APPENDIX 9

STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

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Stormwater Pollution Prevention Plan

Prepared in accordance with NYS DEC General Permit GP-0-10-001
and
Section 18-39 of the Rules and Regulations for the Protection from Contamination, Degradation and Pollution of the New York City Water Supply and Its Sources

for:

Windham Mountain Sporting Club
Phase 1 Construction

Owner/Operator(s):

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Table of Contents

Tables

Exhibits

1.0 REGULATORY OVERVIEW AND REQUIREMENTS

1.1 GP 0-10-001 Overview

This Stormwater Pollution Prevention Plan (SWPPP) is prepared to inform the landowner and construction personnel of the measures to be implemented for controlling runoff and pollutants from the site during and after construction activities. The objective of this plan is to comply with the New York Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activities, Permit No. GP-0-10-001 requirements. Any material conflicts between this plan and the site plans, specification or instructions, must be brought to the attention of the design professional. The project may have other permits and it is the responsibility of the owner and contractor to know and understand all permits.

This Project is located in the West of Hudson, New York City Watershed (See Figure 1-5 in Exhibit J). Therefore, this SWPP has also been designed according to the New York City Department of Environmental Protection Applicant's Guide to Stormwater Pollution Prevention Plans from September of 2011.

The operator will be issued a bill from New York State for a one hundred dollar ($100.00) annual fee for the open GP-0-10-001 permit. The operator will also be billed by New York State for a one time one hundred dollar ($100.00) per acre fee for the proposed disturbed soil area listed in the NOI, and finally a one-time six hundred ($600.00) per acre fee for the proposed increased impervious area listed in the NOI.

The operator is responsible to maintain onsite in a secure location that is accessible during normal working hours to an individual performing a compliance inspection, the following information:

- the Notice of Intent (NOI),
- DEP Application,
- the NYS Department of Environmental Conservation NOI Acknowledgement Letter,
- the SWPPP,
- a copy of the General Permit (included in the SWPPP),
- All inspection reports.

Technical standards are detailed in the "New York State Standards and Specifications for Sediment and Erosion and Sediment Control (August 2005)", as well as illustrated on the Erosion and Sediment Control Plan Maps included in the Site Plan drawing set for the DEIS. The design of post-construction stormwater control practices follow the guidance provided by "New York State Stormwater Management Design Manual, August, 2010."

1.2 NYCDEP Regulatory Requirements

The New York City Department of Environmental Protection Applicant's Guide to Stormwater Pollution Prevention Plans from September of 2011and Section §18-39 of the Rules and Regulations for the Protection from Contamination, Degradation and Pollution of the New York City Water Supply and It's Sources was followed during the planning of this project. Some of the NYCDEP requirements are:

- Certain prohibitions on construction of impervious surface, bridge or crossing within limited distances to watercourses, wetlands, reservoirs, reservoir stems or a controlled lake unless the activities meet certain specifications,
- Stormwater Pollution Prevention Plans (SWPPPs) shall be prepared according to NYSDEC General Permit for Construction GP-0-10-001 except for that no activity shall be exempt from any such requirements as a result of the size or nature of the watercourse(s) to which stormwater from such activity discharges, except from prior written approval from NYCDEP,
- During construction if there are significant changes in the design, construction, operation, or maintenance of an activity which is subject to a SWPPP which may have a significant effect on the potential for the discharge of pollutants to surface waters, and has not otherwise been addressed in the SWPPP or the SWPPP proves to be ineffective in eliminating or minimizing erosion or sedimentation, or construction pollution discharges, the SWPPP shall be amended. The amended SWPPP shall be submitted to NYCDEP for review and approval,
- Any approval of a SWPPP by NYCDEP shall expire and become null and void unless construction is completed within 5 years from the date of issuance, or within any extended time period approved by the NYCDEP upon good cause shown. Following expiration of the approval, the application for the SWPPP may be submitted to NYCDEP for new approval,
- NYCDEP may require evidence of financial security prior to construction from the owner,
- If any activity requires a SWPPP and takes place in the drainage basin of a terminal reservoir, the SWPPP shall include an analysis of coliform runoff before and after the proposed land disturbance activity,
- The SWPPP shall provide for the maintenance of natural drainage systems, including streams, swales and drainage ditches in an open condition to the maximum extent practicable. The SWPPP shall ensure that any closed stormwater conveyance measures are sized to convey the 10-year, 24-hour storm,
- All SWPPP's shall include measures to capture and treat either the 1-year, 24-hour storm or the Water Quality Volume, whichever volume is greater,
- Where infiltration practices are proposed, to the maximum extent practicable, no portion of such infiltration practice shall be located within 100 feet of any portion of an adsorption field for a subsurface, sewage treatment system,
- The SWPPP shall be designed to minimize the alteration of existing drainage areas and to maintain volumes of flow at design points at pre-construction

levels, except as necessary to alleviate downstream flooding problems or other adverse conditions in existence prior to construction, or to divert runoff from off-site and/or undisturbed areas away from proposed areas to be disturbed,

- The SWPPP shall be designed to minimize the loss of annual recharge to groundwater by maximizing the use of infiltration practices where suitable soil conditions exist,
- If an activity requiring a SWPPP will result in impervious surface covering 20% or more of drainage area for which a stormwater management practice is designed, the SWPPP shall provide stormwater runoff from that drainage area be treated by two different types of stormwater management practices in series, unless the proposed stormwater practice is an infiltration practice or the project is in the West of the Hudson watershed and within a village, hamlet, village extension, or area zoned for commercial or industrial uses or in the East of Hudson watershed within a Designated Main Street Area,
- For the purposes of the design criteria incorporated by reference in NYSDEC General Permit for Construction, “detention time,” shall mean the time runoff is detained in a stormwater management practice.
- Redevelopment projects shall be designed according to NYSDEC Construction General Permit GP 0-10-001, be prepared and implemented to the maximum extent possible, in accordance with previous eight requirements listed above, and provide an improvement in stormwater management and/or treatment as compared with conditions prior to the activity.

2.0 SWPPP REVIEW, UPDATE

2.1 SWPPP Review

This SWPPP will be sent to the New York City Department of Environmental Protection (NYCDEP) for review and approval.

Applicable Federal, State, and local regulatory agencies that have jurisdiction may elect to review this SWPPP and notify the permittee in writing that the SWPPP does not meet the requirements of their regulations. If the SWPPP needs to be revised, the permittee and the site contractor will make the required modifications within seven days of such notification and submit written certification to the notifying agency that the changes have been implemented. A copy of the SWPPP will be kept available on site for review by regulatory agencies, engineers, and subcontractors.

This Project is in the Town of Windham, which is not in a Regulated, Traditional Land Use Control MS4 Community.

2.2 SWPPP Update

The permittee identified in this SWPPP shall amend the SWPPP under the following conditions:

- Whenever the current provisions prove to be ineffective in minimizing pollutants in stormwater discharge from the site
- Whenever there is a change in design, construction or operation that could have an effect on the discharge of pollutants
- To address issues or deficiencies identified during an inspection by the qualified inspector, the Department or other regulatory authority
- To identify a new subcontractor that will implement any part of the SWPPP.

If any amendments are required to the SWPPP, the amended SWPPP will be submitted to the NYCDEP for review and approval prior to implementing any amendments.

After NYCDEP accepts the amended SWPPP, the SWPPP PLAN CHANGES, AUTHORIZATION, AND CHANGE CERTIFICATION form (Exhibit D) must be filled out and a copy retained onsite during construction for documentation of the changes.

2.3 Department of Environmental Protection Information

2.3.1 Prior Enforcement Actions Against the Applicant or on the Property

Tuck Eastside Partners, L.P. has not had any enforcement actions associated with it from the NYCDEP. The Project property has not had any enforcement actions associated with it from NYCDEP.

2.3.2 Listing of Required Permits Required for this Project

A number of permits or approvals are required for this Project at the local, county, regional and state levels.

Local- Local approvals are required from the Planning Board and the Town Board. These approvals are being sought during the SEQR process.

- Windham Planning Board Approvals
  - Subdivision Approval
  - Site Plan Approval
- Windham Town Board Approvals
  - Water Supply and Wastewater Disposal Connection Approvals
  - Project Transportation Corporation (water and wastewater)

County- This Project will be reviewed at the county level by the Greene County Planning Board and the Greene County Highway Department.

- Greene County Planning Board
  - The project will be reviewed for potential county-wide impact under Section 239(m) of the NYS General Municipal Law (town law). Referral to the County Planning Board is required because the project site is located within 500 feet of a County Road (CR-12 (South Street)), and within 500 feet of a municipal boundary (Windham and Jewett). The County Planning Board will issue an advisory opinion to the Windham Planning Board as part of the SEQRA process.
- Greene County Highway Department
  - Some grading will be required with this Project within CR-12 (South Street) ROW in order to improve the sight distance for drivers entering the road from Trailside Road. Plans for this work will require approval from the County Highway Department.

Regional-NYCDEP- New York City Department of Environmental Protection (NYCDEP) has approval authority for the Project's Stormwater Pollution Prevention Plan (SWPPP) pursuant to Section 18-39 of the Watershed Regulations. NYCDEP also maintains approval authority for the propose sewer collection system pursuant to Section 18-37 of Watershed Regulations. Information necessary for NYCDEP to begin review of these aspects of the project will be provided in SEQRA documents, including the DEIS, however formal applications to NYCDEP will likely not be submitted until after the completion of the SEQRA process.

State- This project will require review and approval by NYS Department of Environmental Conservation (NYSDEC) and NYS Department of Health (NYSDOH.)

- NYSDEC
  - Stormwater-SPDES General Permit GP 0-10-001 for Construction Activities.
  - Water Supply-A Water Supply Application will be filed with NYSDEC for work associated with bringing water service to the proposed site.
  - 401 Water Quality Certification-will be required because the project will have limited impacts to federal wetlands.

- NYSDOH
  - Realty Subdivision- This project meets the definition of a realty subdivision, therefore, following the SEQRA process, formal plans for the project sanitary facilities prepared in accordance with Part 74 of the State Sanitary Code will be submitted to the NYSDOH for review and approval.
  - Public Water Supply- Because this project intends to connect to the Windham municipal water supply system, NYSDOH will review the project water supply information plans.

- Swimming Pool and Food Services- NYSDOH has regulatory oversight of these types of facilities. Information necessary for NYSDOH review and approval of these facilities will be submitted following the SEQRA process.

Federal- The project involves a total of less than 0.1 acre (0.094 acre) of wetland fills for the construction of 3 crossings (2 road crossings and 1 for a shared driveway). The project qualifies for coverage under the existing U.S. Army Corps of Engineers Nationwide Permit #14.

3.0 SITE ASSESSMENT, EVALUATION AND PLANNING

3.1 Project Location

This Project Site is located in the town of Windham, Greene County, NY. The existing Windham Mountain ski area is to the west of the site. The site is located to the south of County Route 12 (South Street) and can be accessed by Panorama Lane and Trailside Road. The latitude and longitude coordinates of this site are 42^0, 17’, 50.2”N, 74^0, 14’, 46.4”W. Additional coordinates for the sits are 42^0, 18’, 3.2”N, 74^0, 14’, 47.2”W and 42^0, 17’, 40.8”N, 74^0, 14’, 47.1”W. This site is in the “West of the Hudson” watershed (see Figures 1-5).

See **Exhibit J** for a site location map (Figure 1-3.)

3.2 Pre-Development Conditions

Currently, the site is forested containing trees are of varying age as a result of past logging on the property. A majority of the trees onsite consist of secondary growth trees. There are also areas of open brush land with few small trees and many shrubs onsite. A wetland delineation was conducted onsite that determined that there are numerous wetlands and streams located onsite. Most of the wetlands onsite are located in the eastern portion of the site where multiple streams are present. Figure 3-10 in Exhibit J, is of the vegetative cover types that exist on the Project Site.

Currently, there are minimal impervious surfaces on the project site. There is a gravel/dirt jeep trail with many switchbacks that is centrally located on the property that meanders up the steeply-sloping northern face of the site. This road extends from Panorama Lane. In addition to this centrally located road, the interior of the site also contains numerous other dirt roads. One small lean-to building is located on the property.

Topography on the property can be considered typical of hillside areas in the Central Catskills – a series of alternating steeper slopes and flatter benches. Slightly over 1/2 of the site is 25% slopes or greater, while slightly less than the property has slopes less than 25%. Elevation of the WMSC property range from a low of 1,600 feet near the intersection of Panorama Lane and South Street to a high of 3,060 feet near the top of Windham Mountain's east peak express quad lift.

Windham Mountain currently holds easements of 15.69 acres of WMSC land which are currently used for portions of the existing 'Wanderer Trail '– Windham Mountain's eastern-most and longest novice trail, as well as smaller sections of 'Why Not' and 'Wing 'N it' trails. The upper part of the East Express chair lift is also on the project site.

Currently, there are no discharges onsite associated with any industrial activity.

3.3 Project Type

This project is for Phase 1 of three phases of the new construction of a proposed private sporting club development that will offer its members multiple recreational and amenity offerings as well as a variety of residential offerings including single-family homes, duplexes, townhouses and condominiums. No ski trails are proposed, but there are two transport lifts included in the project that will bring skiers to and from the project residential areas to existing Windham Mountain ski trails. Subsequent Phases of construction will have separate SWPPP's assembled for the proposed work.

This first phase of construction will disturb 52.4 acres of land. This disturbance area will be broken down into 23 sub-phases to keep the active site disturbance to a minimum.

3.4 Project Scope

More specifically, the three-phase project includes the following:

- 143 Single-family Homes
- 24 Duplex Units
- 54 Townhome Units
- 81 Condominium Units
- Members Lodges and Clubhouse that includes:
    - Private Lounge
    - Restaurant
    - Bar
    - Kitchen
    - Ski Storage
    - Full Service Spa
    - Condominiums
    - Underground Parking
    - Adjacent Ski Lift "A" connecting to Windham Mountain
- Wellness Center that includes:
    - Tennis Courts
    - Swimming Pool

  - Indoor Exercise Area
  - Climbing Wall
  - Squash Courts
  - Aerobics/Pilates Area
  - Surface Parking
- East Village Lodge, that includes:
  - Grill/Restaurant
  - Heated Pool and Hot Tub
  - Weight/Exercise Room
  - Locker Room
  - Underground and Surface Parking
  - Adjacent Ski Lift "B" connecting to Windham Mountain
- Privately constructed, owned and maintained project roads with project access from Trail Side Road
- Privately constructed, owned and maintained central water and sewer collection system with connection to existing Town of Windham systems in South Street

The Phase 1 portion of the project for which this Stormwater Pollution Prevention Plan is prepared for includes:

- 74 Single-family Homes
- 12 Duplex Units
- 37 Townhouse Units
- 27 Condominium Units
- 2/3 of the Members Lodge and Clubhouse
- Wellness Center
- 2.6 Miles of Roads
- Related Water, Wastewater and Stormwater Infrastructure

Build out of the project is projected to be approximately 15 years.

During the design of this project, soil disturbance in proximity to wetlands and watercourses on the Project Site were avoided to the maximum extent possible. Due to the steep slope and limited access to the property, some watercourse crossings were necessary. Post-construction stormwater management practices were designed conservatively to detain the entire 1-year, 24-hour storm onsite.

Detailed plans of the proposed project are provided in the DEIS drawing set.

3.5 Historic Preservation Determination

Early in the Project planning, correspondence was conducted with the NY State Office of Parks, Recreation and Historic Preservation (OPRHP), which resulted in Phase 1A and 1B studies being conducted on the site by Hudson Mohawk Archaeological Consultants, LLC. These studies found no archeologically sensitive resources on the Project Site. After a review of the Phase 1A and 1B reports, OPRHP staff asked for additional information to complete their review. This requested information is being compiled for OPRHP and will be presented to them when completed. See Exhibit F for a copy of correspondence with NYSHPO.

3.6 Receiving Waters

The Project site is located in the West of Hudson portion of the New York City watershed, within the Schoharie Reservoir drainage. The project site is approximately 15 miles from the reservoir when measured along Schoharie Creek and the Batavia Kill. Schoharie Reservoir is on New York State's 2010 (303(d)) list of impaired waters. The cause of the impairment is listed as silt/sediment and the source is listed as stream bank erosion.

The project site drains to portions of the Batavia Kill that are assigned a water quality standard of A(T) and A(TS). The Batavia Kill is located approximately 1,800 feet from the nearest part of the project site. Only one stream on the project site has been classified by NYSDEC. It is the stream that runs near the western edge of the site and exits in its extreme northwestern corner, and is assigned class and standards of C (NYCRR§879.6, item 231; waters index no. H-240-82-117-12a). Figure 3-7, NYSDEC Mapped Streams, shows the location of this stream relative to the project site, the surrounding area, and the Batavia Kill.

Numerous mapped and unmapped surface water resources on the property were identified, delineated and survey-located. Following the delineation of surface water resources numerous site visits were performed with NYCDEP in order to confirm the locations of watercourses on the project site.

Surface waters on the site mainly consist of small, intermittent or ephemeral streams. See Figure 3-9 in Exhibit J, Perennial, Intermittent and Ephemeral Drainages. There are two main stream systems that are perennial streams. One is in the southeastern quarter of the property, and flows eastward, crossing the property line near the site's easternmost corner. The other has its head in the west-central part of the site and flows northward, leaving the property in its northwestern corner. (This is the previously described Class C mapped NYSDEC stream.) There are no ponds or lakes except for two small artificial ponds, each covering about 2,000 square feet, in the northern part of the property.

3.7 Soils

An onsite soil survey was performed on the WMSC property by a professional soil scientist in the fall of 2008. The soil survey included the excavation of a number of test pits on the property as well as shovel testing verification. The logs of the test pits are provided in Exhibit H. Additional test pit information was collected in 2010 to determine soil conditions in areas considered for stormwater management practices and are also provided.

The soil series mapped by the professional soil scientis onsite consist of: Lewbeach, Halcott, Vly, Onteora, Suny, Willowemoc, Tor, Elka and Tunkhannock.

The corresponding Soil Inventory Plan (Drawing L-2.01) is provided in Sheet L-2.01 of the Site Plan Drawing Set provided in the DEIS.

The Lewbeach soil series is a very deep, well-drained soil formed in glacial till derived from sandstone, siltstone and shale. These soils are gently sloping through steep soils on hillsides and hilltops in the uplands. Permeability is moderate in the surface, moderately slow to moderate in the subsoil and very slow or slow in the fragipan.

The Halcott soil series is a shallow, somewhat excessively drained soil formed in glacial till. These soils are nearly level to very steep soils on glaciated bedrock controlled uplands. Permeability is moderate or moderately rapid throughout.

The Vly soil series is a moderately deep, well drained or somewhat excessively drained soil formed in glacial till. These soils are on glaciated bedrock controlled uplands.

The Onteora soil series is a very deep, somewhat poorly drained soil formed in glacial till derived from sandstone, siltstone and shale. These soils are nearly level through strongly sloping soils on glacial till plains and the lower parts of hillsides in the uplands at elevations of 1,750 to 2,500 feet. Permeability is moderate above the fragipan and slow or very slow in the fragipan and C horizon.

The Suny soil series is a very deep, poorly drained soil formed in acid glacial till derived from sandstone, siltstone and shale. These soils are in level or slightly depressed parts of glaciated uplands.

The Willowemoc soil series is a very deep, moderately well drained soil formed in glacial till derived from sandstone, siltstone, and shale. These soils are nearly level through moderately steep soils on glacial till plains and hillsides in the uplands. Permeability is moderate above the fragipan and slow or very slow in the fragipan.

The Tor soil series is a shallow, somewhat poorly drained soil formed in a thin mantle of glacial till overlying sandstone, siltstone, or shale bedrock. These soils are on bedrock controlled benches and steps on hillsides, mountain sides and upland flats. Bedrock is at a depth of 10 to 20 inches.

The Elka soil series is a very deep, well-drained soil formed in glacial till. These soils are gently sloping to very steep soils on mountainous uplands. Permeability is moderate throughout the soil.

The Tunkhannock soil series is a very deep, well to somewhat excessively drained soil formed in water-sorted glacial material derived from reddish sandstone, siltstone, and shale. Permeability is moderately rapid in the top soil and rapid in the subsoil.

Table 1.0 lists the mapped soils onsite with some general soil characteristics.

Table 1.0 Soil Characteristics

Series Name	Slope Range(%)	Hydrologic Group	Clay Content (%)	Depth to Bedrock (in.)	Seasonal High Groundwater (ft.)	Erosion Potential (K)
Elka Silt Loam	0-8	C	7-15	>60	>6	0.24
Elka Silt Loam	8-15	C	7-15	>60	>6	0.24
Halcott _Rock Outcrop	25-35	C/D	7-27	0-20	>6	0.24
Halcott _Rock Outcrop	>35	C/D	7-27	0-20	>6	0.24
Halcott-Vly Complex	0-8	C/D	7-27	0-40	>6	0.20-0.24
Halcott-Vly Complex	15-25	C/D	7-27	0-40	>6	0.20-0.24
Halcott-Vly Complex	25-35	C/D	7-27	0-40	>6	0.20-0.24
Lewbeach Channery Silt Loam	0-8	C	1-18	>60	2-4 perched Mar-May	0.24
Lewbeach Channery Silt Loam	8-15	C	1-18	>60	2-4 perched Mar-May	0.24
Lewbeach Channery Silt Loam	15-25	C	1-18	>60	2-4 perched Mar-May	0.24
Lewbeach Channery Silt Loam	>25	C	1-18	>60	2-4 perched Mar-May	0.24
Onteora-Suny Complex	0-8	C/D	1-18	>60	0-1.5 perched Nov-Apr	0.24-0.28
Tor Silt Loam	0-3	D	7-27	10-20	0.5-1.0 perched Dec-June	0.24
Tunkhannock Very Channery Loam	0-8	A	10-20	>60	>6	0.24
Tunkhannock Very Channery Loam	8-15	A	10-20	>60	>6	0.24
Vly-Halcott Complex	0-8	C/D	7-27	0-40	>6	0.20-0.24
Vly-Halcott Complex	8-15	C/D	7-27	0-40	>6	0.20-0.24
Vly-Halcott Complex	15-25	C/D	7-27	0-40	>6	0.20-0.24
Vly-Halcott Complex	25-35	C/D	7-27	0-40	>6	0.20-0.24
Vly-Halcott Complex	>35	C/D	7-27	0-40	>6	0.20-0.24
Vly Channery Silt Loam	0-8	C	7-27	20-40	>6	0.2
Vly Channery Silt Loam	8-15	C	7-27	20-40	>6	0.2
Vly Channery Silt Loam	15-25	C	7-27	20-40	>6	0.24
Willowemoc Channery Silt Loam	0-8	C	1-18	>60	1.5-2 perched Oct-May	0.24
Willowemoc Channery Silt Loam	8-15	C	1-18	>60	1.5-2 perched Oct-May	0.24

The predominant soil series observed onsite are the Halcott and Vly soil series. Figure 3-1 in Exhibit J shows the shallow soils (<60”) on the Project Site. Figure 3-3 shows the same shallow soils on the proposed site plan.

3.8 Environmental Compliance with the Detailed Environmental Impact Statement

This SWPPP was prepared concurrently with, and is an Appendix to the Project Draft Environmental Impact Statement submitted to the Town of Windham Planning Board, the SEQRA Lead Agency.

3.9 Site Constraints

Site constraints to development of the proposed Project are shown on the provided mapping for the proposed Project. Shallow depth to bedrock areas are shown on the Soil Inventory Plan (Sheet L-2.01 of the Site Plan Drawing Set for the DEIS) and also on Figure 3.1. Sheet L-2.02 of the Site Plan Drawing Set for the DEIS, is the Slope Map which shows the existing site slope and the steeper areas. According to the Soil Survey map prepared for this Project (Sheet L-2.01 in the Site Plan Drawing Set for the DEIS), there are no excessively drained soils within the Project boundaries. The Composite Constraints Plan (drawing L-2.03) is also provided in the Drawing Set for the DEIS. The Tunkhannock, Vly and Halcott soil series are described as well to somewhat excessively drained, however they are not described as excessively drained. The soil series identified onsite are all listed in Table 1.0 with their respective depth to seasonal high water table.

4.0 EROSION AND SEDIMENT CONTROL

4.1 Erosion and Sediment Control Practices

Generally, the sediment and erosion control plan is to sequence construction into small phases so that large expanses of area will not be disturbed at a single time. Diversion swales will be used to divert clean stormwater away from the work areas and to convey dirty stormwater from work areas to sediment basins for treatment. Several staging areas are proposed throughout the site to stockpile materials and equipment during construction. These can be seen on the Construction Phasing Plan (Sheet L-2.04) and the Sediment and Erosion Control Plans (Drawings L-3.02-L-3.05.)

Phase 1 includes the construction of the access road through the site. Purchasers of individual single-family home lots (143 total), will be responsible for having a qualified professional prepare sediment and erosion control plans for the individual lots. These lots will be constructed as they are sold, so the individual lots need to address their specific erosion and sediment control concerns on a lot-by-lot basis. Typical sediment and erosion control plans for single-family house lot in the WMSC are provided as Sheet L-8.05 in the Site Plan Drawing Set for the DEIS, for different slope conditions.

Clearing of the vegetation will only be done in proposed work areas to preserve the existing vegetation as much as feasibly possible.

Two soil stockpiling areas will be utilized during construction to store excess cut from the project. Most of this material will stay in these areas as fill however some will be temporarily stored so it can be used when fill is required on the Project. These areas are located to the north/northeast of the main Project Site. A construction road will be built utilizing some existing internal roads so that trucks can come in and deposit or remove material as needed. When construction is completed, a stabilized grade will be established on the stockpiling area and the area will be seeded and mulched. Any stockpiled soil that is not disturbed within 7 days, will be seeded and mulched. Close to the end of the day when a rainstorm is predicted for the following evening, any unstabilized soil piles will be temporarily mulched with straw, hydro-mulch or be covered with large tarps to prevent sediment runoff during a storm. The stockpiling areas will be surrounded with silt fence perimeter; construction fencing and fiber roll products throughout the area as shown on the Sediment and Erosion Control Plans.

Temporary sediment and erosion control practices to be used during construction will be:

Temporary Structural Practices

- Silt Fence
- Sediment Basin
- Stabilized Construction Entrance
- Check Dams
- Temporary Swale
- Inlet Protection
- Stabilized Outlet Protection
- Rolled Erosion Control Matting
- Water Bar
- Fiber Roll

Storage volumes for the proposed sediment basins are provided on the Erosion and Sediment Control Drawings Sheets L-3.02-L-3.05 in the Site Plan Drawing Set for the DEIS. Sediment basins were sized larger than the NYSDEC Standards and Specifications for Erosion and Sediment Control Manual (August, 2005), requirement of 3,600 cubic feet per acre of drainage area. The size of the basins was maximized based on the amount of available area in which they are situated so that they will detain as much water as possible. Because the soils on the site contain a high percentage of silts and clays, it is anticipated that gravity settling in the basins alone will not be sufficient to reduce the turbidity of the captured stormwater to desired levels. In order to facilitate settling of fine particles in suspension in the sediment basins, the use of an inert and environmentally friendly flocculent will occur during construction in order to allow the basins to be dewatered in a timely fashion so that they will have capacity to store runoff from subsequent storm events.

The flocculent proposed for this project is a product called Liqui-Floc®, (a.k.a. Chitosan or Storm Klear), marketed by a company called Natural Site Solutions from Washington State. Liqui-Floc® is a natural product made from seafood shells that are a byproduct from food processing. Liqui-Floc® is a derivative of the chitin in the seafood shells. Liqui-Floc® has very low aquatic organism toxicity and completely biodegrades into carbon dioxide and water in 24 hours. This flocculent has been bench tested for the soil series that occur on the project site. Soils were tested using Liqui-Floc® whereby solutions were made to produce turbid water of 5,000, 1,000 and 100 turbidity units (NTU). These turbid soil solutions were then dosed with the flocculent to produce a Liqui-Floc® concentration of 1 ppm. Turbidity levels in the soil test solutions rapidly dropped following the application of Liqui-Floc® within one hour after adding the flocculent. Within one hour after applying Liqui-Floc® turbidity levels had dropped 93% in both the 5,000 NTU and 500 NTU turbid soil solutions.

Each sediment basin will have a staff gauge installed in the deepest part of the basin. Depth to volume conversion charts will have been developed and these charts will be posted at each of the sediment basins. The depth to volume charts will also contain the amount of flocculent solution to be added to each basin to obtain the target 0.5 to 1.0 ppm flocculent dosing. Flocculent solution will be sprayed as evenly as possible over the surface of the water in the sediment basins. A turbidity meter will be used to measure turbidity in the basin after the flocculent has had time to act. Once turbidity in the basin has been reduced to 50 NTU or less, dewatering of the basin will commence. A pump will be attached to a floating skimmer in the basin and the basin will be dewatered to its stabilized outlet at a rate that will not cause erosion. The pump and discharge system will be equipped with an in-line turbidity meter and an automatic shutoff valve system so that water pumped through the discharge system will not exceed the target turbidity level of 50 NTU's. If the automatic shutoff stops the pumping, the basin will be allowed to rest and, if necessary, additional flocculent will be added

Permanent Structural Controls

- Grading

Temporary Stabilization Practices (including vegetative practices)

- Bare areas will be seeded and mulched within 7 days of disturbance unless construction will resume in that area within the 7 days.

Permanent Stabilization Practices (including vegetative practices)

- Seed and mulch all disturbed areas. Slopes that are 3:1 or steeper should receive a Rolled Erosion Control Product (RECP), sodding, and or hydro-seeding a homogenous mixture of wood fiber mulch with tackifying agent.
- No seeding will be done in cuts into bedrock. Any exposed soil resulting from cuts into bedrock will be seeded, however the rock itself will not be seeded.

Refer to the Grading and Drainage Plans (Drawings L-4.01- L-4.09) provided in the Site Plan Drawing Set for the DEIS, for detailed information on each practice.

4.2 Erosion and Sediment Control Drawings

Erosion and Sediment Control Plans are included in the Site Plan Drawing Set for the DEIS.

4.3 Construction Phasing Plan and Sequence of Operations

This project will consist of three phases which are planned to be completed within 12 to 15 years from starting the first phase. This SWPPP is only for Phase 1 of construction. When subsequent phases are ready for construction, a new SWPPP will be assembled for that phase of construction. The Construction Phasing Plan (Drawing L-2.04) is included in the Site Plan Drawing Set for the DEIS.

Phase 1 of construction will consist of construction of the main project road, grading and site prep for building construction. Phase 1 is divided up into 23 different sub-phases each of which is less than 5 acres in size and any combination of sub-phases will not be disturbed at a single time that will result in more than 5 acres overall being disturbed at a single time. Table 2.0 lists the proposed sub-phases and their respective areas:

Table 2.0 Phase 1 Breakout of Individual Sub-phases and their Corresponding Area

Sub-phase	Sub-phase Area (Ac)
1.1	3.90
1.2	4.82
1.3	0.53
1.4	1.47
1.5	2.15
1.6	1.68
1.7	2.64
1.8	1.33
1.9	2.06
1.10	2.15
1.11	2.16
1.12	1.16
1.13	2.85
1.14	2.37
1.15	2.04
1.16	2.95
1.17	2.20
1.18	2.95
1.19	1.11
1.20	1.25
1.21	2.75
1.22	1.25
1.23	1.75

- Temporary structural erosion controls will be installed prior to earthwork as per the attached plans.
- Areas to be undisturbed for more than 7 days will be temporarily stabilized by seeding.
- Disturbed areas will be reseeded and mulched immediately after final contours are re-established and no more than 7 days after the completion of construction at that site.
- Temporary erosion control devices will not be removed until the area served is stabilized by the growth of vegetation and the area is certified as being stabilized by the Qualified Inspector.

Phase 1 construction staging and erosion and sediment control sequencing is provided on the Erosion and Sediment Control Plans L-3.02- L-3.05. This language details what tasks are to be done in what order in each sub-phase of work.

4.3.1 Sediment and Erosion Control Practices to be Converted to Permanent Practices

On this project, all of the temporary sediment basins to be used during construction will be converted to permanent Post-Construction Stormwater Management Practices when the area draining to these practices is stabilized. This includes sediment basins A, B, C, D, E, F and G. In addition, some sections of temporary diversion swales will be converted to permanent Dry Swales located along Sheridan Road, after the drainage area feeding to these practices is stabilized. In order to successfully convert these temporary practices to permanent, additional grading will be necessary to get the permanent practices full calculated volume which will remove any sediment that would have accumulated during construction.

4.4 Erosion and Sediment Control Practice Maintenance

Temporary erosion and sediment control practices will need to be maintained frequently during construction. It is the responsibility of the operator to inspect, and maintain the temporary controls so that they are working efficiently. The operator needs to pay close attention to SWPPP Inspection Reports that will advise of needed maintenance. Captured sediment will have to be removed periodically from each practice in order for the control to function properly. Temporary erosion and sediment control practice maintenance needs are listed below:

- Silt fence – maintenance shall be performed as needed and material removed when “bulges” develop in the silt fence. When material accumulates to one third of the silt fence height, the material will be removed and placed in an upland area and be stabilized. Any tears in the fabric will be repaired, any silt fence that is not properly toed in will be repaired and any broken posts will be replaced.
- Check dams – should be inspected after each rain event. Correct all damage immediately. If significant erosion has occurred between structures, a liner of stone or other suitable material should be installed. Remove sediment accumulated behind the dam as needed to allow channel to drain through the check dam and prevent large flows over the dam.
- Storm drain inlet protection (not including silt sacks) – inspect after each storm event. Remove sediment when 50 percent of the storage volume is achieved.
- Sediment Basin – sediment shall be removed and the basin restored to the original dimensions when the sediment has accumulated to ½ of the design depth. All spoils shall be removed to a stabilized upland area or brought to the stockpile area offsite. Any structural failure in sediment basins or trenches that serve them will be repaired within 24 hours after detection.
- Stabilized construction entrance – entrance shall be maintained in a condition which shall prevent tracking. This may require periodic top dressing with additional aggregate. All sediment tracked onto or spilled on

public rights of way or onto Trailside Road (a private road), shall be removed immediately. When necessary, wheels must be cleaned to remove sediment prior to entrance on public rights of way. When washing is required, it shall be done in an area stabilized with aggregate and wash water shall be directed away from streams or wetlands preferably to a broad grassed area or a stormwater pond.

- Rock outlet protection – once a riprap outlet has been installed, the maintenance needs are very low. It should be inspected after high flows for evidence of scour beneath the riprap. Repair should be immediate.
- Replace top-soil, mulch and seed where seeding has been disturbed.
- Water bars – Water bars will be reformed after each day in heavy traffic areas. Any erosion or bypassing of the water bars will be repaired and if traffic will not travel over the practices frequently, the areas will be seeded and mulched.

4.5 Erosion and Sediment Control Inspection

- It is recommended that a rain gage be installed at the site.
- A qualified inspector shall conduct an assessment of the site prior to the commencement of construction and certify in an inspection report that the appropriate erosion and sediment controls described in the SWPPP have been adequately installed to ensure overall preparedness of the site for commencement of construction.
- This qualified inspector must be a Licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received 4 hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the qualified inspector shall receive 4 hours of training every 3 years.
- The day-to-day erosion control activities on the site will be monitored by the qualified inspector. If the inspector notices a problem with the erosion and sediment control practices used onsite during construction, he or she will immediately inform the Project Manager to resolve the problem. The qualified inspector (as defined by the NYS DEC SPDES regulations) will inspect erosion control devices and non-stabilized areas during construction every day. At least one maintenance inspection report will be completed by the qualified inspector each week. The report form to be completed by the inspector is attached in **Exhibit C.** Reports should be compiled and maintained on-site in the SWPPP 3-ring binder.
- All measures will be maintained in good working order; if repair is necessary, it will be initiated within 24 hours of the inspectors notice. The qualified inspector shall take photographs of any needed repairs

and also photograph when the repairs are completed. These photographs will be time and date stamped and attached to the weekly inspection report. When the repairs are made, photographs will be taken showing the repairs.
- Seeded and planted areas will be inspected for bare spots, washouts, and healthy growth. If necessary, spot reseeding or sodding will be implemented.
- A trained contractor will be an employee from the contracting company responsible for the implementation of the SWPPP. This person will be onsite when any soil disturbing activities are being conducted. The trained contractor must have received 4 hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the qualified inspector shall receive 4 hours of training every 3 years. This trained contractor cannot conduct the regular SWPPP compliance inspections unless they meet the qualified inspector qualifications.

4.6 Contractor Sequence Form

The operator shall prepare a summary of construction status using the Construction Sequence Form (included in **Exhibit D**) once every two weeks. Significant deviations to the sequence and reasons for those deviations (i.e. weather, subcontractor availability, etc.), shall be noted by the contractor. The schedule shall be used to record the dates for initiation of construction, implementation of erosion control measures, stabilization, etc. A copy of this table will be maintained at the construction site and updated. NYCDEP will be informed immediately of any proposed deviations to the construction sequence.

5.0 POST CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

5.1 Stormwater Management Controls

Stormwater Management Controls were designed and approved by David Carr, a Registered Landscape Architect for The LA Group, P.C. The last page of this SWPPP has the signature and stamp if the design professional responsible for this design. The proposed Post Construction Stormwater Management controls on this project are listed below:

- Micropool Extended Detention Ponds (P-1)
- Bioretention (F-5)
- Dry Swale (O-1)

Details on the location of these practices and their size are shown on the Grading and Drainage Plans (Sheets L-4.01- L-4.09.) This Project was designed to minimize alterations of the existing drainage areas and maintain flow volumes to pre-construction levels. According to the HydroCAD model results, the storm flows from the site will be at a similar rate or less than the existing conditions, therefore this proposed Project will not have any effect on any flood plains or flood hazard areas in the drainage basin. As per the NYCDEP requirements, all post-construction stormwater management practices were designed to treat the 1-year, 24-hour storm.

Some stormwater infiltration practices have been proposed (dry swale and bioretention) on the proposed project as much as feasibly possible. The existing site conditions are not conducive to groundwater infiltration because of the steep slope and slowly permeable soils. Therefore, the proposed bioretention ponds will have an under drain to prevent excessive ponding.

The P1 micropool extended detention ponds will provide water quality volume treatment as well as peak storm attenuation. The bioretention and dry swales will only provide water quality volume treatment. Some peak storm attenuation may occur within the bioretention and dry swales, however it is predominantly only to provide water quality volume treatment.

5.2 Green Infrastructure Practices/Runoff Reduction Techniques

The proposed Green Infrastructure and Runoff Reduction practices on this project are listed below:

- Bioretention (F-5)
- Dry Swale (O-1)

Minimal Runoff Reduction Based Upon Hydrologic Soil Group
If the proposed stormwater design does not achieve runoff reduction to pre-construction conditions, at a minimum the runoff reduction from impervious areas to be constructed should be at a minimum 35,654 cubic feet, based upon the Hydrologic Soil Group. The provided runoff reduction volume is 46,163 cubic feet. Details on how these values were calculated can be seen in the Stormwater Management Design Report found in Exhibit B of this SWPPP.

Soil Restoration
Excessively compacted areas and areas of cut and fill on the Project Site will have soil restoration applied as needed and as specified in table 3.0 below. A copy of “Deep Ripping and De-compaction, (DEC 2008) is provided in Exhibit G and should be followed according to the following table:

Table 3.0 Soil Restoration Requirements from NYSDEC Design Manual August, 2010

Type of Soil Disturbance	Soil Restoration Requirement		Comments/Examples
Minimal Soil Disturbance	Restoration not permitted		Preservation of Natural Features
Areas where topsoil is stripped only-no change in grade	Restoration not required		Clearing and Grubbing
Areas of cut and fill	HSG A& B	HSG C & D	
	apply 6 inches of topsoil	Aerate* and apply 6 inches of topsoil	
Heavy traffic areas onsite (especially in a zone 5-25 feet around buildings, but not within a 5 foot perimeter around foundation walls)	HSG A& B	HSG C & D	
	Aerate and apply 6 inches of topsoil	Apply full Soil Restoration**	
Areas where Runoff Reduction and/or infiltration practices are applied	Restoration not required, but may be applied to enhance the reduction specified for appropriate practices		Keep construction equipment from crossing these areas. To protect newly installed practice from any ongoing construction activities construct a single phase operation fence area.

*Aeration includes the use of machines such as tractor-drawn implements with coulters making a narrow slit in the soil, a roller with many spikes making indentations in the soil, or prongs which function like a mini-subsoiler

**Per "Deep Ripping and Decopmpaction, DEC 2008"

- If compost amendment is required, 2 to 4 inches of screened compost will be incorporated into the soil.
- Prior to application of the deep-ripping and de-compaction, the depth to bedrock or naturally occurring hardpan should be known so that the depth of tillage be adjusted according to those restrictive depths.
- Soils with a slope that exceeds 10% will not have full soil restoration with deep-ripping and de-compaction due to potential for erosion from tilled soil.
- Any soil tillage (deep or shallow) will not be done on soils that are excessively wet, as this will damage the soil.
- Any tillage will not be done within approximately 10' of the drip-line of any existing established trees.
- Any large stones that are unearthed during tillage should be removed from the surface prior to final surface preparation and vegetation establishment.
- Once Soil Restoration is done in an area, construction fencing should be installed to prevent traffic from driving on the restored areas.

5.3 Post Construction Stormwater Management Drawings

Post construction stormwater management drawings are included on sheets L-4.01 to L-4.09, of the Site Plan Drawing Set for the DEIS. Post construction stormwater management drawings must include the following:

- Specific locations, sizes, and lengths of each post construction stormwater management practice

- Details of post construction stormwater management practices shall include dimensions, material specifications, installation details, operation and maintenance requirements.

5.4 Hydraulic and Hydrologic Analysis

The program utilized for quantifying stormwater runoff rates and volumes was ***HydroCAD*** software, produced by Applied Microcomputer Systems of Chocorua, New Hampshire. HydroCAD is a program for modeling the hydrology and hydraulics of stormwater runoff that is based on techniques developed by the Soil Conservation Service (TR-55). For a given rainfall event, these techniques are used to generate hydrographs throughout a given watershed and estimate runoff.

To create a HydroCAD model, the designer delineates the watershed into different subcatchments or sub-watersheds, and inserts descriptive parameters about the land into the “existing conditions” model. These parameters consist of slope, vegetative cover type, soil type and identifying areas of concentrated flow.

The designer then analyzes the changes to the site resulting from the proposed development and inputs these parameters into the “proposed conditions” model. These will include changes in slope and cover-type resulting from the addition of buildings or paving, grading, and subcatchment boundaries. The model then simulates the impact on three design storms (1 year, 10 year and 100 year) would have on the existing and proposed conditions.

The designer will then employ best management practices (BMPs) to reduce impacts of the proposed storm flows. In addition to treating the required water quality volume (WQv), the facilities must hold the peak on the hydrograph for the 1 year storm (CPv) and attenuate the peak runoff associated with the 10 year (Qp) and 100 year (Qf) storms. The goal is to treat and attenuate the increase in runoff associated with development.

The SCS 24-hour Type II design storms for 1, 10, and 100-year frequency rainfall were analyzed.

- ✓ Hydrologic/hydraulic analysis for all structural components of the stormwater control system for the applicable design storms for the entire Project (Phase 1-3), (see Exhibit B).
- ✓ Comparison of post-development stormwater runoff conditions with pre-development conditions (see Exhibit B).
- ✓ Dimensions, material specifications and installation details for each post-construction stormwater control practice (see Exhibit B and the Site Plan Drawing Set for the DEIS).

5.5 Comparison of Pre and Post Construction Stormwater Runoff

Stormwater Quantity. These calculations are based on the HydroCAD analysis.

Table 4.0 Peak Storm Flows

	Required	Provided
1 year, 24 hour storm (CPv)	8.41 AC FT	9.09 AC FT
	Pre Development	**Post Development**
10 year, 24 hour storm (Qp)	1,001.1 CFS	735.5 CFS
100 year, 24 hour storm (Qf)	1,971.5 CFS	1,737.6 CFS

Water Quality Volume Calculations

Stormwater Management Practices are sized to treat the 1-year, 24 hour storm, or the WQv (90% storm) whichever is bigger from the contributing drainage area.

The following was utilized to determine water quality volume:

$$WQ_V = \frac{(P)\,(R_V)(A)}{12}$$

Where:
WQ_V= Water Quality Volume (acre/feet)
P = 1-year,24-hour storm or 90% storm, (whichever is bigger)
R_V = 0.05 + 0.009(I) where I is impervious cover in percent
A = Subcatchment area in acres

Table 5.0 Water Quality Volume Summary

	Required		Provided
	NYSDEC	NYCDEP	
Water Quality Volume (WQv)	3.39 AC FT	8.95 AC FT	10.74 AC FT

5.6 Water Quality Discharges

5.6.1 Introduction and Method

This section of the SWPPP will discuss stormwater quality discharges from the existing and proposed conditions on the site. To assess the potential for new loadings of total phosphorus and total suspended solids (TSS), a calculation method was prepared based on the Washington Metropolitan Council of Governments (Schueler 1987) and NYCDEP Guidance for Phosphorus Offset Pilot Programs (1997).

Treatment removal estimates were obtained from the NYSDEC Manual (last revised August, 2010), and various other sources. Over the past seven years, various studies have been completed to evaluate and understand removal capability of stormwater treatment devices. These studies have continued to find great variability in removal efficiency of stormwater devices, which in some cases can be accounted for by slightly different construction techniques, quality of construction, climatic differences, age of system, frequency of water quality measurements, and types of rainfall or rainfall intensity (Roseen et al. 2009).

Table 6.0, "Loading Rates, Conversion Factors, and Data Sources for the Mass Loading Model," identifies the information and sources used in the model.

Table 6.0 Loading Rates, Conversion Factors, and Data Sources for Mass Loading Model

Conversion Factors		
1 µg/l = 0.001 g/m^3		
1 lb = 0.4535 kg		
1 acre = 4047 m^2		
1 inch = 0.0254 m		
Other Constants		
Parameter	Value	Source
Annual Rainfall	50.0 in.	NYC DEP 1997
Runoff coefficient (vegetated)	0.64	
Runoff coefficient (impervious)	0.98	
Total Phosphorus (TP)		
Forest TP Concentration	0.00002005 kg/m^3	USEPA 1983, NYCDEP 1997
Impervious TP Concentration	0.00026 kg/m^3	NYCDEP 2010
Wetland TP Concentration	0.0000825 kg/m^3	Lin, 2004
Pasture/Grass TP Concentration	0.00014 kg/m^3	Lin, 2004
Total Suspended Solids (TSS)		
Forest TP Concentration	0.037 kg/m^3	Lin, 2004
Impervious TP Concentration	0.15 kg/m^3	Lin, 2004
Wetland TP Concentration	0.0 kg/m^3	Lin, 2004
Pasture/Grass TP Concentration	0.037 kg/m^3	Lin, 2004

A series of spreadsheets were organized to estimate the loading to each discharge point. In each subcatchment within the design point, there are varying levels of development and mixes of land cover types. Each cover type has a different loading rate that has to be evaluated separately. The project site has 13 discharge points. The loading estimate is directly calculated by multiplying the components of the equation; therefore this is a direct calculation. Each of the discharge points is independent and does not flow along a common watercourse on the project property. Eventually, the discharges do reach the Batavia Kill or unnamed tributaries thereof.

The general form of the equation is:

$$\text{Loading} = \text{Pollutant Concentration} \times \text{Area} \times \text{Rainfall} \times \text{Runoff Factor}$$

5.6.2 Water Quality Loading Existing and Proposed Conditions

Exhibit I contains the data used to estimate the mass Phosphorus and Total Suspended Solids (TSS) loading existing from the Project Site and in the proposed conditions. Overall, there is an increase in loading of TSS and phosphorus in the proposed conditions due to the increase in impervious surfaces and reduction in forested cover type. In the proposed conditions, 368 acres of the watershed total of 479 acres will remain undisturbed (77%). Therefore the proposed site disturbance is only a small portion (23%) of the entire site area. This project’s impervious area percentage for the proposed conditions will be approximately 7%.

The estimated phosphorus mass leaving the site for the existing conditions is 80.4 kg per year. The estimated phosphorus loading, prior to treatment by a post-construction stormwater management practice is estimated to be 124.9 kg per year for the proposed conditions.

The estimated TSS mass loading leaving the site is 66,721 kg of TSS for the existing conditions. The estimated TSS loading prior to treatment is 88,374 kg for the proposed conditions.

5.6.3 Water Quality Reduction From Post Construction Stormwater Management Practices

After the existing and proposed phosphorus and TSS mass loads were calculated with the Direct Calculation Model, an estimation of the percentage of phosphorus and TSS removal was subtracted from the individual subcatchments corresponding to the stormwater management practices within the respective subcatchments. For phosphorus, a removal percentage of 40% was assumed for the post-construction stormwater management practices of micropool extended detention pond, bioretention and dry swale. For TSS, a removal percentage of 80% for the post-construction stormwater management practices of micropool extended detention pond, bioretention and dry swale. The percent removal is from the August 2010 NYS Stormwater Management Design Manual (Section 3.3). Recent review of literature for the selected system shows that the treatment of TSS and phosphorus will meet the above requirement (Lin, J. P., 2004), (Roseen, R. M. et. al, 2009). The undisturbed subcatchments did not have any reduction percentage associated with phosphorus or TSS. This is shown in the tables 7.0 and 8.0.

- The first two columns of tables 7.0 and 8.0 list the design points and the subcatchments within each design point. These subcatchments are divided up based upon the post-construction stormwater management practice used to treat the areas in each subcatchment and also separate the undisturbed subcatchments that are receiving no treatment.

- The third and fourth columns of the tables identify the stormwater management practice for the corresponding subcatchment areas and the percentage removal of phosphorus or TSS.
- The fifth column lists the annual mass loading of phosphorus or TSS for each design point calculated from the Direct Calculation method. This is the estimated amount of phosphorus or TSS that would be leaving the site after development if no post-construction stormwater management practices were constructed.
- The sixth column breaks the annual mass phosphorus or TSS loading into the corresponding subcatchments. These values were calculated on a subcatchment basis by using the same Direct Calculation Method as shown in tables Exhibit I of this SWPPP.
- The seventh column applies the percentage removal of TSS or phosphorus based on the corresponding stormwater management practice within their respective subcatchments. The undisturbed subcatchments received no reduction in phosphorus or TSS.
- The eighth column sums up the individual subcatchments from the seventh column so the TSS and phosphorus mass loading from undisturbed subcatchments and the subcatchments with stormwater management practices can be represented by design point.
- The ninth column was taken directly from the Direct Calculation output found in Exhibit I for Existing Conditions. Therefore we can compare the proposed numbers with the existing conditions mass loading estimates represented in the ninth column.
- The tenth column was calculated by subtracting the existing/undisturbed mass loading of TSS and phosphorus (column 9) from the proposed/developed annual mass loading with reductions for stormwater management practices (column 8). This value is the net change of mass loading.

When the net mass TSS is summed up in column 10 of table 7, there is a net reduction of 26,392 kg from the existing conditions meaning that the proposed conditions will be contributing 26,392 kg less TSS on an annual basis. This can be explained by determining that the proposed/developed conditions increase the TSS discharge from the disturbed areas without stormwater management practices, but not more than the 80% estimated removal from the proposed stormwater management practices. To further describe the TSS export for the proposed/developed conditions, the proposed export of mass TSS with stormwater management practices in disturbed subcatchments will be 40,330 kg (represented in the sum of column 7 and also in the sum of column 8). This 40,330 kg includes 368 acres of undisturbed land. The corresponding mass TSS load estimated for this undisturbed land in the proposed conditions is 28,318 kg (as represented in the footnote on table 7.0). The 28,318 kg was calculated by summing up the annual mass loading of TSS for the individual subcatchments in column 6 or in column 7 that will remain undisturbed in the proposed conditions. This amount can be discounted from the proposed load because it exists in the existing/undisturbed conditions. When we subtract the 28,318 from the 40,330 kg, we get a value of 12,012 kg of TSS. This value is the actual annual mass load of TSS from the disturbed areas of the proposed Project. This annual mass loading is still smaller than the same area for the existing conditions.

When the net mass of phosphorus is summed up in column 10 of table 8, there is a net increase of 5.4 kg from the existing conditions, meaning that the proposed conditions will be contributing 5.4 kg more of phosphorus on an annual basis. This can be attributed to the increase in impervious areas in the proposed/developed conditions. To further describe the phosphorus export for the proposed/developed conditions, the proposed export of mass phosphorus with stormwater management practices in disturbed subcatchments will be 85.8 kg (represented in the sum of column 7 and also in the sum of column 8). This 85.8 kg includes 368 acres of undisturbed land. The corresponding mass phosphorus load estimated for this undisturbed land in the proposed conditions is 27.1 kg (as represented in the footnote on table 8.0). The 27.1 kg was calculated by summing up the annual mass loading of phosphorus for the individual subcatchments in column 6 or in column 7 that will remain undisturbed in the proposed conditions. This amount can be discounted from the proposed load because it exists in the existing/undeveloped conditions. When we subtract the 27.1 kg from the 85.8 kg, we get a value of 58.7 kg of TSS. This value is the actual annual mass load of TSS from the disturbed areas of the proposed Project.

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Table 7.0 Mass Reduction of Total Suspended Solids from Post-Construction Stormwater Management Practices

Design Point	Subcatchments Within Each Design Point	Stormwater Practices within Individual Subcatchments	% TSS Removal from SW Practice	Annual Mass-TSS Loading from Direct Calculation for Proposed/Developed Conditions by Design Point (kg) Prior to Treatment by Stormwater Management Practices	Annual Mass-TSS Loading for Proposed/Developed Conditions Broken into Subcatchments (kg) Prior to Treatment by Stormwater Management Practices	Annual Mass-TSS Loading with Reductions from SW Practice(s) for Proposed/Developed Conditions for Subcatchments (kg)	Sum of Subcatchments with Reductions for Annual Mass-TSS Discharge from Site by Design Point (kg)	Annual Mass-TSS Loading from Direct Calculation for Existing Conditions by Design Point (kg)	Net Change of Mass-TSS Loading (Proposed-Existing) (kg)
1	*1.3, 1.7, 1.8, 1.9	P1 Pond	80%	13,330	2,175	435	9,849	8,541	1,308
	**1.4, *1.8, 1.10, 1.11	Bioretention	80%		2,177	435			
	1.1, 1.2, 1.12	Undisturbed	0%		8,979	8,979			
2	2.1, 2.4, 2.9, 2.12	Dry Swale	80%	10,104	4,229	846	2,317	4,453	**-2,136**
	2.10, 2.11	Bioretention	80%		755	151			
	2.2, 2.3, 2.5, 2.6, 2.8, 2.13, 2.14, 2.15	P1 Pond	80%		4,750	950			
	2.7	Undisturbed	0%		370	370			
2a	2a	Undisturbed	0%	219	219	219	219	351	**-132**
2b	2b	Undisturbed	0%	519	519	519	519	2,187	**-1,668**
3	3.1, 3.2, 3.3	Dry Swale	80%	6,020	4,640	928	1,858	2,823	**-964**
	3.4, 3.5	P1 Pond	80%		562	112			
	3.6	Undisturbed	0%		818	818			
4	4.1, 4.2	Undisturbed	0%	631	631	631	631	2,518	**-1,887**
5	**5.2, 5.4	Bioretention	80%	4,871	729	146	4,288	5,256	**-968**
	5.1, 5.3	Undisturbed	0%		4,142	4,142			
6	6.2, 6.3	Bioretention	80%	383	197	39	225	343	**-118**
	6.1	Undisturbed	0%		186	186			
7	7.2	P1 Pond	80%	1,343	1,106	221	458	647	**-189**
	7.1	Undisturbed	0%		237	237			
8	8.6, 8.3	Dry Swale	80%	12,553	1,084	217	5,115	4,845	270
	*8.2, 8.4, 8.7, 8.8, 8.9, 8.10, 8.12, 8.13, 8.15	P1 Pond	80%		7,734	1,547			
	8.1, 8.5	Undisturbed	0%		3,255	3,255			
	*8.4, 8.8, 8.10	Bioretention	80%		479	96			
9	9.11	Dry Swale	80%	6,132	1,064	213	1,711	3,546	**-1,836**
	9.3, 9.5, 9.6, 9.9, 9.10	P1 Pond	80%		3,997	799			
	9.2	Bioretention	80%		467	93			
	9.1, 9.4	Undisturbed	0%		605	605			
11	11.8, 11.9, 11.11	P1 Pond	80%	26,283	3,038	608	9,876	27,117	**-17,240**
	**11.3, 11.4, 11.5, 11.10, 11.12, 11.13, 11.16, 11.17, 11.24	Bioretention	80%		16,340	3,268			
	11.20, 11.7, 11.22, 11.25, 11.23	Dry Swale	80%		1,131	226			
	11.2, 11.6, 11.14, 11.15, 11.18, 11.19, 11.21	Undisturbed	0%		5,775	5,775			
12	12.2, 12.4	P1 Pond	80%	5,986	3,293	659	3,263	4,095	**-831**
	12.3	Dry Swale	80%		110	22			
	12.1	Undisturbed	0%		2,583	2,583			
			***Totals	**88,374**	**88,374**	**40,330**	**40,330**	**66,721**	**-26,392**

* subcatchment 1.8, 8.4, 8.8 and 8.10 are being treated by P1 pond and bioretention. We assumed an 80% reduction only one time

** in subcatchments 1.4, 5.2 and 11.3 the disturbed areas are treated by bioretention the remainder of the lot is undisturbed

***** The total mass TSS export from undisturbed areas in the proposed/developed conditions is 28,318 kg, 70% of post construction TSS discharge is comprised of loading from undisturbed areas: (28,318/40,330)*100**

Table 8.0 Mass Reduction of Phosphorus from Post-Construction Stormwater Management Practices

Design Point	Subcatchments Within Each Design Point	Stormwater Practices within Individual Subcatchments	% Phosphorus Removal from SW Practice	Annual Mass-Phosphorus Loading from Direct Calculation for Proposed/Developed Conditions by Design Point (kg) Prior to Treatment by Stormwater Management Practices	Annual Mass-Phosphorus Loading for Proposed/Developed Conditions Broken into Subcatchments (kg) Prior to Treatment by Stormwater Management Practices	Annual Mass-Phosphorus Loading with Reductions from SW Practice(s) for Proposed/Developed Conditions for Subcatchments (kg)	Sum of Subcatchments with Reductions for Annual Mass-Phosphorus Discharge from Site by Design Point (kg)	Annual Mass-Phosphorus Loading from Direct Calculation for Existing Conditions by Design Point (kg)	Net Change of Mass-Phosphorus Loading (Proposed-Existing) (kg)
1	*1.3, 1.7, 1.8, 1.9	P1 Pond	40%	17.2	4.4	2.6	13.9	5.9	8.1
	**1.4, *1.8, 1.10, 1.11	Bioretention	40%		3.9	2.3			
	1.1, 1.2, 1.12	Undisturbed	0%		9.0	9.0			
2	2.1, 2.4, 2.9, 2.12	Dry Swale	40%	18.9	7.4	4.4	11.8	2.8	9.0
	2.10, 2.11	Bioretention	40%		1.3	0.8			
	2.2, 2.3, 2.5, 2.6, 2.8, 2.13, 2.14, 2.15	P1 Pond	40%		9.0	5.4			
	2.7	Undisturbed	0%		1.2	1.2			
2a	2a	Undisturbed	0%	0.1	0.1	0.1	0.1	0.2	-0.1
2b	2b	Undisturbed	0%	0.5	0.5	0.5	0.5	1.2	-0.7
3	3.1, 3.2, 3.3	Dry Swale	40%	10.1	8.4	5.1	6.3	4.2	2.0
	3.4, 3.5	P1 Pond	40%		1.3	0.8			
	3.6	Undisturbed	0%		0.4	0.4			
4	4.1, 4.2	Undisturbed	0%	0.8	0.8	0.8	0.8	3.4	-2.5
5	**5.2, 5.4	Bioretention	40%	6.8	1.9	1.1	6.0	4.9	1.2
	5.1, 5.3	Undisturbed	0%		4.9	4.9			
6	6.2, 6.3	Bioretention	40%	0.5	0.4	0.2	0.3	1.3	-1.0
	6.1	Undisturbed	0%		0.1	0.1			
7	7.2	P1 Pond	40%	2.3	2.1	1.3	1.4	2.3	-0.9
	7.1	Undisturbed	0%		0.1	0.1			
8	8.6, 8.3	Dry Swale	40%	20.6	2.1	1.3	13.7	8.2	5.5
	*8.2, 8.4, 8.7, 8.8, 8.9, 8.10, 8.12, 8.13, 8.15	P1 Pond	40%		14.2	8.5			
	8.1, 8.5	Undisturbed	0%		3.4	3.4			
	*8.4, 8.8, 8.10	Bioretention	40%		0.9	0.5			
9	9.11	Dry Swale	40%	11.4	2.0	1.2	7.2	8.6	-1.4
	9.3, 9.5, 9.6, 9.9, 9.10	P1 Pond	40%		7.5	4.5			
	9.2	Bioretention	40%		1.0	0.6			
	9.1, 9.4	Undisturbed	0%		0.9	0.9			
11	11.8, 11.9, 11.11	P1 Pond	40%	29.3	5.2	3.1	19.2	35.1	-15.9
	**11.3, 11.4, 11.5, 11.10, 11.12, 11.13, 11.16, 11.17, 11.24	Bioretention	40%		18.5	11.1			
	11.20, 11.7, 11.22, 11.25, 11.23	Dry Swale	40%		1.6	1.0			
	11.2, 11.6, 11.14, 11.15, 11.18, 11.19, 11.21	Undisturbed	0%		4.0	4.0			
12	12.2, 12.4	P1 Pond	40%	6.4	4.6	2.8	4.5	2.4	2.1
	12.3	Dry Swale	40%		0.2	0.1			
	12.1	Undisturbed	0%		1.6	1.6			
			Totals	**124.9**	**124.9**	**85.8**	**85.8**	**80.4**	**5.4**

* subcatchment 1.8, 8.4, 8.8 and 8.10 are being treated by P1 pond and bioretention. We assumed an 40% reduction only one time

** in subcatchments 1.4, 5.2 and 11.3 the disturbed areas are treated by bioretention the remainder of the lot is undisturbed

***** The total mass phosphorus export from undisturbed areas in the proposed/developed conditions is 27.1 kg, 32% of post construction phosphorus discharge is comprised of loading from undisturbed areas (27.1/85.8)*100**

5.6.4 References

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Schueler, T. R. 1987. Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban Best Management Practices. Metropolitan Washington Council of Governments. 275 pp.

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5.7 Open Channel Conveyances/Closed Channel Conveyances

To the maximum extent practicable, open channel conveyances were utilized in this design as opposed to closed conveyances. These include roadside swales and drainage swales to convey stormwater to proposed post-construction stormwater management practices. If open channel conveyances could not be used, closed channel conveyances have been designed to convey at the least the 10-year, 24-hour storm. Some underground piping is proposed under the existing road with catch basins to collect road storm drainage. The Grading Plans (Sheets L-4.01- L-4.09, provided in Site Plan Drawing Set for the DEIS), indicate the locations of any closed piping systems throughout the Project.

5.8 Impervious Area for Each Drainage Area(s) Requiring Two Different Stormwater Management Practices in Series

The NYCDEP requires “Where an activity results in impervious surfaces covering 20% or more of the drainage area for which a stormwater management practice is designed, the stormwater management plan shall provide for runoff from the drainage area to be treated by two different types of practices in series, except if the stormwater management practice is infiltration, or the activity is in an area classified as a village, hamlet, village extension or area zoned for commercial/industrial use or in an EOH Designated Main Street area." The only exception is where the post-construction stormwater management practice proposed is a green infrastructure practice or a practice that provides runoff reduction volume. The proposed Project was designed so that no drainage area has 20% or more impervious area, unless stormwater is being treated by a green infrastructure or runoff reduction practice. Table 9.0 shows the proposed drainage area impervious percentage draining to a standard stormwater management practice which will be a micro-pool extended detention pond for this project.

Table 9.0 Impervious Percentages of Area Draining to a Standard Stormwater Management Practice

Design Point	Standard Stormwater Management Practice	Impervious Percentage
1	P1.1 Micropool Extended Detention Pond	13.46%
2	P2.5 Micropool Extended Detention Pond	18.40%
3	P3.3 Micropool Extended Detention Pond	13.52%
5	None*	N/A
6	None*	N/A
7	P7.1 Micropool Extended Detention Pond	7.41%
8	P8.2 Micropool Extended Detention Pond	19.69%
9	P9.2 Micropool Extended Detention Pond	15.46%
11	P11.1 Micropool Extended Detention Pond	19.83%
12	P12.1 Micropool Extended Detention Pond	9.84%

***Stormwater treatment in design points 5 and 6 will be done by bioretention only**

5.9 Downstream Stream Survey of Watercourses that will Receive Stormwater Discharges from the Site

The Proposed Conditions Drainage Map shows the individual design points on the Project Site where individual drainage areas eventually discharge to. These design points have stormwater discharges that vary from a well-defined perennial stream to diffuse and overland flow.

Design points 1 and 2 are made up of large drainage areas that contain intermittent streams, a perennial stream and wetlands. These streams are stable, vegetated and moderate to steeply sloping onsite and as these drainages leave the Project property boundary. The stream geometry is generally shallow streams with grade controls throughout the steep slopes and moderate amount of stream bank vegetation.

Design points 2a and 2b are areas where drainage leaves the site as overland/sheet flow. There is no discernable watercourse where site drainage concentrates. Vegetation in these areas consists of trees with some understory shrubs.

Design points 3 and 4 have steep topography with drainage channels that discharge from the site. These drainage channels are steeply sloping and maintain similar characteristics until the slope is less steep at which the channels often disappear. Vegetation is prevalent throughout the banks and channel bottoms and channel stability is good. The stream bottom is generally rough with some grade controls.

Design point 5 is a drainage ditch that collects surface water, conveys it under a 24" culvert and continues down the slope through an open meadow with tall herbaceous vegetation and some shrubs. The ditch is pretty straight with few grade controls meanders and vegetation within the ditch bottom and on the ditch sides.

Design points 6 and 7 are areas where site drainage leaves the property as overland/sheet flow with no discernable channel where the flow concentrates. This area is open meadow with predominantly tall herbaceous vegetation mixed in with a small amount of understory shrubs.

Design point 8 is an intermittent stream channel that leaves the site via a culvert and continues into a grassed field. The slope of the intermittent stream in the field is moderately steep however the stream channel is stable due to grass-vegetation growing in the stream banks and in parts of the stream bottom. This channel does have some moderate meanders.

Design point 9 is a road side swale that is armored with some rip rap and is very straight along Trailside Road. There is grass vegetation on the edges of the swale that stabilizes the banks.

Design point 11 is a large perennial stream channel that flows off of the site. This channel is relatively straight with some meanders and a stream substrate that is predominantly rock. There are numerous trees and shrubs present on the stream banks for stabilization. This stream slope is very steep; however the stream is stable with numerous grade controls located throughout the channel.

Design point 12 is a moderately sloping watershed that exits the site via an intermittent stream. This stream continues through steep terrain off of the property however the stream is stable with numerous grade controls. Stream characteristics are similar to design points 1 and 2.

6.0 POST CONSTRUCTION STORMWATER MAINTENANCE

6.1 Mechanism of Operation and Maintenance

The Homeowners Association will be responsible for maintenance of all of the post-construction stormwater management practices onsite. Currently, the bylaws that will describe the responsibilities of the Homeowners Association are being drafted, and details of the maintenance of the post-construction stormwater management practices will be described therein. On lots 33, 38, 42, 43, 44, 45, 47, 49, 51, 141, 142 and 143, the lot owners will be responsible for maintenance of the post-construction stormwater management practices (i.e. bioretention practices on the individual lots) for the life of the systems. The maintenance of these stormwater practices on the individual lots will be enforced by the Home Owners Association Offering Plan that all of the individual lot owners will be responsible for signing and abiding by for the life of the lot. This Offering Plan is being drafted and will be finalized when it is accepted by the Attorney General. The Offering Plan will clearly state the maintenance requirements of the stormwater management practices on the individual lots and if the maintenance of these practices is not conducted appropriately, the Homeowners Association will conduct the required work at the expense of the individual lot owner. The Homeowners Association responsibilities regarding the individual lots with post-construction stormwater management practices located on the property will be clearly spelled out in the Offering Plan for the Homeowners Association.

6.2 Maintenance to be Performed

Post-construction maintenance for this project will consist of regular inspections of permanent stormwater management facilities and steep slopes. Generally, facility inspections should be done at a minimum of every 30 to 60 days. These maintenance procedures are essential to assure continual performance of the stormwater management practices on your site. During the inspection and any maintenance activity to the stormwater management practices, the responsible party should fill out an inspection and maintenance log (Exhibit D) to record that it was done.

Micropool Extended Detention Stormwater Ponds

- Should be inspected twice a year and after heavy rain storms.
- Any erosion or scour occurring in the pond, forebay or outlets shall be repaired and revegetated as needed.
- Sediment removal in the forebay shall occur every five to six years or when 50% full.
- Provide maintenance easement and right-of-way and removable trash rack on principal spillway.
- Any mechanical valves shall be operated every two months.
- Regular litter control to be performed as needed.
- Mow grass when it reaches 4-6 inches in height as needed

Dry Swale

- Inspect the side slopes of channels to make sure side slopes remain stable at least twice a year.
- Inspect for scour, erosion, rodent holes and excessive sediment deposition.
- Inspect inlets and outlets for sideslope stability, erosion, rodent holes and excessive sedimentation.
- Remove excess sediment when necessary.
- Repair any scours or erosion by using geomats or rolled erosion products to reinforce the surfaces.

Catch Basins

- Sediment removal with a vacuum truck should be done at least once a year, preferably after spring runoff and then in early fall, or when they are at 50% capacity, whichever comes first.
- Any mechanical valves should be operated for inspection every two months.

Soil Restoration

- Initial inspections for the first six months (once after each storm greater than half-inch).
- Reseeding to repair bare or eroding areas to assure grass stabilization.
- Water areas to encourage healthy grass growth.
- Fertilization and liming may be needed in the fall after the first growing season to increase plant vigor.
- Keep the site free of vehicular and foot traffic or other weight loads. (Sometimes it may be necessary to de-thatch the turf every few years but not required.)

Bioretention

- Clean sediment out of pretreatment portion of the system as needed
- Clean trash and debris out of system as necessary
- Dead or diseased vegetation should be replaced
- When the filtering capacity of the filter diminishes substantially (when water ponds for more than 48 hours), the top few inches of discolored material shall be removed and be replaced with fresh material. The removed sediments shall be disposed of in an acceptable manner (i.e. landfill).
- Silt and sediment should be removed from the filter bed when the accumulation exceeds one inch.
- A stone drop (pea gravel diaphragm) of at least six inches shall be provided at the inlet of the bioretention facility
- Areas devoid of mulch shall be re-mulched on an annual basis

6.3 Stormwater Management Practice Posting

In the vicinity of each stormwater management practice, the owner shall post a sign not less than 18” x 24” (or 10” x 12” for footprints smaller than 400 sf) with the following information:

Stormwater Management Practice - (*name of the practice*)
Project Identification - (*SPDES Construction Permit #, other)*
Must Be Maintained In Accordance With O&M Plan
DO NOT REMOVE OR ALTER

7.0 CONSTRUCTION WASTE

Waste Materials: All waste materials generated during construction will be disposed at a suitable landfill, or transfer station.

Hazardous Waste: The project will not be a generator of hazardous waste and it is not anticipated that any hazardous waste will be generated during construction. If there are any materials generated, a licensed hazardous waste carrier will be contracted to dispose the hazardous material at a suitable disposal site. If hazardous materials are discovered during construction, the work will be stopped until the issue is resolved.

Waste: Portable sanitary facilities will be made available to construction personnel and will be serviced regularly.

8.0 OFFSITE VEHICLE TRACKING

Excavation equipment involved with the construction will remain on the project site and will not regularly egress or ingress the site. Any trucks used to bring in materials or remove materials via municipal paved roads will do so over a stabilized construction entrance. If any off-site vehicle tracking occurs, the contractor will be directed to initiate, street sweeping program in the immediate vicinity of the site.

9.0 TEMPORARY STABILIZATION FOR FROZEN CONDITIONS

The following temporary stabilization measures **MUST** be performed when construction is occurring during winter/frozen ground conditions. The following requirements do not supercede any other requirements of this SWPPP as they apply to non-frozen ground conditions.

- Perimeter erosion control **MUST** still be installed prior to earthwork disturbance as per this SWPPP.
- Any areas that cannot be seeded to turf by October 1 or earlier will receive a temporary seeding. The temporary seeding will consist of winter rye seeded at the rate of 120 pounds per acre (2.5 pounds per 1,000 square

feet) or stabilized as per the temporary stabilization for winter construction/frozen conditions.

- Any area of disturbance that will remain inactive for a period of 7 consecutive days **MUST** be mulched. This includes any previously disturbed areas that are covered with snow.
- Mulch **MUST** consist of loose straw applied at the rate of 2 to 3 bales (90 to 100 pounds) per thousand square feet.
- Mulch **MUST** be applied uniformly over the area of bare soil or bare soil that is covered with snow. For the latter condition, mulch **MUST** be applied on top of snow.
- Using a tracked vehicle, mulch **MUST** be crimped into the bare soil/snow. The tracked vehicle **MUST** be driven across the mulched areas in at least two directions to maximize crimping of mulch into the soil/snow.
- If mulch gets blown off an area to a significant degree, the site inspector **WILL** require that an area be re-mulched in accordance with Items 2 through 5 above, and this area **WILL** be included on the inspection checklist for the next inspection.
- If a particular area repeatedly experiences loss of mulch due to wind, then the inspector **WILL** require that an alternative method be used to secure the mulch in place. Such alternatives may include the use of netting, tackifier or other methods deemed appropriate by the inspector.
- During periods when snow is melting and/or surface soils are thawing during daytime hours, mulched areas **MUST** be re-tracked (crimped) as per Item 5 above at least once every seven days, more frequently if directed by the inspector. Additional mulch may be required to obtain complete coverage of an area. Biodegradable erosion control matting may be required on steeper slopes.
- Additional stabilization measures for non-frozen ground conditions described in this SWPPP **WILL** be implemented at the time deemed appropriate by the inspector.

During the winter season, if a site has been stabilized and soil disturbing activities have been suspended for the winter, weekly inspections can be suspended. However, monthly inspections must still be conducted. All normal weekly inspections must resume when soil disturbing activities resume.

10.0 SPILL PREVENTION PRACTICES

Good Housekeeping and Material Management Practices

The following good housekeeping and material management practices will be followed on site during the construction project to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff.

- Materials will be brought on site in the minimum quantities required.
- All materials stored on 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 kept in their original containers with the original manufacturer's label.
- Substances will not be mixed with one another unless recommended by the manufacturer.
- Whenever possible, all of a product will be used up before disposal.
- Manufacturer's recommendations for proper use and disposal will be followed.
- The construction manager or his designee will inspect regularly to ensure proper use and disposal of materials on site.
- The contractor shall prohibit washing of tools, equipment, and machinery in or within 100 feet of any watercourse or wetland.
- All above grade storage tanks are to be protected from vehicle damage by temporary barriers.

Inventory for Pollution Prevention Plan

The materials and substances listed below are expected to be on-site during construction.

- Petroleum for fueling vehicles will be stored in above ground storage tanks. Tanks will either be steel with an enclosure capable of holding 110% of the storage tank volume or of a Con-Store, concrete encased type typically employed by NYSDOT. Hydraulic oil and other oils will be stored in their original containers. Concrete and asphalt will be stored in the original delivery trucks.
- Fertilizer may be stored on site in its original container for a short period of time prior to seeding. Original containers will be safely piled on pallets or similar devices to protect from moisture.
- Paints and other similar materials will be stored in their original containers and all empty containers will be disposed of in accordance with label directions.
- Portable sanitary facilities, which contain chemical disinfectants (deodorants) will be located on-site, with the disinfectants held in the tank of the toilet.

Hazardous Products

These practices are used to reduce the risks associated with hazardous materials.

- Products will be kept in original containers unless they are not re-sealable.
- Original labels and material safety data sheets will be retained; they contain important product information.
- If surplus product must be disposed of, manufacturers' or local and State recommended methods for proper disposal will be followed.

Spill Prevention

The following product specific practices will be followed on site.

Petroleum Products:

- Construction personnel should be made aware that emergency telephone numbers are located in this SWPPP.
- The contractor shall immediately contact NYSDEC in the event of a spill, and shall take all appropriate steps to contain the spill, including construction of a dike around the spill and placing absorbent material over this spill.
- The contractor shall instruct personnel that spillage of fuels, oils, and similar chemicals must be avoided and will have arranged with a qualified spill remediation company to serve the site.
- Fuels, oils, and chemicals will be stored in appropriate and tightly capped containers. Containers shall not be disposed of on the project site.
- Fuels, oils, chemicals, material, equipment, and sanitary facilities will be stored/located away from trees and at least 100 feet from streams, wells, wet areas, and other environmentally sensitive sites.
- Dispose of chemical containers and surplus chemicals off the project site in accordance with label directions.
- Use tight connections and hoses with appropriate nozzles in all operations involving fuels, lubricating materials or chemicals.
- Use funnels when pouring fuels, lubricating materials or chemicals.
- Refueling and cleaning of construction equipment will take place in parking areas to provide rapid response to emergency situations.
- All on-site vehicles will be monitored for leaks and receive regular preventative maintenance to reduce the chance of leakage. Any vehicle leaking fuel or hydraulic fuel will be immediately scheduled for repairs and use will be discontinued until repairs are made.

Fertilizers:

- Fertilizer will be stored in its original containers on pallets with water resistant coverings.
- Proper delivery scheduling will minimize storage time.
- Any damaged containers will be repaired immediately upon discovery and any released fertilizer recovered to the fullest extent practicable.

Paints:

- All containers will be tightly sealed and stored when not required for use.
- Excess paint will not be discharged to the storm water system or wastewater system, but will be properly disposed of according to manufacturers' instructions or State and local regulations.

Concrete Trucks:

- Concrete trucks will be allowed to wash out or discharge surplus concrete or drum wash water only at designated locations on site.

Asphalt Trucks:

- Asphalt trucks shall not discharge surplus asphalt on the site.

Pesticides:

- During construction, the storage of pesticides which is reasonably likely to lead to a discharge of pesticides in the environment will not be allowed. If pesticides are to be stored onsite, they will be stored in a locked, water tight storage compartment and will be stored in their original water tight containers. Excess pesticides will be removed from the site.

Spill Control Practices

In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and cleanup. The construction manager or site superintendent responsible for the day-to-day site operations will be the spill prevention and cleanup coordinator. He will designate at least three other site personnel who will receive spill prevention and cleanup training. These individuals will each become responsible for a particular phase of prevention and cleanup. The names of responsible spill personnel will be posted in the material storage area and in the onsite construction office or trailer.

- Manufacturers' recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and the location of the information and cleanup supplies. Any spill in excess or suspected to be in excess of two gallons will be reported to the NYSDEC Regional Spill Response Unit. Notification to the NYSDEC (1-800-457-7362) must be completed within two hours of the discovery of the spill.
- Materials and equipment necessary for spill cleanup will be kept in the material storage area onsite. Equipment and materials will include but not be limited to absorbent pads, brooms, dust pans, mops, rags, gloves, goggles, activated clay, sand, sawdust, and plastic and metal trash containers specifically for this purpose.
- All spills will be cleaned up immediately after discovery.
- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with spilled substance.
- Spills of toxic or hazardous material will be reported to the appropriate State or local government agency, regardless of the size

11.0 CERTIFICATIONS

Preparer Certification of Compliance with Federal, State, and Local Regulations

This Stormwater Pollution Prevention Plan was prepared in accordance with the New York State Department of Environmental Conservation SPDES General Permit for Stormwater Discharges from Construction Activities (Permit No. GP-0-10-001), pursuant to Article 17, Titles 7, 8 and Article 70 of the Environmental Conservation Law. This SPDES General Permit implements the Federal Clean Water Act pertaining to stormwater discharges.

Name: William Buetow Title: CPESC

Signature: ____________________ Date: ____________________

Company Name: The LA Group, PC

Owner Pollution Prevention Plan Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who are directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that false statements made herein are punishable as a Class A misdemeanor pursuant to Section 210.45 of the Penal Law.

I understand that GP-0-10-001 requires site inspections be conducted by a qualified inspector once every seven (7) days and when approved in writing by the NYSDEC, disturbances of greater than five (5) acres at one time require site inspections two (2) times every seven (7) days. These inspections shall be performed by a qualified inspector as defined by the General Permit.

The Owner/Operator will be held financially responsible for any and all fines related to work tasks that are not specified by the Contractor(s)/Subcontractor(s) below.

Name: Thomas Wilcock Title: ____________________

Signature: ____________________ Date: ____________________

Company Name: Tuck Eastside Partners, L.P.

Contractor and Subcontractor 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 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.

Name ______________________________ Title ______________________________

Signature ______________________________ Date ______________________________

Company Name ____
Address ____
City, State, Zip ____
Phone Number ____

SWPPP Components You Are Responsible For

1. ____
2. ____
3. ____
4. ____
5. ____
6. ____

Name of Trained Individual Responsible for SWPPP Implementation ____________________________ Title ________________________

Signature of Trained Individual Responsible for SWPPP Implementation ____________________________ Date ________________________

Contractor and Subcontractor 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 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.

Name ______________________ Title ______________________

Signature ______________________ Date ______________________

Company Name ____
Address ____
City, State, Zip ____
Phone Number ____

SWPPP Components You Are Responsible For
1. ____
2. ____
3. ____
4. ____
5. ____
6. ____

Name of Trained Individual Responsible for SWPPP Implementation ____________________ Title ________________

Signature of Trained Individual Responsible for SWPPP Implementation ____________________ Date ________________

Contractor and Subcontractor 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 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.

Name ______________________ Title ______________________

Signature ______________________ Date ______________________

Company Name ____
Address ____
City, State, Zip ____
Phone Number ____

SWPPP Components You Are Responsible For
1. ______________________________________
2. ______________________________________
3. ______________________________________
4. ______________________________________
5. ______________________________________
6. ______________________________________

Name of Trained Individual Responsible for SWPPP Implementation ______________________ Title ______________________

Signature of Trained Individual Responsible for SWPPP Implementation ______________________ Date ______________________

Contractor and Subcontractor 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 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.

Name ______________________________ Title ______________________________

Signature ______________________________ Date ______________________________

Company Name ______________________________
Address ______________________________
City, State, Zip ______________________________
Phone Number ______________________________

SWPPP Components You Are Responsible For
1. ______________________________
2. ______________________________
3. ______________________________
4. ______________________________
5. ______________________________
6. ______________________________

Name of Trained Individual Responsible for SWPPP Implementation ______________________________ Title ______________________________

Signature of Trained Individual Responsible for SWPPP Implementation ______________________________ Date ______________________________

12.0 DEFINITIONS

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

Construction Phasing Plan - a plan designed to construct particular portions of an individual project at different times. Phasing is often used when a project is very large to limit the disturbance at a single time to 5 acres per phase.

Erosion and Sediment Control Practices – temporary measures installed prior to construction and maintained during construction to temporarily treat any stormwater runoff. Once construction is completed and post-construction stormwater management practices are installed and the site is stabilized, the erosion and sediment control practices are removed from the site.

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

Green Infrastructure – in the context of stormwater management, the term green infrastructure includes a wide array of practices at multiple scales to manage and treat stormwater, maintain and restore natural hydrology and ecological function by infiltration, evapotranspiration, capture and reuse of stormwater, and establishment of natural vegetative features. On a regional scale, green infrastructure is the preservation and restoration of natural landscape features, such as forests, floodplains and wetlands, coupled with policies such as infill and redevelopment that reduce overall imperviousness in a watershed or ecoregion. On the local scale green infrastructure consist of site and neighborhood specific practices and runoff reduction techniques. Such practices essentially result in runoff reduction and or establishment of habitat areas with significant utilization of soils, vegetation, and engineered media rather than traditional hardscape collection, conveyance and storage structures. Some examples include green roofs, trees and tree boxes, pervious pavement, rain gardens, vegetated swales, planters, reforestation and protection and enhancement of riparian buffers and floodplains.

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

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

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

Notice of Intent – a standardized format notification sent to the NYSDEC to inform them of the proposed activity to be sent after the SWPPP has been completed.

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

Post-Construction Stormwater Management Practices – permanent devices constructed or installed onsite to treat stormwater from a site when construction is completed.

Qualified Inspector - a Licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received 4 hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the qualified inspector shall receive 4 hours of training every 3 years.

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

Sequence of Operations – the individual steps and their specific order which are undertaken in order to construct a project or a given phase of a project from beginning to end. (i.e. clearing, grading, foundation work, landscaping, etc.)

State Pollutant Discharge Elimination System (SPDES) – means the system established pursuant to Article 17 of the Environmental Conservation Law (ECL) and 6

NYCRR Part 750 for issuance of permits authorizing discharges to the waters of the state.

Stormwater Pollution Prevention Plan (SWPPP) - a report that is compiled providing detailed information about the proposed activity and the specifics to how the stormwater will be managed during construction and after construction is completed.

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

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

Trained Contractor – means an employee from a contracting (construction) company responsible for the day to day implementation of the SWPPP. The trained contractor must have received 4 hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the qualified inspector shall receive 4 hours of training every 3 years.

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

G:\Proj-08\08077_Tuck_Windham\08077Enviro\04SWPPP\SWPPP_GP-0-10-001 meeting DEP guidelines Sept 2011b.docx

Exhibit A

Notice of Intent
(NOI),
NYCDEP Application Form
and
NYSDEC Acknowledgement Letter

0669273036

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)
Tuck Eastside Partners, L.P.

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

Owner/Operator Contact Person First Name
Thomas

Owner/Operator Mailing Address
34 Salisbury Road

City
Darien

State
CT

Zip
06820 -

Phone (Owner/Operator)
2032586747 47

Fax (Owner/Operator)
2036456809 09

Email (Owner/Operator)

FED TAX ID
6409546211 (not required for individuals)

0457273031

Project Site Information

Project/Site Name

Windham Mountain Sporting Club Phase 1

Street Address (NOT P.O. BOX)

South Street (CR 12)

Side of Street

○ **North** ● **South** ○ **East** ○ **West**

City/Town/Village (THAT ISSUES BUILDING PERMIT)

Windham

State	Zip	County	DEC Region
NY	-	Greene	4

Name of Nearest Cross Street

Panorama Lane and County Route 12

Distance to Nearest Cross Street (Feet)

1400

Project In Relation to Cross Street

● **North** ○ **South** ○ **East** ○ **West**

Tax Map Numbers
Section-Block-Parcel

95.00-1-28.1

Tax Map Numbers

95.00-1-47.111

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	1	9	6	8

Y Coordinates (Northing)

4	6	8	3	3	9	6

2. What is the nature of this construction project?

● **New Construction**

○ **Redevelopment with increase in imperviousness**

○ **Redevelopment with no increase in imperviousness**

6953273038

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

Pre-Development Existing Land Use

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

Post-Development Future Land Use

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

Resort

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 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
4 6 4 4 6 . 4 6 . 6	5 2 . 5 4 2 . 4	4 . 4 4 . 4	1 3 . 1 5 3 . 5

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
%	%	97 %	3 %

4094273032

10. Is this a phased project? ● Yes ○ No

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

Start Date 09/01/2012 - **End Date** 09/01/2017

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

Name

Unnamed tributary to Batavia Kill

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

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? ○ **Yes** ○ **No**

If Yes, what is the acreage to be disturbed?

[ ][ ][ ][ ].[ ]

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

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

(If No, skip question 19)

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

Town of Windham roadside ditch

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

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

22. Does this construction activity require the development of a SWPPP that includes Water Quality and Quantity Control components (Post-Construction Stormwater Management Practices) ● **Yes** ○ **No**

(If No, skip questions 23 and 27-35)

23. Have the Water Quality and Quantity Control components of the SWPPP been developed in comformance with the current NYS Stormwater Management Design Manual ? ● **Yes** ○ **No**

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

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

SWPPP Preparer
The LA Group, PC

Contact Name (Last, Space, First)
Carr, David, Jr.

Mailing Address
40 Long Alley

City
Saratoga Springs

State
NY

Zip
12866 -

Phone
518-587-8100

Fax
518-587-0180

Email
dcarr@thelagroup.com

SWPPP Preparer Certification

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project has been prepared in accordance with the terms and conditions of the GP-0-10-001. 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.

First Name
Carr

MI

Last Name
David

Signature

Date
/ /

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

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

Temporary Structural

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

Biotechnical

- [ ] Brush Matting
- [ ] Wattling

Vegetative Measures

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

Permanent Structural

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

Other

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)**

Filtering
- ○ **Surface Sand Filter (F-1)**
- ○ **Underground Sand Filter (F-2)**
- ○ **Perimeter Sand Filter (F-3)**
- ○ **Organic Filter (F-4)**
- ● **Bioretention (F-5)**
- ○ **Other**

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

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

Open Channels
- ● **Dry Swale (O-1)**
- ○ **Wet Swale (O-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.

Additional tax #s 95.0-1-47.2, 95.0-1-47.12, and 95.0-1-47.112

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

Tuck Eastside Partners, L.P.

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

WQv Required		WQv Provided	
3.39	acre-feet	10.74	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		CPv Provided	
8.41	acre-feet	9.10	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		Post-development	
100.11	CFS	735	CFS

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

Pre-Development		Post-development	
19711	CFS	17377	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. 1 %

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. 7 %

34. Indicate the total number of post-construction stormwater management practices to be installed/constructed. 45

35. Provide the total number of stormwater discharge points from the site. (include discharges to either surface waters or to separate storm sewer systems) 13

36. Identify other DEC permits that are required for this project.

DEC Permits

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

37. Does this project require a US Army Corps of Engineers Wetland Permit?
If Yes, Indicate Size of Impact. 0 . 1 0 . 1

(●) **Yes** ○ **No**

38. Is this project subject to the requirements of a regulated, traditional land use control MS4?
(If No, skip question 39)

○ **Yes** (●) **No**

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. NYR

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: Thomas

MI:

Print Last Name: Wilcock

Owner/Operator Signature:

Date: / /

APPENDIX B
NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION
APPLICATION FOR REVIEW AND APPROVAL OF STORMWATER POLLUTION PREVENTION PLANS

NYC Environmental Protection

Project Name: Windham Mountain Sporting Club, Phase 1

Applicant/Designated representative:
Name: Tuck Eastside Partners, L.P.
Address: 34 Salisbury Road
Darien, CT 06820
Phone: 203-258-6747
e-mail:

Design Professional:
Name: The LA Group, P.C.
Address: 40 Long Alley
Saratoga Springs, NY 12866
Phone: 518-587-8100
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Project Location: Address: South Street
Town: Windham
Subdivision name:
Reservoir Basin: Schoharie

Tax Map Parcel: 95.00-1-28.1, 95.00-1-47.111, 95.0-1-47.2, 95.0-1-47.12, 95.0-1-47.112
County: Greene
Lot number: N/A

Submissions must include plans and supporting documents.

All applications must include narratives, plans, details, and specifications providing the following information:

- Project Description
- Description of Existing Conditions
- Description of Proposed Conditions
- Operations and Maintenance Plans

General Requirements for submission are set forth in Section 3 of the accompanying Guide. Supplemental required information for each type of approval is described in Section 4. Also see Appendix D for a checklist of items to be included in the submission. For additional detail, please see Appendixes E and F of this document, Sections 18-23 and 18-39 of the Watershed Regulations, and Part III of the New York State Department of Environmental Conservation (DEC) SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-10-001 ("General Permit").

Notice of Cost-Sharing Funds
Certain costs incurred in the design, implementation, and maintenance of Stormwater Pollution Prevention Plans may be eligible for DEP funding. Refer to Section 5.0 and Appendix H of the accompanying Guide.

I believe this application to be complete and in compliance with the Watershed Regulations.

(Signature)

(Filing Date)

David Carr, Jr.
(Print Name)

<u>Exhibit B</u>

Stormwater Management Report
Hydro CAD for All Three Phases of this Project

the LA group
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Stormwater

Management Design Report

for:

The Windham Mountain Sporting Club

Trailside Road, Town of Windham
Greene County, New York

Applicant:

Tuck Eastside Partners, L.P.
34 Salisbury Road
Darien, CT 06820

Prepared By:

The LA Group
Landscape Architecture and Engineering, P.C.
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November 2011

Table of Contents

TABLES

APPENDICES

FIGURES

3. West of Hudson Watershed Map
4. NYSDEC Mapped Streams

1.0 INTRODUCTION

This report describes the proposed stormwater management plan for the Windham Mountain Sporting Club,("WMSC", or "the Project"), and provides the criteria, methodologies and assumptions used to form the basis of the design. The WMSC is a proposed private sporting club development that will offer its members multiple recreational and amenity offerings as well as a variety of residential offerings including single-family homes, duplexes, townhouses and condominiums. The Project is proposed on 464.6 acres of land in the Town of Windham, NY, south of South Street and east of the Windham Mountain Ski Area.

The goal of the proposed stormwater management plan is to incorporate stormwater management as part of the overall project design. This includes protecting the site's natural resources and environmentally sensitive areas, minimizing development impacts and impervious areas by using effective site planning principles, and incorporating design features that effectively manage stormwater runoff such as, bioretention areas, stormwater management ponds and surface conveyances such as dry swales. The plan utilizes these elements in order to achieve the primary goal of meeting water quality objectives, while at the same time mitigating potential impacts associated with increased stormwater runoff. Specifically, the objectives of the stormwater management plan are to enhance the quality of stormwater runoff to prevent water quality degradation, and preserve water quality in receiving water bodies within the New York City West of Hudson watershed, promote infiltration and evapotranspiration, and to prevent increased runoff from developed land to reduce the potential for flooding, erosion and flood damage.

The management plan incorporates the design standards established in The New York State Department of Environmental Conservation Stormwater Management Design Manual, (SMDM), (August, 2010), and the Rules and Regulations for the Protection from Contamination, Degradation, and Pollution of the New York City Water Supply and its sources, 10 NYCRR §128-3.9.

2.0 PROJECT LOCATION

The WMSC is proposed in the Town of Windham which is located in central Greene County, in New York State. More specifically, the WMSC is proposed on 464.6 acres located south of South Street (Greene County Route (CR) 12) and to the east of Windham Mountain ski area. See Figures 1-1, State Location Map, and 1-2, Regional Location Map in Appendix A.

The project site is located within a region known as the Catskill Park. The Catskill Park is an area of approximately 1,100 square miles that is a mix of privately owned lands and publicly owned lands. The publicly owned lands in the Catskill Park include NYS Forest Preserve lands which comprise about 41% of the Park, and New York City owned watershed lands which comprise approximately 6% of the Park.

The project site is also located in the New York City Watershed, more specially, the West of Hudson Watershed. Figure 1-5, West of Hudson Watershed, shows the extent of the watershed and the location of the project site.

3.0 PROJECT DESCRIPTION

The WMSC is a proposed private sporting club development that will offer its members multiple recreational and amenity offerings as well as a variety of residential offerings including single-family homes, duplexes, townhouses and condominiums. Amenities include a proposed Member's Lodge and Clubhouse with condominiums, underground parking and a restaurant and spa; a Wellness Center, which will offer recreational activities; and the East Base Lodge, with condominiums, a grill/restaurant, and underground and surface parking. There will also be two transport ski lifts that provide access from the Member's Lodge and East Base Lodge to the Windham Mountain Ski Area, however no ski trails are proposed. All the roads, sewer and water utilities and stormwater management infrastructure will be privately owned and maintained. Refer to the Project Master Plan, sheet L1.01 in the DEIS plan set, for the overall Project location and design.

More specifically, the project includes the following:

- 143 Single Family Homes
- 24 Duplex Units
- 54 Townhome Units
- 81 Condominium Units
- Members Lodge and Clubhouse, that includes
    - Private Lounge
    - Restaurant
    - Bar
    - Kitchen
    - Ski Storage
    - Full Service Spa
    - Condominiums
    - Underground Parking
    - Adjacent Ski Lift "A" connecting to Windham Mountain
- Wellness Center, that includes
    - Tennis Courts

  - Swimming Pool
  - Indoor Exercise Area
  - Climbing Wall
  - Squash Courts
  - Aerobics/Pilates Area
  - Surface Parking
- East Village Lodge
  - Grill/Restaurant
  - Heated Pool & Hot Tub
  - Weight/Exercise Room
  - Locker Room
  - Underground and Surface Parking
  - Adjacent Ski Lift "B" connecting to Windham Mountain
- Privately constructed, owned and maintained project roads with project access from Trailside Road
- Privately constructed, owned and maintained central water and sewer collection systems with connection to existing Town of Windham systems in South Street.

The project residential components and amenities are proposed to be built in 3 phases with an anticipated timeframe for full project build out of approximately 15 years. (See Phasing Plan, sheet L-2.04 in the DEIS plan set).

4.0 EXISTING SITE CONDITIONS

Vegetation

The vegetation of the project site consists mainly of upland forests composed of sugar maple with smaller amounts of other hardwood trees. Smaller areas are covered with forest dominated by eastern hemlock and other trees. It is evident that these forests have been managed on a regular basis, for log skidder trails are found throughout, and the forest canopy is somewhat more open than would be expected in a forest allowed to grow naturally.

Evidence of previous agricultural activity on the site is present in the form of non-forested areas that vary from fields covered mainly with grasses and broadleaved herbs to areas dominated by shrubs and tree saplings. These areas were apparently cleared of forest to create pastures or hayfields, were later abandoned, and are in the process of ecological succession that will re-establish forest. Reportedly, such open areas in the eastern part of the property were once used for grazing sheep. Refer to the Existing Subcatchment Maps, sheet L5.01 in the DEIS plan set, for surveyed vegetation and cover types.

Soils

An on-site soil survey was performed on the WMSC property by a professional soil scientist in the fall of 2008. The soil survey included the excavation of a number of test pits on the property as well as shovel testing verification. Additional test pit information was collected in 2010 to determine soil conditions in areas considered for stormwater management practices. Soils mapping and test pit locations for the project site is shown on the Soil Inventory Mapping, sheet L2.01in the DEIS plan set, and test pit data is summarized in Appendix E of this report.

The WMSC property is mostly shallow and moderately deep, very stony soils formed in glacial till soils derived from red shale and sand stone. There are some areas of deep glacial till soils that have a very firm fragipan. (A fragipan is a dense, natural subsurface layer of hard soil with relatively slow permeability to water, mostly because of its extreme density or compactness rather than its high clay content or cementation.) At the base of the mountain in a few areas there are some very gravelly glacial outwash soils and a few areas of the deep till without a fragipan.

The soil identification legend for the WMSC property is based on the published Soil Survey Report for Greene County issued in 1993. The published soil survey was prepared by the USDA Natural Resources Conservation Service and most of the field mapping was done from approximately 1975 to 1985.

All of the soils at the WMSC property fall into the “frigid” soil temperature regime. Soils in frigid temperature regimes have a shorter growing season then soils at lower elevations.

Most of the soils in the higher elevations of the Catskill Mountains is derived from red fine textured shale bedrock and the glacial till derived from the shale tends to be reddish colored and fine textured.

The following soil series have been mapped on the WMSC site.

Halcott soils are well drained shallow (<20 inches deep to bedrock) soils formed from red shale parent material. **Vly** soils are similar to Halcott soils but are moderately deep (20 to 40 inches deep over bedrock). On steep slopes both soils may have significant component of exposed bedrock outcrops.

Lewbeach soils are deep well drained soils formed in fine textured reddish brown glacial till. Lewbeach soils have a very firm fragipan typically 25 to 40 inches below the surface. **Willowemoc** soils are moderately well drained soil also formed in fine textured glacial till, typically on more gentle slopes with the very firm fragipan at 18 to 25 inches below the surface.

At the base of steep slopes, especially the very steep slopes with ledges and rock outcrops there are some area of very deep, well drained soils that don’t have a fragipan. These **Elka** soils typically have a large component for rock fragments mixed with the fine textured glacial till and tallus material.

Well drained **Tunkhannock** soils are at the base of the mountain and extend north to South Street and across to the golf course and continue to the edge of the Batavia Kill.

Lineal polygons on the soil map are areas that have been cleared and graded for access roads either for past agricultural or logging activities on the property. The soils mapped in those lineal polygons are most likely disturbed phases of the named soil.

The wetlands are complex areas of deep, somewhat poorly drained to poorly drained **Onteora** and very poorly drained **Suny** soils on nearly level to moderate slopes. Wetland soils with bedrock with 40 inches are poorly or very poorly drained **Tor** soils.

Based on the extensive soil investigations, mapping and test pit confirmations, the silt/clay soils, fragipans, shallow depths to bedrock and seasonally high groundwater are limiting factors in the design of stormwater management facilities.

Hydrology

The project site is located in the West of Hudson portion of the New York City watershed. Figure 1-5 in Appendix A, West of Hudson Watershed Map, is a map showing the site within the watershed. The project site is also within the Schoharie Reservoir Drainage. On a more local scale, the WMSC property lies within the watershed of the Batavia Kill, which is a tributary of Schoharie Creek. Schoharie Creek is a tributary of the Mohawk River, a traditional navigable waterway.

The highpoint of the project site is along the southern property boundary. From here runoff either drains onto the property or flows north, or away from the property and flows south. There is a ridge in the center of the property which divides the larger watershed into two areas; the eastern portion that drains to the northeast and the western portion that drains to the northwest. This dividing "ridge line" is best described as the subcatchment divide between subcatchments 2 and 3, and 2b and 3, as shown on the Existing Subcatchment Diagram, (sheet L-5.01), in the DEIS plan set. All existing drainage patterns on the site and adjacent areas are also illustrated on the Existing Subcatchment Diagram, Additionally, wetland and watercourse mapping for the site is included on the Wetland Delineation Maps, (sheets JD1-JD10), and the NYCDEP Watercourse Delineation Maps, (Sheets JD1-JD3), in the DEIS plan set.

In the central portion of the northeast drainage area, most sheet flow runs overland about halfway down the project site, and then collects through a series of ephemeral and intermittent drainages in a broad wetland complex in the northeast corner, at Design Point 1. From here it leaves the site in a perennial drainage channel, (channel S-7 on the Watercourse Delineation Maps), eventually crosses NYS Route 296 and reaches the Batavia Kill. The areas of the project site north and south of this central drainage area generally sheet flow to small intermittent channels located close to the northeastern and eastern property boundaries, (Design Points 2 and 12, channels S-6 and S-12 on the Watercourse Delineation Maps). Both of these small drainages also eventually cross NYS Route 296 and flow to the Batavia Kill. There are also two much smaller subcatchments adjacent to Design Point 2, that sheet flow across the property line at Design Points 2a and 2b respectively.

In the northwest drainage area, sheet flow primarily drains to three separate areas. The first is a perennial stream located on the western edge of the site, (channel S-1 on the Watercourse Delineation Maps), that drains to Design Point 11. This is the only stream on the project site that has been mapped classified by

NYSDEC, assigned a class and standards of C (6 NYCRR §879.6, item 231; waters index no. H-240-82-117-12a). Figure 3-7, NYSDEC Mapped Streams, shows the location of this stream relative to the project site, the surrounding area, and the Batavia Kill. Water from the upper portions of the western half of the property above the 'Wanderer' ski trail, runs overland and collects in a manmade ditch on the upper side of Wanderer, where it is either conveyed through water bars across the trail or continues to a pair of 72" culverts that cross under the ski trail. These 72" culverts also convey channelized flow from above. Flow drains from the culverts into a perennial stream channel with a boulder / rocky bed that continues to flow northwest. Runoff from the central part of the western half of the property sheet flows into small wetland pockets and watercourses where it then joins the perennial channel. From here the channel flows through an adjacent neighborhood to a large collection area before it passes under Trailside Road in a 60-inch culvert and continues to the property boundary, (Design point 11), under South Street and eventually to the Batavia Kill.

The second area drains to Design Point 8. This drainage area collects sheet flow from the center of the mid- lower portions of the western half of the property, where it collects into an intermittent drainage that runs along a portion of an existing logging road , before leaving the project site through a 24" culvert, (Design Point 8), at the northern property boundary. (Channel S-3 on the Watercourse Delineation Maps). From here the watercourse flows to a roadside ditch along South Street to a culvert under the road and eventually to the Batavia Kill.

The third area is the generally the middle and eastern portion of the northwest drainage area, draining to Design Point 5. Here, runoff sheet flows to the upper section of the main existing logging road (Upper Panorama Lane), where it is collected in a roadside ditch and conveyed across the road via water bars. It then sheet flows to the lower section of Upper Panorama where it is again collected in a roadside ditch and conveyed across the road via water bars, and sheet flows off the property. Runoff is then intercepted again by a roadside ditch along lower Panorama, which drains to a culvert under the road, (Design point 5), and into a channel that flows to the roadside ditch along South Street.

The remaining Design Points 3, 4 6, 7 and 9, collect runoff from smaller, more specific drainage areas on this portion of the site.

All of the primary perennial and intermittent drainages are rocky, cobbly mountain streams that convey storm flows and seasonal flows. Their locations and contributing watersheds are further illustrated on the Existing Subcatchment Diagram, sheet L5.01 in the DEIS plan set.

Topography

The elevation of the WMSC property ranges from a low of 1600 feet near the intersection of Panorama Lane and South Street to a high of 3060 feet near the top of Windham Mountain's east peak express quad lift. For reference, other elevations include 1660 feet where the property abuts the open field (Cammer property) to the north, the former meadow in the northeast corner of the property is around 2240 feet, the existing lean to on the property is at 2330 feet, and the bend in the Wanderer ski trail is at an elevation of 2630 feet.

Topography on the property can be considered typical of hillside areas in the Central Catskills – a series of alternating steeper slopes and flatter benches. This pattern is evidenced on the slope map of the

WMSC property (Sheet L2.02 in the DEIS plan set.). Approximately 52% of the site is 25% slopes or greater, while 48% of the property has slopes less than 25%.

Resource Mapping

Detailed mapping of existing conditions and environmental resources is provided in the DEIS project plan set as noted in the sections above.

5.0 METHODOLOGY

The Stormwater Management Plan was developed in accordance with the design standards established in The NYSDEC New York State Stormwater Management Design Manual, August, 2010 (SMDM), and the Rules and Regulations for the Protection from Contamination, Degradation, and Pollution of the New York City Water Supply and its sources, 10 NYCRR §128-3.9.

Stormwater Model and Analysis

Stormwater modeling was performed using the computer program HydroCAD (version 9.10) produced by HydroCAD Software Solutions, LLC, and all stormwater calculations were completed utilizing the SCS TR-20 and , TR-55 methods, widely accepted engineering practices, and recommended procedures listed in the SMDM.

Storm Events Analyzed

The Type II storm is synthetic rainfall distribution that SCS has mapped for the project site, based on available National Weather Service duration-frequency data. Type II represents the most intense, short duration rainfall of the four different distributions, and is the design storm utilized in the stormwater model.

The return interval storm events analyzed during the development of the plan are those specified in the August 2010 SMDM.

The storm events analyzed are:

1. The 90% rainfall event totaling **1.1** inches as per Figure 4.1 of the SMDM, used as the basis for the DEC **Water Quality Volume** treatment goals.

2. The 1-Year, Type II Design Storm having a 24-hour rainfall total of **3.0** inches as per Figure 4.4 of the Manual, used as the basis for **Channel Protection Volume** extended detention requirements. This storm event is also used to meet ***NYC DEP*** **Water Quality Volume** treatment goals.

3. The 10-Year, Type II Design Storm having a 24-hour rainfall total of **5.0** inches, as per Figure 4.5 of the Manual, used as the basis for meeting the **Overbank Flood Control** Criteria.

4. The 100-Year, Type II Design Storm having a 24-hour rainfall total of **7.5** inches as per Figure 4.6 of the Manual, used as the basis for meeting the **Extreme Flood Control** criteria.

Design Process

Once an environmental resources analysis of the project site was complete, the stormwater management design process began with the identification of design points, typically located at points of confluence where flows can be easily measured, locations that are down gradient of proposed development, and as close as possible to the areas of proposed development. These were used to develop the subcatchment mapping, and ultimately to compare the rate and volume of runoff in the pre-development and post-development conditions. Once the subcatchment areas were defined, data was collected to determine both quantity and quality requirements. Using this data, the design was then developed in accordance with the 5-step process outlined in the SMDM in order to meet the required goals.

The August 2010 SMDM includes a five-step process that integrates site planning and stormwater management, and requires the use of green infrastructure practices to treat stormwater. The five steps include;

1. Site planning to preserve natural features and reduce impervious cover,
2. Calculation of the initial Water Quality Volume for the site,
3. Providing Runoff Reduction by incorporation of green infrastructure techniques and standard stormwater management practices (SMP's) with Runoff Reduction Volume (RRv) capacity,
4. Using standard SMP's where applicable, to treat the portion of water quality volume (WQv) not addressed by green infrastructure techniques and standard SMP's with RRv capacity, and
5. Design of volume and peak rate control practices where required.

This Project has been designed and developed in conformance with the process listed above. Specific aspects of the design are included in more detail in the body of the report below.

6.0 PRE-DEVELOPMENT MAPPING AND ANALYSIS

In order to establish a baseline from which design goals can be developed, Design Points are selected based on analysis of existing conditions including wetland and watercourse mapping, hydrology, topography, and field investigations. The Design Points are listed below, and shown on the Existing Subcatchment Plans, sheet L5.01 in the DEIS plan set.

Project Design Points

Design Point	Structure Type	Location
1	Existing Stream Channel	Eastern Property Corner
2	Existing Stream Channel	Just West of DP1
2A	Sheet Flow @ Property Line	Between DP1 and DP2
2B	Sheet Flow @ Property Line	West of DP2
3	Existing Drainage Ditch	At existing switchback, northern property line (P.L.)
4	Existing Drainage Ditch	Just west of existing Switchback, northern P.L.
5	24" Culvert	Panorama Lane
6	Sheet Flow @ Property Line	Northern P.L. between Panorama Ln. and Trailside Rd.
7	Sheet Flow @ Property Line	Northern P.L. between Panorama Ln. and Trailside Rd.
8	Existing Stream Channel	Northern P.L., just east of Trailside Rd.
9	Existing Drainage Ditch	Ditch along eastern edge of Trailside Rd.
10	Not Used	Not Used
11	Existing Stream Channel	West of Trailside Rd., North of Two Trees Ln.
12	Existing Stream Channel	Eastern P.L., south of DP1

Once established, initial subcatchment mapping was developed and additional field verification was made as necessary to confirm detailed information. Individual subcatchments were then developed in more detail based on field observation and mapped data. The individual subcatchments include the following.

Cover Types

Areas of cover type are from the project site survey and vegetation community type mapping derived from field observation. These cover types were used to help determine runoff coefficients, and typically include impervious and vegetated areas.

Soils

Soils types and hydrologic soil groups are identified based on-site moderate intensity, second-order soils mapping and used in conjunction with the cover types to help determine runoff coefficients. Based on the collected soil data, Hydrologic Soil Group C is the primary soil type used throughout the existing analysis, with a small portion of Hydrologic Soil Group D in the wetland areas.

Time of Concentration Flow Paths

Time of concentration flow paths will begin with a sheet flow segment, transitioning to shallow concentrated flow and channel flow where these conditions exist. Specific flow paths and channel conditions are based on existing conditions mapping, survey and field observation.

The site is divided up into 18 subcatchments that total 479 acres. There is a small portion of off-site drainage area that is included adjacent to the western property boundary, but most of the watershed is located within the project site. The on-site watershed is primarily wooded and meadow cover types, on Hydrologic Group C soils, with some wetland areas and Hydrologic Group D soils. As a result a 'Woods/Grass combination' with a CN of 72 was utilized for a majority of the project site. There are also several areas within the project site where bedrock is exposed at the surface or present as steeper rock outcroppings. Even though the bedrock would be considered existing impervious areas, as a conservative measure, it is assumed to be a woods/grass combination in the existing HydroCAD modeling.

The existing subcatchments and their characteristics were entered into the HydoCAD model in order to create the pre-development condition that can be used as a baseline comparison for the post-development model. The existing peak discharge rates and volumes at each Design Point for the 10 and 100-yr storm events are summarized in Table 4 later in the report. The WQv and 1-yr storm events are analyzed separately in Tables 1-3, also found later in the report.

7.0 STORMWATER MANAGEMENT PLAN AND DESIGN PROCESS

<u>The Plan:</u>

The proposed project incorporates stormwater management as part of the overall project design. This includes protecting the site's natural resources and environmentally sensitive areas, minimizing development impacts and impervious areas by using effective site planning principles, and incorporating design features that effectively manage stormwater runoff such as green infrastructure practices. The plan utilizes these elements in order to achieve the primary goal of meeting water quality objectives, while at the same time mitigating potential impacts associated with increased stormwater runoff. Specifically, the objectives of the stormwater management plan are to:

- Enhance the quality of stormwater runoff to prevent water quality degradation, and preserve water quality in receiving water bodies within the New York City West of Hudson watershed,
- Promote infiltration and evapotranspiration,
- Prevent increased runoff from developed land to reduce the potential for flooding, erosion and flood damage.

The plan is developed in accordance with the NYSDEC design criteria and process outlined in Section 5 above, and 10 NYCRR §128-3.9. Specific steps are described in detail later in the report. In general, stormwater is conveyed through a series of stabilized rip rap and grassed swales, storm pipes, culverts and in some cases sheet flow. Open conveyances such as roadside swales are utilized as much as possible, where it is feasible and the grade allows. Stormwater is collected, treated and attenuated in catch basins, micropool extended detention ponds, bioretention areas and dry swales. Controlled release structures within the detention ponds regulate the rate at which stormwater is discharged. The existing soils and shallow depths to bedrock limit the ability to use infiltration for treatment, so underdrains are included in the Bioretention areas and Dry Swales.

Even though there are no direct discharges to trout waters, concerns relating to thermal loading were considered in the selection of stormwater management practices due to the site's location within the drainage of the Batavia Kill. This is one of the reasons Micropool Extended Detention Ponds are used throughout the plan instead of other stormwater ponds, (such as Wet Ponds), which could potentially result in increased stream temperatures. Using Bioretention and Dry Swales also helps avoid thermal impacts, as it reduces the amount of stormwater that would be required to pond, and potentially warm, prior to being discharged. Even though 24 hours of extended detention of the 1 yr. storm event is required, using these practices and the Micropool Extended Detention Ponds minimize the potential for thermal loading.

Stormwater management devices will be vegetated with plant species adapted to survive in fluctuating hydrologic conditions, and all conveyances will have sufficient erosion protection including stone, rolled erosion control products and/or grasses. Treated stormwater will be discharged at controlled rates to stabilized swales and existing channels and drainage ways throughout the site. Existing hydrologic patterns that include stormwater runoff from areas located above the proposed development areas, are maintained to the maximum extent practicable. This is achieved by protecting existing watercourses and wetland areas, minimizing the amount of uphill run-off that is diverted away from their existing drainage areas, and allowing this runoff to bypass disturbed areas, and proposed stormwater management practices whenever possible.

By implementing these practices and creating positive drainage with effective site grading within each of the drainage areas, the proposed stormwater management systems are capable of minimizing erosion potential, treating stormwater runoff from developed project areas, and reducing post-development runoff rates from the 1, 10, and 100-year storm events.

<u>Design Process:</u>

As mentioned earlier, there is a five-step process that integrates site planning and stormwater management, and requires the use of green infrastructure practices to manage stormwater. The five steps outlined in the SMDM, (Site Planning to Preserve Natural Features, Water Quality Volume, Runoff Reduction Volume, Channel Protection Volume, and Overbank Flood and Extreme Flood Control), are discussed in the following sections.

Site Planning to Preserve Natural Features

As part of the overall design process for WMSC, the project considered site planning strategies that can be beneficial to a stormwater management plan. Some of these are listed in Table 3.1 in Chapter 3 of the SMDM. There are two categories, Preservation of Natural Resources and Reduction of Impervious Cover.

Preservation of Natural Resources includes:

- Preservation of Undisturbed Areas
- Preservation of Buffers
- Reduction of Clearing and Grading
- Locating Development in Less Sensitive Areas
- Open Space Design

- Soil Restoration

Reduction of Impervious Cover includes:

- Roadway Reduction
- Sidewalk Reduction
- Driveway Reduction
- Cul-de-sac Reduction
- Building Footprint Reduction
- Parking Reduction

On a larger scale, the preservation of land is a primary design goal of the project, as the existing natural environment is one of the aspects that makes the project unique. The planning principles above help support this goal, and were included during the site design and concept refinement process. Based on the existing site conditions and natural resource analysis included in Section 4 above, areas that are more suitable for development were identified, along with natural areas that should be preserved. Development was then clustered in the more suitable areas, (such as the flatter plateaus within the topography), slopes steeper than 25% were avoided to the greatest extent practicable, and other natural resource areas such as wetland and streams were preserved. This allows for significant open space, made up of undeveloped natural areas which can support informal recreational activities such as hiking.

The buildings, being the largest project components, are located in the flattest areas and designed to fit into the topography, to reduce as much as possible the necessary clearing and grading. Roads were then strategically located to connect the developed areas, using the same principles of avoiding sensitive areas and minimizing grading as much as possible. There are several existing logging roads or ‘jeep trails’ within the site, and these existing corridors were re-used as much as possible, helping to further minimize disturbance. Potential impacts to wetlands and watercourses and their setbacks were also minimized by avoidance, spanning streams with bridges, and minimizing grading within buffer areas to the maximum extent practicable. Soils with high or even moderate capacity for infiltration do not exist on the site, and therefore were not a factor in the site design process. However, post-construction soil restoration is specified as part of the stormwater pollution prevention plan (SWPPP), in order to alleviate impacts relating to compaction around the development areas.

Overall the project as a whole would disturb up to about 141 acres out of 464 acres. This represents about 30% of the site. Approximately 323 acres, or 70% of the site, would remain undisturbed. These numbers can be considered worst case since they are based on vegetation being removed from most, if not all of the designated building envelope of each lot. This is not permitted by the Architectural Review Board (ARB), and the Design Guidelines for the project contain a number of conditions that limit the amount of lot clearing to only that area needed to construct the residences, and strongly encourage lot owners to minimize the removal of large massings of existing vegetation and minimize overall environmental intrusion on site. Professionally prepared individual grading/drainage plans and landscaping plans for each lot are required to be submitted by the lot owners and approved the Architectural Review Board to ensure adherence to the guidelines, and that the character and existing environment is preserved to the maximum extent practicable.

As part of the same planning process, impervious areas were also minimized. The paved road widths are limited to 20 feet, and cul-de-sacs are minimized while still allowing for emergency access. Both the Member's Lodge and East Base Lodge, the two largest buildings in the project, incorporate almost all of their parking underground, within the footprint of the building. This alone represents a reduction of approximately 1.3 acres of impervious surface. Impervious surfaces on the residential lots, including the allowable building footprints, are also purposefully limited in the Project Design Guidelines so that existing pervious areas are preserved as much as possible. Additionally, driveway widths for residential units are limited to between 12 and 14 feet for single driveways, and 16 feet for shared driveways. And, single family homes are placed as close to the road as possible to limit the driveway length.

Proposed Subcatchment Mapping

Subcatchment mapping of the proposed project area was developed based on the previously identified design points, the existing subcatchment mapping, and the proposed hydrologic drainage patterns within the project design. The same methodology used in the development of the existing subcatchment mapping with regards to cover types, soils and time of concentration flow paths, were used for the proposed subcatchment mapping.

Cover types in the proposed conditions include woodlands, meadow and wetlands in the undisturbed areas, lawn areas, roads and paving, and roof area. The 'Woods/Grass combination' with a CN of 72 was again used to model the undisturbed areas of the site. Since soil restoration is specified as part of the SWPPP, the proposed lawn areas are modeled with a CN of 74 based on the existing Hydrologic Soil Group C. Time of concentration flow paths are based on a combination of the existing topography and proposed grading, and sheet flow is limited to a distance of 100'.

The proposed watershed is divided into several subcatchments totaling approximately 479 acres. This is the same watershed area identified in the pre-development condition. In the proposed condition, the existing hydrology is maintained as much as possible by structuring the stormwater plan so that watershed areas that drain to a specific Design Point in the pre-development condition, primarily drain to the same Design Point in the post development plan.

The data referenced above is collected during the subcatchment mapping process and entered into the HydroCAD model to be used as part of the basis for the stormwater management design.

Water Quality Volume Calculations

The required water quality volume (WQv) was calculated for each drainage area contributing to a design point, based on the proposed design. The calculation was performed in accordance with the equation presented in Table 4.1 in Chapter 4 of the Manual, utilizing both the 1.1 inch storm event required by DEC, and the 3.0 inch storm event required by DEP. The resulting volumes determined the amount of treatment required, and were then used as the basis for the Runoff Reduction Volume calculation required by NYSDEC. A summary of the WQv required by drainage area is included in Tables 1 and 2 later in the report, and detailed supporting calculations can be found in the Water Quality Volume Calculation Table, in Appendix B.

As part of the above calculation, the percent of impervious area within each drainage area is also calculated. This is used not only to determine the WQv, but also to identify additional DEP treatment requirements above and beyond what is required by DEC, in accordance with DEP's April 2010 updated regulations. Section 18-39(c)(6) of the April 2010 DEP regulations states that if impervious surfaces cover 20% or more of a drainage area for which stormwater practices are designed, runoff from that drainage area shall be treated by two different types of stormwater management practices in series. Based on our analysis of this DEP requirement and its relationship to DEC's SMDM requirements, it is our understanding that the calculation to determine the percentage of impervious area is performed at the design point which defines the contributing drainage area. There appears to be a potential correlation between the DEC design process and this DEP requirement, however the regulations do not include sufficient language or information about how the DEC and DEP calculations and process could integrate with one another.

Based on the above, all of the drainage areas in this project for which standard stormwater management practices are designed do not include impervious surfaces greater than 20% of the total drainage area. A summary of this information is in Table 2, DEP WQv summary, (later in the report) and supporting calculations can be found in the Water Quality Volume Calculation Table in Appendix B.

Runoff Reduction Volume Calculations (RRv)

Section 4.3 of the SMDM states the RRv requirement can be accomplished by application of on-site green infrastructure techniques, standard stormwater management practices with runoff reduction capacity, and good operation and maintenance. If by using these techniques the calculated RRv is greater than the required WQv, the RRv requirement is met. If the RRv is less than the required WQv, then the design must at a minimum, reduce a percentage of the runoff from impervious areas to be constructed on the site. The percent reduction is based on the Hydrologic Soil Group of the site, and is determined by the Specific Reduction Factor (S). The Specific Reduction Factor (S) for this project is 0.30, based on the 'C' soils present.

Green Infrastructure Practices

Listed below are the green infrastructure techniques and standard stormwater management practices with runoff reduction capacity acceptable for runoff reduction, as noted in Tables 3.2 and 3.5 of the SMDM, and an evaluation of its use within this project.

Conservation of Natural Areas

As described in the Site Planning section above, there are several natural areas throughout and around the project site that that have been protected. These natural areas are a critical component of the design, from both an environmental standpoint and an aesthetic standpoint. These areas provide context and setting for the Project as a whole, integrating it with the surrounding landscape. These preserved areas are clearly marked on the project plans, and designated for protection during construction as shown on the Erosion and Sediment Control Plans, sheets L3.01-3.05 in the DEIS plan set. While these areas are clearly protected and will be maintained by the Project, no conservation easements are planned.

In an effort to maintain the existing hydrology of the site as much as possible, runoff from these undisturbed areas is routed so it can bypass stormwater management practices (SMP's) as much as possible, before reaching the design points. These areas are included in the initial WQv calculation;

however, since they do not drain to a Stormwater management Practice (SMP), the areas are not included in the adjusted WQv calculations, and no area reductions are taken for the RRv calculation.

Sheetflow to Riparian Buffers/Filter Strips

This technique is not used for this project primarily due to the slope requirements and the maximum length of overland flow restrictions in the SMDM. Most portions of the project site where this technique could be applied are steeper than the allowable maximum contributing slope ranging from 6%-15% Additionally, as part of this plan, all runoff from developed areas is typically treated and attenuated prior to being discharged into these naturally occurring areas, so the natural hydrology can be maintained as much as possible.

Vegetated Open Swales

RRv is not applied for this technique due to site topography prohibiting the required design flows and flow depths, and exceeding slope requirements of 4 percent. However, vegetated swales are an integral part of the design with respect to stormwater conveyance. And, in many cases, Dry Swales are used instead.

Tree Planting/Tree Box

There are several natural areas with existing trees that are being preserved, and an extensive tree planting plan is included as part of this project, (see sheets L6.01-L6.09, Layout, Materials and Planting Plans). However RRv is not applied for this technique due to limiting slope requirements of 5% for proposed trees and 6%-15% for existing trees and distance limitations based on proximity to impervious areas. (There are several other limiting factors related to the applicability of this technique, such as a correlation to Rooftop Disconnection, Sheet Flow to Filter Strip and Natural Conservation Areas, but it is not clear how all these factors and/or restrictions can be integrated into a project of this size and scope. This is another reason why this technique is not applied to the RRv calculation. However, this is a conservative measure based on the existing wooded areas to be preserved and the extensive tree planting plan.)

Disconnection of Rooftop Runoff

RRv is not applied for this technique due to the limiting infiltration capabilities of the project site soils.

Stream Daylighting

An impervious area reduction is not taken for this practice because the project does not qualify as a re-development project as defined in the SMDM, and therefore stream daylighting is not an applicable practice.

Rain Garden

RRv is not applied for this technique. Rain gardens are typically applied within very small drainage areas usually associated with residential development. The contributing drainage areas for proposed individual homes exceeds the maximum contributing area of 1,000 sf (for a rain garden), specified in SMDM. Instead, Bioretention practices are incorporated as part of the plan. In addition to this practice being more appropriate for larger contributing drainage areas, this results in fewer practices for a larger area which can simplify operations and maintenance.

Green Roof

Green Roofs are not incorporated into this project, and therefore no RRv is applied for this technique. During the design process, it was determined that requiring a green roof as part of a residential offering would eliminate a majority of potential buyers due to the associated substantial cost increase, concerns about maintenance and performance with regards to waterproofing, making the project infeasible. Additionally the proposed architectural philosophy of the project, designed to blend in with the historic mountain character present in many of the surrounding communities by using design elements outlined in the ARB Design Guidelines, does not readily facilitate a green roof. Classic historic structures utilized strong sheltering roof forms with deep overhangs, large covered porches, gable and shed dormers, divided light windows, substantial exposed beam and rafter tails and native materials. These elements, and the historic forms in general result in a steeply sloping roof pitch, which cannot support a green roof. This unifying character is critical to the success of the project as it seeks to compliment the surrounding environment. As a result, this architectural philosophy is consistent throughout the project on both residential and multi-use buildings.

Stormwater Planters

Stormwater Planters are more geared towards urban settings, as they can primarily be utilized in hardscape areas and building terraces, and adjacent to buildings and parking garages. The project as proposed minimizes areas of hardscape, such as patios, and does not include any substantial building terraces. Areas immediately surrounding the proposed buildings are not suited for planters, as one of the project goals is to incorporate natural plantings to compliment and blend in with the existing woodlands, and an artificial planter contradicts this design goal. For these reasons, this RRv technique is not utilized.

Rain Tanks/Cisterns

Rain Tanks and Cisterns were considered as part of the initial stormwater planning for the proposed single family homes. However after looking at the pros and cons relating to on-going maintenance, climate, size requirements and constructability, it was determined that using Bioretention areas instead was more in line with the project design goals, and easier to build and maintain.

Porous Pavement

The infiltration capacity of the existing soils is a limiting factor preventing the effective use of porous pavement on this project. Therefore RRv is not applied for this technique.

Bioretention

Bioretention is a primary treatment device used throughout the project, used mostly to treat the WQv in small drainage areas with high percentages of impervious areas, and at specific residential building lots. The bioretention areas are designed with a 6” maximum ponding depth, an overflow pipe, a 48” depth of soil filter media, a 12” gravel drainage layer and an underdrain. In all cases where these practices are used, the WQv requirement for the DEC storm is met, and overflow from larger events is directed via the overflow pipe, or over a weir to a standard SMP for attenuation. In many cases the Bioretention areas are oversized and the WQv requirement for the DEP storm is met, and therefore in a few cases these practices meet the total RRv requirement for a specific drainage area. As a bioretention practice on ‘C’ soils, 40% of the provided WQv is applied towards the RRv.

Dry Swale

Dry Swales are used throughout the project primarily to convey and treat the WQv associated with project roadways and shared driveways. The dry swales are designed with an 18” ponding depth, a 30” depth of soil filter media, a 12” gravel drainage layer and an underdrain. Checkdams will be used to create the storage capacity. In almost all cases where these practice are used, the WQv requirement for the DEC storm is met, and in some cases the WQv requirement for the DEP storm is met. Overflow from larger events is in most cases directed over a weir, and in some cases directed through an overflow catch basin outlet to a standard SMP for attenuation and additional treatment. In some cases, the Dry Swales discharge directly to conveyance swales or existing drainage channels at a controlled rate to ensure adequate attenuation is provided. As an open channel practice on ‘C’ soils, 20% of the provided WQv is applied towards the RRv.

RRv Summary

The RRv goals and the minimum RRv requirements were calculated in accordance with the equations and methodologies presented in Section 4.3 of the SMDM, utilizing the 1.1 inch storm event required by DEC. Table 1 presents a summary of the Runoff Reduction Volume and DEC Water Quality Volume calculations for the project site.

Table 1 Runoff Reduction and DEC Water Quality Volume Summary

DEC WQv req'd	206,567
Adjusted DEC WQv req'd *	147,652
Additional Area reductions?	NO
Adjusted DEC WQv req'd	147,652
Minimum RRv	35,654
Runoff Reduction Volumes by GI Techniques	
GI Practice	RRv (cf)
Rain Garden	
Green Roof	
Stormwater Planter (infiltration)	
Stormwater Planter (flow through)	
Cistern	
Permeable Pavement	
Infiltration Area	
Bioretention Areas	32,705
Dry Swales	13,458
Vegetated Swale	
Total Runoff Reduction	46,163
Is RRv>WQv?	NO
Is RRv>minimum RRv?	YES
Total WQv remaining to be treated	101,488
WQv provided in standard practices	341,494
Total WQv provided	468,003

**After removal of areas not draining to an SMP*

The calculations show that the minimum RRv is met for the Project Site. Justification evaluating the use of each green infrastructure technique and site limitations is presented in the paragraphs above. Based on this information the project meets the RRv requirements listed in the SMDM.

Remaining Water Quality Volume

Micropool Extended Detention Ponds (P-1) are used to treat the remaining WQv from the drainage areas contributing to those practices. In all cases, the WQv requirements for the DEC 1.1 inch storm and DEP 3.0 inch storm are met. The ponds are typically designed with a forebay, a micropool or permanent pool, and a controlled release structure that regulates discharge from the pond. Emergency spillways or weirs are also provided. See sheet L8.02 in the DEIS plan set for Pond details. Treated water is discharged from the ponds to conveyance swales or existing drainage channels at a controlled rate to ensure adequate attenuation. Table 2 presents a summary of the Water Quality Volume calculations when using the 3.0 inch storm event as required by NYCDEP. It also lists the percent of impervious area that drains to a specific stormwater management practice. Detailed supporting calculations listing required and provided WQv can be found in Appendix B.

Table 2 NYCDEP Water Quality Volume Summary

Drainage Area	DEP WQv Req'd	DEP WQv Provided	% Impervious to SMP	
			Percentage	SMP
1	25,004	33,900	13.46	P1.1
2	97,940	107,126	18.40	P2.5
3	44,088	44,155	13.52	P3.3
5	1,459	1,500	16.21	*Bio
6	2,418	2,500	46.51	*Bio
7	3,779	14,500	7.41	P7.1
8	66,960	73,206	19.69	P8.2
9	45,530	67,689	15.46	P9.2
11	75,561	87,677	19.83	P11.1
12	26,991	35,750	9.84	P12.1

** All area treated via Bioretention*

Based on the plans and supporting calculations, the necessary WQv for both the 1.1 inch (DEC) and 3.0 inch (DEP) storm events is provided, and therefore the requirements are met.

Volume and Peak Rate Control

Channel Protection Volume (CPv)

Stream Channel Protection Volume (CPv) requirements are designed to protect stream channels from erosion, by providing 24-hour (12-hour in trout waters) extended detention of the one-year, 24-hour storm event. For this project, the 1-year event is **3.0 inches** as per Figure 4.4 of the SMDM. For this project, the required CPv is calculated utilizing the Plug Flow Calculation in HydroCAD (TR-20) or the figures and calculations, (TR-55) in Appendix B of the SMDM. Typically, CPv requirements are met using Micropool Extended Detention Ponds with a controlled release structure to provide the necessary attenuation. A summary of the required and provided CPv can be found in Table 3. Detailed information is included with the HydroCAD calculations in Appendix D. Based on the plans and supporting calculations, the CPv requirements are met.

Table 3 Channel Protection Volume Plug Flow Detention Time

Drainage Area	SMP	Detention time (Hours)
1	P1.1	25.3
2	P2.5	30.9
3	P3.3	27.7
7	P7.1	25.0
8	P8.2	25.9
9	P9.2	42.5
11	P11.1	33.9
12	P12.1	25.4

Overbank Flood (Qp) and Extreme Flood (Qf) Control

The primary purpose of the Overbank Flood (Qp) control sizing criterion is to prevent an increase in the frequency and magnitude of out-of-bank flooding generated by urban development. It requires storage and attenuation of the 10-year, 24-hour storm to ensure post-development peak discharge rates do not exceed the pre-development condition. For this project, the 10-yr event is **5.0 inches**, as per Figure 4.5 of the SMDM.

The intent of the Extreme Flood (Qf) criteria is to (a) prevent the increased risk of flood damage from large storm events, (b) maintain the boundaries of the pre-development 100-year floodplain, and (c) protect the physical integrity of stormwater management practices. It requires storage and attenuation of the 100-year, 24-hour storm to ensure post-development peak discharge rates do not exceed the pre-development condition. For this project, the 100-yr event is **7.5 inches** as per Figure 4.6 of the SMDM.

For this project, the Qp and Qf requirements listed above are met using Micropool Extended Detention Ponds (P-1), to provide the attenuation necessary to match the pre-development conditions. Stormwater is routed by conveyance swales, closed system piping or overland sheet flow to these Detention Ponds where it is stored for a period of time and released at a controlled rate through a controlled release structure, and/or over a broad crested weir. Treated storm water is typically discharged at controlled rates from the ponds directly to existing drainage courses, or to constructed conveyance swales that distribute the runoff to existing drainage courses. In most cases runoff cannot be discharged as sheet flow due to the presence of slopes over 10 percent. In all cases conveyance swales are constructed with a stabilized surface, such as grass, grass with turf reinforcement mat, cobbles or rip rap, designed to support anticipated velocities without experiencing erosion. The swale surface materials along with the proposed grading also helps to control flow rates.

All of the project data and calculations mentioned in previous sections was collected and included in the HydroCAD model, to determine the peak rate flows at each of the design points in the post development condition. This information was then compared to the pre-development rates at each design point to ensure the pre-development peak discharge rates are not exceeded. Refer to Table 4, for a comparison of pre and post-development peak discharge rates and volumes.

Table 4 Rate and Volume Summary

DESIGN POINT #	Areas (Ac.)		DESIGN STORM			
			10 YEAR, 5.0"		100 YEAR, 7.5"	
			PEAK	VOLUME	PEAK	VOLUME
			cfs	af	cfs	af
1	74.71	PRE	156.98	13.99	315.08	26.92
	80.53	POST	133.35	15.48	297.42	29.71
2	38.00	PRE	68.67	6.96	135.61	13.49
	43.46	POST	47.14	9.91	121.42	18.23
2a	2.89	PRE	9.43	0.53	18.20	1.02
	1.80	POST	6.16	0.33	11.88	0.64
2b	17.97	PRE	48.08	3.50	94.02	6.78
	4.27	POST	15.25	1.06	29.25	1.80
3	14.68	PRE	35.10	2.69	68.74	5.21
	27.39	POST	23.18	5.17	66.38	8.50
4	12.33	PRE	29.08	2.59	56.97	4.37
	3.57	POST	19.81	1.06	50.51	3.11
5	44.40	PRE	105.04	8.13	205.76	15.75
	24.15	POST	74.02	4.57	144.59	8.75
6	2.82	PRE	10.13	0.50	19.68	0.97
	2.00	POST	5.83	0.41	15.17	0.77
7	5.31	PRE	18.93	0.94	36.82	1.84
	4.92	POST	7.41	1.13	30.25	2.04
8	40.51	PRE	98.47	7.42	194.23	14.38
	52.82	POST	84.96	10.77	192.96	19.55
9	26.05	PRE	69.48	4.95	133.81	9.48
	24.72	POST	15.30	5.66	131.91	10.88
11	165.06	PRE	274.77	31.01	541.52	59.62
	169.25	POST	252.53	32.95	521.68	62.20
12	34.37	PRE	76.97	6.30	151.11	12.20
	40.21	POST	50.57	7.73	124.22	14.75
TOTAL	479.09	PRE				
ACRES	479.09	POST				

Based on this comparison, post-development peak discharge rates do not exceed the pre-development condition at any of the identified design points, and therefore the Qp and Qf requirements are met.

Comprehensive Management Plan

Using the design process described above, the proposed techniques and stormwater management practices are incorporated into the overall project design. The Grading and Drainage Plans, supported by the

Proposed Subcatchment mapping, (sheets L4.00-4.09 and L5.01-L5.06 in the DEIS plan set), show how the specific components are integrated into the overall project. Specific descriptions are as follows.

The eastern half of the project site drains to design points, 12, 1, 2, 2a and 2b. On the easternmost portion, runoff from proposed buildings and roads is collected as sheet flow in roadside swales. A small portion of Sunrise Terrace is collected in a closed system (catch basins and pipe conveyance), in order to prevent stormwater from entering the adjacent stream before it is treated or attenuated. Flows are conveyed to a Micropool Extended Detention Pond near design point 12, where it is treated and attenuated before being released through a controlled release structure with staged orifices to control flow rate, and an overflow weir, to an existing drainage channel that flows into a small wetland area and eventually to design point 12. Within this watershed there is also a small portion of a shared driveway off the cul-de-sac at the end of Cave Mountain Rd. which sheet flows to a Dry Swale, before discharging at a controlled rate to the existing drainage channel leading to design point 12.

North of Design Point 12 and uphill of design point 1, runoff from single family homes and Cave Mountain Rd. is collected in roadside swales and catch basins, and conveyed to a micropool extended detention pond. The pond then discharges to an existing drainage channel that flows through a wetland and eventually to design point 1. There are also three single family homes in this watershed that use bioretention areas to independently treat stormwater runoff from their respective lots. Bioretention was utilized for these lots due to their location and elevation, which make it difficult to convey runoff to the larger stormwater management system and its treatment practices.

In the central portion of the eastern half of the project, (north of the existing primary drainage channels), stormwater is primarily collected in roadside swales and conveyed to Bioretention areas and Dry Swales. From there it is either discharged directly to an existing channel, or conveyed to micropool extended detention basin P-2.5 for additional treatment and attenuation.

Specifically, north of the existing drainage channels and uphill of Sunrise Terrace, sheet flow from homes and roads is collected in roadside swales and conveyed to micropool extended detention pond 2.5 near design point 2. Runoff from Meadow Crossing, the adjacent residential lots and shared driveway just west of the transport lift is conveyed to a dry swale and bioretention area P2.3, where it is treated and released at a controlled rate into an existing drainage channel within a wetland that eventually flows to design point 2. Runoff from the portion of Cave Mountain Rd. just east of its intersection with Sunrise Terrace is also collected and treated in a Dry Swale, before being conveyed through a closed system to pond 2.5 for additional treatment and attenuation. Adjacent to the East Base Lodge, Bioretention Area 1.2 collects runoff from half of the Lodge roof and provides treatment before discharging to an existing drainage channel that flows to design point 1. Stormwater from the other half of the East Base Lodge, adjacent parking areas and roadways are collected in catch basins and conveyed through a pipe system to pond P2.5. Most of the stormwater is released from Pond 2.5 through a controlled release structure and pipe to the existing drainage channel at design point 2. During the larger storm events, a portion of this flow is directed over an overflow weir to an adjacent wetland and drainage channel that flows to design point 1.

Design Points 2a and 2b do not receive runoff from areas with proposed development. Runoff from these areas will sheet flow over the property line, just as it does in the pre-development condition.

The western half of the project site drains to design points, 3-9 and 11. Just west of the ‘ridge’ that separates the eastern and western halves of the project, stormwater runoff from Cave Mountain Rd. , Meadow Crossing and adjacent single family home lots is collected in a series of Dry Swales where it is treated, and then conveyed via swales and pipes to Micropool extended detention pond P3.3. This pond provides additional treatment and attenuation, before discharging to a rip rap conveyance swale that follows the alignment of an existing logging road before discharging to the existing drainage channel at Design Point 3.

Further to the west and adjacent to the existing ski trail ‘Wanderer’ is the Member’s Lodge. Runoff from undisturbed areas above the ski trail is routed through a conveyance swale on the south side of the trail to an existing drainage channel west of the Member’s Lodge. This generally mimics the pre-development condition. There is a shared driveway and four single family home lots west of the Member’s Lodge that primarily utilizes Dry Swales to provide treatment. One of the homes and a small portion of the driveway is collected in catch basins and conveyed to the bioretention area (p11.2) north of the Member’s lodge. This Bioretention area also provides treatment for the Member’s Lodge, the townhome units to the east, and the adjacent portions of Sheridan Drive. Runoff is conveyed to the bioretention area through a closed pipe system that discharges just above the Bioretention area and enters at the surface. The WQv is treated within this facility and discharged to the adjacent stream corridor to the west. Larger storm events are routed through a flow splitter and through an overflow pipe in the bioretention area to the Micropool extended detention pond P11.1, where further treatment and attenuation is provided. Pond 11.1 also collects runoff from Townhome lot TH3 and the adjacent section of Sheridan Drive. Discharge from P11.1 is through a controlled release structure and an overflow weir to an adjacent stream channel within a wetland. Immediately north of pond P-11.1 are three single family home lots (37-39) and a shared driveway. The driveway and lots 38-39 are treated in a bioretention area and released. Lot 37 utilizes an independent bioretention area to manage its stormwater, due to its location and elevation. There are additional single family home lots, 33-36, to the north west of Sheridan drive. These lots also utilize bioretention and dry swales to manage stormwater separate from the Project’s primary system. Another Bioretention area in this location, Pond P11.7, provides stormwater treatment for a small portion of Sheridan Drive and single family home lot 40. Runoff is conveyed to the bioretention area through a closed system.

Just east of the Wellness Center, runoff from the Townhome lots and adjacent road is collected in a dry swale and treated, before it is conveyed through a series of roadside swales and pipes down Sheridan Drive to micropool extended detention pond P8.2. Runoff from the Wellness Center, adjacent single family lots, and a large portion of Sheridan Drive including the areas leading up to, and past ‘the switchback’, is also conveyed via the same system to pond 8.2. Seven single family lots (42-45, 47, 49 and 51) north of the Wellness Center utilize independent bioretention areas to manage stormwater on their respective lots. This provides treatment at the source and reduces the amount of WQv treatment necessary in Pond 8.2. Stormwater collected in pond 8.2 is discharged through a controlled release structure and over a weir to an existing drainage course that flows to design point 8.

Design point 4 is a small drainage channel west of ‘the switchback’ that collects flow from an undisturbed area. This is similar to the pre-development condition.

Design Point 5 collects runoff from a large, undisturbed area to the north of the intersection of Sheridan Drive and Cave Mountain Rd, and from four single family lots (26-29) and their associated driveways. These lots and driveways are treated in Bioretention areas before being conveyed through swales to Design point 5.

Four duplex lots (D1-D4) just south of design point 6 also utilize bioretention in order to manage runoff from their respective lots. Larger storm events will sheet flow over a weir to Design Point 6.

Stormwater runoff from the two additional duplex lots, (D5-D8) and the driveway that services them flows through a conveyance swale to a small Micropool extended detention pond, P7.1. Stormwater collected in the pond is discharged through a controlled release structure and over a weir to a conveyance swale that flows to en existing drainage channel at Design Point 7.

The last portion of the project, the area along the portion of Sheridan Drive from Trailside Rd. to the first stream crossing, collects stormwater runoff from the single family home lots and adjacent road in roadside swales and conveys it to micropool extended detention pond P9.2. The portion of Sheridan Drive east of Batavia Lane is collected and treated in dry swales, before being conveyed to Pond 9.2 for additional treatment and attenuation. The portion of existing Trailside Road between Pond 9.2 and the perennial stream that crosses under it to the south is also conveyed through a roadside swale to Pond 9.2. Stormwater collected in Pond 9.2 is discharged through a controlled release structure and over a weir to a conveyance swale that flows to the existing roadside ditch at Design Point 9. Stormwater runoff from the Townhome lots east of Pond 9.2 is collected and treated in a Bioretention area (P9.3). Larger storm events flow into an overflow pipe and also discharge to the existing roadside ditch at Design Point 9.

8.0 POST-CONSTRUCTION MAINTENANCE REQUIREMENTS

All operational phase stormwater management practices will be maintained in accordance with the project Stormwater Pollution Prevention Plan required by NYSDEC. This includes, but is not limited to, cleaning of sediment from drainage inlet sumps, removal of sediment from SMPs, cleaning conveyance piping and channels of obstructions, and regular inspection and repair as necessary of any outlet control mechanisms. The Homeowners Association will be responsible for maintenance of all of the post-construction stormwater management practices onsite. Currently, the bylaws that will describe the responsibilities of the Homeowners Association are being drafted, and details of the maintenance of the post-construction stormwater management practices will be described therein. On lots 33, 38, 42, 43, 44, 45, 47, 49, 51, 141, 142 and 143, the lot owners will be responsible for maintenance of the post-construction stormwater management practices (i.e. bioretention practices on the individual lots) for the life of the systems. The maintenance of these stormwater practices on the individual lots will be enforced by the Home Owners Association Offering Plan that all of the individual lot owners will be responsible for signing and abiding by for the life of the lot. This Offering Plan is being drafted and will be finalized when it is accepted by the Attorney General. The Offering Plan will clearly state the maintenance requirements of the stormwater management practices on the individual lots and if the maintenance of these practices is not conducted appropriately, the Homeowners Association will conduct the required work at the expense of the individual lot owner. The Homeowners Association responsibilities regarding the individual lots with post-construction stormwater management practices located on the property will be clearly spelled out in the Offering Plan for the Homeowners Association.

9.0 CONCLUSION

The stormwater management goals and objectives for this project listed in the introductory paragraph, specifically meeting water quality objectives while at the same time mitigating potential impacts associated with increased stormwater runoff, have been met. The goals are met through the use of thoughtful and careful site planning, preservation of the site's natural resources and environmentally sensitive areas, minimizing development impacts and impervious areas, and incorporating design features such as green infrastructure techniques and standard stormwater management practices that effectively manage stormwater runoff and compliment the overall project design.

Additionally, the information presented above, supporting calculations and project plans demonstrate that the project and associated stormwater management plan has been developed in accordance with the New York State DEC Stormwater Management Design Manual, (August, 2010), and the Rules and Regulations for the Protection from Contamination, Degradation, and Pollution of the New York City Water Supply and its sources, 10 NYCRR §128-3.9.

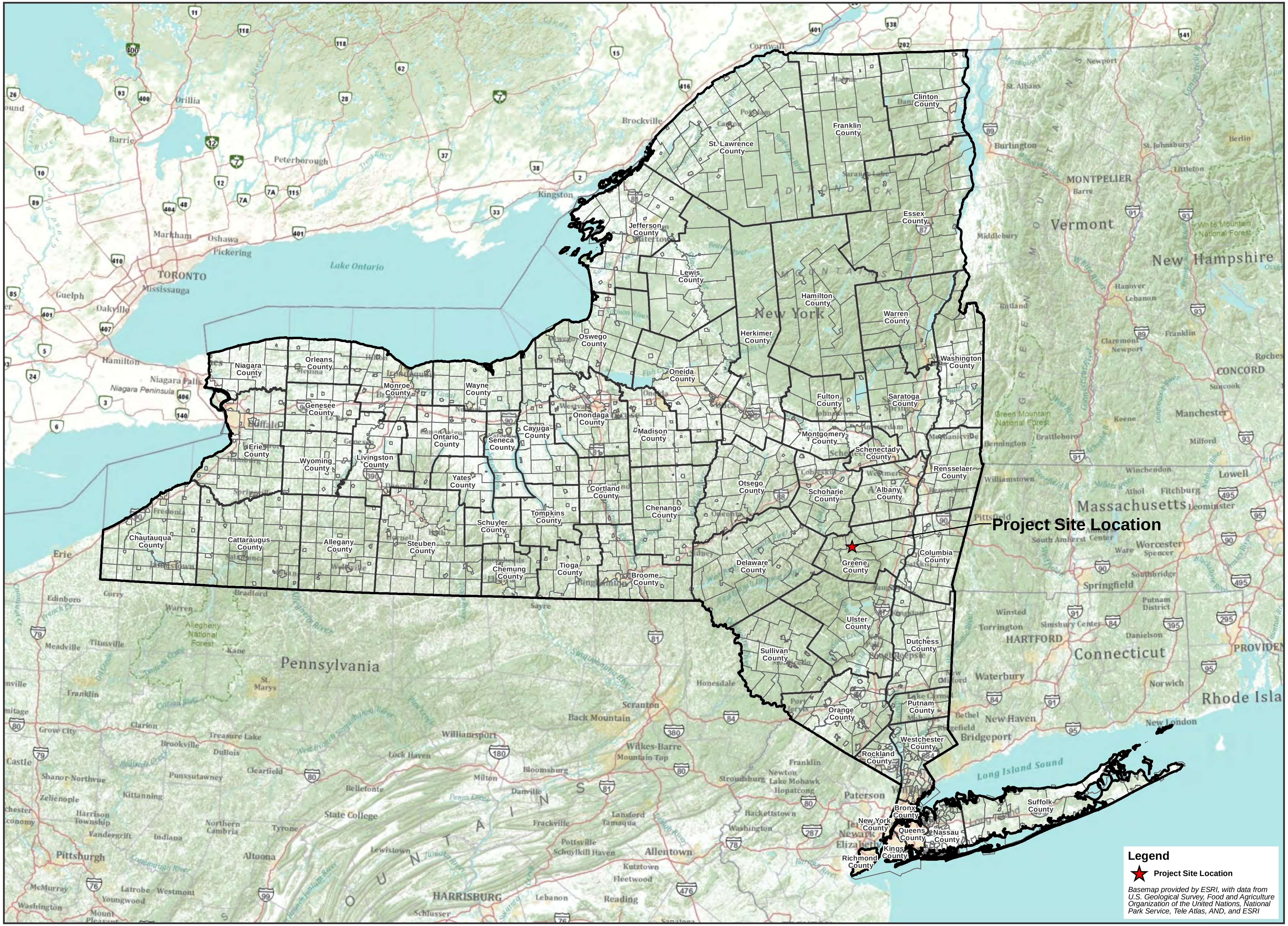
10.0 REFERENCES

1. Urban Hydrology for Small Watersheds. Published by the U.S. Soil Conservation Service, Washington, D.C., June 1986.
2. HydroCAD (version 9.10) Stormwater Modeling Software, by HydroCAD Software Solutions, LLC.
3. NYSDEC Stormwater Management Design Manual. Published by the New York State Department of Environmental Conservation, Updated August 2010.
4. Rules and Regulations for the Protection from Contamination, Degradation, and Pollution of the New York City Water Supply and its sources, 10 NYCRR §128-3.9.

G:\Proj-08\08077_Tuck_Windham\08077hydrocad\Storm Report\08077_Stormreport-Final.Doc

APPENDIX A

Figures



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34 SALISBURY ROAD
DARIEN, CT 06820

The Windham Mountain Sporting Club

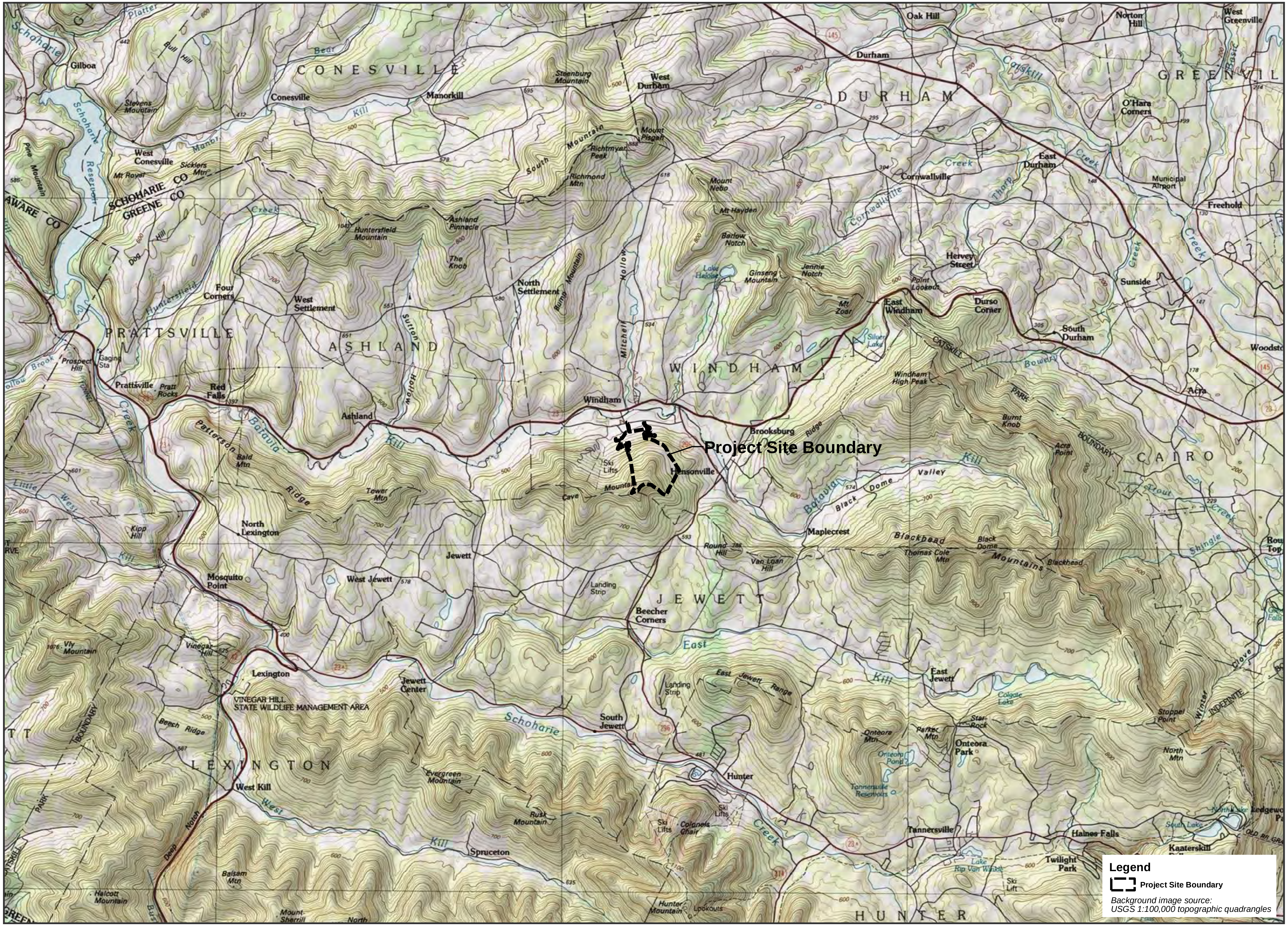
Town of Windham, Greene County, New York

Title
New York State Location Map

0 15 30
Miles

Project: 08077
Date: 11/30/2011

Figure:
1-1



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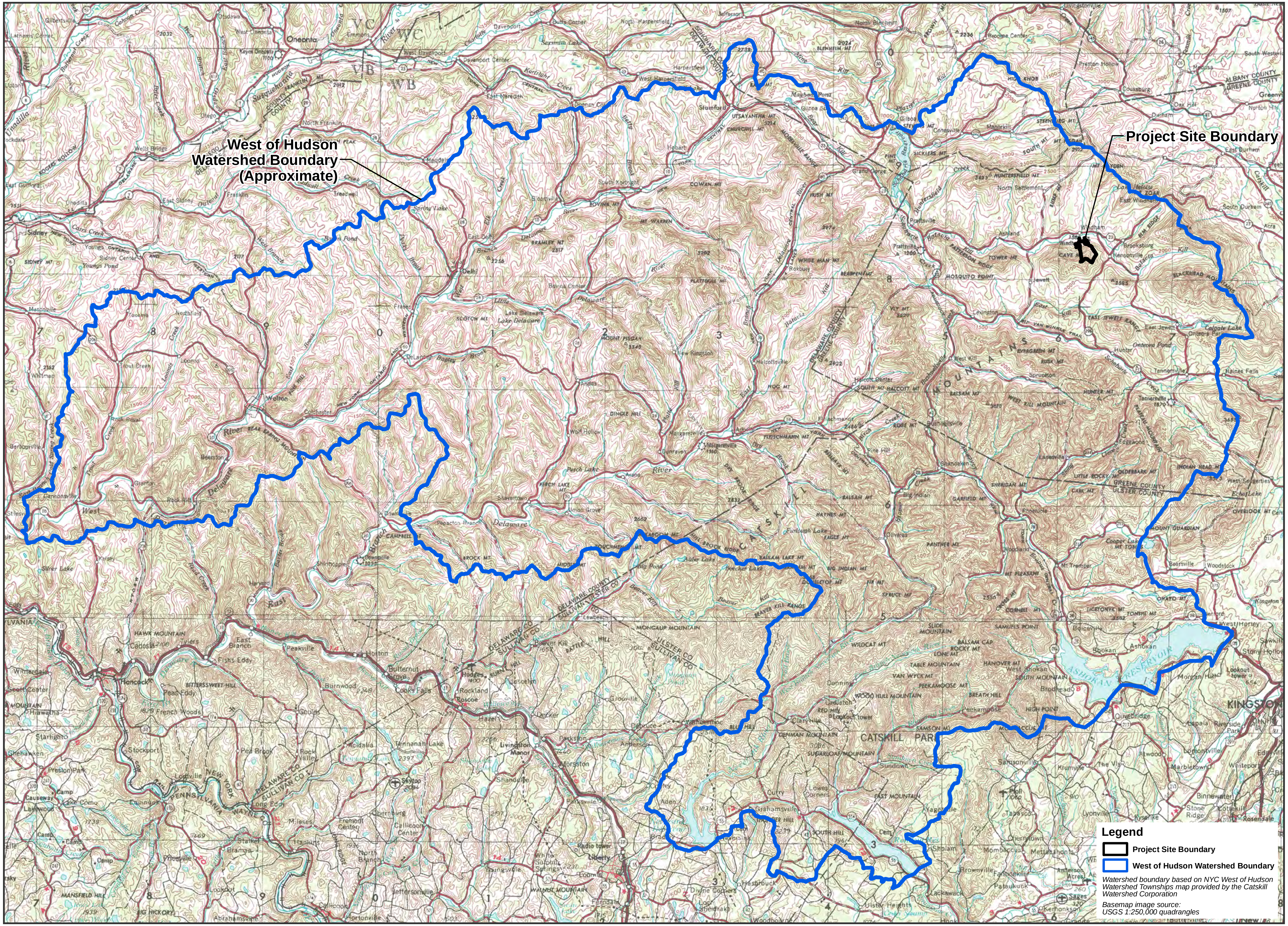
The Windham Mountain Sporting Club
Town of Windham, Greene County, New York

Title
Regional Location Map

0 0.5 1
Miles

Project: 08077
Date: 11/30/2011

Figure:
1-2



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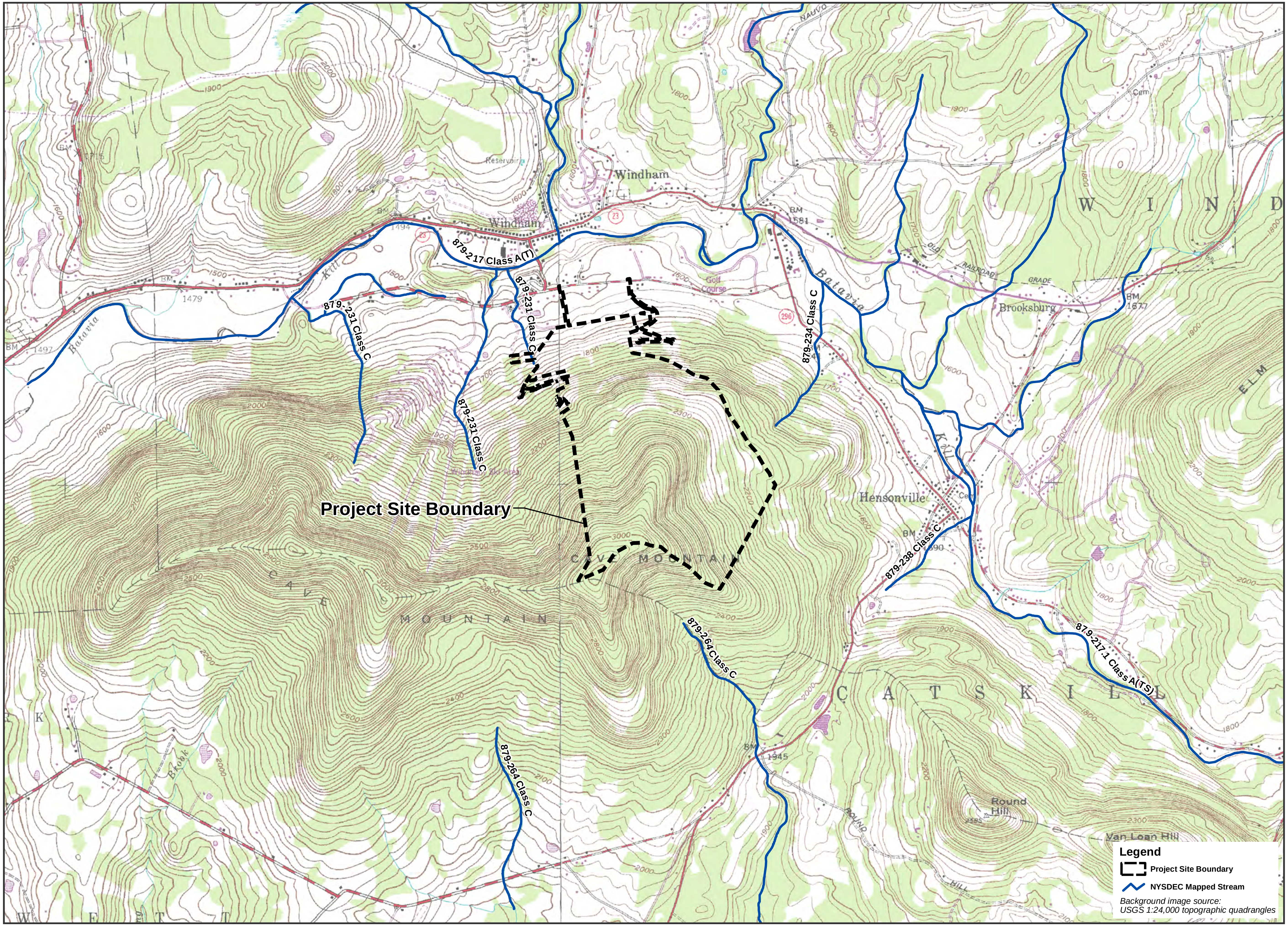
The Windham Mountain Sporting Club
Town of Windham, Greene County, New York

Title
West of Hudson Watershed Map

0 2.5 5
Miles

Project: 08077
Date: 11/30/2011

Figure:
1-5



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DARIEN, CT 06820

The Windham Mountain Sporting Club
Town of Windham, Greene County, New York

Title
NYSDEC Mapped Streams

1" = 2,000'

0 1,000 2,000
Feet

Project: 08077
Date: 12/07/2011

Figure:
3-7

APPENDIX B

Supporting Calculations

The Windham Mountain Sporting Club

Supporting Water Quality Volume Calcs

DESIGN POINT	DRAINAGE AREA (Ac)	Storm Device	Contributing Subcatchments		total size (sf)	total size (ac)	total imp (sf)	total imp (ac)	I %	DEP P	DEC P	Rv	Min. Rv	Req'd DEP WQv Acre Ft.	DEP-3.0" Req'd DEP WQv Cu.Ft.	DEC-1.1" Req'd DEC WQv Acre Ft.	Req'd DEC WQv Cu.Ft.	Provided WQv Cu.Ft.		Ai (ac)	Min. RRv Cu.Ft.	Provided *RRv Cu.Ft.
1	80.53																					
		P1.1 - P-1	1.3		12,843	0.29	5,380	0.12														
			1.7		216,179	4.96	51,548	1.18														
			1.8		149,900	3.44	1,395	0.03														
			1.9		54,520	1.25	0	0.00														
				Total	433,442	9.95	58,323	1.34	13	3.0	1.1	0.17		0.43	18,541	0.16	6,798	27,000				
		P1.2 - Bioretention	1.10		64,226	1.47	0	0.00														
			1.11		23,832	0.55	23,832	0.55														
				Total	88,058	2.02	23,832	0.55	27	3.0	1.1	0.29		0.15	6,463	0.05	2,370	6,900				2760
		None/Undisturbed	1.1		1,659,774	38.10	0	0.00														
			1.2		108,960	2.50	0	0.00														
			1.4		682,225	15.66	5,600	0.13														
			1.12		535,622	12.30	0	0.00														
				Total	2,986,581	68.56	5,600	0.13														
Entire Drainage Area				**Total**	3,508,081	80.53	87,755	2.01	3	3.0	1.1	0.07		1.46	63,596	0.54	23,318					
Contributing to SMP				**Total**	**521,500**	**11.97**	**82,155**	**1.89**	**16**	**3.0**	**1.1**	**0.19**		**0.57**	**25,004**	**0.21**	**9,168**	**33,900**		**0.57**	**2,146**	**2,760**
		Bioret. on Indiv Lots	1.4				2,800	0.06										800				320
			1.8				5,600	0.13										1600				640
																						960
Contributing to SMP's plus Indiv Lots				**Total**	**521,500**	**11.97**	**90,555**	**2.08**	**17.36**	**3.0**	**1.1**	**0.21**		**0.62**	**26,894**	**0.23**	**9,861**			**0.62**	**2,366**	**3,720**
2	43.46																					
		P2.1 - Dry Swale	2.1		274,514	6.30	26,365	0.61														
				Total	274,514	6.30	26,365	0.61	10	3.0	1.1	0.14		0.21	9,364	0.08	3,433	5,200				1040
		P2.2 - Dry Swale	2.9		188,384	4.32	46,415	1.07														
				Total	188,384	4.32	46,415	1.07	25	3.0	1.1	0.27		0.29	12,798	0.11	4,693	6,288				1258
		P2.3 - Bioretention	2.10		93,185	2.14	21,348	0.49														
			2.11		15,687	0.36	9,600	0.22														
				Total	108,872	2.50	30,948	0.71	28	3.0	1.1	0.31		0.19	8,324	0.07	3,052					
				Total WQv req'd incl. leftover from P2.2											14,834			15,000				6000
		P2.4 - Dry Swale	2.4		186,305	4.28	42,350	0.97														
				Total	186,305	4.28	42,350	0.97	23	3.0	1.1	0.25		0.27	11,858	0.10	4,348	6,800				1360
		P2.5 - P-1	2.2		388,505	8.92	54,605	1.25														
			2.3		144,694	3.32	32,385	0.74														
			2.5		111,555	2.56	34,920	0.80														
			2.6		53,051	1.22	0	0.00														
			2.8		31,600	0.73	2,800	0.06														
			2.13		15,983	0.37	15,983	0.37														
			2.14		35,191	0.81	21,215	0.49														
			2.15		13,460	0.31	12,062	0.28														
				Total	794,039	18.23	173,970	3.99	21.91	3.0	1.1	0.25		1.13	49,069	0.41	17,992					
				Total WQv req'd incl. leftover from P2.1, P2.4, P2.6											56,397			65,418				
		P2.6 - Dry Swale	2.12		170,481	3.91	19,540	0.45														
				Total	170,481	3.91	19,540	0.45	11	3.0	1.1	0.15		0.15	6,528	0.05	2,393	8,420				1684
		None/Undisturbed	2.7		170,665	3.92	3,186	0.07														
Entire Drainage Area				Total	1,893,260	43	342,774	8	18.10	3.0	1.1	0.21		2.31	100,790	0.85	36,956					
Contributing to P2.5				Total	1,425,339	33	262,225	6	18.40	3.0	1.1	0.22		1.76	76,817	0.65	28,166					
Contributing to SMPs				**Total**	**1,722,595**	**40**	**339,588**	**8**	**19.71**	**3.0**	**1.1**	**0.23**		**2.25**	**97,940**	**0.82**	**35,911**	**107,126**		**2.34**	**8,872**	**11,342**

The Windham Mountain Sporting Club

Supporting Water Quality Volume Calcs

DESIGN POINT	DRAINAGE AREA (Ac)	Storm Device	Contributing Subcatchments		total size (sf)	total size (ac)	total imp (sf)	total imp (ac)	I %	DEP P	DEC P	Rv	Min. Rv	Req'd DEP WQv Acre Ft.	DEP-3.0" Req'd DEP WQv Cu.Ft.	DEC-1.1" Req'd DEC WQv Acre Ft.	Req'd DEC WQv Cu.Ft.	Provided WQv Cu.Ft.	Ai (ac)	Min. RRv Cu.Ft.	Provided *RRv Cu.Ft.
3	27.39																				
		P3.1 - Dry Swale	3.1		404,592	9.29	29,280	0.67													
			3.2		34,344	0.79	28,650	0.66													
				Total	438,936	10.08	57,930	1.33	13	3.0	1.1	0.17		0.43	18,521	0.16	6,791	10249			2050
		P3.2 - Dry Swale	3.3		343,308	7.88	72,040	1.65													
				Total	343,308	7.88	72,040	1.65	21	3.0	1.1	0.24		0.47	20,500	0.17	7,517	6906			1381
		P3.3 - P-1	3.4		88,013	2.02	15,960	0.37													
			3.5		30,050	0.69	0	0.00													
				Total	118,063	2.71	15,960	0.37	14	3.0	1.1	0.17		0.12	5,067	0.04	1,858				
				Total WQv req'd incl. leftover from P3.1, P3.2											26,933			27000			
		None/Undisturbed	3.6		292,656	6.72	0	0.00													
Entire Drainage Area				Total	1,192,963	27	145,930	3	12	3.0	1.1	0.16		1.10	47,746	0.40	17,507				
Contributing to SMPs				**Total**	**900,307**	**21**	**145,930**	**3**	**16.21**	**3.0**	**1.1**	**0.20**		**1.01**	**44,088**	**0.37**	**16,166**	**44,155**	**1.01**	**3,812**	**3,431**
5	24.15																				
		P5.1 - Bioretention	5.4		29,800	0.68	4,830	0.11													
				Total	29,800	0.68	4,830	0.11	16	3.0	1.1	0.20		0.03	1,459	0.01	535	1608			643.2
		None/Undisturbed	5.1		520,495	11.95	0	0.00													
			5.2		151,968	3.49	2,800	0.06													
			5.3		349,595	8.03	0	0.00													
			total		1,022,058	23.46	2,800	0.06													
Entire Drainage Area				**Total**	1,051,858	24.15	7,630	0.18	1	3.0	1.1	0.06		0.34	14,865	0.13	5,450				
Contributing to SMP				**Total**	**29,800**	**1**	**4,830**	**0**	**16**	**3.0**	**1.1**	**0.20**		**0.03**	**1,459**	**0.01**	**535**	**1,608**	**0.03**	**126**	**643**
		Bioret. on Indiv Lots	5.2				8,400	0.19										2400			960
Contributing to SMP's plus Indiv Lots				**Total**	**29,800**	**0.68**	**13,230**	**0.30**	**44.40**	**3.0**	**1.1**	**0.45**		**0.08**	**3,349**	**0.03**	**1,228**		**0.09**	**346**	**1,603**
6	2.00																				
		P6.1 - Bioretention	6.2		9,809	0.23	4,800	0.11													
				Total	9,809	0.23	4,800	0.11	49	3.0	1.1	0.49		0.03	1,203	0.01	441	1250			500
		P6.2 - Bioretention	6.3		10,833	0.25	4,800	0.11													
				Total	10,833	0.25	4,800	0.11	44	3.0	1.1	0.45		0.03	1,215	0.01	446	1250			500
		None/Undisturbed	6.1		66,488	1.53	0	0.00													
Entire Drainage Area				**Total**	87,130	2	9,600	0	11	3.0	1.1	0.15		0.07	3,249	0.03	1,191				
Contributing to SMP				**Total**	**20,642**	**0**	**9,600**	**0**	**47**	**3.0**	**1.1**	**0.47**		**0.06**	**2,418**	**0.02**	**887**	**2,500**	**0.07**	**251**	**1,000**
7	4.92																				
		P7.1	7.2		129,498	2.97	9,600	0.22													
				Total	129,498	2.97	9,600	0.22	7	3.0	1.1	0.12		0.09	3,779	0.03	1,386	14500			
		None/Undisturbed	7.1		84,705	1.94	0	0.00													
Entire Drainage Area				**Total**	214,203	4.92	9,600	0.22	4	3.0	1.1	0.09		0.11	4,838	0.04	1,774				
Contributing to SMP				**Total**	**129,498**	**3**	**9,600**	**0**	**7**	**3.0**	**1.1**	**0.12**		**0.09**	**3,779**	**0.03**	**1,386**	**14,500**	**0.07**	**251**	**0**

The Windham Mountain Sporting Club

Supporting Water Quality Volume Calcs

DESIGN POINT	DRAINAGE AREA (Ac)	Storm Device	Contributing Subcatchments		total size (sf)	total size (ac)	total imp (sf)	total imp (ac)	I %	DEP P	DEC P	Rv	Min. Rv	Req'd DEP WQv Acre Ft.	DEP-3.0" Req'd DEP WQv Cu.Ft.	DEC-1.1" Req'd DEC WQv Acre Ft.	Req'd DEC WQv Cu.Ft.	Provided WQv Cu.Ft.		Ai (ac)	Min. RRv Cu.Ft.	Provided *RRv Cu.Ft.
8	52.82																					
		P8.1 - Dry Swale	8.6		118,266	2.72	22,800	0.52														
				Total	118,266	2.72	22,800	0.52	19.28	3.0	1.1	0.22		0.15	6,608	0.06	2,423	3,515				703
		P8.2 - P-1	8.2		100,400	2.30	9,600	0.22														
			8.4		237,138	5.44	15,024	0.34														
			8.7		171,819	3.94	56,624	1.30														
			8.8		84,486	1.94	2,800	0.06														
			8.9		31,465	0.72	22,800	0.52														
			8.10		240,018	5.51	23,370	0.54														
			8.12		27,016	0.62	17,800	0.41														
			8.13		26,292	0.60	17,600	0.40														
			8.15		97,618	2.24	34,940	0.80														
				Total	1,016,252	23.33	200,558	4.60	19.74	3.0	1.1	0.23		1.33	57,829	0.49	21,204					
				Total WQv req'd incl. leftover from P8.1											60,922			67076				
		P8.3 - Dry Swale	8.3		49,890	1.15	8,440	0.19														
				Total	49,890	1.15	8,440	0.19	16.92	3.0	1.1	0.20		0.06	2,523	0.02	925	2,615				523
		None/Undisturbed	8.1		274,920	6.31	6,400	0.15														
			8.5		841,461	19.32	5,600	0.13														
				Total	1,116,381	26	12,000	0														
Entire Drainage Area				**Total**	2,300,789	52.82	243,798	5.60	10.60	3.0	1.1	0.15		1.92	83,614	0.70	30,659					
Contributing to P8.2				**Total**	1,134,518	26.04	223,358	5.13	19.69	3.0	1.1	0.23		1.48	64,437	0.54	23,627					
Contributing to SMPs				**Total**	**1,184,408**	**27.19**	**231,798**	**5.32**	**19.57**	**3.0**	**1.1**	**0.23**		**1.54**	**66,960**	**0.56**	**24,552**	**73,206**		**1.60**	**6,056**	**1,226**
		Bioret. on Indiv Lots	8.4				2,800	0.06														
			8.8				5,600	0.13														
			8.10				14,000	0.32														
				Total			22,400	0.51										6400				2560
Contributing to SMP's plus Indiv Lots				**Total**	**1,184,408**	**27**	**254,198**	**5.84**	**21.46**	**3.0**	**1.1**	**0.24**		**1.65**	**72,000**	**0.61**	**26,400**			**1.75**	**6,641**	**3,786**
9	24.72																					
		P9.1 - Dry Swale	9.11		180,827	4.15	38,900	0.89														
				Total	180,827	4.15	38,900	0.89	22	3.0	1.1	0.24		0.25	11,013	0.09	4,038	5889				1178
		P9.2 - P-1	9.3		13,200	0.30	6,610	0.15														
			9.5		43,175	0.99	4,000	0.09														
			9.6		189,355	4.35	40,220	0.92														
			9.9		84,854	1.95	0	0.00														
			9.10		337,146	7.74	41,428	0.95														
				Total	667,730	15.33	92,258	2.12	14	3.0	1.1	0.17		0.67	29,105	0.24	10,672					
				Total WQv req'd incl. leftover from P9.1											34,229			56000				
		P9.3 - Bioretention	9.2		58,685	1.35	20,795	0.48														
				Total	58,685	1.35	20,795	0.48	35	3.0	1.1	0.37		0.12	5,412	0.05	1,985	5800				2320
		None/Undisturbed	9.1		44,704	1.03	4,600	0.11														
			9.4		125,000	2.87	5,600	0.13														
				Total	169,704	3.90	10,200	0.23														
Entire Drainage Area				**Total**	1,076,946	24.72	162,153	3.72	15	3.0	1.1	0.19		1.15	49,946	0.42	18,314					
Contributing to P9.2				**Total**	848,557	19.48	131,158	3.01	15	3.0	1.1	0.19		0.92	40,118	0.34	14,710					
Contributing to SMPs				**Total**	**907,242**	**20.83**	**151,953**	**3.49**	**17**	**3.0**	**1.1**	**0.20**		**1.05**	**45,530**	**0.38**	**16,694**	**67,689**		**1.05**	**3,970**	**3,498**

The Windham Mountain Sporting Club

Supporting Water Quality Volume Calcs

DESIGN POINT	DRAINAGE AREA (Ac)	Storm Device	Contributing Subcatchments		total size (sf)	total size (ac)	total imp (sf)	total imp (ac)	I %	DEP P	DEC P	Rv	Min. Rv	Req'd DEP WQv Acre Ft.	DEP-3.0" Req'd DEP WQv Cu.Ft.	DEC-1.1" Req'd DEC WQv Acre Ft.	Req'd DEC WQv Cu.Ft.	Provided WQv Cu.Ft.	Ai (ac)	Min. RRv Cu.Ft.	Provided *RRv Cu.Ft.
11	169.25																				
		P 11.1 - P-1	11.8		227,013	5.21	0	0.00													
			11.9		374,552	8.60	45,440	1.04													
			11.11		62,503	1.43	35,866	0.82													
				Total	664,068	15	81,306	1.87	12	3.0	1.1	0.16		0.61	26,595	0.22	9,751				
				Total WQv req'd incl. leftover from P11.2											48,827		9,163	50,000			
		P11.2-Bioretention	11.4		139,018	3.19	113,168	2.60													
			11.5		195,393	4.49	0	0.00													
			11.10		27,810	0.64	17,554	0.40													
			11.12		62,712	1.44	0	0.00													
			11.13		7,422	0.17	5,400	0.12													
				Total	432,355	9.93	136,122	3.12	31	3	1.1	0.333		0.83	36,032	0.30	13,212	13,800			5520
		P11.4-Dry Swale	11.20		10,142	0.23	1,092	0.03													
				Total	10,142	0.23	1,092	0.03	11	3	1.1	0.147		0.01	372	0.00	137	441			88
		P11.5-Dry Swale	11.7		5,053	0.12	1,372	0.03													
				Total	5,053	0.12	1,372	0.03	27	3	1.1	0.294		0.01	372	0.00	136	414			83
		P11.6-Dry Swale	11.22		143,911	3.30	5,850	0.13													
				Total	143,911	3.30	5,850	0.13	4	3	1.1	0.087		0.07	3,115	0.03	1,142	3,428			686
		P11.7 - Bioretention	11.16		32,259	0.74	17,787	0.41													
				Total	32,259	0.74	17,787	0.41	55	3	1.1	0.546		0.10	4,405	0.04	1,615	6,900			2760
		P11.8 - Bioretention	11.17		18,810	0.43	14,530	0.33													
				Total	18,810	0.43	14,530	0.33	77	3	1.1	0.745		0.08	3,504	0.03	1,285	4,020			1608
		P11.9 - Bioretention	11.24		25,034	0.57	5,620	0.13													
				Total	25,034	0.57	5,620	0.13	22	3	1.1	0.252		0.04	1,577	0.01	578	2,800			1120
		P11.11 - Dry Swale	11.25		68,066	1.56	8,400	0.19													
				Total	68,066	1.56	8,400	0.19	12	3	1.1	0.161		0.06	2,741	0.02	1,005	3,100			620
		P11.10 - Dry Swale	11.23		54,266	1.25	6,960	0.16													
				Total	54,266	1.25	6,960	0.16	13	3	1.1	0.165		0.05	2,244	0.02	823	2,774			555
		None/Undisturbed	11.2		1,238,435	28.43	0	0.00													
			11.3		3,808,196	87.42	0	0.00													
			11.6		24,573	0.56	0	0.00													
			11.14		194,057	4.45	0	0.00													
			11.15		45,543	1.05	0	0.00													
			11.18		496,244	11.39	2,800	0.06													
			11.19		20,122	0.46	490	0.01													
			11.21		91,283	2.10	448	0.01													
				Total	5,918,453	135.87	3,738	0.09													
Entire Drainage Area				**Total**	7,372,417	169.25	282,777	6.49	4	2.8	1.1	0.085		3.34	145,395	1.31	57,119				
Contributing to P11.1				**Total**	1,096,423	25.17	217,428	4.99	19.83	2.8	1.1	0.228		1.34	58,451	0.53	22,963				
Contributing to SMPs				**Total**	**1,453,964**	**33.38**	**279,039**	**6.41**	**19**	**2.8**	**1.1**	**0.223**		**1.73**	**75,561**	**0.68**	**29,685**	**87,677**	**1.92**	**7,290**	**13,039**
		Bioret. on Indiv Lots	11.3				11,200	0.26										3200			1280
Contributing to SMP's plus Indiv Lots				**Total**	**1,453,964**	**33.38**	**290,239**	**6.66**	**19.96**	**3.0**	**1.1**	**0.23**		**1.92**	**83,478**	**0.70**	**30,609**		**2.00**	**7,582**	**14,319**

The Windham Mountain Sporting Club

Supporting Water Quality Volume Calcs

DESIGN POINT	DRAINAGE AREA (Ac)	Storm Device	Contributing Subcatchments		total size (sf)	total size (ac)	total imp (sf)	total imp (ac)	I %	DEP P	DEC P	Rv	Min. Rv	Req'd DEP WQv Acre Ft.	DEP-3.0" Req'd DEP WQv Cu.Ft.	DEC-1.1" Req'd DEC WQv Acre Ft.	Req'd DEC WQv Cu.Ft.	Provided WQv Cu.Ft.		Ai (ac)	Min. RRv Cu.Ft.	Provided *RRv Cu.Ft.
12	40.21																					
		P12.1 - P1	12.2		755,625	17.35	53,970	1.24														
			12.4		23,780	0.55	22,690	0.52														
				Total	779,405	17.89	76,660	1.76	10	3.0	1.1	0.14		0.62	26,991	0.23	9,897	34500				
		P12.2 - Dry Swale	12.3		16,392	0.38	4,410	0.10														
				Total	16,392	0.38	4,410	0.10	27	3.0	1.1	0.29		0.03	1,197	0.01	439	1250				250
		None/Undisturbed	12.1		955,915	21.94	0	0.00														
			total		955,915	21.94	0	0.00														
Entire Drainage Area				**Total**	1,735,320	40.21	76,660	1.76	4	3.0	1.1	0.09		0.90	39,145	0.33	14,353					
Contributing to SMP				**Total**	**779,405**	**18**	**76,660**	**1.76**	**10**	**3.0**	**1.1**	**0.14**		**0.62**	**26,991**	**0.23**	**9,897**	**35,750**		**0.53**	**2,003**	**250**
TOTAL SITE																						
Entire Drainage Area				Total	20,432,967	469.08	1,368,677	31.42	7	3.0	1.1	0.11		12.93	563,364	4.74	206,567					
Contributing to SMP				**Total**	**7,649,361**	**175.61**	**1,364,753**	**31.33**	**18**	**3.0**	**1.1**	**0.21**		**9.24**	**402,686**	**3.39**	**147,652**	**468,111**		**9.40**	**35,654**	**41,029**
Treatment / Bioretention requirement			**2-unit**																			
for individual lots/units			**Townhome**		4,800	0.11	4,800	0.11	100	3.0	1.1	0.95		0.03	1,140	0.01	418	**1250**				
			sing fam home		2,800	0.06	2,800	0.06	100	3.0	1.1	0.95		0.02	665	0.01	244	**800**				320
			Homes w/ Boiretention																			
			dp 1	3																		960
			dp5	3																		960
			dp8	8																		2560
			dp11	4																		1280

WQv = [(P)(Rv)(A)]/12

Where:

- Rv = 0.05 + 0.009(I)
- I = impervious cover in percent
- P = 90% rainfall (Fig 4.1 inDesign Manual)
- A = site area in acres

Min. RRv = [(P)(Rv*)(Ai)]/12 (in acre feet)

Where:

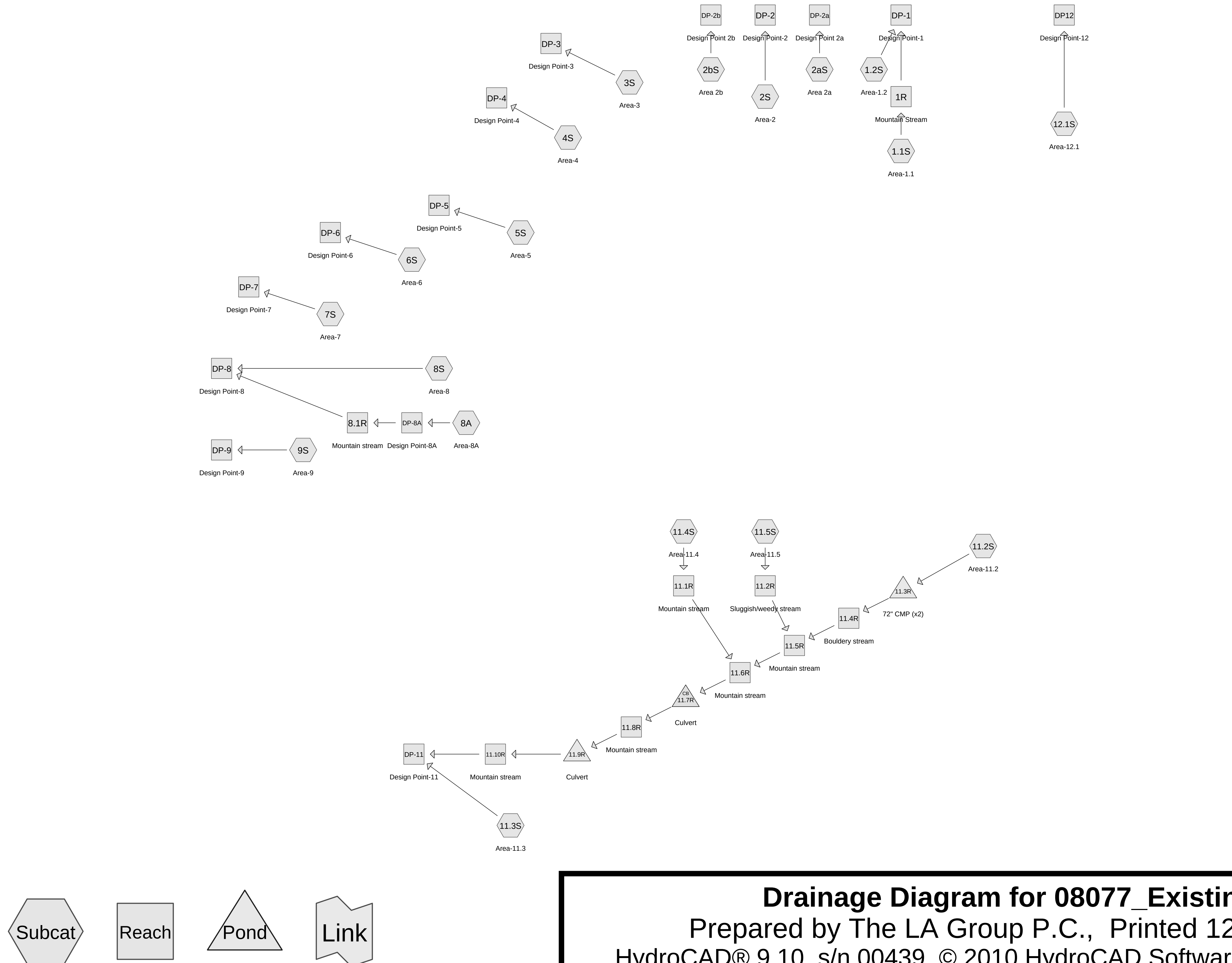
- Rv* = 0.05 + 0.009(I) where I is 100% imp.
- Ai =(S)(Aic), where Ai=imp. Cover targeted for runoff reduction
- Aic=total area of new impervious cover
- S=HSG Specific reduction factor (S)
- P = 90% rainfall (see Figure 4.1 inDesign Manual)

APPENDIX C

HydroCAD Data – Existing Model –

1. **Existing Model Diagram, Area/Soil Listings and Subcatchment Summaries**
2. **Existing Reach and Culvert Summaries – 1 & 10-yr Storm Events**
3. **Existing Design Point Summaries - 1-yr Event**
4. **Existing Design Point Totals – 10 and 100-yr Storm Events**

Model Diagram, Area and Soil Listings and Subcatchment Summaries



Drainage Diagram for 08077_Existing

Prepared by The LA Group P.C., Printed 12/9/2011

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
8.129	71	Meadow, non-grazed, HSG C (6S, 7S)
451.996	72	Woods/grass comb., Good, HSG C (1.1S, 1.2S, 2aS, 2bS, 2S, 3S, 4S, 5S, 8A, 8S, 9S, 11.2S, 11.3S, 11.4S, 11.5S, 12.1S)
15.082	79	Woods/grass comb., Good, HSG D (1.1S, 1.2S, 2S, 3S, 5S, 8A, 8S, 9S, 11.2S, 11.3S, 11.4S, 11.5S, 12.1S)
3.263	98	Paved parking & roofs (11.3S)
0.389	98	Paved parking, HSG C (9S)
0.232	98	Roofs, HSG C (9S)

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
460.746	HSG C	1.1S, 1.2S, 2aS, 2bS, 2S, 3S, 4S, 5S, 6S, 7S, 8A, 8S, 9S, 11.2S, 11.3S, 11.4S, 11.5S, 12.1S
15.082	HSG D	1.1S, 1.2S, 2S, 3S, 5S, 8A, 8S, 9S, 11.2S, 11.3S, 11.4S, 11.5S, 12.1S
3.263	Other	11.3S

Summary for Subcatchment 1.1S: Area-1.1

Runoff = 65.12 cfs @ 12.18 hrs, Volume= 5.562 af, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
1,315,345	72	Woods/grass comb., Good, HSG C
7,575	79	Woods/grass comb., Good, HSG D
1,322,920	72	Weighted Average
1,322,920		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	150	0.1300	0.17		**Sheet Flow, Sheet flow: Woods** Woods: Light underbrush n= 0.400 P2= 3.00"
2.2	320	0.2400	2.45		**Shallow Concentrated Flow, Shallow concentrated: Woods** Woodland Kv= 5.0 fps
1.7	215	0.0930	2.13		**Shallow Concentrated Flow, Shallow concentrated: Meadow** Short Grass Pasture Kv= 7.0 fps
5.2	1,000	0.4160	3.22		**Shallow Concentrated Flow, Shallow concentrated: Woods** Woodland Kv= 5.0 fps
0.6	440	0.2000	12.05	48.22	**Trap/Vee/Rect Channel Flow, Mountain Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.040 Mountain streams
24.2	2,125	Total			

Summary for Subcatchment 1.2S: Area-1.2

Runoff = 110.33 cfs @ 12.14 hrs, Volume= 8.426 af, Depth= 2.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
1,741,605	72	Woods/grass comb., Good, HSG C
189,870	79	Woods/grass comb., Good, HSG D
1,931,475	73	Weighted Average
1,931,475		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	150	0.4500	0.28		**Sheet Flow, Sheet flow: Woods** Woods: Light underbrush n= 0.400 P2= 3.00"
9.9	1,846	0.3900	3.12		**Shallow Concentrated Flow, Shallow concentrated: Woods** Woodland Kv= 5.0 fps
1.5	1,218	0.2200	13.24	176.52	**Parabolic Channel,** W=20.00' D=1.00' Area=13.3 sf Perim=20.1' n= 0.040 Winding stream, pools & shoals
20.2	3,214	Total			

Summary for Subcatchment 2aS: Area 2a

Runoff = 9.43 cfs @ 12.03 hrs, Volume= 0.529 af, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
125,720	72	Woods/grass comb., Good, HSG C
125,720		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	150	0.0860	0.32		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.00"
2.7	405	0.1230	2.45		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.5	555	Total			

Summary for Subcatchment 2bS: Area 2b

Runoff = 45.24 cfs @ 12.12 hrs, Volume= 3.291 af, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
782,773	72	Woods/grass comb., Good, HSG C
782,773		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	150	0.2800	0.23		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
7.8	1,140	0.2350	2.42		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.5	1,290	Total			

Summary for Subcatchment 2S: Area-2

Runoff = 68.67 cfs @ 12.27 hrs, Volume= 6.960 af, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
1,593,805	72	Woods/grass comb., Good, HSG C
61,535	79	Woods/grass comb., Good, HSG D
1,655,340	72	Weighted Average
1,655,340		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	150	0.1467	0.18		**Sheet Flow, Sheet flow: Woods** Woods: Light underbrush n= 0.400 P2= 3.00"
7.7	1,360	0.3456	2.94		**Shallow Concentrated Flow, Shallow concentrated: Woods** Woodland Kv= 5.0 fps
2.0	270	0.1070	2.29		**Shallow Concentrated Flow, Shallow concentrated: Meadow** Short Grass Pasture Kv= 7.0 fps
5.9	630	0.1254	1.77		**Shallow Concentrated Flow, Shallow concentrated: Woods** Woodland Kv= 5.0 fps
1.7	230	0.1040	2.26		**Shallow Concentrated Flow, Shallow concentrated: Meadow** Short Grass Pasture Kv= 7.0 fps
0.4	275	0.2100	12.35	49.41	**Trap/Vee/Rect Channel Flow, Mountain Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.040 Mountain streams
31.5	2,915	Total			

Summary for Subcatchment 3S: Area-3

Runoff = 35.10 cfs @ 12.14 hrs, Volume= 2.689 af, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
633,639	72	Woods/grass comb., Good, HSG C
5,847	79	Woods/grass comb., Good, HSG D
639,486	72	Weighted Average
639,486		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	150	0.3500	0.26		**Sheet Flow, Sheet flow: Woods** Woods: Light underbrush n= 0.400 P2= 3.00"
5.4	910	0.3200	2.83		**Shallow Concentrated Flow, Shallow concentrated: Woods** Woodland Kv= 5.0 fps
2.6	540	0.2500	3.50		**Shallow Concentrated Flow, Shallow concentrated: Meadow** Short Grass Pasture Kv= 7.0 fps
2.2	420	0.4000	3.16		**Shallow Concentrated Flow, Shallow concentrated: Woods** Woodland Kv= 5.0 fps
0.2	200	0.2000	20.67	124.02	**Trap/Vee/Rect Channel Flow, DITCH** Bot.W=1.00' D=2.00' Z= 1.0 '/' Top.W=5.00' n= 0.030 Earth, grassed & winding
20.2	2,220	Total			

Summary for Subcatchment 4S: Area-4

Runoff = 29.08 cfs @ 12.14 hrs, Volume= 2.259 af, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
537,225	72	Woods/grass comb., Good, HSG C
537,225		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	150	0.3000	0.24		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 3.00"
10.1	1,738	0.3300	2.87		**Shallow Concentrated Flow, WOODS/MEADOW** Woodland Kv= 5.0 fps
0.2	245	0.2000	20.67	124.02	**Trap/Vee/Rect Channel Flow, EX DITCH** Bot.W=1.00' D=2.00' Z= 1.0 '/' Top.W=5.00' n= 0.030 Earth, grassed & winding
20.7	2,133	Total			

Summary for Subcatchment 5S: Area-5

Runoff = 105.04 cfs @ 12.14 hrs, Volume= 8.132 af, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
1,881,207	72	Woods/grass comb., Good, HSG C
52,915	79	Woods/grass comb., Good, HSG D
1,934,122	72	Weighted Average
1,934,122		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	150	0.2460	0.22		**Sheet Flow, Sheet flow: Woods** Woods: Light underbrush n= 0.400 P2= 3.00"
8.8	1,510	0.3300	2.87		**Shallow Concentrated Flow, Shallow concentrated: Woods** Woodland Kv= 5.0 fps
0.6	430	0.0800	12.68	95.12	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.50' Z= 2.0 '/' Top.W=8.00' n= 0.030 Earth, grassed & winding
20.6	2,090	Total			

Summary for Subcatchment 6S: Area-6

Runoff = 10.13 cfs @ 11.99 hrs, Volume= 0.497 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
122,692	71	Meadow, non-grazed, HSG C
122,692		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	150	0.1600	0.46		**Sheet Flow, Sheet flow: Meadow** Range n= 0.130 P2= 3.00"
1.5	240	0.1500	2.71		**Shallow Concentrated Flow, Shallow concentrated: Meadow** Short Grass Pasture Kv= 7.0 fps
6.9	390	Total			

Summary for Subcatchment 7S: Area-7

Runoff = 18.93 cfs @ 11.99 hrs, Volume= 0.937 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
231,410	71	Meadow, non-grazed, HSG C
231,410		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	150	0.1800	0.43		**Sheet Flow, Sheet flow: Meadow** Grass: Short n= 0.150 P2= 3.00"
0.9	206	0.0700	3.97		**Shallow Concentrated Flow, Shallow concentrated: Meadow** Grassed Waterway Kv= 15.0 fps
0.5	250	0.3500	8.87		**Shallow Concentrated Flow, field** Grassed Waterway Kv= 15.0 fps
7.2	606	Total			

Summary for Subcatchment 8A: Area-8A

Runoff = 68.05 cfs @ 12.12 hrs, Volume= 5.056 af, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
1,183,365	72	Woods/grass comb., Good, HSG C
19,084	79	Woods/grass comb., Good, HSG D
1,202,449	72	Weighted Average
1,202,449		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	150	0.2400	0.22		**Sheet Flow, Sheet flow: Woods** Woods: Light underbrush n= 0.400 P2= 3.00"
6.5	1,135	0.3400	2.92		**Shallow Concentrated Flow, Shallow concentrated: Woods** Woodland Kv= 5.0 fps
1.3	595	0.0780	7.53	30.11	**Trap/Vee/Rect Channel Flow, SWALE** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.040 Mountain streams
19.2	1,880	Total			

Summary for Subcatchment 8S: Area-8

Runoff = 34.66 cfs @ 12.09 hrs, Volume= 2.363 af, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
550,764	72	Woods/grass comb., Good, HSG C
11,266	79	Woods/grass comb., Good, HSG D
562,030	72	Weighted Average
562,030		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	150	0.1700	0.19		**Sheet Flow, Sheet flow: Woods** Woods: Light underbrush n= 0.400 P2= 3.00"
1.3	235	0.1900	3.05		**Shallow Concentrated Flow, Shallow concentrated: Meadow** Short Grass Pasture Kv= 7.0 fps
2.1	1,320	0.1000	10.63	79.76	**Trap/Vee/Rect Channel Flow, mountain stream** Bot.W=2.00' D=1.50' Z= 2.0 '/' Top.W=8.00' n= 0.040 Mountain streams
16.4	1,705	Total			

Summary for Subcatchment 9S: Area-9

Runoff = 69.48 cfs @ 12.11 hrs, Volume= 4.950 af, Depth= 2.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
16,935	98	Paved parking, HSG C
10,120	98	Roofs, HSG C
425,195	72	Woods/grass comb., Good, HSG C
676,065	72	Woods/grass comb., Good, HSG C
6,220	79	Woods/grass comb., Good, HSG D
1,134,535	73	Weighted Average
1,107,480		97.62% Pervious Area
27,055		2.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	150	0.2900	0.24		**Sheet Flow, Sheet flow: Woods** Woods: Light underbrush n= 0.400 P2= 3.00"
0.9	170	0.4000	3.16		**Shallow Concentrated Flow, Shallow concentrated: Woods** Woodland Kv= 5.0 fps
6.5	1,385	0.2600	3.57		**Shallow Concentrated Flow, Shallow concentrated: Meadow** Short Grass Pasture Kv= 7.0 fps
17.9	1,705	Total			

Summary for Subcatchment 11.2S: Area-11.2

Runoff = 47.62 cfs @ 12.38 hrs, Volume= 5.719 af, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
1,255,520	72	Woods/grass comb., Good, HSG C
85,445	72	Woods/grass comb., Good, HSG C
19,210	79	Woods/grass comb., Good, HSG D
1,360,175	72	Weighted Average
1,360,175		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.8	150	0.0933	0.09		**Sheet Flow, Sheet flow: Woods** Woods: Dense underbrush n= 0.800 P2= 3.00"
3.8	500	0.0960	2.17		**Shallow Concentrated Flow, Shallow concentrated: Meadow** Short Grass Pasture Kv= 7.0 fps
5.3	885	0.3110	2.79		**Shallow Concentrated Flow, Shallow concentrated: Woods** Woodland Kv= 5.0 fps
1.6	355	0.2817	3.72		**Shallow Concentrated Flow, Shallow concentrated: Meadow** Short Grass Pasture Kv= 7.0 fps
0.8	830	0.2600	17.15	128.61	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.50' Z= 2.0 '/' Top.W=8.00' n= 0.040 Mountain streams
40.3	2,720	Total			

Summary for Subcatchment 11.3S: Area-11.3

Runoff = 198.80 cfs @ 12.31 hrs, Volume= 21.503 af, Depth= 2.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
4,343,934	72	Woods/grass comb., Good, HSG C
227,862	72	Woods/grass comb., Good, HSG C
142,150	98	Paved parking & roofs
214,881	79	Woods/grass comb., Good, HSG D
4,928,827	73	Weighted Average
4,786,677		97.12% Pervious Area
142,150		2.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	150	0.1133	0.25		**Sheet Flow, Sheet flow: Meadow** Grass: Dense n= 0.240 P2= 3.00"
4.7	970	0.2412	3.44		**Shallow Concentrated Flow, Shallow concentrated: Meadow** Short Grass Pasture Kv= 7.0 fps
8.3	1,435	0.3300	2.87		**Shallow Concentrated Flow, Shallow concentrated: Woods** Woodland Kv= 5.0 fps
2.6	270	0.0593	1.70		**Shallow Concentrated Flow, Shallow concentrated: Meadow** Short Grass Pasture Kv= 7.0 fps
4.6	730	0.2800	2.65		**Shallow Concentrated Flow, woods** Woodland Kv= 5.0 fps
3.5	790	0.2810	3.71		**Shallow Concentrated Flow, Shallow concentrated: Developed** Short Grass Pasture Kv= 7.0 fps
0.7	850	0.1500	19.75	158.03	**Trap/Vee/Rect Channel Flow, road ditch** Bot.W=2.00' D=2.00' Z= 1.0 '/' Top.W=6.00' n= 0.030 Earth, grassed & winding
0.1	90	0.1500	26.71	524.52	**Pipe Channel, culvert** 60.0" Round Area= 19.6 sf Perim= 15.7' r= 1.25' n= 0.025 Corrugated metal
0.2	375	0.2000	28.04	1,346.06	**Trap/Vee/Rect Channel Flow, stream** Bot.W=4.00' D=4.00' Z= 2.0 '/' Top.W=20.00' n= 0.040 Earth, cobble bottom, clean sides
34.9	5,660	Total			

Summary for Subcatchment 11.4S: Area-11.4

Runoff = 38.19 cfs @ 12.12 hrs, Volume= 2.812 af, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
580,570	72	Woods/grass comb., Good, HSG C
61,400	72	Woods/grass comb., Good, HSG C
26,785	79	Woods/grass comb., Good, HSG D
668,755	72	Weighted Average
668,755		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	150	0.3200	0.25		**Sheet Flow, Sheet flow: Woods** Woods: Light underbrush n= 0.400 P2= 3.00"
1.7	255	0.2400	2.45		**Shallow Concentrated Flow, Shallow concentrated: Woods** Woodland Kv= 5.0 fps
0.8	130	0.1500	2.71		**Shallow Concentrated Flow, Shallow concentrated: Meadow** Short Grass Pasture Kv= 7.0 fps
6.3	1,055	0.3100	2.78		**Shallow Concentrated Flow, Shallow concentrated: Woods** Woodland Kv= 5.0 fps
18.9	1,590	Total			

Summary for Subcatchment 11.5S: Area-11.5

Runoff = 12.93 cfs @ 12.13 hrs, Volume= 0.976 af, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
204,000	72	Woods/grass comb., Good, HSG C
17,930	72	Woods/grass comb., Good, HSG C
10,285	79	Woods/grass comb., Good, HSG D
232,215	72	Weighted Average
232,215		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	150	0.2100	0.21		**Sheet Flow, Sheet flow: Woods** Woods: Light underbrush n= 0.400 P2= 3.00"
1.9	320	0.3100	2.78		**Shallow Concentrated Flow, Shallow concentrated: Woods** Woodland Kv= 5.0 fps
1.0	175	0.1700	2.89		**Shallow Concentrated Flow, Shallow concentrated: Meadow** Short Grass Pasture Kv= 7.0 fps
4.8	815	0.3200	2.83		**Shallow Concentrated Flow, Shallow concentrated: Woods** Woodland Kv= 5.0 fps
19.7	1,460	Total			

Summary for Subcatchment 12.1S: Area-12.1

Runoff = 76.97 cfs @ 12.16 hrs, Volume= 6.295 af, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=5.00"

Area (sf)	CN	Description
31,505	79	Woods/grass comb., Good, HSG D
1,465,565	72	Woods/grass comb., Good, HSG C
1,497,070	72	Weighted Average
1,497,070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.1000	0.14		**Sheet Flow, Sheet flow: Woods** Woods: Light underbrush n= 0.400 P2= 3.00"
7.5	1,337	0.3500	2.96		**Shallow Concentrated Flow, woods** Woodland Kv= 5.0 fps
2.6	350	0.2000	2.24		**Shallow Concentrated Flow, wetland** Woodland Kv= 5.0 fps
0.8	300	0.2000	6.16	12.32	**Trap/Vee/Rect Channel Flow, stream/wetland** Bot.W=1.00' D=1.00' Z= 1.0 '/' Top.W=3.00' n= 0.070 Sluggish weedy reaches w/pools
22.6	2,087	Total			

Reach and Culvert Summaries
1 & 10-yr Storm Events

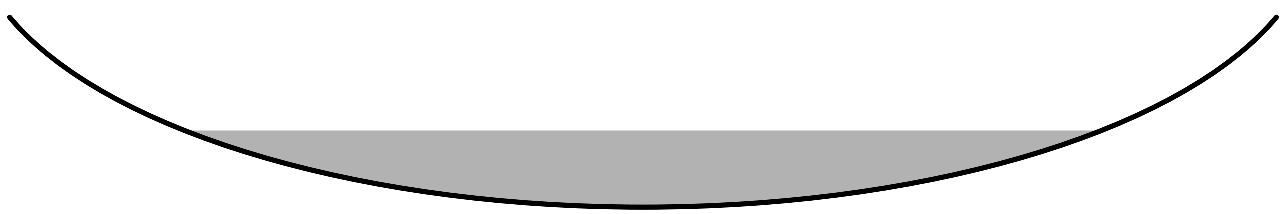
Summary for Reach 1R: Mountain Stream

Inflow Area = 30.370 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 21.79 cfs @ 12.20 hrs, Volume= 2.045 af
Outflow = 20.34 cfs @ 12.35 hrs, Volume= 2.045 af, Atten= 7%, Lag= 8.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.03 fps, Min. Travel Time= 4.9 min
Avg. Velocity = 1.93 fps, Avg. Travel Time= 15.2 min

Peak Storage= 5,988 cf @ 12.26 hrs
Average Depth at Peak Storage= 0.40'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 147.41 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 1,760.0' Slope= 0.1534 '/'
Inlet Invert= 2,380.00', Outlet Invert= 2,110.00'



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Summary for Reach 8.0: Intermediate Point

Inflow Area = 27.604 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 22.95 cfs @ 12.14 hrs, Volume= 1.859 af
Outflow = 22.95 cfs @ 12.14 hrs, Volume= 1.859 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Summary for Reach 8.1R: Mountain stream

Inflow Area = 27.604 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 22.95 cfs @ 12.14 hrs, Volume= 1.859 af
Outflow = 22.38 cfs @ 12.18 hrs, Volume= 1.859 af, Atten= 2%, Lag= 2.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.51 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 3.29 fps, Avg. Travel Time= 4.3 min

Peak Storage= 2,040 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.64'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 124.35 cfs

2.50' x 1.50' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 2.0 '/' Top Width= 8.50'
Length= 850.0' Slope= 0.1906 '/'
Inlet Invert= 1,816.00', Outlet Invert= 1,654.00'

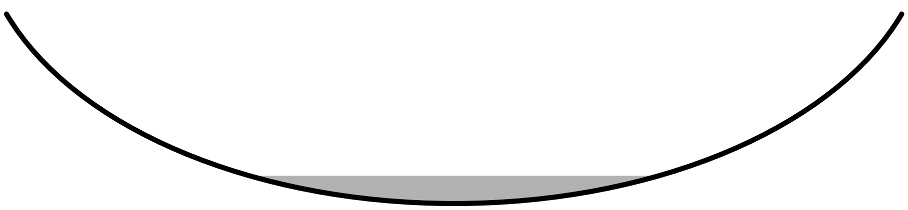
Summary for Reach 11.10R: Mountain stream

Inflow Area = 51.909 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 24.38 cfs @ 12.45 hrs, Volume= 3.495 af
Outflow = 24.31 cfs @ 12.48 hrs, Volume= 3.495 af, Atten= 0%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.22 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 3.33 fps, Avg. Travel Time= 1.9 min

Peak Storage= 1,112 cf @ 12.46 hrs
Average Depth at Peak Storage= 0.58'
Bank-Full Depth= 4.00', Capacity at Bank-Full= 1,501.63 cfs

20.00' x 4.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 375.0' Slope= 0.1760 '/'
Inlet Invert= 1,760.00', Outlet Invert= 1,694.00'



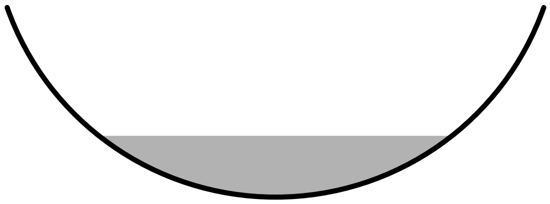
Summary for Reach 11.1R: Mountain stream

Inflow Area = 15.353 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 12.87 cfs @ 12.13 hrs, Volume= 1.034 af
Outflow = 12.43 cfs @ 12.22 hrs, Volume= 1.034 af, Atten= 3%, Lag= 5.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.51 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 3.07 fps, Avg. Travel Time= 8.5 min

Peak Storage= 2,274 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.64'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 133.18 cfs

6.00' x 2.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 1,560.0' Slope= 0.1833 '/'
Inlet Invert= 2,274.00', Outlet Invert= 1,988.00'



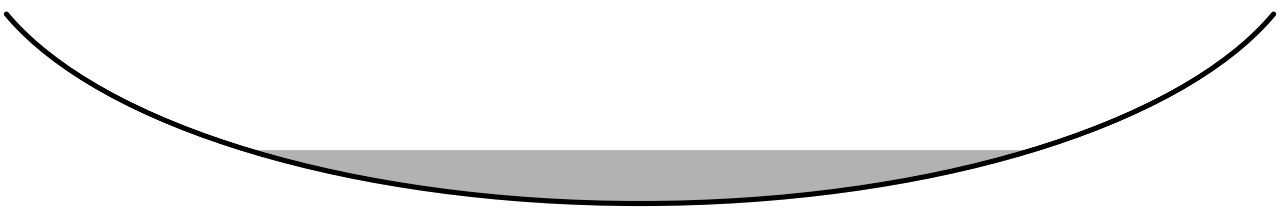
Summary for Reach 11.2R: Sluggish/weedy stream

Inflow Area = 5.331 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 4.37 cfs @ 12.15 hrs, Volume= 0.359 af
Outflow = 3.82 cfs @ 12.33 hrs, Volume= 0.359 af, Atten= 13%, Lag= 11.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.94 fps, Min. Travel Time= 6.4 min
Avg. Velocity = 0.63 fps, Avg. Travel Time= 19.7 min

Peak Storage= 1,468 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 60.21 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.070 Sluggish weedy reaches w/pools
Length= 740.0' Slope= 0.0784 '/'
Inlet Invert= 2,300.00', Outlet Invert= 2,242.00'



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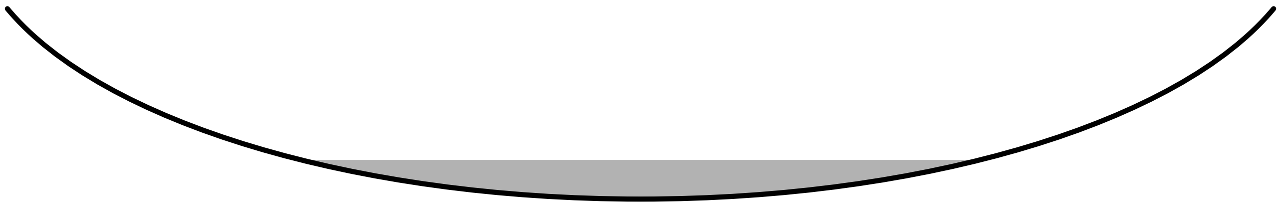
Summary for Reach 11.4R: Bouldery stream

Inflow Area = 31.225 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 15.65 cfs @ 12.41 hrs, Volume= 2.103 af
Outflow = 15.54 cfs @ 12.47 hrs, Volume= 2.103 af, Atten= 1%, Lag= 3.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.35 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 2.69 fps, Avg. Travel Time= 4.0 min

Peak Storage= 1,595 cf @ 12.44 hrs
Average Depth at Peak Storage= 0.41'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 482.65 cfs

20.00' x 2.00' deep Parabolic Channel, n= 0.050 Mountain streams w/large boulders
Length= 650.0' Slope= 0.2615 '/'
Inlet Invert= 2,390.00', Outlet Invert= 2,220.00'



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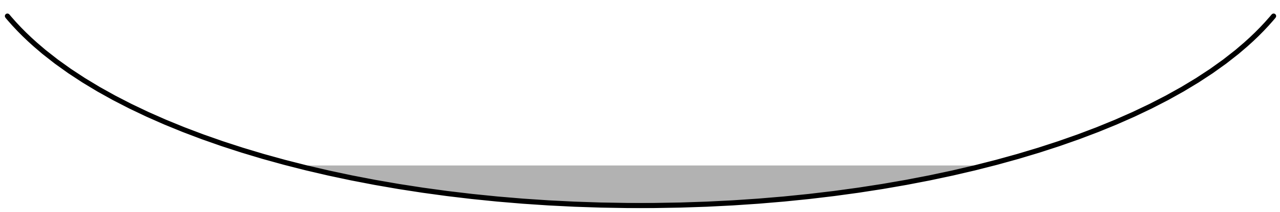
Summary for Reach 11.5R: Mountain stream

Inflow Area = 36.556 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 18.69 cfs @ 12.42 hrs, Volume= 2.462 af
Outflow = 18.52 cfs @ 12.50 hrs, Volume= 2.462 af, Atten= 1%, Lag= 4.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.20 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 2.74 fps, Avg. Travel Time= 6.9 min

Peak Storage= 2,897 cf @ 12.46 hrs
Average Depth at Peak Storage= 0.42'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 535.72 cfs

20.00' x 2.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 1,125.0' Slope= 0.2062 '/'
Inlet Invert= 2,220.00', Outlet Invert= 1,988.00'



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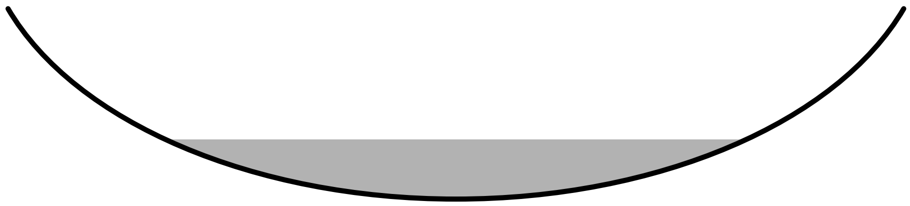
Summary for Reach 11.6R: Mountain stream

Inflow Area = 51.909 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 24.52 cfs @ 12.42 hrs, Volume= 3.496 af
Outflow = 24.46 cfs @ 12.44 hrs, Volume= 3.496 af, Atten= 0%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.56 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 4.06 fps, Avg. Travel Time= 1.5 min

Peak Storage= 835 cf @ 12.43 hrs
Average Depth at Peak Storage= 0.62'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 294.12 cfs

10.00' x 2.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 360.0' Slope= 0.2722 '/'
Inlet Invert= 1,988.00', Outlet Invert= 1,890.00'



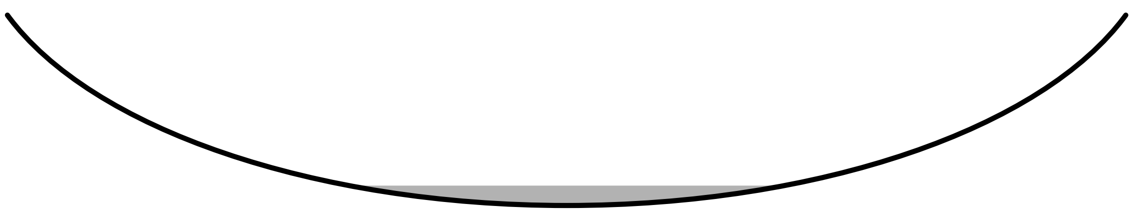
Summary for Reach 11.8R: Mountain stream

Inflow Area = 51.909 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 24.46 cfs @ 12.44 hrs, Volume= 3.496 af
Outflow = 24.41 cfs @ 12.45 hrs, Volume= 3.496 af, Atten= 0%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.07 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 4.64 fps, Avg. Travel Time= 1.3 min

Peak Storage= 773 cf @ 12.44 hrs
Average Depth at Peak Storage= 0.41'
Bank-Full Depth= 4.00', Capacity at Bank-Full= 3,230.06 cfs

25.00' x 4.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 350.0' Slope= 0.5000 '/'
Inlet Invert= 1,882.00', Outlet Invert= 1,707.00'



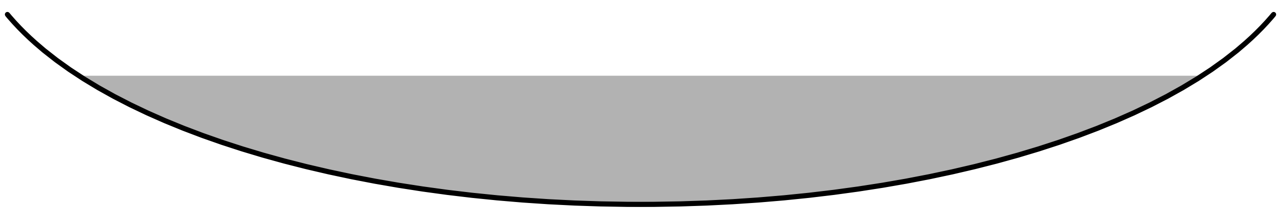
Summary for Reach 1R: Mountain Stream

Inflow Area = 30.370 ac, 0.00% Impervious, Inflow Depth = 2.20" for 10-Year event
Inflow = 65.12 cfs @ 12.18 hrs, Volume= 5.562 af
Outflow = 62.96 cfs @ 12.28 hrs, Volume= 5.562 af, Atten= 3%, Lag= 6.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.51 fps, Min. Travel Time= 3.4 min
Avg. Velocity = 2.42 fps, Avg. Travel Time= 12.1 min

Peak Storage= 13,054 cf @ 12.23 hrs
Average Depth at Peak Storage= 0.68'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 147.41 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 1,760.0' Slope= 0.1534 '/'
Inlet Invert= 2,380.00', Outlet Invert= 2,110.00'



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Summary for Reach 8.0: Intermediate Point

Inflow Area = 27.604 ac, 0.00% Impervious, Inflow Depth = 2.20" for 10-Year event
Inflow = 68.05 cfs @ 12.12 hrs, Volume= 5.056 af
Outflow = 68.05 cfs @ 12.12 hrs, Volume= 5.056 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Summary for Reach 8.1R: Mountain stream

Inflow Area = 27.604 ac, 0.00% Impervious, Inflow Depth = 2.20" for 10-Year event
Inflow = 68.05 cfs @ 12.12 hrs, Volume= 5.056 af
Outflow = 66.77 cfs @ 12.16 hrs, Volume= 5.056 af, Atten= 2%, Lag= 2.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 12.83 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 4.19 fps, Avg. Travel Time= 3.4 min

Peak Storage= 4,481 cf @ 12.14 hrs
Average Depth at Peak Storage= 1.11'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 124.35 cfs

2.50' x 1.50' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 2.0 '/' Top Width= 8.50'
Length= 850.0' Slope= 0.1906 '/'
Inlet Invert= 1,816.00', Outlet Invert= 1,654.00'

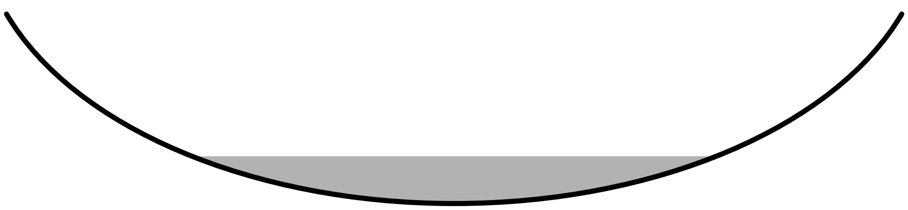
Summary for Reach 11.10R: Mountain stream

Inflow Area = 51.909 ac, 0.00% Impervious, Inflow Depth = 2.20" for 10-Year event
Inflow = 76.72 cfs @ 12.34 hrs, Volume= 9.507 af
Outflow = 76.58 cfs @ 12.36 hrs, Volume= 9.507 af, Atten= 0%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.64 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 4.12 fps, Avg. Travel Time= 1.5 min

Peak Storage= 2,472 cf @ 12.35 hrs
Average Depth at Peak Storage= 0.99'
Bank-Full Depth= 4.00', Capacity at Bank-Full= 1,501.63 cfs

20.00' x 4.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 375.0' Slope= 0.1760 '/'
Inlet Invert= 1,760.00', Outlet Invert= 1,694.00'



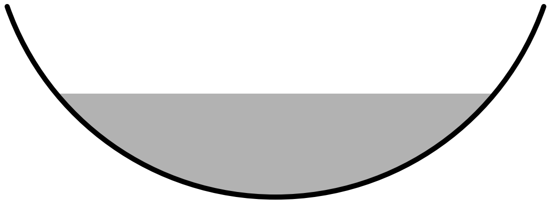
Summary for Reach 11.1R: Mountain stream

Inflow Area = 15.353 ac, 0.00% Impervious, Inflow Depth = 2.20" for 10-Year event
Inflow = 38.19 cfs @ 12.12 hrs, Volume= 2.812 af
Outflow = 36.98 cfs @ 12.19 hrs, Volume= 2.812 af, Atten= 3%, Lag= 4.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.72 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 3.80 fps, Avg. Travel Time= 6.8 min

Peak Storage= 4,985 cf @ 12.15 hrs
Average Depth at Peak Storage= 1.08'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 133.18 cfs

6.00' x 2.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 1,560.0' Slope= 0.1833 '/'
Inlet Invert= 2,274.00', Outlet Invert= 1,988.00'



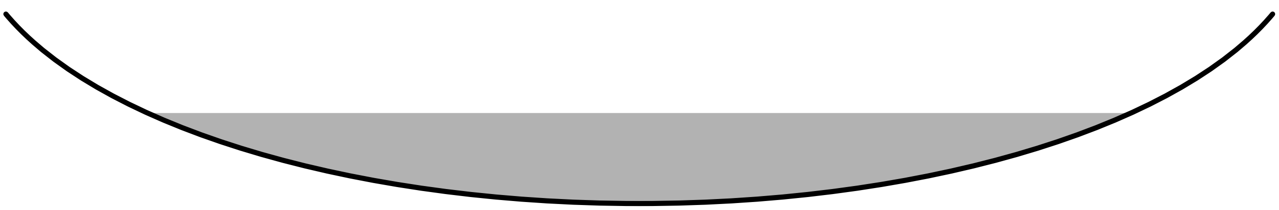
Summary for Reach 11.2R: Sluggish/weedy stream

Inflow Area = 5.331 ac, 0.00% Impervious, Inflow Depth = 2.20" for 10-Year event
Inflow = 12.93 cfs @ 12.13 hrs, Volume= 0.976 af
Outflow = 12.01 cfs @ 12.26 hrs, Volume= 0.976 af, Atten= 7%, Lag= 7.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.76 fps, Min. Travel Time= 4.5 min
Avg. Velocity = 0.78 fps, Avg. Travel Time= 15.9 min

Peak Storage= 3,253 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.48'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 60.21 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.070 Sluggish weedy reaches w/pools
Length= 740.0' Slope= 0.0784 '/'
Inlet Invert= 2,300.00', Outlet Invert= 2,242.00'



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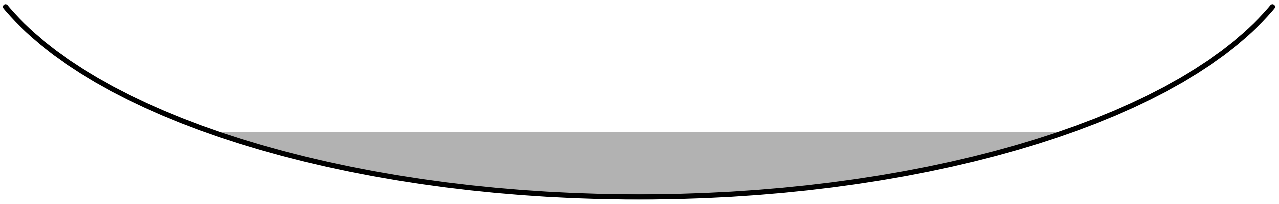
Summary for Reach 11.4R: Bouldery stream

Inflow Area = 31.225 ac, 0.00% Impervious, Inflow Depth = 2.20" for 10-Year event
Inflow = 47.62 cfs @ 12.39 hrs, Volume= 5.719 af
Outflow = 47.37 cfs @ 12.42 hrs, Volume= 5.719 af, Atten= 1%, Lag= 2.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.94 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 3.34 fps, Avg. Travel Time= 3.2 min

Peak Storage= 3,457 cf @ 12.40 hrs
Average Depth at Peak Storage= 0.68'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 482.65 cfs

20.00' x 2.00' deep Parabolic Channel, n= 0.050 Mountain streams w/large boulders
Length= 650.0' Slope= 0.2615 '/'
Inlet Invert= 2,390.00', Outlet Invert= 2,220.00'



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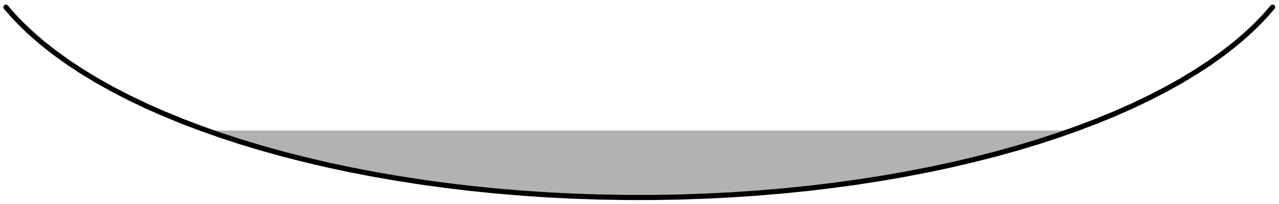
Summary for Reach 11.5R: Mountain stream

Inflow Area = 36.556 ac, 0.00% Impervious, Inflow Depth = 2.20" for 10-Year event
Inflow = 56.36 cfs @ 12.37 hrs, Volume= 6.696 af
Outflow = 55.90 cfs @ 12.43 hrs, Volume= 6.696 af, Atten= 1%, Lag= 3.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.11 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 3.40 fps, Avg. Travel Time= 5.5 min

Peak Storage= 6,246 cf @ 12.40 hrs
Average Depth at Peak Storage= 0.70'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 535.72 cfs

20.00' x 2.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 1,125.0' Slope= 0.2062 '/'
Inlet Invert= 2,220.00', Outlet Invert= 1,988.00'



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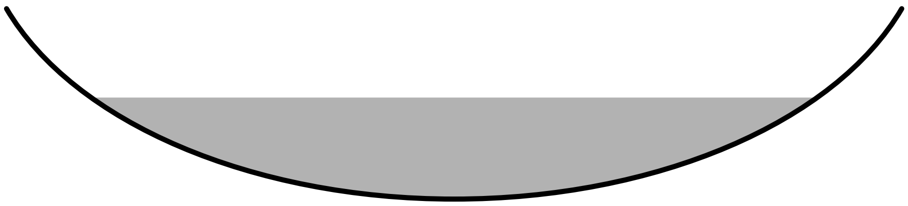
Summary for Reach 11.6R: Mountain stream

Inflow Area = 51.909 ac, 0.00% Impervious, Inflow Depth = 2.20" for 10-Year event
Inflow = 77.25 cfs @ 12.31 hrs, Volume= 9.507 af
Outflow = 77.12 cfs @ 12.32 hrs, Volume= 9.507 af, Atten= 0%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 14.89 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 5.05 fps, Avg. Travel Time= 1.2 min

Peak Storage= 1,867 cf @ 12.32 hrs
Average Depth at Peak Storage= 1.07'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 294.12 cfs

10.00' x 2.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 360.0' Slope= 0.2722 '/'
Inlet Invert= 1,988.00', Outlet Invert= 1,890.00'



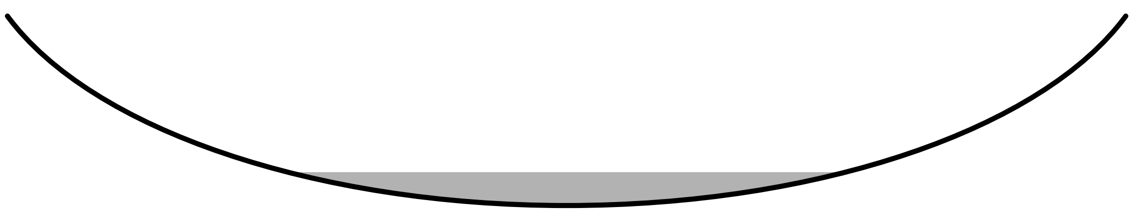
Summary for Reach 11.8R: Mountain stream

Inflow Area = 51.909 ac, 0.00% Impervious, Inflow Depth = 2.20" for 10-Year event
Inflow = 77.12 cfs @ 12.32 hrs, Volume= 9.507 af
Outflow = 76.88 cfs @ 12.34 hrs, Volume= 9.507 af, Atten= 0%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 15.71 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 5.67 fps, Avg. Travel Time= 1.0 min

Peak Storage= 1,715 cf @ 12.33 hrs
Average Depth at Peak Storage= 0.70'
Bank-Full Depth= 4.00', Capacity at Bank-Full= 3,230.06 cfs

25.00' x 4.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 350.0' Slope= 0.5000 '/'
Inlet Invert= 1,882.00', Outlet Invert= 1,707.00'



Summary for Pond 11.3R: 72" CMP (x2)

Inflow Area = 31.225 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 15.65 cfs @ 12.41 hrs, Volume= 2.103 af
Outflow = 15.65 cfs @ 12.41 hrs, Volume= 2.103 af, Atten= 0%, Lag= 0.0 min
Primary = 15.65 cfs @ 12.41 hrs, Volume= 2.103 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 2,412.97' @ 12.41 hrs Surf.Area= 79 sf Storage= 67 cf

Plug-Flow detention time= 0.2 min calculated for 2.102 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (902.1 - 901.9)

Volume	Invert	Avail.Storage	Storage Description
#1	2,412.00'	2,120 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,412.00	60	0	0
2,414.00	100	160	160
2,416.00	260	360	520
2,418.00	380	640	1,160
2,420.00	580	960	2,120

Device	Routing	Invert	Outlet Devices
#1	Primary	2,412.00'	**72.0" Round Culvert X 2.00** L= 120.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 2,412.00' / 2,394.00' S= 0.1500 '/' Cc= 0.900 n= 0.025 Corrugated metal

Primary OutFlow Max=15.59 cfs @ 12.41 hrs HW=2,412.97' (Free Discharge)
1=Culvert (Inlet Controls 15.59 cfs @ 2.64 fps)

Summary for Pond 11.7R: Culvert

Inflow Area = 51.909 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 24.46 cfs @ 12.44 hrs, Volume= 3.496 af
Outflow = 24.46 cfs @ 12.44 hrs, Volume= 3.496 af, Atten= 0%, Lag= 0.0 min
Primary = 24.46 cfs @ 12.44 hrs, Volume= 3.496 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,890.78' @ 12.44 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,889.00'	**48.0" Round Culvert** L= 46.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,889.00' / 1,882.00' S= 0.1522 '/' Cc= 0.900 n= 0.025 Corrugated metal
#2	Primary	1,894.00'	**15.0' long x 35.0' 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=24.40 cfs @ 12.44 hrs HW=1,890.77' (Free Discharge)
1=Culvert (Inlet Controls 24.40 cfs @ 4.53 fps)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 11.9R: Culvert

Inflow Area = 51.909 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 24.41 cfs @ 12.45 hrs, Volume= 3.496 af
Outflow = 24.38 cfs @ 12.45 hrs, Volume= 3.495 af, Atten= 0%, Lag= 0.1 min
Primary = 24.38 cfs @ 12.45 hrs, Volume= 3.495 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 1,775.64' @ 12.45 hrs Surf.Area= 112 sf Storage= 136 cf

Plug-Flow detention time= 0.2 min calculated for 3.494 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (909.4 - 909.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,773.00'	4,126 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,773.00	10	0	0
1,774.00	30	20	20
1,776.00	130	160	180
1,778.00	470	600	780
1,780.00	1,317	1,787	2,567
1,781.00	1,800	1,559	4,126

Device	Routing	Invert	Outlet Devices
#1	Primary	1,774.00'	**60.0" Round Culvert** L= 90.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,774.00' / 1,760.00' S= 0.1556 '/' Cc= 0.900 n= 0.025 Corrugated metal

Primary OutFlow Max=24.35 cfs @ 12.45 hrs HW=1,775.64' (Free Discharge)
1=Culvert (Inlet Controls 24.35 cfs @ 4.36 fps)

Summary for Pond 11.3R: 72" CMP (x2)

Inflow Area = 31.225 ac, 0.00% Impervious, Inflow Depth = 2.20" for 10-Year event
Inflow = 47.62 cfs @ 12.38 hrs, Volume= 5.719 af
Outflow = 47.62 cfs @ 12.39 hrs, Volume= 5.719 af, Atten= 0%, Lag= 0.0 min
Primary = 47.62 cfs @ 12.39 hrs, Volume= 5.719 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 2,413.73' @ 12.39 hrs Surf.Area= 95 sf Storage= 133 cf

Plug-Flow detention time= 0.1 min calculated for 5.717 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (871.2 - 871.0)

Volume	Invert	Avail.Storage	Storage Description
#1	2,412.00'	2,120 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,412.00	60	0	0
2,414.00	100	160	160
2,416.00	260	360	520
2,418.00	380	640	1,160
2,420.00	580	960	2,120

Device	Routing	Invert	Outlet Devices
#1	Primary	2,412.00'	**72.0" Round Culvert X 2.00** L= 120.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 2,412.00' / 2,394.00' S= 0.1500 '/' Cc= 0.900 n= 0.025 Corrugated metal

Primary OutFlow Max=47.43 cfs @ 12.39 hrs HW=2,413.72' (Free Discharge)
1=Culvert (Inlet Controls 47.43 cfs @ 3.53 fps)

Summary for Pond 11.7R: Culvert

Inflow Area = 51.909 ac, 0.00% Impervious, Inflow Depth = 2.20" for 10-Year event
Inflow = 77.12 cfs @ 12.32 hrs, Volume= 9.507 af
Outflow = 77.12 cfs @ 12.32 hrs, Volume= 9.507 af, Atten= 0%, Lag= 0.0 min
Primary = 77.12 cfs @ 12.32 hrs, Volume= 9.507 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,892.61' @ 12.32 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,889.00'	**48.0" Round Culvert** L= 46.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,889.00' / 1,882.00' S= 0.1522 '/' Cc= 0.900 n= 0.025 Corrugated metal
#2	Primary	1,894.00'	**15.0' long x 35.0' 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=76.78 cfs @ 12.32 hrs HW=1,892.59' (Free Discharge)
1=Culvert (Inlet Controls 76.78 cfs @ 6.45 fps)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 11.9R: Culvert

Inflow Area = 51.909 ac, 0.00% Impervious, Inflow Depth = 2.20" for 10-Year event
Inflow = 76.88 cfs @ 12.34 hrs, Volume= 9.507 af
Outflow = 76.72 cfs @ 12.34 hrs, Volume= 9.507 af, Atten= 0%, Lag= 0.2 min
Primary = 76.72 cfs @ 12.34 hrs, Volume= 9.507 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 1,777.10' @ 12.34 hrs Surf.Area= 317 sf Storage= 426 cf

Plug-Flow detention time= 0.4 min calculated for 9.507 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (874.3 - 874.2)

Volume	Invert	Avail.Storage	Storage Description
#1	1,773.00'	4,126 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,773.00	10	0	0
1,774.00	30	20	20
1,776.00	130	160	180
1,778.00	470	600	780
1,780.00	1,317	1,787	2,567
1,781.00	1,800	1,559	4,126

Device	Routing	Invert	Outlet Devices
#1	Primary	1,774.00'	**60.0" Round Culvert** L= 90.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,774.00' / 1,760.00' S= 0.1556 '/' Cc= 0.900 n= 0.025 Corrugated metal

Primary OutFlow Max=76.55 cfs @ 12.34 hrs HW=1,777.10' (Free Discharge)
1=Culvert (Inlet Controls 76.55 cfs @ 5.99 fps)

Design Point Summary
1-yr Storm Event

Design Point Totals
10 & 100-yr Storm Events

Summary for Reach DP-1: Design Point-1

Inflow Area = 74.711 ac, 0.00% Impervious, Inflow Depth = 0.84" for 1-Year event
Inflow = 49.52 cfs @ 12.21 hrs, Volume= 5.213 af
Outflow = 49.52 cfs @ 12.21 hrs, Volume= 5.213 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Summary for Reach DP-11: Design Point-11

Inflow Area = 165.059 ac, 1.98% Impervious, Inflow Depth = 0.84" for 1-Year event
Inflow = 90.27 cfs @ 12.37 hrs, Volume= 11.579 af
Outflow = 90.27 cfs @ 12.37 hrs, Volume= 11.579 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Summary for Reach DP-2: Design Point-2

Inflow Area = 38.001 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 22.71 cfs @ 12.30 hrs, Volume= 2.559 af
Outflow = 22.71 cfs @ 12.30 hrs, Volume= 2.559 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Summary for Reach DP-2a: Design Point 2a

Inflow Area = 2.886 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 3.29 cfs @ 12.04 hrs, Volume= 0.194 af
Outflow = 3.29 cfs @ 12.04 hrs, Volume= 0.194 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Summary for Reach DP-2b: Design Point 2b

Inflow Area = 17.970 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 15.25 cfs @ 12.13 hrs, Volume= 1.210 af
Outflow = 15.25 cfs @ 12.13 hrs, Volume= 1.210 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Summary for Reach DP-3: Design Point-3

Inflow Area = 14.681 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 11.84 cfs @ 12.15 hrs, Volume= 0.989 af
Outflow = 11.84 cfs @ 12.15 hrs, Volume= 0.989 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Summary for Reach DP-4: Design Point-4

Inflow Area = 12.333 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 9.80 cfs @ 12.16 hrs, Volume= 0.831 af
Outflow = 9.80 cfs @ 12.16 hrs, Volume= 0.831 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Summary for Reach DP-5: Design Point-5

Inflow Area = 44.401 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 35.40 cfs @ 12.16 hrs, Volume= 2.990 af
Outflow = 35.40 cfs @ 12.16 hrs, Volume= 2.990 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Summary for Reach DP-6: Design Point-6

Inflow Area = 2.817 ac, 0.00% Impervious, Inflow Depth = 0.76" for 1-Year event
Inflow = 3.48 cfs @ 11.99 hrs, Volume= 0.178 af
Outflow = 3.48 cfs @ 11.99 hrs, Volume= 0.178 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Summary for Reach DP-7: Design Point-7

Inflow Area = 5.312 ac, 0.00% Impervious, Inflow Depth = 0.76" for 1-Year event
Inflow = 6.49 cfs @ 12.00 hrs, Volume= 0.337 af
Outflow = 6.49 cfs @ 12.00 hrs, Volume= 0.337 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Summary for Reach DP-8: Design Point-8

Inflow Area = 40.507 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 32.83 cfs @ 12.16 hrs, Volume= 2.728 af
Outflow = 32.83 cfs @ 12.16 hrs, Volume= 2.728 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Summary for Reach DP-9: Design Point-9

Inflow Area = 26.045 ac, 2.38% Impervious, Inflow Depth = 0.86" for 1-Year event
Inflow = 24.38 cfs @ 12.12 hrs, Volume= 1.861 af
Outflow = 24.38 cfs @ 12.12 hrs, Volume= 1.861 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Summary for Reach DP12: Design Point-12

Inflow Area =	34.368 ac,	0.00% Impervious,	Inflow Depth = 0.81"	for 1-Year event	
Inflow =	25.72 cfs @	12.18 hrs,	Volume=	2.314 af	
Outflow =	25.72 cfs @	12.18 hrs,	Volume=	2.314 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Time span=0.00-144.00 hrs, dt=0.05 hrs, 2881 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Reach DP-1: Design Point-1	Inflow=156.98 cfs 13.989 af Outflow=156.98 cfs 13.989 af
Reach DP-11: Design Point-11	Inflow=274.77 cfs 31.010 af Outflow=274.77 cfs 31.010 af
Reach DP-2: Design Point-2	Inflow=68.67 cfs 6.960 af Outflow=68.67 cfs 6.960 af
Reach DP-2a: Design Point 2a	Inflow=9.43 cfs 0.529 af Outflow=9.43 cfs 0.529 af
Reach DP-2b: Design Point 2b	Inflow=45.24 cfs 3.291 af Outflow=45.24 cfs 3.291 af
Reach DP-3: Design Point-3	Inflow=35.10 cfs 2.689 af Outflow=35.10 cfs 2.689 af
Reach DP-4: Design Point-4	Inflow=29.08 cfs 2.259 af Outflow=29.08 cfs 2.259 af
Reach DP-5: Design Point-5	Inflow=105.04 cfs 8.132 af Outflow=105.04 cfs 8.132 af
Reach DP-6: Design Point-6	Inflow=10.13 cfs 0.497 af Outflow=10.13 cfs 0.497 af
Reach DP-7: Design Point-7	Inflow=18.93 cfs 0.937 af Outflow=18.93 cfs 0.937 af
Reach DP-8: Design Point-8	Inflow=98.47 cfs 7.419 af Outflow=98.47 cfs 7.419 af
Reach DP-9: Design Point-9	Inflow=69.48 cfs 4.950 af Outflow=69.48 cfs 4.950 af
Reach DP12: Design Point-12	Inflow=76.97 cfs 6.295 af Outflow=76.97 cfs 6.295 af

Time span=0.00-144.00 hrs, dt=0.05 hrs, 2881 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

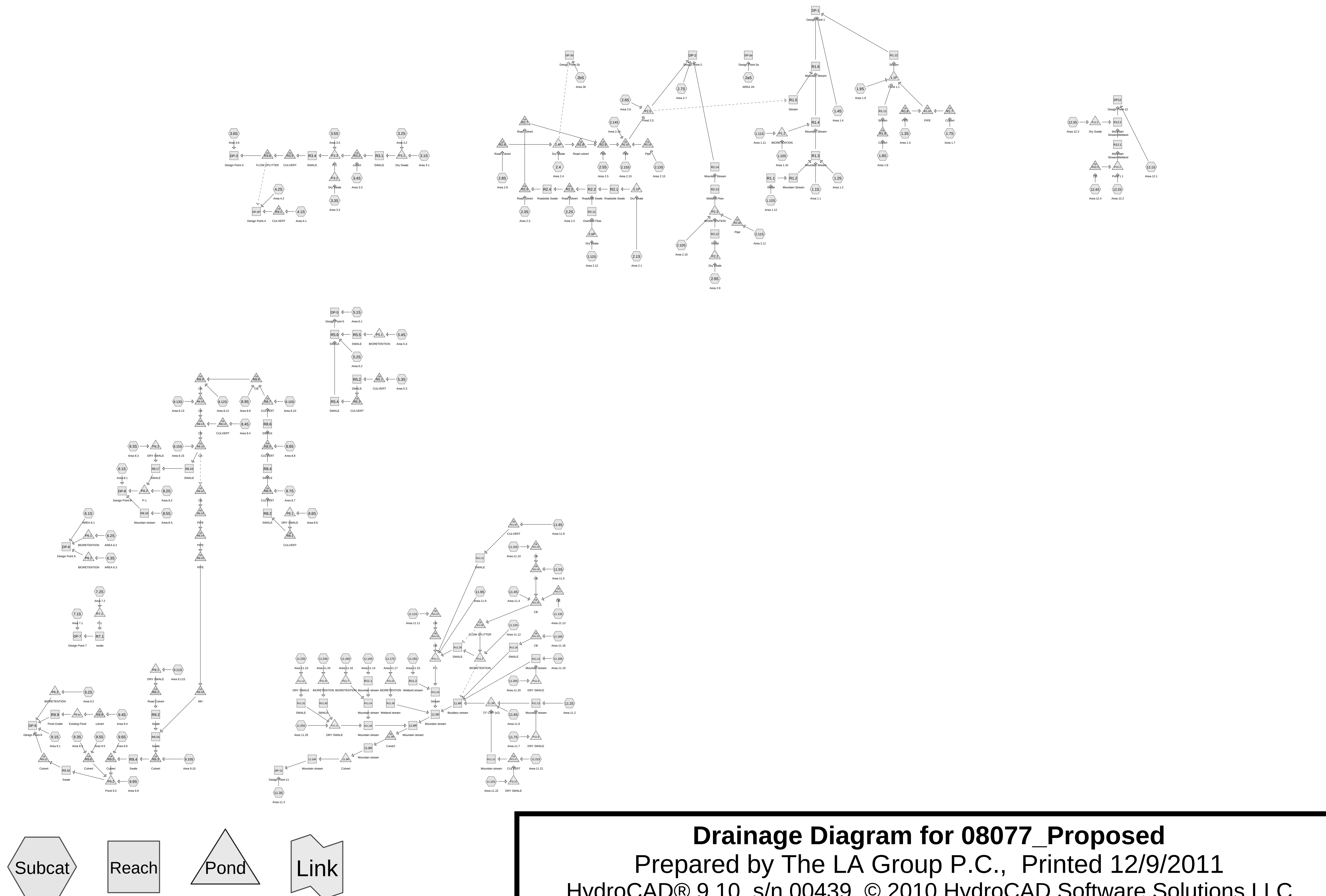
Reach DP-1: Design Point-1	Inflow=315.08 cfs 26.924 af Outflow=315.08 cfs 26.924 af
Reach DP-11: Design Point-11	Inflow=541.52 cfs 59.622 af Outflow=541.52 cfs 59.622 af
Reach DP-2: Design Point-2	Inflow=135.61 cfs 13.486 af Outflow=135.61 cfs 13.486 af
Reach DP-2a: Design Point 2a	Inflow=18.20 cfs 1.024 af Outflow=18.20 cfs 1.024 af
Reach DP-2b: Design Point 2b	Inflow=88.47 cfs 6.377 af Outflow=88.47 cfs 6.377 af
Reach DP-3: Design Point-3	Inflow=68.74 cfs 5.210 af Outflow=68.74 cfs 5.210 af
Reach DP-4: Design Point-4	Inflow=56.97 cfs 4.377 af Outflow=56.97 cfs 4.377 af
Reach DP-5: Design Point-5	Inflow=205.76 cfs 15.757 af Outflow=205.76 cfs 15.757 af
Reach DP-6: Design Point-6	Inflow=19.68 cfs 0.974 af Outflow=19.68 cfs 0.974 af
Reach DP-7: Design Point-7	Inflow=36.82 cfs 1.836 af Outflow=36.82 cfs 1.836 af
Reach DP-8: Design Point-8	Inflow=194.23 cfs 14.375 af Outflow=194.23 cfs 14.375 af
Reach DP-9: Design Point-9	Inflow=133.81 cfs 9.484 af Outflow=133.81 cfs 9.484 af
Reach DP12: Design Point-12	Inflow=151.11 cfs 12.197 af Outflow=151.11 cfs 12.197 af

APPENDIX D

HydroCAD Data – Proposed Model

1. **Proposed Model Diagram, Area/Soil Listings and Subcatchment Summaries**
2. **Proposed Reach and Culvert Summaries – 1 & 10-yr Storm Events**
3. **Proposed Pond Summaries – 1, 10 & 100-yr Storm Events**
4. **Proposed Design Point Summaries - 1-yr Event**
5. **Proposed Design Point Totals – 10 and 100-yr Storm Events**

Model Diagram, Area and Soil Listings and Subcatchment Summaries



Drainage Diagram for 08077_Proposed

Prepared by The LA Group P.C., Printed 12/9/2011

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Reach and Culvert Summaries
1 & 10-yr Storm Events

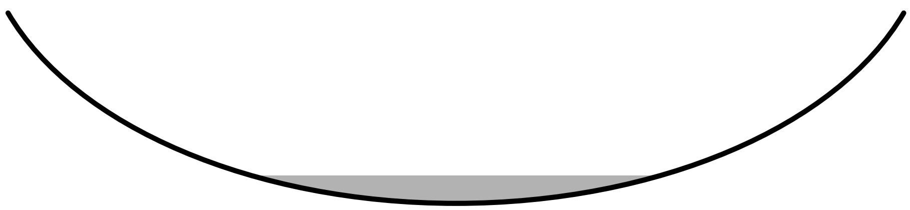
Summary for Reach 11.10R: Mountain stream

Inflow Area = 81.523 ac, 7.59% Impervious, Inflow Depth > 0.95" for 1-Year event
Inflow = 24.22 cfs @ 12.42 hrs, Volume= 6.452 af
Outflow = 24.13 cfs @ 12.45 hrs, Volume= 6.452 af, Atten= 0%, Lag= 1.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 8.15 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.99 fps, Avg. Travel Time= 3.1 min

Peak Storage= 1,111 cf @ 12.43 hrs
Average Depth at Peak Storage= 0.58'
Bank-Full Depth= 4.00', Capacity at Bank-Full= 1,490.21 cfs

20.00' x 4.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 375.0' Slope= 0.1733 '/'
Inlet Invert= 1,759.00', Outlet Invert= 1,694.00'



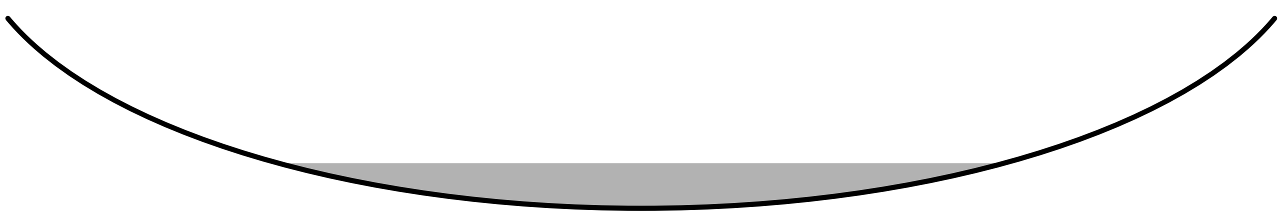
Summary for Reach 11.4R: Bouldery stream

Inflow Area = 46.597 ac, 0.59% Impervious, Inflow Depth = 0.99" for 1-Year event
Inflow = 21.46 cfs @ 12.34 hrs, Volume= 3.827 af
Outflow = 21.37 cfs @ 12.38 hrs, Volume= 3.827 af, Atten= 0%, Lag= 2.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.01 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 1.92 fps, Avg. Travel Time= 5.6 min

Peak Storage= 1,988 cf @ 12.35 hrs
Average Depth at Peak Storage= 0.47'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 482.65 cfs

20.00' x 2.00' deep Parabolic Channel, n= 0.050 Mountain streams w/large boulders
Length= 650.0' Slope= 0.2615 '/'
Inlet Invert= 2,390.00', Outlet Invert= 2,220.00'



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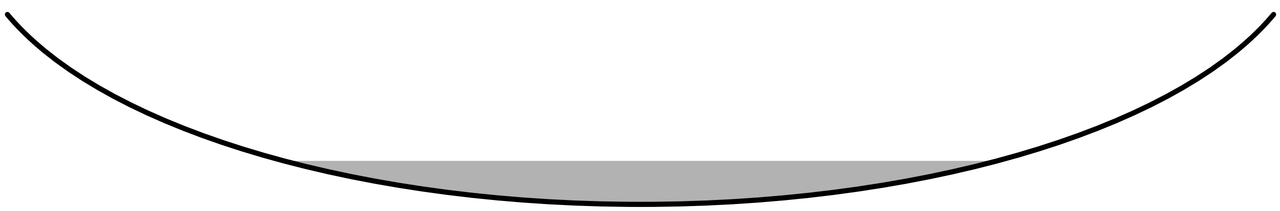
Summary for Reach 11.5R: Mountain stream

Inflow Area = 72.944 ac, 7.27% Impervious, Inflow Depth > 0.94" for 1-Year event
Inflow = 22.10 cfs @ 12.36 hrs, Volume= 5.690 af
Outflow = 22.01 cfs @ 12.43 hrs, Volume= 5.690 af, Atten= 0%, Lag= 4.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.60 fps, Min. Travel Time= 2.5 min
Avg. Velocity = 1.73 fps, Avg. Travel Time= 10.8 min

Peak Storage= 3,264 cf @ 12.39 hrs
Average Depth at Peak Storage= 0.46'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 535.72 cfs

20.00' x 2.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 1,125.0' Slope= 0.2062 '/'
Inlet Invert= 2,220.00', Outlet Invert= 1,988.00'



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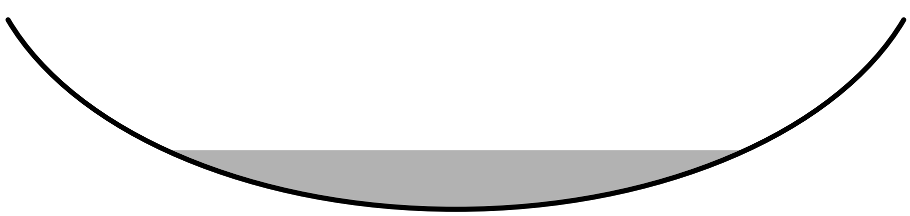
Summary for Reach 11.6R: Mountain stream

Inflow Area = 81.523 ac, 7.59% Impervious, Inflow Depth > 0.95" for 1-Year event
Inflow = 24.31 cfs @ 12.38 hrs, Volume= 6.452 af
Outflow = 24.28 cfs @ 12.41 hrs, Volume= 6.452 af, Atten= 0%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.54 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 2.35 fps, Avg. Travel Time= 2.5 min

Peak Storage= 830 cf @ 12.39 hrs
Average Depth at Peak Storage= 0.62'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 294.12 cfs

10.00' x 2.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 360.0' Slope= 0.2722 '/'
Inlet Invert= 1,988.00', Outlet Invert= 1,890.00'



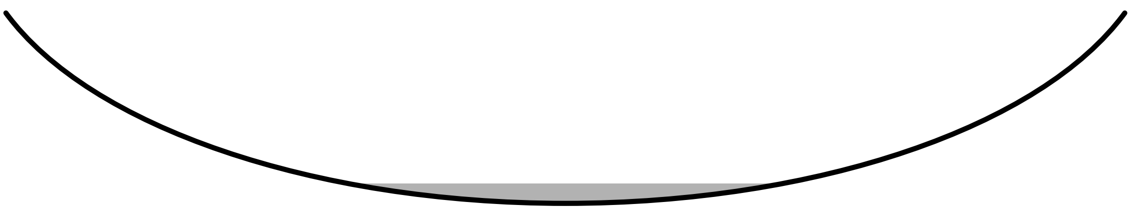
Summary for Reach 11.8R: Mountain stream

Inflow Area = 81.523 ac, 7.59% Impervious, Inflow Depth > 0.95" for 1-Year event
Inflow = 24.28 cfs @ 12.41 hrs, Volume= 6.452 af
Outflow = 24.26 cfs @ 12.42 hrs, Volume= 6.452 af, Atten= 0%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.05 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 2.89 fps, Avg. Travel Time= 2.0 min

Peak Storage= 769 cf @ 12.41 hrs
Average Depth at Peak Storage= 0.41'
Bank-Full Depth= 4.00', Capacity at Bank-Full= 3,230.06 cfs

25.00' x 4.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 350.0' Slope= 0.5000 '/'
Inlet Invert= 1,882.00', Outlet Invert= 1,707.00'



Summary for Reach R1.1: Swale

Inflow Area = 12.296 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 12.34 cfs @ 12.07 hrs, Volume= 0.828 af
Outflow = 11.96 cfs @ 12.11 hrs, Volume= 0.828 af, Atten= 3%, Lag= 2.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.12 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.30 fps, Avg. Travel Time= 3.6 min

Peak Storage= 830 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.58'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 129.38 cfs

4.00' x 2.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 2.0 '/' Top Width= 12.00'
Length= 280.0' Slope= 0.0357 '/'
Inlet Invert= 2,440.00', Outlet Invert= 2,430.00'

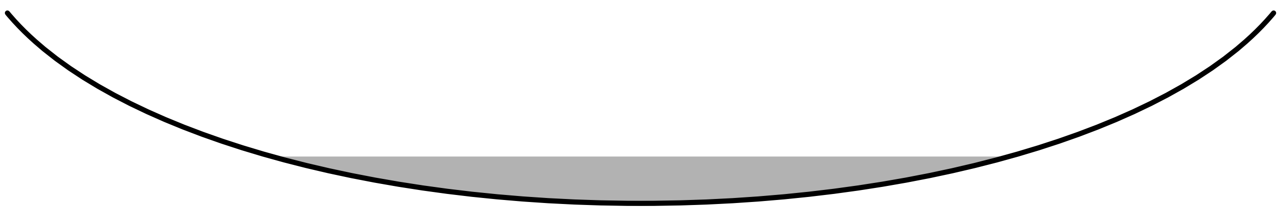
Summary for Reach R1.11: Stream

Inflow Area = 3.441 ac, 4.67% Impervious, Inflow Depth = 0.96" for 1-Year event
Inflow = 5.69 cfs @ 11.98 hrs, Volume= 0.276 af
Outflow = 5.53 cfs @ 11.99 hrs, Volume= 0.276 af, Atten= 3%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.51 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.14 fps, Avg. Travel Time= 1.7 min

Peak Storage= 194 cf @ 11.99 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 119.42 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.070 Sluggish weedy reaches w/pools
Length= 120.0' Slope= 0.3083 '/'
Inlet Invert= 2,205.00', Outlet Invert= 2,168.00'



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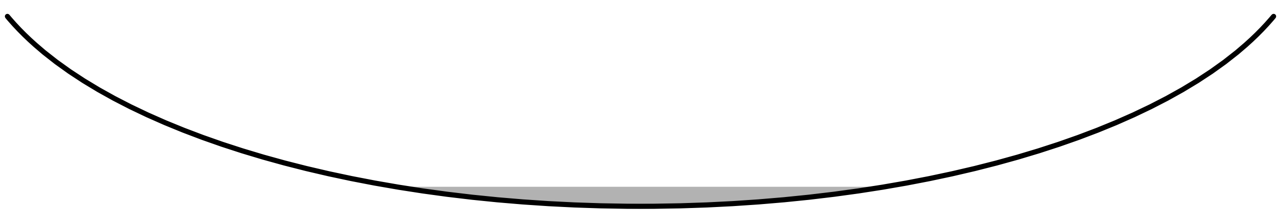
Summary for Reach R1.12: Stream

Inflow Area = 9.950 ac, 14.75% Impervious, Inflow Depth > 1.08" for 1-Year event
Inflow = 0.52 cfs @ 15.61 hrs, Volume= 0.899 af
Outflow = 0.52 cfs @ 15.76 hrs, Volume= 0.898 af, Atten= 0%, Lag= 9.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.21 fps, Min. Travel Time= 5.6 min
Avg. Velocity = 0.54 fps, Avg. Travel Time= 12.5 min

Peak Storage= 174 cf @ 15.67 hrs
Average Depth at Peak Storage= 0.10'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 73.77 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.070 Sluggish weedy reaches w/pools
Length= 405.0' Slope= 0.1177 '/'
Inlet Invert= 2,157.65', Outlet Invert= 2,110.00'



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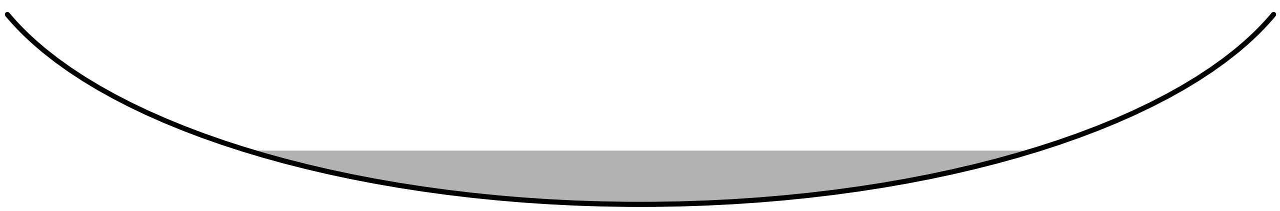
Summary for Reach R1.2: Mountain Stream

Inflow Area = 12.296 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 11.96 cfs @ 12.11 hrs, Volume= 0.828 af
Outflow = 11.52 cfs @ 12.15 hrs, Volume= 0.828 af, Atten= 4%, Lag= 2.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.88 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 2.07 fps, Avg. Travel Time= 4.4 min

Peak Storage= 1,093 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 182.97 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 550.0' Slope= 0.2364 '/'
Inlet Invert= 2,430.00', Outlet Invert= 2,300.00'



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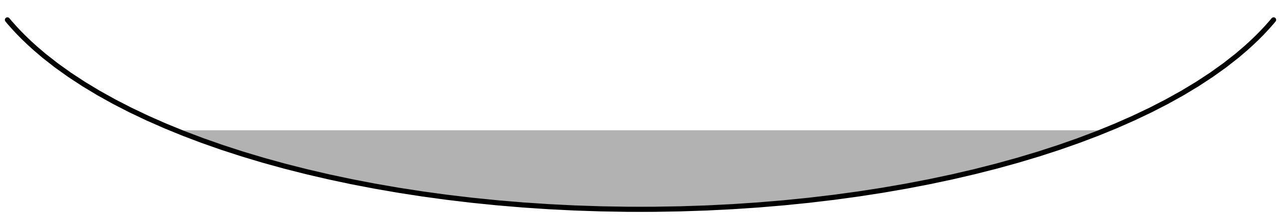
Summary for Reach R1.3: Mountain Stream

Inflow Area = 52.901 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 40.46 cfs @ 12.17 hrs, Volume= 3.573 af
Outflow = 39.61 cfs @ 12.22 hrs, Volume= 3.573 af, Atten= 2%, Lag= 3.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.45 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 2.63 fps, Avg. Travel Time= 4.9 min

Peak Storage= 4,123 cf @ 12.19 hrs
Average Depth at Peak Storage= 0.62'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 265.67 cfs

20.00' x 1.50' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 767.0' Slope= 0.1304 '/'
Inlet Invert= 2,300.00', Outlet Invert= 2,200.00'



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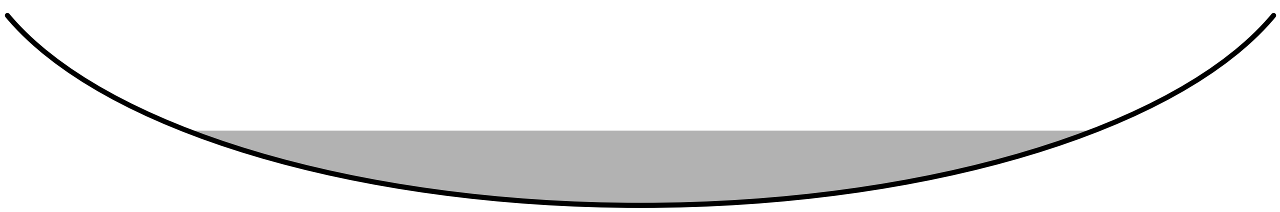
Summary for Reach R1.4: Mountain Stream

Inflow Area =	54.922 ac,	1.00% Impervious, Inflow Depth = 0.83"	for 1-Year event	
Inflow =	39.73 cfs @	12.22 hrs, Volume=	3.804 af	
Outflow =	39.24 cfs @	12.25 hrs, Volume=	3.804 af,	Atten= 1%, Lag= 1.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.03 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.75 fps, Avg. Travel Time= 3.5 min

Peak Storage= 1,796 cf @ 12.23 hrs
Average Depth at Peak Storage= 0.59'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 298.31 cfs

20.00' x 1.50' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 365.0' Slope= 0.1644 '/'
Inlet Invert= 2,200.00', Outlet Invert= 2,140.00'



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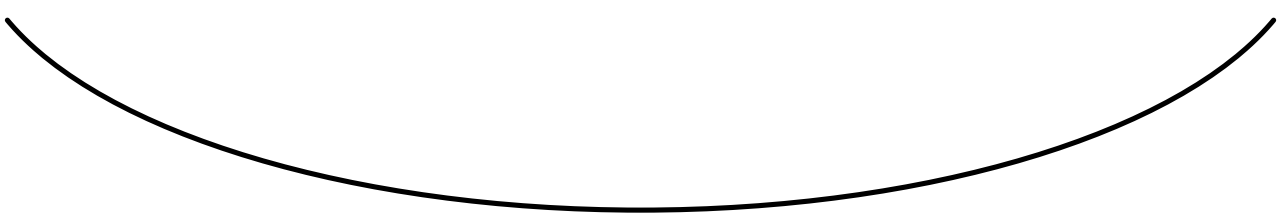
Summary for Reach R1.5: Stream

Inflow =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	
Outflow =	0.00 cfs @	0.00 hrs, Volume=	0.000 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 438.14 cfs

35.00' x 1.50' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 175.0' Slope= 0.1143 '/'
Inlet Invert= 2,160.00', Outlet Invert= 2,140.00'



‡

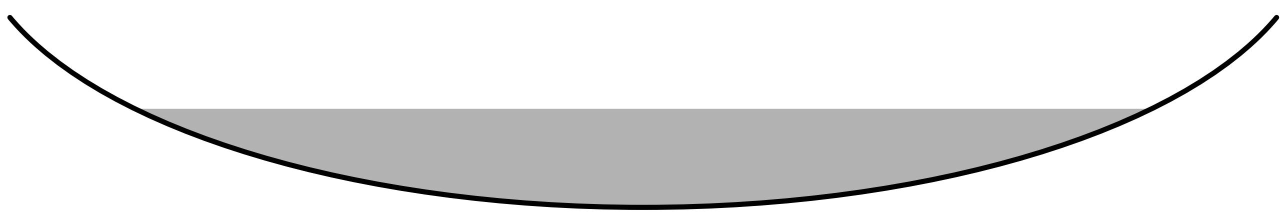
Summary for Reach R1.6: Mountain Stream

Inflow Area = 54.922 ac, 1.00% Impervious, Inflow Depth = 0.83" for 1-Year event
Inflow = 39.24 cfs @ 12.25 hrs, Volume= 3.804 af
Outflow = 38.93 cfs @ 12.27 hrs, Volume= 3.804 af, Atten= 1%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.27 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.13 fps, Avg. Travel Time= 3.0 min

Peak Storage= 1,489 cf @ 12.26 hrs
Average Depth at Peak Storage= 0.78'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 162.83 cfs

20.00' x 1.50' deep Parabolic Channel, n= 0.070 Sluggish weedy reaches w/pools
Length= 200.0' Slope= 0.1500 '/'
Inlet Invert= 2,140.00', Outlet Invert= 2,110.00'



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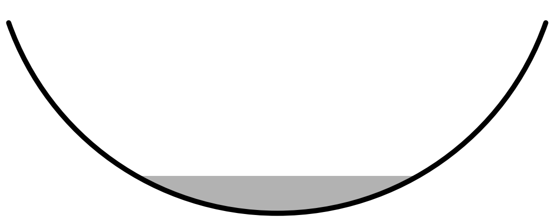
Summary for Reach R11.1: Mountain stream

Inflow Area = 4.455 ac, 0.00% Impervious, Inflow Depth = 0.86" for 1-Year event
Inflow = 4.83 cfs @ 12.07 hrs, Volume= 0.318 af
Outflow = 4.74 cfs @ 12.09 hrs, Volume= 0.318 af, Atten= 2%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.95 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 2.59 fps, Avg. Travel Time= 1.3 min

Peak Storage= 137 cf @ 12.08 hrs
Average Depth at Peak Storage= 0.39'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 149.17 cfs

6.00' x 2.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 200.0' Slope= 0.2300 '/'
Inlet Invert= 2,274.00', Outlet Invert= 2,228.00'



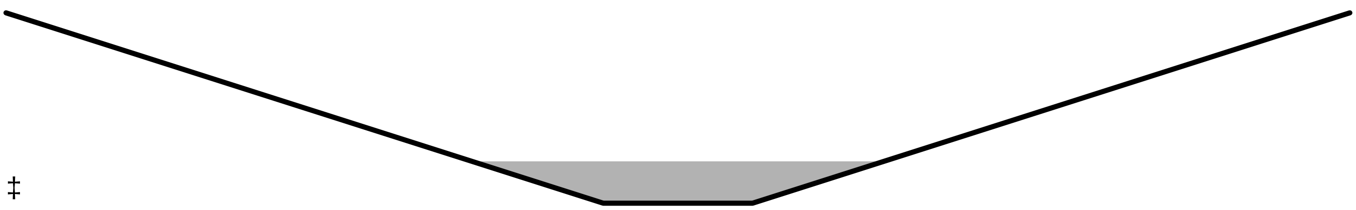
Summary for Reach R11.12: Mountain stream

Inflow Area = 5.399 ac, 2.68% Impervious, Inflow Depth = 0.84" for 1-Year event
Inflow = 2.19 cfs @ 12.07 hrs, Volume= 0.377 af
Outflow = 2.14 cfs @ 12.09 hrs, Volume= 0.377 af, Atten= 2%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.24 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.73 fps, Avg. Travel Time= 1.9 min

Peak Storage= 83 cf @ 12.08 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 62.87 cfs

1.00' x 1.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 4.0 '/' Top Width= 9.00'
Length= 200.0' Slope= 0.2600 '/'
Inlet Invert= 2,472.00', Outlet Invert= 2,420.00'



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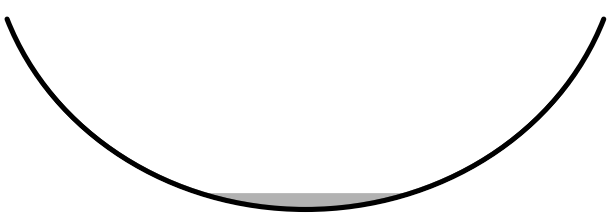
Summary for Reach R11.13: Mountain stream

Inflow Area = 28.547 ac, 0.11% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 14.20 cfs @ 12.42 hrs, Volume= 1.926 af
Outflow = 14.17 cfs @ 12.43 hrs, Volume= 1.926 af, Atten= 0%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.15 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 2.35 fps, Avg. Travel Time= 1.4 min

Peak Storage= 397 cf @ 12.42 hrs
Average Depth at Peak Storage= 0.51'
Bank-Full Depth= 6.00', Capacity at Bank-Full= 2,646.35 cfs

20.00' x 6.00' deep Parabolic Channel, n= 0.050 Mountain streams w/large boulders
Length= 200.0' Slope= 0.2500 '/'
Inlet Invert= 2,470.00', Outlet Invert= 2,420.00'



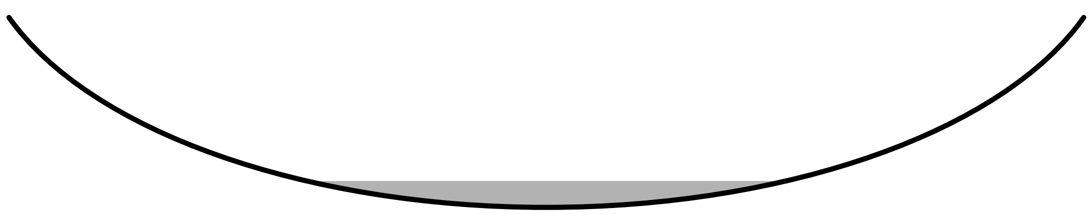
Summary for Reach R11.14: Mountain stream

Inflow Area = 0.695 ac, 5.23% Impervious, Inflow Depth = 0.89" for 1-Year event
Inflow = 0.68 cfs @ 11.98 hrs, Volume= 0.052 af
Outflow = 0.62 cfs @ 12.05 hrs, Volume= 0.052 af, Atten= 9%, Lag= 4.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.07 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 0.83 fps, Avg. Travel Time= 9.6 min

Peak Storage= 99 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 44.26 cfs

6.00' x 1.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 480.0' Slope= 0.1667 '/'
Inlet Invert= 2,470.00', Outlet Invert= 2,390.00'



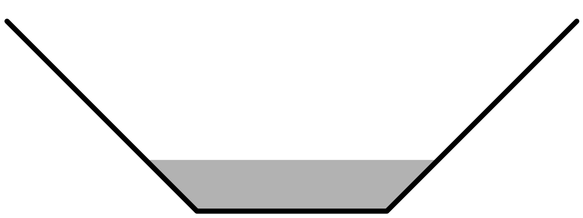
Summary for Reach R11.16: SWALE

Inflow Area = 11.392 ac, 0.56% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 9.05 cfs @ 12.16 hrs, Volume= 0.767 af
Outflow = 8.86 cfs @ 12.20 hrs, Volume= 0.767 af, Atten= 2%, Lag= 2.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.56 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 2.29 fps, Avg. Travel Time= 4.0 min

Peak Storage= 752 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.54'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 101.91 cfs

2.00' x 2.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 1.0 '/' Top Width= 6.00'
Length= 550.0' Slope= 0.1109 '/'
Inlet Invert= 2,451.00', Outlet Invert= 2,390.00'



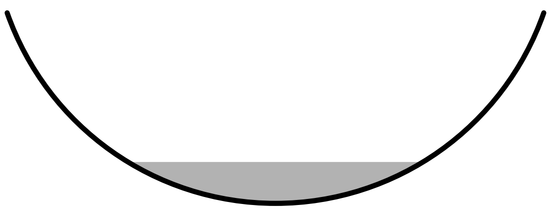
Summary for Reach R11.1A: Mountain stream

Inflow Area = 5.196 ac, 7.86% Impervious, Inflow Depth = 0.98" for 1-Year event
Inflow = 4.85 cfs @ 12.09 hrs, Volume= 0.426 af
Outflow = 4.74 cfs @ 12.11 hrs, Volume= 0.426 af, Atten= 2%, Lag= 1.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.01 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.71 fps, Avg. Travel Time= 3.1 min

Peak Storage= 261 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.43'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 119.72 cfs

6.00' x 2.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 324.0' Slope= 0.1481 '/'
Inlet Invert= 2,228.00', Outlet Invert= 2,180.00'



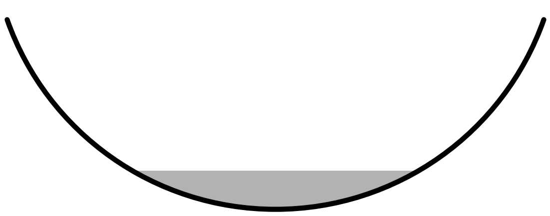
Summary for Reach R11.1B: Mountain stream

Inflow Area = 8.579 ac, 10.37% Impervious, Inflow Depth = 1.07" for 1-Year event
Inflow = 4.79 cfs @ 12.11 hrs, Volume= 0.762 af
Outflow = 4.56 cfs @ 12.19 hrs, Volume= 0.762 af, Atten= 5%, Lag= 5.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.33 fps, Min. Travel Time= 2.7 min
Avg. Velocity = 1.34 fps, Avg. Travel Time= 12.9 min

Peak Storage= 753 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.40'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 131.79 cfs

6.00' x 2.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 1,036.0' Slope= 0.1795 '/'
Inlet Invert= 2,174.00', Outlet Invert= 1,988.00'



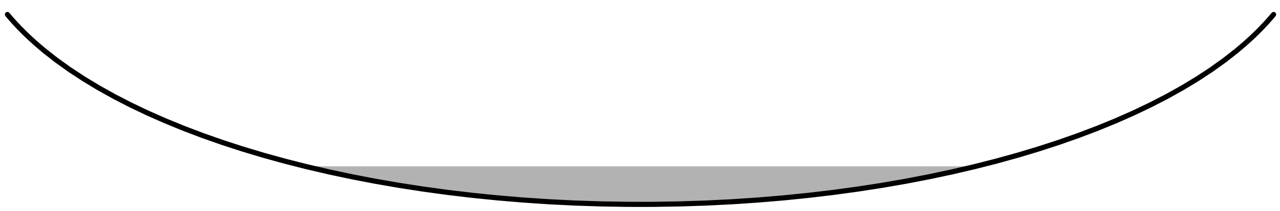
Summary for Reach R11.2: Wetland stream

Inflow Area = 1.046 ac, 0.00% Impervious, Inflow Depth = 0.91" for 1-Year event
Inflow = 1.63 cfs @ 11.98 hrs, Volume= 0.079 af
Outflow = 1.32 cfs @ 12.10 hrs, Volume= 0.079 af, Atten= 19%, Lag= 7.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.14 fps, Min. Travel Time= 4.7 min
Avg. Velocity = 0.36 fps, Avg. Travel Time= 14.8 min

Peak Storage= 379 cf @ 12.02 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 44.98 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.070 Sluggish weedy reaches w/pools
Length= 320.0' Slope= 0.0437 '/'
Inlet Invert= 2,302.00', Outlet Invert= 2,288.00'



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Summary for Reach R11.21: SWALE

Inflow Area = 5.212 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 4.95 cfs @ 12.09 hrs, Volume= 0.351 af
Outflow = 4.26 cfs @ 12.26 hrs, Volume= 0.351 af, Atten= 14%, Lag= 10.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.81 fps, Min. Travel Time= 6.1 min
Avg. Velocity = 1.42 fps, Avg. Travel Time= 20.6 min

Peak Storage= 1,561 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.37'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 51.40 cfs

2.00' x 1.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 1.0 '/' Top Width= 5.00'
Length= 1,760.0' Slope= 0.0875 '/'
Inlet Invert= 2,458.00', Outlet Invert= 2,304.00'

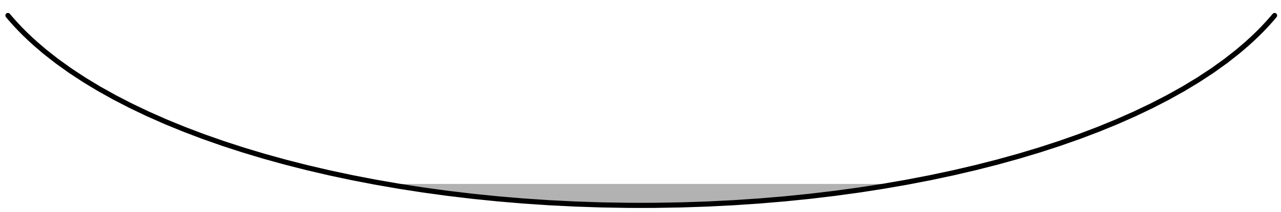
Summary for Reach R11.24: Stream

Inflow Area = 25.915 ac, 18.10% Impervious, Inflow Depth > 0.83" for 1-Year event
Inflow = 1.46 cfs @ 12.11 hrs, Volume= 1.783 af
Outflow = 1.38 cfs @ 12.19 hrs, Volume= 1.783 af, Atten= 6%, Lag= 4.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.85 fps, Min. Travel Time= 2.7 min
Avg. Velocity = 0.82 fps, Avg. Travel Time= 6.1 min

Peak Storage= 226 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 158.42 cfs

30.00' x 1.00' deep Parabolic Channel, n= 0.070 Sluggish weedy reaches w/pools
Length= 300.0' Slope= 0.2400 '/'
Inlet Invert= 2,292.00', Outlet Invert= 2,220.00'

‡


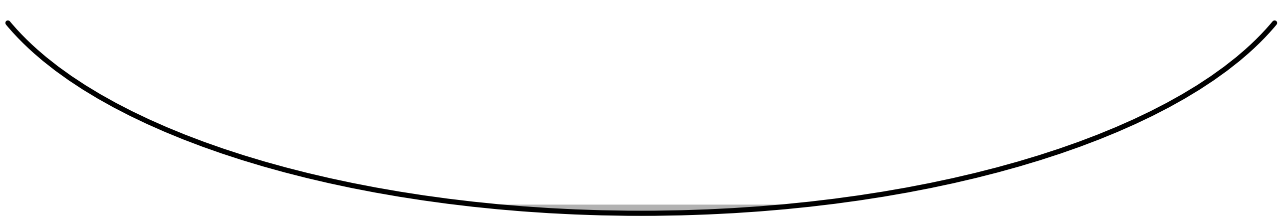
Summary for Reach R11.26: Wetland stream

Inflow Area = 0.432 ac, 77.25% Impervious, Inflow Depth = 2.25" for 1-Year event
Inflow = 0.07 cfs @ 12.00 hrs, Volume= 0.081 af
Outflow = 0.07 cfs @ 12.75 hrs, Volume= 0.081 af, Atten= 0%, Lag= 45.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.05 fps, Min. Travel Time= 2.5 min
Avg. Velocity = 0.71 fps, Avg. Travel Time= 3.6 min

Peak Storage= 10 cf @ 12.70 hrs
Average Depth at Peak Storage= 0.04'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 53.93 cfs

10.00' x 1.00' deep Parabolic Channel, n= 0.070 Sluggish weedy reaches w/pools
Length= 155.0' Slope= 0.2581 '/'
Inlet Invert= 2,260.00', Outlet Invert= 2,220.00'

‡


Summary for Reach R11.29: SWALE

Inflow Area = 9.625 ac, 29.34% Impervious, Inflow Depth = 0.51" for 1-Year event
Inflow = 2.97 cfs @ 12.23 hrs, Volume= 0.412 af
Outflow = 2.97 cfs @ 12.26 hrs, Volume= 0.412 af, Atten= 0%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 6.93 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 3.14 fps, Avg. Travel Time= 0.9 min

Peak Storage= 71 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 106.52 cfs

2.00' x 1.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 1.0 '/' Top Width= 5.00'
Length= 165.0' Slope= 0.3758 '/'
Inlet Invert= 2,366.00', Outlet Invert= 2,304.00'

Summary for Reach R11.30: SWALE

Inflow Area = 0.575 ac, 22.45% Impervious, Inflow Depth = 2.07" for 1-Year event
Inflow = 0.06 cfs @ 0.00 hrs, Volume= 0.099 af
Outflow = 0.05 cfs @ 0.05 hrs, Volume= 0.099 af, Atten= 23%, Lag= 3.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.68 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.34 fps, Avg. Travel Time= 1.1 min

Peak Storage= 3 cf @ 0.05 hrs
Average Depth at Peak Storage= 0.02'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 148.59 cfs

2.00' x 1.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 85.0' Slope= 0.3471 '/'
Inlet Invert= 2,213.50', Outlet Invert= 2,184.00'

Summary for Reach R11.31: SWALE

Inflow Area = 1.246 ac, 12.83% Impervious, Inflow Depth > 1.01" for 1-Year event
Inflow = 0.05 cfs @ 16.27 hrs, Volume= 0.105 af
Outflow = 0.05 cfs @ 16.41 hrs, Volume= 0.105 af, Atten= 0%, Lag= 8.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.88 fps, Min. Travel Time= 4.3 min
Avg. Velocity = 0.58 fps, Avg. Travel Time= 6.4 min

Peak Storage= 14 cf @ 16.34 hrs
Average Depth at Peak Storage= 0.03'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 63.41 cfs

2.00' x 1.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 225.0' Slope= 0.0356 '/'
Inlet Invert= 2,192.00', Outlet Invert= 2,184.00'

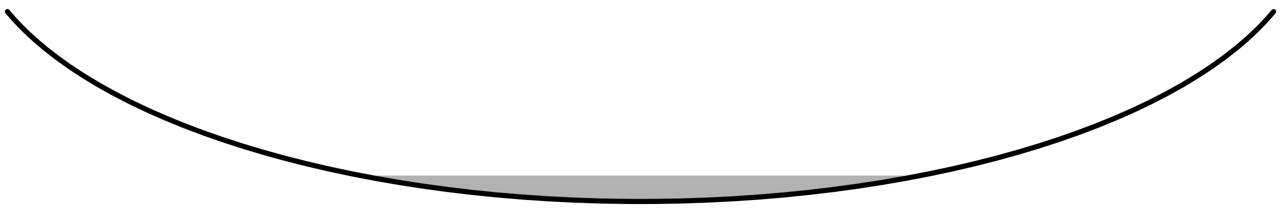
Summary for Reach R12.1: Mountain Stream/Wetland

Inflow Area = 17.893 ac, 9.84% Impervious, Inflow Depth > 0.96" for 1-Year event
Inflow = 0.80 cfs @ 16.04 hrs, Volume= 1.433 af
Outflow = 0.80 cfs @ 16.15 hrs, Volume= 1.433 af, Atten= 0%, Lag= 6.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.21 fps, Min. Travel Time= 3.6 min
Avg. Velocity = 0.55 fps, Avg. Travel Time= 7.9 min

Peak Storage= 172 cf @ 16.09 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 61.12 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.070 Sluggish weedy reaches w/pools
Length= 260.0' Slope= 0.0808 '/'
Inlet Invert= 2,290.00', Outlet Invert= 2,269.00'



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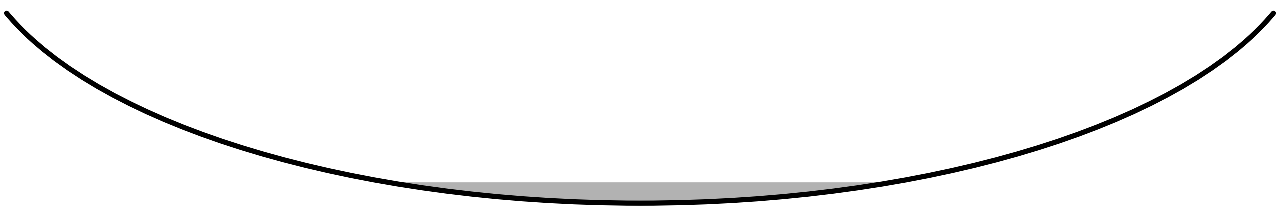
Summary for Reach R12.2: Mountain Stream/Wetland

Inflow Area = 18.269 ac, 10.19% Impervious, Inflow Depth > 0.97" for 1-Year event
Inflow = 0.82 cfs @ 16.14 hrs, Volume= 1.472 af
Outflow = 0.82 cfs @ 16.19 hrs, Volume= 1.472 af, Atten= 0%, Lag= 2.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.72 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 0.79 fps, Avg. Travel Time= 3.7 min

Peak Storage= 84 cf @ 16.16 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 100.21 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.070 Sluggish weedy reaches w/pools
Length= 175.0' Slope= 0.2171 '/'
Inlet Invert= 2,268.00', Outlet Invert= 2,230.00'



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Summary for Reach R2.1: Roadside Swale

Inflow Area = 6.302 ac, 9.60% Impervious, Inflow Depth = 0.96" for 1-Year event
Inflow = 4.18 cfs @ 12.24 hrs, Volume= 0.505 af
Outflow = 4.16 cfs @ 12.27 hrs, Volume= 0.505 af, Atten= 0%, Lag= 1.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.35 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 0.86 fps, Avg. Travel Time= 3.1 min

Peak Storage= 201 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.44'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 91.79 cfs

2.00' x 2.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 160.0' Slope= 0.0375 '/'
Inlet Invert= 2,300.00', Outlet Invert= 2,294.00'

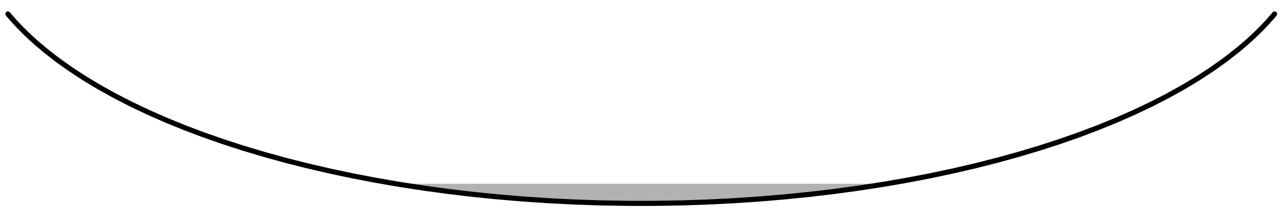
Summary for Reach R2.11: Overland Flow

Inflow Area = 3.914 ac, 11.46% Impervious, Inflow Depth = 1.01" for 1-Year event
Inflow = 0.24 cfs @ 14.79 hrs, Volume= 0.331 af
Outflow = 0.22 cfs @ 16.03 hrs, Volume= 0.331 af, Atten= 7%, Lag= 74.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.20 fps, Min. Travel Time= 38.2 min
Avg. Velocity = 0.11 fps, Avg. Travel Time= 67.4 min

Peak Storage= 503 cf @ 15.40 hrs
Average Depth at Peak Storage= 0.05'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 30.99 cfs

100.00' x 0.50' deep Parabolic Channel, n= 0.400 Sheet flow: Woods+light brush
Length= 465.0' Slope= 0.2710 '/'
Inlet Invert= 2,420.00', Outlet Invert= 2,294.00'



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Summary for Reach R2.12: Swale

Inflow Area = 3.322 ac, 22.38% Impervious, Inflow Depth = 1.19" for 1-Year event
Inflow = 4.41 cfs @ 12.11 hrs, Volume= 0.328 af
Outflow = 4.46 cfs @ 12.12 hrs, Volume= 0.328 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.93 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.37 fps, Avg. Travel Time= 2.1 min

Peak Storage= 135 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 199.13 cfs

2.00' x 2.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 170.0' Slope= 0.1765 '/'
Inlet Invert= 2,260.00', Outlet Invert= 2,230.00'

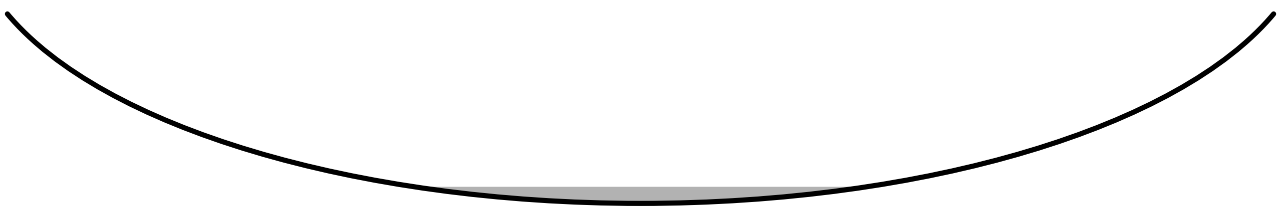
Summary for Reach R2.13: Wetland Flow

Inflow Area = 5.821 ac, 24.98% Impervious, Inflow Depth = 1.21" for 1-Year event
Inflow = 0.36 cfs @ 15.27 hrs, Volume= 0.587 af
Outflow = 0.36 cfs @ 15.35 hrs, Volume= 0.587 af, Atten= 0%, Lag= 4.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.06 fps, Min. Travel Time= 2.9 min
Avg. Velocity = 0.70 fps, Avg. Travel Time= 4.3 min

Peak Storage= 62 cf @ 15.30 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 71.29 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.070 Sluggish weedy reaches w/pools
Length= 182.0' Slope= 0.1099 '/'
Inlet Invert= 2,220.00', Outlet Invert= 2,200.00'



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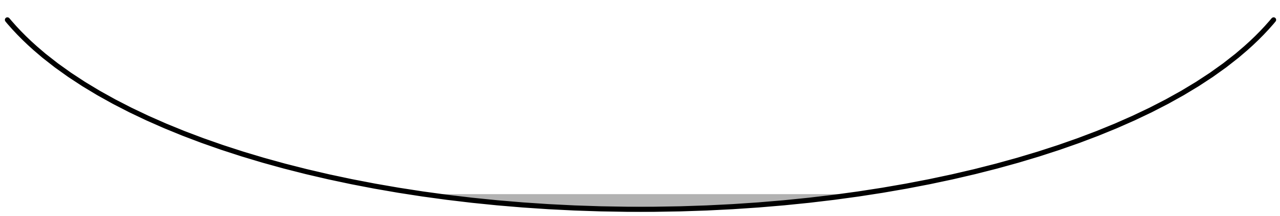
Summary for Reach R2.14: Mountain Stream

Inflow Area = 5.821 ac, 24.98% Impervious, Inflow Depth = 1.21" for 1-Year event
Inflow = 0.36 cfs @ 15.35 hrs, Volume= 0.587 af
Outflow = 0.36 cfs @ 15.46 hrs, Volume= 0.587 af, Atten= 0%, Lag= 6.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.24 fps, Min. Travel Time= 3.8 min
Avg. Velocity = 0.83 fps, Avg. Travel Time= 5.7 min

Peak Storage= 82 cf @ 15.39 hrs
Average Depth at Peak Storage= 0.08'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 90.24 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.070 Sluggish weedy reaches w/pools
Length= 284.0' Slope= 0.1761 '/'
Inlet Invert= 2,200.00', Outlet Invert= 2,150.00'



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Summary for Reach R2.2: Roadside Swale

Inflow Area = 10.216 ac, 10.32% Impervious, Inflow Depth = 0.98" for 1-Year event
Inflow = 4.17 cfs @ 12.27 hrs, Volume= 0.836 af
Outflow = 3.93 cfs @ 12.30 hrs, Volume= 0.836 af, Atten= 6%, Lag= 2.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 4.57 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.39 fps, Avg. Travel Time= 3.0 min

Peak Storage= 218 cf @ 12.28 hrs
Average Depth at Peak Storage= 0.33'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 146.87 cfs

2.00' x 2.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 250.0' Slope= 0.0960 '/'
Inlet Invert= 2,294.00', Outlet Invert= 2,270.00'

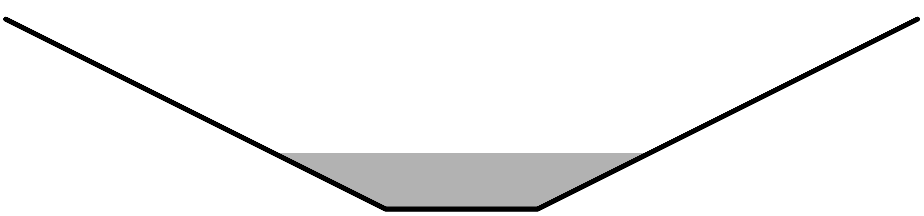
Summary for Reach R2.4: Roadside Swale

Inflow Area = 19.135 ac, 12.06% Impervious, Inflow Depth = 1.00" for 1-Year event
Inflow = 13.17 cfs @ 12.03 hrs, Volume= 1.590 af
Outflow = 12.10 cfs @ 12.12 hrs, Volume= 1.590 af, Atten= 8%, Lag= 5.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.71 fps, Min. Travel Time= 3.2 min
Avg. Velocity = 1.18 fps, Avg. Travel Time= 13.0 min

Peak Storage= 2,360 cf @ 12.07 hrs
Average Depth at Peak Storage= 0.74'
Bank-Full Depth= 2.50', Capacity at Bank-Full= 162.14 cfs

2.00' x 2.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 12.00'
Length= 915.0' Slope= 0.0426 '/'
Inlet Invert= 2,269.00', Outlet Invert= 2,230.00'



Summary for Reach R3.1: SWALE

Inflow Area = 10.077 ac, 13.20% Impervious, Inflow Depth = 1.02" for 1-Year event
Inflow = 8.31 cfs @ 12.14 hrs, Volume= 0.857 af
Outflow = 8.03 cfs @ 12.17 hrs, Volume= 0.857 af, Atten= 3%, Lag= 2.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.76 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.22 fps, Avg. Travel Time= 4.8 min

Peak Storage= 559 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 219.76 cfs

6.00' x 1.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 12.00'
Length= 350.0' Slope= 0.1771 '/'
Inlet Invert= 2,280.00', Outlet Invert= 2,218.00'

‡

Summary for Reach R3.4: SWALE

Inflow Area = 20.668 ac, 16.21% Impervious, Inflow Depth > 1.07" for 1-Year event
Inflow = 1.21 cfs @ 15.11 hrs, Volume= 1.840 af
Outflow = 1.21 cfs @ 15.16 hrs, Volume= 1.840 af, Atten= 0%, Lag= 2.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.21 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 1.83 fps, Avg. Travel Time= 3.8 min

Peak Storage= 121 cf @ 15.13 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 123.07 cfs

2.00' x 1.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 420.0' Slope= 0.2381 '/'
Inlet Invert= 2,180.00', Outlet Invert= 2,080.00'

Summary for Reach R5.2: SWALE

Inflow Area = 8.026 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 9.40 cfs @ 12.03 hrs, Volume= 0.540 af
Outflow = 8.81 cfs @ 12.08 hrs, Volume= 0.540 af, Atten= 6%, Lag= 3.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.18 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 1.84 fps, Avg. Travel Time= 6.2 min

Peak Storage= 1,024 cf @ 12.05 hrs
Average Depth at Peak Storage= 0.58'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 52.51 cfs

2.00' x 1.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 1.0 '/' Top Width= 5.00'
Length= 690.0' Slope= 0.0913 '/'
Inlet Invert= 1,901.00', Outlet Invert= 1,838.00'

Summary for Reach R5.4: SWALE

Inflow Area = 8.026 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 8.81 cfs @ 12.08 hrs, Volume= 0.540 af
Outflow = 8.36 cfs @ 12.13 hrs, Volume= 0.540 af, Atten= 5%, Lag= 2.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.67 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 2.02 fps, Avg. Travel Time= 5.3 min

Peak Storage= 833 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.52'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 105.45 cfs

2.00' x 2.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 1.0 '/' Top Width= 6.00'
Length= 640.0' Slope= 0.1187 '/'
Inlet Invert= 1,822.00', Outlet Invert= 1,746.00'

Summary for Reach R5.5: SWALE

Inflow Area = 0.684 ac, 16.21% Impervious, Inflow Depth = 1.47" for 1-Year event
Inflow = 0.10 cfs @ 12.75 hrs, Volume= 0.084 af
Outflow = 0.10 cfs @ 12.82 hrs, Volume= 0.084 af, Atten= 0%, Lag= 3.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.60 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 1.06 fps, Avg. Travel Time= 3.0 min

Peak Storage= 11 cf @ 12.78 hrs
Average Depth at Peak Storage= 0.03'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 79.73 cfs

2.00' x 1.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 1.0 '/' Top Width= 5.00'
Length= 190.0' Slope= 0.2105 '/'
Inlet Invert= 1,780.00', Outlet Invert= 1,740.00'

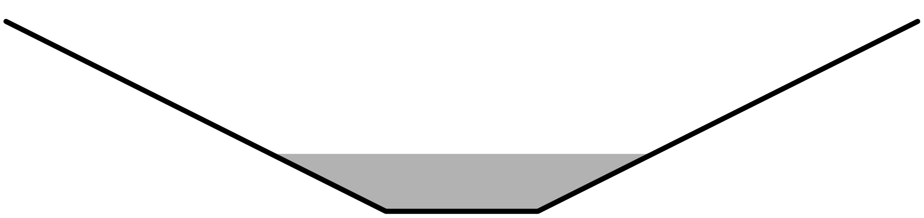
Summary for Reach R5.6: SWALE

Inflow Area = 12.198 ac, 3.02% Impervious, Inflow Depth = 0.90" for 1-Year event
Inflow = 11.94 cfs @ 12.09 hrs, Volume= 0.919 af
Outflow = 11.77 cfs @ 12.11 hrs, Volume= 0.919 af, Atten= 1%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.49 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 0.94 fps, Avg. Travel Time= 3.3 min

Peak Storage= 497 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.76'
Bank-Full Depth= 2.50', Capacity at Bank-Full= 151.95 cfs

2.00' x 2.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 12.00'
Length= 187.0' Slope= 0.0374 '/'
Inlet Invert= 1,745.00', Outlet Invert= 1,738.00'



Summary for Reach R7.1: swale

Inflow Area = 2.973 ac, 39.49% Impervious, Inflow Depth > 1.45" for 1-Year event
Inflow = 0.12 cfs @ 18.68 hrs, Volume= 0.358 af
Outflow = 0.12 cfs @ 18.71 hrs, Volume= 0.358 af, Atten= 0%, Lag= 1.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.69 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.21 fps, Avg. Travel Time= 1.4 min

Peak Storage= 7 cf @ 18.69 hrs
Average Depth at Peak Storage= 0.03'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 111.53 cfs

2.00' x 1.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 100.0' Slope= 0.1100 '/'
Inlet Invert= 1,675.00', Outlet Invert= 1,664.00'

Summary for Reach R8.16: SWALE

Inflow Area = 23.740 ac, 23.90% Impervious, Inflow Depth = 1.19" for 1-Year event
Inflow = 36.18 cfs @ 12.00 hrs, Volume= 2.357 af
Outflow = 35.41 cfs @ 12.01 hrs, Volume= 2.357 af, Atten= 2%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.16 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.77 fps, Avg. Travel Time= 3.0 min

Peak Storage= 1,019 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.62'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 189.11 cfs

4.00' x 1.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 315.0' Slope= 0.2413 '/'
Inlet Invert= 1,818.00', Outlet Invert= 1,742.00'

Summary for Reach R8.17: SWALE

Inflow Area = 24.885 ac, 23.58% Impervious, Inflow Depth = 1.19" for 1-Year event
Inflow = 35.45 cfs @ 12.01 hrs, Volume= 2.464 af
Outflow = 34.63 cfs @ 12.03 hrs, Volume= 2.464 af, Atten= 2%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.53 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.71 fps, Avg. Travel Time= 2.7 min

Peak Storage= 936 cf @ 12.02 hrs
Average Depth at Peak Storage= 0.63'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 176.73 cfs

4.00' x 1.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 280.0' Slope= 0.2107 '/'
Inlet Invert= 1,741.00', Outlet Invert= 1,682.00'

Summary for Reach R8.18: Mountain stream

Inflow Area = 19.317 ac, 0.67% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 11.40 cfs @ 12.30 hrs, Volume= 1.301 af
Outflow = 11.29 cfs @ 12.36 hrs, Volume= 1.301 af, Atten= 1%, Lag= 3.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.70 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 2.88 fps, Avg. Travel Time= 5.0 min

Peak Storage= 1,281 cf @ 12.32 hrs
Average Depth at Peak Storage= 0.44'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 123.67 cfs

2.50' x 1.50' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 2.0 '/' Top Width= 8.50'
Length= 870.0' Slope= 0.1885 '/'
Inlet Invert= 1,818.00', Outlet Invert= 1,654.00'

Summary for Reach R8.2: SWALE

Inflow Area = 2.715 ac, 28.55% Impervious, Inflow Depth = 1.25" for 1-Year event
Inflow = 2.68 cfs @ 12.19 hrs, Volume= 0.283 af
Outflow = 2.58 cfs @ 12.26 hrs, Volume= 0.283 af, Atten= 4%, Lag= 4.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.85 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 0.91 fps, Avg. Travel Time= 7.4 min

Peak Storage= 287 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.31'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 46.39 cfs

2.00' x 1.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 1.0 '/' Top Width= 5.00'
Length= 407.0' Slope= 0.0713 '/'
Inlet Invert= 2,303.00', Outlet Invert= 2,274.00'

Summary for Reach R8.4: SWALE

Inflow Area = 6.659 ac, 31.16% Impervious, Inflow Depth = 1.29" for 1-Year event
Inflow = 8.07 cfs @ 12.01 hrs, Volume= 0.715 af
Outflow = 7.64 cfs @ 12.06 hrs, Volume= 0.715 af, Atten= 5%, Lag= 2.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.80 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 1.19 fps, Avg. Travel Time= 7.4 min

Peak Storage= 711 cf @ 12.03 hrs
Average Depth at Peak Storage= 0.53'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 51.44 cfs

2.00' x 1.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 1.0 '/' Top Width= 5.00'
Length= 525.0' Slope= 0.0876 '/'
Inlet Invert= 2,270.00', Outlet Invert= 2,224.00'

Summary for Reach R8.6: SWALE

Inflow Area = 8.599 ac, 26.37% Impervious, Inflow Depth = 1.21" for 1-Year event
Inflow = 9.87 cfs @ 12.03 hrs, Volume= 0.870 af
Outflow = 9.68 cfs @ 12.05 hrs, Volume= 0.870 af, Atten= 2%, Lag= 1.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.86 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.36 fps, Avg. Travel Time= 4.2 min

Peak Storage= 495 cf @ 12.04 hrs
Average Depth at Peak Storage= 0.56'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 59.17 cfs

2.00' x 1.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 1.0 '/' Top Width= 5.00'
Length= 345.0' Slope= 0.1159 '/'
Inlet Invert= 2,220.00', Outlet Invert= 2,180.00'

Summary for Reach R9.10: Swale

Inflow Area = 19.480 ac, 21.84% Impervious, Inflow Depth > 1.15" for 1-Year event
Inflow = 0.58 cfs @ 19.79 hrs, Volume= 1.867 af
Outflow = 0.58 cfs @ 19.83 hrs, Volume= 1.867 af, Atten= 0%, Lag= 2.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 2.31 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.39 fps, Avg. Travel Time= 2.0 min

Peak Storage= 43 cf @ 19.81 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 136.03 cfs

2.00' x 2.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 170.0' Slope= 0.0824 '/'
Inlet Invert= 1,672.00', Outlet Invert= 1,658.00'

Summary for Reach R9.2: Swale

Inflow Area = 4.151 ac, 21.51% Impervious, Inflow Depth = 1.13" for 1-Year event
Inflow = 1.85 cfs @ 12.34 hrs, Volume= 0.391 af
Outflow = 1.82 cfs @ 12.36 hrs, Volume= 0.391 af, Atten= 1%, Lag= 1.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.49 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.09 fps, Avg. Travel Time= 1.8 min

Peak Storage= 63 cf @ 12.30 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 74.96 cfs

2.00' x 1.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 120.0' Slope= 0.0883 '/'
Inlet Invert= 1,815.50', Outlet Invert= 1,804.90'

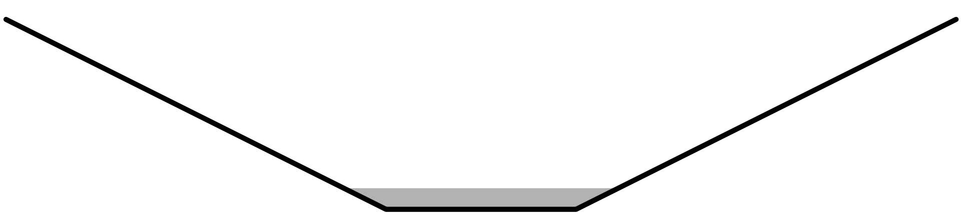
Summary for Reach R9.2A: Swale

Inflow Area = 4.151 ac, 21.51% Impervious, Inflow Depth = 1.13" for 1-Year event
Inflow = 1.82 cfs @ 12.36 hrs, Volume= 0.392 af
Outflow = 1.81 cfs @ 12.42 hrs, Volume= 0.392 af, Atten= 0%, Lag= 3.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.31 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 1.08 fps, Avg. Travel Time= 6.2 min

Peak Storage= 218 cf @ 12.38 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 131.75 cfs

2.00' x 2.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 400.0' Slope= 0.0773 '/'
Inlet Invert= 1,804.90', Outlet Invert= 1,774.00'



Summary for Reach R9.4: Swale

Inflow Area = 11.891 ac, 25.97% Impervious, Inflow Depth = 1.21" for 1-Year event
Inflow = 16.89 cfs @ 11.98 hrs, Volume= 1.198 af
Outflow = 15.78 cfs @ 12.01 hrs, Volume= 1.198 af, Atten= 7%, Lag= 2.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.97 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 1.43 fps, Avg. Travel Time= 6.3 min

Peak Storage= 1,286 cf @ 11.99 hrs
Average Depth at Peak Storage= 0.70'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 148.51 cfs

2.00' x 2.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 540.0' Slope= 0.0981 '/'
Inlet Invert= 1,769.00', Outlet Invert= 1,716.00'

Summary for Reach R9.9: Pond Outlet

Inflow Area = 2.870 ac, 4.48% Impervious, Inflow Depth = 0.44" for 1-Year event
Inflow = 0.30 cfs @ 13.00 hrs, Volume= 0.105 af
Outflow = 0.30 cfs @ 13.05 hrs, Volume= 0.105 af, Atten= 0%, Lag= 3.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.26 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 0.81 fps, Avg. Travel Time= 2.6 min

Peak Storage= 30 cf @ 13.02 hrs
Average Depth at Peak Storage= 0.07'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 94.04 cfs

3.00' x 1.50' deep channel, n= 0.070 Sluggish weedy reaches w/pools
Side Slope Z-value= 4.0 '/' Top Width= 15.00'
Length= 125.0' Slope= 0.1280 '/'
Inlet Invert= 1,672.00', Outlet Invert= 1,656.00'

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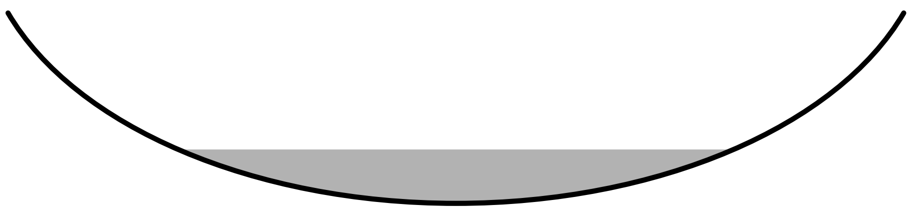
Summary for Reach 11.10R: Mountain stream

Inflow Area = 81.523 ac, 7.59% Impervious, Inflow Depth = 2.40" for 10-Year event
Inflow = 99.78 cfs @ 12.31 hrs, Volume= 16.332 af
Outflow = 99.26 cfs @ 12.32 hrs, Volume= 16.332 af, Atten= 1%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 12.51 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 2.21 fps, Avg. Travel Time= 2.8 min

Peak Storage= 2,980 cf @ 12.31 hrs
Average Depth at Peak Storage= 1.12'
Bank-Full Depth= 4.00', Capacity at Bank-Full= 1,490.21 cfs

20.00' x 4.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 375.0' Slope= 0.1733 '/'
Inlet Invert= 1,759.00', Outlet Invert= 1,694.00'



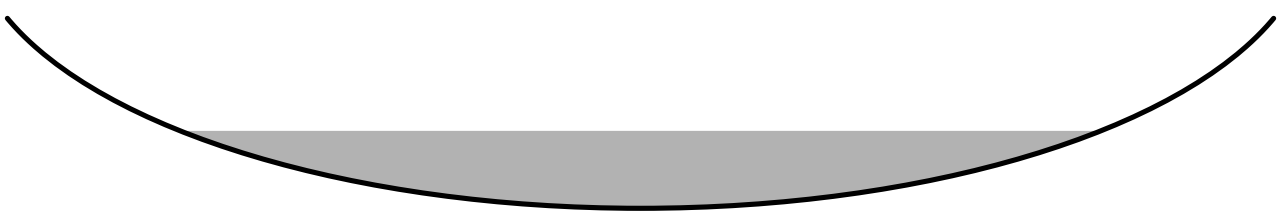
Summary for Reach 11.4R: Bouldery stream

Inflow Area = 46.597 ac, 0.59% Impervious, Inflow Depth = 2.40" for 10-Year event
Inflow = 69.65 cfs @ 12.22 hrs, Volume= 9.308 af
Outflow = 69.34 cfs @ 12.26 hrs, Volume= 9.308 af, Atten= 0%, Lag= 2.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.04 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 2.22 fps, Avg. Travel Time= 4.9 min

Peak Storage= 4,500 cf @ 12.23 hrs
Average Depth at Peak Storage= 0.81'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 482.65 cfs

20.00' x 2.00' deep Parabolic Channel, n= 0.050 Mountain streams w/large boulders
Length= 650.0' Slope= 0.2615 '/'
Inlet Invert= 2,390.00', Outlet Invert= 2,220.00'



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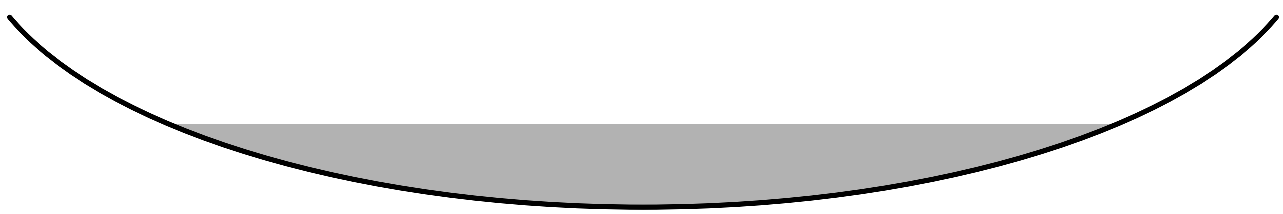
Summary for Reach 11.5R: Mountain stream

Inflow Area = 72.944 ac, 7.27% Impervious, Inflow Depth = 2.38" for 10-Year event
Inflow = 90.15 cfs @ 12.27 hrs, Volume= 14.497 af
Outflow = 89.71 cfs @ 12.32 hrs, Volume= 14.497 af, Atten= 0%, Lag= 3.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.67 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 1.95 fps, Avg. Travel Time= 9.6 min

Peak Storage= 8,656 cf @ 12.29 hrs
Average Depth at Peak Storage= 0.87'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 535.72 cfs

20.00' x 2.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 1,125.0' Slope= 0.2062 '/'
Inlet Invert= 2,220.00', Outlet Invert= 1,988.00'



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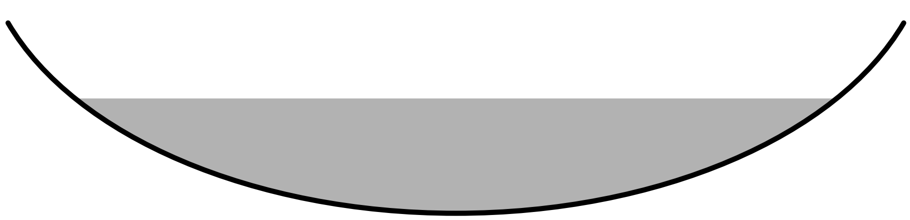
Summary for Reach 11.6R: Mountain stream

Inflow Area = 81.523 ac, 7.59% Impervious, Inflow Depth = 2.40" for 10-Year event
Inflow = 100.37 cfs @ 12.28 hrs, Volume= 16.333 af
Outflow = 100.19 cfs @ 12.29 hrs, Volume= 16.333 af, Atten= 0%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 16.09 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 2.67 fps, Avg. Travel Time= 2.2 min

Peak Storage= 2,245 cf @ 12.28 hrs
Average Depth at Peak Storage= 1.20'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 294.12 cfs

10.00' x 2.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 360.0' Slope= 0.2722 '/'
Inlet Invert= 1,988.00', Outlet Invert= 1,890.00'



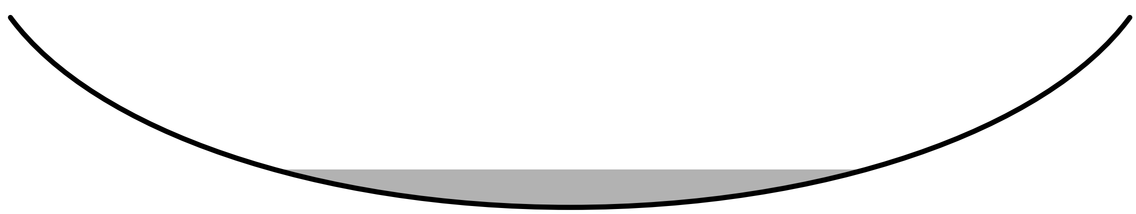
Summary for Reach 11.8R: Mountain stream

Inflow Area = 81.523 ac, 7.59% Impervious, Inflow Depth = 2.40" for 10-Year event
Inflow = 100.19 cfs @ 12.29 hrs, Volume= 16.333 af
Outflow = 100.06 cfs @ 12.30 hrs, Volume= 16.333 af, Atten= 0%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 17.03 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 3.16 fps, Avg. Travel Time= 1.8 min

Peak Storage= 2,060 cf @ 12.30 hrs
Average Depth at Peak Storage= 0.79'
Bank-Full Depth= 4.00', Capacity at Bank-Full= 3,230.06 cfs

25.00' x 4.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 350.0' Slope= 0.5000 '/'
Inlet Invert= 1,882.00', Outlet Invert= 1,707.00'



Summary for Reach R1.1: Swale

Inflow Area = 12.296 ac, 0.00% Impervious, Inflow Depth = 2.20" for 10-Year event
Inflow = 35.98 cfs @ 12.06 hrs, Volume= 2.252 af
Outflow = 35.06 cfs @ 12.09 hrs, Volume= 2.252 af, Atten= 3%, Lag= 1.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.65 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.68 fps, Avg. Travel Time= 2.8 min

Peak Storage= 1,762 cf @ 12.07 hrs
Average Depth at Peak Storage= 1.04'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 129.38 cfs

4.00' x 2.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 2.0 '/' Top Width= 12.00'
Length= 280.0' Slope= 0.0357 '/'
Inlet Invert= 2,440.00', Outlet Invert= 2,430.00'

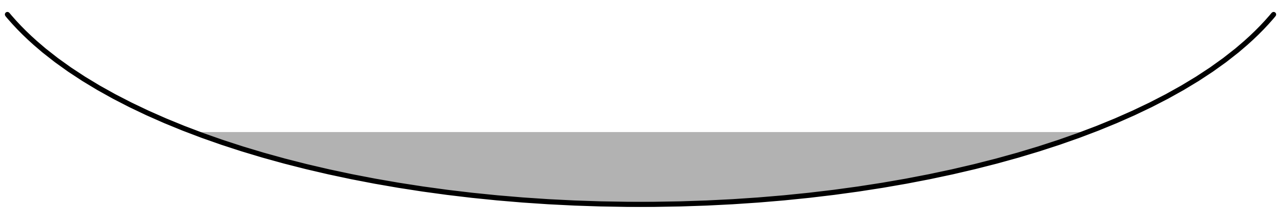
Summary for Reach R1.11: Stream

Inflow Area = 3.441 ac, 4.67% Impervious, Inflow Depth = 2.45" for 10-Year event
Inflow = 14.52 cfs @ 11.97 hrs, Volume= 0.702 af
Outflow = 14.38 cfs @ 11.98 hrs, Volume= 0.702 af, Atten= 1%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.66 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.40 fps, Avg. Travel Time= 1.4 min

Peak Storage= 374 cf @ 11.98 hrs
Average Depth at Peak Storage= 0.38'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 119.42 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.070 Sluggish weedy reaches w/pools
Length= 120.0' Slope= 0.3083 '/'
Inlet Invert= 2,205.00', Outlet Invert= 2,168.00'



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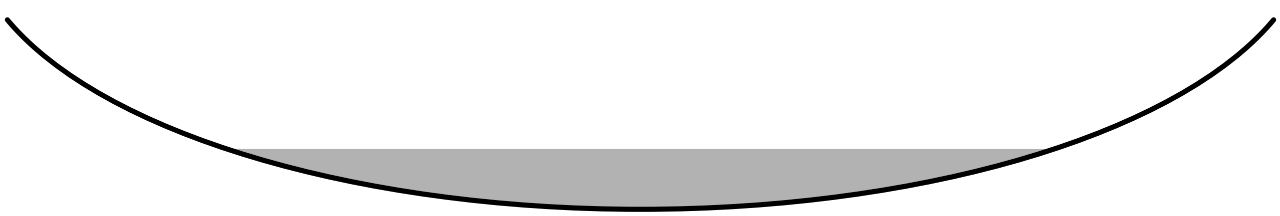
Summary for Reach R1.12: Stream

Inflow Area = 9.950 ac, 14.75% Impervious, Inflow Depth = 2.64" for 10-Year event
Inflow = 6.18 cfs @ 12.32 hrs, Volume= 2.187 af
Outflow = 6.12 cfs @ 12.41 hrs, Volume= 2.187 af, Atten= 1%, Lag= 5.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.58 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 0.61 fps, Avg. Travel Time= 11.1 min

Peak Storage= 963 cf @ 12.36 hrs
Average Depth at Peak Storage= 0.32'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 73.77 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.070 Sluggish weedy reaches w/pools
Length= 405.0' Slope= 0.1177 '/'
Inlet Invert= 2,157.65', Outlet Invert= 2,110.00'



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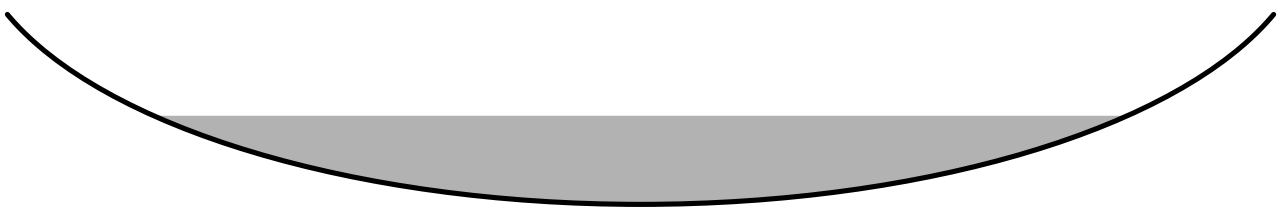
Summary for Reach R1.2: Mountain Stream

Inflow Area = 12.296 ac, 0.00% Impervious, Inflow Depth = 2.20" for 10-Year event
Inflow = 35.06 cfs @ 12.09 hrs, Volume= 2.252 af
Outflow = 34.10 cfs @ 12.12 hrs, Volume= 2.252 af, Atten= 3%, Lag= 1.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.26 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 2.57 fps, Avg. Travel Time= 3.6 min

Peak Storage= 2,325 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.46'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 182.97 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 550.0' Slope= 0.2364 '/'
Inlet Invert= 2,430.00', Outlet Invert= 2,300.00'



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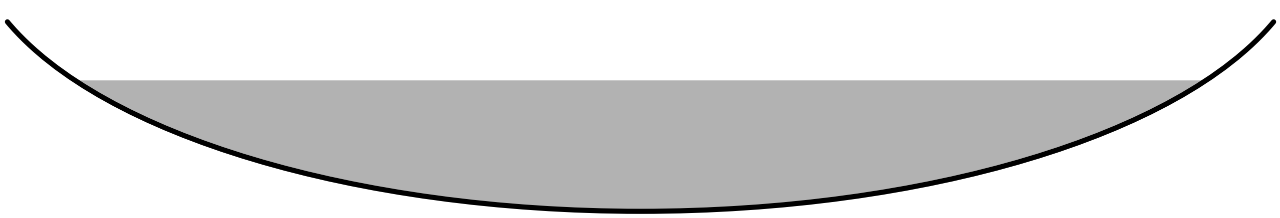
Summary for Reach R1.3: Mountain Stream

Inflow Area = 52.901 ac, 0.00% Impervious, Inflow Depth = 2.20" for 10-Year event
Inflow = 119.73 cfs @ 12.15 hrs, Volume= 9.706 af
Outflow = 117.60 cfs @ 12.18 hrs, Volume= 9.706 af, Atten= 2%, Lag= 2.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.40 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 3.28 fps, Avg. Travel Time= 3.9 min

Peak Storage= 8,799 cf @ 12.16 hrs
Average Depth at Peak Storage= 1.04'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 265.67 cfs

20.00' x 1.50' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 767.0' Slope= 0.1304 '/'
Inlet Invert= 2,300.00', Outlet Invert= 2,200.00'



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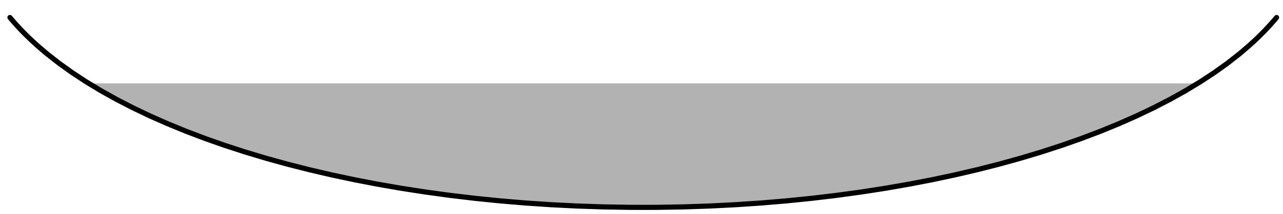
Summary for Reach R1.4: Mountain Stream

Inflow Area = 54.922 ac, 1.00% Impervious, Inflow Depth = 2.23" for 10-Year event
Inflow = 118.53 cfs @ 12.18 hrs, Volume= 10.203 af
Outflow = 117.77 cfs @ 12.20 hrs, Volume= 10.203 af, Atten= 1%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.25 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 2.08 fps, Avg. Travel Time= 2.9 min

Peak Storage= 3,845 cf @ 12.19 hrs
Average Depth at Peak Storage= 0.98'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 298.31 cfs

20.00' x 1.50' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 365.0' Slope= 0.1644 '/'
Inlet Invert= 2,200.00', Outlet Invert= 2,140.00'



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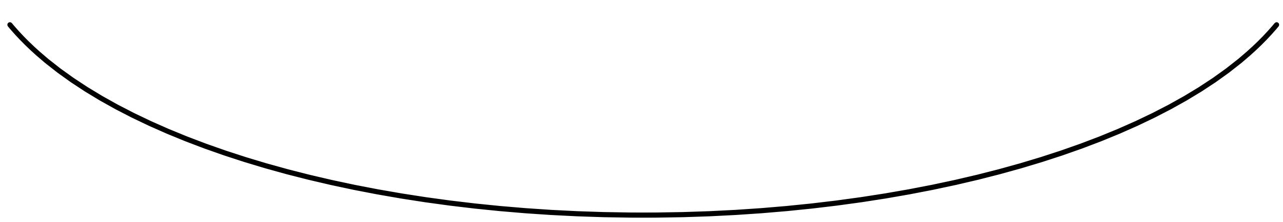
Summary for Reach R1.5: Stream

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 438.14 cfs

35.00' x 1.50' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 175.0' Slope= 0.1143 '/'
Inlet Invert= 2,160.00', Outlet Invert= 2,140.00'



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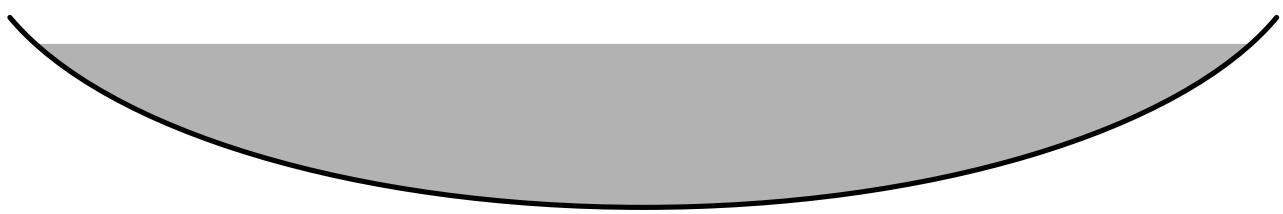
Summary for Reach R1.6: Mountain Stream

Inflow Area = 54.922 ac, 1.00% Impervious, Inflow Depth = 2.23" for 10-Year event
Inflow = 117.77 cfs @ 12.20 hrs, Volume= 10.203 af
Outflow = 117.05 cfs @ 12.21 hrs, Volume= 10.203 af, Atten= 1%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.37 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.35 fps, Avg. Travel Time= 2.5 min

Peak Storage= 3,193 cf @ 12.21 hrs
Average Depth at Peak Storage= 1.29'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 162.83 cfs

20.00' x 1.50' deep Parabolic Channel, n= 0.070 Sluggish weedy reaches w/pools
Length= 200.0' Slope= 0.1500 '/'
Inlet Invert= 2,140.00', Outlet Invert= 2,110.00'



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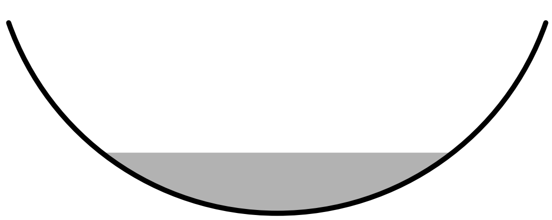
Summary for Reach R11.1: Mountain stream

Inflow Area = 4.455 ac, 0.00% Impervious, Inflow Depth = 2.28" for 10-Year event
Inflow = 13.60 cfs @ 12.06 hrs, Volume= 0.847 af
Outflow = 13.43 cfs @ 12.07 hrs, Volume= 0.847 af, Atten= 1%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.48 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 3.19 fps, Avg. Travel Time= 1.0 min

Peak Storage= 286 cf @ 12.06 hrs
Average Depth at Peak Storage= 0.63'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 149.17 cfs

6.00' x 2.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 200.0' Slope= 0.2300 '/'
Inlet Invert= 2,274.00', Outlet Invert= 2,228.00'



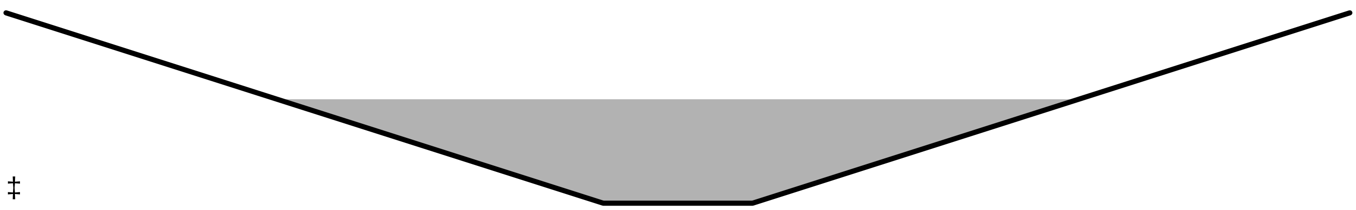
Summary for Reach R11.12: Mountain stream

Inflow Area = 5.399 ac, 2.68% Impervious, Inflow Depth = 2.25" for 10-Year event
Inflow = 15.40 cfs @ 12.08 hrs, Volume= 1.011 af
Outflow = 15.13 cfs @ 12.09 hrs, Volume= 1.011 af, Atten= 2%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.77 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.96 fps, Avg. Travel Time= 1.7 min

Peak Storage= 348 cf @ 12.08 hrs
Average Depth at Peak Storage= 0.55'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 62.87 cfs

1.00' x 1.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 4.0 '/' Top Width= 9.00'
Length= 200.0' Slope= 0.2600 '/'
Inlet Invert= 2,472.00', Outlet Invert= 2,420.00'



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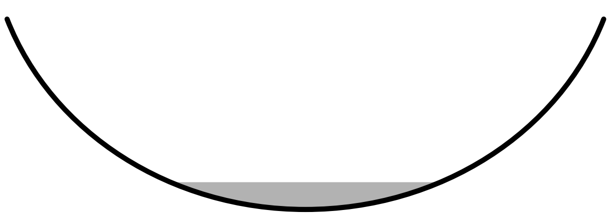
Summary for Reach R11.13: Mountain stream

Inflow Area = 28.547 ac, 0.11% Impervious, Inflow Depth = 2.20" for 10-Year event
Inflow = 43.24 cfs @ 12.39 hrs, Volume= 5.234 af
Outflow = 43.19 cfs @ 12.40 hrs, Volume= 5.234 af, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.02 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.53 fps, Avg. Travel Time= 1.3 min

Peak Storage= 864 cf @ 12.39 hrs
Average Depth at Peak Storage= 0.86'
Bank-Full Depth= 6.00', Capacity at Bank-Full= 2,646.35 cfs

20.00' x 6.00' deep Parabolic Channel, n= 0.050 Mountain streams w/large boulders
Length= 200.0' Slope= 0.2500 '/'
Inlet Invert= 2,470.00', Outlet Invert= 2,420.00'



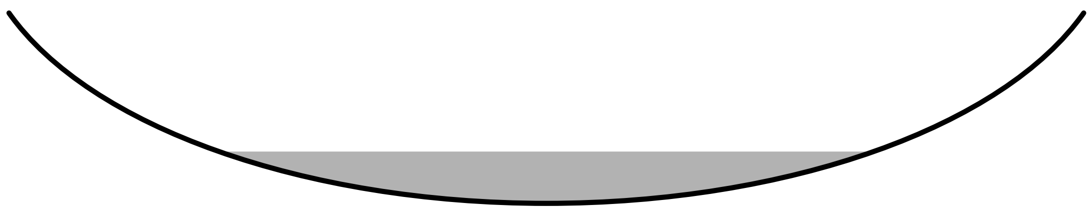
Summary for Reach R11.14: Mountain stream

Inflow Area = 0.695 ac, 5.23% Impervious, Inflow Depth = 2.35" for 10-Year event
Inflow = 2.76 cfs @ 11.98 hrs, Volume= 0.136 af
Outflow = 2.50 cfs @ 12.04 hrs, Volume= 0.136 af, Atten= 9%, Lag= 3.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.77 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 0.94 fps, Avg. Travel Time= 8.5 min

Peak Storage= 270 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 44.26 cfs

6.00' x 1.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 480.0' Slope= 0.1667 '/'
Inlet Invert= 2,470.00', Outlet Invert= 2,390.00'



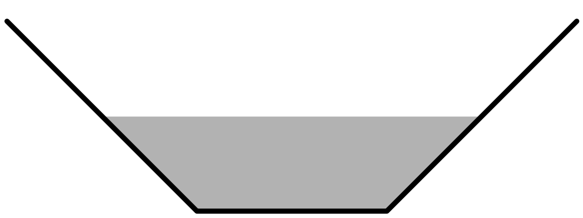
Summary for Reach R11.16: SWALE

Inflow Area = 11.392 ac, 0.56% Impervious, Inflow Depth = 2.20" for 10-Year event
Inflow = 26.86 cfs @ 12.14 hrs, Volume= 2.087 af
Outflow = 26.46 cfs @ 12.17 hrs, Volume= 2.087 af, Atten= 2%, Lag= 1.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.99 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 2.95 fps, Avg. Travel Time= 3.1 min

Peak Storage= 1,640 cf @ 12.16 hrs
Average Depth at Peak Storage= 1.00'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 101.91 cfs

2.00' x 2.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 1.0 '/' Top Width= 6.00'
Length= 550.0' Slope= 0.1109 '/'
Inlet Invert= 2,451.00', Outlet Invert= 2,390.00'



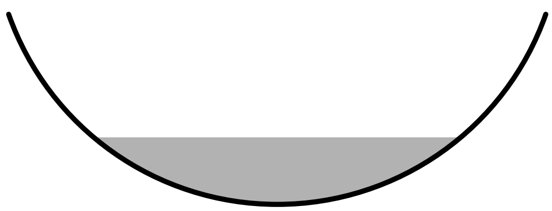
Summary for Reach R11.1A: Mountain stream

Inflow Area = 5.196 ac, 7.86% Impervious, Inflow Depth = 2.46" for 10-Year event
Inflow = 13.55 cfs @ 12.07 hrs, Volume= 1.067 af
Outflow = 13.31 cfs @ 12.09 hrs, Volume= 1.067 af, Atten= 2%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.08 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.96 fps, Avg. Travel Time= 2.8 min

Peak Storage= 539 cf @ 12.08 hrs
Average Depth at Peak Storage= 0.70'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 119.72 cfs

6.00' x 2.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 324.0' Slope= 0.1481 '/'
Inlet Invert= 2,228.00', Outlet Invert= 2,180.00'



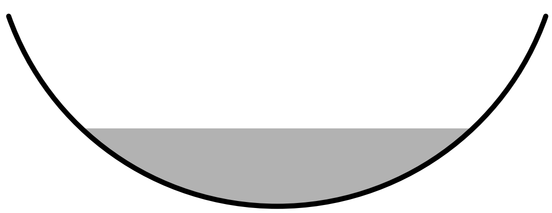
Summary for Reach R11.1B: Mountain stream

Inflow Area = 8.579 ac, 10.37% Impervious, Inflow Depth = 2.57" for 10-Year event
Inflow = 20.82 cfs @ 12.08 hrs, Volume= 1.836 af
Outflow = 20.08 cfs @ 12.13 hrs, Volume= 1.836 af, Atten= 4%, Lag= 3.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.80 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 1.48 fps, Avg. Travel Time= 11.6 min

Peak Storage= 2,170 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.82'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 131.79 cfs

6.00' x 2.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 1,036.0' Slope= 0.1795 '/'
Inlet Invert= 2,174.00', Outlet Invert= 1,988.00'



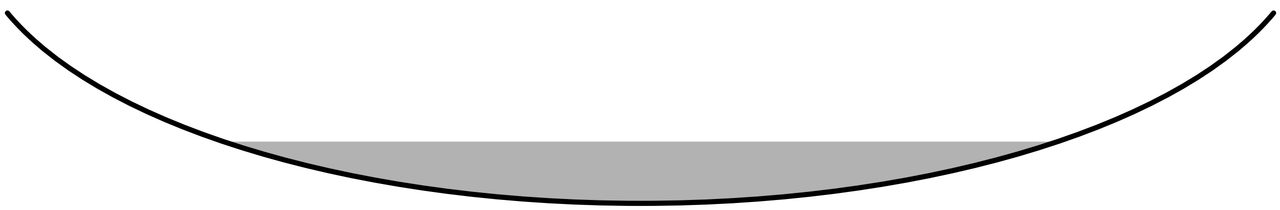
Summary for Reach R11.2: Wetland stream

Inflow Area = 1.046 ac, 0.00% Impervious, Inflow Depth = 2.36" for 10-Year event
Inflow = 4.26 cfs @ 11.97 hrs, Volume= 0.206 af
Outflow = 3.86 cfs @ 12.06 hrs, Volume= 0.206 af, Atten= 10%, Lag= 5.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.59 fps, Min. Travel Time= 3.3 min
Avg. Velocity = 0.44 fps, Avg. Travel Time= 12.1 min

Peak Storage= 786 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.32'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 44.98 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.070 Sluggish weedy reaches w/pools
Length= 320.0' Slope= 0.0437 '/'
Inlet Invert= 2,302.00', Outlet Invert= 2,288.00'



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Summary for Reach R11.21: SWALE

Inflow Area = 5.212 ac, 0.00% Impervious, Inflow Depth = 2.20" for 10-Year event
Inflow = 14.46 cfs @ 12.08 hrs, Volume= 0.955 af
Outflow = 13.13 cfs @ 12.20 hrs, Volume= 0.955 af, Atten= 9%, Lag= 7.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.77 fps, Min. Travel Time= 4.3 min
Avg. Velocity = 1.82 fps, Avg. Travel Time= 16.1 min

Peak Storage= 3,456 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.72'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 51.40 cfs

2.00' x 1.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 1.0 '/' Top Width= 5.00'
Length= 1,760.0' Slope= 0.0875 '/'
Inlet Invert= 2,458.00', Outlet Invert= 2,304.00'

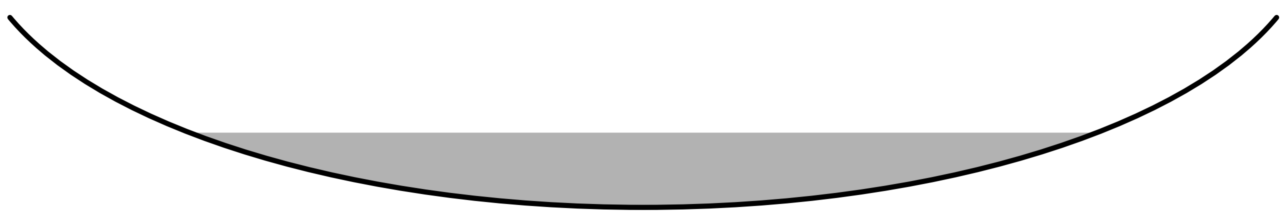
Summary for Reach R11.24: Stream

Inflow Area = 25.915 ac, 18.10% Impervious, Inflow Depth > 2.33" for 10-Year event
Inflow = 20.94 cfs @ 12.32 hrs, Volume= 5.037 af
Outflow = 20.91 cfs @ 12.35 hrs, Volume= 5.037 af, Atten= 0%, Lag= 2.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.25 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 0.93 fps, Avg. Travel Time= 5.4 min

Peak Storage= 1,477 cf @ 12.33 hrs
Average Depth at Peak Storage= 0.39'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 158.42 cfs

30.00' x 1.00' deep Parabolic Channel, n= 0.070 Sluggish weedy reaches w/pools
Length= 300.0' Slope= 0.2400 '/'
Inlet Invert= 2,292.00', Outlet Invert= 2,220.00'



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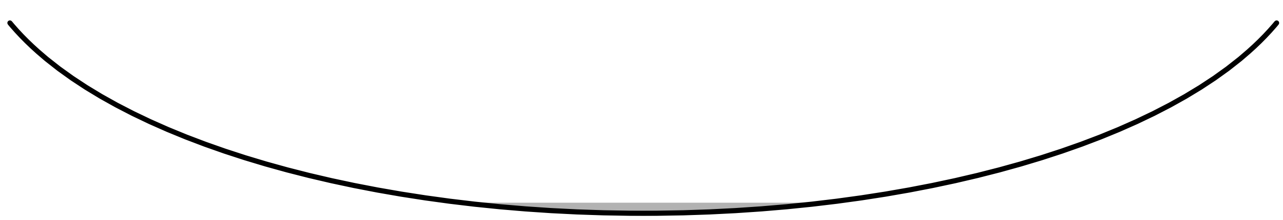
Summary for Reach R11.26: Wetland stream

Inflow Area = 0.432 ac, 77.25% Impervious, Inflow Depth = 4.20" for 10-Year event
Inflow = 0.10 cfs @ 13.58 hrs, Volume= 0.151 af
Outflow = 0.10 cfs @ 13.65 hrs, Volume= 0.151 af, Atten= 0%, Lag= 3.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.19 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 0.80 fps, Avg. Travel Time= 3.2 min

Peak Storage= 13 cf @ 13.61 hrs
Average Depth at Peak Storage= 0.05'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 53.93 cfs

10.00' x 1.00' deep Parabolic Channel, n= 0.070 Sluggish weedy reaches w/pools
Length= 155.0' Slope= 0.2581 '/'
Inlet Invert= 2,260.00', Outlet Invert= 2,220.00'



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Summary for Reach R11.29: SWALE

Inflow Area = 9.625 ac, 29.34% Impervious, Inflow Depth = 2.03" for 10-Year event
Inflow = 43.33 cfs @ 11.99 hrs, Volume= 1.625 af
Outflow = 42.43 cfs @ 12.00 hrs, Volume= 1.627 af, Atten= 2%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 15.90 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 4.11 fps, Avg. Travel Time= 0.7 min

Peak Storage= 445 cf @ 11.99 hrs
Average Depth at Peak Storage= 0.92'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 106.52 cfs

2.00' x 1.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 1.0 '/' Top Width= 5.00'
Length= 165.0' Slope= 0.3758 '/'
Inlet Invert= 2,366.00', Outlet Invert= 2,304.00'

Summary for Reach R11.30: SWALE

Inflow Area = 0.575 ac, 22.45% Impervious, Inflow Depth = 3.69" for 10-Year event
Inflow = 1.12 cfs @ 12.10 hrs, Volume= 0.177 af
Outflow = 1.09 cfs @ 12.11 hrs, Volume= 0.176 af, Atten= 3%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.65 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.47 fps, Avg. Travel Time= 1.0 min

Peak Storage= 21 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 148.59 cfs

2.00' x 1.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 85.0' Slope= 0.3471 '/'
Inlet Invert= 2,213.50', Outlet Invert= 2,184.00'

Summary for Reach R11.31: SWALE

Inflow Area = 1.246 ac, 12.83% Impervious, Inflow Depth = 2.53" for 10-Year event
Inflow = 3.81 cfs @ 12.05 hrs, Volume= 0.263 af
Outflow = 3.46 cfs @ 12.08 hrs, Volume= 0.263 af, Atten= 9%, Lag= 2.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.93 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 0.63 fps, Avg. Travel Time= 6.0 min

Peak Storage= 226 cf @ 12.06 hrs
Average Depth at Peak Storage= 0.37'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 63.41 cfs

2.00' x 1.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 225.0' Slope= 0.0356 '/'
Inlet Invert= 2,192.00', Outlet Invert= 2,184.00'

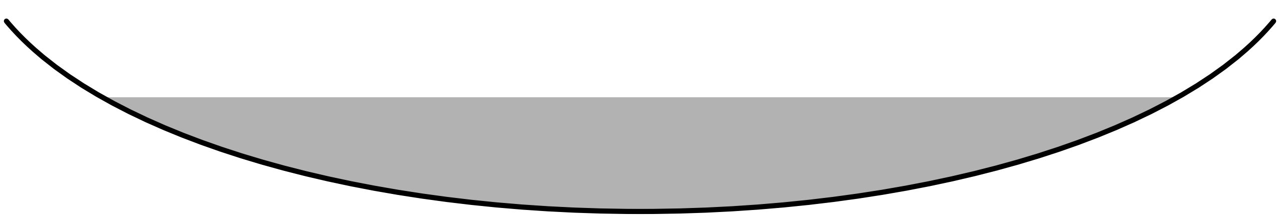
Summary for Reach R12.1: Mountain Stream/Wetland

Inflow Area = 17.893 ac, 9.84% Impervious, Inflow Depth = 2.43" for 10-Year event
Inflow = 20.17 cfs @ 12.40 hrs, Volume= 3.628 af
Outflow = 20.10 cfs @ 12.44 hrs, Volume= 3.628 af, Atten= 0%, Lag= 2.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.26 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 0.61 fps, Avg. Travel Time= 7.1 min

Peak Storage= 1,607 cf @ 12.42 hrs
Average Depth at Peak Storage= 0.60'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 61.12 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.070 Sluggish weedy reaches w/pools
Length= 260.0' Slope= 0.0808 '/'
Inlet Invert= 2,290.00', Outlet Invert= 2,269.00'



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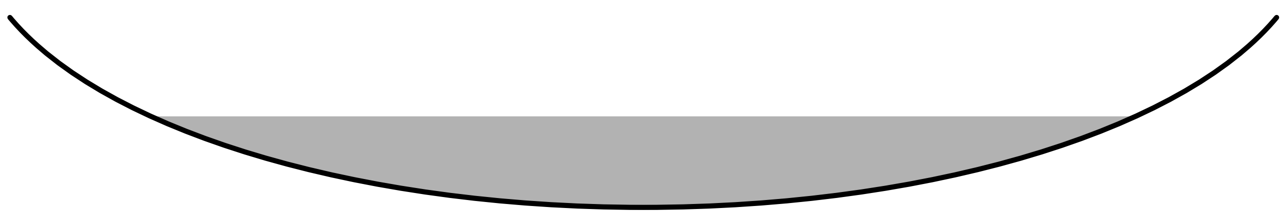
Summary for Reach R12.2: Mountain Stream/Wetland

Inflow Area = 18.269 ac, 10.19% Impervious, Inflow Depth = 2.44" for 10-Year event
Inflow = 20.31 cfs @ 12.44 hrs, Volume= 3.719 af
Outflow = 20.28 cfs @ 12.46 hrs, Volume= 3.719 af, Atten= 0%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.61 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 0.88 fps, Avg. Travel Time= 3.3 min

Peak Storage= 771 cf @ 12.45 hrs
Average Depth at Peak Storage= 0.48'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 100.21 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.070 Sluggish weedy reaches w/pools
Length= 175.0' Slope= 0.2171 '/'
Inlet Invert= 2,268.00', Outlet Invert= 2,230.00'



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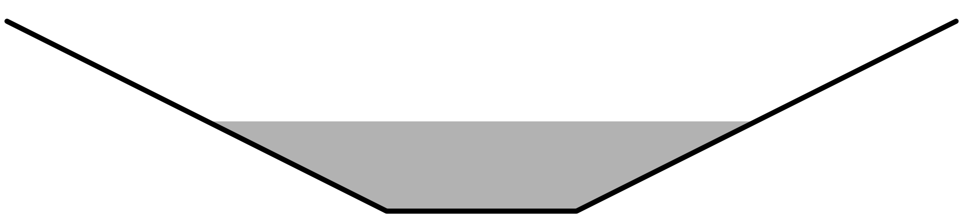
Summary for Reach R2.1: Roadside Swale

Inflow Area = 6.302 ac, 9.60% Impervious, Inflow Depth = 2.45" for 10-Year event
Inflow = 18.63 cfs @ 12.11 hrs, Volume= 1.287 af
Outflow = 18.31 cfs @ 12.13 hrs, Volume= 1.287 af, Atten= 2%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.05 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 0.97 fps, Avg. Travel Time= 2.7 min

Peak Storage= 588 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.95'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 91.79 cfs

2.00' x 2.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 160.0' Slope= 0.0375 '/'
Inlet Invert= 2,300.00', Outlet Invert= 2,294.00'



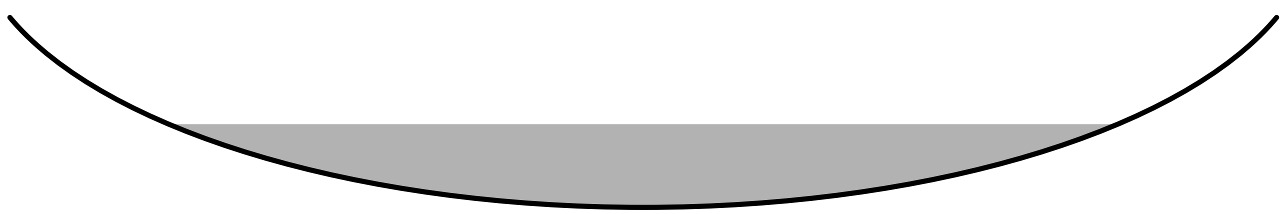
Summary for Reach R2.11: Overland Flow

Inflow Area = 3.914 ac, 11.46% Impervious, Inflow Depth = 2.53" for 10-Year event
Inflow = 9.04 cfs @ 12.14 hrs, Volume= 0.826 af
Outflow = 5.13 cfs @ 12.55 hrs, Volume= 0.826 af, Atten= 43%, Lag= 24.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.54 fps, Min. Travel Time= 14.5 min
Avg. Velocity = 0.13 fps, Avg. Travel Time= 60.2 min

Peak Storage= 4,479 cf @ 12.31 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 30.99 cfs

100.00' x 0.50' deep Parabolic Channel, n= 0.400 Sheet flow: Woods+light brush
Length= 465.0' Slope= 0.2710 '/'
Inlet Invert= 2,420.00', Outlet Invert= 2,294.00'



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Summary for Reach R2.12: Swale

Inflow Area = 3.322 ac, 22.38% Impervious, Inflow Depth = 2.80" for 10-Year event
Inflow = 12.86 cfs @ 12.05 hrs, Volume= 0.776 af
Outflow = 12.73 cfs @ 12.06 hrs, Volume= 0.776 af, Atten= 1%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.02 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.54 fps, Avg. Travel Time= 1.8 min

Peak Storage= 273 cf @ 12.06 hrs
Average Depth at Peak Storage= 0.53'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 199.13 cfs

2.00' x 2.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 170.0' Slope= 0.1765 '/'
Inlet Invert= 2,260.00', Outlet Invert= 2,230.00'

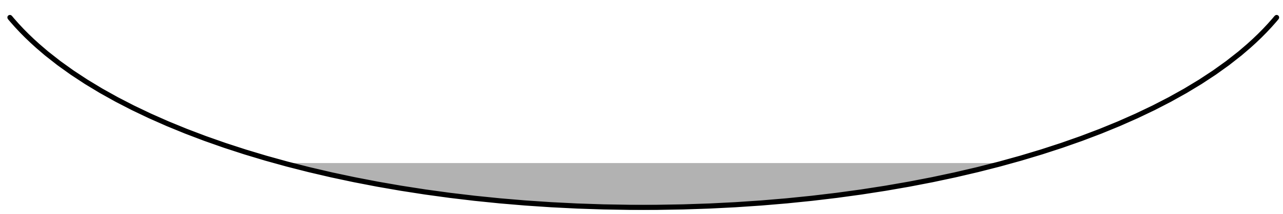
Summary for Reach R2.13: Wetland Flow

Inflow Area = 5.821 ac, 24.98% Impervious, Inflow Depth = 2.83" for 10-Year event
Inflow = 3.02 cfs @ 12.53 hrs, Volume= 1.372 af
Outflow = 2.99 cfs @ 12.58 hrs, Volume= 1.372 af, Atten= 1%, Lag= 2.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.02 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 0.86 fps, Avg. Travel Time= 3.5 min

Peak Storage= 271 cf @ 12.55 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 71.29 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.070 Sluggish weedy reaches w/pools
Length= 182.0' Slope= 0.1099 '/'
Inlet Invert= 2,220.00', Outlet Invert= 2,200.00'



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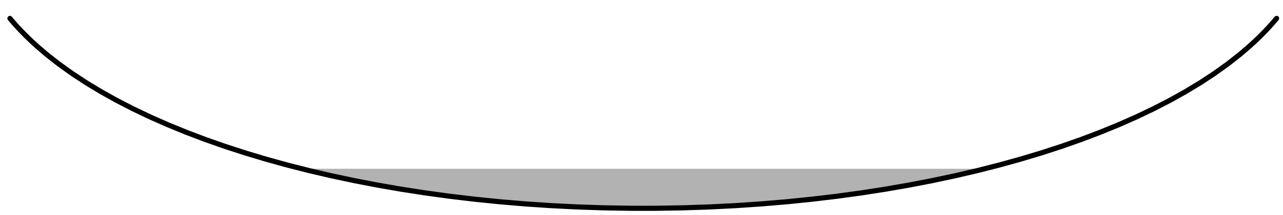
Summary for Reach R2.14: Mountain Stream

Inflow Area = 5.821 ac, 24.98% Impervious, Inflow Depth = 2.83" for 10-Year event
Inflow = 2.99 cfs @ 12.58 hrs, Volume= 1.372 af
Outflow = 2.96 cfs @ 12.65 hrs, Volume= 1.372 af, Atten= 1%, Lag= 4.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.38 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 1.01 fps, Avg. Travel Time= 4.7 min

Peak Storage= 357 cf @ 12.61 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 90.24 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.070 Sluggish weedy reaches w/pools
Length= 284.0' Slope= 0.1761 '/'
Inlet Invert= 2,200.00', Outlet Invert= 2,150.00'



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Summary for Reach R2.2: Roadside Swale

Inflow Area = 10.216 ac, 10.32% Impervious, Inflow Depth = 2.48" for 10-Year event
Inflow = 18.36 cfs @ 12.13 hrs, Volume= 2.113 af
Outflow = 17.99 cfs @ 12.15 hrs, Volume= 2.113 af, Atten= 2%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 7.09 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.55 fps, Avg. Travel Time= 2.7 min

Peak Storage= 641 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.74'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 146.87 cfs

2.00' x 2.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 250.0' Slope= 0.0960 '/'
Inlet Invert= 2,294.00', Outlet Invert= 2,270.00'

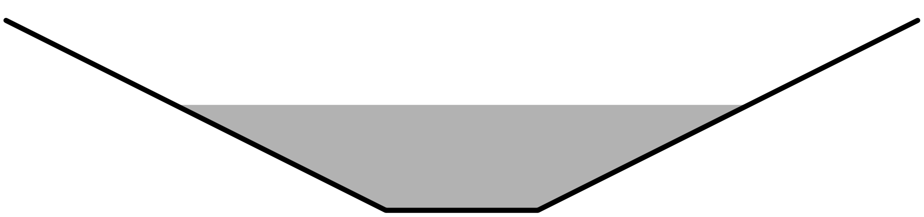
Summary for Reach R2.4: Roadside Swale

Inflow Area = 19.135 ac, 12.06% Impervious, Inflow Depth = 2.51" for 10-Year event
Inflow = 45.77 cfs @ 12.05 hrs, Volume= 3.998 af
Outflow = 43.64 cfs @ 12.12 hrs, Volume= 3.998 af, Atten= 5%, Lag= 4.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.64 fps, Min. Travel Time= 2.3 min
Avg. Velocity = 1.33 fps, Avg. Travel Time= 11.4 min

Peak Storage= 6,065 cf @ 12.09 hrs
Average Depth at Peak Storage= 1.39'
Bank-Full Depth= 2.50', Capacity at Bank-Full= 162.14 cfs

2.00' x 2.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 12.00'
Length= 915.0' Slope= 0.0426 '/'
Inlet Invert= 2,269.00', Outlet Invert= 2,230.00'



Summary for Reach R3.1: SWALE

Inflow Area = 10.077 ac, 13.20% Impervious, Inflow Depth = 2.52" for 10-Year event
Inflow = 35.98 cfs @ 12.04 hrs, Volume= 2.113 af
Outflow = 35.29 cfs @ 12.06 hrs, Volume= 2.113 af, Atten= 2%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.31 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.38 fps, Avg. Travel Time= 4.2 min

Peak Storage= 1,357 cf @ 12.05 hrs
Average Depth at Peak Storage= 0.55'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 219.76 cfs

6.00' x 1.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 12.00'
Length= 350.0' Slope= 0.1771 '/'
Inlet Invert= 2,280.00', Outlet Invert= 2,218.00'

‡

Summary for Reach R3.4: SWALE

Inflow Area = 20.668 ac, 16.21% Impervious, Inflow Depth = 2.60" for 10-Year event
Inflow = 35.73 cfs @ 12.18 hrs, Volume= 4.486 af
Outflow = 35.29 cfs @ 12.20 hrs, Volume= 4.486 af, Atten= 1%, Lag= 1.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.84 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.99 fps, Avg. Travel Time= 3.5 min

Peak Storage= 1,304 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.84'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 123.07 cfs

2.00' x 1.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 420.0' Slope= 0.2381 '/'
Inlet Invert= 2,180.00', Outlet Invert= 2,080.00'

Summary for Reach R5.2: SWALE

Inflow Area = 8.026 ac, 0.00% Impervious, Inflow Depth = 2.20" for 10-Year event
Inflow = 27.00 cfs @ 12.02 hrs, Volume= 1.470 af
Outflow = 25.68 cfs @ 12.06 hrs, Volume= 1.470 af, Atten= 5%, Lag= 2.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.33 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 2.38 fps, Avg. Travel Time= 4.8 min

Peak Storage= 2,194 cf @ 12.04 hrs
Average Depth at Peak Storage= 1.04'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 52.51 cfs

2.00' x 1.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 1.0 '/' Top Width= 5.00'
Length= 690.0' Slope= 0.0913 '/'
Inlet Invert= 1,901.00', Outlet Invert= 1,838.00'

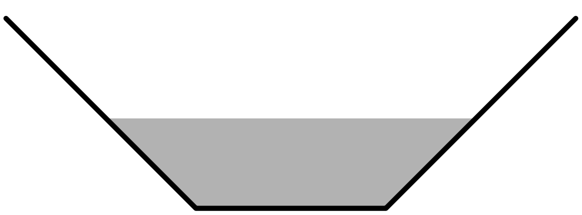
Summary for Reach R5.4: SWALE

Inflow Area = 8.026 ac, 0.00% Impervious, Inflow Depth = 2.20" for 10-Year event
Inflow = 25.68 cfs @ 12.06 hrs, Volume= 1.470 af
Outflow = 24.67 cfs @ 12.09 hrs, Volume= 1.470 af, Atten= 4%, Lag= 2.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.02 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 2.61 fps, Avg. Travel Time= 4.1 min

Peak Storage= 1,785 cf @ 12.07 hrs
Average Depth at Peak Storage= 0.95'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 105.45 cfs

2.00' x 2.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 1.0 '/' Top Width= 6.00'
Length= 640.0' Slope= 0.1187 '/'
Inlet Invert= 1,822.00', Outlet Invert= 1,746.00'



Summary for Reach R5.5: SWALE

Inflow Area = 0.684 ac, 16.21% Impervious, Inflow Depth = 3.02" for 10-Year event
Inflow = 2.99 cfs @ 11.99 hrs, Volume= 0.172 af
Outflow = 3.02 cfs @ 12.01 hrs, Volume= 0.172 af, Atten= 0%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.86 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.15 fps, Avg. Travel Time= 2.8 min

Peak Storage= 103 cf @ 12.00 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 79.73 cfs

2.00' x 1.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 1.0 '/' Top Width= 5.00'
Length= 190.0' Slope= 0.2105 '/'
Inlet Invert= 1,780.00', Outlet Invert= 1,740.00'

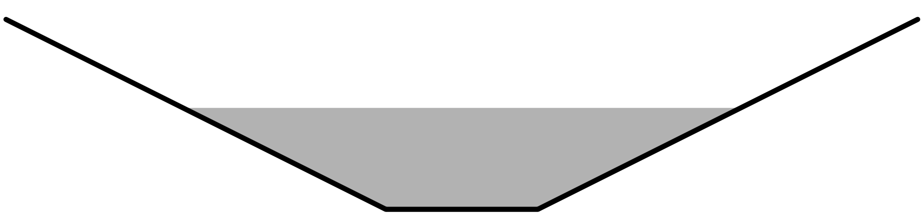
Summary for Reach R5.6: SWALE

Inflow Area = 12.198 ac, 3.02% Impervious, Inflow Depth = 2.34" for 10-Year event
Inflow = 38.09 cfs @ 12.06 hrs, Volume= 2.379 af
Outflow = 37.53 cfs @ 12.07 hrs, Volume= 2.379 af, Atten= 1%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.09 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.10 fps, Avg. Travel Time= 2.8 min

Peak Storage= 1,166 cf @ 12.06 hrs
Average Depth at Peak Storage= 1.34'
Bank-Full Depth= 2.50', Capacity at Bank-Full= 151.95 cfs

2.00' x 2.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 12.00'
Length= 187.0' Slope= 0.0374 '/'
Inlet Invert= 1,745.00', Outlet Invert= 1,738.00'



Summary for Reach R7.1: swale

Inflow Area = 2.973 ac, 39.49% Impervious, Inflow Depth = 3.17" for 10-Year event
Inflow = 1.34 cfs @ 12.52 hrs, Volume= 0.786 af
Outflow = 1.33 cfs @ 12.53 hrs, Volume= 0.786 af, Atten= 0%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.08 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.33 fps, Avg. Travel Time= 1.2 min

Peak Storage= 33 cf @ 12.53 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 111.53 cfs

2.00' x 1.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 100.0' Slope= 0.1100 '/'
Inlet Invert= 1,675.00', Outlet Invert= 1,664.00'

Summary for Reach R8.16: SWALE

Inflow Area = 23.740 ac, 23.90% Impervious, Inflow Depth = 2.69" for 10-Year event
Inflow = 75.84 cfs @ 12.00 hrs, Volume= 5.320 af
Outflow = 74.89 cfs @ 12.01 hrs, Volume= 5.320 af, Atten= 1%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 13.93 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 2.12 fps, Avg. Travel Time= 2.5 min

Peak Storage= 1,713 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.93'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 189.11 cfs

4.00' x 1.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 315.0' Slope= 0.2413 '/'
Inlet Invert= 1,818.00', Outlet Invert= 1,742.00'

Summary for Reach R8.17: SWALE

Inflow Area = 24.885 ac, 23.58% Impervious, Inflow Depth = 2.69" for 10-Year event
Inflow = 79.27 cfs @ 12.01 hrs, Volume= 5.579 af
Outflow = 78.18 cfs @ 12.02 hrs, Volume= 5.579 af, Atten= 1%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 13.40 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.02 fps, Avg. Travel Time= 2.3 min

Peak Storage= 1,649 cf @ 12.02 hrs
Average Depth at Peak Storage= 0.99'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 176.73 cfs

4.00' x 1.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 280.0' Slope= 0.2107 '/'
Inlet Invert= 1,741.00', Outlet Invert= 1,682.00'

Summary for Reach R8.18: Mountain stream

Inflow Area = 19.317 ac, 0.67% Impervious, Inflow Depth = 2.20" for 10-Year event
Inflow = 34.49 cfs @ 12.28 hrs, Volume= 3.538 af
Outflow = 34.21 cfs @ 12.32 hrs, Volume= 3.538 af, Atten= 1%, Lag= 2.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.64 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 3.69 fps, Avg. Travel Time= 3.9 min

Peak Storage= 2,815 cf @ 12.30 hrs
Average Depth at Peak Storage= 0.79'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 123.67 cfs

2.50' x 1.50' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 2.0 '/' Top Width= 8.50'
Length= 870.0' Slope= 0.1885 '/'
Inlet Invert= 1,818.00', Outlet Invert= 1,654.00'

Summary for Reach R8.2: SWALE

Inflow Area = 2.715 ac, 28.55% Impervious, Inflow Depth = 2.89" for 10-Year event
Inflow = 10.05 cfs @ 12.09 hrs, Volume= 0.654 af
Outflow = 9.78 cfs @ 12.12 hrs, Volume= 0.654 af, Atten= 3%, Lag= 2.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.81 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.03 fps, Avg. Travel Time= 6.6 min

Peak Storage= 701 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.65'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 46.39 cfs

2.00' x 1.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 1.0 '/' Top Width= 5.00'
Length= 407.0' Slope= 0.0713 '/'
Inlet Invert= 2,303.00', Outlet Invert= 2,274.00'

Summary for Reach R8.4: SWALE

Inflow Area = 6.659 ac, 31.16% Impervious, Inflow Depth = 2.95" for 10-Year event
Inflow = 24.95 cfs @ 12.03 hrs, Volume= 1.636 af
Outflow = 24.27 cfs @ 12.07 hrs, Volume= 1.636 af, Atten= 3%, Lag= 2.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.09 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.38 fps, Avg. Travel Time= 6.3 min

Peak Storage= 1,617 cf @ 12.05 hrs
Average Depth at Peak Storage= 1.02'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 51.44 cfs

2.00' x 1.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 1.0 '/' Top Width= 5.00'
Length= 525.0' Slope= 0.0876 '/'
Inlet Invert= 2,270.00', Outlet Invert= 2,224.00'

Summary for Reach R8.6: SWALE

Inflow Area = 8.599 ac, 26.37% Impervious, Inflow Depth = 2.83" for 10-Year event
Inflow = 29.19 cfs @ 12.04 hrs, Volume= 2.031 af
Outflow = 28.85 cfs @ 12.06 hrs, Volume= 2.031 af, Atten= 1%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.35 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.60 fps, Avg. Travel Time= 3.6 min

Peak Storage= 1,079 cf @ 12.05 hrs
Average Depth at Peak Storage= 1.03'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 59.17 cfs

2.00' x 1.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 1.0 '/' Top Width= 5.00'
Length= 345.0' Slope= 0.1159 '/'
Inlet Invert= 2,220.00', Outlet Invert= 2,180.00'

Summary for Reach R9.10: Swale

Inflow Area = 19.480 ac, 21.84% Impervious, Inflow Depth > 2.86" for 10-Year event
Inflow = 3.29 cfs @ 13.96 hrs, Volume= 4.643 af
Outflow = 3.29 cfs @ 13.98 hrs, Volume= 4.643 af, Atten= 0%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 4.10 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.68 fps, Avg. Travel Time= 1.7 min

Peak Storage= 136 cf @ 13.97 hrs
Average Depth at Peak Storage= 0.31'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 136.03 cfs

2.00' x 2.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 170.0' Slope= 0.0824 '/'
Inlet Invert= 1,672.00', Outlet Invert= 1,658.00'

Summary for Reach R9.2: Swale

Inflow Area = 4.151 ac, 21.51% Impervious, Inflow Depth = 2.71" for 10-Year event
Inflow = 13.49 cfs @ 12.12 hrs, Volume= 0.938 af
Outflow = 13.28 cfs @ 12.13 hrs, Volume= 0.938 af, Atten= 2%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.30 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.21 fps, Avg. Travel Time= 1.6 min

Peak Storage= 255 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.65'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 74.96 cfs

2.00' x 1.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 120.0' Slope= 0.0883 '/'
Inlet Invert= 1,815.50', Outlet Invert= 1,804.90'

Summary for Reach R9.2A: Swale

Inflow Area = 4.151 ac, 21.51% Impervious, Inflow Depth = 3.29" for 10-Year event
Inflow = 21.70 cfs @ 12.03 hrs, Volume= 1.137 af
Outflow = 21.18 cfs @ 12.07 hrs, Volume= 1.137 af, Atten= 2%, Lag= 2.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.90 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.21 fps, Avg. Travel Time= 5.5 min

Peak Storage= 1,274 cf @ 12.05 hrs
Average Depth at Peak Storage= 0.86'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 131.75 cfs

2.00' x 2.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 400.0' Slope= 0.0773 '/'
Inlet Invert= 1,804.90', Outlet Invert= 1,774.00'

Summary for Reach R9.4: Swale

Inflow Area = 11.891 ac, 25.97% Impervious, Inflow Depth = 3.03" for 10-Year event
Inflow = 51.81 cfs @ 12.00 hrs, Volume= 3.003 af
Outflow = 49.08 cfs @ 12.03 hrs, Volume= 3.003 af, Atten= 5%, Lag= 1.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.40 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.65 fps, Avg. Travel Time= 5.5 min

Peak Storage= 2,934 cf @ 12.01 hrs
Average Depth at Peak Storage= 1.22'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 148.51 cfs

2.00' x 2.00' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 540.0' Slope= 0.0981 '/'
Inlet Invert= 1,769.00', Outlet Invert= 1,716.00'

Summary for Reach R9.9: Pond Outlet

Inflow Area = 2.870 ac, 4.48% Impervious, Inflow Depth = 1.90" for 10-Year event
Inflow = 10.96 cfs @ 12.01 hrs, Volume= 0.454 af
Outflow = 10.75 cfs @ 12.02 hrs, Volume= 0.454 af, Atten= 2%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.97 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.16 fps, Avg. Travel Time= 1.8 min

Peak Storage= 363 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.56'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 94.04 cfs

3.00' x 1.50' deep channel, n= 0.070 Sluggish weedy reaches w/pools
Side Slope Z-value= 4.0 '/' Top Width= 15.00'
Length= 125.0' Slope= 0.1280 '/'
Inlet Invert= 1,672.00', Outlet Invert= 1,656.00'

‡

Summary for Pond 11.3R: 72" CMP (x2)

Inflow Area = 34.510 ac, 0.51% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 15.60 cfs @ 12.43 hrs, Volume= 2.341 af
Outflow = 15.60 cfs @ 12.43 hrs, Volume= 2.341 af, Atten= 0%, Lag= 0.0 min
Primary = 15.60 cfs @ 12.43 hrs, Volume= 2.341 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 2,412.97' @ 12.43 hrs Surf.Area= 79 sf Storage= 67 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.2 min (950.7 - 950.5)

Volume	Invert	Avail.Storage	Storage Description
#1	2,412.00'	2,120 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,412.00	60	0	0
2,414.00	100	160	160
2,416.00	260	360	520
2,418.00	380	640	1,160
2,420.00	580	960	2,120

Device	Routing	Invert	Outlet Devices
#1	Primary	2,412.00'	**72.0" Round Culvert X 2.00** L= 120.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 2,412.00' / 2,394.00' S= 0.1500 '/' Cc= 0.900 n= 0.025 Corrugated metal

Primary OutFlow Max=15.54 cfs @ 12.43 hrs HW=2,412.97' (Free Discharge)
1=Culvert (Inlet Controls 15.54 cfs @ 2.64 fps)

Summary for Pond 11.7R: Culvert

Inflow Area = 81.523 ac, 7.59% Impervious, Inflow Depth > 0.95" for 1-Year event
Inflow = 24.28 cfs @ 12.41 hrs, Volume= 6.452 af
Outflow = 24.28 cfs @ 12.41 hrs, Volume= 6.452 af, Atten= 0%, Lag= 0.0 min
Primary = 24.28 cfs @ 12.41 hrs, Volume= 6.452 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,890.77' @ 12.41 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,889.00'	**48.0" Round Culvert** L= 46.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,889.00' / 1,882.00' S= 0.1522 '/' Cc= 0.900 n= 0.025 Corrugated metal
#2	Primary	1,894.00'	**15.0' long x 35.0' 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=24.26 cfs @ 12.41 hrs HW=1,890.77' (Free Discharge)
1=Culvert (Inlet Controls 24.26 cfs @ 4.53 fps)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond R1.10: PIPE

Inflow Area = 5.258 ac, 24.86% Impervious, Inflow Depth = 1.21" for 1-Year event
Inflow = 9.80 cfs @ 12.01 hrs, Volume= 0.529 af
Outflow = 9.80 cfs @ 12.01 hrs, Volume= 0.529 af, Atten= 0%, Lag= 0.0 min
Primary = 9.80 cfs @ 12.01 hrs, Volume= 0.529 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,205.43' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,204.00'	**24.0" Round Culvert** L= 140.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,204.00' / 2,180.00' S= 0.1714 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=9.59 cfs @ 12.01 hrs HW=2,205.41' (Free Discharge)
1=Culvert (Inlet Controls 9.59 cfs @ 4.05 fps)

Summary for Pond R1.7: Culvert

Inflow Area = 4.963 ac, 23.85% Impervious, Inflow Depth = 1.19" for 1-Year event
Inflow = 9.10 cfs @ 12.01 hrs, Volume= 0.492 af
Outflow = 9.10 cfs @ 12.01 hrs, Volume= 0.492 af, Atten= 0%, Lag= 0.0 min
Primary = 9.10 cfs @ 12.01 hrs, Volume= 0.492 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,231.37' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,230.00'	**24.0" Round Culvert** L= 290.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,230.00' / 2,205.00' S= 0.0862 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=8.86 cfs @ 12.01 hrs HW=2,231.34' (Free Discharge)
1=Culvert (Inlet Controls 8.86 cfs @ 3.95 fps)

Summary for Pond R1.8: PIPE

Inflow Area = 0.295 ac, 41.89% Impervious, Inflow Depth = 1.52" for 1-Year event
Inflow = 0.77 cfs @ 11.97 hrs, Volume= 0.037 af
Outflow = 0.77 cfs @ 11.97 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.0 min
Primary = 0.77 cfs @ 11.97 hrs, Volume= 0.037 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Peak Elev= 2,207.44' @ 11.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,207.00'	**24.0" Round Culvert** L= 250.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,207.00' / 2,205.00' S= 0.0080 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=0.74 cfs @ 11.97 hrs HW=2,207.43' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.74 cfs @ 2.26 fps)

Summary for Pond R1.9: Culvert

Inflow Area = 3.441 ac, 4.67% Impervious, Inflow Depth = 0.96" for 1-Year event
Inflow = 5.69 cfs @ 11.98 hrs, Volume= 0.276 af
Outflow = 5.69 cfs @ 11.98 hrs, Volume= 0.276 af, Atten= 0%, Lag= 0.0 min
Primary = 5.69 cfs @ 11.98 hrs, Volume= 0.276 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,207.05' @ 11.98 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,206.00'	**24.0" Round Culvert** L= 50.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,206.00' / 2,205.00' S= 0.0200 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=5.44 cfs @ 11.98 hrs HW=2,207.03' (Free Discharge)
└─**1=Culvert** (Barrel Controls 5.44 cfs @ 4.89 fps)

Summary for Pond R11.11: CULVERT

Inflow Area = 5.399 ac, 2.68% Impervious, Inflow Depth = 0.84" for 1-Year event
Inflow = 2.19 cfs @ 12.07 hrs, Volume= 0.377 af
Outflow = 2.19 cfs @ 12.07 hrs, Volume= 0.377 af, Atten= 0%, Lag= 0.0 min
Primary = 2.19 cfs @ 12.07 hrs, Volume= 0.377 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,478.57' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,478.00'	**30.0" Round Culvert** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 2,478.00' / 2,472.00' S= 0.1714 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=2.14 cfs @ 12.07 hrs HW=2,478.57' (Free Discharge)
└─**1=Culvert** (Inlet Controls 2.14 cfs @ 2.56 fps)

Summary for Pond R11.15: CB

Inflow Area = 11.392 ac, 0.56% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 9.05 cfs @ 12.16 hrs, Volume= 0.767 af
Outflow = 9.05 cfs @ 12.16 hrs, Volume= 0.767 af, Atten= 0%, Lag= 0.0 min
Primary = 9.05 cfs @ 12.16 hrs, Volume= 0.767 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,453.15' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,452.00'	**36.0" Round Culvert** L= 110.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,452.00' / 2,450.00' S= 0.0182 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=8.99 cfs @ 12.16 hrs HW=2,453.14' (Free Discharge)
└─**1=Culvert** (Inlet Controls 8.99 cfs @ 3.64 fps)

Summary for Pond R11.17: CB

Inflow Area = 0.170 ac, 72.76% Impervious, Inflow Depth = 2.07" for 1-Year event
Inflow = 0.52 cfs @ 12.01 hrs, Volume= 0.029 af
Outflow = 0.52 cfs @ 12.01 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.0 min
Primary = 0.52 cfs @ 12.01 hrs, Volume= 0.029 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,453.36' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,453.00'	**12.0" Round Culvert** L= 200.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,453.00' / 2,449.00' S= 0.0200 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=0.52 cfs @ 12.01 hrs HW=2,453.36' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.52 cfs @ 3.00 fps)

Summary for Pond R11.18: CB

Inflow Area = 0.638 ac, 63.12% Impervious, Inflow Depth = 1.90" for 1-Year event
Inflow = 2.05 cfs @ 11.97 hrs, Volume= 0.101 af
Outflow = 2.05 cfs @ 11.97 hrs, Volume= 0.101 af, Atten= 0%, Lag= 0.0 min
Primary = 2.05 cfs @ 11.97 hrs, Volume= 0.101 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,455.71' @ 11.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,455.00'	**15.0" Round Culvert** L= 160.0' CPP, square edge headwall, Ke= 0.500

Inlet / Outlet Invert= 2,455.00' / 2,452.00' S= 0.0187 '/' Cc= 0.900
n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=1.98 cfs @ 11.97 hrs HW=2,455.69' (Free Discharge)
└─**1=Culvert** (Inlet Controls 1.98 cfs @ 2.84 fps)

Summary for Pond R11.19: CB

Inflow Area =	5.124 ac,	7.86% Impervious, Inflow Depth = 0.94"	for 1-Year event	
Inflow =	7.89 cfs @	11.99 hrs, Volume=	0.403 af	
Outflow =	7.89 cfs @	11.99 hrs, Volume=	0.403 af,	Atten= 0%, Lag= 0.0 min
Primary =	7.89 cfs @	11.99 hrs, Volume=	0.403 af	

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,452.26' @ 11.99 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,451.00'	**30.0" Round Culvert** L= 625.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,451.00' / 2,444.75' S= 0.0100 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=7.65 cfs @ 11.99 hrs HW=2,452.23' (Free Discharge)
└─**1=Culvert** (Barrel Controls 7.65 cfs @ 4.63 fps)

Summary for Pond R11.20: CULVERT

Inflow Area =	5.212 ac,	0.00% Impervious, Inflow Depth = 0.81"	for 1-Year event	
Inflow =	4.95 cfs @	12.09 hrs, Volume=	0.351 af	
Outflow =	4.95 cfs @	12.09 hrs, Volume=	0.351 af,	Atten= 0%, Lag= 0.0 min
Primary =	4.95 cfs @	12.09 hrs, Volume=	0.351 af	

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,459.88' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,459.00'	**30.0" Round Culvert** L= 45.0' Ke= 0.500 Inlet / Outlet Invert= 2,459.00' / 2,458.00' S= 0.0222 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=4.89 cfs @ 12.09 hrs HW=2,459.88' (Free Discharge)
└─**1=Culvert** (Inlet Controls 4.89 cfs @ 3.19 fps)

Summary for Pond R11.22: CB

Inflow Area =	1.435 ac,	57.38% Impervious, Inflow Depth = 1.82"	for 1-Year event	
Inflow =	4.43 cfs @	11.97 hrs, Volume=	0.217 af	
Outflow =	4.43 cfs @	11.97 hrs, Volume=	0.217 af,	Atten= 0%, Lag= 0.0 min
Primary =	4.43 cfs @	11.97 hrs, Volume=	0.217 af	

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Peak Elev= 2,412.95' @ 11.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,412.00'	**21.0" Round CB** L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,412.00' / 2,410.00' S= 0.0333 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=4.29 cfs @ 11.97 hrs HW=2,412.93' (Free Discharge)
└─**1=CB** (Inlet Controls 4.29 cfs @ 3.29 fps)

Summary for Pond R11.23: CB

Inflow Area = 1.435 ac, 57.38% Impervious, Inflow Depth = 1.82" for 1-Year event
Inflow = 4.43 cfs @ 11.97 hrs, Volume= 0.217 af
Outflow = 4.43 cfs @ 11.97 hrs, Volume= 0.217 af, Atten= 0%, Lag= 0.0 min
Primary = 4.43 cfs @ 11.97 hrs, Volume= 0.217 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,410.90' @ 11.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,410.00'	**24.0" Round CB** L= 1,200.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,410.00' / 2,304.00' S= 0.0883 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=4.29 cfs @ 11.97 hrs HW=2,410.88' (Free Discharge)
└─**1=CB** (Inlet Controls 4.29 cfs @ 3.20 fps)

Summary for Pond R11.25: CB

Inflow Area = 8.185 ac, 34.51% Impervious, Inflow Depth = 1.43" for 1-Year event
Inflow = 18.88 cfs @ 11.98 hrs, Volume= 0.976 af
Outflow = 18.88 cfs @ 11.98 hrs, Volume= 0.976 af, Atten= 0%, Lag= 0.0 min
Primary = 18.88 cfs @ 11.98 hrs, Volume= 0.976 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,411.73' @ 11.98 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,410.00'	**36.0" Round Culvert** L= 300.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,410.00' / 2,380.00' S= 0.1000 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=18.13 cfs @ 11.98 hrs HW=2,411.69' (Free Discharge)
└─**1=Culvert** (Inlet Controls 18.13 cfs @ 4.42 fps)

Summary for Pond R11.28: FLOW SPLITTER

Inflow Area = 8.185 ac, 34.51% Impervious, Inflow Depth = 1.43" for 1-Year event
Inflow = 18.88 cfs @ 11.98 hrs, Volume= 0.976 af
Outflow = 18.88 cfs @ 11.98 hrs, Volume= 0.976 af, Atten= 0%, Lag= 0.0 min
Primary = 18.88 cfs @ 11.98 hrs, Volume= 0.976 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,376.80' @ 11.98 hrs
Flood Elev= 2,384.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	2,374.00'	**24.0" Round Culvert** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,374.00' / 2,373.70' S= 0.0200 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Secondary	2,376.85'	**36.0" Round Culvert** L= 114.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,376.85' / 2,370.00' S= 0.0601 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=18.01 cfs @ 11.98 hrs HW=2,376.69' (Free Discharge)
1=Culvert (Barrel Controls 18.01 cfs @ 5.73 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=2,374.00' (Free Discharge)
2=Culvert (Controls 0.00 cfs)

Summary for Pond R12.3: CB

Inflow Area = 0.546 ac, 95.42% Impervious, Inflow Depth = 2.66" for 1-Year event
Inflow = 2.21 cfs @ 11.96 hrs, Volume= 0.121 af
Outflow = 2.21 cfs @ 11.96 hrs, Volume= 0.121 af, Atten= 0%, Lag= 0.0 min
Primary = 2.21 cfs @ 11.96 hrs, Volume= 0.121 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,307.70' @ 11.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,307.00'	**24.0" Round Culvert** L= 650.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,307.00' / 2,300.50' S= 0.0100 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=2.16 cfs @ 11.96 hrs HW=2,307.69' (Free Discharge)
1=Culvert (Barrel Controls 2.16 cfs @ 3.33 fps)

Summary for Pond R2.10: Pipe

Inflow Area = 35.108 ac, 17.64% Impervious, Inflow Depth = 1.01" for 1-Year event
Inflow = 29.32 cfs @ 12.04 hrs, Volume= 2.955 af
Outflow = 29.32 cfs @ 12.04 hrs, Volume= 2.955 af, Atten= 0%, Lag= 0.0 min
Primary = 29.32 cfs @ 12.04 hrs, Volume= 2.955 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,186.47' @ 12.04 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,184.30'	**48.0" Round Culvert** L= 180.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,184.30' / 2,182.50' S= 0.0100 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=28.88 cfs @ 12.04 hrs HW=2,186.45' (Free Discharge)
1=Culvert (Barrel Controls 28.88 cfs @ 6.08 fps)

Summary for Pond R2.15: Pipe

Inflow Area = 0.367 ac,100.00% Impervious, Inflow Depth = 2.77" for 1-Year event
Inflow = 1.51 cfs @ 11.96 hrs, Volume= 0.085 af
Outflow = 1.51 cfs @ 11.96 hrs, Volume= 0.085 af, Atten= 0%, Lag= 0.0 min
Primary = 1.51 cfs @ 11.96 hrs, Volume= 0.085 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,195.66' @ 11.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,195.00'	**12.0" Round Culvert** L= 125.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,195.00' / 2,192.00' S= 0.0240 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=1.47 cfs @ 11.96 hrs HW=2,195.65' (Free Discharge)
1=Culvert (Inlet Controls 1.47 cfs @ 2.74 fps)

Summary for Pond R2.16: Pipe

Inflow Area = 0.360 ac, 61.20% Impervious, Inflow Depth = 1.90" for 1-Year event
Inflow = 1.15 cfs @ 11.97 hrs, Volume= 0.057 af
Outflow = 1.15 cfs @ 11.97 hrs, Volume= 0.057 af, Atten= 0%, Lag= 0.0 min
Primary = 1.15 cfs @ 11.97 hrs, Volume= 0.057 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,250.56' @ 11.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,250.00'	**12.0" Round Culvert** L= 325.0' CPP, square edge headwall, Ke= 0.500

Inlet / Outlet Invert= 2,250.00' / 2,235.00' S= 0.0462 '/' Cc= 0.900
n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=1.12 cfs @ 11.97 hrs HW=2,250.55' (Free Discharge)
└─**1=Culvert** (Inlet Controls 1.12 cfs @ 2.53 fps)

Summary for Pond R2.3: Road culvert

Inflow Area = 19.135 ac, 12.06% Impervious, Inflow Depth = 1.00" for 1-Year event
Inflow = 13.17 cfs @ 12.03 hrs, Volume= 1.590 af
Outflow = 13.17 cfs @ 12.03 hrs, Volume= 1.590 af, Atten= 0%, Lag= 0.0 min
Primary = 13.17 cfs @ 12.03 hrs, Volume= 1.590 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,271.51' @ 12.03 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,270.00'	**36.0" Round Culvert** L= 30.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 2,270.00' / 2,269.00' S= 0.0333 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Primary	2,276.00'	**20.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=12.81 cfs @ 12.03 hrs HW=2,271.49' (Free Discharge)
├─**1=Culvert** (Inlet Controls 12.81 cfs @ 3.66 fps)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond R2.5: Road culvert

Inflow Area = 22.456 ac, 13.59% Impervious, Inflow Depth = 1.03" for 1-Year event
Inflow = 14.07 cfs @ 12.09 hrs, Volume= 1.919 af
Outflow = 14.07 cfs @ 12.09 hrs, Volume= 1.919 af, Atten= 0%, Lag= 0.0 min
Primary = 14.07 cfs @ 12.09 hrs, Volume= 1.919 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,230.57' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,229.00'	**36.0" Round Culvert** L= 175.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 2,229.00' / 2,214.00' S= 0.0857 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=13.97 cfs @ 12.09 hrs HW=2,230.56' (Free Discharge)
└─**1=Culvert** (Inlet Controls 13.97 cfs @ 3.75 fps)

Summary for Pond R2.6: Road Culvert

Inflow Area =	0.725 ac,	8.86% Impervious, Inflow Depth = 0.96"	for 1-Year event	
Inflow =	1.20 cfs @	11.98 hrs, Volume=	0.058 af	
Outflow =	1.20 cfs @	11.98 hrs, Volume=	0.058 af,	Atten= 0%, Lag= 0.0 min
Primary =	1.20 cfs @	11.98 hrs, Volume=	0.058 af	

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,216.53' @ 11.98 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,216.00'	**18.0" Round Culvert** L= 30.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 2,216.00' / 2,215.00' S= 0.0333 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=1.15 cfs @ 11.98 hrs HW=2,216.51' (Free Discharge)
└─**1=Culvert** (Inlet Controls 1.15 cfs @ 2.15 fps)

Summary for Pond R2.7: Road culvert

Inflow Area =	22.456 ac,	13.59% Impervious, Inflow Depth = 1.03"	for 1-Year event	
Inflow =	14.07 cfs @	12.09 hrs, Volume=	1.919 af	
Outflow =	14.07 cfs @	12.09 hrs, Volume=	1.919 af,	Atten= 0%, Lag= 0.0 min
Primary =	14.07 cfs @	12.09 hrs, Volume=	1.919 af	

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,215.57' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,214.00'	**36.0" Round Culvert** L= 900.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 2,214.00' / 2,189.00' S= 0.0278 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=13.97 cfs @ 12.09 hrs HW=2,215.56' (Free Discharge)
└─**1=Culvert** (Inlet Controls 13.97 cfs @ 3.75 fps)

Summary for Pond R2.8: Road culvert

Inflow Area =	5.002 ac,	20.72% Impervious, Inflow Depth = 0.52"	for 1-Year event	
Inflow =	4.18 cfs @	12.09 hrs, Volume=	0.218 af	
Outflow =	4.18 cfs @	12.09 hrs, Volume=	0.218 af,	Atten= 0%, Lag= 0.0 min
Primary =	4.18 cfs @	12.09 hrs, Volume=	0.218 af	

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,191.86' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,191.00'	**36.0" Round Culvert** L= 200.0' CPP, mitered to conform to fill, Ke= 0.700

Inlet / Outlet Invert= 2,191.00' / 2,189.00' S= 0.0100 '/' Cc= 0.900
n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=4.07 cfs @ 12.09 hrs HW=2,191.85' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 4.07 cfs @ 3.74 fps)

Summary for Pond R2.9: Pipe

Inflow Area = 30.020 ac, 16.29% Impervious, Inflow Depth = 0.97" for 1-Year event
Inflow = 20.96 cfs @ 12.06 hrs, Volume= 2.417 af
Outflow = 20.96 cfs @ 12.06 hrs, Volume= 2.417 af, Atten= 0%, Lag= 0.0 min
Primary = 20.96 cfs @ 12.06 hrs, Volume= 2.417 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,190.84' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,189.00'	**36.0" Round Culvert** L= 460.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,189.00' / 2,184.40' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=20.65 cfs @ 12.06 hrs HW=2,190.82' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 20.65 cfs @ 4.60 fps)

Summary for Pond R3.2: culvert

Inflow Area = 12.097 ac, 14.02% Impervious, Inflow Depth = 1.04" for 1-Year event
Inflow = 8.83 cfs @ 12.17 hrs, Volume= 1.047 af
Outflow = 8.83 cfs @ 12.17 hrs, Volume= 1.047 af, Atten= 0%, Lag= 0.0 min
Primary = 8.83 cfs @ 12.17 hrs, Volume= 1.047 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,214.15' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,213.00'	**42.0" Round Culvert** L= 220.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 2,213.00' / 2,205.00' S= 0.0364 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=8.31 cfs @ 12.17 hrs HW=2,214.11' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 8.31 cfs @ 3.17 fps)

Summary for Pond R3.5: CULVERT

Inflow Area = 20.668 ac, 16.21% Impervious, Inflow Depth > 1.07" for 1-Year event
Inflow = 1.21 cfs @ 15.16 hrs, Volume= 1.840 af
Outflow = 1.21 cfs @ 15.16 hrs, Volume= 1.840 af, Atten= 0%, Lag= 0.0 min
Primary = 1.21 cfs @ 15.16 hrs, Volume= 1.840 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,080.49' @ 15.16 hrs
Flood Elev= 2,085.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	2,080.00'	**48.0" Round Culvert** L= 10.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 2,080.00' / 2,079.95' S= 0.0050 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=1.21 cfs @ 15.16 hrs HW=2,080.49' (Free Discharge)
└─**1=Culvert** (Barrel Controls 1.21 cfs @ 2.10 fps)

Summary for Pond R3.6: FLOW SPLITTER

Inflow Area = 20.668 ac, 16.21% Impervious, Inflow Depth > 1.07" for 1-Year event
Inflow = 1.21 cfs @ 15.16 hrs, Volume= 1.840 af
Outflow = 1.21 cfs @ 15.16 hrs, Volume= 1.840 af, Atten= 0%, Lag= 0.0 min
Primary = 1.21 cfs @ 15.16 hrs, Volume= 1.840 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,071.48' @ 15.16 hrs
Flood Elev= 2,085.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	2,071.00'	**24.0" Round PIPE** L= 30.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 2,071.00' / 2,070.00' S= 0.0333 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Secondary	2,072.00'	**24.0" Round PIPE** L= 108.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,072.00' / 2,068.00' S= 0.0370 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=1.19 cfs @ 15.16 hrs HW=2,071.48' (Free Discharge)
└─**1=PIPE** (Inlet Controls 1.19 cfs @ 2.07 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=2,071.00' (Free Discharge)
└─**2=PIPE** (Controls 0.00 cfs)

Summary for Pond R4.1: CULVERT

Inflow Area = 2.529 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 3.19 cfs @ 12.01 hrs, Volume= 0.170 af
Outflow = 3.19 cfs @ 12.01 hrs, Volume= 0.170 af, Atten= 0%, Lag= 0.0 min
Primary = 3.19 cfs @ 12.01 hrs, Volume= 0.170 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,990.81' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,990.00'	**24.0" Round Culvert** L= 50.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 1,990.00' / 1,988.00' S= 0.0400 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=3.13 cfs @ 12.01 hrs HW=1,990.80' (Free Discharge)
└─**1=Culvert** (Inlet Controls 3.13 cfs @ 2.68 fps)

Summary for Pond R5.1: CULVERT

Inflow Area = 8.026 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 9.40 cfs @ 12.03 hrs, Volume= 0.540 af
Outflow = 9.40 cfs @ 12.03 hrs, Volume= 0.540 af, Atten= 0%, Lag= 0.0 min
Primary = 9.40 cfs @ 12.03 hrs, Volume= 0.540 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,905.30' @ 12.03 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,904.00'	**33.0" Round Culvert** L= 50.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 1,904.00' / 1,902.00' S= 0.0400 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=9.10 cfs @ 12.03 hrs HW=1,905.27' (Free Discharge)
└─**1=Culvert** (Inlet Controls 9.10 cfs @ 3.39 fps)

Summary for Pond R5.3: CULVERT

Inflow Area = 8.026 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 8.81 cfs @ 12.08 hrs, Volume= 0.540 af
Outflow = 8.81 cfs @ 12.08 hrs, Volume= 0.540 af, Atten= 0%, Lag= 0.0 min
Primary = 8.81 cfs @ 12.08 hrs, Volume= 0.540 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,838.25' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,837.00'	**33.0" Round Culvert** L= 120.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 1,837.00' / 1,823.00' S= 0.1167 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=8.58 cfs @ 12.08 hrs HW=1,838.23' (Free Discharge)
└─**1=Culvert** (Inlet Controls 8.58 cfs @ 3.33 fps)

Summary for Pond R8.1: CULVERT

Inflow Area = 2.715 ac, 28.55% Impervious, Inflow Depth = 1.25" for 1-Year event
Inflow = 2.68 cfs @ 12.19 hrs, Volume= 0.283 af
Outflow = 2.68 cfs @ 12.19 hrs, Volume= 0.283 af, Atten= 0%, Lag= 0.0 min
Primary = 2.68 cfs @ 12.19 hrs, Volume= 0.283 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,308.73' @ 12.19 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,308.00'	**24.0" Round Culvert** L= 275.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 2,308.00' / 2,304.00' S= 0.0145 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=2.64 cfs @ 12.19 hrs HW=2,308.73' (Free Discharge)
└─**1=Culvert** (Inlet Controls 2.64 cfs @ 2.56 fps)

Summary for Pond R8.10: CB

Inflow Area = 16.055 ac, 27.79% Impervious, Inflow Depth = 1.26" for 1-Year event
Inflow = 24.66 cfs @ 12.00 hrs, Volume= 1.689 af
Outflow = 24.66 cfs @ 12.00 hrs, Volume= 1.689 af, Atten= 0%, Lag= 0.0 min
Primary = 24.66 cfs @ 12.00 hrs, Volume= 1.689 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,977.83' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,976.00'	**45.0" Round Culvert** L= 765.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,976.00' / 1,899.00' S= 0.1007 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=24.62 cfs @ 12.00 hrs HW=1,977.83' (Free Discharge)
└─**1=Culvert** (Inlet Controls 24.62 cfs @ 4.60 fps)

Summary for Pond R8.12: CULVERT

Inflow Area = 5.444 ac, 7.52% Impervious, Inflow Depth = 0.91" for 1-Year event
Inflow = 7.11 cfs @ 12.03 hrs, Volume= 0.412 af
Outflow = 7.11 cfs @ 12.03 hrs, Volume= 0.412 af, Atten= 0%, Lag= 0.0 min
Primary = 7.11 cfs @ 12.03 hrs, Volume= 0.412 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,903.15' @ 12.03 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,902.00'	**30.0" Round Culvert** L= 40.0' CPP, mitered to conform to fill, Ke= 0.700

Inlet / Outlet Invert= 1,902.00' / 1,899.00' S= 0.0750 '/' Cc= 0.900
n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=6.91 cfs @ 12.03 hrs HW=1,903.13' (Free Discharge)
└─**1=Culvert** (Inlet Controls 6.91 cfs @ 3.20 fps)

Summary for Pond R8.13: CB

Inflow Area = 21.499 ac, 22.66% Impervious, Inflow Depth = 1.17" for 1-Year event
Inflow = 31.43 cfs @ 12.01 hrs, Volume= 2.101 af
Outflow = 31.43 cfs @ 12.01 hrs, Volume= 2.101 af, Atten= 0%, Lag= 0.0 min
Primary = 31.43 cfs @ 12.01 hrs, Volume= 2.101 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,898.04' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,896.00'	**48.0" Round Culvert** L= 835.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,896.00' / 1,824.00' S= 0.0862 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=30.99 cfs @ 12.01 hrs HW=1,898.03' (Free Discharge)
└─**1=Culvert** (Inlet Controls 30.99 cfs @ 4.85 fps)

Summary for Pond R8.15: CB

Inflow Area = 23.740 ac, 23.90% Impervious, Inflow Depth = 1.19" for 1-Year event
Inflow = 36.51 cfs @ 12.00 hrs, Volume= 2.358 af
Outflow = 36.51 cfs @ 12.00 hrs, Volume= 2.358 af, Atten= 0%, Lag= 0.0 min
Primary = 36.18 cfs @ 12.00 hrs, Volume= 2.357 af
Secondary = 0.33 cfs @ 12.00 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,823.21' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,821.00'	**48.0" Round Culvert** L= 65.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,821.00' / 1,818.00' S= 0.0462 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Secondary	1,823.00'	**36.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,823.00' / 1,822.00' S= 0.0200 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=36.14 cfs @ 12.00 hrs HW=1,823.21' (Free Discharge)
└─**1=Culvert** (Inlet Controls 36.14 cfs @ 5.07 fps)

Secondary OutFlow Max=0.33 cfs @ 12.00 hrs HW=1,823.21' (Free Discharge)
└─**2=Culvert** (Barrel Controls 0.33 cfs @ 2.25 fps)

Summary for Pond R8.3: CULVERT

Inflow Area = 6.659 ac, 31.16% Impervious, Inflow Depth = 1.29" for 1-Year event
Inflow = 8.07 cfs @ 12.01 hrs, Volume= 0.715 af
Outflow = 8.07 cfs @ 12.01 hrs, Volume= 0.715 af, Atten= 0%, Lag= 0.0 min
Primary = 8.07 cfs @ 12.01 hrs, Volume= 0.715 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,273.15' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,272.00'	**36.0" Round Culvert** L= 50.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 2,272.00' / 2,271.00' S= 0.0200 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Primary	2,274.00'	**10.0' long x 30.0' 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=7.87 cfs @ 12.01 hrs HW=2,273.14' (Free Discharge)
└─**1=Culvert** (Inlet Controls 7.87 cfs @ 3.20 fps)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond R8.5: CULVERT

Inflow Area = 8.599 ac, 26.37% Impervious, Inflow Depth = 1.21" for 1-Year event
Inflow = 9.87 cfs @ 12.03 hrs, Volume= 0.870 af
Outflow = 9.87 cfs @ 12.03 hrs, Volume= 0.870 af, Atten= 0%, Lag= 0.0 min
Primary = 9.87 cfs @ 12.03 hrs, Volume= 0.870 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,223.29' @ 12.03 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,222.00'	**36.0" Round Culvert** L= 50.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 2,222.00' / 2,220.00' S= 0.0400 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Primary	2,224.00'	**10.0' long x 30.0' 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=9.67 cfs @ 12.03 hrs HW=2,223.27' (Free Discharge)
└─**1=Culvert** (Inlet Controls 9.67 cfs @ 3.39 fps)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond R8.7: CULVERT

Inflow Area = 14.109 ac, 22.15% Impervious, Inflow Depth = 1.16" for 1-Year event
Inflow = 18.64 cfs @ 12.01 hrs, Volume= 1.362 af
Outflow = 18.64 cfs @ 12.01 hrs, Volume= 1.362 af, Atten= 0%, Lag= 0.0 min
Primary = 18.64 cfs @ 12.01 hrs, Volume= 1.362 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,179.73' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,178.00'	**42.0" Round Culvert** L= 200.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 2,178.00' / 2,163.00' S= 0.0750 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=18.18 cfs @ 12.01 hrs HW=2,179.70' (Free Discharge)
└─**1=Culvert** (Inlet Controls 18.18 cfs @ 3.92 fps)

Summary for Pond R8.8: CB

Inflow Area = 14.831 ac, 24.61% Impervious, Inflow Depth = 1.20" for 1-Year event
Inflow = 20.87 cfs @ 12.01 hrs, Volume= 1.486 af
Outflow = 20.87 cfs @ 12.01 hrs, Volume= 1.486 af, Atten= 0%, Lag= 0.0 min
Primary = 20.87 cfs @ 12.01 hrs, Volume= 1.486 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,161.71' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,160.00'	**42.0" Round Culvert** L= 880.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,160.00' / 2,077.00' S= 0.0943 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=20.54 cfs @ 12.01 hrs HW=2,161.70' (Free Discharge)
└─**1=Culvert** (Inlet Controls 20.54 cfs @ 4.44 fps)

Summary for Pond R8.9: CB

Inflow Area = 15.452 ac, 26.26% Impervious, Inflow Depth = 1.23" for 1-Year event
Inflow = 22.77 cfs @ 12.00 hrs, Volume= 1.589 af
Outflow = 22.77 cfs @ 12.00 hrs, Volume= 1.589 af, Atten= 0%, Lag= 0.0 min
Primary = 22.77 cfs @ 12.00 hrs, Volume= 1.589 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,075.80' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,074.00'	**42.0" Round Culvert** L= 900.0' CPP, square edge headwall, Ke= 0.500

Inlet / Outlet Invert= 2,074.00' / 1,979.00' S= 0.1056 '/' Cc= 0.900
n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=22.61 cfs @ 12.00 hrs HW=2,075.79' (Free Discharge)
└─**1=Culvert** (Inlet Controls 22.61 cfs @ 4.56 fps)

Summary for Pond R9.1: Road Culvert

Inflow Area = 4.151 ac, 21.51% Impervious, Inflow Depth = 1.13" for 1-Year event
Inflow = 1.85 cfs @ 12.34 hrs, Volume= 0.391 af
Outflow = 1.85 cfs @ 12.34 hrs, Volume= 0.391 af, Atten= 0%, Lag= 0.0 min
Primary = 1.85 cfs @ 12.34 hrs, Volume= 0.391 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,817.56' @ 12.34 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,817.00'	**30.0" Round Culvert** L= 40.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 1,817.00' / 1,816.00' S= 0.0250 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Primary	1,820.00'	**40.0' 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=1.83 cfs @ 12.34 hrs HW=1,817.56' (Free Discharge)
├─**1=Culvert** (Inlet Controls 1.83 cfs @ 2.24 fps)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond R9.11: Culvert

Inflow Area = 19.480 ac, 21.84% Impervious, Inflow Depth > 1.15" for 1-Year event
Inflow = 0.58 cfs @ 19.83 hrs, Volume= 1.867 af
Outflow = 0.58 cfs @ 19.83 hrs, Volume= 1.867 af, Atten= 0%, Lag= 0.0 min
Primary = 0.58 cfs @ 19.83 hrs, Volume= 1.867 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,658.28' @ 19.83 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,658.00'	**36.0" Round Culvert** L= 50.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,658.00' / 1,656.00' S= 0.0400 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=0.58 cfs @ 19.83 hrs HW=1,658.28' (Free Discharge)
└─**1=Culvert** (Inlet Controls 0.58 cfs @ 1.79 fps)

Summary for Pond R9.12: CB

Inflow	=	0.33 cfs @	12.00 hrs, Volume=	0.001 af
Outflow	=	0.33 cfs @	12.00 hrs, Volume=	0.001 af, Atten= 0%, Lag= 0.0 min
Primary	=	0.33 cfs @	12.00 hrs, Volume=	0.001 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,815.24' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,815.00'	**42.0" Round Culvert** L= 90.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,815.00' / 1,814.10' S= 0.0100 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=0.33 cfs @ 12.00 hrs HW=1,815.24' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.33 cfs @ 1.77 fps)

Summary for Pond R9.13: PIPE

Inflow	=	0.33 cfs @	12.00 hrs, Volume=	0.001 af
Outflow	=	0.33 cfs @	12.00 hrs, Volume=	0.001 af, Atten= 0%, Lag= 0.0 min
Primary	=	0.33 cfs @	12.00 hrs, Volume=	0.001 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 1,814.24' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,814.00'	**42.0" Round PIPE** L= 220.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,814.00' / 1,811.80' S= 0.0100 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=0.33 cfs @ 12.00 hrs HW=1,814.24' (Free Discharge)
└─**1=PIPE** (Barrel Controls 0.33 cfs @ 1.77 fps)

Summary for Pond R9.14: PIPE

Inflow	=	0.33 cfs @	12.00 hrs, Volume=	0.001 af
Outflow	=	0.33 cfs @	12.00 hrs, Volume=	0.001 af, Atten= 0%, Lag= 0.0 min
Primary	=	0.33 cfs @	12.00 hrs, Volume=	0.001 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 1,812.04' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,811.80'	**42.0" Round PIPE** L= 250.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,811.80' / 1,809.30' S= 0.0100 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=0.33 cfs @ 12.00 hrs HW=1,812.04' (Free Discharge)
└─**1=PIPE** (Barrel Controls 0.33 cfs @ 1.77 fps)

Summary for Pond R9.15: PIPE

Inflow	=	0.33 cfs @	12.00 hrs, Volume=	0.001 af	
Outflow	=	0.33 cfs @	12.00 hrs, Volume=	0.001 af,	Atten= 0%, Lag= 0.0 min
Primary	=	0.33 cfs @	12.00 hrs, Volume=	0.001 af	

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 1,809.54' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,809.30'	**42.0" Round PIPE** L= 240.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,809.30' / 1,806.90' S= 0.0100 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=0.33 cfs @ 12.00 hrs HW=1,809.54' (Free Discharge)
└─**1=PIPE** (Barrel Controls 0.33 cfs @ 1.77 fps)

Summary for Pond R9.16: MH

Inflow	=	0.33 cfs @	12.00 hrs, Volume=	0.001 af	
Outflow	=	0.33 cfs @	12.00 hrs, Volume=	0.001 af,	Atten= 0%, Lag= 0.0 min
Primary	=	0.33 cfs @	12.00 hrs, Volume=	0.001 af	

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,807.11' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,806.90'	**36.0" Round Culvert** L= 200.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,806.90' / 1,804.90' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.33 cfs @ 12.00 hrs HW=1,807.11' (Free Discharge)
└─**1=Culvert** (Inlet Controls 0.33 cfs @ 1.55 fps)

Summary for Pond R9.3: Culvert

Inflow Area = 11.891 ac, 25.97% Impervious, Inflow Depth = 1.21" for 1-Year event

Inflow	=	16.89 cfs @	11.98 hrs, Volume=	1.198 af	
Outflow	=	16.89 cfs @	11.98 hrs, Volume=	1.198 af,	Atten= 0%, Lag= 0.0 min
Primary	=	16.89 cfs @	11.98 hrs, Volume=	1.198 af	

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,773.45' @ 11.98 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,772.00'	**48.0" Round Culvert** L= 40.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,772.00' / 1,770.00' S= 0.0500 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=16.18 cfs @ 11.98 hrs HW=1,773.42' (Free Discharge)
└─**1=Culvert** (Inlet Controls 16.18 cfs @ 4.05 fps)

Summary for Pond R9.5: Culvert

Inflow Area = 16.238 ac, 24.71% Impervious, Inflow Depth = 1.19" for 1-Year event
Inflow = 23.93 cfs @ 12.00 hrs, Volume= 1.607 af
Outflow = 23.93 cfs @ 12.00 hrs, Volume= 1.607 af, Atten= 0%, Lag= 0.0 min
Primary = 23.93 cfs @ 12.00 hrs, Volume= 1.607 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,715.68' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,714.00'	**54.0" Round Culvert** L= 60.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,714.00' / 1,710.00' S= 0.0667 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=23.71 cfs @ 12.00 hrs HW=1,715.67' (Free Discharge)
└─**1=Culvert** (Inlet Controls 23.71 cfs @ 4.40 fps)

Summary for Pond R9.6: Culvert

Inflow Area = 1.294 ac, 18.82% Impervious, Inflow Depth = 1.13" for 1-Year event
Inflow = 2.15 cfs @ 12.00 hrs, Volume= 0.121 af
Outflow = 2.15 cfs @ 12.00 hrs, Volume= 0.121 af, Atten= 0%, Lag= 0.0 min
Primary = 2.15 cfs @ 12.00 hrs, Volume= 0.121 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,684.67' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,684.00'	**18.0" Round Culvert** L= 100.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,684.00' / 1,682.00' S= 0.0200 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=2.14 cfs @ 12.00 hrs HW=1,684.67' (Free Discharge)
└─**1=Culvert** (Inlet Controls 2.14 cfs @ 2.79 fps)

Summary for Pond R9.8: culvert

Inflow Area = 2.870 ac, 4.48% Impervious, Inflow Depth = 0.91" for 1-Year event
Inflow = 4.37 cfs @ 11.99 hrs, Volume= 0.217 af
Outflow = 4.37 cfs @ 11.99 hrs, Volume= 0.217 af, Atten= 0%, Lag= 0.0 min
Primary = 4.37 cfs @ 11.99 hrs, Volume= 0.217 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,686.89' @ 11.99 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,686.00'	**24.0" Round Culvert** L= 40.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,686.00' / 1,685.00' S= 0.0250 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=4.23 cfs @ 11.99 hrs HW=1,686.88' (Free Discharge)
└─**1=Culvert** (Inlet Controls 4.23 cfs @ 3.19 fps)

Summary for Pond 11.3R: 72" CMP (x2)

Inflow Area = 34.510 ac, 0.51% Impervious, Inflow Depth = 2.21" for 10-Year event
Inflow = 47.79 cfs @ 12.36 hrs, Volume= 6.348 af
Outflow = 47.78 cfs @ 12.36 hrs, Volume= 6.348 af, Atten= 0%, Lag= 0.0 min
Primary = 47.78 cfs @ 12.36 hrs, Volume= 6.348 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 2,413.73' @ 12.36 hrs Surf.Area= 95 sf Storage= 134 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (888.3 - 888.2)

Volume	Invert	Avail.Storage	Storage Description
#1	2,412.00'	2,120 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,412.00	60	0	0
2,414.00	100	160	160
2,416.00	260	360	520
2,418.00	380	640	1,160
2,420.00	580	960	2,120

Device	Routing	Invert	Outlet Devices
#1	Primary	2,412.00'	**72.0" Round Culvert X 2.00** L= 120.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 2,412.00' / 2,394.00' S= 0.1500 '/' Cc= 0.900 n= 0.025 Corrugated metal

Primary OutFlow Max=47.65 cfs @ 12.36 hrs HW=2,413.73' (Free Discharge)
└**1=Culvert** (Inlet Controls 47.65 cfs @ 3.53 fps)

Summary for Pond 11.7R: Culvert

Inflow Area = 81.523 ac, 7.59% Impervious, Inflow Depth = 2.40" for 10-Year event
Inflow = 100.19 cfs @ 12.29 hrs, Volume= 16.333 af
Outflow = 100.19 cfs @ 12.29 hrs, Volume= 16.333 af, Atten= 0%, Lag= 0.0 min
Primary = 100.19 cfs @ 12.29 hrs, Volume= 16.333 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,893.74' @ 12.29 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,889.00'	**48.0" Round Culvert** L= 46.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,889.00' / 1,882.00' S= 0.1522 '/' Cc= 0.900 n= 0.025 Corrugated metal
#2	Primary	1,894.00'	**15.0' long x 35.0' 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=99.97 cfs @ 12.29 hrs HW=1,893.73' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 99.97 cfs @ 7.96 fps)
└—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond R1.10: PIPE

Inflow Area = 5.258 ac, 24.86% Impervious, Inflow Depth = 2.83" for 10-Year event
Inflow = 22.97 cfs @ 12.00 hrs, Volume= 1.239 af
Outflow = 22.97 cfs @ 12.00 hrs, Volume= 1.239 af, Atten= 0%, Lag= 0.0 min
Primary = 22.97 cfs @ 12.00 hrs, Volume= 1.239 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,207.31' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,204.00'	**24.0" Round Culvert** L= 140.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,204.00' / 2,180.00' S= 0.1714 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=22.73 cfs @ 12.00 hrs HW=2,207.26' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 22.73 cfs @ 7.23 fps)

Summary for Pond R1.7: Culvert

Inflow Area = 4.963 ac, 23.85% Impervious, Inflow Depth = 2.80" for 10-Year event
Inflow = 21.49 cfs @ 12.01 hrs, Volume= 1.159 af
Outflow = 21.49 cfs @ 12.01 hrs, Volume= 1.159 af, Atten= 0%, Lag= 0.0 min
Primary = 21.49 cfs @ 12.01 hrs, Volume= 1.159 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,233.02' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,230.00'	**24.0" Round Culvert** L= 290.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,230.00' / 2,205.00' S= 0.0862 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=21.13 cfs @ 12.01 hrs HW=2,232.95' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 21.13 cfs @ 6.73 fps)

Summary for Pond R1.8: PIPE

Inflow Area = 0.295 ac, 41.89% Impervious, Inflow Depth = 3.27" for 10-Year event
Inflow = 1.62 cfs @ 11.97 hrs, Volume= 0.080 af
Outflow = 1.62 cfs @ 11.97 hrs, Volume= 0.080 af, Atten= 0%, Lag= 0.0 min
Primary = 1.62 cfs @ 11.97 hrs, Volume= 0.080 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Peak Elev= 2,207.64' @ 11.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,207.00'	**24.0" Round Culvert** L= 250.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,207.00' / 2,205.00' S= 0.0080 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=1.57 cfs @ 11.97 hrs HW=2,207.62' (Free Discharge)
└─**1=Culvert** (Barrel Controls 1.57 cfs @ 2.80 fps)

Summary for Pond R1.9: Culvert

Inflow Area = 3.441 ac, 4.67% Impervious, Inflow Depth = 2.45" for 10-Year event
Inflow = 14.52 cfs @ 11.97 hrs, Volume= 0.702 af
Outflow = 14.52 cfs @ 11.97 hrs, Volume= 0.702 af, Atten= 0%, Lag= 0.0 min
Primary = 14.52 cfs @ 11.97 hrs, Volume= 0.702 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,207.92' @ 11.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,206.00'	**24.0" Round Culvert** L= 50.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,206.00' / 2,205.00' S= 0.0200 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=14.04 cfs @ 11.97 hrs HW=2,207.88' (Free Discharge)
└─**1=Culvert** (Barrel Controls 14.04 cfs @ 5.95 fps)

Summary for Pond R11.11: CULVERT

Inflow Area = 5.399 ac, 2.68% Impervious, Inflow Depth = 2.25" for 10-Year event
Inflow = 15.40 cfs @ 12.08 hrs, Volume= 1.011 af
Outflow = 15.40 cfs @ 12.08 hrs, Volume= 1.011 af, Atten= 0%, Lag= 0.0 min
Primary = 15.40 cfs @ 12.08 hrs, Volume= 1.011 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,479.67' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,478.00'	**30.0" Round Culvert** L= 35.0' Ke= 0.500 Inlet / Outlet Invert= 2,478.00' / 2,472.00' S= 0.1714 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=15.10 cfs @ 12.08 hrs HW=2,479.65' (Free Discharge)
└─**1=Culvert** (Inlet Controls 15.10 cfs @ 4.38 fps)

Summary for Pond R11.15: CB

Inflow Area = 11.392 ac, 0.56% Impervious, Inflow Depth = 2.20" for 10-Year event
Inflow = 26.86 cfs @ 12.14 hrs, Volume= 2.087 af
Outflow = 26.86 cfs @ 12.14 hrs, Volume= 2.087 af, Atten= 0%, Lag= 0.0 min
Primary = 26.86 cfs @ 12.14 hrs, Volume= 2.087 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,454.14' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,452.00'	**36.0" Round Culvert** L= 110.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,452.00' / 2,450.00' S= 0.0182 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=26.67 cfs @ 12.14 hrs HW=2,454.13' (Free Discharge)
└─**1=Culvert** (Inlet Controls 26.67 cfs @ 4.97 fps)

Summary for Pond R11.17: CB

Inflow Area = 0.170 ac, 72.76% Impervious, Inflow Depth = 3.98" for 10-Year event
Inflow = 0.97 cfs @ 12.01 hrs, Volume= 0.057 af
Outflow = 0.97 cfs @ 12.01 hrs, Volume= 0.057 af, Atten= 0%, Lag= 0.0 min
Primary = 0.97 cfs @ 12.01 hrs, Volume= 0.057 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,453.51' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,453.00'	**12.0" Round Culvert** L= 200.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,453.00' / 2,449.00' S= 0.0200 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=0.96 cfs @ 12.01 hrs HW=2,453.50' (Free Discharge)
└─**1=Culvert** (Inlet Controls 0.96 cfs @ 2.42 fps)

Summary for Pond R11.18: CB

Inflow Area = 0.638 ac, 63.12% Impervious, Inflow Depth = 3.77" for 10-Year event
Inflow = 3.92 cfs @ 11.96 hrs, Volume= 0.201 af
Outflow = 3.92 cfs @ 11.96 hrs, Volume= 0.201 af, Atten= 0%, Lag= 0.0 min
Primary = 3.92 cfs @ 11.96 hrs, Volume= 0.201 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,456.07' @ 11.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,455.00'	**15.0" Round Culvert** L= 160.0' CPP, square edge headwall, Ke= 0.500

Inlet / Outlet Invert= 2,455.00' / 2,452.00' S= 0.0187 '/' Cc= 0.900
n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=3.81 cfs @ 11.96 hrs HW=2,456.04' (Free Discharge)
└─**1=Culvert** (Inlet Controls 3.81 cfs @ 3.48 fps)

Summary for Pond R11.19: CB

Inflow Area = 5.124 ac, 7.86% Impervious, Inflow Depth = 2.39" for 10-Year event
Inflow = 20.50 cfs @ 11.98 hrs, Volume= 1.022 af
Outflow = 20.50 cfs @ 11.98 hrs, Volume= 1.022 af, Atten= 0%, Lag= 0.0 min
Primary = 20.50 cfs @ 11.98 hrs, Volume= 1.022 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,453.23' @ 11.98 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,451.00'	**30.0" Round Culvert** L= 625.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,451.00' / 2,444.75' S= 0.0100 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=19.77 cfs @ 11.98 hrs HW=2,453.17' (Free Discharge)
└─**1=Culvert** (Barrel Controls 19.77 cfs @ 5.84 fps)

Summary for Pond R11.20: CULVERT

Inflow Area = 5.212 ac, 0.00% Impervious, Inflow Depth = 2.20" for 10-Year event
Inflow = 14.46 cfs @ 12.08 hrs, Volume= 0.955 af
Outflow = 14.46 cfs @ 12.08 hrs, Volume= 0.955 af, Atten= 0%, Lag= 0.0 min
Primary = 14.46 cfs @ 12.08 hrs, Volume= 0.955 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,460.64' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,459.00'	**30.0" Round Culvert** L= 45.0' Ke= 0.500 Inlet / Outlet Invert= 2,459.00' / 2,458.00' S= 0.0222 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=14.20 cfs @ 12.08 hrs HW=2,460.62' (Free Discharge)
└─**1=Culvert** (Barrel Controls 14.20 cfs @ 6.00 fps)

Summary for Pond R11.22: CB

Inflow Area = 1.435 ac, 57.38% Impervious, Inflow Depth = 3.67" for 10-Year event
Inflow = 8.64 cfs @ 11.97 hrs, Volume= 0.439 af
Outflow = 8.64 cfs @ 11.97 hrs, Volume= 0.439 af, Atten= 0%, Lag= 0.0 min
Primary = 8.64 cfs @ 11.97 hrs, Volume= 0.439 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Peak Elev= 2,413.44' @ 11.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,412.00'	**21.0" Round CB** L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,412.00' / 2,410.00' S= 0.0333 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=8.39 cfs @ 11.97 hrs HW=2,413.41' (Free Discharge)
└—**1=CB** (Inlet Controls 8.39 cfs @ 4.04 fps)

Summary for Pond R11.23: CB

Inflow Area =	1.435 ac,	57.38% Impervious, Inflow Depth = 3.67"	for 10-Year event	
Inflow =	8.64 cfs @	11.97 hrs, Volume=	0.439 af	
Outflow =	8.64 cfs @	11.97 hrs, Volume=	0.439 af,	Atten= 0%, Lag= 0.0 min
Primary =	8.64 cfs @	11.97 hrs, Volume=	0.439 af	

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,411.32' @ 11.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,410.00'	**24.0" Round CB** L= 1,200.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,410.00' / 2,304.00' S= 0.0883 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=8.39 cfs @ 11.97 hrs HW=2,411.30' (Free Discharge)
└—**1=CB** (Inlet Controls 8.39 cfs @ 3.88 fps)

Summary for Pond R11.25: CB

Inflow Area =	8.185 ac,	34.51% Impervious, Inflow Depth = 3.06"	for 10-Year event	
Inflow =	40.24 cfs @	11.98 hrs, Volume=	2.090 af	
Outflow =	40.24 cfs @	11.98 hrs, Volume=	2.090 af,	Atten= 0%, Lag= 0.0 min
Primary =	40.24 cfs @	11.98 hrs, Volume=	2.090 af	

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,412.86' @ 11.98 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,410.00'	**36.0" Round Culvert** L= 300.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,410.00' / 2,380.00' S= 0.1000 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=38.67 cfs @ 11.98 hrs HW=2,412.77' (Free Discharge)
└—**1=Culvert** (Inlet Controls 38.67 cfs @ 5.67 fps)

Summary for Pond R11.28: FLOW SPLITTER

Inflow Area = 8.185 ac, 34.51% Impervious, Inflow Depth = 3.06" for 10-Year event
Inflow = 40.24 cfs @ 11.98 hrs, Volume= 2.090 af
Outflow = 40.24 cfs @ 11.98 hrs, Volume= 2.090 af, Atten= 0%, Lag= 0.0 min
Primary = 27.34 cfs @ 11.98 hrs, Volume= 1.962 af
Secondary = 12.89 cfs @ 11.98 hrs, Volume= 0.128 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,378.26' @ 11.98 hrs
Flood Elev= 2,384.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	2,374.00'	**24.0" Round Culvert** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,374.00' / 2,373.70' S= 0.0200 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Secondary	2,376.85'	**36.0" Round Culvert** L= 114.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,376.85' / 2,370.00' S= 0.0601 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=26.94 cfs @ 11.98 hrs HW=2,378.17' (Free Discharge)
└─**1=Culvert** (Inlet Controls 26.94 cfs @ 8.57 fps)

Secondary OutFlow Max=11.73 cfs @ 11.98 hrs HW=2,378.17' (Free Discharge)
└─**2=Culvert** (Inlet Controls 11.73 cfs @ 3.91 fps)

Summary for Pond R12.3: CB

Inflow Area = 0.546 ac, 95.42% Impervious, Inflow Depth = 4.65" for 10-Year event
Inflow = 3.75 cfs @ 11.96 hrs, Volume= 0.211 af
Outflow = 3.75 cfs @ 11.96 hrs, Volume= 0.211 af, Atten= 0%, Lag= 0.0 min
Primary = 3.75 cfs @ 11.96 hrs, Volume= 0.211 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,307.92' @ 11.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,307.00'	**24.0" Round Culvert** L= 650.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,307.00' / 2,300.50' S= 0.0100 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=3.66 cfs @ 11.96 hrs HW=2,307.91' (Free Discharge)
└─**1=Culvert** (Barrel Controls 3.66 cfs @ 3.86 fps)

Summary for Pond R2.10: Pipe

Inflow Area = 35.108 ac, 17.64% Impervious, Inflow Depth = 2.56" for 10-Year event
Inflow = 97.19 cfs @ 12.01 hrs, Volume= 7.500 af
Outflow = 97.19 cfs @ 12.01 hrs, Volume= 7.500 af, Atten= 0%, Lag= 0.0 min
Primary = 97.19 cfs @ 12.01 hrs, Volume= 7.500 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,189.84' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,184.30'	**48.0" Round Culvert** L= 180.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,184.30' / 2,182.50' S= 0.0100 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=95.01 cfs @ 12.01 hrs HW=2,189.70' (Free Discharge)
└─**1=Culvert** (Barrel Controls 95.01 cfs @ 7.56 fps)

Summary for Pond R2.15: Pipe

Inflow Area = 0.367 ac,100.00% Impervious, Inflow Depth = 4.76" for 10-Year event
Inflow = 2.54 cfs @ 11.96 hrs, Volume= 0.146 af
Outflow = 2.54 cfs @ 11.96 hrs, Volume= 0.146 af, Atten= 0%, Lag= 0.0 min
Primary = 2.54 cfs @ 11.96 hrs, Volume= 0.146 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,195.94' @ 11.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,195.00'	**12.0" Round Culvert** L= 125.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,195.00' / 2,192.00' S= 0.0240 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=2.48 cfs @ 11.96 hrs HW=2,195.92' (Free Discharge)
└─**1=Culvert** (Inlet Controls 2.48 cfs @ 3.27 fps)

Summary for Pond R2.16: Pipe

Inflow Area = 0.360 ac, 61.20% Impervious, Inflow Depth = 3.77" for 10-Year event
Inflow = 2.21 cfs @ 11.96 hrs, Volume= 0.113 af
Outflow = 2.21 cfs @ 11.96 hrs, Volume= 0.113 af, Atten= 0%, Lag= 0.0 min
Primary = 2.21 cfs @ 11.96 hrs, Volume= 0.113 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,250.84' @ 11.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,250.00'	**12.0" Round Culvert** L= 325.0' CPP, square edge headwall, Ke= 0.500

Inlet / Outlet Invert= 2,250.00' / 2,235.00' S= 0.0462 '/' Cc= 0.900
n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=2.15 cfs @ 11.96 hrs HW=2,250.83' (Free Discharge)
└─**1=Culvert** (Inlet Controls 2.15 cfs @ 3.10 fps)

Summary for Pond R2.3: Road culvert

Inflow Area = 19.135 ac, 12.06% Impervious, Inflow Depth = 2.51" for 10-Year event
Inflow = 45.77 cfs @ 12.05 hrs, Volume= 3.998 af
Outflow = 45.77 cfs @ 12.05 hrs, Volume= 3.998 af, Atten= 0%, Lag= 0.0 min
Primary = 45.77 cfs @ 12.05 hrs, Volume= 3.998 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,273.82' @ 12.05 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,270.00'	**36.0" Round Culvert** L= 30.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 2,270.00' / 2,269.00' S= 0.0333 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Primary	2,276.00'	**20.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=45.47 cfs @ 12.05 hrs HW=2,273.79' (Free Discharge)
├─**1=Culvert** (Inlet Controls 45.47 cfs @ 6.43 fps)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond R2.5: Road culvert

Inflow Area = 22.456 ac, 13.59% Impervious, Inflow Depth = 2.55" for 10-Year event
Inflow = 47.71 cfs @ 12.10 hrs, Volume= 4.773 af
Outflow = 47.71 cfs @ 12.10 hrs, Volume= 4.773 af, Atten= 0%, Lag= 0.0 min
Primary = 47.71 cfs @ 12.10 hrs, Volume= 4.773 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,233.02' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,229.00'	**36.0" Round Culvert** L= 175.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 2,229.00' / 2,214.00' S= 0.0857 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=47.57 cfs @ 12.10 hrs HW=2,233.01' (Free Discharge)
└─**1=Culvert** (Inlet Controls 47.57 cfs @ 6.73 fps)

Summary for Pond R2.6: Road Culvert

Inflow Area = 0.725 ac, 8.86% Impervious, Inflow Depth = 2.45" for 10-Year event
Inflow = 3.06 cfs @ 11.97 hrs, Volume= 0.148 af
Outflow = 3.06 cfs @ 11.97 hrs, Volume= 0.148 af, Atten= 0%, Lag= 0.0 min
Primary = 3.06 cfs @ 11.97 hrs, Volume= 0.148 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,216.88' @ 11.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,216.00'	**18.0" Round Culvert** L= 30.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 2,216.00' / 2,215.00' S= 0.0333 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=2.96 cfs @ 11.97 hrs HW=2,216.87' (Free Discharge)
└─**1=Culvert** (Inlet Controls 2.96 cfs @ 2.80 fps)

Summary for Pond R2.7: Road culvert

Inflow Area = 22.456 ac, 13.59% Impervious, Inflow Depth = 2.55" for 10-Year event
Inflow = 47.71 cfs @ 12.10 hrs, Volume= 4.773 af
Outflow = 47.71 cfs @ 12.10 hrs, Volume= 4.773 af, Atten= 0%, Lag= 0.0 min
Primary = 47.71 cfs @ 12.10 hrs, Volume= 4.773 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,218.02' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,214.00'	**36.0" Round Culvert** L= 900.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 2,214.00' / 2,189.00' S= 0.0278 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=47.57 cfs @ 12.10 hrs HW=2,218.01' (Free Discharge)
└─**1=Culvert** (Inlet Controls 47.57 cfs @ 6.73 fps)

Summary for Pond R2.8: Road culvert

Inflow Area = 5.002 ac, 20.72% Impervious, Inflow Depth = 2.09" for 10-Year event
Inflow = 22.37 cfs @ 11.99 hrs, Volume= 0.870 af
Outflow = 22.37 cfs @ 11.99 hrs, Volume= 0.870 af, Atten= 0%, Lag= 0.0 min
Primary = 22.37 cfs @ 11.99 hrs, Volume= 0.870 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,193.16' @ 11.99 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,191.00'	**36.0" Round Culvert** L= 200.0' CPP, mitered to conform to fill, Ke= 0.700

Inlet / Outlet Invert= 2,191.00' / 2,189.00' S= 0.0100 '/' Cc= 0.900
n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=21.92 cfs @ 11.99 hrs HW=2,193.13' (Free Discharge)
└─**1=Culvert** (Barrel Controls 21.92 cfs @ 5.73 fps)

Summary for Pond R2.9: Pipe

Inflow Area =	30.020 ac, 16.29% Impervious, Inflow Depth = 2.51"	for 10-Year event	
Inflow =	75.07 cfs @ 12.01 hrs, Volume=	6.280 af	
Outflow =	75.07 cfs @ 12.01 hrs, Volume=	6.280 af,	Atten= 0%, Lag= 0.0 min
Primary =	75.07 cfs @ 12.01 hrs, Volume=	6.280 af	

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,195.82' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,189.00'	**36.0" Round Culvert** L= 460.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,189.00' / 2,184.40' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=73.78 cfs @ 12.01 hrs HW=2,195.59' (Free Discharge)
└─**1=Culvert** (Barrel Controls 73.78 cfs @ 10.44 fps)

Summary for Pond R3.2: culvert

Inflow Area =	12.097 ac, 14.02% Impervious, Inflow Depth = 2.55"	for 10-Year event	
Inflow =	41.93 cfs @ 12.04 hrs, Volume=	2.570 af	
Outflow =	41.93 cfs @ 12.04 hrs, Volume=	2.570 af,	Atten= 0%, Lag= 0.0 min
Primary =	41.93 cfs @ 12.04 hrs, Volume=	2.570 af	

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,215.82' @ 12.04 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,213.00'	**42.0" Round Culvert** L= 220.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 2,213.00' / 2,205.00' S= 0.0364 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=41.25 cfs @ 12.04 hrs HW=2,215.79' (Free Discharge)
└─**1=Culvert** (Inlet Controls 41.25 cfs @ 5.02 fps)

Summary for Pond R3.5: CULVERT

Inflow Area =	20.668 ac, 16.21% Impervious, Inflow Depth = 2.60"	for 10-Year event	
Inflow =	35.29 cfs @ 12.20 hrs, Volume=	4.486 af	
Outflow =	35.29 cfs @ 12.20 hrs, Volume=	4.486 af,	Atten= 0%, Lag= 0.0 min
Primary =	35.29 cfs @ 12.20 hrs, Volume=	4.486 af	

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,082.84' @ 12.20 hrs
Flood Elev= 2,085.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	2,080.00'	**48.0" Round Culvert** L= 10.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 2,080.00' / 2,079.95' S= 0.0050 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=35.13 cfs @ 12.20 hrs HW=2,082.83' (Free Discharge)
└─**1=Culvert** (Barrel Controls 35.13 cfs @ 5.19 fps)

Summary for Pond R3.6: FLOW SPLITTER

Inflow Area =	20.668 ac,	16.21% Impervious, Inflow Depth =	2.60"	for 10-Year event
Inflow =	35.29 cfs @	12.20 hrs, Volume=	4.486 af	
Outflow =	35.29 cfs @	12.20 hrs, Volume=	4.486 af,	Atten= 0%, Lag= 0.0 min
Primary =	19.37 cfs @	12.20 hrs, Volume=	4.082 af	
Secondary =	15.92 cfs @	12.20 hrs, Volume=	0.404 af	

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,074.11' @ 12.20 hrs
Flood Elev= 2,085.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	2,071.00'	**24.0" Round PIPE** L= 30.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 2,071.00' / 2,070.00' S= 0.0333 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Secondary	2,072.00'	**24.0" Round PIPE** L= 108.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,072.00' / 2,068.00' S= 0.0370 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=19.32 cfs @ 12.20 hrs HW=2,074.09' (Free Discharge)
└─**1=PIPE** (Inlet Controls 19.32 cfs @ 6.15 fps)

Secondary OutFlow Max=15.82 cfs @ 12.20 hrs HW=2,074.09' (Free Discharge)
└─**2=PIPE** (Inlet Controls 15.82 cfs @ 5.03 fps)

Summary for Pond R4.1: CULVERT

Inflow Area =	2.529 ac,	0.00% Impervious, Inflow Depth =	2.20"	for 10-Year event
Inflow =	9.07 cfs @	12.00 hrs, Volume=	0.463 af	
Outflow =	9.07 cfs @	12.00 hrs, Volume=	0.463 af,	Atten= 0%, Lag= 0.0 min
Primary =	9.07 cfs @	12.00 hrs, Volume=	0.463 af	

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,991.48' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,990.00'	**24.0" Round Culvert** L= 50.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 1,990.00' / 1,988.00' S= 0.0400 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=9.02 cfs @ 12.00 hrs HW=1,991.47' (Free Discharge)
└─**1=Culvert** (Inlet Controls 9.02 cfs @ 3.64 fps)

Summary for Pond R5.1: CULVERT

Inflow Area =	8.026 ac,	0.00% Impervious,	Inflow Depth = 2.20"	for 10-Year event
Inflow =	27.00 cfs @	12.02 hrs, Volume=	1.470 af	
Outflow =	27.00 cfs @	12.02 hrs, Volume=	1.470 af,	Atten= 0%, Lag= 0.0 min
Primary =	27.00 cfs @	12.02 hrs, Volume=	1.470 af	

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,906.50' @ 12.02 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,904.00'	**33.0" Round Culvert** L= 50.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 1,904.00' / 1,902.00' S= 0.0400 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=26.29 cfs @ 12.02 hrs HW=1,906.45' (Free Discharge)
└─**1=Culvert** (Inlet Controls 26.29 cfs @ 4.70 fps)

Summary for Pond R5.3: CULVERT

Inflow Area =	8.026 ac,	0.00% Impervious,	Inflow Depth = 2.20"	for 10-Year event
Inflow =	25.68 cfs @	12.06 hrs, Volume=	1.470 af	
Outflow =	25.68 cfs @	12.06 hrs, Volume=	1.470 af,	Atten= 0%, Lag= 0.0 min
Primary =	25.68 cfs @	12.06 hrs, Volume=	1.470 af	

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,839.41' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,837.00'	**33.0" Round Culvert** L= 120.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 1,837.00' / 1,823.00' S= 0.1167 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=25.37 cfs @ 12.06 hrs HW=1,839.38' (Free Discharge)
└─**1=Culvert** (Inlet Controls 25.37 cfs @ 4.64 fps)

Summary for Pond R8.1: CULVERT

Inflow Area = 2.715 ac, 28.55% Impervious, Inflow Depth = 2.89" for 10-Year event
Inflow = 10.05 cfs @ 12.09 hrs, Volume= 0.654 af
Outflow = 10.05 cfs @ 12.09 hrs, Volume= 0.654 af, Atten= 0%, Lag= 0.0 min
Primary = 10.05 cfs @ 12.09 hrs, Volume= 0.654 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,309.58' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,308.00'	**24.0" Round Culvert** L= 275.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 2,308.00' / 2,304.00' S= 0.0145 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=9.89 cfs @ 12.09 hrs HW=2,309.56' (Free Discharge)
└─**1=Culvert** (Inlet Controls 9.89 cfs @ 3.76 fps)

Summary for Pond R8.10: CB

Inflow Area = 16.055 ac, 27.79% Impervious, Inflow Depth = 2.89" for 10-Year event
Inflow = 61.13 cfs @ 12.00 hrs, Volume= 3.871 af
Outflow = 61.13 cfs @ 12.00 hrs, Volume= 3.871 af, Atten= 0%, Lag= 0.0 min
Primary = 61.13 cfs @ 12.00 hrs, Volume= 3.871 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,979.20' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,976.00'	**45.0" Round Culvert** L= 765.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,976.00' / 1,899.00' S= 0.1007 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=60.88 cfs @ 12.00 hrs HW=1,979.19' (Free Discharge)
└─**1=Culvert** (Inlet Controls 60.88 cfs @ 6.08 fps)

Summary for Pond R8.12: CULVERT

Inflow Area = 5.444 ac, 7.52% Impervious, Inflow Depth = 2.36" for 10-Year event
Inflow = 19.13 cfs @ 12.02 hrs, Volume= 1.073 af
Outflow = 19.13 cfs @ 12.02 hrs, Volume= 1.073 af, Atten= 0%, Lag= 0.0 min
Primary = 19.13 cfs @ 12.02 hrs, Volume= 1.073 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,904.10' @ 12.02 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,902.00'	**30.0" Round Culvert** L= 40.0' CPP, mitered to conform to fill, Ke= 0.700

Inlet / Outlet Invert= 1,902.00' / 1,899.00' S= 0.0750 '/' Cc= 0.900
n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=18.62 cfs @ 12.02 hrs HW=1,904.06' (Free Discharge)
1=Culvert (Inlet Controls 18.62 cfs @ 4.31 fps)

Summary for Pond R8.13: CB

Inflow Area = 21.499 ac, 22.66% Impervious, Inflow Depth = 2.76" for 10-Year event
Inflow = 79.93 cfs @ 12.01 hrs, Volume= 4.943 af
Outflow = 79.93 cfs @ 12.01 hrs, Volume= 4.943 af, Atten= 0%, Lag= 0.0 min
Primary = 79.93 cfs @ 12.01 hrs, Volume= 4.943 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,899.72' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,896.00'	**48.0" Round Culvert** L= 835.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,896.00' / 1,824.00' S= 0.0862 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=78.90 cfs @ 12.01 hrs HW=1,899.68' (Free Discharge)
1=Culvert (Inlet Controls 78.90 cfs @ 6.53 fps)

Summary for Pond R8.15: CB

Inflow Area = 23.740 ac, 23.90% Impervious, Inflow Depth = 2.79" for 10-Year event
Inflow = 90.84 cfs @ 12.00 hrs, Volume= 5.518 af
Outflow = 90.84 cfs @ 12.00 hrs, Volume= 5.518 af, Atten= 0%, Lag= 0.0 min
Primary = 75.84 cfs @ 12.00 hrs, Volume= 5.320 af
Secondary = 15.00 cfs @ 12.00 hrs, Volume= 0.199 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,824.56' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,821.00'	**48.0" Round Culvert** L= 65.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,821.00' / 1,818.00' S= 0.0462 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Secondary	1,823.00'	**36.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,823.00' / 1,822.00' S= 0.0200 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=75.75 cfs @ 12.00 hrs HW=1,824.55' (Free Discharge)
1=Culvert (Inlet Controls 75.75 cfs @ 6.42 fps)

Secondary OutFlow Max=14.95 cfs @ 12.00 hrs HW=1,824.55' (Free Discharge)
2=Culvert (Barrel Controls 14.95 cfs @ 5.88 fps)

Summary for Pond R8.3: CULVERT

Inflow Area =	6.659 ac, 31.16% Impervious,	Inflow Depth = 2.95"	for 10-Year event	
Inflow =	24.95 cfs @	12.03 hrs, Volume=	1.636 af	
Outflow =	24.95 cfs @	12.03 hrs, Volume=	1.636 af,	Atten= 0%, Lag= 0.0 min
Primary =	24.95 cfs @	12.03 hrs, Volume=	1.636 af	

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,274.14' @ 12.03 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,272.00'	**36.0" Round Culvert** L= 50.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 2,272.00' / 2,271.00' S= 0.0200 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Primary	2,274.00'	**10.0' long x 30.0' 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=24.45 cfs @ 12.03 hrs HW=2,274.12' (Free Discharge)
1=Culvert (Inlet Controls 23.35 cfs @ 4.37 fps)
2=Broad-Crested Rectangular Weir (Weir Controls 1.10 cfs @ 0.93 fps)

Summary for Pond R8.5: CULVERT

Inflow Area =	8.599 ac, 26.37% Impervious,	Inflow Depth = 2.83"	for 10-Year event	
Inflow =	29.19 cfs @	12.04 hrs, Volume=	2.031 af	
Outflow =	29.19 cfs @	12.04 hrs, Volume=	2.031 af,	Atten= 0%, Lag= 0.0 min
Primary =	29.19 cfs @	12.04 hrs, Volume=	2.031 af	

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,224.26' @ 12.04 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,222.00'	**36.0" Round Culvert** L= 50.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 2,222.00' / 2,220.00' S= 0.0400 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Primary	2,224.00'	**10.0' long x 30.0' 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=28.78 cfs @ 12.04 hrs HW=2,224.24' (Free Discharge)
1=Culvert (Inlet Controls 25.53 cfs @ 4.50 fps)
2=Broad-Crested Rectangular Weir (Weir Controls 3.25 cfs @ 1.33 fps)

Summary for Pond R8.7: CULVERT

Inflow Area = 14.109 ac, 22.15% Impervious, Inflow Depth = 2.75" for 10-Year event
Inflow = 50.10 cfs @ 12.01 hrs, Volume= 3.236 af
Outflow = 50.10 cfs @ 12.01 hrs, Volume= 3.236 af, Atten= 0%, Lag= 0.0 min
Primary = 50.10 cfs @ 12.01 hrs, Volume= 3.236 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,181.23' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,178.00'	**42.0" Round Culvert** L= 200.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 2,178.00' / 2,163.00' S= 0.0750 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=49.01 cfs @ 12.01 hrs HW=2,181.17' (Free Discharge)
└─**1=Culvert** (Inlet Controls 49.01 cfs @ 5.35 fps)

Summary for Pond R8.8: CB

Inflow Area = 14.831 ac, 24.61% Impervious, Inflow Depth = 2.81" for 10-Year event
Inflow = 54.15 cfs @ 12.01 hrs, Volume= 3.475 af
Outflow = 54.15 cfs @ 12.01 hrs, Volume= 3.475 af, Atten= 0%, Lag= 0.0 min
Primary = 54.15 cfs @ 12.01 hrs, Volume= 3.475 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,163.10' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,160.00'	**42.0" Round Culvert** L= 880.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,160.00' / 2,077.00' S= 0.0943 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=53.30 cfs @ 12.01 hrs HW=2,163.07' (Free Discharge)
└─**1=Culvert** (Inlet Controls 53.30 cfs @ 5.96 fps)

Summary for Pond R8.9: CB

Inflow Area = 15.452 ac, 26.26% Impervious, Inflow Depth = 2.85" for 10-Year event
Inflow = 57.66 cfs @ 12.00 hrs, Volume= 3.676 af
Outflow = 57.66 cfs @ 12.00 hrs, Volume= 3.676 af, Atten= 0%, Lag= 0.0 min
Primary = 57.66 cfs @ 12.00 hrs, Volume= 3.676 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,077.27' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2,074.00'	**42.0" Round Culvert** L= 900.0' CPP, square edge headwall, Ke= 0.500

Inlet / Outlet Invert= 2,074.00' / 1,979.00' S= 0.1056 '/' Cc= 0.900
n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=57.12 cfs @ 12.00 hrs HW=2,077.25' (Free Discharge)
└─**1=Culvert** (Inlet Controls 57.12 cfs @ 6.13 fps)

Summary for Pond R9.1: Road Culvert

Inflow Area = 4.151 ac, 21.51% Impervious, Inflow Depth = 2.71" for 10-Year event
Inflow = 13.49 cfs @ 12.12 hrs, Volume= 0.938 af
Outflow = 13.49 cfs @ 12.12 hrs, Volume= 0.938 af, Atten= 0%, Lag= 0.0 min
Primary = 13.49 cfs @ 12.12 hrs, Volume= 0.938 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,818.67' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,817.00'	**30.0" Round Culvert** L= 40.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 1,817.00' / 1,816.00' S= 0.0250 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Primary	1,820.00'	**40.0' 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=13.19 cfs @ 12.12 hrs HW=1,818.64' (Free Discharge)
├─**1=Culvert** (Inlet Controls 13.19 cfs @ 3.85 fps)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond R9.11: Culvert

Inflow Area = 19.480 ac, 21.84% Impervious, Inflow Depth > 2.86" for 10-Year event
Inflow = 3.29 cfs @ 13.98 hrs, Volume= 4.643 af
Outflow = 3.29 cfs @ 13.98 hrs, Volume= 4.643 af, Atten= 0%, Lag= 0.0 min
Primary = 3.29 cfs @ 13.98 hrs, Volume= 4.643 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,658.67' @ 13.98 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,658.00'	**36.0" Round Culvert** L= 50.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,658.00' / 1,656.00' S= 0.0400 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=3.29 cfs @ 13.98 hrs HW=1,658.67' (Free Discharge)
└─**1=Culvert** (Inlet Controls 3.29 cfs @ 2.79 fps)

Summary for Pond R9.12: CB

Inflow	=	15.00 cfs @	12.00 hrs, Volume=	0.199 af
Outflow	=	15.00 cfs @	12.00 hrs, Volume=	0.199 af, Atten= 0%, Lag= 0.0 min
Primary	=	15.00 cfs @	12.00 hrs, Volume=	0.199 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,816.62' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,815.00'	**42.0" Round Culvert** L= 90.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,815.00' / 1,814.10' S= 0.0100 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=14.94 cfs @ 12.00 hrs HW=1,816.62' (Free Discharge)
└─**1=Culvert** (Barrel Controls 14.94 cfs @ 5.05 fps)

Summary for Pond R9.13: PIPE

Inflow	=	15.00 cfs @	12.00 hrs, Volume=	0.199 af
Outflow	=	15.00 cfs @	12.00 hrs, Volume=	0.199 af, Atten= 0%, Lag= 0.0 min
Primary	=	15.00 cfs @	12.00 hrs, Volume=	0.199 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 1,815.57' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,814.00'	**42.0" Round PIPE** L= 220.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,814.00' / 1,811.80' S= 0.0100 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=14.95 cfs @ 12.00 hrs HW=1,815.57' (Free Discharge)
└─**1=PIPE** (Barrel Controls 14.95 cfs @ 5.27 fps)

Summary for Pond R9.14: PIPE

Inflow	=	15.00 cfs @	12.00 hrs, Volume=	0.199 af
Outflow	=	15.00 cfs @	12.00 hrs, Volume=	0.199 af, Atten= 0%, Lag= 0.0 min
Primary	=	15.00 cfs @	12.00 hrs, Volume=	0.199 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 1,813.37' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,811.80'	**42.0" Round PIPE** L= 250.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,811.80' / 1,809.30' S= 0.0100 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=14.94 cfs @ 12.00 hrs HW=1,813.36' (Free Discharge)
└─**1=PIPE** (Barrel Controls 14.94 cfs @ 5.29 fps)

Summary for Pond R9.15: PIPE

Inflow	=	15.00 cfs @	12.00 hrs, Volume=	0.199 af
Outflow	=	15.00 cfs @	12.00 hrs, Volume=	0.199 af, Atten= 0%, Lag= 0.0 min
Primary	=	15.00 cfs @	12.00 hrs, Volume=	0.199 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 1,810.87' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,809.30'	**42.0" Round PIPE** L= 240.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,809.30' / 1,806.90' S= 0.0100 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=14.94 cfs @ 12.00 hrs HW=1,810.86' (Free Discharge)
└─**1=PIPE** (Barrel Controls 14.94 cfs @ 5.28 fps)

Summary for Pond R9.16: MH

Inflow	=	15.00 cfs @	12.00 hrs, Volume=	0.199 af
Outflow	=	15.00 cfs @	12.00 hrs, Volume=	0.199 af, Atten= 0%, Lag= 0.0 min
Primary	=	15.00 cfs @	12.00 hrs, Volume=	0.199 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,808.41' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,806.90'	**36.0" Round Culvert** L= 200.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,806.90' / 1,804.90' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=14.95 cfs @ 12.00 hrs HW=1,808.41' (Free Discharge)
└─**1=Culvert** (Inlet Controls 14.95 cfs @ 4.19 fps)

Summary for Pond R9.3: Culvert

Inflow Area = 11.891 ac, 25.97% Impervious, Inflow Depth = 3.03" for 10-Year event

Inflow	=	51.81 cfs @	12.00 hrs, Volume=	3.003 af
Outflow	=	51.81 cfs @	12.00 hrs, Volume=	3.003 af, Atten= 0%, Lag= 0.0 min
Primary	=	51.81 cfs @	12.00 hrs, Volume=	3.003 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,774.74' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,772.00'	**48.0" Round Culvert** L= 40.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,772.00' / 1,770.00' S= 0.0500 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=51.64 cfs @ 12.00 hrs HW=1,774.74' (Free Discharge)
└─**1=Culvert** (Inlet Controls 51.64 cfs @ 5.63 fps)

Summary for Pond R9.5: Culvert

Inflow Area = 16.238 ac, 24.71% Impervious, Inflow Depth = 2.94" for 10-Year event
Inflow = 66.99 cfs @ 12.01 hrs, Volume= 3.985 af
Outflow = 66.99 cfs @ 12.01 hrs, Volume= 3.985 af, Atten= 0%, Lag= 0.0 min
Primary = 66.99 cfs @ 12.01 hrs, Volume= 3.985 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,717.02' @ 12.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,714.00'	**54.0" Round Culvert** L= 60.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,714.00' / 1,710.00' S= 0.0667 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=66.03 cfs @ 12.01 hrs HW=1,716.99' (Free Discharge)
└─**1=Culvert** (Inlet Controls 66.03 cfs @ 5.89 fps)

Summary for Pond R9.6: Culvert

Inflow Area = 1.294 ac, 18.82% Impervious, Inflow Depth = 2.69" for 10-Year event
Inflow = 5.21 cfs @ 12.00 hrs, Volume= 0.290 af
Outflow = 5.21 cfs @ 12.00 hrs, Volume= 0.290 af, Atten= 0%, Lag= 0.0 min
Primary = 5.21 cfs @ 12.00 hrs, Volume= 0.290 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,685.14' @ 12.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,684.00'	**18.0" Round Culvert** L= 100.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,684.00' / 1,682.00' S= 0.0200 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=5.20 cfs @ 12.00 hrs HW=1,685.13' (Free Discharge)
└─**1=Culvert** (Inlet Controls 5.20 cfs @ 3.63 fps)

Summary for Pond R9.8: culvert

Inflow Area =	2.870 ac,	4.48% Impervious,	Inflow Depth = 2.36"	for 10-Year event	
Inflow =	11.59 cfs @	11.98 hrs,	Volume=	0.565 af	
Outflow =	11.59 cfs @	11.98 hrs,	Volume=	0.565 af,	Atten= 0%, Lag= 0.0 min
Primary =	11.59 cfs @	11.98 hrs,	Volume=	0.565 af	

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,687.60' @ 11.98 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,686.00'	**24.0" Round Culvert** L= 40.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,686.00' / 1,685.00' S= 0.0250 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=11.15 cfs @ 11.98 hrs HW=1,687.56' (Free Discharge)
└—**1=Culvert** (Inlet Controls 11.15 cfs @ 4.25 fps)

Pond Summaries
1, 10 & 100-yr Storm Events

Summary for Pond 1.1P: Pond 1.1

Inflow Area = 9.950 ac, 14.75% Impervious, Inflow Depth = 1.08" for 1-Year event
Inflow = 17.16 cfs @ 12.00 hrs, Volume= 0.899 af
Outflow = 0.52 cfs @ 15.61 hrs, Volume= 0.899 af, Atten= 97%, Lag= 216.4 min
Primary = 0.52 cfs @ 15.61 hrs, Volume= 0.899 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Starting Elev= 2,158.50' Surf.Area= 4,792 sf Storage= 6,889 cf
Peak Elev= 2,161.63' @ 15.61 hrs Surf.Area= 11,184 sf Storage= 31,603 cf (24,714 cf above start)

Plug-Flow detention time= 1,518.4 min calculated for 0.740 af (82% of inflow)
Center-of-Mass det. time= 1,192.6 min (2,046.2 - 853.6)

Volume	Invert	Avail.Storage	Storage Description
#1	2,156.00'	125,359 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,156.00	902	0	0
2,158.00	3,831	4,733	4,733
2,160.00	7,673	11,504	16,237
2,162.00	11,982	19,655	35,892
2,164.00	16,663	28,645	64,537
2,166.00	21,746	38,409	102,946
2,167.00	23,079	22,413	125,359

Device	Routing	Invert	Outlet Devices
#1	Primary	2,158.50'	**24.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,158.50' / 2,157.65' S= 0.0170 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,158.50'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	2,161.25'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	2,163.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	2,164.75'	**25.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.52 cfs @ 15.61 hrs HW=2,161.63' (Free Discharge)
1=Culvert (Passes 0.52 cfs of 20.57 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.18 cfs @ 8.40 fps)
3=Orifice/Grate (Orifice Controls 0.34 cfs @ 2.10 fps)
4=Orifice/Grate (Controls 0.00 cfs)
5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 2.1P: Dry Swale

Inflow Area = 6.302 ac, 9.60% Impervious, Inflow Depth = 0.96" for 1-Year event
Inflow = 7.42 cfs @ 12.08 hrs, Volume= 0.505 af
Outflow = 4.18 cfs @ 12.24 hrs, Volume= 0.505 af, Atten= 44%, Lag= 9.1 min
Primary = 4.18 cfs @ 12.24 hrs, Volume= 0.505 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,302.09' @ 12.24 hrs Surf.Area= 8,031 sf Storage= 6,373 cf

Plug-Flow detention time= 324.4 min calculated for 0.504 af (100% of inflow)
Center-of-Mass det. time= 325.0 min (1,193.0 - 867.9)

Volume	Invert	Avail.Storage	Storage Description
#1	2,297.00'	460 cf	**gravel underdrain (Prismatic)**Listed below (Recalc) 1,150 cf Overall x 40.0% Voids
#2	2,298.00'	431 cf	**Filter Media (Prismatic)**Listed below (Recalc) 2,875 cf Overall x 15.0% Voids
#3	2,300.50'	8,050 cf	**Surface Storage (Prismatic)**Listed below (Recalc)
		8,941 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,297.00	1,150	0	0
2,298.00	1,150	1,150	1,150

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,298.00	1,150	0	0
2,300.50	1,150	2,875	2,875

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,300.50	1,150	0	0
2,302.50	6,900	8,050	8,050

Device	Routing	Invert	Outlet Devices
#1	Primary	2,301.85'	**12.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Primary	2,297.00'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=4.10 cfs @ 12.24 hrs HW=2,302.09' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 4.01 cfs @ 1.39 fps)
2=Exfiltration (Exfiltration Controls 0.09 cfs)

Summary for Pond 2.4P: Dry Swale

Inflow Area = 5.002 ac, 20.72% Impervious, Inflow Depth = 1.16" for 1-Year event
Inflow = 10.05 cfs @ 11.98 hrs, Volume= 0.482 af
Outflow = 4.29 cfs @ 12.09 hrs, Volume= 0.482 af, Atten= 57%, Lag= 7.0 min
Primary = 4.18 cfs @ 12.09 hrs, Volume= 0.218 af
Secondary = 0.11 cfs @ 12.09 hrs, Volume= 0.265 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,191.65' @ 12.09 hrs Surf.Area= 9,353 sf Storage= 7,615 cf

Plug-Flow detention time= 456.0 min calculated for 0.482 af (100% of inflow)
Center-of-Mass det. time= 459.4 min (1,307.1 - 847.7)

Volume	Invert	Avail.Storage	Storage Description
#1	2,186.50'	720 cf	**Stone Underdrain (Prismatic)** Listed below (Recalc) 1,800 cf Overall x 40.0% Voids
#2	2,187.50'	675 cf	**Filter Media (Prismatic)** Listed below (Recalc) 4,500 cf Overall x 15.0% Voids
#3	2,190.00'	8,400 cf	**Surface Storage (Prismatic)** Listed below (Recalc)
		9,795 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,186.50	1,800	0	0
2,187.50	1,800	1,800	1,800

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,187.50	1,800	0	0
2,190.00	1,800	4,500	4,500

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,190.00	1,800	0	0
2,192.00	6,600	8,400	8,400

Device	Routing	Invert	Outlet Devices
#1	Primary	2,191.50'	**18.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	2,191.50'	**10.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#3	Secondary	2,186.50'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=4.02 cfs @ 12.09 hrs HW=2,191.64' (Free Discharge)
—**1=Orifice/Grate** (Weir Controls 2.54 cfs @ 1.24 fps)
—**2=Broad-Crested Rectangular Weir** (Weir Controls 1.48 cfs @ 1.02 fps)

Secondary OutFlow Max=0.11 cfs @ 12.09 hrs HW=2,191.64' (Free Discharge)
—**3=Exfiltration** (Exfiltration Controls 0.11 cfs)

Summary for Pond 2.6P: Dry Swale

Inflow Area = 3.914 ac, 11.46% Impervious, Inflow Depth = 1.02" for 1-Year event
Inflow = 5.70 cfs @ 12.04 hrs, Volume= 0.331 af
Outflow = 0.24 cfs @ 14.79 hrs, Volume= 0.331 af, Atten= 96%, Lag= 165.3 min
Primary = 0.24 cfs @ 14.79 hrs, Volume= 0.331 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,422.02' @ 14.79 hrs Surf.Area= 11,216 sf Storage= 8,550 cf

Plug-Flow detention time= 771.6 min calculated for 0.331 af (100% of inflow)
Center-of-Mass det. time= 771.4 min (1,632.1 - 860.7)

Volume	Invert	Avail.Storage	Storage Description
#1	2,417.00'	850 cf	**Stone Underdrain (Prismatic)**Listed below (Recalc) 2,125 cf Overall x 40.0% Voids
#2	2,418.00'	797 cf	**filter media (Prismatic)**Listed below (Recalc) 5,313 cf Overall x 15.0% Voids
#3	2,420.50'	10,625 cf	**surface storage (Prismatic)**Listed below (Recalc)
		12,272 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,417.00	2,125	0	0
2,418.00	2,125	2,125	2,125

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,418.00	2,125	0	0
2,420.50	2,125	5,313	5,313

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,420.50	2,125	0	0
2,422.50	8,500	10,625	10,625

Device	Routing	Invert	Outlet Devices
#1	Primary	2,422.00'	**10.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Primary	2,417.00'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.20 cfs @ 14.79 hrs HW=2,422.02' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 0.07 cfs @ 0.37 fps)
└─**2=Exfiltration** (Exfiltration Controls 0.13 cfs)

Summary for Pond P1.2: BIORETENTION

Inflow Area = 2.022 ac, 27.06% Impervious, Inflow Depth = 1.37" for 1-Year event
Inflow = 3.92 cfs @ 11.99 hrs, Volume= 0.232 af
Outflow = 0.15 cfs @ 14.06 hrs, Volume= 0.232 af, Atten= 96%, Lag= 124.4 min
Primary = 0.15 cfs @ 14.06 hrs, Volume= 0.232 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,214.20' @ 14.06 hrs Surf.Area= 13,312 sf Storage= 5,266 cf

Plug-Flow detention time= 454.1 min calculated for 0.231 af (100% of inflow)
Center-of-Mass det. time= 454.3 min (1,261.0 - 806.6)

Volume	Invert	Avail.Storage	Storage Description
#1	2,209.00'	1,758 cf	**stone underdrain (Prismatic)** Listed below (Recalc) 4,394 cf Overall x 40.0% Voids
#2	2,210.00'	2,636 cf	**filter media (Prismatic)** Listed below (Recalc) 17,576 cf Overall x 15.0% Voids
#3	2,214.00'	10,119 cf	**surface storage (Prismatic)** Listed below (Recalc)
		14,513 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,209.00	4,394	0	0
2,210.00	4,394	4,394	4,394

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,210.00	4,394	0	0
2,214.00	4,394	17,576	17,576

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,214.00	4,394	0	0
2,216.00	5,725	10,119	10,119

Device	Routing	Invert	Outlet Devices
#1	Primary	2,209.00'	**18.0" Round Culvert** L= 100.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,209.00' / 2,208.50' S= 0.0050 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Primary	2,209.00'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	2,214.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	2,215.50'	**25.0' long x 1.0' 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
Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31
3.30 3.31 3.32

Primary OutFlow Max=0.15 cfs @ 14.06 hrs HW=2,214.20' (Free Discharge)
1=Culvert (Passes 0.00 cfs of 12.03 cfs potential flow)
3=Orifice/Grate (Controls 0.00 cfs)
2=Exfiltration (Exfiltration Controls 0.15 cfs)
4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond P11.1: P-1

Inflow Area = 24.870 ac, 18.86% Impervious, Inflow Depth = 0.82" for 1-Year event
Inflow = 19.96 cfs @ 11.98 hrs, Volume= 1.708 af
Outflow = 0.91 cfs @ 16.11 hrs, Volume= 1.703 af, Atten= 95%, Lag= 247.3 min
Primary = 0.91 cfs @ 16.11 hrs, Volume= 1.703 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Starting Elev= 2,296.75' Surf.Area= 6,846 sf Storage= 11,991 cf
Peak Elev= 2,301.04' @ 16.11 hrs Surf.Area= 16,962 sf Storage= 62,205 cf (50,214 cf above start)

Plug-Flow detention time= 2,031.6 min calculated for 1.428 af (84% of inflow)
Center-of-Mass det. time= 1,652.2 min (2,500.2 - 848.0)

Volume	Invert	Avail.Storage	Storage Description
#1	2,294.00'	126,454 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,294.00	2,612	0	0
2,296.00	4,954	7,566	7,566
2,298.00	10,000	14,954	22,520
2,300.00	13,679	23,679	46,199
2,302.00	19,963	33,642	79,841
2,304.00	26,650	46,613	126,454

Device	Routing	Invert	Outlet Devices
#1	Primary	2,293.00'	**24.0" Round Culvert** L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,293.00' / 2,292.50' S= 0.0083 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,296.75'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	2,300.25'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	2,302.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	2,303.00'	**50.0' 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=0.91 cfs @ 16.11 hrs HW=2,301.04' (Free Discharge)
└**1=Culvert** (Passes 0.91 cfs of 35.67 cfs potential flow)
 └**2=Orifice/Grate** (Orifice Controls 0.22 cfs @ 9.88 fps)
 └**3=Orifice/Grate** (Orifice Controls 0.70 cfs @ 3.55 fps)
 └**4=Orifice/Grate** (Controls 0.00 cfs)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond P11.10: DRY SWALE

Inflow Area = 1.246 ac, 12.83% Impervious, Inflow Depth = 1.02" for 1-Year event
Inflow = 2.19 cfs @ 11.98 hrs, Volume= 0.105 af
Outflow = 0.05 cfs @ 16.27 hrs, Volume= 0.105 af, Atten= 98%, Lag= 257.3 min
Primary = 0.05 cfs @ 16.27 hrs, Volume= 0.105 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Starting Elev= 2,192.00' Surf.Area= 3,150 sf Storage= 814 cf
Peak Elev= 2,193.51' @ 16.27 hrs Surf.Area= 5,261 sf Storage= 3,989 cf (3,175 cf above start)

Plug-Flow detention time= 2,046.6 min calculated for 0.086 af (82% of inflow)
Center-of-Mass det. time= 1,634.0 min (2,490.1 - 856.1)

Volume	Invert	Avail.Storage	Storage Description
#1	2,188.50'	420 cf	**gravel underdrain (Prismatic)**Listed below (Recalc) 1,050 cf Overall x 40.0% Voids
#2	2,189.50'	394 cf	**filter media (Prismatic)**Listed below (Recalc) 2,625 cf Overall x 15.0% Voids
#3	2,192.00'	4,900 cf	**surface storage (Prismatic)**Listed below (Recalc)
		5,714 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,188.50	1,050	0	0
2,189.50	1,050	1,050	1,050

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,189.50	1,050	0	0
2,192.00	1,050	2,625	2,625

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,192.00	1,050	0	0
2,194.00	3,850	4,900	4,900

Device	Routing	Invert	Outlet Devices
#1	Primary	2,192.00'	**0.500 in/hr Exfiltration over Surface area above 2,192.00'** Excluded Surface area = 3,150 sf
#2	Primary	2,193.50'	**10.0' 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=0.04 cfs @ 16.27 hrs HW=2,193.51' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)
└—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.02 cfs @ 0.23 fps)

Summary for Pond P11.11: DRY SWALE

Inflow Area = 3.383 ac, 14.24% Impervious, Inflow Depth = 1.19" for 1-Year event
Inflow = 2.79 cfs @ 11.98 hrs, Volume= 0.336 af
Outflow = 0.38 cfs @ 12.43 hrs, Volume= 0.336 af, Atten= 86%, Lag= 27.2 min
Primary = 0.38 cfs @ 12.43 hrs, Volume= 0.336 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,179.45' @ 12.43 hrs Surf.Area= 4,445 sf Storage= 3,275 cf

Plug-Flow detention time= 524.0 min calculated for 0.336 af (100% of inflow)
Center-of-Mass det. time= 523.6 min (1,925.3 - 1,401.7)

Volume	Invert	Avail.Storage	Storage Description
#1	2,174.50'	360 cf	**gravel underdrain (Prismatic)**Listed below (Recalc) 900 cf Overall x 40.0% Voids
#2	2,175.50'	338 cf	**filter media (Prismatic)**Listed below (Recalc) 2,250 cf Overall x 15.0% Voids
#3	2,178.00'	4,200 cf	**surface storage (Prismatic)**Listed below (Recalc)
		4,898 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,174.50	900	0	0
2,175.50	900	900	900

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,175.50	900	0	0
2,178.00	900	2,250	2,250

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,178.00	900	0	0
2,180.00	3,300	4,200	4,200

Device	Routing	Invert	Outlet Devices
#1	Primary	2,174.50'	**0.500 in/hr Exfiltration over Surface area**
#2	Primary	2,179.40'	**10.0' 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=0.37 cfs @ 12.43 hrs HW=2,179.45' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.05 cfs)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 0.32 cfs @ 0.59 fps)

Summary for Pond P11.2: BIORETENTION

Inflow Area = 9.625 ac, 29.34% Impervious, Inflow Depth = 1.34" for 1-Year event
Inflow = 20.98 cfs @ 11.98 hrs, Volume= 1.078 af
Outflow = 3.31 cfs @ 12.23 hrs, Volume= 1.078 af, Atten= 84%, Lag= 15.4 min
Primary = 2.97 cfs @ 12.23 hrs, Volume= 0.412 af
Secondary = 0.34 cfs @ 12.23 hrs, Volume= 0.666 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,373.12' @ 12.23 hrs Surf.Area= 28,996 sf Storage= 20,227 cf

Plug-Flow detention time= 360.0 min calculated for 1.078 af (100% of inflow)
Center-of-Mass det. time= 360.2 min (1,183.5 - 823.3)

Volume	Invert	Avail.Storage	Storage Description
#1	2,367.00'	3,652 cf	**stone underdrain (Prismatic)** Listed below (Recalc) 9,131 cf Overall x 40.0% Voids
#2	2,368.00'	5,479 cf	**filter media (Prismatic)** Listed below (Recalc) 36,524 cf Overall x 15.0% Voids
#3	2,372.00'	21,131 cf	**surface storage (Prismatic)** Listed below (Recalc)
		30,262 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,367.00	9,131	0	0
2,368.00	9,131	9,131	9,131

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,368.00	9,131	0	0
2,372.00	9,131	36,524	36,524

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,372.00	9,131	0	0
2,374.00	12,000	21,131	21,131

Device	Routing	Invert	Outlet Devices
#1	Primary	2,367.00'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,367.00' / 2,366.00' S= 0.0200 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,372.50'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	2,373.25'	**50.0' 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
#4 Secondary 2,367.00' **0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=2.97 cfs @ 12.23 hrs HW=2,373.12' (Free Discharge)
1=Culvert (Passes 2.97 cfs of 6.83 cfs potential flow)
2=Orifice/Grate (Orifice Controls 2.97 cfs @ 3.78 fps)
3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Secondary OutFlow Max=0.34 cfs @ 12.23 hrs HW=2,373.12' (Free Discharge)
4=Exfiltration (Exfiltration Controls 0.34 cfs)

Summary for Pond P11.4: DRY SWALE

Inflow Area = 0.233 ac, 10.77% Impervious, Inflow Depth = 0.96" for 1-Year event
Inflow = 0.39 cfs @ 11.98 hrs, Volume= 0.019 af
Outflow = 0.01 cfs @ 14.25 hrs, Volume= 0.019 af, Atten= 96%, Lag= 136.1 min
Primary = 0.01 cfs @ 14.25 hrs, Volume= 0.019 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,475.51' @ 14.25 hrs Surf.Area= 623 sf Storage= 472 cf

Plug-Flow detention time= 753.0 min calculated for 0.019 af (100% of inflow)
Center-of-Mass det. time= 752.8 min (1,612.3 - 859.5)

Volume	Invert	Avail.Storage	Storage Description
#1	2,470.50'	60 cf	**stone underdrain (Prismatic)**Listed below (Recalc) 150 cf Overall x 40.0% Voids
#2	2,471.50'	56 cf	**filter media (Prismatic)**Listed below (Recalc) 375 cf Overall x 15.0% Voids
#3	2,474.00'	530 cf	**surface storage (Prismatic)**Listed below (Recalc)
		646 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,470.50	150	0	0
2,471.50	150	150	150

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,471.50	150	0	0
2,474.00	150	375	375

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,474.00	150	0	0
2,476.00	380	530	530

Device	Routing	Invert	Outlet Devices
#1	Primary	2,470.50'	**0.500 in/hr Exfiltration over Surface area**
#2	Primary	2,475.50'	**5.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.01 cfs @ 14.25 hrs HW=2,475.51' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.01 cfs)
2=Broad-Crested Rectangular Weir (Weir Controls 0.01 cfs @ 0.20 fps)

Summary for Pond P11.5: DRY SWALE

Inflow Area = 0.116 ac, 27.15% Impervious, Inflow Depth = 1.19" for 1-Year event
Inflow = 0.24 cfs @ 11.98 hrs, Volume= 0.011 af
Outflow = 0.01 cfs @ 15.83 hrs, Volume= 0.011 af, Atten= 98%, Lag= 231.3 min
Primary = 0.01 cfs @ 15.83 hrs, Volume= 0.011 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,479.03' @ 15.83 hrs Surf.Area= 517 sf Storage= 299 cf

Plug-Flow detention time= 625.6 min calculated for 0.011 af (100% of inflow)
Center-of-Mass det. time= 626.1 min (1,472.2 - 846.1)

Volume	Invert	Avail.Storage	Storage Description
#1	2,474.50'	50 cf	**stone underdrain (Prismatic)** Listed below (Recalc) 125 cf Overall x 40.0% Voids
#2	2,475.50'	47 cf	**filter media (Prismatic)** Listed below (Recalc) 313 cf Overall x 15.0% Voids
#3	2,478.00'	525 cf	**surface storage (Prismatic)** Listed below (Recalc)
		622 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,474.50	125	0	0
2,475.50	125	125	125

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,475.50	125	0	0
2,478.00	125	313	313

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,478.00	125	0	0
2,480.00	400	525	525

Device	Routing	Invert	Outlet Devices
#1	Primary	2,474.50'	**0.500 in/hr Exfiltration over Surface area**
#2	Primary	2,479.50'	**5.0' long x 1.0' 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
Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.01 cfs @ 15.83 hrs HW=2,479.03' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.01 cfs)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond P11.6: DRY SWALE

Inflow Area = 3.304 ac, 4.07% Impervious, Inflow Depth = 0.86" for 1-Year event
Inflow = 3.52 cfs @ 12.07 hrs, Volume= 0.236 af
Outflow = 0.88 cfs @ 12.42 hrs, Volume= 0.236 af, Atten= 75%, Lag= 20.5 min
Primary = 0.88 cfs @ 12.42 hrs, Volume= 0.236 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,483.48' @ 12.42 hrs Surf.Area= 5,202 sf Storage= 3,898 cf

Plug-Flow detention time= 486.9 min calculated for 0.236 af (100% of inflow)
Center-of-Mass det. time= 488.1 min (1,362.1 - 874.0)

Volume	Invert	Avail.Storage	Storage Description
#1	2,478.50'	464 cf	**stone underdrain (Prismatic)**Listed below (Recalc) 1,160 cf Overall x 40.0% Voids
#2	2,479.50'	435 cf	**filter media (Prismatic)**Listed below (Recalc) 2,900 cf Overall x 15.0% Voids
#3	2,482.00'	4,640 cf	**surface storage (Prismatic)**Listed below (Recalc)
		5,539 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,478.50	1,160	0	0
2,479.50	1,160	1,160	1,160

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,479.50	1,160	0	0
2,482.00	1,160	2,900	2,900

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,482.00	1,160	0	0
2,484.00	3,480	4,640	4,640

Device	Routing	Invert	Outlet Devices
#1	Primary	2,478.50'	**0.500 in/hr Exfiltration over Surface area**
#2	Primary	2,483.40'	**12.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31

3.30 3.31 3.32

Primary OutFlow Max=0.83 cfs @ 12.42 hrs HW=2,483.48' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.06 cfs)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 0.77 cfs @ 0.78 fps)

Summary for Pond P11.7: BIORETENTION

Inflow Area = 0.741 ac, 55.14% Impervious, Inflow Depth = 1.74" for 1-Year event
Inflow = 2.20 cfs @ 11.97 hrs, Volume= 0.107 af
Outflow = 0.11 cfs @ 12.05 hrs, Volume= 0.107 af, Atten= 95%, Lag= 4.8 min
Primary = 0.11 cfs @ 12.05 hrs, Volume= 0.107 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,244.94' @ 13.23 hrs Surf.Area= 9,100 sf Storage= 2,462 cf

Plug-Flow detention time= 335.6 min calculated for 0.107 af (100% of inflow)
Center-of-Mass det. time= 335.8 min (1,154.4 - 818.5)

Volume	Invert	Avail.Storage	Storage Description
#1	2,243.00'	1,820 cf	**gravel drainage layer (Prismatic)** Listed below (Recalc) 4,550 cf Overall x 40.0% Voids
#2	2,244.00'	2,730 cf	**filter media (Prismatic)** Listed below (Recalc) 18,200 cf Overall x 15.0% Voids
#3	2,248.00'	10,350 cf	**surface storage (Prismatic)** Listed below (Recalc)
		14,900 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,243.00	4,550	0	0
2,244.00	4,550	4,550	4,550

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,244.00	4,550	0	0
2,248.00	4,550	18,200	18,200

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,248.00	4,550	0	0
2,250.00	5,800	10,350	10,350

Device	Routing	Invert	Outlet Devices
#1	Primary	2,243.00'	**18.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,243.00' / 2,240.00' S= 0.0600 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,243.00'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	2,248.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	2,249.00'	**25.0' 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=0.11 cfs @ 12.05 hrs HW=2,244.16' (Free Discharge)
1=Culvert (Passes 0.11 cfs of 5.35 cfs potential flow)
2=Exfiltration (Exfiltration Controls 0.11 cfs)
3=Orifice/Grate (Controls 0.00 cfs)
4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond P11.8: BIORETENTION

Inflow Area = 0.432 ac, 77.25% Impervious, Inflow Depth = 2.25" for 1-Year event
Inflow = 1.59 cfs @ 11.96 hrs, Volume= 0.081 af
Outflow = 0.07 cfs @ 12.00 hrs, Volume= 0.081 af, Atten= 96%, Lag= 2.1 min
Primary = 0.07 cfs @ 12.00 hrs, Volume= 0.081 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,257.90' @ 13.34 hrs Surf.Area= 5,700 sf Storage= 1,951 cf

Plug-Flow detention time= 358.4 min calculated for 0.081 af (100% of inflow)
Center-of-Mass det. time= 358.3 min (1,150.0 - 791.7)

Volume	Invert	Avail.Storage	Storage Description
#1	2,255.00'	1,140 cf	**gravel underdrain (Prismatic)**Listed below (Recalc) 2,850 cf Overall x 40.0% Voids
#2	2,256.00'	1,710 cf	**filter media (Prismatic)**Listed below (Recalc) 11,400 cf Overall x 15.0% Voids
#3	2,260.00'	6,450 cf	**surface storage (Prismatic)**Listed below (Recalc)
		9,300 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,255.00	2,850	0	0
2,256.00	2,850	2,850	2,850

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,256.00	2,850	0	0
2,260.00	2,850	11,400	11,400

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,260.00	2,850	0	0
2,262.00	3,600	6,450	6,450

Device	Routing	Invert	Outlet Devices
#1	Primary	2,255.00'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,255.00' / 2,254.50' S= 0.0100 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,255.00'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	2,260.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	2,261.00'	**15.0' 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=0.07 cfs @ 12.00 hrs HW=2,256.51' (Free Discharge)
1=Culvert (Passes 0.07 cfs of 2.77 cfs potential flow)
2=Exfiltration (Exfiltration Controls 0.07 cfs)
3=Orifice/Grate (Controls 0.00 cfs)
4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond P11.9: BIORETENTION

Inflow Area = 0.575 ac, 22.45% Impervious, Inflow Depth = 1.19" for 1-Year event
Inflow = 1.19 cfs @ 11.98 hrs, Volume= 0.057 af
Outflow = 0.06 cfs @ 0.00 hrs, Volume= 0.099 af, Atten= 95%, Lag= 0.0 min
Primary = 0.06 cfs @ 0.00 hrs, Volume= 0.099 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Starting Elev= 2,219.00' Surf.Area= 5,520 sf Storage= 1,840 cf
Peak Elev= 2,219.00' @ 0.00 hrs Surf.Area= 5,520 sf Storage= 1,840 cf

Plug-Flow detention time= 533.3 min calculated for 0.057 af (100% of inflow)
Center-of-Mass det. time= 116.4 min (962.5 - 846.1)

Volume	Invert	Avail.Storage	Storage Description
#1	2,214.00'	736 cf	**gravel drainage layer (Prismatic)** Listed below (Recalc) 1,840 cf Overall x 40.0% Voids
#2	2,215.00'	1,104 cf	**filter media (Prismatic)** Listed below (Recalc) 7,360 cf Overall x 15.0% Voids
#3	2,219.00'	2,040 cf	**surface storage (Prismatic)** Listed below (Recalc)
		3,880 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,214.00	1,840	0	0
2,215.00	1,840	1,840	1,840

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,215.00	1,840	0	0
2,219.00	1,840	7,360	7,360

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,219.00	1,840	0	0
2,220.00	2,239	2,040	2,040

Device	Routing	Invert	Outlet Devices
#1	Primary	2,214.00'	**0.500 in/hr Exfiltration over Surface area**
#2	Primary	2,219.50'	**15.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.06 cfs @ 0.00 hrs HW=2,219.00' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.06 cfs)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond P12.1: Pond 1.1

Inflow Area = 17.893 ac, 9.84% Impervious, Inflow Depth = 0.96" for 1-Year event
Inflow = 16.01 cfs @ 12.16 hrs, Volume= 1.434 af
Outflow = 0.80 cfs @ 16.04 hrs, Volume= 1.433 af, Atten= 95%, Lag= 233.2 min
Primary = 0.80 cfs @ 16.04 hrs, Volume= 1.433 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Starting Elev= 2,295.25' Surf.Area= 5,504 sf Storage= 5,359 cf
Peak Elev= 2,299.15' @ 16.04 hrs Surf.Area= 14,704 sf Storage= 43,883 cf (38,524 cf above start)

Plug-Flow detention time= 1,520.6 min calculated for 1.310 af (91% of inflow)
Center-of-Mass det. time= 1,344.2 min (2,211.9 - 867.7)

Volume	Invert	Avail.Storage	Storage Description
#1	2,294.00'	120,048 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,294.00	3,070	0	0
2,296.00	6,964	10,034	10,034
2,298.00	11,720	18,684	28,718
2,300.00	16,919	28,639	57,357
2,302.00	22,520	39,439	96,796
2,303.00	23,983	23,252	120,048

Device	Routing	Invert	Outlet Devices
#1	Primary	2,294.00'	**24.0" Round Culvert** L= 115.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,294.00' / 2,293.25' S= 0.0065 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,295.25'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	2,298.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	2,299.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

#5	Primary	2,302.00'	**50.0' 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=0.80 cfs @ 16.04 hrs HW=2,299.15' (Free Discharge)
1=Culvert (Passes 0.80 cfs of 22.50 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.21 cfs @ 9.40 fps)
3=Orifice/Grate (Orifice Controls 0.60 cfs @ 3.04 fps)
4=Orifice/Grate (Controls 0.00 cfs)
5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond P12.2: Dry Swale

Inflow Area = 0.376 ac, 26.90% Impervious, Inflow Depth = 1.25" for 1-Year event
Inflow = 0.82 cfs @ 11.98 hrs, Volume= 0.039 af
Outflow = 0.02 cfs @ 15.09 hrs, Volume= 0.039 af, Atten= 97%, Lag= 187.0 min
Primary = 0.02 cfs @ 15.09 hrs, Volume= 0.039 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,269.31' @ 15.09 hrs Surf.Area= 2,064 sf Storage= 984 cf

Plug-Flow detention time= 542.0 min calculated for 0.039 af (100% of inflow)
Center-of-Mass det. time= 541.9 min (1,384.7 - 842.8)

Volume	Invert	Avail.Storage	Storage Description
#1	2,265.00'	160 cf	**stone underdrain (Prismatic)**Listed below (Recalc) 400 cf Overall x 40.0% Voids
#2	2,266.00'	150 cf	**filter media (Prismatic)**Listed below (Recalc) 1,000 cf Overall x 15.0% Voids
#3	2,268.50'	2,900 cf	**surface storage (Prismatic)**Listed below (Recalc)
		3,210 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,265.00	400	0	0
2,266.00	400	400	400

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,266.00	400	0	0
2,268.50	400	1,000	1,000

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,268.50	400	0	0
2,270.00	2,000	1,800	1,800
2,270.50	2,400	1,100	2,900

Device	Routing	Invert	Outlet Devices
#1	Primary	2,269.50'	**8.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Primary	2,265.00'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.02 cfs @ 15.09 hrs HW=2,269.31' (Free Discharge)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)
2=Exfiltration (Exfiltration Controls 0.02 cfs)

Summary for Pond P2.2: Dry Swale

Inflow Area = 3.322 ac, 22.38% Impervious, Inflow Depth = 1.19" for 1-Year event
Inflow = 5.86 cfs @ 12.03 hrs, Volume= 0.329 af
Outflow = 4.41 cfs @ 12.11 hrs, Volume= 0.328 af, Atten= 25%, Lag= 4.9 min
Primary = 4.41 cfs @ 12.11 hrs, Volume= 0.328 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,265.61' @ 12.11 hrs Surf.Area= 5,116 sf Storage= 3,920 cf

Plug-Flow detention time= 271.6 min calculated for 0.328 af (100% of inflow)
Center-of-Mass det. time= 270.4 min (1,120.6 - 850.2)

Volume	Invert	Avail.Storage	Storage Description
#1	2,261.50'	420 cf	**gravel underdrain (Prismatic)**Listed below (Recalc) 1,050 cf Overall x 40.0% Voids
#2	2,262.50'	236 cf	**Filter Media (Prismatic)**Listed below (Recalc) 1,575 cf Overall x 15.0% Voids
#3	2,264.00'	8,400 cf	**Surface Storage (Prismatic)**Listed below (Recalc)
		9,056 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,261.50	1,050	0	0
2,262.50	1,050	1,050	1,050

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,262.50	1,050	0	0
2,264.00	1,050	1,575	1,575

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,264.00	1,050	0	0
2,266.00	3,500	4,550	4,550
2,267.00	4,200	3,850	8,400

Device	Routing	Invert	Outlet Devices
#1	Primary	2,265.25'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	2,266.50'	**100.0' long x 50.0' 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
#3	Primary	2,261.50'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=4.29 cfs @ 12.11 hrs HW=2,265.60' (Free Discharge)
—**1=Orifice/Grate** (Weir Controls 4.23 cfs @ 1.93 fps)
—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
—**3=Exfiltration** (Exfiltration Controls 0.06 cfs)

Summary for Pond P2.3: BIORETENTION

Inflow Area = 5.821 ac, 24.98% Impervious, Inflow Depth = 1.21" for 1-Year event
Inflow = 7.56 cfs @ 12.10 hrs, Volume= 0.587 af
Outflow = 0.36 cfs @ 15.27 hrs, Volume= 0.587 af, Atten= 95%, Lag= 190.0 min
Primary = 0.36 cfs @ 15.27 hrs, Volume= 0.587 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,227.14' @ 15.27 hrs Surf.Area= 31,185 sf Storage= 11,803 cf

Plug-Flow detention time= 473.3 min calculated for 0.587 af (100% of inflow)
Center-of-Mass det. time= 473.7 min (1,474.0 - 1,000.4)

Volume	Invert	Avail.Storage	Storage Description
#1	2,222.00'	4,142 cf	**stone underdrain (Prismatic)**Listed below (Recalc) 10,354 cf Overall x 40.0% Voids
#2	2,223.00'	6,212 cf	**filter media (Prismatic)**Listed below (Recalc) 41,416 cf Overall x 15.0% Voids
#3	2,227.00'	22,469 cf	**surface storage (Prismatic)**Listed below (Recalc)
		32,823 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,222.00	10,354	0	0
2,223.00	10,354	10,354	10,354

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,223.00	10,354	0	0
2,227.00	10,354	41,416	41,416

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,227.00	10,354	0	0
2,229.00	12,115	22,469	22,469

Device	Routing	Invert	Outlet Devices
#1	Primary	2,222.00'	**18.0" Round Culvert** L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,222.00' / 2,221.40' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Primary	2,222.00'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	2,227.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	2,228.50'	**35.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.36 cfs @ 15.27 hrs HW=2,227.14' (Free Discharge)
1=Culvert (Passes 0.00 cfs of 17.83 cfs potential flow)
3=Orifice/Grate (Controls 0.00 cfs)
2=Exfiltration (Exfiltration Controls 0.36 cfs)
4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond P2.5: Pond 2.5

Inflow Area = 36.326 ac, 17.04% Impervious, Inflow Depth = 1.01" for 1-Year event
Inflow = 30.76 cfs @ 12.03 hrs, Volume= 3.047 af
Outflow = 3.35 cfs @ 13.41 hrs, Volume= 3.020 af, Atten= 89%, Lag= 83.2 min
Primary = 3.35 cfs @ 13.41 hrs, Volume= 3.020 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 2,161.00' Surf.Area= 7,652 sf Storage= 13,933 cf
Peak Elev= 2,165.53' @ 13.41 hrs Surf.Area= 18,496 sf Storage= 71,433 cf (57,500 cf above start)

Plug-Flow detention time= 1,854.8 min calculated for 2.699 af (89% of inflow)
Center-of-Mass det. time= 1,513.6 min (2,519.7 - 1,006.1)

Volume	Invert	Avail.Storage	Storage Description
#1	2,158.00'	216,744 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,158.00	1,411	0	0
2,160.00	5,797	7,208	7,208
2,162.00	9,507	15,304	22,512
2,164.00	14,282	23,789	46,301
2,166.00	19,778	34,060	80,361
2,168.00	25,755	45,533	125,894
2,170.00	32,133	57,888	183,782
2,171.00	33,791	32,962	216,744

Device	Routing	Invert	Outlet Devices
#1	Primary	2,158.00'	**36.0" Round Culvert** L= 300.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,158.00' / 2,156.50' S= 0.0050 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,161.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	2,165.00'	**30.0" W x 18.0" H Vert. Orifice/Grate** C= 0.600
#4	Device 1	2,166.50'	**36.0" W x 30.0" H Vert. Orifice/Grate** C= 0.600
#5	Device 1	2,169.00'	**48.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600
#6	Secondary	2,170.25'	**10.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=3.35 cfs @ 13.41 hrs HW=2,165.53' (Free Discharge)
1=Culvert (Passes 3.35 cfs of 54.01 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.22 cfs @ 10.16 fps)
3=Orifice/Grate (Orifice Controls 3.13 cfs @ 2.34 fps)
4=Orifice/Grate (Controls 0.00 cfs)
5=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=2,161.00' (Free Discharge)
6=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond P3.1: Dry Swale

Inflow Area = 10.077 ac, 13.20% Impervious, Inflow Depth = 1.02" for 1-Year event
Inflow = 14.59 cfs @ 12.02 hrs, Volume= 0.857 af
Outflow = 8.31 cfs @ 12.14 hrs, Volume= 0.857 af, Atten= 43%, Lag= 7.4 min
Primary = 8.31 cfs @ 12.14 hrs, Volume= 0.857 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,288.19' @ 12.14 hrs Surf.Area= 14,260 sf Storage= 11,855 cf

Plug-Flow detention time= 391.4 min calculated for 0.857 af (100% of inflow)
Center-of-Mass det. time= 392.0 min (1,244.3 - 852.4)

Volume	Invert	Avail.Storage	Storage Description
#1	2,283.00'	1,086 cf	**stone underdrain (Prismatic)** Listed below (Recalc) 2,715 cf Overall x 40.0% Voids
#2	2,284.00'	1,018 cf	**filter media (Prismatic)** Listed below (Recalc) 6,788 cf Overall x 15.0% Voids
#3	2,286.50'	18,100 cf	**surface storage (Prismatic)** Listed below (Recalc)
		20,204 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,283.00	2,715	0	0
2,284.00	2,715	2,715	2,715

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,284.00	2,715	0	0
2,286.50	2,715	6,788	6,788

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,286.50	2,715	0	0
2,289.00	11,765	18,100	18,100

Device	Routing	Invert	Outlet Devices
#1	Primary	2,284.50'	**48.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,284.50' / 2,282.00' S= 0.0500 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,288.00'	**30.0" x 30.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	2,283.00'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=8.01 cfs @ 12.14 hrs HW=2,288.19' (Free Discharge)
1=Culvert (Passes 7.84 cfs of 79.14 cfs potential flow)
2=Orifice/Grate (Weir Controls 7.84 cfs @ 1.41 fps)
3=Exfiltration (Exfiltration Controls 0.16 cfs)

Summary for Pond P3.2: Dry Swale

Inflow Area = 7.881 ac, 20.98% Impervious, Inflow Depth = 1.13" for 1-Year event
Inflow = 14.08 cfs @ 12.01 hrs, Volume= 0.741 af
Outflow = 13.15 cfs @ 12.07 hrs, Volume= 0.741 af, Atten= 7%, Lag= 3.6 min
Primary = 13.15 cfs @ 12.07 hrs, Volume= 0.741 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,203.26' @ 12.07 hrs Surf.Area= 10,195 sf Storage= 8,502 cf

Plug-Flow detention time= 296.9 min calculated for 0.741 af (100% of inflow)
Center-of-Mass det. time= 297.4 min (1,149.3 - 851.9)

Volume	Invert	Avail.Storage	Storage Description
#1	2,199.00'	762 cf	**stone underdrain (Prismatic)**Listed below (Recalc) 1,905 cf Overall x 40.0% Voids
#2	2,200.00'	429 cf	**filter media (Prismatic)**Listed below (Recalc) 2,858 cf Overall x 15.0% Voids
#3	2,201.50'	12,700 cf	**surface storage (Prismatic)**Listed below (Recalc)
		13,891 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,199.00	1,905	0	0
2,200.00	1,905	1,905	1,905

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,200.00	1,905	0	0
2,201.50	1,905	2,858	2,858

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,201.50	1,905	0	0
2,204.00	8,255	12,700	12,700

Device	Routing	Invert	Outlet Devices
#1	Primary	2,198.00'	**42.0" Round Culvert** L= 550.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,198.00' / 2,192.50' S= 0.0100 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,203.00'	**30.0" x 30.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	2,199.00'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=11.79 cfs @ 12.07 hrs HW=2,203.24' (Free Discharge)
1=Culvert (Passes 11.67 cfs of 68.52 cfs potential flow)
2=Orifice/Grate (Weir Controls 11.67 cfs @ 1.61 fps)
3=Exfiltration (Exfiltration Controls 0.12 cfs)

Summary for Pond P3.3: P-1

Inflow Area = 20.668 ac, 16.21% Impervious, Inflow Depth = 1.07" for 1-Year event
Inflow = 16.94 cfs @ 12.07 hrs, Volume= 1.841 af
Outflow = 1.21 cfs @ 15.11 hrs, Volume= 1.840 af, Atten= 93%, Lag= 182.6 min
Primary = 1.21 cfs @ 15.11 hrs, Volume= 1.840 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Starting Elev= 2,183.00' Surf.Area= 5,003 sf Storage= 5,563 cf
Peak Elev= 2,186.79' @ 15.11 hrs Surf.Area= 13,276 sf Storage= 39,870 cf (34,307 cf above start)

Plug-Flow detention time= 1,659.6 min calculated for 1.712 af (93% of inflow)
Center-of-Mass det. time= 1,418.4 min (2,575.0 - 1,156.6)

Volume	Invert	Avail.Storage	Storage Description
#1	2,181.00'	116,977 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,181.00	300	0	0
2,182.00	2,911	1,606	1,606
2,184.00	7,095	10,006	11,612
2,186.00	11,412	18,507	30,119
2,188.00	16,132	27,544	57,663
2,190.00	21,255	37,387	95,050
2,191.00	22,600	21,928	116,977

Device	Routing	Invert	Outlet Devices
#1	Primary	2,181.00'	**30.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,181.00' / 2,180.85' S= 0.0050 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,183.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	2,186.50'	**24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600
#4	Device 1	2,187.50'	**30.0" x 30.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	2,190.00'	**10.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=1.20 cfs @ 15.11 hrs HW=2,186.79' (Free Discharge)
1=Culvert (Passes 1.20 cfs of 49.74 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.20 cfs @ 9.27 fps)
3=Orifice/Grate (Orifice Controls 1.00 cfs @ 1.73 fps)
4=Orifice/Grate (Controls 0.00 cfs)
5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond P5.1: BIORETENTION

Inflow Area = 0.684 ac, 16.21% Impervious, Inflow Depth = 1.07" for 1-Year event
Inflow = 1.27 cfs @ 11.98 hrs, Volume= 0.061 af
Outflow = 0.10 cfs @ 12.75 hrs, Volume= 0.084 af, Atten= 92%, Lag= 46.5 min
Primary = 0.10 cfs @ 12.75 hrs, Volume= 0.084 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 1,808.00' Surf.Area= 2,961 sf Storage= 987 cf
Peak Elev= 1,808.51' @ 12.75 hrs Surf.Area= 3,043 sf Storage= 1,514 cf (527 cf above start)

Plug-Flow detention time= 549.7 min calculated for 0.061 af (100% of inflow)
Center-of-Mass det. time= 277.0 min (1,129.8 - 852.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,803.00'	395 cf	**stone underdrain (Prismatic)**Listed below (Recalc) 987 cf Overall x 40.0% Voids
#2	1,804.00'	592 cf	**filter media (Prismatic)**Listed below (Recalc) 3,948 cf Overall x 15.0% Voids
#3	1,808.00'	2,295 cf	**surface storage (Prismatic)**Listed below (Recalc)
		3,282 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,803.00	987	0	0
1,804.00	987	987	987

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,804.00	987	0	0
1,808.00	987	3,948	3,948

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,808.00	987	0	0
1,810.00	1,308	2,295	2,295

Device	Routing	Invert	Outlet Devices
#1	Primary	1,808.50'	**10.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Primary	1,803.00'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.07 cfs @ 12.75 hrs HW=1,808.51' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 0.04 cfs @ 0.31 fps)
2=Exfiltration (Exfiltration Controls 0.04 cfs)

Summary for Pond P6.1: BIORETENTION

Inflow Area = 0.225 ac, 48.98% Impervious, Inflow Depth = 1.66" for 1-Year event
Inflow = 0.64 cfs @ 11.97 hrs, Volume= 0.031 af
Outflow = 0.02 cfs @ 11.95 hrs, Volume= 0.031 af, Atten= 97%, Lag= 0.0 min
Primary = 0.02 cfs @ 11.95 hrs, Volume= 0.031 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 0.01' Surf.Area= 0 sf Storage= 0 cf
Peak Elev= 1,685.87' @ 14.63 hrs Surf.Area= 1,600 sf Storage= 784 cf

Plug-Flow detention time= 479.8 min calculated for 0.031 af (100% of inflow)
Center-of-Mass det. time= 480.1 min (1,302.4 - 822.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,681.00'	320 cf	**stone underdrain (Prismatic)**Listed below (Recalc) 800 cf Overall x 40.0% Voids
#2	1,682.00'	480 cf	**filter media (Prismatic)**Listed below (Recalc) 3,200 cf Overall x 15.0% Voids
#3	1,686.00'	2,300 cf	**surface storage (Prismatic)**Listed below (Recalc)
		3,100 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,681.00	800	0	0
1,682.00	800	800	800

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,682.00	800	0	0
1,686.00	800	3,200	3,200

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,686.00	800	0	0
1,688.00	1,500	2,300	2,300

Device	Routing	Invert	Outlet Devices
#1	Primary	1,686.50'	**5.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Primary	1,681.00'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.02 cfs @ 11.95 hrs HW=1,682.30' (Free Discharge)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)
2=Exfiltration (Exfiltration Controls 0.02 cfs)

Summary for Pond P6.2: BIORETENTION

Inflow Area = 0.249 ac, 44.31% Impervious, Inflow Depth = 1.59" for 1-Year event
Inflow = 0.68 cfs @ 11.97 hrs, Volume= 0.033 af
Outflow = 0.03 cfs @ 13.60 hrs, Volume= 0.033 af, Atten= 96%, Lag= 97.6 min
Primary = 0.03 cfs @ 13.60 hrs, Volume= 0.033 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 0.01' Surf.Area= 0 sf Storage= 0 cf
Peak Elev= 1,686.01' @ 13.60 hrs Surf.Area= 2,402 sf Storage= 805 cf

Plug-Flow detention time= 480.0 min calculated for 0.033 af (100% of inflow)
Center-of-Mass det. time= 480.4 min (1,306.3 - 825.9)

Volume	Invert	Avail.Storage	Storage Description
#1	1,681.00'	320 cf	**stone underdrain (Prismatic)**Listed below (Recalc) 800 cf Overall x 40.0% Voids
#2	1,682.00'	480 cf	**filter media (Prismatic)**Listed below (Recalc) 3,200 cf Overall x 15.0% Voids
#3	1,686.00'	2,300 cf	**surface storage (Prismatic)**Listed below (Recalc)
		3,100 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,681.00	800	0	0
1,682.00	800	800	800

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,682.00	800	0	0
1,686.00	800	3,200	3,200

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,686.00	800	0	0
1,688.00	1,500	2,300	2,300

Device	Routing	Invert	Outlet Devices
#1	Primary	1,686.50'	**5.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Primary	1,681.00'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.03 cfs @ 13.60 hrs HW=1,686.01' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└—**2=Exfiltration** (Exfiltration Controls 0.03 cfs)

Summary for Pond P7.1: P-1

Inflow Area = 2.973 ac, 39.49% Impervious, Inflow Depth = 1.45" for 1-Year event
Inflow = 7.41 cfs @ 11.97 hrs, Volume= 0.358 af
Outflow = 0.12 cfs @ 18.68 hrs, Volume= 0.358 af, Atten= 98%, Lag= 402.5 min
Primary = 0.12 cfs @ 18.68 hrs, Volume= 0.358 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 1,676.00' Surf.Area= 2,800 sf Storage= 3,265 cf
Peak Elev= 1,678.44' @ 18.68 hrs Surf.Area= 6,237 sf Storage= 14,213 cf (10,948 cf above start)

Plug-Flow detention time= 1,502.2 min calculated for 0.283 af (79% of inflow)
Center-of-Mass det. time= 1,142.7 min (1,975.5 - 832.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,674.00'	34,944 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,674.00	465	0	0
1,676.00	2,800	3,265	3,265
1,678.00	5,541	8,341	11,606
1,680.00	8,686	14,227	25,833
1,681.00	9,535	9,111	34,944

Device	Routing	Invert	Outlet Devices
#1	Primary	1,674.00'	**24.0" Round Culvert** L= 74.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,674.00' / 1,673.63' S= 0.0050 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	1,676.00'	**1.7" Vert. Orifice/Grate** C= 0.600
#3	Device 1	1,678.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	1,679.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	1,680.00'	**20.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.12 cfs @ 18.68 hrs HW=1,678.44' (Free Discharge)
1=Culvert (Passes 0.12 cfs of 22.03 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.12 cfs @ 7.42 fps)
3=Orifice/Grate (Controls 0.00 cfs)
4=Orifice/Grate (Controls 0.00 cfs)
5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond P8.1: DRY SWALE

Inflow Area = 2.715 ac, 28.55% Impervious, Inflow Depth = 1.25" for 1-Year event
Inflow = 4.58 cfs @ 12.06 hrs, Volume= 0.283 af
Outflow = 2.68 cfs @ 12.19 hrs, Volume= 0.283 af, Atten= 42%, Lag= 8.1 min
Primary = 2.68 cfs @ 12.19 hrs, Volume= 0.283 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,309.46' @ 12.19 hrs Surf.Area= 5,492 sf Storage= 4,061 cf

Plug-Flow detention time= 372.8 min calculated for 0.283 af (100% of inflow)
Center-of-Mass det. time= 373.2 min (1,222.8 - 849.6)

Volume	Invert	Avail.Storage	Storage Description
#1	2,304.50'	444 cf	**stone underdrain (Prismatic)**Listed below (Recalc) 1,110 cf Overall x 40.0% Voids
#2	2,305.50'	416 cf	**filter media (Prismatic)**Listed below (Recalc) 2,775 cf Overall x 15.0% Voids
#3	2,308.00'	5,180 cf	**surface storage (Prismatic)**Listed below (Recalc)
		6,040 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,304.50	1,110	0	0
2,305.50	1,110	1,110	1,110

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,305.50	1,110	0	0
2,308.00	1,110	2,775	2,775

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,308.00	1,110	0	0
2,310.00	4,070	5,180	5,180

Device	Routing	Invert	Outlet Devices
#1	Primary	2,309.25'	**10.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Primary	2,304.50'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=2.63 cfs @ 12.19 hrs HW=2,309.46' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 2.57 cfs @ 1.23 fps)
└─**2=Exfiltration** (Exfiltration Controls 0.06 cfs)

Summary for Pond P8.2: P-1

Inflow Area = 27.190 ac, 22.39% Impervious, Inflow Depth = 1.16" for 1-Year event
Inflow = 37.90 cfs @ 12.02 hrs, Volume= 2.639 af
Outflow = 3.07 cfs @ 13.25 hrs, Volume= 2.638 af, Atten= 92%, Lag= 73.7 min
Primary = 3.07 cfs @ 13.25 hrs, Volume= 2.638 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Starting Elev= 1,675.75' Surf.Area= 4,839 sf Storage= 10,231 cf
Peak Elev= 1,681.61' @ 13.25 hrs Surf.Area= 14,576 sf Storage= 65,430 cf (55,199 cf above start)

Plug-Flow detention time= 1,555.7 min calculated for 2.402 af (91% of inflow)
Center-of-Mass det. time= 1,327.4 min (2,250.6 - 923.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,672.00'	106,080 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,672.00	1,000	0	0
1,674.00	2,665	3,665	3,665
1,676.00	5,150	7,815	11,480
1,678.00	8,130	13,280	24,760
1,680.00	11,525	19,655	44,415
1,682.00	15,315	26,840	71,255
1,684.00	19,510	34,825	106,080

Device	Routing	Invert	Outlet Devices
#1	Primary	1,672.00'	**24.0" Round Culvert** L= 93.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,672.00' / 1,671.54' S= 0.0049 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	1,675.75'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	1,681.00'	**24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600

#4	Device 1	1,682.00'	**36.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	1,683.00'	**35.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=3.08 cfs @ 13.25 hrs HW=1,681.61' (Free Discharge)
- **1=Culvert** (Passes 3.08 cfs of 34.77 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.25 cfs @ 11.57 fps)
  - **3=Orifice/Grate** (Orifice Controls 2.83 cfs @ 2.83 fps)
  - **4=Orifice/Grate** (Controls 0.00 cfs)
- **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond P8.3: DRY SWALE

Inflow Area = 1.145 ac, 16.92% Impervious, Inflow Depth = 1.13" for 1-Year event
Inflow = 2.25 cfs @ 11.98 hrs, Volume= 0.108 af
Outflow = 0.11 cfs @ 13.49 hrs, Volume= 0.108 af, Atten= 95%, Lag= 90.9 min
Primary = 0.11 cfs @ 13.49 hrs, Volume= 0.108 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 1,756.52' @ 13.49 hrs Surf.Area= 3,482 sf Storage= 2,651 cf

Plug-Flow detention time= 738.7 min calculated for 0.108 af (100% of inflow)
Center-of-Mass det. time= 739.0 min (1,588.4 - 849.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,751.50'	264 cf	**stone underdrain (Prismatic)**Listed below (Recalc) 660 cf Overall x 40.0% Voids
#2	1,752.50'	248 cf	**filter media (Prismatic)**Listed below (Recalc) 1,650 cf Overall x 15.0% Voids
#3	1,755.00'	6,105 cf	**surface storage (Prismatic)**Listed below (Recalc)
		6,617 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,751.50	660	0	0
1,752.50	660	660	660

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,752.50	660	0	0
1,755.00	660	1,650	1,650

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,755.00	660	0	0
1,757.00	2,640	3,300	3,300
1,758.00	2,970	2,805	6,105

Device	Routing	Invert	Outlet Devices
#1	Primary	1,756.50'	**7.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Primary	1,751.50'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.08 cfs @ 13.49 hrs HW=1,756.52' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 0.04 cfs @ 0.35 fps)
2=Exfiltration (Exfiltration Controls 0.04 cfs)

Summary for Pond P9.1: DRY SWALE

Inflow Area = 4.151 ac, 21.51% Impervious, Inflow Depth = 1.13" for 1-Year event
Inflow = 6.07 cfs @ 12.07 hrs, Volume= 0.391 af
Outflow = 1.85 cfs @ 12.34 hrs, Volume= 0.391 af, Atten= 70%, Lag= 15.9 min
Primary = 1.85 cfs @ 12.34 hrs, Volume= 0.391 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,819.16' @ 12.33 hrs Surf.Area= 8,136 sf Storage= 6,673 cf

Plug-Flow detention time= 492.8 min calculated for 0.390 af (100% of inflow)
Center-of-Mass det. time= 493.3 min (1,350.4 - 857.0)

Volume	Invert	Avail.Storage	Storage Description
#1	1,814.00'	624 cf	**stone underdrain (Prismatic)**Listed below (Recalc) 1,560 cf Overall x 40.0% Voids
#2	1,815.00'	585 cf	**filter media (Prismatic)**Listed below (Recalc) 3,900 cf Overall x 15.0% Voids
#3	1,817.50'	10,400 cf	**surface storage (Prismatic)**Listed below (Recalc)
		11,609 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,814.00	1,560	0	0
1,815.00	1,560	1,560	1,560

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,815.00	1,560	0	0
1,817.50	1,560	3,900	3,900

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,817.50	1,560	0	0
1,820.00	6,760	10,400	10,400

Device	Routing	Invert	Outlet Devices
#1	Primary	1,814.00'	**0.500 in/hr Exfiltration over Surface area**
#2	Primary	1,819.00'	**10.0' long x 1.0' 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
Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=1.83 cfs @ 12.34 hrs HW=1,819.16' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.09 cfs)
2=Broad-Crested Rectangular Weir (Weir Controls 1.73 cfs @ 1.08 fps)

Summary for Pond P9.2: Pond 9.2

Inflow Area = 19.480 ac, 21.84% Impervious, Inflow Depth = 1.15" for 1-Year event
Inflow = 28.88 cfs @ 12.00 hrs, Volume= 1.868 af
Outflow = 0.58 cfs @ 19.79 hrs, Volume= 1.867 af, Atten= 98%, Lag= 467.9 min
Primary = 0.58 cfs @ 19.79 hrs, Volume= 1.867 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Starting Elev= 1,667.00' Surf.Area= 3,838 sf Storage= 6,979 cf
Peak Elev= 1,672.14' @ 19.79 hrs Surf.Area= 18,624 sf Storage= 63,821 cf (56,841 cf above start)

Plug-Flow detention time= 2,551.5 min calculated for 1.707 af (91% of inflow)
Center-of-Mass det. time= 2,237.1 min (3,194.4 - 957.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,664.00'	169,813 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,664.00	433	0	0
1,666.00	3,085	3,518	3,518
1,668.00	4,590	7,675	11,193
1,670.00	13,607	18,197	29,390
1,672.00	18,274	31,881	61,271
1,674.00	23,344	41,618	102,889
1,676.00	28,815	52,159	155,048
1,676.50	30,246	14,765	169,813

Device	Routing	Invert	Outlet Devices
#1	Primary	1,653.00'	**24.0" Round Culvert** L= 300.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,653.00' / 1,651.50' S= 0.0050 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	1,667.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	1,671.75'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	1,675.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	1,675.50'	**50.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.58 cfs @ 19.79 hrs HW=1,672.14' (Free Discharge)
1=Culvert (Passes 0.58 cfs of 33.83 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.24 cfs @ 10.83 fps)
3=Orifice/Grate (Orifice Controls 0.35 cfs @ 2.12 fps)
4=Orifice/Grate (Controls 0.00 cfs)
5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond P9.3: BIORETENTION

Inflow Area = 1.347 ac, 35.43% Impervious, Inflow Depth = 1.45" for 1-Year event
Inflow = 3.36 cfs @ 11.97 hrs, Volume= 0.162 af
Outflow = 0.13 cfs @ 13.73 hrs, Volume= 0.162 af, Atten= 96%, Lag= 105.4 min
Primary = 0.13 cfs @ 13.73 hrs, Volume= 0.162 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 1,658.03' @ 13.73 hrs Surf.Area= 11,610 sf Storage= 3,979 cf

Plug-Flow detention time= 488.1 min calculated for 0.162 af (100% of inflow)
Center-of-Mass det. time= 488.5 min (1,321.4 - 832.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,653.00'	1,546 cf	**stone underdrain (Prismatic)**Listed below (Recalc) 3,864 cf Overall x 40.0% Voids
#2	1,654.00'	2,318 cf	**filter media (Prismatic)**Listed below (Recalc) 15,456 cf Overall x 15.0% Voids
#3	1,658.00'	8,914 cf	**surface storage (Prismatic)**Listed below (Recalc)
		12,778 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,653.00	3,864	0	0
1,654.00	3,864	3,864	3,864

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,654.00	3,864	0	0
1,658.00	3,864	15,456	15,456

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,658.00	3,864	0	0
1,660.00	5,050	8,914	8,914

Device	Routing	Invert	Outlet Devices
#1	Primary	1,653.00'	**12.0" Round Culvert** L= 80.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,653.00' / 1,652.60' S= 0.0050 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	1,653.00'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	1,658.50'	**6.0" Horiz. Orifice/Grate** C= 0.600

			Limited to weir flow at low heads
#4	Primary	1,659.50'	**25.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.13 cfs @ 13.73 hrs HW=1,658.03' (Free Discharge)
└─**1=Culvert** (Passes 0.13 cfs of 4.86 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.13 cfs)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond P9.ex: Existing Pond

Inflow Area = 2.870 ac, 4.48% Impervious, Inflow Depth = 0.91" for 1-Year event
Inflow = 4.37 cfs @ 11.99 hrs, Volume= 0.217 af
Outflow = 0.30 cfs @ 13.00 hrs, Volume= 0.105 af, Atten= 93%, Lag= 60.7 min
Primary = 0.30 cfs @ 13.00 hrs, Volume= 0.105 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 1,672.04' @ 13.00 hrs Surf.Area= 2,670 sf Storage= 4,988 cf

Plug-Flow detention time= 299.1 min calculated for 0.105 af (48% of inflow)
Center-of-Mass det. time= 157.0 min (1,020.6 - 863.6)

Volume	Invert	Avail.Storage	Storage Description
#1	1,668.50'	6,300 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,668.50	150	0	0
1,672.50	3,000	6,300	6,300

Device	Routing	Invert	Outlet Devices
#1	Primary	1,672.00'	**15.0' 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=0.28 cfs @ 13.00 hrs HW=1,672.04' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 0.28 cfs @ 0.49 fps)

Summary for Pond 1.1P: Pond 1.1

Inflow Area = 9.950 ac, 14.75% Impervious, Inflow Depth = 2.64" for 10-Year event
Inflow = 42.14 cfs @ 11.99 hrs, Volume= 2.188 af
Outflow = 6.18 cfs @ 12.32 hrs, Volume= 2.187 af, Atten= 85%, Lag= 19.9 min
Primary = 6.18 cfs @ 12.32 hrs, Volume= 2.187 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Starting Elev= 2,158.50' Surf.Area= 4,792 sf Storage= 6,889 cf
Peak Elev= 2,163.31' @ 12.32 hrs Surf.Area= 15,060 sf Storage= 53,671 cf (46,782 cf above start)

Plug-Flow detention time= 743.5 min calculated for 2.029 af (93% of inflow)
Center-of-Mass det. time= 646.1 min (1,473.8 - 827.7)

Volume	Invert	Avail.Storage	Storage Description
#1	2,156.00'	125,359 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,156.00	902	0	0
2,158.00	3,831	4,733	4,733
2,160.00	7,673	11,504	16,237
2,162.00	11,982	19,655	35,892
2,164.00	16,663	28,645	64,537
2,166.00	21,746	38,409	102,946
2,167.00	23,079	22,413	125,359

Device	Routing	Invert	Outlet Devices
#1	Primary	2,158.50'	**24.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,158.50' / 2,157.65' S= 0.0170 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,158.50'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	2,161.25'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	2,163.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	2,164.75'	**25.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=6.09 cfs @ 12.32 hrs HW=2,163.31' (Free Discharge)
1=Culvert (Passes 6.09 cfs of 27.98 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.23 cfs @ 10.47 fps)
3=Orifice/Grate (Orifice Controls 1.27 cfs @ 6.48 fps)
4=Orifice/Grate (Weir Controls 4.59 cfs @ 1.83 fps)
5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 2.1P: Dry Swale

Inflow Area = 6.302 ac, 9.60% Impervious, Inflow Depth = 2.45" for 10-Year event
Inflow = 19.74 cfs @ 12.07 hrs, Volume= 1.286 af
Outflow = 18.63 cfs @ 12.11 hrs, Volume= 1.287 af, Atten= 6%, Lag= 2.4 min
Primary = 18.63 cfs @ 12.11 hrs, Volume= 1.287 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,302.48' @ 12.11 hrs Surf.Area= 9,133 sf Storage= 8,781 cf

Plug-Flow detention time= 134.0 min calculated for 1.286 af (100% of inflow)
Center-of-Mass det. time= 134.8 min (974.9 - 840.1)

Volume	Invert	Avail.Storage	Storage Description
#1	2,297.00'	460 cf	**gravel underdrain (Prismatic)**Listed below (Recalc) 1,150 cf Overall x 40.0% Voids
#2	2,298.00'	431 cf	**Filter Media (Prismatic)**Listed below (Recalc) 2,875 cf Overall x 15.0% Voids
#3	2,300.50'	8,050 cf	**Surface Storage (Prismatic)**Listed below (Recalc)
		8,941 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,297.00	1,150	0	0
2,298.00	1,150	1,150	1,150

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,298.00	1,150	0	0
2,300.50	1,150	2,875	2,875

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,300.50	1,150	0	0
2,302.50	6,900	8,050	8,050

Device	Routing	Invert	Outlet Devices
#1	Primary	2,301.85'	**12.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Primary	2,297.00'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=18.30 cfs @ 12.11 hrs HW=2,302.47' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 18.20 cfs @ 2.44 fps)
2=Exfiltration (Exfiltration Controls 0.11 cfs)

Summary for Pond 2.4P: Dry Swale

Inflow Area = 5.002 ac, 20.72% Impervious, Inflow Depth = 2.75" for 10-Year event
Inflow = 23.55 cfs @ 11.97 hrs, Volume= 1.147 af
Outflow = 22.49 cfs @ 11.99 hrs, Volume= 1.146 af, Atten= 5%, Lag= 1.3 min
Primary = 22.37 cfs @ 11.99 hrs, Volume= 0.870 af
Secondary = 0.12 cfs @ 11.99 hrs, Volume= 0.276 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,191.95' @ 11.99 hrs Surf.Area= 10,086 sf Storage= 9,483 cf

Plug-Flow detention time= 201.3 min calculated for 1.146 af (100% of inflow)
Center-of-Mass det. time= 200.8 min (1,023.5 - 822.7)

Volume	Invert	Avail.Storage	Storage Description
#1	2,186.50'	720 cf	**Stone Underdrain (Prismatic)**Listed below (Recalc) 1,800 cf Overall x 40.0% Voids
#2	2,187.50'	675 cf	**Filter Media (Prismatic)**Listed below (Recalc) 4,500 cf Overall x 15.0% Voids
#3	2,190.00'	8,400 cf	**Surface Storage (Prismatic)**Listed below (Recalc)
		9,795 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,186.50	1,800	0	0
2,187.50	1,800	1,800	1,800

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,187.50	1,800	0	0
2,190.00	1,800	4,500	4,500

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,190.00	1,800	0	0
2,192.00	6,600	8,400	8,400

Device	Routing	Invert	Outlet Devices
#1	Primary	2,191.50'	**18.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	2,191.50'	**10.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#3	Secondary	2,186.50'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=21.90 cfs @ 11.99 hrs HW=2,191.95' (Free Discharge)
└─**1=Orifice/Grate** (Weir Controls 13.78 cfs @ 2.18 fps)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 8.13 cfs @ 1.82 fps)

Secondary OutFlow Max=0.12 cfs @ 11.99 hrs HW=2,191.95' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 0.12 cfs)

Summary for Pond 2.6P: Dry Swale

Inflow Area = 3.914 ac, 11.46% Impervious, Inflow Depth = 2.54" for 10-Year event
Inflow = 14.54 cfs @ 12.03 hrs, Volume= 0.827 af
Outflow = 9.04 cfs @ 12.14 hrs, Volume= 0.826 af, Atten= 38%, Lag= 6.4 min
Primary = 9.04 cfs @ 12.14 hrs, Volume= 0.826 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,422.47' @ 12.14 hrs Surf.Area= 12,664 sf Storage= 12,044 cf

Plug-Flow detention time= 344.4 min calculated for 0.826 af (100% of inflow)
Center-of-Mass det. time= 343.9 min (1,177.7 - 833.8)

Volume	Invert	Avail.Storage	Storage Description
#1	2,417.00'	850 cf	**Stone Underdrain (Prismatic)**Listed below (Recalc) 2,125 cf Overall x 40.0% Voids
#2	2,418.00'	797 cf	**filter media (Prismatic)**Listed below (Recalc) 5,313 cf Overall x 15.0% Voids
#3	2,420.50'	10,625 cf	**surface storage (Prismatic)**Listed below (Recalc)
		12,272 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,417.00	2,125	0	0
2,418.00	2,125	2,125	2,125

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,418.00	2,125	0	0
2,420.50	2,125	5,313	5,313

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,420.50	2,125	0	0
2,422.50	8,500	10,625	10,625

Device	Routing	Invert	Outlet Devices
#1	Primary	2,422.00'	**10.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Primary	2,417.00'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=8.87 cfs @ 12.14 hrs HW=2,422.47' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 8.73 cfs @ 1.87 fps)
└─**2=Exfiltration** (Exfiltration Controls 0.15 cfs)

Summary for Pond P1.2: BIORETENTION

Inflow Area = 2.022 ac, 27.06% Impervious, Inflow Depth = 2.95" for 10-Year event
Inflow = 8.66 cfs @ 11.99 hrs, Volume= 0.497 af
Outflow = 0.97 cfs @ 12.47 hrs, Volume= 0.497 af, Atten= 89%, Lag= 28.6 min
Primary = 0.97 cfs @ 12.47 hrs, Volume= 0.497 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,215.23' @ 12.47 hrs Surf.Area= 14,003 sf Storage= 10,319 cf

Plug-Flow detention time= 369.4 min calculated for 0.497 af (100% of inflow)
Center-of-Mass det. time= 369.0 min (1,167.1 - 798.1)

Volume	Invert	Avail.Storage	Storage Description
#1	2,209.00'	1,758 cf	**stone underdrain (Prismatic)** Listed below (Recalc) 4,394 cf Overall x 40.0% Voids
#2	2,210.00'	2,636 cf	**filter media (Prismatic)** Listed below (Recalc) 17,576 cf Overall x 15.0% Voids
#3	2,214.00'	10,119 cf	**surface storage (Prismatic)** Listed below (Recalc)
		14,513 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,209.00	4,394	0	0
2,210.00	4,394	4,394	4,394

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,210.00	4,394	0	0
2,214.00	4,394	17,576	17,576

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,214.00	4,394	0	0
2,216.00	5,725	10,119	10,119

Device	Routing	Invert	Outlet Devices
#1	Primary	2,209.00'	**18.0" Round Culvert** L= 100.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,209.00' / 2,208.50' S= 0.0050 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Primary	2,209.00'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	2,214.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	2,215.50'	**25.0' long x 1.0' 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
Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31
3.30 3.31 3.32

Primary OutFlow Max=0.97 cfs @ 12.47 hrs HW=2,215.23' (Free Discharge)
└─**1=Culvert** (Passes 0.81 cfs of 13.44 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 0.81 cfs @ 4.12 fps)
└─**2=Exfiltration** (Exfiltration Controls 0.16 cfs)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond P11.1: P-1

Inflow Area = 24.870 ac, 18.86% Impervious, Inflow Depth = 2.33" for 10-Year event
Inflow = 92.06 cfs @ 11.99 hrs, Volume= 4.837 af
Outflow = 20.20 cfs @ 12.35 hrs, Volume= 4.831 af, Atten= 78%, Lag= 21.6 min
Primary = 20.20 cfs @ 12.35 hrs, Volume= 4.831 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Starting Elev= 2,296.75' Surf.Area= 6,846 sf Storage= 11,991 cf
Peak Elev= 2,302.92' @ 12.35 hrs Surf.Area= 23,039 sf Storage= 99,622 cf (87,631 cf above start)

Plug-Flow detention time= 829.6 min calculated for 4.554 af (94% of inflow)
Center-of-Mass det. time= 748.7 min (1,576.3 - 827.6)

Volume	Invert	Avail.Storage	Storage Description
#1	2,294.00'	126,454 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,294.00	2,612	0	0
2,296.00	4,954	7,566	7,566
2,298.00	10,000	14,954	22,520
2,300.00	13,679	23,679	46,199
2,302.00	19,963	33,642	79,841
2,304.00	26,650	46,613	126,454

Device	Routing	Invert	Outlet Devices
#1	Primary	2,293.00'	**24.0" Round Culvert** L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,293.00' / 2,292.50' S= 0.0083 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,296.75'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	2,300.25'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	2,302.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	2,303.00'	**50.0' 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=20.20 cfs @ 12.35 hrs HW=2,302.92' (Free Discharge)
—**1=Culvert** (Passes 20.20 cfs of 40.45 cfs potential flow)
—**2=Orifice/Grate** (Orifice Controls 0.26 cfs @ 11.88 fps)
—**3=Orifice/Grate** (Orifice Controls 1.47 cfs @ 7.49 fps)
—**4=Orifice/Grate** (Orifice Controls 18.47 cfs @ 4.62 fps)
—**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond P11.10: DRY SWALE

Inflow Area = 1.246 ac, 12.83% Impervious, Inflow Depth = 2.54" for 10-Year event
Inflow = 5.43 cfs @ 11.97 hrs, Volume= 0.263 af
Outflow = 3.81 cfs @ 12.05 hrs, Volume= 0.263 af, Atten= 30%, Lag= 4.8 min
Primary = 3.81 cfs @ 12.05 hrs, Volume= 0.263 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Starting Elev= 2,192.00' Surf.Area= 3,150 sf Storage= 814 cf
Peak Elev= 2,193.78' @ 12.05 hrs Surf.Area= 5,640 sf Storage= 4,896 cf (4,082 cf above start)

Plug-Flow detention time= 770.3 min calculated for 0.244 af (93% of inflow)
Center-of-Mass det. time= 673.4 min (1,502.5 - 829.1)

Volume	Invert	Avail.Storage	Storage Description
#1	2,188.50'	420 cf	**gravel underdrain (Prismatic)**Listed below (Recalc) 1,050 cf Overall x 40.0% Voids
#2	2,189.50'	394 cf	**filter media (Prismatic)**Listed below (Recalc) 2,625 cf Overall x 15.0% Voids
#3	2,192.00'	4,900 cf	**surface storage (Prismatic)**Listed below (Recalc)
		5,714 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,188.50	1,050	0	0
2,189.50	1,050	1,050	1,050

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,189.50	1,050	0	0
2,192.00	1,050	2,625	2,625

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,192.00	1,050	0	0
2,194.00	3,850	4,900	4,900

Device	Routing	Invert	Outlet Devices
#1	Primary	2,192.00'	**0.500 in/hr Exfiltration over Surface area above 2,192.00'** Excluded Surface area = 3,150 sf
#2	Primary	2,193.50'	**10.0' 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=3.78 cfs @ 12.05 hrs HW=2,193.78' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.03 cfs)
2=Broad-Crested Rectangular Weir (Weir Controls 3.75 cfs @ 1.35 fps)

Summary for Pond P11.11: DRY SWALE

Inflow Area = 3.383 ac, 14.24% Impervious, Inflow Depth = 2.73" for 10-Year event
Inflow = 7.98 cfs @ 12.03 hrs, Volume= 0.769 af
Outflow = 7.70 cfs @ 12.06 hrs, Volume= 0.769 af, Atten= 3%, Lag= 1.9 min
Primary = 7.70 cfs @ 12.06 hrs, Volume= 0.769 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,179.84' @ 12.06 hrs Surf.Area= 4,909 sf Storage= 4,388 cf

Plug-Flow detention time= 257.9 min calculated for 0.769 af (100% of inflow)
Center-of-Mass det. time= 257.8 min (1,375.2 - 1,117.4)

Volume	Invert	Avail.Storage	Storage Description
#1	2,174.50'	360 cf	**gravel underdrain (Prismatic)** Listed below (Recalc) 900 cf Overall x 40.0% Voids
#2	2,175.50'	338 cf	**filter media (Prismatic)** Listed below (Recalc) 2,250 cf Overall x 15.0% Voids
#3	2,178.00'	4,200 cf	**surface storage (Prismatic)** Listed below (Recalc)
		4,898 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,174.50	900	0	0
2,175.50	900	900	900

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,175.50	900	0	0
2,178.00	900	2,250	2,250

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,178.00	900	0	0
2,180.00	3,300	4,200	4,200

Device	Routing	Invert	Outlet Devices
#1	Primary	2,174.50'	**0.500 in/hr Exfiltration over Surface area**
#2	Primary	2,179.40'	**10.0' 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=7.61 cfs @ 12.06 hrs HW=2,179.84' (Free Discharge)
├─**1=Exfiltration** (Exfiltration Controls 0.06 cfs)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 7.55 cfs @ 1.73 fps)

Summary for Pond P11.2: BIORETENTION

Inflow Area = 9.625 ac, 29.34% Impervious, Inflow Depth = 2.79" for 10-Year event
Inflow = 33.06 cfs @ 11.98 hrs, Volume= 2.235 af
Outflow = 31.78 cfs @ 12.01 hrs, Volume= 2.234 af, Atten= 4%, Lag= 2.1 min
Primary = 31.44 cfs @ 12.01 hrs, Volume= 1.496 af
Secondary = 0.34 cfs @ 12.01 hrs, Volume= 0.738 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,373.60' @ 12.01 hrs Surf.Area= 29,695 sf Storage= 25,629 cf

Plug-Flow detention time= 203.2 min calculated for 2.234 af (100% of inflow)
Center-of-Mass det. time= 202.6 min (1,014.1 - 811.5)

Volume	Invert	Avail.Storage	Storage Description
#1	2,367.00'	3,652 cf	**stone underdrain (Prismatic)**Listed below (Recalc) 9,131 cf Overall x 40.0% Voids
#2	2,368.00'	5,479 cf	**filter media (Prismatic)**Listed below (Recalc) 36,524 cf Overall x 15.0% Voids
#3	2,372.00'	21,131 cf	**surface storage (Prismatic)**Listed below (Recalc)
		30,262 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,367.00	9,131	0	0
2,368.00	9,131	9,131	9,131

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,368.00	9,131	0	0
2,372.00	9,131	36,524	36,524

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,372.00	9,131	0	0
2,374.00	12,000	21,131	21,131

Device	Routing	Invert	Outlet Devices
#1	Primary	2,367.00'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,367.00' / 2,366.00' S= 0.0200 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,372.50'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	2,373.25'	**50.0' 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
#4	Secondary	2,367.00'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=30.72 cfs @ 12.01 hrs HW=2,373.60' (Free Discharge)
—**1=Culvert** (Passes 3.96 cfs of 7.09 cfs potential flow)
—**2=Orifice/Grate** (Orifice Controls 3.96 cfs @ 5.05 fps)
—**3=Broad-Crested Rectangular Weir** (Weir Controls 26.75 cfs @ 1.53 fps)

Secondary OutFlow Max=0.34 cfs @ 12.01 hrs HW=2,373.60' (Free Discharge)
—**4=Exfiltration** (Exfiltration Controls 0.34 cfs)

Summary for Pond P11.4: DRY SWALE

Inflow Area = 0.233 ac, 10.77% Impervious, Inflow Depth = 2.45" for 10-Year event
Inflow = 0.98 cfs @ 11.97 hrs, Volume= 0.048 af
Outflow = 0.95 cfs @ 12.00 hrs, Volume= 0.048 af, Atten= 4%, Lag= 1.4 min
Primary = 0.95 cfs @ 12.00 hrs, Volume= 0.048 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,475.67' @ 12.00 hrs Surf.Area= 642 sf Storage= 527 cf

Plug-Flow detention time= 292.3 min calculated for 0.048 af (100% of inflow)
Center-of-Mass det. time= 315.7 min (1,147.3 - 831.7)

Volume	Invert	Avail.Storage	Storage Description
#1	2,470.50'	60 cf	**stone underdrain (Prismatic)** Listed below (Recalc)
			150 cf Overall x 40.0% Voids
#2	2,471.50'	56 cf	**filter media (Prismatic)** Listed below (Recalc)
			375 cf Overall x 15.0% Voids
#3	2,474.00'	530 cf	**surface storage (Prismatic)** Listed below (Recalc)
		646 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,470.50	150	0	0
2,471.50	150	150	150

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,471.50	150	0	0
2,474.00	150	375	375

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,474.00	150	0	0
2,476.00	380	530	530

Device	Routing	Invert	Outlet Devices
#1	Primary	2,470.50'	**0.500 in/hr Exfiltration over Surface area**
#2	Primary	2,475.50'	**5.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.93 cfs @ 12.00 hrs HW=2,475.67' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)
└—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.92 cfs @ 1.10 fps)

Summary for Pond P11.5: DRY SWALE

Inflow Area = 0.116 ac, 27.15% Impervious, Inflow Depth = 2.80" for 10-Year event
Inflow = 0.56 cfs @ 11.97 hrs, Volume= 0.027 af
Outflow = 0.39 cfs @ 12.06 hrs, Volume= 0.027 af, Atten= 30%, Lag= 5.4 min
Primary = 0.39 cfs @ 12.06 hrs, Volume= 0.027 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,479.59' @ 12.06 hrs Surf.Area= 594 sf Storage= 471 cf

Plug-Flow detention time= 529.1 min calculated for 0.027 af (99% of inflow)
Center-of-Mass det. time= 522.8 min (1,344.1 - 821.4)

Volume	Invert	Avail.Storage	Storage Description
#1	2,474.50'	50 cf	**stone underdrain (Prismatic)** Listed below (Recalc) 125 cf Overall x 40.0% Voids
#2	2,475.50'	47 cf	**filter media (Prismatic)** Listed below (Recalc) 313 cf Overall x 15.0% Voids
#3	2,478.00'	525 cf	**surface storage (Prismatic)** Listed below (Recalc)
		622 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,474.50	125	0	0
2,475.50	125	125	125

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,475.50	125	0	0
2,478.00	125	313	313

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,478.00	125	0	0
2,480.00	400	525	525

Device	Routing	Invert	Outlet Devices
#1	Primary	2,474.50'	**0.500 in/hr Exfiltration over Surface area**
#2	Primary	2,479.50'	**5.0' long x 1.0' 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
Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.33 cfs @ 12.06 hrs HW=2,479.58' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.01 cfs)
2=Broad-Crested Rectangular Weir (Weir Controls 0.33 cfs @ 0.78 fps)

Summary for Pond P11.6: DRY SWALE

Inflow Area = 3.304 ac, 4.07% Impervious, Inflow Depth = 2.28" for 10-Year event
Inflow = 9.94 cfs @ 12.06 hrs, Volume= 0.628 af
Outflow = 9.48 cfs @ 12.10 hrs, Volume= 0.627 af, Atten= 5%, Lag= 2.1 min
Primary = 9.48 cfs @ 12.10 hrs, Volume= 0.627 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,483.84' @ 12.10 hrs Surf.Area= 5,610 sf Storage= 4,984 cf

Plug-Flow detention time= 191.4 min calculated for 0.627 af (100% of inflow)
Center-of-Mass det. time= 190.6 min (1,034.8 - 844.2)

Volume	Invert	Avail.Storage	Storage Description
#1	2,478.50'	464 cf	**stone underdrain (Prismatic)**Listed below (Recalc) 1,160 cf Overall x 40.0% Voids
#2	2,479.50'	435 cf	**filter media (Prismatic)**Listed below (Recalc) 2,900 cf Overall x 15.0% Voids
#3	2,482.00'	4,640 cf	**surface storage (Prismatic)**Listed below (Recalc)
		5,539 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,478.50	1,160	0	0
2,479.50	1,160	1,160	1,160

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,479.50	1,160	0	0
2,482.00	1,160	2,900	2,900

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,482.00	1,160	0	0
2,484.00	3,480	4,640	4,640

Device	Routing	Invert	Outlet Devices
#1	Primary	2,478.50'	**0.500 in/hr Exfiltration over Surface area**
#2	Primary	2,483.40'	**12.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31

3.30 3.31 3.32

Primary OutFlow Max=9.46 cfs @ 12.10 hrs HW=2,483.84' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.06 cfs)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 9.40 cfs @ 1.80 fps)

Summary for Pond P11.7: BIORETENTION

Inflow Area = 0.741 ac, 55.14% Impervious, Inflow Depth = 3.57" for 10-Year event
Inflow = 4.36 cfs @ 11.97 hrs, Volume= 0.220 af
Outflow = 0.16 cfs @ 13.62 hrs, Volume= 0.220 af, Atten= 96%, Lag= 99.2 min
Primary = 0.16 cfs @ 13.62 hrs, Volume= 0.220 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,248.21' @ 13.62 hrs Surf.Area= 13,783 sf Storage= 5,531 cf

Plug-Flow detention time= 466.3 min calculated for 0.220 af (100% of inflow)
Center-of-Mass det. time= 467.0 min (1,265.1 - 798.1)

Volume	Invert	Avail.Storage	Storage Description
#1	2,243.00'	1,820 cf	**gravel drainage layer (Prismatic)** Listed below (Recalc) 4,550 cf Overall x 40.0% Voids
#2	2,244.00'	2,730 cf	**filter media (Prismatic)** Listed below (Recalc) 18,200 cf Overall x 15.0% Voids
#3	2,248.00'	10,350 cf	**surface storage (Prismatic)** Listed below (Recalc)
		14,900 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,243.00	4,550	0	0
2,244.00	4,550	4,550	4,550

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,244.00	4,550	0	0
2,248.00	4,550	18,200	18,200

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,248.00	4,550	0	0
2,250.00	5,800	10,350	10,350

Device	Routing	Invert	Outlet Devices
#1	Primary	2,243.00'	**18.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,243.00' / 2,240.00' S= 0.0600 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,243.00'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	2,248.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	2,249.00'	**25.0' 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=0.16 cfs @ 13.62 hrs HW=2,248.21' (Free Discharge)
1=Culvert (Passes 0.16 cfs of 17.97 cfs potential flow)
2=Exfiltration (Exfiltration Controls 0.16 cfs)
3=Orifice/Grate (Controls 0.00 cfs)
4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond P11.8: BIORETENTION

Inflow Area = 0.432 ac, 77.25% Impervious, Inflow Depth = 4.20" for 10-Year event
Inflow = 2.84 cfs @ 11.96 hrs, Volume= 0.151 af
Outflow = 0.10 cfs @ 13.58 hrs, Volume= 0.151 af, Atten= 96%, Lag= 97.2 min
Primary = 0.10 cfs @ 13.58 hrs, Volume= 0.151 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,260.34' @ 13.58 hrs Surf.Area= 8,679 sf Storage= 3,852 cf

Plug-Flow detention time= 477.9 min calculated for 0.151 af (100% of inflow)
Center-of-Mass det. time= 477.4 min (1,252.3 - 774.9)

Volume	Invert	Avail.Storage	Storage Description
#1	2,255.00'	1,140 cf	**gravel underdrain (Prismatic)**Listed below (Recalc) 2,850 cf Overall x 40.0% Voids
#2	2,256.00'	1,710 cf	**filter media (Prismatic)**Listed below (Recalc) 11,400 cf Overall x 15.0% Voids
#3	2,260.00'	6,450 cf	**surface storage (Prismatic)**Listed below (Recalc)
		9,300 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,255.00	2,850	0	0
2,256.00	2,850	2,850	2,850

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,256.00	2,850	0	0
2,260.00	2,850	11,400	11,400

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,260.00	2,850	0	0
2,262.00	3,600	6,450	6,450

Device	Routing	Invert	Outlet Devices
#1	Primary	2,255.00'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,255.00' / 2,254.50' S= 0.0100 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,255.00'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	2,260.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	2,261.00'	**15.0' 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=0.10 cfs @ 13.58 hrs HW=2,260.34' (Free Discharge)
1=Culvert (Passes 0.10 cfs of 6.07 cfs potential flow)
2=Exfiltration (Exfiltration Controls 0.10 cfs)
3=Orifice/Grate (Controls 0.00 cfs)
4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond P11.9: BIORETENTION

Inflow Area = 0.575 ac, 22.45% Impervious, Inflow Depth = 2.80" for 10-Year event
Inflow = 2.75 cfs @ 11.97 hrs, Volume= 0.134 af
Outflow = 1.12 cfs @ 12.10 hrs, Volume= 0.177 af, Atten= 59%, Lag= 8.1 min
Primary = 1.12 cfs @ 12.10 hrs, Volume= 0.177 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Starting Elev= 2,219.00' Surf.Area= 5,520 sf Storage= 1,840 cf
Peak Elev= 2,219.59' @ 12.11 hrs Surf.Area= 5,754 sf Storage= 2,990 cf (1,150 cf above start)

Plug-Flow detention time= 469.0 min calculated for 0.134 af (100% of inflow)
Center-of-Mass det. time= 253.2 min (1,074.5 - 821.4)

Volume	Invert	Avail.Storage	Storage Description
#1	2,214.00'	736 cf	**gravel drainage layer (Prismatic)** Listed below (Recalc) 1,840 cf Overall x 40.0% Voids
#2	2,215.00'	1,104 cf	**filter media (Prismatic)** Listed below (Recalc) 7,360 cf Overall x 15.0% Voids
#3	2,219.00'	2,040 cf	**surface storage (Prismatic)** Listed below (Recalc)
		3,880 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,214.00	1,840	0	0
2,215.00	1,840	1,840	1,840

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,215.00	1,840	0	0
2,219.00	1,840	7,360	7,360

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,219.00	1,840	0	0
2,220.00	2,239	2,040	2,040

Device	Routing	Invert	Outlet Devices
#1	Primary	2,214.00'	**0.500 in/hr Exfiltration over Surface area**
#2	Primary	2,219.50'	**15.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=1.07 cfs @ 12.10 hrs HW=2,219.58' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.07 cfs)
2=Broad-Crested Rectangular Weir (Weir Controls 1.00 cfs @ 0.78 fps)

Summary for Pond P12.1: Pond 1.1

Inflow Area = 17.893 ac, 9.84% Impervious, Inflow Depth = 2.43" for 10-Year event
Inflow = 44.13 cfs @ 12.15 hrs, Volume= 3.629 af
Outflow = 20.17 cfs @ 12.40 hrs, Volume= 3.628 af, Atten= 54%, Lag= 15.5 min
Primary = 20.17 cfs @ 12.40 hrs, Volume= 3.628 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Starting Elev= 2,295.25' Surf.Area= 5,504 sf Storage= 5,359 cf
Peak Elev= 2,300.44' @ 12.40 hrs Surf.Area= 18,161 sf Storage= 65,135 cf (59,776 cf above start)

Plug-Flow detention time= 665.7 min calculated for 3.504 af (97% of inflow)
Center-of-Mass det. time= 621.4 min (1,464.3 - 842.9)

Volume	Invert	Avail.Storage	Storage Description
#1	2,294.00'	120,048 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,294.00	3,070	0	0
2,296.00	6,964	10,034	10,034
2,298.00	11,720	18,684	28,718
2,300.00	16,919	28,639	57,357
2,302.00	22,520	39,439	96,796
2,303.00	23,983	23,252	120,048

Device	Routing	Invert	Outlet Devices
#1	Primary	2,294.00'	**24.0" Round Culvert** L= 115.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,294.00' / 2,293.25' S= 0.0065 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,295.25'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	2,298.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	2,299.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

#5	Primary	2,302.00'	**50.0' 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=20.16 cfs @ 12.40 hrs HW=2,300.44' (Free Discharge)
1=Culvert (Passes 20.16 cfs of 25.97 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.24 cfs @ 10.88 fps)
3=Orifice/Grate (Orifice Controls 1.23 cfs @ 6.26 fps)
4=Orifice/Grate (Orifice Controls 18.69 cfs @ 4.67 fps)
5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond P12.2: Dry Swale

Inflow Area = 0.376 ac, 26.90% Impervious, Inflow Depth = 2.89" for 10-Year event
Inflow = 1.86 cfs @ 11.97 hrs, Volume= 0.091 af
Outflow = 1.33 cfs @ 12.05 hrs, Volume= 0.091 af, Atten= 28%, Lag= 4.9 min
Primary = 1.33 cfs @ 12.05 hrs, Volume= 0.091 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,269.65' @ 12.05 hrs Surf.Area= 2,430 sf Storage= 1,480 cf

Plug-Flow detention time= 382.3 min calculated for 0.091 af (100% of inflow)
Center-of-Mass det. time= 382.7 min (1,201.4 - 818.7)

Volume	Invert	Avail.Storage	Storage Description
#1	2,265.00'	160 cf	**stone underdrain (Prismatic)**Listed below (Recalc) 400 cf Overall x 40.0% Voids
#2	2,266.00'	150 cf	**filter media (Prismatic)**Listed below (Recalc) 1,000 cf Overall x 15.0% Voids
#3	2,268.50'	2,900 cf	**surface storage (Prismatic)**Listed below (Recalc)
		3,210 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,265.00	400	0	0
2,266.00	400	400	400

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,266.00	400	0	0
2,268.50	400	1,000	1,000

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,268.50	400	0	0
2,270.00	2,000	1,800	1,800
2,270.50	2,400	1,100	2,900

Device	Routing	Invert	Outlet Devices
#1	Primary	2,269.50'	**8.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Primary	2,265.00'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=1.30 cfs @ 12.05 hrs HW=2,269.65' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 1.27 cfs @ 1.05 fps)
2=Exfiltration (Exfiltration Controls 0.03 cfs)

Summary for Pond P2.2: Dry Swale

Inflow Area = 3.322 ac, 22.38% Impervious, Inflow Depth = 2.80" for 10-Year event
Inflow = 13.84 cfs @ 12.02 hrs, Volume= 0.776 af
Outflow = 12.86 cfs @ 12.05 hrs, Volume= 0.776 af, Atten= 7%, Lag= 2.0 min
Primary = 12.86 cfs @ 12.05 hrs, Volume= 0.776 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,265.99' @ 12.05 hrs Surf.Area= 5,582 sf Storage= 5,155 cf

Plug-Flow detention time= 121.5 min calculated for 0.775 af (100% of inflow)
Center-of-Mass det. time= 122.0 min (947.4 - 825.4)

Volume	Invert	Avail.Storage	Storage Description
#1	2,261.50'	420 cf	**gravel underdrain (Prismatic)**Listed below (Recalc) 1,050 cf Overall x 40.0% Voids
#2	2,262.50'	236 cf	**Filter Media (Prismatic)**Listed below (Recalc) 1,575 cf Overall x 15.0% Voids
#3	2,264.00'	8,400 cf	**Surface Storage (Prismatic)**Listed below (Recalc)
		9,056 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,261.50	1,050	0	0
2,262.50	1,050	1,050	1,050

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,262.50	1,050	0	0
2,264.00	1,050	1,575	1,575

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,264.00	1,050	0	0
2,266.00	3,500	4,550	4,550
2,267.00	4,200	3,850	8,400

Device	Routing	Invert	Outlet Devices
#1	Primary	2,265.25'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	2,266.50'	**100.0' long x 50.0' 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
#3	Primary	2,261.50'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=12.92 cfs @ 12.05 hrs HW=2,265.98' (Free Discharge)
1=Orifice/Grate (Weir Controls 12.86 cfs @ 2.80 fps)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)
3=Exfiltration (Exfiltration Controls 0.06 cfs)

Summary for Pond P2.3: BIORETENTION

Inflow Area = 5.821 ac, 24.98% Impervious, Inflow Depth = 2.83" for 10-Year event
Inflow = 22.20 cfs @ 12.04 hrs, Volume= 1.372 af
Outflow = 3.02 cfs @ 12.53 hrs, Volume= 1.372 af, Atten= 86%, Lag= 29.3 min
Primary = 3.02 cfs @ 12.53 hrs, Volume= 1.372 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,228.56' @ 12.53 hrs Surf.Area= 32,439 sf Storage= 27,625 cf

Plug-Flow detention time= 396.2 min calculated for 1.372 af (100% of inflow)
Center-of-Mass det. time= 396.2 min (1,289.8 - 893.7)

Volume	Invert	Avail.Storage	Storage Description
#1	2,222.00'	4,142 cf	**stone underdrain (Prismatic)**Listed below (Recalc) 10,354 cf Overall x 40.0% Voids
#2	2,223.00'	6,212 cf	**filter media (Prismatic)**Listed below (Recalc) 41,416 cf Overall x 15.0% Voids
#3	2,227.00'	22,469 cf	**surface storage (Prismatic)**Listed below (Recalc)
		32,823 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,222.00	10,354	0	0
2,223.00	10,354	10,354	10,354

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,223.00	10,354	0	0
2,227.00	10,354	41,416	41,416

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,227.00	10,354	0	0
2,229.00	12,115	22,469	22,469

Device	Routing	Invert	Outlet Devices
#1	Primary	2,222.00'	**18.0" Round Culvert** L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,222.00' / 2,221.40' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Primary	2,222.00'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	2,227.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	2,228.50'	**35.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=2.86 cfs @ 12.53 hrs HW=2,228.56' (Free Discharge)
1=Culvert (Passes 0.98 cfs of 20.52 cfs potential flow)
3=Orifice/Grate (Orifice Controls 0.98 cfs @ 4.97 fps)
2=Exfiltration (Exfiltration Controls 0.38 cfs)
4=Broad-Crested Rectangular Weir (Weir Controls 1.51 cfs @ 0.68 fps)

Summary for Pond P2.5: Pond 2.5

Inflow Area = 36.326 ac, 17.04% Impervious, Inflow Depth = 2.56" for 10-Year event
Inflow = 101.86 cfs @ 12.00 hrs, Volume= 7.740 af
Outflow = 40.28 cfs @ 12.27 hrs, Volume= 7.711 af, Atten= 60%, Lag= 16.1 min
Primary = 40.28 cfs @ 12.27 hrs, Volume= 7.711 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 2,161.00' Surf.Area= 7,652 sf Storage= 13,933 cf
Peak Elev= 2,167.80' @ 12.27 hrs Surf.Area= 25,160 sf Storage= 120,826 cf (106,893 cf above start)

Plug-Flow detention time= 709.3 min calculated for 7.389 af (95% of inflow)
Center-of-Mass det. time= 619.5 min (1,516.1 - 896.6)

Volume	Invert	Avail.Storage	Storage Description
#1	2,158.00'	216,744 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,158.00	1,411	0	0
2,160.00	5,797	7,208	7,208
2,162.00	9,507	15,304	22,512
2,164.00	14,282	23,789	46,301
2,166.00	19,778	34,060	80,361
2,168.00	25,755	45,533	125,894
2,170.00	32,133	57,888	183,782
2,171.00	33,791	32,962	216,744

Device	Routing	Invert	Outlet Devices
#1	Primary	2,158.00'	**36.0" Round Culvert** L= 300.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,158.00' / 2,156.50' S= 0.0050 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,161.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	2,165.00'	**30.0" W x 18.0" H Vert. Orifice/Grate** C= 0.600
#4	Device 1	2,166.50'	**36.0" W x 30.0" H Vert. Orifice/Grate** C= 0.600
#5	Device 1	2,169.00'	**48.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600
#6	Secondary	2,170.25'	**10.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=40.09 cfs @ 12.27 hrs HW=2,167.79' (Free Discharge)
└─**1=Culvert** (Passes 40.09 cfs of 63.32 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.27 cfs @ 12.47 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 25.66 cfs @ 6.84 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 14.16 cfs @ 3.65 fps)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=2,161.00' (Free Discharge)
└─**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond P3.1: Dry Swale

Inflow Area = 10.077 ac, 13.20% Impervious, Inflow Depth = 2.52" for 10-Year event
Inflow = 37.31 cfs @ 12.01 hrs, Volume= 2.113 af
Outflow = 35.98 cfs @ 12.04 hrs, Volume= 2.113 af, Atten= 4%, Lag= 1.7 min
Primary = 35.98 cfs @ 12.04 hrs, Volume= 2.113 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,288.51' @ 12.04 hrs Surf.Area= 15,423 sf Storage= 14,878 cf

Plug-Flow detention time= 166.1 min calculated for 2.113 af (100% of inflow)
Center-of-Mass det. time= 166.0 min (995.0 - 829.1)

Volume	Invert	Avail.Storage	Storage Description
#1	2,283.00'	1,086 cf	**stone underdrain (Prismatic)** Listed below (Recalc) 2,715 cf Overall x 40.0% Voids
#2	2,284.00'	1,018 cf	**filter media (Prismatic)** Listed below (Recalc) 6,788 cf Overall x 15.0% Voids
#3	2,286.50'	18,100 cf	**surface storage (Prismatic)** Listed below (Recalc)
		20,204 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,283.00	2,715	0	0
2,284.00	2,715	2,715	2,715

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,284.00	2,715	0	0
2,286.50	2,715	6,788	6,788

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,286.50	2,715	0	0
2,289.00	11,765	18,100	18,100

Device	Routing	Invert	Outlet Devices
#1	Primary	2,284.50'	**48.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,284.50' / 2,282.00' S= 0.0500 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,288.00'	**30.0" x 30.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	2,283.00'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=35.32 cfs @ 12.04 hrs HW=2,288.50' (Free Discharge)
└─**1=Culvert** (Passes 35.14 cfs of 85.66 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 35.14 cfs @ 2.32 fps)
└─**3=Exfiltration** (Exfiltration Controls 0.18 cfs)

Summary for Pond P3.2: Dry Swale

Inflow Area = 7.881 ac, 20.98% Impervious, Inflow Depth = 2.71" for 10-Year event
Inflow = 33.98 cfs @ 12.00 hrs, Volume= 1.781 af
Outflow = 32.85 cfs @ 12.02 hrs, Volume= 1.781 af, Atten= 3%, Lag= 1.2 min
Primary = 32.85 cfs @ 12.02 hrs, Volume= 1.781 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,203.48' @ 12.02 hrs Surf.Area= 10,747 sf Storage= 9,948 cf

Plug-Flow detention time= 129.1 min calculated for 1.780 af (100% of inflow)
Center-of-Mass det. time= 129.7 min (956.2 - 826.5)

Volume	Invert	Avail.Storage	Storage Description
#1	2,199.00'	762 cf	**stone underdrain (Prismatic)**Listed below (Recalc) 1,905 cf Overall x 40.0% Voids
#2	2,200.00'	429 cf	**filter media (Prismatic)**Listed below (Recalc) 2,858 cf Overall x 15.0% Voids
#3	2,201.50'	12,700 cf	**surface storage (Prismatic)**Listed below (Recalc)
		13,891 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,199.00	1,905	0	0
2,200.00	1,905	1,905	1,905

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,200.00	1,905	0	0
2,201.50	1,905	2,858	2,858

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,201.50	1,905	0	0
2,204.00	8,255	12,700	12,700

Device	Routing	Invert	Outlet Devices
#1	Primary	2,198.00'	**42.0" Round Culvert** L= 550.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,198.00' / 2,192.50' S= 0.0100 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,203.00'	**30.0" x 30.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	2,199.00'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=31.92 cfs @ 12.02 hrs HW=2,203.47' (Free Discharge)
1=Culvert (Passes 31.80 cfs of 69.60 cfs potential flow)
2=Orifice/Grate (Weir Controls 31.80 cfs @ 2.25 fps)
3=Exfiltration (Exfiltration Controls 0.12 cfs)

Summary for Pond P3.3: P-1

Inflow Area = 20.668 ac, 16.21% Impervious, Inflow Depth = 2.60" for 10-Year event
Inflow = 76.69 cfs @ 12.03 hrs, Volume= 4.486 af
Outflow = 35.73 cfs @ 12.18 hrs, Volume= 4.486 af, Atten= 53%, Lag= 9.0 min
Primary = 35.73 cfs @ 12.18 hrs, Volume= 4.486 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Starting Elev= 2,183.00' Surf.Area= 5,003 sf Storage= 5,563 cf
Peak Elev= 2,188.45' @ 12.18 hrs Surf.Area= 17,293 sf Storage= 65,239 cf (59,676 cf above start)

Plug-Flow detention time= 681.5 min calculated for 4.357 af (97% of inflow)
Center-of-Mass det. time= 607.9 min (1,566.5 - 958.7)

Volume	Invert	Avail.Storage	Storage Description
#1	2,181.00'	116,977 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,181.00	300	0	0
2,182.00	2,911	1,606	1,606
2,184.00	7,095	10,006	11,612
2,186.00	11,412	18,507	30,119
2,188.00	16,132	27,544	57,663
2,190.00	21,255	37,387	95,050
2,191.00	22,600	21,928	116,977

Device	Routing	Invert	Outlet Devices
#1	Primary	2,181.00'	**30.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,181.00' / 2,180.85' S= 0.0050 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,183.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	2,186.50'	**24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600
#4	Device 1	2,187.50'	**30.0" x 30.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	2,190.00'	**10.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=35.70 cfs @ 12.18 hrs HW=2,188.44' (Free Discharge)
└─**1=Culvert** (Passes 35.70 cfs of 58.81 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.24 cfs @ 11.15 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 6.26 cfs @ 6.26 fps)
  └─**4=Orifice/Grate** (Orifice Controls 29.20 cfs @ 4.67 fps)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond P5.1: BIORETENTION

Inflow Area = 0.684 ac, 16.21% Impervious, Inflow Depth = 2.62" for 10-Year event
Inflow = 3.08 cfs @ 11.97 hrs, Volume= 0.150 af
Outflow = 2.99 cfs @ 11.99 hrs, Volume= 0.172 af, Atten= 3%, Lag= 1.0 min
Primary = 2.99 cfs @ 11.99 hrs, Volume= 0.172 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 1,808.00' Surf.Area= 2,961 sf Storage= 987 cf
Peak Elev= 1,808.73' @ 11.99 hrs Surf.Area= 3,078 sf Storage= 1,748 cf (761 cf above start)

Plug-Flow detention time= 285.0 min calculated for 0.149 af (100% of inflow)
Center-of-Mass det. time= 188.0 min (1,014.6 - 826.6)

Volume	Invert	Avail.Storage	Storage Description
#1	1,803.00'	395 cf	**stone underdrain (Prismatic)**Listed below (Recalc) 987 cf Overall x 40.0% Voids
#2	1,804.00'	592 cf	**filter media (Prismatic)**Listed below (Recalc) 3,948 cf Overall x 15.0% Voids
#3	1,808.00'	2,295 cf	**surface storage (Prismatic)**Listed below (Recalc)
		3,282 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,803.00	987	0	0
1,804.00	987	987	987

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,804.00	987	0	0
1,808.00	987	3,948	3,948

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,808.00	987	0	0
1,810.00	1,308	2,295	2,295

Device	Routing	Invert	Outlet Devices
#1	Primary	1,808.50'	**10.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Primary	1,803.00'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=2.88 cfs @ 11.99 hrs HW=1,808.72' (Free Discharge)
├─**1=Broad-Crested Rectangular Weir** (Weir Controls 2.84 cfs @ 1.27 fps)
└─**2=Exfiltration** (Exfiltration Controls 0.04 cfs)

Summary for Pond P6.1: BIORETENTION

Inflow Area = 0.225 ac, 48.98% Impervious, Inflow Depth = 3.47" for 10-Year event
Inflow = 1.30 cfs @ 11.97 hrs, Volume= 0.065 af
Outflow = 0.41 cfs @ 12.12 hrs, Volume= 0.065 af, Atten= 68%, Lag= 8.9 min
Primary = 0.41 cfs @ 12.12 hrs, Volume= 0.065 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 0.01' Surf.Area= 0 sf Storage= 0 cf
Peak Elev= 1,686.59' @ 12.12 hrs Surf.Area= 2,607 sf Storage= 1,335 cf

Plug-Flow detention time= 426.1 min calculated for 0.065 af (100% of inflow)
Center-of-Mass det. time= 426.3 min (1,227.6 - 801.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,681.00'	320 cf	**stone underdrain (Prismatic)** Listed below (Recalc) 800 cf Overall x 40.0% Voids
#2	1,682.00'	480 cf	**filter media (Prismatic)** Listed below (Recalc) 3,200 cf Overall x 15.0% Voids
#3	1,686.00'	2,300 cf	**surface storage (Prismatic)** Listed below (Recalc)
		3,100 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,681.00	800	0	0
1,682.00	800	800	800

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,682.00	800	0	0
1,686.00	800	3,200	3,200

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,686.00	800	0	0
1,688.00	1,500	2,300	2,300

Device	Routing	Invert	Outlet Devices
#1	Primary	1,686.50'	**5.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Primary	1,681.00'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.37 cfs @ 12.12 hrs HW=1,686.59' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 0.34 cfs @ 0.79 fps)
2=Exfiltration (Exfiltration Controls 0.03 cfs)

Summary for Pond P6.2: BIORETENTION

Inflow Area = 0.249 ac, 44.31% Impervious, Inflow Depth = 3.37" for 10-Year event
Inflow = 1.40 cfs @ 11.97 hrs, Volume= 0.070 af
Outflow = 0.56 cfs @ 12.09 hrs, Volume= 0.070 af, Atten= 60%, Lag= 7.6 min
Primary = 0.56 cfs @ 12.09 hrs, Volume= 0.070 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 0.01' Surf.Area= 0 sf Storage= 0 cf
Peak Elev= 1,686.61' @ 12.09 hrs Surf.Area= 2,615 sf Storage= 1,358 cf

Plug-Flow detention time= 408.5 min calculated for 0.070 af (100% of inflow)
Center-of-Mass det. time= 409.3 min (1,213.7 - 804.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,681.00'	320 cf	**stone underdrain (Prismatic)**Listed below (Recalc) 800 cf Overall x 40.0% Voids
#2	1,682.00'	480 cf	**filter media (Prismatic)**Listed below (Recalc) 3,200 cf Overall x 15.0% Voids
#3	1,686.00'	2,300 cf	**surface storage (Prismatic)**Listed below (Recalc)
		3,100 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,681.00	800	0	0
1,682.00	800	800	800

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,682.00	800	0	0
1,686.00	800	3,200	3,200

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,686.00	800	0	0
1,688.00	1,500	2,300	2,300

Device	Routing	Invert	Outlet Devices
#1	Primary	1,686.50'	**5.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Primary	1,681.00'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.54 cfs @ 12.09 hrs HW=1,686.61' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 0.51 cfs @ 0.90 fps)
└─**2=Exfiltration** (Exfiltration Controls 0.03 cfs)

Summary for Pond P7.1: P-1

Inflow Area = 2.973 ac, 39.49% Impervious, Inflow Depth = 3.17" for 10-Year event
Inflow = 15.92 cfs @ 11.97 hrs, Volume= 0.786 af
Outflow = 1.34 cfs @ 12.52 hrs, Volume= 0.786 af, Atten= 92%, Lag= 32.9 min
Primary = 1.34 cfs @ 12.52 hrs, Volume= 0.786 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 1,676.00' Surf.Area= 2,800 sf Storage= 3,265 cf
Peak Elev= 1,679.55' @ 12.52 hrs Surf.Area= 7,981 sf Storage= 22,096 cf (18,831 cf above start)

Plug-Flow detention time= 815.0 min calculated for 0.711 af (90% of inflow)
Center-of-Mass det. time= 684.4 min (1,494.8 - 810.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,674.00'	34,944 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,674.00	465	0	0
1,676.00	2,800	3,265	3,265
1,678.00	5,541	8,341	11,606
1,680.00	8,686	14,227	25,833
1,681.00	9,535	9,111	34,944

Device	Routing	Invert	Outlet Devices
#1	Primary	1,674.00'	**24.0" Round Culvert** L= 74.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,674.00' / 1,673.63' S= 0.0050 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	1,676.00'	**1.7" Vert. Orifice/Grate** C= 0.600
#3	Device 1	1,678.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	1,679.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	1,680.00'	**20.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=1.29 cfs @ 12.52 hrs HW=1,679.55' (Free Discharge)
↑—**1=Culvert** (Passes 1.29 cfs of 26.01 cfs potential flow)
  ↑—**2=Orifice/Grate** (Orifice Controls 0.14 cfs @ 8.98 fps)
  —**3=Orifice/Grate** (Orifice Controls 0.85 cfs @ 4.31 fps)
  —**4=Orifice/Grate** (Weir Controls 0.30 cfs @ 0.74 fps)
—**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond P8.1: DRY SWALE

Inflow Area = 2.715 ac, 28.55% Impervious, Inflow Depth = 2.89" for 10-Year event
Inflow = 10.66 cfs @ 12.05 hrs, Volume= 0.655 af
Outflow = 10.05 cfs @ 12.09 hrs, Volume= 0.654 af, Atten= 6%, Lag= 2.1 min
Primary = 10.05 cfs @ 12.09 hrs, Volume= 0.654 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,309.76' @ 12.09 hrs Surf.Area= 5,935 sf Storage= 5,107 cf

Plug-Flow detention time= 169.7 min calculated for 0.654 af (100% of inflow)
Center-of-Mass det. time= 170.0 min (995.5 - 825.5)

Volume	Invert	Avail.Storage	Storage Description
#1	2,304.50'	444 cf	**stone underdrain (Prismatic)** Listed below (Recalc) 1,110 cf Overall x 40.0% Voids
#2	2,305.50'	416 cf	**filter media (Prismatic)** Listed below (Recalc) 2,775 cf Overall x 15.0% Voids
#3	2,308.00'	5,180 cf	**surface storage (Prismatic)** Listed below (Recalc)
		6,040 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,304.50	1,110	0	0
2,305.50	1,110	1,110	1,110

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,305.50	1,110	0	0
2,308.00	1,110	2,775	2,775

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,308.00	1,110	0	0
2,310.00	4,070	5,180	5,180

Device	Routing	Invert	Outlet Devices
#1	Primary	2,309.25'	**10.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Primary	2,304.50'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=9.88 cfs @ 12.09 hrs HW=2,309.75' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 9.81 cfs @ 1.94 fps)
2=Exfiltration (Exfiltration Controls 0.07 cfs)

Summary for Pond P8.2: P-1

Inflow Area = 27.190 ac, 22.39% Impervious, Inflow Depth = 2.66" for 10-Year event
Inflow = 86.72 cfs @ 12.02 hrs, Volume= 6.033 af
Outflow = 55.26 cfs @ 12.15 hrs, Volume= 6.032 af, Atten= 36%, Lag= 8.0 min
Primary = 55.26 cfs @ 12.15 hrs, Volume= 6.032 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Starting Elev= 1,675.75' Surf.Area= 4,839 sf Storage= 10,231 cf
Peak Elev= 1,683.32' @ 12.15 hrs Surf.Area= 18,075 sf Storage= 93,220 cf (82,988 cf above start)

Plug-Flow detention time= 676.3 min calculated for 5.795 af (96% of inflow)
Center-of-Mass det. time= 608.2 min (1,472.1 - 863.9)

Volume	Invert	Avail.Storage	Storage Description
#1	1,672.00'	106,080 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,672.00	1,000	0	0
1,674.00	2,665	3,665	3,665
1,676.00	5,150	7,815	11,480
1,678.00	8,130	13,280	24,760
1,680.00	11,525	19,655	44,415
1,682.00	15,315	26,840	71,255
1,684.00	19,510	34,825	106,080

Device	Routing	Invert	Outlet Devices
#1	Primary	1,672.00'	**24.0" Round Culvert** L= 93.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,672.00' / 1,671.54' S= 0.0049 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	1,675.75'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	1,681.00'	**24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600

#4	Device 1	1,682.00'	**36.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	1,683.00'	**35.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=54.78 cfs @ 12.15 hrs HW=1,683.31' (Free Discharge)
└─**1=Culvert** (Barrel Controls 38.26 cfs @ 12.18 fps)
  ├─**2=Orifice/Grate** (Passes < 0.29 cfs potential flow)
  ├─**3=Orifice/Grate** (Passes < 6.91 cfs potential flow)
  └─**4=Orifice/Grate** (Passes < 49.64 cfs potential flow)
└─**5=Broad-Crested Rectangular Weir** (Weir Controls 16.52 cfs @ 1.51 fps)

Summary for Pond P8.3: DRY SWALE

Inflow Area = 1.145 ac, 16.92% Impervious, Inflow Depth = 2.71" for 10-Year event
Inflow = 5.32 cfs @ 11.97 hrs, Volume= 0.259 af
Outflow = 4.43 cfs @ 12.02 hrs, Volume= 0.259 af, Atten= 17%, Lag= 3.1 min
Primary = 4.43 cfs @ 12.02 hrs, Volume= 0.259 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 1,756.88' @ 12.02 hrs Surf.Area= 3,839 sf Storage= 3,495 cf

Plug-Flow detention time= 334.8 min calculated for 0.259 af (100% of inflow)
Center-of-Mass det. time= 337.0 min (1,161.0 - 824.0)

Volume	Invert	Avail.Storage	Storage Description
#1	1,751.50'	264 cf	**stone underdrain (Prismatic)**Listed below (Recalc) 660 cf Overall x 40.0% Voids
#2	1,752.50'	248 cf	**filter media (Prismatic)**Listed below (Recalc) 1,650 cf Overall x 15.0% Voids
#3	1,755.00'	6,105 cf	**surface storage (Prismatic)**Listed below (Recalc)
		6,617 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,751.50	660	0	0
1,752.50	660	660	660

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,752.50	660	0	0
1,755.00	660	1,650	1,650

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,755.00	660	0	0
1,757.00	2,640	3,300	3,300
1,758.00	2,970	2,805	6,105

Device	Routing	Invert	Outlet Devices
#1	Primary	1,756.50'	**7.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Primary	1,751.50'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=4.14 cfs @ 12.02 hrs HW=1,756.86' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 4.10 cfs @ 1.63 fps)
2=Exfiltration (Exfiltration Controls 0.04 cfs)

Summary for Pond P9.1: DRY SWALE

Inflow Area = 4.151 ac, 21.51% Impervious, Inflow Depth = 2.71" for 10-Year event
Inflow = 14.85 cfs @ 12.06 hrs, Volume= 0.938 af
Outflow = 13.49 cfs @ 12.12 hrs, Volume= 0.938 af, Atten= 9%, Lag= 3.3 min
Primary = 13.49 cfs @ 12.12 hrs, Volume= 0.938 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,819.62' @ 12.12 hrs Surf.Area= 9,083 sf Storage= 9,172 cf

Plug-Flow detention time= 214.9 min calculated for 0.938 af (100% of inflow)
Center-of-Mass det. time= 215.5 min (1,047.1 - 831.6)

Volume	Invert	Avail.Storage	Storage Description
#1	1,814.00'	624 cf	**stone underdrain (Prismatic)** Listed below (Recalc) 1,560 cf Overall x 40.0% Voids
#2	1,815.00'	585 cf	**filter media (Prismatic)** Listed below (Recalc) 3,900 cf Overall x 15.0% Voids
#3	1,817.50'	10,400 cf	**surface storage (Prismatic)** Listed below (Recalc)
		11,609 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,814.00	1,560	0	0
1,815.00	1,560	1,560	1,560

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,815.00	1,560	0	0
1,817.50	1,560	3,900	3,900

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,817.50	1,560	0	0
1,820.00	6,760	10,400	10,400

Device	Routing	Invert	Outlet Devices
#1	Primary	1,814.00'	**0.500 in/hr Exfiltration over Surface area**
#2	Primary	1,819.00'	**10.0' long x 1.0' 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
Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=13.16 cfs @ 12.12 hrs HW=1,819.61' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.10 cfs)
2=Broad-Crested Rectangular Weir (Weir Controls 13.05 cfs @ 2.15 fps)

Summary for Pond P9.2: Pond 9.2

Inflow Area = 19.480 ac, 21.84% Impervious, Inflow Depth = 2.86" for 10-Year event
Inflow = 79.47 cfs @ 12.00 hrs, Volume= 4.645 af
Outflow = 3.29 cfs @ 13.96 hrs, Volume= 4.643 af, Atten= 96%, Lag= 117.5 min
Primary = 3.29 cfs @ 13.96 hrs, Volume= 4.643 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Starting Elev= 1,667.00' Surf.Area= 3,838 sf Storage= 6,979 cf
Peak Elev= 1,675.13' @ 13.96 hrs Surf.Area= 26,447 sf Storage= 131,134 cf (124,154 cf above start)

Plug-Flow detention time= 1,438.7 min calculated for 4.481 af (96% of inflow)
Center-of-Mass det. time= 1,345.3 min (2,212.0 - 866.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,664.00'	169,813 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,664.00	433	0	0
1,666.00	3,085	3,518	3,518
1,668.00	4,590	7,675	11,193
1,670.00	13,607	18,197	29,390
1,672.00	18,274	31,881	61,271
1,674.00	23,344	41,618	102,889
1,676.00	28,815	52,159	155,048
1,676.50	30,246	14,765	169,813

Device	Routing	Invert	Outlet Devices
#1	Primary	1,653.00'	**24.0" Round Culvert** L= 300.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,653.00' / 1,651.50' S= 0.0050 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	1,667.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	1,671.75'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	1,675.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	1,675.50'	**50.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=3.26 cfs @ 13.96 hrs HW=1,675.13' (Free Discharge)
└**1=Culvert** (Passes 3.26 cfs of 36.45 cfs potential flow)
  └**2=Orifice/Grate** (Orifice Controls 0.30 cfs @ 13.66 fps)
  └**3=Orifice/Grate** (Orifice Controls 1.67 cfs @ 8.52 fps)
  └**4=Orifice/Grate** (Weir Controls 1.29 cfs @ 1.20 fps)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond P9.3: BIORETENTION

Inflow Area = 1.347 ac, 35.43% Impervious, Inflow Depth = 3.17" for 10-Year event
Inflow = 7.22 cfs @ 11.97 hrs, Volume= 0.356 af
Outflow = 0.77 cfs @ 12.38 hrs, Volume= 0.356 af, Atten= 89%, Lag= 24.9 min
Primary = 0.77 cfs @ 12.38 hrs, Volume= 0.356 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 1,658.95' @ 12.38 hrs Surf.Area= 12,154 sf Storage= 7,794 cf

Plug-Flow detention time= 414.2 min calculated for 0.356 af (100% of inflow)
Center-of-Mass det. time= 413.1 min (1,223.5 - 810.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,653.00'	1,546 cf	**stone underdrain (Prismatic)**Listed below (Recalc) 3,864 cf Overall x 40.0% Voids
#2	1,654.00'	2,318 cf	**filter media (Prismatic)**Listed below (Recalc) 15,456 cf Overall x 15.0% Voids
#3	1,658.00'	8,914 cf	**surface storage (Prismatic)**Listed below (Recalc)
		12,778 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,653.00	3,864	0	0
1,654.00	3,864	3,864	3,864

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,654.00	3,864	0	0
1,658.00	3,864	15,456	15,456

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,658.00	3,864	0	0
1,660.00	5,050	8,914	8,914

Device	Routing	Invert	Outlet Devices
#1	Primary	1,653.00'	**12.0" Round Culvert** L= 80.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,653.00' / 1,652.60' S= 0.0050 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	1,653.00'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	1,658.50'	**6.0" Horiz. Orifice/Grate** C= 0.600

			Limited to weir flow at low heads
#4	Primary	1,659.50'	**25.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.77 cfs @ 12.38 hrs HW=1,658.95' (Free Discharge)
└─**1=Culvert** (Passes 0.77 cfs of 5.34 cfs potential flow)
 ├─**2=Exfiltration** (Exfiltration Controls 0.14 cfs)
 └─**3=Orifice/Grate** (Orifice Controls 0.63 cfs @ 3.22 fps)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond P9.ex: Existing Pond

Inflow Area = 2.870 ac, 4.48% Impervious, Inflow Depth = 2.36" for 10-Year event
Inflow = 11.59 cfs @ 11.98 hrs, Volume= 0.565 af
Outflow = 10.96 cfs @ 12.01 hrs, Volume= 0.454 af, Atten= 5%, Lag= 1.7 min
Primary = 10.96 cfs @ 12.01 hrs, Volume= 0.454 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 1,672.43' @ 12.01 hrs Surf.Area= 2,949 sf Storage= 6,086 cf

Plug-Flow detention time= 122.4 min calculated for 0.454 af (80% of inflow)
Center-of-Mass det. time= 38.4 min (873.3 - 834.9)

Volume	Invert	Avail.Storage	Storage Description
#1	1,668.50'	6,300 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,668.50	150	0	0
1,672.50	3,000	6,300	6,300

Device	Routing	Invert	Outlet Devices
#1	Primary	1,672.00'	**15.0' 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=10.51 cfs @ 12.01 hrs HW=1,672.42' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 10.51 cfs @ 1.68 fps)

Summary for Pond 1.1P: Pond 1.1

Inflow Area = 9.950 ac, 14.75% Impervious, Inflow Depth = 4.83" for 100-Year event
Inflow = 75.87 cfs @ 11.99 hrs, Volume= 4.009 af
Outflow = 29.52 cfs @ 12.13 hrs, Volume= 4.008 af, Atten= 61%, Lag= 8.5 min
Primary = 29.52 cfs @ 12.13 hrs, Volume= 4.008 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Starting Elev= 2,158.50' Surf.Area= 4,792 sf Storage= 6,889 cf
Peak Elev= 2,164.83' @ 12.13 hrs Surf.Area= 18,768 sf Storage= 79,208 cf (72,319 cf above start)

Plug-Flow detention time= 443.4 min calculated for 3.848 af (96% of inflow)
Center-of-Mass det. time= 400.9 min (1,211.5 - 810.5)

Volume	Invert	Avail.Storage	Storage Description
#1	2,156.00'	125,359 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,156.00	902	0	0
2,158.00	3,831	4,733	4,733
2,160.00	7,673	11,504	16,237
2,162.00	11,982	19,655	35,892
2,164.00	16,663	28,645	64,537
2,166.00	21,746	38,409	102,946
2,167.00	23,079	22,413	125,359

Device	Routing	Invert	Outlet Devices
#1	Primary	2,158.50'	**24.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,158.50' / 2,157.65' S= 0.0170 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,158.50'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	2,161.25'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	2,163.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	2,164.75'	**25.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=29.11 cfs @ 12.13 hrs HW=2,164.82' (Free Discharge)
└─**1=Culvert** (Passes 27.95 cfs of 33.23 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.26 cfs @ 12.02 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 1.72 cfs @ 8.77 fps)
  └─**4=Orifice/Grate** (Orifice Controls 25.96 cfs @ 6.49 fps)
└─**5=Broad-Crested Rectangular Weir** (Weir Controls 1.17 cfs @ 0.70 fps)

Summary for Pond 2.1P: Dry Swale

Inflow Area = 6.302 ac, 9.60% Impervious, Inflow Depth = 4.59" for 100-Year event
Inflow = 36.89 cfs @ 12.07 hrs, Volume= 2.412 af
Outflow = 35.39 cfs @ 12.07 hrs, Volume= 2.377 af, Atten= 4%, Lag= 0.0 min
Primary = 35.39 cfs @ 12.07 hrs, Volume= 2.377 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,302.77' @ 12.07 hrs Surf.Area= 9,200 sf Storage= 8,941 cf

Plug-Flow detention time= 88.6 min calculated for 2.376 af (99% of inflow)
Center-of-Mass det. time= 80.4 min (902.6 - 822.2)

Volume	Invert	Avail.Storage	Storage Description
#1	2,297.00'	460 cf	**gravel underdrain (Prismatic)**Listed below (Recalc) 1,150 cf Overall x 40.0% Voids
#2	2,298.00'	431 cf	**Filter Media (Prismatic)**Listed below (Recalc) 2,875 cf Overall x 15.0% Voids
#3	2,300.50'	8,050 cf	**Surface Storage (Prismatic)**Listed below (Recalc)
		8,941 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,297.00	1,150	0	0
2,298.00	1,150	1,150	1,150

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,298.00	1,150	0	0
2,300.50	1,150	2,875	2,875

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,300.50	1,150	0	0
2,302.50	6,900	8,050	8,050

Device	Routing	Invert	Outlet Devices
#1	Primary	2,301.85'	**12.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Primary	2,297.00'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=34.68 cfs @ 12.07 hrs HW=2,302.76' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 34.58 cfs @ 3.16 fps)
2=Exfiltration (Exfiltration Controls 0.11 cfs)

Summary for Pond 2.4P: Dry Swale

Inflow Area = 5.002 ac, 20.72% Impervious, Inflow Depth = 4.98" for 100-Year event
Inflow = 41.71 cfs @ 11.97 hrs, Volume= 2.075 af
Outflow = 39.87 cfs @ 11.97 hrs, Volume= 2.060 af, Atten= 4%, Lag= 0.0 min
Primary = 39.76 cfs @ 11.97 hrs, Volume= 1.769 af
Secondary = 0.12 cfs @ 11.90 hrs, Volume= 0.291 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,192.24' @ 11.97 hrs Surf.Area= 10,200 sf Storage= 9,795 cf

Plug-Flow detention time= 124.3 min calculated for 2.060 af (99% of inflow)
Center-of-Mass det. time= 119.4 min (925.3 - 805.8)

Volume	Invert	Avail.Storage	Storage Description
#1	2,186.50'	720 cf	**Stone Underdrain (Prismatic)**Listed below (Recalc) 1,800 cf Overall x 40.0% Voids
#2	2,187.50'	675 cf	**Filter Media (Prismatic)**Listed below (Recalc) 4,500 cf Overall x 15.0% Voids
#3	2,190.00'	8,400 cf	**Surface Storage (Prismatic)**Listed below (Recalc)
		9,795 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,186.50	1,800	0	0
2,187.50	1,800	1,800	1,800

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,187.50	1,800	0	0
2,190.00	1,800	4,500	4,500

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,190.00	1,800	0	0
2,192.00	6,600	8,400	8,400

Device	Routing	Invert	Outlet Devices
#1	Primary	2,191.50'	**18.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#2	Primary	2,191.50'	**10.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#3	Secondary	2,186.50'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=38.50 cfs @ 11.97 hrs HW=2,192.21' (Free Discharge)
└─**1=Orifice/Grate** (Orifice Controls 21.57 cfs @ 4.07 fps)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 16.93 cfs @ 2.37 fps)

Secondary OutFlow Max=0.12 cfs @ 11.90 hrs HW=2,192.05' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 0.12 cfs)

Summary for Pond 2.6P: Dry Swale

Inflow Area = 3.914 ac, 11.46% Impervious, Inflow Depth = 4.71" for 100-Year event
Inflow = 26.65 cfs @ 12.03 hrs, Volume= 1.535 af
Outflow = 33.10 cfs @ 12.03 hrs, Volume= 1.670 af, Atten= 0%, Lag= 0.0 min
Primary = 33.10 cfs @ 12.03 hrs, Volume= 1.670 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,423.06' @ 12.03 hrs Surf.Area= 12,750 sf Storage= 12,272 cf

Plug-Flow detention time= 49.7 min calculated for 1.534 af (100% of inflow)
Center-of-Mass det. time= 171.4 min (987.5 - 816.1)

Volume	Invert	Avail.Storage	Storage Description
#1	2,417.00'	850 cf	**Stone Underdrain (Prismatic)**Listed below (Recalc) 2,125 cf Overall x 40.0% Voids
#2	2,418.00'	797 cf	**filter media (Prismatic)**Listed below (Recalc) 5,313 cf Overall x 15.0% Voids
#3	2,420.50'	10,625 cf	**surface storage (Prismatic)**Listed below (Recalc)
		12,272 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,417.00	2,125	0	0
2,418.00	2,125	2,125	2,125

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,418.00	2,125	0	0
2,420.50	2,125	5,313	5,313

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,420.50	2,125	0	0
2,422.50	8,500	10,625	10,625

Device	Routing	Invert	Outlet Devices
#1	Primary	2,422.00'	**10.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Primary	2,417.00'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=32.40 cfs @ 12.03 hrs HW=2,423.05' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 32.25 cfs @ 3.08 fps)
└─**2=Exfiltration** (Exfiltration Controls 0.15 cfs)

Summary for Pond P1.2: BIORETENTION

Inflow Area = 2.022 ac, 27.06% Impervious, Inflow Depth = 5.15" for 100-Year event
Inflow = 15.13 cfs @ 11.99 hrs, Volume= 0.868 af
Outflow = 12.52 cfs @ 12.06 hrs, Volume= 0.870 af, Atten= 17%, Lag= 4.1 min
Primary = 12.52 cfs @ 12.06 hrs, Volume= 0.870 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,215.80' @ 12.06 hrs Surf.Area= 14,382 sf Storage= 13,398 cf

Plug-Flow detention time= 248.1 min calculated for 0.868 af (100% of inflow)
Center-of-Mass det. time= 252.7 min (1,042.2 - 789.5)

Volume	Invert	Avail.Storage	Storage Description
#1	2,209.00'	1,758 cf	**stone underdrain (Prismatic)** Listed below (Recalc) 4,394 cf Overall x 40.0% Voids
#2	2,210.00'	2,636 cf	**filter media (Prismatic)** Listed below (Recalc) 17,576 cf Overall x 15.0% Voids
#3	2,214.00'	10,119 cf	**surface storage (Prismatic)** Listed below (Recalc)
		14,513 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,209.00	4,394	0	0
2,210.00	4,394	4,394	4,394

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,210.00	4,394	0	0
2,214.00	4,394	17,576	17,576

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,214.00	4,394	0	0
2,216.00	5,725	10,119	10,119

Device	Routing	Invert	Outlet Devices
#1	Primary	2,209.00'	**18.0" Round Culvert** L= 100.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,209.00' / 2,208.50' S= 0.0050 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Primary	2,209.00'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	2,214.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	2,215.50'	**25.0' long x 1.0' 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
Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31
3.30 3.31 3.32

Primary OutFlow Max=11.89 cfs @ 12.06 hrs HW=2,215.79' (Free Discharge)
1=Culvert (Passes 1.07 cfs of 14.14 cfs potential flow)
3=Orifice/Grate (Orifice Controls 1.07 cfs @ 5.47 fps)
2=Exfiltration (Exfiltration Controls 0.17 cfs)
4=Broad-Crested Rectangular Weir (Weir Controls 10.65 cfs @ 1.46 fps)

Summary for Pond P11.1: P-1

Inflow Area = 24.870 ac, 18.86% Impervious, Inflow Depth = 4.49" for 100-Year event
Inflow = 169.08 cfs @ 11.98 hrs, Volume= 9.302 af
Outflow = 142.88 cfs @ 12.04 hrs, Volume= 9.296 af, Atten= 15%, Lag= 3.4 min
Primary = 142.88 cfs @ 12.04 hrs, Volume= 9.296 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Starting Elev= 2,296.75' Surf.Area= 6,846 sf Storage= 11,991 cf
Peak Elev= 2,303.91' @ 12.03 hrs Surf.Area= 26,352 sf Storage= 124,094 cf (112,103 cf above start)

Plug-Flow detention time= 449.2 min calculated for 9.021 af (97% of inflow)
Center-of-Mass det. time= 415.0 min (1,230.3 - 815.2)

Volume	Invert	Avail.Storage	Storage Description
#1	2,294.00'	126,454 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,294.00	2,612	0	0
2,296.00	4,954	7,566	7,566
2,298.00	10,000	14,954	22,520
2,300.00	13,679	23,679	46,199
2,302.00	19,963	33,642	79,841
2,304.00	26,650	46,613	126,454

Device	Routing	Invert	Outlet Devices
#1	Primary	2,293.00'	**24.0" Round Culvert** L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,293.00' / 2,292.50' S= 0.0083 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,296.75'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	2,300.25'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	2,302.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	2,303.00'	**50.0' 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=138.61 cfs @ 12.04 hrs HW=2,303.89' (Free Discharge)
- **1=Culvert** (Passes 28.49 cfs of 42.72 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.28 cfs @ 12.79 fps)
  - **3=Orifice/Grate** (Orifice Controls 1.74 cfs @ 8.86 fps)
  - **4=Orifice/Grate** (Orifice Controls 26.47 cfs @ 6.62 fps)
- **5=Broad-Crested Rectangular Weir** (Weir Controls 110.12 cfs @ 2.48 fps)

Summary for Pond P11.10: DRY SWALE

Inflow Area = 1.246 ac, 12.83% Impervious, Inflow Depth = 4.71" for 100-Year event
Inflow = 9.91 cfs @ 11.97 hrs, Volume= 0.488 af
Outflow = 9.17 cfs @ 12.00 hrs, Volume= 0.488 af, Atten= 7%, Lag= 2.0 min
Primary = 9.17 cfs @ 12.00 hrs, Volume= 0.488 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Starting Elev= 2,192.00' Surf.Area= 3,150 sf Storage= 814 cf
Peak Elev= 2,194.00' @ 12.00 hrs Surf.Area= 5,945 sf Storage= 5,701 cf (4,887 cf above start)

Plug-Flow detention time= 411.8 min calculated for 0.469 af (96% of inflow)
Center-of-Mass det. time= 372.0 min (1,183.4 - 811.5)

Volume	Invert	Avail.Storage	Storage Description
#1	2,188.50'	420 cf	**gravel underdrain (Prismatic)** Listed below (Recalc) 1,050 cf Overall x 40.0% Voids
#2	2,189.50'	394 cf	**filter media (Prismatic)** Listed below (Recalc) 2,625 cf Overall x 15.0% Voids
#3	2,192.00'	4,900 cf	**surface storage (Prismatic)** Listed below (Recalc)
		5,714 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,188.50	1,050	0	0
2,189.50	1,050	1,050	1,050

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,189.50	1,050	0	0
2,192.00	1,050	2,625	2,625

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,192.00	1,050	0	0
2,194.00	3,850	4,900	4,900

Device	Routing	Invert	Outlet Devices
#1	Primary	2,192.00'	**0.500 in/hr Exfiltration over Surface area above 2,192.00'** Excluded Surface area = 3,150 sf
#2	Primary	2,193.50'	**10.0' 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=9.12 cfs @ 12.00 hrs HW=2,194.00' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.03 cfs)
└—**2=Broad-Crested Rectangular Weir** (Weir Controls 9.09 cfs @ 1.84 fps)

Summary for Pond P11.11: DRY SWALE

Inflow Area = 3.383 ac, 14.24% Impervious, Inflow Depth = 4.91" for 100-Year event
Inflow = 25.28 cfs @ 11.99 hrs, Volume= 1.385 af
Outflow = 26.23 cfs @ 11.97 hrs, Volume= 1.385 af, Atten= 0%, Lag= 0.0 min
Primary = 26.23 cfs @ 11.97 hrs, Volume= 1.385 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,180.40' @ 11.97 hrs Surf.Area= 5,100 sf Storage= 4,898 cf

Plug-Flow detention time= 152.6 min calculated for 1.385 af (100% of inflow)
Center-of-Mass det. time= 152.6 min (1,136.5 - 984.0)

Volume	Invert	Avail.Storage	Storage Description
#1	2,174.50'	360 cf	**gravel underdrain (Prismatic)** Listed below (Recalc) 900 cf Overall x 40.0% Voids
#2	2,175.50'	338 cf	**filter media (Prismatic)** Listed below (Recalc) 2,250 cf Overall x 15.0% Voids
#3	2,178.00'	4,200 cf	**surface storage (Prismatic)** Listed below (Recalc)
		4,898 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,174.50	900	0	0
2,175.50	900	900	900

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,175.50	900	0	0
2,178.00	900	2,250	2,250

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,178.00	900	0	0
2,180.00	3,300	4,200	4,200

Device	Routing	Invert	Outlet Devices
#1	Primary	2,174.50'	**0.500 in/hr Exfiltration over Surface area**
#2	Primary	2,179.40'	**10.0' 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=24.31 cfs @ 11.97 hrs HW=2,180.34' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.06 cfs)
2=Broad-Crested Rectangular Weir (Weir Controls 24.25 cfs @ 2.57 fps)

Summary for Pond P11.2: BIORETENTION

Inflow Area = 9.625 ac, 29.34% Impervious, Inflow Depth = 4.54" for 100-Year event
Inflow = 42.66 cfs @ 11.97 hrs, Volume= 3.640 af
Outflow = 41.78 cfs @ 11.99 hrs, Volume= 3.638 af, Atten= 2%, Lag= 1.2 min
Primary = 41.43 cfs @ 11.99 hrs, Volume= 2.849 af
Secondary = 0.34 cfs @ 11.99 hrs, Volume= 0.790 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,373.68' @ 11.99 hrs Surf.Area= 29,808 sf Storage= 26,534 cf

Plug-Flow detention time= 140.5 min calculated for 3.638 af (100% of inflow)
Center-of-Mass det. time= 140.1 min (944.6 - 804.5)

Volume	Invert	Avail.Storage	Storage Description
#1	2,367.00'	3,652 cf	**stone underdrain (Prismatic)**Listed below (Recalc) 9,131 cf Overall x 40.0% Voids
#2	2,368.00'	5,479 cf	**filter media (Prismatic)**Listed below (Recalc) 36,524 cf Overall x 15.0% Voids
#3	2,372.00'	21,131 cf	**surface storage (Prismatic)**Listed below (Recalc)
		30,262 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,367.00	9,131	0	0
2,368.00	9,131	9,131	9,131

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,368.00	9,131	0	0
2,372.00	9,131	36,524	36,524

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,372.00	9,131	0	0
2,374.00	12,000	21,131	21,131

Device	Routing	Invert	Outlet Devices
#1	Primary	2,367.00'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,367.00' / 2,366.00' S= 0.0200 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,372.50'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	2,373.25'	**50.0' 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
#4	Secondary	2,367.00'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=40.95 cfs @ 11.99 hrs HW=2,373.68' (Free Discharge)
1=Culvert (Passes 4.11 cfs of 7.13 cfs potential flow)
2=Orifice/Grate (Orifice Controls 4.11 cfs @ 5.23 fps)
3=Broad-Crested Rectangular Weir (Weir Controls 36.84 cfs @ 1.71 fps)

Secondary OutFlow Max=0.34 cfs @ 11.99 hrs HW=2,373.68' (Free Discharge)
4=Exfiltration (Exfiltration Controls 0.34 cfs)

Summary for Pond P11.4: DRY SWALE

Inflow Area = 0.233 ac, 10.77% Impervious, Inflow Depth = 4.59" for 100-Year event
Inflow = 1.81 cfs @ 11.97 hrs, Volume= 0.089 af
Outflow = 1.78 cfs @ 11.98 hrs, Volume= 0.089 af, Atten= 2%, Lag= 0.5 min
Primary = 1.78 cfs @ 11.98 hrs, Volume= 0.089 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,475.76' @ 11.98 hrs Surf.Area= 652 sf Storage= 558 cf

Plug-Flow detention time= 174.5 min calculated for 0.089 af (100% of inflow)
Center-of-Mass det. time= 176.8 min (990.5 - 813.7)

Volume	Invert	Avail.Storage	Storage Description
#1	2,470.50'	60 cf	**stone underdrain (Prismatic)** Listed below (Recalc) 150 cf Overall x 40.0% Voids
#2	2,471.50'	56 cf	**filter media (Prismatic)** Listed below (Recalc) 375 cf Overall x 15.0% Voids
#3	2,474.00'	530 cf	**surface storage (Prismatic)** Listed below (Recalc)
		646 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,470.50	150	0	0
2,471.50	150	150	150

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,471.50	150	0	0
2,474.00	150	375	375

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,474.00	150	0	0
2,476.00	380	530	530

Device	Routing	Invert	Outlet Devices
#1	Primary	2,470.50'	**0.500 in/hr Exfiltration over Surface area**
#2	Primary	2,475.50'	**5.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=1.71 cfs @ 11.98 hrs HW=2,475.75' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 1.70 cfs @ 1.35 fps)

Summary for Pond P11.5: DRY SWALE

Inflow Area = 0.116 ac, 27.15% Impervious, Inflow Depth = 5.04" for 100-Year event
Inflow = 0.98 cfs @ 11.97 hrs, Volume= 0.049 af
Outflow = 0.96 cfs @ 11.98 hrs, Volume= 0.049 af, Atten= 2%, Lag= 0.7 min
Primary = 0.96 cfs @ 11.98 hrs, Volume= 0.049 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,479.67' @ 11.98 hrs Surf.Area= 605 sf Storage= 498 cf

Plug-Flow detention time= 304.1 min calculated for 0.049 af (100% of inflow)
Center-of-Mass det. time= 302.2 min (1,106.8 - 804.6)

Volume	Invert	Avail.Storage	Storage Description
#1	2,474.50'	50 cf	**stone underdrain (Prismatic)** Listed below (Recalc) 125 cf Overall x 40.0% Voids
#2	2,475.50'	47 cf	**filter media (Prismatic)** Listed below (Recalc) 313 cf Overall x 15.0% Voids
#3	2,478.00'	525 cf	**surface storage (Prismatic)** Listed below (Recalc)
		622 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,474.50	125	0	0
2,475.50	125	125	125

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,475.50	125	0	0
2,478.00	125	313	313

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,478.00	125	0	0
2,480.00	400	525	525

Device	Routing	Invert	Outlet Devices
#1	Primary	2,474.50'	**0.500 in/hr Exfiltration over Surface area**
#2	Primary	2,479.50'	**5.0' long x 1.0' 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
Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.92 cfs @ 11.98 hrs HW=2,479.67' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.01 cfs)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 0.91 cfs @ 1.10 fps)

Summary for Pond P11.6: DRY SWALE

Inflow Area = 3.304 ac, 4.07% Impervious, Inflow Depth = 4.37" for 100-Year event
Inflow = 19.06 cfs @ 12.06 hrs, Volume= 1.203 af
Outflow = 18.82 cfs @ 12.06 hrs, Volume= 1.199 af, Atten= 1%, Lag= 0.3 min
Primary = 18.82 cfs @ 12.06 hrs, Volume= 1.199 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,484.08' @ 12.07 hrs Surf.Area= 5,800 sf Storage= 5,539 cf

Plug-Flow detention time= 108.2 min calculated for 1.199 af (100% of inflow)
Center-of-Mass det. time= 105.8 min (931.4 - 825.6)

Volume	Invert	Avail.Storage	Storage Description
#1	2,478.50'	464 cf	**stone underdrain (Prismatic)** Listed below (Recalc) 1,160 cf Overall x 40.0% Voids
#2	2,479.50'	435 cf	**filter media (Prismatic)** Listed below (Recalc) 2,900 cf Overall x 15.0% Voids
#3	2,482.00'	4,640 cf	**surface storage (Prismatic)** Listed below (Recalc)
		5,539 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,478.50	1,160	0	0
2,479.50	1,160	1,160	1,160

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,479.50	1,160	0	0
2,482.00	1,160	2,900	2,900

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,482.00	1,160	0	0
2,484.00	3,480	4,640	4,640

Device	Routing	Invert	Outlet Devices
#1	Primary	2,478.50'	**0.500 in/hr Exfiltration over Surface area**
#2	Primary	2,483.40'	**12.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31

3.30 3.31 3.32

Primary OutFlow Max=18.28 cfs @ 12.06 hrs HW=2,484.07' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.07 cfs)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 18.21 cfs @ 2.27 fps)

Summary for Pond P11.7: BIORETENTION

Inflow Area = 0.741 ac, 55.14% Impervious, Inflow Depth = 5.96" for 100-Year event
Inflow = 7.07 cfs @ 11.96 hrs, Volume= 0.368 af
Outflow = 0.70 cfs @ 12.40 hrs, Volume= 0.368 af, Atten= 90%, Lag= 25.9 min
Primary = 0.70 cfs @ 12.40 hrs, Volume= 0.368 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,248.82' @ 12.40 hrs Surf.Area= 14,164 sf Storage= 8,501 cf

Plug-Flow detention time= 430.0 min calculated for 0.368 af (100% of inflow)
Center-of-Mass det. time= 430.3 min (1,214.1 - 783.8)

Volume	Invert	Avail.Storage	Storage Description
#1	2,243.00'	1,820 cf	**gravel drainage layer (Prismatic)** Listed below (Recalc) 4,550 cf Overall x 40.0% Voids
#2	2,244.00'	2,730 cf	**filter media (Prismatic)** Listed below (Recalc) 18,200 cf Overall x 15.0% Voids
#3	2,248.00'	10,350 cf	**surface storage (Prismatic)** Listed below (Recalc)
		14,900 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,243.00	4,550	0	0
2,244.00	4,550	4,550	4,550

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,244.00	4,550	0	0
2,248.00	4,550	18,200	18,200

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,248.00	4,550	0	0
2,250.00	5,800	10,350	10,350

Device	Routing	Invert	Outlet Devices
#1	Primary	2,243.00'	**18.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,243.00' / 2,240.00' S= 0.0600 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,243.00'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	2,248.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	2,249.00'	**25.0' 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=0.70 cfs @ 12.40 hrs HW=2,248.82' (Free Discharge)
└─**1=Culvert** (Passes 0.70 cfs of 19.16 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.16 cfs)
  └─**3=Orifice/Grate** (Orifice Controls 0.54 cfs @ 2.73 fps)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond P11.8: BIORETENTION

Inflow Area = 0.432 ac, 77.25% Impervious, Inflow Depth = 6.67" for 100-Year event
Inflow = 4.38 cfs @ 11.96 hrs, Volume= 0.240 af
Outflow = 0.66 cfs @ 12.19 hrs, Volume= 0.240 af, Atten= 85%, Lag= 13.8 min
Primary = 0.66 cfs @ 12.19 hrs, Volume= 0.240 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,260.85' @ 12.19 hrs Surf.Area= 8,868 sf Storage= 5,401 cf

Plug-Flow detention time= 409.8 min calculated for 0.240 af (100% of inflow)
Center-of-Mass det. time= 409.8 min (1,173.2 - 763.3)

Volume	Invert	Avail.Storage	Storage Description
#1	2,255.00'	1,140 cf	**gravel underdrain (Prismatic)**Listed below (Recalc) 2,850 cf Overall x 40.0% Voids
#2	2,256.00'	1,710 cf	**filter media (Prismatic)**Listed below (Recalc) 11,400 cf Overall x 15.0% Voids
#3	2,260.00'	6,450 cf	**surface storage (Prismatic)**Listed below (Recalc)
		9,300 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,255.00	2,850	0	0
2,256.00	2,850	2,850	2,850

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,256.00	2,850	0	0
2,260.00	2,850	11,400	11,400

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,260.00	2,850	0	0
2,262.00	3,600	6,450	6,450

Device	Routing	Invert	Outlet Devices
#1	Primary	2,255.00'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,255.00' / 2,254.50' S= 0.0100 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,255.00'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	2,260.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	2,261.00'	**15.0' 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=0.66 cfs @ 12.19 hrs HW=2,260.85' (Free Discharge)
1=Culvert (Passes 0.66 cfs of 6.38 cfs potential flow)
2=Exfiltration (Exfiltration Controls 0.10 cfs)
3=Orifice/Grate (Orifice Controls 0.56 cfs @ 2.84 fps)
4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond P11.9: BIORETENTION

Inflow Area = 0.575 ac, 22.45% Impervious, Inflow Depth = 5.04" for 100-Year event
Inflow = 4.85 cfs @ 11.97 hrs, Volume= 0.242 af
Outflow = 4.74 cfs @ 11.99 hrs, Volume= 0.284 af, Atten= 2%, Lag= 1.4 min
Primary = 4.74 cfs @ 11.99 hrs, Volume= 0.284 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Starting Elev= 2,219.00' Surf.Area= 5,520 sf Storage= 1,840 cf
Peak Elev= 2,219.74' @ 11.99 hrs Surf.Area= 5,814 sf Storage= 3,303 cf (1,463 cf above start)

Plug-Flow detention time= 313.0 min calculated for 0.242 af (100% of inflow)
Center-of-Mass det. time= 201.9 min (1,006.5 - 804.6)

Volume	Invert	Avail.Storage	Storage Description
#1	2,214.00'	736 cf	**gravel drainage layer (Prismatic)**Listed below (Recalc) 1,840 cf Overall x 40.0% Voids
#2	2,215.00'	1,104 cf	**filter media (Prismatic)**Listed below (Recalc) 7,360 cf Overall x 15.0% Voids
#3	2,219.00'	2,040 cf	**surface storage (Prismatic)**Listed below (Recalc)
		3,880 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,214.00	1,840	0	0
2,215.00	1,840	1,840	1,840

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,215.00	1,840	0	0
2,219.00	1,840	7,360	7,360

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,219.00	1,840	0	0
2,220.00	2,239	2,040	2,040

Device	Routing	Invert	Outlet Devices
#1	Primary	2,214.00'	**0.500 in/hr Exfiltration over Surface area**
#2	Primary	2,219.50'	**15.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=4.59 cfs @ 11.99 hrs HW=2,219.73' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.07 cfs)
2=Broad-Crested Rectangular Weir (Weir Controls 4.52 cfs @ 1.30 fps)

Summary for Pond P12.1: Pond 1.1

Inflow Area = 17.893 ac, 9.84% Impervious, Inflow Depth = 4.56" for 100-Year event
Inflow = 83.86 cfs @ 12.14 hrs, Volume= 6.803 af
Outflow = 56.14 cfs @ 12.31 hrs, Volume= 6.801 af, Atten= 33%, Lag= 10.3 min
Primary = 56.14 cfs @ 12.31 hrs, Volume= 6.801 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Starting Elev= 2,295.25' Surf.Area= 5,504 sf Storage= 5,359 cf
Peak Elev= 2,302.34' @ 12.31 hrs Surf.Area= 23,017 sf Storage= 104,535 cf (99,176 cf above start)

Plug-Flow detention time= 373.1 min calculated for 6.676 af (98% of inflow)
Center-of-Mass det. time= 354.7 min (1,180.8 - 826.1)

Volume	Invert	Avail.Storage	Storage Description
#1	2,294.00'	120,048 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,294.00	3,070	0	0
2,296.00	6,964	10,034	10,034
2,298.00	11,720	18,684	28,718
2,300.00	16,919	28,639	57,357
2,302.00	22,520	39,439	96,796
2,303.00	23,983	23,252	120,048

Device	Routing	Invert	Outlet Devices
#1	Primary	2,294.00'	**24.0" Round Culvert** L= 115.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,294.00' / 2,293.25' S= 0.0065 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,295.25'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	2,298.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	2,299.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

#5	Primary	2,302.00'	**50.0' 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=54.91 cfs @ 12.31 hrs HW=2,302.33' (Free Discharge)
1=Culvert (Barrel Controls 30.33 cfs @ 9.65 fps)
2=Orifice/Grate (Passes < 0.28 cfs potential flow)
3=Orifice/Grate (Passes < 1.79 cfs potential flow)
4=Orifice/Grate (Passes < 32.40 cfs potential flow)
5=Broad-Crested Rectangular Weir (Weir Controls 24.58 cfs @ 1.49 fps)

Summary for Pond P12.2: Dry Swale

Inflow Area = 0.376 ac, 26.90% Impervious, Inflow Depth = 5.16" for 100-Year event
Inflow = 3.23 cfs @ 11.97 hrs, Volume= 0.162 af
Outflow = 3.09 cfs @ 11.99 hrs, Volume= 0.162 af, Atten= 4%, Lag= 1.7 min
Primary = 3.09 cfs @ 11.99 hrs, Volume= 0.162 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,269.77' @ 11.99 hrs Surf.Area= 2,556 sf Storage= 1,680 cf

Plug-Flow detention time= 235.6 min calculated for 0.162 af (100% of inflow)
Center-of-Mass det. time= 236.1 min (1,038.3 - 802.2)

Volume	Invert	Avail.Storage	Storage Description
#1	2,265.00'	160 cf	**stone underdrain (Prismatic)** Listed below (Recalc) 400 cf Overall x 40.0% Voids
#2	2,266.00'	150 cf	**filter media (Prismatic)** Listed below (Recalc) 1,000 cf Overall x 15.0% Voids
#3	2,268.50'	2,900 cf	**surface storage (Prismatic)** Listed below (Recalc)
		3,210 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,265.00	400	0	0
2,266.00	400	400	400

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,266.00	400	0	0
2,268.50	400	1,000	1,000

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,268.50	400	0	0
2,270.00	2,000	1,800	1,800
2,270.50	2,400	1,100	2,900

Device	Routing	Invert	Outlet Devices
#1	Primary	2,269.50'	**8.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Primary	2,265.00'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=3.03 cfs @ 11.99 hrs HW=2,269.77' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 3.00 cfs @ 1.40 fps)
2=Exfiltration (Exfiltration Controls 0.03 cfs)

Summary for Pond P2.2: Dry Swale

Inflow Area = 3.322 ac, 22.38% Impervious, Inflow Depth = 5.04" for 100-Year event
Inflow = 24.49 cfs @ 12.02 hrs, Volume= 1.396 af
Outflow = 23.86 cfs @ 12.05 hrs, Volume= 1.394 af, Atten= 3%, Lag= 2.3 min
Primary = 23.86 cfs @ 12.05 hrs, Volume= 1.394 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,266.58' @ 12.06 hrs Surf.Area= 6,008 sf Storage= 7,368 cf

Plug-Flow detention time= 75.3 min calculated for 1.394 af (100% of inflow)
Center-of-Mass det. time= 74.8 min (883.5 - 808.7)

Volume	Invert	Avail.Storage	Storage Description
#1	2,261.50'	420 cf	**gravel underdrain (Prismatic)** Listed below (Recalc) 1,050 cf Overall x 40.0% Voids
#2	2,262.50'	236 cf	**Filter Media (Prismatic)** Listed below (Recalc) 1,575 cf Overall x 15.0% Voids
#3	2,264.00'	8,400 cf	**Surface Storage (Prismatic)** Listed below (Recalc)
		9,056 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,261.50	1,050	0	0
2,262.50	1,050	1,050	1,050

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,262.50	1,050	0	0
2,264.00	1,050	1,575	1,575

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,264.00	1,050	0	0
2,266.00	3,500	4,550	4,550
2,267.00	4,200	3,850	8,400

Device	Routing	Invert	Outlet Devices
#1	Primary	2,265.25'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	2,266.50'	**100.0' long x 50.0' 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
#3	Primary	2,261.50'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=22.98 cfs @ 12.05 hrs HW=2,266.57' (Free Discharge)
1=Orifice/Grate (Orifice Controls 17.41 cfs @ 5.54 fps)
2=Broad-Crested Rectangular Weir (Weir Controls 5.50 cfs @ 0.73 fps)
3=Exfiltration (Exfiltration Controls 0.07 cfs)

Summary for Pond P2.3: BIORETENTION

Inflow Area = 5.821 ac, 24.98% Impervious, Inflow Depth = 5.07" for 100-Year event
Inflow = 39.07 cfs @ 12.05 hrs, Volume= 2.459 af
Outflow = 33.38 cfs @ 12.11 hrs, Volume= 2.457 af, Atten= 15%, Lag= 3.8 min
Primary = 33.38 cfs @ 12.11 hrs, Volume= 2.457 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,228.98' @ 12.11 hrs Surf.Area= 32,806 sf Storage= 32,586 cf

Plug-Flow detention time= 254.2 min calculated for 2.456 af (100% of inflow)
Center-of-Mass det. time= 252.3 min (1,102.9 - 850.6)

Volume	Invert	Avail.Storage	Storage Description
#1	2,222.00'	4,142 cf	**stone underdrain (Prismatic)** Listed below (Recalc) 10,354 cf Overall x 40.0% Voids
#2	2,223.00'	6,212 cf	**filter media (Prismatic)** Listed below (Recalc) 41,416 cf Overall x 15.0% Voids
#3	2,227.00'	22,469 cf	**surface storage (Prismatic)** Listed below (Recalc)
		32,823 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,222.00	10,354	0	0
2,223.00	10,354	10,354	10,354

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,223.00	10,354	0	0
2,227.00	10,354	41,416	41,416

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,227.00	10,354	0	0
2,229.00	12,115	22,469	22,469

Device	Routing	Invert	Outlet Devices
#1	Primary	2,222.00'	**18.0" Round Culvert** L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,222.00' / 2,221.40' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Primary	2,222.00'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	2,227.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	2,228.50'	**35.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=32.02 cfs @ 12.11 hrs HW=2,228.97' (Free Discharge)
├─**1=Culvert** (Passes 1.15 cfs of 21.22 cfs potential flow)
│ └─**3=Orifice/Grate** (Orifice Controls 1.15 cfs @ 5.83 fps)
├─**2=Exfiltration** (Exfiltration Controls 0.38 cfs)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 30.50 cfs @ 1.87 fps)

Summary for Pond P2.5: Pond 2.5

Inflow Area = 36.326 ac, 17.04% Impervious, Inflow Depth = 4.78" for 100-Year event
Inflow = 194.14 cfs @ 12.00 hrs, Volume= 14.455 af
Outflow = 82.82 cfs @ 12.27 hrs, Volume= 14.427 af, Atten= 57%, Lag= 16.2 min
Primary = 73.69 cfs @ 12.27 hrs, Volume= 14.237 af
Secondary = 9.13 cfs @ 12.27 hrs, Volume= 0.190 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 2,161.00' Surf.Area= 7,652 sf Storage= 13,933 cf
Peak Elev= 2,170.73' @ 12.27 hrs Surf.Area= 33,345 sf Storage= 207,709 cf (193,777 cf above start)

Plug-Flow detention time= 389.5 min calculated for 14.102 af (98% of inflow)
Center-of-Mass det. time= 349.0 min (1,201.5 - 852.5)

Volume	Invert	Avail.Storage	Storage Description
#1	2,158.00'	216,744 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,158.00	1,411	0	0
2,160.00	5,797	7,208	7,208
2,162.00	9,507	15,304	22,512
2,164.00	14,282	23,789	46,301
2,166.00	19,778	34,060	80,361
2,168.00	25,755	45,533	125,894
2,170.00	32,133	57,888	183,782
2,171.00	33,791	32,962	216,744

Device	Routing	Invert	Outlet Devices
#1	Primary	2,158.00'	**36.0" Round Culvert** L= 300.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,158.00' / 2,156.50' S= 0.0050 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,161.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	2,165.00'	**30.0" W x 18.0" H Vert. Orifice/Grate** C= 0.600
#4	Device 1	2,166.50'	**36.0" W x 30.0" H Vert. Orifice/Grate** C= 0.600
#5	Device 1	2,169.00'	**48.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600
#6	Secondary	2,170.25'	**10.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=73.67 cfs @ 12.27 hrs HW=2,170.72' (Free Discharge)
└─**1=Culvert** (Barrel Controls 73.67 cfs @ 10.42 fps)
  ├─**2=Orifice/Grate** (Passes < 0.33 cfs potential flow)
  ├─**3=Orifice/Grate** (Passes < 40.23 cfs potential flow)
  ├─**4=Orifice/Grate** (Passes < 61.80 cfs potential flow)
  └─**5=Orifice/Grate** (Passes < 21.15 cfs potential flow)

Secondary OutFlow Max=8.91 cfs @ 12.27 hrs HW=2,170.72' (Free Discharge)
└─**6=Broad-Crested Rectangular Weir** (Weir Controls 8.91 cfs @ 1.88 fps)

Summary for Pond P3.1: Dry Swale

Inflow Area = 10.077 ac, 13.20% Impervious, Inflow Depth = 4.66" for 100-Year event
Inflow = 68.80 cfs @ 12.01 hrs, Volume= 3.914 af
Outflow = 66.79 cfs @ 12.04 hrs, Volume= 3.914 af, Atten= 3%, Lag= 1.5 min
Primary = 66.79 cfs @ 12.04 hrs, Volume= 3.914 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,288.77' @ 12.03 hrs Surf.Area= 16,372 sf Storage= 17,622 cf

Plug-Flow detention time= 95.4 min calculated for 3.913 af (100% of inflow)
Center-of-Mass det. time= 96.0 min (909.0 - 813.0)

Volume	Invert	Avail.Storage	Storage Description
#1	2,283.00'	1,086 cf	**stone underdrain (Prismatic)** Listed below (Recalc) 2,715 cf Overall x 40.0% Voids
#2	2,284.00'	1,018 cf	**filter media (Prismatic)** Listed below (Recalc) 6,788 cf Overall x 15.0% Voids
#3	2,286.50'	18,100 cf	**surface storage (Prismatic)** Listed below (Recalc)
		20,204 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,283.00	2,715	0	0
2,284.00	2,715	2,715	2,715

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,284.00	2,715	0	0
2,286.50	2,715	6,788	6,788

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,286.50	2,715	0	0
2,289.00	11,765	18,100	18,100

Device	Routing	Invert	Outlet Devices
#1	Primary	2,284.50'	**48.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,284.50' / 2,282.00' S= 0.0500 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,288.00'	**30.0" x 30.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	2,283.00'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=65.27 cfs @ 12.04 hrs HW=2,288.76' (Free Discharge)
└─**1=Culvert** (Passes 65.08 cfs of 90.97 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 65.08 cfs @ 2.85 fps)
└─**3=Exfiltration** (Exfiltration Controls 0.19 cfs)

Summary for Pond P3.2: Dry Swale

Inflow Area = 7.881 ac, 20.98% Impervious, Inflow Depth = 4.93" for 100-Year event
Inflow = 60.63 cfs @ 12.00 hrs, Volume= 3.238 af
Outflow = 58.99 cfs @ 12.02 hrs, Volume= 3.238 af, Atten= 3%, Lag= 1.0 min
Primary = 58.99 cfs @ 12.02 hrs, Volume= 3.238 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 2,203.71' @ 12.02 hrs Surf.Area= 11,332 sf Storage= 11,615 cf

Plug-Flow detention time= 76.3 min calculated for 3.237 af (100% of inflow)
Center-of-Mass det. time= 76.9 min (886.4 - 809.4)

Volume	Invert	Avail.Storage	Storage Description
#1	2,199.00'	762 cf	**stone underdrain (Prismatic)**Listed below (Recalc) 1,905 cf Overall x 40.0% Voids
#2	2,200.00'	429 cf	**filter media (Prismatic)**Listed below (Recalc) 2,858 cf Overall x 15.0% Voids
#3	2,201.50'	12,700 cf	**surface storage (Prismatic)**Listed below (Recalc)
		13,891 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,199.00	1,905	0	0
2,200.00	1,905	1,905	1,905

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,200.00	1,905	0	0
2,201.50	1,905	2,858	2,858

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,201.50	1,905	0	0
2,204.00	8,255	12,700	12,700

Device	Routing	Invert	Outlet Devices
#1	Primary	2,198.00'	**42.0" Round Culvert** L= 550.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,198.00' / 2,192.50' S= 0.0100 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,203.00'	**30.0" x 30.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	2,199.00'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=57.56 cfs @ 12.02 hrs HW=2,203.70' (Free Discharge)
1=Culvert (Passes 57.43 cfs of 70.65 cfs potential flow)
2=Orifice/Grate (Weir Controls 57.43 cfs @ 2.74 fps)
3=Exfiltration (Exfiltration Controls 0.13 cfs)

Summary for Pond P3.3: P-1

Inflow Area = 20.668 ac, 16.21% Impervious, Inflow Depth = 4.78" for 100-Year event
Inflow = 141.01 cfs @ 12.02 hrs, Volume= 8.240 af
Outflow = 81.63 cfs @ 12.14 hrs, Volume= 8.240 af, Atten= 42%, Lag= 7.4 min
Primary = 81.63 cfs @ 12.14 hrs, Volume= 8.240 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Starting Elev= 2,183.00' Surf.Area= 5,003 sf Storage= 5,563 cf
Peak Elev= 2,190.73' @ 12.14 hrs Surf.Area= 22,239 sf Storage= 110,953 cf (105,390 cf above start)

Plug-Flow detention time= 381.0 min calculated for 8.112 af (98% of inflow)
Center-of-Mass det. time= 344.1 min (1,232.0 - 887.9)

Volume	Invert	Avail.Storage	Storage Description
#1	2,181.00'	116,977 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,181.00	300	0	0
2,182.00	2,911	1,606	1,606
2,184.00	7,095	10,006	11,612
2,186.00	11,412	18,507	30,119
2,188.00	16,132	27,544	57,663
2,190.00	21,255	37,387	95,050
2,191.00	22,600	21,928	116,977

Device	Routing	Invert	Outlet Devices
#1	Primary	2,181.00'	**30.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2,181.00' / 2,180.85' S= 0.0050 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	2,183.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	2,186.50'	**24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600
#4	Device 1	2,187.50'	**30.0" x 30.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	2,190.00'	**10.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=81.02 cfs @ 12.14 hrs HW=2,190.72' (Free Discharge)
1=Culvert (Passes 63.88 cfs of 68.78 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.29 cfs @ 13.31 fps)
3=Orifice/Grate (Orifice Controls 9.59 cfs @ 9.59 fps)
4=Orifice/Grate (Orifice Controls 54.00 cfs @ 8.64 fps)
5=Broad-Crested Rectangular Weir (Weir Controls 17.14 cfs @ 2.38 fps)

Summary for Pond P5.1: BIORETENTION

Inflow Area = 0.684 ac, 16.21% Impervious, Inflow Depth = 4.82" for 100-Year event
Inflow = 5.55 cfs @ 11.97 hrs, Volume= 0.275 af
Outflow = 5.42 cfs @ 11.98 hrs, Volume= 0.298 af, Atten= 2%, Lag= 0.8 min
Primary = 5.42 cfs @ 11.98 hrs, Volume= 0.298 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 1,808.00' Surf.Area= 2,961 sf Storage= 987 cf
Peak Elev= 1,808.84' @ 11.98 hrs Surf.Area= 3,096 sf Storage= 1,873 cf (886 cf above start)

Plug-Flow detention time= 160.3 min calculated for 0.275 af (100% of inflow)
Center-of-Mass det. time= 116.3 min (925.5 - 809.2)

Volume	Invert	Avail.Storage	Storage Description
#1	1,803.00'	395 cf	**stone underdrain (Prismatic)**Listed below (Recalc) 987 cf Overall x 40.0% Voids
#2	1,804.00'	592 cf	**filter media (Prismatic)**Listed below (Recalc) 3,948 cf Overall x 15.0% Voids
#3	1,808.00'	2,295 cf	**surface storage (Prismatic)**Listed below (Recalc)
		3,282 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,803.00	987	0	0
1,804.00	987	987	987

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,804.00	987	0	0
1,808.00	987	3,948	3,948

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,808.00	987	0	0
1,810.00	1,308	2,295	2,295

Device	Routing	Invert	Outlet Devices
#1	Primary	1,808.50'	**10.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Primary	1,803.00'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=5.21 cfs @ 11.98 hrs HW=1,808.83' (Free Discharge)
—**1=Broad-Crested Rectangular Weir** (Weir Controls 5.17 cfs @ 1.56 fps)
—**2=Exfiltration** (Exfiltration Controls 0.04 cfs)

Summary for Pond P6.1: BIORETENTION

Inflow Area = 0.225 ac, 48.98% Impervious, Inflow Depth = 5.85" for 100-Year event
Inflow = 2.12 cfs @ 11.96 hrs, Volume= 0.110 af
Outflow = 1.96 cfs @ 12.00 hrs, Volume= 0.110 af, Atten= 7%, Lag= 2.1 min
Primary = 1.96 cfs @ 12.00 hrs, Volume= 0.110 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 0.01' Surf.Area= 0 sf Storage= 0 cf
Peak Elev= 1,686.77' @ 12.00 hrs Surf.Area= 2,670 sf Storage= 1,522 cf

Plug-Flow detention time= 300.8 min calculated for 0.110 af (100% of inflow)
Center-of-Mass det. time= 300.7 min (1,087.4 - 786.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,681.00'	320 cf	**stone underdrain (Prismatic)**Listed below (Recalc) 800 cf Overall x 40.0% Voids
#2	1,682.00'	480 cf	**filter media (Prismatic)**Listed below (Recalc) 3,200 cf Overall x 15.0% Voids
#3	1,686.00'	2,300 cf	**surface storage (Prismatic)**Listed below (Recalc)
		3,100 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,681.00	800	0	0
1,682.00	800	800	800

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,682.00	800	0	0
1,686.00	800	3,200	3,200

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,686.00	800	0	0
1,688.00	1,500	2,300	2,300

Device	Routing	Invert	Outlet Devices
#1	Primary	1,686.50'	**5.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Primary	1,681.00'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=1.95 cfs @ 12.00 hrs HW=1,686.77' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 1.92 cfs @ 1.41 fps)
2=Exfiltration (Exfiltration Controls 0.03 cfs)

Summary for Pond P6.2: BIORETENTION

Inflow Area = 0.249 ac, 44.31% Impervious, Inflow Depth = 5.73" for 100-Year event
Inflow = 2.31 cfs @ 11.96 hrs, Volume= 0.119 af
Outflow = 2.17 cfs @ 11.99 hrs, Volume= 0.119 af, Atten= 6%, Lag= 1.8 min
Primary = 2.17 cfs @ 11.99 hrs, Volume= 0.119 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 0.01' Surf.Area= 0 sf Storage= 0 cf
Peak Elev= 1,686.79' @ 11.99 hrs Surf.Area= 2,677 sf Storage= 1,543 cf

Plug-Flow detention time= 283.6 min calculated for 0.119 af (100% of inflow)
Center-of-Mass det. time= 284.6 min (1,074.1 - 789.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,681.00'	320 cf	**stone underdrain (Prismatic)**Listed below (Recalc) 800 cf Overall x 40.0% Voids
#2	1,682.00'	480 cf	**filter media (Prismatic)**Listed below (Recalc) 3,200 cf Overall x 15.0% Voids
#3	1,686.00'	2,300 cf	**surface storage (Prismatic)**Listed below (Recalc)
		3,100 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,681.00	800	0	0
1,682.00	800	800	800

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,682.00	800	0	0
1,686.00	800	3,200	3,200

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,686.00	800	0	0
1,688.00	1,500	2,300	2,300

Device	Routing	Invert	Outlet Devices
#1	Primary	1,686.50'	**5.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Primary	1,681.00'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=2.12 cfs @ 11.99 hrs HW=1,686.79' (Free Discharge)
—**1=Broad-Crested Rectangular Weir** (Weir Controls 2.09 cfs @ 1.45 fps)
—**2=Exfiltration** (Exfiltration Controls 0.03 cfs)

Summary for Pond P7.1: P-1

Inflow Area = 2.973 ac, 39.49% Impervious, Inflow Depth = 5.50" for 100-Year event
Inflow = 26.83 cfs @ 11.97 hrs, Volume= 1.363 af
Outflow = 19.30 cfs @ 12.04 hrs, Volume= 1.365 af, Atten= 28%, Lag= 4.3 min
Primary = 19.30 cfs @ 12.04 hrs, Volume= 1.365 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 1,676.00' Surf.Area= 2,800 sf Storage= 3,265 cf
Peak Elev= 1,680.17' @ 12.04 hrs Surf.Area= 8,830 sf Storage= 27,314 cf (24,049 cf above start)

Plug-Flow detention time= 489.5 min calculated for 1.289 af (95% of inflow)
Center-of-Mass det. time= 428.6 min (1,223.4 - 794.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,674.00'	34,944 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,674.00	465	0	0
1,676.00	2,800	3,265	3,265
1,678.00	5,541	8,341	11,606
1,680.00	8,686	14,227	25,833
1,681.00	9,535	9,111	34,944

Device	Routing	Invert	Outlet Devices
#1	Primary	1,674.00'	**24.0" Round Culvert** L= 74.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,674.00' / 1,673.63' S= 0.0050 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	1,676.00'	**1.7" Vert. Orifice/Grate** C= 0.600
#3	Device 1	1,678.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	1,679.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	1,680.00'	**20.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=18.56 cfs @ 12.04 hrs HW=1,680.16' (Free Discharge)
└─**1=Culvert** (Passes 15.21 cfs of 27.95 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.15 cfs @ 9.73 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 1.12 cfs @ 5.71 fps)
  └─**4=Orifice/Grate** (Weir Controls 13.94 cfs @ 2.65 fps)
└─**5=Broad-Crested Rectangular Weir** (Weir Controls 3.35 cfs @ 1.07 fps)

Summary for Pond P8.1: DRY SWALE

Inflow Area = 2.715 ac, 28.55% Impervious, Inflow Depth = 5.16" for 100-Year event
Inflow = 18.68 cfs @ 12.05 hrs, Volume= 1.167 af
Outflow = 17.85 cfs @ 12.08 hrs, Volume= 1.167 af, Atten= 4%, Lag= 1.6 min
Primary = 17.85 cfs @ 12.08 hrs, Volume= 1.167 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2,309.99' @ 12.08 hrs Surf.Area= 6,269 sf Storage= 5,981 cf

Plug-Flow detention time= 102.3 min calculated for 1.167 af (100% of inflow)
Center-of-Mass det. time= 102.9 min (911.9 - 809.0)

Volume	Invert	Avail.Storage	Storage Description
#1	2,304.50'	444 cf	**stone underdrain (Prismatic)**Listed below (Recalc) 1,110 cf Overall x 40.0% Voids
#2	2,305.50'	416 cf	**filter media (Prismatic)**Listed below (Recalc) 2,775 cf Overall x 15.0% Voids
#3	2,308.00'	5,180 cf	**surface storage (Prismatic)**Listed below (Recalc)
		6,040 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,304.50	1,110	0	0
2,305.50	1,110	1,110	1,110

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,305.50	1,110	0	0
2,308.00	1,110	2,775	2,775

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
2,308.00	1,110	0	0
2,310.00	4,070	5,180	5,180

Device	Routing	Invert	Outlet Devices
#1	Primary	2,309.25'	**10.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Primary	2,304.50'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=17.50 cfs @ 12.08 hrs HW=2,309.98' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 17.43 cfs @ 2.40 fps)
2=Exfiltration (Exfiltration Controls 0.07 cfs)

Summary for Pond P8.2: P-1

Inflow Area = 27.190 ac, 22.39% Impervious, Inflow Depth = 4.59" for 100-Year event
Inflow = 138.10 cfs @ 12.01 hrs, Volume= 10.397 af
Outflow = 132.31 cfs @ 12.05 hrs, Volume= 10.396 af, Atten= 4%, Lag= 2.3 min
Primary = 132.31 cfs @ 12.05 hrs, Volume= 10.396 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Starting Elev= 1,675.75' Surf.Area= 4,839 sf Storage= 10,231 cf
Peak Elev= 1,683.93' @ 12.05 hrs Surf.Area= 19,369 sf Storage= 104,775 cf (94,544 cf above start)

Plug-Flow detention time= 403.5 min calculated for 10.161 af (98% of inflow)
Center-of-Mass det. time= 368.0 min (1,206.2 - 838.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,672.00'	106,080 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,672.00	1,000	0	0
1,674.00	2,665	3,665	3,665
1,676.00	5,150	7,815	11,480
1,678.00	8,130	13,280	24,760
1,680.00	11,525	19,655	44,415
1,682.00	15,315	26,840	71,255
1,684.00	19,510	34,825	106,080

Device	Routing	Invert	Outlet Devices
#1	Primary	1,672.00'	**24.0" Round Culvert** L= 93.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,672.00' / 1,671.54' S= 0.0049 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	1,675.75'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	1,681.00'	**24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600

#4	Device 1	1,682.00'	**36.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	1,683.00'	**35.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=131.72 cfs @ 12.05 hrs HW=1,683.93' (Free Discharge)
└─**1=Culvert** (Barrel Controls 39.45 cfs @ 12.56 fps)
  ├─**2=Orifice/Grate** (Passes < 0.30 cfs potential flow)
  ├─**3=Orifice/Grate** (Passes < 7.88 cfs potential flow)
  └─**4=Orifice/Grate** (Passes < 60.22 cfs potential flow)
└─**5=Broad-Crested Rectangular Weir** (Weir Controls 92.26 cfs @ 2.83 fps)

Summary for Pond P8.3: DRY SWALE

Inflow Area = 1.145 ac, 16.92% Impervious, Inflow Depth = 4.93" for 100-Year event
Inflow = 9.48 cfs @ 11.97 hrs, Volume= 0.471 af
Outflow = 8.85 cfs @ 12.00 hrs, Volume= 0.471 af, Atten= 7%, Lag= 1.7 min
Primary = 8.85 cfs @ 12.00 hrs, Volume= 0.471 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 1,757.09' @ 12.00 hrs Surf.Area= 3,991 sf Storage= 4,059 cf

Plug-Flow detention time= 193.5 min calculated for 0.470 af (100% of inflow)
Center-of-Mass det. time= 194.1 min (1,001.1 - 806.9)

Volume	Invert	Avail.Storage	Storage Description
#1	1,751.50'	264 cf	**stone underdrain (Prismatic)** Listed below (Recalc) 660 cf Overall x 40.0% Voids
#2	1,752.50'	248 cf	**filter media (Prismatic)** Listed below (Recalc) 1,650 cf Overall x 15.0% Voids
#3	1,755.00'	6,105 cf	**surface storage (Prismatic)** Listed below (Recalc)
		6,617 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,751.50	660	0	0
1,752.50	660	660	660

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,752.50	660	0	0
1,755.00	660	1,650	1,650

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,755.00	660	0	0
1,757.00	2,640	3,300	3,300
1,758.00	2,970	2,805	6,105

Device	Routing	Invert	Outlet Devices
#1	Primary	1,756.50'	**7.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Primary	1,751.50'	**0.500 in/hr Exfiltration over Surface area**

Primary OutFlow Max=8.73 cfs @ 12.00 hrs HW=1,757.09' (Free Discharge)
—**1=Broad-Crested Rectangular Weir** (Weir Controls 8.69 cfs @ 2.11 fps)
—**2=Exfiltration** (Exfiltration Controls 0.05 cfs)

Summary for Pond P9.1: DRY SWALE

Inflow Area = 4.151 ac, 21.51% Impervious, Inflow Depth = 4.93" for 100-Year event
Inflow = 26.69 cfs @ 12.06 hrs, Volume= 1.706 af
Outflow = 25.35 cfs @ 12.10 hrs, Volume= 1.706 af, Atten= 5%, Lag= 2.4 min
Primary = 25.35 cfs @ 12.10 hrs, Volume= 1.706 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Peak Elev= 1,819.91' @ 12.10 hrs Surf.Area= 9,687 sf Storage= 10,989 cf

Plug-Flow detention time= 127.1 min calculated for 1.706 af (100% of inflow)
Center-of-Mass det. time= 127.0 min (941.5 - 814.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,814.00'	624 cf	**stone underdrain (Prismatic)** Listed below (Recalc) 1,560 cf Overall x 40.0% Voids
#2	1,815.00'	585 cf	**filter media (Prismatic)** Listed below (Recalc) 3,900 cf Overall x 15.0% Voids
#3	1,817.50'	10,400 cf	**surface storage (Prismatic)** Listed below (Recalc)
		11,609 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,814.00	1,560	0	0
1,815.00	1,560	1,560	1,560

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,815.00	1,560	0	0
1,817.50	1,560	3,900	3,900

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,817.50	1,560	0	0
1,820.00	6,760	10,400	10,400

Device	Routing	Invert	Outlet Devices
#1	Primary	1,814.00'	**0.500 in/hr Exfiltration over Surface area**
#2	Primary	1,819.00'	**10.0' long x 1.0' 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
Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31
3.30 3.31 3.32

Primary OutFlow Max=25.26 cfs @ 12.10 hrs HW=1,819.91' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.11 cfs)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 25.15 cfs @ 2.78 fps)

Summary for Pond P9.2: Pond 9.2

Inflow Area = 19.480 ac, 21.84% Impervious, Inflow Depth = 5.49" for 100-Year event
Inflow = 176.20 cfs @ 12.00 hrs, Volume= 8.913 af
Outflow = 118.58 cfs @ 12.11 hrs, Volume= 8.911 af, Atten= 33%, Lag= 6.4 min
Primary = 118.58 cfs @ 12.11 hrs, Volume= 8.911 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs
Starting Elev= 1,667.00' Surf.Area= 3,838 sf Storage= 6,979 cf
Peak Elev= 1,676.26' @ 12.11 hrs Surf.Area= 29,571 sf Storage= 162,762 cf (155,783 cf above start)

Plug-Flow detention time= 792.2 min calculated for 8.747 af (98% of inflow)
Center-of-Mass det. time= 755.1 min (1,581.2 - 826.1)

Volume	Invert	Avail.Storage	Storage Description
#1	1,664.00'	169,813 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,664.00	433	0	0
1,666.00	3,085	3,518	3,518
1,668.00	4,590	7,675	11,193
1,670.00	13,607	18,197	29,390
1,672.00	18,274	31,881	61,271
1,674.00	23,344	41,618	102,889
1,676.00	28,815	52,159	155,048
1,676.50	30,246	14,765	169,813

Device	Routing	Invert	Outlet Devices
#1	Primary	1,653.00'	**24.0" Round Culvert** L= 300.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,653.00' / 1,651.50' S= 0.0050 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	1,667.00'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	1,671.75'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	1,675.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	1,675.50'	**50.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=115.22 cfs @ 12.11 hrs HW=1,676.25' (Free Discharge)
1=Culvert (Passes 23.79 cfs of 37.38 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.32 cfs @ 14.58 fps)
3=Orifice/Grate (Orifice Controls 1.95 cfs @ 9.92 fps)
4=Orifice/Grate (Orifice Controls 21.52 cfs @ 5.38 fps)
5=Broad-Crested Rectangular Weir (Weir Controls 91.43 cfs @ 2.44 fps)

Summary for Pond P9.3: BIORETENTION

Inflow Area = 1.347 ac, 35.43% Impervious, Inflow Depth = 5.50" for 100-Year event
Inflow = 12.16 cfs @ 11.97 hrs, Volume= 0.618 af
Outflow = 8.01 cfs @ 12.05 hrs, Volume= 0.618 af, Atten= 34%, Lag= 5.4 min
Primary = 8.01 cfs @ 12.05 hrs, Volume= 0.618 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 1,659.72' @ 12.06 hrs Surf.Area= 12,610 sf Storage= 11,374 cf

Plug-Flow detention time= 291.7 min calculated for 0.618 af (100% of inflow)
Center-of-Mass det. time= 293.1 min (1,087.8 - 794.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,653.00'	1,546 cf	**stone underdrain (Prismatic)** Listed below (Recalc) 3,864 cf Overall x 40.0% Voids
#2	1,654.00'	2,318 cf	**filter media (Prismatic)** Listed below (Recalc) 15,456 cf Overall x 15.0% Voids
#3	1,658.00'	8,914 cf	**surface storage (Prismatic)** Listed below (Recalc)
		12,778 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,653.00	3,864	0	0
1,654.00	3,864	3,864	3,864

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,654.00	3,864	0	0
1,658.00	3,864	15,456	15,456

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,658.00	3,864	0	0
1,660.00	5,050	8,914	8,914

Device	Routing	Invert	Outlet Devices
#1	Primary	1,653.00'	**12.0" Round Culvert** L= 80.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,653.00' / 1,652.60' S= 0.0050 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior
#2	Device 1	1,653.00'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	1,658.50'	**6.0" Horiz. Orifice/Grate** C= 0.600

			Limited to weir flow at low heads
#4	Primary	1,659.50'	**25.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=7.72 cfs @ 12.05 hrs HW=1,659.71' (Free Discharge)
└─**1=Culvert** (Passes 1.19 cfs of 5.71 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.15 cfs)
  └─**3=Orifice/Grate** (Orifice Controls 1.04 cfs @ 5.30 fps)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 6.54 cfs @ 1.24 fps)

Summary for Pond P9.ex: Existing Pond

Inflow Area = 2.870 ac, 4.48% Impervious, Inflow Depth = 4.48" for 100-Year event
Inflow = 21.62 cfs @ 11.98 hrs, Volume= 1.072 af
Outflow = 20.45 cfs @ 11.98 hrs, Volume= 0.946 af, Atten= 5%, Lag= 0.0 min
Primary = 20.45 cfs @ 11.98 hrs, Volume= 0.946 af

Routing by Stor-Ind method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 1,672.65' @ 11.98 hrs Surf.Area= 3,000 sf Storage= 6,300 cf

Plug-Flow detention time= 82.9 min calculated for 0.946 af (88% of inflow)
Center-of-Mass det. time= 25.2 min (841.7 - 816.6)

Volume	Invert	Avail.Storage	Storage Description
#1	1,668.50'	6,300 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,668.50	150	0	0
1,672.50	3,000	6,300	6,300

Device	Routing	Invert	Outlet Devices
#1	Primary	1,672.00'	**15.0' 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=19.63 cfs @ 11.98 hrs HW=1,672.63' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 19.63 cfs @ 2.07 fps)

Design Point Summary
1-yr Storm Event

Design Point Totals
10 & 100-yr Storm Events

Summary for Reach DP-1: Design Point-1

Inflow Area = 80.534 ac, 2.74% Impervious, Inflow Depth = 0.88" for 1-Year event
Inflow = 43.56 cfs @ 12.26 hrs, Volume= 5.888 af
Outflow = 43.56 cfs @ 12.26 hrs, Volume= 5.888 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Summary for Reach DP-11: Design Point-11

Inflow Area = 168.947 ac, 5.75% Impervious, Inflow Depth = 0.90" for 1-Year event
Inflow = 75.52 cfs @ 12.37 hrs, Volume= 12.698 af
Outflow = 75.52 cfs @ 12.37 hrs, Volume= 12.698 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Summary for Reach DP-2: Design Point-2

Inflow Area = 46.065 ac, 16.76% Impervious, Inflow Depth > 1.03" for 1-Year event
Inflow = 5.28 cfs @ 12.08 hrs, Volume= 3.938 af
Outflow = 5.28 cfs @ 12.08 hrs, Volume= 3.938 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Summary for Reach DP-2a: Design Point-2a

Inflow Area = 1.800 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 2.15 cfs @ 12.02 hrs, Volume= 0.121 af
Outflow = 2.15 cfs @ 12.02 hrs, Volume= 0.121 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Summary for Reach DP-2b: Design Point-2b

Inflow Area = 4.268 ac, 0.00% Impervious, Inflow Depth = 1.55" for 1-Year event
Inflow = 5.41 cfs @ 12.01 hrs, Volume= 0.552 af
Outflow = 5.41 cfs @ 12.01 hrs, Volume= 0.552 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Summary for Reach DP-3: Design Point-3

Inflow Area = 26.617 ac, 12.59% Impervious, Inflow Depth > 1.01" for 1-Year event
Inflow = 8.18 cfs @ 11.98 hrs, Volume= 2.241 af
Outflow = 8.18 cfs @ 11.98 hrs, Volume= 2.241 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Summary for Reach DP-4P: Design Point-4

Inflow Area = 3.572 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-Year event
Inflow = 4.06 cfs @ 12.02 hrs, Volume= 0.241 af
Outflow = 4.06 cfs @ 12.02 hrs, Volume= 0.241 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Summary for Reach DP-5: Design Point-5

Inflow Area = 24.147 ac, 1.52% Impervious, Inflow Depth = 0.86" for 1-Year event
Inflow = 23.81 cfs @ 12.07 hrs, Volume= 1.724 af
Outflow = 23.81 cfs @ 12.07 hrs, Volume= 1.724 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Summary for Reach DP-6: Design Point 6

Inflow Area = 2.000 ac, 11.02% Impervious, Inflow Depth = 1.00" for 1-Year event
Inflow = 2.12 cfs @ 11.98 hrs, Volume= 0.167 af
Outflow = 2.12 cfs @ 11.98 hrs, Volume= 0.167 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Summary for Reach DP-7: Design Point 7

Inflow Area = 4.917 ac, 23.87% Impervious, Inflow Depth = 1.18" for 1-Year event
Inflow = 2.56 cfs @ 11.98 hrs, Volume= 0.482 af
Outflow = 2.56 cfs @ 11.98 hrs, Volume= 0.482 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Summary for Reach DP-8: Design Point-8

Inflow Area = 52.819 ac, 12.05% Impervious, Inflow Depth > 1.00" for 1-Year event
Inflow = 12.88 cfs @ 12.38 hrs, Volume= 4.389 af
Outflow = 12.88 cfs @ 12.38 hrs, Volume= 4.389 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Summary for Reach DP-9: Design Point-9

Inflow Area = 24.723 ac, 20.09% Impervious, Inflow Depth > 1.08" for 1-Year event
Inflow = 1.93 cfs @ 11.98 hrs, Volume= 2.217 af
Outflow = 1.93 cfs @ 11.98 hrs, Volume= 2.217 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Summary for Reach DP12: Design Point-12

Inflow Area = 40.214 ac, 4.63% Impervious, Inflow Depth = 0.88" for 1-Year event
Inflow = 16.53 cfs @ 12.18 hrs, Volume= 2.950 af
Outflow = 16.53 cfs @ 12.18 hrs, Volume= 2.950 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-144.00 hrs, dt= 0.05 hrs

Time span=0.00-144.00 hrs, dt=0.05 hrs, 2881 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Reach DP-1: Design Point-1 Inflow=133.35 cfs 15.477 af
Outflow=133.35 cfs 15.477 af

Reach DP-11: Design Point-11 Inflow=252.53 cfs 32.946 af
Outflow=252.53 cfs 32.946 af

Reach DP-2: Design Point-2 Inflow=47.14 cfs 9.911 af
Outflow=47.14 cfs 9.911 af

Reach DP-2a: Design Point-2a Inflow=6.16 cfs 0.330 af
Outflow=6.16 cfs 0.330 af

Reach DP-2b: Design Point-2b Inflow=15.25 cfs 1.058 af
Outflow=15.25 cfs 1.058 af

Reach DP-3: Design Point-3 Inflow=23.18 cfs 5.172 af
Outflow=23.18 cfs 5.172 af

Reach DP-4P: Design Point-4 Inflow=19.81 cfs 1.058 af
Outflow=19.81 cfs 1.058 af

Reach DP-5: Design Point-5 Inflow=74.02 cfs 4.568 af
Outflow=74.02 cfs 4.568 af

Reach DP-6: Design Point 6 Inflow=5.83 cfs 0.414 af
Outflow=5.83 cfs 0.414 af

Reach DP-7: Design Point 7 Inflow=7.41 cfs 1.129 af
Outflow=7.41 cfs 1.129 af

Reach DP-8: Design Point-8 Inflow=84.96 cfs 10.769 af
Outflow=84.96 cfs 10.769 af

Reach DP-9: Design Point-9 Inflow=15.30 cfs 5.662 af
Outflow=15.30 cfs 5.662 af

Reach DP12: Design Point-12 Inflow=50.57 cfs 7.738 af
Outflow=50.57 cfs 7.738 af

Time span=0.00-144.00 hrs, dt=0.05 hrs, 2881 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Reach DP-1: Design Point-1	Inflow=297.42 cfs 29.713 af Outflow=297.42 cfs 29.713 af
Reach DP-11: Design Point-11	Inflow=521.68 cfs 62.197 af Outflow=521.68 cfs 62.197 af
Reach DP-2: Design Point-2	Inflow=121.42 cfs 18.230 af Outflow=121.42 cfs 18.230 af
Reach DP-2a: Design Point-2a	Inflow=11.88 cfs 0.639 af Outflow=11.88 cfs 0.639 af
Reach DP-2b: Design Point-2b	Inflow=29.25 cfs 1.805 af Outflow=29.25 cfs 1.805 af
Reach DP-3: Design Point-3	Inflow=66.38 cfs 8.505 af Outflow=66.38 cfs 8.505 af
Reach DP-4P: Design Point-4	Inflow=50.51 cfs 3.113 af Outflow=50.51 cfs 3.113 af
Reach DP-5: Design Point-5	Inflow=144.59 cfs 8.754 af Outflow=144.59 cfs 8.754 af
Reach DP-6: Design Point 6	Inflow=15.17 cfs 0.770 af Outflow=15.17 cfs 0.770 af
Reach DP-7: Design Point 7	Inflow=30.25 cfs 2.037 af Outflow=30.25 cfs 2.037 af
Reach DP-8: Design Point-8	Inflow=192.96 cfs 19.550 af Outflow=192.96 cfs 19.550 af
Reach DP-9: Design Point-9	Inflow=131.91 cfs 10.875 af Outflow=131.91 cfs 10.875 af
Reach DP12: Design Point-12	Inflow=124.22 cfs 14.751 af Outflow=124.22 cfs 14.751 af

APPENDIX E

Soil Test Pit Logs

Windham Mountain Sporting Club

Test Pit Summary

Date Performed	Performed By	TP #	Series	Boundary Condition Depth (in)	Boundary Type	Perc Rate	Depth of Perc (in)	HSG	Notes
Oct-08	RJC	1	Lewbeach	25	hardpan			C	
Oct-08	RJC	2	Lewbeach	31	hardpan			C	
Oct-08	RJC	3	Halcott	19	bedrock			C/D	
Oct-08	RJC	4	Vly	26	bedrock			C	
Oct-08	RJC	5	Vly	31	bedrock			C	
Oct-08	RJC	6	Vly	36	bedrock			C	
Oct-08	RJC	7	Vly	30	bedrock			C	
Oct-08	RJC	8	Vly	22	bedrock			C	
Oct-08	RJC	9	Vly	40	bedrock			C	
Oct-08	RJC	10	Onteora	16	hardpan			C	Hydric Soil
Oct-08	RJC	11	Halcott	15	bedrock			C/D	
Oct-08	RJC	12	Elka	51	bedrock			C	
Oct-08	RJC	13	Elka	57	bedrock			C	
Oct-08	RJC	14	Elka	60	bedrock			C	
Oct-08	RJC	15	Vly	40	bedrock			C	
Oct-08	RJC	16	Vly	34	bedrock			C	
Oct-08	RJC	17	Vly	29	bedrock			C	
Oct-08	RJC	18	Lewbeach	29	hardpan			C	
Oct-08	RJC	19	Elka	51	bedrock			C	
Oct-08	RJC	20	Willowemoc	20	SHWT			C	
Oct-08	RJC	21	Halcott	14	bedrock			C/D	
Oct-08	RJC	22	Vly	30	bedrock			C	
Oct-08	RJC	23	Lewbeach	26	hardpan			C	
Oct-08	RJC	24	Halcott	12	bedrock			C/D	
Oct-08	RJC	25	Vly	38	bedrock			C	
Oct-08	RJC	26	Lewbeach	25	hardpan			C	
Oct-08	RJC	27	Lewbeach	29	hardpan			C	
Oct-08	RJC	28	Vly	26	bedrock			C	
Oct-08	RJC	29	Lewbeach	25	hardpan			C	
Oct-08	RJC	30	Halcott	12	bedrock			C/D	
Oct-08	RJC	31	Vly	34	bedrock			C	
Oct-08	RJC	32	Vly	29	bedrock			C	
Oct-08	RJC	33	Lewbeach	26	hardpan			C	
Oct-08	RJC	34	Lewbeach	25	hardpan			C	
Oct-08	RJC	35	Vly	38	bedrock			C	
Oct-08	RJC	N/A	Tor					D	
Oct-08	RJC	N/A	Tunkhannock					A	
Dec-10	WSB	36 (1)	Lewbeach	67	SHWT	36	24	C	
Dec-10	WSB	37 (2)	Lewbeach	>90	None	45	24	C	
Dec-10	WSB	38 (3)	Lewbeach	76	SHWT	47	24	C	
Dec-10	WSB	39 (4)	Vly	26	bedrock	none		C	
Dec-10	WSB	40 (5)	Vly	24	bedrock/SHWT	none		C	

THE LA GROUP
40 Long Alley, Saratoga Springs, New York 12866

To: Kevin Franke

From: Roger J. Case, Soil Scientist

Re: Deep Soil Test pits @ Windham Resort (revised 12/17/2009)

On October 2008 the following deep soil test pits were observed.

Test pit #1: 0 to 4 inches, dark reddish brown silt loam
4 to 25 inches, yellowish red gravelly silt loam
25 to 70+ inches, very firm, reddish gray gravelly fine sandy loam

Soil type: Lewbeach silt loam
Boundary condition @ 25 inches, restrictive layer

Test pit #2: 0 to 4 inches, dark reddish brown silt loam
4 to 31 inches, yellowish red gravelly silt loam
31 to 70+ inches, very firm, reddish gray gravelly fine sandy loam

Soil type: Lewbeach silt loam
Boundary condition @ 31 inches, restrictive layer

Test pit #3: 0 to 4 inches, dark reddish brown silt loam
4 to 19 inches, yellowish red gravelly silt loam
19 inches, hard bedrock ledge

Soil type: Halcott silt loam
Boundary condition @ 19 inches, impervious layer

Test pit #4: 0 to 4 inches, dark reddish brown silt loam
4 to 26 inches, yellowish red gravelly silt loam
26 inches, hard bedrock ledge

Soil type: Vly silt loam
Boundary condition @ 26 inches, impervious layer

Test pit #5: 0 to 5 inches, dark reddish brown silt loam
5 to 31 inches, reddish brown very gravelly silt loam
31 inches, rippable red shale bedrock

Soil type: Vly silt loam
Boundary condition @ 31 inches, impervious layer

Test pit #6: 0 to 5 inches, dark reddish brown silt loam
5 to 36 inches, reddish brown very gravelly silt loam
36 inches, rippable red shale bedrock

Soil type: Vly silt loam
Boundary condition @ 36 inches, impervious layer

Test pit #7: 0 to 5 inches, dark reddish brown silt loam
5 to 30 inches, reddish brown, silty clay loam
30 inches, hard red shale bedrock

Soil type: Vly silt loam
Boundary condition @ 30 inches, impervious layer

Test pit #8: 0 to 5 inches, dark reddish brown silt loam
5 to 22 inches, reddish brown, gravelly silt loam
22 inches, hard bedrock

Soil type: Vly silt loam
Boundary condition @ 22 inches, impervious layer

Test pit #9: 0 to 5 inches, dark reddish brown silt loam
5 to 40 inches, reddish brown, gravelly silt loam
40 inches, hard red shale bedrock

Soil type: Vly silt loam
Boundary condition @ 40 inches, impervious layer

Test pit #10: 0 to 5 inches, dark reddish brown silt loam
5 to 16 inches, reddish brown, gravelly silt loam
16 to 36 inches, mottled reddish brown , gravelly silt loam
Refusal

Soil type: Onteora silt loam
Boundary condition @ 16 inches, seasonal high water table

Test pit #11: 0 to 4 inches, dark reddish brown silt loam
4 to 15 inches, yellowish red gravelly silt loam
15 inches, hard bedrock ledge

Soil type: Halcott silt loam
Boundary condition @ 15 inches, impervious layer

Test pit #12: 0 to 5 inches, dark reddish brown, gravelly (channery) silt loam
5 to 36 inches, reddish brown, very channery silt loam
36 to 51 inches, reddish brown, slightly firm, unconsolidated shale fragments
51 inches, reddish brown shale bedrock

Soil type: Elka channery silt loam
Boundary condition @ 51 inches, impervious layer

Test pit #13: 0 to 5 inches, dark reddish brown, gravelly (channery) silt loam
5 to 40 inches, reddish brown, very channery silt loam
40 to 57 inches, reddish brown, slightly firm, unconsolidated shale fragments
57 inches, reddish brown shale bedrock

Soil type: Elka channery silt loam
Boundary condition @ 57 inches, impervious layer

Test pit #14: 0 to 5 inches, dark reddish brown, gravelly (channery) silt loam
5 to 36 inches, reddish brown, very channery silt loam
36 to 60 inches, reddish brown, firm, unconsolidated shale fragments
60+ inches, reddish brown shale bedrock

Soil type: Elka channery silt loam
Boundary condition @ 60 inches, impervious layer

Test pit #15: 0 to 5 inches, dark reddish brown silt loam
5 to 25 inches, reddish brown, gravelly silt loam
25 to 40 inches, angular very gravelly aggregate
40 inches, hard bedrock

Soil type: Vly silt loam
Boundary condition @ 40 inches, impervious layer

Test pit #16: 0 to 5 inches, dark reddish brown silt loam
5 to 34 inches, reddish brown, gravelly silt loam
34 inches, hard red shale bedrock

Soil type: Vly silt loam
Boundary condition @ 34 inches, impervious layer

Test pit #17: 0 to 5 inches, dark reddish brown silt loam
5 to 29 inches, reddish brown, gravelly silt loam
29 inches, hard red shale bedrock

Soil type: Vly silt loam
Boundary condition @ 29 inches, impervious layer

Test pit #18: 0 to 4 inches, dark reddish brown silt loam
4 to 29 inches, yellowish red gravelly silt loam
29 to 70+ inches, very firm, reddish gray gravelly fine sandy loam

Soil type: Lewbeach silt loam
Boundary condition @ 29 inches, restrictive layer

Test pit #19: 0 to 5 inches, dark reddish brown, gravelly (channery) silt loam
5 to 45 inches, reddish brown, very channery silt loam
45 to 51 inches, reddish brown, slightly firm, unconsolidated shale fragments with strong seeps in the upper part
51 inches, reddish brown shale bedrock

Soil type: Elka channery silt loam
Boundary condition @ 45 inches, seasonal high water table

Test pit #20: 0 to 4 inches, dark reddish brown silt loam
4 to 20 inches, yellowish red gravelly silt loam
20 to 29 inches, mottled, reddish brown gravelly fine sandy loam
29 to 72+ inches, reddish brown gravelly silt loam

Soil type: Willowemoc silt loam
Boundary condition @ 20 inches, seasonal high water table

Test pit #21: 0 to 4 inches, dark reddish brown silt loam
4 to 14 inches, yellowish red gravelly silt loam
14 inches, hard bedrock ledge

Soil type: Halcott silt loam
Boundary condition @ 14 inches, impervious layer

Test pit #22: 0 to 5 inches, dark reddish brown silt loam
5 to 30 inches, reddish brown, gravelly silt loam
30 inches, hard red shale bedrock

Soil type: Vly silt loam
Boundary condition @ 30 inches, impervious layer

Test pit #23: 0 to 4 inches, dark reddish brown silt loam
4 to 26 inches, yellowish red gravelly silt loam
26 to 70+ inches, very firm, reddish gray gravelly fine sandy loam

Soil type: Lewbeach silt loam
Boundary condition @ 26 inches, restrictive layer

Test pit #24: 0 to 4 inches, dark reddish brown silt loam
4 to 12 inches, yellowish red gravelly silt loam
12 inches, hard bedrock ledge

Soil type: Halcott silt loam
Boundary condition @ 12 inches, impervious layer

Test pit #25: 0 to 5 inches, dark reddish brown silt loam
5 to 38 inches, reddish brown, gravelly silt loam
38 inches, hard red shale bedrock

Soil type: Vly silt loam
Boundary condition @ 38 inches, impervious layer

Test pit #26: 0 to 4 inches, dark reddish brown silt loam
4 to 25 inches, yellowish red gravelly silt loam
25 to 70+ inches, very firm, reddish gray gravelly fine sandy loam

Soil type: Lewbeach silt loam
Boundary condition @ 25 inches, restrictive layer

Test pit #27: 0 to 4 inches, dark reddish brown silt loam
4 to 29 inches, yellowish red gravelly silt loam
29 to 70+ inches, very firm, reddish gray gravelly fine sandy loam

Soil type: Lewbeach silt loam
Boundary condition @ 29 inches, restrictive layer

Test pit #28: 0 to 5 inches, dark reddish brown silt loam
5 to 26 inches, reddish brown, gravelly silt loam
26 inches, hard red shale bedrock

Soil type: Vly silt loam
Boundary condition @ 26 inches, impervious layer

Test pit #29: 0 to 4 inches, dark reddish brown silt loam
4 to 25 inches, yellowish red gravelly silt loam
25 to 70+ inches, very firm, reddish gray gravelly fine sandy loam

Soil type: Lewbeach silt loam
Boundary condition @ 25 inches, restrictive layer

Test pit #30 0 to 4 inches, dark reddish brown silt loam
4 to 12 inches, yellowish red gravelly silt loam
12 inches, hard bedrock ledge

Soil type: Halcott silt loam
Boundary condition @ 12 inches, impervious layer

Test pit #31: 0 to 5 inches, dark reddish brown silt loam
5 to 34 inches, reddish brown, gravelly silt loam
34 inches, hard red shale bedrock

Soil type: Vly silt loam
Boundary condition @ 34 inches, impervious layer

Test pit #32: 0 to 5 inches, dark reddish brown silt loam
5 to 29 inches, reddish brown, gravelly silt loam
29 inches, fractured bedrock

Soil type: Vly silt loam
Boundary condition @ 29 inches, impervious layer

Test pit #33: 0 to 4 inches, dark reddish brown silt loam
4 to 26 inches, yellowish red gravelly silt loam
26 to 70+ inches, very firm, reddish gray gravelly fine sandy loam

Soil type: Lewbeach silt loam
Boundary condition @ 26 inches, restrictive layer

Test pit #34: 0 to 5 inches, dark reddish brown silt loam
5 to 25 inches, yellowish red gravelly silt loam
25 to 70+ inches, very firm, reddish gray gravelly fine sandy loam

Soil type: Lewbeach silt loam
Boundary condition @ 25 inches, restrictive layer

Test pit #35: 0 to 5 inches, dark reddish brown silt loam
5 to 38 inches, reddish brown, gravelly silt loam
38 inches, hard red shale bedrock

Soil type: Vly silt loam
Boundary condition @ 38 inches, impervious layer

Every test pit witnessed at the property had a boundary condition. Where the boundary condition is bedrock it is described as an impervious layer. The restrictive layer is used to indicate the upper limits of a hardpan in a deep soil and seasonal high water table indicates mottling or seeps.

MEMO

TO: Kevin Franke, Mark Taber

FROM: Will Buetow

DATE: December 13, 2010

RE: Windham Test Pit and Percolation Tests Results

On December 10, 2010, I went to the Windham site to evaluate deep hole test pits and perform percolation tests for stormwater suitability determinations. The locations of five deep hole test pits were determined in the office and loaded onto a GPS unit so they could be located in the field. Five deep hole test pits were evaluated and three percolation tests were performed and GPS points were collected at each location. John from Katterskill was also present and performed all of the other percolation tests. The results from the deep hole test pits are as follows:

TP1-12/10/10
This site is located to the west of Trail Side Road close to the road edge. The slope at this location is approximately 12%.

A 0"-7" (5YR 3/4)dark red brown, gravelly silt loam, strong, fine, granular structure, friable.
B 7"-32" (5YR 4/3) red brown, gravelly fine silt loam, moderate, fine subangular blocky structure, friable.
B/Cd 32"-48" (2.5YR 4/3) red brown, gravelly silt loam, weak, fine subangular blocky structure, moderately firm.

This pit was dug to 8' with no bedrock encountered. A fast flowing seep was observed at 67" which is representative of the water table. A percolation test was performed at a 24" depth resulting in a stabilized percolation rate of 36 minutes per inch of fall. This soil is most like the Lewbeach soil series.

TP2-12/10/2010
This site is located just off of a dirt road onsite in the northern most portion of the site and immediately south of an offsite house. The slope at this location is approximately 12%.

A 0"-7" (5YR 3/4) dark red brown, gravelly silt loam, strong, fine, granular structure, friable, many large rocks at the soil surface.
B 7"-32" (5YR 4/3) red brown, gravelly fine silt loam, moderate, fine subangular blocky structure, friable.
B/Cd 32"-48" (2.5YR 5/3) red brown, gravelly silt loam, weak, fine subangular blocky structure, moderately firm.

This pit was dug to 9’ with no bedrock indication of groundwater. A percolation test was performed at a 24” depth resulting in a stabilized percolation rate of 45 minutes per inch of fall. This soil is most like the Lewbeech soil series.

TP3-12/10/10
This pit is located in the northern portion of the site just to the west of a switchback onsite. The slope at this location is approximately 17%.

A 0”-5” (5YR 3/4) dark red brown, gravelly silt loam, strong, fine, granular structure, friable, many large pieces of shale at the soil surface.
B 5”-29” (5YR 4/3) red brown, gravelly fine silt loam, strong, fine subangular blocky structure, friable.
B/Cd 32”-48” (2.5YR 5/3) red brown, gravelly silt loam, very weak, fine subangular blocky structure, moderately firm.

This pit was dug to 8’ with no bedrock encountered. Flowing seeps were observed at 76” depth which are indicative of groundwater. A percolation test performed at a 24” depth resulted in a stabilized percolation rate of 47 minutes per inch of fall. This soil is most like the Lewbeach soil series.

TP4-12/10/10
This pit is located in the central portion of the site just to the east of the Wanderer Ski Slope. The slope at this location is approximately 8%. This area is a terrace which has bedrock exposed throughout the terrace face. This pit was dug to 26” and rippable shale was encountered. At 28” depth, hard bedrock was encountered. No percolation test was performed. This soil is most like the Vly soil series.

TP5-12/10/10
This pit is located in the southeastern portion of the property close to the eastern property boundary. The slope at this location is approximately 10%. Bedrock ledge and flowing seeps were encountered at a 24” depth. Numerous other pits were dug in the area with similar results. No percolation test were performed at this location. This soil is most like the Halcott and Vly soil series.

Exhibit C

SWPPP Inspection Form

Windham Mountain Sporting Club Phase 1 of Construction
WEEKLY SWPPP INSPECTION REPORT

Inspector Name:	Date:
Signature (required):	Time:
Weather:	Inspection #:
Soil Conditions (dry, saturated, etc):	

Note: Digital photos, with date stamp required for all practices requiring corrective action, before and after, to be attached to the inspection report.

	YES	NO	N/A		
1.	☐	☐	☐	Routine Inspection.	Date of last inspection:______________________________
2.	☐	☐	☐	Inspection following rain event.	Date/time of storm ending:__________________________ Rainfall amount:____________________________________ Recorded by:_______________________________________
3.	☐	☐	☐	Is this a final site inspection?	
4.	☐	☐	☐	Has site undergone final stabilization?	
	☐	☐	☐	If so, have all temporary erosion and sediment controls been removed?	

Site Disturbance (Indicate Locations on Plan)

	YES	NO	N/A	
1.	☐	☐	☐	Areas previously disturbed, but have not undergone active site work in the last 14 days?
2.	☐	☐	☐	Areas disturbed within last 14 days?
3.	☐	☐	☐	Areas expected to be disturbed in next 14 days?
4.	☐	☐	☐	Do areas of steep slopes or complex stabilization issues exist? If "YES" explain:
5.	☐	☐	☐	Are there currently more than 5 acres of disturbed soil at the site? If so make sure there is an approval letter from NYS DEC.

Additional Comments:____
____

Inspection of Erosion and Sediment Control Devices

	Type of Control Device	Accumulation (if any) in %	Repairs/Maintenance Needed
1.			
2.			
3.			
4.			
5.			
6.			

Stabilization/Runoff

	YES	NO	N/A	
1.	☐	☐	☐	Are all existing disturbed areas contained by control devices? Type of devices:
2.	☐	☐	☐	Are there areas that require stabilization within the next 14 days? Specify Area:
3.	☐	☐	☐	Have stabilization measures been initiated in inactive areas?
4.	☐	☐	☐	Is there current snow cover or frozen ground conditions?
5.	☐	☐	☐	Rills or gullies?
6.	☐	☐	☐	Slumping/deposition?
7.	☐	☐	☐	Loss of vegetation?
8.	☐	☐	☐	Lack of germination?
9.	☐	☐	☐	Loss of mulching?

Receiving Structures/Water Bodies (Indicate locations where runoff leaves the project site on the site plan)

	YES	NO	N/A	
1.	☐	☐	☐	Surface water swale or natural surface waterbody?

If natural waterbody:

Is waterbody located ☐ onsite, or ☐ adjacent to property boundary?

Description of condition:____

	YES	NO	N/A	
2.	☐	☐	☐	Municipal or community system?

Inspect locations where runoff from project site enters the receiving waters and indicate if there is evidence of:

	YES	NO	N/A	
a.	☐	☐	☐	Rills or gullies?
b.	☐	☐	☐	Slumping/deposition?
c.	☐	☐	☐	Loss of vegetation?
d.	☐	☐	☐	Undermining of structures?
e.	☐	☐	☐	Was there a discharge into the receiving water on the day of inspection?
f.	☐	☐	☐	Is there evidence of turbidity, sedimentation, or oil in the receiving waters?

Additional Comments:____

Inspection of Post-Construction Stormwater Management Control Devices

	Type of Control Device	Phase of Construction	Repairs/Maintenance Needed
1.			
2.			
3.			
4.			

General Site Condition

	YES	NO	N/A	
1.	☐	☐	☐	Have action items from previous reports been addressed?
2.	☐	☐	☐	Does routine maintenance of protection components occur on a regular basis?
3.	☐	☐	☐	Does cleaning and/or sweeping affected roadways occur, at minimum, daily?
4.	☐	☐	☐	Is debris and litter removed on a monthly basis, or as necessary?
5.	☐	☐	☐	Is the site maintained in an orderly manner?

Describe the condition of all natural waterbodies within or adjacent to the Project that receive runoff from the site:

____

Contractors progress over last 7 days:____

Anticipated work to be begun in the next 7 days:____

Additional Comments:____

Visual Observations

	YES	NO	N/A	
1.	☐	☐	☐	All erosion and sediment control measures have been installed/constructed?
2.	☐	☐	☐	All erosion and sediment control measures are being maintained properly?

SUMMARY OF ACTION ITEMS TO REPAIR/REPLACE/MAINTAIN/CORRECT DEFICIENCIES

Action Reported To (no signature required): ____

Company: ____

Exhibit D

Other SWPPP Forms

Construction Sequence
SWPPP Plan Changes
Spill Response Form
Stormwater Management Practice Maintenance Log

The operator shall prepare a summary of construction status using the Construction Sequence Form below once every month. Significant deviations to the sequence and reasons for those deviations (i.e. weather, subcontractor availability, etc.), shall be noted by the contractor. The schedule shall be used to record the dates for initiation of construction, implementation of erosion control measures, stabilization, etc. A copy of this table will be maintained at the construction site and updated in addition to the individual Inspection Reports completed for each inspection.

Construction Sequence Form

Construction Activities (Identify name of planned practices)	**Date Complete**
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	

STORM WATER POLLUTION PREVENTION PLAN
PLAN CHANGES, AUTHORIZATION, AND CHANGE CERTIFICATION

CHANGES REQUIRED TO THE POLLUTION PREVENTION PLAN:

____
____
____
____
____

REASONS FOR CHANGES:

____
____
____
____
____

REQUESTED BY: ____________________________

DATE: ____________________________

AUTHORIZED BY: ____________________________

DATE: ____________________________

CERTIFICATION OF CHANGES:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that false statements made herein are punishable as a Class A misdemeanor pursuant to Section 210.45 of the penal code.

SIGNATURE: ____________________________________

DATE: ____________________________________

Please note that any changes to this SWPPP need to be approved by the NYCDEP prior to their implementation onsite.

SPILL RESPONSE REPORT

Within 1 hour of a spill discovery less than 2 gallons in volume the following must be notified:

Mr. Thomas Wilcock
(203) 258-6747

Within 1 hour of a spill discovery greater than 2 gallons the following must be notified:

Mr. Thomas Wilcock
NYSDEC Spill Response Hotline 1-800-457-7362
Spill Response Contractor

Material Spilled: ____
____
____
____

Approximate Volume: ____

Location: ____
____
____

Distance to nearest down gradient drainage: ______________________________
____

Distance to nearest down gradient open water: ______________________________
____

Temporary control measures in place: ______________________________
____
____
____
____
____

Stormwater Pond/Wetland Operation, Maintenance and Management Inspection Checklist

Project ______________________________

Location: ______________________________

Site Status: ______________________________

Date: ______________________________

Time: ______________________________

Inspector: ______________________________

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

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

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

Bioretention Operation, Maintenance and Management Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

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

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

Comments:

Actions to be Taken:

Open Channel Operation, Maintenance, and Management Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

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

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

Comments:

Actions to be Taken:

Exhibit E

SPDES General Permit GP-0-10-001

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES

from

CONSTRUCTION ACTIVITY

Permit No. GP-0-10-001

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

Effective Date: January 29, 2010 Expiration Date: January 28, 2015

William R. Adriance
Chief Permit Administrator

William R. Adriance January 28, 2010
Authorized Signature Date

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

PREFACE

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

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

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

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

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

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

FROM CONSTRUCTION ACTIVITIES

TABLE OF CONTENTS

Part I. <u>PERMIT COVERAGE AND LIMITATIONS</u>

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

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

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

3. *Construction activities* located in the watershed(s) identified in Appendix D that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land.

B. <u>Maintaining Water Quality</u> - It shall be a violation of this permit and the *ECL* for any *discharge* to either cause or contribute to a violation of *water quality standards* as contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York, such as:

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

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

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

C. <u>Eligibility Under This General Permit</u>

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

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

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

D. <u>Activities Which Are Ineligible for Coverage Under This General Permit</u> - All of the following are **<u>not</u>** authorized by this permit:

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

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

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

4. *Discharges* from *construction activities* that adversely affect a listed, or proposed to be listed, endangered or threatened species, or its critical habitat;

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

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

    a. are tributary to waters of the state classified as AA or AA-s; and

b. disturb one or more acres of land with no existing impervious cover and where the Soil Slope Phase is identified as an E or F on the USDA Soil Survey for the County in which the disturbance will occur.

7. *Construction activities* for linear transportation projects and linear utility projects that:
   a. are tributary to waters of the state classified as AA or AA-s; and

   b. disturb two or more acres of land with no existing impervious cover and where the Soil Slope Phase is identified as an E or F on the USDA Soil Survey for the County in which the disturbance will occur.

8. *Construction activities* that adversely affect a property that is listed or is eligible for listing on the State or National Register of Historic Places (Note: includes Archeological sites), unless there are written agreements in place with the NYS Office of Parks, Recreation and Historic Preservation (OPRHP) or other governmental agencies to mitigate the effects, or there are local land use approvals evidencing the same.

Part II. <u>OBTAINING PERMIT COVERAGE</u>

A. <u>Notice of Intent (NOI) Submittal</u>

1. An *owner or operator* of a *construction activity* that is <u>not</u> subject to the requirements of a *regulated, traditional land use control MS4* must first develop a SWPPP in accordance with all applicable requirements of this permit and then submit a completed NOI form to the address below in order to be authorized to *discharge* under this permit. The NOI form shall be one which is associated with this permit, signed in accordance with Part VII.H. of this permit.

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

2. An *owner or operator* of a *construction activity* that is subject to the requirements of a *regulated, traditional land use control MS4* must first develop a SWPPP in accordance with all applicable requirements of this permit and then have its SWPPP reviewed and accepted by the *MS4* prior to submitting the NOI to the Department. The *owner or operator* shall have the "MS4 SWPPP Acceptance" form signed by the principal executive officer or ranking elected official from the *regulated, traditional land use control MS4*, or by a duly authorized representative of that person, and then submit that form along with the NOI to the address referenced under "Notice of Intent (NOI) Submittal".

3. This requirement does not apply to an *owner or operator* that is obtaining permit coverage in accordance with the requirements in Part II.E. (Change of Owner or Operator).

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

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

B. <u>Permit Authorization</u>

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

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

   a. project review pursuant to the State Environmental Quality Review Act (SEQRA) have been satisfied, when SEQRA is applicable,

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

   c. the final SWPPP has been prepared, and

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

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

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

i. Five (5) business days from the date the Department receives a complete NOI for *construction activities* with a SWPPP that has been prepared in conformance with the technical standards referenced in Parts III.B.1, 2 and/or 3, or

ii. Sixty (60) business days from the date the Department receives a complete NOI for *construction activities* with a SWPPP that has <u>not</u> been prepared in conformance with the technical standards referenced in Parts III.B.1, 2 or 3.

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

i. Five (5) business days from the date the Department receives a complete NOI and signed "MS4 SWPPP Acceptance" form,

4. The Department may suspend or deny an *owner's or operator's* coverage under this permit if the Department determines that the SWPPP does not meet the permit requirements.

5. Coverage under this permit authorizes stormwater *discharges* from only those areas of disturbance that are identified in the NOI. If an *owner or operator* wishes to have stormwater *discharges* from future or additional areas of disturbance authorized, they must submit a new NOI that addresses that phase of the development, unless otherwise notified by the Department.

C. <u>General Requirements For Owners or Operators With Permit Coverage</u>

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

2. The *owner or operator* shall maintain a copy of the General Permit (GP-0-10-001), NOI, *NOI Acknowledgment Letter*, SWPPP, MS4 SWPPP Acceptance form and inspection reports at the construction site until all disturbed areas have achieved *final stabilization* and the NOT has been submitted to the Department.

The documents must be maintained in a secure location, such as a job trailer, on-site construction office, or mailbox with lock. The secure location must be accessible during normal business hours to an individual performing a compliance inspection.

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

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

b. In areas where soil disturbance activity has been temporarily or permanently ceased, temporary and/or permanent soil stabilization measures shall be installed and/or implemented within seven (7) days from the date the soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control.

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

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

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

4. The Department may suspend or revoke an *owner's or operator's* coverage under this permit at any time if the Department determines that the SWPPP does not meet the permit requirements.

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

D. Permit Coverage for Discharges Authorized Under GP-0-08-001

1. Upon renewal of SPDES General Permit for Stormwater Discharges from Construction Activity (Permit No. GP-0-08-001), a*n owner or operator* of *construction activity* with coverage under GP-0-08-001, as of the effective date of GP-0-10-001, shall be authorized to *discharge* in accordance with GP-0-10-001 unless otherwise notified by the Department.

E. Change of Owner or Operator

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

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

Part III. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

A. General SWPPP Requirements

1. The SWPPP shall be prepared prior to the submittal of the NOI. The NOI shall be submitted to the Department prior to the *commencement of construction activity*.

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

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

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

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

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

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

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

6. Prior to the *commencement of construction activity*, the *owner or operator* must identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting and maintaining the erosion and sediment control practices included in the SWPPP; and the contractor(s) and subcontractor(s) that will be responsible for constructing the post-construction stormwater management practices included in the SWPPP.

The *owner or operator* shall have each of the contractors and subcontractors identify at least one person from their company that will be responsible for implementation of the SWPPP. This person shall be known as the *trained contractor.* The *owner or operator* shall ensure that at least one *trained contractor* is on site on a daily basis when soil disturbance activities are being performed.

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

> "I hereby certify 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. "

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

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

8. The SWPPP must include documentation supporting the determination of permit eligibility with regard to Part I.D.8. (Historic Places or Archeological Resource). At a minimum, the supporting documentation shall include the following:

   a. Information on whether the stormwater discharge or *construction activities* would have an effect on a property (historic or archeological resource) that is listed or eligible for listing on the State or National Register of Historic Places;

   b. Results of historic resources screening determinations conducted. Information regarding the location of historic places listed, or eligible for listing, on the State or National Registers of Historic Places <u>and</u> areas of archeological sensitivity that may indicate the need for a survey can be obtained online by viewing the New York State Office of Parks, Recreation and Historic Places (OPRHP) online resources located on their web site at: http://nysparks.state.ny.us/shpo/online-tools/ (using The Geographic Information System for Archeology and National Register). OPRHP can also be contacted at: NYS OPRHP, State Historic Preservation Office, Peebles Island Resources Center, P.O. Box 189, Waterford, NY 12188-0189, phone: 518-237-8643;

   c. A description of measures necessary to avoid or minimize adverse impacts on places listed, or eligible for listing, on the State or National Register of Historic Places. If the *owner or operator* fails to describe and implement such measures, the stormwater *discharge* is ineligible for coverage under this permit; and

   d. Where adverse effects may occur, any written agreements in place with OPRHP or other governmental agency to mitigate those effects, or local land use approvals evidencing the same.

B. <u>Required SWPPP Contents</u>

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

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

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

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

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

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

f. A temporary and permanent soil stabilization plan that meets the requirements of the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, for each stage of the project, including initial land clearing and grubbing to project completion and achievement of final stabilization;

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

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

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

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

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

l. Identification of any elements of the design that are not in conformance with the requirements in the most current version of the technical standard, New York State Standards and Specifications for Erosion and Sediment Control. Include the reason for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is equivalent to the technical standards.

2. Post-construction stormwater management practice component - All construction projects identified in Table 2 of Appendix B as needing post-construction stormwater management practices shall prepare a SWPPP that includes practices designed in conformance with the most current version of the technical standard, New York State Stormwater Management Design Manual (“Design Manual”). If the Design Manual is revised during the term of this permit, an *owner or operator* must begin using the revised version of the Design Manual to prepare their SWPPP six (6) months from the final revision date of the Design Manual.

   Where post-construction stormwater management practices are not designed in conformance with this technical standard, the *owner or operator* must demonstrate equivalence to the technical standard.

   At a minimum, the post-construction stormwater management practice component of the SWPPP shall include the following:

   a. Identification of all post-construction stormwater management practices to be constructed as part of the project;

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

c. The dimensions, material specifications and installation details for each post-construction stormwater management practice;

d. Identification of any elements of the design that are not in conformance with the Design Manual. Include the reason for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is equivalent to the technical standards;

e. A hydrologic and hydraulic analysis for all structural components of the stormwater management control system;

f. A detailed summary (including calculations) of the sizing criteria that was used to design all post-construction stormwater management practices. At a minimum, the summary shall address the required design criteria from the applicable chapter of the Design Manual; including the identification of and justification for any deviations from the Design Manual, and identification of any design criteria that are not required based on the design criteria or waiver criteria included in the Design Manual; and

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

3. Enhanced Phosphorus Removal Standards - All construction projects identified in Table 2 of Appendix B that are located in the watersheds identified in Appendix C shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the Enhanced Phosphorus Removal Standards included in the Design Manual. At a minimum, the post-construction stormwater management practice component of the SWPPP shall include items 2.a - 2.g. above.

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

Part IV. INSPECTION AND MAINTENANCE REQUIREMENTS

A. General Construction Site Inspection and Maintenance Requirements

1. The *owner or operator* must ensure that all erosion and sediment control practices and all post-construction stormwater management practices identified in the SWPPP are maintained in effective operating condition at all times.

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

B. Owner or Operator Maintenance Inspection Requirements

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

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

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

C. <u>Qualified Inspector Inspection Requirements</u> - The *owner or operator* shall have a *qualified inspector* conduct site inspections in conformance with the following requirements:

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

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

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

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

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

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

    d. construction activities located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land.

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

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

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

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

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

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

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

   a. Date and time of inspection;

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

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

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

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

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

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

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

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

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

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

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

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

Part V. <u>TERMINATION OF PERMIT COVERAGE</u>

A. <u>Termination of Permit Coverage</u>

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

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

(Part V. A. 2)

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

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

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

3. For *construction activities* meeting subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *qualified inspector* perform a final site inspection prior to submitting the NOT. The *qualified inspector* shall, by signing the "Final Stabilization" and "Post-Construction Stormwater Management Practice" certification statements on the NOT, certify that all disturbed areas have achieved *final stabilization;* and all temporary, structural erosion and sediment control measures have been removed; and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP.

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

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

(Part V. A. 5)

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

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

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

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

Part VI. REPORTING AND RETENTION OF RECORDS

A. Record Retention - The *owner or operator* shall retain a copy of the NOI, NOI Acknowledgment Letter, SWPPP, MS4 SWPPP Acceptance form and any inspection reports that were prepared in conjunction with this permit for a period of at least five (5) years from the date that the site achieves *final stabilization*. This period may be extended by the Department, in its sole discretion, at any time upon written notification.

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

Part VII. STANDARD PERMIT CONDITIONS

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

The stop work order shall be in writing, shall describe the non-compliance in detail, and shall be sent to the *owner or operator*.

B. <u>Continuation of the Expired General Permit</u> - This permit expires five (5) years from the effective date. However, coverage may be obtained under the expired general permit, which will continue in force and effect, until a new general permit is issued. Unless otherwise notified by the Department in writing, an *owner or operator* seeking authorization under the new general permit must submit a new NOI in accordance with the terms of such new general permit.

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

D. <u>Need to Halt or Reduce Activity Not a Defense</u> - It shall not be a defense for an *owner or operator* in an enforcement action that it would have been necessary to halt or reduce the *construction activity* in order to maintain compliance with the conditions of this permit.

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

F. <u>Duty to Provide Information</u> - The *owner or operator* shall make available to the Department for review and copying or furnish to the Department within five (5) business days of receipt of a Department request for such information, any information requested for the purpose of determining compliance with this permit. This can include, but is not limited to, the NOI, NOI Acknowledgment Letter, SWPPP, MS4 SWPPP Acceptance form, executed maintenance agreement, and inspection reports. Failure to provide information requested by the Department within the request timeframe shall be a violation of this permit.

The NOI, SWPPP and inspection reports required by this permit are public documents that the *owner or operator* must make available for review and copying by any person within five (5) business days of the *owner or operator* receiving a written request by any such person to review the NOI, SWPPP or inspection reports. Copying of documents will be done at the requester's expense.

G. <u>Other Information</u> - When the *owner or operator* becomes aware that they failed to submit any relevant facts, or submitted incorrect information in the NOI or in any other report, or have made substantive revisions to the SWPPP (e.g. the scope of the project changes significantly, the type of post-construction stormwater management practice(s)

changes, there is a reduction in the sizing of the post-construction stormwater management practice, or there is an increase in the disturbance area or impervious area), which were not reflected in the original NOI submitted to the Department, they shall promptly submit such facts or information to the Department. Failure of the *owner or operator* to correct or supplement any relevant facts within five (5) business days of becoming aware of the deficiency shall constitute a violation of this permit.

H. <u>Signatory Requirements</u>

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

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

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

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

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

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

        i. the chief executive officer of the agency, or

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

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

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

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

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

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

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

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

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

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

K. <u>Denial of Coverage Under This Permit</u>

1. At its sole discretion, the Department may require any *owner or operator* authorized by this permit to apply for and/or obtain either an individual SPDES permit or another SPDES general permit. When the Department requires any discharger authorized by a general permit to apply for an individual SPDES permit, it shall notify the discharger in writing that a permit application is required. This notice shall include a brief statement of the reasons for this decision, an application form, a statement setting a time frame for the *owner or operator* to file the application for an individual SPDES permit, and a deadline, not sooner than 180 days from *owner or operator* receipt of the notification letter, whereby the authorization to discharge under this general permit shall be terminated. Applications must be submitted to the appropriate Regional Office. The Department may grant additional time upon demonstration, to the satisfaction of the Regional Water Engineer, that additional time to apply for an alternative authorization is necessary or where the Department has not provided a permit determination in accordance with Part 621 of this Title.

2. Any *owner or operator* authorized by this permit may request to be excluded from the coverage under this permit by applying for an individual permit or another general permit. In such cases, the *owner or operator* shall submit an individual application or an alternative general permit application in accordance with the requirements of this general permit, 40 CFR 122.26(c)(1)(ii) and 6 NYCRR Part 621, with reasons supporting the request, to the Department at the address for the appropriate Department Office (see addresses in Appendix F).The request may be granted by issuance of an individual permit or another general permit at the discretion of the Department.

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

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

M. <u>Inspection and Entry</u> - The *owner or operator* shall allow the Department or an authorized representative of EPA, the State, or, in the case of a construction site which discharges through an *MS4*, an authorized representative of the *MS4* receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

(Part VII. M)

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

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

3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment).

N. Permit Actions - At the Department's sole discretion, this permit may, at any time, be modified, suspended, revoked, or renewed. The filing of a request by the *owner or operator* for a permit modification, revocation and reissuance, termination, a notification of planned changes or anticipated noncompliance does not limit, diminish and/or stay compliance with any terms of this permit.

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

P. Re-Opener Clause

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

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

Q. Penalties for Falsification of Forms and Reports – Article 17 of the ECL provides for a civil penalty of $37,500 per day per violation of this permit. Articles 175 and 210 of the New York State Penal Law provide for a criminal penalty of a fine and/or imprisonment for falsifying forms and reports required by this permit.

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

APPENDIX A

Definitions

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

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

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

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

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

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

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

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

General SPDES permit - means a SPDES permit issued pursuant to 6 NYCRR Part 750-1.21 authorizing a category of discharges.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

APPENDIX B

Required SWPPP Components by Project Type

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

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

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

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

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

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

- All construction activities located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land.

Table 2
CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

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

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

APPENDIX C

Watersheds Where Enhanced Phosphorus Removal Standards Are Required

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

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

Figure 1 - New York City Watershed East of the Hudson

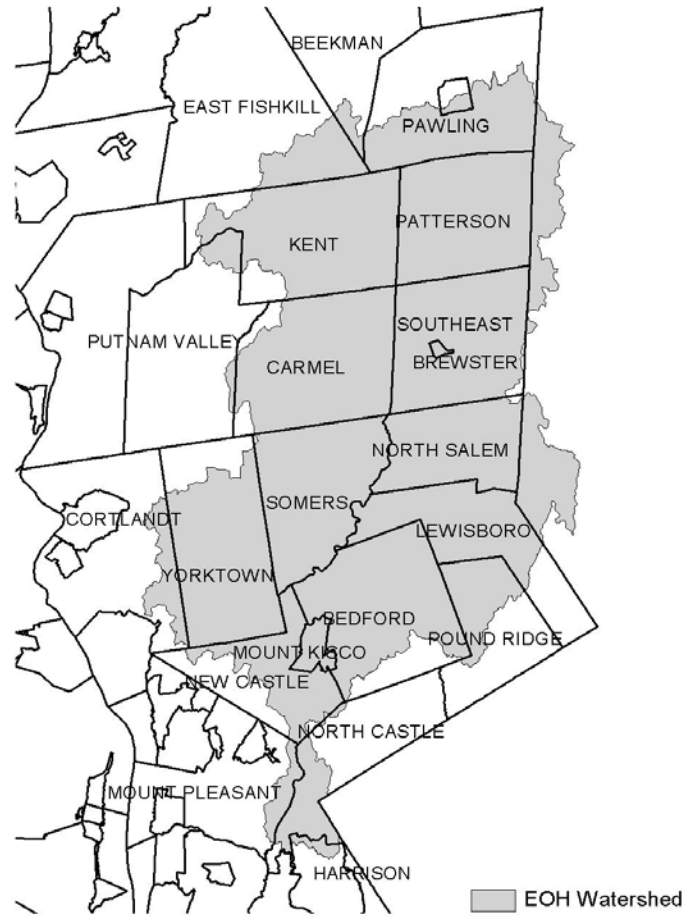


Figure 2 - Onondaga Lake Watershed

Figure 3 - Greenwood Lake Watershed

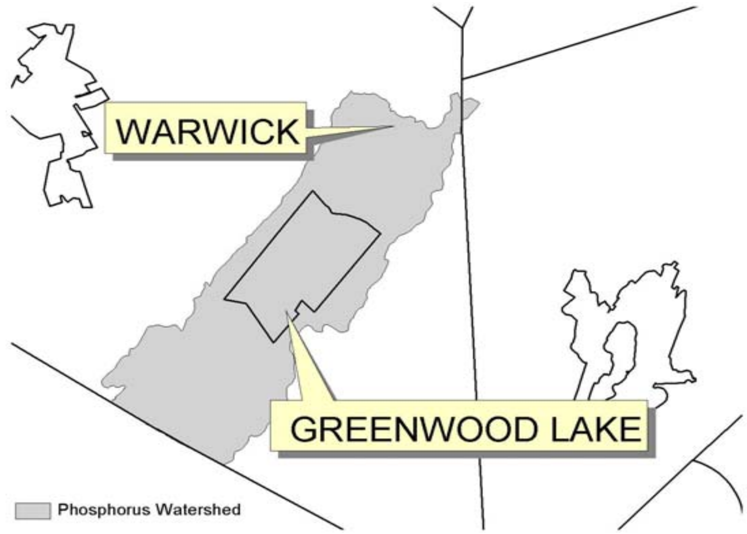
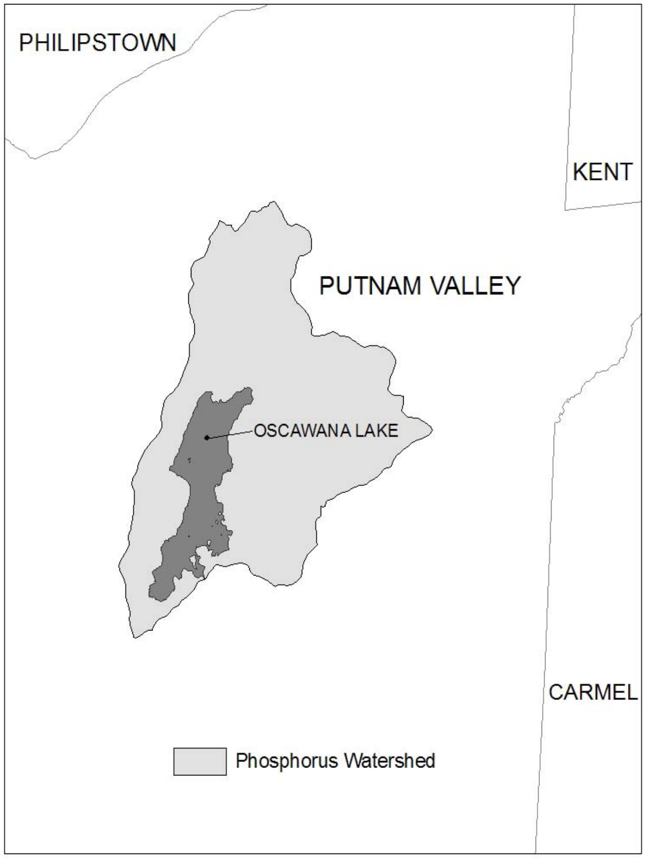


Figure 4 - Oscawana Lake Watershed



APPENDIX D

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

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

APPENDIX E

List of 303(d) segments impaired by pollutants related to construction activity (e.g. silt, sediment or nutrients). *Owners or operators* of single family home and single family residential subdivision construction activities that involve soil disturbances of one or more acres of land, but less than 5 acres, and *directly discharge* to one of the listed segments below shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the most current version of the technical standard, New York State Stormwater Management Design Manual ("Design Manual").

COUNTY	WATERBODY	COUNTY	WATERBODY
Albany	Ann Lee (Shakers) Pond, Stump Pond	Monroe	Genesee River, Lower, Main Stem
Albany	Basic Creek Reservoir	Monroe	Genesee River, Middle, Main Stem
Bronx	Van Cortlandt Lake	Monroe	Black Creek, Lower, and minor tribs
Broome	Whitney Point Lake/Reservoir	Monroe	Buck Pond
Broome	Beaver Lake	Monroe	Long Pond
Broome	White Birch Lake	Monroe	Cranberry Pond
Chautauqua	Chautauqua Lake, North	Monroe	Mill Creek and tribs
Chautauqua	Chautauqua Lake, South	Monroe	Shipbuilders Creek and tribs
Chautauqua	Bear Lake	Monroe	Minor tribs to Irondequoit Bay
Chautauqua	Chadakoin River and tribs	Monroe	Thomas Creek/White Brook and tribs
Chautauqua	Lower Cassadaga Lake	Nassau	Glen Cove Creek, Lower, and tribs
Chautauqua	Middle Cassadaga Lake	Nassau	LI Tribs (fresh) to East Bay
Chautauqua	Findley Lake	Nassau	East Meadow Brook, Upper, and tribs
Clinton	Great Chazy River, Lower, Main Stem	Nassau	Hempstead Bay
Columbia	Kinderhook Lake	Nassau	Hempstead Lake
Columbia	Robinson Pond	Nassau	Grant Park Pond
Dutchess	Hillside Lake	Niagara	Bergholtz Creek and tribs
Dutchess	Wappinger Lakes	Oneida	Ballou, Nail Creeks
Dutchess	Fall Kill and tribs	Onondaga	Ley Creek and tribs
Dutchess	Rudd Pond	Onondaga	Onondaga Creek, Lower and tribs
Erie	Rush Creek and tribs	Onondaga	Onondaga creek, Middle and tribs
Erie	Ellicott Creek, Lower, and tribs	Onondaga	Onondaga Creek, Upper, and minor tribs
Erie	Beeman Creek and tribs	Onondaga	Harbor Brook, Lower, and tribs
Erie	Murder Creek, Lower, and tribs	Onondaga	Ninemile Creek, Lower, and tribs
Erie	South Branch Smoke Cr, Lower, and tribs	Onondaga	Minor tribs to Onondaga Lake
Erie	Little Sister Creek, Lower, and tribs	Ontario	Honeoye Lake
Essex	Lake George (primary county listed as Warren)	Ontario	Hemlock Lake Outlet and minor tribs
Genesee	Black Creek, Upper, and minor tribs	Ontario	Great Brook and minor tribs
Genesee	Tonawanda Creek, Middle, Main Stem	Oswego	Lake Neatahwanta
Genesee	Tonawanda Creek, Upper, and minor tribs	Putnam	Oscawana Lake
Genesee	Little Tonawanda Creek, Lower, and tribs	Putnam	Lake Carmel
Genesee	Oak Orchard Creek, Upper, and tribs	Queens	Jamaica Bay, Eastern, and tribs (Queens)
Genesee	Bowen Brook and tribs	Queens	Bergen Basin
Genesee	Bigelow Creek and tribs	Queens	Shellbank Basin
Greene	Schoharie Reservoir	Rensselaer	Snyders Lake
Greene	Sleepy Hollow Lake	Richmond	Grasmere, Arbutus and Wolfes Lakes
Herkimer	Steele Creek tribs	Saratoga	Dwaas Kill and tribs
Kings	Hendrix Creek	Saratoga	Tribs to Lake Lonely
Lewis	Mill Creek/South Branch and tribs	Saratoga	Lake Lonely
Livingston	Conesus Lake	Saratoga	Schuyler Creek and tribs
Livingston	Jaycox Creek and tribs	Schenectady	Collins Lake
Livingston	Mill Creek and minor tribs		

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

COUNTY	WATERBODY	COUNTY	WATERBODY
Schoharie	Engleville Pond		
Schoharie	Summit Lake		
St. Lawrence	Black Lake Outlet/Black Lake		
Steuben	Lake Salubria		
Steuben	Smith Pond		
Suffolk	Millers Pond		
Suffolk	Mattituck (Marratooka) Pond		
Suffolk	Tidal tribs to West Moriches Bay		
Suffolk	Canaan Lake		
Suffolk	Lake Ronkonkoma		
Tompkins	Cayuga Lake, Southern End		
Tompkins	Owasco Inlet, Upper, and tribs		
Ulster	Ashokan Reservoir		
Ulster	Esopus Creek, Upper, and minor tribs		
Warren	Lake George		
Warren	Tribs to L.George, Village of L George		
Warren	Huddle/Finkle Brooks and tribs		
Warren	Indian Brook and tribs		
Warren	Hague Brook and tribs		
Washington	Tribs to L.George, East Shore of Lake George		
Washington	Cossayuna Lake		
Wayne	Port Bay		
Wayne	Marbletown Creek and tribs		
Westchester	Peach Lake		
Westchester	Mamaroneck River, Lower		
Westchester	Mamaroneck River, Upper, and minor tribs		
Westchester	Sheldrake River and tribs		
Westchester	Blind Brook, Lower		
Westchester	Blind Brook, Upper, and tribs		
Westchester	Lake Lincolndale		
Westchester	Lake Meahaugh		
Wyoming	Java Lake		
Wyoming	Silver Lake		

Note: The list above identifies those waters from the final New York State "2008 Section 303(d) List of Impaired Waters Requiring a TMDL/Other Strategy", dated May 26, 2008, that are impaired by silt, sediment or nutrients.

APPENDIX F

LIST OF NYS DEC REGIONAL OFFICES

Region	COVERING THE FOLLOWING COUNTIES:	DIVISION OF ENVIRONMENTAL PERMITS (DEP) PERMIT ADMINISTRATORS	DIVISION OF WATER (DOW) WATER (SPDES) PROGRAM
1	NASSAU AND SUFFOLK	50 CIRCLE ROAD STONY BROOK, NY 11790 TEL. (631) 444-0365	50 CIRCLE ROAD STONY BROOK, NY 11790-3409 TEL. (631) 444-0405
2	BRONX, KINGS, NEW YORK, QUEENS AND RICHMOND	1 HUNTERS POINT PLAZA, 47-40 21ST ST. LONG ISLAND CITY, NY 11101-5407 TEL. (718) 482-4997	1 HUNTERS POINT PLAZA, 47-40 21ST ST. LONG ISLAND CITY, NY 11101-5407 TEL. (718) 482-4933
3	DUTCHESS, ORANGE, PUTNAM, ROCKLAND, SULLIVAN, ULSTER AND WESTCHESTER	21 SOUTH PUTT CORNERS ROAD NEW PALTZ, NY 12561-1696 TEL. (845) 256-3059	100 HILLSIDE AVENUE, SUITE 1W WHITE PLAINS, NY 10603 TEL. (914) 428 - 2505
4	ALBANY, COLUMBIA, DELAWARE, GREENE, MONTGOMERY, OTSEGO, RENSSELAER, SCHENECTADY AND SCHOHARIE	1150 NORTH WESTCOTT ROAD SCHENECTADY, NY 12306-2014 TEL. (518) 357-2069	1130 NORTH WESTCOTT ROAD SCHENECTADY, NY 12306-2014 TEL. (518) 357-2045
5	CLINTON, ESSEX, FRANKLIN, FULTON, HAMILTON, SARATOGA, WARREN AND WASHINGTON	1115 STATE ROUTE 86, PO BOX 296 RAY BROOK, NY 12977-0296 TEL. (518) 897-1234	232 GOLF COURSE ROAD, PO BOX 220 WARRENSBURG, NY 12885-0220 TEL. (518) 623-1200
6	HERKIMER, JEFFERSON, LEWIS, ONEIDA AND ST. LAWRENCE	STATE OFFICE BUILDING 317 WASHINGTON STREET WATERTOWN, NY 13601-3787 TEL. (315) 785-2245	STATE OFFICE BUILDING 207 GENESEE STREET UTICA, NY 13501-2885 TEL. (315) 793-2554
7	BROOME, CAYUGA, CHENANGO, CORTLAND, MADISON, ONONDAGA, OSWEGO, TIOGA AND TOMPKINS	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7438	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7500
8	CHEMUNG, GENESEE, LIVINGSTON, MONROE, ONTARIO, ORLEANS, SCHUYLER, SENECA, STEUBEN, WAYNE AND YATES	6274 EAST AVON-LIMA ROAD AVON, NY 14414-9519 TEL. (585) 226-2466	6274 EAST AVON-LIMA RD. AVON, NY 14414-9519 TEL. (585) 226-2466
9	ALLEGANY, CATTARAUGUS, CHAUTAUQUA, ERIE, NIAGARA AND WYOMING	270 MICHIGAN AVENUE BUFFALO, NY 14203-2999 TEL. (716) 851-7165	270 MICHIGAN AVE. BUFFALO, NY 14203-2999 TEL. (716) 851-7070

<u>Exhibit F</u>

Historic Preservation Documentation

OFFICE OF PARKS · RECREATION · HISTORIC PRESERVATION
NEW YORK STATE

New York State Office of Parks, Recreation and Historic Preservation

David A. Paterson
Governor

Carol Ash
Commissioner

Historic Preservation Field Services Bureau • Peebles Island, PO Box 189, Waterford, New York 12188-0189
518-237-8643
www.nysparks.com

4 November 2010

Mr. Kevin J. Franke
The LA Group
40 Long Alley
Saratoga Springs, NY 12866

Re: DEC
Windham Mountain Sporting Club
Town of Windham, Greene County
10PR01623

Dear Mr. Franke:

The Office of Parks, Recreation and Historic Preservation (OPRHP) has reviewed the information submitted for this project (*Phase IA Literature Review and Archaeological Sensitivity Assessment & Phase IB Archaeological Field Survey and Reconnaissance, The Windham Mountain Sporting Club Project, Town of Windham, Greene County, NY*, dated September 2010, prepared by Hudson Mohawk Archaeological Consultants, LLC). Our review has been in accordance with Section 14.09 of the New York Parks, Recreation and Historic Preservation Law and relevant implementing regulations.

Thank you for submitting the above-referenced report. In order to continue review of this project OPRHP requests submission of the following additional information. Please provide a project plan which shows the locations of all shovel tests and clearly labels areas not tested with the reason for exclusion from testing.

Comments regarding buildings and structures are provided on the accompanying form.

If you have any questions please don't hesitate to contact me.

Sincerely,

Philip A. Perazio, OPRHP
Phone: 518-237-8643 x3276; FAX: 518-233-9049
Email: Philip.Perazio@oprhp.state.ny.us

Enclosure

Cc: Jason Fenton, Hudson Mohawk (via email)

REQUEST FOR ADDITIONAL INFORMATION
BUILDINGS/STRUCTURES/DISTRICTS

PROJECT NUMBER 10PR01623

(Windham Mountain Sporting Club/Windham/T/WINDHAM)

In order for us to complete our evaluation of the historic signification of all buildings/structures/districts within or adjacent to your project area we will need the following additional information

- ☐ Full project description showing area of potential effect.
- ☐ Clear, original photographs of buildings/structures 50 years or older.
  - ☐ within or ☐ immediately adjacent to the project area
  - ** *key all photographs to a site map*
- ☐ Clear, original photographs of the surroundings looking out from the project site in all direction, *keyed to a site map.*
- ☐ Date of construction.
- ☐ Brief history of property.
- ☐ Clear, original photographs of the following:
- ☑ Other:

  This report does not address the presence or absence of built features; there is no report on whether an architectural survey was even done

Please provide only the additional information checked above. If you have any question concerning this request for additional information, please call Kathleen LaFrank at 237-8643. ext 3261

PLEASE BE SURE TO REFER TO THE PROJECT NUMBER NOTED ABOVE WHEN RESPONDING TO THIS REQUEST

<u>Exhibit G</u>

Deep Ripping and De-compaction (DEC, 2008)

New York State
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Water

Deep-Ripping and Decompaction

April 2008

New York State
Department of Environmental Conservation

Document Prepared by:

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

Alternative Stormwater Management
Deep-Ripping and Decompaction

Description

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

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

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


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

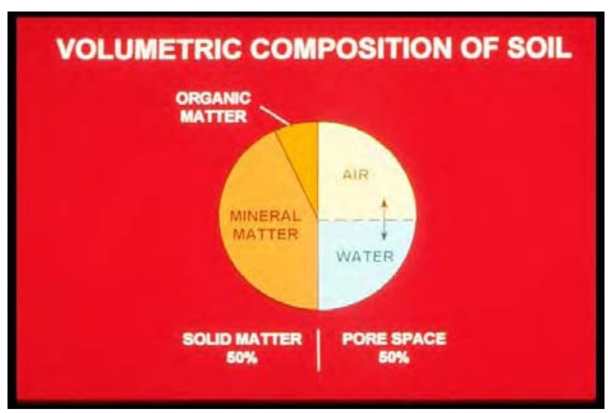


Fig. 2. About 50% of the volume of undisturbed loam surface soil is pore space, when soil is in good condition for plant growth. Brady, 2002.

Recommended Application of Practice

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

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

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

Benefits

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

- Increases the project (larger size) area's direct surface infiltration of rainfall by providing the open site's mitigated soil condition and lowers the demand on concentrated runoff control structures

- Enhances direct groundwater recharge through greater dispersion across and through a broader surface than afforded by some runoff-control structural measures

- Decreases runoff volume generated and provides hydrologic source control

- May be planned for application in feasible open locations either alone or in conjunction with plans for structural practices (e.g., subsurface drain line or infiltration basin) serving the same or contiguous areas

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

Feasibility/Limitations

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

Soil

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

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

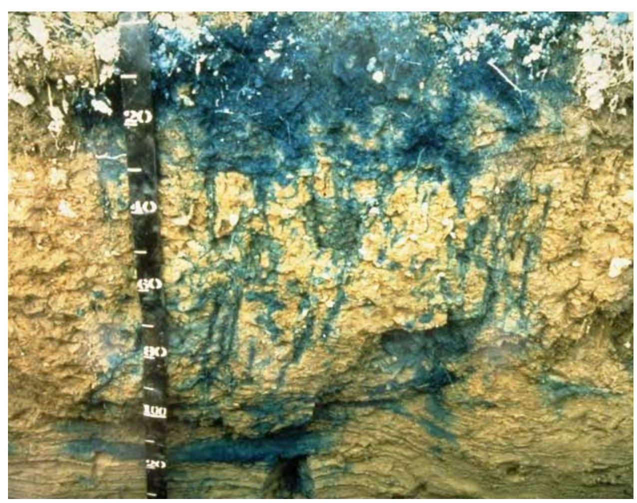


Fig. 4. Profile (in centimeters) displaying the infiltration test result of the natural undisturbed horizons of a soil in Hydrologic Soil Group C.

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

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

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

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

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

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

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

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

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

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

Design Guidance

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

1) Deep rip the affected thickness of exposed subsoil material (see Figure 10 and 11), aggressively fracturing it before the protected topsoil is reapplied on the site (see Figure 12); and

2) Decompact (deep subsoil), simultaneously through the restored topsoil layer and the upper half of the affected subsoil (Figure 13). The second phase, "decompaction," mitigates the partial recompaction which occurs during the heavy process of topsoil spreading/grading. Prior to deep ripping and decompacting the site, all construction activity, including construction equipment and material storage, site cleanup and trafficking (Figure 14), should be finished; and the site closed off to further disturbance. Likewise, once the practice is underway and the area's soil permeability and

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

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

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

Implements

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

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

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

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

Pulling-Power of Equipment

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

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

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

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

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

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

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

There may be construction sites where the depth of the exposed subsoil's compression is moderate, e.g.: 12 inches, rather than deep. This can be verified by using a ¾ inch cone penetrometer and a shovel to test the subsoil for its level of compaction, incrementally, every three inches of increasing depth. Once the full thickness of the subsoil's compacted zone is finally "pieced" and there is a significant drop in the psi measurements of the soil penetrometer, the depth/thickness of compaction is determined. This is repeated at several representative locations of the construction site. If the thickness of the site's subsoil compaction is verified as, for example, ten inches, then the Phase 1 Deep Ripping can be correspondingly reduced to the implement's minimum operable depth of 12 inches. However, the Phase 2 simultaneous Decompation (subsoiling) of an 11 inch thick layer of replaced topsoil and the upper subsoil should run at the subsoiling implements full operating depth.

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

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

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

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

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

- The first series (pattern) of passes is applied lengthwise, parallel with the longest spread of the site; gradually progressing across the site's width, with each successive pass.

- The second series runs obliquely, crossing the first series at an angle of about 45 degrees.

- The third series runs at right angle (or 90 degrees), to the first series to complete the fracturing and shattering on severely compacted sites, and avoid leaving large unbroken blocks of compressed soil material. (In certain instances, the third series may be optional, depending on how thoroughly the first two series loosen the material and eliminate large chunks/blocks of material as verified by tests with a ¾-inch cone penetrometer.)

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


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

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

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

● A second series of passes makes a broad “S” shaped pattern of rips, continually and gradually alternating the “S” curves between opposite edges inside the compacted corridor.

● The third and final series again uses the broad, alternating S pattern, but it is “flip-flopped” to continually cross the previous S pattern along the corridor’s centerline. This final series of the S pattern curves back along the edge areas skipped by the second series.

Maintenance and Cost

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

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

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

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

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

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

Resources

Publications:

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- Ellis, B. (Editor). 1997. Safe & Easy Lawn Care: The Complete Guide to Organic Low Maintenance Lawn. Houghton Mifflin.

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Exhibit H

Deep Hole Test Pit Logs from Soil Mapping

THE LA GROUP
40 Long Alley, Saratoga Springs, New York 12866

To: Kevin Franke

From: Roger J. Case, Soil Scientist

Re: Deep Soil Test pits @ Windham Resort (revised 12/17/2009)

On October 2008 the following deep soil test pits were observed.

Test pit #1: 0 to 4 inches, dark reddish brown silt loam
4 to 25 inches, yellowish red gravelly silt loam
25 to 70+ inches, very firm, reddish gray gravelly fine sandy loam

Soil type: Lewbeach silt loam
Boundary condition @ 25 inches, restrictive layer

Test pit #2: 0 to 4 inches, dark reddish brown silt loam
4 to 31 inches, yellowish red gravelly silt loam
31 to 70+ inches, very firm, reddish gray gravelly fine sandy loam

Soil type: Lewbeach silt loam
Boundary condition @ 31 inches, restrictive layer

Test pit #3: 0 to 4 inches, dark reddish brown silt loam
4 to 19 inches, yellowish red gravelly silt loam
19 inches, hard bedrock ledge

Soil type: Halcott silt loam
Boundary condition @ 19 inches, impervious layer

Test pit #4: 0 to 4 inches, dark reddish brown silt loam
4 to 26 inches, yellowish red gravelly silt loam
26 inches, hard bedrock ledge

Soil type: Vly silt loam
Boundary condition @ 26 inches, impervious layer

Test pit #5: 0 to 5 inches, dark reddish brown silt loam
5 to 31 inches, reddish brown very gravelly silt loam
31 inches, rippable red shale bedrock

Soil type: Vly silt loam
Boundary condition @ 31 inches, impervious layer

Test pit #6: 0 to 5 inches, dark reddish brown silt loam
5 to 36 inches, reddish brown very gravelly silt loam
36 inches, rippable red shale bedrock

Soil type: Vly silt loam
Boundary condition @ 36 inches, impervious layer

Test pit #7: 0 to 5 inches, dark reddish brown silt loam
5 to 30 inches, reddish brown, silty clay loam
30 inches, hard red shale bedrock

Soil type: Vly silt loam
Boundary condition @ 30 inches, impervious layer

Test pit #8: 0 to 5 inches, dark reddish brown silt loam
5 to 22 inches, reddish brown, gravelly silt loam
22 inches, hard bedrock

Soil type: Vly silt loam
Boundary condition @ 22 inches, impervious layer

Test pit #9: 0 to 5 inches, dark reddish brown silt loam
5 to 40 inches, reddish brown, gravelly silt loam
40 inches, hard red shale bedrock

Soil type: Vly silt loam
Boundary condition @ 40 inches, impervious layer

Test pit #10: 0 to 5 inches, dark reddish brown silt loam
5 to 16 inches, reddish brown, gravelly silt loam
16 to 36 inches, mottled reddish brown , gravelly silt loam
Refusal

Soil type: Onteora silt loam
Boundary condition @ 16 inches, seasonal high water table

Test pit #11: 0 to 4 inches, dark reddish brown silt loam
4 to 15 inches, yellowish red gravelly silt loam
15 inches, hard bedrock ledge

Soil type: Halcott silt loam
Boundary condition @ 15 inches, impervious layer

Test pit #12: 0 to 5 inches, dark reddish brown, gravelly (channery) silt loam
5 to 36 inches, reddish brown, very channery silt loam
36 to 51 inches, reddish brown, slightly firm, unconsolidated shale fragments
51 inches, reddish brown shale bedrock

Soil type: Elka channery silt loam
Boundary condition @ 51 inches, impervious layer

Test pit #13: 0 to 5 inches, dark reddish brown, gravelly (channery) silt loam
5 to 40 inches, reddish brown, very channery silt loam
40 to 57 inches, reddish brown, slightly firm, unconsolidated shale fragments
57 inches, reddish brown shale bedrock

Soil type: Elka channery silt loam
Boundary condition @ 57 inches, impervious layer

Test pit #14: 0 to 5 inches, dark reddish brown, gravelly (channery) silt loam
5 to 36 inches, reddish brown, very channery silt loam
36 to 60 inches, reddish brown, firm, unconsolidated shale fragments
60+ inches, reddish brown shale bedrock

Soil type: Elka channery silt loam
Boundary condition @ 60 inches, impervious layer

Test pit #15: 0 to 5 inches, dark reddish brown silt loam
5 to 25 inches, reddish brown, gravelly silt loam
25 to 40 inches, angular very gravelly aggregate
40 inches, hard bedrock

Soil type: Vly silt loam
Boundary condition @ 40 inches, impervious layer

Test pit #16: 0 to 5 inches, dark reddish brown silt loam
5 to 34 inches, reddish brown, gravelly silt loam
34 inches, hard red shale bedrock

Soil type: Vly silt loam
Boundary condition @ 34 inches, impervious layer

Test pit #17: 0 to 5 inches, dark reddish brown silt loam
5 to 29 inches, reddish brown, gravelly silt loam
29 inches, hard red shale bedrock

Soil type: Vly silt loam
Boundary condition @ 29 inches, impervious layer

Test pit #18: 0 to 4 inches, dark reddish brown silt loam
4 to 29 inches, yellowish red gravelly silt loam
29 to 70+ inches, very firm, reddish gray gravelly fine sandy loam

Soil type: Lewbeach silt loam
Boundary condition @ 29 inches, restrictive layer

Test pit #19: 0 to 5 inches, dark reddish brown, gravelly (channery) silt loam
5 to 45 inches, reddish brown, very channery silt loam
45 to 51 inches, reddish brown, slightly firm, unconsolidated shale fragments with strong seeps in the upper part
51 inches, reddish brown shale bedrock

Soil type: Elka channery silt loam
Boundary condition @ 45 inches, seasonal high water table

Test pit #20: 0 to 4 inches, dark reddish brown silt loam
4 to 20 inches, yellowish red gravelly silt loam
20 to 29 inches, mottled, reddish brown gravelly fine sandy loam
29 to 72+ inches, reddish brown gravelly silt loam

Soil type: Willowemoc silt loam
Boundary condition @ 20 inches, seasonal high water table

Test pit #21: 0 to 4 inches, dark reddish brown silt loam
4 to 14 inches, yellowish red gravelly silt loam
14 inches, hard bedrock ledge

Soil type: Halcott silt loam
Boundary condition @ 14 inches, impervious layer

Test pit #22: 0 to 5 inches, dark reddish brown silt loam
5 to 30 inches, reddish brown, gravelly silt loam
30 inches, hard red shale bedrock

Soil type: Vly silt loam
Boundary condition @ 30 inches, impervious layer

Test pit #23: 0 to 4 inches, dark reddish brown silt loam
4 to 26 inches, yellowish red gravelly silt loam
26 to 70+ inches, very firm, reddish gray gravelly fine sandy loam

Soil type: Lewbeach silt loam
Boundary condition @ 26 inches, restrictive layer

Test pit #24: 0 to 4 inches, dark reddish brown silt loam
4 to 12 inches, yellowish red gravelly silt loam
12 inches, hard bedrock ledge

Soil type: Halcott silt loam
Boundary condition @ 12 inches, impervious layer

Test pit #25: 0 to 5 inches, dark reddish brown silt loam
5 to 38 inches, reddish brown, gravelly silt loam
38 inches, hard red shale bedrock

Soil type: Vly silt loam
Boundary condition @ 38 inches, impervious layer

Test pit #26: 0 to 4 inches, dark reddish brown silt loam
4 to 25 inches, yellowish red gravelly silt loam
25 to 70+ inches, very firm, reddish gray gravelly fine sandy loam

Soil type: Lewbeach silt loam
Boundary condition @ 25 inches, restrictive layer

Test pit #27: 0 to 4 inches, dark reddish brown silt loam
4 to 29 inches, yellowish red gravelly silt loam
29 to 70+ inches, very firm, reddish gray gravelly fine sandy loam

Soil type: Lewbeach silt loam
Boundary condition @ 29 inches, restrictive layer

Test pit #28: 0 to 5 inches, dark reddish brown silt loam
5 to 26 inches, reddish brown, gravelly silt loam
26 inches, hard red shale bedrock

Soil type: Vly silt loam
Boundary condition @ 26 inches, impervious layer

Test pit #29: 0 to 4 inches, dark reddish brown silt loam
4 to 25 inches, yellowish red gravelly silt loam
25 to 70+ inches, very firm, reddish gray gravelly fine sandy loam

Soil type: Lewbeach silt loam
Boundary condition @ 25 inches, restrictive layer

Test pit #30 0 to 4 inches, dark reddish brown silt loam
4 to 12 inches, yellowish red gravelly silt loam
12 inches, hard bedrock ledge

Soil type: Halcott silt loam
Boundary condition @ 12 inches, impervious layer

Test pit #31: 0 to 5 inches, dark reddish brown silt loam
5 to 34 inches, reddish brown, gravelly silt loam
34 inches, hard red shale bedrock

Soil type: Vly silt loam
Boundary condition @ 34 inches, impervious layer

Test pit #32: 0 to 5 inches, dark reddish brown silt loam
5 to 29 inches, reddish brown, gravelly silt loam
29 inches, fractured bedrock

Soil type: Vly silt loam
Boundary condition @ 29 inches, impervious layer

Test pit #33: 0 to 4 inches, dark reddish brown silt loam
4 to 26 inches, yellowish red gravelly silt loam
26 to 70+ inches, very firm, reddish gray gravelly fine sandy loam

Soil type: Lewbeach silt loam
Boundary condition @ 26 inches, restrictive layer

Test pit #34: 0 to 5 inches, dark reddish brown silt loam
5 to 25 inches, yellowish red gravelly silt loam
25 to 70+ inches, very firm, reddish gray gravelly fine sandy loam

Soil type: Lewbeach silt loam
Boundary condition @ 25 inches, restrictive layer

Test pit #35: 0 to 5 inches, dark reddish brown silt loam
5 to 38 inches, reddish brown, gravelly silt loam
38 inches, hard red shale bedrock

Soil type: Vly silt loam
Boundary condition @ 38 inches, impervious layer

Every test pit witnessed at the property had a boundary condition. Where the boundary condition is bedrock it is described as an impervious layer. The restrictive layer is used to indicate the upper limits of a hardpan in a deep soil and seasonal high water table indicates mottling or seeps.

<u>MEMO</u>

TO: Kevin Franke, Mark Taber

FROM: Will Buetow

DATE: December 13, 2010

RE: Windham Test Pit and Percolation Tests Results

On December 10, 2010, I went to the Windham site to evaluate deep hole test pits and perform percolation tests for stormwater suitability determinations. The locations of five deep hole test pits were determined in the office and loaded onto a GPS unit so they could be located in the field. Five deep hole test pits were evaluated and three percolation tests were performed and GPS points were collected at each location. John from Katterskill was also present and performed all of the other percolation tests. The results from the deep hole test pits are as follows:

TP1-12/10/10
This site is located to the west of Trail Side Road close to the road edge. The slope at this location is approximately 12%.

A 0”-7” (5YR 3/4)dark red brown, gravelly silt loam, strong, fine, granular structure, friable.
B 7”-32” (5YR 4/3) red brown, gravelly fine silt loam, moderate, fine subangular blocky structure, friable.
B/Cd 32”-48” (2.5YR 4/3) red brown, gravelly silt loam, weak, fine subangular blocky structure, moderately firm.
This pit was dug to 8’ with no bedrock encountered. A fast flowing seep was observed at 67” which is representative of the water table. A percolation test was performed at a 24” depth resulting in a stabilized percolation rate of 36 minutes per inch of fall. This soil is most like the Lewbeach soil series.

TP2-12/10/2010
This site is located just off of a dirt road onsite in the northern most portion of the site and immediately south of an offsite house. The slope at this location is approximately 12%.

A 0”-7” (5YR 3/4) dark red brown, gravelly silt loam, strong, fine, granular structure, friable, many large rocks at the soil surface.
B 7”-32” (5YR 4/3) red brown, gravelly fine silt loam, moderate, fine subangular blocky structure, friable.
B/Cd 32”-48” (2.5YR 5/3) red brown, gravelly silt loam, weak, fine subangular blocky structure, moderately firm.

This pit was dug to 9’ with no bedrock indication of groundwater. A percolation test was performed at a 24” depth resulting in a stabilized percolation rate of 45 minutes per inch of fall. This soil is most like the Lewbeech soil series.

TP3-12/10/10
This pit is located in the northern portion of the site just to the west of a switchback onsite. The slope at this location is approximately 17%.

A 0”-5” (5YR 3/4) dark red brown, gravelly silt loam, strong, fine, granular structure, friable, many large pieces of shale at the soil surface.
B 5”-29” (5YR 4/3) red brown, gravelly fine silt loam, strong, fine subangular blocky structure, friable.
B/Cd 32”-48” (2.5YR 5/3) red brown, gravelly silt loam, very weak, fine subangular blocky structure, moderately firm.

This pit was dug to 8’ with no bedrock encountered. Flowing seeps were observed at 76” depth which are indicative of groundwater. A percolation test performed at a 24” depth resulted in a stabilized percolation rate of 47 minutes per inch of fall. This soil is most like the Lewbeach soil series.

TP4-12/10/10
This pit is located in the central portion of the site just to the east of the Wanderer Ski Slope. The slope at this location is approximately 8%. This area is a terrace which has bedrock exposed throughout the terrace face. This pit was dug to 26” and rippable shale was encountered. At 28” depth, hard bedrock was encountered. No percolation test was performed. This soil is most like the Vly soil series.

TP5-12/10/10
This pit is located in the southeastern portion of the property close to the eastern property boundary. The slope at this location is approximately 10%. Bedrock ledge and flowing seeps were encountered at a 24” depth. Numerous other pits were dug in the area with similar results. No percolation test were performed at this location. This soil is most like the Halcott and Vly soil series.

Exhibit I

Phosphorus and Total Suspended Solids Models for Existing and Proposed Conditions

Direct Calculation Mass Total P (Kg)

Pre Development		Post Development	
Design Point 1 Total acreage 74.71		Design Point 1 Total acreage 80.53	
Forest		Forest	
(0.00002005kg/m3) (70.18acres* 4047m2) (1.27m) (0.64) =	4.63	(0.00002005kg/m3) (62.09acres* 4047m2) (1.27m) (0.64) =	4.10
Impervious		Impervious	
(0.00026kg/m3) (0acres* 4047m2) (1.27m) (0.98) =	-	(0.00026kg/m3) (6.44acres* 4047m2) (1.27m) (0.98) =	8.43
Wetland		Wetland	
(0.0000825kg/m3) (4.53acres* 4047m2) (1.27m) (0.64) =	1.23	(0.0000825kg/m3) (4.53acres* 4047m2) (1.27m) (0.64) =	1.23
Pasture/Grass		Pasture/Grass	
(0.00014kg/m3) (0acres* 4047m2) (1.27m) (0.64) =	-	(0.00014kg/m3) (7.47acres* 4047m2) (1.27m) (0.64) =	3.44
Total kg of P per year	**5.86**	**Total kg of P per year**	**17.20**

Pre Development		Post Development	
Design Point 2 Total acreage 38.00		Design Point 2 Total acreage 43.46	
Forest		Forest	
(0.00002005kg/m3) (36.59acres* 4047m2) (1.27m) (0.64) =	2.41	(0.00002005kg/m3) (19.23acres* 4047m2) (1.27m) (0.64) =	1.27
Impervious		Impervious	
(0.00026kg/m3) (0acres* 4047m2) (1.27m) (0.98) =	-	(0.00026kg/m3) (7.87acres* 4047m2) (1.27m) (0.98) =	10.31
Wetland		Wetland	
(0.0000825kg/m3) (1.41acres* 4047m2) (1.27m) (0.64) =	0.38	(0.0000825kg/m3) (1.43acres* 4047m2) (1.27m) (0.64) =	0.39
Pasture/Grass		Pasture/Grass	
(0.00014kg/m3) (0acres* 4047m2) (1.27m) (0.64) =	-	(0.00014kg/m3) (14.93acres* 4047m2) (1.27m) (0.64) =	6.88
Total kg of P per year	**2.79**	**Total kg of P per year**	**18.85**

Pre Development		Post Development	
Design Point 2a Total acreage 2.89		Design Point 2a Total acreage 1.80	
Forest		Forest	
(0.00002005kg/m3) (2.89acres* 4047m2) (1.27m) (0.64) =	0.19	(0.00002005kg/m3) (1.73acres* 4047m2) (1.27m) (0.64) =	0.11
Impervious		Impervious	
(0.00026kg/m3) (0acres* 4047m2) (1.27m) (0.98) =	-	(0.00026kg/m3) (0acres* 4047m2) (1.27m) (0.98) =	-
Wetland		Wetland	
(0.0000825kg/m3) (0acres* 4047m2) (1.27m) (0.64) =	-	(0.0000825kg/m3) (0acres* 4047m2) (1.27m) (0.64) =	-
Pasture/Grass		Pasture/Grass	
(0.00014kg/m3) (0acres* 4047m2) (1.27m) (0.64) =	-	(0.00014kg/m3) (0.07acres* 4047m2) (1.27m) (0.64) =	0.03
Total kg of P per year	**0.19**	**Total kg of P per year**	**0.14**

Pre Development		Post Development	
Design Point 2b Total acreage 17.97		Design Point 2b Total acreage 4.27	
Forest		Forest	
(0.00002005kg/m3) (17.97acres* 4047m2) (1.27m) (0.64) =	1.19	(0.00002005kg/m3) (3.68acres* 4047m2) (1.27m) (0.64) =	0.24
Impervious		Impervious	
(0.00026kg/m3) (0acres* 4047m2) (1.27m) (0.98) =	-	(0.00026kg/m3) (0acres* 4047m2) (1.27m) (0.98) =	-
Wetland		Wetland	
(0.0000825kg/m3) (0acres* 4047m2) (1.27m) (0.64) =	-	(0.0000825kg/m3) (0acres* 4047m2) (1.27m) (0.64) =	-
Pasture/Grass		Pasture/Grass	
(0.00014kg/m3) (0acres* 4047m2) (1.27m) (0.64) =	-	(0.00014kg/m3) (0.59acres* 4047m2) (1.27m) (0.64) =	0.27
Total kg of P per year	**1.19**	**Total kg of P per year**	**0.51**

Pre Development		Post Development	
Design Point 3 Total acreage 14.68		Design Point 3 Total acreage 27.38	
Forest		Forest	
(0.00002005kg/m3) (9.88acres* 4047m2) (1.27m) (0.64) =	0.65	(0.00002005kg/m3) (15.39acres* 4047m2) (1.27m) (0.64) =	1.01
Impervious		Impervious	
(0.00026kg/m3) (1.66acres* 4047m2) (1.27m) (0.98) =	2.17	(0.00026kg/m3) (4.24acres* 4047m2) (1.27m) (0.98) =	5.55
Wetland		Wetland	
(0.0000825kg/m3) (0.13acres* 4047m2) (1.27m) (0.64) =	0.04	(0.0000825kg/m3) (0acres* 4047m2) (1.27m) (0.64) =	-
Pasture/Grass		Pasture/Grass	
(0.00014kg/m3) (3.01acres* 4047m2) (1.27m) (0.64) =	1.38	(0.00014kg/m3) (7.76acres* 4047m2) (1.27m) (0.64) =	3.57
Total kg of P per year	**4.24**	**Total kg of P per year**	**10.13**

Pre Development				
Design Point	4	Total acreage	12.33	
Forest				
(0.00002005kg/m3) (9.33acres* 4047m2) (1.27m) (0.64) =				0.62
Impervious				
(0.00026kg/m3) (1.6acres* 4047m2) (1.27m) (0.98) =				2.10
Wetland				
(0.0000825kg/m3) (0acres* 4047m2) (1.27m) (0.64) =				-
Pasture/Grass				
(0.00014kg/m3) (1.4acres* 4047m2) (1.27m) (0.64) =				0.64
Total kg of P per year				**3.36**

Post Development				
Design Point	4	Total acreage	3.57	
Forest				
(0.00002005kg/m3) (2.77acres* 4047m2) (1.27m) (0.64) =				0.18
Impervious				
(0.00026kg/m3) (0.31acres* 4047m2) (1.27m) (0.98) =				0.41
Wetland				
(0.0000825kg/m3) (0acres* 4047m2) (1.27m) (0.64) =				-
Pasture/Grass				
(0.00014kg/m3) (0.49acres* 4047m2) (1.27m) (0.64) =				0.23
Total kg of P per year				**0.82**

Pre Development				
Design Point	5	Total acreage	44.40	
Forest				
(0.00002005kg/m3) (38.96acres* 4047m2) (1.27m) (0.64) =				2.57
Impervious				
(0.00026kg/m3) (0acres* 4047m2) (1.27m) (0.98) =				-
Wetland				
(0.0000825kg/m3) (1.21acres* 4047m2) (1.27m) (0.64) =				0.33
Pasture/Grass				
(0.00014kg/m3) (4.23acres* 4047m2) (1.27m) (0.64) =				1.95
Total kg of P per year				**4.85**

Post Development				
Design Point	5	Total acreage	24.14	
Forest				
(0.00002005kg/m3) (17.61acres* 4047m2) (1.27m) (0.64) =				1.16
Impervious				
(0.00026kg/m3) (3.07acres* 4047m2) (1.27m) (0.98) =				4.02
Wetland				
(0.0000825kg/m3) (0.1acres* 4047m2) (1.27m) (0.64) =				0.03
Pasture/Grass				
(0.00014kg/m3) (3.36acres* 4047m2) (1.27m) (0.64) =				1.55
Total kg of P per year				**6.76**

Pre Development				
Design Point	6	Total acreage	2.82	
Forest				
(0.00002005kg/m3) (0acres* 4047m2) (1.27m) (0.64) =				-
Impervious				
(0.00026kg/m3) (0acres* 4047m2) (1.27m) (0.98) =				-
Wetland				
(0.0000825kg/m3) (0acres* 4047m2) (1.27m) (0.64) =				-
Pasture/Grass				
(0.00014kg/m3) (2.82acres* 4047m2) (1.27m) (0.64) =				1.30
Total kg of P per year				**1.30**

Post Development				
Design Point	6	Total acreage	2.00	
Forest				
(0.00002005kg/m3) (1.53acres* 4047m2) (1.27m) (0.64) =				0.10
Impervious				
(0.00026kg/m3) (0.22acres* 4047m2) (1.27m) (0.98) =				0.29
Wetland				
(0.0000825kg/m3) (0acres* 4047m2) (1.27m) (0.64) =				-
Pasture/Grass				
(0.00014kg/m3) (0.25acres* 4047m2) (1.27m) (0.64) =				0.12
Total kg of P per year				**0.51**

Pre Development				
Design Point	7	Total acreage	5.31	
Forest				
(0.00002005kg/m3) (0.37acres* 4047m2) (1.27m) (0.64) =				0.02
Impervious				
(0.00026kg/m3) (0acres* 4047m2) (1.27m) (0.98) =				-
Wetland				
(0.0000825kg/m3) (0acres* 4047m2) (1.27m) (0.64) =				-
Pasture/Grass				
(0.00014kg/m3) (4.95acres* 4047m2) (1.27m) (0.64) =				2.28
Total kg of P per year				**2.30**

Post Development				
Design Point	7	Total acreage	4.92	
Forest				
(0.00002005kg/m3) (2.57acres* 4047m2) (1.27m) (0.64) =				0.17
Impervious				
(0.00026kg/m3) (1.17acres* 4047m2) (1.27m) (0.98) =				1.54
Wetland				
(0.0000825kg/m3) (0acres* 4047m2) (1.27m) (0.64) =				-
Pasture/Grass				
(0.00014kg/m3) (1.17acres* 4047m2) (1.27m) (0.64) =				0.54
Total kg of P per year				**2.25**

Pre Development				
Design Point	8	Total acreage	40.51	
Forest				
(0.00002005kg/m3) (26.23acres* 4047m2) (1.27m) (0.64) =				1.73
Impervious				
(0.00026kg/m3) (0acres* 4047m2) (1.27m) (0.98) =				-
Wetland				
(0.0000825kg/m3) (0.7acres* 4047m2) (1.27m) (0.64) =				0.19
Pasture/Grass				
(0.00014kg/m3) (13.58acres* 4047m2) (1.27m) (0.64) =				6.25
Total kg of P per year				**8.17**

Post Development				
Design Point	8	Total acreage	52.82	
Forest				
(0.00002005kg/m3) (30.29acres* 4047m2) (1.27m) (0.64) =				2.00
Impervious				
(0.00026kg/m3) (9.72acres* 4047m2) (1.27m) (0.98) =				12.73
Wetland				
(0.0000825kg/m3) (0.32acres* 4047m2) (1.27m) (0.64) =				0.09
Pasture/Grass				
(0.00014kg/m3) (12.49acres* 4047m2) (1.27m) (0.64) =				5.75
Total kg of P per year				**20.57**

Pre Development		Post Development	
Design Point 9 Total acreage 26.05		Design Point 9 Total acreage 24.72	
Forest		Forest	
(0.00002005kg/m3) (9.76acres* 4047m2) (1.27m) (0.64) =	0.64	(0.00002005kg/m3) (10.45acres* 4047m2) (1.27m) (0.64) =	0.69
Impervious		Impervious	
(0.00026kg/m3) (0.62acres* 4047m2) (1.27m) (0.98) =	0.81	(0.00026kg/m3) (4.97acres* 4047m2) (1.27m) (0.98) =	6.50
Wetland		Wetland	
(0.0000825kg/m3) (0.14acres* 4047m2) (1.27m) (0.64) =	0.04	(0.0000825kg/m3) (0.2acres* 4047m2) (1.27m) (0.64) =	0.05
Pasture/Grass		Pasture/Grass	
(0.00014kg/m3) (15.52acres* 4047m2) (1.27m) (0.64) =	7.15	(0.00014kg/m3) (9.11acres* 4047m2) (1.27m) (0.64) =	4.19
Total kg of P per year	**8.64**	**Total kg of P per year**	**11.43**

Pre Development		Post Development	
Design Point 11 Total acreage 165.06		Design Point 11 Total acreage 169.25	
Forest		Forest	
(0.00002005kg/m3) (127.23acres* 4047m2) (1.27m) (0.64) =	8.39	(0.00002005kg/m3) (142.12acres* 4047m2) (1.27m) (0.64) =	9.37
Impervious		Impervious	
(0.00026kg/m3) (12.28acres* 4047m2) (1.27m) (0.98) =	16.09	(0.00026kg/m3) (10.01acres* 4047m2) (1.27m) (0.98) =	13.11
Wetland		Wetland	
(0.0000825kg/m3) (6.22acres* 4047m2) (1.27m) (0.64) =	1.69	(0.0000825kg/m3) (5.43acres* 4047m2) (1.27m) (0.64) =	1.47
Pasture/Grass		Pasture/Grass	
(0.00014kg/m3) (19.32acres* 4047m2) (1.27m) (0.64) =	8.90	(0.00014kg/m3) (11.68acres* 4047m2) (1.27m) (0.64) =	5.38
Total kg of P per year	**35.07**	**Total kg of P per year**	**29.33**

Pre Development		Post Development	
Design Point 12 Total acreage 34.37		Design Point 12 Total acreage 40.21	
Forest		Forest	
(0.00002005kg/m3) (33.64acres* 4047m2) (1.27m) (0.64) =	2.22	(0.00002005kg/m3) (34.29acres* 4047m2) (1.27m) (0.64) =	2.26
Impervious		Impervious	
(0.00026kg/m3) (0acres* 4047m2) (1.27m) (0.98) =	-	(0.00026kg/m3) (1.86acres* 4047m2) (1.27m) (0.98) =	2.44
Wetland		Wetland	
(0.0000825kg/m3) (0.72acres* 4047m2) (1.27m) (0.64) =	0.20	(0.0000825kg/m3) (0.72acres* 4047m2) (1.27m) (0.64) =	0.20
Pasture/Grass		Pasture/Grass	
(0.00014kg/m3) (0acres* 4047m2) (1.27m) (0.64) =	-	(0.00014kg/m3) (3.34acres* 4047m2) (1.27m) (0.64) =	1.54
Total kg of P per year	**2.42**	**Total kg of P per year**	**6.44**

Total Existing kg P/year 80.38 **Total Proposed kg P/year 124.94**

Total pre-development acreage 479.09 **Total post-development acreage 479.08**

Direct Calculation Total Kg of TSS per year

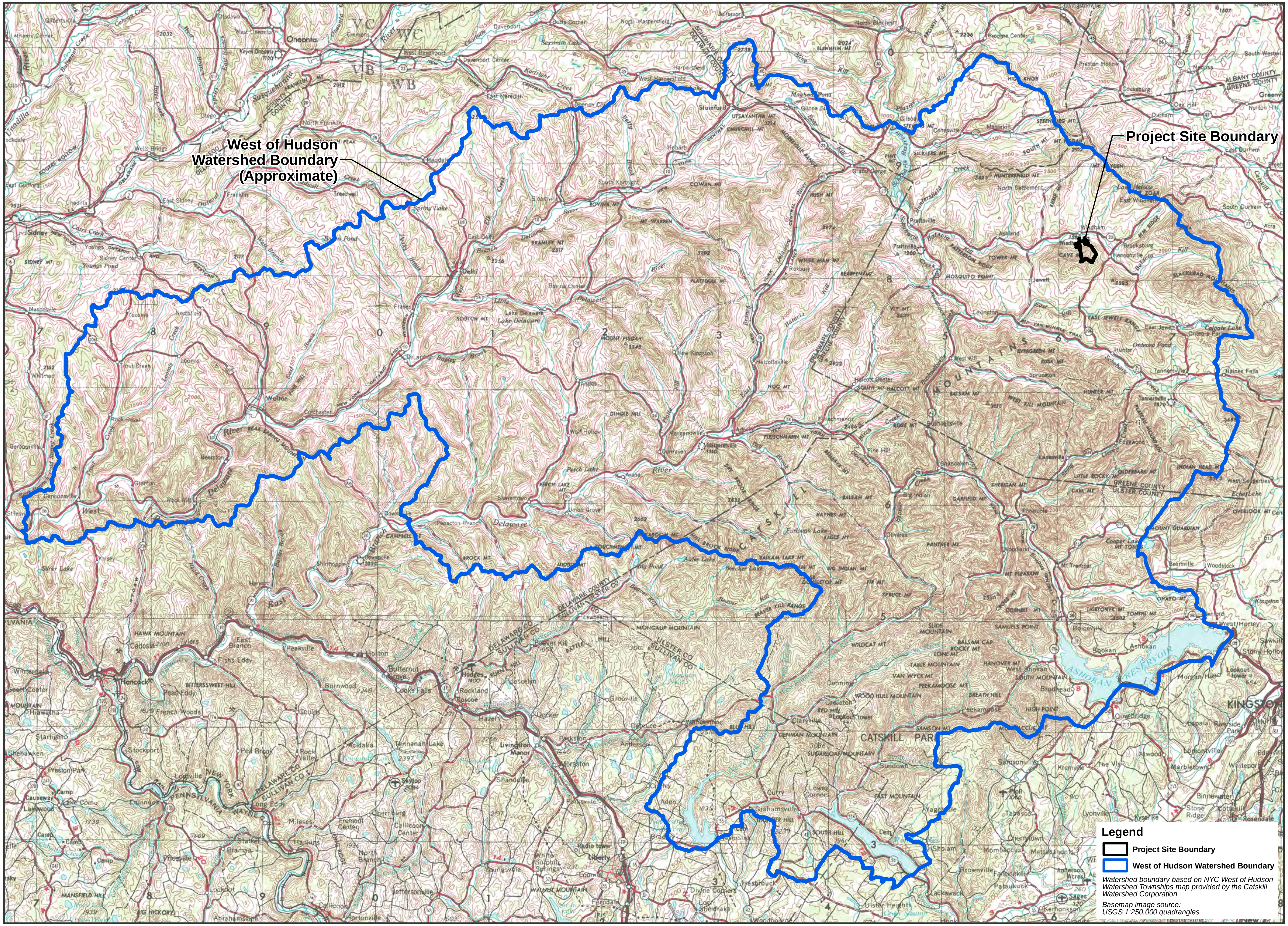
Pre Development		Post Development	
Design Point 1 Total acreage 74.71		Design Point 1 Total acreage 80.53	
Forest		Forest	
(0.037kg/m3) (70.18acres* 4047m2) (1.27m) (0.64) =	8,541	(0.037kg/m3) (62.09acres* 4047m2) (1.27m) (0.64) =	7,557
Impervious		Impervious	
(0.15kg/m3) (0acres* 4047m2) (1.27m) (0.98) =	-	(0.15kg/m3) (6.44acres* 4047m2) (1.27m) (0.98) =	4,864
Wetland		Wetland	
(0kg/m3) (4.53acres* 4047m2) (1.27m) (0.64) =	-	(0kg/m3) (4.53acres* 4047m2) (1.27m) (0.64) =	-
Pasture/Grass		Pasture/Grass	
(0.037kg/m3) * (0acres* 4047m2) (1.27m) (0.64) =	-	(0.037kg/m3) * (7.47acres* 4047m2) (1.27m) (0.64) =	909
Total TSS kg/Year	**8,541**	**Total TSS kg/Year**	**13,330**
Pre Development		Post Development	
Design Point 2 Total acreage 38.00		Design Point 2 Total acreage 43.46	
Forest		Forest	
(0.037kg/m3) (36.59acres* 4047m2) (1.27m) (0.64) =	4,453	(0.037kg/m3) (19.23acres* 4047m2) (1.27m) (0.64) =	2,341
Impervious		Impervious	
(0.15kg/m3) (0acres* 4047m2) (1.27m) (0.98) =	-	(0.15kg/m3) (7.87acres* 4047m2) (1.27m) (0.98) =	5,945
Wetland		Wetland	
(0kg/m3) (1.41acres* 4047m2) (1.27m) (0.64) =	-	(0kg/m3) (1.43acres* 4047m2) (1.27m) (0.64) =	-
Pasture/Grass		Pasture/Grass	
(0.037kg/m3) * (0acres* 4047m2) (1.27m) (0.64) =	-	(0.037kg/m3) * (14.93acres* 4047m2) (1.27m) (0.64) =	1,818
Total TSS kg/Year	**4,453**	**Total TSS kg/Year**	**10,104**
Pre Development		Post Development	
Design Point 2a Total acreage 2.89		Design Point 2a Total acreage 1.80	
Forest		Forest	
(0.037kg/m3) (2.89acres* 4047m2) (1.27m) (0.64) =	351	(0.037kg/m3) (1.73acres* 4047m2) (1.27m) (0.64) =	211
Impervious		Impervious	
(0.15kg/m3) (0acres* 4047m2) (1.27m) (0.98) =	-	(0.15kg/m3) (0acres* 4047m2) (1.27m) (0.98) =	-
Wetland		Wetland	
(0kg/m3) (0acres* 4047m2) (1.27m) (0.64) =	-	(0kg/m3) (0acres* 4047m2) (1.27m) (0.64) =	-
Pasture/Grass		Pasture/Grass	
(0.037kg/m3) * (0acres* 4047m2) (1.27m) (0.64) =	-	(0.037kg/m3) * (0.07acres* 4047m2) (1.27m) (0.64) =	9
Total TSS kg/Year	**351**	**Total TSS kg/Year**	**219**
Pre Development		Post Development	
Design Point 2b Total acreage 17.97		Design Point 2b Total acreage 4.27	
Forest		Forest	
(0.037kg/m3) (17.97acres* 4047m2) (1.27m) (0.64) =	2,187	(0.037kg/m3) (3.68acres* 4047m2) (1.27m) (0.64) =	448
Impervious		Impervious	
(0.15kg/m3) (0acres* 4047m2) (1.27m) (0.98) =	-	(0.15kg/m3) (0acres* 4047m2) (1.27m) (0.98) =	-
Wetland		Wetland	
(0kg/m3) (0acres* 4047m2) (1.27m) (0.64) =	-	(0kg/m3) (0acres* 4047m2) (1.27m) (0.64) =	-
Pasture/Grass		Pasture/Grass	
(0.037kg/m3) * (0acres* 4047m2) (1.27m) (0.64) =	-	(0.037kg/m3) * (0.59acres* 4047m2) (1.27m) (0.64) =	71
Total TSS kg/Year	**2,187**	**Total TSS kg/Year**	**519**
Pre Development		Post Development	
Design Point 3 Total acreage 14.68		Design Point 3 Total acreage 27.38	
Forest		Forest	
(0.037kg/m3) (9.88acres* 4047m2) (1.27m) (0.64) =	1,202	(0.037kg/m3) (15.39acres* 4047m2) (1.27m) (0.64) =	1,873
Impervious		Impervious	
(0.15kg/m3) (1.66acres* 4047m2) (1.27m) (0.98) =	1,254	(0.15kg/m3) (4.24acres* 4047m2) (1.27m) (0.98) =	3,204
Wetland		Wetland	
(0kg/m3) (0.13acres* 4047m2) (1.27m) (0.64) =	-	(0kg/m3) (0acres* 4047m2) (1.27m) (0.64) =	-
Pasture/Grass		Pasture/Grass	
(0.037kg/m3) * (3.01acres* 4047m2) (1.27m) (0.64) =	366	(0.037kg/m3) * (7.76acres* 4047m2) (1.27m) (0.64) =	944
Total TSS kg/Year	**2,823**	**Total TSS kg/Year**	**6,020**

Pre Development		Post Development	
Design Point 4 Total acreage 12.33		Design Point 4 Total acreage 3.57	
Forest		Forest	
(0.037kg/m3) (9.33acres* 4047m2) (1.27m) (0.64) =	1,136	(0.037kg/m3) (2.77acres* 4047m2) (1.27m) (0.64) =	337
Impervious		Impervious	
(0.15kg/m3) (1.6acres* 4047m2) (1.27m) (0.98) =	1,212	(0.15kg/m3) (0.31acres* 4047m2) (1.27m) (0.98) =	234
Wetland		Wetland	
(0kg/m3) (0acres* 4047m2) (1.27m) (0.64) =	-	(0kg/m3) (0acres* 4047m2) (1.27m) (0.64) =	-
Pasture/Grass		Pasture/Grass	
(0.037kg/m3) * (1.4acres* 4047m2) (1.27m) (0.64) =	170	(0.037kg/m3) * (0.49acres* 4047m2) (1.27m) (0.64) =	60
Total TSS kg/Year	**2,518**	**Total TSS kg/Year**	**631**
Pre Development		Post Development	
Design Point 5 Total acreage 44.40		Design Point 5 Total acreage 24.14	
Forest		Forest	
(0.037kg/m3) (38.96acres* 4047m2) (1.27m) (0.64) =	4,742	(0.037kg/m3) (17.61acres* 4047m2) (1.27m) (0.64) =	2,143
Impervious		Impervious	
(0.15kg/m3) (0acres* 4047m2) (1.27m) (0.98) =	-	(0.15kg/m3) (3.07acres* 4047m2) (1.27m) (0.98) =	2,318
Wetland		Wetland	
(0kg/m3) (1.21acres* 4047m2) (1.27m) (0.64) =	-	(0kg/m3) (0.1acres* 4047m2) (1.27m) (0.64) =	-
Pasture/Grass		Pasture/Grass	
(0.037kg/m3) * (4.23acres* 4047m2) (1.27m) (0.64) =	514	(0.037kg/m3) * (3.36acres* 4047m2) (1.27m) (0.64) =	409
Total TSS kg/Year	**5,256**	**Total TSS kg/Year**	**4,871**
Pre Development		Post Development	
Design Point 6 Total acreage 2.82		Design Point 6 Total acreage 2.00	
Forest		Forest	
(0.037kg/m3) (0acres* 4047m2) (1.27m) (0.64) =	-	(0.037kg/m3) (1.53acres* 4047m2) (1.27m) (0.64) =	186
Impervious		Impervious	
(0.15kg/m3) (0acres* 4047m2) (1.27m) (0.98) =	-	(0.15kg/m3) (0.22acres* 4047m2) (1.27m) (0.98) =	167
Wetland		Wetland	
(0kg/m3) (0acres* 4047m2) (1.27m) (0.64) =	-	(0kg/m3) (0acres* 4047m2) (1.27m) (0.64) =	-
Pasture/Grass		Pasture/Grass	
(0.037kg/m3) * (2.82acres* 4047m2) (1.27m) (0.64) =	343	(0.037kg/m3) * (0.25acres* 4047m2) (1.27m) (0.64) =	31
Total TSS kg/Year	**343**	**Total TSS kg/Year**	**383**
Pre Development		Post Development	
Design Point 7 Total acreage 5.31		Design Point 7 Total acreage 4.92	
Forest		Forest	
(0.037kg/m3) (0.37acres* 4047m2) (1.27m) (0.64) =	45	(0.037kg/m3) (2.57acres* 4047m2) (1.27m) (0.64) =	313
Impervious		Impervious	
(0.15kg/m3) (0acres* 4047m2) (1.27m) (0.98) =	-	(0.15kg/m3) (1.17acres* 4047m2) (1.27m) (0.98) =	887
Wetland		Wetland	
(0kg/m3) (0acres* 4047m2) (1.27m) (0.64) =	-	(0kg/m3) (0acres* 4047m2) (1.27m) (0.64) =	-
Pasture/Grass		Pasture/Grass	
(0.037kg/m3) * (4.95acres* 4047m2) (1.27m) (0.64) =	602	(0.037kg/m3) * (1.17acres* 4047m2) (1.27m) (0.64) =	142
Total TSS kg/Year	**647**	**Total TSS kg/Year**	**1,343**
Pre Development		Post Development	
Design Point 8 Total acreage 40.51		Design Point 8 Total acreage 52.82	
Forest		Forest	
(0.037kg/m3) (26.23acres* 4047m2) (1.27m) (0.64) =	3,193	(0.037kg/m3) (30.29acres* 4047m2) (1.27m) (0.64) =	3,687
Impervious		Impervious	
(0.15kg/m3) (0acres* 4047m2) (1.27m) (0.98) =	-	(0.15kg/m3) (9.72acres* 4047m2) (1.27m) (0.98) =	7,346
Wetland		Wetland	
(0kg/m3) (0.7acres* 4047m2) (1.27m) (0.64) =	-	(0kg/m3) (0.32acres* 4047m2) (1.27m) (0.64) =	-
Pasture/Grass		Pasture/Grass	
(0.037kg/m3) * (13.58acres* 4047m2) (1.27m) (0.64) =	1,653	(0.037kg/m3) * (12.49acres* 4047m2) (1.27m) (0.64) =	1,520
Total TSS kg/Year	**4,845**	**Total TSS kg/Year**	**12,553**

Pre Development		Post Development	
Design Point 9 Total acreage 26.05		Design Point 9 Total acreage 24.72	
Forest		Forest	
(0.037kg/m3) (9.76acres* 4047m2) (1.27m) (0.64) =	1,188	(0.037kg/m3) (10.45acres* 4047m2) (1.27m) (0.64) =	1,271
Impervious		Impervious	
(0.15kg/m3) (0.62acres* 4047m2) (1.27m) (0.98) =	469	(0.15kg/m3) (4.97acres* 4047m2) (1.27m) (0.98) =	3,753
Wetland		Wetland	
(0kg/m3) (0.14acres* 4047m2) (1.27m) (0.64) =	-	(0kg/m3) (0.2acres* 4047m2) (1.27m) (0.64) =	-
Pasture/Grass		Pasture/Grass	
(0.037kg/m3) * (15.52acres* 4047m2) (1.27m) (0.64) =	1,889	(0.037kg/m3) * (9.11acres* 4047m2) (1.27m) (0.64) =	1,108
Total TSS kg/Year	**3,546**	**Total TSS kg/Year**	**6,132**
Pre Development		Post Development	
Design Point 11 Total acreage 165.06		Design Point 11 Total acreage 169.25	
Forest		Forest	
(0.037kg/m3) (127.23acres* 4047m2) (1.27m) (0.64) =	15,485	(0.037kg/m3) (142.12acres* 4047m2) (1.27m) (0.64) =	17,297
Impervious		Impervious	
(0.15kg/m3) (12.28acres* 4047m2) (1.27m) (0.98) =	9,280	(0.15kg/m3) (10.01acres* 4047m2) (1.27m) (0.98) =	7,565
Wetland		Wetland	
(0kg/m3) (6.22acres* 4047m2) (1.27m) (0.64) =	-	(0kg/m3) (5.43acres* 4047m2) (1.27m) (0.64) =	-
Pasture/Grass		Pasture/Grass	
(0.037kg/m3) * (19.32acres* 4047m2) (1.27m) (0.64) =	2,351	(0.037kg/m3) * (11.68acres* 4047m2) (1.27m) (0.64) =	1,422
Total TSS kg/Year	**27,117**	**Total TSS kg/Year**	**26,283**
Pre Development		Post Development	
Design Point 12 Total acreage 34.37		Design Point 12 Total acreage 40.21	
Forest		Forest	
(0.037kg/m3) (33.64acres* 4047m2) (1.27m) (0.64) =	4,095	(0.037kg/m3) (34.29acres* 4047m2) (1.27m) (0.64) =	4,174
Impervious		Impervious	
(0.15kg/m3) (0acres* 4047m2) (1.27m) (0.98) =	-	(0.15kg/m3) (1.86acres* 4047m2) (1.27m) (0.98) =	1,406
Wetland		Wetland	
(0kg/m3) (0.72acres* 4047m2) (1.27m) (0.64) =	-	(0kg/m3) (0.72acres* 4047m2) (1.27m) (0.64) =	-
Pasture/Grass		Pasture/Grass	
(0.037kg/m3) * (0acres* 4047m2) (1.27m) (0.64) =	-	(0.037kg/m3) * (3.34acres* 4047m2) (1.27m) (0.64) =	406
Total TSS kg/Year	**4,095**	**Total TSS kg/Year**	**5,986**
Total Existing kg P/year	**66,721**	**Total Proposed kg P/year**	**88,374**
Total pre-development acreage 479.09		**Total post-development acreage 479.08**	

Exhibit J

Figures



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34 SALISBURY ROAD
DARIEN, CT 06820

The Windham Mountain Sporting Club

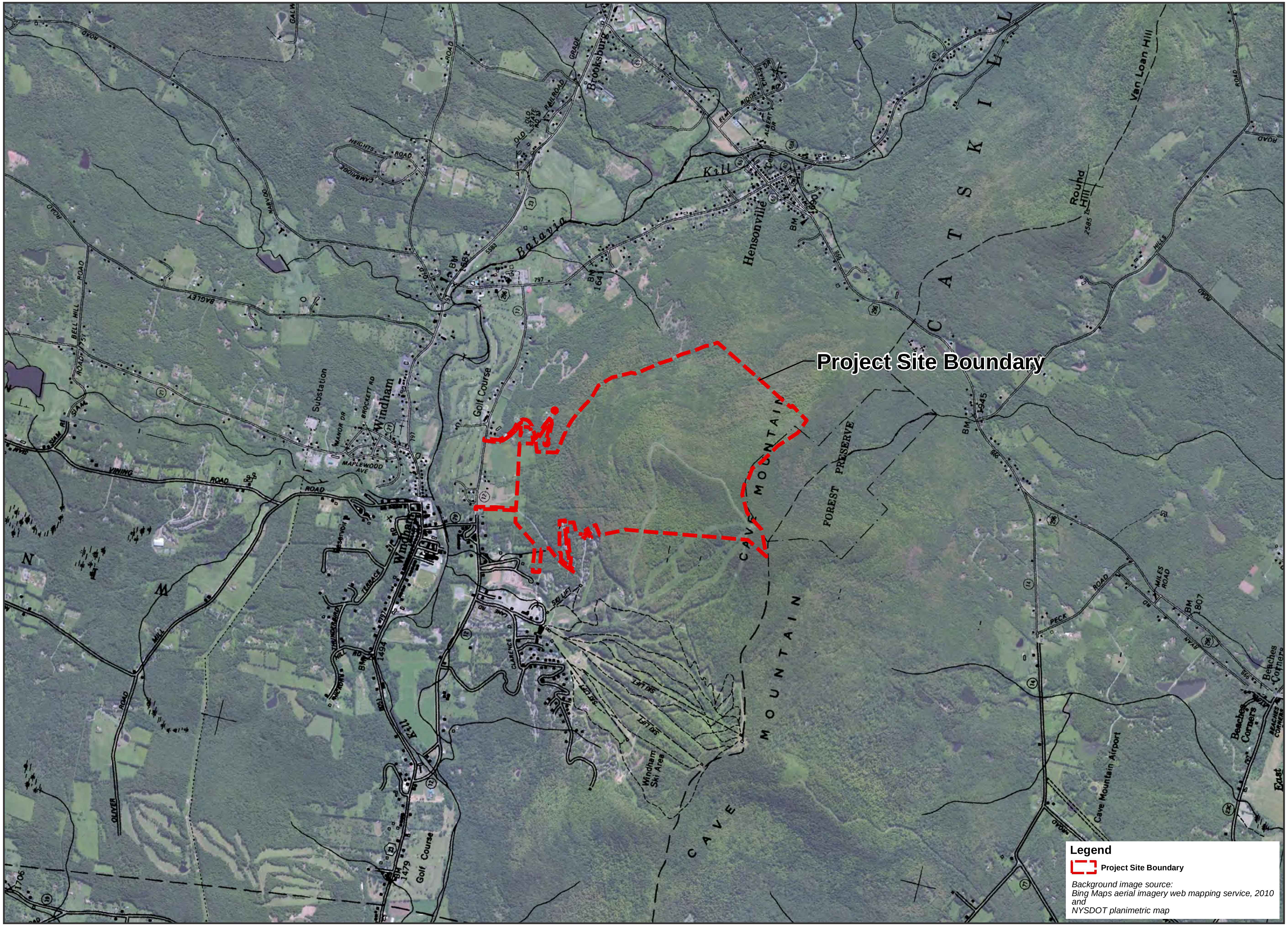
Town of Windham, Greene County, New York

Title
West of Hudson Watershed Map

0 2.5 5
Miles

Project: 08077
Date: 11/30/2011

Figure:
1-5



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The Windham Mountain Sporting Club
Town of Windham, Greene County, New York

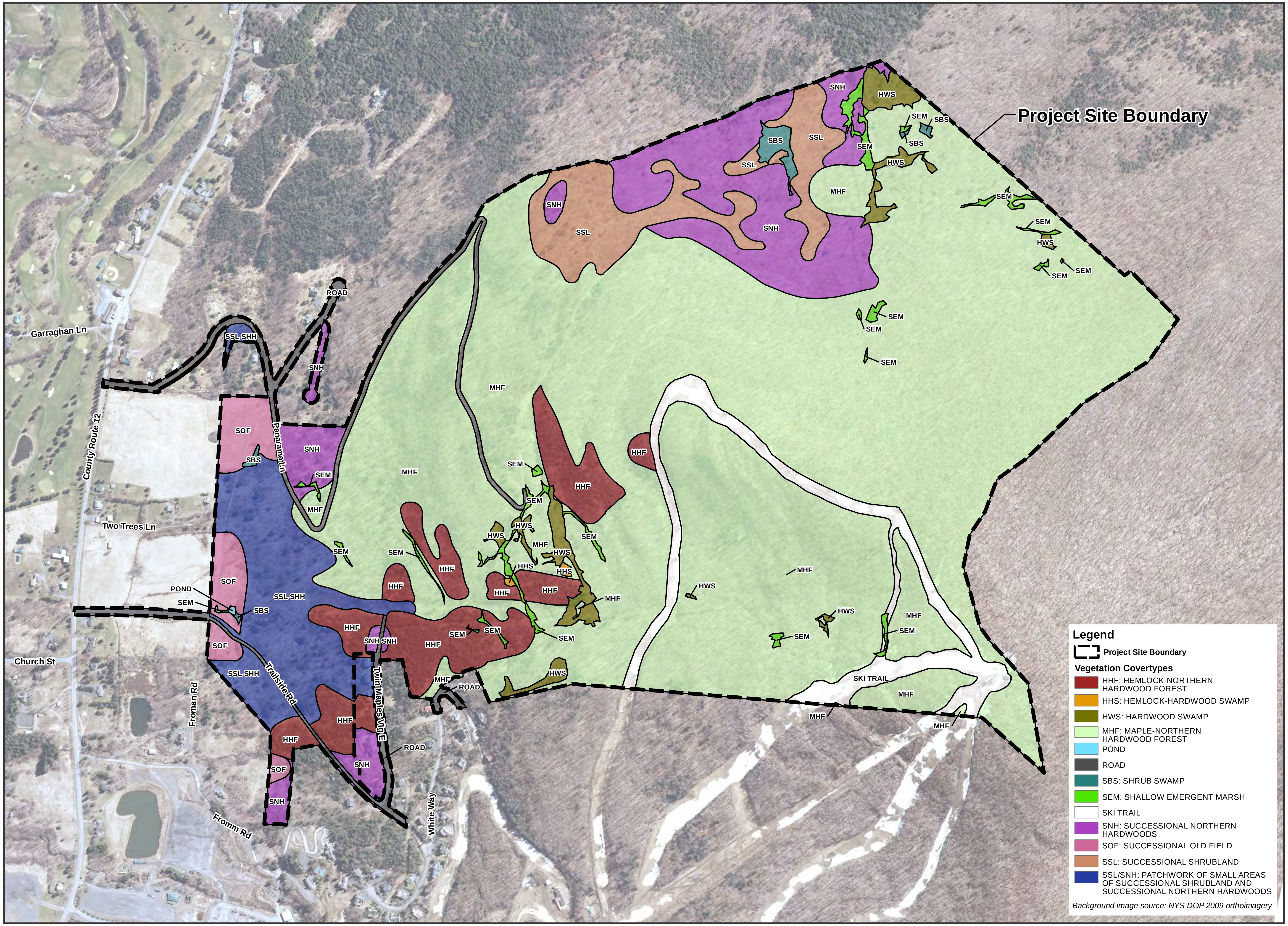
Title
Site Location Map

1" = 2,000'

0 1,000 2,000
Feet

Project: 08077
Date: 11/30/2011

Figure:
1-3



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The Windham Mountain Sporting Club

Town of Windham, Greene County, New York

Title **Vegetation Covertypes**

1" = 600'

0 300 600

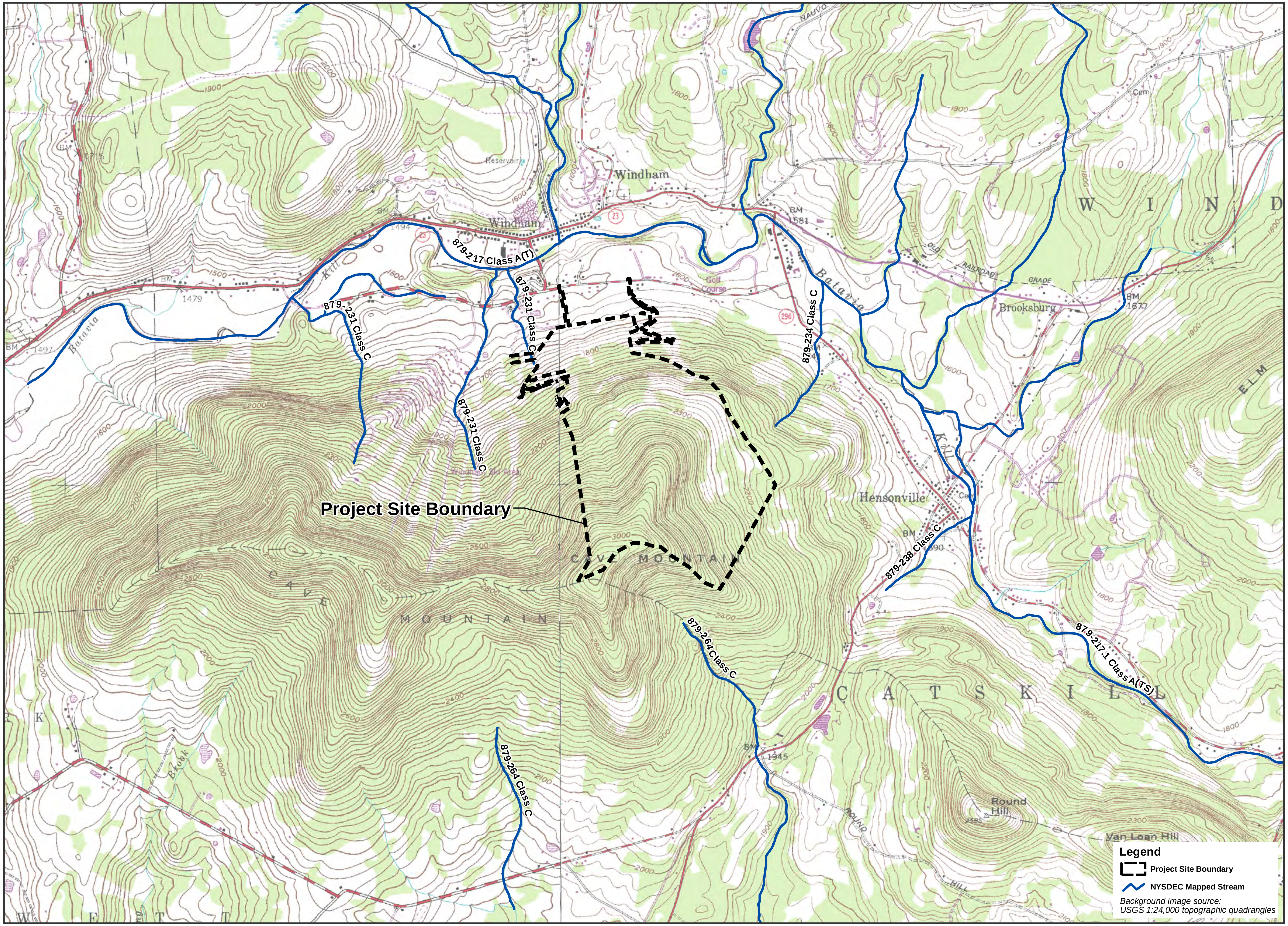
Feet

Project: 08077

Date: 12/07/2011

Figure:

3-10



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PREPARED FOR:
TUCK EASTSIDE PARTNERS, L.P.
34 SALISBURY ROAD
DARIEN, CT 06820

The Windham Mountain Sporting Club

Town of Windham, Greene County, New York

Title
NYSDEC Mapped Streams

1" = 2,000'

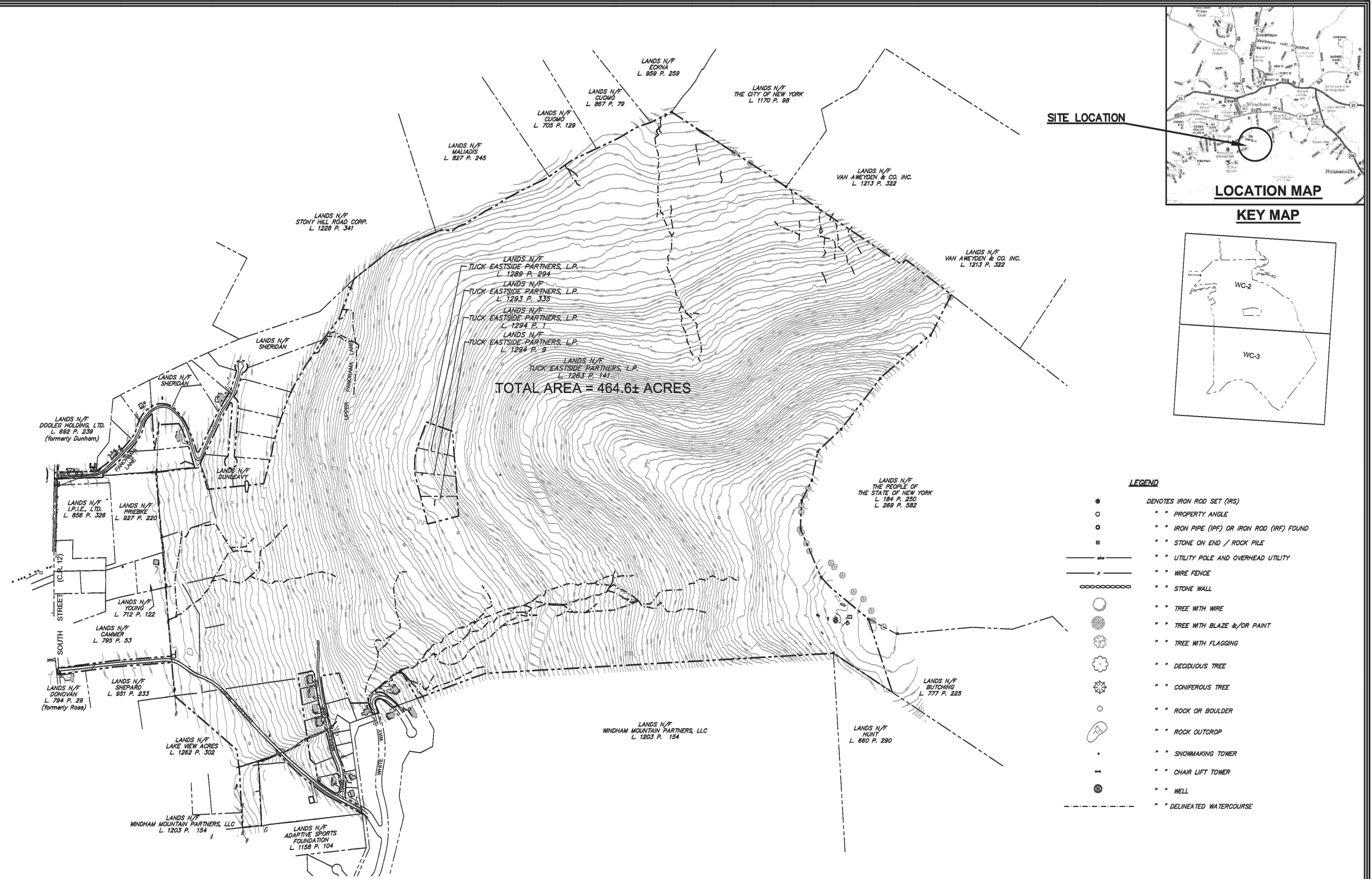
0 1,000 2,000
Feet

Project: 08077

Date: 12/07/2011

Figure:
3-7

DELINEATED WATERCOURSES				
DESIGNATION	NUMBER	LENGTH	HYDROLOGICAL TYPE	ISOLATED ?
S	1	2,936	Perennial	NO
S	1.1	1,213	Intermittent	NO
S	1.1.1	241	Ephemeral	NO
S	1.1.2	45	Intermittent	YES
S	1.2	144	Intermittent	NO
S	1.2.1	180	Intermittent	NO
S	1.2.2	667	Intermittent	NO
S	1.2.3	140	Ephemeral	NO
S	1.3	1,000	Intermittent	NO
S	1.3.1	62	Intermittent	NO
S	1.3.2	12	Intermittent	NO
S	1.3.3	36	Intermittent	NO
S	1.4	716	Ephemeral	NO
S	1.4.1	217	Ephemeral	NO
S	1.4.2	308	Ephemeral	NO
S	1.5	488	Intermittent	NO
S	1.6	218	Intermittent	NO
S	1.6.1	114	Ephemeral	NO
S	1.7	191	Ephemeral	NO
S	1.8	583	Perennial (?)	NO
S	1.8.1	201	Intermittent	NO
S	1.8.2	114	Intermittent	NO
S	1.9	616	Ephemeral	NO
S	1.9.1	140	Ephemeral	NO
S	1.9.2	118	Ephemeral	NO
S	1.10	289	Ephemeral	NO
S	1.10.1	106	Ephemeral	NO
S	1.11	50	Ephemeral	NO
S	1.11.1	201	Ephemeral	NO
S	1.11.2	64	Ephemeral	NO
S	1.12	289	Perennial or Intermittent	NO
S	1.12.1	413	Ephemeral	NO
S	1.12.1.1	448	Ephemeral	NO
S	1.12.2	646	Intermittent	NO
S	2	59	Intermittent	NO
S	3	63	Intermittent	NO
S	3.1	766	Intermittent	NO
S	3.1.1	304	Ephemeral	NO
S	3.1.2	729	Intermittent / ephemeral	NO
S	3.1.3	529	Intermittent	NO
S	3.2	1,238	Intermittent Upper Ephemeral Lower	YES
S	3.2.1	31	Ephemeral	YES
S	3.2.2	11	Ephemeral	YES
S	3.2.3	212	Ephemeral	YES
S	3.2.4	155	Ephemeral	YES
S	4	869	Intermittent	YES
S	4.1	213	Ephemeral	YES
S	4.2	56	Intermittent	YES
S	5	336	Intermittent	YES
S	5.1	104	Intermittent	YES
S	6	143	Intermittent	NO
S	6.1	169	Intermittent	NO
S	6.2	424	Intermittent	NO
S	7	1,621	Perennial in lower part, intermittent in upper part	NO
S	7.1	99	Intermittent	NO
S	7.2	84	Intermittent	NO
S	7.3	114	Intermittent	NO
S	7.4	442	Intermittent	NO
S	7.5	133	Ephemeral	NO
S	7.6	506	Intermittent	NO
S	8	27	Intermittent	NO
S	9	186	Intermittent	YES
S	10	161	Intermittent	YES
S	11	99	Intermittent	YES
S	12	100	Intermittent	NO
S	12.1	148	Intermittent	YES
S	12.2	229	Intermittent	YES
S	13	328	Intermittent	NO
S	13.1	49	Intermittent	NO
S	13.2	159	Intermittent	NO
S	13.3	229	Intermittent	NO
S	14	91	Intermittent	YES
S	15	571	Intermittent	NO
S	16	259	Intermittent	
TOTAL LINEAR FEET OF WATER COURSE		25,250		



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KAATERSKILL ASSOCIATES
SURVEYORS, ARCHITECTS AND ENGINEERS
CAIRO, NY (518)622-9667

REV	DATE	DESCRIPTION	APP.
		REVISIONS	

WINDHAM MOUNTAIN SPORTING CLUB SITE
OF LANDS OF
TUCK EASTSIDE PARTNERS, L.P.
34 SALISBURY ROAD, DARIEN CT 06820
OFF SOUTH STREET
TOWN OF WINDHAM GREENE COUNTY, NY
WATERCOURSE DELINEATION

PROJECT: 164207.01
DATE: 12-07-2011
SCALE: 1"=400'
TAX MAP #: 95-1-28.1
DRAWN BY: JWV
CHECKED BY: CPV
FILE: 16420701- Watercourse Delineation sheet WC-1.dwg

CHRISTINE P. VALACHOVIC
NYS PLS #50368

DRAWING:
WC-1
SHEET 1 of 3

the LA group
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Submission:
FOR REGULATORY APPROVALS ONLY

PREPARED FOR:
TUCK EASTSIDE PARTNERS, L.P.
34 SALISBURY ROAD
DARIEN, CT 06820

The Windham Mountain Sporting Club
Town of Windham
Greene County, New York
Title
Perennial, Intermittent and Ephemeral Drainages

Revisions

Project: 08077
Date: 11/23/2011

Drawing
3-9a

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GRAPHIC SCALE

(IN FEET)
1 inch = 200 ft.

CONTINUED ON SHEET WC-3

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SURVEYORS, ARCHITECTS AND ENGINEERS
CAIRO, NY (518)622-9667

REV	DATE	DESCRIPTION	APP.

REVISIONS

WINDHAM MOUNTAIN SPORTING CLUB SITE
OF LANDS OF
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34 SALISBURY ROAD, DARIEN CT 06820
OFF SOUTH STREET
TOWN OF WINDHAM — GREENE COUNTY, NY

WATERCOURSE DELINEATION

PROJECT: 164207.01
DATE: 12/07/2011
SCALE: 1"=200'
TAX MAP #: 95-1-28.1
DRAWN BY: JWV
CHECKED BY: CPV
FILE: 16420701-Watercourse Delineation sheets WC 2 WC 3.dwg

CHRISTINE P. VALACHOVIC
NYS PLS #50368

DRAWING: **WC-2**
SHEET 2 of 3

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34 SALISBURY ROAD
DARIEN, CT 06820

The Windham Mountain Sporting Club
Town of Windham
Greene County, New York

Title
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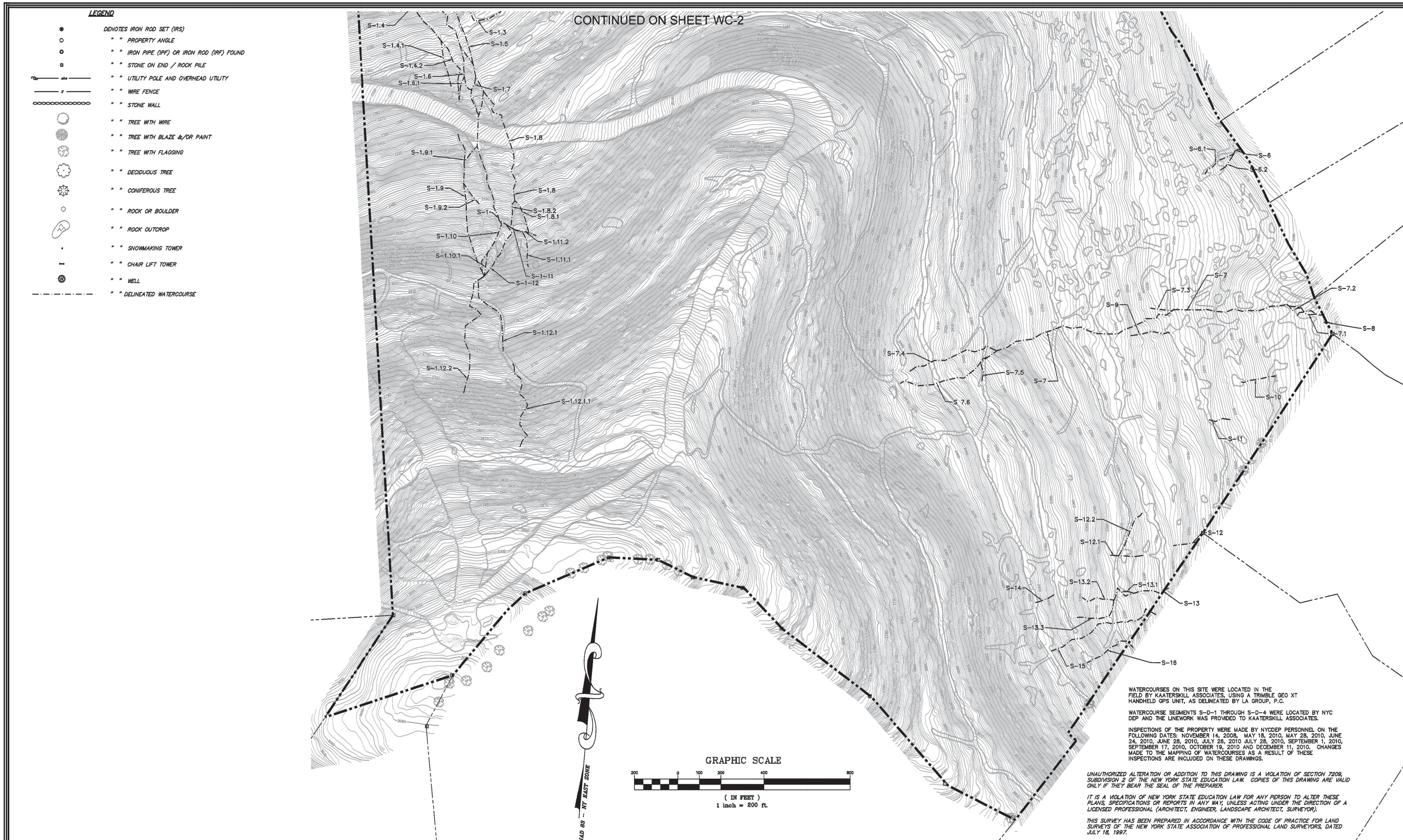
Revisions

Project: 08077
Date: 11/23/2011

Drawing
3-9b



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REV	DATE	DESCRIPTION	APP.

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NYS PLS #50368

DRAWING: **WC-3**
SHEET 3 of 3

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Greene County, New York

Title
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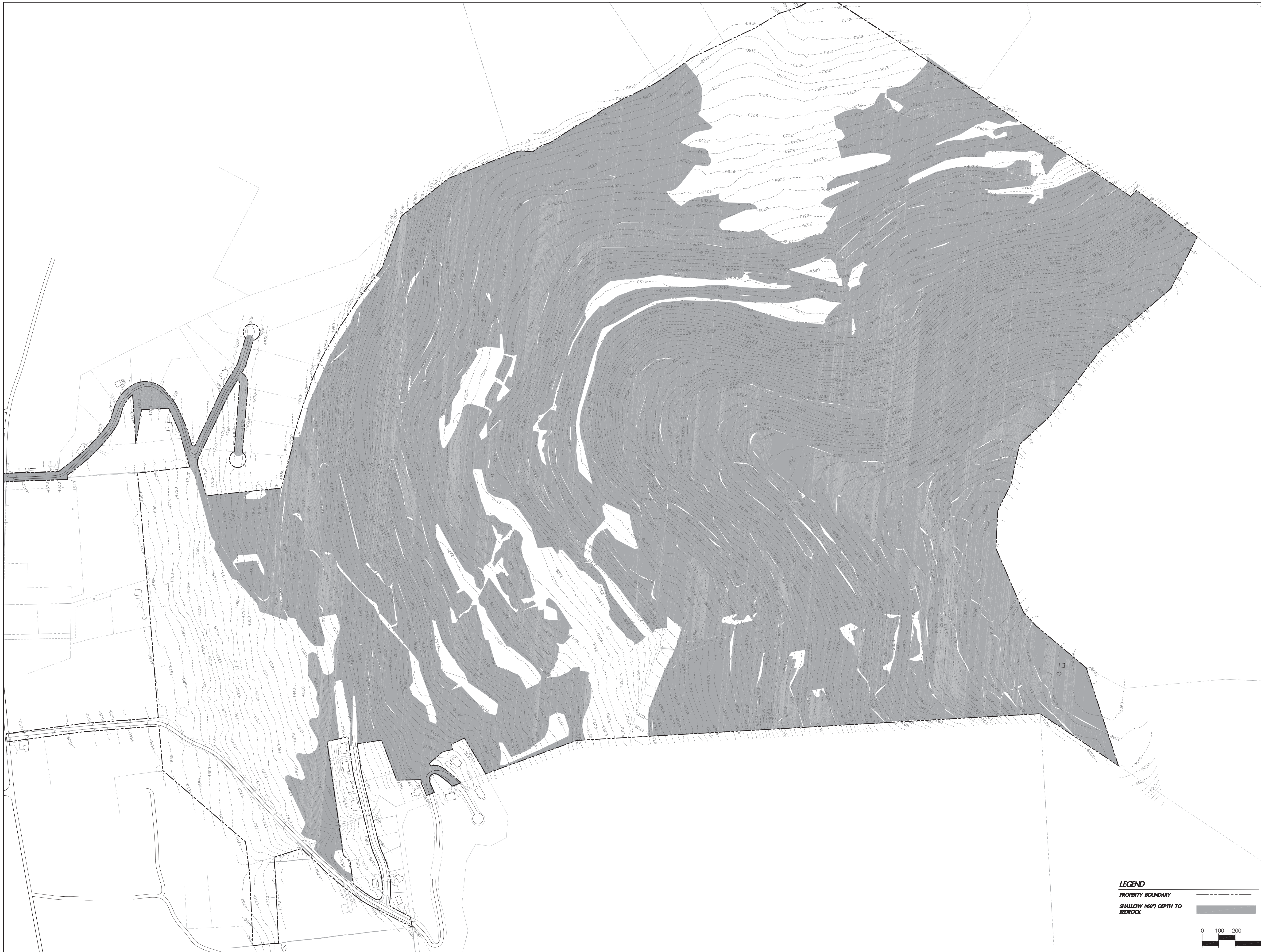
Revisions

Project: 08077
Date: 11/23/2011

Drawing
3-9c



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Design MJT/JTS

Drawn MJT/JTS

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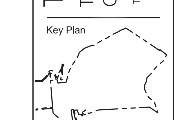
DARIEN, CT 06820

The Windham Mountain Sporting Club

Town of Windham
Greene County, New York

Title
Shallow Depth to Bedrock (<60")

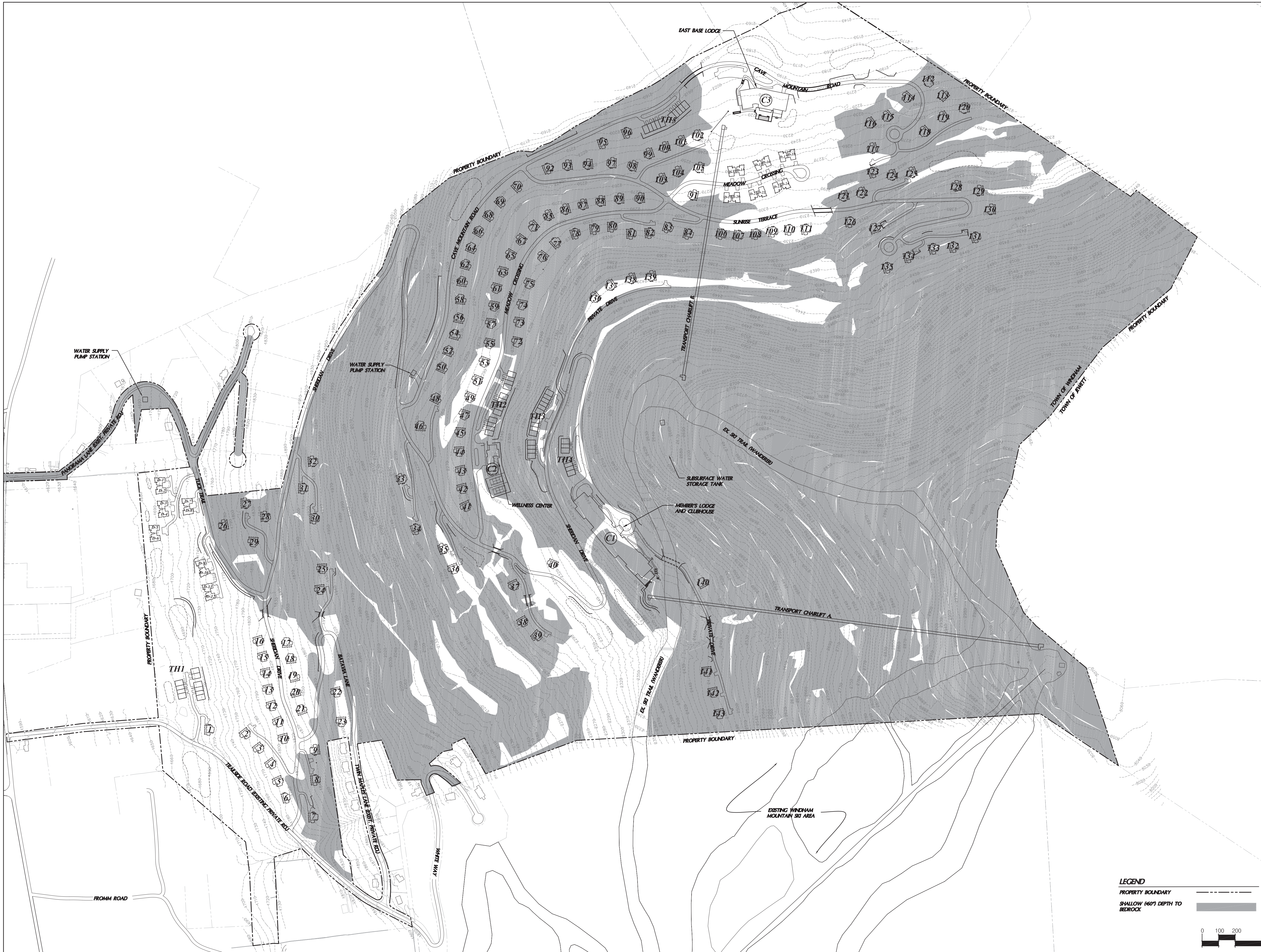


NORTH

Revisions

Project: 08077
Date: 11/23/2011

Drawing
3-1



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DARIEN, CT 06820

The Windham Mountain Sporting Club

Town of Windham
Greene County, New York

Title Shallow Depth to Bedrock (<60") with Master Plan Overlay

Key Plan

NORTH

Revisions

Project: 08077
Date: 11/23/2011

Drawing
3-3