STORMWATER REPORT

PRE-ENGINEERED METAL BUILDING
5 NEW VENTURE DRIVE
SOUTH DENNIS, MA

DECEMBER 2025

Owner/Applicant:

535 HIGGINS CROWELL, LLC
P.O. Box 517
Yarmouth Port, Massachusetts 02675

BSC Job Number: 0102234.00

Prepared by:

BSC GROUP
BUILD | SUPPORT | CONNECT

349 Main Street- Route 28
West Yarmouth, MA 02673

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SECTION 1.0

PROJECT INFORMATION

1.01 PROJECT DESCRIPTION

535 Higgins Crowell, LLC (The Applicant) is seeking to construct a pre-engineered metal building located at 5 New Venture Drive in South Dennis, Massachusetts, hereinafter referred to as "the Project". The total property area is 1.34 acres (58,291± sq. ft.) and is located off New Venture Drive, west of the intersection with Sout Gages Way. The property is bounded on the north by New Venture Drive, on the east and west by commercial properties, and bounded on the south by the Cape Cod Rail Trail.

The Project consists of the construction of the pre-engineered metal building with surface level parking located north and south of the building, a driveway into the site via New Venture drive west of the proposed building and a driveway east of the building connecting the two parking areas, a walkway, utility services, and stormwater management systems. The building has a footprint of approximately 6,000 square feet.

1.02 PRE-DEVELOPMENT CONDITIONS

The existing site topography generally slopes west across the property off-site or south towards a large on-site depression with slopes ranging from 0-12%. A small portion of the site slopes north towards New Venture Drive and off-site to the east. The current site is comprised of bare soil. The eastern, western, and southern perimeters of the site are wooded. The primary soil classification identified by the NRCS Web Soil Survey is Carver coarse sand (252B) which accounts for all of the property and project area. On July 15, 2025, BSC Group conducted 2 test pits on the site, the locations of which are noted on the Utility & Septic Plan, and the test pit data is included as Appendix X of this report. The test pits consisted primarily of sand to a depth of 12 feet. Based on the sandy materials found, runoff calculations have been performed using curve numbers corresponding to Hydrologic Soil Group (HSG) A.

There are no existing stormwater control measures on the property. The majority of stormwater runoff is directed off-site to the west or to an existing depression in southeast corner. A small portion of the site is discharged off-site to the north and west.

1.03 POST-DEVELOPMENT CONDITIONS

The proposed stormwater management system has been designed in a manner that will meet or exceed the provisions of the Department of Environmental Protection (DEP) Stormwater Management Standards for a new development project, as well as the Town of Dennis Stormwater Management Rules and Regulations.

Stormwater runoff from the building (approximately 6,000 square feet) will be collected by a series of roof drains which discharge into an infiltration basin located in the southeast corner of the property. Stormwater runoff collected via two catch basins located within the parking area south of the proposed building will be conveyed through a water quality unit, discharging into the infiltration basin as well. Runoff from the parking lot north of the proposed building will also be collected by two catch basins and routed into a water quality unit. This runoff will be discharged into the Cultec R-280HD infiltration system location beneath the driveway west of the proposed building.

The portion of stormwater runoff that discharges offsite will significantly decrease from proposed conditions. Each system is designed to completely hold and infiltrate the 100-year, 24-hour storm event.

Specifics of the project's compliance with the Stormwater Standards are discussed in detail in the following sections.

SECTION 2.0

DRAINAGE SUMMARY

2.01 Stormwater Standard 1 – New Stormwater Conveyances

Per Massachusetts Stormwater Management Standard #1, no new outfalls may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth. No new untreated stormwater discharges are proposed.

2.02 Stormwater Standard 2 – Stormwater Runoff Rates

Watershed modeling was performed using HydroCAD Stormwater Modeling Software version 10.20, a computer aided design program that combines SCS runoff methodology with standard hydraulic calculations. A model of the site's hydrology was developed for both pre- and post-development conditions to assess the effects of the proposed development on the project site and surrounding areas.

Stormwater runoff was modeled using TP-40 rainfall values. The following rainfall values have been used in our analysis:

Storm Frequency	**TP-40 Rainfall (Inches)**
2-year	3.50
10-year	4.80
100-year	7.15

The stormwater management systems for the project has been designed such that the post-development conditions result in no increase to peak runoff rates off the property for the 2, 10, and 100-year, 24-hour storm events, as detailed in the table below.

Peak Flow Discharge Rates

Node DP1 – Off-Site (North)

Storm Event	**Pre-Development Peak Discharge Rate (cfs)**	**Post-Development Peak Discharge Rate (cfs)**	**Change in Peak Discharge Rate (cfs)**
2-Year	0.15	0.00	-0.15
10-Year	0.27	0.00	-0.27
100-Year	0.49	0.03	-0.46

Node 2R– Off-Site (East)

Storm Event	**Pre-Development Peak Discharge Rate (cfs)**	**Post-Development Peak Discharge Rate (cfs)**	**Change in Peak Discharge Rate (cfs)**
2-Year	0.01	0.00	-0.01
10-Year	0.01	0.00	-0.01
100-Year	0.02	0.00	-0.02

Node 3R– Off-Site (South)

Storm Event	Pre-Development Peak Discharge Rate (cfs)	Post-Development Peak Discharge Rate (cfs)	Change in Peak Discharge Rate (cfs)
2-Year	0.28	0.00	-0.28
10-Year	0.49	0.00	-0.49
100-Year	0.89	0.08	-0.81

Node 4R– Off-Site (West)

Storm Event	Pre-Development Peak Discharge Rate (cfs)	Post-Development Peak Discharge Rate (cfs)	Change in Peak Discharge Rate (cfs)
2-Year	0.54	0.00	-0.54
10-Year	0.98	0.00	-0.98
100-Year	1.84	0.04	-1.80

2.03 Stormwater Standard 3 – Groundwater Recharge

Groundwater recharge is provided on site via one underground structural infiltration and one surface infiltration basin. The underground system is located beneath the driveway, west of the proposed building. The infiltration basin is located in the southeast corner of the property, utilizing the location of the existing depression. Overall, the project will result in no loss of annual recharge to groundwater as required by Standard 3. Refer to Section 6.0 of this Report for groundwater recharge information.

2.04 Stormwater Standard 4 – TSS Removal

As new development, the Project stormwater management system will achieve a TSS removal greater than 80% as required by the Town of Dennis Stormwater Management Rules and Regulations. The proposed stormwater management system has been designed to provide treatment of runoff in order to reduce suspended solids prior to discharge off-site through the implementation of the following best management practices:

- Water Quality Units
- Underground Stormwater Infiltration Systems
- Infiltration Basin

The water quality volume is defined as the runoff volume requiring TSS Removal for the site and is equal to 1.0-inches of runoff over the total impervious area of the post-development site for sites with rapid infiltration rates. The required water quality volume for the project is provided in Section 6.0 of this Report.

All infiltration systems have been sized to treat the required water quality volume and calculations are included in Section 6.0 of this Report.

A long-term pollution prevention plan complying with the requirements of Standard 4 is included in Section 4.0 of this Report.

2.05 Stormwater Standard 5 – Land Uses with Higher Potential Pollutant Loads

This standard is not applicable as the project site is not a land use with higher potential pollutant loads (LUHPPL).

2.06 Stormwater Standard 6 – Stormwater Discharges to a Critical Area

This standard is not applicable as runoff from the project site does not discharge to a critical area.

2.07 Stormwater Standard 7 – Redevelopment Projects

The Project is a new development and therefore has been designed to fully comply with all MassDEP Stormwater Standards and the Town of Dennis Stormwater Management Rules and Regulations.

2.08 Stormwater Standard 8 – Sedimentation and Erosion Control Plan

Erosion and sedimentation controls are shown on the Project Plans. Additionally, a Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan is included in Section 3.0 of this Report.

2.09 Stormwater Standard 9 – Long Term Operation and Maintenance Plan

A Long-Term Operation and Maintenance Plan is included in Section 4.0 of this Report.

2.10 Stormwater Standard 10 – Illicit Discharges

There are no known illicit discharges on the project site, and none are proposed. An illicit discharge compliance statement is included in Section 6.0 and will be signed by the Applicant prior to issuance of any permits.

2.11 Conclusion

The project has been designed in accordance with DEP Stormwater Management Standards and the Town of Dennis Stormwater Management Rules and Regulations. Through the construction of the aforementioned stormwater systems, the project will provide peak rate attenuation, TSS removal and groundwater recharge.

SECTION 3.0

CONSTRUCTION PERIOD POLLUTION PREVENTION AND EROSION AND SEDIMENTATION CONTROL PLAN

3.0 CONSTRUCTION PERIOD POLLUTION PREVENTION AND EROSION AND SEDIMENTATION CONTROL PLAN

This Section specifies requirements and suggestions for implementation of a Stormwater Pollution Prevention Plan (SWPPP) for **5 New Venture Drive, in South Dennis, Massachusetts**. The SWPPP shall be provided and maintained on-site by the Contractor(s) during all construction activities. The SWPPP shall be updated as required to reflect changes to construction activity.

The stormwater pollution prevention measures contained in the SWPPP shall be at least the minimum required by Local Regulations. The Contractor shall provide additional measures to prevent pollution from stormwater discharges in compliance with all local, state and federal requirements.

The SWPPP shall include provisions for, but not be limited to, the following:

1. Construction Trailers
2. Lay-down Areas
3. Equipment Storage Areas
4. Stockpile Areas
5. Disturbed Areas

Erosion and Sedimentation Control

The Contractor shall be solely responsible for erosion and sedimentation control at the site. The Contractor shall utilize a system of operations and all necessary erosion and sedimentation control measures, even if not specified herein or elsewhere, to minimize erosion damage at the site to prevent the migration of sediment into environmentally sensitive areas. Environmentally sensitive areas include all wetland resource areas within, and downstream of, the site, and those areas of the site that are not being altered.

Erosion and sedimentation control shall be in accordance with this Section, the design drawings, and the following:

- "National Pollutant Discharge Elimination System General Permit for Discharges from Construction Activities (EPA Construction General Permit February 16, 2017).
- Massachusetts Stormwater Management Policy Handbook issued by the Massachusetts Department of Environmental Protection, January 2008.
- Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas, A Guide for Planners, Designers and Municipal Officials, March 1997.

The BMP's presented herein should be used as a guide for erosion and sedimentation control and are not intended to be considered specifications for construction. The most important BMP is maintaining a rapid construction process, resulting in prompt stabilization of surfaces, thereby reducing erosion potential. Given the primacy of rapid construction, these guidelines have been designed to allow construction to progress with essentially no hindrance by the erosion control methods prescribed. These guidelines have also been designed with sufficient flexibility to allow the Contractor to modify the suggested methods as required to suit seasonal, atmospheric, and site-specific physical constraints.

Another important BMP is the prevention of concentrated water flow. Sheet flow does not have the erosive potential of a concentrated rivulet. These guidelines recommend construction methods that allow localized erosion control and a system of construction, which inhibits the development of shallow concentrated flow. These BMP's shall be maintained throughout the construction process.

CONTACT INFORMATION AND RESPONSIBLE PARTIES

The following is a list of all project-associated parties:

Owner
535 Higgin Crowell, LLC
P.O. Box 517
Yarmouth Port, MA 02675

Contractor
To be determined

Environmental Consultant
BSC Group, Inc.
349 Main Street – Route 28
West Yarmouth, MA 02673

Contact: Brian Yergatian, P.E.
Phone: (617) 896–4590
Email: byergatian@bscgroup.com

3.1 Existing Site and Soil Conditions

The total property area is 1.34 acres (58,291± sq. ft.) and is located off New Venture Drive, west of the intersection with Sout Gages Way. The property is bounded on the north by New Venture Drive, on the east and west by commercial properties, and bounded on the south by the Cape Cod Rail Trail.

The existing site topography generally slopes west across the property off-site or south towards a large on-site depression with slopes ranging from 0-12%. A small portion of the site slopes north towards New Venture Drive and off-site to the east. The current site is comprised of bare soil. The eastern, western, and southern perimeters of the site are wooded. The primary soil classification identified by the NRCS Web Soil Survey is Carver coarse sand (252B) which accounts for all of the property and project area. On July 15, 2025, BSC Group conducted 2 test pits on the site, the locations of which are noted on the Utility & Septic Plan, and the test pit data is included as Appendix X of this report. The test pits consisted primarily of sand to a depth of 12 feet. Based on the sandy materials found, runoff calculations have been performed using curve numbers corresponding to Hydrologic Soil Group (HSG) A.

There are no existing stormwater control measures on the property. The majority of stormwater runoff is directed off-site to the west or to an existing depression in southeast corner. A small portion of the site is discharged off-site to the north and west.

3.2 Project Description and Intended Construction Sequence

The site is currently comprised of an office building with surface level parking and a lawned area. The proposed activities will include the following major components:

- The construction of one (1) pre-engineered metal building,
- The construction of stormwater management systems,
- Site grading and landscaping, and
- Utility connections and installation.

The proposed project will disturb a total of approximately 54,138 ± S.F. (1.24 ± acres).

Soil disturbing activities will include site demolition, installing stabilized construction exits, installation of erosion and sedimentation controls, grading, storm drain inlets, stormwater management systems, utilities, construction of site driveways and preparation for final landscaping. Please refer to Table 1 for the projects anticipated construction timetable. A description of BMP's associated with project timetable and construction-phasing elements is provided in this Erosion and Sediment Control Plan.

Table 1 – Anticipated Construction Timetable

Construction Phasing Activity	Anticipated Timetable
Grubbing and Stripping of Limits of Construction Phase	To be determined
Rough Site Grading and Site Utilities	To be determined
Utility Plan Construction	To be determined
Landscaping	To be determined

3.3 Potential Sources of Pollution

Any project site activities that have the potential to add pollutants to runoff are subject to the requirements of the SWPPP. Listed below are a description of potential sources of pollution from both sedimentation to Stormwater runoff, and pollutants from sources other than sedimentation.

Table 2 – Potential Sources of Sediment to Stormwater Runoff

Potential Source	Activities/Comments
Construction Site Entrance and Site Vehicles	Vehicles leaving the site can track soils onto public roadways. Site Vehicles can readily transport exposed soils throughout the site and off-site areas.
Grading Operations	Exposed soils have the potential for erosion and discharge of sediment to off-site areas.
Material Excavation, Relocation, and Stockpiling	Stockpiling of materials during excavation and relocation of soils can contribute to erosion and sedimentation. In addition, fugitive dust from stockpiled material, vehicle transport and site grading can be deposited in wetlands and waterway.
Landscaping Operations	Landscaping operations specifically associated with exposed soils can contribute to erosion and sedimentation. Hydroseeding, if not properly applied, can runoff to adjacent wetlands and waterways.

Table 3 – Potential Pollutants and Sources, other than Sediment to Stormwater Runoff

Potential Source	Activities/Comments
Staging Areas and Construction Vehicles	Vehicle refueling, minor equipment maintenance, sanitary facilities and hazardous waste storage
Materials Storage Area	General building materials, solvents, adhesives, paving materials, paints, aggregates, trash, etc.
Construction Activities	Construction, paving, curb/gutter installation, concrete pouring/mortar/stucco

3.4 Erosion and Sedimentation Control Best Management Practices

All construction activities will implement Best Management Practices (BMP's) in order to minimize overall site disturbance and impacts to the sites natural features. Please refer to the following sections for a detailed

description of site specific BMP's. In addition, an Erosion and Sedimentation Control Plan is provided in the Site Plans.

3.5 Timetable and Construction Phasing

This section provides the Owner and Contractor with a suggested order of construction that shall minimize erosion and the transport of sediments. The individual objectives of the construction techniques described herein shall be considered an integral component of the project design intent of each project phase. The construction sequence is not intended to prescribe definitive construction methods and should not be interpreted as a construction specification document. However, the Contractor shall follow the general construction phase principles provided below:

- Protect and maintain existing vegetation wherever possible.
- Minimize the area of disturbance.
- To the extent possible, route unpolluted flows around disturbed areas.
- Install mitigation devices as early as possible.
- Minimize the time disturbed areas are left unstabilized.
- Maintain siltation control devices in proper condition.
- The contractor should use the suggested sequence and techniques as a general guide and modify the suggested methods and procedures as required to best suit seasonal, atmospheric, and site specific physical constraints for the purpose of minimizing the environmental impact of construction.

Demolition, Grubbing and Stripping of Limits of Construction Phase

- Install Temporary Erosion Control (TEC) devices as required to prevent sediment transport into resource areas.
- Place a ring of silt socks and/or haybales around stockpiles.
- Stabilize all exposed surfaces that will not be under immediate construction.
- Store and/or dispose all pavement and building demolition debris as indicated in accordance with all applicable local, state, and federal regulations.

Driveway Area Sub-Base Construction

- Install temporary culverts and diversion ditches and additional TEC devices as required by individual construction area constraints to direct potential runoff toward detention areas designated for the current construction phase.
- Compact gravel as work progresses to control erosion potential.
- Apply water to control air suspension of dust.
- Avoid creating an erosive condition due to over-watering.
- Install piped utility systems as required as work progresses, keeping all inlets sealed until all downstream drainage system components are functional.

Binder Construction

- Fine grade gravel base and install processed gravel to the design grades.
- Compact pavement base as work progresses.
- Install pavement binder coat starting from the downhill end of the site and work toward the top.

Finish Paving

- Repair and stabilize damaged side slopes.
- Clean inverts of drainage structures.
- Install final top coat of pavement.

Final Clean-up

- Clean inverts of culverts and catch basins.
- Remove sediment and debris from rip-rap outlet areas.
- Remove TEC devices only after permanent vegetation and erosion control has been fully established.

3.6 Site Stabilization

Grubbing Stripping and Grading

- Erosion control devices shall be in place as shown on the design plans before grading commences.
- Stripping shall be done in a manner, which will not concentrate runoff. If precipitation is expected, earthen berms shall be constructed around the area being stripped, with a silt sock, silt fence or haybale dike situated in an arc at the low point of the berm.
- If intense precipitation is anticipated, silt socks, haybales, dikes and /or silt fences shall be used as required to prevent erosion and sediment transport. The materials required shall be stored on site at all time.
- If water is required for soil compaction, it shall be added in a uniform manner that does not allow excess water to flow off the area being compacted.
- Dust shall be held at a minimum by sprinkling exposed soil with an appropriate amount of water.

Maintenance of Disturbed Surfaces

- Runoff shall be diverted from disturbed side slopes in both cut and fill.
- Mulching may be used for temporary stabilization.
- Silt sock, haybale or silt fences shall be set where required to trap products of erosion and shall be maintained on a continuing basis during the construction process.

Loaming and Seeding

- Loam shall not be placed unless it is to be seeded directly thereafter.
- All disturbed areas shall have a minimum of 4" of loam placed before seeded and mulched.
- Consideration shall be given to hydro-mulching, especially on slopes in excess of 3 to 1.
- Loamed and seeded slopes shall be protected from washout by mulching or other acceptable slope protection until vegetation begins to grow.

Stormwater Collection System Installation

- The Stormwater drainage system shall be installed from the downstream end up and in a manner which will not allow runoff from disturbed areas to enter pipes.
- Excavation for the drainage system shall not be left open when rainfall is expected overnight. If left open under other circumstances, pipe ends shall be closed by a staked board or by an equivalent method.
- All catch basin openings shall be covered by a silt bag between the grate and the frame or protected from sediment by silt fence surrounding the catch basin grate.
- During the installation of the infiltration systems, ensure that loose material from the construction of the town home roof shingles is swept and removed from the area prior to connecting the roof drains to the infiltration systems. No roof drains shall be connected to the infiltration systems until all tributary roof areas have been thoroughly cleared of debris that could impact the infiltration system functions.

Completion of Paved Areas

- During the placement of sub-base and pavement, the entrance to the Stormwater drainage systems shall be sealed when rain is expected. When these entrances are closed, consideration must be given to the direction of run-off and measures shall be undertaken to minimize erosion and to provide for the collection of sediment.
- In some situations, it may be necessary to keep catch basins open.
- Appropriate arrangements shall be made downstream to remove all sediment deposition.

Stabilization of Surfaces

- Stabilization of surfaces includes the placement of pavement, rip-rap, wood bark mulch and the establishment of vegetated surfaces.
- Upon completion of construction, all surfaces shall be stabilized even though it is apparent that future construction efforts will cause their disturbance.
- Vegetated cover shall be established during the proper growing season and shall be enhanced by soil adjustment for proper pH, nutrients and moisture content.
- Surfaces that are disturbed by erosion processes or vandalism shall be stabilized as soon as possible.
- Areas where construction activities have permanently or temporarily ceased shall be stabilized within 14 days from the last construction activity, except when construction activity will resume within 21 days (e.g., the total time period that construction activity is temporarily ceased is less than 21 days).
- Hydro-mulching of grass surfaces is recommended, especially if seeding of the surfaces is required outside the normal growing season.
- Hay mulch is an effective method of temporarily stabilizing surfaces, but only if it is properly secured by branches, weighted snow fences or weighted chicken wire.

3.7 Temporary Structural Erosion Control Measures

Temporary erosion control measures serve to minimize construction-associated impacts to wetland resource and undisturbed areas. Please refer to the following sections for a description of temporary erosion control measures implemented as part of the project and this sample SWPPP.

3.7.1 Silt Socks, Haybales, and Silt Fencing

The siltation barriers will demarcate the limit of work, form a work envelope and provide additional assurance that construction equipment will not enter the adjacent wetlands or undisturbed portions of the site. All barriers will remain in place until disturbed areas are stabilized.

3.7.2 Temporary Stormwater Diversion Swale

A temporary diversion swale is an effective practice for temporarily diverting stormwater flows and to reduce stormwater runoff velocities during storm events. The swale channel can be installed before infrastructure construction begins at the site, or as needed throughout the construction process. The diversion swale should be routinely compacted or seeded to minimize the amount of exposed soil.

3.7.3 Dewatering Basins

Dewatering may be required during stormwater system, foundation construction and utility installation. Should the need for dewatering arise, groundwater will be pumped directly into a temporary settling basin, which will act as a sediment trap during construction. All temporary settling basins will be located within close proximity of daily work activities. Prior to discharge, all groundwater will be treated by means of the settling basin or acceptable substitute. Discharges from sediment basins will be free of visible floating, suspended and settleable solids that would impair the functions of a wetland or degrade the chemical

composition of the wetland resource area receiving ground or surface water flows and will be to the combined system.

3.7.4 Material Stockpiling Locations

Piping and trench excavate associated with the subsurface utility work will be contained with a single row of silt socks and/or haybales.

3.8 Permanent Structural Erosion Control Measures

Permanent erosion control measures serve to minimize post-construction impacts to wetland resource areas and undisturbed areas. Please refer to the Site Plans and Long-Term Operations and Maintenance Plan for a description of permanent erosion control measures implemented as part of the project and this SWPPP.

3.9 Good Housekeeping Best Management Practices

3.9.1 Street Sweeping

Main Street in front of the project property shall be swept clean on a daily basis at the conclusion of the work day of any soils tracked onto it from the project site. All sweepings shall be disposed of off-site in accordance with all applicable laws and regulations.

3.9.2 Material Handling and Waste Management

Solid waste generation during the construction period will be primarily construction debris. The debris will include scrap lumber (used forming and shoring pallets and other shipping containers), waste packaging materials (plastic sheeting and cardboard), scrap cable and wire, roll-off containers (or dumpsters) and will be removed by a contract hauler to a properly licensed landfill. The roll-off containers will be covered with a properly secured tarp before the hauler exits the site. In addition to construction debris, the construction work force will generate some amount of household-type wastes (food packing, soft drink containers, and other paper). Trash containers for these wastes will be located around the site and will be emptied regularly so as to prevent wind-blown litter. This waste will also be removed by a contract hauler.

All hazardous waste material such as oil filters, petroleum products, paint and equipment maintenance fluids will be stored in structurally sound and sealed shipping containers in the hazardous-materials storage area and segregated from other non-waste materials. Secondary containment will be provided for all materials in the hazardous materials storage area and will consist of commercially available spill pallets. Additionally, all hazardous materials will be disposed of in accordance with federal, state and municipal regulations.

Two temporary sanitary facilities (portable toilets) will be provided at the site in the combined staging area. The toilets will be away from a concentrated flow path and traffic flow and will have collection pans underneath as secondary treatment. All sanitary waste will be collected from an approved party at a minimum of three times per week.

3.9.3 Building Material Staging Areas

Construction equipment and maintenance materials will be stored at the combined staging area and materials storage areas. Silt fence will be installed around the perimeter to designate the staging and materials storage area. A watertight shipping container will be used to store hand tools, small parts and other construction materials.

Non-hazardous building materials such as packaging material (wood, plastic and glass) and construction scrap material (brick, wood, steel, metal scraps, and pine cuttings) will be stored in a separate covered storage facility adjacent to other stored materials. All hazardous-waste materials such as oil filters, petroleum products, paint and equipment maintenance fluids will be stored in structurally sound and sealed containers under cover within the hazardous materials storage area.

Large items such as framing materials and stockpiled lumber will be stored in the open storage area. Such materials will be elevated on wood blocks to minimize contact with runoff.

The combined storage areas are expected to remain clean, well-organized and equipped with ample cleaning supplies as appropriate for the materials being stored. Perimeter controls such as containment structures, covers and liners will be repaired or replaced as necessary to maintain proper function.

3.9.4 Designated Washout Areas

Designated temporary, below-ground concrete washout areas will be constructed, as required, to minimize the pollution potential associated with concrete, paint, stucco, mixers etc. Signs will, if required, be posted marking the location of the washout area to ensure that concrete equipment operators use the proper facility. Concrete pours will not be conducted during or before an anticipated precipitation event. All excess concrete and concrete washout slurries from the concrete mixer trucks and chutes will be discharged to the washout area or hauled off-site for disposal.

3.9.5 Equipment/Vehicle Maintenance and Fueling Areas

Several types of vehicles and equipment will be used on-site throughout the project including graders, scrapers, excavators, loaders, paving equipment, rollers, trucks and trailers, backhoes and forklifts. All major equipment/vehicle fueling and maintenance will be performed off-site. A small, 20-gallon pickup bed fuel tank will be kept on-site in the combined staging area. When vehicle fueling must occur on-site, the fueling activity will occur in the staging area. Only minor equipment maintenance will occur on-site. All equipment fluids generated from maintenance activities will be disposed of into designated drums stored on spill pallets. Absorbent, spill-cleanup materials and spill kits will be available at the combined staging and materials storage area. Drip pans will be placed under all equipment receiving maintenance and vehicles and equipment parked overnight.

3.9.6 Equipment/Vehicle Wash down Area

All equipment and vehicle washing will be performed off-site.

3.9.7 Spill Prevention Plan

A spill containment kit will be kept on-site in the Contractor's trailer and/or the designated staging area throughout the duration of construction. Should there be an accidental release of petroleum product into a resource area, the appropriate agencies will be immediately notified.

3.9.8 Inspections

Maintenance of existing and proposed BMP's to address stormwater management facilities during construction is an on-going process. The purpose of the inspections is to observe all sources of stormwater or non-stormwater discharge as identified in the SWPPP as well as the status of the receiving waters. The following sections describe the appropriate inspection measures to adequately implement the project's SWPPP. A sample blank inspection form is provided at the end of this section. Completed inspection forms are to be maintained on site.

Inspection Personnel

The owner's appointed representative will be responsible for performing regular inspections of erosion controls and ordering repairs as necessary.

Inspection Frequency

Inspections will be performed by qualified personnel once every 7 days. The inspections must be documented on the inspection form provided at the end of this section, and completed forms will be provided to the on-site supervisor and maintained at the Owner's office throughout the entire duration of construction.

Inspection Reporting

Each inspection report will summarize the scope of the inspection, name(s) and qualifications of personnel making the inspection, and major observations relating to the implementation of the SWPPP, including compliance and non-compliance items. Completed inspection reports will remain with the completed SWPPP on site.

3.9.9 Amendment Requirements

The final SWPPP is intended to be a working document that is utilized regularly on the construction site, and provides guidance to the Contractor. It must reflect changes made to the originally proposed plan and will be updated to include project specific activities and ensure that they are in compliance with the state and local laws and regulations. It should be amended whenever there is a change in design, construction, operation or maintenance that affects discharge of pollutants. The following items should be addressed should an amendment to the SWPPP occur:

- Dates of certain construction activities such as major grading activities, clearing and initiation of and completion of stabilization measures should be recorded.
- Future amendments to the SWPPP will be recorded as required. As this SWPPP is amended, all amendments will be kept on site and made part of the SWPPP.
- Upon completion of site stabilization (completed as designed and/or 70% background vegetative cover), it can be documented and marked on the plans. Inspections are no longer required at this time.
- Inspections often identify areas not included in the original SWPPP, which will require the SWPPP to be amended. These updates should be made within seven days of being recognized by the inspector.

3.10 SWPPP Inspection and Maintenance Report

The following form is an example to be used for SWPPP Inspection Reporting.

Stormwater Construction Site Inspection and Maintenance Report

TO BE COMPLETED AT LEAST EVERY 7 DAYS. AFTER SITE STABILIZATION, TO BE COMPLETED AT LEAST ONCE PER MONTH FOR THREE YEARS OR UNTIL A NOTICE OF TERMINATION IS FILED (IF APPLICABLE).

General Information			
Project Name	Pre-engineered Metal Building		
NPDES Tracking No. (if applicable)		**Location**	5 New Venture Drive South Dennis, MA
Date of Inspection		**Start/End Time**	
Inspector's Name(s)			
Inspector's Title(s)			
Inspector's Contact Information			
Inspector's Qualifications			
Describe present phase of construction			
Type of Inspection: ❑ Regular ❑ Pre-storm event ❑ During storm event ❑ Post-storm event			
Weather Information			
Has there been a storm event since the last inspection? ❑Yes ❑No **If yes, provide:** Storm Start Date & Time: Storm Duration (hrs): Approximate Amount of Precipitation (in):			
Weather at time of this inspection? ❑ Clear ❑Cloudy ❑ Rain ❑ Sleet ❑ Fog ❑ Snowing ❑ High Winds ❑ Other: Temperature:			
Have any discharges occurred since the last inspection? ❑Yes ❑No **If yes, describe:**			
Are there any discharges at the time of inspection? ❑Yes ❑No **If yes, describe:**			

Site-specific BMPs

- *Number the structural and non-structural BMPs identified in your SWPPP on your site map and list them below (add as many BMPs as necessary). Carry a copy of the numbered site map with you during your inspections. This list will ensure that you are inspecting all required BMPs at your site.*
- *Describe corrective actions initiated, date completed, and note the person that completed the work in the Corrective Action Log.*

	BMP	**BMP Installed?**	**BMP Maintenance Required?**	**Corrective Action Needed and Notes Action required by whom and when**
1	Catch Basin Protection	❑Yes ❑No	❑Yes ❑No	
2	Haybale & Silt Fencing	❑Yes ❑No	❑Yes ❑No	

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes Action required by whom and when
3	Straw Wattles	❑Yes ❑No	❑Yes ❑No	
4	Construction Entrance	❑Yes ❑No	❑Yes ❑No	
5	Sediment Basins	❑Yes ❑No	❑Yes ❑No	
6	Dewatering Pit	❑Yes ❑No	❑Yes ❑No	
7		❑Yes ❑No	❑Yes ❑No	

Overall Site Issues

Below are some general site issues that should be assessed during inspections. Customize this list as needed for conditions at your site.

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes Action required by whom and when
1	Are all slopes and disturbed areas not actively being worked properly stabilized?	❑Yes ❑No	❑Yes ❑No	
2	Are natural resource areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs?	❑Yes ❑No	❑Yes ❑No	
3	Are perimeter controls and sediment barriers adequately installed (keyed into substrate) and maintained?	❑Yes ❑No	❑Yes ❑No	

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes Action required by whom and when
4	Are discharge points and receiving waters free of any sediment deposits?	❑Yes ❑No	❑Yes ❑No	
5	Are storm drain inlets properly protected?	❑Yes ❑No	❑Yes ❑No	
6	Is the construction exit preventing sediment from being tracked into the street?	❑Yes ❑No	❑Yes ❑No	
7	Is trash/litter from work areas collected and placed in covered dumpsters?	❑Yes ❑No	❑Yes ❑No	
8	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	❑Yes ❑No	❑Yes ❑No	
9	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	❑Yes ❑No	❑Yes ❑No	Vehicle Maintenance not allowed on site
10	Are materials that are potential stormwater contaminants stored inside or under cover?	❑Yes ❑No	❑Yes ❑No	
11	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	❑Yes ❑No	❑Yes ❑No	
12	(Other)	❑Yes ❑No	❑Yes ❑No	

Non-Compliance

Describe any incidents of non-compliance not described above:

CERTIFICATION STATEMENT

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

Print name and title: _____
(Qualified Person Performing the Inspection)

Signature: _____ **Date:** _____

Print name and title: _____
(Contractor/Operator)

Signature: _____ **Date:** _____

SECTION 4.0

LONG-TERM POLLUTION PREVENTION & OPERATION AND MAINTENANCE PLAN

4.0 LONG-TERM POLLUTION PREVENTION & OPERATION AND MAINTENANCE PLAN

As required by Standard #4 of the Stormwater Management Policy, this Long-Term Pollution Prevention Plan has been developed for source control and pollution prevention at the site after construction.

MAINTENANCE RESPONSIBILITY

Ensuring that the provisions of the Long-Term Pollution Prevention Plan are followed will be the responsibility of The Applicant, 535 Higgins Crowell, LLC.

GOOD HOUSEKEEPING PRACTICES

The site to be kept clean of trash and debris at all times. Trash, junk, etc. is not to be left outside.

VEHICLE WASHING CONTROLS

The following BMP's, or equivalent measures, methods or practices are required if you are engaged in vehicle washing and/or steam cleaning:

> It is allowable to rinse down the body or a vehicle, including the bed of a truck, with just water without doing any wash water control BMP's.
>
> If you wash (with mild detergents) on an area that infiltrates water, such as gravel, grass, or loose soil, it is acceptable to let the wash water infiltrate as long as you only wash the body of vehicles.
>
> However, if you wash on a paved area and use detergents or other cleansers, or if you wash/rinse the engine compartment or the underside of vehicles, you must take the vehicles to a commercial vehicle wash.

REQUIREMENTS FOR ROUTINE INSPECTIONS AND MAINTENANCE OF STORMWATER BMPS

All stormwater BMPs are to be inspected and maintain as follows;

Haybales, Silt Fence, and other temporary measures

The temporary erosion control measures will be installed up gradient of any wetland resource area where any disturbance or alteration might otherwise allow for erosion or sedimentation. They will be regularly inspected to ensure that they are functioning adequately. Additional supplies of these temporary measures will be stockpiled on site for any immediate needs or routine replacement.

Water Quality Treatment Units

The water quality treatment structures require periodic inspection and cleaning to maintain operation and function. Owners should have these units inspected on a semi-annual basis and after periods of intense precipitation. Inspections can be done by using a clear Plexiglas tube ("sludge judge") to extract a water column sample. When sediment accumulation reaches 15% of storage capacity, cleaning of the unit is required.

These water quality structures must and will be checked and cleaned immediately after petroleum spills; contact appropriate regulatory agencies.

Maintenance of these units should be done by a vacuum truck that will remove the water, sediment, debris, floating hydrocarbons and other materials in unit. Proper cleaning and disposal of the removed materials and liquid must be followed.

Infiltration Basins

Infiltration basins are prone to clogging and failure, meaning regular maintenance is essential. Once the basin has been constructed, it shall be inspected once a month for the first few months to confirm it is stabilized and it is functioning properly, as well as after every major storm event. After the first few months have passed and the basin is operating successfully, inspections may be reduced to two times per year and after every major storm event. Pretreatment devices shall be inspected and cleaned as detailed above.

The buffer area of the basin shall be mowed at least twice per year, and any grass clippings, trash, debris, and sediment found within the basin shall be removed. Use light equipment so the underlying soil is not compacted. After the basin is cleaned out, deeply till the remaining soil and revegetate as soon as possible.

PROVISIONS FOR MAINTENANCE OF LAWNS, GARDENS AND OTHER LANDSCAPE AREAS

Suggested Maintenance Operations

A. Trees and Shrubs

Disease and Pest Management - Prevention of disease or infestation is the first step of Pest Management. A plant that is in overall good health is far less susceptible to disease. Good general landscape maintenance can reduce problems from disease.

Inspections of plant materials for signs of disease or infestation are to be performed monthly by the Landscape Maintenance Contractor's Certified Arborist. This is a critical step for early diagnosis. Trees and Shrubs that have been diagnosed to have a plant disease or an infestation of insect pests are to be treated promptly with an appropriate material by a licensed applicator.

Fertilization - Trees and shrubs live outside their natural environment and should be given proper care to maintain health and vigor. Fertilizing trees and shrubs provides the plants with nutrients needed to resist insect attack, to resist drought and to grow thicker foliage. Fertilizing of new and old trees may be done in one of three ways, in either the early spring or the late fall.

- Systemic Injection of new and existing trees on trees 2 inches or greater in diameter. You must be licensed to apply this method.
- Soil Injection – a liquid fertilizer with a product such as Arbor Green or Rapid Grow injected into the soil under the drip zone of a tree or shrub. Material must be used according to manufacturers' specifications to be effective. Outside contracting is recommended.
- Punch Bar Method – a dry fertilizer such as 10-10-10, may be used by punched holes in the drip zone of the tree 12-18" deep, two feet apart around the circumference, to the edge of the drip line. Three pounds of fertilizer should be used per diameter inch for trees with trunks six inches or more in diameter.
- Fertilizer of shrubs – use a fertilizer such as 10-10-10, broadcast over the planting area according to the manufacturers' rate and water in.
- All fertilization must be noted on daily maintenance log.

Watering - Trees and Shrubs will need supplemental watering to remain in vigorous health. All new plants need to be watered once a week in cool weather, twice a week during warm weather, and up to three times in a week during periods of extreme heat and drought. Trees and shrubs should be watered in such a manner as to totally saturate the soil in the root zone area. Over-watering or constant saturation of the soil must be avoided as this could lead to root rot and other disease problems. The use of a soil moisture meter can help you monitor the soil's water intake.

Plant Replacement - Unhealthy plants that may cause widespread infestation of other nearby plants shall be immediately removed from the site. Any vegetation removed from the site must be recorded and submitted with the daily maintenance log. The area shall be treated to prevent further infestation. The plant shall then be replaced with a healthy specimen of the same species and size. This work shall have a pre-established budget allowance for the year.

A spring inspection of all plant materials shall be performed to identify those plant materials that are not in vigorously healthy condition. Unhealthy plant materials shall be evaluated. If the problem is determined to be minor the plant material shall be given appropriate restorative care in accordance with this maintenance guideline until it is restored to a vigorously healthy condition. Unhealthy plant materials that do not respond to restorative care or are determined to be beyond saving shall be replaced with a healthy specimen of the same species and size. In the case of the necessity of replacing extremely large plant materials the Landscape Architect shall determine the size of the replacement plant.

Pruning - Proper pruning is the selective removal of branches without changing the plant's natural appearance, or habit of growth. All tree pruning is to be performed by a licensed Arborist. All branches that are dead, broken, scared or crossing should be removed. All cuts should be made at the collar and not cut flush with the base.

Pruning on the site shall be done for the following purposes;

- To maintain or reduce the size of a tree or shrub
- To remove dead, diseased or damaged branches
- To rejuvenate old shrubs and encourage new growth
- To stimulate future flower and fruit development
- To maximize the visibility of twig color
- To prevent damage and reduce hazards to people and properties

All shrubs are recommended to be pruned on an annual basis to prevent the shrub from becoming overgrown and eliminate the need for drastic pruning. There are several types of pruning for deciduous shrubs. Hand snips should be used to maintain a more natural look or hand shears can be used for a more formal appearance.

Winter Protection - All trees and shrubs are to be watered, fertilized, and mulched before the first frost. All stakes should be checked and ties adjusted. Damaged branches should be pruned.

Shrubs located in areas likely to be piled with snow during snow removal (but not designated as Snow Storage Areas) shall be marked by six-foot high poles with bright green banner flags. Stockpiles of snow are not to be located in these areas due to potential damage to the plant materials from both the weight of the snow and the snow melting chemicals.

At the fall landscape maintenance conference parameters will be discussed between the Landscape Maintenance Contractor and the snow removal contractor to assure minimal damage and loss of landscape amenities during the winter season.

Seasonal Clean Up - A thorough spring cleanup is to be performed. This includes the removal and replacement of dead or unhealthy plant materials and the cleanup of plant debris and any general debris that has accumulated over the winter season. Mulch is to be lightly raked to clean debris from the surface without removing any mulch. Twigs and debris are to be removed from the planting beds throughout the growing season.

Mulching - Planting beds shall be mulched with a treated shredded hardwood mulch free from dirt, debris, and insects. A sample of this mulch shall be given to the Owner for approval prior to installation.

Maintain a 2-3" maximum depth and keep free of weeds either by hand weeding or by the use of a pre-emergent weed control such as Treflan or Serfian. Seasonal re-mulching shall occur as necessary in the spring and the fall to maintain this minimum depth. When new mulch is added to the planting bed it shall be spread to create a total depth of no more than three inches. Edges should be maintained in a cleanly edged fashion.

Mulch shall not be placed directly against the trunk of any tree or shrub.

B. Groundcover and Perennials

Disease and Pest Management – Pesticides and herbicides should be applied only as problems occur, with the proper chemical applied only by a trained professional or in the case of pesticide, a Certified Pesticide Applicator. Plants should be monitored weekly and treated accordingly.

Fertilizer – The health of the plants can be maintained or improved, and their growth encouraged by an application of complete fertilizer. Apply a fertilizer such as 4-12-4 as growth becomes apparent and before mulching. Apply to all groundcover and perennial planting areas by hand and avoid letting the fertilizer come in contact with the foliage, or use a liquid fertilizer and apply by soaking the soil. Apply according to the manufacturers' specifications.

Fertilization shall stop at the end of July.

Water – Groundcovers and Perennials will need supplemental watering in order to become established, healthy plants. All new plants need to be watered once a week in cool weather, twice a week during warm weather, and up to three times in a week during periods of extreme heat and drought. Until established, groundcovers and perennials should be watered in such a manner as to totally saturate the soil in the root zone area, to a depth of 6 inches. Once established, perennials shall continue to be watered as necessary to maintain them in a vigorous healthy condition. Over-watering or constant saturation of the soil must be avoided as this could lead to root rot and other disease problems. The use of a soil moisture meter can help you monitor the soil's water intake.

On-site water shall be furnished by the Owner. Hose and other watering equipment shall be furnished by the Landscape Maintenance Contractor.

Replacement – Any unhealthy plant/s that may cause widespread infestation of other nearby plants shall be immediately removed from the site. Any vegetation removed from the site must be recorded and submitted with the landscape maintenance log. The area shall be treated to prevent further infestation. The plant/s shall then be replaced with healthy specimen/s of the same species and size. Old Forge shall have a pre-established budget allowance for this type of replacement, each year.

Plant material that is damaged as a result of other landscape maintenance activities, such as mowing, shall be replaced with healthy specimens of the same species and size, at no additional cost to the owner.

Deadheading – Perennials shall be checked on a weekly basis and dead-headed once flowers have faded or as necessary based on plant type and duration of flower. Spent flowers can be pinched off with the thumb and forefinger. Continue to remove all faded flowers until Fall. All associated debris shall be removed from site daily.

Staking – Upright-growing perennials need support especially when in flower. Use of bamboo stakes, galvanized wire hoops or mesh may be necessary for their support. Supports should be put in place before they have become too difficult to handle. The supports should not be taller than the mature height of the perennial plant.

Division of Perennials – Two or three-year-old perennials are easily divided in the spring if more plants are needed. To divide, cut out the entire section of plant to be divided, including roots. The larger divisions (those with three or more shoots), can be set out immediately in their permanent location, where they can be expected to bloom the same season. Smaller divisions are best planted in an out-of-the-way planting bed until the following autumn or spring, when they can be moved to their permanent location.

Weeding – All planting beds should be kept weed-free. Weed either by hand or with a pre-emergent herbicide such as Treflen used according to manufacturers' specifications. Manual weeding is to be used in combination with the use of spot applications of herbicides. Both live and dead weeds are to be pulled and removed from the site.

All herbicide applications shall be documented in the Landscape Maintenance Log. The actual product label or the manufacturer's product specification sheet for the specific product shall also be included in the Log.

Only personnel with appropriate applicator licenses shall supervise and/or perform the application of pesticide products requiring a license.

Winterizing – Perennial gardens should be cleaned-up when growth ceases in the fall. Remove foliage of plants that normally die down to the ground. Divide and replant over-grown clumps.

C. Lawn Areas - Turf Systems

Mowing – Proper mowing is an integral part of any good turf maintenance program. Without it, the finest in fertilization, watering and other vital maintenance practices would be completely ineffective. Proper mowing will help control dicot weeds; help the turf survive during periods of extreme heat, and gain strength and vigor to resist disease and other infestations.

Mowing height – The proper mowing height will vary somewhat according to the type of grass. The most common type of seed & sod lawns contain a mixture of bluegrass, fine fescue and perennial rye, which should be mowed at 2-3 inches.

Mowing frequency – The basic rule of thumb for mowing frequency is to never remove more than 1/3 of the grass blade in one mowing. Example: if you want to mow your turf at 2 inches, you should cut it when it reaches 3 inches. Removing more than ½ of the grass plant at a time can put the plant into shock, thus making it more susceptible to stress disease and weed infestation.

Mowing frequency will vary with the growing season and should be set by the plant height and not a set date. It will often be necessary to mow twice a week during periods of surge growth to help maintain plant health and color. Mowing should be cut back during periods of stress.

Grass clippings should be removed whenever they are thick enough to layer the turf. The return of clippings to the soil actually adds nutrients and helps retain moisture. Heavily clumped grass clippings are a sign of infrequent mowing, calling for an adjustment in the mowing schedule.

When mowing any area, try to alternate mowing patterns. This tends to keep grass blades more erect and assures an even cut. A dull mower will cause color loss due to tearing of the turf plant, and since mowing will ultimately determine the appearance of any turf area there is an absolute necessity for a clean sharp cut.

Weed & Pest Control and Fertilizing- In order to maintain turf grass health, vigor color, and nutrients, fertilizer must be added to the soil. Recommendations for fertilization of lawn areas are as follows; fertilize at the rate of one (1) pound of nitrogen per thousand square feet, per year is optimum. Fertilizer should be a balanced slow release, sulfur coated type fertilizer.

Weed Control - All turf areas will require some weed control, for both weed grasses and dicot weeds. Weeds should be treated at the appropriate time and with a material labeled for the target weed. Please refer to the fertilizer weed and pest schedule for timing.

Pest Control - All turf areas will require some pest control. Pests should be treated at the appropriate time with a material labeled for the target pest. Please refer to the fertilizer, weed and pest schedule for timing.

Lime - A common cause for an unhealthy lawn is acidic soil. When the pH is below the neutral range (between 6-7) vital plant nutrients become fixed in the soil and cannot be absorbed by the grass plant. Lime corrects an acid soil condition, supplies calcium for plant growth and improves air and water circulation. Limestone applied at the rate of 50 lbs. per thousand square feet will adjust the soil pH one point over a period of 6-9 months.

D. Fertilizer, Weed & Pest Control Schedule – Turf Systems

Spring - (April)	Fertilize one (1) pound of nitrogen per 1,000 square feet Pre-emergent weed grass control Broadleaf weed control
Late Spring - (June)	Fertilize one (1) pound of nitrogen per 1,000 square feet Pre-emergent weed grass control Broadleaf weed control Insect Control (if needed)
*Summer - (August)	Fertilize one (1) pound of nitrogen per 1,000 square feet Broadleaf weed control (if needed) Insect Control (if needed)
Fall - (September)	Fertilize one (1) pound of nitrogen per 1,000 square feet

*Omit if area is not to be irrigated

Lawn Maintenance Task Schedule

MARCH (Weather permitting)
- Clean up winter debris, sand, leaves, trash etc.
- Re-edge mulch beds, maintain at 2-3" maximum.
- Fertilize plants
- Aerate and thatch turf (conditions permitting)

APRIL
- Reseed or sod all areas needing attention.
- Fertilize and weed control
- Lime
- Start mowing when grass reaches 2-1/2", mow to 2"

MAY
- Mow turf to 2-2-1/2"
- Weed as necessary.
- Check for disease and pest problems in both turf and plants.

JUNE
- Mow turf to 2-1/2" – 3"
- Fertilize and weed control.
- Weed
- Check for disease and pest problems in both turf and plants, treat as necessary.

PROVISIONS FOR SOLID WASTE MANAGEMENT (SITE TRASH)

Trash will be placed in on-site dumpsters and the Owner will make provisions for its regular and timely removal.

SNOW DISPOSAL AND PLOWING PLANS

The purpose of the snow and snowmelt management plan is to provide guidelines regarding snow disposal site selection, site preparation and maintenance that are acceptable to the Department of Environmental Protection. For the areas that require snow removal, snow storage onsite will largely be accomplished by using pervious areas along the shoulder of the roadway and development as windrowed by plows.

- Avoid dumping of snow into any water body, including rivers, ponds, or wetlands. In addition to water quality impacts and flooding, snow disposed of in open water can cause navigational hazards when it freezes into ice blocks.
- Avoid disposing of snow on top of storm drain catch basins or in stormwater basins. Snow combined with sand and debris may block a storm drainage system, causing localized flooding. A high volume of sand, sediment, and litter released from melting snow also may be quickly transported through the system into surface water.
- In significant storm events, the melting or off-site trucking of snow may be implemented. These activities shall be conducted in accordance with all local, state and federal regulations.
- Snow shall be removed from the areas around on-site fire-hydrants to maintain emergency access to hydrants at all times. Removable flags or markers should be placed on hydrants to allow snow removal crews to more easily locate hydrants and not damage them with plows or other snow removal equipment.

WINTER ROAD SALT AND/OR SAND USE AND STORAGE RESTRICTIONS

The applicant will be responsible for sanding and salting the site. As previously stated, sanding shall not be used for the porous pavers as it may cause clogging of the porous pavers. No storage on site.

STREET SWEEPING SCHEDULES

There are three types of sweepers: Mechanical, Regenerative Air, and Vacuum Filter.

1) Mechanical: Mechanical sweepers use brooms or rotary brushes to scour the pavement.
2) Regenerative Air: These sweepers blow air onto the road or parking lot surface, causing fines to rise where they are vacuumed.
3) Vacuum filter: These sweepers remove fines along roads. Two general types of vacuum filter sweepers are available - wet and dry. The dry type uses a broom in combination with the vacuum. The wet type uses water for dust suppression

Regardless of the type chosen, the efficiency of street sweeping is increased when sweepers are operated in tandem.

This project has not included street sweeping as part of the TSS removal calculations. However, it is recommended that street sweeping of the parking areas occur two times a year, including once after the spring snow melt.

Reuse and Disposal of Street Sweepings

Once removed from paved surfaces, the sweepings must be handled and disposed of properly. Mass DEP's Bureau of Waste Prevention has issued a written policy regarding the reuse and disposal of street sweepings. These sweepings are regulated as a solid waste, and can be used in three ways:

- In one of the ways already approved by Mass DEP (e.g., daily cover in a landfill, additive to compost, fill in a public way)
- If approved under a Beneficial Use Determination
- Disposed in a landfill

TRAINING OF STAFF OR PERSONNEL INVOLVED WITH IMPLEMENTING LONG-TERM POLLUTION PREVENTION PLAN

The Long-Term Pollution Prevention Plan is to be implemented by property owner of the site. Trained and, if required, licensed Professionals are to be hired by the owner as applicable to implement the Long-Term Pollution Prevention Plan.

LIST OF EMERGENCY CONTACTS FOR IMPLEMENTING LONG-TERM POLLUTION PREVENTION PLAN

The applicant will be required to implement the Long-Term Pollution Prevention Plan and will create and maintain a list of emergency contacts.

POST CONSTRUCTION PHASE INSPECTION SCHEDULE AND EVALUATION CHECKLIST

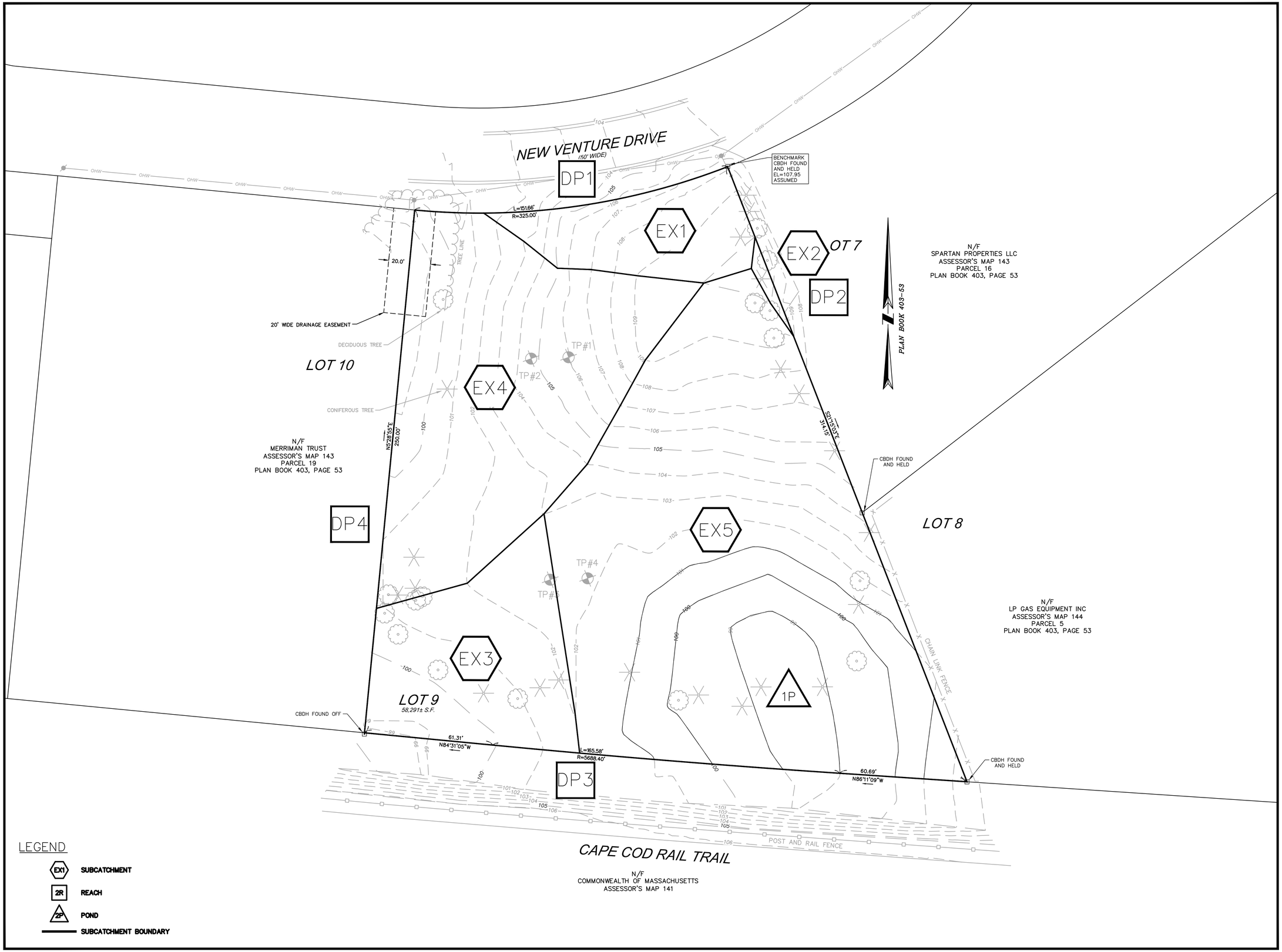
Inspection Date	Inspector	BMP Inspected	Inspection Frequency Requirements	Comments	Recommendation	Follow-up Inspection Required (yes/no)
		Water Quality Units	Four times a year			
		Infiltration System	Twice a year			
		Infiltration Basin	Twice a year			

1. Refer to the Massachusetts Stormwater Handbook Volume Two: Stormwater Technical Handbook (February 2008) for recommendations regarding frequency for inspections and maintenance of specific BMP's
2. Inspections to be conducted by a qualified professional such as an environmental scientist or civil engineer.
3. Limited or no use of sodium chloride salts, fertilizers or pesticides recommended.
4. Other Notes: (Include deviations from Conservation Commission Approvals, Planning Board Approvals and Approved Plans)

SECTION 5.0

HYDROLOGY CALCULATIONS

5.01 EXISTING WATERSHED PLAN



LEGEND

- EX1 — SUBCATCHMENT
- 2R — REACH
- 2P — POND
- SUBCATCHMENT BOUNDARY

BRIAN G. YERGATIAN DATE

5 NEW VENTURE DRIVE

IN

SOUTH DENNIS
MASSACHUSETTS

EXISTING CONDITIONS WATERSHED MAP

DECEMBER 29, 2025

REVISIONS:

PREPARED FOR:

535 HIGGINS CROWELL, LLC
P.O. BOX 517
YARMOUTH PORT, MA 02675

BSC GROUP
BUILD | SUPPORT | CONNECT
349 Main Street - Route 28
West Yarmouth, Massachusetts
02673
508 778 8919

SCALE: 1" = 20'

0 10 20 40 FEET

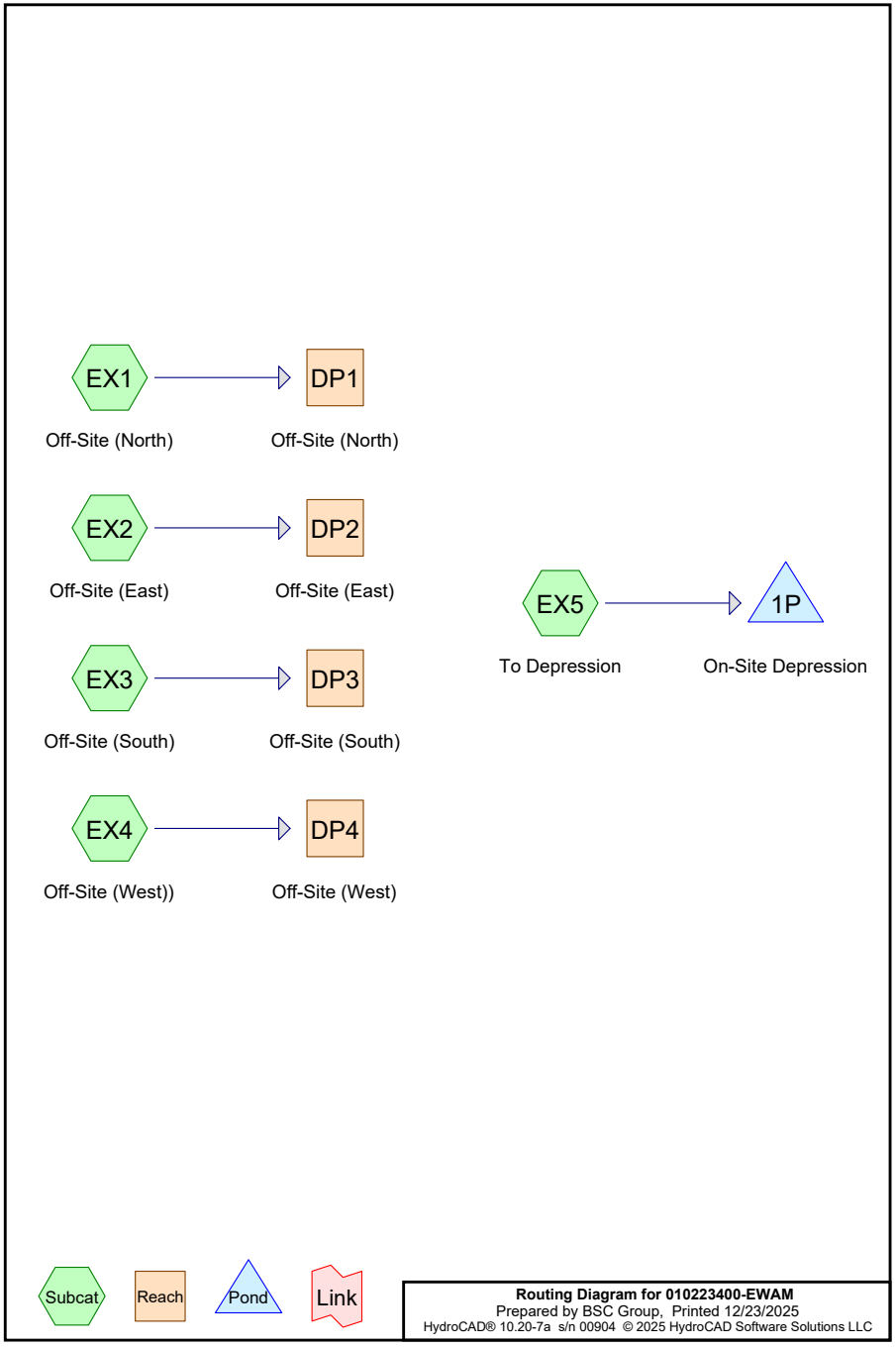
FILE: P:\010223400\C\ED\DD\WM

DWG. NO:

JOB. NO: 0102234.00

EWAM

5.02 EXISTING HYDROLOGY CALCULATIONS (HYDROCAD™ PRINTOUTS)



Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-year	Type III 24-hr		Default	24.00	1	3.50	2
2	10-year	Type III 24-hr		Default	24.00	1	4.80	2
3	100-year	Type III 24-hr		Default	24.00	1	7.15	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
57,530	77	Fallow, bare soil, HSG A (EX1, EX2, EX3, EX4, EX5)
770	30	Woods, Good, HSG A (EX4)
58,300	**76**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
58,300	HSG A	EX1, EX2, EX3, EX4, EX5
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
58,300		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcatc Number
57,530	0	0	0	0	57,530	Fallow, bare soil	
770	0	0	0	0	770	Woods, Good	
58,300	**0**	**0**	**0**	**0**	**58,300**	**TOTAL AREA**	

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentEX1: Off-Site (North) Runoff Area=4,133 sf 0.00% Impervious Runoff Depth=1.43"
Tc=6.0 min CN=77 Runoff=0.15 cfs 493 cf

SubcatchmentEX2: Off-Site (East) Runoff Area=199 sf 0.00% Impervious Runoff Depth=1.43"
Tc=6.0 min CN=77 Runoff=0.01 cfs 24 cf

SubcatchmentEX3: Off-Site (South) Runoff Area=7,526 sf 0.00% Impervious Runoff Depth=1.43"
Tc=6.0 min CN=77 Runoff=0.28 cfs 897 cf

SubcatchmentEX4: Off-Site (West)) Runoff Area=16,285 sf 0.00% Impervious Runoff Depth=1.30"
Tc=6.0 min CN=75 Runoff=0.54 cfs 1,767 cf

SubcatchmentEX5: To Depression Runoff Area=30,157 sf 0.00% Impervious Runoff Depth=1.43"
Tc=6.0 min CN=77 Runoff=1.12 cfs 3,595 cf

Reach DP1: Off-Site (North) Inflow=0.15 cfs 493 cf
Outflow=0.15 cfs 493 cf

Reach DP2: Off-Site (East) Inflow=0.01 cfs 24 cf
Outflow=0.01 cfs 24 cf

Reach DP3: Off-Site (South) Inflow=0.28 cfs 897 cf
Outflow=0.28 cfs 897 cf

Reach DP4: Off-Site (West) Inflow=0.54 cfs 1,767 cf
Outflow=0.54 cfs 1,767 cf

Pond 1P: On-Site Depression Peak Elev=99.12' Storage=335 cf Inflow=1.12 cfs 3,595 cf
Outflow=0.59 cfs 3,595 cf

Total Runoff Area = 58,300 sf Runoff Volume = 6,775 cf Average Runoff Depth = 1.39"
100.00% Pervious = 58,300 sf 0.00% Impervious = 0 sf

Summary for Subcatchment EX1: Off-Site (North)

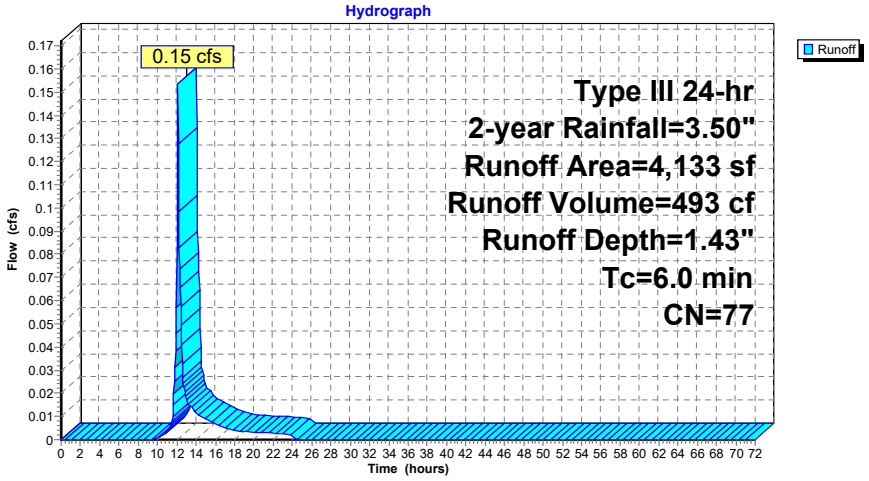
Runoff = 0.15 cfs @ 12.10 hrs, Volume= 493 cf, Depth= 1.43"
Routed to Reach DP1 : Off-Site (North)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.50"

Area (sf)	CN	Description
4,133	77	Fallow, bare soil, HSG A
4,133		100.00% Pervious Area

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

Subcatchment EX1: Off-Site (North)



Summary for Subcatchment EX2: Off-Site (East)

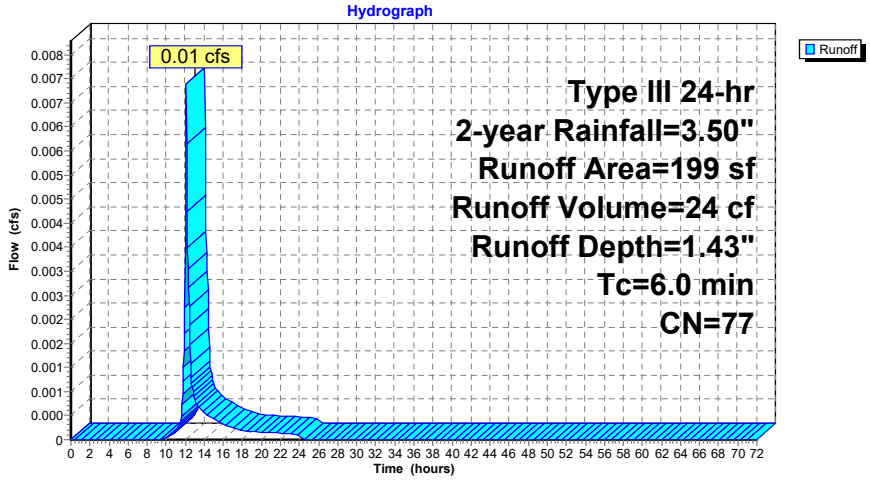
Runoff = 0.01 cfs @ 12.10 hrs, Volume= 24 cf, Depth= 1.43"
Routed to Reach DP2 : Off-Site (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.50"

Area (sf)	CN	Description
199	77	Fallow, bare soil, HSG A
199		100.00% Pervious Area

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

Subcatchment EX2: Off-Site (East)



Summary for Subcatchment EX3: Off-Site (South)

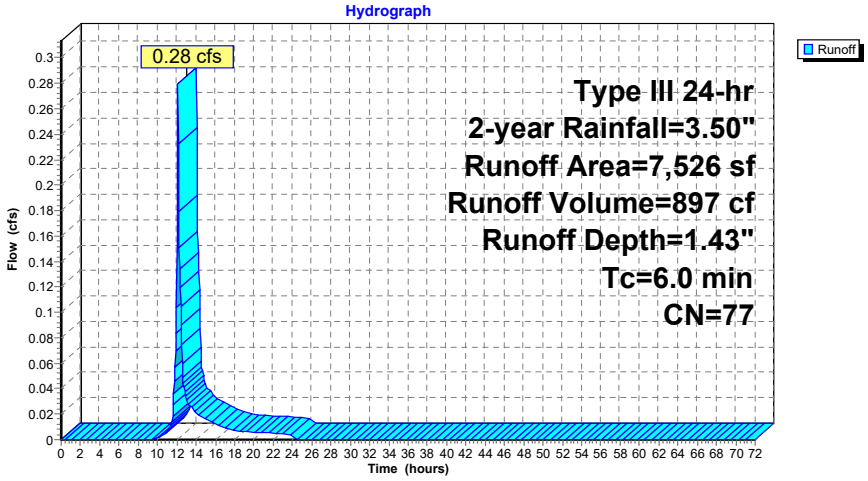
Runoff = 0.28 cfs @ 12.10 hrs, Volume= 897 cf, Depth= 1.43"
Routed to Reach DP3 : Off-Site (South)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.50"

Area (sf)	CN	Description
7,526	77	Fallow, bare soil, HSG A
7,526		100.00% Pervious Area

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

Subcatchment EX3: Off-Site (South)



Summary for Subcatchment EX4: Off-Site (West))

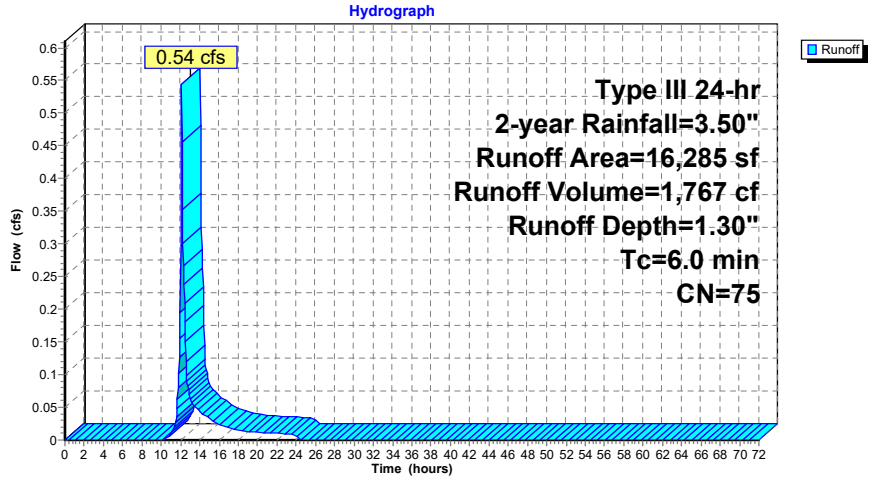
Runoff = 0.54 cfs @ 12.10 hrs, Volume= 1,767 cf, Depth= 1.30"
Routed to Reach DP4 : Off-Site (West)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.50"

Area (sf)	CN	Description
15,515	77	Fallow, bare soil, HSG A
770	30	Woods, Good, HSG A
16,285	75	Weighted Average
16,285		100.00% Pervious Area

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

Subcatchment EX4: Off-Site (West))



Summary for Subcatchment EX5: To Depression

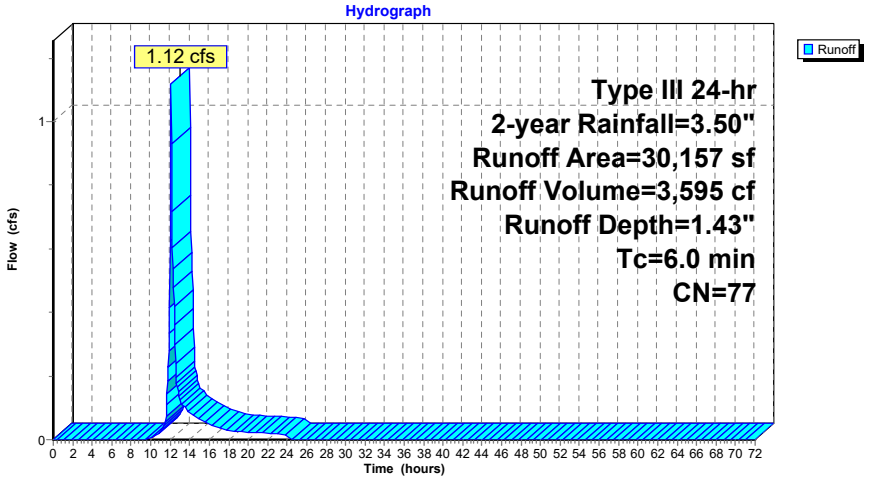
Runoff = 1.12 cfs @ 12.10 hrs, Volume= 3,595 cf, Depth= 1.43"
Routed to Pond 1P : On-Site Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.50"

Area (sf)	CN	Description
30,157	77	Fallow, bare soil, HSG A
30,157		100.00% Pervious Area

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

Subcatchment EX5: To Depression

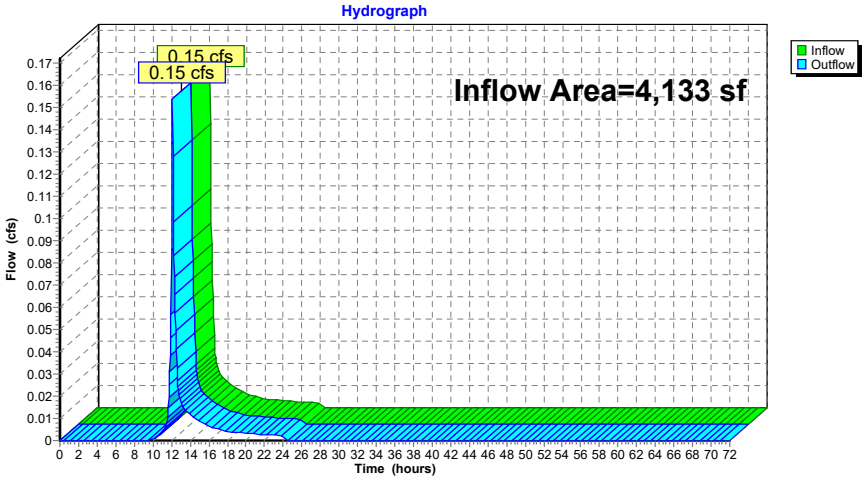


Summary for Reach DP1: Off-Site (North)

Inflow Area = 4,133 sf, 0.00% Impervious, Inflow Depth = 1.43" for 2-year event
Inflow = 0.15 cfs @ 12.10 hrs, Volume= 493 cf
Outflow = 0.15 cfs @ 12.10 hrs, Volume= 493 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP1: Off-Site (North)

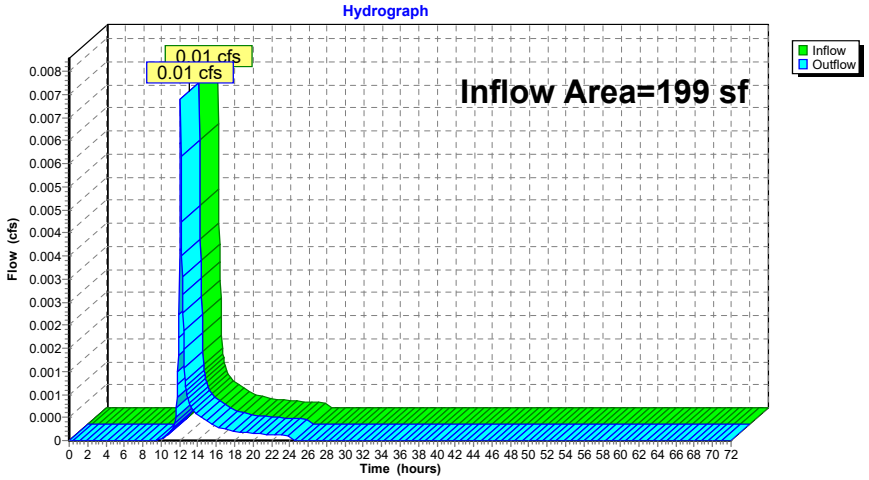


Summary for Reach DP2: Off-Site (East)

Inflow Area = 199 sf, 0.00% Impervious, Inflow Depth = 1.43" for 2-year event
Inflow = 0.01 cfs @ 12.10 hrs, Volume= 24 cf
Outflow = 0.01 cfs @ 12.10 hrs, Volume= 24 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP2: Off-Site (East)

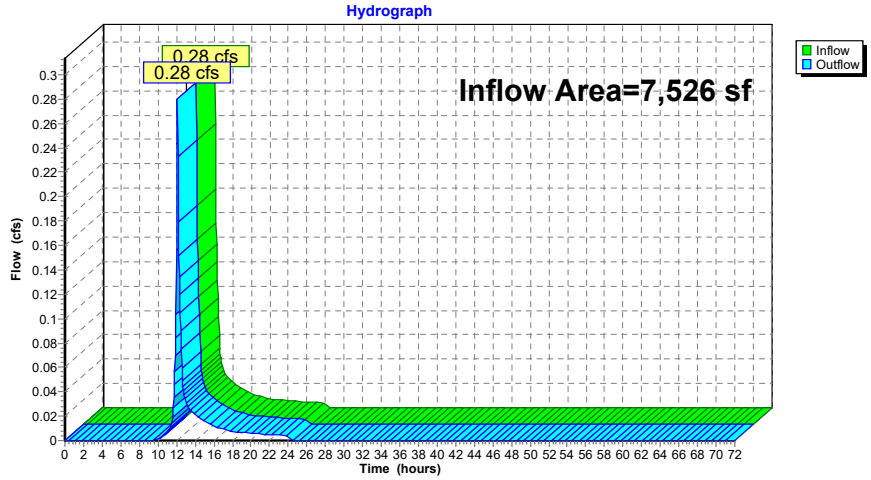


Summary for Reach DP3: Off-Site (South)

Inflow Area = 7,526 sf, 0.00% Impervious, Inflow Depth = 1.43" for 2-year event
Inflow = 0.28 cfs @ 12.10 hrs, Volume= 897 cf
Outflow = 0.28 cfs @ 12.10 hrs, Volume= 897 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP3: Off-Site (South)

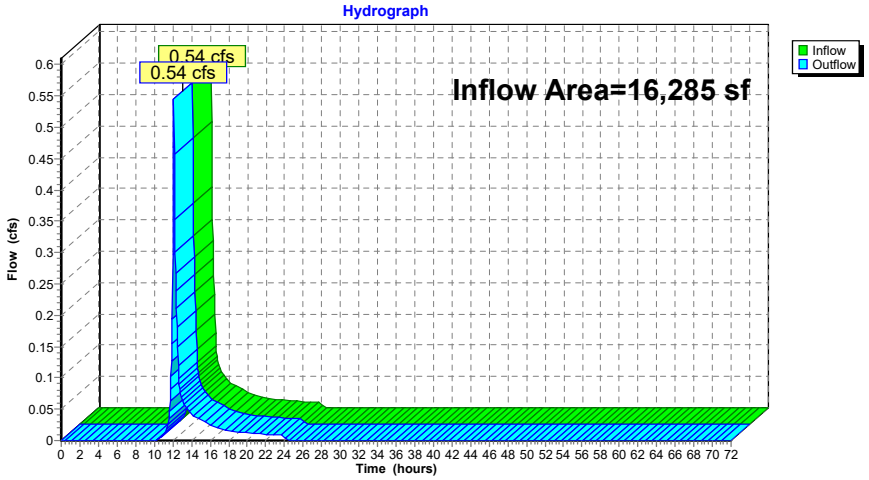


Summary for Reach DP4: Off-Site (West)

Inflow Area = 16,285 sf, 0.00% Impervious, Inflow Depth = 1.30" for 2-year event
Inflow = 0.54 cfs @ 12.10 hrs, Volume= 1,767 cf
Outflow = 0.54 cfs @ 12.10 hrs, Volume= 1,767 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP4: Off-Site (West)



Summary for Pond 1P: On-Site Depression

Inflow Area = 30,157 sf, 0.00% Impervious, Inflow Depth = 1.43" for 2-year event
Inflow = 1.12 cfs @ 12.10 hrs, Volume= 3,595 cf
Outflow = 0.59 cfs @ 12.26 hrs, Volume= 3,595 cf, Atten= 47%, Lag= 10.1 min
Discarded = 0.59 cfs @ 12.26 hrs, Volume= 3,595 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 99.12' @ 12.26 hrs Surf.Area= 3,084 sf Storage= 335 cf

Plug-Flow detention time= 3.6 min calculated for 3,592 cf (100% of inflow)
Center-of-Mass det. time= 3.6 min (851.0 - 847.4)

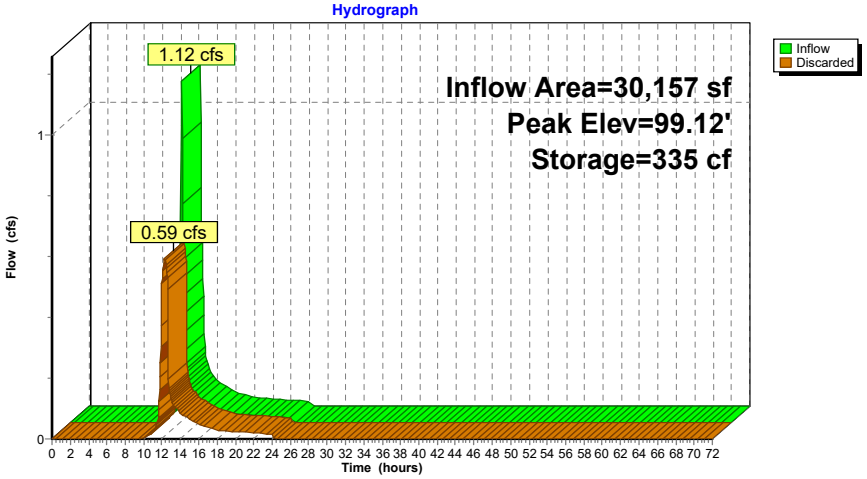
Volume	Invert	Avail.Storage	Storage Description
#1	99.00'	15,102 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
99.00	2,605	210.0	0	0	2,605
100.00	7,942	339.0	5,032	5,032	8,247
101.00	12,360	428.0	10,070	15,102	13,693

Device	Routing	Invert	Outlet Devices
#1	Discarded	99.00'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.59 cfs @ 12.26 hrs HW=99.12' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.59 cfs)

Pond 1P: On-Site Depression



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentEX1: Off-Site (North) Runoff Area=4,133 sf 0.00% Impervious Runoff Depth=2.46"
Tc=6.0 min CN=77 Runoff=0.27 cfs 846 cf

SubcatchmentEX2: Off-Site (East) Runoff Area=199 sf 0.00% Impervious Runoff Depth=2.46"
Tc=6.0 min CN=77 Runoff=0.01 cfs 41 cf

SubcatchmentEX3: Off-Site (South) Runoff Area=7,526 sf 0.00% Impervious Runoff Depth=2.46"
Tc=6.0 min CN=77 Runoff=0.49 cfs 1,541 cf

SubcatchmentEX4: Off-Site (West)) Runoff Area=16,285 sf 0.00% Impervious Runoff Depth=2.29"
Tc=6.0 min CN=75 Runoff=0.98 cfs 3,105 cf

SubcatchmentEX5: To Depression Runoff Area=30,157 sf 0.00% Impervious Runoff Depth=2.46"
Tc=6.0 min CN=77 Runoff=1.95 cfs 6,174 cf

Reach DP1: Off-Site (North) Inflow=0.27 cfs 846 cf
Outflow=0.27 cfs 846 cf

Reach DP2: Off-Site (East) Inflow=0.01 cfs 41 cf
Outflow=0.01 cfs 41 cf

Reach DP3: Off-Site (South) Inflow=0.49 cfs 1,541 cf
Outflow=0.49 cfs 1,541 cf

Reach DP4: Off-Site (West) Inflow=0.98 cfs 3,105 cf
Outflow=0.98 cfs 3,105 cf

Pond 1P: On-Site Depression Peak Elev=99.31' Storage=999 cf Inflow=1.95 cfs 6,174 cf
Outflow=0.75 cfs 6,174 cf

Total Runoff Area = 58,300 sf Runoff Volume = 11,706 cf Average Runoff Depth = 2.41"
100.00% Pervious = 58,300 sf 0.00% Impervious = 0 sf

Summary for Subcatchment EX1: Off-Site (North)

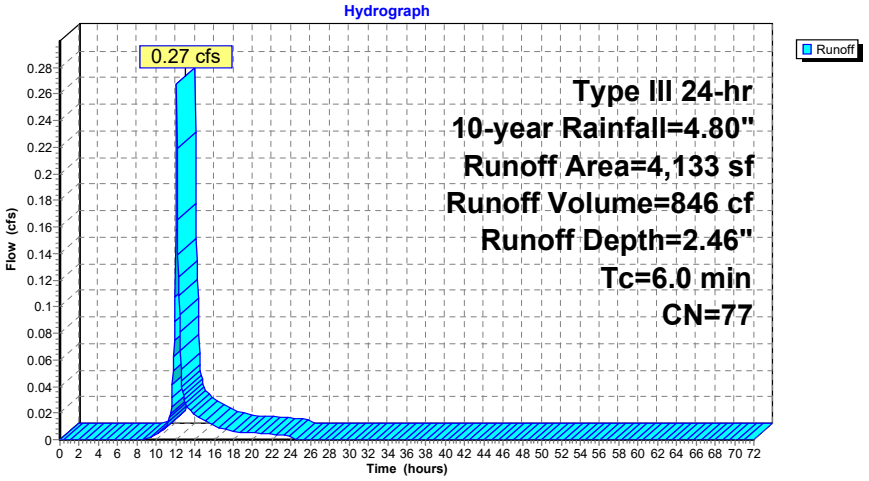
Runoff = 0.27 cfs @ 12.09 hrs, Volume= 846 cf, Depth= 2.46"
Routed to Reach DP1 : Off-Site (North)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
4,133	77	Fallow, bare soil, HSG A
4,133		100.00% Pervious Area

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

Subcatchment EX1: Off-Site (North)



Summary for Subcatchment EX2: Off-Site (East)

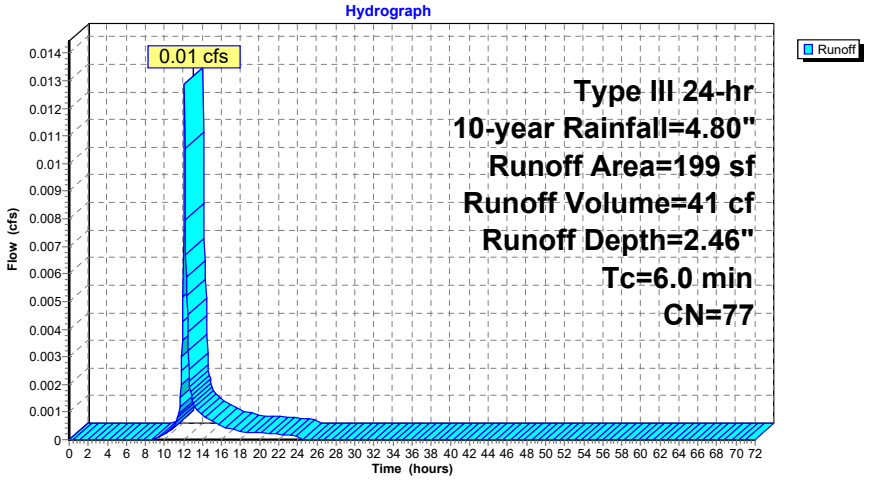
Runoff = 0.01 cfs @ 12.09 hrs, Volume= 41 cf, Depth= 2.46"
Routed to Reach DP2 : Off-Site (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
199	77	Fallow, bare soil, HSG A
199		100.00% Pervious Area

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

Subcatchment EX2: Off-Site (East)



Summary for Subcatchment EX3: Off-Site (South)

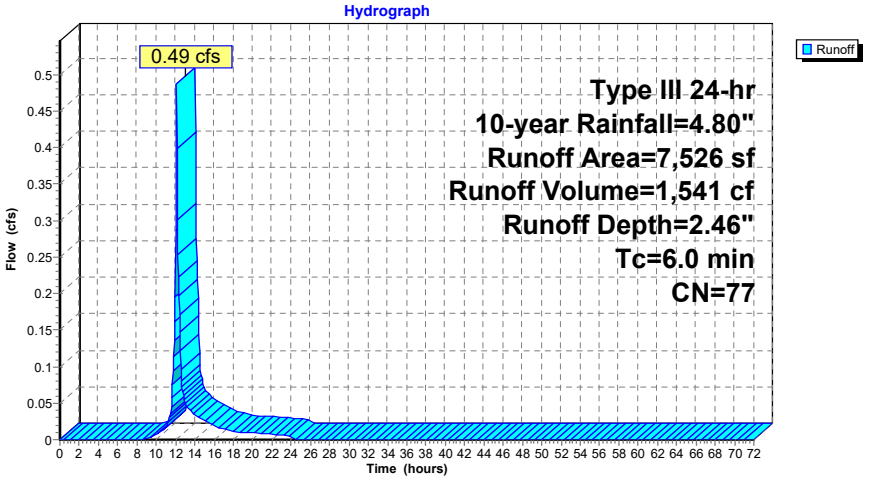
Runoff = 0.49 cfs @ 12.09 hrs, Volume= 1,541 cf, Depth= 2.46"
Routed to Reach DP3 : Off-Site (South)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
7,526	77	Fallow, bare soil, HSG A
7,526		100.00% Pervious Area

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

Subcatchment EX3: Off-Site (South)



Summary for Subcatchment EX4: Off-Site (West))

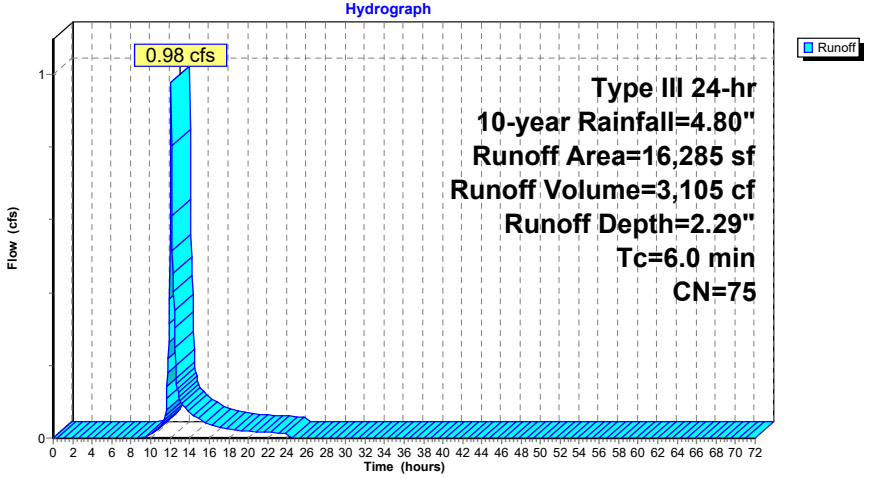
Runoff = 0.98 cfs @ 12.09 hrs, Volume= 3,105 cf, Depth= 2.29"
Routed to Reach DP4 : Off-Site (West)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
15,515	77	Fallow, bare soil, HSG A
770	30	Woods, Good, HSG A
16,285	75	Weighted Average
16,285		100.00% Pervious Area

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

Subcatchment EX4: Off-Site (West))



Summary for Subcatchment EX5: To Depression

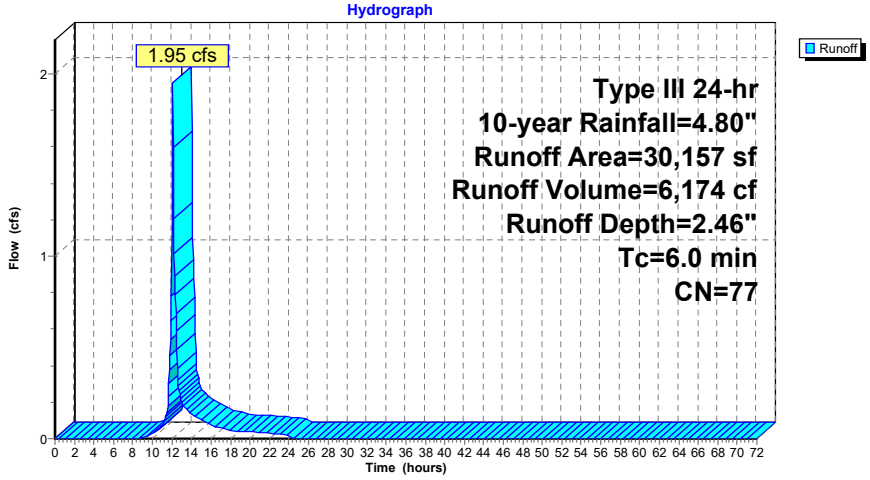
Runoff = 1.95 cfs @ 12.09 hrs, Volume= 6,174 cf, Depth= 2.46"
Routed to Pond 1P : On-Site Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
30,157	77	Fallow, bare soil, HSG A
30,157		100.00% Pervious Area

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

Subcatchment EX5: To Depression

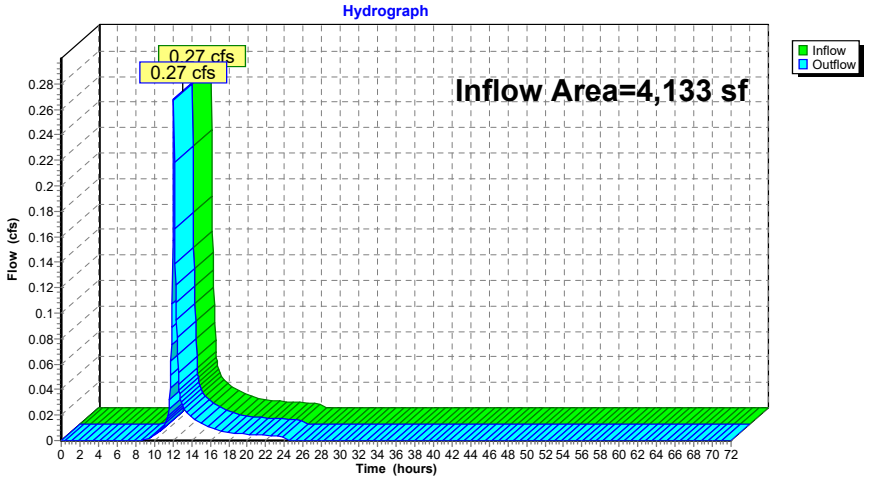


Summary for Reach DP1: Off-Site (North)

Inflow Area = 4,133 sf, 0.00% Impervious, Inflow Depth = 2.46" for 10-year event
Inflow = 0.27 cfs @ 12.09 hrs, Volume= 846 cf
Outflow = 0.27 cfs @ 12.09 hrs, Volume= 846 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP1: Off-Site (North)

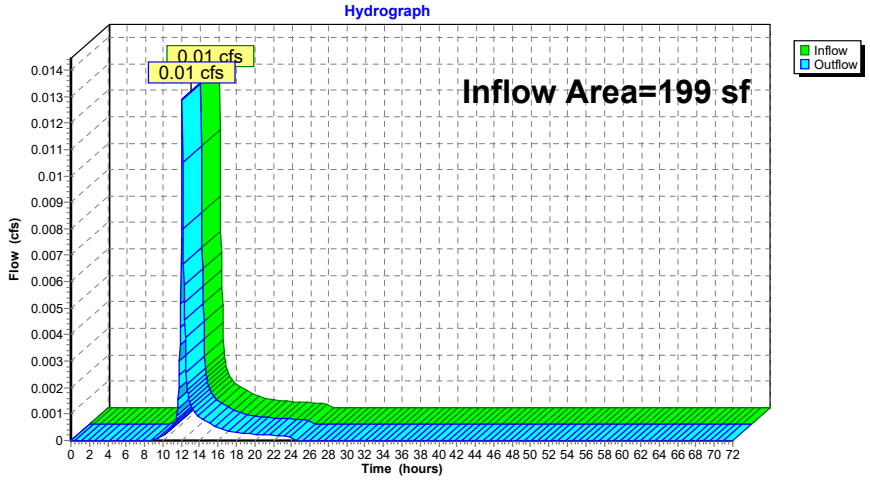


Summary for Reach DP2: Off-Site (East)

Inflow Area = 199 sf, 0.00% Impervious, Inflow Depth = 2.46" for 10-year event
Inflow = 0.01 cfs @ 12.09 hrs, Volume= 41 cf
Outflow = 0.01 cfs @ 12.09 hrs, Volume= 41 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP2: Off-Site (East)

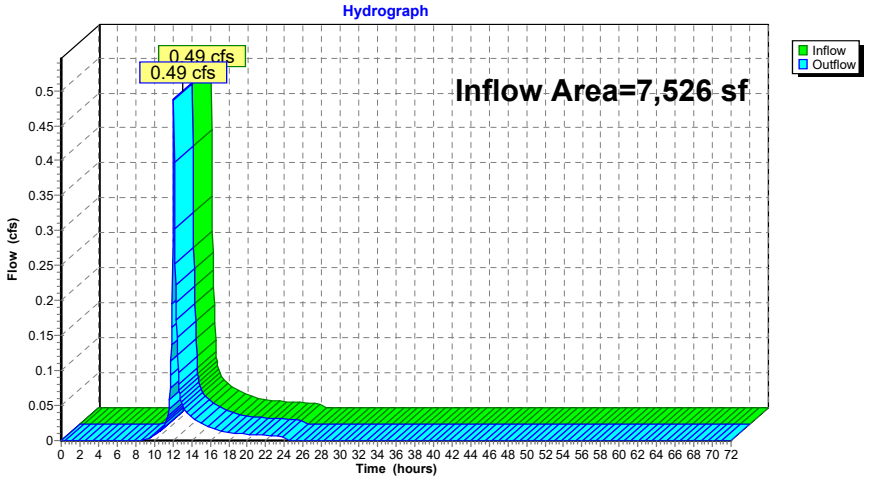


Summary for Reach DP3: Off-Site (South)

Inflow Area = 7,526 sf, 0.00% Impervious, Inflow Depth = 2.46" for 10-year event
Inflow = 0.49 cfs @ 12.09 hrs, Volume= 1,541 cf
Outflow = 0.49 cfs @ 12.09 hrs, Volume= 1,541 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP3: Off-Site (South)

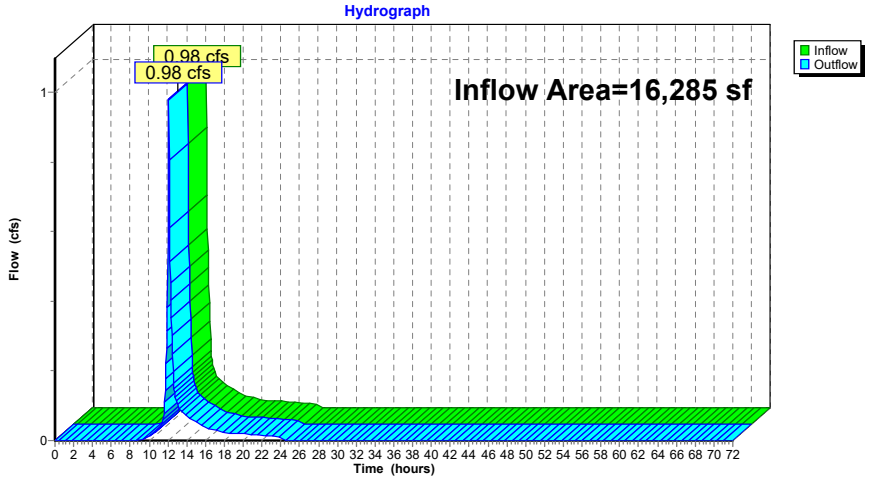


Summary for Reach DP4: Off-Site (West)

Inflow Area = 16,285 sf, 0.00% Impervious, Inflow Depth = 2.29" for 10-year event
Inflow = 0.98 cfs @ 12.09 hrs, Volume= 3,105 cf
Outflow = 0.98 cfs @ 12.09 hrs, Volume= 3,105 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP4: Off-Site (West)



Summary for Pond 1P: On-Site Depression

Inflow Area = 30,157 sf, 0.00% Impervious, Inflow Depth = 2.46" for 10-year event
Inflow = 1.95 cfs @ 12.09 hrs, Volume= 6,174 cf
Outflow = 0.75 cfs @ 12.37 hrs, Volume= 6,174 cf, Atten= 61%, Lag= 16.4 min
Discarded = 0.75 cfs @ 12.37 hrs, Volume= 6,174 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 99.31' @ 12.37 hrs Surf.Area= 3,938 sf Storage= 999 cf

Plug-Flow detention time= 8.1 min calculated for 6,169 cf (100% of inflow)
Center-of-Mass det. time= 8.1 min (839.7 - 831.6)

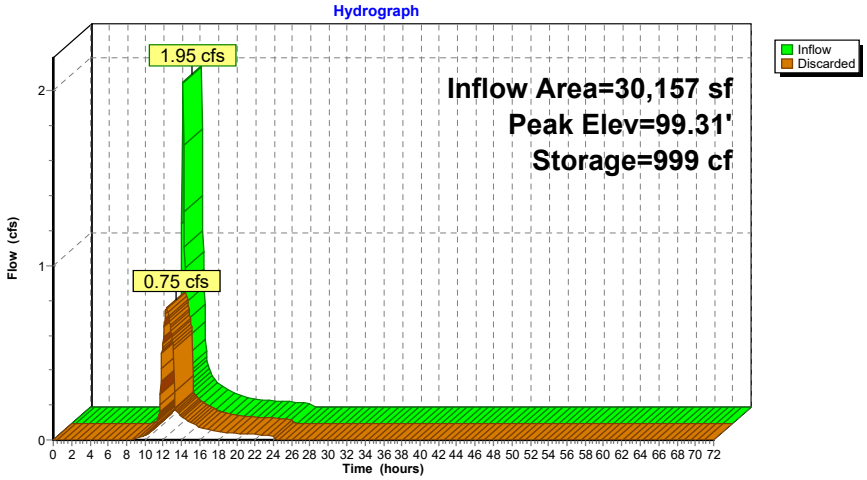
Volume	Invert	Avail.Storage	Storage Description
#1	99.00'	15,102 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
99.00	2,605	210.0	0	0	2,605
100.00	7,942	339.0	5,032	5,032	8,247
101.00	12,360	428.0	10,070	15,102	13,693

Device	Routing	Invert	Outlet Devices
#1	Discarded	99.00'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.75 cfs @ 12.37 hrs HW=99.31' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.75 cfs)

Pond 1P: On-Site Depression



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentEX1: Off-Site (North) Runoff Area=4,133 sf 0.00% Impervious Runoff Depth=4.50"
Tc=6.0 min CN=77 Runoff=0.49 cfs 1,550 cf

SubcatchmentEX2: Off-Site (East) Runoff Area=199 sf 0.00% Impervious Runoff Depth=4.50"
Tc=6.0 min CN=77 Runoff=0.02 cfs 75 cf

SubcatchmentEX3: Off-Site (South) Runoff Area=7,526 sf 0.00% Impervious Runoff Depth=4.50"
Tc=6.0 min CN=77 Runoff=0.89 cfs 2,823 cf

SubcatchmentEX4: Off-Site (West)) Runoff Area=16,285 sf 0.00% Impervious Runoff Depth=4.28"
Tc=6.0 min CN=75 Runoff=1.84 cfs 5,811 cf

SubcatchmentEX5: To Depression Runoff Area=30,157 sf 0.00% Impervious Runoff Depth=4.50"
Tc=6.0 min CN=77 Runoff=3.56 cfs 11,311 cf

Reach DP1: Off-Site (North) Inflow=0.49 cfs 1,550 cf
Outflow=0.49 cfs 1,550 cf

Reach DP2: Off-Site (East) Inflow=0.02 cfs 75 cf
Outflow=0.02 cfs 75 cf

Reach DP3: Off-Site (South) Inflow=0.89 cfs 2,823 cf
Outflow=0.89 cfs 2,823 cf

Reach DP4: Off-Site (West) Inflow=1.84 cfs 5,811 cf
Outflow=1.84 cfs 5,811 cf

Pond 1P: On-Site Depression Peak Elev=99.64' Storage=2,587 cf Inflow=3.56 cfs 11,311 cf
Outflow=1.09 cfs 11,311 cf

Total Runoff Area = 58,300 sf Runoff Volume = 21,570 cf Average Runoff Depth = 4.44"
100.00% Pervious = 58,300 sf 0.00% Impervious = 0 sf

Summary for Subcatchment EX1: Off-Site (North)

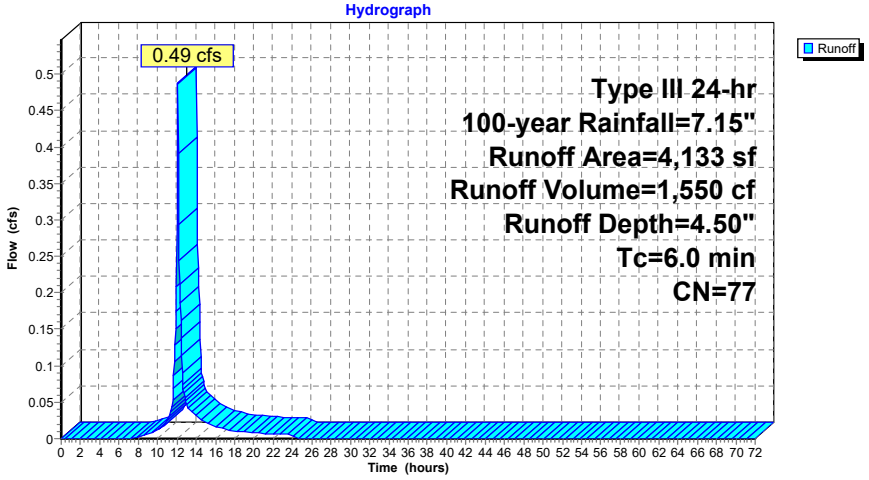
Runoff = 0.49 cfs @ 12.09 hrs, Volume= 1,550 cf, Depth= 4.50"
Routed to Reach DP1 : Off-Site (North)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.15"

Area (sf)	CN	Description
4,133	77	Fallow, bare soil, HSG A
4,133		100.00% Pervious Area

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

Subcatchment EX1: Off-Site (North)



Summary for Subcatchment EX2: Off-Site (East)

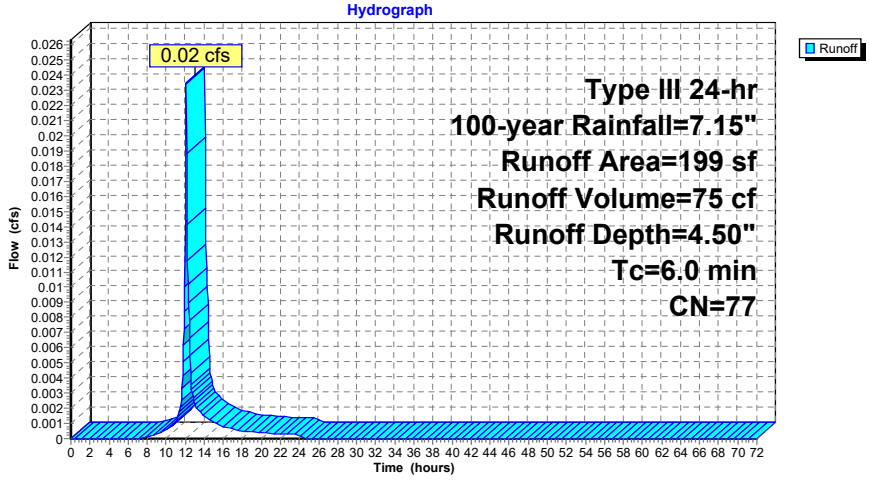
Runoff = 0.02 cfs @ 12.09 hrs, Volume= 75 cf, Depth= 4.50"
Routed to Reach DP2 : Off-Site (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.15"

Area (sf)	CN	Description
199	77	Fallow, bare soil, HSG A
199		100.00% Pervious Area

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

Subcatchment EX2: Off-Site (East)



Summary for Subcatchment EX3: Off-Site (South)

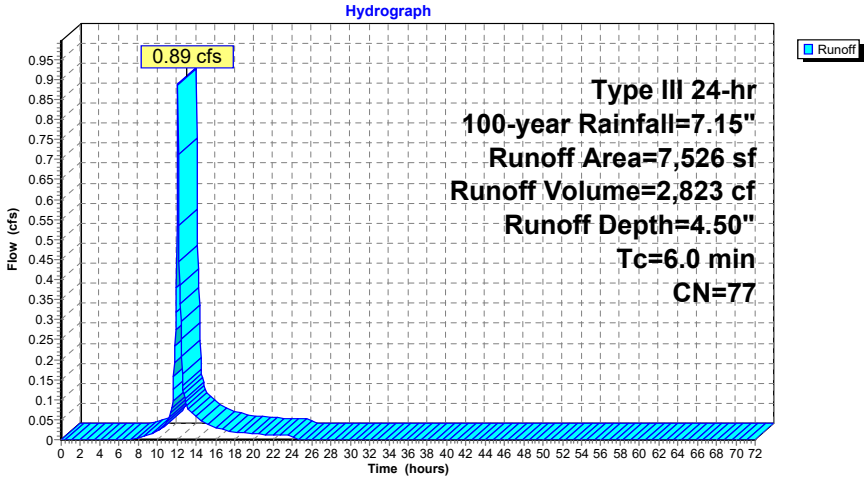
Runoff = 0.89 cfs @ 12.09 hrs, Volume= 2,823 cf, Depth= 4.50"
Routed to Reach DP3 : Off-Site (South)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.15"

Area (sf)	CN	Description
7,526	77	Fallow, bare soil, HSG A
7,526		100.00% Pervious Area

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

Subcatchment EX3: Off-Site (South)



Summary for Subcatchment EX4: Off-Site (West))

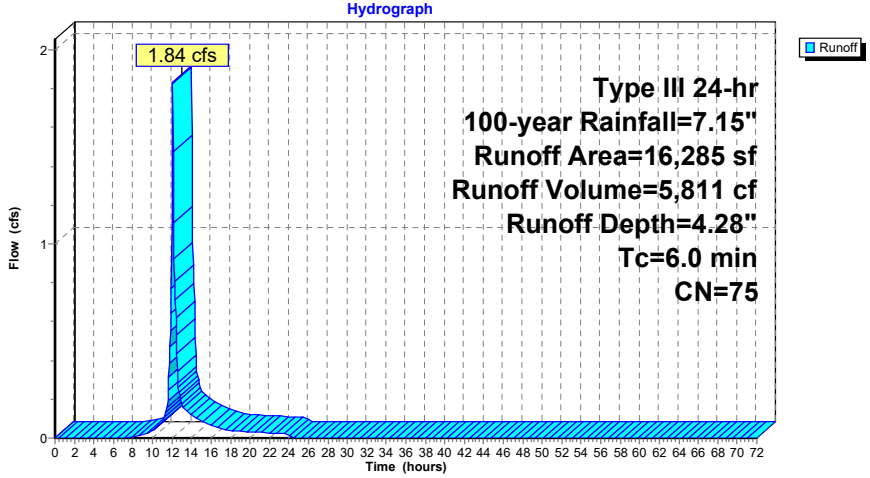
Runoff = 1.84 cfs @ 12.09 hrs, Volume= 5,811 cf, Depth= 4.28"
Routed to Reach DP4 : Off-Site (West)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.15"

Area (sf)	CN	Description
15,515	77	Fallow, bare soil, HSG A
770	30	Woods, Good, HSG A
16,285	75	Weighted Average
16,285		100.00% Pervious Area

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

Subcatchment EX4: Off-Site (West))



Summary for Subcatchment EX5: To Depression

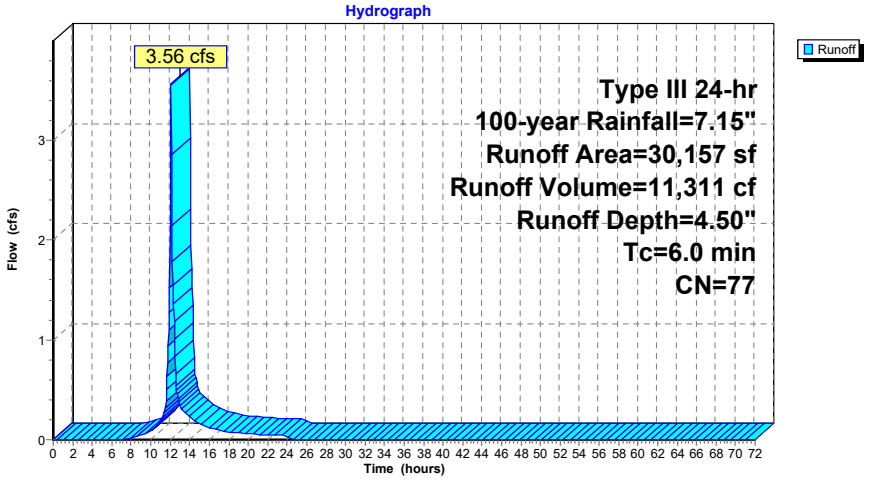
Runoff = 3.56 cfs @ 12.09 hrs, Volume= 11,311 cf, Depth= 4.50"
Routed to Pond 1P : On-Site Depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.15"

Area (sf)	CN	Description
30,157	77	Fallow, bare soil, HSG A
30,157		100.00% Pervious Area

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

Subcatchment EX5: To Depression

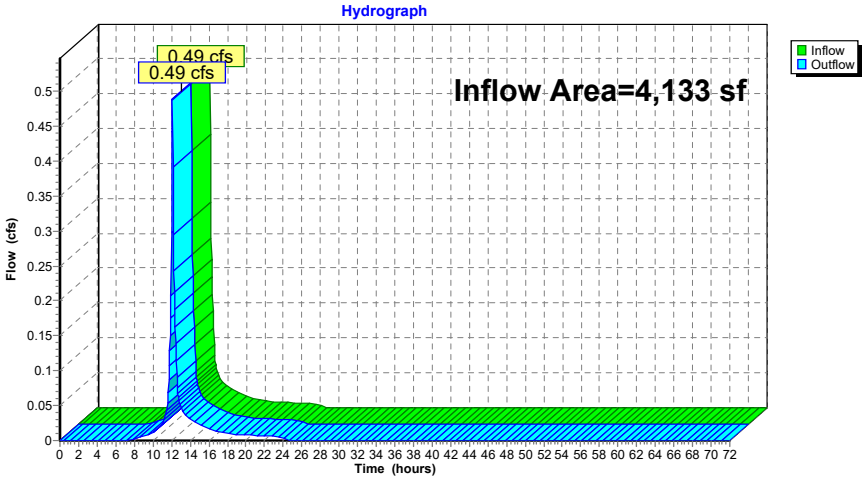


Summary for Reach DP1: Off-Site (North)

Inflow Area = 4,133 sf, 0.00% Impervious, Inflow Depth = 4.50" for 100-year event
Inflow = 0.49 cfs @ 12.09 hrs, Volume= 1,550 cf
Outflow = 0.49 cfs @ 12.09 hrs, Volume= 1,550 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP1: Off-Site (North)

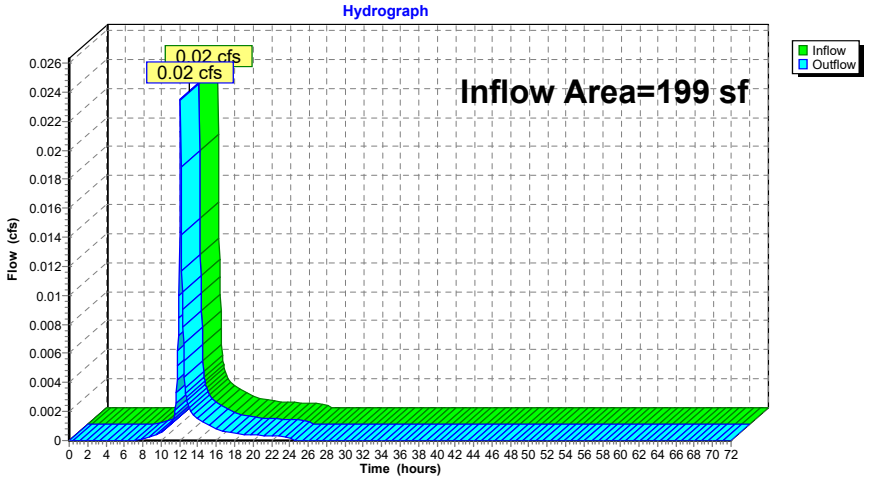


Summary for Reach DP2: Off-Site (East)

Inflow Area = 199 sf, 0.00% Impervious, Inflow Depth = 4.50" for 100-year event
Inflow = 0.02 cfs @ 12.09 hrs, Volume= 75 cf
Outflow = 0.02 cfs @ 12.09 hrs, Volume= 75 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP2: Off-Site (East)

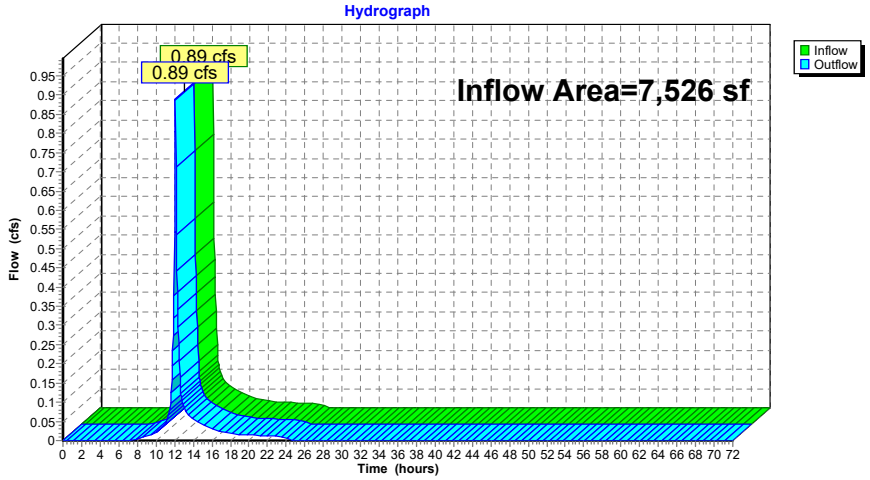


Summary for Reach DP3: Off-Site (South)

Inflow Area = 7,526 sf, 0.00% Impervious, Inflow Depth = 4.50" for 100-year event
Inflow = 0.89 cfs @ 12.09 hrs, Volume= 2,823 cf
Outflow = 0.89 cfs @ 12.09 hrs, Volume= 2,823 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP3: Off-Site (South)

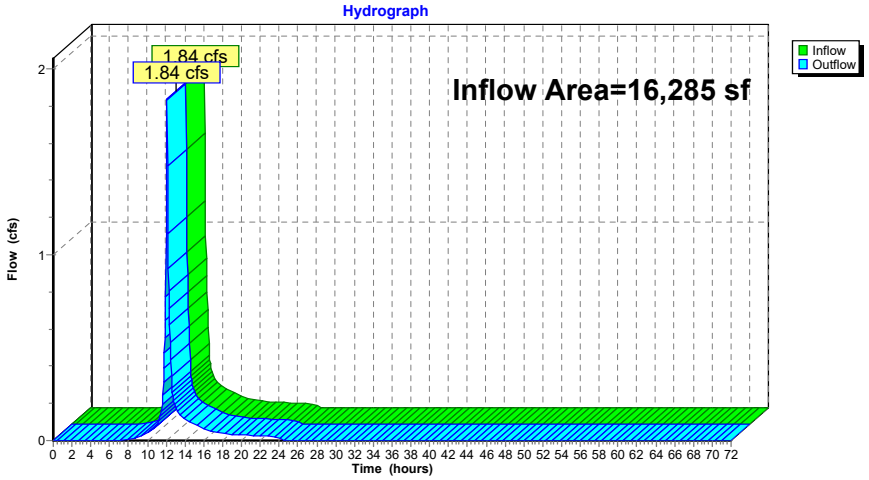


Summary for Reach DP4: Off-Site (West)

Inflow Area = 16,285 sf, 0.00% Impervious, Inflow Depth = 4.28" for 100-year event
Inflow = 1.84 cfs @ 12.09 hrs, Volume= 5,811 cf
Outflow = 1.84 cfs @ 12.09 hrs, Volume= 5,811 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP4: Off-Site (West)



Summary for Pond 1P: On-Site Depression

Inflow Area = 30,157 sf, 0.00% Impervious, Inflow Depth = 4.50" for 100-year event
Inflow = 3.56 cfs @ 12.09 hrs, Volume= 11,311 cf
Outflow = 1.09 cfs @ 12.43 hrs, Volume= 11,311 cf, Atten= 69%, Lag= 20.2 min
Discarded = 1.09 cfs @ 12.43 hrs, Volume= 11,311 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 99.64' @ 12.43 hrs Surf.Area= 5,683 sf Storage= 2,587 cf

Plug-Flow detention time= 16.4 min calculated for 11,311 cf (100% of inflow)
Center-of-Mass det. time= 16.4 min (830.7 - 814.2)

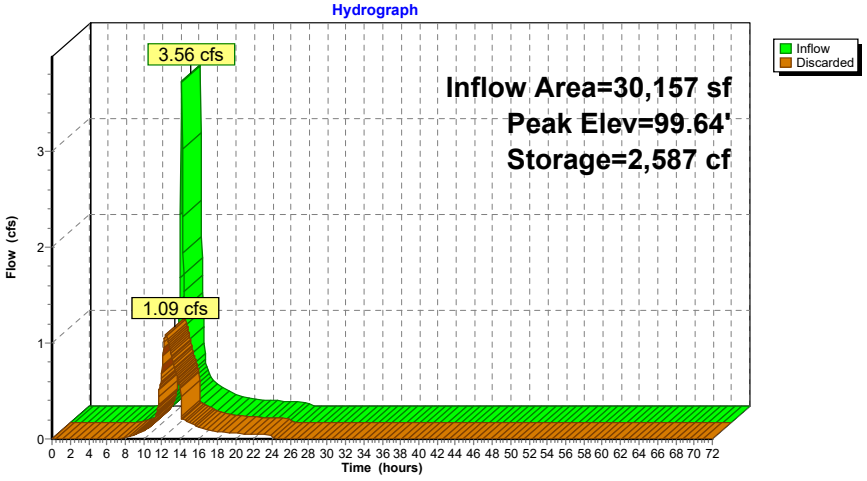
Volume	Invert	Avail.Storage	Storage Description
#1	99.00'	15,102 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
99.00	2,605	210.0	0	0	2,605
100.00	7,942	339.0	5,032	5,032	8,247
101.00	12,360	428.0	10,070	15,102	13,693

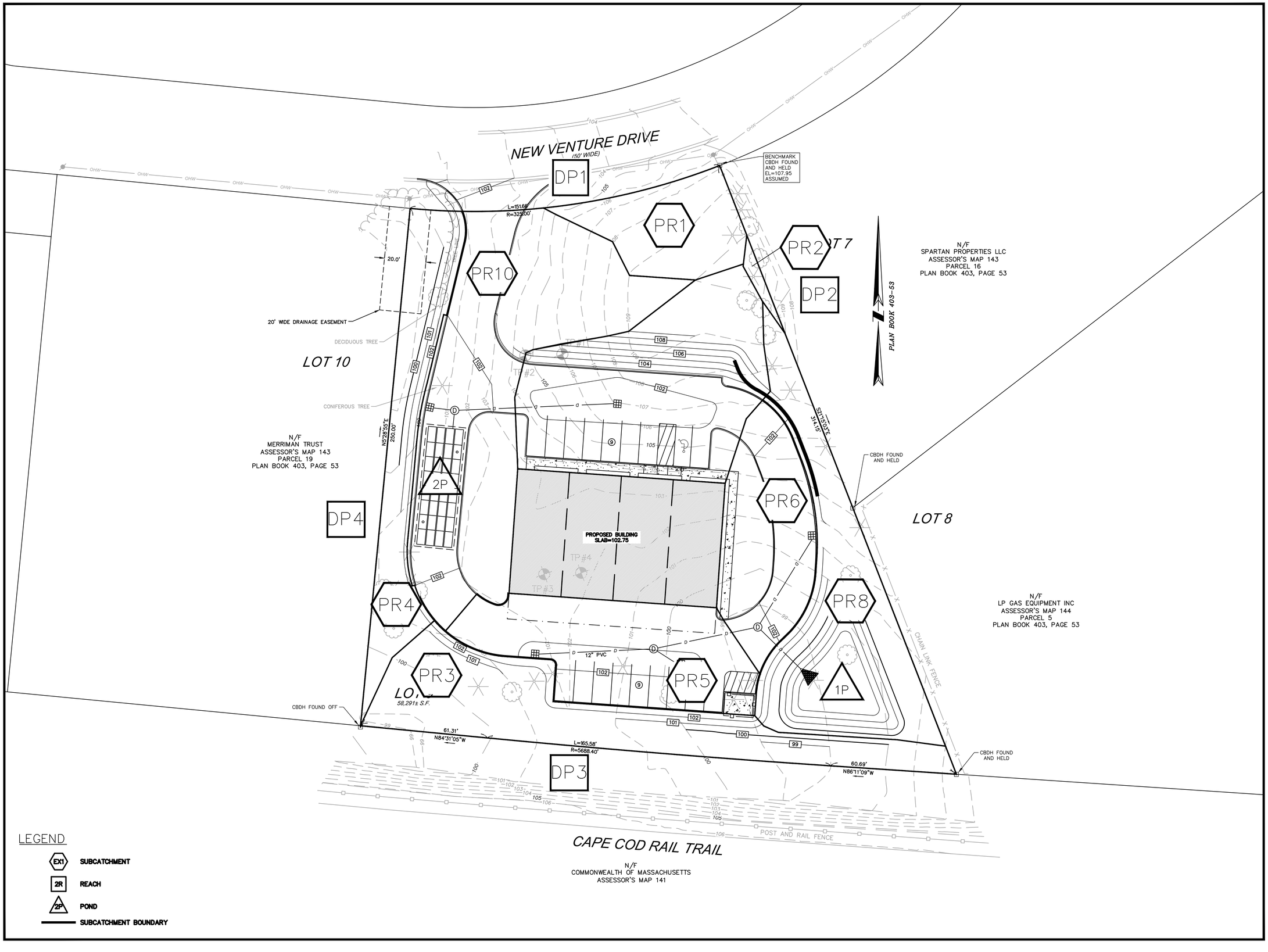
Device	Routing	Invert	Outlet Devices
#1	Discarded	99.00'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.09 cfs @ 12.43 hrs HW=99.64' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 1.09 cfs)

Pond 1P: On-Site Depression



5.03 PROPOSED WATERSHED PLAN



LEGEND

- EX1 SUBCATCHMENT
- 2R REACH
- 2P POND
- SUBCATCHMENT BOUNDARY

BRIAN G. YERGATIAN DATE

5 NEW VENTURE DRIVE

IN

SOUTH DENNIS
MASSACHUSETTS

PROPOSED CONDITIONS
WATERSHED MAP

DECEMBER 29, 2025

REVISIONS:

PREPARED FOR:
535 HIGGINS CROWELL, LLC
P.O. BOX 517
YARMOUTH PORT, MA 02675

BSC GROUP
BUILD | SUPPORT | CONNECT
349 Main Street - Route 28
West Yarmouth, Massachusetts
02673
508 778 8919

SCALE: 1" = 20'

0 10 20 40 FEET

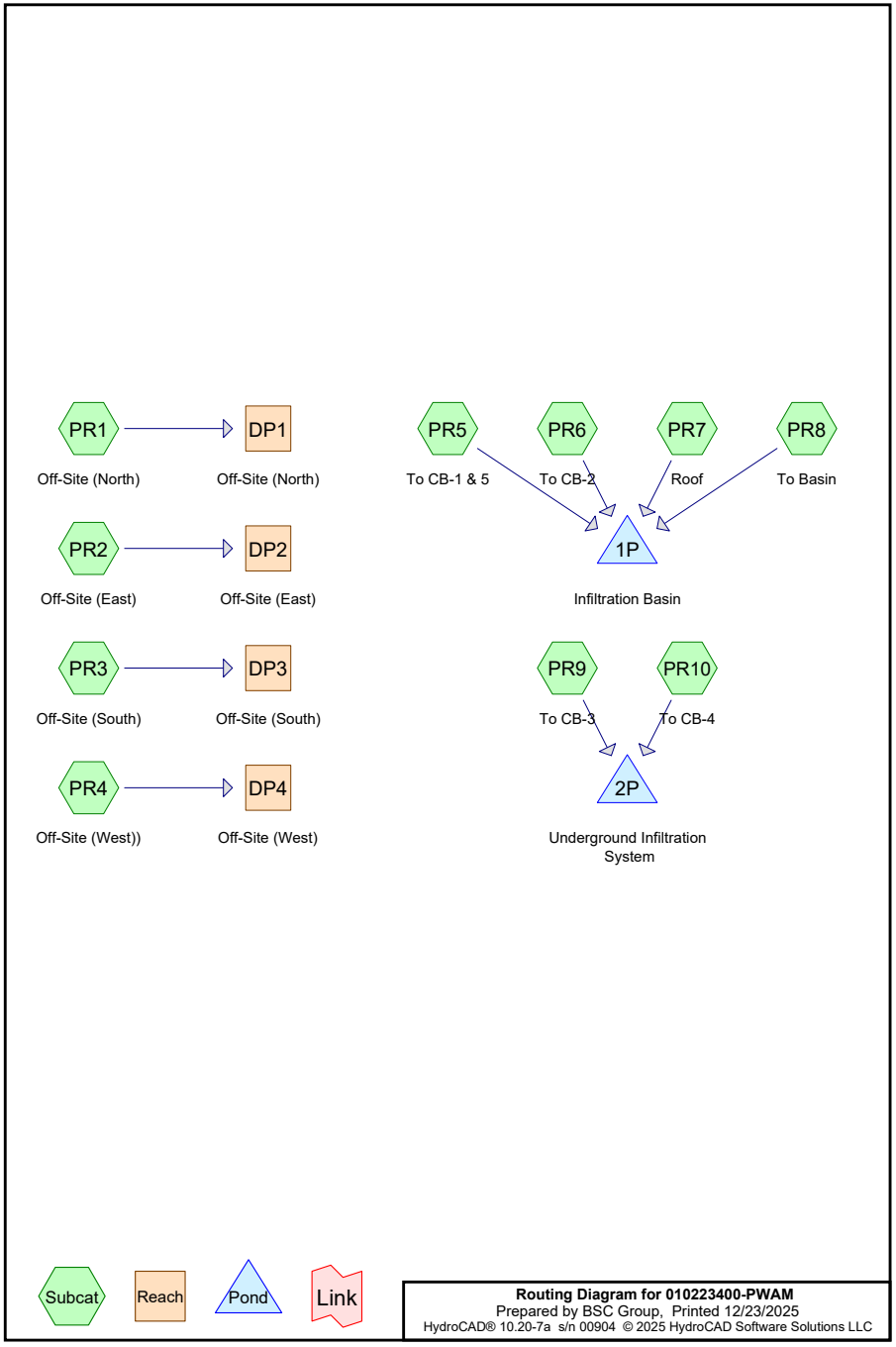
FILE: P:\010223400\C\ED\DD\WM

DWG. NO:

JOB. NO: 0102234.00

PWAM

5.04 PROPOSED HYDROLOGY CALCULATIONS (HYDROCAD™ PRINTOUTS)



Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-year	Type III 24-hr		Default	24.00	1	3.50	2
2	10-year	Type III 24-hr		Default	24.00	1	4.80	2
3	100-year	Type III 24-hr		Default	24.00	1	7.15	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
32,509	39	>75% Grass cover, Good, HSG A (PR1, PR10, PR2, PR3, PR4, PR5, PR6, PR8, PR9)
18,396	98	Paved parking, HSG A (PR10, PR5, PR6, PR9)
6,000	98	Roofs, HSG A (PR7)
286	98	Walkway, HSG A (PR6)
420	98	Walkways, HSG A (PR9)
689	30	Woods, Good, HSG A (PR4)
58,300	**64**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
58,300	HSG A	PR1, PR10, PR2, PR3, PR4, PR5, PR6, PR7, PR8, PR9
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
58,300		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
32,509	0	0	0	0	32,509	>75% Grass cover, Good
18,396	0	0	0	0	18,396	Paved parking
6,000	0	0	0	0	6,000	Roofs
286	0	0	0	0	286	Walkway
420	0	0	0	0	420	Walkways
689	0	0	0	0	689	Woods, Good
58,300	**0**	**0**	**0**	**0**	**58,300**	**TOTAL AREA**

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPR1: Off-Site (North) Runoff Area=3,020 sf 0.00% Impervious Runoff Depth=0.01"
Tc=6.0 min CN=39 Runoff=0.00 cfs 2 cf

SubcatchmentPR10: To CB-4 Runoff Area=11,406 sf 46.05% Impervious Runoff Depth=0.80"
Flow Length=197' Tc=6.7 min CN=66 Runoff=0.20 cfs 761 cf

SubcatchmentPR2: Off-Site (East) Runoff Area=199 sf 0.00% Impervious Runoff Depth=0.01"
Tc=6.0 min CN=39 Runoff=0.00 cfs 0 cf

SubcatchmentPR3: Off-Site (South) Runoff Area=7,033 sf 0.00% Impervious Runoff Depth=0.01"
Tc=6.0 min CN=39 Runoff=0.00 cfs 5 cf

SubcatchmentPR4: Off-Site (West)) Runoff Area=4,310 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=38 Runoff=0.00 cfs 1 cf

SubcatchmentPR5: To CB-1 & 5 Runoff Area=5,930 sf 99.93% Impervious Runoff Depth=3.27"
Tc=6.0 min CN=98 Runoff=0.45 cfs 1,614 cf

SubcatchmentPR6: To CB-2 Runoff Area=4,387 sf 68.13% Impervious Runoff Depth=1.57"
Tc=6.0 min CN=79 Runoff=0.18 cfs 572 cf

SubcatchmentPR7: Roof Runoff Area=6,000 sf 100.00% Impervious Runoff Depth=3.27"
Tc=6.0 min CN=98 Runoff=0.46 cfs 1,633 cf

SubcatchmentPR8: To Basin Runoff Area=7,148 sf 0.00% Impervious Runoff Depth=0.01"
Tc=6.0 min CN=39 Runoff=0.00 cfs 5 cf

SubcatchmentPR9: To CB-3 Runoff Area=8,867 sf 55.66% Impervious Runoff Depth=1.12"
Tc=6.0 min CN=72 Runoff=0.25 cfs 828 cf

Reach DP1: Off-Site (North) Inflow=0.00 cfs 2 cf
Outflow=0.00 cfs 2 cf

Reach DP2: Off-Site (East) Inflow=0.00 cfs 0 cf
Outflow=0.00 cfs 0 cf

Reach DP3: Off-Site (South) Inflow=0.00 cfs 5 cf
Outflow=0.00 cfs 5 cf

Reach DP4: Off-Site (West) Inflow=0.00 cfs 1 cf
Outflow=0.00 cfs 1 cf

Pond 1P: Infiltration Basin Peak Elev=97.79' Storage=901 cf Inflow=1.09 cfs 3,825 cf
Outflow=0.25 cfs 3,825 cf

Pond 2P: Underground Infiltration System Peak Elev=95.85' Storage=154 cf Inflow=0.45 cfs 1,589 cf
Outflow=0.21 cfs 1,589 cf

Total Runoff Area = 58,300 sf Runoff Volume = 5,423 cf Average Runoff Depth = 1.12"
56.94% Pervious = 33,198 sf 43.06% Impervious = 25,102 sf

Summary for Subcatchment PR1: Off-Site (North)

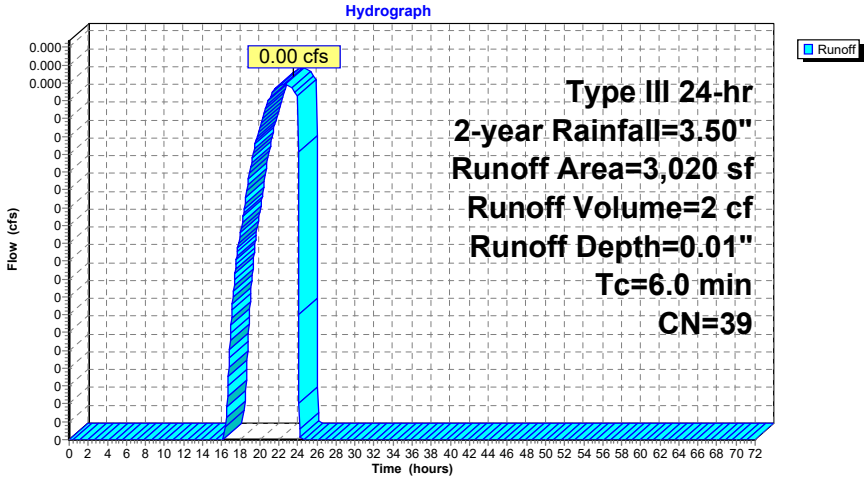
Runoff = 0.00 cfs @ 22.55 hrs, Volume= 2 cf, Depth= 0.01"
Routed to Reach DP1 : Off-Site (North)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.50"

Area (sf)	CN	Description
3,020	39	>75% Grass cover, Good, HSG A
3,020		100.00% Pervious Area

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

Subcatchment PR1: Off-Site (North)



Summary for Subcatchment PR10: To CB-4

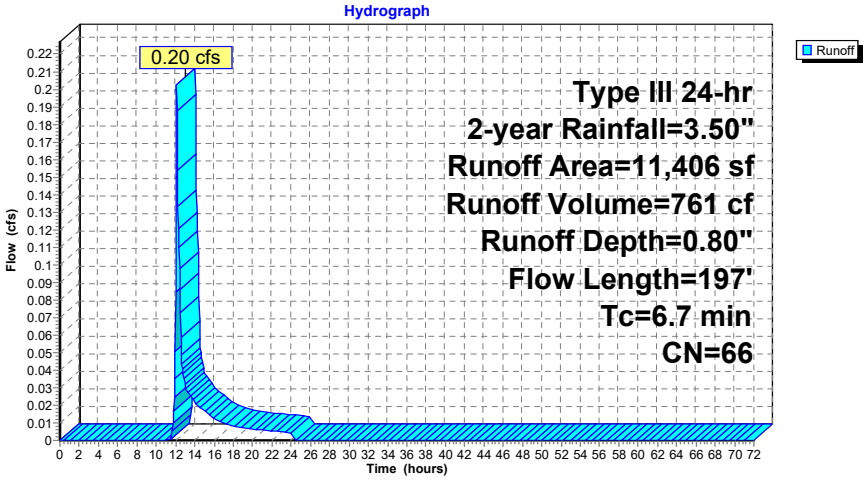
Runoff = 0.20 cfs @ 12.12 hrs, Volume= 761 cf, Depth= 0.80"
Routed to Pond 2P : Underground Infiltration System

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.50"

Area (sf)	CN	Description
6,154	39	>75% Grass cover, Good, HSG A
5,252	98	Paved parking, HSG A
11,406	66	Weighted Average
6,154		53.95% Pervious Area
5,252		46.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0860	0.32		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.50"
1.5	97	0.0238	1.08		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.7	197	Total			

Subcatchment PR10: To CB-4



Summary for Subcatchment PR2: Off-Site (East)

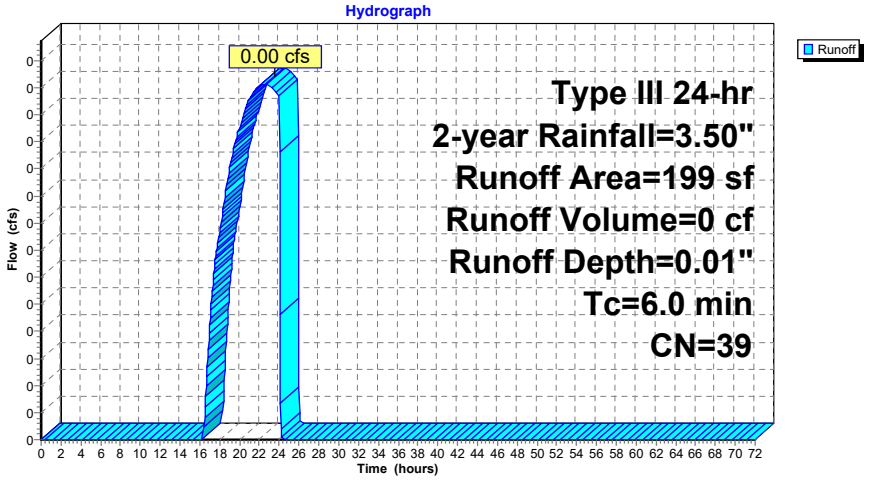
Runoff = 0.00 cfs @ 22.55 hrs, Volume= 0 cf, Depth= 0.01"
Routed to Reach DP2 : Off-Site (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.50"

Area (sf)	CN	Description
199	39	>75% Grass cover, Good, HSG A
199		100.00% Pervious Area

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

Subcatchment PR2: Off-Site (East)



Summary for Subcatchment PR3: Off-Site (South)

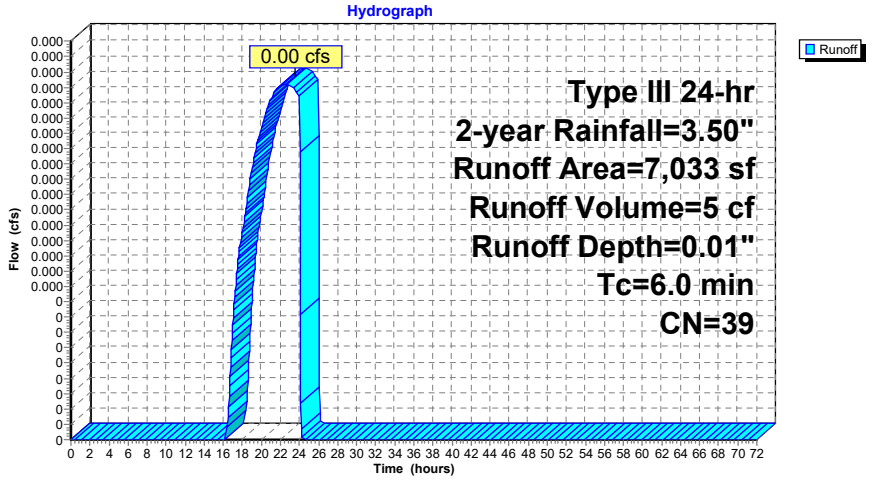
Runoff = 0.00 cfs @ 22.55 hrs, Volume= 5 cf, Depth= 0.01"
Routed to Reach DP3 : Off-Site (South)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.50"

Area (sf)	CN	Description
7,033	39	>75% Grass cover, Good, HSG A
7,033		100.00% Pervious Area

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

Subcatchment PR3: Off-Site (South)



Summary for Subcatchment PR4: Off-Site (West))

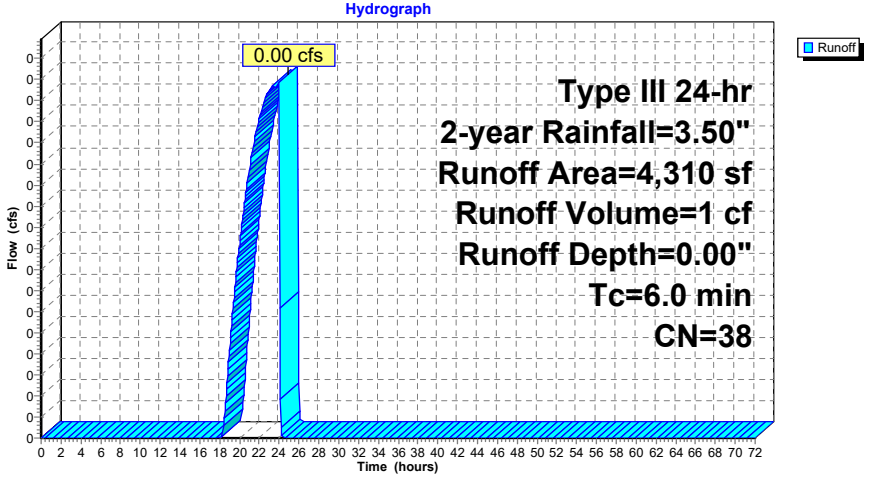
Runoff = 0.00 cfs @ 23.91 hrs, Volume= 1 cf, Depth= 0.00"
Routed to Reach DP4 : Off-Site (West)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.50"

Area (sf)	CN	Description
3,621	39	>75% Grass cover, Good, HSG A
689	30	Woods, Good, HSG A
4,310	38	Weighted Average
4,310		100.00% Pervious Area

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

Subcatchment PR4: Off-Site (West))



Summary for Subcatchment PR5: To CB-1 & 5

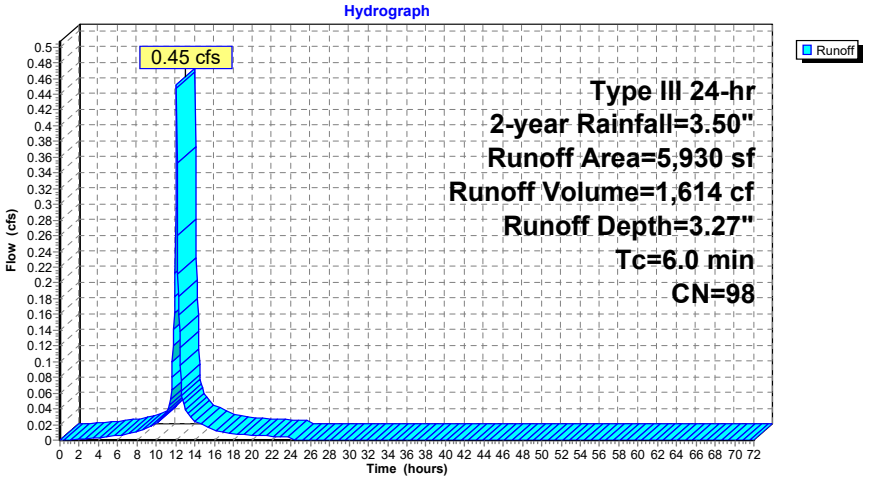
Runoff = 0.45 cfs @ 12.09 hrs, Volume= 1,614 cf, Depth= 3.27"
Routed to Pond 1P : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.50"

Area (sf)	CN	Description
5,926	98	Paved parking, HSG A
4	39	>75% Grass cover, Good, HSG A
5,930	98	Weighted Average
4		0.07% Pervious Area
5,926		99.93% Impervious Area

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

Subcatchment PR5: To CB-1 & 5



Summary for Subcatchment PR6: To CB-2

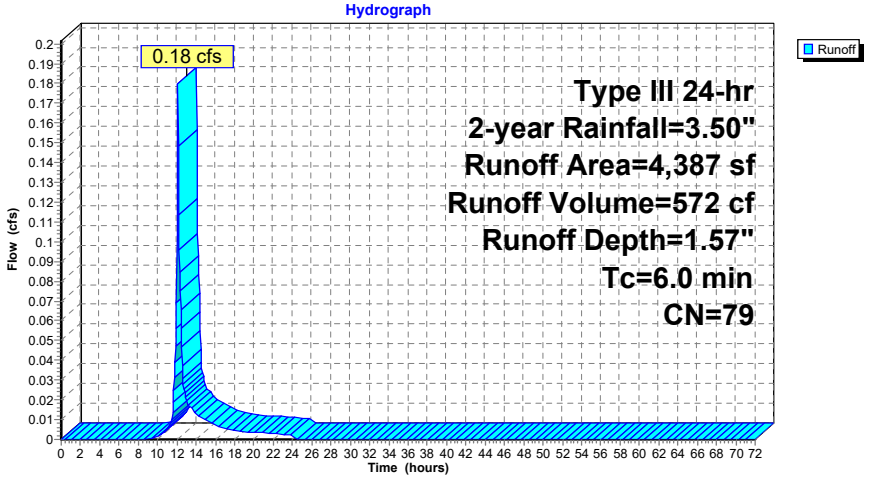
Runoff = 0.18 cfs @ 12.10 hrs, Volume= 572 cf, Depth= 1.57"
Routed to Pond 1P : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.50"

	Area (sf)	CN	Description
	2,703	98	Paved parking, HSG A
*	286	98	Walkway, HSG A
	1,398	39	>75% Grass cover, Good, HSG A
	4,387	79	Weighted Average
	1,398		31.87% Pervious Area
	2,989		68.13% Impervious Area

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

Subcatchment PR6: To CB-2



Summary for Subcatchment PR7: Roof

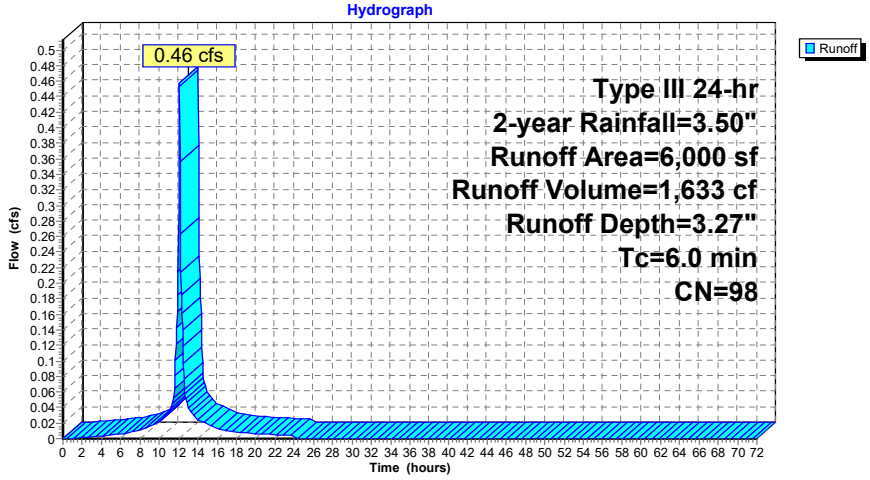
Runoff = 0.46 cfs @ 12.09 hrs, Volume= 1,633 cf, Depth= 3.27"
Routed to Pond 1P : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.50"

Area (sf)	CN	Description
6,000	98	Roofs, HSG A
6,000		100.00% Impervious Area

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

Subcatchment PR7: Roof



Summary for Subcatchment PR8: To Basin

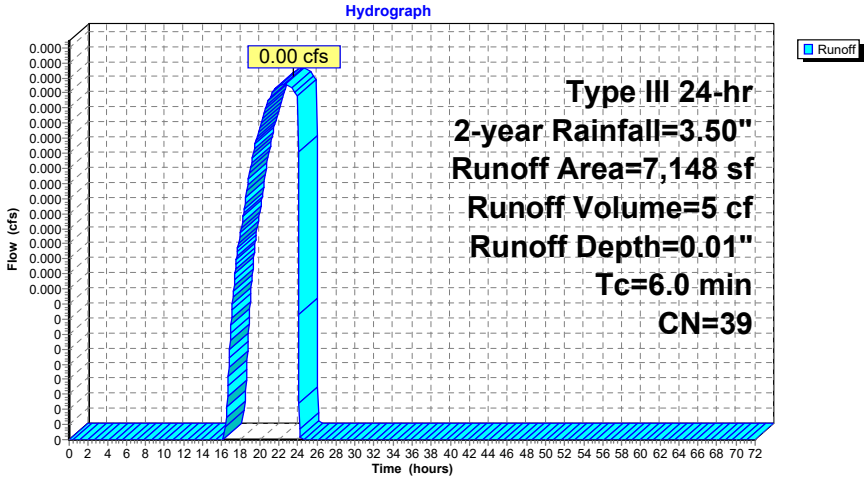
Runoff = 0.00 cfs @ 22.55 hrs, Volume= 5 cf, Depth= 0.01"
Routed to Pond 1P : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.50"

Area (sf)	CN	Description
7,148	39	>75% Grass cover, Good, HSG A
7,148		100.00% Pervious Area

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

Subcatchment PR8: To Basin



Summary for Subcatchment PR9: To CB-3

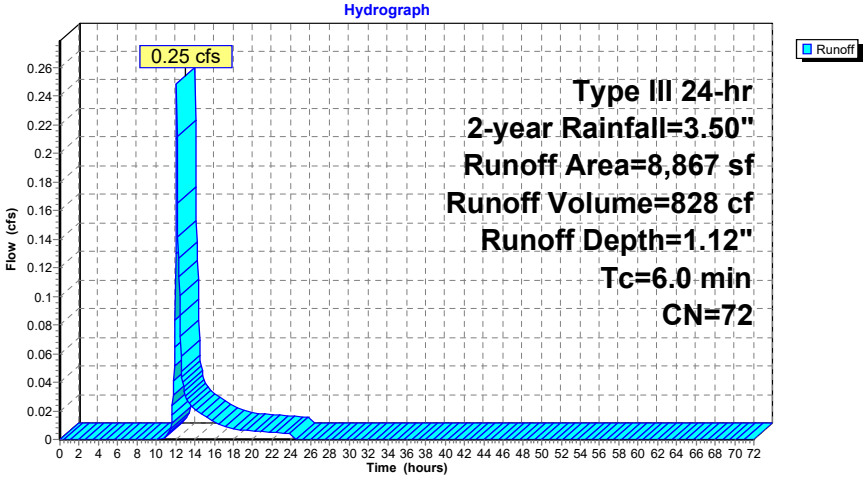
Runoff = 0.25 cfs @ 12.10 hrs, Volume= 828 cf, Depth= 1.12"
Routed to Pond 2P : Underground Infiltration System

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.50"

	Area (sf)	CN	Description
	4,515	98	Paved parking, HSG A
	3,932	39	>75% Grass cover, Good, HSG A
*	420	98	Walkways, HSG A
	8,867	72	Weighted Average
	3,932		44.34% Pervious Area
	4,935		55.66% Impervious Area

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

Subcatchment PR9: To CB-3

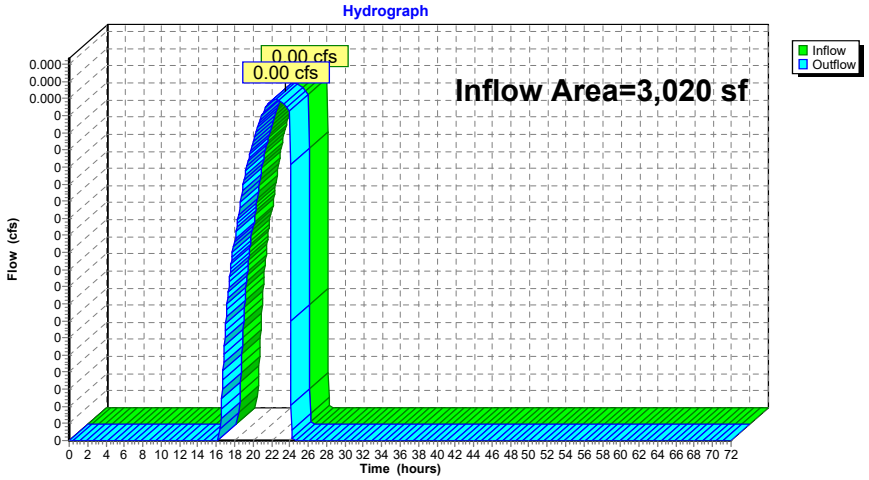


Summary for Reach DP1: Off-Site (North)

Inflow Area = 3,020 sf, 0.00% Impervious, Inflow Depth = 0.01" for 2-year event
Inflow = 0.00 cfs @ 22.55 hrs, Volume= 2 cf
Outflow = 0.00 cfs @ 22.55 hrs, Volume= 2 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP1: Off-Site (North)

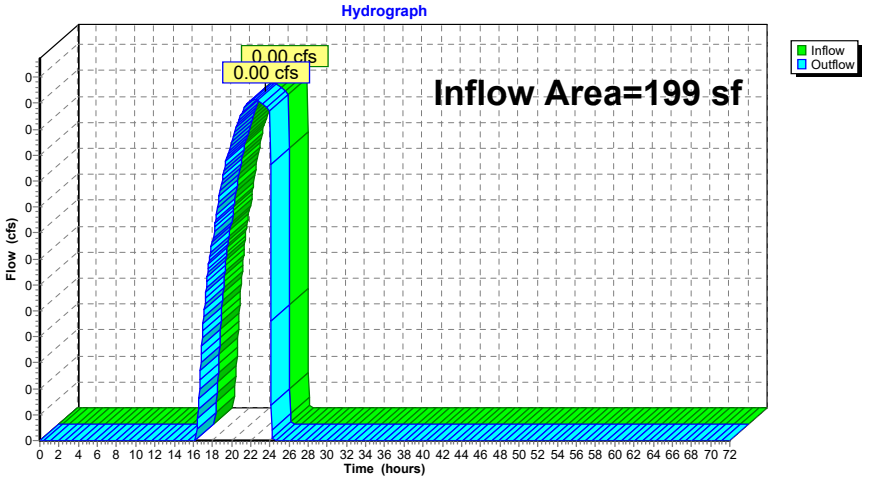


Summary for Reach DP2: Off-Site (East)

Inflow Area = 199 sf, 0.00% Impervious, Inflow Depth = 0.01" for 2-year event
Inflow = 0.00 cfs @ 22.55 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 22.55 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP2: Off-Site (East)

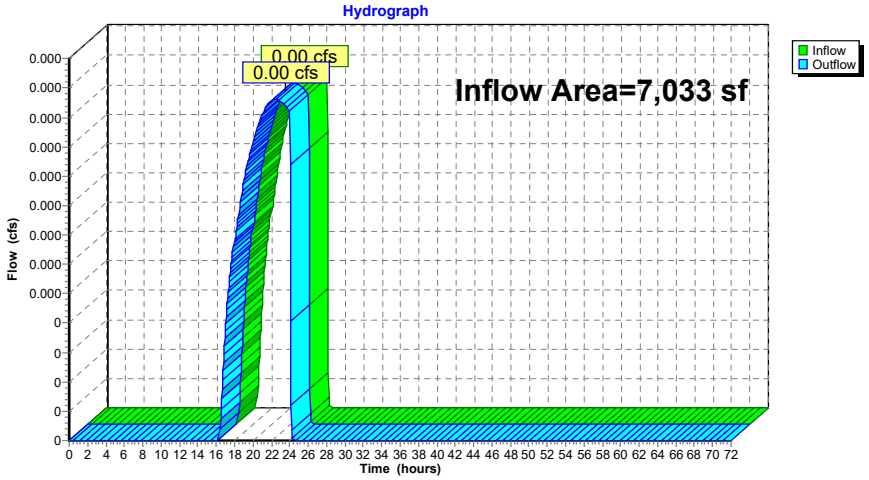


Summary for Reach DP3: Off-Site (South)

Inflow Area = 7,033 sf, 0.00% Impervious, Inflow Depth = 0.01" for 2-year event
Inflow = 0.00 cfs @ 22.55 hrs, Volume= 5 cf
Outflow = 0.00 cfs @ 22.55 hrs, Volume= 5 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP3: Off-Site (South)

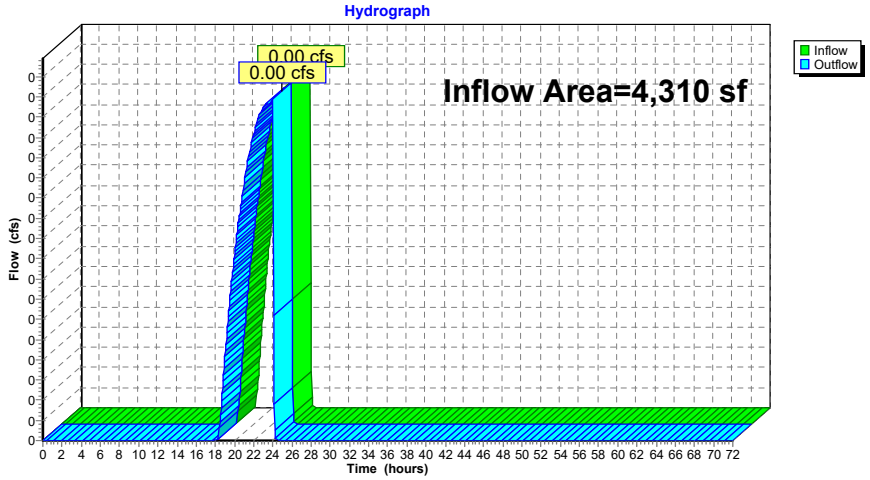


Summary for Reach DP4: Off-Site (West)

Inflow Area = 4,310 sf, 0.00% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 23.91 hrs, Volume= 1 cf
Outflow = 0.00 cfs @ 23.91 hrs, Volume= 1 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP4: Off-Site (West)



Summary for Pond 1P: Infiltration Basin

Inflow Area = 23,465 sf, 63.56% Impervious, Inflow Depth = 1.96" for 2-year event
Inflow = 1.09 cfs @ 12.09 hrs, Volume= 3,825 cf
Outflow = 0.25 cfs @ 12.49 hrs, Volume= 3,825 cf, Atten= 77%, Lag= 23.9 min
Discarded = 0.25 cfs @ 12.49 hrs, Volume= 3,825 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 97.79' @ 12.49 hrs Surf.Area= 1,323 sf Storage= 901 cf

Plug-Flow detention time= 21.1 min calculated for 3,825 cf (100% of inflow)
Center-of-Mass det. time= 21.1 min (789.3 - 768.2)

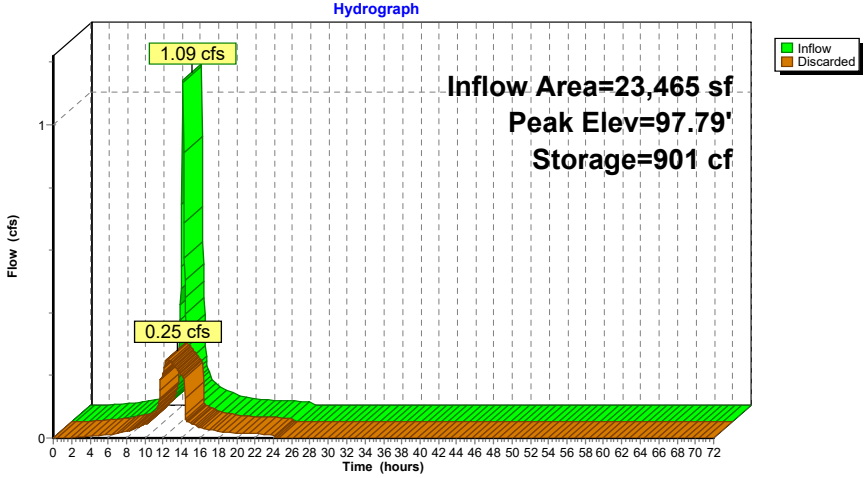
Volume	Invert	Avail.Storage	Storage Description
#1	97.00'	5,096 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
97.00	972	128.0	0	0	972
98.00	1,427	156.0	1,192	1,192	1,621
99.00	1,946	180.0	1,680	2,872	2,284
100.00	2,515	199.0	2,224	5,096	2,887

Device	Routing	Invert	Outlet Devices
#1	Discarded	97.00'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.25 cfs @ 12.49 hrs HW=97.79' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.25 cfs)

Pond 1P: Infiltration Basin



Summary for Pond 2P: Underground Infiltration System

Inflow Area = 20,273 sf, 50.25% Impervious, Inflow Depth = 0.94" for 2-year event
Inflow = 0.45 cfs @ 12.11 hrs, Volume= 1,589 cf
Outflow = 0.21 cfs @ 12.05 hrs, Volume= 1,589 cf, Atten= 53%, Lag= 0.0 min
Discarded = 0.21 cfs @ 12.05 hrs, Volume= 1,589 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 95.85' @ 12.37 hrs Surf.Area= 1,116 sf Storage= 154 cf

Plug-Flow detention time= 3.8 min calculated for 1,588 cf (100% of inflow)
Center-of-Mass det. time= 3.8 min (876.6 - 872.9)

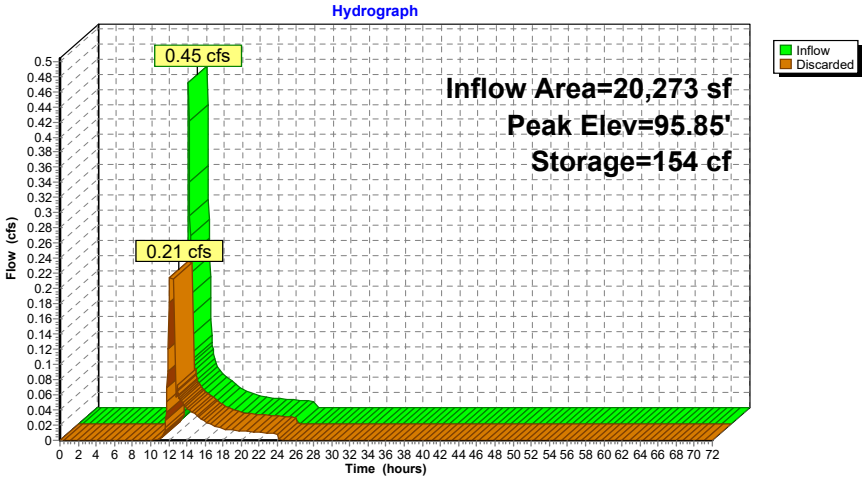
Volume	Invert	Avail.Storage	Storage Description
#1A	95.50'	879 cf	**18.92'W x 59.00'L x 3.21'H Field A** 3,581 cf Overall - 1,384 cf Embedded = 2,196 cf x 40.0% Voids
#2A	96.00'	1,384 cf	**Cultec R-280HD** x 32 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 4 rows
		2,263 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	95.50'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.21 cfs @ 12.05 hrs HW=95.56' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.21 cfs)

Pond 2P: Underground Infiltration System



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPR1: Off-Site (North) Runoff Area=3,020 sf 0.00% Impervious Runoff Depth=0.16"
Tc=6.0 min CN=39 Runoff=0.00 cfs 41 cf

SubcatchmentPR10: To CB-4 Runoff Area=11,406 sf 46.05% Impervious Runoff Depth=1.59"
Flow Length=197' Tc=6.7 min CN=66 Runoff=0.45 cfs 1,514 cf

SubcatchmentPR2: Off-Site (East) Runoff Area=199 sf 0.00% Impervious Runoff Depth=0.16"
Tc=6.0 min CN=39 Runoff=0.00 cfs 3 cf

SubcatchmentPR3: Off-Site (South) Runoff Area=7,033 sf 0.00% Impervious Runoff Depth=0.16"
Tc=6.0 min CN=39 Runoff=0.00 cfs 95 cf

SubcatchmentPR4: Off-Site (West)) Runoff Area=4,310 sf 0.00% Impervious Runoff Depth=0.13"
Tc=6.0 min CN=38 Runoff=0.00 cfs 48 cf

SubcatchmentPR5: To CB-1 & 5 Runoff Area=5,930 sf 99.93% Impervious Runoff Depth=4.56"
Tc=6.0 min CN=98 Runoff=0.62 cfs 2,255 cf

SubcatchmentPR6: To CB-2 Runoff Area=4,387 sf 68.13% Impervious Runoff Depth=2.63"
Tc=6.0 min CN=79 Runoff=0.30 cfs 962 cf

SubcatchmentPR7: Roof Runoff Area=6,000 sf 100.00% Impervious Runoff Depth=4.56"
Tc=6.0 min CN=98 Runoff=0.63 cfs 2,282 cf

SubcatchmentPR8: To Basin Runoff Area=7,148 sf 0.00% Impervious Runoff Depth=0.16"
Tc=6.0 min CN=39 Runoff=0.00 cfs 96 cf

SubcatchmentPR9: To CB-3 Runoff Area=8,867 sf 55.66% Impervious Runoff Depth=2.05"
Tc=6.0 min CN=72 Runoff=0.47 cfs 1,511 cf

Reach DP1: Off-Site (North) Inflow=0.00 cfs 41 cf
Outflow=0.00 cfs 41 cf

Reach DP2: Off-Site (East) Inflow=0.00 cfs 3 cf
Outflow=0.00 cfs 3 cf

Reach DP3: Off-Site (South) Inflow=0.00 cfs 95 cf
Outflow=0.00 cfs 95 cf

Reach DP4: Off-Site (West) Inflow=0.00 cfs 48 cf
Outflow=0.00 cfs 48 cf

Pond 1P: Infiltration Basin Peak Elev=98.22' Storage=1,518 cf Inflow=1.56 cfs 5,595 cf
Outflow=0.29 cfs 5,595 cf

Pond 2P: Underground Infiltration System Peak Elev=96.48' Storage=687 cf Inflow=0.92 cfs 3,025 cf
Outflow=0.21 cfs 3,025 cf

Total Runoff Area = 58,300 sf Runoff Volume = 8,805 cf Average Runoff Depth = 1.81"
56.94% Pervious = 33,198 sf 43.06% Impervious = 25,102 sf

Summary for Subcatchment PR1: Off-Site (North)

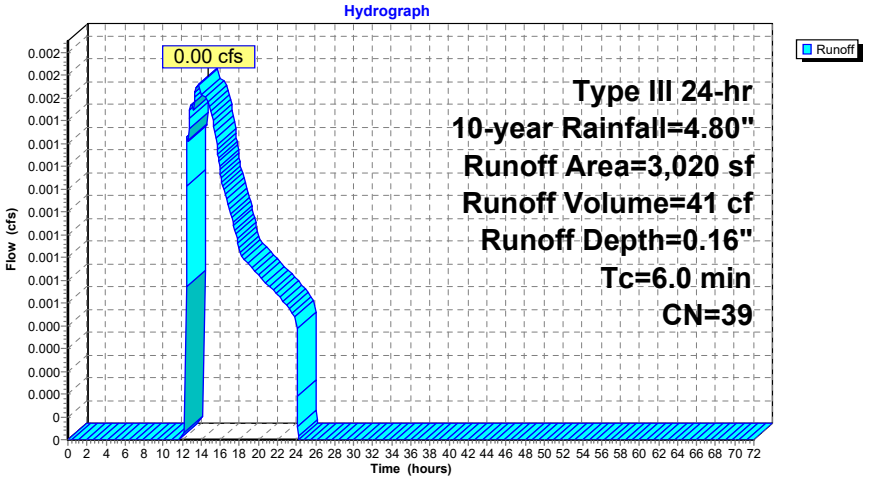
Runoff = 0.00 cfs @ 13.67 hrs, Volume= 41 cf, Depth= 0.16"
Routed to Reach DP1 : Off-Site (North)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
3,020	39	>75% Grass cover, Good, HSG A
3,020		100.00% Pervious Area

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

Subcatchment PR1: Off-Site (North)



Summary for Subcatchment PR10: To CB-4

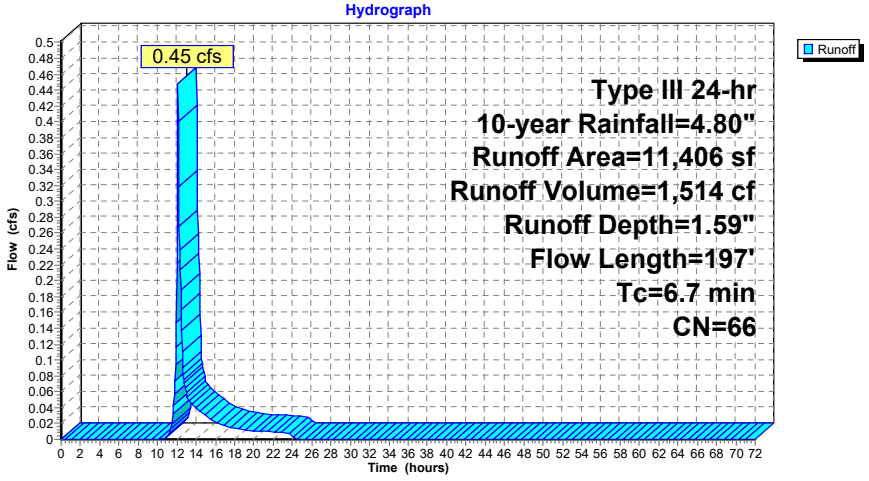
Runoff = 0.45 cfs @ 12.11 hrs, Volume= 1,514 cf, Depth= 1.59"
Routed to Pond 2P : Underground Infiltration System

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
6,154	39	>75% Grass cover, Good, HSG A
5,252	98	Paved parking, HSG A
11,406	66	Weighted Average
6,154		53.95% Pervious Area
5,252		46.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0860	0.32		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.50"
1.5	97	0.0238	1.08		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.7	197	Total			

Subcatchment PR10: To CB-4



Summary for Subcatchment PR2: Off-Site (East)

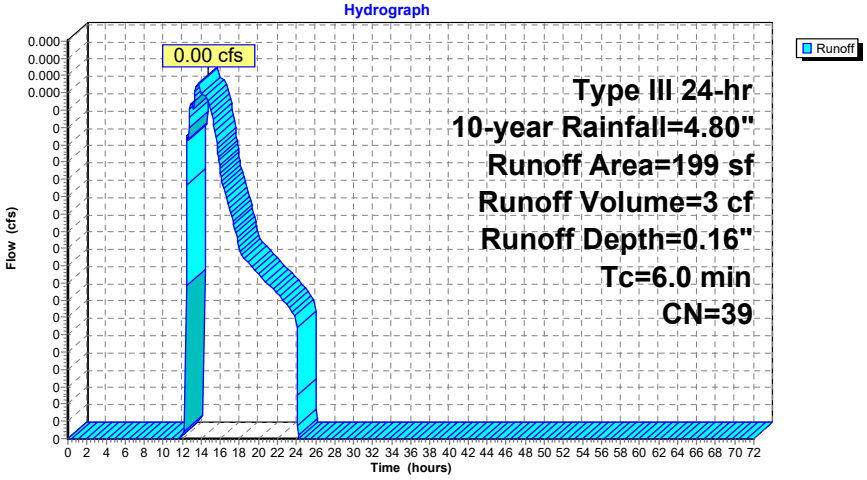
Runoff = 0.00 cfs @ 13.67 hrs, Volume= 3 cf, Depth= 0.16"
Routed to Reach DP2 : Off-Site (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
199	39	>75% Grass cover, Good, HSG A
199		100.00% Pervious Area

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

Subcatchment PR2: Off-Site (East)



Summary for Subcatchment PR3: Off-Site (South)

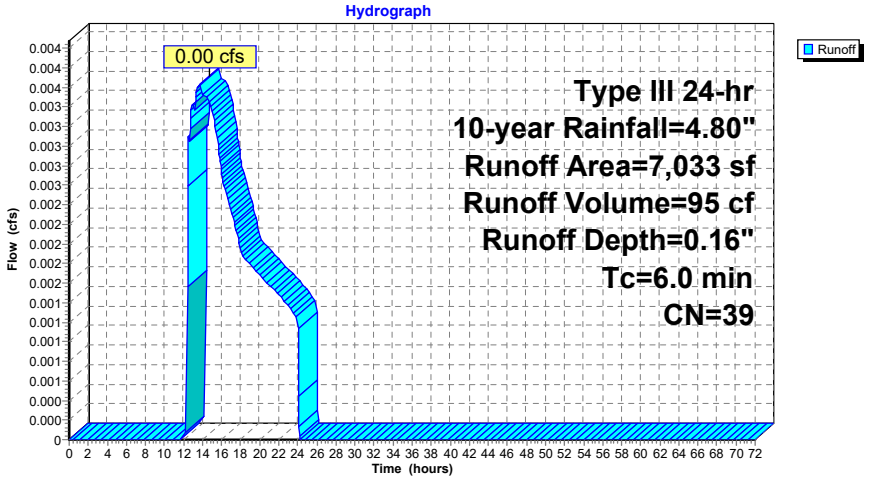
Runoff = 0.00 cfs @ 13.67 hrs, Volume= 95 cf, Depth= 0.16"
Routed to Reach DP3 : Off-Site (South)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
7,033	39	>75% Grass cover, Good, HSG A
7,033		100.00% Pervious Area

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

Subcatchment PR3: Off-Site (South)



Summary for Subcatchment PR4: Off-Site (West))

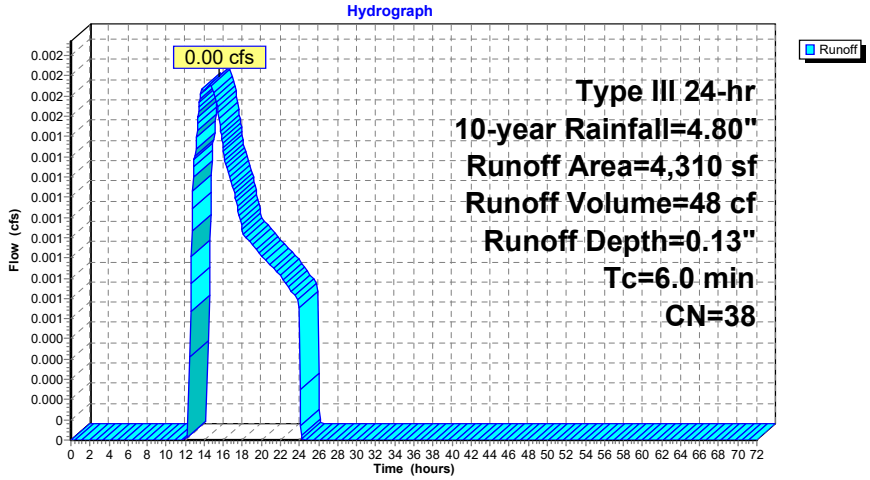
Runoff = 0.00 cfs @ 14.58 hrs, Volume= 48 cf, Depth= 0.13"
Routed to Reach DP4 : Off-Site (West)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
3,621	39	>75% Grass cover, Good, HSG A
689	30	Woods, Good, HSG A
4,310	38	Weighted Average
4,310		100.00% Pervious Area

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

Subcatchment PR4: Off-Site (West))



Summary for Subcatchment PR5: To CB-1 & 5

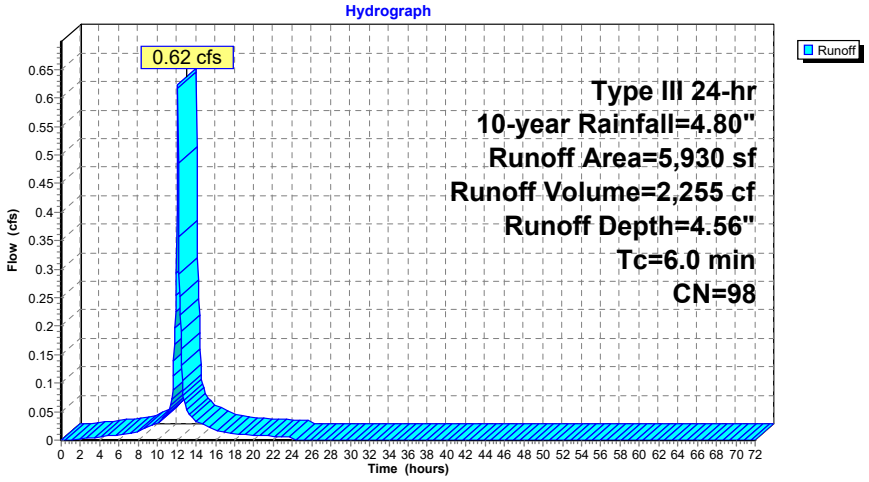
Runoff = 0.62 cfs @ 12.09 hrs, Volume= 2,255 cf, Depth= 4.56"
Routed to Pond 1P : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
5,926	98	Paved parking, HSG A
4	39	>75% Grass cover, Good, HSG A
5,930	98	Weighted Average
4		0.07% Pervious Area
5,926		99.93% Impervious Area

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

Subcatchment PR5: To CB-1 & 5



Summary for Subcatchment PR6: To CB-2

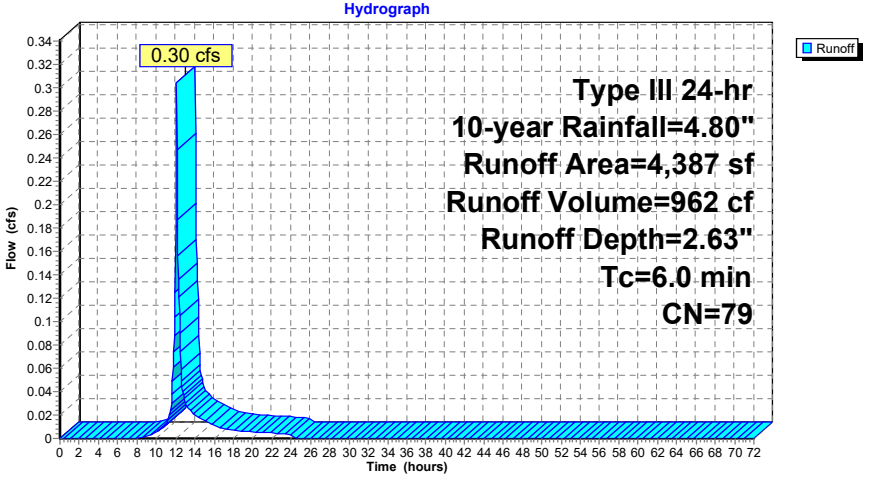
Runoff = 0.30 cfs @ 12.09 hrs, Volume= 962 cf, Depth= 2.63"
Routed to Pond 1P : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	2,703	98	Paved parking, HSG A
*	286	98	Walkway, HSG A
	1,398	39	>75% Grass cover, Good, HSG A
	4,387	79	Weighted Average
	1,398		31.87% Pervious Area
	2,989		68.13% Impervious Area

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

Subcatchment PR6: To CB-2



Summary for Subcatchment PR7: Roof

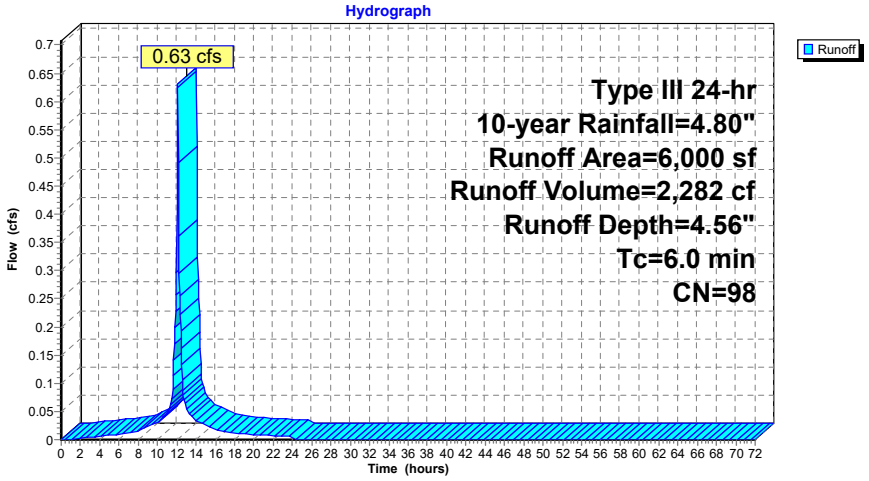
Runoff = 0.63 cfs @ 12.09 hrs, Volume= 2,282 cf, Depth= 4.56"
Routed to Pond 1P : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
6,000	98	Roofs, HSG A
6,000		100.00% Impervious Area

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

Subcatchment PR7: Roof



Summary for Subcatchment PR8: To Basin

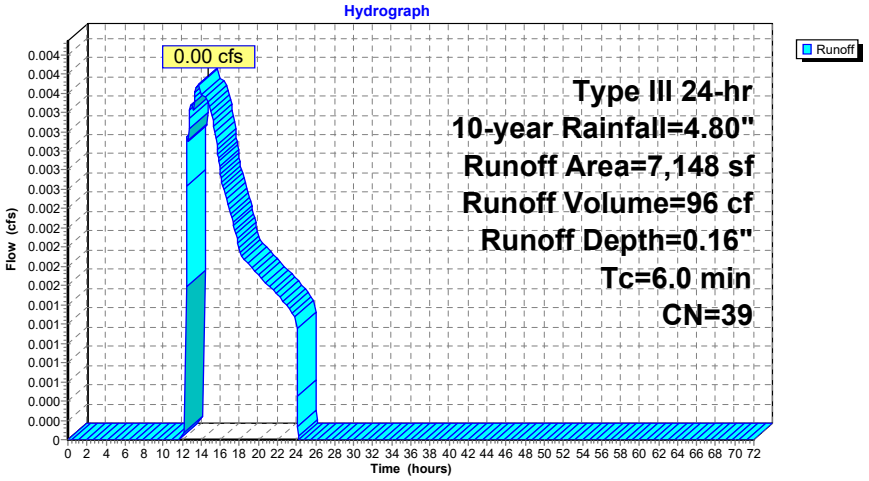
Runoff = 0.00 cfs @ 13.67 hrs, Volume= 96 cf, Depth= 0.16"
Routed to Pond 1P : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
7,148	39	>75% Grass cover, Good, HSG A
7,148		100.00% Pervious Area

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

Subcatchment PR8: To Basin



Summary for Subcatchment PR9: To CB-3

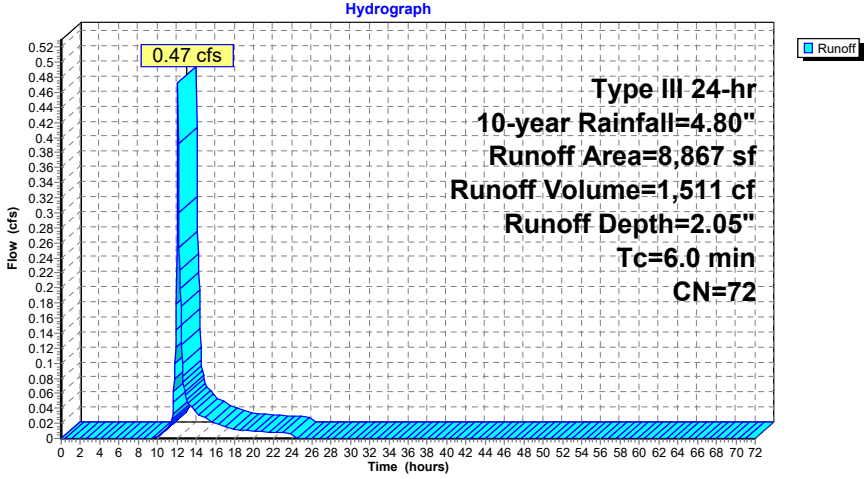
Runoff = 0.47 cfs @ 12.10 hrs, Volume= 1,511 cf, Depth= 2.05"
Routed to Pond 2P : Underground Infiltration System

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.80"

	Area (sf)	CN	Description
	4,515	98	Paved parking, HSG A
	3,932	39	>75% Grass cover, Good, HSG A
*	420	98	Walkways, HSG A
	8,867	72	Weighted Average
	3,932		44.34% Pervious Area
	4,935		55.66% Impervious Area

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

Subcatchment PR9: To CB-3

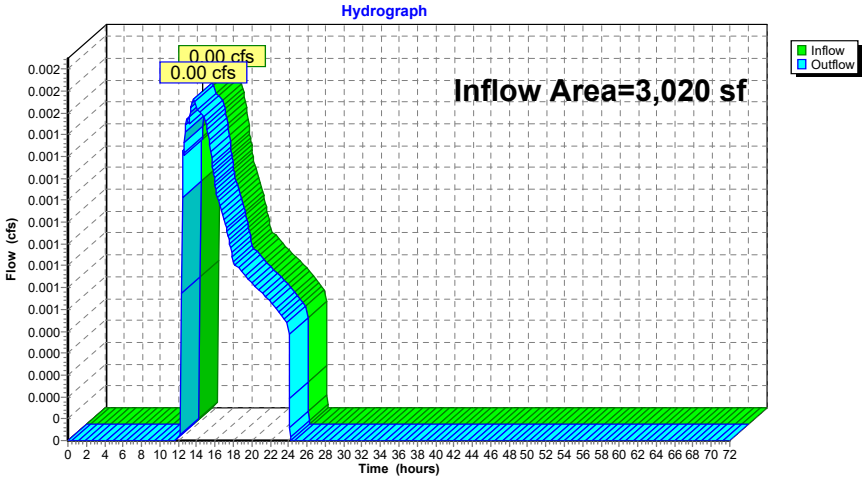


Summary for Reach DP1: Off-Site (North)

Inflow Area = 3,020 sf, 0.00% Impervious, Inflow Depth = 0.16" for 10-year event
Inflow = 0.00 cfs @ 13.67 hrs, Volume= 41 cf
Outflow = 0.00 cfs @ 13.67 hrs, Volume= 41 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP1: Off-Site (North)

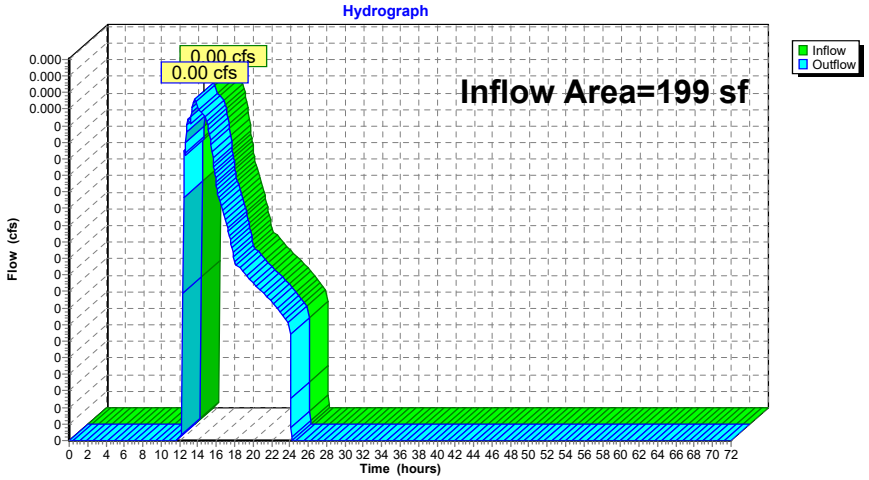


Summary for Reach DP2: Off-Site (East)

Inflow Area = 199 sf, 0.00% Impervious, Inflow Depth = 0.16" for 10-year event
Inflow = 0.00 cfs @ 13.67 hrs, Volume= 3 cf
Outflow = 0.00 cfs @ 13.67 hrs, Volume= 3 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP2: Off-Site (East)

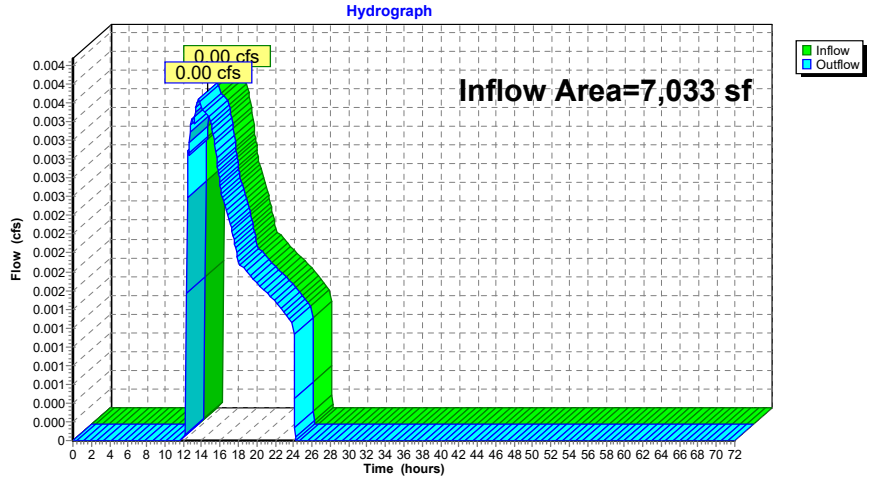


Summary for Reach DP3: Off-Site (South)

Inflow Area = 7,033 sf, 0.00% Impervious, Inflow Depth = 0.16" for 10-year event
Inflow = 0.00 cfs @ 13.67 hrs, Volume= 95 cf
Outflow = 0.00 cfs @ 13.67 hrs, Volume= 95 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP3: Off-Site (South)

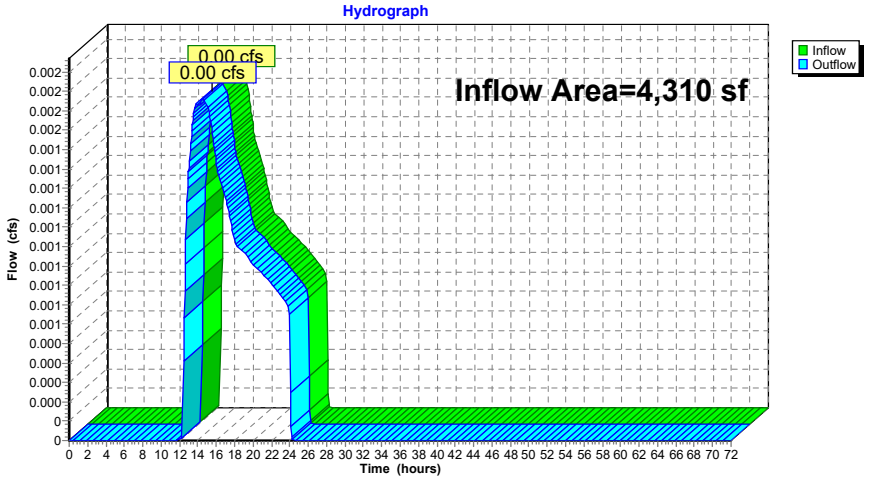


Summary for Reach DP4: Off-Site (West)

Inflow Area = 4,310 sf, 0.00% Impervious, Inflow Depth = 0.13" for 10-year event
Inflow = 0.00 cfs @ 14.58 hrs, Volume= 48 cf
Outflow = 0.00 cfs @ 14.58 hrs, Volume= 48 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP4: Off-Site (West)



Summary for Pond 1P: Infiltration Basin

Inflow Area = 23,465 sf, 63.56% Impervious, Inflow Depth = 2.86" for 10-year event
Inflow = 1.56 cfs @ 12.09 hrs, Volume= 5,595 cf
Outflow = 0.29 cfs @ 12.54 hrs, Volume= 5,595 cf, Atten= 81%, Lag= 26.9 min
Discarded = 0.29 cfs @ 12.54 hrs, Volume= 5,595 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 98.22' @ 12.54 hrs Surf.Area= 1,534 sf Storage= 1,518 cf

Plug-Flow detention time= 33.8 min calculated for 5,591 cf (100% of inflow)
Center-of-Mass det. time= 33.8 min (800.6 - 766.8)

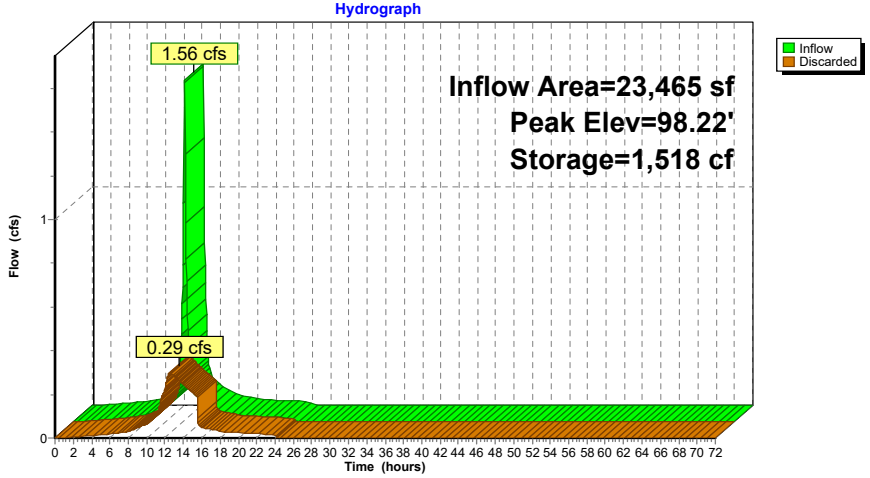
Volume	Invert	Avail.Storage	Storage Description
#1	97.00'	5,096 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
97.00	972	128.0	0	0	972
98.00	1,427	156.0	1,192	1,192	1,621
99.00	1,946	180.0	1,680	2,872	2,284
100.00	2,515	199.0	2,224	5,096	2,887

Device	Routing	Invert	Outlet Devices
#1	Discarded	97.00'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.29 cfs @ 12.54 hrs HW=98.22' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.29 cfs)

Pond 1P: Infiltration Basin



Summary for Pond 2P: Underground Infiltration System

Inflow Area = 20,273 sf, 50.25% Impervious, Inflow Depth = 1.79" for 10-year event
Inflow = 0.92 cfs @ 12.10 hrs, Volume= 3,025 cf
Outflow = 0.21 cfs @ 11.90 hrs, Volume= 3,025 cf, Atten= 77%, Lag= 0.0 min
Discarded = 0.21 cfs @ 11.90 hrs, Volume= 3,025 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 96.48' @ 12.55 hrs Surf.Area= 1,116 sf Storage= 687 cf

Plug-Flow detention time= 18.8 min calculated for 3,023 cf (100% of inflow)
Center-of-Mass det. time= 18.8 min (871.8 - 853.0)

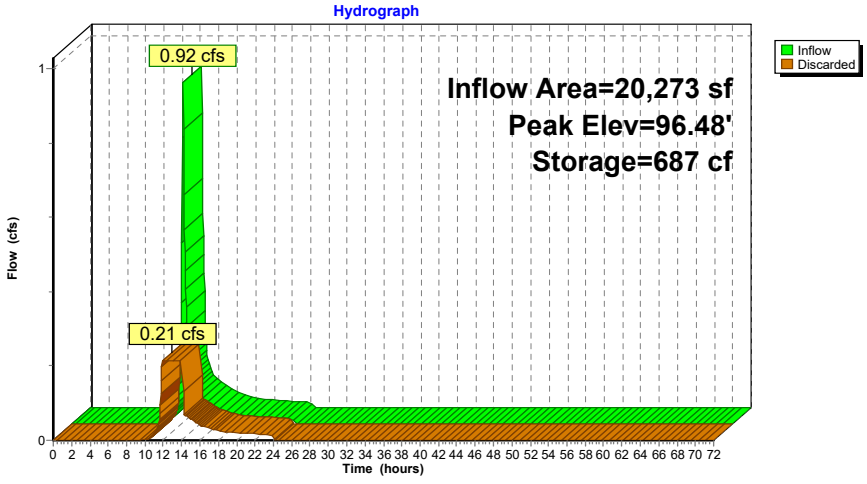
Volume	Invert	Avail.Storage	Storage Description
#1A	95.50'	879 cf	**18.92'W x 59.00'L x 3.21'H Field A** 3,581 cf Overall - 1,384 cf Embedded = 2,196 cf x 40.0% Voids
#2A	96.00'	1,384 cf	**Cultec R-280HD** x 32 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 4 rows
		2,263 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	95.50'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.21 cfs @ 11.90 hrs HW=95.54' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.21 cfs)

Pond 2P: Underground Infiltration System



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPR1: Off-Site (North) Runoff Area=3,020 sf 0.00% Impervious Runoff Depth=0.82"
Tc=6.0 min CN=39 Runoff=0.03 cfs 207 cf

SubcatchmentPR10: To CB-4 Runoff Area=11,406 sf 46.05% Impervious Runoff Depth=3.32"
Flow Length=197' Tc=6.7 min CN=66 Runoff=0.98 cfs 3,158 cf

SubcatchmentPR2: Off-Site (East) Runoff Area=199 sf 0.00% Impervious Runoff Depth=0.82"
Tc=6.0 min CN=39 Runoff=0.00 cfs 14 cf

SubcatchmentPR3: Off-Site (South) Runoff Area=7,033 sf 0.00% Impervious Runoff Depth=0.82"
Tc=6.0 min CN=39 Runoff=0.08 cfs 482 cf

SubcatchmentPR4: Off-Site (West)) Runoff Area=4,310 sf 0.00% Impervious Runoff Depth=0.75"
Tc=6.0 min CN=38 Runoff=0.04 cfs 269 cf

SubcatchmentPR5: To CB-1 & 5 Runoff Area=5,930 sf 99.93% Impervious Runoff Depth=6.91"
Tc=6.0 min CN=98 Runoff=0.93 cfs 3,415 cf

SubcatchmentPR6: To CB-2 Runoff Area=4,387 sf 68.13% Impervious Runoff Depth=4.72"
Tc=6.0 min CN=79 Runoff=0.54 cfs 1,726 cf

SubcatchmentPR7: Roof Runoff Area=6,000 sf 100.00% Impervious Runoff Depth=6.91"
Tc=6.0 min CN=98 Runoff=0.94 cfs 3,455 cf

SubcatchmentPR8: To Basin Runoff Area=7,148 sf 0.00% Impervious Runoff Depth=0.82"
Tc=6.0 min CN=39 Runoff=0.08 cfs 490 cf

SubcatchmentPR9: To CB-3 Runoff Area=8,867 sf 55.66% Impervious Runoff Depth=3.96"
Tc=6.0 min CN=72 Runoff=0.93 cfs 2,924 cf

Reach DP1: Off-Site (North) Inflow=0.03 cfs 207 cf
Outflow=0.03 cfs 207 cf

Reach DP2: Off-Site (East) Inflow=0.00 cfs 14 cf
Outflow=0.00 cfs 14 cf

Reach DP3: Off-Site (South) Inflow=0.08 cfs 482 cf
Outflow=0.08 cfs 482 cf

Reach DP4: Off-Site (West) Inflow=0.04 cfs 269 cf
Outflow=0.04 cfs 269 cf

Pond 1P: Infiltration Basin Peak Elev=98.99' Storage=2,848 cf Inflow=2.48 cfs 9,087 cf
Outflow=0.37 cfs 9,087 cf

Pond 2P: Underground Infiltration System Peak Elev=98.43' Storage=2,140 cf Inflow=1.90 cfs 6,082 cf
Outflow=0.21 cfs 6,082 cf

Total Runoff Area = 58,300 sf Runoff Volume = 16,140 cf Average Runoff Depth = 3.32"
56.94% Pervious = 33,198 sf 43.06% Impervious = 25,102 sf

Summary for Subcatchment PR1: Off-Site (North)

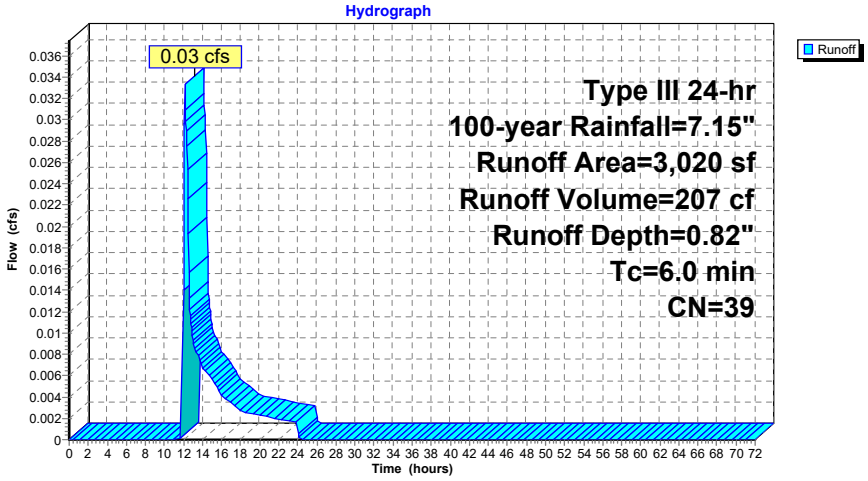
Runoff = 0.03 cfs @ 12.16 hrs, Volume= 207 cf, Depth= 0.82"
Routed to Reach DP1 : Off-Site (North)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.15"

Area (sf)	CN	Description
3,020	39	>75% Grass cover, Good, HSG A
3,020		100.00% Pervious Area

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

Subcatchment PR1: Off-Site (North)



Summary for Subcatchment PR10: To CB-4

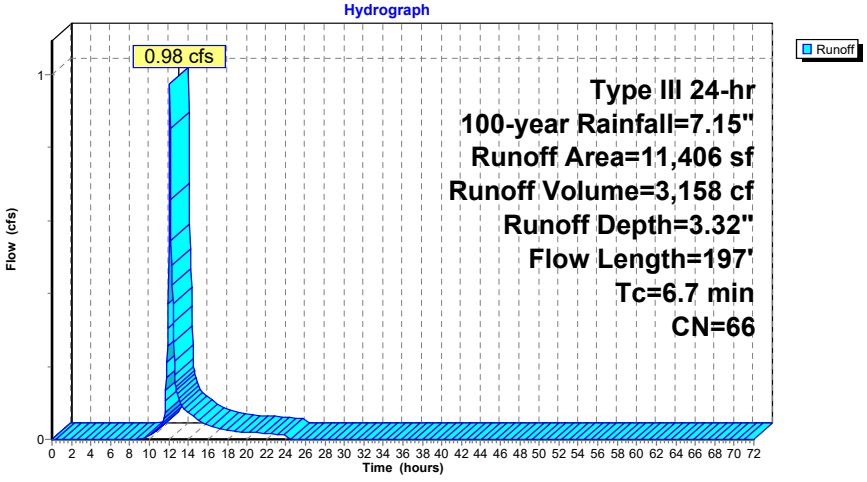
Runoff = 0.98 cfs @ 12.10 hrs, Volume= 3,158 cf, Depth= 3.32"
Routed to Pond 2P : Underground Infiltration System

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.15"

Area (sf)	CN	Description
6,154	39	>75% Grass cover, Good, HSG A
5,252	98	Paved parking, HSG A
11,406	66	Weighted Average
6,154		53.95% Pervious Area
5,252		46.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.0860	0.32		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.50"
1.5	97	0.0238	1.08		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.7	197	Total			

Subcatchment PR10: To CB-4



Summary for Subcatchment PR2: Off-Site (East)

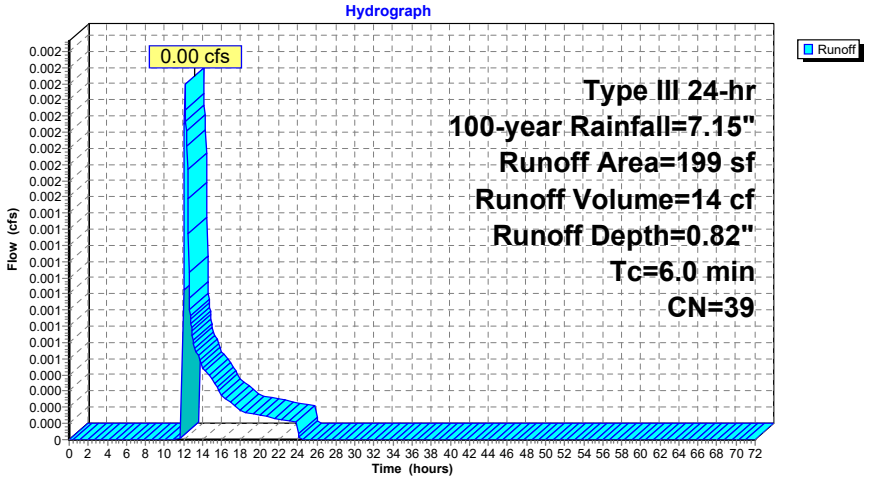
Runoff = 0.00 cfs @ 12.16 hrs, Volume= 14 cf, Depth= 0.82"
Routed to Reach DP2 : Off-Site (East)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.15"

Area (sf)	CN	Description
199	39	>75% Grass cover, Good, HSG A
199		100.00% Pervious Area

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

Subcatchment PR2: Off-Site (East)



Summary for Subcatchment PR3: Off-Site (South)

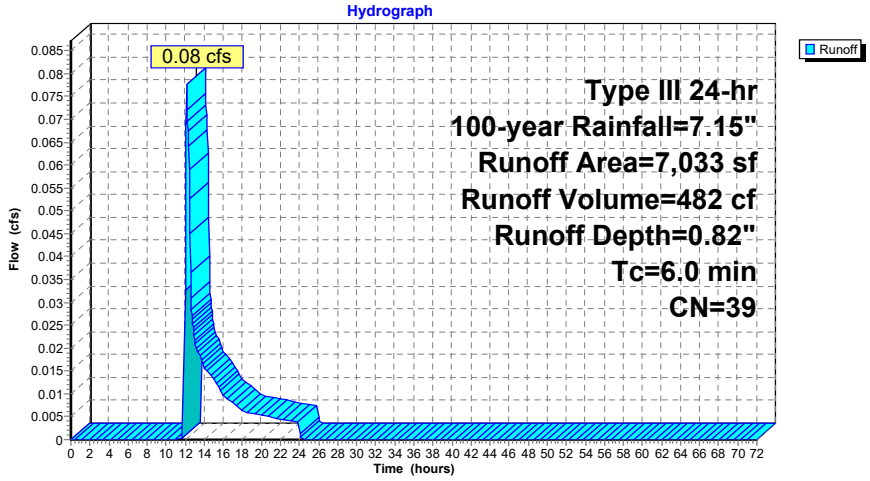
Runoff = 0.08 cfs @ 12.16 hrs, Volume= 482 cf, Depth= 0.82"
Routed to Reach DP3 : Off-Site (South)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.15"

Area (sf)	CN	Description
7,033	39	>75% Grass cover, Good, HSG A
7,033		100.00% Pervious Area

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

Subcatchment PR3: Off-Site (South)



Summary for Subcatchment PR4: Off-Site (West))

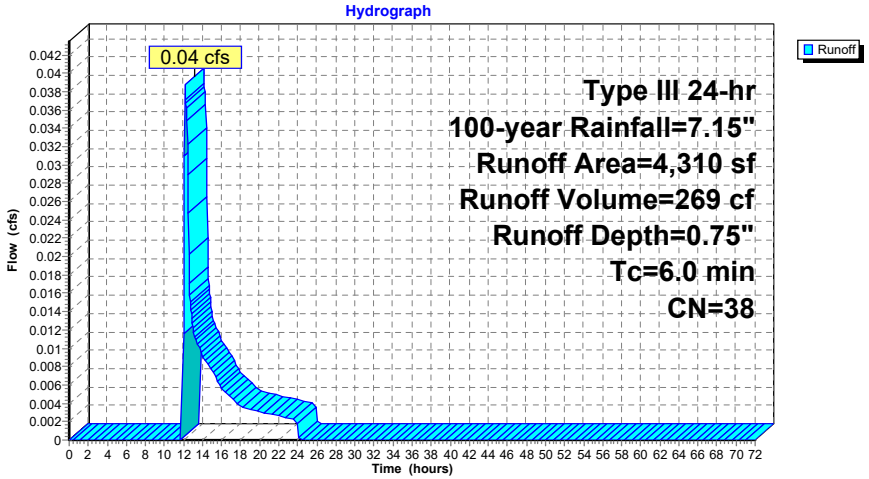
Runoff = 0.04 cfs @ 12.17 hrs, Volume= 269 cf, Depth= 0.75"
Routed to Reach DP4 : Off-Site (West)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.15"

Area (sf)	CN	Description
3,621	39	>75% Grass cover, Good, HSG A
689	30	Woods, Good, HSG A
4,310	38	Weighted Average
4,310		100.00% Pervious Area

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

Subcatchment PR4: Off-Site (West))



Summary for Subcatchment PR5: To CB-1 & 5

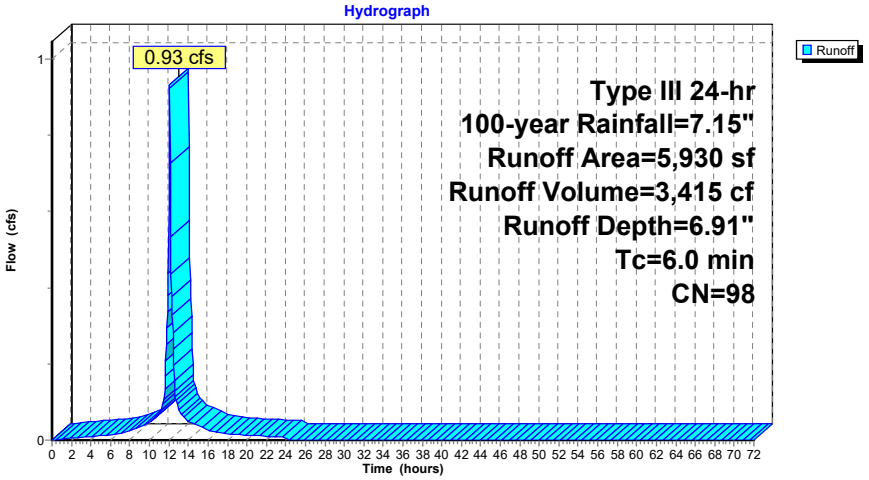
Runoff = 0.93 cfs @ 12.09 hrs, Volume= 3,415 cf, Depth= 6.91"
Routed to Pond 1P : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.15"

Area (sf)	CN	Description
5,926	98	Paved parking, HSG A
4	39	>75% Grass cover, Good, HSG A
5,930	98	Weighted Average
4		0.07% Pervious Area
5,926		99.93% Impervious Area

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

Subcatchment PR5: To CB-1 & 5



Summary for Subcatchment PR6: To CB-2

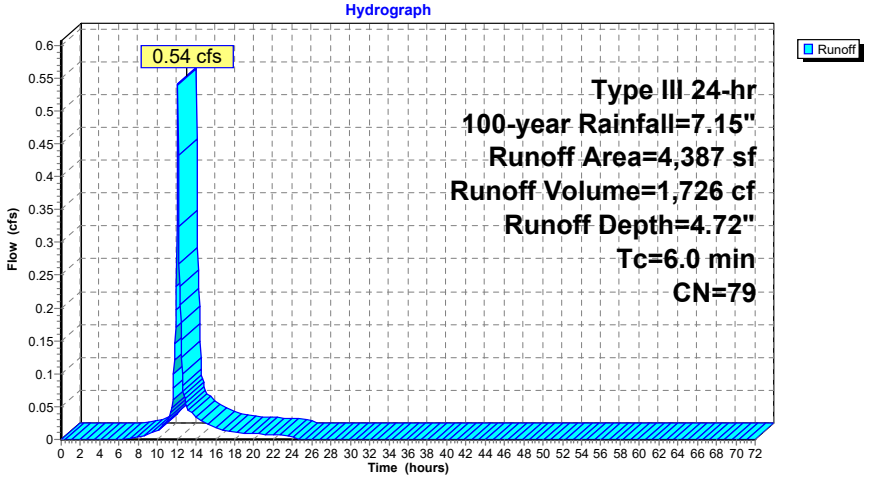
Runoff = 0.54 cfs @ 12.09 hrs, Volume= 1,726 cf, Depth= 4.72"
Routed to Pond 1P : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.15"

	Area (sf)	CN	Description
	2,703	98	Paved parking, HSG A
*	286	98	Walkway, HSG A
	1,398	39	>75% Grass cover, Good, HSG A
	4,387	79	Weighted Average
	1,398		31.87% Pervious Area
	2,989		68.13% Impervious Area

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

Subcatchment PR6: To CB-2



Summary for Subcatchment PR7: Roof

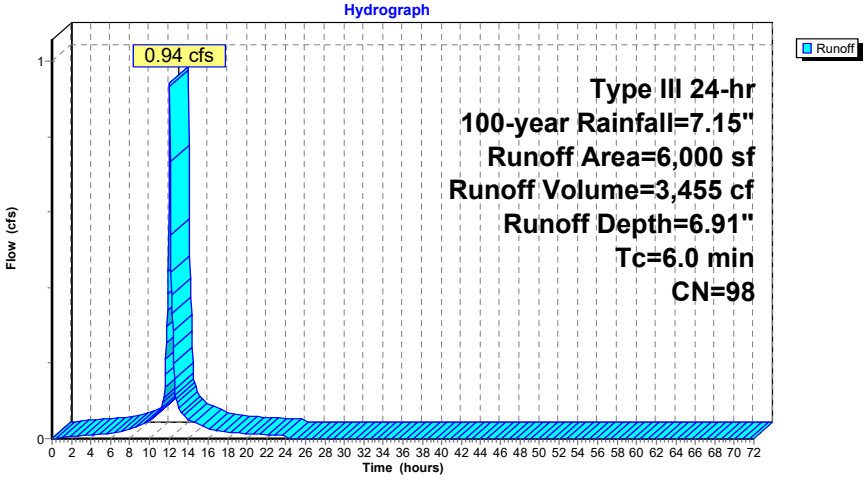
Runoff = 0.94 cfs @ 12.09 hrs, Volume= 3,455 cf, Depth= 6.91"
Routed to Pond 1P : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.15"

Area (sf)	CN	Description
6,000	98	Roofs, HSG A
6,000		100.00% Impervious Area

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

Subcatchment PR7: Roof



Summary for Subcatchment PR8: To Basin

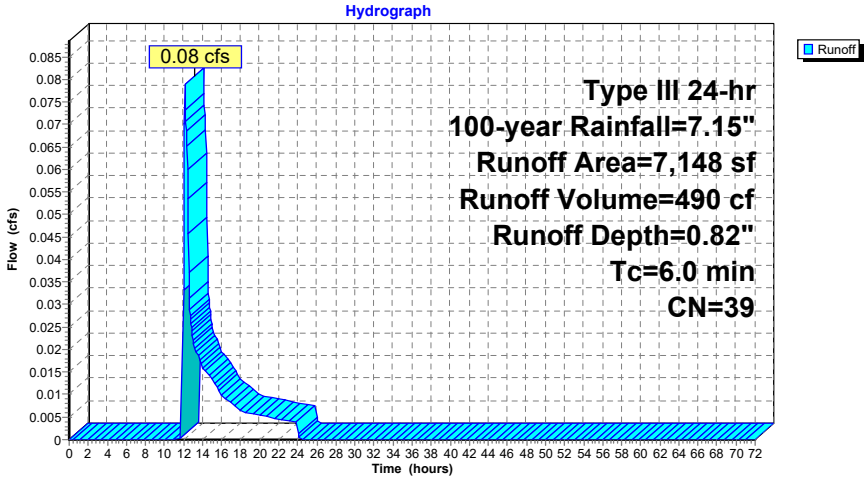
Runoff = 0.08 cfs @ 12.16 hrs, Volume= 490 cf, Depth= 0.82"
Routed to Pond 1P : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.15"

Area (sf)	CN	Description
7,148	39	>75% Grass cover, Good, HSG A
7,148		100.00% Pervious Area

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

Subcatchment PR8: To Basin



Summary for Subcatchment PR9: To CB-3

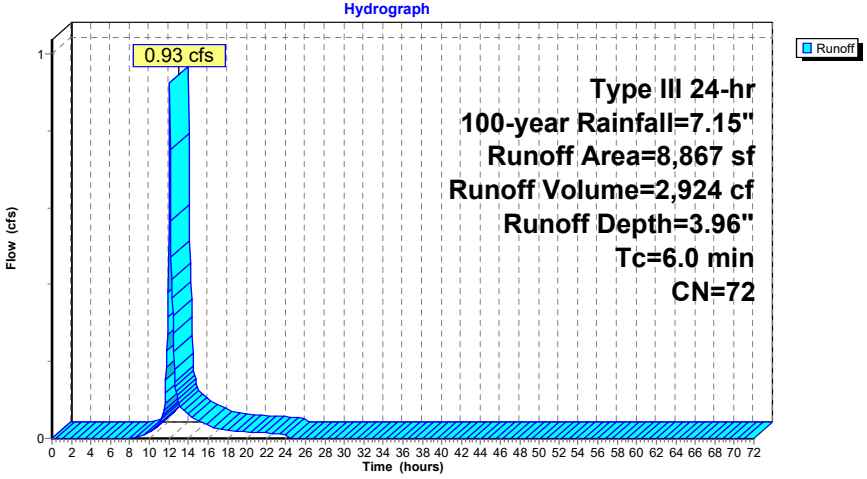
Runoff = 0.93 cfs @ 12.09 hrs, Volume= 2,924 cf, Depth= 3.96"
Routed to Pond 2P : Underground Infiltration System

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.15"

	Area (sf)	CN	Description
	4,515	98	Paved parking, HSG A
	3,932	39	>75% Grass cover, Good, HSG A
*	420	98	Walkways, HSG A
	8,867	72	Weighted Average
	3,932		44.34% Pervious Area
	4,935		55.66% Impervious Area

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

Subcatchment PR9: To CB-3

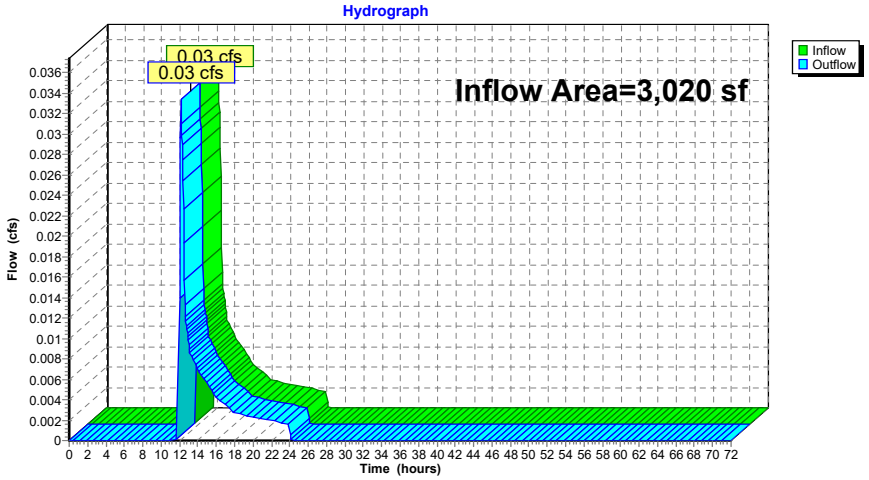


Summary for Reach DP1: Off-Site (North)

Inflow Area = 3,020 sf, 0.00% Impervious, Inflow Depth = 0.82" for 100-year event
Inflow = 0.03 cfs @ 12.16 hrs, Volume= 207 cf
Outflow = 0.03 cfs @ 12.16 hrs, Volume= 207 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP1: Off-Site (North)

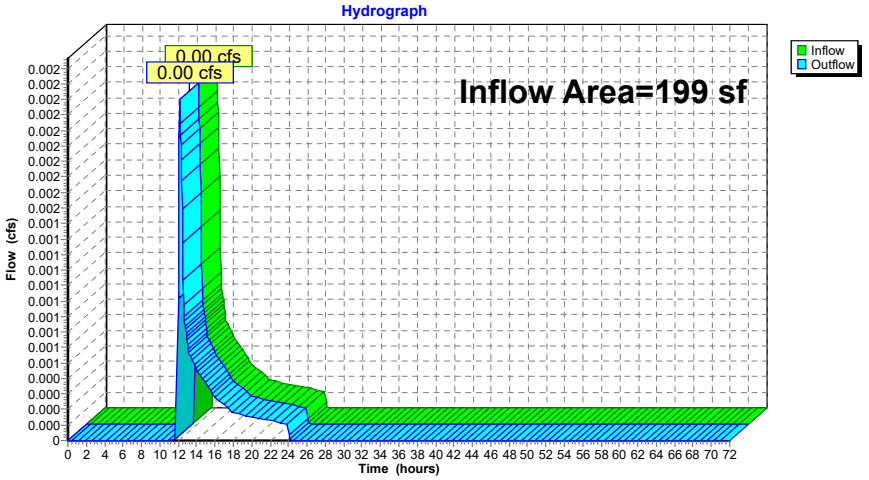


Summary for Reach DP2: Off-Site (East)

Inflow Area = 199 sf, 0.00% Impervious, Inflow Depth = 0.82" for 100-year event
Inflow = 0.00 cfs @ 12.16 hrs, Volume= 14 cf
Outflow = 0.00 cfs @ 12.16 hrs, Volume= 14 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP2: Off-Site (East)

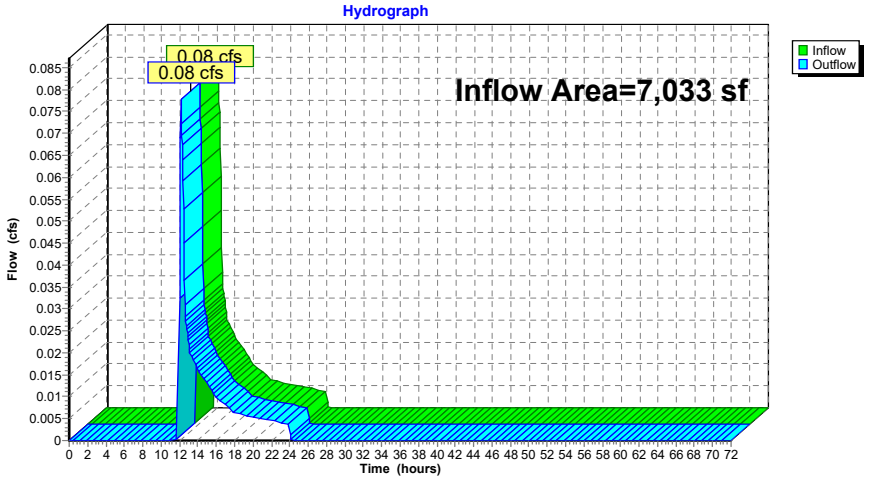


Summary for Reach DP3: Off-Site (South)

Inflow Area = 7,033 sf, 0.00% Impervious, Inflow Depth = 0.82" for 100-year event
Inflow = 0.08 cfs @ 12.16 hrs, Volume= 482 cf
Outflow = 0.08 cfs @ 12.16 hrs, Volume= 482 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP3: Off-Site (South)

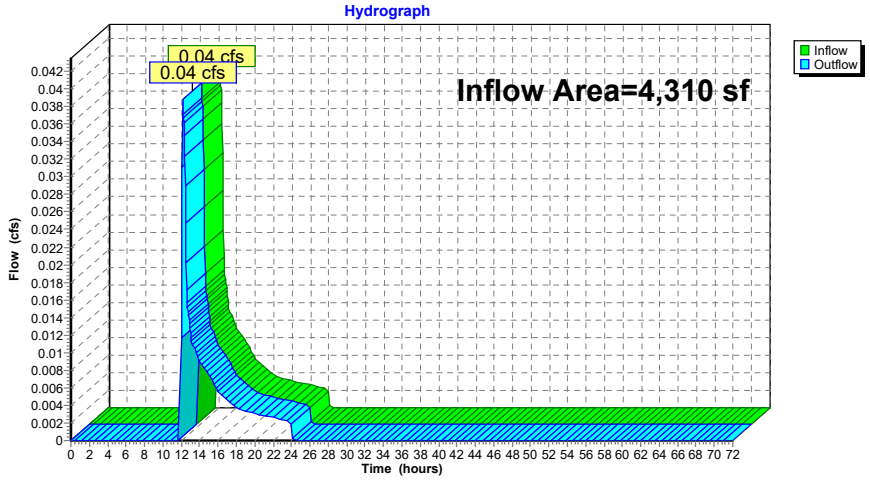


Summary for Reach DP4: Off-Site (West)

Inflow Area = 4,310 sf, 0.00% Impervious, Inflow Depth = 0.75" for 100-year event
Inflow = 0.04 cfs @ 12.17 hrs, Volume= 269 cf
Outflow = 0.04 cfs @ 12.17 hrs, Volume= 269 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP4: Off-Site (West)



Summary for Pond 1P: Infiltration Basin

Inflow Area = 23,465 sf, 63.56% Impervious, Inflow Depth = 4.65" for 100-year event
Inflow = 2.48 cfs @ 12.09 hrs, Volume= 9,087 cf
Outflow = 0.37 cfs @ 12.61 hrs, Volume= 9,087 cf, Atten= 85%, Lag= 31.1 min
Discarded = 0.37 cfs @ 12.61 hrs, Volume= 9,087 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 98.99' @ 12.61 hrs Surf.Area= 1,939 sf Storage= 2,848 cf

Plug-Flow detention time= 58.7 min calculated for 9,080 cf (100% of inflow)
Center-of-Mass det. time= 58.7 min (824.0 - 765.3)

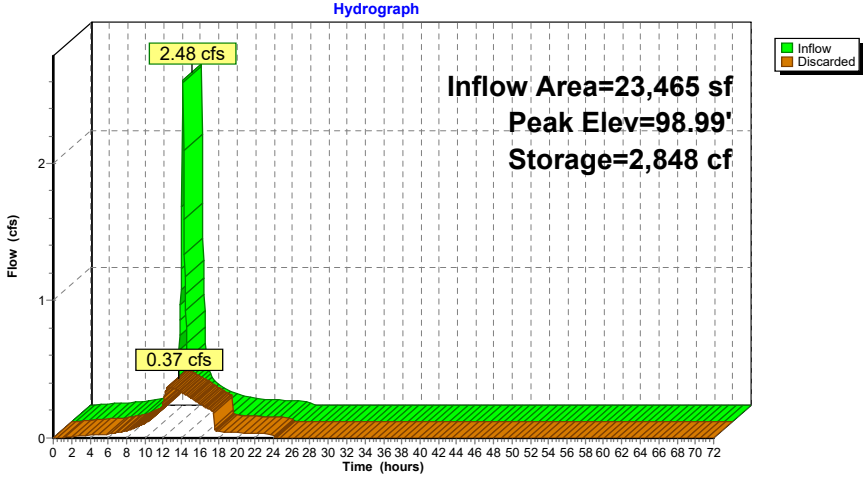
Volume	Invert	Avail.Storage	Storage Description
#1	97.00'	5,096 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
97.00	972	128.0	0	0	972
98.00	1,427	156.0	1,192	1,192	1,621
99.00	1,946	180.0	1,680	2,872	2,284
100.00	2,515	199.0	2,224	5,096	2,887

Device	Routing	Invert	Outlet Devices
#1	Discarded	97.00'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.37 cfs @ 12.61 hrs HW=98.99' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.37 cfs)

Pond 1P: Infiltration Basin



Summary for Pond 2P: Underground Infiltration System

Inflow Area = 20,273 sf, 50.25% Impervious, Inflow Depth = 3.60" for 100-year event
Inflow = 1.90 cfs @ 12.10 hrs, Volume= 6,082 cf
Outflow = 0.21 cfs @ 11.70 hrs, Volume= 6,082 cf, Atten= 89%, Lag= 0.0 min
Discarded = 0.21 cfs @ 11.70 hrs, Volume= 6,082 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 98.43' @ 12.95 hrs Surf.Area= 1,116 sf Storage= 2,140 cf

Plug-Flow detention time= 81.1 min calculated for 6,078 cf (100% of inflow)
Center-of-Mass det. time= 81.1 min (913.8 - 832.7)

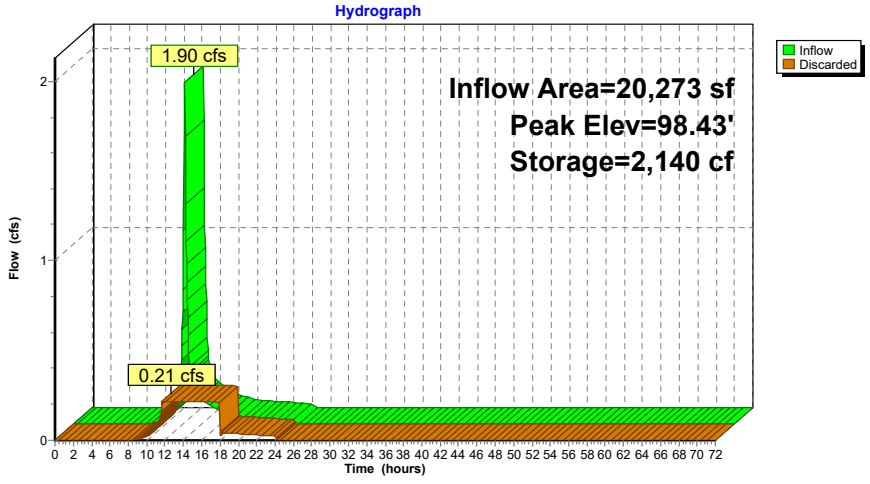
Volume	Invert	Avail.Storage	Storage Description
#1A	95.50'	879 cf	**18.92'W x 59.00'L x 3.21'H Field A** 3,581 cf Overall - 1,384 cf Embedded = 2,196 cf x 40.0% Voids
#2A	96.00'	1,384 cf	**Cultec R-280HD** x 32 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 4 rows
		2,263 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	95.50'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.21 cfs @ 11.70 hrs HW=95.55' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.21 cfs)

Pond 2P: Underground Infiltration System



SECTION 6.0

ADDITIONAL DRAINAGE CALCULATIONS

6.01 TSS REMOVAL CALCULATIONS

TSS Removal Calculation Worksheet

44% Pretreatment

Location: 5 New Venture Drive Dennis, MA

Project: 0102234.00

Prepared By: M. Morrison

Date: 12/23/2025

AREA 1 - Parking Lot (South)

Total Impervious Area, Acres= 0.205

A	B	C	D	E
BMP	TSS Removal Rate	Starting TSS Load*	Amount Removed (BxC)	Remaining Load (C-D)
Deep Sump and Hooded Catchbasins	0.25	1.00	0.25	0.75
StormCeptor	0.77	0.75	0.58	0.17

TSS Removal = 0.83

AREA 2 - Parking Lot (North)

Total Impervious Area, Acres= 0.113

A	B	C	D	E
BMP	TSS Removal Rate	Starting TSS Load*	Amount Removed (BxC)	Remaining Load (C-D)
Deep Sump and Hooded Catchbasins	0.25	1.00	0.25	0.75
StormCeptor	0.77	0.75	0.58	0.17

TSS Removal = 0.83

AREA 3 - Roof

Total Impervious Area, Acres= 0.138

A	B	C	D	E
BMP	TSS Removal Rate	Starting TSS Load*	Amount Removed (BxC)	Remaining Load (C-D)
StormCeptor	0.77	1.00	0.77	0.23

TSS Removal = 0.77

Weighted Annual Average TSS Removal Rate

[TSS Removal-1 (Area-1) + TSS Revoval-2 (Area-2)+ ….] / [Area-1 + Area-2 + ...] = 0.81

Project Site TSS Removal = 0.81

TSS Removal Calculation Worksheet

Location: 5 New Venture Drive Dennis, MA

Project: 0102234.00

Prepared By: M. Morrison

Date: 12/23/2025

AREA 1 - Parking Lot (South)

Total Impervious Area, Acres= 0.205

A	B	C	D	E
BMP	TSS Removal Rate	Starting TSS Load*	Amount Removed (BxC)	Remaining Load (C-D)
Deep Sump and Hooded Catchbasins	0.25	1.00	0.25	0.75
StormCeptor	0.77	0.75	0.58	0.17
Infiltration Basin	0.8	0.17	0.14	0.03

TSS Removal = 0.97

AREA 2 - Parking Lot (North)

Total Impervious Area, Acres= 0.113

A	B	C	D	E
BMP	TSS Removal Rate	Starting TSS Load*	Amount Removed (BxC)	Remaining Load (C-D)
Deep Sump and Hooded Catchbasins	0.25	1.00	0.25	0.75
StormCeptor	0.77	0.75	0.58	0.17
Subsurface Infiltration System	0.8	0.17	0.14	0.03

TSS Removal = 0.97

AREA 3 - Roof

Total Impervious Area, Acres= 0.138

A	B	C	D	E
BMP	TSS Removal Rate	Starting TSS Load*	Amount Removed (BxC)	Remaining Load (C-D)
StormCeptor	0.77	1.00	0.77	0.23
Infiltration Basin	0.8	0.23	0.18	0.05

TSS Removal = 0.95

Weighted Annual Average TSS Removal Rate

[TSS Removal-1 (Area-1) + TSS Revoval-2 (Area-2)+ ….] / [Area-1 + Area-2 + ...] = 0.96

Project Site TSS Removal = 0.96

6.02 GROUNDWATER RECHARGE VOLUME CALCULATIONS

Required Recharge Volume

Rv = F x Impervious Area

Where:

Rv = Recharge Volume

F=Target Depth Factor associated with each Hydrologic Soil Group

(F=0.6-inch for Soil Type A)

Impervious Area = Proposed Pavement and Rooftop area on-site

$$Rv = \left(\frac{0.6\ in}{12}\right)(25{,}102\ sft) =$$

Rv = 1,255 cf (required recharge volume)

Storage Provided

- Underground Infiltration Systems = 2,263 cubic feet provided.
- Infiltration Basin = 5,096 cubic feet provided.

Total Provided Recharge Volume = 7,359 cubic feet provided.
Refer to the HydroCAD storage table provided for more information.

Drawdown Within 72-Hours

Pond 1P

Rv = Storage Volume, 5,096 cu.ft. (see above)

K = Saturated Hydraulic Conductivity, in/hr (from Rawls Table)

Bottom Area = Area of Infiltration System Bottom, sq.ft.

$$Time = \frac{Rv}{(K)(Bottom\ Area)}$$

$$Time = \left(\frac{5{,}096\ cu.ft.}{(0.6891\ ft/hr)(972\ sq.ft.)}\right) =$$

$$Time = 7.61\ hours$$

- 7.61 hours < 72 hours

Pond 2P

Rv =Storage Volume, 2,263 cu.ft. (see HydroCAD)

K = Saturated Hydraulic Conductivity, in/hr (from Rawls Table)

Bottom Area = Area of Infiltration System Bottom, sq.ft.

$$Time = \frac{Rv}{(K)(Bottom\ Area)}$$

$$Time = \left(\frac{2{,}263\ cu.ft.}{(0.6891\ ft/hr)(1{,}116\ sq.ft.)}\right) =$$

$$Time = 2.94\ hours$$

- 2.94 hours < 72 hours

Stage-Area-Storage for Pond 1P: Infiltration Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
97.00	972	0
97.05	993	49
97.10	1,014	99
97.15	1,035	150
97.20	1,056	203
97.25	1,078	256
97.30	1,099	311
97.35	1,121	366
97.40	1,144	423
97.45	1,166	480
97.50	1,189	539
97.55	1,211	599
97.60	1,235	660
97.65	1,258	723
97.70	1,281	786
97.75	1,305	851
97.80	1,329	917
97.85	1,353	984
97.90	1,378	1,052
97.95	1,402	1,122
98.00	1,427	1,192
98.05	1,451	1,264
98.10	1,475	1,337
98.15	1,500	1,412
98.20	1,524	1,487
98.25	1,549	1,564
98.30	1,574	1,642
98.35	1,600	1,722
98.40	1,625	1,802
98.45	1,651	1,884
98.50	1,676	1,967
98.55	1,703	2,052
98.60	1,729	2,138
98.65	1,755	2,225
98.70	1,782	2,313
98.75	1,809	2,403
98.80	1,836	2,494
98.85	1,863	2,586
98.90	1,890	2,680
98.95	1,918	2,775
99.00	1,946	2,872
99.05	1,973	2,970
99.10	2,000	3,069
99.15	2,027	3,170
99.20	2,054	3,272
99.25	2,081	3,375
99.30	2,109	3,480
99.35	2,137	3,586
99.40	2,165	3,694
99.45	2,193	3,803
99.50	2,221	3,913
99.55	2,250	4,025
99.60	2,279	4,138
99.65	2,308	4,253
99.70	2,337	4,369
99.75	2,366	4,486
99.80	2,395	4,605
99.85	2,425	4,726
99.90	2,455	4,848
99.95	2,485	4,971
100.00	**2,515**	**5,096**

Stage-Area-Storage for Pond 2P: Underground Infiltration System

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
95.50	**1,116**	0
95.55	1,116	22
95.60	1,116	45
95.65	1,116	67
95.70	1,116	89
95.75	1,116	112
95.80	1,116	134
95.85	1,116	156
95.90	1,116	179
95.95	1,116	201
96.00	1,116	223
96.05	1,116	272
96.10	1,116	321
96.15	1,116	369
96.20	1,116	417
96.25	1,116	464
96.30	1,116	512
96.35	1,116	560
96.40	1,116	607
96.45	1,116	654
96.50	1,116	701
96.55	1,116	748
96.60	1,116	795
96.65	1,116	841
96.70	1,116	887
96.75	1,116	933
96.80	1,116	978
96.85	1,116	1,023
96.90	1,116	1,068
96.95	1,116	1,113
97.00	1,116	1,157
97.05	1,116	1,202
97.10	1,116	1,246
97.15	1,116	1,289
97.20	1,116	1,333
97.25	1,116	1,375
97.30	1,116	1,417
97.35	1,116	1,459
97.40	1,116	1,501
97.45	1,116	1,541
97.50	1,116	1,582
97.55	1,116	1,621
97.60	1,116	1,660
97.65	1,116	1,699
97.70	1,116	1,736
97.75	1,116	1,773
97.80	1,116	1,808
97.85	1,116	1,843
97.90	1,116	1,876
97.95	1,116	1,908
98.00	1,116	1,937
98.05	1,116	1,964
98.10	1,116	1,990
98.15	1,116	2,013
98.20	1,116	2,036
98.25	1,116	2,058
98.30	1,116	2,081
98.35	1,116	2,103
98.40	1,116	2,125
98.45	1,116	2,148
98.50	1,116	2,170
98.55	1,116	2,192
98.60	1,116	2,215
98.65	1,116	2,237
98.70	1,116	**2,259**

6.03 WATER QUALITY VOLUME CALCULATIONS

Water Quality Volume Calculation

V_{WQ} = (D_{WQ}/12 inches/foot) * (A_{IMP} square feet)

V_{WQ} = Required Water Quality Volume (in cubic feet)
D_{WQ} = Water Quality Depth: **1.0-inch for sites with rapid infiltration rates.**
A_{IMP} = Total Impervious Area (in acres) used for driveways, parking, etc.

Underground Infiltration Systems and Bio-Retention Area

A_{IMP} = 25,102 sq.ft.

V_{WQ} = (1.0 inches/12 inches/foot) * (25,102 sq.ft.)

V_{WQ} = 2,092 cubic feet (required volume), provided volume = 7,359 cubic feet in an Underground Infiltration System & Infiltration Basin (refer to the HydroCAD storage tables provided in groundwater recharge section).

6.04 STONE OUTLET PROTECTION SIZING CALCULATIONS

OUTLET PROTECTION SIZING

BSC GROUP
BUILD | SUPPORT | CONNECT

Project No.	102234.00	**Calc By**	M. Morrison
Subject	Outlet Protection Sizing Calcs	**Date**	12/23/2025
Location	5 New Venture Drive Dennis, MA	**Checked by**	B. Yergatian
		Date	

FES-1

Q=Design Discharge, (ft^3/s) = 0.37 cfs

D=Culvert Diameter, (ft) = 1.00 ft

TW=Tailwater Depth, (ft) = 1 ft, (0.4xD for unknow tailwater, or enter known tailwater)

(Tailwater depth is to be limited to between 0.4D and 1.0D)

Riprap Rock Sizing

$$D_{50} = 0.2D\left[\frac{Q}{\sqrt{g}D^{2.5}}\right]^{4/3}\left[\frac{D}{TW}\right]$$

g=32.2 fps

D_{50} = median rock size, ft

$$D_{50} = 0.2\,\frac{0.37}{5.67}\,(4/3)\,\frac{1.00}{1.00} = 0.01 \text{ ft}$$

= 6 inches

Table 1 : Riprap Classes and Apron Dimensions

Class	D_{50} (in)	Apron Length	Apron Depth
1	5	4D	$3.5D_{50}$
2	**6**	**4D**	**$3.5D_{50}$**
3	10	5D	$3.3D_{50}$
4	14	6D	$2.2D_{50}$
5	20	7D	$2.0D_{50}$
6	22	8D	$2.0D_{50}$

Use Class 2

Apron Dimensions

Length, L=7D	=	**7 ft**	
Depth=2.0D_{50}	=	**12.00 Inches**	
Width=3D+(2/3)L	=	**7.67 ft**	(at apron end)

Riprap Rock Sizing Gradation

% of Weight Smaller than Given Size	Size of Stone, inches		
100	**9**	to	**12**
85	**8**	to	**11**
50	**6**	to	**9**
15	**2**	to	**3**

Reference Note: Sizing based in accordance with HEC #14 as required by MassHighway Design Manual

6.05 ILLICIT DISCHARGE COMPLIANCE STATEMENT

Illicit Discharge Compliance Statement

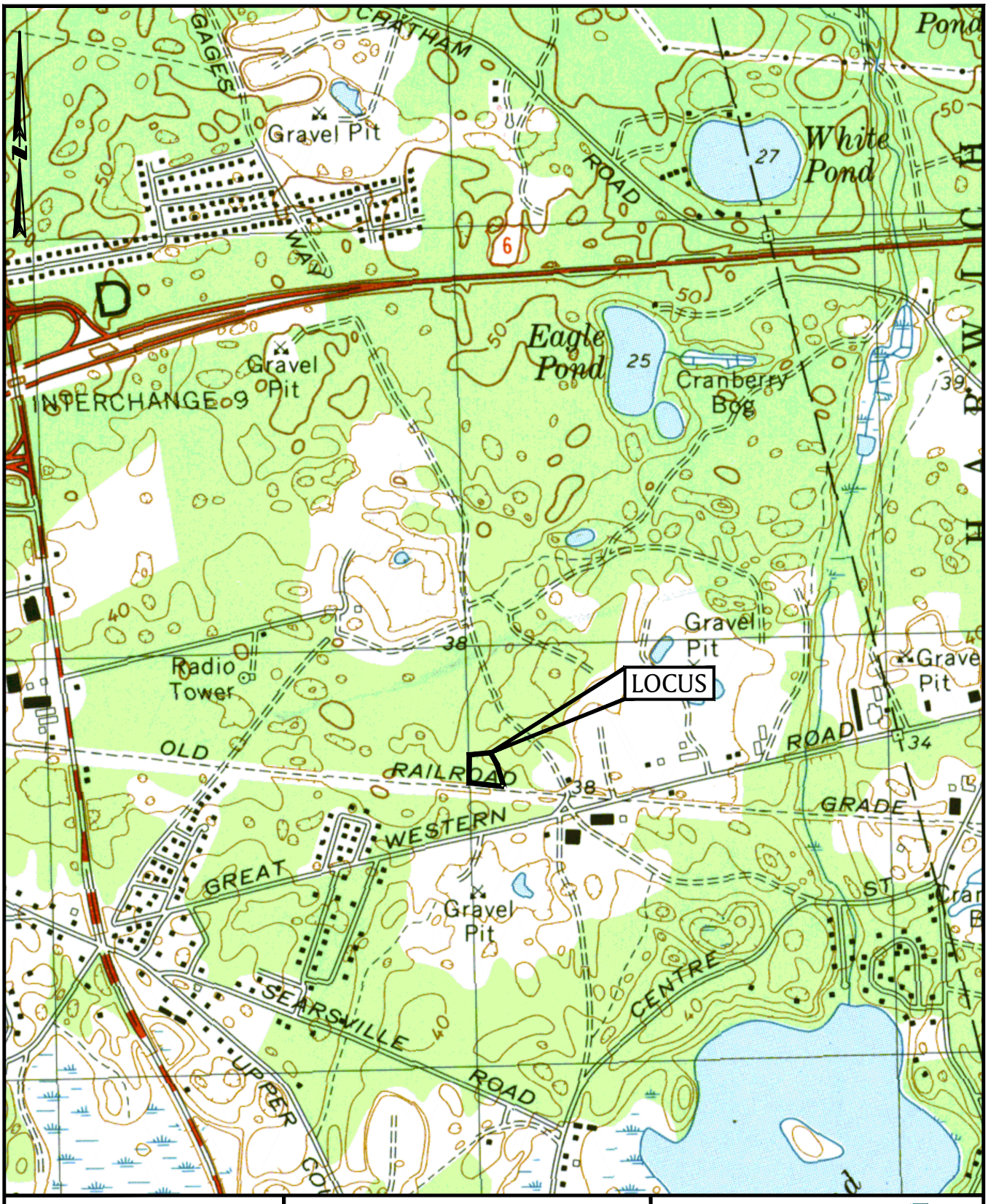
This statement is to document that, to the best of my knowledge and belief, there are no and will be no illicit discharges to the stormwater management systems or protected wetland resource areas for the Pre-engineered Metal Building at 5 New Venture Drive in South Dennis, Massachusetts.

Authorized Signature/Title

Date

APPENDIX A

USGS LOCUS MAP



PREPARED FOR:

535 HIGGINS CROWELL, LLC
P.O. BOX 517
YARMOUTH PORT, MA
02675

USGS LOCUS MAP

5 NEW VENTURE DRIVE
SOUTH DENNIS, MA

BSC GROUP
BUILD | SUPPORT | CONNECT
349 Main Street Route 28 West
Yarmouth, Massachusetts
02649
508 778 8919

Job No.: 0102234.00 Date: 12/23/2025
Scale: 1"=500' Revised:
Dwg. No: Figure:

File: 0102234.00\C\R\A

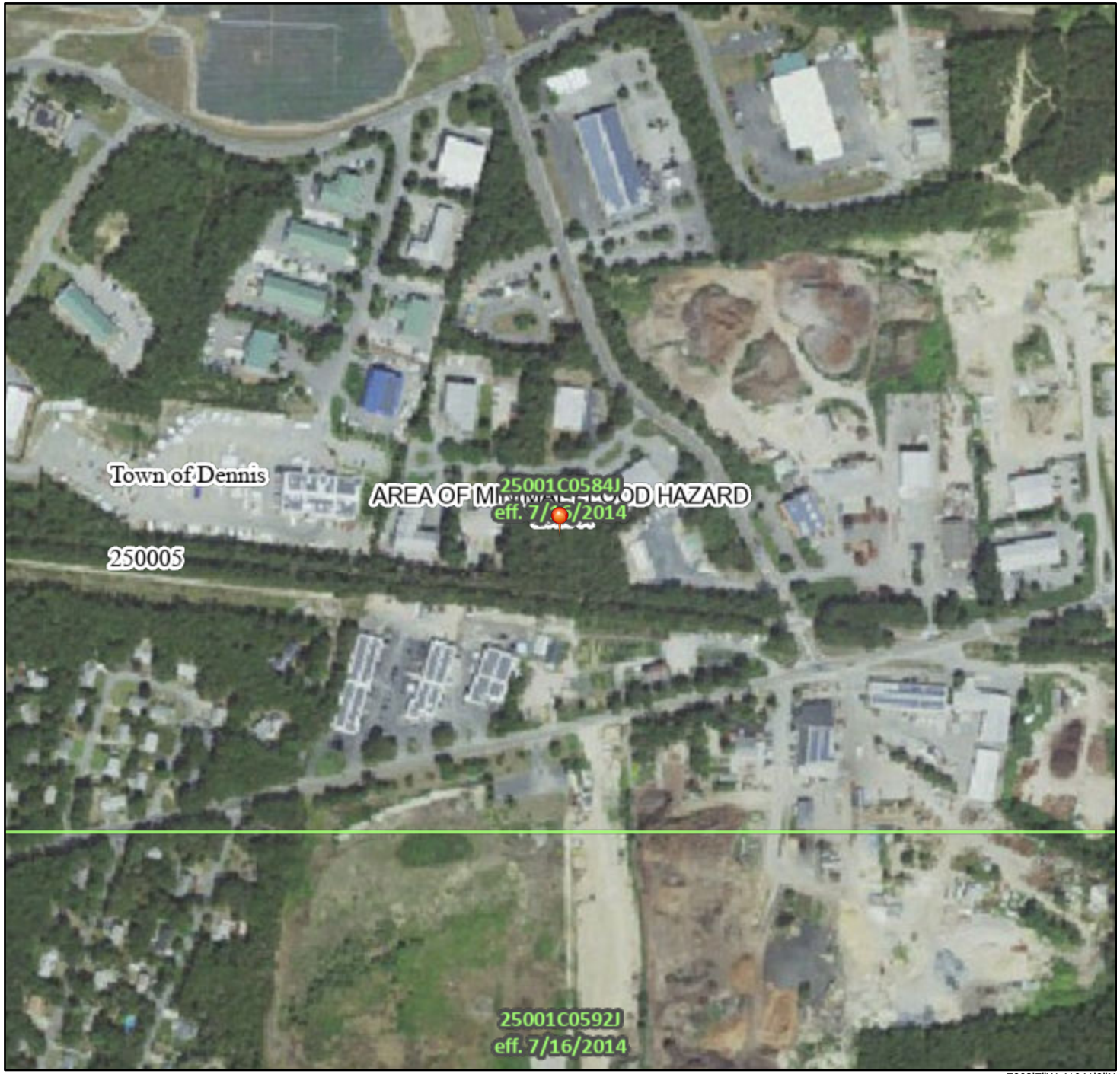
APPENDIX B

FEMA MAP

National Flood Hazard Layer FIRMette

FEMA

70°8'44"W 41°41'36"N



70°8'7"W 41°41'9"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

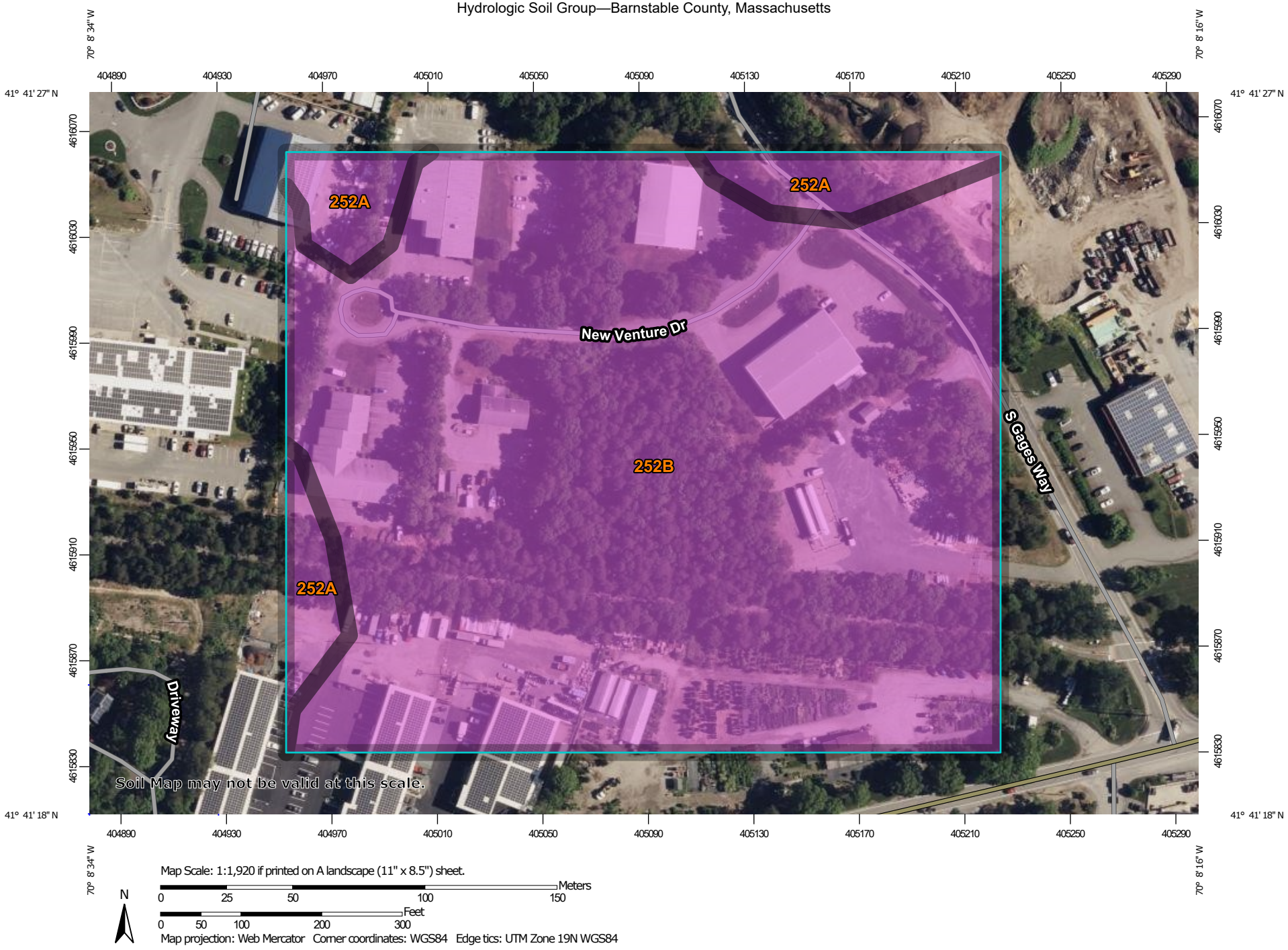
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/23/2025 at 5:40 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

APPENDIX C

WEB SOIL SURVEY



Map Scale: 1:1,920 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

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

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

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

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

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

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

Soil Survey Area: Barnstable County, Massachusetts
Survey Area Data: Version 24, Sep 5, 2025

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

Date(s) aerial images were photographed: Jun 10, 2022—Jun 30, 2022

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
252A	Carver coarse sand, 0 to 3 percent slopes	A	1.3	8.5%
252B	Carver coarse sand, 3 to 8 percent slopes	A	14.0	91.5%
Totals for Area of Interest			**15.3**	**100.0%**

Description

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

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

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

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

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

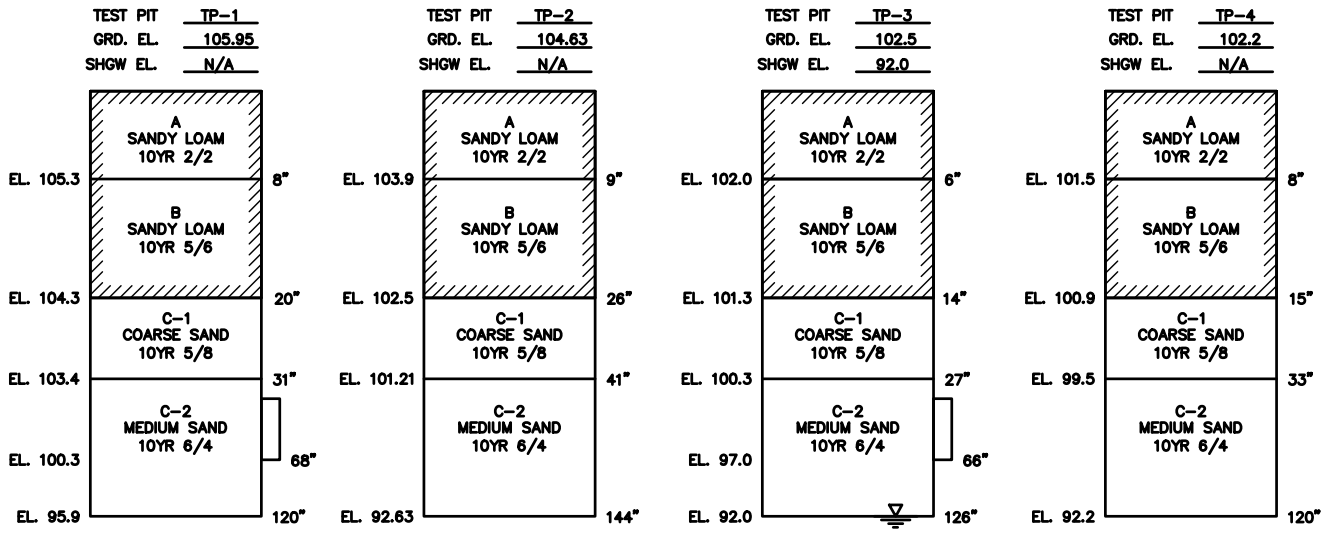
Tie-break Rule: Higher

APPENDIX D

TEST PIT DATA

SOIL TEST PIT DATA

NOT TO SCALE



ONSITE SOIL EVALUATION

DATE:	JULY 15, 2025
TEST BY:	BSC GROUP, INC.
WITNESSED BY:	GRACE MELILLO, HEALTH AGENT
LICENSED SOIL EVALUATOR:	KIERAN J. HEALY, PLS, SE.
PERCOLATION RATE:	< 2 MINS./INCH
SOIL CLASS:	CLASS 1
L.T.A.R.:	0.74 GPD/S.F.

LEGEND

PERCOLATION TEST

ESTIMATED SEASONAL HIGH GROUNDWATER

OBSERVED GROUNDWATER

SEASONAL HIGH GROUNDWATER ADJUSTMENT

(BASED ON TEST PIT #3)

DEPTH TO BOTTOM OF HOLE
10.5

SCALE: NONE

PREPARED FOR:

535 HIGGINS CROWELL, LLC
P.O. BOX 517
YARMOUTH PORT, MA 02675

SOIL / DRAINAGE TEST PIT DATA

5 NEW VENTURE DRIVE
SOUTH DENNIS, MA

BSC GROUP
BUILD | SUPPORT | CONNECT
349 Main Street - Route 28
West Yarmouth, Massachusetts
02673
508 778 8919

Job No.: 0102234.00 Date: 12/23/25
Scale: NONE Revised:
Dwg. No: Figure: APP. D

APPENDIX E

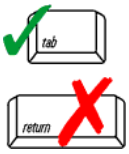
STORMWATER CHECKLIST

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

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[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature

12/29/2025

Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

- [x] New development
- [ ] Redevelopment
- [ ] Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- ■ No disturbance to any Wetland Resource Areas
- ☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☐ Reduced Impervious Area (Redevelopment Only)
- ☐ Minimizing disturbance to existing trees and shrubs
- ☐ LID Site Design Credit Requested:
  - ☐ Credit 1
  - ☐ Credit 2
  - ☐ Credit 3
- ☐ Use of "country drainage" versus curb and gutter conveyance and pipe
- ☐ Bioretention Cells (includes Rain Gardens)
- ☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- ☐ Treebox Filter
- ☐ Water Quality Swale
- ☐ Grass Channel
- ☐ Green Roof
- ☐ Other (describe): _____

Standard 1: No New Untreated Discharges

- ■ No new untreated discharges
- ☐ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- ☐ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

■ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

■ Soil Analysis provided.

■ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

■ Sizing the infiltration, BMPs is based on the following method: Check the method used.

■ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.

■ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

■ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

■ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

■ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ■ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

■ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☐ The BMP is sized (and calculations provided) based on:

- ■ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

■ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

■ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

■ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

■ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☐ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☐ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ■ Name of the stormwater management system owners;
- ■ Party responsible for operation and maintenance;
- ■ Schedule for implementation of routine and non-routine maintenance tasks;
- ☐ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☐ Description and delineation of public safety features;
- ☐ Estimated operation and maintenance budget; and
- ■ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

■ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☐ An Illicit Discharge Compliance Statement is attached;

■ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.