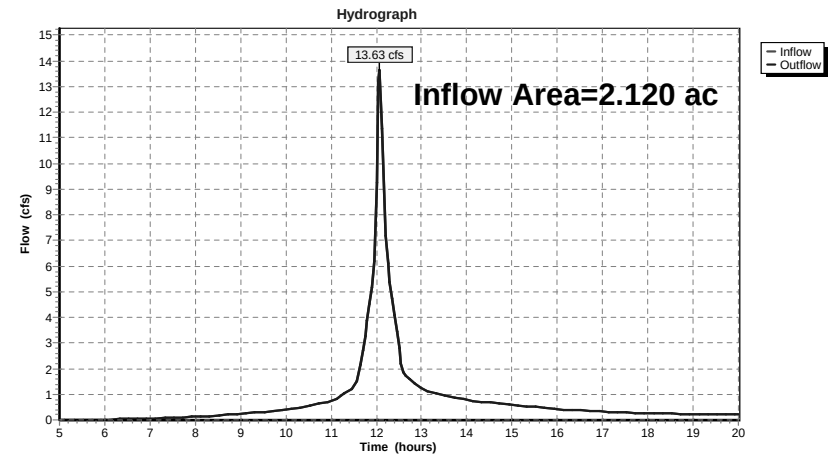
Page 50

Summary for Reach SF: Sandfilters

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

Inflow Area = 2.120 ac, 35.85% Impervious, Inflow Depth > 5.23" for 100-YEAR event
 Inflow = 13.63 cfs @ 12.07 hrs, Volume= 0.925 af
 Outflow = 13.63 cfs @ 12.07 hrs, Volume= 0.925 af, Atten= 0%, Lag= 0.0 min

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

Reach SF: Sandfilters

Proposed Conditions_DP-3

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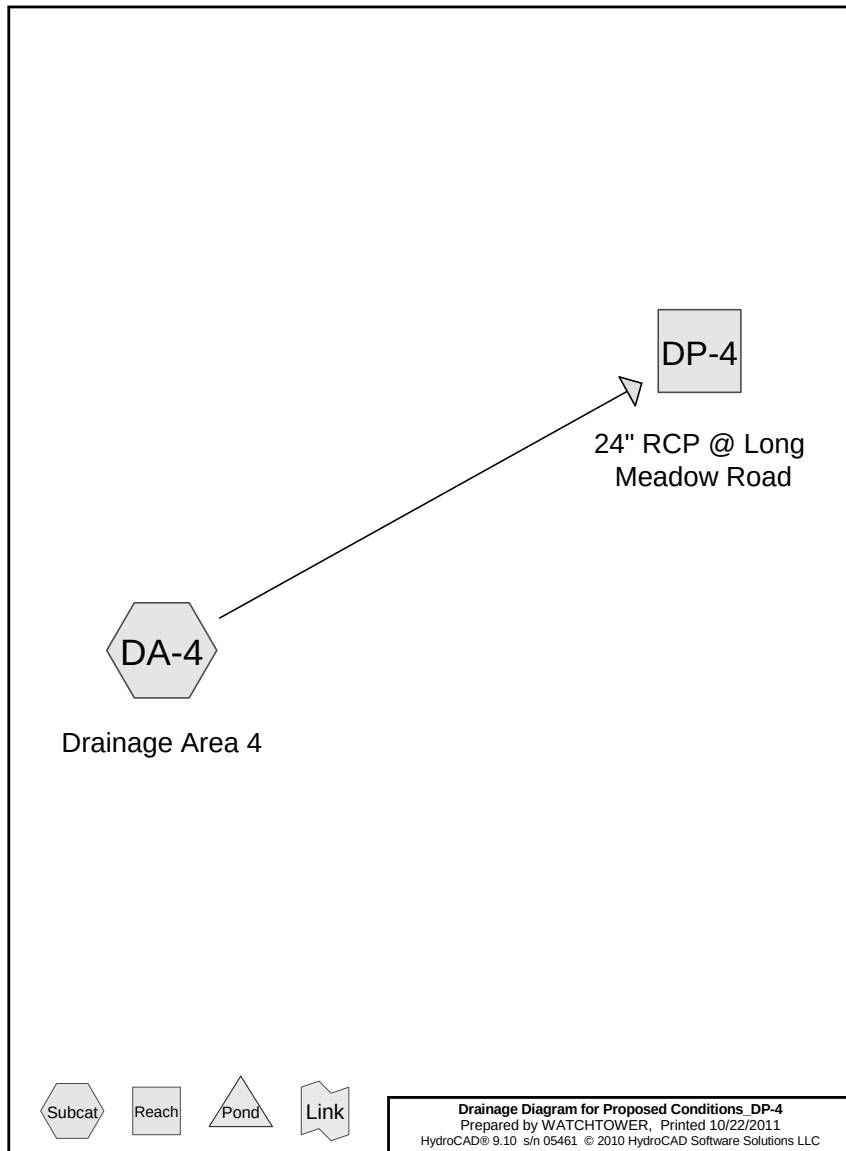
Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 51

Hydrograph for Reach SF: Sandfilters

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
5.00	0.00		0.00	18.00	0.26		0.26
5.25	0.00		0.00	18.25	0.25		0.25
5.50	0.00		0.00	18.50	0.24		0.24
5.75	0.01		0.01	18.75	0.23		0.23
6.00	0.02		0.02	19.00	0.23		0.23
6.25	0.03		0.03	19.25	0.22		0.22
6.50	0.03		0.03	19.50	0.22		0.22
6.75	0.05		0.05	19.75	0.21		0.21
7.00	0.06		0.06	20.00	0.20		0.20
7.25	0.07		0.07				
7.50	0.08		0.08				
7.75	0.10		0.10				
8.00	0.12		0.12				
8.25	0.14		0.14				
8.50	0.17		0.17				
8.75	0.20		0.20				
9.00	0.24		0.24				
9.25	0.27		0.27				
9.50	0.31		0.31				
9.75	0.36		0.36				
10.00	0.40		0.40				
10.25	0.47		0.47				
10.50	0.55		0.55				
10.75	0.64		0.64				
11.00	0.73		0.73				
11.25	0.96		0.96				
11.50	1.26		1.26				
11.75	3.28		3.28				
12.00	9.23		9.23				
12.25	6.09		6.09				
12.50	2.79		2.79				
12.75	1.55		1.55				
13.00	1.21		1.21				
13.25	1.04		1.04				
13.50	0.96		0.96				
13.75	0.87		0.87				
14.00	0.78		0.78				
14.25	0.72		0.72				
14.50	0.68		0.68				
14.75	0.63		0.63				
15.00	0.59		0.59				
15.25	0.55		0.55				
15.50	0.50		0.50				
15.75	0.46		0.46				
16.00	0.42		0.42				
16.25	0.39		0.39				
16.50	0.37		0.37				
16.75	0.35		0.35				
17.00	0.33		0.33				
17.25	0.31		0.31				
17.50	0.29		0.29				
17.75	0.27		0.27				



Proposed Conditions_DP-4

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.307	65	Brush, Good, HSG C (DA-4)
3.460	70	Woods, Good, HSG C (DA-4)
0.692	74	>75% Grass cover, Good, HSG C (DA-4)
0.310	74	Pavers, HSG C (DA-4)
0.280	98	Paved roads, HSG C (DA-4)
5.049	72	TOTAL AREA

Time span=5.00-20.00 hrs, dt=0.01 hrs, 1501 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-4: Drainage Area 4 Runoff Area=5.049 ac 5.55% Impervious Runoff Depth>0.72"
Flow Length=515' Tc=22.6 min CN=72 Runoff=2.76 cfs 0.305 af

Reach DP-4: 24" RCP @ Long Meadow Avg. Flow Depth=0.35' Max Vel=7.53 fps Inflow=2.76 cfs 0.305 af
24.0" Round Pipe n=0.013 L=61.0' S=0.0341 '/ Outflow=2.76 cfs 0.305 af

Total Runoff Area = 5.049 ac Runoff Volume = 0.305 af Average Runoff Depth = 0.72"
94.45% Pervious = 4.769 ac 5.55% Impervious = 0.280 ac

Summary for Subcatchment DA-4: Drainage Area 4

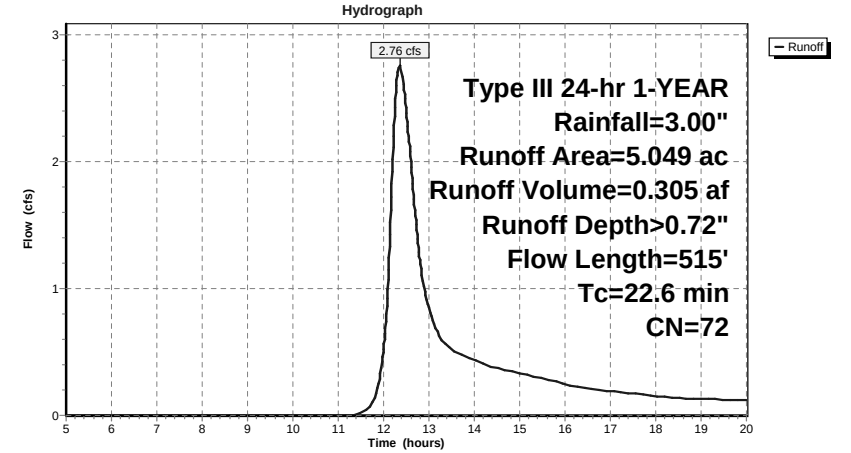
Runoff = 2.76 cfs @ 12.35 hrs, Volume= 0.305 af, Depth> 0.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
3.460	70	Woods, Good, HSG C
0.307	65	Brush, Good, HSG C
0.280	98	Paved roads, HSG C
0.310	74	Pavers, HSG C
0.692	74	>75% Grass cover, Good, HSG C
5.049	72	Weighted Average
4.769		94.45% Pervious Area
0.280		5.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.4	100	0.1400	0.10		Sheet Flow, Woods: Dense underbrush n= 0.800 P2= 3.50"
6.2	415	0.2010	1.12		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
22.6	515	Total			

Subcatchment DA-4: Drainage Area 4



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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 5

Hydrograph for Subcatchment DA-4: Drainage Area 4

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.17	0.00	0.00	15.40	2.60	0.58	0.30
5.20	0.18	0.00	0.00	15.60	2.62	0.59	0.28
5.40	0.19	0.00	0.00	15.80	2.64	0.60	0.27
5.60	0.20	0.00	0.00	16.00	2.66	0.61	0.25
5.80	0.21	0.00	0.00	16.20	2.67	0.62	0.23
6.00	0.22	0.00	0.00	16.40	2.69	0.63	0.22
6.20	0.23	0.00	0.00	16.60	2.70	0.64	0.21
6.40	0.24	0.00	0.00	16.80	2.72	0.64	0.20
6.60	0.25	0.00	0.00	17.00	2.73	0.65	0.19
6.80	0.26	0.00	0.00	17.20	2.74	0.66	0.18
7.00	0.27	0.00	0.00	17.40	2.75	0.67	0.18
7.20	0.28	0.00	0.00	17.60	2.76	0.67	0.17
7.40	0.30	0.00	0.00	17.80	2.77	0.68	0.16
7.60	0.31	0.00	0.00	18.00	2.78	0.68	0.15
7.80	0.33	0.00	0.00	18.20	2.79	0.69	0.14
8.00	0.34	0.00	0.00	18.40	2.80	0.69	0.14
8.20	0.36	0.00	0.00	18.60	2.81	0.70	0.14
8.40	0.38	0.00	0.00	18.80	2.82	0.70	0.13
8.60	0.40	0.00	0.00	19.00	2.83	0.71	0.13
8.80	0.42	0.00	0.00	19.20	2.84	0.71	0.13
9.00	0.44	0.00	0.00	19.40	2.85	0.72	0.13
9.20	0.46	0.00	0.00	19.60	2.86	0.72	0.12
9.40	0.49	0.00	0.00	19.80	2.86	0.73	0.12
9.60	0.51	0.00	0.00	20.00	2.87	0.73	0.12
9.80	0.54	0.00	0.00				
10.00	0.57	0.00	0.00				
10.20	0.60	0.00	0.00				
10.40	0.63	0.00	0.00				
10.60	0.67	0.00	0.00				
10.80	0.71	0.00	0.00				
11.00	0.75	0.00	0.00				
11.20	0.80	0.00	0.00				
11.40	0.86	0.00	0.01				
11.60	0.94	0.01	0.04				
11.80	1.12	0.03	0.14				
12.00	1.50	0.11	0.52				
12.20	1.88	0.24	2.02				
12.40	2.06	0.32	2.70				
12.60	2.14	0.35	2.00				
12.80	2.20	0.38	1.22				
13.00	2.25	0.40	0.84				
13.20	2.29	0.42	0.65				
13.40	2.33	0.44	0.55				
13.60	2.37	0.46	0.50				
13.80	2.40	0.48	0.47				
14.00	2.43	0.49	0.44				
14.20	2.46	0.51	0.40				
14.40	2.49	0.52	0.38				
14.60	2.51	0.54	0.36				
14.80	2.54	0.55	0.35				
15.00	2.56	0.56	0.33				
15.20	2.58	0.57	0.32				

Proposed Conditions_DP-4

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 6

Summary for Reach DP-4: 24" RCP @ Long Meadow Road

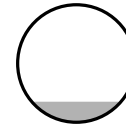
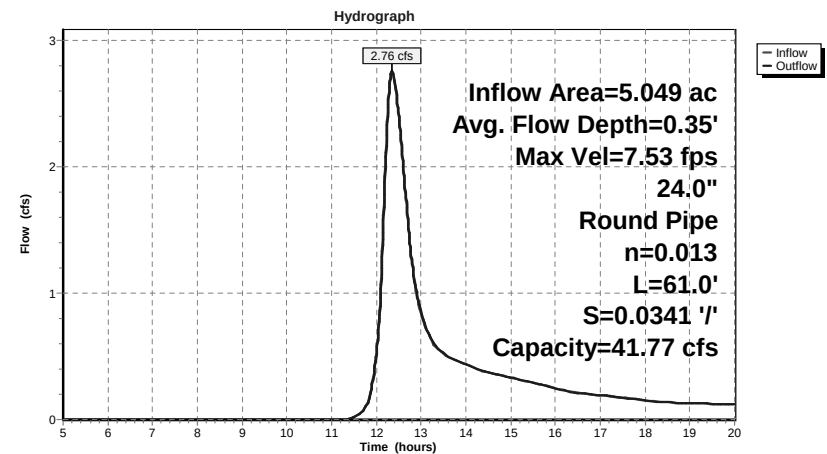
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 5.049 ac, 5.55% Impervious, Inflow Depth > 0.72" for 1-YEAR event
Inflow = 2.76 cfs @ 12.35 hrs, Volume= 0.305 af
Outflow = 2.76 cfs @ 12.36 hrs, Volume= 0.305 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.53 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 3.84 fps, Avg. Travel Time= 0.3 min

Peak Storage= 22 cf @ 12.36 hrs
Average Depth at Peak Storage= 0.35'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 41.77 cfs

24.0" Round Pipe
n= 0.013
Length= 61.0' Slope= 0.0341 '/'
Inlet Invert= 569.01', Outlet Invert= 566.93'

**Reach DP-4: 24" RCP @ Long Meadow Road**

Proposed Conditions_DP-4

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 7

Hydrograph for Reach DP-4: 24" RCP @ Long Meadow Road

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	0.00	0	569.01	0.00
5.50	0.00	0	569.01	0.00
6.00	0.00	0	569.01	0.00
6.50	0.00	0	569.01	0.00
7.00	0.00	0	569.01	0.00
7.50	0.00	0	569.01	0.00
8.00	0.00	0	569.01	0.00
8.50	0.00	0	569.01	0.00
9.00	0.00	0	569.01	0.00
9.50	0.00	0	569.01	0.00
10.00	0.00	0	569.01	0.00
10.50	0.00	0	569.01	0.00
11.00	0.00	0	569.01	0.00
11.50	0.02	1	569.04	0.02
12.00	0.52	7	569.17	0.51
12.50	2.39	20	569.33	2.40
13.00	0.84	10	569.21	0.84
13.50	0.52	7	569.17	0.52
14.00	0.44	6	569.15	0.44
14.50	0.37	5	569.14	0.37
15.00	0.33	5	569.14	0.33
15.50	0.29	5	569.13	0.29
16.00	0.25	4	569.12	0.25
16.50	0.21	4	569.11	0.21
17.00	0.19	3	569.11	0.19
17.50	0.17	3	569.10	0.17
18.00	0.15	3	569.10	0.15
18.50	0.14	3	569.09	0.14
19.00	0.13	3	569.09	0.13
19.50	0.12	3	569.09	0.12
20.00	0.12	2	569.09	0.12

Proposed Conditions_DP-4

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 8

Time span=5.00-20.00 hrs, dt=0.01 hrs, 1501 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-4: Drainage Area 4Runoff Area=5.049 ac 5.55% Impervious Runoff Depth>2.02"
Flow Length=515' Tc=22.6 min CN=72 Runoff=8.23 cfs 0.848 af**Reach DP-4: 24" RCP @ Long Meadow**Avg. Flow Depth=0.60' Max Vel=10.34 fps Inflow=8.23 cfs 0.848 af
24.0" Round Pipe n=0.013 L=61.0' S=0.0341 '/ Capacity=41.77 cfs Outflow=8.22 cfs 0.848 af**Total Runoff Area = 5.049 ac Runoff Volume = 0.848 af Average Runoff Depth = 2.02"**
94.45% Pervious = 4.769 ac 5.55% Impervious = 0.280 ac

Proposed Conditions_DP-4

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 9

Summary for Subcatchment DA-4: Drainage Area 4

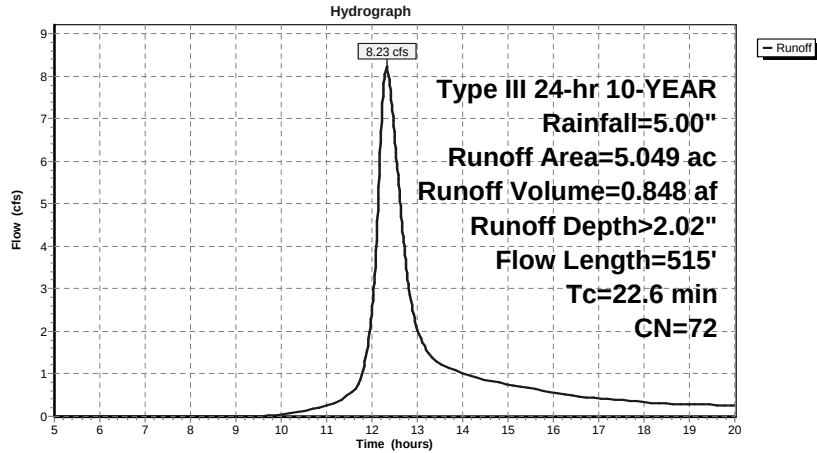
Runoff = 8.23 cfs @ 12.33 hrs, Volume= 0.848 af, Depth> 2.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
3.460	70	Woods, Good, HSG C
0.307	65	Brush, Good, HSG C
0.280	98	Paved roads, HSG C
0.310	74	Pavers, HSG C
0.692	74	>75% Grass cover, Good, HSG C
5.049	72	Weighted Average
4.769		94.45% Pervious Area
0.280		5.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.4	100	0.1400	0.10		Sheet Flow, Woods: Dense underbrush n= 0.800 P2= 3.50"
6.2	415	0.2010	1.12		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
22.6	515	Total			

Subcatchment DA-4: Drainage Area 4**Proposed Conditions_DP-4**

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 10

Hydrograph for Subcatchment DA-4: Drainage Area 4

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.28	0.00	0.00	15.40	4.34	1.70	0.68
5.20	0.30	0.00	0.00	15.60	4.37	1.73	0.64
5.40	0.31	0.00	0.00	15.80	4.40	1.75	0.60
5.60	0.33	0.00	0.00	16.00	4.43	1.77	0.56
5.80	0.34	0.00	0.00	16.20	4.46	1.79	0.52
6.00	0.36	0.00	0.00	16.40	4.48	1.81	0.49
6.20	0.38	0.00	0.00	16.60	4.50	1.82	0.47
6.40	0.39	0.00	0.00	16.80	4.53	1.84	0.45
6.60	0.41	0.00	0.00	17.00	4.55	1.86	0.43
6.80	0.43	0.00	0.00	17.20	4.57	1.87	0.41
7.00	0.45	0.00	0.00	17.40	4.59	1.89	0.39
7.20	0.47	0.00	0.00	17.60	4.61	1.90	0.37
7.40	0.50	0.00	0.00	17.80	4.62	1.91	0.36
7.60	0.52	0.00	0.00	18.00	4.64	1.92	0.34
7.80	0.54	0.00	0.00	18.20	4.66	1.94	0.32
8.00	0.57	0.00	0.00	18.40	4.67	1.95	0.31
8.20	0.60	0.00	0.00	18.60	4.69	1.96	0.30
8.40	0.63	0.00	0.00	18.80	4.70	1.97	0.29
8.60	0.66	0.00	0.00	19.00	4.72	1.98	0.29
8.80	0.69	0.00	0.00	19.20	4.73	1.99	0.28
9.00	0.73	0.00	0.00	19.40	4.74	2.00	0.28
9.20	0.77	0.00	0.00	19.60	4.76	2.01	0.27
9.40	0.81	0.00	0.00	19.80	4.77	2.02	0.27
9.60	0.85	0.00	0.01	20.00	4.79	2.03	0.26
9.80	0.90	0.00	0.03				
10.00	0.95	0.01	0.05				
10.20	1.00	0.01	0.08				
10.40	1.05	0.02	0.11				
10.60	1.11	0.03	0.16				
10.80	1.18	0.04	0.21				
11.00	1.25	0.05	0.26				
11.20	1.33	0.07	0.33				
11.40	1.43	0.09	0.44				
11.60	1.57	0.13	0.61				
11.80	1.87	0.24	1.07				
12.00	2.50	0.53	2.49				
12.20	3.13	0.89	6.70				
12.40	3.43	1.07	7.78				
12.60	3.57	1.17	5.32				
12.80	3.67	1.23	3.12				
13.00	3.75	1.29	2.07				
13.20	3.82	1.34	1.57				
13.40	3.89	1.38	1.31				
13.60	3.95	1.42	1.18				
13.80	4.00	1.46	1.10				
14.00	4.06	1.50	1.02				
14.20	4.10	1.53	0.94				
14.40	4.15	1.56	0.88				
14.60	4.19	1.60	0.84				
14.80	4.23	1.63	0.80				
15.00	4.27	1.65	0.76				
15.20	4.31	1.68	0.72				

Summary for Reach DP-4: 24" RCP @ Long Meadow Road

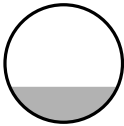
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 5.049 ac, 5.55% Impervious, Inflow Depth > 2.02" for 10-YEAR event
Inflow = 8.23 cfs @ 12.33 hrs, Volume= 0.848 af
Outflow = 8.22 cfs @ 12.33 hrs, Volume= 0.848 af, Atten= 0%, Lag= 0.1 min

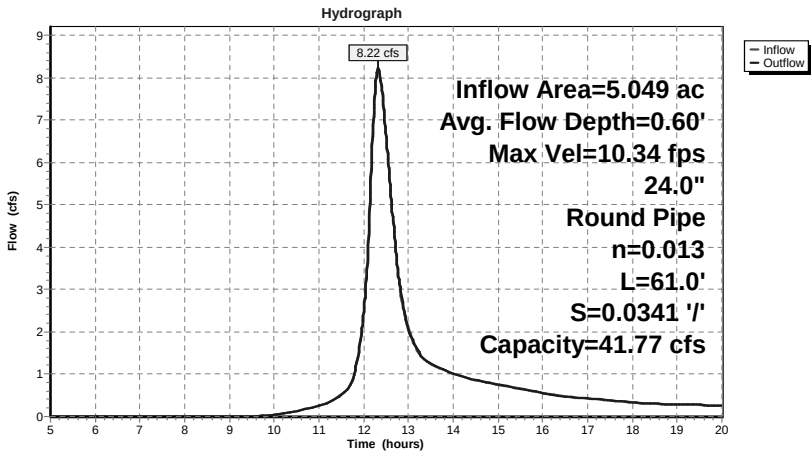
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 10.34 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 4.73 fps, Avg. Travel Time= 0.2 min

Peak Storage= 49 cf @ 12.33 hrs
Average Depth at Peak Storage= 0.60'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 41.77 cfs

24.0" Round Pipe
n= 0.013
Length= 61.0' Slope= 0.0341 '/'
Inlet Invert= 569.01', Outlet Invert= 566.93'



Reach DP-4: 24" RCP @ Long Meadow Road



Hydrograph for Reach DP-4: 24" RCP @ Long Meadow Road

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	0.00	0	569.01	0.00
5.50	0.00	0	569.01	0.00
6.00	0.00	0	569.01	0.00
6.50	0.00	0	569.01	0.00
7.00	0.00	0	569.01	0.00
7.50	0.00	0	569.01	0.00
8.00	0.00	0	569.01	0.00
8.50	0.00	0	569.01	0.00
9.00	0.00	0	569.01	0.00
9.50	0.00	0	569.02	0.00
10.00	0.05	1	569.06	0.05
10.50	0.13	3	569.09	0.13
11.00	0.26	4	569.12	0.26
11.50	0.52	7	569.17	0.52
12.00	2.49	21	569.34	2.45
12.50	6.56	41	569.55	6.60
13.00	2.07	18	569.31	2.08
13.50	1.24	13	569.25	1.24
14.00	1.02	11	569.23	1.02
14.50	0.86	10	569.21	0.86
15.00	0.76	9	569.20	0.76
15.50	0.66	8	569.19	0.66
16.00	0.56	7	569.17	0.56
16.50	0.48	7	569.16	0.48
17.00	0.43	6	569.15	0.43
17.50	0.38	6	569.15	0.38
18.00	0.34	5	569.14	0.34
18.50	0.30	5	569.13	0.30
19.00	0.29	5	569.13	0.29
19.50	0.27	4	569.13	0.27
20.00	0.26	4	569.12	0.26

Time span=5.00-20.00 hrs, dt=0.01 hrs, 1501 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-4: Drainage Area 4 Runoff Area=5.049 ac 5.55% Impervious Runoff Depth>4.20"
Flow Length=515' Tc=22.6 min CN=72 Runoff=17.12 cfs 1.766 af

Reach DP-4: 24" RCP @ Long Avg. Flow Depth=0.89' Max Vel=12.64 fps Inflow=17.12 cfs 1.766 af
24.0" Round Pipe n=0.013 L=61.0' S=0.0341 ' Capacity=41.77 cfs Outflow=17.12 cfs 1.766 af

Total Runoff Area = 5.049 ac Runoff Volume = 1.766 af Average Runoff Depth = 4.20"
94.45% Pervious = 4.769 ac 5.55% Impervious = 0.280 ac

Summary for Subcatchment DA-4: Drainage Area 4

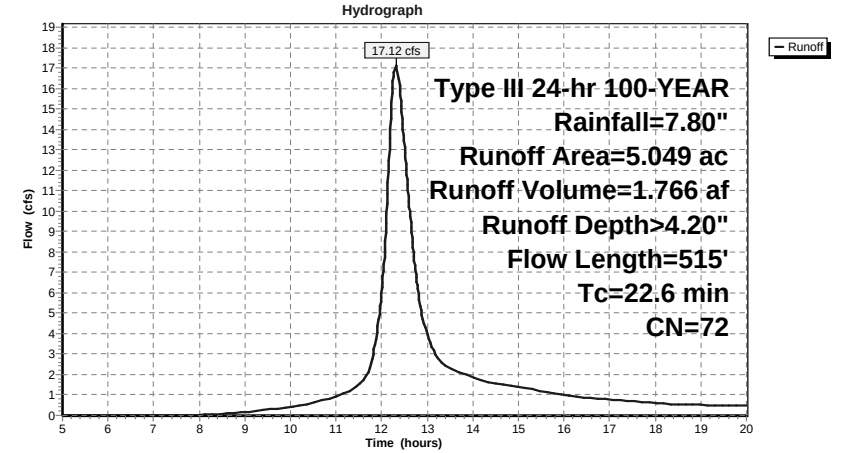
Runoff = 17.12 cfs @ 12.31 hrs, Volume= 1.766 af, Depth> 4.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
3.460	70	Woods, Good, HSG C
0.307	65	Brush, Good, HSG C
0.280	98	Paved roads, HSG C
* 0.310	74	Pavers, HSG C
0.692	74	>75% Grass cover, Good, HSG C
5.049	72	Weighted Average
4.769		94.45% Pervious Area
0.280		5.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.4	100	0.1400	0.10		Sheet Flow, Woods: Dense underbrush n= 0.800 P2= 3.50"
6.2	415	0.2010	1.12		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
22.6	515	Total			

Subcatchment DA-4: Drainage Area 4



Proposed Conditions_DP-4

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 15

Hydrograph for Subcatchment DA-4: Drainage Area 4

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.44	0.00	0.00	15.40	6.77	3.64	1.23
5.20	0.47	0.00	0.00	15.60	6.82	3.68	1.16
5.40	0.49	0.00	0.00	15.80	6.87	3.72	1.09
5.60	0.51	0.00	0.00	16.00	6.91	3.75	1.01
5.80	0.54	0.00	0.00	16.20	6.95	3.79	0.94
6.00	0.56	0.00	0.00	16.40	6.99	3.82	0.88
6.20	0.59	0.00	0.00	16.60	7.03	3.85	0.84
6.40	0.61	0.00	0.00	16.80	7.06	3.88	0.80
6.60	0.64	0.00	0.00	17.00	7.09	3.91	0.77
6.80	0.67	0.00	0.00	17.20	7.13	3.94	0.74
7.00	0.71	0.00	0.00	17.40	7.16	3.96	0.70
7.20	0.74	0.00	0.00	17.60	7.19	3.99	0.67
7.40	0.77	0.00	0.00	17.80	7.21	4.01	0.64
7.60	0.81	0.00	0.00	18.00	7.24	4.03	0.60
7.80	0.85	0.00	0.01	18.20	7.26	4.05	0.57
8.00	0.89	0.00	0.02	18.40	7.29	4.08	0.55
8.20	0.93	0.01	0.04	18.60	7.31	4.10	0.53
8.40	0.98	0.01	0.07	18.80	7.33	4.12	0.52
8.60	1.03	0.02	0.09	19.00	7.36	4.14	0.51
8.80	1.08	0.02	0.13	19.20	7.38	4.15	0.50
9.00	1.14	0.03	0.16	19.40	7.40	4.17	0.49
9.20	1.20	0.04	0.21	19.60	7.42	4.19	0.48
9.40	1.26	0.05	0.26	19.80	7.44	4.21	0.47
9.60	1.33	0.07	0.31	20.00	7.46	4.23	0.46
9.80	1.40	0.09	0.37				
10.00	1.47	0.11	0.43				
10.20	1.55	0.13	0.50				
10.40	1.64	0.16	0.58				
10.60	1.74	0.19	0.69				
10.80	1.84	0.23	0.80				
11.00	1.95	0.27	0.94				
11.20	2.08	0.33	1.09				
11.40	2.24	0.40	1.35				
11.60	2.45	0.50	1.74				
11.80	2.91	0.76	2.83				
12.00	3.90	1.39	6.00				
12.20	4.89	2.11	14.51				
12.40	5.35	2.47	15.89				
12.60	5.56	2.64	10.48				
12.80	5.72	2.77	6.03				
13.00	5.85	2.87	3.93				
13.20	5.96	2.96	2.95				
13.40	6.06	3.04	2.44				
13.60	6.16	3.12	2.20				
13.80	6.25	3.20	2.03				
14.00	6.33	3.26	1.88				
14.20	6.40	3.32	1.73				
14.40	6.47	3.38	1.62				
14.60	6.54	3.44	1.53				
14.80	6.60	3.49	1.46				
15.00	6.66	3.54	1.38				
15.20	6.72	3.59	1.31				

Proposed Conditions_DP-4

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 16

Summary for Reach DP-4: 24" RCP @ Long Meadow Road

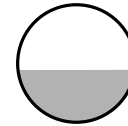
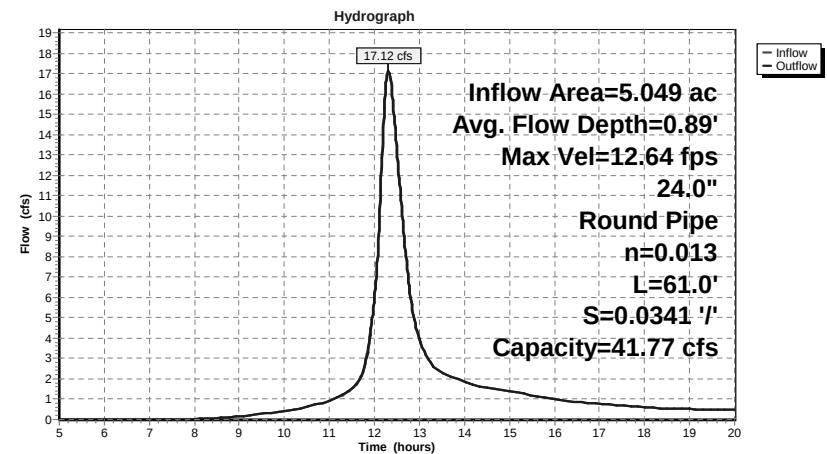
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 5.049 ac, 5.55% Impervious, Inflow Depth > 4.20" for 100-YEAR event
 Inflow = 17.12 cfs @ 12.31 hrs, Volume= 1.766 af
 Outflow = 17.12 cfs @ 12.31 hrs, Volume= 1.766 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs
 Max. Velocity= 12.64 fps, Min. Travel Time= 0.1 min
 Avg. Velocity = 5.48 fps, Avg. Travel Time= 0.2 min

Peak Storage= 83 cf @ 12.31 hrs
 Average Depth at Peak Storage= 0.89'
 Bank-Full Depth= 2.00', Capacity at Bank-Full= 41.77 cfs

24.0" Round Pipe
 n= 0.013
 Length= 61.0' Slope= 0.0341 '/'
 Inlet Invert= 569.01', Outlet Invert= 566.93'

**Reach DP-4: 24" RCP @ Long Meadow Road**

Proposed Conditions_DP-4

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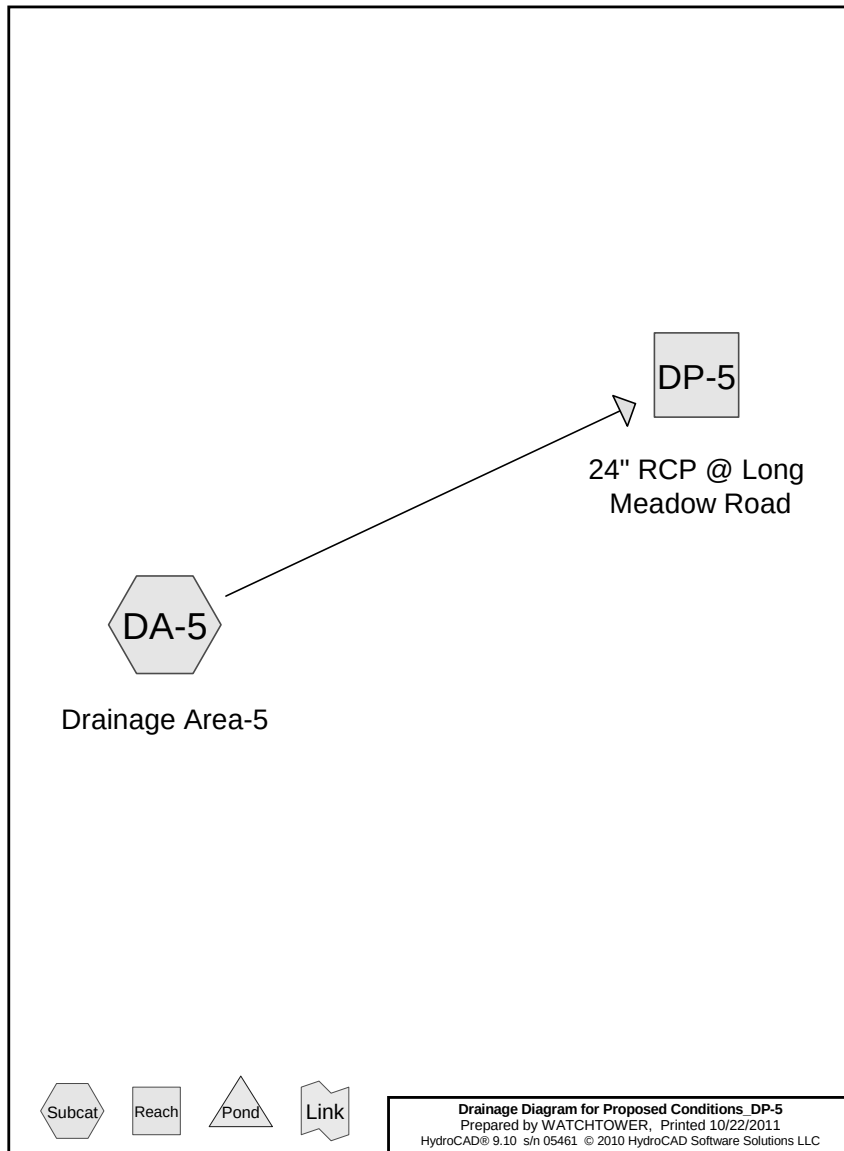
Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 17

Hydrograph for Reach DP-4: 24" RCP @ Long Meadow Road

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	0.00	0	569.01	0.00
5.50	0.00	0	569.01	0.00
6.00	0.00	0	569.01	0.00
6.50	0.00	0	569.01	0.00
7.00	0.00	0	569.01	0.00
7.50	0.00	0	569.01	0.00
8.00	0.02	1	569.04	0.02
8.50	0.08	2	569.07	0.08
9.00	0.16	3	569.10	0.16
9.50	0.28	5	569.13	0.28
10.00	0.43	6	569.15	0.43
10.50	0.63	8	569.18	0.63
11.00	0.94	10	569.22	0.93
11.50	1.53	15	569.27	1.52
12.00	6.00	39	569.52	5.94
12.50	13.15	68	569.78	13.21
13.00	3.93	29	569.42	3.94
13.50	2.31	20	569.33	2.31
14.00	1.88	17	569.30	1.88
14.50	1.57	15	569.28	1.57
15.00	1.38	14	569.26	1.38
15.50	1.20	12	569.24	1.20
16.00	1.01	11	569.22	1.01
16.50	0.86	10	569.21	0.86
17.00	0.77	9	569.20	0.77
17.50	0.69	8	569.19	0.69
18.00	0.60	8	569.18	0.61
18.50	0.54	7	569.17	0.54
19.00	0.51	7	569.17	0.51
19.50	0.49	7	569.16	0.49
20.00	0.46	6	569.16	0.46



Proposed Conditions_DP-5

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
9.490	70	Woods, Good, HSG C (DA-5)
0.190	98	Paved roads, HSG C (DA-5)
9.680	71	TOTAL AREA

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-5: Drainage Area-5 Runoff Area=9.680 ac 1.96% Impervious Runoff Depth>0.67"
Flow Length=1,676' Tc=44.5 min CN=71 Runoff=3.57 cfs 0.542 af

Reach DP-5: 24" RCP @ Long Meadow Avg. Flow Depth=0.39' Max Vel=8.12 fps Inflow=3.57 cfs 0.542 af
24.0" Round Pipe n=0.013 L=61.0' S=0.0341 '/ Outflow=3.56 cfs 0.542 af

Total Runoff Area = 9.680 ac Runoff Volume = 0.542 af Average Runoff Depth = 0.67"
98.04% Pervious = 9.490 ac 1.96% Impervious = 0.190 ac

Summary for Subcatchment DA-5: Drainage Area-5

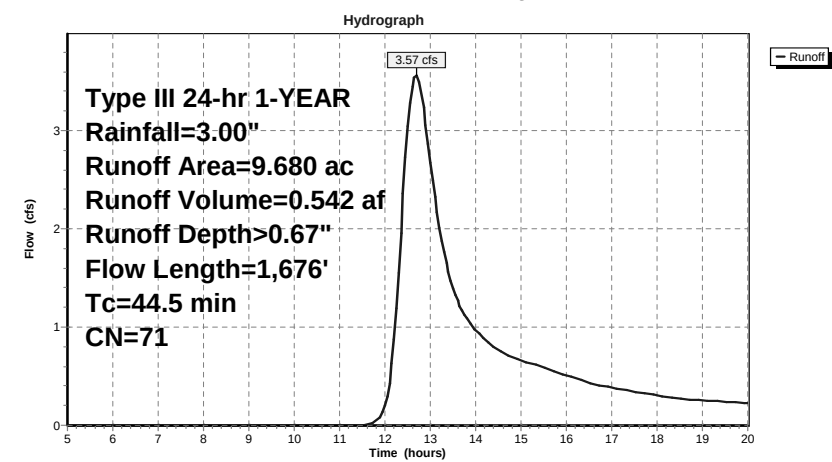
Runoff = 3.57 cfs @ 12.69 hrs, Volume= 0.542 af, Depth> 0.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
9.490	70	Woods, Good, HSG C
* 0.190	98	Paved roads, HSG C
9.680	71	Weighted Average
9.490		98.04% Pervious Area
0.190		1.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.1000	0.09		Sheet Flow, Woods: Dense underbrush n= 0.800 P2= 3.50"
4.1	150	0.0600	0.61		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
11.2	546	0.1060	0.81		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
7.9	500	0.1800	1.06		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
2.5	380	0.2530	2.51		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
44.5	1,676	Total			

Subcatchment DA-5: Drainage Area-5



Hydrograph for Subcatchment DA-5: Drainage Area-5

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.17	0.00	0.00	18.00	2.78	0.64	0.31
5.25	0.18	0.00	0.00	18.25	2.80	0.65	0.29
5.50	0.19	0.00	0.00	18.50	2.81	0.65	0.27
5.75	0.20	0.00	0.00	18.75	2.82	0.66	0.26
6.00	0.22	0.00	0.00	19.00	2.83	0.66	0.25
6.25	0.23	0.00	0.00	19.25	2.84	0.67	0.24
6.50	0.24	0.00	0.00	19.50	2.85	0.68	0.24
6.75	0.26	0.00	0.00	19.75	2.86	0.68	0.23
7.00	0.27	0.00	0.00	20.00	2.87	0.69	0.23
7.25	0.29	0.00	0.00				
7.50	0.30	0.00	0.00				
7.75	0.32	0.00	0.00				
8.00	0.34	0.00	0.00				
8.25	0.36	0.00	0.00				
8.50	0.39	0.00	0.00				
8.75	0.41	0.00	0.00				
9.00	0.44	0.00	0.00				
9.25	0.47	0.00	0.00				
9.50	0.50	0.00	0.00				
9.75	0.53	0.00	0.00				
10.00	0.57	0.00	0.00				
10.25	0.61	0.00	0.00				
10.50	0.65	0.00	0.00				
10.75	0.70	0.00	0.00				
11.00	0.75	0.00	0.00				
11.25	0.81	0.00	0.00				
11.50	0.89	0.00	0.00				
11.75	1.07	0.01	0.02				
12.00	1.50	0.10	0.20				
12.25	1.93	0.24	1.19				
12.50	2.11	0.31	3.04				
12.75	2.19	0.34	3.51				
13.00	2.25	0.37	2.68				
13.25	2.30	0.40	1.88				
13.50	2.35	0.42	1.40				
13.75	2.39	0.44	1.12				
14.00	2.43	0.46	0.97				
14.25	2.47	0.48	0.86				
14.50	2.50	0.49	0.77				
14.75	2.53	0.51	0.71				
15.00	2.56	0.52	0.66				
15.25	2.59	0.54	0.62				
15.50	2.61	0.55	0.59				
15.75	2.64	0.56	0.55				
16.00	2.66	0.57	0.51				
16.25	2.68	0.58	0.47				
16.50	2.70	0.59	0.43				
16.75	2.71	0.60	0.41				
17.00	2.73	0.61	0.38				
17.25	2.74	0.62	0.36				
17.50	2.76	0.63	0.34				
17.75	2.77	0.63	0.33				

Summary for Reach DP-5: 24" RCP @ Long Meadow Road

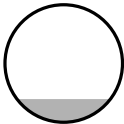
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 9.680 ac, 1.96% Impervious, Inflow Depth > 0.67" for 1-YEAR event
Inflow = 3.57 cfs @ 12.69 hrs, Volume= 0.542 af
Outflow = 3.56 cfs @ 12.69 hrs, Volume= 0.542 af, Atten= 0%, Lag= 0.2 min

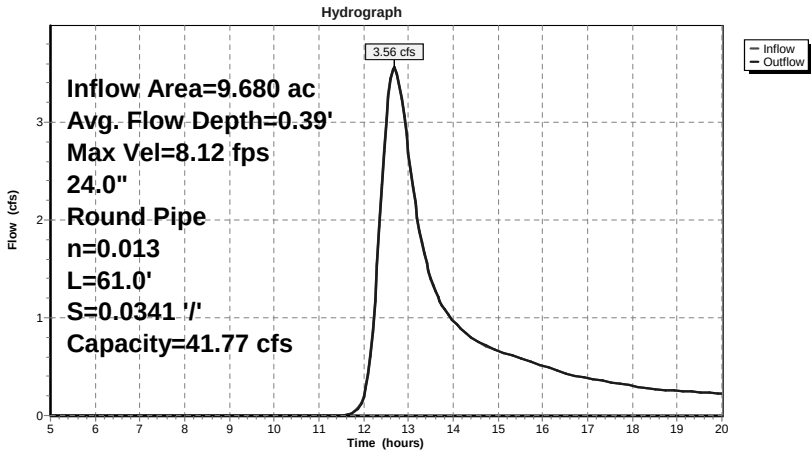
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.12 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 4.64 fps, Avg. Travel Time= 0.2 min

Peak Storage= 27 cf @ 12.69 hrs
Average Depth at Peak Storage= 0.39'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 41.77 cfs

24.0" Round Pipe
n= 0.013
Length= 61.0' Slope= 0.0341 '/'
Inlet Invert= 569.01', Outlet Invert= 566.93'



Reach DP-5: 24" RCP @ Long Meadow Road



Hydrograph for Reach DP-5: 24" RCP @ Long Meadow Road

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	0.00	0	569.01	0.00
5.50	0.00	0	569.01	0.00
6.00	0.00	0	569.01	0.00
6.50	0.00	0	569.01	0.00
7.00	0.00	0	569.01	0.00
7.50	0.00	0	569.01	0.00
8.00	0.00	0	569.01	0.00
8.50	0.00	0	569.01	0.00
9.00	0.00	0	569.01	0.00
9.50	0.00	0	569.01	0.00
10.00	0.00	0	569.01	0.00
10.50	0.00	0	569.01	0.00
11.00	0.00	0	569.01	0.00
11.50	0.00	0	569.01	0.00
12.00	0.20	4	569.11	0.19
12.50	3.04	24	569.37	3.02
13.00	2.68	22	569.35	2.69
13.50	1.40	14	569.26	1.41
14.00	0.97	11	569.22	0.97
14.50	0.77	9	569.20	0.77
15.00	0.66	8	569.19	0.66
15.50	0.59	8	569.18	0.59
16.00	0.51	7	569.16	0.51
16.50	0.43	6	569.15	0.43
17.00	0.38	6	569.15	0.38
17.50	0.34	5	569.14	0.34
18.00	0.31	5	569.13	0.31
18.50	0.27	4	569.12	0.27
19.00	0.25	4	569.12	0.25
19.50	0.24	4	569.12	0.24
20.00	0.23	4	569.12	0.23

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-5: Drainage Area-5 Runoff Area=9.680 ac 1.96% Impervious Runoff Depth>1.92"
Flow Length=1,676' Tc=44.5 min CN=71 Runoff=10.98 cfs 1.550 af

Reach DP-5: 24" RCP @ Long Avg. Flow Depth=0.70' Max Vel=11.21 fps Inflow=10.98 cfs 1.550 af
24.0" Round Pipe n=0.013 L=61.0' S=0.0341 ' / ' Capacity=41.77 cfs Outflow=10.98 cfs 1.550 af

Total Runoff Area = 9.680 ac Runoff Volume = 1.550 af Average Runoff Depth = 1.92"
98.04% Pervious = 9.490 ac 1.96% Impervious = 0.190 ac

Summary for Subcatchment DA-5: Drainage Area-5

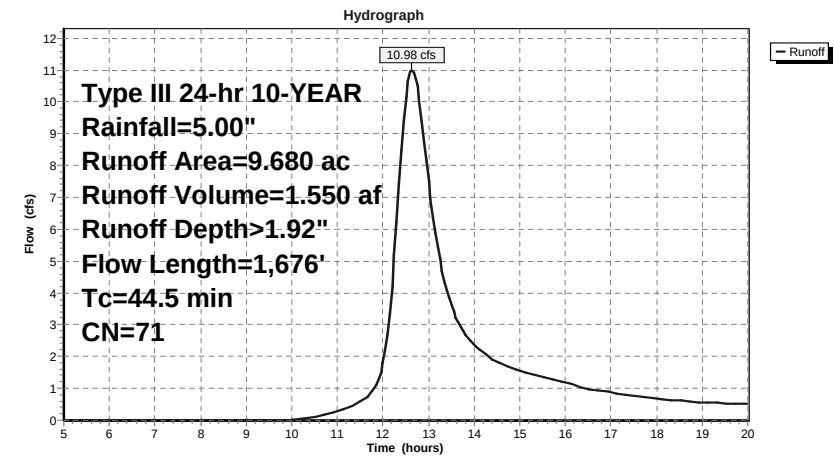
Runoff = 10.98 cfs @ 12.63 hrs, Volume= 1.550 af, Depth> 1.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
9.490	70	Woods, Good, HSG C
* 0.190	98	Paved roads, HSG C
9.680	71	Weighted Average
9.490		98.04% Pervious Area
0.190		1.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.1000	0.09		Sheet Flow, Woods: Dense underbrush n= 0.800 P2= 3.50"
4.1	150	0.0600	0.61		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
11.2	546	0.1060	0.81		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
7.9	500	0.1800	1.06		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
2.5	380	0.2530	2.51		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
44.5	1,676	Total			

Subcatchment DA-5: Drainage Area-5



Hydrograph for Subcatchment DA-5: Drainage Area-5

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.28	0.00	0.00	18.00	4.64	1.85	0.69
5.25	0.30	0.00	0.00	18.25	4.66	1.86	0.65
5.50	0.32	0.00	0.00	18.50	4.68	1.88	0.61
5.75	0.34	0.00	0.00	18.75	4.70	1.89	0.58
6.00	0.36	0.00	0.00	19.00	4.72	1.90	0.56
6.25	0.38	0.00	0.00	19.25	4.73	1.92	0.55
6.50	0.40	0.00	0.00	19.50	4.75	1.93	0.53
6.75	0.43	0.00	0.00	19.75	4.77	1.94	0.52
7.00	0.45	0.00	0.00	20.00	4.79	1.96	0.51
7.25	0.48	0.00	0.00				
7.50	0.51	0.00	0.00				
7.75	0.54	0.00	0.00				
8.00	0.57	0.00	0.00				
8.25	0.60	0.00	0.00				
8.50	0.64	0.00	0.00				
8.75	0.68	0.00	0.00				
9.00	0.73	0.00	0.00				
9.25	0.78	0.00	0.00				
9.50	0.83	0.00	0.00				
9.75	0.89	0.00	0.00				
10.00	0.95	0.00	0.01				
10.25	1.01	0.01	0.05				
10.50	1.08	0.02	0.11				
10.75	1.16	0.03	0.18				
11.00	1.25	0.04	0.28				
11.25	1.36	0.06	0.41				
11.50	1.49	0.10	0.58				
11.75	1.78	0.18	0.88				
12.00	2.50	0.49	1.80				
12.25	3.22	0.89	5.17				
12.50	3.51	1.07	10.16				
12.75	3.64	1.16	10.48				
13.00	3.75	1.23	7.50				
13.25	3.84	1.28	5.04				
13.50	3.92	1.34	3.61				
13.75	3.99	1.39	2.81				
14.00	4.06	1.43	2.37				
14.25	4.11	1.47	2.06				
14.50	4.17	1.51	1.83				
14.75	4.22	1.55	1.67				
15.00	4.27	1.58	1.56				
15.25	4.32	1.61	1.46				
15.50	4.36	1.64	1.36				
15.75	4.40	1.67	1.27				
16.00	4.43	1.70	1.18				
16.25	4.46	1.72	1.08				
16.50	4.49	1.74	0.99				
16.75	4.52	1.76	0.92				
17.00	4.55	1.78	0.87				
17.25	4.57	1.80	0.82				
17.50	4.60	1.82	0.78				
17.75	4.62	1.83	0.73				

Summary for Reach DP-5: 24" RCP @ Long Meadow Road

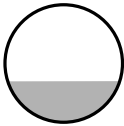
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 9.680 ac, 1.96% Impervious, Inflow Depth > 1.92" for 10-YEAR event
Inflow = 10.98 cfs @ 12.63 hrs, Volume= 1.550 af
Outflow = 10.98 cfs @ 12.64 hrs, Volume= 1.550 af, Atten= 0%, Lag= 0.2 min

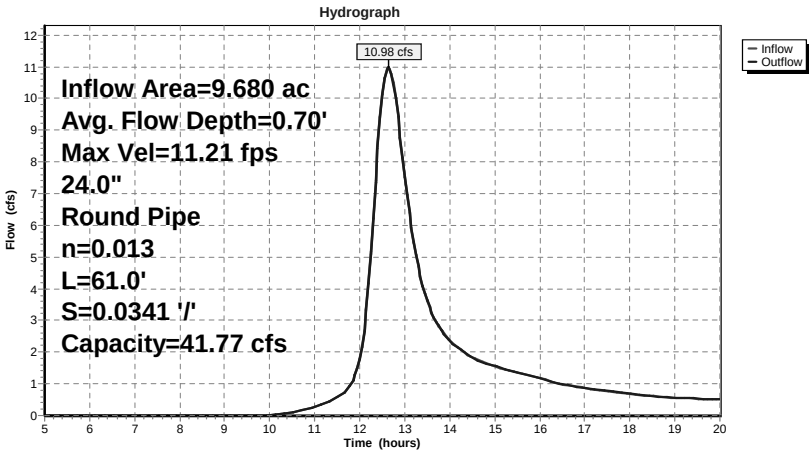
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.21 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.71 fps, Avg. Travel Time= 0.2 min

Peak Storage= 60 cf @ 12.64 hrs
Average Depth at Peak Storage= 0.70'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 41.77 cfs

24.0" Round Pipe
n= 0.013
Length= 61.0' Slope= 0.0341 '/'
Inlet Invert= 569.01', Outlet Invert= 566.93'



Reach DP-5: 24" RCP @ Long Meadow Road



Hydrograph for Reach DP-5: 24" RCP @ Long Meadow Road

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	0.00	0	569.01	0.00
5.50	0.00	0	569.01	0.00
6.00	0.00	0	569.01	0.00
6.50	0.00	0	569.01	0.00
7.00	0.00	0	569.01	0.00
7.50	0.00	0	569.01	0.00
8.00	0.00	0	569.01	0.00
8.50	0.00	0	569.01	0.00
9.00	0.00	0	569.01	0.00
9.50	0.00	0	569.01	0.00
10.00	0.01	1	569.04	0.01
10.50	0.11	2	569.08	0.10
11.00	0.28	5	569.13	0.28
11.50	0.58	7	569.17	0.57
12.00	1.80	16	569.29	1.78
12.50	10.16	56	569.68	10.12
13.00	7.50	45	569.58	7.53
13.50	3.61	27	569.41	3.63
14.00	2.37	20	569.33	2.37
14.50	1.83	17	569.30	1.84
15.00	1.56	15	569.27	1.56
15.50	1.36	14	569.26	1.36
16.00	1.18	12	569.24	1.18
16.50	0.99	11	569.22	0.99
17.00	0.87	10	569.21	0.87
17.50	0.78	9	569.20	0.78
18.00	0.69	8	569.19	0.69
18.50	0.61	8	569.18	0.61
19.00	0.56	7	569.17	0.56
19.50	0.53	7	569.17	0.53
20.00	0.51	7	569.16	0.51

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-5: Drainage Area-5 Runoff Area=9.680 ac 1.96% Impervious Runoff Depth>4.06"
Flow Length=1,676' Tc=44.5 min CN=71 Runoff=23.30 cfs 3.273 af

Reach DP-5: 24" RCP @ Long Avg. Flow Depth=1.07' Max Vel=13.66 fps Inflow=23.30 cfs 3.273 af
24.0" Round Pipe n=0.013 L=61.0' S=0.0341 ' Capacity=41.77 cfs Outflow=23.29 cfs 3.273 af

Total Runoff Area = 9.680 ac Runoff Volume = 3.273 af Average Runoff Depth = 4.06"
98.04% Pervious = 9.490 ac 1.96% Impervious = 0.190 ac

Summary for Subcatchment DA-5: Drainage Area-5

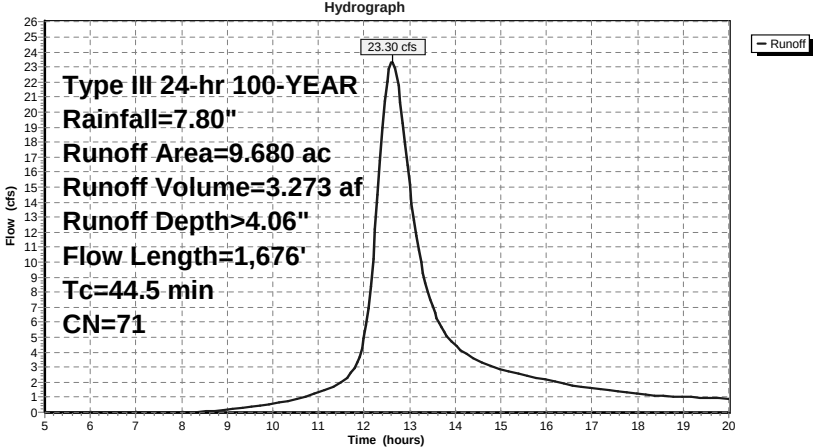
Runoff = 23.30 cfs @ 12.61 hrs, Volume= 3.273 af, Depth> 4.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
9.490	70	Woods, Good, HSG C
* 0.190	98	Paved roads, HSG C
9.680	71	Weighted Average
9.490		98.04% Pervious Area
0.190		1.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.1000	0.09		Sheet Flow, Woods: Dense underbrush n= 0.800 P2= 3.50"
4.1	150	0.0600	0.61		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
11.2	546	0.1060	0.81		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
7.9	500	0.1800	1.06		Shallow Concentrated Flow, Forest w/Heavy Litter Kv= 2.5 fps
2.5	380	0.2530	2.51		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
44.5	1,676	Total			

Subcatchment DA-5: Drainage Area-5



Hydrograph for Subcatchment DA-5: Drainage Area-5

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
5.00	0.44	0.00	0.00	18.00	7.24	3.92	1.25
5.25	0.47	0.00	0.00	18.25	7.27	3.95	1.17
5.50	0.50	0.00	0.00	18.50	7.30	3.98	1.10
5.75	0.53	0.00	0.00	18.75	7.33	4.00	1.05
6.00	0.56	0.00	0.00	19.00	7.36	4.03	1.01
6.25	0.59	0.00	0.00	19.25	7.39	4.05	0.99
6.50	0.63	0.00	0.00	19.50	7.41	4.07	0.96
6.75	0.67	0.00	0.00	19.75	7.44	4.10	0.94
7.00	0.71	0.00	0.00	20.00	7.46	4.12	0.91
7.25	0.75	0.00	0.00				
7.50	0.79	0.00	0.00				
7.75	0.84	0.00	0.00				
8.00	0.89	0.00	0.00				
8.25	0.94	0.00	0.02				
8.50	1.00	0.01	0.05				
8.75	1.07	0.01	0.10				
9.00	1.14	0.02	0.16				
9.25	1.21	0.03	0.24				
9.50	1.29	0.05	0.33				
9.75	1.38	0.07	0.44				
10.00	1.47	0.09	0.56				
10.25	1.58	0.12	0.70				
10.50	1.69	0.15	0.86				
10.75	1.81	0.20	1.07				
11.00	1.95	0.25	1.31				
11.25	2.11	0.31	1.60				
11.50	2.32	0.41	2.01				
11.75	2.77	0.63	2.73				
12.00	3.90	1.33	4.91				
12.25	5.03	2.14	12.22				
12.50	5.48	2.48	22.07				
12.75	5.69	2.65	21.78				
13.00	5.85	2.78	15.15				
13.25	5.99	2.89	9.98				
13.50	6.11	2.99	7.02				
13.75	6.22	3.08	5.39				
14.00	6.33	3.16	4.47				
14.25	6.42	3.24	3.87				
14.50	6.51	3.31	3.42				
14.75	6.59	3.38	3.10				
15.00	6.66	3.44	2.88				
15.25	6.73	3.50	2.69				
15.50	6.80	3.55	2.51				
15.75	6.86	3.60	2.33				
16.00	6.91	3.65	2.15				
16.25	6.96	3.69	1.98				
16.50	7.01	3.73	1.81				
16.75	7.05	3.77	1.68				
17.00	7.09	3.80	1.58				
17.25	7.13	3.84	1.49				
17.50	7.17	3.87	1.41				
17.75	7.21	3.90	1.33				

Summary for Reach DP-5: 24" RCP @ Long Meadow Road

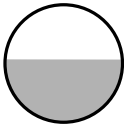
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 9.680 ac, 1.96% Impervious, Inflow Depth > 4.06" for 100-YEAR event
Inflow = 23.30 cfs @ 12.61 hrs, Volume= 3.273 af
Outflow = 23.29 cfs @ 12.61 hrs, Volume= 3.273 af, Atten= 0%, Lag= 0.1 min

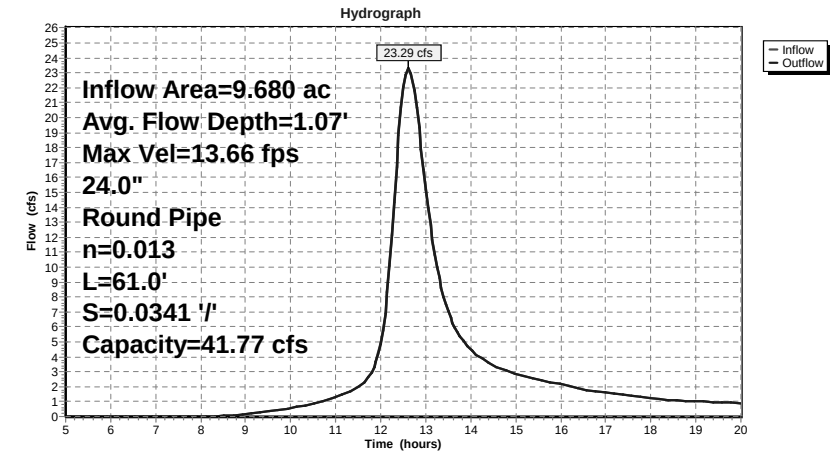
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 13.66 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 6.61 fps, Avg. Travel Time= 0.2 min

Peak Storage= 104 cf @ 12.61 hrs
Average Depth at Peak Storage= 1.07'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 41.77 cfs

24.0" Round Pipe
n= 0.013
Length= 61.0' Slope= 0.0341 '/'
Inlet Invert= 569.01', Outlet Invert= 566.93'

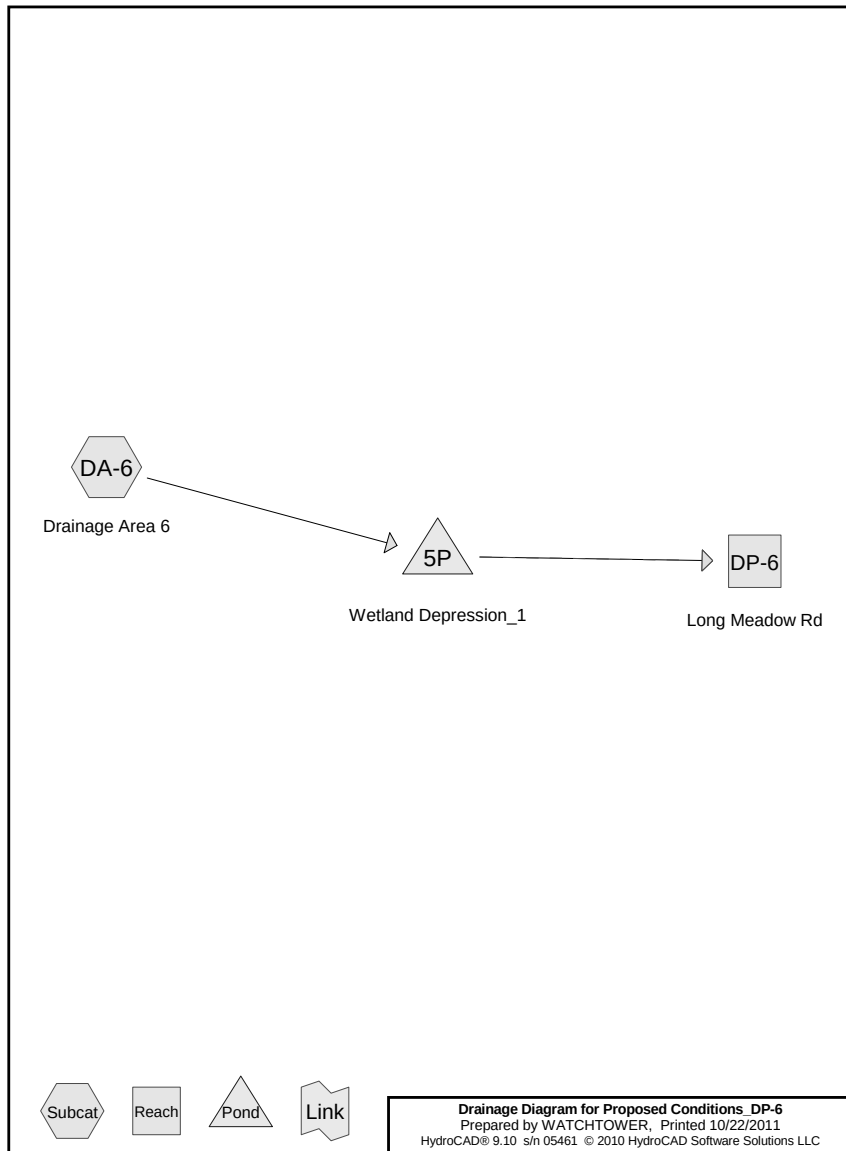


Reach DP-5: 24" RCP @ Long Meadow Road



Hydrograph for Reach DP-5: 24" RCP @ Long Meadow Road

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
5.00	0.00	0	569.01	0.00
5.50	0.00	0	569.01	0.00
6.00	0.00	0	569.01	0.00
6.50	0.00	0	569.01	0.00
7.00	0.00	0	569.01	0.00
7.50	0.00	0	569.01	0.00
8.00	0.00	0	569.02	0.00
8.50	0.05	1	569.06	0.05
9.00	0.16	3	569.10	0.16
9.50	0.33	5	569.14	0.33
10.00	0.56	7	569.17	0.56
10.50	0.86	10	569.21	0.86
11.00	1.31	13	569.25	1.31
11.50	2.01	18	569.31	2.00
12.00	4.91	34	569.47	4.88
12.50	22.07	100	570.04	22.02
13.00	15.15	76	569.84	15.20
13.50	7.02	43	569.56	7.04
14.00	4.47	31	569.45	4.48
14.50	3.42	26	569.40	3.42
15.00	2.88	23	569.37	2.88
15.50	2.51	21	569.34	2.51
16.00	2.15	19	569.32	2.15
16.50	1.81	17	569.29	1.81
17.00	1.58	15	569.28	1.58
17.50	1.41	14	569.26	1.41
18.00	1.25	13	569.25	1.25
18.50	1.10	12	569.23	1.10
19.00	1.01	11	569.22	1.02
19.50	0.96	11	569.22	0.96
20.00	0.91	10	569.21	0.91



Proposed Conditions_DP-6

Prepared by WATCHTOWER

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.810	73	Woods, Fair, HSG C (DA-6)
5.640	77	Woods, Good, HSG D (DA-6)
0.640	98	Paved parking & Roads, HSG C (DA-6)
8.090	78	TOTAL AREA

Notes Listing (all nodes)

Line#	Node Number	Notes
1	DP-6	Assume the DP-2 is at the tail end of the pipe, therefore the full length of the culvert (73') has not been specified. The culvert outlet elevation has replaced the inlet elevation so as to not overtop Wetland Depression_1. Outlet elevation has been replaced to mimick the existing slope on the culvert pipe.

Time span=1.00-60.00 hrs, dt=0.01 hrs, 5901 points x 3
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond 5P: Wetland Depression_1 Peak Elev=584.12' Storage=0.032 af Inflow=8.91 cfs 0.761 af
Primary=7.40 cfs 0.761 af Secondary=0.00 cfs 0.000 af Outflow=7.40 cfs 0.761 af

Subcatchment DA-6: Drainage Area 6 Runoff Area=8.090 ac 7.91% Impervious Runoff Depth=1.13"
Flow Length=642' Tc=10.5 min CN=78 Runoff=8.91 cfs 0.761 af

Reach DP-6: Long Meadow Rd Avg. Flow Depth=0.35' Max Vel=13.93 fps Inflow=7.40 cfs 0.761 af
48.0" Round Pipe n=0.013 L=1.0' S=0.1100 'l' Capacity=476.41 cfs Outflow=7.40 cfs 0.761 af

Total Runoff Area = 8.090 ac Runoff Volume = 0.761 af Average Runoff Depth = 1.13"
92.09% Pervious = 7.450 ac 7.91% Impervious = 0.640 ac

Summary for Pond 5P: Wetland Depression_1

[87] Warning: Oscillations may require Finer Routing or smaller dt

Inflow Area = 8.090 ac, 7.91% Impervious, Inflow Depth = 1.13" for 1-YEAR event

Inflow = 8.91 cfs @ 12.15 hrs, Volume= 0.761 af

Outflow = 7.40 cfs @ 12.23 hrs, Volume= 0.761 af, Atten= 17%, Lag= 4.9 min

Primary = 7.40 cfs @ 12.23 hrs, Volume= 0.761 af

Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-60.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 584.12' @ 12.23 hrs Surf.Area= 0.105 ac Storage= 0.032 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 0.8 min (857.8 - 857.0)

Volume	Invert	Avail.Storage	Storage Description
#1	583.40'	3.751 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
583.40	0.000	0.000	0.000
584.00	0.071	0.021	0.021
589.00	1.421	3.730	3.751

Device	Routing	Invert	Outlet Devices
#1	Primary	582.73'	24.0" Round Culvert L= 78.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 582.73' / 582.33' S= 0.0051 ' /' Cc= 0.900 n= 0.013
#2	Secondary	588.90'	10.0' long x 18.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

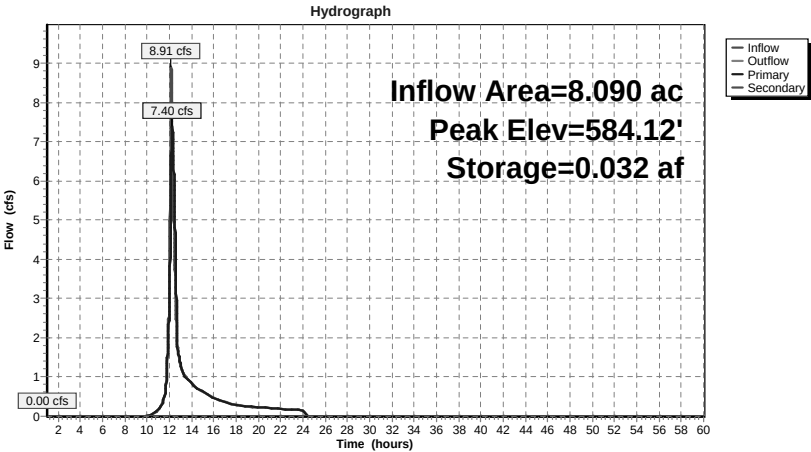
Primary OutFlow Max=7.40 cfs @ 12.23 hrs HW=584.12' TW=580.15' (Dynamic Tailwater)

1=Culvert (Barrel Controls 7.40 cfs @ 4.45 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=583.40' TW=579.80' (Dynamic Tailwater)

2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 5P: Wetland Depression_1



Proposed Conditions_DP-6

Prepared by WATCHTOWER

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 7

Hydrograph for Pond 5P: Wetland Depression_1

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
1.00	0.00	0.000	583.40	0.00	0.00	0.00
3.00	0.00	0.000	583.40	0.00	0.00	0.00
5.00	0.00	0.000	583.40	0.00	0.00	0.00
7.00	0.00	0.000	583.40	0.00	0.00	0.00
9.00	0.00	0.000	583.40	0.00	0.00	0.00
11.00	0.17	0.000	583.40	0.17	0.17	0.00
13.00	1.29	0.000	583.40	1.32	1.32	0.00
15.00	0.63	0.000	583.40	0.66	0.66	0.00
17.00	0.36	0.000	583.40	0.39	0.39	0.00
19.00	0.25	0.000	583.40	0.28	0.28	0.00
21.00	0.21	0.000	583.40	0.24	0.24	0.00
23.00	0.17	0.000	583.40	0.20	0.20	0.00
25.00	0.00	0.000	583.40	0.00	0.00	0.00
27.00	0.00	0.000	583.40	0.00	0.00	0.00
29.00	0.00	0.000	583.40	0.00	0.00	0.00
31.00	0.00	0.000	583.40	0.00	0.00	0.00
33.00	0.00	0.000	583.40	0.00	0.00	0.00
35.00	0.00	0.000	583.40	0.00	0.00	0.00
37.00	0.00	0.000	583.40	0.00	0.00	0.00
39.00	0.00	0.000	583.40	0.00	0.00	0.00
41.00	0.00	0.000	583.40	0.00	0.00	0.00
43.00	0.00	0.000	583.40	0.00	0.00	0.00
45.00	0.00	0.000	583.40	0.00	0.00	0.00
47.00	0.00	0.000	583.40	0.00	0.00	0.00
49.00	0.00	0.000	583.40	0.00	0.00	0.00
51.00	0.00	0.000	583.40	0.00	0.00	0.00
53.00	0.00	0.000	583.40	0.00	0.00	0.00
55.00	0.00	0.000	583.40	0.00	0.00	0.00
57.00	0.00	0.000	583.40	0.00	0.00	0.00
59.00	0.00	0.000	583.40	0.00	0.00	0.00

Proposed Conditions_DP-6

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 8

Summary for Subcatchment DA-6: Drainage Area 6

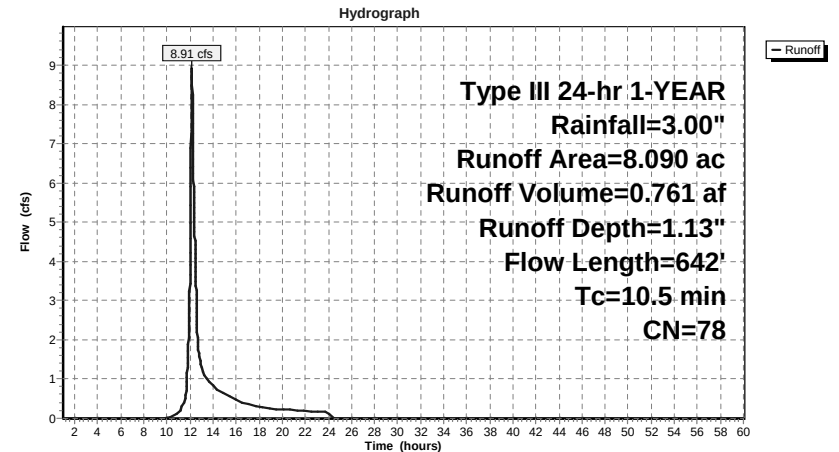
Runoff = 8.91 cfs @ 12.15 hrs, Volume= 0.761 af, Depth= 1.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-60.00 hrs, dt= 0.01 hrs

Type III 24-hr 1-YEAR Rainfall=3.00"

Area (ac)	CN	Description
5.640	77	Woods, Good, HSG D
1.810	73	Woods, Fair, HSG C
* 0.640	98	Paved parking & Roads, HSG C
8.090	78	Weighted Average
7.450		92.09% Pervious Area
0.640		7.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	87	0.1030	0.15		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.3	48	0.3330	2.89		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.7	507	0.0730	11.27	191.58	Channel Flow, Area= 17.0 sf Perim= 22.0' r= 0.77' n= 0.030 Earth, grassed & winding
10.5	642	Total			

Subcatchment DA-6: Drainage Area 6

Proposed Conditions_DP-6

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 9

Hydrograph for Subcatchment DA-6: Drainage Area 6

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.03	0.00	0.00	53.00	3.00	1.13	0.00
2.00	0.06	0.00	0.00	54.00	3.00	1.13	0.00
3.00	0.09	0.00	0.00	55.00	3.00	1.13	0.00
4.00	0.13	0.00	0.00	56.00	3.00	1.13	0.00
5.00	0.17	0.00	0.00	57.00	3.00	1.13	0.00
6.00	0.22	0.00	0.00	58.00	3.00	1.13	0.00
7.00	0.27	0.00	0.00	59.00	3.00	1.13	0.00
8.00	0.34	0.00	0.00	60.00	3.00	1.13	0.00
9.00	0.44	0.00	0.00				
10.00	0.57	0.00	0.00				
11.00	0.75	0.01	0.17				
12.00	1.50	0.23	3.65				
13.00	2.25	0.63	1.29				
14.00	2.43	0.74	0.82				
15.00	2.56	0.83	0.63				
16.00	2.66	0.89	0.46				
17.00	2.73	0.94	0.36				
18.00	2.78	0.98	0.28				
19.00	2.83	1.01	0.25				
20.00	2.87	1.04	0.23				
21.00	2.91	1.06	0.21				
22.00	2.94	1.09	0.19				
23.00	2.97	1.11	0.17				
24.00	3.00	1.13	0.15				
25.00	3.00	1.13	0.00				
26.00	3.00	1.13	0.00				
27.00	3.00	1.13	0.00				
28.00	3.00	1.13	0.00				
29.00	3.00	1.13	0.00				
30.00	3.00	1.13	0.00				
31.00	3.00	1.13	0.00				
32.00	3.00	1.13	0.00				
33.00	3.00	1.13	0.00				
34.00	3.00	1.13	0.00				
35.00	3.00	1.13	0.00				
36.00	3.00	1.13	0.00				
37.00	3.00	1.13	0.00				
38.00	3.00	1.13	0.00				
39.00	3.00	1.13	0.00				
40.00	3.00	1.13	0.00				
41.00	3.00	1.13	0.00				
42.00	3.00	1.13	0.00				
43.00	3.00	1.13	0.00				
44.00	3.00	1.13	0.00				
45.00	3.00	1.13	0.00				
46.00	3.00	1.13	0.00				
47.00	3.00	1.13	0.00				
48.00	3.00	1.13	0.00				
49.00	3.00	1.13	0.00				
50.00	3.00	1.13	0.00				
51.00	3.00	1.13	0.00				
52.00	3.00	1.13	0.00				

Proposed Conditions_DP-6

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Type III 24-hr 1-YEAR Rainfall=3.00"

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Page 10

Summary for Reach DP-6: Long Meadow Rd

Assume the DP-2 is at the tail end of the pipe, therefore the full length of the culvert (73') has not been specified. The culvert outlet elevation has replaced the inlet elevation so as to not overtop Wetland Depression_1. Outlet elevation has been replaced to mimick the existing slope on the culvert pipe.

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 8.090 ac, 7.91% Impervious, Inflow Depth = 1.13" for 1-YEAR event
 Inflow = 7.40 cfs @ 12.23 hrs, Volume= 0.761 af
 Outflow = 7.40 cfs @ 12.23 hrs, Volume= 0.761 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-60.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 13.93 fps, Min. Travel Time= 0.0 min

Avg. Velocity = 5.86 fps, Avg. Travel Time= 0.0 min

Peak Storage= 1 cf @ 12.23 hrs

Average Depth at Peak Storage= 0.35'

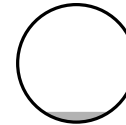
Bank-Full Depth= 4.00', Capacity at Bank-Full= 476.41 cfs

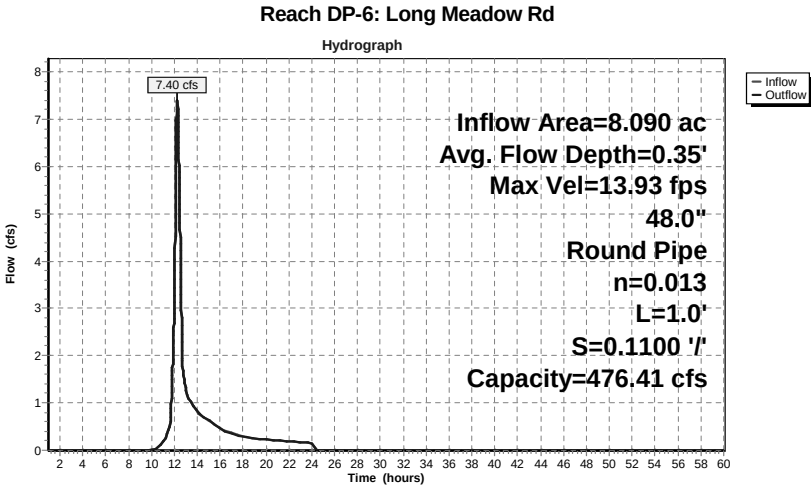
48.0" Round Pipe

n= 0.013

Length= 1.0' Slope= 0.1100 '/

Inlet Invert= 579.80', Outlet Invert= 579.69'





Hydrograph for Reach DP-6: Long Meadow Rd

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
1.00	0.00	0	579.80	0.00
3.00	0.00	0	579.80	0.00
5.00	0.00	0	579.80	0.00
7.00	0.00	0	579.80	0.00
9.00	0.00	0	579.80	0.00
11.00	0.17	0	579.86	0.17
13.00	1.32	0	579.95	1.32
15.00	0.66	0	579.91	0.63
17.00	0.39	0	579.88	0.36
19.00	0.28	0	579.87	0.25
21.00	0.24	0	579.86	0.21
23.00	0.20	0	579.86	0.17
25.00	0.00	0	579.80	0.00
27.00	0.00	0	579.80	0.00
29.00	0.00	0	579.80	0.00
31.00	0.00	0	579.80	0.00
33.00	0.00	0	579.80	0.00
35.00	0.00	0	579.80	0.00
37.00	0.00	0	579.80	0.00
39.00	0.00	0	579.80	0.00
41.00	0.00	0	579.80	0.00
43.00	0.00	0	579.80	0.00
45.00	0.00	0	579.80	0.00
47.00	0.00	0	579.80	0.00
49.00	0.00	0	579.80	0.00
51.00	0.00	0	579.80	0.00
53.00	0.00	0	579.80	0.00
55.00	0.00	0	579.80	0.00
57.00	0.00	0	579.80	0.00
59.00	0.00	0	579.80	0.00

Time span=1.00-60.00 hrs, dt=0.01 hrs, 5901 points x 3
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond 5P: Wetland Depression_1 Peak Elev=584.87' Storage=0.184 af Inflow=22.12 cfs 1.828 af
Primary=13.95 cfs 1.828 af Secondary=0.00 cfs 0.000 af Outflow=13.95 cfs 1.828 af

Subcatchment DA-6: Drainage Area 6 Runoff Area=8.090 ac 7.91% Impervious Runoff Depth=2.71"
Flow Length=642' Tc=10.5 min CN=78 Runoff=22.12 cfs 1.828 af

Reach DP-6: Long Meadow Rd Avg. Flow Depth=0.47' Max Vel=16.85 fps Inflow=13.95 cfs 1.828 af
48.0" Round Pipe n=0.013 L=1.0' S=0.1100 '/ Capacity=476.41 cfs Outflow=13.95 cfs 1.828 af

Total Runoff Area = 8.090 ac Runoff Volume = 1.828 af Average Runoff Depth = 2.71"
92.09% Pervious = 7.450 ac 7.91% Impervious = 0.640 ac

Summary for Pond 5P: Wetland Depression_1

Inflow Area = 8.090 ac, 7.91% Impervious, Inflow Depth = 2.71" for 10-YEAR event
Inflow = 22.12 cfs @ 12.15 hrs, Volume= 1.828 af
Outflow = 13.95 cfs @ 12.30 hrs, Volume= 1.828 af, Atten= 37%, Lag= 9.4 min
Primary = 13.95 cfs @ 12.30 hrs, Volume= 1.828 af
Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-60.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 584.87' @ 12.30 hrs Surf.Area= 0.305 ac Storage= 0.184 af

Plug-Flow detention time= 3.2 min calculated for 1.828 af (100% of inflow)
Center-of-Mass det. time= 3.2 min (834.5 - 831.3)

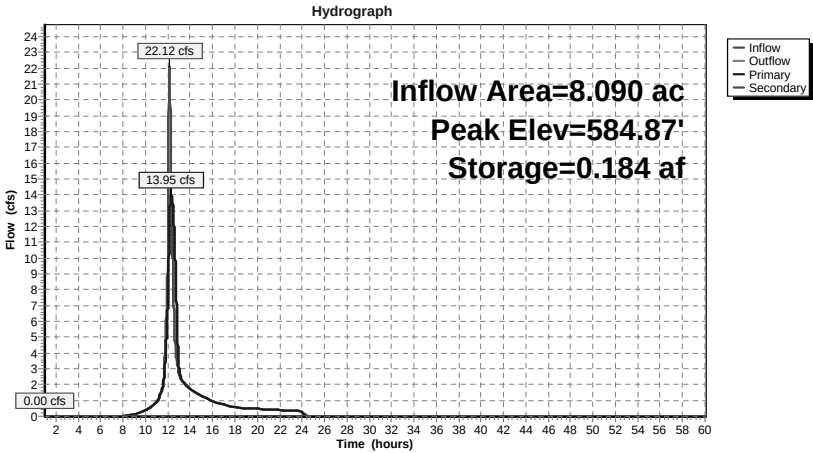
Volume	Invert	Avail.Storage	Storage Description
#1	583.40'	3.751 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
583.40	0.000	0.000	0.000
584.00	0.071	0.021	0.021
589.00	1.421	3.730	3.751

Device	Routing	Invert	Outlet Devices
#1	Primary	582.73'	24.0" Round Culvert L= 78.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 582.73' / 582.33' S= 0.0051 '/ Cc= 0.900 n= 0.013
#2	Secondary	588.90'	10.0' long x 18.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=13.95 cfs @ 12.30 hrs HW=584.87' TW=580.27' (Dynamic Tailwater)
1=Culvert (Barrel Controls 13.95 cfs @ 5.17 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=583.40' TW=579.80' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 5P: Wetland Depression_1



Hydrograph for Pond 5P: Wetland Depression_1

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
1.00	0.00	0.000	583.40	0.00	0.00	0.00
3.00	0.00	0.000	583.40	0.00	0.00	0.00
5.00	0.00	0.000	583.40	0.00	0.00	0.00
7.00	0.00	0.000	583.40	0.00	0.00	0.00
9.00	0.13	0.000	583.40	0.13	0.13	0.00
11.00	0.93	0.000	583.40	0.93	0.93	0.00
13.00	2.78	0.002	583.56	2.99	2.99	0.00
15.00	1.30	0.000	583.40	1.30	1.30	0.00
17.00	0.74	0.000	583.40	0.74	0.74	0.00
19.00	0.50	0.000	583.40	0.50	0.50	0.00
21.00	0.41	0.000	583.40	0.41	0.41	0.00
23.00	0.34	0.000	583.40	0.34	0.34	0.00
25.00	0.00	0.000	583.40	0.00	0.00	0.00
27.00	0.00	0.000	583.40	0.00	0.00	0.00
29.00	0.00	0.000	583.40	0.00	0.00	0.00
31.00	0.00	0.000	583.40	0.00	0.00	0.00
33.00	0.00	0.000	583.40	0.00	0.00	0.00
35.00	0.00	0.000	583.40	0.00	0.00	0.00
37.00	0.00	0.000	583.40	0.00	0.00	0.00
39.00	0.00	0.000	583.40	0.00	0.00	0.00
41.00	0.00	0.000	583.40	0.00	0.00	0.00
43.00	0.00	0.000	583.40	0.00	0.00	0.00
45.00	0.00	0.000	583.40	0.00	0.00	0.00
47.00	0.00	0.000	583.40	0.00	0.00	0.00
49.00	0.00	0.000	583.40	0.00	0.00	0.00
51.00	0.00	0.000	583.40	0.00	0.00	0.00
53.00	0.00	0.000	583.40	0.00	0.00	0.00
55.00	0.00	0.000	583.40	0.00	0.00	0.00
57.00	0.00	0.000	583.40	0.00	0.00	0.00
59.00	0.00	0.000	583.40	0.00	0.00	0.00

Proposed Conditions_DP-6

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 17

Summary for Subcatchment DA-6: Drainage Area 6

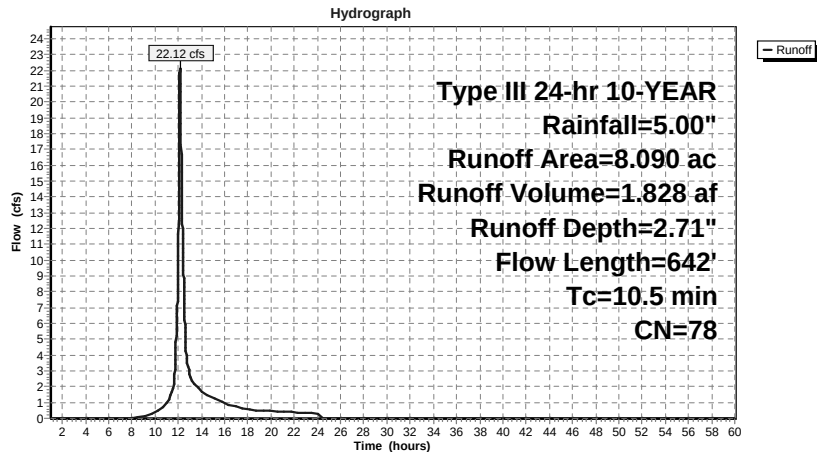
Runoff = 22.12 cfs @ 12.15 hrs, Volume= 1.828 af, Depth= 2.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-60.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-YEAR Rainfall=5.00"

Area (ac)	CN	Description
5.640	77	Woods, Good, HSG D
1.810	73	Woods, Fair, HSG C
* 0.640	98	Paved parking & Roads, HSG C
8.090	78	Weighted Average
7.450		92.09% Pervious Area
0.640		7.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	87	0.1030	0.15		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.3	48	0.3330	2.89		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.7	507	0.0730	11.27	191.58	Channel Flow, Area= 17.0 sf Perim= 22.0' r= 0.77' n= 0.030 Earth, grassed & winding
10.5	642	Total			

Subcatchment DA-6: Drainage Area 6**Proposed Conditions_DP-6**

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 18

Hydrograph for Subcatchment DA-6: Drainage Area 6

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.05	0.00	0.00	53.00	5.00	2.71	0.00
2.00	0.10	0.00	0.00	54.00	5.00	2.71	0.00
3.00	0.15	0.00	0.00	55.00	5.00	2.71	0.00
4.00	0.22	0.00	0.00	56.00	5.00	2.71	0.00
5.00	0.28	0.00	0.00	57.00	5.00	2.71	0.00
6.00	0.36	0.00	0.00	58.00	5.00	2.71	0.00
7.00	0.45	0.00	0.00	59.00	5.00	2.71	0.00
8.00	0.57	0.00	0.00	60.00	5.00	2.71	0.00
9.00	0.73	0.01	0.13				
10.00	0.95	0.05	0.39				
11.00	1.25	0.13	0.93				
12.00	2.50	0.79	10.23				
13.00	3.75	1.69	2.78				
14.00	4.06	1.93	1.72				
15.00	4.27	2.11	1.30				
16.00	4.43	2.24	0.93				
17.00	4.55	2.33	0.74				
18.00	4.64	2.41	0.57				
19.00	4.72	2.47	0.50				
20.00	4.79	2.53	0.45				
21.00	4.85	2.58	0.41				
22.00	4.90	2.63	0.38				
23.00	4.95	2.67	0.34				
24.00	5.00	2.71	0.30				
25.00	5.00	2.71	0.00				
26.00	5.00	2.71	0.00				
27.00	5.00	2.71	0.00				
28.00	5.00	2.71	0.00				
29.00	5.00	2.71	0.00				
30.00	5.00	2.71	0.00				
31.00	5.00	2.71	0.00				
32.00	5.00	2.71	0.00				
33.00	5.00	2.71	0.00				
34.00	5.00	2.71	0.00				
35.00	5.00	2.71	0.00				
36.00	5.00	2.71	0.00				
37.00	5.00	2.71	0.00				
38.00	5.00	2.71	0.00				
39.00	5.00	2.71	0.00				
40.00	5.00	2.71	0.00				
41.00	5.00	2.71	0.00				
42.00	5.00	2.71	0.00				
43.00	5.00	2.71	0.00				
44.00	5.00	2.71	0.00				
45.00	5.00	2.71	0.00				
46.00	5.00	2.71	0.00				
47.00	5.00	2.71	0.00				
48.00	5.00	2.71	0.00				
49.00	5.00	2.71	0.00				
50.00	5.00	2.71	0.00				
51.00	5.00	2.71	0.00				
52.00	5.00	2.71	0.00				

Summary for Reach DP-6: Long Meadow Rd

Assume the DP-2 is at the tail end of the pipe, therefore the full length of the culvert (73') has not been specified. The culvert outlet elevation has replaced the inlet elevation so as to not overtop Wetland Depression_1. Outlet elevation has been replaced to mimick the existing slope on the culvert pipe.

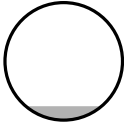
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 8.090 ac, 7.91% Impervious, Inflow Depth = 2.71" for 10-YEAR event
Inflow = 13.95 cfs @ 12.30 hrs, Volume= 1.828 af
Outflow = 13.95 cfs @ 12.30 hrs, Volume= 1.828 af, Atten= 0%, Lag= 0.0 min

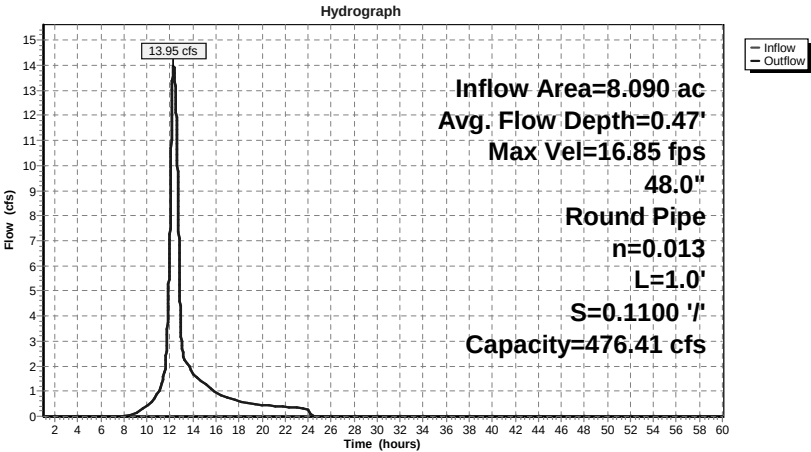
Routing by Dyn-Stor-Ind method, Time Span= 1.00-60.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 16.85 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 7.08 fps, Avg. Travel Time= 0.0 min

Peak Storage= 1 cf @ 12.30 hrs
Average Depth at Peak Storage= 0.47'
Bank-Full Depth= 4.00', Capacity at Bank-Full= 476.41 cfs

48.0" Round Pipe
n= 0.013
Length= 1.0' Slope= 0.1100 '/'
Inlet Invert= 579.80', Outlet Invert= 579.69'



Reach DP-6: Long Meadow Rd



Proposed Conditions_DP-6

Prepared by WATCHTOWER

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Type III 24-hr 10-YEAR Rainfall=5.00"

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Page 21

Hydrograph for Reach DP-6: Long Meadow Rd

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
1.00	0.00	0	579.80	0.00
3.00	0.00	0	579.80	0.00
5.00	0.00	0	579.80	0.00
7.00	0.00	0	579.80	0.00
9.00	0.13	0	579.85	0.13
11.00	0.93	0	579.93	0.93
13.00	2.99	0	580.03	2.99
15.00	1.30	0	579.95	1.30
17.00	0.74	0	579.92	0.74
19.00	0.50	0	579.90	0.50
21.00	0.41	0	579.89	0.41
23.00	0.34	0	579.88	0.34
25.00	0.00	0	579.80	0.00
27.00	0.00	0	579.80	0.00
29.00	0.00	0	579.80	0.00
31.00	0.00	0	579.80	0.00
33.00	0.00	0	579.80	0.00
35.00	0.00	0	579.80	0.00
37.00	0.00	0	579.80	0.00
39.00	0.00	0	579.80	0.00
41.00	0.00	0	579.80	0.00
43.00	0.00	0	579.80	0.00
45.00	0.00	0	579.80	0.00
47.00	0.00	0	579.80	0.00
49.00	0.00	0	579.80	0.00
51.00	0.00	0	579.80	0.00
53.00	0.00	0	579.80	0.00
55.00	0.00	0	579.80	0.00
57.00	0.00	0	579.80	0.00
59.00	0.00	0	579.80	0.00

Proposed Conditions_DP-6

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 22

Time span=1.00-60.00 hrs, dt=0.01 hrs, 5901 points x 3

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond 5P: Wetland Depression_1 Peak Elev=585.78' Storage=0.578 af Inflow=42.16 cfs 3.510 af
Primary=19.34 cfs 3.510 af Secondary=0.00 cfs 0.000 af Outflow=19.34 cfs 3.510 af

Subcatchment DA-6: Drainage Area 6 Runoff Area=8.090 ac 7.91% Impervious Runoff Depth=5.21"
Flow Length=642' Tc=10.5 min CN=78 Runoff=42.16 cfs 3.510 af

Reach DP-6: Long Meadow Rd Avg. Flow Depth=0.55' Max Vel=18.58 fps Inflow=19.34 cfs 3.510 af
48.0" Round Pipe n=0.013 L=1.0' S=0.1100 ' Capacity=476.41 cfs Outflow=19.34 cfs 3.510 af

Total Runoff Area = 8.090 ac Runoff Volume = 3.510 af Average Runoff Depth = 5.21"
92.09% Pervious = 7.450 ac 7.91% Impervious = 0.640 ac

Summary for Pond 5P: Wetland Depression_1

Inflow Area = 8.090 ac, 7.91% Impervious, Inflow Depth = 5.21" for 100-YEAR event
Inflow = 42.16 cfs @ 12.14 hrs, Volume= 3.510 af
Outflow = 19.34 cfs @ 12.40 hrs, Volume= 3.510 af, Atten= 54%, Lag= 15.6 min
Primary = 19.34 cfs @ 12.40 hrs, Volume= 3.510 af
Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-60.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 585.78' @ 12.40 hrs Surf.Area= 0.553 ac Storage= 0.578 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 7.8 min (820.4 - 812.6)

Volume	Invert	Avail.Storage	Storage Description
#1	583.40'	3.751 af	Custom Stage Data (Prismatic) Listed below (Recalc)

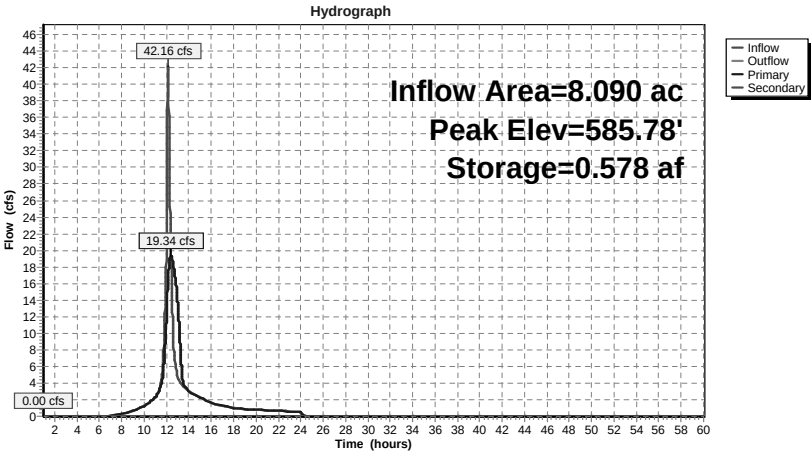
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
583.40	0.000	0.000	0.000
584.00	0.071	0.021	0.021
589.00	1.421	3.730	3.751

Device	Routing	Invert	Outlet Devices
#1	Primary	582.73'	24.0" Round Culvert L= 78.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 582.73' / 582.33' S= 0.0051 ' / Cc= 0.900 n= 0.013
#2	Secondary	588.90'	10.0' long x 18.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=19.34 cfs @ 12.40 hrs HW=585.78' TW=580.35' (Dynamic Tailwater)
1=Culvert (Barrel Controls 19.34 cfs @ 6.16 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=583.40' TW=579.80' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 5P: Wetland Depression_1



Proposed Conditions_DP-6

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 25

Hydrograph for Pond 5P: Wetland Depression_1

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
1.00	0.00	0.000	583.40	0.00	0.00	0.00
3.00	0.00	0.000	583.40	0.00	0.00	0.00
5.00	0.00	0.000	583.40	0.00	0.00	0.00
7.00	0.10	0.000	583.40	0.10	0.10	0.00
9.00	0.66	0.000	583.40	0.66	0.66	0.00
11.00	2.33	0.000	583.45	2.32	2.32	0.00
13.00	4.90	0.174	584.83	13.69	13.69	0.00
15.00	2.25	0.000	583.44	2.26	2.26	0.00
17.00	1.26	0.000	583.40	1.26	1.26	0.00
19.00	0.86	0.000	583.40	0.86	0.86	0.00
21.00	0.70	0.000	583.40	0.70	0.70	0.00
23.00	0.57	0.000	583.40	0.57	0.57	0.00
25.00	0.00	0.000	583.40	0.00	0.00	0.00
27.00	0.00	0.000	583.40	0.00	0.00	0.00
29.00	0.00	0.000	583.40	0.00	0.00	0.00
31.00	0.00	0.000	583.40	0.00	0.00	0.00
33.00	0.00	0.000	583.40	0.00	0.00	0.00
35.00	0.00	0.000	583.40	0.00	0.00	0.00
37.00	0.00	0.000	583.40	0.00	0.00	0.00
39.00	0.00	0.000	583.40	0.00	0.00	0.00
41.00	0.00	0.000	583.40	0.00	0.00	0.00
43.00	0.00	0.000	583.40	0.00	0.00	0.00
45.00	0.00	0.000	583.40	0.00	0.00	0.00
47.00	0.00	0.000	583.40	0.00	0.00	0.00
49.00	0.00	0.000	583.40	0.00	0.00	0.00
51.00	0.00	0.000	583.40	0.00	0.00	0.00
53.00	0.00	0.000	583.40	0.00	0.00	0.00
55.00	0.00	0.000	583.40	0.00	0.00	0.00
57.00	0.00	0.000	583.40	0.00	0.00	0.00
59.00	0.00	0.000	583.40	0.00	0.00	0.00

Proposed Conditions_DP-6

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 26

Summary for Subcatchment DA-6: Drainage Area 6

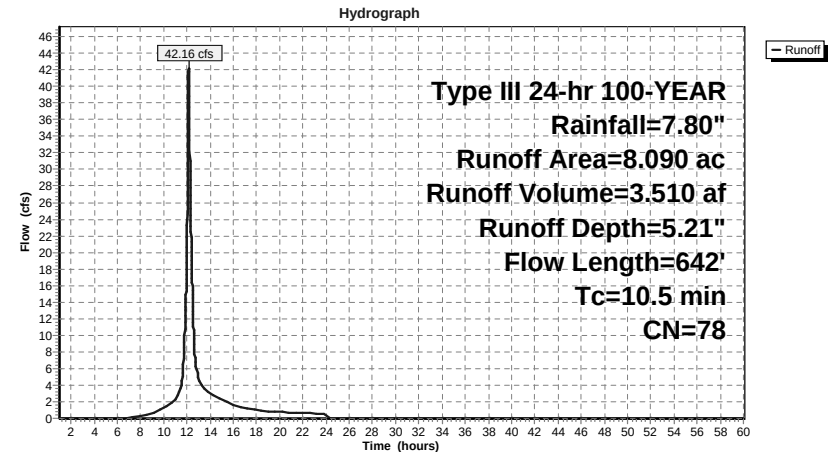
Runoff = 42.16 cfs @ 12.14 hrs, Volume= 3.510 af, Depth= 5.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-60.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-YEAR Rainfall=7.80"

Area (ac)	CN	Description
5.640	77	Woods, Good, HSG D
1.810	73	Woods, Fair, HSG C
* 0.640	98	Paved parking & Roads, HSG C
8.090	78	Weighted Average
7.450		92.09% Pervious Area
0.640		7.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	87	0.1030	0.15		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.3	48	0.3330	2.89		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.7	507	0.0730	11.27	191.58	Channel Flow, Area= 17.0 sf Perim= 22.0' r= 0.77' n= 0.030 Earth, grassed & winding
10.5	642	Total			

Subcatchment DA-6: Drainage Area 6

Proposed Conditions_DP-6

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 27

Hydrograph for Subcatchment DA-6: Drainage Area 6

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.08	0.00	0.00	53.00	7.80	5.21	0.00
2.00	0.16	0.00	0.00	54.00	7.80	5.21	0.00
3.00	0.24	0.00	0.00	55.00	7.80	5.21	0.00
4.00	0.34	0.00	0.00	56.00	7.80	5.21	0.00
5.00	0.44	0.00	0.00	57.00	7.80	5.21	0.00
6.00	0.56	0.00	0.00	58.00	7.80	5.21	0.00
7.00	0.71	0.01	0.10	59.00	7.80	5.21	0.00
8.00	0.89	0.03	0.29	60.00	7.80	5.21	0.00
9.00	1.14	0.10	0.66				
10.00	1.47	0.22	1.23				
11.00	1.95	0.46	2.33				
12.00	3.90	1.81	20.63				
13.00	5.85	3.45	4.90				
14.00	6.33	3.87	2.99				
15.00	6.66	4.17	2.25				
16.00	6.91	4.39	1.60				
17.00	7.09	4.56	1.26				
18.00	7.24	4.69	0.98				
19.00	7.36	4.80	0.86				
20.00	7.46	4.90	0.77				
21.00	7.56	4.99	0.70				
22.00	7.65	5.07	0.64				
23.00	7.73	5.14	0.57				
24.00	7.80	5.21	0.51				
25.00	7.80	5.21	0.00				
26.00	7.80	5.21	0.00				
27.00	7.80	5.21	0.00				
28.00	7.80	5.21	0.00				
29.00	7.80	5.21	0.00				
30.00	7.80	5.21	0.00				
31.00	7.80	5.21	0.00				
32.00	7.80	5.21	0.00				
33.00	7.80	5.21	0.00				
34.00	7.80	5.21	0.00				
35.00	7.80	5.21	0.00				
36.00	7.80	5.21	0.00				
37.00	7.80	5.21	0.00				
38.00	7.80	5.21	0.00				
39.00	7.80	5.21	0.00				
40.00	7.80	5.21	0.00				
41.00	7.80	5.21	0.00				
42.00	7.80	5.21	0.00				
43.00	7.80	5.21	0.00				
44.00	7.80	5.21	0.00				
45.00	7.80	5.21	0.00				
46.00	7.80	5.21	0.00				
47.00	7.80	5.21	0.00				
48.00	7.80	5.21	0.00				
49.00	7.80	5.21	0.00				
50.00	7.80	5.21	0.00				
51.00	7.80	5.21	0.00				
52.00	7.80	5.21	0.00				

Proposed Conditions_DP-6

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Type III 24-hr 100-YEAR Rainfall=7.80"

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Page 28

Summary for Reach DP-6: Long Meadow Rd

Assume the DP-2 is at the tail end of the pipe, therefore the full length of the culvert (73') has not been specified. The culvert outlet elevation has replaced the inlet elevation so as to not overtop Wetland Depression_1. Outlet elevation has been replaced to mimick the existing slope on the culvert pipe.

[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 8.090 ac, 7.91% Impervious, Inflow Depth = 5.21" for 100-YEAR event
 Inflow = 19.34 cfs @ 12.40 hrs, Volume= 3.510 af
 Outflow = 19.34 cfs @ 12.41 hrs, Volume= 3.510 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-60.00 hrs, dt= 0.01 hrs / 3

Max. Velocity= 18.58 fps, Min. Travel Time= 0.0 min

Avg. Velocity = 8.23 fps, Avg. Travel Time= 0.0 min

Peak Storage= 1 cf @ 12.41 hrs

Average Depth at Peak Storage= 0.55'

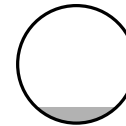
Bank-Full Depth= 4.00', Capacity at Bank-Full= 476.41 cfs

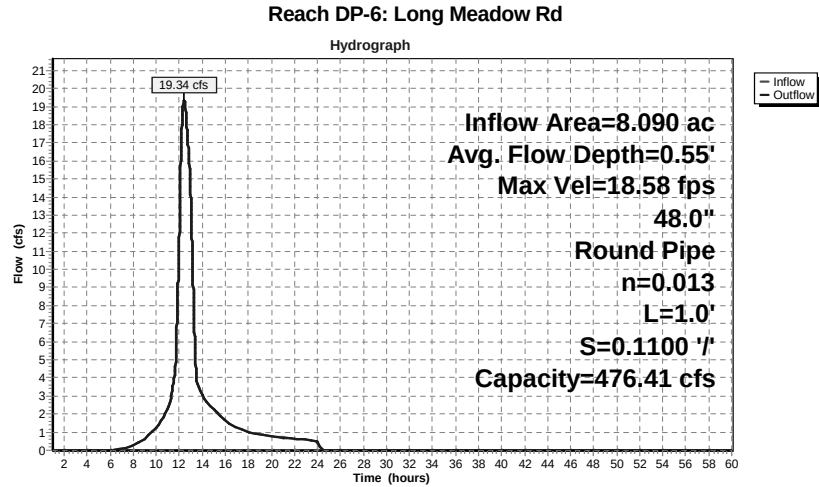
48.0" Round Pipe

n= 0.013

Length= 1.0' Slope= 0.1100 '/

Inlet Invert= 579.80', Outlet Invert= 579.69'





Hydrograph for Reach DP-6: Long Meadow Rd

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
1.00	0.00	0	579.80	0.00
3.00	0.00	0	579.80	0.00
5.00	0.00	0	579.80	0.00
7.00	0.10	0	579.84	0.10
9.00	0.66	0	579.91	0.66
11.00	2.32	0	580.00	2.32
13.00	13.69	1	580.27	13.69
15.00	2.26	0	580.00	2.26
17.00	1.26	0	579.95	1.26
19.00	0.86	0	579.93	0.86
21.00	0.70	0	579.91	0.70
23.00	0.57	0	579.90	0.57
25.00	0.00	0	579.80	0.00
27.00	0.00	0	579.80	0.00
29.00	0.00	0	579.80	0.00
31.00	0.00	0	579.80	0.00
33.00	0.00	0	579.80	0.00
35.00	0.00	0	579.80	0.00
37.00	0.00	0	579.80	0.00
39.00	0.00	0	579.80	0.00
41.00	0.00	0	579.80	0.00
43.00	0.00	0	579.80	0.00
45.00	0.00	0	579.80	0.00
47.00	0.00	0	579.80	0.00
49.00	0.00	0	579.80	0.00
51.00	0.00	0	579.80	0.00
53.00	0.00	0	579.80	0.00
55.00	0.00	0	579.80	0.00
57.00	0.00	0	579.80	0.00
59.00	0.00	0	579.80	0.00

SWPPP—APPENDIX F

Soil Boring Logs

APPENDIX B

BORING LOGS



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG
TEST PIT NUMBER TP-01

Page 1 of 1

LOCATION: Warwick, New York

PIT DIMENSIONS - TOP: 10 X 18 ft

BOTTOM: 10 X 18 ft

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: Watchtower Operator

EQUIPMENT: CAT 325BL

INSPECTOR: K. Owens

START DATE and TIME: 12/1/2010 9:00:00 AM

FINISH DATE and TIME: 12/1/2010 9:40:00 AM

SURFACE

ELEV: 677.64 (ft; Surveyed)

CHECKED BY: J. Gorman

WATER LEVEL
OBSERVATIONS
DURING/AFTER
EXCAVATION

DATE

TIME

WATER
DEPTH (ft)

12-1-10

9:20 AM

7

NUMBER OF
BOULDERS
ENCOUNTERED8 to 18 inches Diam: 20
Over 18 inches Diam: 12

SAMPLE # AND DEPTH RANGE (Feet)	ELEVATION (Feet)	DEPTH (Feet)	STRATA	DESCRIPTION AND CLASSIFICATION	WATER AND/OR SEEP ELEV.	Remarks on Character of Excavation, Water seeps, etc.
G-1 6 - 7	675	5		<u>TOPSOIL</u> <u>f.m.c. SAND</u> , little silt, trace waste, gray, moist (FILL)		Boulders and cobbles throughout the test pit. Waste in the fill consisted of metal straps/pipes, soda cans, and large angular rock.
	670	10		<u>f.m.c. SAND</u> , Some f.c. Gravel, little clayey silt, mottled orange/gray, wet (SM)		Fill was difficult to excavate, difficulty lessened at depths of natural materials. Very large boulder, greater than 5' wide, removed at a depth of 6'. Sample G-1 moisture content = 9.9%.
	665	15		<u>f.m.c. SAND</u> , little f.c. gravel, trace silt, light brown, moist (SP-TILL)		Test pits were only open for a short duration and groundwater observations may not represent static conditions. Fewer boulders were excavated in the test pit in the glacial till than in the fill.
G-2 12.5 - 14	660	20		End of Test Pit at 16 ft		Test pit terminated in glacial till soils.
	655	25				
	650	30				

TEST PIT LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATEDCHA.GDT 12/7/11



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG
TEST PIT NUMBER TP-02

Page 1 of 1

LOCATION: Warwick, New York

PIT DIMENSIONS - TOP: 20 X 14 ft

BOTTOM: 20 X 14 ft

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: Watchtower Operator

EQUIPMENT: CAT 325BL

INSPECTOR: K. Owens

START DATE and TIME: 12/1/2010 9:50:00 AM

FINISH DATE and TIME: 12/1/2000 10:15:00 AM

SURFACE

ELEV: 684.58 (ft; Surveyed)

CHECKED BY: J. Gorman

WATER LEVEL
OBSERVATIONS
DURING/AFTER
EXCAVATION

DATE

TIME

WATER
DEPTH (ft)NUMBER OF
BOULDERS
ENCOUNTERED

8 to 18 inches Diam: 0

Over 18 inches Diam: 0

SAMPLE #
AND
DEPTH
RANGE
(Feet)ELEVATION
(Feet)DEPTH
(Feet)

STRATA

DESCRIPTION AND CLASSIFICATION

WATER
AND/OR
SEEP ELEV.Remarks on
Character of
Excavation,
Water seeps, etc.G-1
2 - 3

680

5

675

10

670

15

665

20

660

25

655

30

TOPSOIL**f.m.c. SAND**, little clayey silt, little f.c. gravel, light brown, moist (**SM**)

End of Test Pit at 3.5 ft



Layer of asphalt and concrete at 0.8'.
Test pits were only open for a short duration and groundwater observations may not represent static conditions.
Fractured granite bedrock was in spoils from 2' to 3.5'.
Test pit terminated at 3.5' due to refusal on granite bedrock.

TEST PIT LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATED CHA.GDT 12/7/11



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG
TEST PIT NUMBER TP-03

Page 1 of 1

LOCATION: Warwick, New York

PIT DIMENSIONS - TOP: 15 X 15 ft

BOTTOM: 15 X 15 ft

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: Watchtower Operator

EQUIPMENT: CAT 325BL

INSPECTOR: K. Owens

START DATE and TIME: 12/6/2010 8:25:00 AM

FINISH DATE and TIME: 12/6/2010 9:00:00 AM

SURFACE

ELEV: 672.48 (ft; Surveyed)

CHECKED BY: J. Gorman

WATER LEVEL
OBSERVATIONS
DURING/AFTER
EXCAVATION

DATE

TIME

WATER
DEPTH (ft)NUMBER OF
BOULDERS
ENCOUNTERED8 to 18 inches Diam: 10
Over 18 inches Diam: 6

SAMPLE # AND DEPTH RANGE (Feet)	ELEVATION (Feet)	DEPTH (Feet)	STRATA	DESCRIPTION AND CLASSIFICATION	WATER AND/OR SEEP ELEV.	Remarks on Character of Excavation, Water seeps, etc.
PR-1 4 - 6	670	5		TOPSOIL		Test pits were only open for a short duration and groundwater observations may not represent static conditions. Very large, angular boulders from 2.5' to test pit termination. PR-1 max dry density = 136.0 pcf @ optimum moisture = 6.8%. Test pit terminated at 8'. The test pit was advanced on a slope and large boulder removal was causing the walls to collapse and undercutting the excavator.
				f.m.c. SAND , trace silt, trace f.c. gravel, brown, moist (SP)		
				f.m.c. SAND , Some Silt, Some f.c. gravel, light brown/orange/black, moist (COMPLETELY WEATHERED BEDROCK)		
				End of Test Pit at 8 ft		
	665					
		10				
	660					
		15				
	655					
		20				
	650					
		25				
	645					
		30				

TEST PIT LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATEDCHA.GDT 12/7/11



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG
TEST PIT NUMBER TP-04

Page 1 of 1

LOCATION: Warwick, New York

PIT DIMENSIONS - TOP: 20 X 15 ft

BOTTOM: 20 X 15 ft

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: Watchtower Operator

EQUIPMENT: CAT 325BL

INSPECTOR: K. Owens

START DATE and TIME: 12/1/2010 8:20:00 AM

FINISH DATE and TIME: 12/1/2010 8:45:00 AM

SURFACE

ELEV: 704.83 (ft; Surveyed)

CHECKED BY: J. Gorman

WATER LEVEL
OBSERVATIONS
DURING/AFTER
EXCAVATION

DATE

TIME

WATER
DEPTH (ft)NUMBER OF
BOULDERS
ENCOUNTERED

8 to 18 inches Diam: 0

Over 18 inches Diam: 0

SAMPLE #
AND
DEPTH
RANGE
(Feet)ELEVATION
(Feet)DEPTH
(Feet)

STRATA

DESCRIPTION AND CLASSIFICATION

WATER
AND/OR
SEEP ELEV.Remarks on
Character of
Excavation,
Water seeps, etc.G-1
1 - 2.5

700 5

695 10

690 15

685 20

680 25

675 30

TOPSOIL**f.m.c. SAND.** Some clayey Silt, Some f.c. Gravel, trace organics, light brown/orange, wet (**SM**)

End of Test Pit at 3 ft

Test pits were only open for a short duration and groundwater observations may not represent static conditions. Boulders observed at the ground surface. Sample G-1 moisture content = 17.2%. Test pit termination due to excavator refusal on granite bedrock.



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG
TEST PIT NUMBER TP-05

Page 1 of 1

LOCATION: Warwick, New York

PIT DIMENSIONS - TOP: 8 X 14 ft

BOTTOM: 8 X 14 ft

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: Watchtower Operator

EQUIPMENT: CAT 325BL

INSPECTOR: K. Owens

START DATE and TIME: 12/1/2010 7:30:00 AM

FINISH DATE and TIME: 12/1/2010 8:00:00 AM

SURFACE

ELEV: 706.28 (ft; Surveyed)

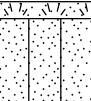
CHECKED BY: J. Gorman

WATER LEVEL
OBSERVATIONS
DURING/AFTER
EXCAVATION

DATE

TIME

WATER
DEPTH (ft)NUMBER OF
BOULDERS
ENCOUNTERED8 to 18 inches Diam: 12
Over 18 inches Diam: 6

SAMPLE # AND DEPTH RANGE (Feet)	ELEVATION (Feet)	DEPTH (Feet)	STRATA	DESCRIPTION AND CLASSIFICATION	WATER AND/OR SEEP ELEV.	Remarks on Character of Excavation, Water seeps, etc.	
G-1 5 - 6	705			<u>TOPSOIL</u> f.m.c. SAND, little silt, trace f.c. gravel, light brown/orange, moist (SM)		Large boulders observed at the ground surface. Cobbles and boulders were excavated 2.5' to test pit termination.	
		5		f.m.c. SAND, little silt, little f.c. gravel, light brown/gray, moist (SM-TILL)			
	700					Difficult excavation 4' to test pit termination.	
		10				Test pits were only open for a short duration and groundwater observations may not represent static conditions. Test pit termination due to excavator refusal on schist bedrock.	
	695			End of Test Pit at 11 ft			
		15					
	690						
		20					
	685						
		25					
	680						
		30					
	675						

TEST PIT LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATED CHA.GDT 12/7/11



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG
TEST PIT NUMBER TP-06

Page 1 of 1

LOCATION: Warwick, New York

PIT DIMENSIONS - TOP: 4 X 8 ft

BOTTOM: 4 X 8 ft

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: Watchtower Operator

EQUIPMENT: CAT 325BL

INSPECTOR: K. Owens

START DATE and TIME: 12/6/2010 7:40:00 AM

FINISH DATE and TIME: 12/6/2010 8:15:00 AM

SURFACE

ELEV: 694.24 (ft; Surveyed)

CHECKED BY: J. Gorman

WATER LEVEL
OBSERVATIONS
DURING/AFTER
EXCAVATION

DATE

TIME

WATER
DEPTH (ft)

12-6-10

8:00 AM

6.7

NUMBER OF
BOULDERS
ENCOUNTERED

8 to 18 inches Diam: 35

Over 18 inches Diam: 8

SAMPLE # AND DEPTH RANGE (Feet)	ELEVATION (Feet)	DEPTH (Feet)	STRATA	DESCRIPTION AND CLASSIFICATION	WATER AND/OR SEEP ELEV.	Remarks on Character of Excavation, Water seeps, etc.
G-1 3 - 5	690	5		<u>TOPSOIL</u>		Very large boulders were excavated throughout the test pit, some boulders were very angular and likely fractured bedrock. Test pits were only open for a short duration and groundwater observations may not represent static conditions. Test pit termination due to excavator refusal on granite bedrock.
				<u>f.m.c. SAND</u> , little f.c. gravel, trace silt, dark brown, moist (SP)		
				<u>f.m.c. SAND</u> , trace silt, trace f.c. gravel, light brown, moist (SP-TILL)		
				End of Test Pit at 6.9 ft		
	685	10				
	680	15				
	675	20				
	670	25				
	665	30				

TEST PIT LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATED CHA.GDT 12/7/11



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG
TEST PIT NUMBER TP-07

Page 1 of 1

LOCATION: Warwick, New York

PIT DIMENSIONS - TOP: 10 X 15.5 ft

BOTTOM: 11 X 15.5 ft

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: Watchtower Operator

EQUIPMENT: CAT 325BL

INSPECTOR: K. Owens

START DATE and TIME: 11/30/2010 3:20:00 PM

FINISH DATE and TIME: 11/30/2010 4:05:00 PM

SURFACE

ELEV: 688.81 (ft; Surveyed)

CHECKED BY: J. Gorman

WATER LEVEL
OBSERVATIONS
DURING/AFTER
EXCAVATION

DATE

11-30-10

TIME

3:50 PM

WATER
DEPTH (ft)

9

NUMBER OF
BOULDERS
ENCOUNTERED8 to 18 inches Diam: 20
Over 18 inches Diam: 15SAMPLE #
AND
DEPTH
RANGE
(Feet)ELEVATION
(Feet)DEPTH
(Feet)

STRATA

DESCRIPTION AND CLASSIFICATION

WATER
AND/OR
SEEP ELEV.Remarks on
Character of
Excavation,
Water seeps, etc.G-1
5 - 6

685

5

680

10

675

15

670

20

665

25

660

30

ASPHALT**f.c. GRAVEL**, trace silt, trace sand, black (**SUBBASE**)**f.m.c. SAND**, little silt, trace wire, red/orange, moist
(**FILL**)**f.m.c. SAND**, little silt, little f.c. gravel, light brown, wet
(**SM-TILL**)

End of Test Pit at 11 ft

Cobbles and boulders
observed in excavation
throughout the test pit.
Metal stranded cable in wall of
test pit in fill layer.Test pits were only open for a
short duration and
groundwater observations
may not represent static
conditions.
Test pit termination at 11' due
to excavator refusal on granite
bedrock.



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG
TEST PIT NUMBER TP-08

Page 1 of 1

LOCATION: Warwick, New York

PIT DIMENSIONS - TOP: 14 X 17 ft

BOTTOM: 14 X 17 ft

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: Watchtower Operator

EQUIPMENT: CAT 325BL

INSPECTOR: K. Owens

START DATE and TIME: 11/30/2010 10:40:00 AM

FINISH DATE and TIME: 11/30/2010 11:40:00 AM

SURFACE

ELEV: 694.12 (ft; Surveyed)

CHECKED BY: J. Gorman

WATER LEVEL
OBSERVATIONS
DURING/AFTER
EXCAVATION

DATE

TIME

WATER
DEPTH (ft)NUMBER OF
BOULDERS
ENCOUNTERED

11-30-10

11:30 AM

14

11-30-10

11:40 AM

11

8 to 18 inches Diam: 6

Over 18 inches Diam: 9

SAMPLE #
AND
DEPTH
RANGE
(Feet)ELEVATION
(Feet)DEPTH
(Feet)

STRATA

DESCRIPTION AND CLASSIFICATION

WATER
AND/OR
SEEP ELEV.Remarks on
Character of
Excavation,
Water seeps, etc.G-1
0.5 - 1.5690
4 - 5

5

G-3
8 - 10

685

10

G-4
14 - 15

680

15

675

20

670

25

665

30

ASPHALT**f.m.c. SAND**, little silt, little f.c. gravel, trace organics,
light brown, moist (**FILL**)**f.m.c. SAND**, Some Silt, little f.c. gravel, light brown,
moist (**SM-TILL**)

becomes gray

becomes light brown

becomes wet

End of Test Pit at 15 ft

Difficulty of excavating
decreased from 10' to test pit
termination and boulders were
smaller.
Test pits were only open for a
short duration and
groundwater observations
may not represent static
conditions.Test pits were only open for a
short duration and
groundwater observations
may not represent static
conditions.
Test pit terminated in glacial
till soils.

TEST PIT LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATEDCHA.GDT 12/7/11



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG
TEST PIT NUMBER TP-09

Page 1 of 1

LOCATION: Warwick, New York

PIT DIMENSIONS - TOP: 10 X 18 ft

BOTTOM: 10 X 18 ft

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: Watchtower Operator

EQUIPMENT: CAT 325BL

INSPECTOR: K. Owens

START DATE and TIME: 11/30/2010 12:55:00 PM

FINISH DATE and TIME: 11/30/2010 1:45:00 PM

SURFACE

ELEV: 694.82 (ft; Surveyed)

CHECKED BY: J. Gorman

WATER LEVEL
OBSERVATIONS
DURING/AFTER
EXCAVATION

DATE

11-30-10

TIME

1:45 PM

WATER
DEPTH (ft)

None

NUMBER OF
BOULDERS
ENCOUNTERED8 to 18 inches Diam: 10
Over 18 inches Diam: 10SAMPLE #
AND
DEPTH
RANGE
(Feet)ELEVATION
(Feet)DEPTH
(Feet)

STRATA

DESCRIPTION AND CLASSIFICATION

WATER
AND/OR
SEEP ELEV.Remarks on
Character of
Excavation,
Water seeps, etc.G-1
0.7 - 1.3

690

5

G-2
4 - 5G-3
9 - 11

685

10

G-4
14 - 15

680

15

675

20

670

25

665

30

ASPHALT**f.c. GRAVEL**, trace silt, trace f.m.c. sand, black, moist
(SUBBASE)**f.m.c. SAND**, little silt, little f.c. gravel, orange/dark
brown, moist (FILL)**f.m.c. SAND**, little silt, little f.c. gravel, light brown/gray,
moist (SM-TILL)Some f.c. Gravel, little clayey silt, grayish brown, moist
(SM-TILL)

becomes light brown

f.m.c. SAND, Some Silt, little f.c. gravel, red/white/light
brown, moist (COMPLETELY WEATHERED
BEDROCK)

End of Test Pit at 15 ft

Test pits were only open for a
short duration and
groundwater observations
may not represent static
conditions.
Cobbles and boulders
observed in test pit excavation
from 1.5' to test pit
termination.Sample G-2 moisture content
= 5.5%.Several large boulders packed
together at 9'.Sample G-4 moisture content
= 10.2%.Test pit terminated in
completely weathered
bedrock.

TEST PIT LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATEDCHA.GDT 12/7/11



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG
TEST PIT NUMBER TP-10

Page 1 of 1

LOCATION: Warwick, New York

PIT DIMENSIONS - TOP: 7 X 10 ft

BOTTOM: 7 X 10 ft

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: Watchtower Operator

EQUIPMENT: CAT 325BL

INSPECTOR: K. Owens

START DATE and TIME: 11/30/2010 4:15:00 PM

FINISH DATE and TIME: 11/30/2010 4:25:00 PM

SURFACE

ELEV: 686.21 (ft; Surveyed)

CHECKED BY: J. Gorman

WATER LEVEL
OBSERVATIONS
DURING/AFTER
EXCAVATION

DATE

11-30-10

TIME

4:25 AM

WATER
DEPTH (ft)

None

NUMBER OF
BOULDERS
ENCOUNTERED

8 to 18 inches Diam: 0

Over 18 inches Diam: 0

SAMPLE #
AND
DEPTH
RANGE
(Feet)ELEVATION
(Feet)DEPTH
(Feet)

STRATA

DESCRIPTION AND CLASSIFICATION

WATER
AND/OR
SEEP ELEV.Remarks on
Character of
Excavation,
Water seeps, etc.
TOPSOIL
GRANITE, gray, very hard, moderately weathered, close
fracture spacing

End of Test Pit at 2.5 ft

Test pit was on bedrock
outcropping. Excavator was
able to remove approximately
1' of fractured bedrock off of
the rock face.
Test pits were only open for a
short duration and
groundwater observations
may not represent static
conditions.
Test pit termination at
excavator refusal on granite
bedrock.

TEST PIT LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATED CHA.GDT 1/27/11



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG
TEST PIT NUMBER TP-11

Page 1 of 1

LOCATION: Warwick, New York

PIT DIMENSIONS - TOP: 4 X 10 ft

BOTTOM: 4 X 10 ft

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: Watchtower Operator

EQUIPMENT: CAT 325BL

INSPECTOR: K. Owens

START DATE and TIME: 12/6/2010 10:50:00 AM

FINISH DATE and TIME: 12/6/2010 11:15:00 AM

SURFACE

ELEV: 670.70 (ft; Surveyed)

CHECKED BY: J. Gorman

WATER LEVEL
OBSERVATIONS
DURING/AFTER
EXCAVATION

DATE

12-6-10

TIME

11:15 AM

WATER
DEPTH (ft)

4.5

NUMBER OF
BOULDERS
ENCOUNTERED

8 to 18 inches Diam: 5

Over 18 inches Diam: 1

SAMPLE #
AND
DEPTH
RANGE
(Feet)ELEVATION
(Feet)DEPTH
(Feet)

STRATA

DESCRIPTION AND CLASSIFICATION

WATER
AND/OR
SEEP ELEV.Remarks on
Character of
Excavation,
Water seeps, etc.G-1
3 - 4
G-2
4 - 4.5

670

5

665

10

655

15

650

20

645

25

640

30

ASPHALT**f.m.c. SAND**, trace silt, trace f. gravel, mottled light brown/orange, moist (**FILL**)**f.m.c. SAND**, trace silt, trace f.c. gravel, light brown, moist/wet (**SP-TILL**)**f.m.c. SAND**, little silt, trace f.c. gravel, light brown/orange/white (**COMPLETELY WEATHERED BEDROCK**)

End of Test Pit at 4.5 ft



Test pits were only open for a short duration and groundwater observations may not represent static conditions. Test pit termination due to excavator refusal on granite bedrock.



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG
TEST PIT NUMBER TP-12

Page 1 of 1

LOCATION: Warwick, New York

PIT DIMENSIONS - TOP: 7 X 18 ft

BOTTOM: 7 X 18 ft

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: Watchtower Operator

EQUIPMENT: CAT 325BL

INSPECTOR: K. Owens

START DATE and TIME: 11/30/2010 2:20:00 PM

FINISH DATE and TIME: 11/30/2010 3:00:00 PM

SURFACE

ELEV: 693.52 (ft; Surveyed)

CHECKED BY: J. Gorman

WATER LEVEL
OBSERVATIONS
DURING/AFTER
EXCAVATION

DATE

11-30-10

TIME

12:50 PM

WATER
DEPTH (ft)

16

NUMBER OF
BOULDERS
ENCOUNTERED

8 to 18 inches Diam: 20

Over 18 inches Diam: 9

SAMPLE #
AND
DEPTH
RANGE
(Feet)ELEVATION
(Feet)DEPTH
(Feet)

STRATA

DESCRIPTION AND CLASSIFICATION

WATER
AND/OR
SEEP ELEV.Remarks on
Character of
Excavation,
Water seeps, etc.G-1
4 - 5

690

5

TOPSOILf.m.c. SAND, little silt, trace f.c. gravel, orange/brown,
moist (FILL)f.m.c. SAND, little silt, little f.c. gravel, light brown, moist
(SM-TILL)G-2
13 - 14.5

680

15

f.m.c. SAND, And Clayey SILT, little f.c. gravel, brown,
moist (SM-TILL)

becomes gray

f.m.c. SAND, And Clayey SILT, little f.c. gravel, gray,
moist (SM-TILL)G-3
17 - 18

675

20

End of Test Pit at 22 ft

670

25

665

30

Boulders and cobbles
observed from 2' to test pit
termination.Boulders packed together
from 11' to 13' caused difficult
excavation.Sample G-2 moisture content
= 11.0%.Layer of boulders at 16'.
Test pits were only open for a
short duration and
groundwater observations
may not represent static
conditions.
Sample G-3 moisture content
= 13.0%.Test pit terminated in glacial
till soils.

TEST PIT LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATED CHA.GDT 12/7/11



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG
TEST PIT NUMBER TP-13

Page 1 of 1

LOCATION: Warwick, New York

PIT DIMENSIONS - TOP: 6 X 12 ft

BOTTOM: 6 X 12 ft

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: Watchtower Operator

EQUIPMENT: CAT 325BL

INSPECTOR: K. Owens

START DATE and TIME: 12/1/2010 1:05:00 PM

FINISH DATE and TIME: 12/1/2010 1:45:00 PM

SURFACE

ELEV: 670.08 (ft; Surveyed)

CHECKED BY: J. Gorman

WATER LEVEL
OBSERVATIONS
DURING/AFTER
EXCAVATION

DATE

TIME

WATER
DEPTH (ft)NUMBER OF
BOULDERS
ENCOUNTERED8 to 18 inches Diam: 8
Over 18 inches Diam: 5SAMPLE #
AND
DEPTH
RANGE
(Feet)ELEVATION
(Feet)DEPTH
(Feet)

STRATA

DESCRIPTION AND CLASSIFICATION

WATER
AND/OR
SEEP ELEV.Remarks on
Character of
Excavation,
Water seeps, etc.G-1
4 - 5

665

5

G-2
12 - 14

660

10

655

15

650

20

645

25

640

30

TOPSOIL**f.m.c. SAND**, little clayey silt, trace f.c. gravel, light brown/orange, moist (**SM**)**f.m.c. SAND**, little f.c. gravel, trace silt, light brown/gray, moist (**SM-TILL**)**f.m.c. SAND**, Some f.c. Gravel, little silt, brown/gray, moist (**SM-TILL**)

End of Test Pit at 15 ft

Test pits were only open for a short duration and groundwater observations may not represent static conditions. Cobbles and boulders were observed throughout the test pit. Large boulders were observed at the ground surface and at a depth of 8 feet.

Sample G-2 moisture content = 10.8%.

Test pit terminated in glacial till soils.

TEST PIT LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATED CHA.GDT 12/7/11



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG
TEST PIT NUMBER TP-14

Page 1 of 1

LOCATION: Warwick, New York

PIT DIMENSIONS - TOP: 4 X 10 ft

BOTTOM: 4 X 10 ft

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: Watchtower Operator

EQUIPMENT: CAT 325BL

INSPECTOR: K. Owens

START DATE and TIME: 12/1/2010 11:40:00 AM

FINISH DATE and TIME: 12/1/2010 12:05:00 PM

SURFACE

ELEV: 668.34 (ft; Surveyed)

CHECKED BY: J. Gorman

WATER LEVEL
OBSERVATIONS
DURING/AFTER
EXCAVATION

DATE

TIME

WATER
DEPTH (ft)NUMBER OF
BOULDERS
ENCOUNTERED

8 to 18 inches Diam: 8

Over 18 inches Diam: 4

SAMPLE #
AND
DEPTH
RANGE
(Feet)ELEVATION
(Feet)DEPTH
(Feet)

STRATA

DESCRIPTION AND CLASSIFICATION

WATER
AND/OR
SEEP ELEV.Remarks on
Character of
Excavation,
Water seeps, etc.TOPSOILf.m.c. SAND. Some clayey Silt, little f. gravel, trace organics, orange/light brown, wet (**SM**)f.m.c. SAND. Some f.c. Gravel, little silt, light brown/gray, moist (**SM-TILL**)f.m.c. SAND. Some f.c. Gravel, little silt, light brown/gray, moist (**SM-TILL**)

End of Test Pit at 15.5 ft



Large boulders were observed at the ground surface and at a depth of 8 feet. Less boulders were excavated as the depth of the test pit increased.

Test pits were only open for a short duration and groundwater observations may not represent static conditions.
Sample G-1 moisture content = 8.9%.
PR-1 max dry density = 140.2 pcf @ optimum moisture = 6.8%.

Sample G-2 moisture content = 6.6%.

Test pit terminated in glacial till soils.

TEST PIT LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATEDCHA.GDT 12/7/11



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG
TEST PIT NUMBER TP-15

Page 1 of 1

LOCATION: Warwick, New York

PIT DIMENSIONS - TOP: 7 X 25 ft

BOTTOM: 7 X 25 ft

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: Watchtower Operator

EQUIPMENT: CAT 325BL

INSPECTOR: K. Owens

START DATE and TIME: 12/1/2010 10:45:00 AM

FINISH DATE and TIME: 12/1/2010 11:25:00 AM

SURFACE

ELEV: 660.30 (ft; Surveyed)

CHECKED BY: J. Gorman

WATER LEVEL
OBSERVATIONS
DURING/AFTER
EXCAVATION

DATE

TIME

WATER
DEPTH (ft)NUMBER OF
BOULDERS
ENCOUNTERED8 to 18 inches Diam: 10
Over 18 inches Diam: 6

SAMPLE # AND DEPTH RANGE (Feet)	ELEVATION (Feet)	DEPTH (Feet)	STRATA	DESCRIPTION AND CLASSIFICATION	WATER AND/OR SEEP ELEV.	Remarks on Character of Excavation, Water seeps, etc.
	660			<u>TOPSOIL</u> <u>f.m.c. SAND</u> , little clayey silt, light brown, moist (SM)		Test pits were only open for a short duration and groundwater observations may not represent static conditions. Very large boulders were removed from the test pit from ground surface to a depth of 4 feet.
G-1 4 - 5		5		<u>f.m.c. SAND</u> , Some f.c. Gravel, little silt, light brown/gray, moist (SM-TILL)		Sample G-1 moisture content = 8.2%.
PR-1 6 - 7				<u>f.m.c. SAND</u> , Some Silt, Some f.c. Gravel, light brown/gray, moist (SM-TILL)		PR-1 max dry density = 137.3 pcf @ optimum moisture = 7.3%.
	655					
	650	10				
				End of Test Pit at 11.5 ft		Test pit termination due to excavator refusal on tightly packed boulders.
	645	15				
	640	20				
	635	25				
	630	30				

TEST PIT LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATEDCHA.GDT 1/27/11



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG
TEST PIT NUMBER TP-16

Page 1 of 1

LOCATION: Warwick, New York

PIT DIMENSIONS - TOP: 8 X 12 ft

BOTTOM: 8 X 12 ft

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: Watchtower Operator

EQUIPMENT: CAT 325BL

INSPECTOR: K. Owens

START DATE and TIME: 12/1/2010 3:00:00 PM

FINISH DATE and TIME: 12/1/2010 3:20:00 PM

SURFACE

ELEV: 668.85 (ft; Surveyed)

CHECKED BY: J. Gorman

WATER LEVEL
OBSERVATIONS
DURING/AFTER
EXCAVATION

DATE

TIME

WATER
DEPTH (ft)NUMBER OF
BOULDERS
ENCOUNTERED

12-1-10

3:20 PM

9

12-1-10

3:21 PM

7

8 to 18 inches Diam: 17
Over 18 inches Diam: 6SAMPLE #
AND
DEPTH
RANGE
(Feet)ELEVATION
(Feet)DEPTH
(Feet)

STRATA

DESCRIPTION AND CLASSIFICATION

WATER
AND/OR
SEEP ELEV.Remarks on
Character of
Excavation,
Water seeps, etc.G-1
5 - 7G-2
10 - 11

665

5

660

10

655

15

650

20

645

25

640

30

TOPSOIL**f.m.c. SAND**, little f.c. gravel, trace silt, light brown, moist
(SM)**f.m.c. SAND**, And Clayey SILT, little f.c. gravel,
red/brown, moist (SM)**f.m.c. SAND**, trace silt, trace f.c. gravel, light brown,
moist (SM-TILL)**f.m.c. SAND**, And Clayey SILT, little f.c. gravel, light
brown, moist (SM-TILL)

End of Test Pit at 15 ft

Cobbles and boulders were
observed throughout the
excavation.Sample G-1 moisture content
= 15.4%.Operator notes difficult
excavation from a depth of 7
feet to test pit termination.
Test pits were only open for a
short duration and
groundwater observations
may not represent static
conditions.Sample G-2 moisture content
= 11.4%.Test pit terminated in glacial
till soils.

TEST PIT LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATEDCHA.GDT 12/7/11



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG
TEST PIT NUMBER TP-17

Page 1 of 1

LOCATION: Warwick, New York

PIT DIMENSIONS - TOP: 8 X 17 ft

BOTTOM: 8 X 17 ft

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: Watchtower Operator

EQUIPMENT: CAT 325BL

INSPECTOR: K. Owens

START DATE and TIME: 12/1/2010 2:20:00 PM

FINISH DATE and TIME: 12/1/2010 2:55:00 PM

SURFACE

ELEV: 653.73 (ft; Surveyed)

CHECKED BY: J. Gorman

WATER LEVEL
OBSERVATIONS
DURING/AFTER
EXCAVATION

DATE

TIME

WATER
DEPTH (ft)NUMBER OF
BOULDERS
ENCOUNTERED

12-1-10

2:40 PM

5.5

12-1-10

2:50 PM

7.1

8 to 18 inches Diam: 3

Over 18 inches Diam: 8

SAMPLE #
AND
DEPTH
RANGE
(Feet)ELEVATION
(Feet)DEPTH
(Feet)

STRATA

DESCRIPTION AND CLASSIFICATION

WATER
AND/OR
SEEP ELEV.Remarks on
Character of
Excavation,
Water seeps, etc.G-1
3 - 4

650

5

PR-1
6 - 8

645

G-2
10 - 11

10

640

15

635

20

630

25

625

30

TOPSOIL**f.m.c. SAND**, little clayey silt, trace f.c. gravel, light brown, moist (**SM-TILL**)**f.m.c. SAND**, Some clayey Silt, Some f.c. Gravel, gray, wet (**SM-TILL**)**f.m.c. SAND**, And Clayey SILT, little f.c gravel, light brown, moist (**SM-TILL**)

End of Test Pit at 14 ft



Very large boulders throughout test pit. Few cobbles and mostly boulders were observed.

Test pits were only open for a short duration and groundwater observations may not represent static conditions.
PR-1 max dry density = 129.7 pcf @ optimum moisture = 9.3%.

Sample G-2 moisture content = 20.3%.

Test pit terminated at 14 feet because the side walls were collapsing and undercutting the excavator.

TEST PIT LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATEDCHA.GDT 12/7/11



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG
TEST PIT NUMBER TP-18

Page 1 of 1

LOCATION: Warwick, New York

PIT DIMENSIONS - TOP: 9 X 16 ft

BOTTOM: 9 X 16 ft

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: Watchtower Operator

EQUIPMENT: CAT 325BL

INSPECTOR: K. Owens

START DATE and TIME: 12/1/2010 3:30:00 PM

FINISH DATE and TIME: 12/1/2010 4:00:00 PM

SURFACE

ELEV: 653.03 (ft; Surveyed)

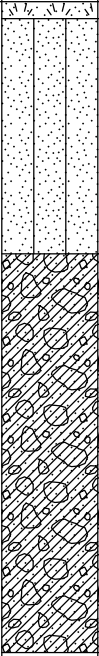
CHECKED BY: J. Gorman

WATER LEVEL
OBSERVATIONS
DURING/AFTER
EXCAVATION

DATE

TIME

WATER
DEPTH (ft)NUMBER OF
BOULDERS
ENCOUNTERED8 to 18 inches Diam: 12
Over 18 inches Diam: 4

SAMPLE # AND DEPTH RANGE (Feet)	ELEVATION (Feet)	DEPTH (Feet)	STRATA	DESCRIPTION AND CLASSIFICATION	WATER AND/OR SEEP ELEV.	Remarks on Character of Excavation, Water seeps, etc.
G-1 2 - 3.5	650	5		<u>TOPSOIL</u> <u>f.m.c. SAND</u> , little silt, little f.c. gravel, light brown, moist (SM) <u>f.m.c. SAND</u> , Some Silt, trace f.c. gravel, light brown, moist (SM) becomes light brown becomes red		Test pits were only open for a short duration and groundwater observations may not represent static conditions. Boulders and cobbles observed throughout the test pit, higher concentration of boulders near the ground surface. Sample G-1 moisture content = 9.3%.
G-2 7 - 9	645	10		<u>f.m.c. SAND</u> , Some f.c. Gravel, little silt, light brown, moist (SM-TILL)		Sample G-2 moisture content = 5.7%.
	640	15		End of Test Pit at 15.5 ft		Test pit terminated in glacial till soils.
	635	20				
	630	25				
	625	30				

TEST PIT LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATED CHA.GDT 12/7/11



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG
HOLE NUMBER TB-01

Page 1 of 1

LOCATION: Warwick, New York

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: SoilTesting

DRILLER: T. Page

INSPECTOR: K. Owens

START DATE and TIME: 4/23/2010 10:25:00 AM

FINISH DATE and TIME: 4/23/2010 12:30:00 PM

SURFACE

ELEV: 611.00 (ft; Surveyed)

CHECKED BY: C. Symmes

DRILL FLUID: None

DRILLING METHOD: 3.75" HSA

WATER LEVEL
OBSERVATIONS

DATE

TIME

READING
TYPEWATER
DEPTH
(ft)CASING
BOTTOM
(ft)HOLE
BOTTOM
(ft)

4-23-10

11:45 AM

During Drilling

10

8

12

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-1	2	1.2	2-3-12-18	15				TOPSOIL Clayey SILT , little f.m.c. sand, trace f.c. gravel, trace organics, dark brown, stiff, moist (FILL)	610	Groundwater levels encountered during drilling may not reflect static groundwater conditions.	
S-2	2	1.1	18-12-13-18	25				f. SAND , Some Silt, trace f.c. gravel, orange, medium compact, wet (SM)			
S-3	2	1.4	26-31-38-27	69		5		f. SAND , Some Silt, light brown, very compact, moist (SM)			
S-4	2	1.4	25-27-41-56	68				Similar Soil (SM) f.m.c. SAND , trace silt, trace f.c. gravel, light brown, very compact, moist (SP-TILL)	605	Boulders and cobbles encountered throughout the glacial till soils based on hard drilling and auger chatter.	
S-5	2	1.6	42-33-35-14	68				Similar Soil (SP-TILL) f.m.c. SAND , little silt, trace f.c. gravel, light brown, very compact, moist (SM-TILL)		Infiltration test conducted in boring TB-01 with bottom of hole at 7.1'.	
S-6	2	1.6	11-18-16-16	34		10		f.m.c. SAND , trace silt, trace f.c. gravel, gray/brown/white/black, compact, wet (SP-TILL)	600		
S-7	2	1.4	26-42-29-34	71		15		f.m.c. SAND , little silt, trace f. gravel, light brown, very compact, wet (SM-TILL)	595		
S-8	2	2	6-12-24-22	36		20		f.m.c. SAND , little silt, trace f. gravel, light brown, compact, wet (SM-TILL)	590		
S-9	2	1.3	18-14-14-16	28		25		f.m.c. SAND , little silt, trace f. gravel, light brown, medium compact, wet (SM-TILL)	585		
								End of Boring at 27 ft			
						30			580		

SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATED CHA.GDT 1/27/11



World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG
HOLE NUMBER TB-02

Page 1 of 2

PROJECT NUMBER: 21137.3000.32000

12/7/10

LOCATION: Warwick, New York

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: SoilTesting

DRILLER: T. Page

INSPECTOR: K. Owens

START DATE and TIME: 4/30/2010 9:55:00 AM

FINISH DATE and TIME: 4/30/2010 4:45:00 PM

SURFACE

ELEV: 623.25 (ft; Surveyed)

CHECKED BY: C. Symmes

DRILL FLUID: None

DRILLING METHOD: 3.75" HSA

WATER LEVEL
OBSERVATIONS

DATE

TIME

READING
TYPEWATER
DEPTH
(ft)CASING
BOTTOM
(ft)HOLE
BOTTOM
(ft)

4-30-10

10:50 AM

During Drilling

10

10

11.9

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-1	2	0.6	3-48-24-4	72				TOPSOIL f.m.c. SAND , little silt, little f.c. gravel, light brown/orange, very compact, moist/wet (SM) No recovery		Groundwater levels encountered during drilling may not reflect static groundwater conditions.	
S-2	2	0	5-3-7-11	10					620	Boulders and cobbles encountered throughout the glacial till soils based on hard drilling and auger chatter.	
S-3	2	1.3	21-26-26-61	52		5		f.m.c. SAND , little silt, trace f.c. gravel, light brown, very compact, wet (SM-TILL) becomes brown (SM-TILL)		Cobble fragment lodged in shoe of sample S-4.	
S-4	2	1.6	60-46-44-65	90				grades to little f.c. gravel (SM-TILL)	615		
S-5	2	1.7	88-78-62-77	R		10					
S-6	1.9	1.4	22-24-33-50/5"	57				f.m.c. SAND , little f.c. gravel, trace silt, brown, very compact, wet (SP-TILL)	610		
S-7	2	1.2	14-23-24-50	47		15		f.m.c. SAND , little silt, trace f. gravel, brown, compact, wet (SM-TILL)	605		
S-8	0.1	0	50/1"	R		20		No recovery	600		
S-9	0.3	0.3	100/4"	R		25		f.m.c. SAND , little silt, little c. gravel, gray, very compact, moist (SM-TILL)	595		
S-10	0.8	0.6	61-100/3"	R		30		f.m.c. SAND , little silt, trace f.c. gravel, gray, very compact, moist (SM-TILL)			

SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATEDCHA.GDT 1/27/11



World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-02

PROJECT NUMBER: 21137.3000.32000

12/7/10

Page 2 of 2

SAMP./CORE NUMBER	SAMP. ADV. (ft)	LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-11	0.7	0.5		62-50/2"	R		35		f.m.c. SAND , little silt, trace f. gravel, gray, very compact, moist (SM-TILL)	590		
S-12	0.5	0.5		121/6"	R		40		f.m.c. SAND , little silt, gray, very compact, moist/wet (SM-TILL)	585		
S-13	0.5	0.2		143/6"	R		45		grades to trace c. gravel (SM-TILL)	580		
S-14	0.3	0.3		50/3"	R		50		f.m.c. SAND , Some Clayey Silt, trace f. gravel, gray, very compact, moist/wet (SM-TILL) End of Boring at 50.3 ft	575		
										570		
										565		
										560		
										555		
										550		
										545		
										540		
										535		
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										90		
										85		
										80		
										75		
										70		



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-03

Page 1 of 1

LOCATION: Warwick, New York

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: SoilTesting

DRILLER: T. Page

INSPECTOR: K. Owens

START DATE and TIME: 5/3/2010 8:45:00 AM

FINISH DATE and TIME: 5/3/2010 11:50:00 AM

SURFACE

ELEV: 643.63 (ft; Surveyed)

CHECKED BY: C. Symmes

DRILL FLUID: None

DRILLING METHOD: 3.75" HSA

WATER LEVEL
OBSERVATIONS

DATE

TIME

READING
TYPEWATER
DEPTH
(ft)CASING
BOTTOM
(ft)HOLE
BOTTOM
(ft)

5-3-10

9:45 AM

During Drilling

15

15

17

5-6-10

12:00 PM

Well Install

4.8

24.5

24.5

6-7-10

10:30 AM

Static

16

24.5

24.5

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-1	2	0.8	3-1-2-3	3				TOPSOIL f.m.c. SAND , Some Clayey Silt, trace organics, light brown, very loose, moist (FILL)			
S-2	2	1.4	14-9-9-10	18				f.m.c. SAND , little clayey silt, trace f. gravel, light brown/gray/orange, medium compact, moist (SM) becomes light brown (SM)	640	Samples S-2 and S-3 laboratory testing results: MC = 14.4%, LL = 23.6, PL = 13.6.	
S-3	2	1.5	7-7-10-12	17		5		f.m.c. SAND , Some Clayey Silt, trace f. gravel, light brown, compact, moist (SM)			
S-4	2	1.9	9-18-18-18	36				f.m.c. SAND , little clayey silt, little f.c. gravel, light brown, compact, moist (SM-TILL)	635	Boulders and cobbles encountered throughout the glacial till soils based on hard drilling and auger chatter.	
S-5	2	1.8	19-23-26-27	49		10		becomes very compact (SM-TILL)			
S-6	1.7	1.7	13-22-38-50/2"	60					630		
S-7	1.6	0.7	15-13-48-50/1"	61		15		f.m.c. SAND , little clayey silt, little f.c. gravel, light brown, very compact, wet (SM-TILL)	625		
S-8	0.5	0.5	100/6"	R		20		f.m.c. SAND , little silt, little f.c. gravel, gray/light brown, very compact, moist (SM-TILL)	620		
S-9	1.5	1.5	39-71-73/6"	R		25		Similar Soil (SM-TILL)			
								End of Boring at 26.5 ft	615		
						30					

SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATED CHA.GDT 1/27/11



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-04

Page 1 of 2

LOCATION: Warwick, New York

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: SoilTesting

DRILLER: T. Page

INSPECTOR: K. Owens

START DATE and TIME: 4/29/2010 1:45:00 PM

FINISH DATE and TIME: 4/30/2010 9:25:00 AM

SURFACE

ELEV: 679.13 (ft; Surveyed)

CHECKED BY: C. Symmes

DRILL FLUID: Water @ 40.5'

DRILLING METHOD: 3.75" HSA

WATER LEVEL
OBSERVATIONS

DATE

TIME

READING
TYPEWATER
DEPTH
(ft)CASING
BOTTOM
(ft)HOLE
BOTTOM
(ft)

4-29-10

2:35 PM

During Drilling

8

8

10

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD %	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-1	2	0.5	2-1-1-1	2				TOPSOIL SILT , trace f. sand, trace organics, brown, moist, very soft (FILL)		Groundwater levels encountered during drilling may not reflect static groundwater conditions.	
S-2	2	1.4	3-15-10-8	25				f.m.c. SAND , Some Silt, trace f. gravel, light brown, medium compact, moist (SM)			
S-3	2	1.7	4-6-11-24	17		5		f.m.c. SAND , Some Silt, trace f. gravel, light brown, medium compact, wet (SM)	675	Boulders and cobbles encountered throughout the glacial till soils based on hard drilling and auger chatter.	
S-4	2	1.5	15-16-20-45	36				f.m.c. SAND , And Silt, trace f.c. gravel, light brown, compact, moist/wet (SM)			
S-5	2	1.9	9-10-11-13	21		10		f.m.c. SAND , Some Silt, trace f. gravel, light brown, medium compact, wet (SM)	670		
S-6	2	1.4	15-19-26-28	45				f.m.c. SAND , Some Silt, trace f. gravel, brown, compact, wet (SM-TILL)			
S-7	2	1.8	18-42-31-36	73		15		f.m.c. SAND , Some Silt, trace f.c. gravel, brown, very compact, moist (SM-TILL)	665		
						20			660	No spoon taken at 20' due to boulder. Auger to 25' and continue sampling.	
S-8	1.5	0.7	63-91-85/6"	R		25		becomes gray/light brown (SM-TILL)	655		
S-9	1.5	1.3	15-50-51/6"	R		30		Similar Soil (SM-TILL)	650		

SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATED CHA.GDT 1/27/11



World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-04

PROJECT NUMBER: 21137.3000.32000

12/7/10

Page 2 of 2

SAMP./CORE NUMBER	SAMP. ADV. (ft)	LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-10	2	2		14-15-19-27	34		35		becomes gray, very compact (SM-TILL)	645		
S-11	0.2	0.2		50/2"	R		40		becomes very compact (SM-TILL) GRANITE (BOULDERS/COBBLES)	640	Auger refusal at 40.5'	
R-1	9.5	1.9					45			635	No spoon taken at 45' due to hole collapse 43'-50'. Wash from core barrel was fine sand and silt.	
							50		End of Boring at 50 ft	630		
							55			625		
							60			620		
							65			615		
							70			610		



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-05

Page 1 of 2

LOCATION: Warwick, New York

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: SoilTesting

DRILLER: T. Page

INSPECTOR: K. Owens

START DATE and TIME: 4/29/2010 8:25:00 AM

FINISH DATE and TIME: 4/29/2010 1:35:00 PM

SURFACE

ELEV: 698.87 (ft; Surveyed)

CHECKED BY: C. Symmes

DRILL FLUID: Water @ 26'

DRILLING METHOD: 3.75" HSA

WATER LEVEL
OBSERVATIONS

DATE

TIME

READING
TYPEWATER
DEPTH
(ft)CASING
BOTTOM
(ft)HOLE
BOTTOM
(ft)

4-29-10

11:30 AM

During Drilling

35

35

36.5

SAMP./CORE NUMBER	SAMP. ADV. (ft)	RECOVERY LEN. CORE (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-1	2	1.4	1-3-2-7	5				TOPSOIL f.m.c. SAND. Some Silty Clay, trace f. gravel, trace organics, light brown, loose, wet (FILL)		Groundwater levels encountered during drilling may not reflect static groundwater conditions.	
S-2	2	1.5	9-7-10-12	17				f.m.c. SAND. Some Silt, light brown, medium compact, moist (SM)			
S-3	2	1.7	16-34-41-26	75		5		f.m.c. SAND. And Silt, trace f. gravel, light brown, very compact, moist (SM-TILL)	695	Boulders and cobbles encountered throughout the glacial till soils based on hard drilling and auger chatter.	
S-4	0.9	0.9	20-50/5"	R				becomes mottled orange/gray/light brown/black (SM-TILL)			
S-5	2	2	13-19-29-57	48		10		becomes brown, compact (SM-TILL)	690		
S-6	2	1.9	36-39-44-57	83				becomes very compact (SM-TILL)			
S-7	0.3	0.3	100/3"	R		15		f.m.c. SAND. Some Silt, brown, very compact, moist (SM-TILL)	685		
S-8	1.5	1.5	23-44-53/6"	R		20		grades to trace f.c. gravel (SM-TILL)	680		
S-9	1.5	1.5	48-57-62/6"	R		25		Similar Soil (SM-TILL)	675		
S-10	1.5	1.5	49-45-71/6"	R		30		Similar Soil (SM-TILL)	670	Water introduced at 26' to ease drilling.	

SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATED CHA.GDT 1/27/11



World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-05

PROJECT NUMBER: 21137.3000.32000

12/7/10

Page 2 of 2

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-11	1.5	1.5	26-30-105/6"	R		35		becomes gray (SM-TILL)	665		
S-12	1.3	1.3	24-65-100/4"	R		40		<u>Similar Soil</u> (SM-TILL)	660		
S-13	0.1	0.1	50/1"	R		45		<u>Similar Soil</u> (SM-TILL)	655		
S-14	1.5	1.5	26-31-89/6"	R		50		<u>Similar Soil</u> (SM-TILL)	650		
								End of Boring at 51.5 ft			
						55			645		
						60			640		
						65			635		
						70			630		



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-06

Page 1 of 1

LOCATION: Warwick, New York

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: SoilTesting

DRILLER: T. Page

INSPECTOR: K. Owens

START DATE and TIME: 4/28/2010 8:30:00 AM

FINISH DATE and TIME: 4/28/2010 11:40:00 AM

SURFACE

ELEV: 677.01 (ft; Surveyed)

CHECKED BY: C. Symmes

DRILL FLUID: None

DRILLING METHOD: 3.75" HSA

WATER LEVEL
OBSERVATIONS

DATE

TIME

READING
TYPEWATER
DEPTH
(ft)CASING
BOTTOM
(ft)HOLE
BOTTOM
(ft)

4-28-10

11:40 AM

Completion

None

25

25.5

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-1	2	0.9	3-4-3-6	7				TOPSOIL f.m.c. SAND , Some Clayey Silt, trace f.c. gravel, light brown/orange/black, loose, moist/wet (SM)	675	Groundwater levels encountered during drilling may not reflect static groundwater conditions.	
S-2	1.4	1.2	3-18-50/5"	R				f.m.c. SAND , Some Clayey Silt, trace f.c. gravel, light brown/orange/black, very compact, wet (SM)			
S-3	1	1	11-100/6"	R		5		f.m.c. SAND , Little silty clay, trace f.c. gravel, brown, very compact, moist (SM-TILL)			
S-4	0.3	0.3	50/4"	R				f.m.c. SAND , Some Clayey Silt, trace f. gravel, brown, very compact, moist (SM-TILL)	670	Boulders and cobbles encountered throughout the glacial till soils based on hard drilling and auger chatter.	
S-5	1.5	1.5	28-44-75/6"	R		10		Similar Soil (SM-TILL)	665		
S-6	1.5	1.5	30-47-61/6"	R		15		f.m.c. SAND , little silt, trace f.c. gravel, light brown, very compact, moist (SM-TILL)	660		
S-7	1.5	1.5	28-78-52/6"	R		20		Similar Soil (SM-TILL)	655		
S-8	0.5	0.5	100/6"	R		25		Similar Soil (SM-TILL) End of Boring at 25.5 ft	650		
						30					

SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATEDCHA.GDT 1/27/11



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-07

Page 1 of 2

LOCATION: Warwick, New York

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: SoilTesting

DRILLER: T. Page

INSPECTOR: K. Owens

START DATE and TIME: 4/27/2010 8:25:00 AM

FINISH DATE and TIME: 4/28/2010 8:00:00 AM

SURFACE

ELEV: 653.94 (ft; Surveyed)

CHECKED BY: C. Symmes

DRILL FLUID: Water @ 23.5'

DRILLING METHOD: 3.75" HSA

WATER LEVEL
OBSERVATIONS

DATE

TIME

READING
TYPEWATER
DEPTH
(ft)CASING
BOTTOM
(ft)HOLE
BOTTOM
(ft)

4-27-10

9:15 AM

During Drilling

10

8

12

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-1	2	0.5	7-11-12-4	23				TOPSOIL Silty CLAY. Some f. Sand, trace m.c. sand, trace organics/wood, light brown, very stiff, moist (FILL)		Groundwater levels encountered during drilling may not reflect static groundwater conditions.	
S-2	2	1.7	18-35-26-24	61				becomes hard (FILL) f.m.c. SAND. Some Clayey Silt, trace c. gravel, orange/light brown, very compact, moist (SM)	650	Residual soil lenses in shoe of sample S-2.	
S-3	2	1.9	4-14-14-28	28		5		f.m.c. SAND. little silt, trace f. gravel, light brown/orange/red, medium compact, moist (SM)			
S-4	2	1.5	14-21-33-40	54				f.m.c. SAND. Some Clayey Silt, orange/light brown, medium compact, moist (SM)		Boulders and cobbles encountered throughout the glacial till soils based on hard drilling and auger chatter.	
S-5	2	1.7	22-31-33-59	64		10		f.m.c. SAND. Some Silt, trace c. gravel, light brown, very compact, moist (SM-TILL)	645	Coarse gravel lodged in shoe of S-5.	
S-6	2	1.4	40-38-60-45	98				f.m.c. SAND. little silt, trace f.c. gravel, light brown, very compact, moist/wet (SM-TILL) becomes wet (SM-TILL)			
S-7	1.4	1.2	39-49-50/5"	R		15		Similar Soil (SM-TILL)	640		
S-8	0.7	0.7	53-50/2"	R		20		f. SAND, little silt, trace m.c. sand, trace f.c. gravel, light brown, very compact, wet (SM-TILL)	635		
R-1	2.5	1.9				25		GRANITE (BOULDERS/COBBLES)	630	Auger refusal at 23.5'. Switch drilling methods to flush joint casing to advance boring.	
R-2	3	0						No recovery			
S-9	0.7	0.3	52-50/2"	R		30		f.m.c. SAND. little silt, trace f.c. gravel, light brown, very compact, moist/wet (SM-TILL)	625		

SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATEDCHA.GDT 1/27/11



World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-07

PROJECT NUMBER: 21137.3000.32000

12/7/10

Page 2 of 2

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-10	0	0	50/0"	R		35		No recovery GRANITE (BOULDERS/COBBLES)	620		
R-3	4.9	0.3									
S-11	0.5	0	70/6"	R		40		No recovery GRANITE (BOULDERS/COBBLES)	615		
R-4	4.5	0.9									
S-12	0.9	0.5	53-50/5"	R		45		f.m.c. SAND , little silt, trace f.c. gravel, gray, very compact, wet (SM-TILL) GRANITE (BOULDERS/COBBLES)	610		
R-5	4.1	0.4									
S-13	0.9	0	41-60/5"	R		50		No recovery	605		
								End of Boring at 50.9 ft			
									600		
									595		
									590		
									585		
									70		

SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATEDCHA.GDT 1/27/11



World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-08

Page 1 of 2

PROJECT NUMBER: 21137.3000.32000

12/7/10

LOCATION: Warwick, New York

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: SoilTesting

DRILLER: T. Page

INSPECTOR: K. Owens

START DATE and TIME: 4/23/2010 1:30:00 PM

FINISH DATE and TIME: 4/26/2010 2:00:00 PM

SURFACE

ELEV: 686.01 (ft; Surveyed)

CHECKED BY: C. Symmes

DRILL FLUID: Water @ 8.5'

DRILLING METHOD: 3.75" HSA

WATER LEVEL
OBSERVATIONS

DATE

TIME

READING
TYPE

WATER
DEPTH
(ft)

CASING
BOTTOM
(ft)

HOLE
BOTTOM
(ft)

4-26-10

8:15 AM

Start of Day

12.5

24

24

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD/%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-1	2	1.5	2-2-2-2	4				TOPSOIL f.m.c. SAND. Some Clayey Silt, trace f. gravel, trace organics, orange/light brown, very loose, moist/wet (FILL)	685	Groundwater levels encountered during drilling may not reflect static groundwater conditions. Samples S-2 and S-3 laboratory testing results: MC = 7.2%, LL = 16.6, PL = 13.1.	
S-2	2	1.6	16-18-17-20	35				f.m.c. SAND. Some f.c. Gravel, little clayey silt, light brown/orange, compact, moist (SM)			
S-3	2	1.8	13-15-18-17	33		5		f.m.c. SAND. Some f.c. Gravel, little clayey silt, light brown, compact, moist (SM)			
S-4	1.7	1.6	25-21-38-60/2"	59				f.m.c. SAND. little silt, trace f.c. gravel, brown, very compact, moist (SM-TILL)	680	Boulders and cobbles encountered throughout the glacial till soils based on hard drilling and auger chatter.	
S-5	0.1	0.1	50/1"	R				f.m.c. SAND. little silt, little f. gravel, brown, very compact, moist (SM-TILL)		Auger grinding at 8'. Auger refusal at 8.5'. Switch drilling methods to flush joint casing to advance boring.	
R-1	3	0.6				10		SANDSTONE (BOULDERS/COBBLES)	675		
S-6	0.9	0.8	52-60/5"	R		15		f.m.c. SAND. little silt, trace f.c. gravel, gray, very compact, moist (SM-TILL)	670		
S-7	0.3	0.3	50/3"	R		20		Similar Soil (SM-TILL)	665		
S-8	0.3	0.1	50/4"	R		25		Similar Soil (SM-TILL) GRANITE (BOULDERS/COBBLES)	660		
R-2	4.7	0.9									
S-9	0.1	0	50/1"	R		30		No recovery GRANITE (BOULDERS/COBBLES)	655		



SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATEDCHA.GDT 1/27/11



World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-08

PROJECT NUMBER: 21137.3000.32000

12/7/10

Page 2 of 2

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
R-3	3.9	0.9						<u>GRANITE (BOULDERS/COBBLES)</u> (continued)			
						35		<u>GRANITE (BOULDERS/COBBLES)</u>	650	Core barrel jams at 34'.	
R-4	6	1.3									
S-10	0.1	0	75/1"	R		40		No recovery <u>GRANITE (BOULDERS/COBBLES)</u>	645		
R-5	4.9	0.6								Gray silt and sand in wash.	
S-11	0.5	0	105/6"	R		45		No recovery <u>GRANITE (BOULDERS/COBBLES)</u>	640		
R-6	4.5	1.3								Gray silt and sand in wash.	
S-12	0.9	0	53-100/5"	R		50		No recovery			
								End of Boring at 50.9 ft	635		
						55			630		
						60			625		
						65			620		
						70					



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-09

Page 1 of 2

LOCATION: Warwick, New York

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: SoilTesting

DRILLER: T. Page

INSPECTOR: K. Owens

START DATE and TIME: 4/21/2010 9:15:00 AM

FINISH DATE and TIME: 4/22/2010 8:45:00 AM

SURFACE

ELEV: 662.63 (ft; Surveyed)

CHECKED BY: C. Symmes

DRILL FLUID: Water @ 21'

DRILLING METHOD: 3.75" HSA

WATER LEVEL
OBSERVATIONS

DATE

TIME

READING
TYPE

WATER
DEPTH
(ft)

CASING
BOTTOM
(ft)

HOLE
BOTTOM
(ft)

4-21-10

10:30 AM

During Drilling

8

8

8.4

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-1	2	0.7	2-3-4-3	7				TOPSOIL f.m.c. SAND. Some Silt, trace organics, light brown, loose, moist (FILL)		Groundwater levels encountered during drilling may not reflect static groundwater conditions. Coarse gravel in sample S-2 consists of boulder and cobble fragments.	
S-2	2	1.3	4-4-5-6	9				f.m.c. SAND. Some Silt, trace c. gravel, trace organics, light brown, loose, moist (FILL)	660		
S-3	2	1.2	4-7-49-56	56		5		f.m.c. SAND. little silt, little f.c. gravel, trace organics, light brown, very compact, moist (FILL)			
S-4	0.1	0	50/1"	R				No recovery		Boulders and cobbles encountered throughout the glacial till soils based on hard drilling and auger chatter.	
S-5	0.4	0.4	50/4"	R				f.m.c. SAND. little silt, trace f. gravel, brown, very compact, moist/wet (SM-TILL)	655		
S-6	2	1.2	12-19-25-34	44		10		becomes compact (SM-TILL) f.m.c. SAND. trace silt, trace c. gravel, brown, compact, moist/wet (SP-TILL)	650		
S-7	2	0.8	39-55-25-22	80		15		f.m.c. SAND. little f.c. gravel, trace silt, gray, very compact, wet (SP-TILL)	645		
S-8	0	0	50/0"	R		20		No recovery SANDSTONE (BOULDERS/COBBLES)		Auger refusal at 21'. Switch drilling methods to flush joint casing to advance boring.	
R-1	4.9	1							640		
S-9	0.4	0.2	100/4"	R		25		f.m.c. SAND. little c. gravel, trace silt, gray, very compact, wet (SP-TILL) GRANITE (BOULDERS/COBBLES)			
R-2	4.6	0.8							635		
S-10	0.5	0.2	112/6"	R		30		f.m.c. SAND. little silt, little c. gravel, gray, very compact, wet (SM-TILL) GRANITE (BOULDERS/COBBLES)			

SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATED CHA.GDT 1/27/11



World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-09

PROJECT NUMBER: 21137.3000.32000

12/7/10

Page 2 of 2

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
R-3	4.5	0.9						GRANITE (BOULDERS/COBBLES) (continued)	630		
S-11	0.9	0.8	34-80/5"	R		35		f.m.c. SAND , little silt, little c. gravel, very compact, wet (SM-TILL) No Recovery			
R-4	4.1	0							625		
S-12	0.7	0.3	30-60/2"	R		40		becomes brown (SM-TILL) f.m.c. SAND , trace silt, orange/white/brown/black, very compact, wet (COMPLETELY WEATHERED BEDROCK)	620	Completely weathered bedrock in shoe of spoon S-12. Completely weathered bedrock in samples S-12 and S-14 contain micaceous sand.	
S-13	0.3	0.2	100/3"	R		45		f.m.c. SAND , trace silt, trace f. gravel, orange/white/black/light brown, very compact, wet (COMPLETELY WEATHERED BEDROCK)	615		
S-14	0.2	0	100/2"	R		50		No Recovery (COMPLETELY WEATHERED BEDROCK) End of Boring at 50.2 ft	610	Silt and sand in wash appears to be completely weathered bedrock.	
						55					
						60					
						65					
						70					

SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATEDCHA.GDT 11/27/11



World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-10

Page 1 of 2

PROJECT NUMBER: 21137.3000.32000

12/7/10

LOCATION: Warwick, New York

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: SoilTesting

DRILLER: T. Page

INSPECTOR: K. Owens

START DATE and TIME: 4/12/2010 12:45:00 PM

FINISH DATE and TIME: 4/13/2010 1:40:00 PM

SURFACE
ELEV: 677.91 (ft; Surveyed)

CHECKED BY: C. Symmes

DRILL FLUID: Water @ 7.5'

DRILLING METHOD: 3.75" HSA

WATER LEVEL
OBSERVATIONS

DATE

TIME

READING
TYPEWATER
DEPTH
(ft)CASING
BOTTOM
(ft)HOLE
BOTTOM
(ft)

4-13-10

8:20 AM

Start of Day

12.7

10

13

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-1	2	0.3	5-3-5-4	8				<u>f.m.c. SAND</u> , little silt, trace f.c. gravel, trace organics, brown, loose, moist (FILL)			
S-2	2	0.9	4-2-3-3	5				<u>f.m.c. SAND</u> , trace silt, trace f. gravel, trace organics, brown/light brown/gray, loose, moist (FILL)	675	Groundwater levels encountered during drilling may not reflect static groundwater conditions. Coarse gravel in shoe of S-1.	
S-3	2	1.1	28-39-72-70	R		5		<u>f.m.c. SAND</u> , trace silt, trace f.c. gravel, brown, very compact, moist (SP-TILL)			
S-4	1.9	1.2	72-70-100/5"	R				<u>Similar Soil</u> (SP-TILL)			
R-1	2.5	1.5				10		<u>GRANITE</u> (BOULDERS/COBBLES)	670	Boulders and cobbles encountered throughout the glacial till soils based on hard drilling and auger chatter. Sample S-3 has stratification. Samples S-3 and S-4 laboratory testing results: MC = 5.9%, LL = n/a, PL = n/a. Samples are non-plastic. Very difficult drilling 5-6'. Auger refusal at 7.5'. Switch drilling methods to flush joint casing to advance boring.	
S-5	2	0.5	16-35-96-44	R				<u>f.m.c. SAND</u> , little clayey silt, trace f. gravel, light brown, very compact, wet (SM-TILL) <u>GRANITE</u> (BOULDERS/COBBLES)			
R-2	3	0.5				15					
S-6	2	0.8	40-46-36-62	82				<u>f.m.c. SAND</u> , trace silt, trace c. gravel, light brown, very compact, wet (SP-TILL)			
R-3	3	0.9				20		<u>GRANITE</u> (BOULDERS/COBBLES)	660		
S-7	1.9	0.9	38-24-40-100/5"	64				<u>f.m.c. SAND</u> , little silt, trace f. gravel, light brown, very compact, wet (SM-TILL)			
R-4A	4.6	1				25		<u>GRANITE</u> (BOULDERS/COBBLES)	655		
R-4B	3.5	0.6								No spoon taken at 25' because of large boulder 24-26'.	
S-8	0.1	0	100/1"	R		30		No recovery <u>GRANITE</u> (BOULDERS/COBBLES)	650		



SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATED CHA.GDT 1/27/11



World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-10

PROJECT NUMBER: 21137.3000.32000

12/7/10

Page 2 of 2

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
R-5	4.9	1.3						GRANITE (BOULDERS/COBBLES) <i>(continued)</i>	645		
S-9	0	0	100/0"	R		35		No recovery GRANITE (BOULDERS/COBBLES)			
R-6	4.9	1.9							640		
S-10	0.3	0	100/3"	R		40		No recovery GRANITE (BOULDERS/COBBLES)			
R-7	4.7	0.7							635		
S-11	0.3	0	100/4"	R		45		No recovery GRANITE (BOULDERS/COBBLES)			
R-8	4.7	1							630		
S-12	0.6	0.1	72-100/2"	R		50		f.m.c. SAND , little silt, little f. gravel, gray, very compact, wet (SM-TILL) End of Boring at 50.6 ft			
									625		
									620		
									615		
									610		
									70		

SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATEDCHA.GDT 1/27/11



World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-11

PROJECT NUMBER: 21137.3000.32000

12/7/10

Page 1 of 2

LOCATION: Warwick, New York

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: SoilTesting

DRILLER: T. Page

INSPECTOR: K. Owens

START DATE and TIME: 4/8/2010 12:35:00 PM

FINISH DATE and TIME: 4/12/2010 12:30:00 PM

SURFACE

ELEV: 671.00 (ft; Surveyed)

CHECKED BY: C. Symmes

DRILL FLUID: Water @ 16'

DRILLING METHOD: 3.75" HSA

	DATE	TIME	READING TYPE	WATER DEPTH (ft)	CASING BOTTOM (ft)	HOLE BOTTOM (ft)
WATER LEVEL OBSERVATIONS	4-8-10	2:15 PM	During Drilling	10	8	12
	4-12-10	8:20 AM	Start of Day	11	34	34
	5-6-10	12:10 PM	Well Install	None	15.5	15.5
	6-7-10	10:55 AM	Static	None	15.5	15.5

SAMP./CORE NUMBER	SAMP. ADV. (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-1	2	0.3	1-2-3-3	5				<u>TOPSOIL</u>	670		
S-2	1.9	1.9	3-21-42-50/5"	63				<u>f.m.c. SAND</u> , trace silt, trace f. gravel, trace organics, light brown/gray, very compact, moist (FILL)			
S-3	2	2	19-54-60-57	R		5		<u>f.m.c. SAND</u> , little silt, trace f. gravel, light brown/gray, very compact, moist (SM-TILL)		Boulders and cobbles encountered throughout the glacial till soils based on hard drilling and auger chatter.	
S-4	2	0.9	56-35-48-100	83				grades to trace silt (SP-TILL)	665	Hard augering 7-8'.	
S-5	2	1.3	15-40-48-48	88		10		grades to trace f.c. gravel (SP-TILL)			
S-6	2	1.6	31-48-46-120	94				<u>f.m.c. SAND</u> , little silt, little f.c. gravel, light brown, wet (SM-TILL)	660		
S-7	0.8	0.8	89-100/4"	R		15		becomes moist (SM-TILL) No recovery	655	Auger refusal at 16'. Switch drilling methods to flush joint casing to advance boring.	
R-1	4.2	0						No recovery			
S-8	0.3	0	50/3"	R		20		No recovery <u>GRANITE (BOULDERS/COBBLES)</u>	650		
R-2	4.7	1									
						25		<u>GRANITE (BOULDERS/COBBLES)</u>	645	Hole collapses at 26' while pulling augers back to 15' for piezometer installation. Backfill with sand to 15'.	
R-3	5	1.8									
S-9	0.1	0	50/1"	R		30		No recovery <u>GRANITE (BOULDERS/COBBLES)</u>	640		

SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATED CHA.GDT 1/27/11



World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-11

PROJECT NUMBER: 21137.3000.32000

12/7/10

Page 2 of 2

SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATED CHA.GDT 1/27/11

SAMP./CORE NUMBER	SAMP. ADV. (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
R-4	4.9	3.4						GRANITE (BOULDERS/COBBLES) <i>(continued)</i>			
S-10	0.1	0	50/1"	R		35		No recovery GRANITE (BOULDERS/COBBLES)	635		
R-5	4.9	1.5									
S-11	0.3	0.3	200/3"	R		40		f.m.c. SAND , little silt, trace f. gravel, gray, very compact, wet (SM-TILL) GRANITE (BOULDERS/COBBLES)	630		
R-6	4.7	0.5									
S-12	0.1	0	100/1"	R		45		No recovery GRANITE (BOULDERS/COBBLES)	625		
R-7	4.9	1.6									
S-13	0.3	0	100/3"	R		50		No recovery GRANITE (BOULDERS/COBBLES)	620	Wash in S-13 consists of f.m.c. sand and cobble/boulder fragments.	
R-8	4.7	1									
S-14	0.5	0.2	225/6"	R		55		f.m.c. SAND , little silt, trace f. gravel, gray, very compact, wet (SM-TILL) GRANITE (BOULDERS/COBBLES)	615		
R-9	4.5	0.4									
S-15	0.8	0	87-100/3"	R		60		No recovery	610		
								End of Boring at 60.8 ft	610		
						65					
						70			605		



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-12

Page 1 of 2

LOCATION: Warwick, New York

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: SoilTesting

DRILLER: T. Page

INSPECTOR: K. Owens

START DATE and TIME: 4/14/2010 1:45:00 PM

FINISH DATE and TIME: 4/15/2010 3:15:00 PM

SURFACE

ELEV: 683.85 (ft; Surveyed)

CHECKED BY: C. Symmes

DRILL FLUID: Water @ 13'

DRILLING METHOD: 3.75" HSA

WATER LEVEL
OBSERVATIONS

DATE

TIME

READING
TYPEWATER
DEPTH
(ft)CASING
BOTTOM
(ft)HOLE
BOTTOM
(ft)

4-15-10

8:20 AM

Start of Day

17.6

13

18

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-1	2	1.1	3-7-6-7	13				TOPSOIL Clayey SILT , trace f.m.c. sand, trace f. gravel, trace wood/organics, brown, medium compact, moist (FILL)		Groundwater levels encountered during drilling may not reflect static groundwater conditions.	
S-2	2	1.6	5-35-52-58	87				grades to little f.m.c. sand (FILL) f.m.c. SAND , little silt, trace f.c. gravel, gray, very compact, moist (SM-TILL) becomes light brown (SM-TILL)	680	Boulders and cobbles encountered throughout the glacial till soils based on hard drilling and auger chatter.	
S-3	2	2	31-34-37-27	71		5					
S-4	0.8	0.8	28-100/4"	R				Similar Soil (SM-TILL)			
									675		
S-5	2	1.4	19-21-16-23	37		10		f.m.c. SAND , trace silt, trace f.c. gravel, light brown/gray, compact, moist (SP-TILL)			
								SCHIST (BOULDERS/COBBLES)	670	Auger refusal at 13'. Switch drilling methods to flush joint casing to advance boring.	
R-1	5	2.1				15					
								SCHIST (BOULDERS/COBBLES)			
R-2	2	1.8						GRANITE (BOULDERS/COBBLES)	665		
S-6	1	0.2	44-125/6"	R		20		f.m.c. SAND , little silt, trace f.c. gravel, gray, very compact, wet (SM-TILL) No recovery			
R-3	4	0							660		
								f.m.c. SAND , trace silt, gray, very compact, wet (SP-TILL) GRANITE (BOULDERS/COBBLES)			
S-7	1.8	1.3	37-51-98-100/4"	R		25					
R-4	3.2	0.6							655		
								No recovery			
S-8	0.9	0	27-100/5"	R		30		GRANITE (BOULDERS/COBBLES)			



SUBSURFACE LOG- 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATED CHA.GDT 1/27/11



World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-12

PROJECT NUMBER: 21137.3000.32000

12/7/10

Page 2 of 2

SAMP./CORE NUMBER	SAMP. ADV. (ft)	LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
R-5	4.1	1.1							<u>GRANITE (BOULDERS/COBBLES)</u> (continued)	650		
S-9	1.3	0		31-37-100/4"	R		35		No recovery			
R-6	3.7	2.3							<u>GRANITE (BOULDERS/COBBLES)</u>	645		
S-10	1.5	0		50-54-100	R		40		No recovery		Running sands encountered while attempting sample S-10. Hole flushed with water in unsuccessful attempt to obtain sample.	
R-7	3.5	1.5							<u>GRANITE (BOULDERS/COBBLES)</u>	640		
							45		<u>GRANITE (BOULDERS/COBBLES)</u>		No split spoon samples taken at 45' and 50' due to failure to get rods down to sample depths from running sand conditions.	
R-8	5	1.2								635		
							50		End of Boring at 50 ft			
										630		
							55					
										625		
							60					
										620		
							65					
										615		
							70					



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG
HOLE NUMBER TB-13

Page 1 of 2

LOCATION: Warwick, New York

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: SoilTesting

DRILLER: T. Page

INSPECTOR: K. Owens

START DATE and TIME: 4/20/2010 8:30:00 AM

FINISH DATE and TIME: 4/21/2010 8:30:00 AM

SURFACE

ELEV: 687.39 (ft; Surveyed)

CHECKED BY: C. Symmes

DRILL FLUID: Water @ 32.5'

DRILLING METHOD: 3.75" HSA

WATER LEVEL
OBSERVATIONS

DATE

TIME

READING
TYPEWATER
DEPTH
(ft)CASING
BOTTOM
(ft)HOLE
BOTTOM
(ft)

4-20-10

9:10 AM

During Drilling

10

10

11.6

5-6-10

12:20 PM

Well Install

16.3

20

20

6-7-10

10:45 AM

Static

16.8

20

20

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-1	2	1.4	2-19-18-20	37				TOPSOIL f. SAND. Some Silt, little m.c. sand, trace organics, brown, compact, moist (FILL)		Groundwater levels encountered during drilling may not reflect static groundwater conditions.	
S-2	2	1.1	15-8-6-5	14				f.m.c. SAND. little silt, trace c. gravel, brown, medium compact, moist (FILL)	685		
S-3	2	0.7	14-6-7-12	13		5		f.m.c. SAND. little clayey silt, little f.c. gravel, trace organics, light brown, medium compact, moist (FILL)		Boulders and cobbles encountered throughout the glacial till soils based on hard drilling and auger chatter.	
S-4	2	1.8	23-35-33-21	68				f.m.c. SAND. Some Silt, trace f.c. gravel, light brown, very compact, moist (SM-TILL)	680		
S-5	1.3	1.3	18-20-100/4"	R		10		SILT, trace f. sand, mottled light brown/brown, very compact, wet/moist (ML-TILL)			
S-6	1.6	1.2	27-44-74-80/1"	R				f.m.c. SAND. little silt, trace f.c. gravel, light brown/gray, very compact, wet (SM-TILL)	675		
S-7	1.5	1.3	24-26-15/6"	R		15		f.m.c. SAND. little silt, trace f.c. gravel, brown, very compact, wet (SM-TILL)	670	Coarse gravel lodged in shoe of S-7.	
S-8	2	1.1	31-16-12-10	28		20		grades to Some Silt, becomes medium compact (SM-TILL)	665		
S-9	2	0	WR-4-3-1	7		25		No recovery			
S-10	0.3	0.3	50/3"	R				f.m.c. SAND. trace silt, brown, very compact, wet (SP-TILL)	660		
S-11	0.7	0.7	55-52/2"	R		30		f.m.c. SAND. little silt, trace f.c. gravel, brown, very compact, wet (SM-TILL)			

SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATEDCHA.GDT 1/27/11



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG
HOLE NUMBER TB-14

Page 1 of 2

LOCATION: Warwick, New York

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: SoilTesting

DRILLER: T. Page

INSPECTOR: K. Owens

START DATE and TIME: 4/19/2010 11:35:00 AM

FINISH DATE and TIME: 4/19/2010 3:30:00 PM

SURFACE

ELEV: 696.81 (ft; Surveyed)

CHECKED BY: C. Symmes

DRILL FLUID: None

DRILLING METHOD: 3.75" HSA

WATER LEVEL
OBSERVATIONS

DATE

TIME

READING
TYPEWATER
DEPTH
(ft)CASING
BOTTOM
(ft)HOLE
BOTTOM
(ft)

4-19-10

3:30 PM

Completion

None

50

50

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-1	2	0.7	1-7-8-11	15				TOPSOIL f. SAND. Some Clayey Silt, trace f.c. gravel, trace organics, brown, medium compact, wet (FILL)	695	Groundwater levels encountered during drilling may not reflect static groundwater conditions. Sample S-1 is wet, standing water at location of boring.	
S-2	2	1.1	12-19-18-8	37				f.m.c. SAND. little clayey silt, trace f. gravel, brown/orange/black/white, compact, moist (SM)			
S-3	2	1.6	13-24-21-38	45		5		f.m.c. SAND. little silt, trace f. gravel, light brown, compact, moist (SM)			
S-4	2	1.5	41-39-26-40	65				f.m.c. SAND. little silt, trace f.c. gravel, light brown, very compact, moist (SM-TILL)	690	Boulders and cobbles encountered throughout the glacial till soils based on hard drilling and auger chatter.	
S-5	2	1.8	24-30-41-53	71		10		grades to Some Clayey Silt (SM-TILL)			
S-6	1.5	0.8	26-57-82/6"	R				Similar Soil (SM-TILL)	685		
S-7	0.2	0	100/2"	R		15		No recovery	680	Coarse gravel in shoe of S-7. Loose boulders encountered 15-17'.	
S-8	0.4	0.4	100/5"	R		20		Similar Soil (SM-TILL)	675		
S-9	2	1.8	10-29-24-50	53		25		Clayey SILT. Some f. Sand, trace c. sand, orange/white/light brown/black, very hard, moist (COMPLETELY WEATHERED BEDROCK)	670	Completely weathered bedrock contains micaceous sand.	
S-10	2	0.8	22-25-34-60	59		30		Similar Soil (COMPLETELY WEATHERED BEDROCK)		Samples S-9 and S-10 laboratory testing results: MC = 23.1%, LL = 35.8, PL = 30.1.	

SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATEDCHA.GDT 1/27/11



World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-14

PROJECT NUMBER: 21137.3000.32000

12/7/10

Page 2 of 2

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-11	0.9	0.9	60-100/5"	R		35		Similar Soil (COMPLETELY WEATHERED BEDROCK) <i>(continued)</i> f.m.c. SAND. Some Silt, white/black/orange/light brown, very compact, moist (COMPLETELY WEATHERED BEDROCK)	660		
S-12	1.5	1.3	88-70-115/6"	R		40		Similar Soil (COMPLETELY WEATHERED BEDROCK)	655		
S-13	0.5	0.5	100/6"	R		45		Similar Soil (COMPLETELY WEATHERED BEDROCK)	650	Hard drilling 45-46'.	
S-14	0	0	100/0"	R		50		No recovery End of Boring at 50 ft	645	Very hard drilling 49-50'.	
						55			640		
						60			635		
						65			630		
						70					



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-15

Page 1 of 2

LOCATION: Warwick, New York

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: SoilTesting

DRILLER: T. Page

INSPECTOR: K. Owens

START DATE and TIME: 4/22/2010 9:20:00 AM

FINISH DATE and TIME: 4/23/2010 9:30:00 AM

SURFACE

ELEV: 672.04 (ft; Surveyed)

CHECKED BY: C. Symmes

DRILL FLUID: Water@ 27"

DRILLING METHOD: 3.75" HSA

WATER LEVEL
OBSERVATIONS

DATE

TIME

READING
TYPE

WATER
DEPTH
(ft)

CASING
BOTTOM
(ft)

HOLE
BOTTOM
(ft)

4-22-10

10:05 AM

During Drilling

8.5

8

10

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-1	2	1	13-13-55-56	68				<u>TOPSOIL</u>			
								<u>CONCRETE</u>			
S-2	2	1.1	38-21-47-46	68				<u>f.m.c. SAND</u> , trace silt, light brown/orange, very compact, moist (FILL)	670	Groundwater levels encountered during drilling may not reflect static groundwater conditions. Concrete encountered from parking area.	
S-3	2	1.3	14-39-31-28	70		5		<u>f.m.c. SAND</u> , trace silt, trace f.c. gravel, light brown, very compact, moist (SP-TILL)			
S-4	2	1.3	48-48-59-75	R				<u>f.m.c. SAND</u> , little f. c. gravel, trace silt, light brown, very compact, moist (SP-TILL)	665	Boulders and cobbles encountered throughout the glacial till soils based on hard drilling and auger chatter.	
S-5	2	0.9	31-14-13-23	27		10		becomes medium compact, wet (SP-TILL)			
S-6	2	1.4	22-15-23-36	38				<u>f.m.c. SAND</u> , little silt, little f.c. gravel, brown, compact, wet (SM-TILL)	660		
						15		<u>f.m.c. SAND</u> , little silt, trace f.c. gravel, brown, compact, wet (SM-TILL)	655		
S-7	2	1.4	18-20-21-46	41				becomes very compact (SM-TILL)	650		
S-8	1.7	1.6	30-35-42-50/2"	77				<u>f.m.c. SAND</u> , little silt, trace f.c. gravel, gray, very compact, moist (SM-TILL)	645		
S-9	1.5	1	19-59-105/6"	R		25		<u>GRANITE (BOULDERS/COBBLES)</u>			
R-1	3	0.3									
S-10	0.3	0.2	50/4"	R		30		<u>f.m.c. SAND</u> , little silt, trace f.c. gravel, gray, very compact, moist (SM-TILL)			

SUBSURFACE LOG: 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATED: CHA.GDT 1/27/11



World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-15

PROJECT NUMBER: 21137.3000.32000

12/7/10

Page 2 of 2

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
R-2	2	1.1				35		<u>GRANITE (BOULDERS/COBBLES)</u>		Auger refusal at 32'. Switch drilling methods to flush joint casing to advance boring.	
R-3	4	2.8						<u>GRANITE (BOULDERS/COBBLES)</u>	635		
						40		<u>GRANITE (BOULDERS/COBBLES)</u>			
R-4	6	2.4				45		<u>SCHIST</u> , gray/dark gray, very hard, slightly weathered, very closely fractured	630		
								<u>SCHIST</u> , gray/dark gray, very hard, freshly weathered, closely fractured, fair RQD			
R-5	6	5.1		52%		50			625		
								End of Boring at 50 ft			
									620		
						55					
									615		
						60					
									610		
						65					
									605		
						70					



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-16

Page 1 of 2

LOCATION: Warwick, New York

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: SoilTesting

DRILLER: T. Page

INSPECTOR: K. Owens

START DATE and TIME: 4/13/2010 2:05:00 PM

FINISH DATE and TIME: 2/14/2010 1:20:00 PM

SURFACE

ELEV: 655.87 (ft; Surveyed)

CHECKED BY: C. Symmes

DRILL FLUID: Water @ 25.5'

DRILLING METHOD: 3.75" HSA

WATER LEVEL
OBSERVATIONS

DATE

TIME

READING
TYPEWATER
DEPTH
(ft)CASING
BOTTOM
(ft)HOLE
BOTTOM
(ft)

4-13-10

2:30 PM

During Drilling

4

4

6

4-14-10

7:45 AM

Start of Day

9

20

20

SAMP./CORE NUMBER	SAMP. ADV. (ft)	RECOVERY LEN. CORE (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-1	2	1	1-2-3-5	5				TOPSOIL	655	Groundwater levels encountered during drilling may not reflect static groundwater conditions.	
S-2	2	1.3	8-9-18-17	27				SILT , little f. sand, trace organics, dark brown, medium stiff, moist (FILL)			
S-3	2	1.6	12-9-17-24	26		5		f.m.c. SAND , Some Clayey Silt, trace f. gravel, light brown/orange/dark brown/white, medium compact, moist (SM)		Boulder at 3.5'	
S-4	2	0.9	36-48-51-17	99				f.m.c. SAND , little silt, trace f. gravel, light brown, medium compact, wet (SM-TILL)	650	Boulders and cobbles encountered throughout the glacial till soils based on hard drilling and auger chatter.	
S-5	2	1	11-19-23-17	42		10		f.m.c. SAND , trace silt, trace f.c. gravel, light brown, very compact, wet (SP-TILL)			
S-6	2	1.6	23-20-19-12	39				f.m.c. SAND , little c. gravel, trace silt, light brown, compact, wet (SP-TILL)	645		
S-7	2	1.7	49-64-59-113	R		15		f.m.c. SAND , trace silt, trace f.c. gravel, light brown/dark brown, compact, wet (SP-TILL)			
S-8	0.8	0.8	87-100/4"	R		20		f.m.c. SAND , little silt, trace f. gravel, light brown, very compact, wet (SM-TILL)	640		
S-9	0.1	0.1	100/1"	R		25		f.m.c. SAND , little clayey silt, trace f. gravel, gray, very compact, wet (SM-TILL)	635		
R-1	2.2	2.2						f.m.c. SAND , little clayey silt, gray/orange, very compact, wet (SM-TILL)	630	Auger refusal at 25.5. Switch drilling methods to flush joint casing to advance boring.	
R-2	4.3	2				30		GRANITE (BOULDERS/COBBLES)		Core barrel jams, terminate core run to push casing to 28'.	
								GRANITE (BOULDERS/COBBLES)	625		

SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATED CHA.GDT 1/27/11



World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-16

PROJECT NUMBER: 21137.3000.32000

12/7/10

Page 2 of 2

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
R-3	5	4.6		88%		35		<u>GRANITE</u> , gray/dark gray, very hard, freshly weathered, medium fracture spacing, good RQD	620		
								End of Boring at 37 ft			
						40			615		
						45			610		
						50			605		
						55			600		
						60			595		
						65			590		
						70					



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG
HOLE NUMBER TB-17

Page 1 of 1

LOCATION: Warwick, New York

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: SoilTesting

DRILLER: T. Page

INSPECTOR: K. Owens

START DATE and TIME: 4/5/2010 1:55:00 PM

FINISH DATE and TIME: 4/5/2010 3:10:00 PM

SURFACE

ELEV: 686.13 (ft; Surveyed)

CHECKED BY: C. Symmes

DRILL FLUID: None

DRILLING METHOD: 3.75" HSA

WATER LEVEL
OBSERVATIONS

DATE

TIME

READING
TYPEWATER
DEPTH
(ft)CASING
BOTTOM
(ft)HOLE
BOTTOM
(ft)

4-5-10

2:45 PM

During Drilling

4

4

6

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-1	1.3	0.7	5-8-50/3"	R				f.m.c. SAND , trace silt, black, very compact, moist (SUBBASE) f.m.c. SAND , little silt, trace f. gravel, brown, very compact, moist (FILL)	685	Groundwater levels encountered during drilling may not reflect static groundwater conditions. Auger through 0.5' of pavement and begin sampling. Hard drilling 0.5-4'.	
S-2	2	0.3	19-38-8-10	46		5		f.m.c. SAND , little silt, trace c. gravel, light brown, compact, wet (FILL)		Hard drilling 5-8'.	
S-3	2	0.8	8-6-10-9	16				f.m.c. SAND , little silty clay, trace f. gravel, brown, medium compact, wet (FILL)	680		
S-4	2	1.2	15-31-18-35	49		10		grades to trace organics, becomes compact (FILL) c. GRAVEL , gray, compact, moist (FILL) f.m.c. SAND , trace silt, trace f. gravel, brown, compact, moist (FILL)			
S-5	1.3	0.9	39-38-50/4"	R				f.m.c. SAND , little silty clay, trace f. gravel, trace asphalt, brown, very compact, wet (FILL) End of Boring at 11.3 ft	675	Augers shear off in borehole. Boring relocated to TB-17A.	
						15					
						20					
						25					
						30					
									670		
									665		
									660		
									655		

SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATED CHA.GDT 1/27/11



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-17A

Page 1 of 1

LOCATION: Warwick, New York

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: SoilTesting

DRILLER: T. Page

INSPECTOR: K. Owens

START DATE and TIME: 4/6/2010 8:15:00 AM

FINISH DATE and TIME: 4/6/2010 12:35:00 PM

SURFACE

ELEV: 686.72 (ft; Surveyed)

CHECKED BY: C. Symmes

DRILL FLUID: Water @ 23'

DRILLING METHOD: 3.75" HSA

WATER LEVEL
OBSERVATIONS

DATE

TIME

READING
TYPEWATER
DEPTH
(ft)CASING
BOTTOM
(ft)HOLE
BOTTOM
(ft)

4-6-10

12:12 PM

Completion

6.3

22.5

28

4-6-10

12:35 PM

Casing Pulled

6.7

N/A

10.5

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
	15								685	Groundwater levels encountered during drilling may not reflect static groundwater conditions. Auger sheared off in boring TB-17. Moved 10' north to TB-17A. Augered to 15' for S-1 without sampling.	
S-1	2	1.6	10-18-22-25	40		15		<u>f.m.c. SAND</u> , trace silt, trace asphalt, brown/gray/black/light brown, compact, wet (FILL)	670		
S-2	1	0.8	15-100/6"	R		20		<u>f.m.c. SAND</u> , trace silt, trace f.c. gravel, brown/gray, very compact, wet (SM-TILL)	665	Boulders and cobbles encountered throughout the glacial till soils based on hard drilling and auger chatter.	
S-3	0.6	0.1	68-100/1"	R				<u>c. GRAVEL</u> , trace m.c. sand, gray, very compact, wet (GP-TILL) <u>GRANITE</u> , dark gray, very hard, slightly weathered, closely fractured, very poor RQD		Auger refusal at 22.5'. Spoon taken to confirm refusal.	
R-1	5	2.7		12%		25			660		
								End of Boring at 28 ft			
						30			655		

SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATED CHA.GDT 1/27/11



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-18

Page 1 of 1

LOCATION: Warwick, New York

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: SoilTesting

DRILLER: T. Page

INSPECTOR: K. Owens

START DATE and TIME: 4/5/2010 10:55:00 AM

FINISH DATE and TIME: 4/5/2010 12:00:00 PM

SURFACE

ELEV: 674.97 (ft; Surveyed)

CHECKED BY: C. Symmes

DRILL FLUID: None

DRILLING METHOD: 3.75" HSA

WATER LEVEL
OBSERVATIONS

DATE

TIME

READING
TYPEWATER
DEPTH
(ft)CASING
BOTTOM
(ft)HOLE
BOTTOM
(ft)

4-5-10

12:00 PM

During Drilling

None

3

3

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-1	2	1.8	4-3-17-44	20				<u>Clayey SILT</u> , little f. sand, trace wood, trace organics, dark/light brown, medium compact, moist (FILL)		Groundwater levels encountered during drilling may not reflect static groundwater conditions. Driller notes hard augering 0.5-3'.	
S-2	0.9	0.2	33-75/4"	R				<u>f.m.c. SAND</u> , little silt, little f.c. gravel, light brown/orange/gray, medium compact, moist (SM)		Auger refusal at 3'. Moved east 2' to confirm bedrock or boulders.	
								<u>c. GRAVEL</u> , gray, very compact, moist (GP-TILL)			
						5		End of Boring at 3 ft	670		
						10			665		
						15			660		
						20			655		
						25			650		
						30			645		



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-18A

Page 1 of 1

LOCATION: Warwick, New York

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: SoilTesting

DRILLER: T. Page

INSPECTOR: K. Owens

START DATE and TIME: 4/5/2010 12:00:00 PM

FINISH DATE and TIME: 4/5/2010 1:45:00 PM

SURFACE

ELEV: 674.97 (ft; Surveyed)

CHECKED BY: C. Symmes

DRILL FLUID: Water @ 3'

DRILLING METHOD: 3.75" HSA

WATER LEVEL
OBSERVATIONS

DATE

TIME

READING
TYPEWATER
DEPTH
(ft)CASING
BOTTOM
(ft)HOLE
BOTTOM
(ft)

4-5-10

1:45 PM

During Drilling

None

3

3

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
R-1	3	4.8		64%		5		SCHIST , light gray, very hard, slightly weathered, closely fractured, fair RQD	670	Groundwater levels encountered during drilling may not reflect static groundwater conditions. Relocated from TB-18 to confirm bedrock or boulders. Auger to refusal at 3' without sampling. Rock core indicates refusal on bedrock.	
R-2	5	4.8		42%		10		SCHIST , dark gray, very hard, moderately weathered, closely fractured, poor RQD	665		
						13		End of Boring at 13 ft	660		
						15			660		
						20			655		
						25			650		
						30			645		

SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATED CHA GDT 1/27/11



World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-19

Page 1 of 2

PROJECT NUMBER: 21137.3000.32000

12/7/10

LOCATION: Warwick, New York

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: SoilTesting

DRILLER: T. Page

INSPECTOR: K. Owens

START DATE and TIME: 4/16/2010 2:50:00 PM

FINISH DATE and TIME: 4/19/2010 11:25:00 AM

SURFACE

ELEV: 699.00 (ft; Surveyed)

CHECKED BY: C. Symmes

DRILL FLUID: Water @ 31'

DRILLING METHOD: 3.75" HSA

WATER LEVEL
OBSERVATIONS

DATE

TIME

READING
TYPEWATER
DEPTH
(ft)CASING
BOTTOM
(ft)HOLE
BOTTOM
(ft)

4-16-10

3:10 PM

During Drilling

6

4

8

SAMP./CORE NUMBER	SAMP. ADV. (ft)	RECOVERY LEN. CORE (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-1	2	0.3	2-4-4-10	8				TOPSOIL			
S-2	2	0.5	12-12-13-13	25				f.m.c. SAND , little clayey silt, trace c. gravel, brown, medium compact, moist (SM)			
S-3	2	0.6	6-11-4-6	15		5		Silty CLAY , trace f.m. sand, orange/white/light brown, stiff, moist (CL)	695		
S-4	2	1.1	17-39-23-29	62				f.m.c. SAND , Some Clayey Silt, trace f.c. gravel, brown, very compact, wet (SM)			
S-5	2	1.1	9-27-17-30	44		10		f.m.c. SAND , trace silt, trace f. gravel, brown, compact, wet (SP)	690		
S-6	2	1	10-9-12-8	21				f.m.c. SAND , trace silt, trace f. gravel, brown, medium compact, wet (SP)			
S-7	2	0.8	9-8-9-34	17		15		Clayey SILT , Some f.m.c. Sand, trace f.c. gravel, brown, very stiff, wet (ML)	685		
S-8	2	1.4	42-30-31-36	61		20		f.m.c. SAND , trace silt, trace f. gravel, light brown, very compact, wet (SP-TILL)	680	Boulders and cobbles encountered throughout the glacial till soils based on hard drilling and auger chatter encountered at 17.5'.	
S-9	2	1.1	21-23-44-70	67		25		Similar Soil (SP-TILL)	675	Hard drilling 25-26'.	
S-10	1.1	0.6	43-44-100/1"	R		30		f.m.c. SAND , little silt, trace f.c. gravel, light brown, very compact, wet (SM-TILL)	670	Hard drilling 28-29'.	
										Auger refusal at 31'. Switch drilling methods to	

SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATED CHA.GDT 1/27/11



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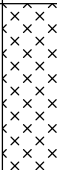
SUBSURFACE LOG

HOLE NUMBER TB-19

PROJECT NUMBER: 21137.3000.32000

12/7/10

Page 2 of 2

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
R-1	5	5		78%		35		GRANITE , gray/dark gray/brown, very hard, slightly weathered, closely fractured, good RQD (<i>continued</i>)	665	flush joint casing for rock core.	
								End of Boring at 36 ft			
						40			660		
						45			655		
						50			650		
						55			645		
						60			640		
						65			635		
						70			630		



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG
HOLE NUMBER TB-20

Page 1 of 1

LOCATION: Warwick, New York

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: SoilTesting

DRILLER: T. Page

INSPECTOR: K. Owens

START DATE and TIME: 4/7/2010 9:50:00 AM

FINISH DATE and TIME: 4/7/2010 1:05:00 PM

SURFACE

ELEV: 691.58 (ft; Surveyed)

CHECKED BY: C. Symmes

DRILL FLUID: Water @ 7.4'

DRILLING METHOD: 3.75" HSA

WATER LEVEL
OBSERVATIONS

DATE

TIME

READING
TYPEWATER
DEPTH
(ft)CASING
BOTTOM
(ft)HOLE
BOTTOM
(ft)

4-7-10

11:00 AM

During Drilling

10

8

12

5-6-10

12:30 PM

Well Install

9.4

13.5

13.5

6-7-10

10:40 AM

Static

10.8

13.5

13.5

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-1	2	0.9	2-3-6-4	9				TOPSOIL f.m.c. SAND , trace silt, trace f. gravel, trace organics, brown, loose, moist (FILL)	690	Groundwater levels encountered during drilling may not reflect static groundwater conditions.	
S-2	2	0.9	12-17-19-30	36				f.m.c. SAND , little f. c. gravel, trace silt, trace organics, brown, compact, moist (FILL)			
S-3	2	0.8	12-9-11-12	20		5		f.m.c. SAND , little silt, trace f. gravel, trace organics, brown, medium compact, moist (FILL)			
S-4	1	0.2	24-120/6"	R				f.m.c. SAND , Some f.c. Gravel, trace silt, brown, very compact, moist (SP-TILL)	685	Boulders and cobbles encountered throughout the glacial till soils based on hard drilling and auger chatter.	
R-1	0.4	0.4						GRANITE (BOULDERS/COBBLES)		Coarse gravel lodged in shoe of S-4.	
S-5	2	1.2	3-5-4-3	9		10		f.m.c. SAND , Some Clayey Silt, brown, loose, moist (SM-TILL)		Auger refusal at 7'.	
S-6	2	1.1	2-4-24-30	28				f.m.c. SAND , little clayey silt, little f.c. gravel, brown, medium compact, wet (SM-TILL)	680	Switch drilling methods to flush joint casing to advance boring.	
						15		SCHIST , gray, very hard, freshly weathered, closely fractured, fair RQD		Auger refusal at 13.5'.	
R-2	5	3.3		66%				End of Boring at 18.5 ft	675		
						20					
						25					
						30					
									660		

SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATEDCHA.GDT 1/27/11



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-21

Page 1 of 1

LOCATION: Warwick, New York

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: SoilTesting

DRILLER: D. DeAngelis

INSPECTOR: K. Owens

START DATE and TIME: 4/6/2010 1:45:00 PM

FINISH DATE and TIME: 4/7/2010 9:10:00 AM

SURFACE

ELEV: 711.39 (ft; Surveyed)

CHECKED BY: C. Symmes

DRILL FLUID: Water @ 12'

DRILLING METHOD: 3.75" HSA

WATER LEVEL
OBSERVATIONS

DATE

TIME

READING
TYPEWATER
DEPTH
(ft)CASING
BOTTOM
(ft)HOLE
BOTTOM
(ft)

4-7-10

8:50 AM

Completion

1.9'

12

15.6

4-7-10

9:00 AM

Casing Pulled

2.5

N/A

9

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-1	2	1.4	2-2-2-14	4				TOPSOIL f.m. SAND. Some Clayey Silt, trace gravel, trace roots, brown, loose, moist (FILL)	710	Groundwater levels encountered during drilling may not reflect static groundwater conditions.	
S-2	2	1.1	13-15-7-7	22				f.m.c. SAND. little clayey silt, trace f. gravel, trace roots, light brown, medium compact, moist (FILL)			
S-3	2	1.3	5-3-15-19	18		5		grades to trace organics (FILL)		Hard drilling 4-5'.	
S-4	2	1.8	34-41-57-84	98				f.m.c. SAND. little clayey silt, trace f. gravel. brown, very compact, moist (SM-TILL)	705	Boulders and cobbles encountered throughout the glacial till soils based on hard drilling and auger chatter.	
S-5	1.6	0.5	17-24-40-100/2"	64				grades to trace silt (SP-TILL)		Hard drilling 8-12'.	
S-6	0.1	0	50/1"	R		10		No recovery	700		
								GRANITE. light gray, very hard, moderately weathered, very closely fractured, poor RQD		Auger refusal at 12'. Switch drilling methods to flush joint casing for rock core.	
R-1	5	5		48%		15			695		
								End of Boring at 17 ft			
						20					
									690		
						25					
									685		
						30					
									680		

SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATED CHA.GDT 1/27/11



World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-22

Page 1 of 1

PROJECT NUMBER: 21137.3000.32000

12/7/10

LOCATION: Warwick, New York

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: SoilTesting

DRILLER: T. Page

INSPECTOR: K. Owens

START DATE and TIME: 4/7/2010 1:45:00 PM

FINISH DATE and TIME: 4/8/2010 11:35:00 AM

SURFACE

ELEV: 664.42 (ft; Surveyed)

CHECKED BY: C. Symmes

DRILL FLUID: Water @ 7.5'

DRILLING METHOD: 3.75" HSA

WATER LEVEL
OBSERVATIONS

DATE

TIME

READING
TYPE

WATER
DEPTH
(ft)

CASING
BOTTOM
(ft)

HOLE
BOTTOM
(ft)

4-8-10

8:20 AM

Start of Day

7.1

7.5

7.5

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-1	2	0.8	3-2-3-1	5				TOPSOIL Clayey SILT , little f.m.c. sand, trace organics, light brown, medium stiff, moist (FILL) grades to trace f. gravel, becomes hard (FILL)		Groundwater levels encountered during drilling may not reflect static groundwater conditions.	
S-2	2	1.4	11-38-34-36	72				f.m.c. SAND , Some Clayey Silt, trace f.c. gravel, light brown/gray, very compact, moist (SM-TILL) f.m.c. SAND , little clayey silt, trace c. gravel, light brown/gray, very compact, moist (SM-TILL) Similar Soil (SM-TILL) GRANITE (BOULDERS/COBBLES)	660	Boulders and cobbles encountered throughout the glacial till soils based on hard drilling and auger chatter.	
S-3	2	1.5	15-24-33-36	57		5					
S-4	0.8	0.5	47-100/3"	R							
R-1	5	2.4				10			655	Auger refusal at 7.5'. Switch drilling methods to flush joint casing to advance boring.	
R-2	4.5	4.1		34%		15		GRANITE , light gray, very hard, slightly weathered, very closely fractured GRANITE , light gray, very hard, slightly weathered, closely fractured, fair RQD	650	Transition from boulders/cobbles to bedrock at 11.6' as interpreted from visual inspection of rock core.	
								End of Boring at 17 ft			
						20			645		
						25			640		
						30			635		



SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATED CHA GDT 1/27/11



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG
HOLE NUMBER TB-23

Page 1 of 2

LOCATION: Warwick, New York

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: SoilTesting

DRILLER: T. Page

INSPECTOR: K. Owens

START DATE and TIME: 4/16/2010 8:05:00 AM

FINISH DATE and TIME: 4/16/2010 2:35:00 PM

SURFACE

ELEV: 687.88 (ft; Surveyed)

CHECKED BY: C. Symmes

DRILL FLUID: Water @ 36'

DRILLING METHOD: 3.75" HSA

WATER LEVEL
OBSERVATIONS

DATE

TIME

READING
TYPEWATER
DEPTH
(ft)CASING
BOTTOM
(ft)HOLE
BOTTOM
(ft)

4-16-10

8:45 AM

During Drilling

10

10

12

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-1	1.5	1.4	8-27-92/6"	R				ASPHALT f.m.c. SAND , trace silt, trace f. gravel, trace asphalt, light brown/gray, very compact, moist (FILL)	685	Groundwater levels encountered during drilling may not reflect static groundwater conditions. Auger through 0.5' of asphalt and begin sampling.	
S-2	2	1.3	62-47-55-25	R				f.m.c. SAND , little silt, trace f.c. gravel, white/light brown/black, very compact, moist (FILL)			
S-3	2	1.8	10-17-14-15	31		5		f.m.c. SAND , little clayey silt, trace f. gravel, brown/orange/dark brown, compact, moist (FILL)			
S-4	2	1.1	18-15-17-18	32				f.m.c. SAND , little clayey silt, trace f. gravel, brown, compact, moist/wet (SM)	680		
S-5	2	1.2	29-21-19-18	40		10		f.m.c. SAND , trace clayey silt, trace f.c. gravel, brown, compact, moist (SP)			
S-6	2	1.4	9-13-11-15	24				f.m.c. SAND , little silt, trace f. gravel, brown, medium compact, wet (SM)	675		
S-7	2	1.3	18-69-54-15	R		15		f.m.c. SAND , little silt, trace f. gravel, brown, very compact, wet (SM-TILL)	670	Boulders and cobbles encountered throughout the glacial till soils based on hard drilling and auger chatter.	
S-8	2	1.4	22-32-45-34	77		20		Similar Soil (SM-TILL)	665		
S-9	2	1.2	19-31-46-70	77		25		f.m.c. SAND , trace silt, trace c. gravel, light brown, very compact, wet (SP-TILL)	660		
S-10	1.3	1.1	69-52-100/3"	R		30		f.m.c. SAND , Some Silt, brown, very compact, wet (SM-TILL)			

SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATEDCHA.GDT 1/27/11



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-24

Page 1 of 2

LOCATION: Warwick, New York

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: SoilTesting

DRILLER: T. Page

INSPECTOR: K. Owens

START DATE and TIME: 4/28/2010 12:15:00 PM

FINISH DATE and TIME: 4/28/2010 4:45:00 PM

SURFACE

ELEV: 712.89 (ft; Surveyed)

CHECKED BY: C. Symmes

DRILL FLUID: None

DRILLING METHOD: 3.75" HSA

WATER LEVEL
OBSERVATIONS

DATE

TIME

READING
TYPEWATER
DEPTH
(ft)CASING
BOTTOM
(ft)HOLE
BOTTOM
(ft)

4-28-10

1:20 PM

During Drilling

15

15

17

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-1	2	1.6	3-5-4-5	9				TOPSOIL Silty CLAY. Some f.m.c. Sand, light brown/orange, stiff, wet (CL)		Groundwater levels encountered during drilling may not reflect static groundwater conditions.	
S-2	2	1.4	8-7-18-25	25				f.m.c. SAND. Some Clayey Silt, trace f. gravel, light brown, medium compact, wet (SM)	710		
S-3	2	1.7	11-23-22-17	45		5		f.m.c. SAND. Some Silt, trace f. gravel, light brown/orange/black, compact, moist (SM-TILL)		Boulders and cobbles encountered throughout the glacial till soils based on hard drilling and auger chatter.	
S-4	2	1.6	31-34-23-27	57				f.m.c. SAND. Some Silt, light brown/black, very compact, moist (SM-TILL)	705		
S-5	1.5	1.5	16-25-50/6"	R		10		grades to trace f.c. gravel (SM-TILL)			
									700		
S-6	2	1.9	17-21-41-42	62		15		f.m.c. SAND. Some Silt, trace f.c. gravel, gray, very compact, wet (SM-TILL)	695		
S-7	2	1.8	28-19-55-90	74		20		Similar Soil (SM-TILL)	690		
S-8	1.5	1.5	51-50-52/6"	R		25		Similar Soil (SM-TILL)	685		
S-9	1.1	1.1	44-47-50/1"	R		30		Similar Soil (SM-TILL)			



SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATEDCHA.GDT 1/27/11



World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-24

PROJECT NUMBER: 21137.3000.32000

12/7/10

Page 2 of 2

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-10	0.5	0.5	115/6"	R		35		<u>Similar Soil (SM-TILL)</u>	680		
S-11	0.1	0.1	100/1"	R		40		<u>f.m.c. SAND</u> , Some f.c. Gravel, little silt, gray, very compact, wet (SM-TILL)	675		
S-12	0.1	0	100/1"	R		45		No recovery	670	Cobble fragment lodged in shoe of S-12.	
S-13	1.3	1.3	41-80-50/4"	R				<u>Similar Soil (SM-TILL)</u>	665	Final spoon taken at 47' because the driller did not have a 5' auger to advance to 50', 3' auger was able to advance to 47'.	
						50		End of Boring at 48.3 ft			
						55			660		
						60			655		
						65			650		
						70			645		



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG
HOLE NUMBER TB-25

Page 1 of 2

LOCATION: Warwick, New York

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: TransTech Drilling Services

DRILLER: J. Leonhardt

INSPECTOR: K. Owens

START DATE and TIME: 12/3/2010 9:20:00 AM

FINISH DATE and TIME: 12/3/2010 3:45:00 PM

SURFACE

ELEV: 690.97 (ft; Surveyed)

CHECKED BY: J. Gorman

DRILL FLUID: Water @ 3'

DRILLING METHOD: 4" FWC

WATER LEVEL
OBSERVATIONS

DATE

TIME

READING
TYPEWATER
DEPTH
(ft)CASING
BOTTOM
(ft)HOLE
BOTTOM
(ft)

12-3-10

3:45 PM

Casing Pulled

None

N/A

35

SAMP./CORE NUMBER	SAMP. ADV. (ft)	LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-1	2	0.5		9-7-16-34	23				ASPHALT f.c. GRAVEL , little f.m.c. sand, gray/black, medium compact, moist (SUBBASE)	690	Groundwater conditions observed during drilling may not represent static conditions.	
S-2	0.7	0.7		17-100/2"	R				f.m.c. SAND , little f.c. gravel, trace silt, light brown, medium compact, moist (FILL)		Cobble fragment in spoon of sample S-1.	
S-3	0.3	0		100/3"	R				f.m.c. SAND , trace silt, trace c. gravel, light brown, very compact, moist (FILL)		Sample S-2 was mottled.	
							5		No recovery		Roller bit grinding 3' to 4'.	
S-4	2	1.3		14-29-44-42	73				f.m.c. SAND , Some Silt, Some f.c. Gravel, light brown, very compact, moist (SM-TILL)	685	Boulders and cobbles encountered throughout the glacial till soils based on difficult drilling and drill rig bouncing.	
S-5	2	1.3		17-16-49-57	65		10		Similar Soil (SM-TILL)	680	Zones of completely weathered rock in sample S-5. Sample S-5 & S-6 moisture content = 9.2%. Roller bit grinding 12' to 13'.	
S-6	2	1.4		30-49-42-35	91		15		Similar Soil (SM-TILL)	675	Drill rig bouncing 15' to 15.5'.	
S-7	2	1.3		15-24-58-100	82		20		f.m.c. SAND , trace silt, trace f.c. gravel, light brown/gray, very compact, moist (SP-TILL)	670	Drill rig bouncing 17.5' to 18'. Roller bit grinding at 19'. Zones of weathered rock in sample S-7.	
S-8	0.7	0.5		80-100/2"	R		25		Similar Soil (SP-TILL)	665	Slow roller bit advancement from 23' to 24.5'.	
S-9	0.1	0		100/1"	R		30		No recovery	660	Hard/slow roller bit advancement 26' to 30'. Coarse gravel in shoe of sample S-9.	

SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATEDCHA.GDT 1/27/11



World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-25

PROJECT NUMBER: 21137.3000.32000

12/7/10

Page 2 of 2

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
								No recovery (continued)			
S-10	2	1.8	22-40-72-88	R		35		f.m.c. SAND. Some Silt, light brown/orange/white, very compact, moist (COMPLETELY WEATHERED BEDROCK)	655	Wash from drilling operations turned to orange/brown at 34' and interpreted as top of the completely weathered rock. Sample S-10 & S-11 moisture content = 16.8%.	
S-11	2	1.5	17-23-35-52	58		40		Similar Soil (COMPLETELY WEATHERED BEDROCK)	650		
S-12	1.3	1.2	14-28-100/3"	R		45		Similar Soil (COMPLETELY WEATHERED BEDROCK)	645		
S-13	0.4	0.4	100/5"	R				Similar Soil (COMPLETELY WEATHERED BEDROCK) End of Boring at 48.4 ft			
						50			640		
						55			635		
						60			630		
						65			625		
						70					



PROJECT NUMBER: 21137.3000.32000

12/7/10

World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-26

Page 1 of 2

LOCATION: Warwick, New York

CLIENT: Watchtower Bible & Tract Society

CONTRACTOR: TransTech Drilling Services

DRILLER: J. Leonhardt

INSPECTOR: K. Owens

START DATE and TIME: 12/2/2010 10:15:00 AM

FINISH DATE and TIME: 12/3/2010 8:30:00 AM

SURFACE

ELEV: 680.40 (ft; Surveyed)

CHECKED BY: J. Gorman

DRILL FLUID: Water @ 4'

DRILLING METHOD: 4" FWC

WATER LEVEL
OBSERVATIONS

DATE

TIME

READING
TYPEWATER
DEPTH
(ft)CASING
BOTTOM
(ft)HOLE
BOTTOM
(ft)

12-3-10

7:15 AM

Start of Day

20.4

20

42

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-1	2	0.9	19-8-15-14	23				ASPHALT f.c. GRAVEL , trace silt, trace f.m.c. sand, gray, medium compact, moist (SUBBASE)	680		
S-2	2	1.3	10-15-26-20	41				f.m.c. SAND , trace silt, trace f. gravel, light brown/gray, medium compact, moist (FILL)		Soil mottled 2'-2.5' in Sample S-2.	
S-3	2	1.5	8-9-10-14	19		5		f.m.c. SAND , little clayey silt, trace f.c. gravel, light brown/gray, compact, moist (FILL)		Boulders and cobbles encountered throughout the glacial till soils based on difficult drilling and drill rig bouncing. Sample S-4 contains zones of weathered cobbles and boulders.	
S-4	2	1.3	15-14-21-21	35				f.m.c. SAND , little clayey silt, trace f. gravel, brown, medium compact, moist (SM-TILL)	675		
								Similar Soil (SM-TILL)			
S-5	2	0.8	17-24-30-32	54		10		f.m.c. SAND , trace silt, trace f.c. gravel, light brown, very compact, moist (SP-TILL)	670		
S-6	2	0.9	33-40-82-45	R		15		becomes light brown and gray	665	Drill rig bouncing from 13.5' to 15' due to hard drilling.	
S-7	1.8	0.6	19-40-38-100/4"	78		20		f.m.c. SAND , little silt, trace f.c. gravel, light brown, very compact, moist (SM-TILL)	660	Groundwater conditions observed during drilling may not represent static conditions. Roller bit grinding 22' - 22.5', driller notes it is likely a boulder.	
S-8	1.3	0.2	8-18-100/4"	R		25		f.m.c. SAND , Some Silt, Some f.c. Gravel, light brown, very compact, moist (SM-TILL)	655	Sample S-8 & S-9 moisture content = 6.8%. Roller bit difficulty increases and remains difficult until boring termination.	
S-9	1	0.5	5-100/6"	R		30		Similar Soil (SM-TILL)	650		



SUBSURFACE LOG 21137 TUXEDO BUILDING FOOTPRINT LOGS.GPJ UPDATED CHA.GDT 1/27/11



World Headquarters of Jehovah's Witnesses

SUBSURFACE LOG

HOLE NUMBER TB-26

PROJECT NUMBER: 21137.3000.32000

12/7/10

Page 2 of 2

SAMP./CORE NUMBER	SAMP. ADV. (ft) LEN. CORE (ft)	RECOVERY (ft)	Blows Per 6" on Split Spoon Sampler	"N" Value or RQD%	SAMPLE	DEPTH (Feet)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	ELEVATION (Feet)	Remarks on Character of Drilling, Water Return, etc.	WATER LEVELS AND/OR WELL DATA
S-10	2	0.6	41-57-38-21	95		35			645	Sample not taken at 35' because drilling was advancing roller bit through likely boulder from 34.5' to 37'.	
						40		<u>Similar Soil (SM-TILL)</u>	640	Tip of the spoon from sample S-10 had completely weathered rock.	
S-11	2	0.3	14-16-26-34	42		45		<u>f.m.c. SAND</u> , Some clayey Silt, orange/black/white, medium compact, wet (COMPLETELY WEATHERED BEDROCK)	635		
S-12	2	1.6	35-27-36-44	63		50		<u>f.m.c. SAND</u> , Some clayey Silt, orange/white/black, very compact, moist (COMPLETELY WEATHERED BEDROCK)	630		
								End of Boring at 52 ft			
						55			625		
						60			620		
						65			615		
						70			610		

SWPPP—APPENDIX G

Water Quality Volume Worksheets

STORMWATER MANAGEMENT
PLANNING AND PRACTICE SELECTION WORKSHEET FOR
NEW PROJECTS IN NON-IMPAIRED WATERSHEDS*

**Use different methods for enhanced phosphorus treatment and re-development projects.*

PROJECT: World Headquarters of Jehovah's Witnesses, Warwick, NY DATE: November 2, 2011

Watershed Drainage Area:

Design Point: 2

Drainage Area Name: DA-2B4

Drainage Area: 0.870 (acres)

Impervious Area: 0.780 (acres)

Soils:

HSG(s): C

S: 0.3

90% RAIN: (P) 1.25 inches

PLANNING:

1. Plan to preserve, avoid and minimize (underline all concepts utilized):

- Preserve undisturbed, natural buffer, and critical environment areas
- Employ open space, conservation, and clustering site design techniques
- Avoid developing in environmentally sensitive areas: floodplain, steep slopes, habitat, ecosystems, bedrock, wetlands, shorelines, shallow groundwater, impervious soils, unstable soils
- Minimize impervious surfaces: building footprints, parking, roads, sidewalks, and driveways
- Minimize clearing and grading

WATER QUALITY VOLUME (before runoff reduction)

2. Calculate water quality volume (WQv): $WQv = P \cdot A \cdot Rv / 12$

DA: 0.870 Impervious Area* (AI) = 0.780 acres; Rv = 0.857

** If soil restoration is not practices, include construction compacted areas as impervious.*

original WQv = 0.078 ac-ft

3. Minimum RRV requirements (when 100% WQv reduction cannot be achieved)

(Calculate minimum required Runoff Reduction Volume (RRv) using):

$RRv = 90\% \text{ rain (P)} \times 0.95 \times S \times \text{total impervious area (AI from \#2)/12}$

with S = 0.55 (A soils) 0.40 (B soils) 0.30 (C soils) 0.20 (D soils) OR weighted HSG average in DA

Minimum required RRV = (P) 1.25 $0.95 \times (S)$ 0.3 $\times (AI)$ 0.78 ac/12 =

Minimum RRV required = 0.023 ac-ft

AREA REDUCTION PRACTICES

4. Incorporate area reduction practices (complete for all applicable practices): (area includes practice and contributing area)

- Conservation of natural areas: (contributing AI = 0 ac.) Area = 0 ac.
- Riparian buffers/filter strips: (contributing AI = 0.000 ac.) Area = 0.000 ac.
- Tree planting/tree preservation: (contributing AI = 0 ac.) Area = 0 ac.
- Total area reduction: Total Area Reduced = 0.000 ac.
- Total impervious area within area reduction: AI in Reduced Area = 0.000 ac.

5. Subtract total area reduction from DA:

Remaining drainage area: (#2 area - #4 area)

Remaining impervious area: (#2 AI - #4 AI)

Remaining Drainage Area = 0.870 ac.

Remaining AI = 0.780 ac.

6. Recalculate WQv for site area remaining after area reductions:

Remaining DA = 0.870 remaining AI = 0.780 ac. Rv = 0.86 area reduced WQv = 0.078 ac-ft

7. Runoff reduction volume (RRv) from #2: (#2 WQv - #6 WQv) =

RRv = 0.000 ac-ft

ROOFTOP DISCONNECTION

8. Incorporate rooftop area disconnection:

Total disconnected rooftop area (now considered pervious for RV calculation(s))

Area = 0 ac.

9. Recalculate WQv with RV modified for impervious disconnection:

DA (from #5) = 0.870 acres

remaining AI = 0.780 ac.);

Rv = 0.86

Rv reduced WQv = 0.078 ac-ft

10. Runoff reduction volume: #6 (area reduced WQv) - #9 (Rv reduced WQv) =

Rv reduced WQv = 0.000 ac-ft

SOURCE CONTROL WQv TREATMENT PRACTICES

(From attached worksheet)

11a. Subtotal DA tributary to Source Control treatment practice 0.870 (acres)

11b. Subtotal AI treated by Source Control practices AI = 0.780 (ac-ft)

11c. Subtotal Runoff Reduction Volume (RRv):

Subtotal (Rv) RRv = 0.078 ac-ft

TOTAL RUNOFF REDUCTION VOLUME (RRv)

12a. Total RRv calculated (#7 + #10 + #11c) = Total (RRv) =

Total Calculated RRv = 0.078 ac-ft

12b. Total RRv provided =

Total Provided RRv = 0.078 ac-ft

13. Is provided RRv (#12b) ≥ original WQv (#2)?

Yes X No If yes, skip to #18.

14. Is provided RRv (#12b) ≥ minimum RRv (#3)?
recalculate, or provide justification.

Yes X No If no, provide additional RRv and

15a. Total drainage area treated with runoff reduction/source control practices = 0.870 acres
(Area reduction (from #4) + total DA tributary to source control (#11a.)

15b. Total impervious area (AI) treated with area reduction or source control (AI#4 + AI#8 + AI#11b)

Total treated AI = 0.780 acres

16a. Is all of the watershed DA treated by either area reduction or source control practices?

Yes X No

16b. Is all the watershed impervious area (AI) treated with either area reduction or source control practices?

Yes X No If no, provide justification

Go to #17.

STANDARD WQv TREATMENT

17. Provide treatment for any remaining untreated watershed DA with standard practices:

Remaining untreated DA = Watershed DA (#2) acre(s) - treated DA (#15)

 acres =

Remaining DA = acres

Remaining impervious area = total AI (#2) acre(s) - treated AI (#15b)

 acres =

remaining AI = acres

Remaining DA = acres;

remaining AI = acres;

RV = *;

WQv = ac-ft

* Minimum Rv for standard practice is 0.2

• Ponds WQv provided = 0 ac-ft

• Wetlands WQv provided = 0 ac-ft

• Infiltration WQv provided = 0 ac-ft

• Filters WQv provided = 0 ac-ft

• Open channels WQv provided = 0 ac-ft

ALTERNATIVE WQv TREATMENT

17A. Provide treatment for any remaining WQv with alternative practices:

Remaining untreated WQv

Remaining WQv = 0.000 ac-ft

• Alternative WQv provided = 0.000 ac-ft

11. SOURCE CONTROL WQv TREATMENT PRACTICES WORKSHEET - (complete for all applicable practices and soil types).

Standard Practices (used as source control)

Allowable Runoff Reduction volume (RRv)

• Infiltration (soils with k>0.5"/hour only) DA tributary to practice: acres AI = acres RV = -- WQv = -- (ac-ft)					90% of WQv = -- ac-ft (k>0.5"/hour soils only)
• Bioretention DA tributary to practice: acres AI = acres RV = -- WQv = -- (ac-ft)					80% of WQv = ac-ft (A/B soils) OR 40% of WQv = -- ac-ft (C/D soils)
• Dry Swale DA tributary to practice: acres AI = acres RV = -- WQv = -- (ac-ft)					40% of WQv = ac-ft (A/B soils) OR 20% of WQv = -- ac-ft (C/D soils)

Green Infrastructure Practices

• Vegetated swale DA tributary to practice: acres AI = acres RV = -- WQv = -- (ac-ft)					20% of WQv = -- ac-ft (A/B soils) OR 10% of WQv = -- ac-ft (C/D soils)
Green roof Roof area = acres AI = acres RV = 0.95 WQv = 0.000 (ac-ft)					100% of WQv = 0.000 ac-ft
Rain Garden Roof area = acres AI = acres RV = 0.95 WQv = 0.000 (ac-ft)					100% of WQv = 0.000 ac-ft
Stormwater planters DA tributary to practice: 0.870 acres AI = 0.780 acres RV = 0.857 WQv = 0.078 (ac-ft)					100% of WQv = 0.078 ac-ft
Cisterns/rain barrels Roof area = acres AI = acres RV = 0.95 WQv = 0.000 (ac-ft)					100% of WQv = 0.000 ac-ft
Porous pavement (A/B/C soils only) DA tributary to practice: acres AI = acres RV = -- WQv = -- (ac-ft)					100% of WQv = -- ac-ft (A/B/C soils only)
11a. Subtotal DA tributary to Source Control WQv Treatment practices = 0.870 (acres)					Subtotal (Rv) RRv = 0.078 (ac-ft)
11b. Subtotal AI treated by Source Control practices AI = 0.780 (acres)					
11c. Subtotal Runoff Reduction Volume (RRv):					

**STORMWATER MANAGEMENT
PLANNING AND PRACTICE SELECTION WORKSHEET FOR
NEW PROJECTS IN NON-IMPAIRED WATERSHEDS***

*Use different methods for enhanced phosphorus treatment and re-development projects.

PROJECT: World Headquarters of Jehovah's Witnesses, Warwick, NY DATE: October 26, 2011

Watershed Drainage Area:

Design Point: 3
Drainage Area Name: DA-3A
Drainage Area: 1.810 (acres)
Impervious Area: 0.170 (acres)

Soils:

HSG(s): C 90% RAIN: (P) 1.25 inches
S: 0.3

PLANNING:

1. Plan to preserve, avoid and minimize (underline all concepts utilized):

- Preserve undisturbed, natural buffer, and critical environment areas
- Employ open space, conservation, and clustering site design techniques
- Avoid developing in environmentally sensitive areas: floodplain, steep slopes, habitat, ecosystems, bedrock, wetlands, shorelines, shallow groundwater, impervious soils, unstable soils
- Minimize impervious surfaces: building footprints, parking, roads, sidewalks, and driveways
- Minimize clearing and grading

WATER QUALITY VOLUME (before runoff reduction)

2. Calculate water quality volume (WQv): $WQv = P \times A \times Rv / 12$

DA: 1.810 Impervious Area* (AI) = 0.170 acres; Rv = 0.135 original WQv = 0.025 ac-ft

* If soil restoration is not practices, include construction compacted areas as impervious.

3. Minimum RRv requirements (when 100% WQv reduction cannot be achieved)

(Calculate minimum required Runoff Reduction Volume (RRv) using):

$RRv = 90\% \text{ rain (P)} \times 0.95 \times S \times \text{total impervious area (AI from \#2)} / 12$

with S = 0.55 (A soils) 0.40 (B soils) 0.30 (C soils) 0.20 (D soils) OR weighted HSG average in DA

Minimum required RRv = (P) 1.25 0.95 x (S) 0.3 x (AI) 0.17 ac/12 = Minimum RRv required = 0.005 ac-ft

AREA REDUCTION PRACTICES

4. Incorporate area reduction practices (complete for all applicable practices): (area includes practice and contributing area)

• Conservation of natural areas:	(contributing AI = <u>0</u> ac.)	Area = <u>0</u> ac.
• Riparian buffers/filter strips:	(contributing AI = <u>0</u> ac.)	Area = <u>0</u> ac.
• Tree planting/tree preservation:	(contributing AI = <u>0</u> ac.)	Area = <u>0</u> ac.
• Total area reduction:		Total Area Reduced = <u>0.000</u> ac.
• Total impervious area within area reduction:		AI in Reduced Area = <u>0.000</u> ac.

5. Subtract total area reduction from DA:

Remaining drainage area: (#2 area - #4 area)

Remaining Drainage Area = 1.810 ac.

Remaining impervious area: (#2 AI - #4 AI)

Remaining AI = 0.170 ac.

6. Recalculate WQv for site area remaining after area reductions:

Remaining DA = 1.810 remaining AI = 0.170 ac. Rv = 0.13 area reduced WQv = 0.025 ac-ft

7. Runoff reduction volume (RRv) from #2: (#2 WQv - #6 WQv) =

RRv = 0.000 ac-ft

ROOFTOP DISCONNECTION**8. Incorporate rooftop area disconnection:**

Total disconnected rooftop area (now considered pervious for RV calculation(s))

Area = 0 ac.**9. Recalculate WQv with RV modified for impervious disconnection:**DA (from #5) = 1.810 acresremaining AI = 0.170 ac.;Rv = 0.13Rv reduced WQv = 0.025 ac-ft**10. Runoff reduction volume: #6 (area reduced WQv) - #9 (Rv reduced WQv) =**0.000 ac-ft**SOURCE CONTROL WQv TREATMENT PRACTICES**

(From attached worksheet)

11a. Subtotal DA tributary to Source Control treatment practices 1.810 (acres)**11b. Subtotal AI treated by Source Control practices AI =** 0.170 (ac-ft)**11c. Subtotal Runoff Reduction Volume (RRv):**0.025 ac-ft**TOTAL RUNOFF REDUCTION VOLUME (RRv)****12a. Total RRv calculated (#7 + #10 + #11c) = Total (RRv) =**0.025 ac-ft**12b. Total RRv provided =**0.025 ac-ft**13. Is provided RRv (#12b) ≥ original WQv (#2)?**Yes X No If yes, skip to #18.**14. Is provided RRv (#12b) ≥ minimum RRv (#3)?
recalculate, or provide justification.**Yes X No If no, provide additional RRv and**15a. Total drainage area treated with runoff reduction/source control practices =** 1.810 acres
(Area reduction (from #4) + total DA tributary to source control (#11a.)**15b. Total impervious area (AI) treated with area reduction or source control (AI#4 + AI#8 + AI#11b)**Total treated AI = 0.170 acres**16a. Is all of the watershed DA treated by either area reduction or source control practices?**Yes X No **16b. Is all the watershed impervious area (AI) treated with either area reduction or source control practices?**Yes X No If no, provide justification

Go to #17.

STANDARD WQv TREATMENT**17. Provide treatment for any remaining untreated watershed DA with standard practices:**Remaining untreated DA = Watershed DA (#2) acre(s) - treated DA (#15) acres =Remaining impervious area = total AI (#2) acre(s) - treated AI (#15b) acres =Remaining DA = acres; remaining AI = acres;RV = *;Remaining DA = acresremaining AI = acresWQv = ac-ft

* Minimum Rv for standard practice is 0.2

- Ponds WQv provided = 0 ac-ft
- Wetlands WQv provided = 0 ac-ft
- Infiltration WQv provided = 0 ac-ft
- Filters WQv provided = 0.000 ac-ft
- Open channels WQv provided = 0 ac-ft

ALTERNATIVE WQv TREATMENT**17A. Provide treatment for any remaining WQv with alternative practices:**

Remaining untreated WQv

0.000 ac-ft

- Alternative WQv provided = 0.000 ac-ft

11. SOURCE CONTROL WQv TREATMENT PRACTICES WORKSHEET - (complete for all applicable practices and soil types).
Standard Practices (used as source control)
Allowable Runoff Reduction volume (RRv)

• Infiltration (soils with k>0.5"/hour only) DA tributary to practice: acres AI = acres RV = -- WQv = -- (ac-ft)					90% of WQv = -- ac-ft (k>0.5"/hour soils only)
• Bioretention DA tributary to practice: acres AI = acres RV = -- WQv = -- (ac-ft)					80% of WQv = ac-ft (A/B soils) OR 40% of WQv = -- ac-ft (C/D soils)
• Dry Swale DA tributary to practice: acres AI = acres RV = -- WQv = -- (ac-ft)					40% of WQv = ac-ft (A/B soils) OR 20% of WQv = -- ac-ft (C/D soils)

Green Infrastructure Practices

• Vegetated swale DA tributary to practice: acres AI = acres RV = -- WQv = -- (ac-ft)					20% of WQv = -- ac-ft (A/B soils) OR 10% of WQv = ac-ft (C/D soils)
Green roof Roof area = acres AI = acres RV = 0.95 WQv = 0.000 (ac-ft)					100% of WQv = 0.000 ac-ft
Rain Garden Roof area = acres AI = acres RV = 0.95 WQv = 0.000 (ac-ft)					100% of WQv = 0.000 ac-ft
Stormwater planters DA tributary to practice: acres AI = acres RV = -- WQv = -- (ac-ft)					100% of WQv = -- ac-ft
Cisterns/rain barrels Roof area = acres AI = acres RV = 0.95 WQv = 0.000 (ac-ft)					100% of WQv = 0.000 ac-ft
Porous pavement (A/B/C soils only) DA tributary to practice: 1.810 acres AI = 0.170 acres RV = 0.13453 WQv = 0.025 (ac-ft)					100% of WQv = 0.025 ac-ft (A/B/C soils only)
11a. Subtotal DA tributary to Source Control WQv Treatment practices = 1.810 (acres)					Subtotal (Rv) RRv = 0.025 (ac-ft)
11b. Subtotal AI treated by Source Control practices AI = 0.170 (acres)					
11c. Subtotal Runoff Reduction Volume (RRv):					

STORMWATER MANAGEMENT
PLANNING AND PRACTICE SELECTION WORKSHEET FOR
NEW PROJECTS IN NON-IMPAIRED WATERSHEDS*

*Use different methods for enhanced phosphorus treatment and re-development projects.

PROJECT: World Headquarters of Jehovah's Witnesses, Warwick, NY DATE: October 26, 2011

<u>Watershed Drainage Area:</u>		<u>Soils:</u>		
Design Point:	<u>3</u>	HSG(s):	<u>C</u>	90% RAIN: (P) <u>1.25</u> inches
Drainage Area Name:	<u>DA-3B</u>	S:	<u>0.3</u>	
Drainage Area:	<u>2.310</u> (acres)			
Impervious Area:	<u>1.180</u> (acres)			

PLANNING:

1. Plan to preserve, avoid and minimize (underline all concepts utilized):

- Preserve undisturbed, natural buffer, and critical environment areas
- Employ open space, conservation, and clustering site design techniques
- Avoid developing in environmentally sensitive areas: floodplain, steep slopes, habitat, ecosystems, bedrock, wetlands, shorelines, shallow groundwater, impervious soils, unstable soils
- Minimize impervious surfaces: building footprints, parking, roads, sidewalks, and driveways
- Minimize clearing and grading

WATER QUALITY VOLUME (before runoff reduction)

2. Calculate water quality volume (WQv): $WQv = P \cdot A \cdot Rv / 12$

DA: 2.310 Impervious Area* (AI) = 1.180 acres; Rv = 0.510 original WQv = 0.123 ac-ft

* If soil restoration is not practices, include construction compacted areas as impervious.

3. Minimum RRV requirements (when 100% WQv reduction cannot be achieved)

(Calculate minimum required Runoff Reduction Volume (RRv) using):

$RRv = 90\% \text{ rain (P)} \times 0.95 \times S \times \text{total impervious area (AI from \#2)} / 12$

with S = 0.55 (A soils) 0.40 (B soils) 0.30 (C soils) 0.20 (D soils) OR weighted HSG average in DA

Minimum required RRV = (P) 1.25 $0.95 \times (S)$ 0.3 $\times (AI)$ 1.18 $ac / 12 =$ Minimum RRV required = 0.035 ac-ft

AREA REDUCTION PRACTICES

4. Incorporate area reduction practices (complete for all applicable practices): (area includes practice and contributing area)

• Conservation of natural areas:	(contributing AI = <u>0</u> ac.)	Area = <u>0</u> ac.
• Riparian buffers/filter strips:	(contributing AI = <u>0</u> ac.)	Area = <u>0</u> ac.
• Tree planting/tree preservation:	(contributing AI = <u>0</u> ac.)	Area = <u>0</u> ac.
• Total area reduction:		Total Area Reduced = <u>0.000</u> ac.
• Total impervious area within area reduction:		AI in Reduced Area = <u>0.000</u> ac.

5. Subtract total area reduction from DA:

Remaining drainage area: (#2 area - #4 area) Remaining Drainage Area = 2.310 ac.
 Remaining impervious area: (#2 AI - #4 AI) Remaining AI = 1.180 ac.

6. Recalculate WQv for site area remaining after area reductions:

Remaining DA = 2.310 remaining AI = 1.180 ac. Rv = 0.51 area reduced WQv = 0.123 ac-ft

7. Runoff reduction volume (RRv) from #2: (#2 WQv - #6 WQv) =

RRv = 0.000 ac-ft

ROOFTOP DISCONNECTION**8. Incorporate rooftop area disconnection:**

Total disconnected rooftop area (now considered pervious for RV calculation(s))

Area = 0 ac.**9. Recalculate WQv with RV modified for impervious disconnection:**DA (from #5) = 2.310 acresremaining AI = 1.180 ac.);Rv = 0.51Rv reduced WQv = 0.123 ac-ft**10. Runoff reduction volume: #6 (area reduced WQv) - #9 (Rv reduced WQv) =**Rv reduced WQv = 0.000 ac-ft**SOURCE CONTROL WQv TREATMENT PRACTICES**

(From attached worksheet)

11a. Subtotal DA tributary to Source Control treatment practices 0.420 (acres)**11b. Subtotal AI treated by Source Control practices AI =** 0.420 (ac-ft)**11c. Subtotal Runoff Reduction Volume (RRv):**Subtotal (Rv) RRv = 0.042 ac-ft**TOTAL RUNOFF REDUCTION VOLUME (RRv)****12a. Total RRv calculated (#7 + #10 + #11c) = Total (RRv) =**Total Calculated RRv = 0.042 ac-ft**12b. Total RRv provided =**Total Provided RRv = 0.042 ac-ft**13. Is provided RRv (#12b) ≥ original WQv (#2)?**Yes No X If yes, skip to #18.**14. Is provided RRv (#12b) ≥ minimum RRv (#3)?**
recalculate, or provide justification.Yes X No If no, provide additional RRv and**15a. Total drainage area treated with runoff reduction/source control practices =** 0.420 acres
(Area reduction (from #4) + total DA tributary to source control (#11a.)**15b. Total impervious area (AI) treated with area reduction or source control (AI#4 + AI#8 + AI#11b)**Total treated AI = 0.420 acres**16a. Is all of the watershed DA treated by either area reduction or source control practices?**Yes No X**16b. Is all the watershed impervious area (AI) treated with either area reduction or source control practices?**Yes No X If no, provide justification

Go to #17.

STANDARD WQv TREATMENT**17. Provide treatment for any remaining untreated watershed DA with standard practices:**Remaining untreated DA = Watershed DA (#2) 2.310 acre(s) - treated DA (#15) 0.420 acres =Remaining impervious area = total AI (#2) 1.180 acre(s) - treated AI (#15b) 0.420 acres =Remaining DA = 1.890 acres; remaining AI = 0.760 acres;RV = 0.412 *;Remaining DA = 1.890 acresremaining AI = 0.760 acresWQv = 0.081 ac-ft

* Minimum Rv for standard practice is 0.2

• Ponds	WQv provided =	<u>0</u>	ac-ft
• Wetlands	WQv provided =	<u>0</u>	ac-ft
• Infiltration	WQv provided =	<u>0</u>	ac-ft
• Filters	WQv provided =	<u>0.132</u>	ac-ft
• Open channels	WQv provided =	<u>0</u>	ac-ft

ALTERNATIVE WQv TREATMENT**17A. Provide treatment for any remaining WQv with alternative practices:**

Remaining untreated WQv

Remaining WQv = 0.000 ac-ft• Alternative WQv provided = 0.000 ac-ft

11. SOURCE CONTROL WQv TREATMENT PRACTICES WORKSHEET - (complete for all applicable practices and soil types).
Standard Practices (used as source control)
Allowable Runoff Reduction volume (RRv)

• Infiltration (soils with k>0.5"/hour only) DA tributary to practice: <u> </u> acres AI = <u> </u> acres RV = <u> -- </u> WQv = <u> -- </u> (ac-ft)					90% of WQv = <u> -- </u> ac-ft (k>0.5"/hour soils only)
• Bioretention DA tributary to practice: <u> </u> acres AI = <u> </u> acres RV = <u> -- </u> WQv = <u> -- </u> (ac-ft)					80% of WQv = <u> </u> ac-ft (A/B soils) OR 40% of WQv = <u> -- </u> ac-ft (C/D soils)
• Dry Swale DA tributary to practice: <u> </u> acres AI = <u> </u> acres RV = <u> -- </u> WQv = <u> -- </u> (ac-ft)					40% of WQv = <u> </u> ac-ft (A/B soils) OR 20% of WQv = <u> -- </u> ac-ft (C/D soils)

Green Infrastructure Practices

• Vegetated swale					20% of WQv = <u> -- </u> ac-ft (A/B soils) OR
DA tributary to practice:	<u> </u> acres	AI = <u> </u> acres	RV = <u> -- </u>	WQv = <u> -- </u> (ac-ft)	10% of WQv = <u> </u> ac-ft (C/D soils)
Green roof					
Roof area =	<u> 0.420 </u> acres	AI = <u> 0.420 </u> acres	RV = <u> 0.95 </u>	WQv = <u> 0.042 </u> (ac-ft)	100% of WQv = <u> 0.042 </u> ac-ft
Rain Garden					
Roof area =	<u> </u> acres	AI = <u> </u> acres	RV = <u> 0.95 </u>	WQv = <u> 0.000 </u> (ac-ft)	100% of WQv = <u> 0.000 </u> ac-ft
Stormwater planters					
DA tributary to practice:	<u> </u> acres	AI = <u> </u> acres	RV = <u> -- </u>	WQv = <u> -- </u> (ac-ft)	100% of WQv = <u> -- </u> ac-ft
Cisterns/rain barrels					
Roof area =	<u> </u> acres	AI = <u> </u> acres	RV = <u> 0.95 </u>	WQv = <u> 0.000 </u> (ac-ft)	100% of WQv = <u> 0.000 </u> ac-ft
Porous pavement (A/B/C soils only)					
DA tributary to practice:	<u> </u> acres	AI = <u> </u> acres	RV = <u> -- </u>	WQv = <u> -- </u> (ac-ft)	100% of WQv = <u> -- </u> ac-ft (A/B/C soils only)
11a. Subtotal DA tributary to Source Control WQv Treatment practices =					<u> 0.420 </u> (acres)
11b. Subtotal AI treated by Source Control practices AI =					<u> 0.420 </u> (acres)
11c. Subtotal Runoff Reduction Volume (RRv):					Subtotal (Rv) RRv = <u> 0.042 </u> (ac-ft)

STORMWATER MANAGEMENT
PLANNING AND PRACTICE SELECTION WORKSHEET FOR
NEW PROJECTS IN NON-IMPAIRED WATERSHEDS*

*Use different methods for enhanced phosphorus treatment and re-development projects.

PROJECT: World Headquarters of Jehovah's Witnesses, Warwick, NY DATE: October 26, 2011

<u>Watershed Drainage Area:</u>		<u>Soils:</u>		
Design Point:	<u>3</u>	HSG(s):	<u>C</u>	90% RAIN: (P) <u>1.25</u> inches
Drainage Area Name:	<u>DA-3C</u>	S:	<u>0.3</u>	
Drainage Area:	<u>2.660</u> (acres)			
Impervious Area:	<u>1.180</u> (acres)			

PLANNING:

1. Plan to preserve, avoid and minimize (underline all concepts utilized):

- Preserve undisturbed, natural buffer, and critical environment areas
- Employ open space, conservation, and clustering site design techniques
- Avoid developing in environmentally sensitive areas: floodplain, steep slopes, habitat, ecosystems, bedrock, wetlands, shorelines, shallow groundwater, impervious soils, unstable soils
- Minimize impervious surfaces: building footprints, parking, roads, sidewalks, and driveways
- Minimize clearing and grading

WATER QUALITY VOLUME (before runoff reduction)

2. Calculate water quality volume (WQv): $WQv = P \times A \times Rv / 12$

DA: 2.660 Impervious Area* (AI) = 1.180 acres; Rv = 0.449 original WQv = 0.124 ac-ft

* If soil restoration is not practices, include construction compacted areas as impervious.

3. Minimum RRV requirements (when 100% WQv reduction cannot be achieved)

(Calculate minimum required Runoff Reduction Volume (RRv) using):

$RRv = 90\% \text{ rain (P)} \times 0.95 \times S \times \text{total impervious area (AI from \#2)} / 12$

with S = 0.55 (A soils) 0.40 (B soils) 0.30 (C soils) 0.20 (D soils) OR weighted HSG average in DA

Minimum required RRV = (P) 1.25 $0.95 \times (S)$ 0.3 $\times (AI)$ 1.18 $ac / 12 =$ Minimum RRV required = 0.035 ac-ft

AREA REDUCTION PRACTICES

4. Incorporate area reduction practices (complete for all applicable practices): (area includes practice and contributing area)

• Conservation of natural areas:	(contributing AI = <u>0</u> ac.)	Area = <u>0</u> ac.
• Riparian buffers/filter strips:	(contributing AI = <u>0</u> ac.)	Area = <u>0</u> ac.
• Tree planting/tree preservation:	(contributing AI = <u>0</u> ac.)	Area = <u>0</u> ac.
• Total area reduction:		Total Area Reduced = <u>0.000</u> ac.
• Total impervious area within area reduction:		AI in Reduced Area = <u>0.000</u> ac.

5. Subtract total area reduction from DA:

Remaining drainage area: (#2 area - #4 area) Remaining Drainage Area = 2.660 ac.
 Remaining impervious area: (#2 AI - #4 AI) Remaining AI = 1.180 ac.

6. Recalculate WQv for site area remaining after area reductions:

Remaining DA = 2.660 remaining AI = 1.180 ac. Rv = 0.45 area reduced WQv = 0.124 ac-ft

7. Runoff reduction volume (RRv) from #2: (#2 WQv - #6 WQv) =

RRv = 0.000 ac-ft

ROOFTOP DISCONNECTION**8. Incorporate rooftop area disconnection:**

Total disconnected rooftop area (now considered pervious for RV calculation(s))

Area = 0 ac.**9. Recalculate WQv with RV modified for impervious disconnection:**DA (from #5) = 2.660 acresremaining AI = 1.180 ac.);Rv = 0.45Rv reduced WQv = 0.124 ac-ft**10. Runoff reduction volume: #6 (area reduced WQv) - #9 (Rv reduced WQv) =**Rv reduced WQv = 0.000 ac-ft**SOURCE CONTROL WQv TREATMENT PRACTICES**

(From attached worksheet)

11a. Subtotal DA tributary to Source Control treatment practices 2.310 (acres)**11b. Subtotal AI treated by Source Control practices AI =** 1.180 (ac-ft)**11c. Subtotal Runoff Reduction Volume (RRv):**Subtotal (Rv) RRv = 0.059 ac-ft**TOTAL RUNOFF REDUCTION VOLUME (RRv)****12a. Total RRv calculated (#7 + #10 + #11c) = Total (RRv) =**Total Calculated RRv = 0.059 ac-ft**12b. Total RRv provided =**Total Provided RRv = 0.059 ac-ft**13. Is provided RRv (#12b) ≥ original WQv (#2)?**Yes No X If yes, skip to #18.**14. Is provided RRv (#12b) ≥ minimum RRv (#3)?
recalculate, or provide justification.**Yes X No If no, provide additional RRv and**15a. Total drainage area treated with runoff reduction/source control practices =** 2.310 acres
(Area reduction (from #4) + total DA tributary to source control (#11a.)**15b. Total impervious area (AI) treated with area reduction or source control (AI#4 + AI#8 + AI#11b)**Total treated AI = 1.180 acres**16a. Is all of the watershed DA treated by either area reduction or source control practices?**Yes No X**16b. Is all the watershed impervious area (AI) treated with either area reduction or source control practices?**Yes X No If no, provide justification

Go to #17.

STANDARD WQv TREATMENT**17. Provide treatment for any remaining untreated watershed DA with standard practices:**Remaining untreated DA = Watershed DA (#2) 2.660 acre(s) - treated DA (#15) 2.310 acres =Remaining impervious area = total AI (#2) acre(s) - treated AI (#15b) acres =Remaining DA = 0.000 acres; remaining AI = acres;RV = -- *;Remaining DA = 0.350 acresremaining AI = acresWQv = -- ac-ft

* Minimum Rv for standard practice is 0.2

• Ponds	WQv provided =	<u>0</u>	ac-ft
• Wetlands	WQv provided =	<u>0</u>	ac-ft
• Infiltration	WQv provided =	<u>0</u>	ac-ft
• Filters	WQv provided =	<u>0</u>	ac-ft
• Open channels	WQv provided =	<u>0</u>	ac-ft

ALTERNATIVE WQv TREATMENT**17A. Provide treatment for any remaining WQv with alternative practices:**

Remaining untreated WQv

Remaining WQv = -- ac-ft

• Alternative	WQv provided =	<u>0.000</u>	ac-ft

11. SOURCE CONTROL WQv TREATMENT PRACTICES WORKSHEET - (complete for all applicable practices and soil types).
Standard Practices (used as source control)
Allowable Runoff Reduction volume (RRv)

• Infiltration (soils with k>0.5"/hour only) DA tributary to practice: <u> </u> acres AI = <u> </u> acres RV = <u> -- </u> WQv = <u> -- </u> (ac-ft)					90% of WQv = <u> -- </u> ac-ft (k>0.5"/hour soils only)
• Bioretention DA tributary to practice: <u> 2.150 </u> acres AI = <u> 1.020 </u> acres RV = <u> 0.47698 </u> WQv = <u> 0.107 </u> (ac-ft)					80% of WQv = <u> </u> ac-ft (A/B soils) OR 40% of WQv = <u> 0.043 </u> ac-ft (C/D soils)
• Dry Swale DA tributary to practice: <u> </u> acres AI = <u> </u> acres RV = <u> -- </u> WQv = <u> -- </u> (ac-ft)					40% of WQv = <u> </u> ac-ft (A/B soils) OR 20% of WQv = <u> -- </u> ac-ft (C/D soils)

Green Infrastructure Practices

• Vegetated swale					20% of WQv = <u> -- </u> ac-ft (A/B soils) OR
DA tributary to practice:	<u> </u> acres	AI = <u> </u> acres	RV = <u> -- </u>	WQv = <u> -- </u> (ac-ft)	10% of WQv = <u> </u> ac-ft (C/D soils)
Green roof					
Roof area =	<u> </u> acres	AI = <u> </u> acres	RV = <u> 0.95 </u>	WQv = <u> 0.000 </u> (ac-ft)	100% of WQv = <u> 0.000 </u> ac-ft
Rain Garden					
Roof area =	<u> </u> acres	AI = <u> </u> acres	RV = <u> 0.95 </u>	WQv = <u> 0.000 </u> (ac-ft)	100% of WQv = <u> 0.000 </u> ac-ft
Stormwater planters					
DA tributary to practice:	<u> </u> acres	AI = <u> </u> acres	RV = <u> -- </u>	WQv = <u> -- </u> (ac-ft)	100% of WQv = <u> -- </u> ac-ft
Cisterns/rain barrels					
Roof area =	<u> </u> acres	AI = <u> </u> acres	RV = <u> 0.95 </u>	WQv = <u> 0.000 </u> (ac-ft)	100% of WQv = <u> 0.000 </u> ac-ft
Porous pavement (A/B/C soils only)					
DA tributary to practice:	<u> 0.160 </u> acres	AI = <u> 0.160 </u> acres	RV = <u> 0.95 </u>	WQv = <u> 0.016 </u> (ac-ft)	100% of WQv = <u> 0.016 </u> ac-ft (A/B/C soils only)
11a. Subtotal DA tributary to Source Control WQv Treatment practices =					Subtotal (Rv) RRv = <u> 0.059 </u> (ac-ft)
11b. Subtotal AI treated by Source Control practices AI =					
11c. Subtotal Runoff Reduction Volume (RRv):					

STORMWATER MANAGEMENT
PLANNING AND PRACTICE SELECTION WORKSHEET FOR
NEW PROJECTS IN NON-IMPAIRED WATERSHEDS*

*Use different methods for enhanced phosphorus treatment and re-development projects.

PROJECT: World Headquarters of Jehovah's Witnesses, Warwick, NY

DATE: October 26, 2011

Watershed Drainage Area:

Design Point: 4
 Drainage Area Name: DA-4
 Drainage Area: 5.050 (acres)
 Impervious Area: 0.390 (acres)

Soils:

HSG(s): C
 S: 0.3

90% RAIN: (P) 1.25 inches

PLANNING:

1. Plan to preserve, avoid and minimize (underline all concepts utilized):

- Preserve undisturbed, natural buffer, and critical environment areas
- Employ open space, conservation, and clustering site design techniques
- Avoid developing in environmentally sensitive areas: floodplain, steep slopes, habitat, ecosystems, bedrock, wetlands, shorelines, shallow groundwater, impervious soils, unstable soils
- Minimize impervious surfaces: building footprints, parking, roads, sidewalks, and driveways
- Minimize clearing and grading

WATER QUALITY VOLUME (before runoff reduction)

2. Calculate water quality volume (WQv): $WQv = P \cdot A \cdot Rv / 12$

DA: 5.050 Impervious Area* (AI) = 0.390 acres; Rv = 0.120

original WQv = 0.063 ac-ft

* If soil restoration is not practices, include construction compacted areas as impervious.

3. Minimum RRV requirements (when 100% WQv reduction cannot be achieved)

(Calculate minimum required Runoff Reduction Volume (RRv) using):

$RRv = 90\% \text{ rain (P)} \times 0.95 \times S \times \text{total impervious area (AI from \#2)} / 12$

with S = 0.55 (A soils) 0.40 (B soils) 0.30 (C soils) 0.20 (D soils) OR weighted HSG average in DA

Minimum required RRV = (P) 1.25 0.95 x (S) 0.3 x (AI) 0.39 ac/12 =

Minimum RRV required = 0.012 ac-ft

AREA REDUCTION PRACTICES

4. Incorporate area reduction practices (complete for all applicable practices): (area includes practice and contributing area)

• Conservation of natural areas:	(contributing AI = <u>0</u> ac.)	Area = <u>0</u> ac.
• Riparian buffers/filter strips:	(contributing AI = <u>0</u> ac.)	Area = <u>0</u> ac.
• Tree planting/tree preservation:	(contributing AI = <u>0</u> ac.)	Area = <u>0</u> ac.
• Total area reduction:		Total Area Reduced = <u>0.000</u> ac.
• Total impervious area within area reduction:		AI in Reduced Area = <u>0.000</u> ac.

5. Subtract total area reduction from DA:

Remaining drainage area: (#2 area - #4 area)

Remaining Drainage Area = 5.050 ac.

Remaining impervious area: (#2 AI - #4 AI)

Remaining AI = 0.390 ac.

6. Recalculate WQv for site area remaining after area reductions:

Remaining DA = 5.050 remaining AI = 0.390 ac.

Rv = 0.12

area reduced WQv = 0.063 ac-ft

7. Runoff reduction volume (RRv) from #2: (#2 WQv - #6 WQv) =

RRv = 0.000 ac-ft

ROOFTOP DISCONNECTION**8. Incorporate rooftop area disconnection:**

Total disconnected rooftop area (now considered pervious for RV calculation(s))

Area = 0.060 ac.**9. Recalculate WQv with RV modified for impervious disconnection:**DA (from #5) = 5.050 acres remaining AI = 0.330 ac.;Rv = 0.11Rv reduced WQv = 0.057 ac-ft**10. Runoff reduction volume: #6 (area reduced WQv) - #9 (Rv reduced WQv) =**0.006 ac-ft**SOURCE CONTROL WQv TREATMENT PRACTICES**

(From attached worksheet)

11a. Subtotal DA tributary to Source Control treatment practices 0.330 (acres)**11b. Subtotal AI treated by Source Control practices AI =** 0.330 (ac-ft)**11c. Subtotal Runoff Reduction Volume (RRv):**0.033 ac-ft**TOTAL RUNOFF REDUCTION VOLUME (RRv)****12a. Total RRv calculated (#7 + #10 + #11c) = Total (RRv) =**0.038 ac-ft**12b. Total RRv provided =**0.038 ac-ft**13. Is provided RRv (#12b) ≥ original WQv (#2)?**Yes No X If yes, skip to #18.**14. Is provided RRv (#12b) ≥ minimum RRv (#3)?**
recalculate, or provide justification.Yes X No If no, provide additional RRv and**15a. Total drainage area treated with runoff reduction/source control practices =** 0.330 acres
(Area reduction (from #4) + total DA tributary to source control (#11a.)**15b. Total impervious area (AI) treated with area reduction or source control (AI#4 + AI#8 + AI#11b)**Total treated AI = 0.390 acres**16a. Is all of the watershed DA treated by either area reduction or source control practices?**Yes No X**16b. Is all the watershed impervious area (AI) treated with either area reduction or source control practices?**Yes X No If no, provide justification

Go to #17.

STANDARD WQv TREATMENT**17. Provide treatment for any remaining untreated watershed DA with standard practices:**Remaining untreated DA = Watershed DA (#2) 5.050 acre(s) - treated DA (#15) 0.330 acres =Remaining DA = 4.720 acresRemaining impervious area = total AI (#2) acre(s) - treated AI (#15b) acres =remaining AI = 0 acresRemaining DA = 0.000 acres; remaining AI = 0 acres; RV = -- *;WQv = -- ac-ft

* Minimum Rv for standard practice is 0.2

• Ponds WQv provided = 0 ac-ft• Wetlands WQv provided = 0 ac-ft• Infiltration WQv provided = 0 ac-ft• Filters WQv provided = 0 ac-ft• Open channels WQv provided = 0 ac-ft**ALTERNATIVE WQv TREATMENT****17A. Provide treatment for any remaining WQv with alternative practices:**

Remaining untreated WQv

Remaining WQv = -- ac-ft• Alternative WQv provided = 0.000 ac-ft

11. SOURCE CONTROL WQv TREATMENT PRACTICES WORKSHEET - (complete for all applicable practices and soil types).
Standard Practices (used as source control)
Allowable Runoff Reduction volume (RRv)

• Infiltration (soils with k>0.5"/hour only) DA tributary to practice: acres AI = acres RV = -- WQv = -- (ac-ft)					90% of WQv = -- ac-ft (k>0.5"/hour soils only)
• Bioretention DA tributary to practice: acres AI = acres RV = -- WQv = -- (ac-ft)					80% of WQv = ac-ft (A/B soils) OR 40% of WQv = -- ac-ft (C/D soils)
• Dry Swale DA tributary to practice: acres AI = acres RV = -- WQv = -- (ac-ft)					40% of WQv = ac-ft (A/B soils) OR 20% of WQv = -- ac-ft (C/D soils)

Green Infrastructure Practices

• Vegetated swale					20% of WQv = <u> -- </u> ac-ft (A/B soils) OR
DA tributary to practice:	<u> </u> acres	AI = <u> </u> acres	RV = <u> -- </u>	WQv = <u> -- </u> (ac-ft)	10% of WQv = <u> </u> ac-ft (C/D soils)
Green roof					
Roof area =	<u> </u> acres	AI = <u> </u> acres	RV = <u> 0.95 </u>	WQv = <u> 0.000 </u> (ac-ft)	100% of WQv = <u> 0.000 </u> ac-ft
Rain Garden					
Roof area =	<u> </u> acres	AI = <u> </u> acres	RV = <u> 0.95 </u>	WQv = <u> 0.000 </u> (ac-ft)	100% of WQv = <u> 0.000 </u> ac-ft
Stormwater planters					
DA tributary to practice:	<u> </u> acres	AI = <u> </u> acres	RV = <u> -- </u>	WQv = <u> -- </u> (ac-ft)	100% of WQv = <u> -- </u> ac-ft
Cisterns/rain barrels					
Roof area =	<u> </u> acres	AI = <u> </u> acres	RV = <u> 0.95 </u>	WQv = <u> 0.000 </u> (ac-ft)	100% of WQv = <u> 0.000 </u> ac-ft
Porous pavement (A/B/C soils only)					
DA tributary to practice:	<u> 0.330 </u> acres	AI = <u> 0.330 </u> acres	RV = <u> 0.95 </u>	WQv = <u> 0.033 </u> (ac-ft)	100% of WQv = <u> 0.033 </u> ac-ft (A/B/C soils only)
11a. Subtotal DA tributary to Source Control WQv Treatment practices =					
<u> 0.330 </u> (acres)					
11b. Subtotal AI treated by Source Control practices AI =					
<u> 0.330 </u> (acres)					
11c. Subtotal Runoff Reduction Volume (RRv):					
					Subtotal (Rv) RRv = <u> 0.033 </u> (ac-ft)

WORLD HEADQUARTERS OF JEHOVAH'S WITNESSES

LEGEND

---	PL	PROPERTY LINE
---	100	MAJOR CONTOUR LINES
---	102	MINOR CONTOUR LINES
---	SS	SANITARY SEWER
---	SS FM	SANITARY SEWER FORCE MAIN
---	SD	STORM SEWER
---	RD	DRAIN LINES -- ROOFS & BUILDING LEADERS
---	FP	FIRE PROTECTION LINES
---	W	WATER LINES
---	C	COMMUNICATION LINES
---	E	ELECTRICAL POWER LINES -- UNDERGROUND
---	OVHD	ELECTRICAL POWER LINES -- OVERHEAD
---		PONDS, CREEKS, RIVERS, LAKES, WETLANDS
---		SWALES
---		ROAD CENTER LINES
---		UNPAVED OR GRAVEL ROAD
---		UNDERGROUND STRUCTURES

TB-#
BR 100.0
TEST BORE LOCATION
TOP OF BEDROCK EL

TP-#
TEST PIT LOCATION

CATCH BASIN
CURB INLET
MANHOLE
FLOW ARROW
SPOT ELEVATION
VALVE
HYDRANT
UTILITY POLE

LEGEND (CONTINUED)

PS	PERMANENT SEEDING
M	MULCHING
Grass	GRASSSED WATERWAY
Filter	STORM DRAIN INLET FILTER
Rock	ROCK OUTLET PROTECTION
Trap	PIPE OUTLET SEDIMENT TRAP
Basin	SEDIMENT BASIN
Dike	EARTH DIKE
Filter	FILTER FABRIC DROP INLET PROTECTION
Pit	SUMP PIT
Drop	CURB INLET DROP PROTECTION
Tree	TREE PROTECTION
Level	LEVEL SPREADER
Stone	STONE & BLOCK INLET PROTECTION
Bar	WATER BAR
Dike	PERIMETER DIKE/SWALE
Dam	CHECK DAM
Entrance	STABILIZED CONSTRUCTION ENTRANCE/EXIT

Demolish	STRUCTURE OR PAVEMENT TO BE DEMOLISHED
Pavers	PERMEABLE CONCRETE PAVERS
Asphalt	POROUS ASPHALT
Boulder	BOULDER WALL
Wetlands	ONSITE WETLANDS/OPEN WATERS OF US
Buffer	RIPARIAN BUFFER
Roof	GREEN ROOF
Planter	STORMWATER PLANTER
Retention	BIORETENTION

ABBREVIATIONS

AC	ACRES
BLDG	BUILDING
CB	CATCH BASIN
COMM	COMMUNICATIONS
CONC	CONCRETE
EL	ELEVATION
ELEC	ELECTRICAL
ESOM	EROSION & SEDIMENT CONTROL MEASURES
EXIST or E	EXISTING
FF	FINISHED FLOOR
FF EL	FINISH FLOOR ELEVATION
FP	FIRE PROTECTION
FM	FORCED MAIN
IE	INVERT ELEVATION
MAX	MAXIMUM
MH	MANHOLE
MIN	MINIMUM
MW	MUNICIPAL WATER MAIN
OVHD	OVERHEAD
PL	PROPERTY LINE
PWR	POWER
R or RAD	RADIUS
RD	ROOF DRAIN
SD	STORM DRAIN
SDMH	STORM DRAIN MANHOLE
SS	SANITARY SEWER
SSMH	SANITARY SEWER MANHOLE
STA	STATION
TYP	TYPICAL
W	POTABLE WATER

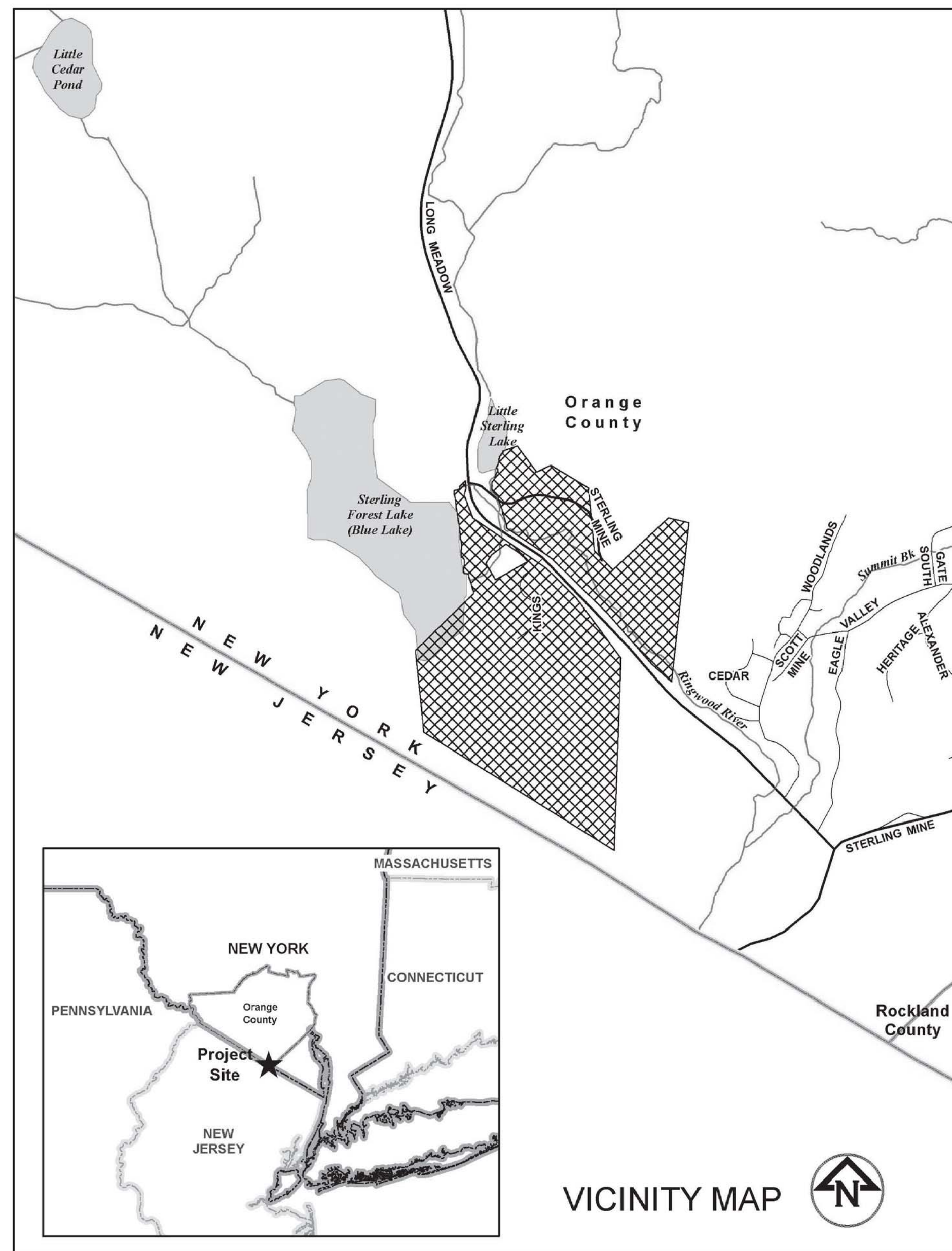
GENERAL NOTES

- PROPERTY BOUNDARY AND EXISTING SURFACE CONDITIONS ARE BASED ON THE BOUNDARY SURVEY PREPARED BY PAULUS, SOKOLOWSKI, & SARTOR (PS&S).
- WETLAND DELINEATIONS ARE BASED ON THE WETLAND SURVEY PERFORMED BY PAULUS, SOKOLOWSKI, & SARTOR (PS&S).
- SEE GEOTECHNICAL ENGINEERING REPORT "WORLD HEADQUARTERS OF JEHOVAH'S WITNESSES, WARWICK, NEW YORK" DATED 2-3-11 BY CLOUGH HARBOR & ASSOCIATES (CHA) FOR TEST BORING (TB-) AND TEST PIT (TP-) INFORMATION.
- AERIAL MAPPING PREPARED BY ATLANTIS AERIAL SURVEY COMPANY. MAPPING IS BASED ON NEW YORK STATE PLANE COORDINATE SYSTEM, EASTERN ZONE NAD83 AND VERTICAL DATUM NAVD88.
- DISAFAELY NEW YORK SHALL BE CONTACTED AT LEAST TWO DAYS PRIOR TO COMMENCING EXCAVATION WITHIN PUBLIC RIGHTS OF WAY AT 1-800-962-7962.

DRAWING INDEX

CIVIL	COVER SHEET
C-001	EXISTING CONDITIONS PLAN
C-002	EXISTING CONDITIONS PLAN
C-003	EXISTING CONDITIONS PLAN
C-004	EXISTING CONDITIONS PLAN
C-005	SITE PLAN
C-006	STORMWATER MANAGEMENT PLAN
C-007	CONSTRUCTION PHASING PLAN
C-008	EXISTING CONDITIONS WATERSHED MAP
C-009	PROPOSED CONDITIONS WATERSHED MAP
C-010	
CE101	EROSION & SEDIMENT CONTROL PLAN
CE102	EROSION & SEDIMENT CONTROL PLAN
CE103	EROSION & SEDIMENT CONTROL PLAN
CE104	EROSION & SEDIMENT CONTROL PLAN
CE105	EROSION & SEDIMENT CONTROL PLAN
CE106	EROSION & SEDIMENT CONTROL PLAN
CE107	EROSION & SEDIMENT CONTROL PLAN
CE501	EROSION & SEDIMENT CONTROL DETAILS
CE502	EROSION & SEDIMENT CONTROL DETAILS
CE503	EROSION & SEDIMENT CONTROL DETAILS
CG101	GRADING & DRAINAGE PLAN
CG102	GRADING & DRAINAGE PLAN
CG103	GRADING & DRAINAGE PLAN
CG104	GRADING & DRAINAGE PLAN
CG501	GRADING & DRAINAGE DETAILS
CG502	GRADING & DRAINAGE DETAILS
CS101	LAYOUT PLAN
CS102	LAYOUT PLAN
CS103	LAYOUT PLAN
CS104	LAYOUT PLAN

LANDSCAPING	LANDSCAPING PLAN
L-001	TREE PRESERVATION PLAN
L-002	TREE PRESERVATION PLAN
L-501	TREE PRESERVATION DETAILS



WATCHTOWER
BIBLE AND TRACT SOCIETY
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25 COLUMBIA HEIGHTS
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16 NOV 11 FILING
15 JUN 11 FILING
14 MAR 11 SWPPP

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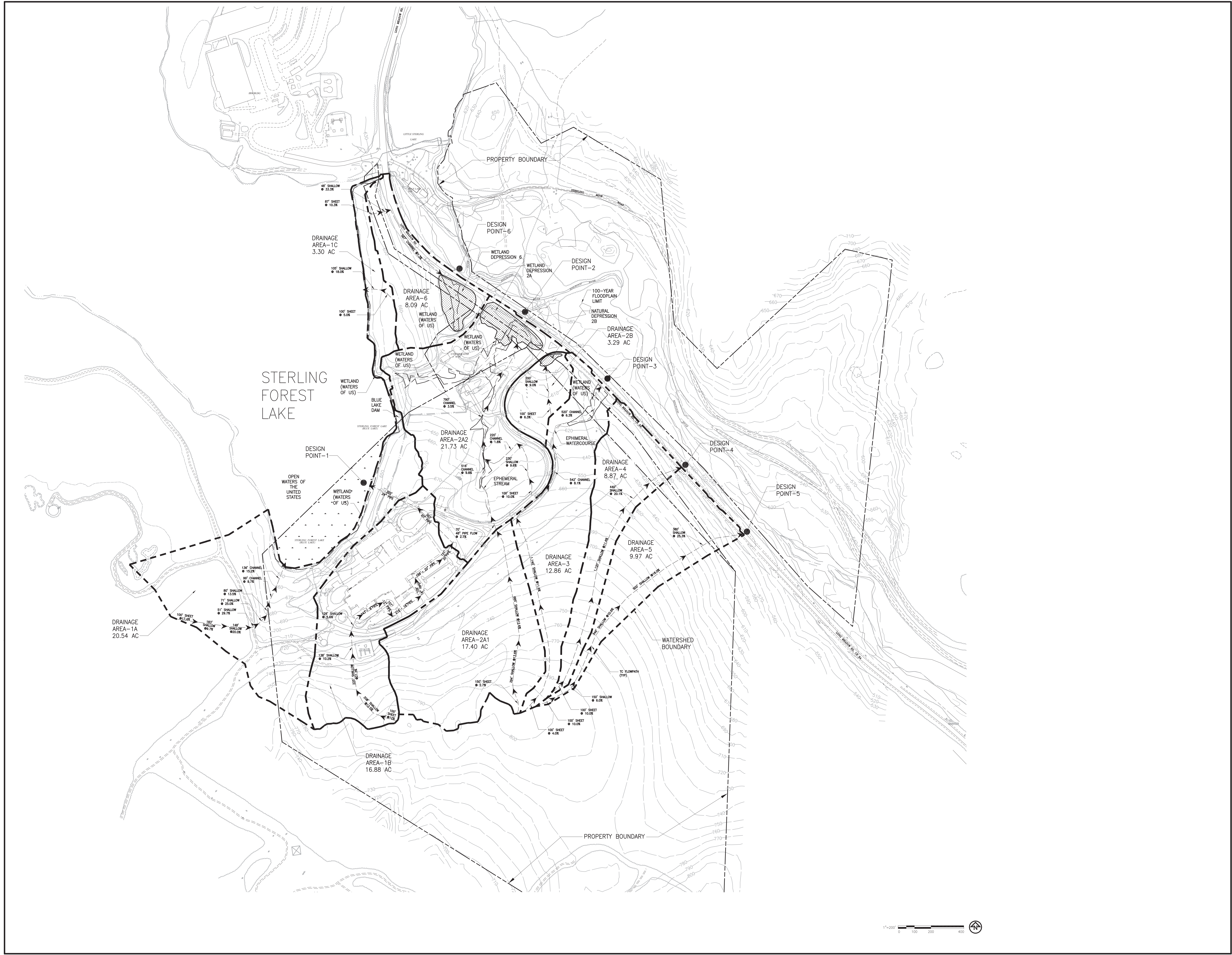
OWNER:
**WATCHTOWER BIBLE &
TRACT SOC. OF NY, INC.**
25 COLUMBIA HEIGHTS
BROOKLYN, NY 11201

ACCOUNT No:
PROJECT TITLE:
**WORLD HEADQUARTERS
OF JEHOVAH'S WITNESSES**
LONG MEADOW ROAD, WARWICK
ORANGE COUNTY, NEW YORK

SHEET TITLE:
COVER SHEET

PROJECT No:
HWK0001

SHEET No:
C-001



WATCHTOWER
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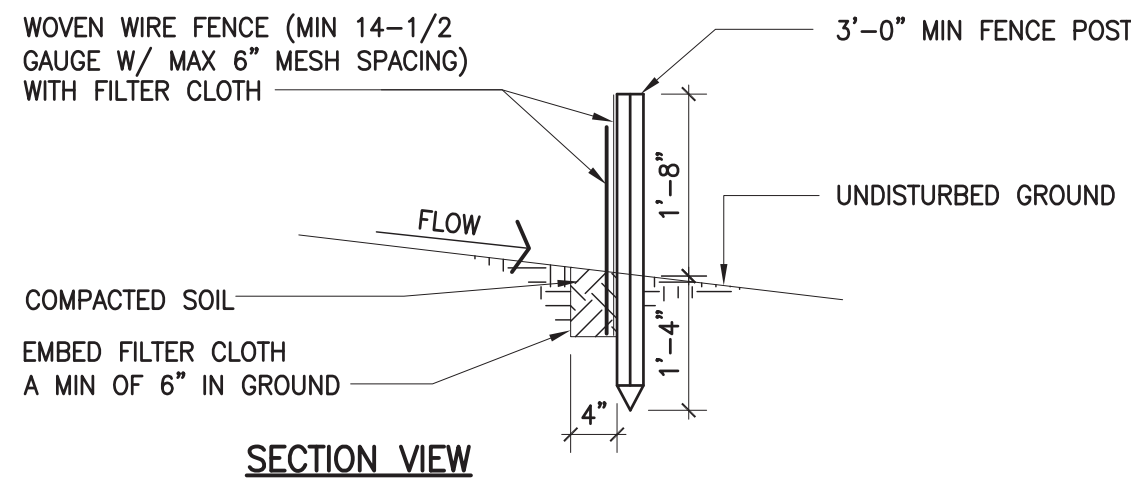
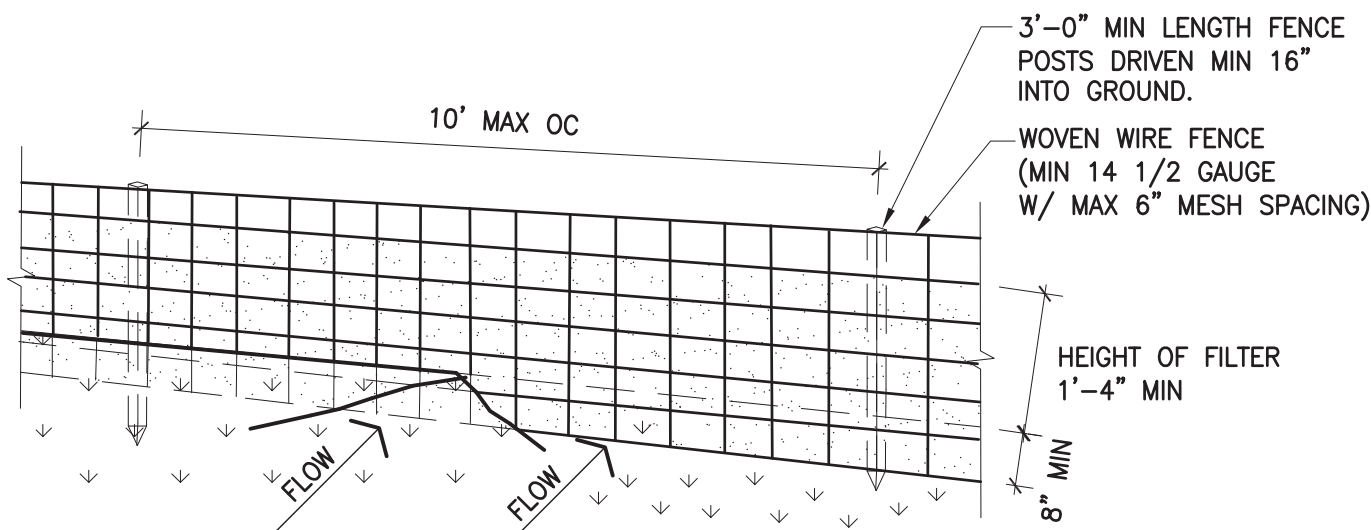
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ACCOUNT NO.:	
PROJECT TITLE:	WORLD HEADQUARTERS OF JEHOVAH'S WITNESSES LONG MEADOW ROAD, WARWICK ORANGE COUNTY, NEW YORK
SHEET TITLE:	EXISTING CONDITIONS WATERSHED MAP
PROJECT NO.:	HWRK0001
SHEET NO.:	C-009

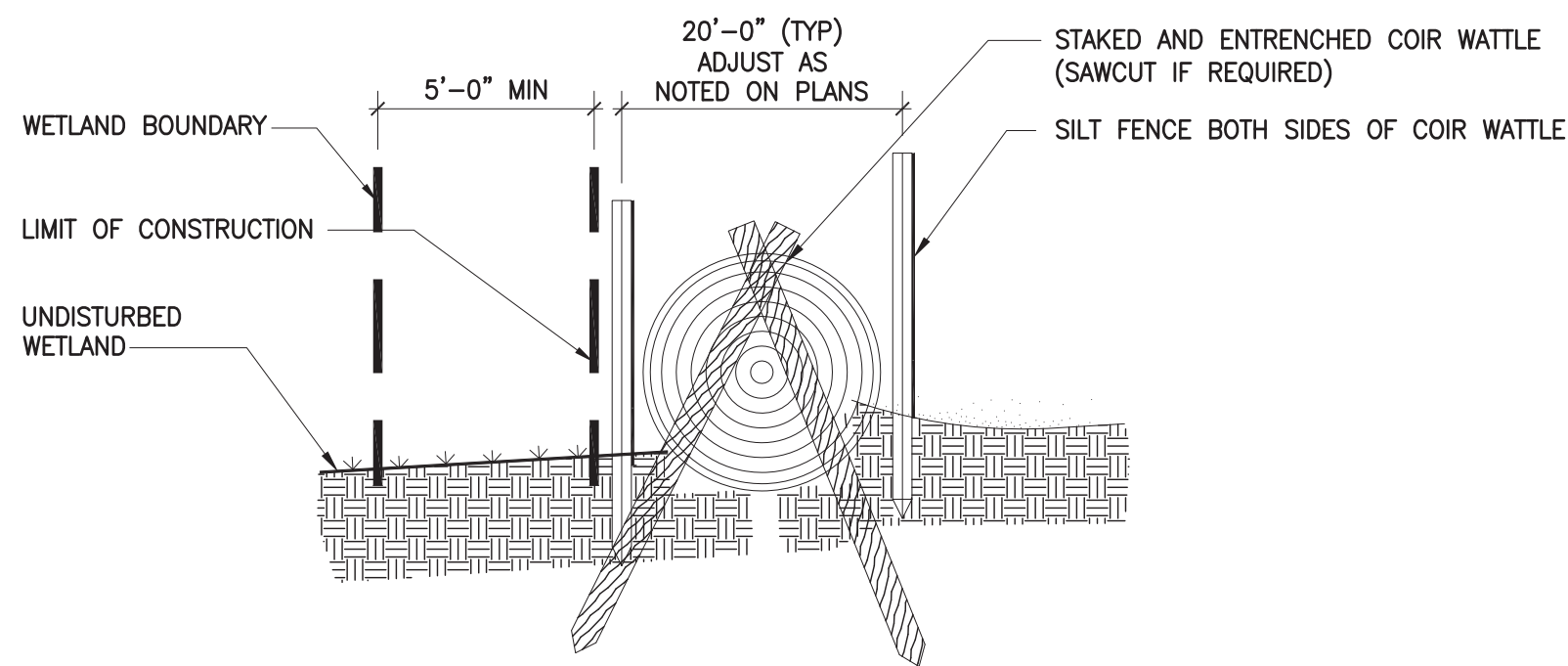
NOTES:

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 12-1/2 GAUGE, 6" MAXIMUM MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.
4. PREFABRICATED UNITS SHALL BE GEOFAB, ENVROFENCE, OR APPROVED EQUIVALENT.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.



1 DETAIL - SILT FENCE

REF: 1/CE101
NOT TO SCALE

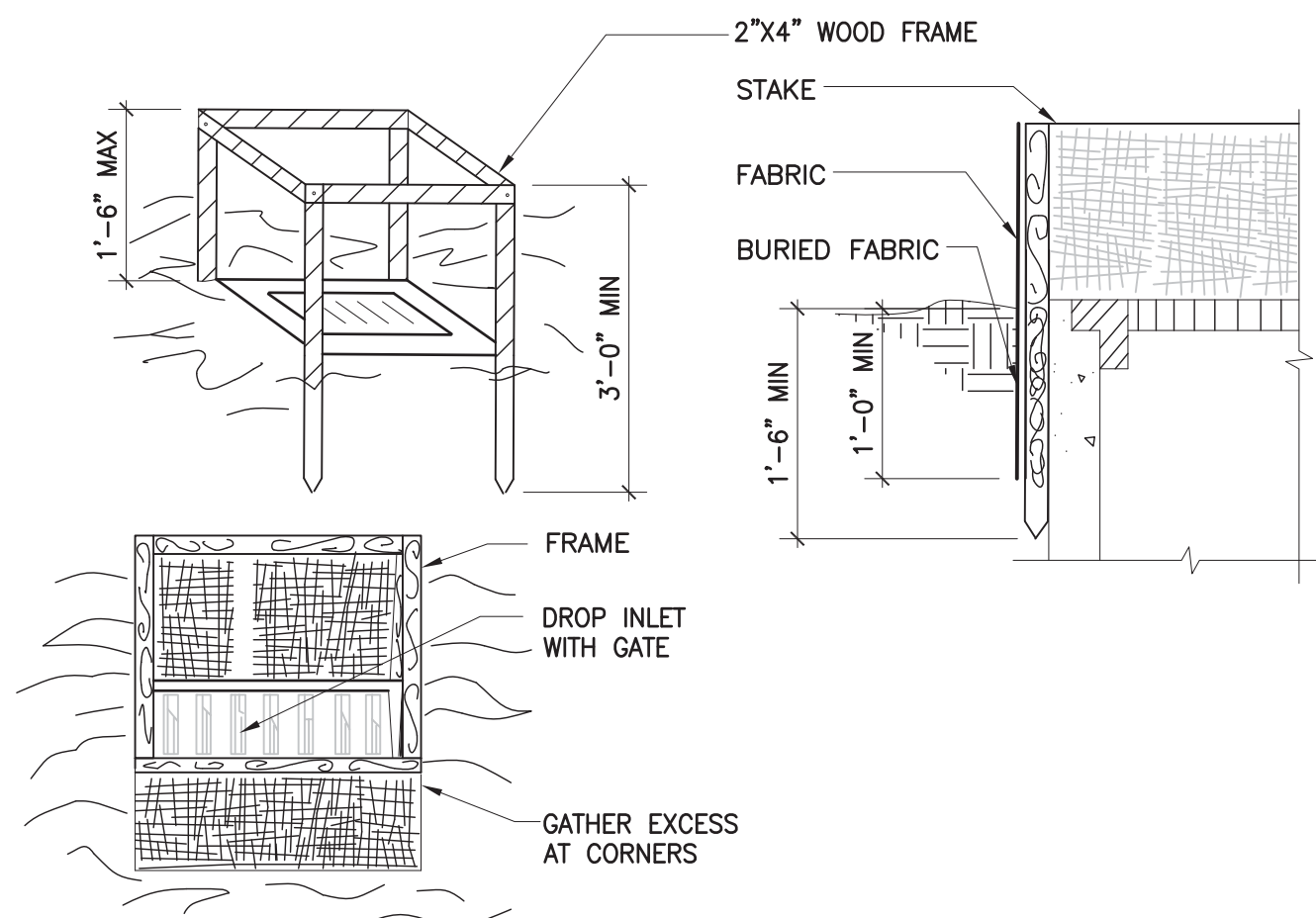


2 DETAIL - WETLAND PROTECTION/WILDLIFE BARRIER

REF: 1/CE101
NOT TO SCALE

NOTES:

1. FILTER FABRIC SHALL HAVE AN EFFECTIVE OPENING SIZE (EOS) OF 40-85. BURLAP MAY BE USED FOR SHORT TERM APPLICATIONS.
2. CUT FABRIC FROM A CONTINUOUS ROLL TO ELIMINATE JOINTS. IF JOINTS ARE NEEDED THEY WILL BE OVERLAPPED TO THE NEXT STAKE.
3. STAKE MATERIALS WILL BE STANDARD 2"x4" WOOD OR EQUIVALENT. METAL WITH A MINIMUM LENGTH OF 3 FEET.
4. SPACE STAKES EVENLY AROUND INLET 3 FEET APART AND DRIVE A MINIMUM 18 INCHES DEEP. SPANS GREATER THAN 3 FEET MAY BE BRIDGED WITH THE USE OF WIRE MESH BEHIND THE FILTER FABRIC FOR SUPPORT.
5. FABRIC SHALL BE EMBEDDED 1 FOOT MINIMUM BELOW GROUND AND BACKFILLED. IT SHALL BE SECURELY FASTENED TO THE STAKES AND FRAME.
6. A 2"x4" WOOD FRAME SHALL BE COMPLETED AROUND THE CREST OF THE FABRIC FOR OVER FLOW STABILITY.

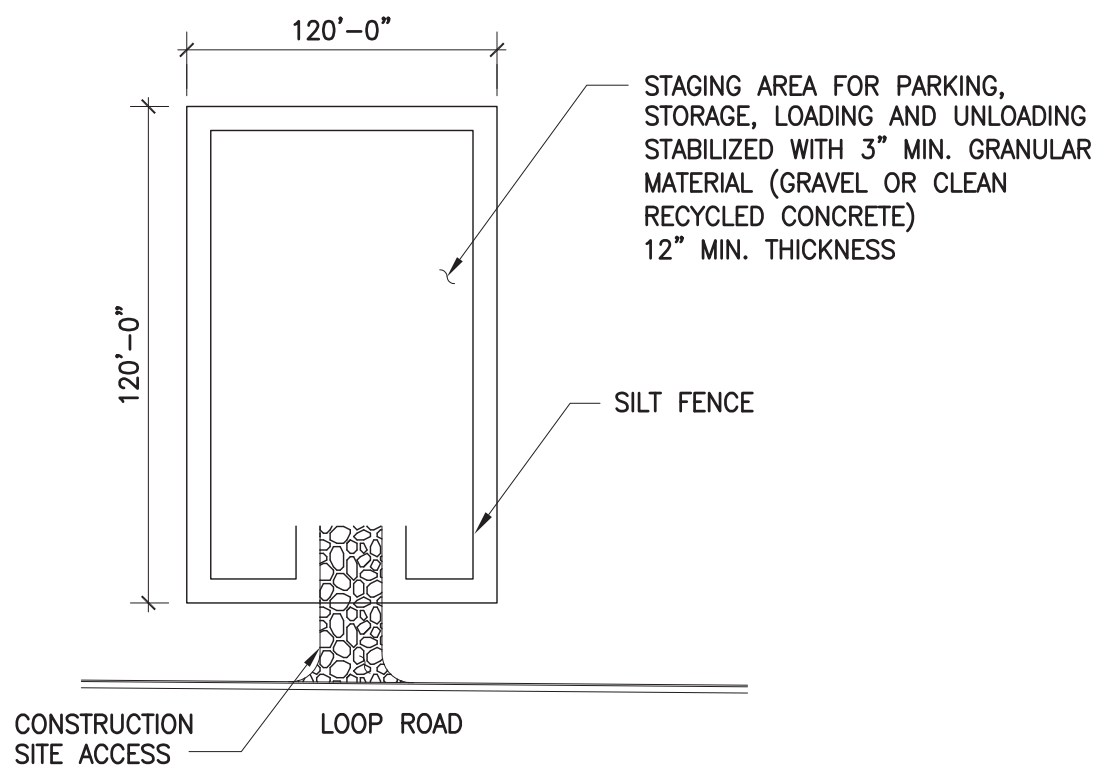


3 DETAIL - FILTER FABRIC DROP INLET PROTECTION

REF: 1/CE101
NOT TO SCALE

STABILIZED STAGING AREA INSTALLATION NOTES:

1. SEE PLAN VIEW FOR GENERAL LOCATION OF STAGING AREA.
2. STABILIZED STAGING AREA SHALL BE LARGE ENOUGH TO FULLY CONTAIN PARKING, STORAGE, AND UNLOADING AND LOADING OPERATIONS.
3. STAGING AREA SHALL BE STABILIZED PRIOR TO ANY OTHER OPERATIONS ON THE SITE.
4. THE STABILIZED STAGING AREA SHALL CONSIST OF A MINIMUM OF 3" OF GRANULAR MATERIAL (GRAVEL OR CLEAN RECYCLED CONCRETE).

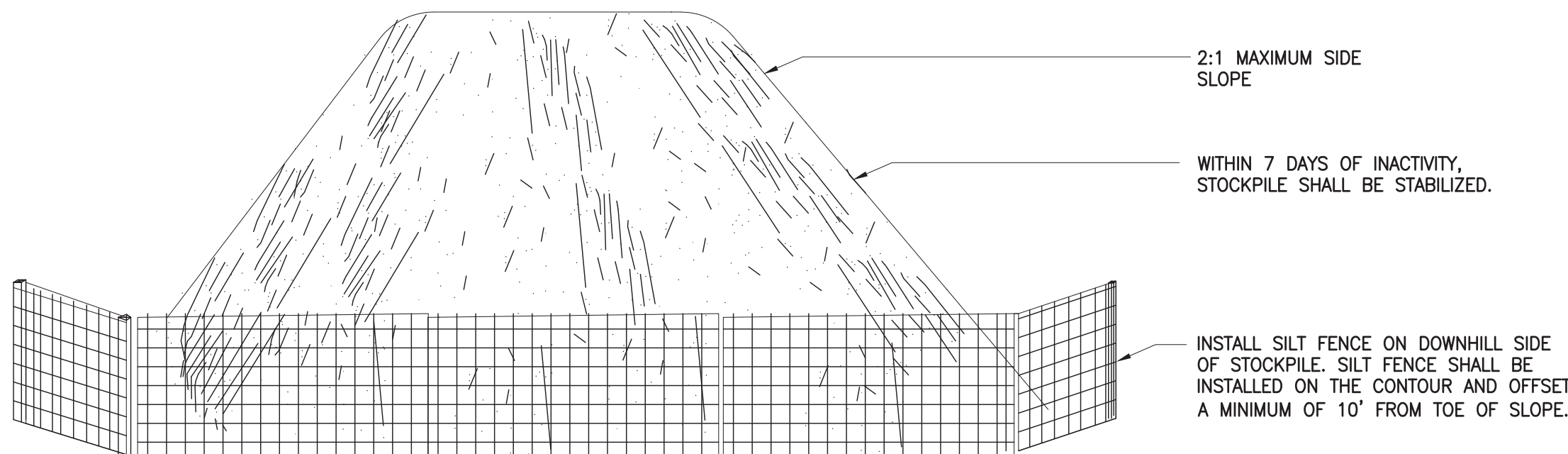


4 DETAIL - COMBINED STAGING AND MATERIALS HANDLING

REF: 1/CE101
NOT TO SCALE

NOTES:

1. STOCKPILING SHALL ONLY BE LOCATED AS SHOWN ON APPROVED EROSION AND SEDIMENT CONTROL DRAWINGS.
2. EXPOSED SOIL SHALL BE STABILIZED BY SEED, MULCH, OR OTHER APPROVED MEASURES. WHEN ACTIVITIES TEMPORARILY CEASE DURING CONSTRUCTION FOR 7 DAYS OR MORE, IN ACCORDANCE WITH NYSDEC REQUIREMENTS
3. STOCKPILE SHALL BE PROTECTED FROM CONCENTRATED FLOWS BY PLACING TEMPORARY PERIMETER SEDIMENT BARRIERS UP SLOPE OF STOCK PILE.
4. WIND EROSION CONTROL PRACTICES SHALL BE USED AS APPROPRIATE.

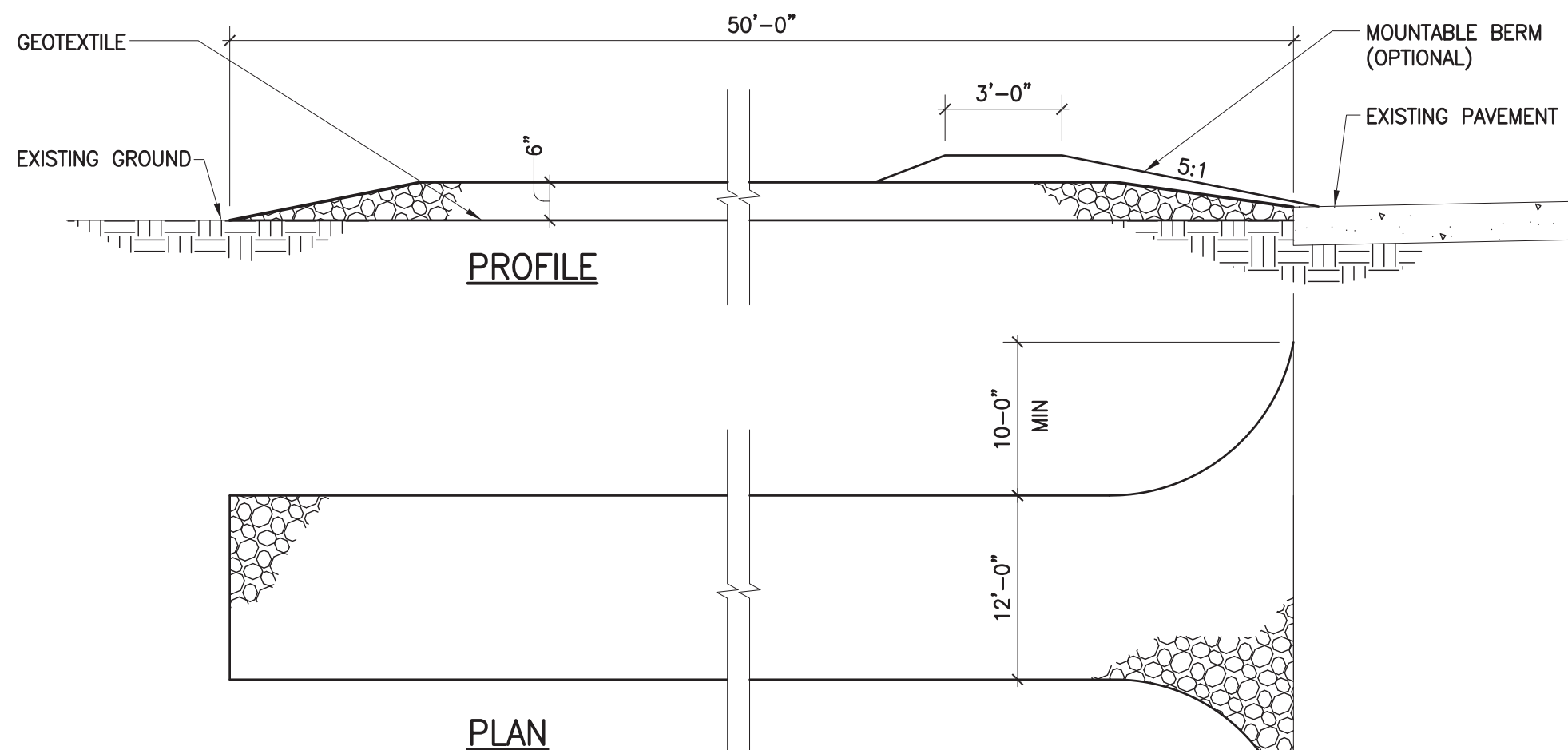


6 DETAIL - SOIL STOCKPILE

REF: 1/CE101
NOT TO SCALE

NOTES:

1. STONE SIZE - USE 1-4 INCH STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH - NOT LESS THAN 50 FEET.
3. THICKNESS - NOT LESS THAN SIX (6) INCHES.
4. WIDTH - TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. TWENTY-FOUR (24) FOOT IF SINGLE ENTRANCE TO SITE.
5. GEOTEXTILE - WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

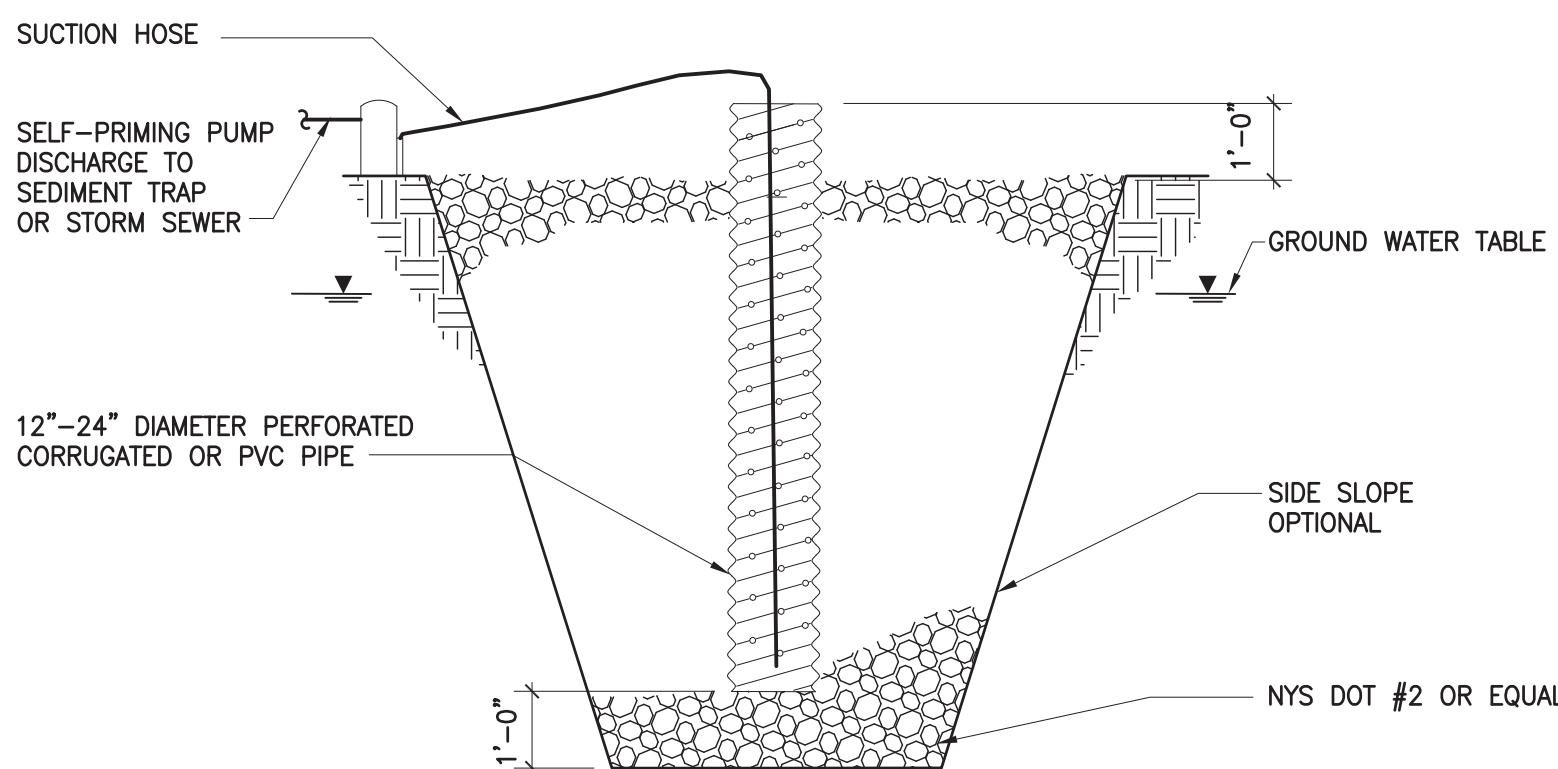


7 DETAIL - STABILIZED CONSTRUCTION ENTRANCE

REF: 1/CE101
NOT TO SCALE

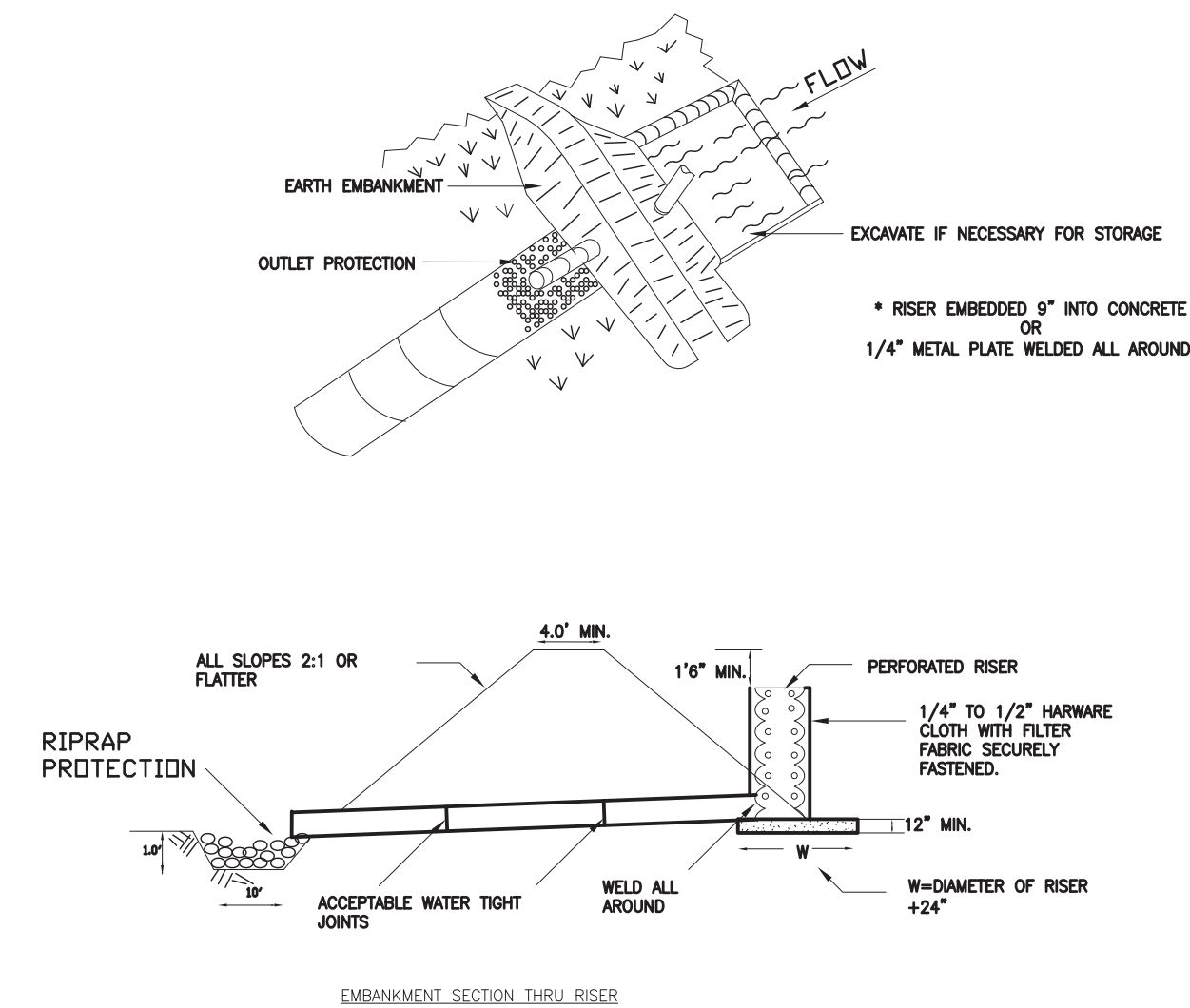
NOTES:

1. PIT DIMENSIONS ARE OPTIONAL.
2. THE STANDPIPE SHOULD BE CONSTRUCTED BY PERFORATING A 1'-2" DIAMETER CORRUGATED OR PVC PIPE.
3. A BASE OF 2" AGGREGATE SHOULD BE PLACED IN THE PIT TO A DEPTH OF 1'-0". AFTER INSTALLING THE STANDPIPE, THE PIT SURROUNDING THE STANDPIPE SHOULD BE BACKFILLED WITH 2" AGGREGATE.
4. THE STANDPIPE SHOULD EXTEND 1' TO 1'-6" ABOVE THE LIP OF THE PIT.
5. THE STANDPIPE SHOULD BE WRAPPED WITH FILTERCLOTH BEFORE INSTALLATION. IF DESIRED, 1/4"-1/2" HARDWARE CLOTH MAY BE PLACED AROUND THE STANDPIPE, PRIOR TO ATTACHING THE FILTERCLOTH.



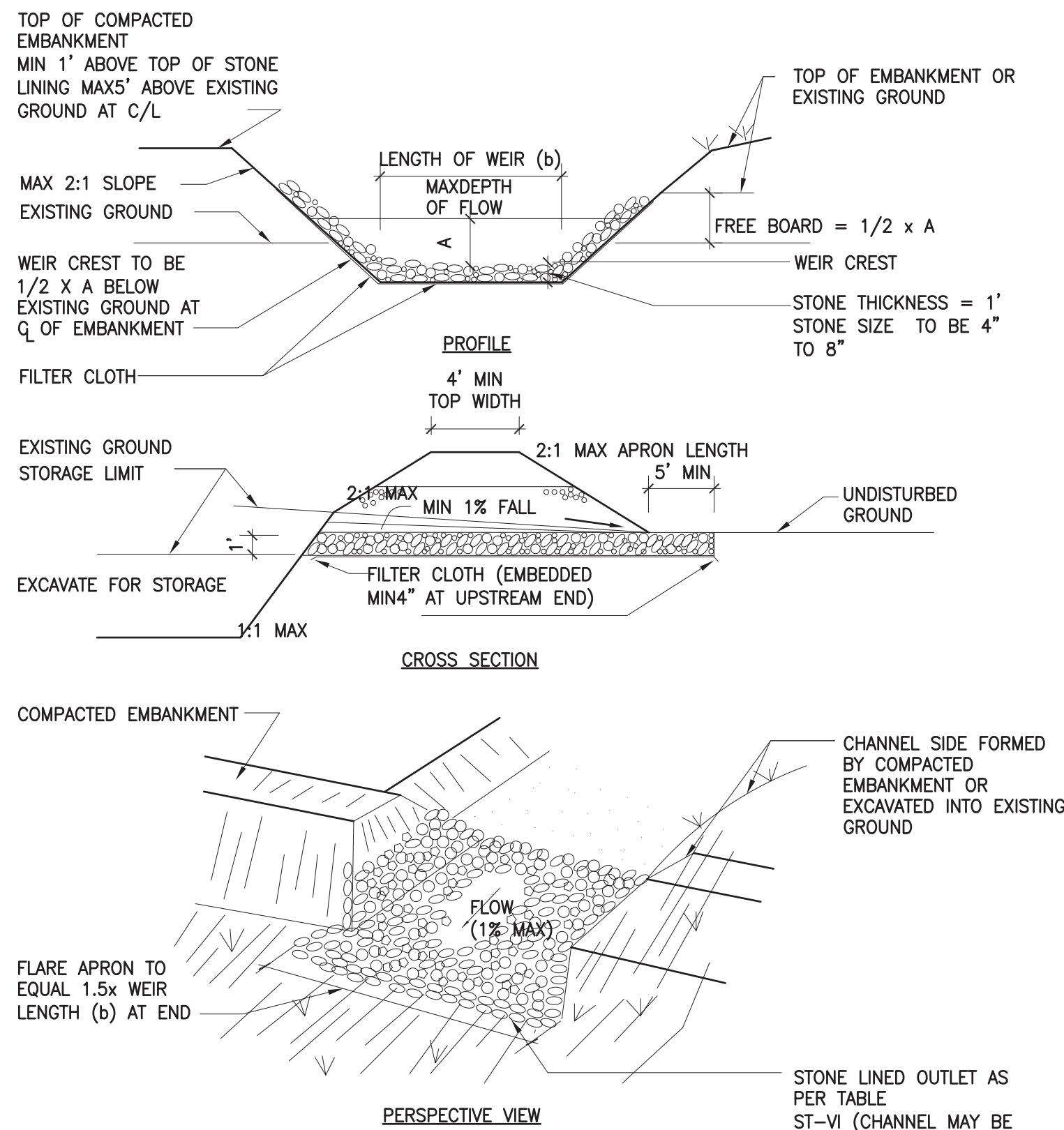
8 DETAIL - SUMP PIT

REF: 3/CE102
NOT TO SCALE



1 DETAIL -PIPE OUTLET SEDIMENT TRAP

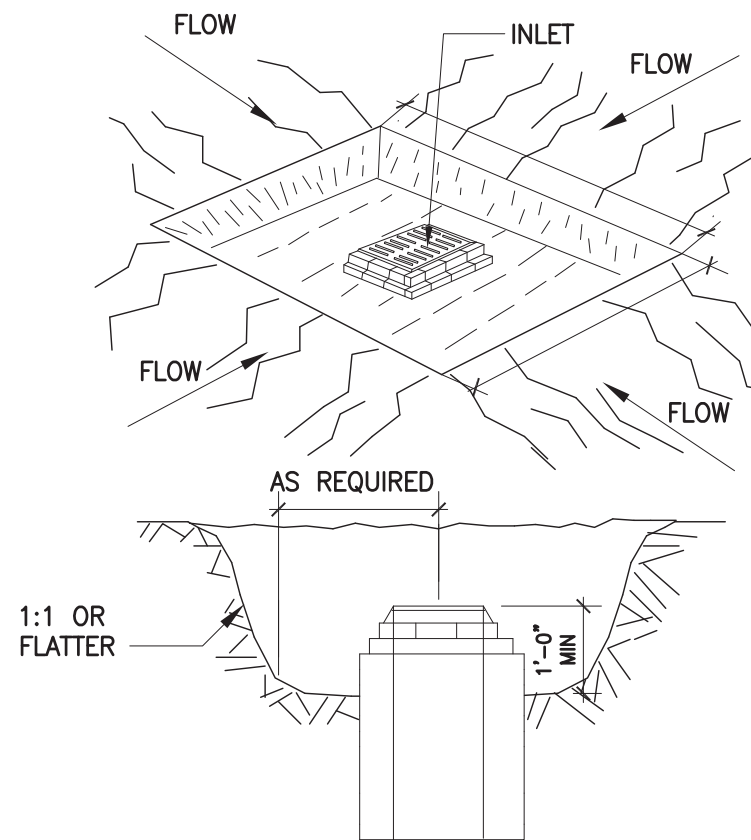
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2 DETAIL - RIPRAP OUTLET SEDIMENT TRAP

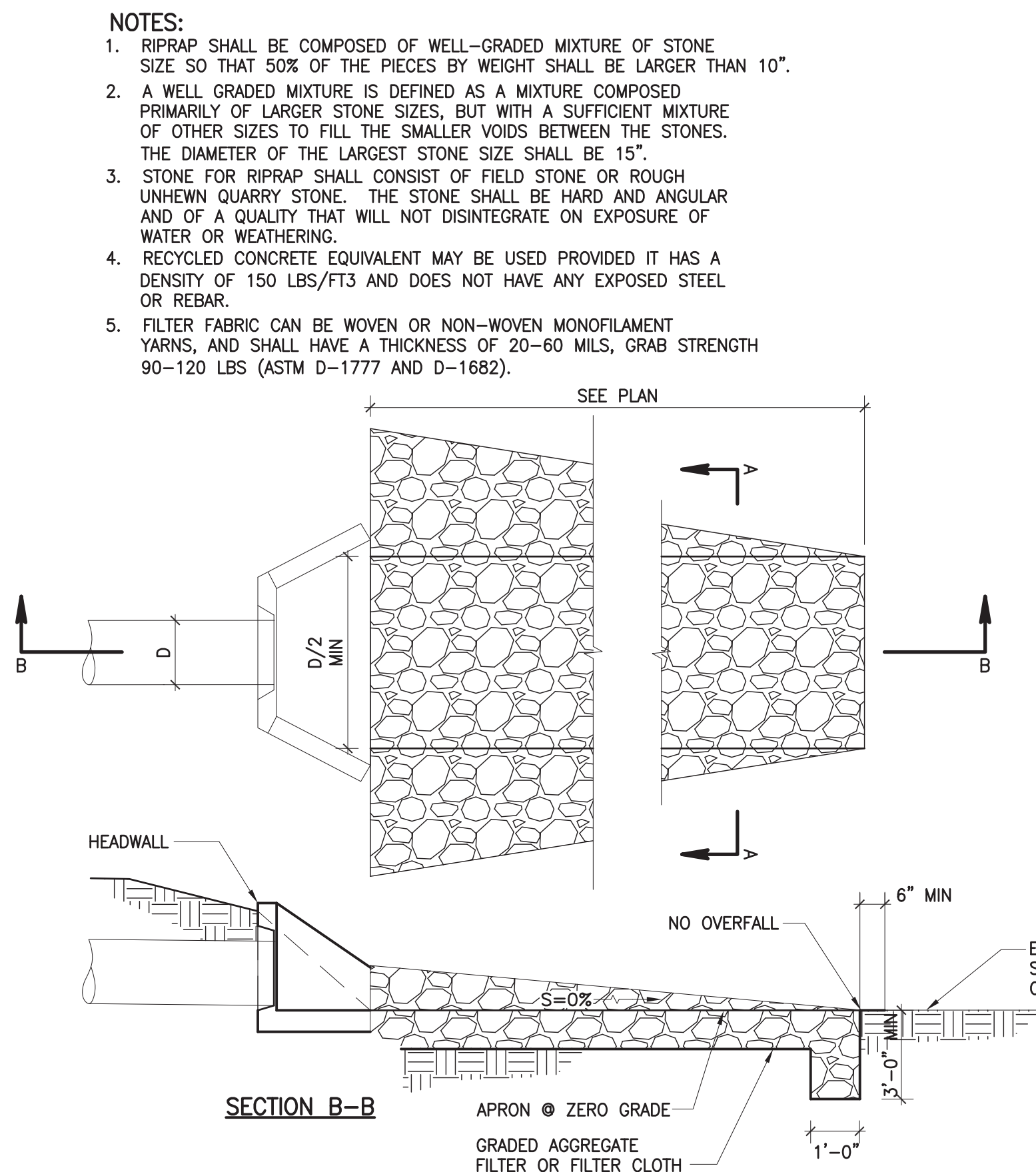
REF:9/CE105
NOT TO SCALE

- NOTES:
1. SEDIMENT SHALL BE REMOVED AND THE TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.
 2. THE VOLUME OF SEDIMENT STORAGE SHALL BE 1800 CUBIC FEET PER ACRE OF CONTRIBUTORY DRAINAGE.
 3. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
 4. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND WATER POLLUTION SHALL BE MINIMIZED.
 5. THE SEDIMENT TRAP SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE CONSTRUCTED DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
 6. ALL CUT SLOPES SHALL BE 1:1 OR FLATTER.
 7. MAXIMUM CONTRIBUTING DRAINAGE IS 3 ACRE.



3 DETAIL - CATCH BASIN SEDIMENT TRAP

REF:2/CE101
NOT TO SCALE



4 DETAIL - ROCK OUTLET PROTECTION

REF:1/CE101
NOT TO SCALE



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25 COLUMBIA HEIGHTS
BROOKLYN, NY 11201

PROJECT No:
PROJECT TITLE:
WORLD HEADQUARTERS OF JEHOVAH'S WITNESSES
LONG MEADOW ROAD, WARWICK
ORANGE COUNTY, NEW YORK

SHEET TITLE:
EROSION & SEDIMENT CONTROL DETAILS

PROJECT No:
HWRK0001

SHEET No:
CE502



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ORANGE COUNTY, NEW YORK

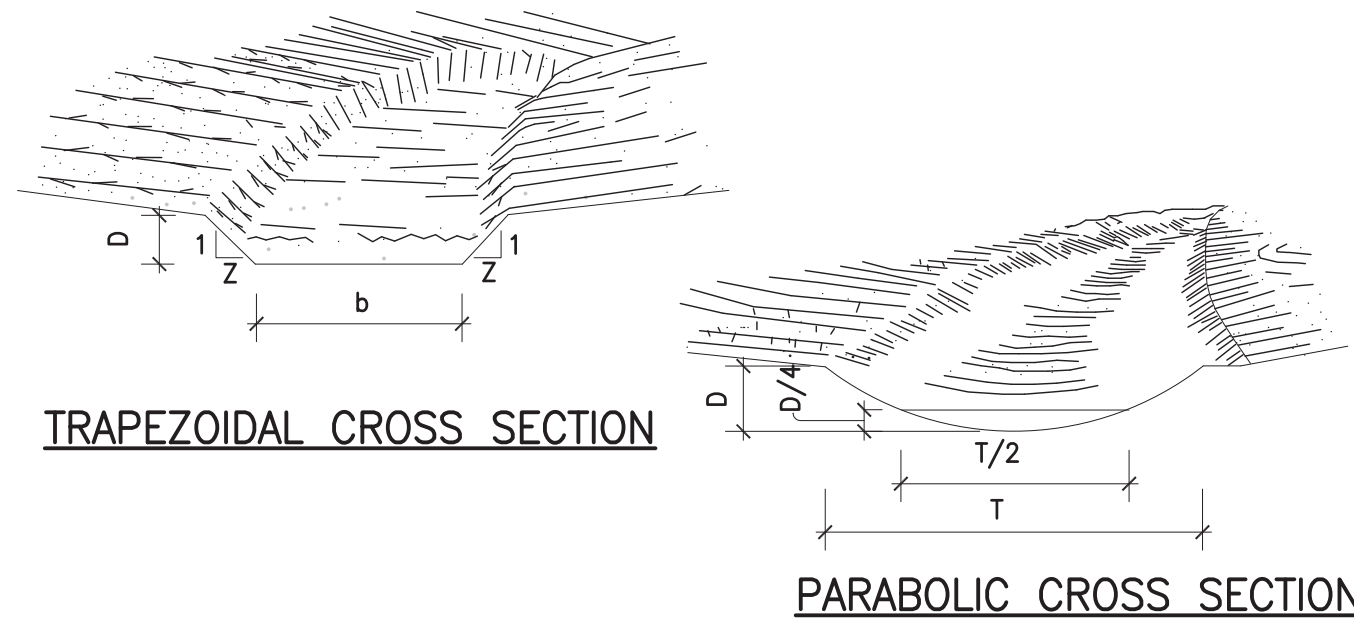
SHEET TITLE:
EROSION & SEDIMENT CONTROL
DETAILS

PROJECT No:
HWRK0001

SHEET No:
CE503

NOTES:

- ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF SO AS NOT TO INTERFERE WITH THE PROPER FUNCTIONING OF THE WATERWAY.
- THE WATERWAY SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED HEREIN, AND BE FREE OF BANK PROJECTIONS OR OTHER IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
- FILLS SHALL BE COMPACTED AS NEEDED TO PREVENT UNEQUAL SETTLEMENT THAT WOULD CAUSE DAMAGE IN THE COMPLETE WATERWAY.
- ALL EARTH REMOVED AND NOT NEEDED IN CONSTRUCTION SHALL BE SPREAD OR DISPOSED OF SO THAT IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE WATERWAY.
- STABILIZE WITH SEEDING PROTECTED BY JUTE OR EXCELSIOR MATTING.

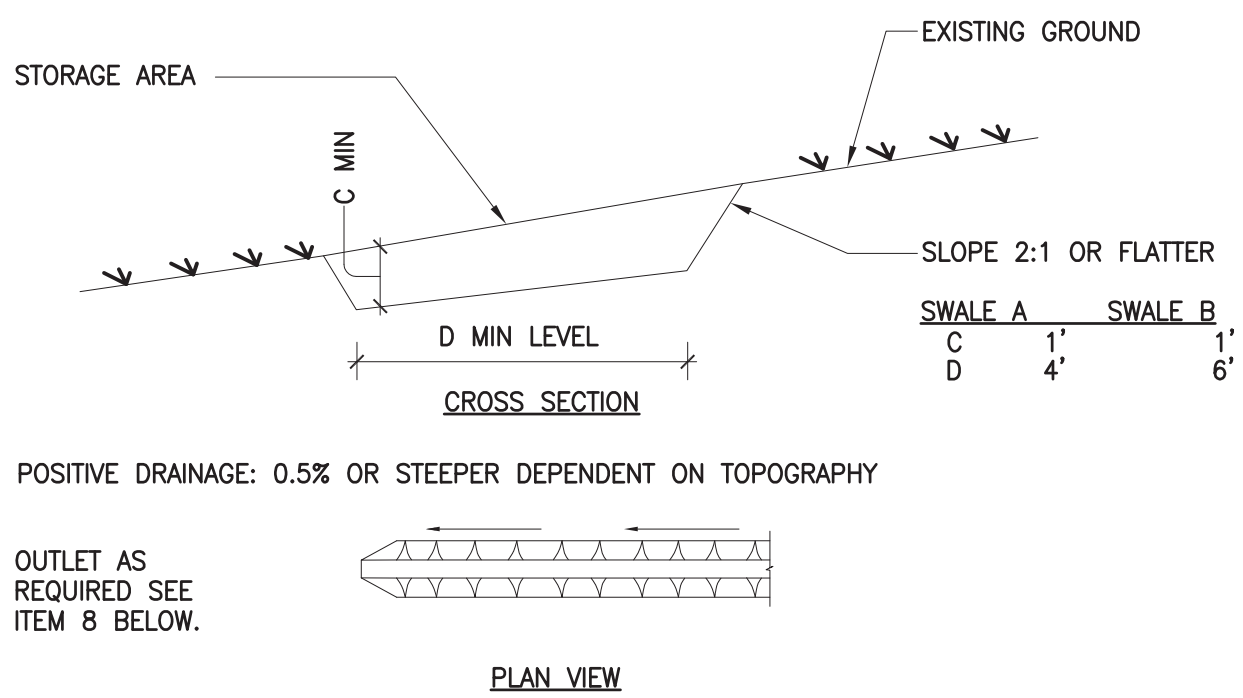


1 DETAIL - GRASSED WATERWAY

REF: 1/CE101
NOT TO SCALE

NOTES:

- ALL TEMPORARY SWALES SHALL HAVE UNINTERRUPTED POSITIVE GRADE TO AN OUTLET.
- DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
- DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET DIRECTLY INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSIVE VELOCITY.
- ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF SO AS NOT TO INTERFERE WITH THE PROPER FUNCTIONING OF THE SWALE.
- THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED HEREIN AND BE FREE OF BANK PROJECTIONS OR OTHER IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
- FILLS SHALL BE COMPACTED BY EARTH MOVING EQUIPMENT.
- ALL EARTH REMOVED AND NOT NEEDED FOR CONSTRUCTION SHALL BE PLACED SO THAT IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE SWALE.
- STABILIZATION SHALL BE AS PER THE FLOW CHANNEL STABILIZATION CHART BELOW.
- PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.



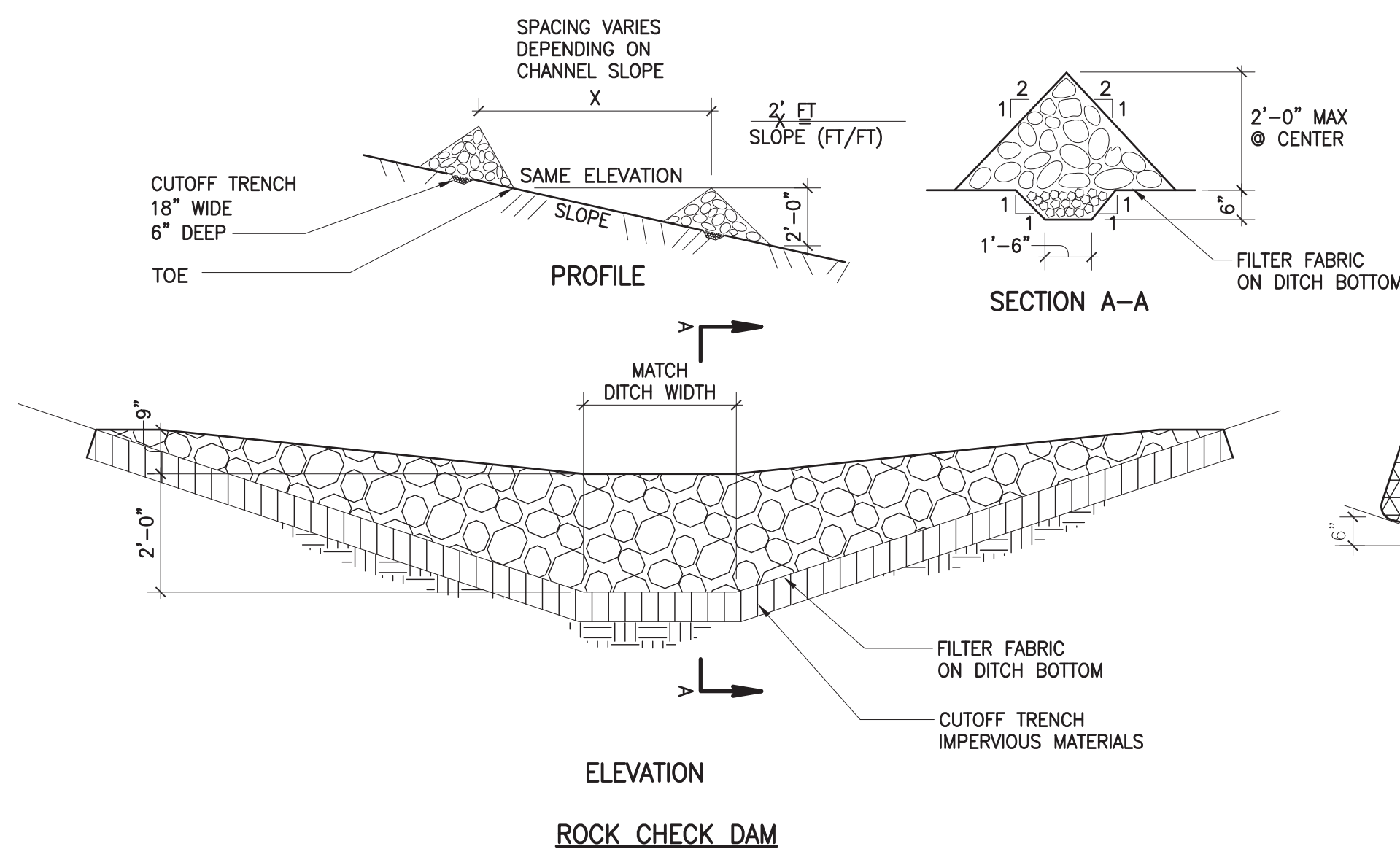
TYPE OF TREATMENT	CHANNEL GRADE	A (5 AC. OR LESS)	B (5 AC. - 10 AC)
1	0.5-3.0%	SEED AND STRAW MULCH	SEED AND STRAW MULCH
2	3.1-5.0%	SEED AND STRAW MULCH	SEED USING JUTE OR EXCELSIOR
3	5.1-8.0%	SEED WITH JUTE OR EXCELSIOR, SOD	LINED WITH 4-8" RIP-RAP OR RECYCLED CONCRETE EQUIVALENT
4	8.1-20.0%	LINED WITH 4-8" RIP-RAP	ENGINEERED DESIGN

3 DETAIL - TEMPORARY SWALE

REF: 1/CE101
NOT TO SCALE

NOTES:

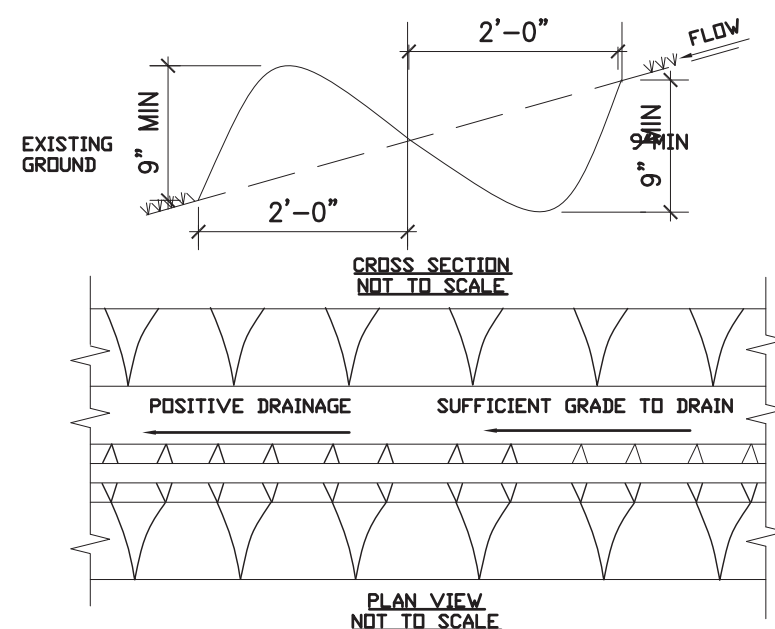
- STONE WILL BE PLACED ON A FILTER FABRIC FOUNDATION TO THE LINES, GRADES AND LOCATIONS SHOWN IN THE PLAN.
- SET SPACING OF CHECK DAMS TO ASSUME THAT THE ELEVATIONS OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION OF THE TOE OF THE UPSTREAM DAM.
- EXTEND THE STONE A MINIMUM OF 1.5 FEET BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.
- PROTECT THE CHANNEL DOWNSTREAM OF THE LOWEST CHECK DAM FROM SCOUR AND EROSION WITH STONE OR LINER AS APPROPRIATE.
- ENSURE THAT CHANNEL APPURTENANCES SUCH AS CULVERT ENTRANCES BELOW CHECK DAMS ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED STONE. MAXIMUM DRAINAGE AREA 2 ACRES.
- PLACE CHECK DAM PERPENDICULAR TO THE FLOW LINE OF THE DITCH.



5 DETAIL - CHECK DAM

NOTES:

- ALL PERIMETER DIKE/SWALE SHALL HAVE UNINTERRUPTED POSITIVE GRADE TO AN OUTLET.
- DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
- DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSION VELOCITY.
- THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED IN THE STANDARD.
- STABILIZATION OF THE AREA DISTURBED BY THE DIKE AND SWALE SHALL BE DONE IN ACCORDANCE WITH THE STANDARD AND SPECIFICATIONS FOR TEMPORARY SEEDING AND MULCHING, AND SHALL BE DONE WITHIN 7 DAYS.
- PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT OF 1/2 INCH OR GREATER.
MAXIMUM DRAINAGE AREA LIMIT: 2 ACRES

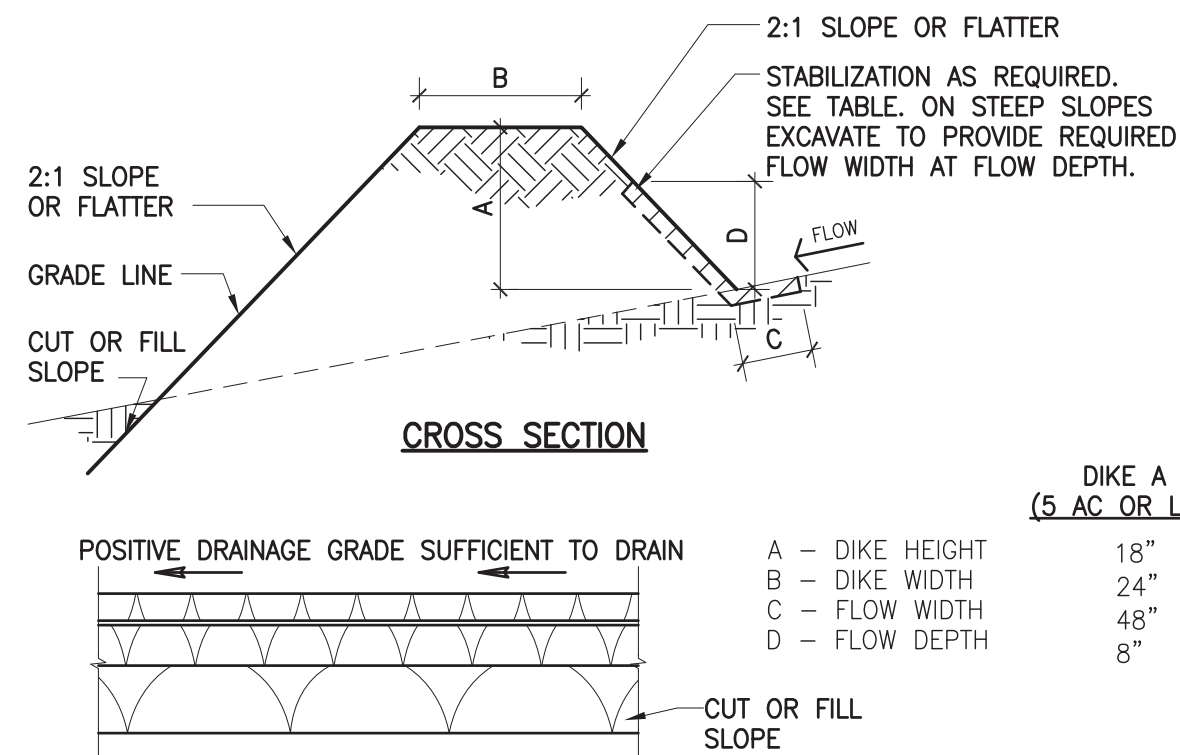


2 DETAIL - PERIMETER DIKE / SWALE

REF: 1/CE101
NOT TO SCALE

NOTES:

- ALL DIKES SHALL BE COMPACTED BY EARTH-MOVING EQUIPMENT.
- ALL DIKES SHALL HAVE POSITIVE DRAINAGE TO AN OUTLET.
- TOP WIDTH MAY BE WIDER AND SIDE SLOPES BE FLATTER IF DESIRED TO FACILITATE CROSSING BY CONSTRUCTION TRAFFIC.
- FIELD LOCATION SHOULD BE ADJUSTED AS NEEDED TO UTILIZE A STABILIZED SAFE OUTLET.
- EARTH DIKES SHALL HAVE AN OUTLET THAT FUNCTIONS WITH A MINIMUM OF EROSION. RUNOFF SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE SUCH AS A SEDIMENT TRAP OR SEDIMENT BASIN WHERE EITHER THE DIKE CHANNEL OR THE DRAINAGE AREA ABOVE THE DIKE ARE NOT ADEQUATELY STABILIZED.
- RECP (ROLLED EROSION CONTROL PRODUCTS) SHALL BE NORTHERN GREEN, STRAW WATTLES WST1210 OR EQUAL.

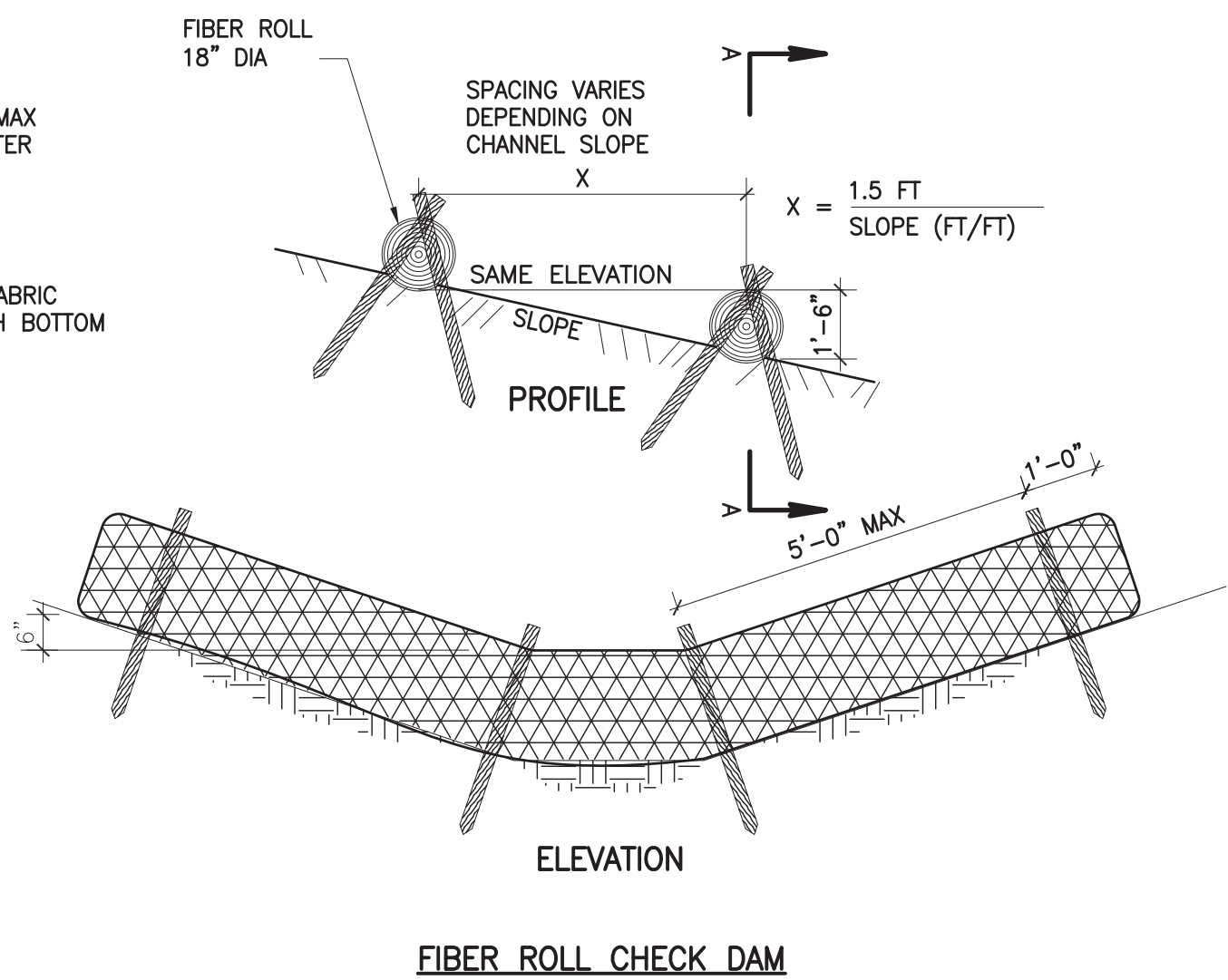


FLOW CHANNEL STABILIZATION TYPE		
CONTRIBUTING AREA		
CHANNEL GRADE	<5 AC.	5 - 10 AC.
0.5-3.0%	SEED & STRAW MULCH	SEED & COVER WITH ROLLED EROSION CONTROL PRODUCTS (RECP) OR LINED WITH PLASTIC OR 2-INCH STONE
3.1-5.0%	SEED & STRAW MULCH	LINE WITH 4-8 INCH OF STONE OR RECYCLED CONCRETE EQUIVALENT OR GEOTEXTILE
5.1-8.0%	SEED & COVER WITH RECP OR LINED WITH PLASTIC OR 2-INCH STONE	SITE SPECIFIC ENGINEERING DESIGN
8.1-20%	LINE WITH 4-8 INCH OF STONE OR RECYCLED CONCRETE EQUIVALENT OR GEOTEXTILE	

	DIKE A (5 AC. OR LESS)	DIKE B (5-10 AC)
A - DIKE HEIGHT	18"	36"
B - DIKE WIDTH	24"	36"
C - FLOW WIDTH	48"	72"
D - FLOW DEPTH	6"	15"

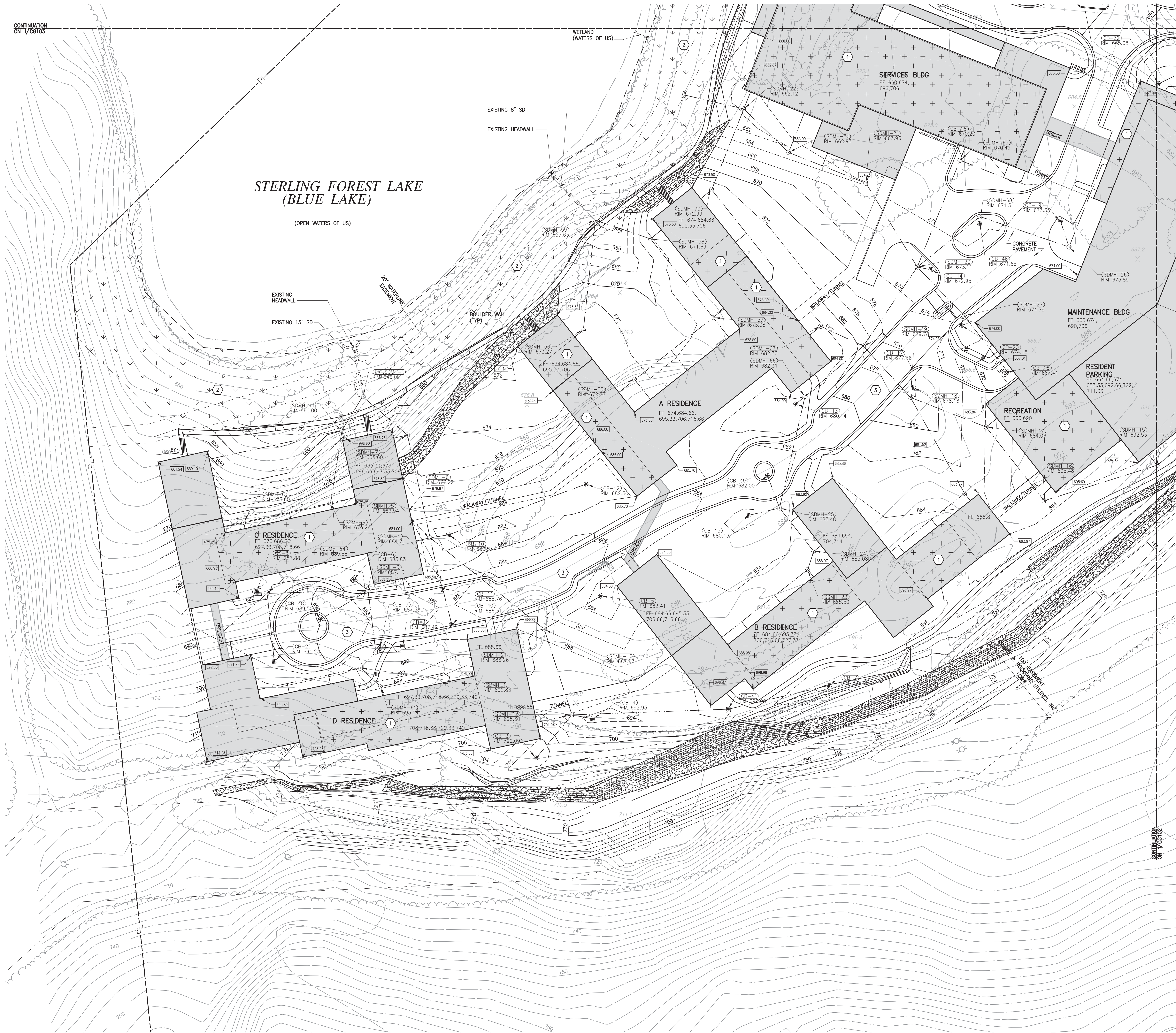
4 DETAIL - EARTH DIKE

REF: 1/CE101
NOT TO SCALE



REF: 1/CE101
NOT TO SCALE

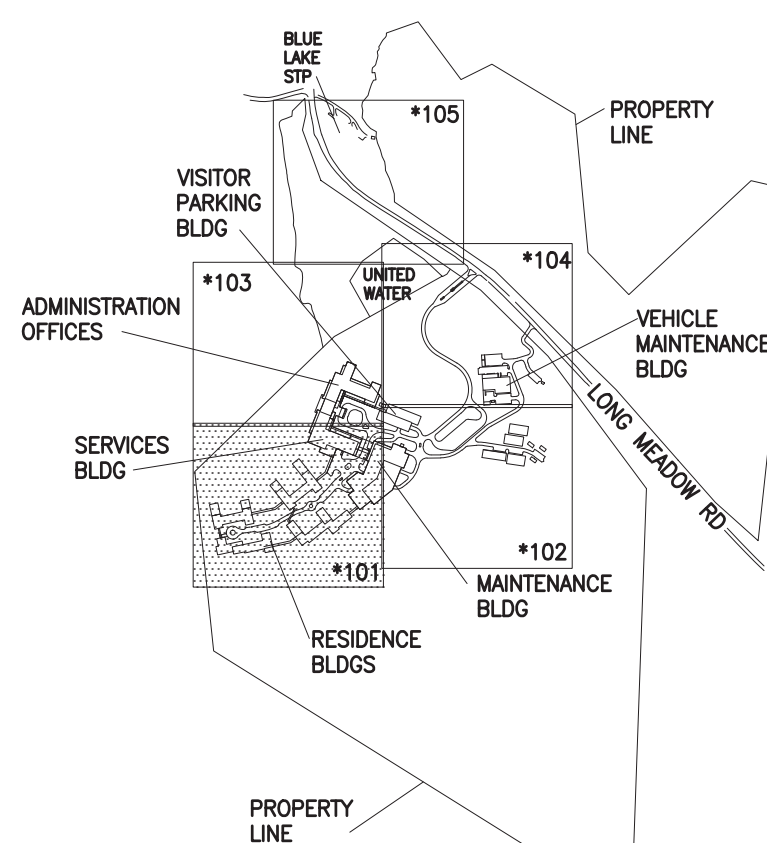
CONTINUATION
ON 1/CG103



1 PLAN - GRADING & DRAINAGE

SHEET KEYNOTES

1. GREEN ROOF
2. RESTORED RIPARIAN BUFFER
3. PERMEABLE CONCRETE PAVERS
4. REFER TO SHEET CG502 FOR STORMWATER PRACTICES DETAILS



KEY PLAN

WATCHTOWER

BIBLE AND TRACT SOCIETY
OF NEW YORK, INC.
25 COLUMBIA HEIGHTS
BROOKLYN, NY 11201 USA
PH: (718) 560-5000
FAX: (718) 560-6831



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ACCOUNT No:
PROJECT TITLE:
WORLD HEADQUARTERS
OF JEHOVAH'S WITNESSES
LONG MEADOW ROAD, WARWICK
ORANGE COUNTY, NEW YORK

SHEET TITLE:
GRADING
& DRAINAGE
PLAN

PROJECT No:
HWRK0001

SHEET No:
CG101



1 PLAN - GRADING & DRAINAGE

SHEET KEYNOTES

1. GREEN ROOF
2. POROUS ASPHALT
3. PERMEABLE CONCRETE PAVERS
4. STORMWATER PLANTERS
5. WETLAND BUFFER
6. BIORETENTION
7. ROOFTOP DISCONNECT
8. REFER TO SHEET CG502 FOR STORMWATER PRACTICES DETAILS

WATCHTOWER
BIBLE AND TRACT SOCIETY
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14 MAR 11 SWPPP

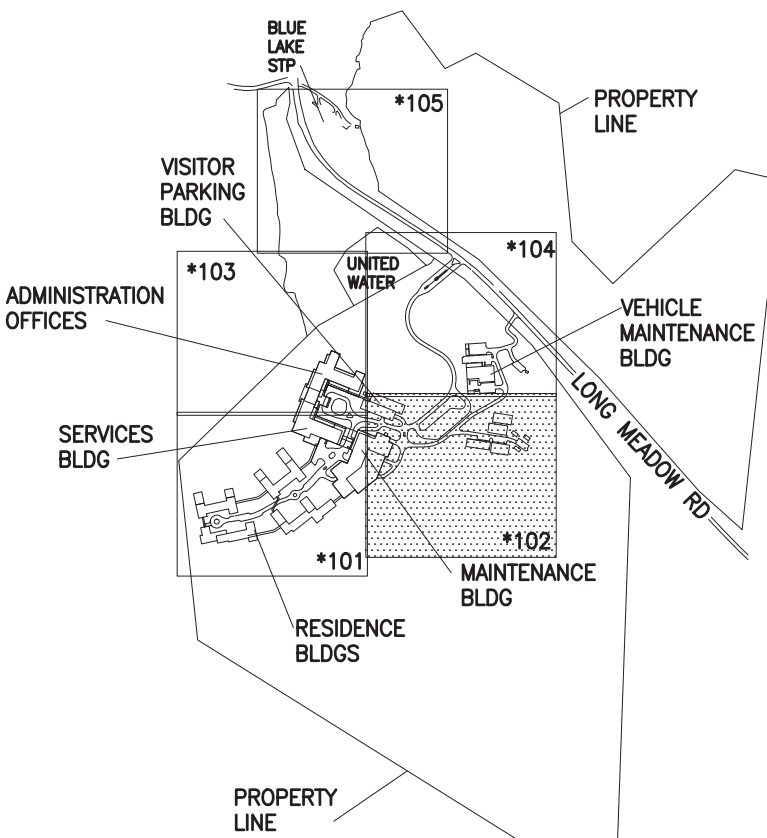
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WATCHTOWER BIBLE & TRACT SOC. OF NY, INC.
25 COLUMBIA HEIGHTS
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PROJECT TITLE:
WORLD HEADQUARTERS OF JEHOVAH'S WITNESSES
LONG MEADOW ROAD, WARWICK
ORANGE COUNTY, NEW YORK

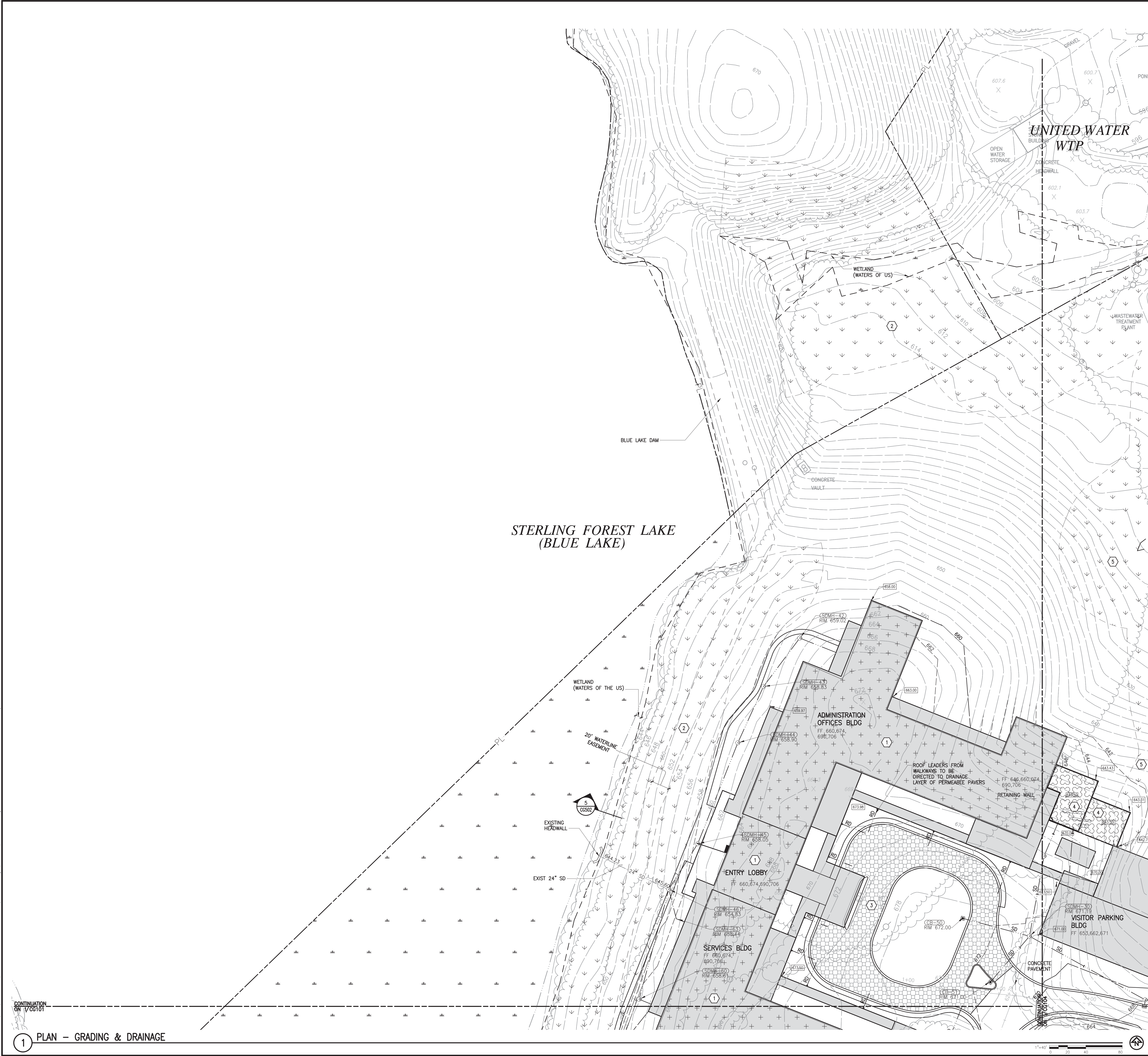
SHEET TITLE:
GRADING & DRAINAGE PLAN

PROJECT No:
HWRK0001

SHEET No:
CG102



KEY PLAN



- SHEET KEYNOTES
1. GREEN ROOF
 2. RESTORED RIPARIAN BUFFER
 3. PERMEABLE CONCRETE PAVERS
 4. STORMWATER PLANTER
 5. WETLAND BUFFER
 6. REFER TO SHEET CG502 FOR STORMWATER PRACTICES DETAILS

WATCHTOWER

BIBLE AND TRACT SOCIETY
OF NEW YORK, INC.

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WATCHTOWER BIBLE & TRACT SOC. OF NY, INC.

25 COLUMBIA HEIGHTS
BROOKLYN, NY 11201

ACCOUNT No:

PROJECT TITLE:

WORLD HEADQUARTERS
OF JEHOVAH'S WITNESSES
LONG MEADOW ROAD, WARWICK
ORANGE COUNTY, NEW YORK

SHEET TITLE:

GRADING
& DRAINAGE
PLAN

PROJECT No:

HWRK0001

SHEET No:

CG103



SHEET KEYNOTES

1. GREEN ROOF
2. WETLAND BUFFER
3. PERMEABLE CONCRETE PAVERS
4. STORMWATER PLANTER
5. UNDERGROUND SAND FILTER
6. UNDERGROUND STORMWATER DETENTION UNITS
7. WATER QUALITY UNIT; WET VAULT
8. DRY DETENTION BASIN
9. BIORETENTION
10. ROOFTOP DISCONNECT
11. REFER TO SHEET CG502 FOR STORMWATER PRACTICES DETAILS

WATCHTOWER
BIBLE AND TRACT SOCIETY
OF NEW YORK, INC.
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MARK: DATE: DESCRIPTION:

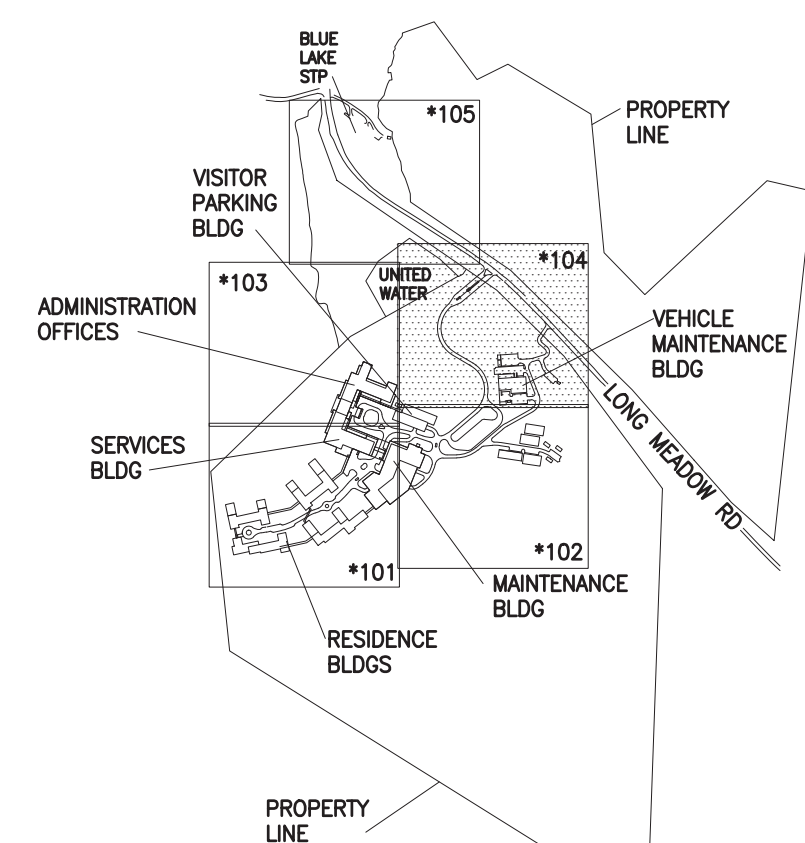
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25 COLUMBIA HEIGHTS
BROOKLYN, NY 11201

ACCOUNT NO:
PROJECT TITLE:
**WORLD HEADQUARTERS
OF JEHOVAH'S WITNESSES
LONG MEADOW ROAD, WARWICK
ORANGE COUNTY, NEW YORK**

SHEET TITLE:
**GRADING
& DRAINAGE
PLAN**

PROJECT NO:
HWRK0001

SHEET NO:
CG104



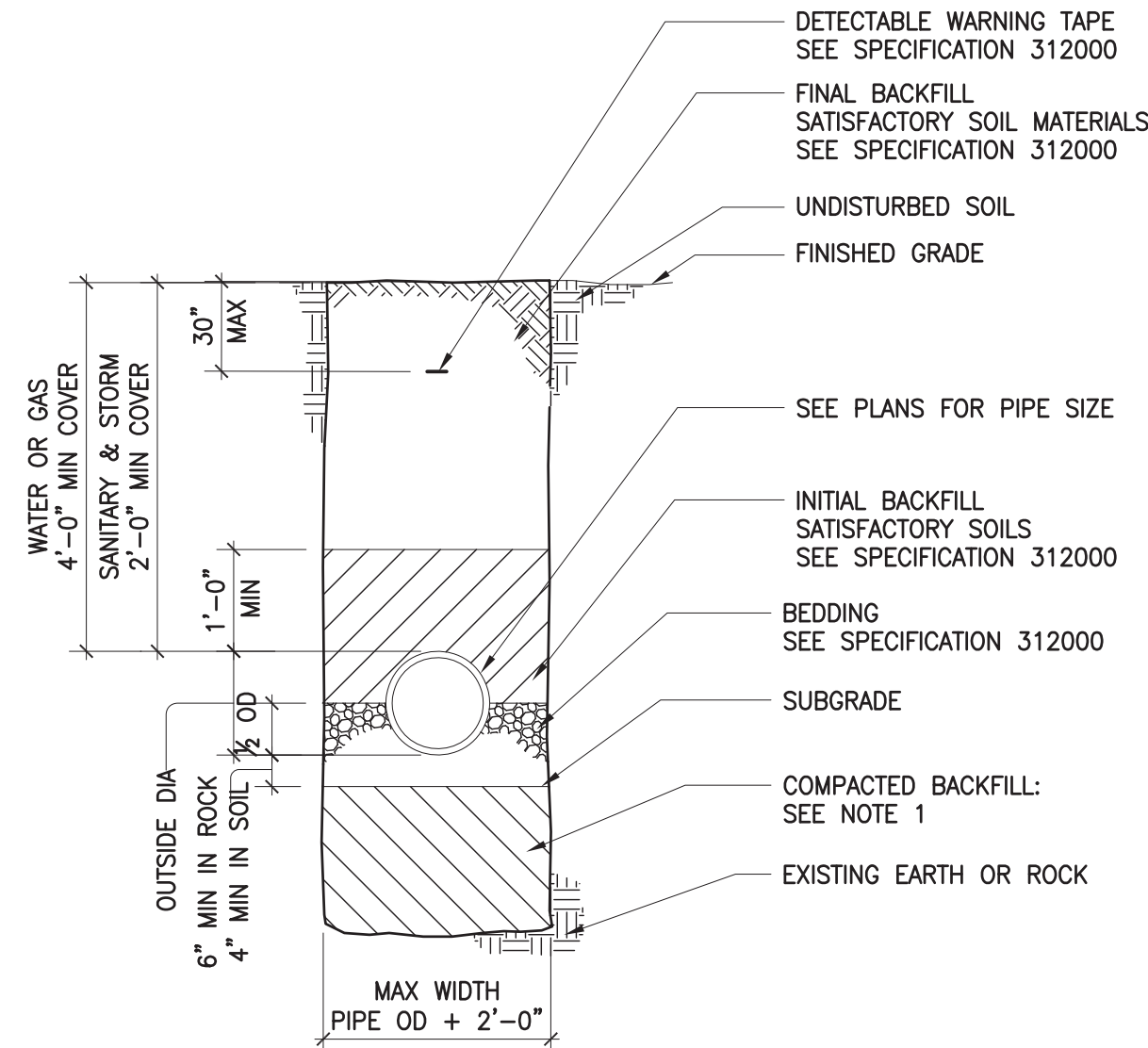
KEY PLAN

1"=40'
0 20 40 80
N

1 PLAN -GRADING & DRAINAGE

NOTE:

1. REMOVE ALL UNSUITABLE MATERIAL TO A MINIMUM OF 30" BELOW THE PIPE OR TWICE THE DIAMETER, WHICHEVER IS GREATER. REPLACE WITH COMPACTED BACKFILL.
2. PROVIDE PROTECTION FOR TRENCH WALLS WHERE THE TRENCH DEPTH IS GREATER THAN 5 FEET.

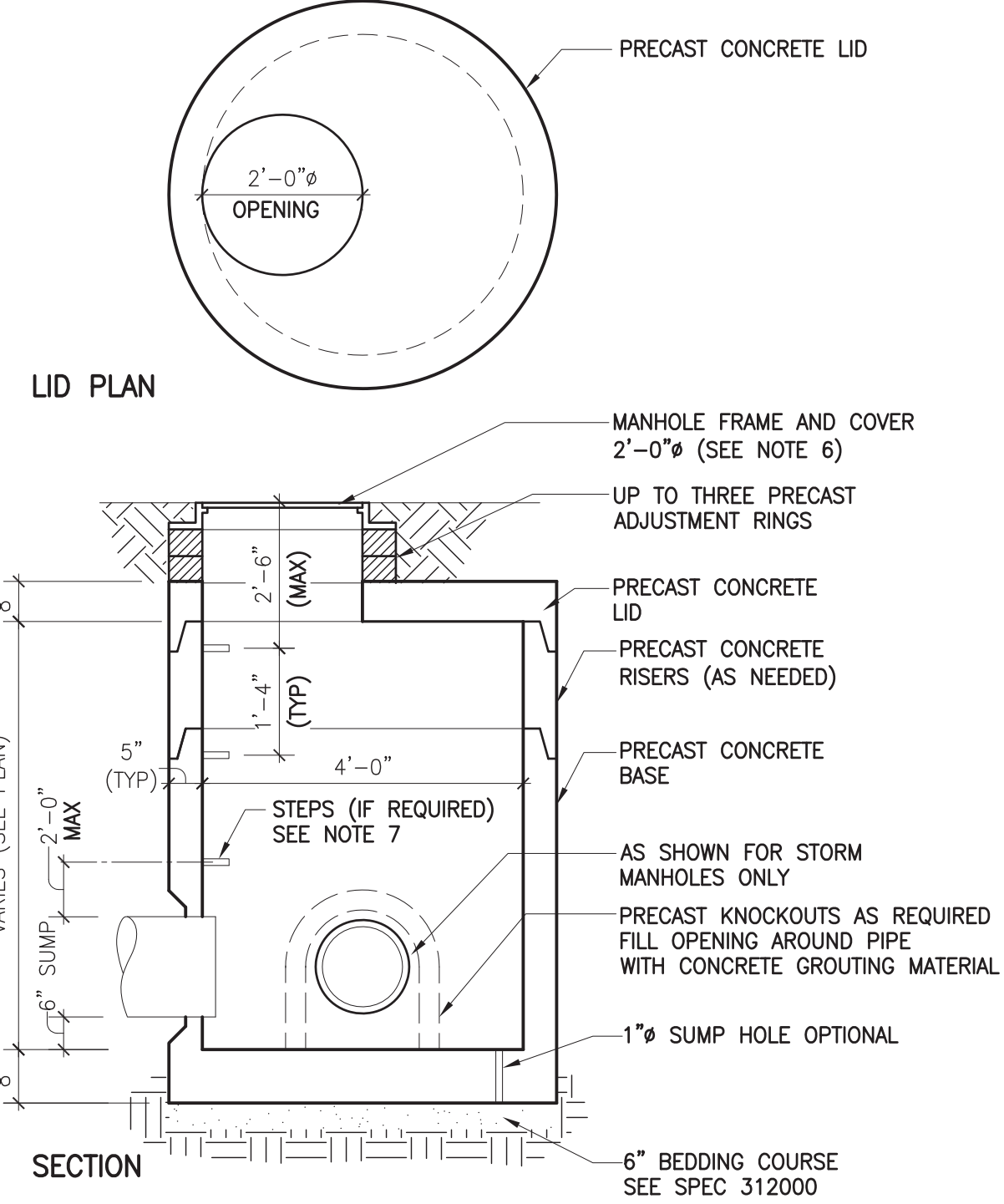


1 DETAIL - UTILITY TRENCH

REF: 1/CG101
NOT TO SCALE

NOTES:

1. INLET PIPES ARE NOT TO EXTEND MORE THAN 3" INTO MANHOLE. OUTLET PIPES ARE TO BE FLUSH AND ALL EDGES SMOOTH WITH MANHOLE WALL.
2. MINIMUM SLOPE OF FLOW CHANNEL INVERT FROM INLET TO OUTLET IS 2% UNLESS NOTED OTHERWISE.
3. REINFORCEMENT SHALL BE FOR H20/ASTM C857 LOADING.
4. USE 4000+ PSI PRECAST CONCRETE.
5. IF STRUCTURE EXTENDS BELOW WATER TABLE, ADD WEEP HOLES TO RELIEVE WATER PRESSURE.
6. INSTALL HEAVY DUTY MANHOLE FRAME AND COVER.
7. STEPS ARE REQUIRED FOR STRUCTURES DEEPER THAN 4 FEET.

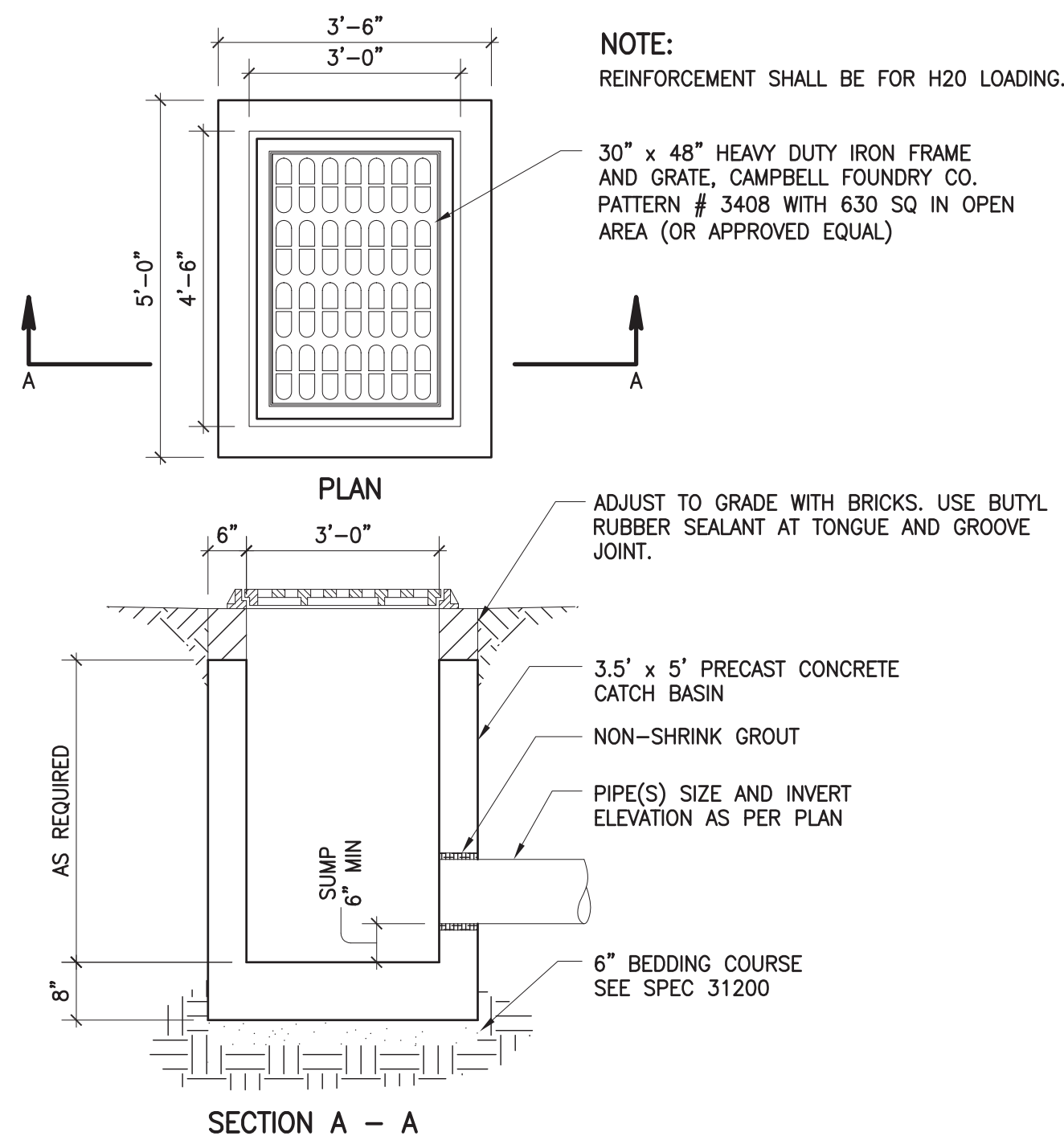


2 DETAIL - STORM DRAIN MANHOLE

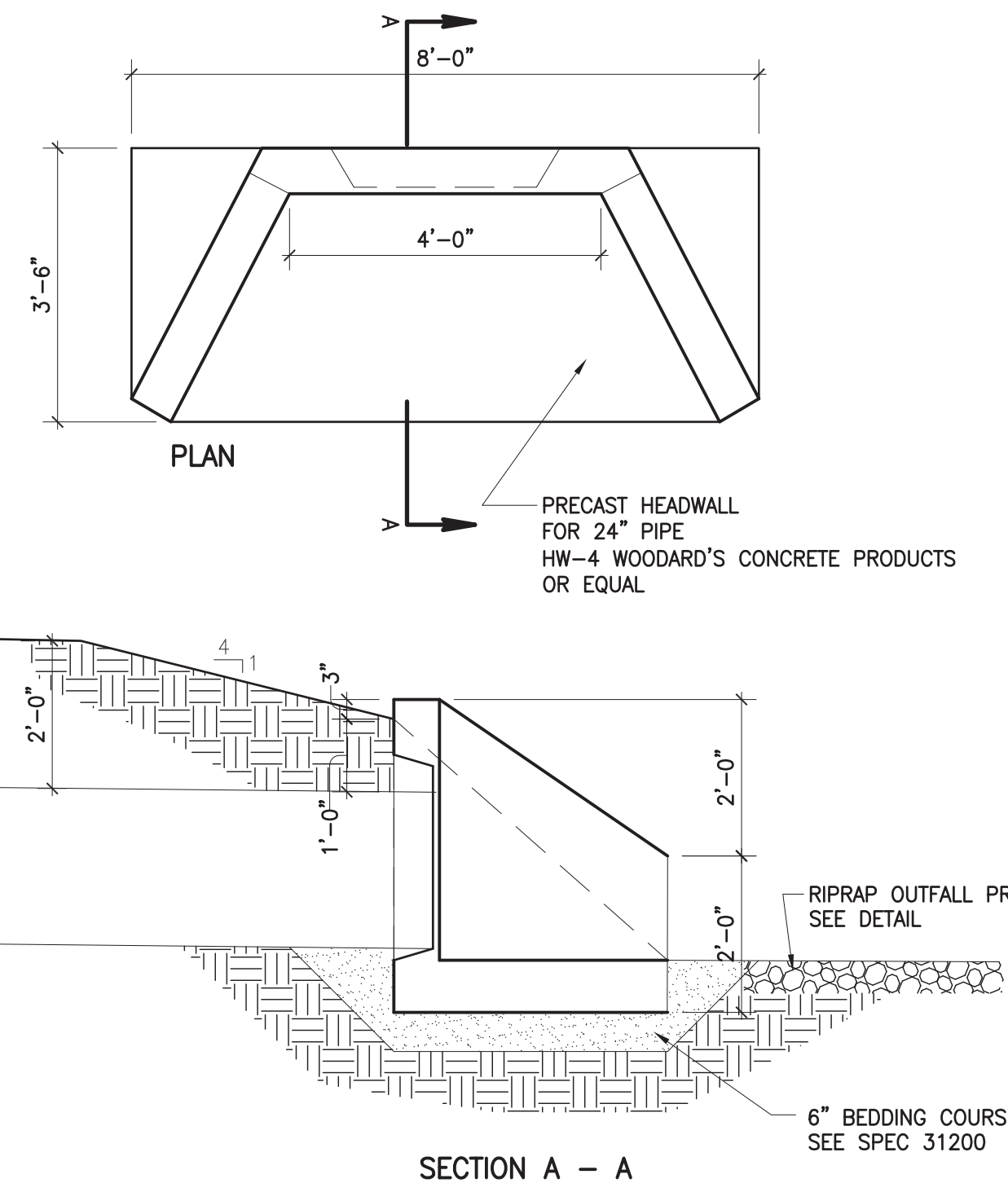
REF: 1/CG101
NOT TO SCALE

NOTE:

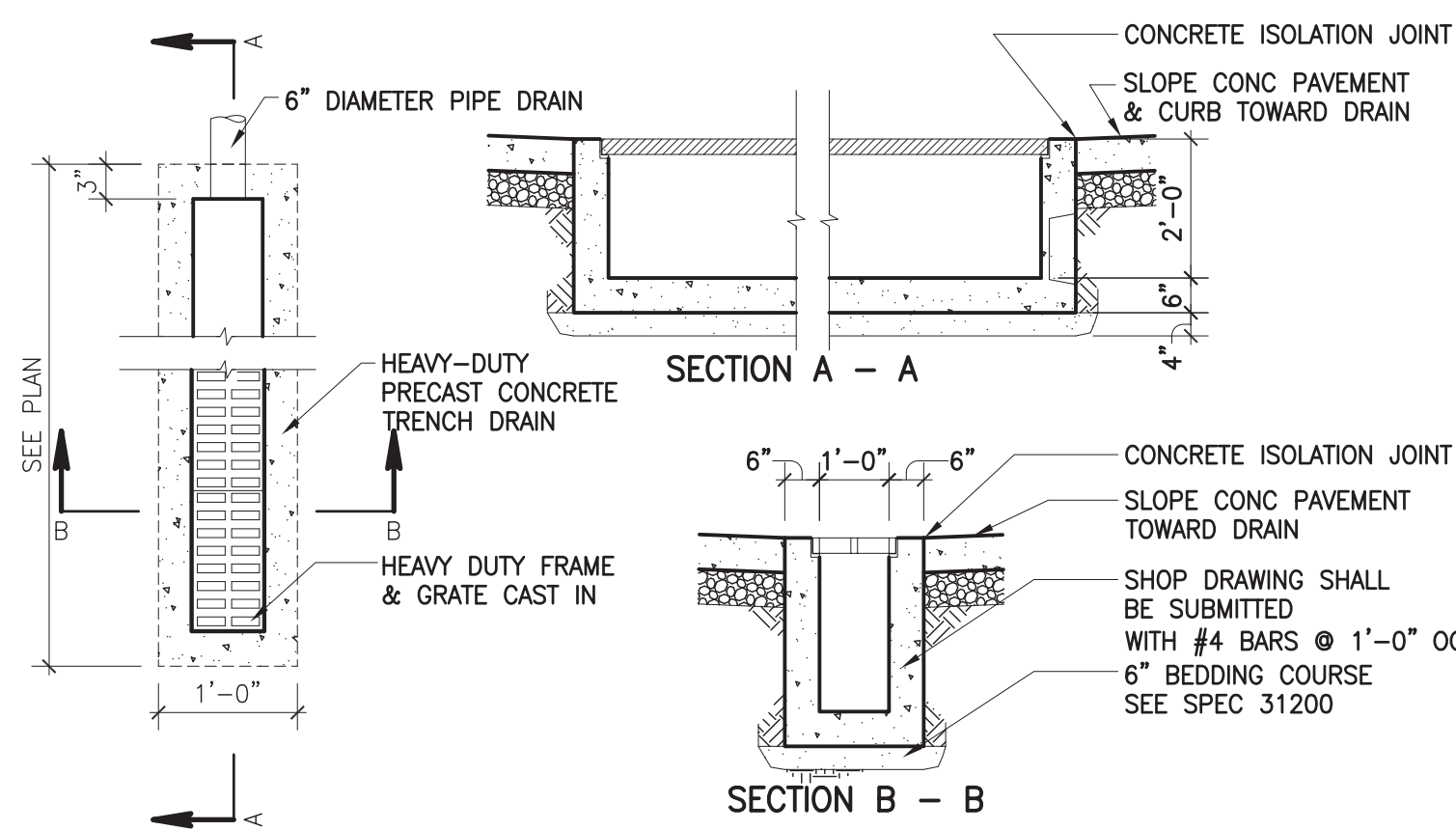
REINFORCEMENT SHALL BE FOR H20 LOADING.



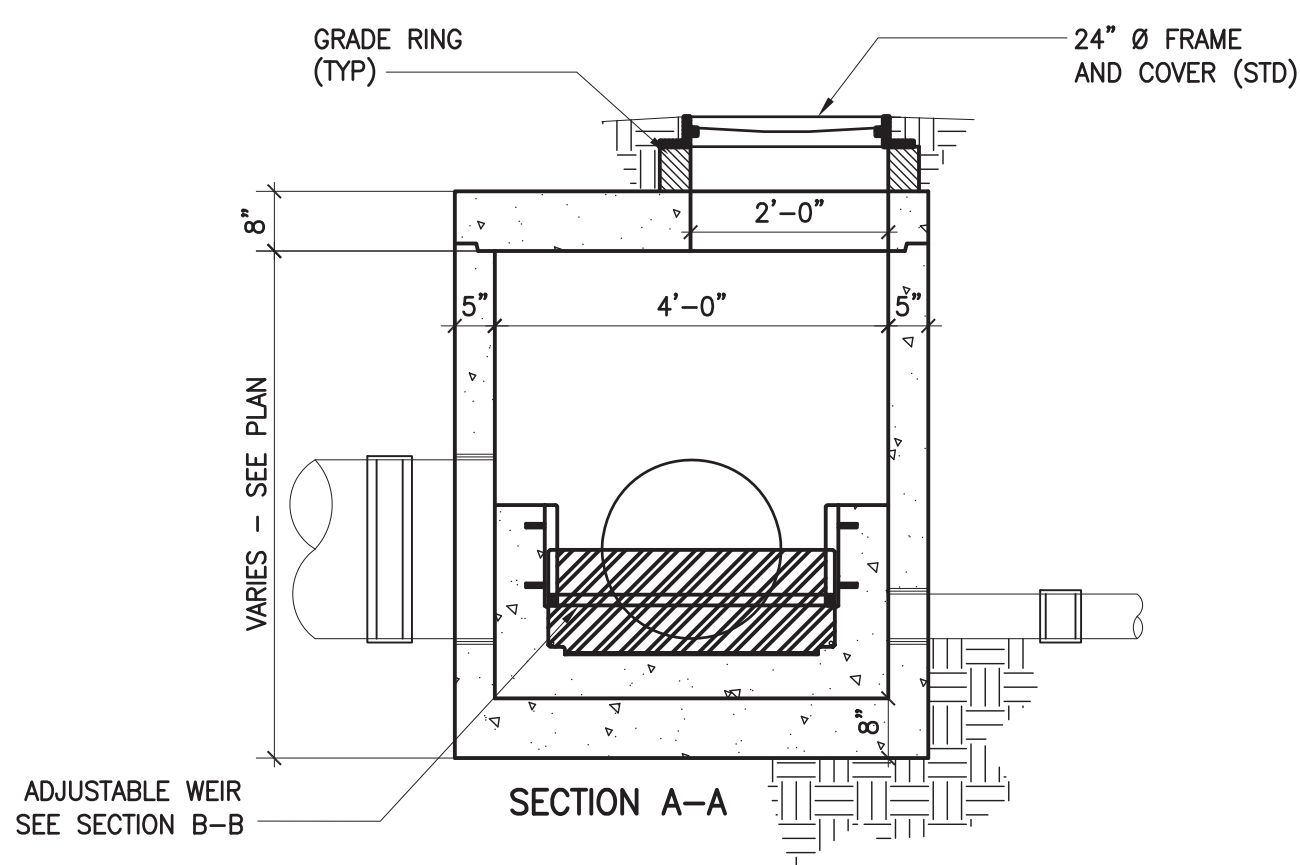
3 DETAIL - PRECAST CONCRETE CATCH BASIN (3.5'x5')

REF: 1/CG101
NOT TO SCALE

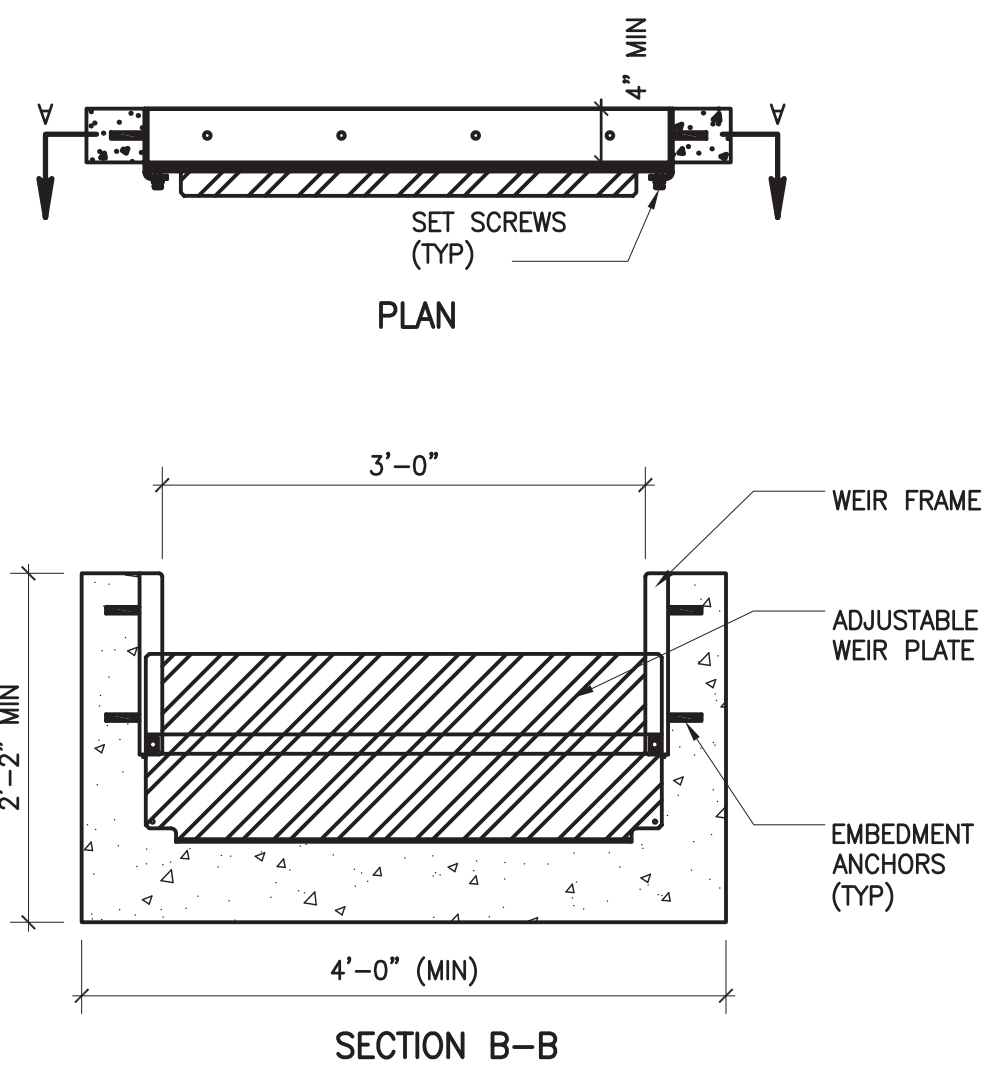
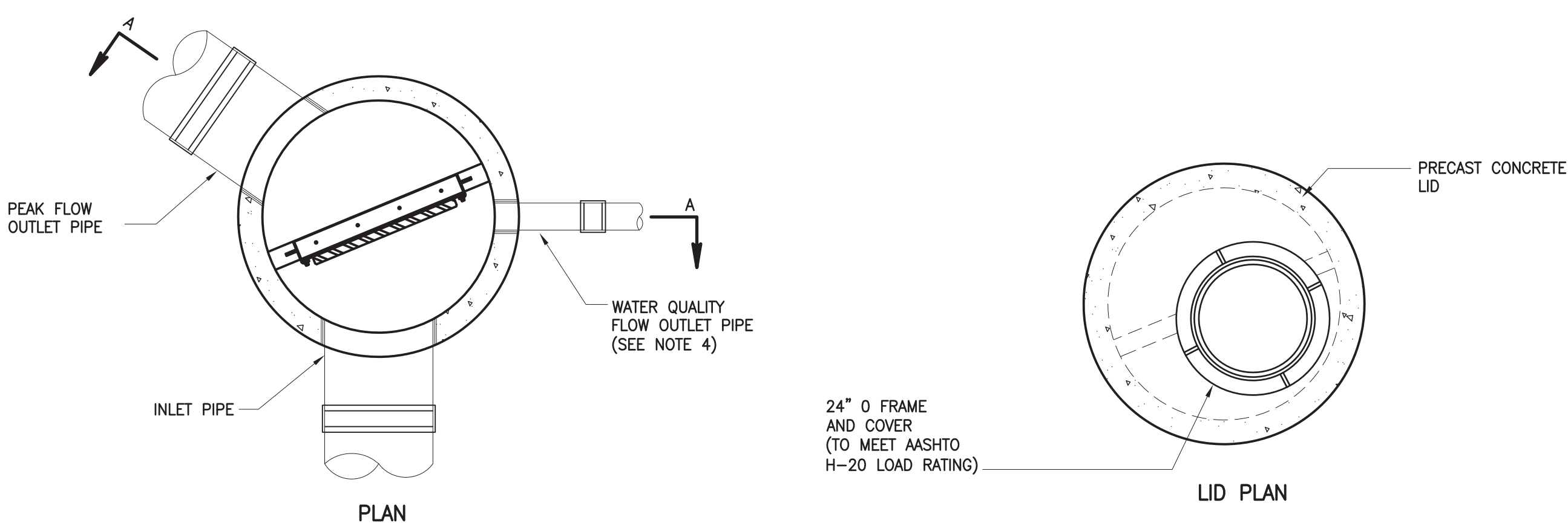
4 DETAIL - PRECAST HEADWALL - FOR UP TO 24" PIPE

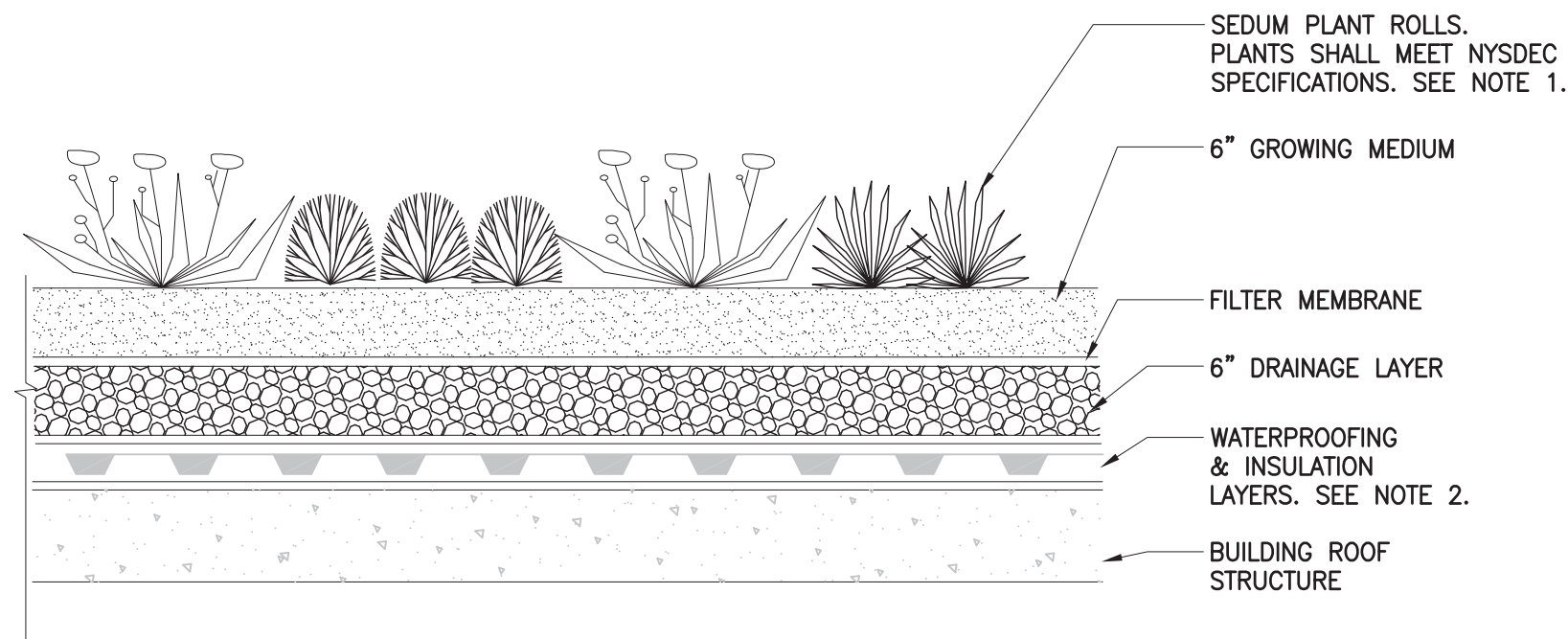
REF: 1/CG101
NOT TO SCALE

5 DETAIL - PRECAST TRENCH DRAIN

REF: 1/CG101
NOT TO SCALE

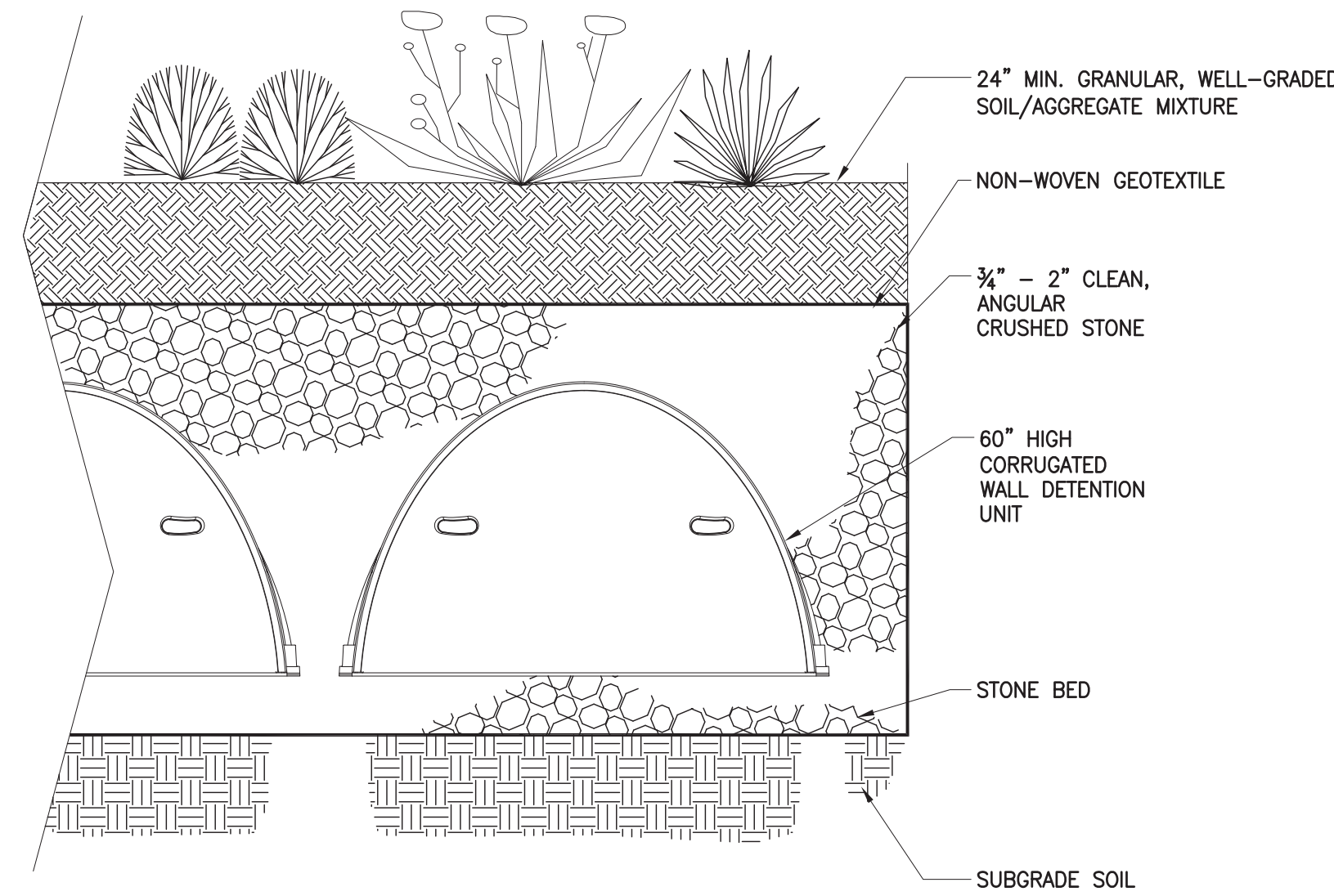
6 DETAIL - STORM DRAIN MANHOLE W/FLOW SPLITTER

REF: 1/CG102
NOT TO SCALE

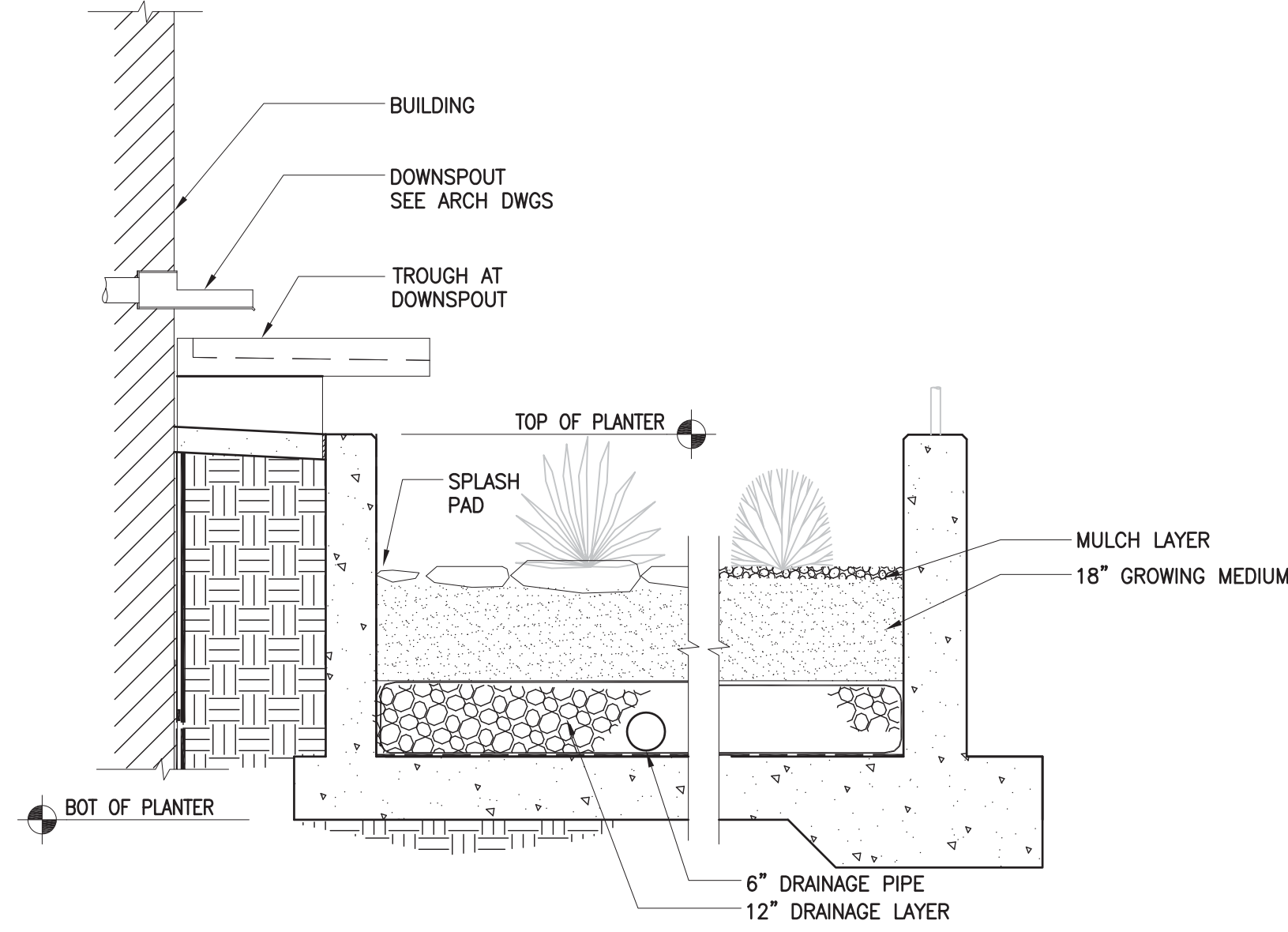


- NOTES:
1. REFER TO LANDSCAPING DRAWINGS FOR FINAL PLANTING TYPES & QUANTITIES.
 2. ROOF CROSS-SECTION DETAIL PROVIDED FOR SCHEMATIC PURPOSES ONLY. REFER TO STRUCTURAL DRAWINGS WHICH GOVERN ROOF DESIGN.

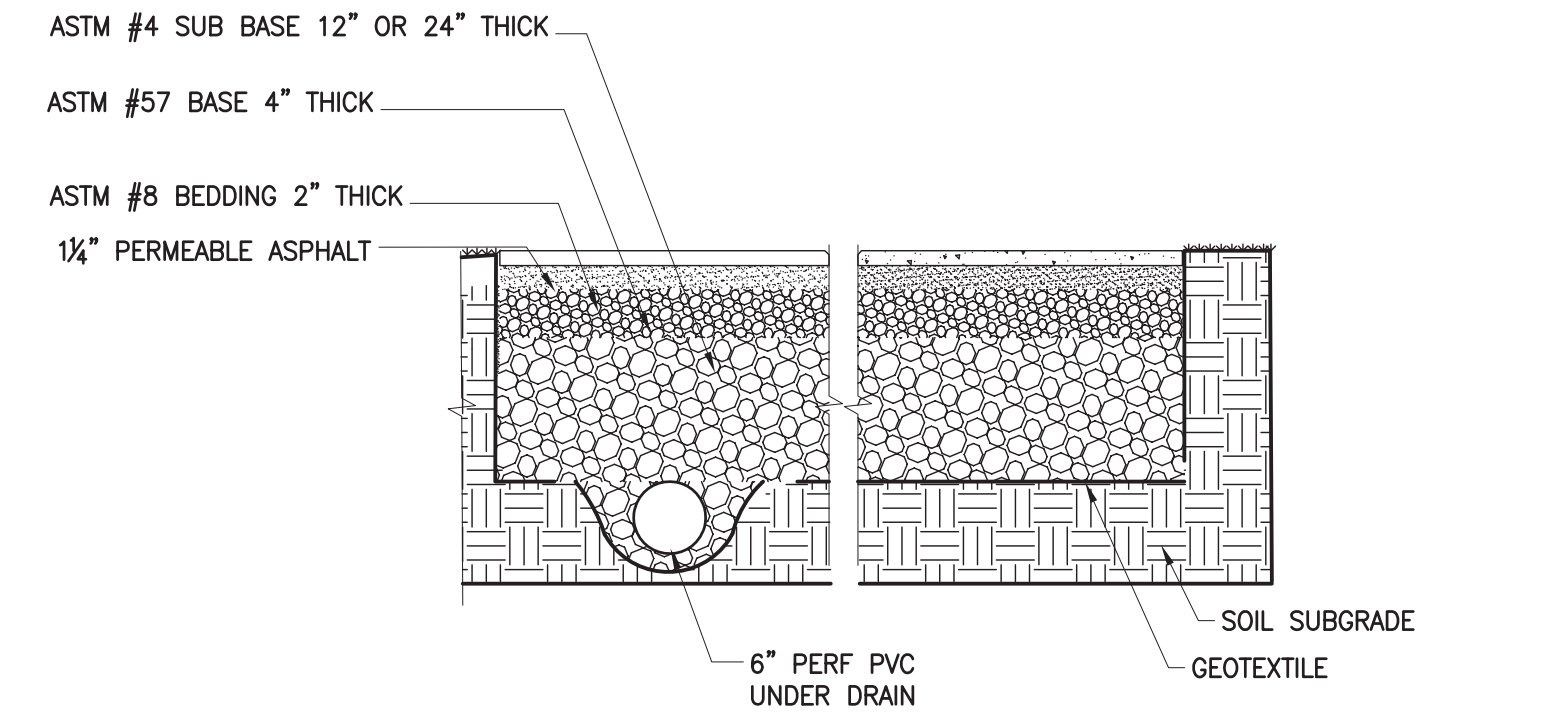
1 DETAIL - EXTENSIVE VEGETATED ROOF (GREEN ROOF) REF: 1/CG101
3/4"=1'-0" 0' 1' 2'



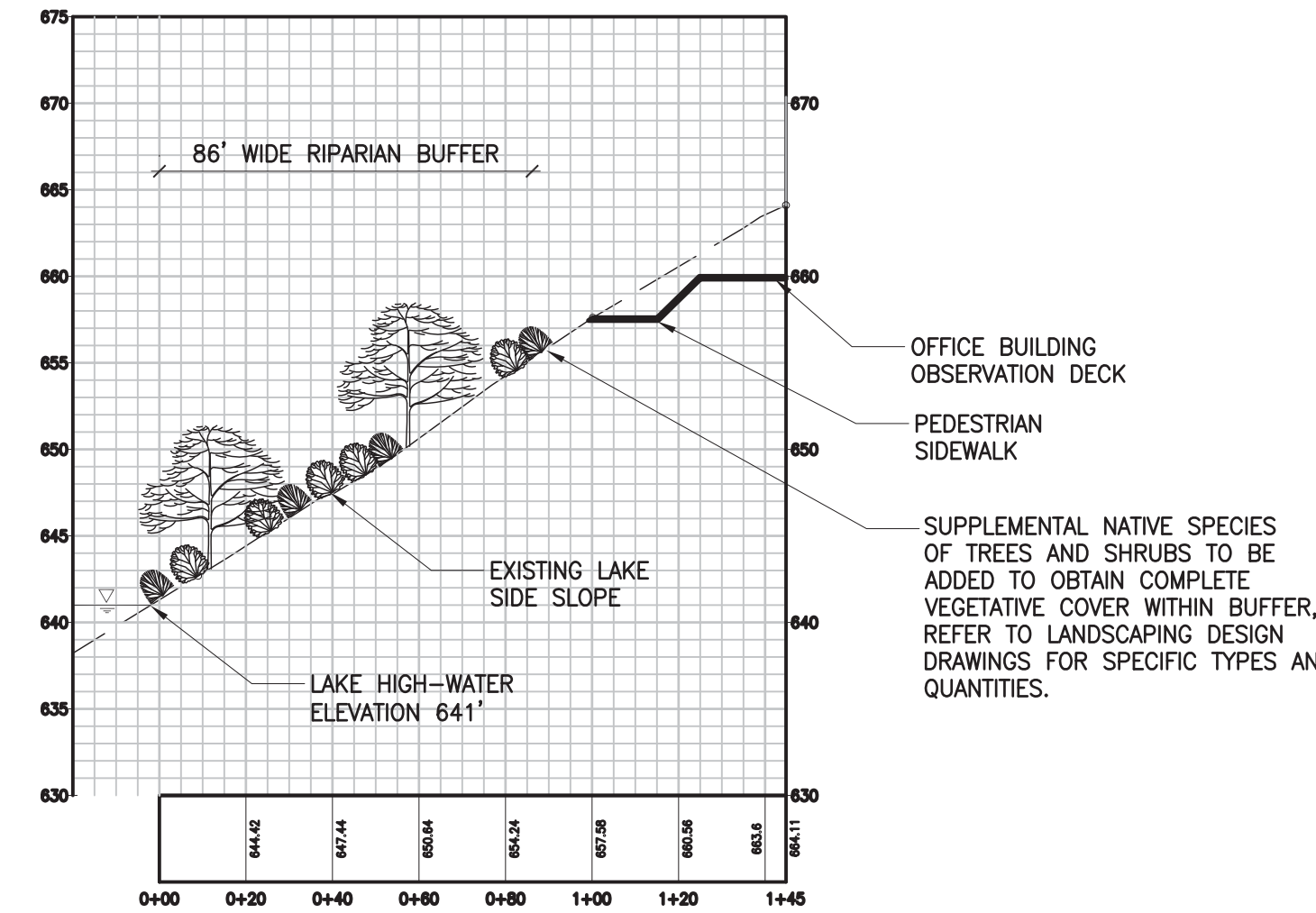
2 DETAIL - UNDERGROUND STORMWATER DETENTION UNITS REF: 1/CG104
3/8"=1'-0" 0' 1' 2' 4'



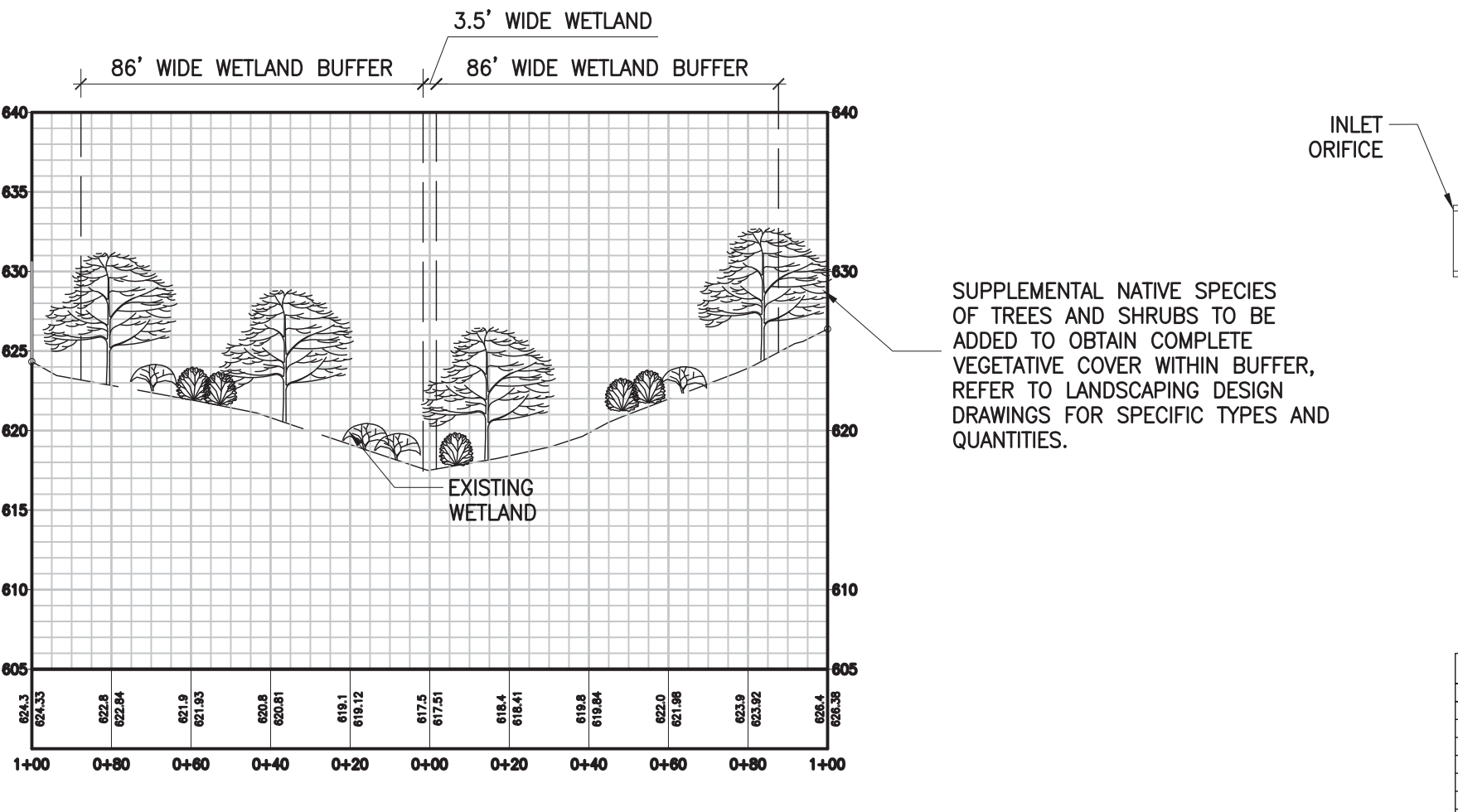
3 DETAIL - STORMWATER PLANTER REF: 1/CG102
1/2"=1'-0" 0' 1' 2' 4'



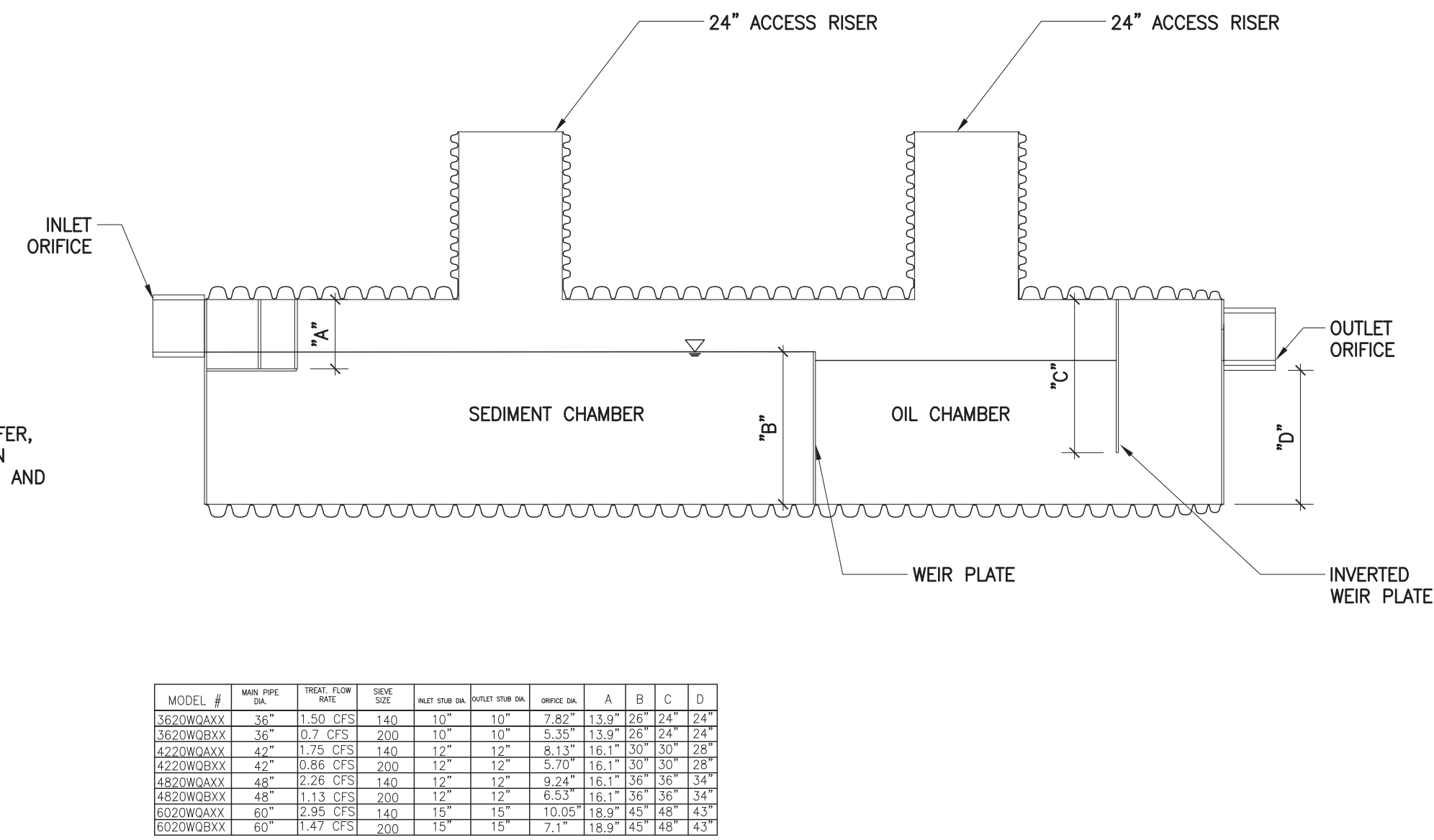
4 DETAIL - POROUS ASPHALT PAVEMENT REF: 1/CG102
3/4"=1'-0" 0' 1' 2'



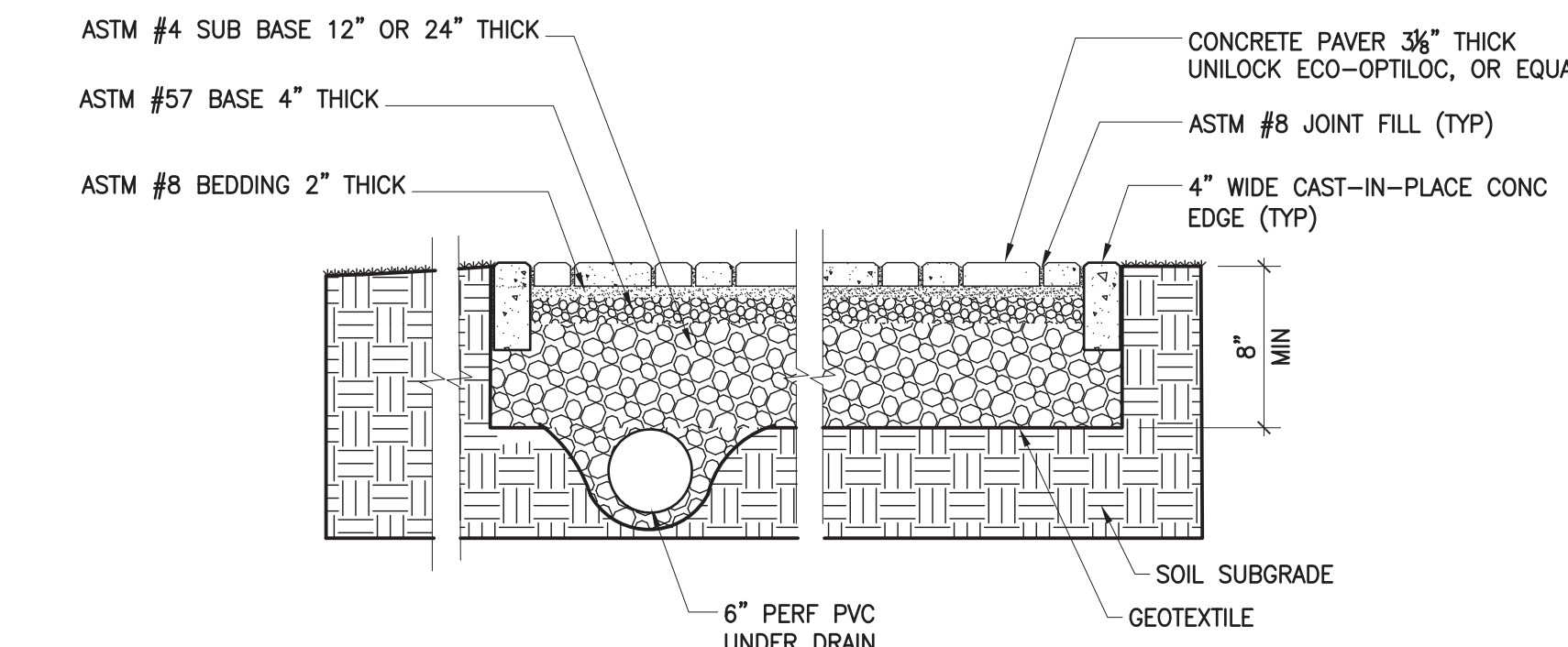
5 SECTION - RESTORED RIPARIAN BUFFER REF: 1/CG101
1"=10'-0" 0' 5' 10' 20'



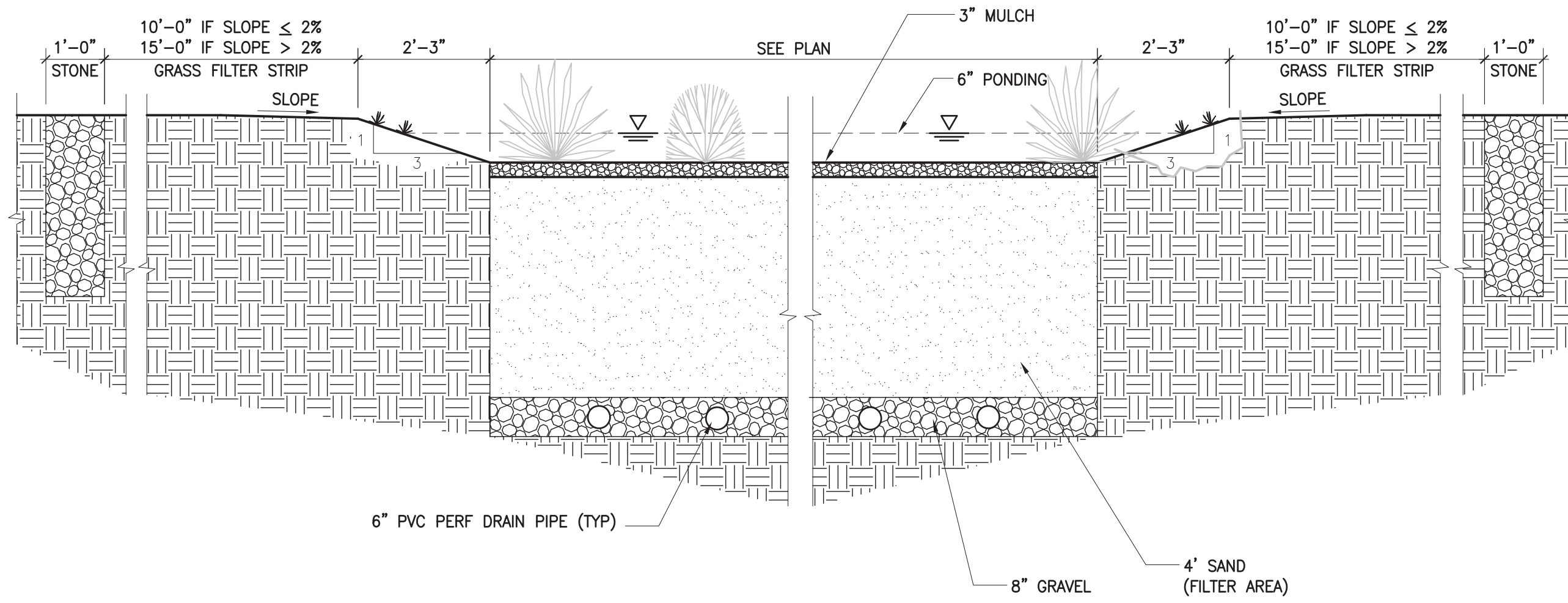
6 SECTION - WETLAND BUFFER REF: 1/CG102
1"=10'-0" 0' 5' 10' 20'



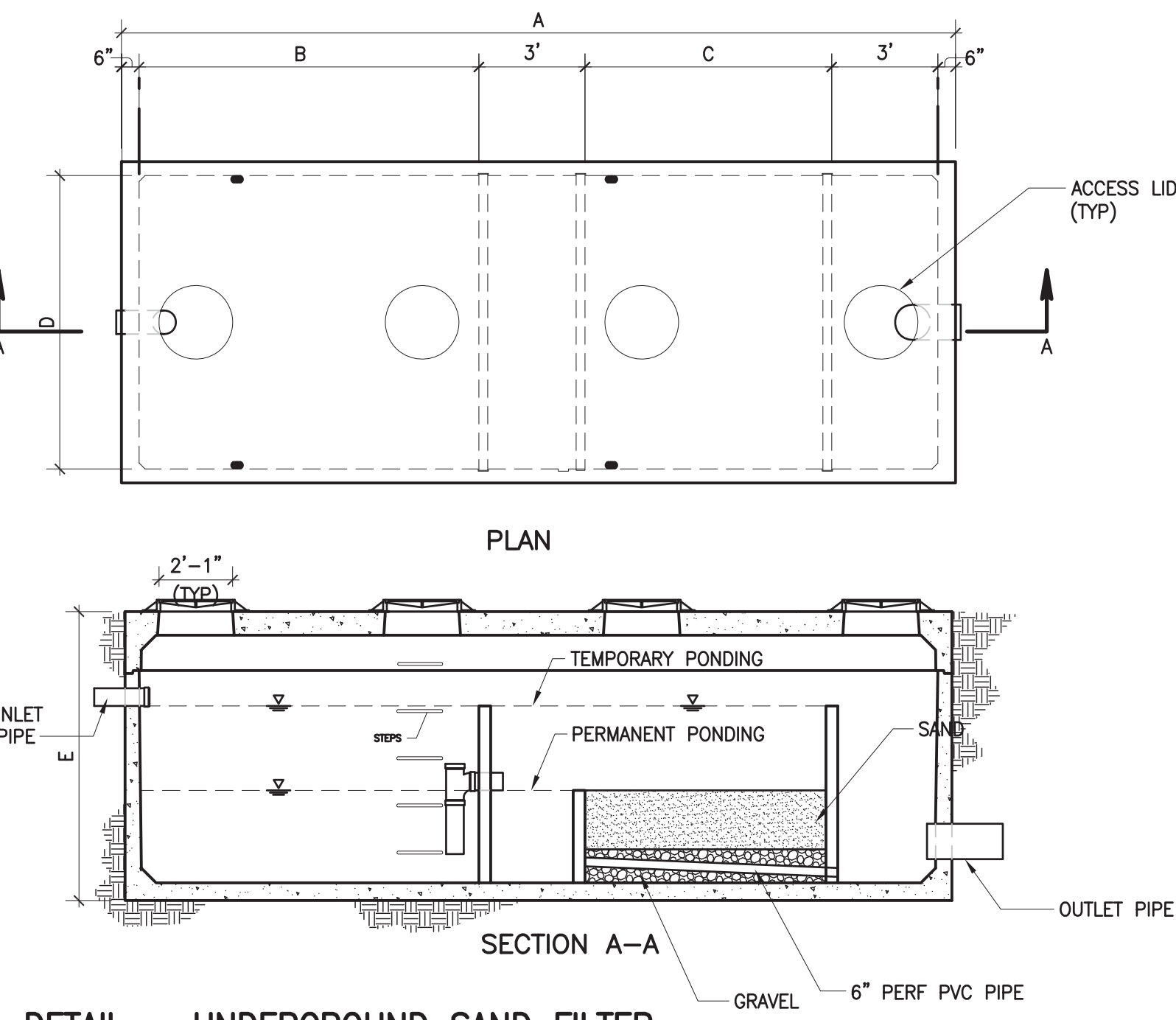
7 DETAIL - HANCOR WATER QUALITY UNIT REF: 1/CG104
NOT TO SCALE



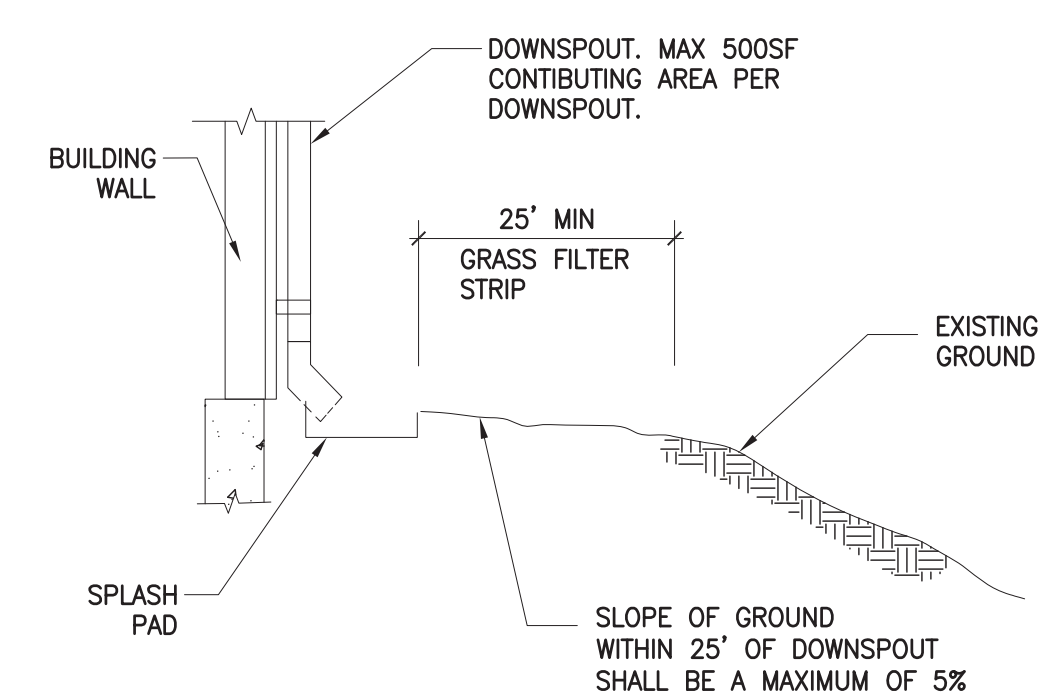
8 DETAIL - PERMEABLE INTER-LOCKING CONCRETE PAVERS REF: 1/CG101
NOT TO SCALE



9 DETAIL - BIORETENTION BASIN REF: 1/CG102
1/2"=1'-0" 0' 1' 2' 4'



10 DETAIL - UNDERGROUND SAND FILTER REF: 1/CG104
1/4"=1'-0" 0' 2' 4' 6'



11 DETAIL - ROOFTOP DISCONNECT REF: 1/CG102