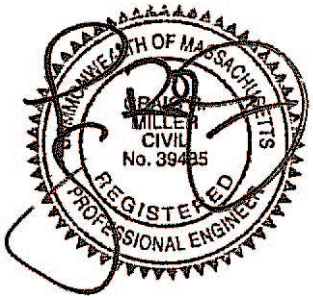
Roadway, Parking Lot & Sidewalk Replacement
Neponset View Terrace, Walpole
Neponset Housing Authority

STORMWATER REPORT

April 2024



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WDG Project No.: 1666-76

Introduction:

This Stormwater Report, Erosion and Sedimentation Control Plan and Long Term Operations and Maintenance Plan have been prepared in conformance with the requirements of the 2008 Massachusetts Department of Environmental Protection (MADEP) Stormwater Handbook, the 2008 amendments to 310 CMR 10.00 et. seq. (Massachusetts Wetlands Act Regulations (MAWPA Regs)), and the Town of Walpole Stormwater Management and Erosion Control Bylaw. This report is prepared to meet the requirements of MADEP Stormwater Checklist and is submitted as part of a Notice of Intent under the Massachusetts Wetlands Protection Act.

Site Description:

The proposed project site is located along Neponset View Terrace in the Town of Walpole off of East Street. The proposed project is located on land which is presently low-income elderly apartments and associated parking and driveway access. The site also consists of nine existing buildings totaling 59,240 S.F. and associated parking area. The site is owned by the Walpole Housing Authority and is found at the Town of Walpole's Assessor's Map 25 Plat 176, 177. A portion of the site is located within the 100- and 200-foot Riverfront Area of the Neponset River. No portion of the proposed work is located within the 100-year floodplain of the Neponset River FEMA Map #25021C0169E dated July 17, 2012.

Description of Proposed Project:

The project consists of the demolition and replacement of existing pavement and the conversion of some lawn areas to pavement for additional parking access and associated drainage improvements and stormwater management structures, and associated appurtenances within the existing disturbed and degraded 100- and 200-foot Riverfront Areas to the Neponset River.

Access to the site will be provided by an existing curb cut, which will be maintained. Parking will occur off of the internal access road.

No utilities other than drainage associated with the project are proposed.

Existing Conditions:

The proposed project is made up of two parcels. The existing site is eight (8) residential apartment buildings and one (1) community building and associated paved access and parking at the top of the wooded slope, which drops to the Neponset River. Parcel is abutted to the east by commercial development, to the north by wooded and wetland areas associated with the Neponset River, to the south by Main Street, and to the west by wooded areas.

The entire site is previously disturbed and degraded by the existing buildings and pavement. The overall site gradient slopes from the east to the west at approximately 6.0%. Runoff currently slopes to inlet grates and the edge of pavement which outlets to the wooded area before the Neponset River (DP#1).

Proposed Conditions:

Neponset View Terrace parking and driveway access areas will be redeveloped to improve deteriorating pavement, access conditions, provide a more accessible and livable community and to come closer to current Town parking and emergency and maintenance access requirements. Stormwater drainage for the proposed building will be handled by underground infiltration storage chambers. Stormwater drainage from the new parking areas will be handled by a series of catch basins and proprietary separators before outletting to the underground infiltration storage chambers. Most of the rest of the site will continue to collect into the Housing Authority stormwater system through existing catch basins and pipes which outlet the Neponset River.

A small portion at the entrance to the site will be repaved and continue to flow to the drainage system in Main Street

The on-site storage is designed to not increase the flows from the site for up to the 100-year storm event. The total area disturbed by the project will be approximately 1.9 acres and an NPDES General Permit for Construction Activity as well as a

Stormwater Pollution Prevention Plan will be required for the project. Copies of the SWPPP will be provided to the Town of Walpole prior to the start of construction on the project.

Soils

Test pits, borings and monitoring wells conducted at the site found fill, organic over top of the naturally occurring soil. The naturally occurring soil was found to be a glacial outwash (sandy loam and sandy soils). The depth to the groundwater varied depending on the location of the soil investigations. See attached soil logs.

The infiltration rate for sandy loam soils from Table 2.3.3 Rawl's Rates in the DEP Handbook is 1.02 inch/hour. This rate was used in the design of the underground infiltration chambers.

100 Year Flood Storage

A no portion of the proposed site work is within the 100-year floodplain according to the latest FEMA flood insurance map of the site.

Low Impact Development (LID) Practices

The DEP Stormwater Standards require LID measures be considered. The DEP Stormwater checklist requires that the proponent document which environmentally sensitive and LID Techniques were considered during the planning and design of the projects.

Below are a list of environmentally sensitive and LID Techniques and how they were or were not able to be implemented into the project:

No disturbance to any Wetland Resource Areas

The proposed project is the redevelopment of an existing disturbed and degraded site. The redevelopment of existing sites is encourage by the DEP and is recognized by the U.S. Green Building Council as environmentally sensitive.

The project does not disturb Wetland Resource Areas.

The project redevelops area within the Riverfront Area.

The project does not disturb the existing river bank.

Reduce Imperious Surface

The site increased impervious surface by 4,494 SF with all of the increase in impervious area is outside of the 100' Riverfront Area.

Site Design Practices

The site is designed to incorporate the minimum amount facilities necessary in order for the project to be financially viable to the applicant and to meet Town requirements. Wherever practical the design was limited to decrease disturbance.

Minimize Disturbance to Existing Trees and Shrubs

The existing site has a few shrubs that needed to be removed to meet parking requirements. Additional plantings are proposed in new vegetated areas.

Use of "country drainage" versus curb and gutter conveyance and pipe/vegetated filter strips

The site is in a high traffic area with no existing or proposed space for gutter conveyance or vegetated filter strips. The site uses curbs and gutters and proprietary separators to clean the stormwater runoff.

Bioretention Cells

Bioretention cells were considered, but were not implemented for the following reasons:

- The site did not have the space to accommodate bioretention cells.
- In addition, bioretention cells require pretreatment by sediment forebay which would have the same high groundwater, and soil issues.
- The bioretention cells would require additional disturbance to the wooded 100'-RFA.

Constructed Wetlands

Similar to bioretention cells the site does not have the room to accommodate constructed wetlands and pretreatment forebays upstream from the wetlands.

Treebox Filter

Treebox filters would not be practical as the only tree that is proposed is not in the area of new parking and access driveways.

Water Quality Swales & Grass Channels

Similar to bioretention cells and constructed wetlands the site does not have the room to accommodate water quality swales and grass channels. Creation of these would require the removal of woodlands within the 100'-RFA.

Green Roof

No roofs are proposed as part of this project.

Permeable Pavements

Due to the high volume of traffic at the site permeable pavements are not a viable treatment option nor is there funds in the owner's budget for the permeable pavement maintenance.

Green walls & Fences

No walls or fences are proposed at the site.

Cisterns

Cistern and water reuse are not financially viable systems to incorporate into the site design.

Total Maximum Daily Loads (TMDL)

The project discharges directly to the Neponset River. The MassDEP has issued a final Total Maximum Daily Load (TDML) that establishes a waste load allocation for stormwater discharge for the Neponset River (MA73-01-2002 CN 121.0). The Massachusetts Department of Environmental Protection as issued a final TMDL report for the Neponset River. The MADEP has listed as cause for impairment:

- Bacteria

The proposed site has taken following measures to ensure that the pollutants from the site are consistent with the assumptions of the EPA-approved TMDL.

- The site has instituted the above mentioned "Good Housekeeping BMPs", "Post-Construction BMPs" and "Operation and Maintenance Plan" in Standards 8 & 9.

- Direct runoff from the new parking areas is diverted to catch basins, proprietary separators, and infiltration chambers.

- Proprietary separators are used to reduce the amounts of solids leaving the stormwater system.
- Infiltration chambers are used to increase recharge and reduce the amounts of solids leaving the stormwater system.

Total Site Area

Total Site Area to be Developed = 1.8 acres

Existing Impervious Area = 1.1 acres

Proposed Impervious Area = 1.2 acres

Standard 1: No New Untreated Discharges

The existing developed and degraded site, which is completely pavement and lawn area and currently discharges runoff untreated into the Neponset River will continue to flow across the repavement areas to the Neponset River. The proposed additional paved areas will be treated per the requirements of the MADEP 2008 Stormwater Handbook and Regulations. This will be done through the use of deep sump catch basins, proprietary separators, and underground infiltration chambers.

See the TSS calculations attached to the end of this report for stormwater treatment calculations.

Since the runoff from the redeveloped impervious surfaces will be treated in accordance with the requirements of the MADEP 2008 Stormwater Handbook and Regulations to the maximum extent practical and since the new paved surfaces on the site will be treated according to the regulations, and since both outlets will continue to discharge to the river, which currently accepts the untreated site runoff, no new untreated discharge will be added to the site. Therefore, Standard 1 has been met by the proposed project.

Standard 2: Peak Rate & Volume Attenuation

The proposed project involves the redevelopment of the previously developed and degraded site. Attached to this report are the existing and proposed (site developed) runoff calculations for the Project for the 2-, 10-, 25-, and 100-year storms.

All calculations were prepared using SCS Methods consistent with the requirements of the Wetland Protection Regulations and the 2008 MADEP Stormwater Handbook. The calculations were prepared using HydroCAD version 10.00 by Applied Microcomputers Systems. Soils data for the modeling was obtained from test pits conducted at the site. See attached test pit soil logs. Groundwater elevations also come from the test pits. Ground cover data is based on existing and proposed site conditions, and times of concentration are based on the tributary watershed characteristics. Hydrologic soil group data was obtained from the SCS National Engineering Handbook NEH #4 - Hydrology. Times of concentration for the study were computed using SCS Methodology. Rainfall data for the study is based on the U.S. Weather Bureau Technical Paper #40 and the U.S. Weather Service Technical Memorandum No. Hydro. 35.

Discharge Point #1		
Storm Return Period (years)	Existing Peak Inflow Rate (c.f.s.)	Proposed (Site Developed) Peak Inflow Rate (c.f.s.)
2	3.48	3.47 (-0.01)
10	5.99	5.88 (-0.11)
25	7.81	7.61 (-0.20)
100	10.00	9.64 (-0.36)

Existing discharge to DP #2 will be maintained under proposed conditions as only repavement is proposed in that area.

Based on the results of the calculations as demonstrated above, the requirements of Standard 2 have been met and the redevelopment of the site and development of new areas will not result in any net increase in the peak rate of runoff or the runoff volume from the site.

Standard 3: Recharge

The proposed project involves the redevelopment of a previously developed and degraded site. The proposed project will provide infiltration from the new parking areas via prefabricated infiltration/storage chambers. First flush of stormwater runoff is directed to an isolator row to pretreat the runoff and remove solids. Calculations detailing the infiltration/recharge are attached to this report.

The infiltration of the proposed parking areas provides infiltration that exceeds that required by the MADEP regulations.

See the infiltration calculations attached to the end of the report for the stormwater infiltration calculations.

Therefore, Standard 3 has been met by the proposed project.

Standard 4: Water Quality

The proposed project involves the redevelopment of a previously developed and degraded site.

The proposed project will provide for the treatment of stormwater from the paved parking area enclosed by the building. Total Suspended Solids (TSS) will be removed by the use of deep sump catch basins and proprietary separators before the water discharges to underground infiltration chambers.

Attached to this report are calculations sheets showing the TSS removal for the proposed pre-treatment trains along with technical data regarding the design of and the removal efficiencies for the proprietary separator units.

As demonstrated by the calculation sheets, the runoff water quality from the new parking areas at the site treats the flows according to the regulations and the existing degraded repaved areas treat the runoff to the maximum extent practical. Therefore, Standard 4 has been met by the proposed redevelopment project.

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

The proposed project use does not constitute a Land Use with Higher Potential Pollutant Loads as defined by the 2008 MADEP Stormwater Handbook and the 2008 amendments to 310 CMR 10.00 et. seq. (MAWPA Regs).

Therefore Standard 5 has been met by the proposed project.

Standard 6: Critical Areas

No portion of the site is in a critical area. Therefore, Standard 6 has been met by the proposed project.

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

The proposed project is a redevelopment project as defined by the 2008 MADEP Stormwater Handbook and the 2008 amendments to 310 CMR 10.00 et. seq. (MAWPA Regs). Below is a summary of how the different Standards are met for the development areas.

Standard 1 (must be met to the maximum extent practical):

> Since the runoff from the redeveloped impervious surfaces will be treated in accordance with the requirements of the MADEP 2008 Stormwater Handbook and Regulations to the maximum extent practical and since the new paved surfaces on the site will be treated according to the regulations, and since both outlets will continue to discharge to the river, which currently accepts the untreated site runoff, no new untreated discharge will be added to the site. Therefore, Standard 1 has been met by the proposed project.

Standard 2 (must be met to the maximum extent practical)

Based on the results of the calculations as demonstrated above, the requirements of Standard 2 have been met and the redevelopment of the site and development of new areas will not result in any net increase in the peak rate of runoff or the runoff volume from the site.

Standard 3 (must be met to the maximum extent practical)

The infiltration of the proposed new parking areas provides infiltration that exceeds that required by the MADEP regulations. The redeveloped areas will provide no new treatment as those areas are only being repaved. Therefore, Standard 3 has been met by the proposed project to the maximum extent practical.

Standard 4 (must be met to the maximum extent practical)

As demonstrated by the calculation sheets, the runoff water quality from the new development areas treat the flows from the site according to the regulations. The redeveloped will not recharge as these areas are only being repaved. Therefore, Standard 4 has been met by the proposed redevelopment project to the maximum extent practical.

Standard 5 (must be met to the maximum extent practical)

The proposed project use does not constitute a Land Use with Higher Potential Pollutant Loads as defined by the 2008 MADEP Stormwater Handbook and the 2008 amendments to 310 CMR 10.00 et. seq. (MAWPA Regs). Therefore, Standard 5 is met for the project.

Standard 6 (must be met to the maximum extent practical)

No portion of the site is in a critical area. Therefore, Standard 6 has been met by the proposed project.

Standard 8 (must be met)

Standard 8 is met for the redevelopment portion as described below.

Standard 9 (must be met)

Standard 9 is met for the redevelopment portion as described below.

Standard 10 (must be met)

Standard 10 is met for the redevelopment portion as described below.

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

Construction Phasing Notes

1. Development is focused within previously disturbed areas.
2. The contractor shall substantially complete and stabilize all disturbed areas in one phase of construction prior to beginning the next phase of construction.
3. Upon completion of a phase of construction the contractor shall notify the engineer and town conservation agent to review the site prior to beginning the next phase of construction.
4. The contractor shall install phase specific erosion control and temporary construction phase detention basins and filtration dams prior to any work corresponding to that phase of construction.

Demolition Notes

1. All demolition debris shall be legally disposed of offsite and shall be considered incidental work.
2. The contractor shall be responsible for all permits and licenses, fees and approvals required to correctly complete the work.
3. The contractor shall assume complete responsibility and liability for the safety of all who will traverse through the site and the structural integrity and safety of all excavations, stored items, work, and utilities to remain during construction.
4. Demolition, sitework and landscaping shall be sequenced to avoid long periods of disturbance to the site. Construction sequencing shall be scheduled so that work progresses quickly, efficiently and with the least amount of disturbance to the site.
5. Contractor shall clean construction site daily to prevent dust and debris from leaving the site. The contractor shall clear debris from the site at the end of each day. All potential loose material shall be secured in closed containers. The contractor shall have a water source on site to wash vehicles and spray down dust.
6. The contractor shall call Dig Safe (1-888-DIG-SAFE, notify private and public utility companies and receive formal clearance/verification from all affected utilities at least 72 hours prior to excavating near any utilities that may be affected by any portion of this construction. The contractor shall notify the town of Winchester at the same time Dig Safe is called. The contractor shall also notify the Winchester department of public works to mark out any town-owned utilities, which are not registered with Dig Safe.
7. The contractor shall conform with the specific requirements for excavation as set forth in Massachusetts General Law: Chapter 82, Section 40a and OSHA Regulations 29cfr1926.651(a. The contractor shall coordinate all work involving utility company facilities, whether those facilities be existing or proposed.
8. The contractor shall protect all existing catch basins with silt sacks and prevent all construction debris from entering the drainage system. Contractor shall follow manufacturer's instructions and the SWPPP regarding frequency of inspection, repair, and cleaning of silt sacks.
9. Upon completion of construction, the contractor shall clear catch basin of all silt and debris and flush the drainage line.
10. When flushing any sediment out of the storm drain system, sediment laden water shall be collected and flushed materials shall not be allowed to enter the downstream drainage system or any resource areas.
11. All trees, shrubs, grass and landscaping areas, and physical site features (buildings, fences, paving, light poles, signs etc. not included in this project; along with all other property not included in this project shall be protected during construction operations at all times. This includes abutting property as well. Any damage or loss to the above items or areas caused by the actions of the contractor shall be immediately repaired or replaced by the contractor at no cost to the owner. The contractor is also responsible for the actions of all subtrades and subcontractors that the contractor

may invite to perform the work of this contract.

12. The contractor shall verify all existing conditions in the field and report any discrepancies between plans and actual conditions to the engineer prior to starting work.

13. Stockpile materials in an approved location and in accordance with the Stormwater Pollution Prevention Plan.

14. Install erosion control measures as indicated prior to beginning demolition activities.

15. A Licensed Soil Professional (LSP) shall make periodic inspections during construction.

Erosion Control and Construction Sequencing

With regard to work proposed on the project and erosion and siltation control, the sequence of activities will generally take place as follows:

1. A 25 foot entrance, construction parking areas, and staging areas shall have at least 2 inches of crushed rock.

2. Prior to general pavement removal, clearing, grubbing or topsoil stripping, place all strawbales, silt fence, and erosion control dikes in the location shown on the drawings. Although installation of these measures can be phased according to the construction schedule, strawbales, silt fence, and erosion control dikes must be in place prior to any work in a specific location.

3. Prior to grubbing or topsoil stripping or pavement removal, place silt sack catch basin protection in all existing catch basins adjacent to the work area and in the location shown on the drawings. Although installation of this measure can be phased according to the construction schedule, silt sack catch basin protection must be in place prior to any work in a specific location.

4. Prior to any earthwork operations, install temporary siltation sump/filtration dams, swales with check dams, and construction entrance in the locations shown on the plans. These measures may be installed in phases according to the construction schedule but must be completed prior to earthwork operations in the adjacent work area.

5. Damaged or loose strawbales and silt fence shall be replaced as necessary to maintain their function of controlling erosion and siltation. Damaged or broken-down check dams and filtration dams shall be replaced immediately. Construction entrance and silt sack catch basin protection shall be replaced as necessary to maintain its function of controlling erosion and siltation to the work area.

6. Remove any accumulation of silt or soil build-up behind strawbales, silt fence, check dams, and filtration dams as it occurs. Remove accumulations of silt and soil build-up from the siltation sumps when it is approximately 18 inches deep. Replace the gravel filter on the inside of the filtration dams when it becomes clogged with silt or does not permit free drainage of stormwater through it, whichever occurs first.

7. Throughout excavation, filling, and grading operations, in addition to drainage swales, check dams, siltation sumps/filtration dams, and other items shown on the drawings, the Contractor shall take other necessary precautions, including installation of temporary drainage swales, siltation sumps/filtration dams, check dams, strawbales, silt fences, and temporary pipe, to direct and control drainage from disturbed areas on the site so that erosion and siltation is minimal. In addition, no erosion or discharge of silt or larger particles shall occur in areas to remain undisturbed or onto adjacent properties.

8. Remove all erosion control measures, including strawbales, silt fence, siltation sumps and check dams, only when construction is completed, upland surfaces are stabilized, and the piped drainage system is fully operational and it has been approved to do so.

9. Dust control shall be controlled during construction and/or until the area is stabilized.

10. Uncontaminated surface water shall be diverted around disturbed areas.

11. All Erosion and Sediment Control measures shall be installed and maintained in accordance with Town specifications and good engineering practices.

12. Off-site transport of sediment shall be prevented, including sediment tracked by vehicles leaving the site.

13. On and off-site stockpile areas shall be managed to provide protection from erosion and sediment transport (overburden and stockpiles of dirt, borrow areas, or other areas used solely by the permitted project are considered a part of the project).

14. Applicable Federal, State and local laws and regulations shall be complied with fully including waste disposal, sanitary sewer or septic system regulations, and air quality requirements, including dust control.

15. Interim and permanent stabilization measures shall be instituted on a disturbed area as soon as practicable but no more than fourteen (14) days after construction activity has temporarily or permanently ceased on that portion of the site.

16. On-site construction and waste materials shall be handled properly.

If the Contractor anticipates deviations from the above procedures, he shall obtain written approval from the Engineer prior to proceeding.

List of Materials Available for to Stabilize Site for Storm Event

- Extra haybales and silt fences to repair broken fencing
- Extra Silt Sack
- 3/4” Crushed stone
- Geotextile or jute mating to cover exposed material

Erosion and Sediment Control BMP’s

The Erosion and Sediment Controls represent the suggested best management practices proposed for the project. The Contractor's approach to controlling stormwater runoff from the site may vary somewhat; however, they must update the SWPPP for the project to reflect the changes and implement appropriate corresponding erosion control measures.

The use of erosion and sediment controls are mandatory and must be employed to eliminate impacts to adjacent areas during construction. If sediment escapes the construction site, off-site accumulations of sediment must be completely removed immediately.

The control practices which are required to minimize stormwater pollution during construction must remain functional until disturbed areas have been stabilized. Erosion control products are to be installed and maintained in accordance with manufacturer's specifications and good engineering practices.

The most important aspects of controlling erosion and sedimentation are limiting the extent of drainage structures. These fundamental principles will be the key factors in the contractor's control of erosion on the project site. If appropriate, the contractor will construct temporary diversion swales and settling basins or use a settling tank. If additional drainage or erosion control measures are needed, they will be located up-gradient from the hay bales and silt fences.

The contractor is responsible for the maintenance and repair of all erosion control devices on-site. All erosion control devices will be regularly inspected. At no time will silt-laden water be allowed to enter sensitive areas (wetlands, streams, and drainage systems). Any runoff from disturbed surfaces will be directed through a sedimentation process prior to being discharged to the existing on-site drainage system.

The contractor will establish a staging area on a lot to be disturbed for the overnight storage of equipment and stockpiling of materials.

In the staging area, the contractor will have a stockpile of materials required to control erosion on-site to be used to supplement or repair erosion control devices. These materials will include, but are not limited to hay bales, silt fence, erosion control matting, and crushed stone. As mentioned previously, erosion and sedimentation controls will be employed to minimize the

erosion and transport of sediment into resource areas during the earthwork and construction phases of the Project. Erosion and sedimentation control measures will be installed prior to site excavation or disturbance and will be maintained throughout the construction period.

The contractor is responsible for erosion control on the site and will utilize supplemental erosion control measures to supplement the erosion controls shown on the plans prepared for this project to work with his day-to-day operations at the site.

Primary erosion control techniques proposed include hay bale barriers, silt fence barriers, inlet sediment traps, siltation control dikes, a stabilized construction entrance, temporary diversion channels, and temporary sedimentation ponds when applicable. A detailed description of each technique is discussed below. During the growing season, slope stabilization will be achieved by applying topsoil followed by seeding and mulching as soon as final grades are achieved. Organic mulching, jute netting, geo-textiles, or a combination will be used to stabilize slopes completed outside of the growing season.

Best Management Practices (BMPs)

Silt Fence Strawbale Barriers

Erosion control barriers (silt fences or strawbale dike) will be installed prior to the start of construction. These barriers will remain in place until all tributary surfaces have been fully stabilized.

Strawbale barriers will be placed to trap sediment transported by runoff before it reaches the drainage system or leaves the construction site. In areas where high runoff velocities or high sediment loads are expected, silt fencing may be installed adjacent to the strawbale barriers. This semi-permeable barrier made of a synthetic porous fabric will provide additional protection. The silt fences and hay bale barrier will be replaced as determined by periodic field inspection. The underside of hay bales will be kept in close contact with the earth and reset as necessary. Hay bale barriers and siltation fences will be maintained and cleaned until slopes have healthy stands of grass.

Drain System Protection

Silt Sack sediment traps supplemented with hay bale erosion checks will be installed at drainage structures and maintained and cleaned until slopes have healthy stands of grass. Catch basins, drain manholes, storm drain pipes, water quality inlets, and detention basins will be cleaned of sediment and debris after the completion of construction. Sediment collected in structures will be disposed of properly and covered, if stored on-site.

- Straw bale check dams will be used on roadways to divert runoff onto stabilized areas.
- Until tributary areas are stabilized, catch basin inlets will be filtered with Silt sacks. If intense rainfall is predicted before all tributary areas are stabilized, erosion control measures will be reinforced for the duration of the storm. Downstream areas will be inspected, and any sediment removed at the end of the storm.
- Unfiltered water will not be allowed to enter pipes from unstabilized surfaces.
- Trench excavation will be limited to the minimum length required for daily pipe installation. All trenches will be backfilled as soon as possible. The ends of pipes will be closed nightly with plywood.
- During construction of the site, silt-laden waters should be intercepted prior to reaching catch basins. Any gross depositions of materials on paved surfaces will be removed by sweeping.
- All paved areas will be swept on a weekly basis, as permitted by weather, during the construction period.

Diversion Channels

Diversion channels may be used to intercept and divert runoff from slopes that are exposed during construction. These diversions will minimize the development of concentrated runoff down slopes, which could produce gully erosion. Diversions will also be used to collect runoff from construction areas and convey it to temporary sediment basins or traps. Temporary

diversions will remain in place until slopes are stabilized or graded level. If vegetation of the diversion channel is required to avoid erosion of the channel, the channel will be temporarily stabilized to ensure viability of the grass seed.

Temporary Sediment Ponds

Temporary sediment ponds/basins will be constructed as necessary on the site either as excavations or bermed water detention structures, depending on grading. These temporary ponds will retain runoff for a sufficient period of time to allow suspended soil particles to settle out prior to discharge. These temporary basins will be located at low points on the site and will receive runoff from temporary diversion swales. Discharge points from sediment basins will be stabilized as necessary to minimize erosion. The bottom of sediment basins will be cleaned periodically, with the sediment removed to a secure location to prevent siltation of natural waterways.

Utility Construction

The Contractor will construct utility trenches in a manner that will not direct runoff toward drainage system structures.

Stabilization Activities

All disturbed surfaces will be stabilized within 14 days after construction in any portion of the project site is completed or is temporarily halted, unless additional construction is intended to be initiated within 14 days. The Contractor will not disturb more area than can be stabilized within 14 days unless the area is to remain active. The Contractor will not disturb more area than can be stabilized within the same construction season.

Slope Stabilization

The smallest practicable area of land will be exposed at a time. Slopes greater than three-to-one (horizontal to vertical) will be stabilized with seed, organic mulch, jute fabric, or riprap, as appropriate, to prevent erosion during construction. After disturbed areas have been stabilized, the temporary erosion control measures will be removed and accumulated sediment will be removed and disposed of in an appropriate location. Disturbed areas will be stabilized with appropriate ground cover as soon as possible. After the removal of temporary erosion control measures, disturbed areas will receive a layer of topsoil for stabilization.

Stabilized Construction Entrance

Temporary stabilized construction entrances will be installed at the project site. The purpose of the construction entrance is to remove sediment attached to vehicle tires and to minimize sediment transport and deposition onto public road surfaces. The construction entrances will be composed of beds of crushed stone which will be replenished as necessary to maintain their proper function.

Inspections

The 2012 EPA Construction General Permit Conditions require routine inspections of the site and careful documentation of events and conditions. The following inspection activities will be completed by a qualified, designated site monitor.

- Erosion control, sedimentation prevention, and stormwater management measures will be inspected at least once per week throughout the construction period.
- All controls, outfalls, and potential problem areas will also be inspected within 24 hours of any storm exceeding 0.5 inches of precipitation.

A log of inspection results will be maintained on-site and will include the name of the inspector, date, major observations, and necessary corrective measures.

Built up sediment will be removed when it has reached one-third the height of the silt fence.

All needed repairs or modifications will be reported to the contractors to permit the timely implementation of required actions. Where necessary repairs do not pose an immediate concern, repairs or modifications will be implemented within two (2) days of inspection.

The SWPPP for the project will be modified within seven days to reflect any modifications to measures as a result of inspection.

A report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the SWPPP, and actions taken will be made and retained as part of the SWPPP for at least three years after the date of the inspection.

Weekly reports of maintenance and inspection activities will be maintained on-site, in conformance with the NPDES permit conditions.

Maintenance

The following maintenance practices will be used by the Contractor to maintain erosion and sediment controls. Maintenance activities will be documented on the Inspection Report Forms.

Erosion and sediment control measures and other protective measures must be maintained in effective operating conditions.

- If site inspections indicate that BMPs are not operating effectively, maintenance must be performed as soon as possible and before the next storm event whenever practicable to maintain the continued effectiveness of the BMPs. If implementation before the next storm event is impracticable, the situation must be documented in the SWPPP and alternative BMPs must be implemented as soon as possible.

- If existing BMPs need to be modified or if additional BMPs are necessary for any reason, implementation must be completed before the next storm event whenever practicable. If implementation before the next storm event is impracticable, the situation must be documented in the SWPPP and alternative BMPs must be implemented as soon as possible.

- Pollution prevention measures must be maintained in good working order. If a repair is necessary, it will be initiated, if practicable, within 24 hours of the report.

- Accumulated sediment within the catch basin inlet protection must be removed on a weekly basis.

- Maintenance and inspection of pollution prevention measures must be continued on the site for as long as a portion of the site remains disturbed.

- Stabilization measures will be initiated as soon as practicable on portions of the site where construction has temporarily or permanently ceased. This will occur in NO CASE more than 14 days after construction activities have temporarily or permanently ceased.

- If issues are identified at hazardous materials storage areas, corrective actions will be implemented immediately. If leaks or spills are identified procedures outlined in Standard 9 will be followed.

Record Keeping

Records will be retained for a minimum period of at least 3 years after the permit is terminated. Any time the following activities occur the *Grading and Stabilization Activities Log* will be filled out:

- When major grading activities occur

- When construction activities temporarily or permanently cease on a portion of the site

- When an area is either temporarily or permanently stabilized

A copy of the Stormwater Construction Site Inspection Reports shall be submitted monthly to the Town Conservation Agent.

Log of Changes to the SWPPP

This SWPPP must be modified as necessary to:

- Ensure permit compliance when notified by EPA that the plan does comply.
- Include additional or modified BMPs that correct problems identified as a result of an inspection. Revisions must be completed within seven (7) calendar days following the inspection.
- Ensure the effectiveness of the SWPPP in eliminating or significantly minimizing pollutants from stormwater discharges from the site.
- Prevent the reoccurrence of release of a hazardous material or oil.
- Address a change in design, construction, operation, or maintenance which has or may have a significant effect on the potential for the discharge of pollutants.

All modifications to the SWPPP must be recorded on the SWPPP Amendment Log included in the SWPPP Appendix.

Stockpiling

All materials to be stockpiled on site shall be stockpiled so as to prevent erosion of materials.

Training

Training sessions must be provided by the Contractor for construction personnel. The training will review specific BMPs used in the work area as well as reporting and response measures that may be needed by either construction personnel and/or inspectors to implement the SWPPP. Additionally, appropriate construction personnel will be trained in the operation and maintenance of equipment to prevent the discharge of oil/hazmat and spill response procedures. Training sessions will highlight known spills or releases and recently developed precautionary measures. The Training Log shall be kept up to date by the Contractor.

Neponset View Terrace Walpole, MA Report No. ____

Stormwater Construction Site Inspection Report

General Information			
Project Name	Roadway, Parking Lot, & Sidewalk Replacement		
NPDES Tracking No.	MAR10????	**Location**	Neponset View Terrace, Walpole, MA
Date of Inspection		**Time Start/End**	
Inspector's Name(s) & Title			
Inspector's Company			
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

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
	Hay Bales / Silt Fence	❑Yes ❑No	❑Yes ❑No	
	Catch Basin Protection	❑Yes ❑No	❑Yes ❑No	
	Interior Site Erosion Controls	❑Yes ❑No	❑Yes ❑No	
	Temporary Check Dams	❑Yes ❑No	❑Yes ❑No	
	Diversion Channels	❑Yes ❑No	❑Yes ❑No	
	Temporary Sediment Basins	❑Yes ❑No	❑Yes ❑No	
	Stabilized Construction Entrance	❑Yes ❑No	❑Yes ❑No	
	Street Sweeping / Construction Access	❑Yes ❑No	❑Yes ❑No	
	Temp. and Permanent Slope Stabilization	❑Yes ❑No	❑Yes ❑No	
	Dust Control	❑Yes ❑No	❑Yes ❑No	

N/A – Not Applicable

Overall Site Issues

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
	Are all slopes and disturbed areas not actively being worked properly stabilized?	❑Yes ❑No	❑Yes ❑No	
	Are natural resource areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs	❑Yes ❑No	❑Yes ❑No	
	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
	Are discharge points and receiving waters free of any sediment deposits?	❑Yes ❑No	❑Yes ❑No	
	Are storm drain inlets properly protected?	❑Yes ❑No	❑Yes ❑No	
	Is the construction exit preventing sediment from being tracked into the street?	❑Yes ❑No	❑Yes ❑No	
	Is trash/litter from work areas collected and placed in covered dumpsters?	❑Yes ❑No	❑Yes ❑No	
	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	❑Yes ❑No	❑Yes ❑No	
	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	❑Yes ❑No	❑Yes ❑No	
	Are materials that are potential stormwater contaminants stored inside or under cover?	❑Yes ❑No	❑Yes ❑No	
	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	❑Yes ❑No	❑Yes ❑No	
	(Other)	❑Yes ❑No	❑Yes ❑No	

In the event of a spill refer to the Spill Response Procedure and contact appropriate agencies. Refer to SWPPP for Spill Prevention Plan and Response Procedures.

Are sediment / pollution discharges from the site present?
☐ No ☐ Yes If yes, describe: _____

_____

_____

Describe any corrective action at this time: _____

_____

_____

_____

_____

Non-Compliance

Describe any incidents of non-compliance not described above:

_____

_____

_____

_____

_____

_____

General Comments (Attached figures to show locations of concern):

_____

_____

_____

Are Additional Erosion Control Measures Needed?

☐ No ☐ Yes If yes, describe: _____

_____

Notes:_____

_____

_____

_____

_____

_____

_____

_____

_____

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: _____

Signature: _____

Date: _____

**** A copy of this report should be placed in the Monitoring Section of the Stormwater Pollution Prevention Plan.**

Corrective Action Log

Project Name:
SWPPP Contact:

Inspection Date	Inspector Name(s)	Description of BMP Deficiency	Corrective Action Needed (including planned date/responsible person)	Date Action Taken/ Responsible person

SWPPP Amendment Log

Project Name:
SWPPP Contact:

Amendment No.	Description of the Amendment	Date of Amendment	Amendment Prepared by [Name(s) and Title]

Subcontractor Certifications/Agreements

SUBCONTRACTOR CERTIFICATION
STORMWATER POLLUTION PREVENTION PLAN

Project Number: _____

Project Title: _____

Operator(s): _____

As a subcontractor, you are required to comply with the Stormwater Pollution Prevention Plan (SWPPP) for any work that you perform on-site. Any person or group who violates any condition of the SWPPP may be subject to substantial penalties or loss of contract. You are encouraged to advise each of your employees working on this project of the requirements of the SWPPP. A copy of the SWPPP is available for your review at the office trailer.

Each subcontractor engaged in activities at the construction site that could impact stormwater must be identified and sign the following certification statement:

I certify under the penalty of law that I have read and understand the terms and conditions of the SWPPP for the above designated project and agree to follow the BMPs and practices described in the SWPPP.

This certification is hereby signed in reference to the above named project:

Company: _____

Address: _____

Telephone Number: _____

Type of construction service to be provided: _____

_____

_____

Signature: _____

Title: _____ Date: _____

Grading and Stabilization Activities Log

Project Name:
SWPPP Contact:

Date Grading Activity Initiated	Description of Grading Activity	Date Grading Activity Ceased (Indicate Temporary or Permanent)	Date When Stabilization Measures are Initiated	Description of Stabilization Measure and Location

SWPPP Training Log

Stormwater Pollution Prevention Training Log

Project Name:

Project Location:

Instructor's Name(s):

Instructor's Title(s):

Course Location: _____ Date: _____

Course Length (hours): _____

Stormwater Training Topic: *(check as appropriate)*

- ❑ **Erosion Control BMPs**
- ❑ **Emergency Procedures**
- ❑ **Sediment Control BMPs**
- ❑ **Good Housekeeping BMPs**
- ❑ **Non-Stormwater BMPs**

Specific Training Objective:_____

_____

Attendee Roster: *(attach additional pages as necessary)*

No.	Name of Attendee	Company
1		
2		
3		
4		
5		
6		
7		
8		
9		

Delegation of Authority Form

Delegation of Authority

I, _____ (name), hereby designate the person or specifically described position below to be a duly authorized representative for the purpose of overseeing compliance with environmental requirements, including the Construction General Permit, at the _____ construction site. The designee is authorized to sign any reports, stormwater pollution prevention plans and all other documents required by the permit.

_____ (name of person or position)
_____ (company)
_____ (address)
_____ (city, state, zip)
_____ (phone)

By signing this authorization, I confirm that I meet the requirements to make such a designation as set forth in _____ (Reference State Permit), and that the designee above meets the definition of a "duly authorized representative" as set forth in _____ (Reference State Permit).

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.

Name: _____

Company: _____

Title: _____

Signature: _____

Date: _____

Standard 9: Long Term Operation and Maintenance Plan

An Operation and Maintenance Plan is summarized below and will be incorporated into the construction documents for this project.

In accordance with the Stormwater Management Policy issued by the Department of Environmental Protection (DEP), Waterfield Design Group, Inc. has prepared the following Operation and Maintenance Plan for the proposed project. This plan is broken into two major sections. The first section describes construction-related controls and practices. The second section is devoted to the post-construction operation and maintenance plan.

Basic Information

Developer: Responsible for operation and maintenance, financing maintenance and emergency repairs.

Developer:	Walpole Housing Authority
Contact:	Ms. Monique Bergeron
Address:	8 Diamond Pond Terrace
City:	Walpole, MA 02081
Tel:	508-678-7878

Owner:	Walpole Housing Authority
Address:	8 Diamond Pond Terrace
City:	Walpole, MA 02081

Good Housekeeping BMP's (Construction and Post Construction Periods)

The following good housekeeping practices will be followed onsite during and after the construction project:

- An effort will be made to store only enough product required to do the job. All materials stored onsite will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure
- Products will be kept in their original containers with the original manufacturer's label.
- Substances will not be mixed with one another unless recommended by the manufacture.
- Whenever possible, all of a product will be used up before disposing of the container.
- Manufacturer's recommendations for proper use and disposal will be followed.
- The site superintendent will inspect daily to ensure proper use and disposal of materials.

CONSTRUCTION PERIOD

Material Handling And Waste Management

Hazardous Products:

These practices will be used to reduce the risks associated with hazardous materials. Material Safety Data Sheets (MSDSs) for each substance with hazardous properties that is used on the job site will be obtained and used for the proper management of potential wastes that may result from these products. An MSDS will be posted in the immediate area where such product is stored and/or used and another copy of each MSDS will be maintained in the SWPPP file at the job site construction trailer

office. Each employee who must handle a substance with hazardous properties will be instructed on the use of MSDS sheets and the specific information in the applicable MSDS for the product they are using, particularly regarding spill control techniques.

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

Hazardous Waste

All hazardous waste material will be disposed of by the Contractor in the manner specified by local, state, and/or federal regulations and by the manufacturer of such products. Site personnel will be instructed in these practices by the job site superintendent, who will also be responsible for seeing that these practices are followed.

Solid and Construction Wastes

All waste materials will be collected and stored in accordance with state and federal law in an appropriately covered container and/or securely lidded metal dumpster.

All trash and construction debris from the site will be deposited in the dumpster. No construction waste materials will be buried on site. All personnel will be instructed regarding the correct procedures for waste disposal.

All waste dumpsters and roll-off containers will be located in an area where the likelihood of the containers contributing to storm water discharges is negligible. If required, additional BMPs must be implemented, such as sandbags around the base, to prevent waste from contributing to storm water discharges.

Sanitary Wastes

All sanitary waste will be collected from the portable units a minimum of three times per week by a licensed portable facility provider in complete compliance with local and state regulations.

All sanitary waste units will be located in an area where the likelihood of the unit contributing to storm water discharges is negligible. If required, additional BMP’s must be implemented, such as sandbags around the base, to prevent waste from contributing to storm water discharges.

Washout Areas

The Contractor will provide wheel wash stations and concrete washout areas at the site as described below.

Wheel Wash Stations

The Contractor will provide wheel wash stations adjacent to the construction entrance which lead directly to a public way or portions of the site outside the limits of work.

Concrete Washout

Trucks will be allowed to washout or discharge surplus concrete or drum wash water on the site, but only in specifically

designated diked and impervious washout areas which have been prepared to prevent contact between the concrete wash and stormwater. Waste generated from concrete wash water shall not be allowed to flow into drainage ways, inlets, receiving waters or highway right of ways, or any location other than the designated concrete washout. Waste concrete may be poured into forms to make riprap or other useful concrete products. Proper signage designating the "concrete washout" shall be placed near the facility.

The hardened residue from the concrete washout diked areas will be disposed of in the same manner as other non-hazardous construction waste materials or may be broken up and used on site as deemed appropriate by the Contractor. Maintenance of the washout includes removal of hardened concrete. The facility shall have sufficient volume to contain all the concrete waste resulting from washout and a minimum freeboard of 1 foot. Facility shall not be filled beyond 95% capacity and shall be cleaned out once 75% full unless a new facility is constructed.

Vehicle and Equipment Fueling

Areas will be designated on site to refuel or maintain equipment used on site. Equipment fuel storage and refueling operations will be in an upland area at a horizontal distance greater than 100 feet from the boundaries of the river. The fueling areas will include secondary containment. The fueling areas will be inspected and cleaned weekly.

Spill Prevention and Control Plan

The Contractor will train all personnel in the proper handling and cleanup of spilled materials. No spilled hazardous materials or hazardous wastes will be allowed to come in contact with storm water discharges. If such contact occurs, the storm water discharge will be contained on site until appropriate measures in compliance with state and federal regulations are taken to dispose of such contaminated storm water. It shall be the responsibility of the job site superintendent to properly train all personnel in spill prevention and clean up procedures.

In order to minimize the potential for a spill of hazardous materials to come into contact with storm water, the following steps will be implemented:

1. All materials with hazardous properties (such as pesticides, petroleum products, fertilizers, detergents, construction chemicals, acids, paints, paint solvents, cleaning solvents, additives for soil stabilization, concrete curing compounds and additives, etc.) will be stored in a secure location, with their lids on, preferably under cover, when not in use.

2. During construction, liquid petroleum products and other hazardous materials with the potential to contaminate groundwater may not be stored or handled in areas of the site draining to an infiltration area, an "infiltration area" is any area of the site that by design or as a result of soils, topography and other relevant factors accumulates runoff that infiltrates into the soil. Dikes, berms, sumps, and other forms of secondary containment that prevent discharge to groundwater may be used to isolate portions of the site for the purposes of storage and handling of these materials.

3. The minimum practical quantity of all such materials will be kept on the job site at all times.

4. A spill control and containment kit (containing, for example, absorbent materials, acid neutralizing powder, brooms, dust pans, mops, rags, gloves, goggles, plastic and metal trash containers, etc.) will be provided at the storage site. Catch basin inlet cover blankets and inflatable pipe plugs will be used to seal the openings in the outlet control structure and isolate product in the wet pond should a spill occur.

5. Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be trained regarding these procedures and the location of the information and cleanup supplies.

In the event of a spill, the following procedures should be followed:

1. All spills will be cleaned up immediately after discovery.

2. The spill area will be kept well ventilated, and personnel will wear appropriate protective clothing to prevent injury from contact with the hazardous substances.

3. The project manager and the Engineer of Record will be notified immediately.

4. Spills of toxic or hazardous materials will be reported to the appropriate federal, state, and/or local government agency, regardless of the size of the spill.

5. If the spill exceeds a Reportable Quantity, the SWPPP must be modified within seven (7) calendar days of knowledge of the discharge to provide a description of the release, the circumstances leading to the release, and the date of the release. The plans must identify measures to prevent the recurrence of such releases and to respond to such releases.

The job site superintendent will be the spill prevention and response coordinator. He will designate the individuals who will receive spill prevention and response training. These individuals will each become responsible for a particular phase of prevention and response. The names of these personnel will be posted in the material storage area and in the office trailer onsite.

In case of a spill the site superintendent will determine if the fire department needs to be called.

Allowable Non-Stormwater Discharge Management

Certain types of discharges are allowed under the NPDES General Permit for Construction Activity, and it is the intent of this SWPPP to allow such discharges. These types of discharges will be allowed under the conditions that no pollutants will be allowed to come into contact with the water prior to or after its discharge. The control measures that have been outlined previously in this SWPPP will be strictly followed to ensure that no contamination of these non-stormwater discharges takes place. The following non-stormwater discharges that may occur from the job site include:

- Discharges from fire-fighting activities
- Fire Hydrant flushings
- Waters used to wash vehicles where detergents are not used.
- Water used to control dust in accordance with off-site vehicle tracking
- Potable water including uncontaminated water line flushings
- Routine external building wash down that does not use detergents.
- Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used.
- Uncontaminated air conditioner compressor condensate
- Uncontaminated ground water or spring water
- Foundation or footing drains where flows are not contaminated with process materials such as solvents.
- Uncontaminated excavation dewatering
- Landscape irrigation

POST CONSTRUCTION PERIOD LONG-TERM POLLUTION PREVENTION PLAN

Post-Construction BMP's for Water Quality

- Good housekeeping practices for long-term pollution prevention are detailed below.
- All material and waste products used for maintaining the site shall be stored inside, outside under cover, or placed in the dumpster if it is being disposed of.
- No post-construction vehicle washing shall occur on site.
- Requirements for routine inspections and maintenance of stormwater BMPs are detailed below.
- Spill prevention and response plans are detailed below.
- Provisions for maintenance of lawns, gardens, and other landscaped areas are detailed below.
- Storage of all fertilizers, herbicides, and pesticides shall follow the material storage requirements listed above. Use of all fertilizers, herbicides, and pesticides is detailed below.
- All pet waste shall be disposed of in the dumpster facilities.
- No septic system is on site.
- Solid waste management shall be relegated to the disposal facilities placed on site. All debris and other waste shall be disposed of in the dumpster. The dumpster shall be emptied at a regularly scheduled time to be determined by the site operator. Special pick-ups shall be made before and after large events to make sure that the dumpster does not overflow.
- Snow disposal and plow plans are detailed below.
- Winter salt and sand use are detailed below.
- Street sweeping schedules are detailed below.
- Provisions for prevention of illicit discharges to the stormwater management system are detailed below.
- Stormwater BMPs are not near a critical area or an LUHPPL. If a spill occurs that directs contaminants to the catch basin entry points on site. Those spills shall be contained by closing the flap gates at the outfalls.
- Training of staff involved with implementing the Long-Term Pollution Prevention Plan is detailed below.
- List of Emergency contacts responsible for implementing the Long-Term Pollution Prevention Plan are listed above in the Basic Information section.

Several types of structural and non-structural water quality controls in various combinations are proposed to treat stormwater generated on the site. These measures include deep sump catch basins with hoods and stormwater treatment units. These Water quality treatment measures will result in the removal of total suspended solids (TSS) load in runoff prior to discharge from the site, consistent with DEP's TSS removal standard.

The following best management practices are specified in the proposed development program to mitigate the increase in stormwater runoff from the site.

BMPs Used

- Deep Sump Catch Basins
- Stormwater Treatment Units
- Underground Stormwater Infiltration Chambers

Post-Development Activities

1. Paved Areas: Paved Areas shall be mechanically swept during the dry weather to remove excess sediments, thereby reducing the amount of sediments that the drainage system will have to remove from the runoff. Paved areas shall be mechanically swept a minimum of twice each year (in the spring (March/April) and in the fall (November/December)).

2. Catch Basins: Catch basins shall be inspected at least four times/year and at the end of the snowfall and foliage seasons to verify that the inlet openings are not clogged by debris. Debris shall be removed from the grates and disposed of properly. The catch basin sumps shall also be inspected and cleaned at the same times and whenever the depth of the sediment is 50% or more of the sump depth the collected sediment and debris shall be removed. Material shall be removed from catch basins and disposed of in accordance with all applicable regulations.

3. The Contech TSS removal units shall be cleaned and inspected at least four times/year and at the end of the snowfall and foliage seasons for the first year and twice per year thereafter if the silt and sediment trap does not require cleaning in six months. Cleaning shall be in strict conformance with the manufacturer's recommendations, which are attached to and made part of this Long Term Operation and Maintenance Plan.

4. The underground infiltration chambers and the inlet/outlet pipes shall be inspected a minimum of twice/year for signs of accumulated water or debris. Implement appropriate corrective action if any issues are discovered during the inspection. Cleaning shall be in strict conformance with the manufacturer's recommendations, which are attached to and made part of this Long Term Operation and Maintenance Plan.

5. All sediments removed from the site drainage facilities shall be disposed of properly and in accordance with all applicable local and state regulations.

6. All vegetated slope areas on the site shall be stabilized following completion of construction and maintained to control erosion. Any disturbed areas shall be re-seeded and stabilized by the application of jute mesh if the slope exceeds 3 feet horizontal to 1 foot vertical.

7. Snow storage at the site will be managed to prevent blockage of storm drain catch basins and other elements of the storm drainage system.

8. Snow shall not be dumped into any waterbody, pond, wetland resource area, wet basin or detention basin.

9. Sand and debris deposited on vegetated and paved areas at the site shall be cleared from the site and disposed of at the end of the snow season, no later than May 15.

10. Snow should be trucked off-site to an approved disposal area operated in accordance with MADEP Snow Management Standards when there is insufficient space for snow storage at the site.

11. All contracts for snow plowing and removal at the site shall include items 7 through 10 above.

All structural BMP's and maintenance responsibilities as identified on the site plans and within this document will be owned and maintained by the owner of the property and shall run with the title of the property.

Annual Reporting Form

The Owner shall keep complete records of all BMP maintenance activities using the following form which will be submitted annually to the Walpole Conservation Commission as part of the Order of Conditions:

OPERATION AND MAINTENANCE PLAN

Project: Neponset View Terrace
Location: Walpole, MA

Date: February 2024

Structure or Task	Inspection Schedule	Inspection Performed		Method	Notes/Remarks
		Date	By:		
Street Sweeping	April / May			Power broom or vacuum walks and pavement	
Catch Basins	March			Clam shell or vacuum sumps	Clean when sediment is 12" deep
	June				
	September				
	December				
Contech Units	March			Clam shell or vacuum sumps	Reduce to bi-annual inspections after first year of operations
	June				
	September				
	December				
Underground Storage Chambers	April / May			Inspect maintenance ports	Remove accumulated debris and silt
	Sept. / Oct.				

Party responsible for O & M Plan:

Name Walpole Housing Authority
Address 8 Diamond Pond Terrace
Contact Monique Bergeron
Phone (508) 678-7878

NOTE: This form must be submitted to the Walpole Conservation Commission yearly by May 1st.

Annual Operating Budget

The estimated annual operating budget for the O & M Plan is $5,000±.

Plan of BMP's

Reference is made to the Proposed Utility Plan for the location of all BMP's.

Inspections

A log of inspection results will be maintained on-site and will include the name of the inspector, date, major observations, and necessary corrective measures.

Necessary minor modification to the site will be implemented within two (2) days of inspection.

This manual will be modified within seven days to reflect any modifications to measures as a result of inspection.

A report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the Manual, and actions taken will be made and retained as part of the Manual for at least three years after the date of the inspection.

Training

Training sessions must be provided by the Owner for property managers and operations personnel. The Training Log shall be kept up to date by the Owner.

Updating the Long Term Operations and Maintenance Plan

This Plan must be modified as necessary to:

- Include additional or modified BMPs that correct problems identified as a result of an inspection. Revisions must be completed with seven (7) calendar days following the inspection.
- Ensure the effectiveness of the Plan in eliminating or significantly minimizing pollutants from stormwater and flood waters discharging from the site.
- Prevent the reoccurrence of release of a hazardous material or oil.
- Address a change in design, construction, operation, or maintenance which has or may have a significant effect on the potential for the discharge of pollutants.

All modifications to the Plan must be recorded on the Plan Amendment Log included in the Appendix.

Owner/Developer shall notify the Conservation Commission in writing of change in ownership or assignment of financial responsibility.

Standard 10: Prohibition of Illicit Discharges

As provided for in the 2008 MADEP Stormwater Handbook and the 2008 amendments to 310 CMR 10.00 et. seq. (MAWPA Regs) the following will serve as the Illicit Discharge Compliance Statement for the project.

The existing developed site has no existing illicit discharges from the site. The new site is being designed such that there will not be any illicit discharges from the site.

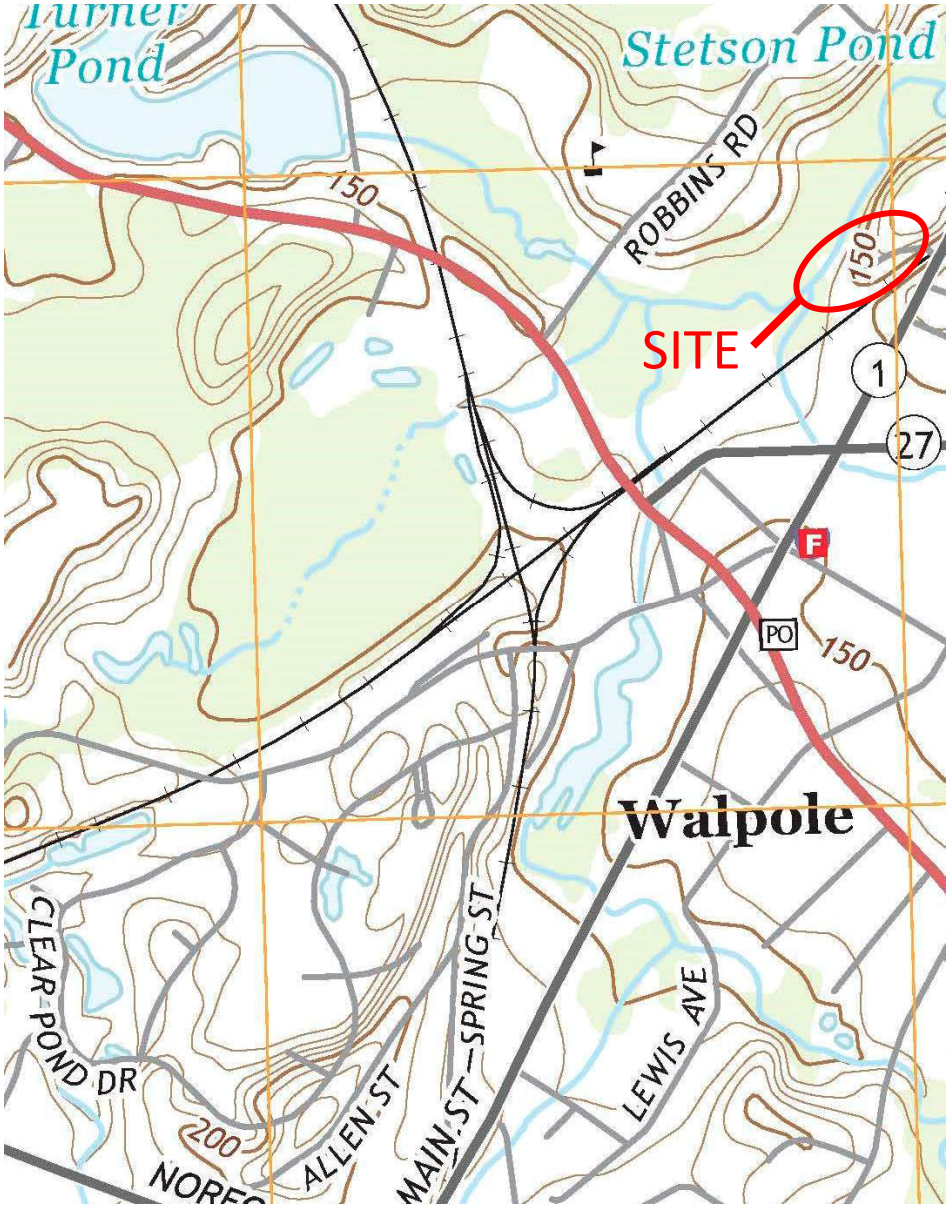
Conclusion

As demonstrated in this report, the construction of the proposed redevelopment project will meet the requirements of the 2008 MADEP Stormwater Handbook and the 2008 amendments to 310 CMR 10.00 et. seq. (MAWPA Regs) MADEP Stormwater Guidelines and the Town of Walpole Stormwater Management and Erosion Control Bylaw except where the proposed redevelopment site meets the regulations to the maximum extent practical where noted above.

LOCUS MAP &
NRCS SOIL MAP
SOIL LOGS

Regional Locus

Neponset View Terrace, Walpole, MA



United States Department of Agriculture

NRCS

Natural Resources Conservation Service

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

Custom Soil Resource Report for Norfolk and Suffolk Counties, Massachusetts

December 20, 2023

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:3,360 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 45 90 180 270

Feet: 0 150 300 600 900

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 Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 19, Sep 10, 2023

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

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Water	0.0	0.0%
51	Swansea muck, 0 to 1 percent slopes	0.4	1.2%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	1.2	3.2%
602	Urban land, 0 to 15 percent slopes	17.1	46.9%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	5.8	15.9%
628C	Canton-Urban land complex, 3 to 15 percent slopes	12.0	32.8%
Totals for Area of Interest		**36.5**	**100.0%**

Map Unit Descriptions

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

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

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

was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

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

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

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

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

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

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

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

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

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

Norfolk and Suffolk Counties, Massachusetts

1—Water

Map Unit Setting

National map unit symbol: vkyp
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 120 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

51—Swansea muck, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2trl2
Elevation: 0 to 1,140 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Swansea and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Swansea

Setting

Landform: Bogs, swamps
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Highly decomposed organic material over loose sandy and gravelly glaciofluvial deposits

Typical profile

Oa1 - 0 to 24 inches: muck
Oa2 - 24 to 34 inches: muck
Cg - 34 to 79 inches: coarse sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)

Depth to water table: About 0 to 6 inches
Frequency of flooding: Rare
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Very high (about 16.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: B/D
Ecological site: F144AY043MA - Acidic Organic Wetlands
Hydric soil rating: Yes

Minor Components

Freetown

Percent of map unit: 10 percent
Landform: Bogs, swamps
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Whitman

Percent of map unit: 5 percent
Landform: Drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Scarboro

Percent of map unit: 5 percent
Landform: Drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

254B—Merrimac fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyqs
Elevation: 0 to 1,290 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Merrimac and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Kames, outwash plains, outwash terraces, moraines, eskers
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Crest, side slope, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F145XY008MA - Dry Outwash
Hydric soil rating: No

Minor Components

Sudbury

Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Crest, side slope, head slope, nose slope, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Windsor

Percent of map unit: 3 percent
Landform: Outwash terraces, dunes, deltas, outwash plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Agawam

Percent of map unit: 2 percent
Landform: Outwash plains, outwash terraces, moraines, stream terraces, eskers, kames
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

602—Urban land, 0 to 15 percent slopes

Map Unit Setting

National map unit symbol: vkyj
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 120 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 99 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Parent material: Excavated and filled land

Minor Components

Rock outcrops
Percent of map unit: 1 percent
Hydric soil rating: Unranked

626B—Merrimac-Urban land complex, 0 to 8 percent slopes

Map Unit Setting
National map unit symbol: 2tyr9
Elevation: 0 to 820 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition
Merrimac and similar soils: 45 percent
Urban land: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting
Landform: Outwash plains, outwash terraces, moraines, eskers, kames
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Crest, side slope, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile
Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities
Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Description of Urban Land

Typical profile

M - 0 to 10 inches: cemented material

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 0 inches to manufactured layer
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Sudbury

Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Crest, side slope, head slope, nose slope, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Windsor

Percent of map unit: 5 percent
Landform: Outwash terraces, dunes, outwash plains, deltas
Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex

Hydric soil rating: No

628C—Canton-Urban land complex, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: vktb
Elevation: 0 to 1,000 feet
Mean annual precipitation: 32 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 120 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Canton and similar soils: 70 percent
Urban land: 20 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton

Setting

Landform: Ice-contact slopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Friable coarse-loamy eolian deposits over loose sandy and gravelly ablation till

Typical profile

H1 - 0 to 3 inches: fine sandy loam
H2 - 3 to 18 inches: fine sandy loam
H3 - 18 to 60 inches: gravelly loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 18 to 36 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: A
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Urban Land

Setting

Parent material: Excavated and filled land

Minor Components

Montauk

Percent of map unit: 4 percent
Hydric soil rating: No

Udorthents

Percent of map unit: 2 percent
Hydric soil rating: Unranked

Charlton

Percent of map unit: 2 percent
Hydric soil rating: No

Scituate

Percent of map unit: 2 percent
Hydric soil rating: No

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Commonwealth of Massachusetts
City/Town of Sturbridge

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: TP-1

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-12”	Ap	2.5Y3/2				Fine Sandy Loam	5%				
12-27”	C1	2.5Y5/3				Gravelly Sandy Loam	10%				
27-52”	C2	2.5Y5/4				Sandy Loam					
52-110”	C3	2.5Y6/4				Sand					

Additional Notes:

C3 does not form a cast. No refusal. Sides collapsing at 110”. Not mottles, standing, or weeping water.

Commonwealth of Massachusetts
City/Town of Sturbridge
Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: TP-2

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-12”	Af	10YR3/2				Fine Sandy Loam					
12”-26”	Fill	2.5Y4/3				Gravelly, Sandy Loam	10%				
26”-30”	B	10YR5/6				Sandy Loam					
30-58”	C1	2.5Y5/4				Sandy Loam					
58-101”	C2	2.5Y5/3				Loamy Sand					

Additional Notes:

Large rock at 101”. No refusal. Not mottles, standing, or weeping water.

Commonwealth of Massachusetts
City/Town of Sturbridge

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: TP-3

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-10”	Af	10YR3/2				Fine Sandy Loam					
10-49”	Fill	2.5Y5/3				Gravelly Sandy Loam	10%				
49-55”	Ab	10YR3/2				Fine Sandy Loam					Roots at 55”
55-65”	Bb	10YR5/6				Sandy Loam					
65-103”	C1	2.5Y6/4				Cobbly, Gravelly, Loamy Sand	10%	10%			

Additional Notes:

No mottles, standing, or weeping water. Wall collapsing at 103”.

Commonwealth of Massachusetts
City/Town of Sturbridge
Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: TP-4

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-10”	A	2.5Y3/2				Fine Sandy Loam					
10”-26”	B	10YR5/6				Sandy Loam	5%				
26-44”	C1	2.5Y6/4				Loamy Sand					
44-52”	C2	2.5Y5/4				Sandy Loam					
52-104”	C3	2.5Y5/3				Coarse Gravelly Sand	10%				

Additional Notes:

No mottles, standing, or weeping water. No refusal. Walls collapsing at 104”.

TSS CALCULATIONS
CONTECH CALCULATIONS
CONTECH DATA

INSTRUCTIONS:

Non-automated: Mar. 4, 2008

1. Sheet is nonautomated. Print sheet and complete using hand calculations. Column A and B: See MassDEP Structural BMP Table
2. The calculations must be completed using the Column Headings specified in Chart and Not the Excel Column Headings
3. To complete Chart Column D, multiple Column B value within Row x Column C value within Row
4. To complete Chart Column E value, subtract Column D value within Row from Column C within Row
5. Total TSS Removal = Sum All Values in Column D

Location: PS #1 Pretreatment

TSS Removal Calculation Worksheet

A BMP[1]	B TSS Removal Rate[1]	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
Deep Sump Catch Basin	25%	1.00	0.25	0.75
CDS Unit	80%	0.75	0.60	0.15

Total TSS Removal = 85%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: WHANEconset View

Prepared By: JRM

Date: 1/18/24

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed

1. From MassDEP Stormwater Handbook Vol. 1

INSTRUCTIONS:

Non-automated: Mar. 4, 2008

1. Sheet is nonautomated. Print sheet and complete using hand calculations. Column A and B: See MassDEP Structural BMP Table
2. The calculations must be completed using the Column Headings specified in Chart and Not the Excel Column Headings
3. To complete Chart Column D, multiple Column B value within Row x Column C value within Row
4. To complete Chart Column E value, subtract Column D value within Row from Column C within Row
5. Total TSS Removal = Sum All Values in Column D

Location: PS #2 Pretreatment

TSS Removal Calculation Worksheet

A BMP[1]	B TSS Removal Rate[1]	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
Deep Sump Catch Basin	25%	1.00	0.25	0.75
CDS Unit	80%	0.75	0.60	0.15

Total TSS Removal = 85%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: WHA Pleasant View

Prepared By: JRM

Date: 1/18/24

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed

1. From MassDEP Stormwater Handbook Vol. 1

INSTRUCTIONS:

Non-automated: Mar. 4, 2008

1. Sheet is nonautomated. Print sheet and complete using hand calculations. Column A and B: See MassDEP Structural BMP Table
2. The calculations must be completed using the Column Headings specified in Chart and Not the Excel Column Headings
3. To complete Chart Column D, multiple Column B value within Row x Column C value within Row
4. To complete Chart Column E value, subtract Column D value within Row from Column C within Row
5. Total TSS Removal = Sum All Values in Column D

Location: Underground Storage #1

TSS Removal Calculation Worksheet

A BMP[1]	B TSS Removal Rate[1]	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
SC-740	80%	1.00	0.80	0.20

Total TSS Removal = 80%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: WTA Neponset View

Prepared By: JRM

Date: 1/18/24

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed

1. From MassDEP Stormwater Handbook Vol. 1

INSTRUCTIONS:

Non-automated: Mar. 4, 2008

1. Sheet is nonautomated. Print sheet and complete using hand calculations. Column A and B: See MassDEP Structural BMP Table
2. The calculations must be completed using the Column Headings specified in Chart and Not the Excel Column Headings
3. To complete Chart Column D, multiple Column B value within Row x Column C value within Row
4. To complete Chart Column E value, subtract Column D value within Row from Column C within Row
5. Total TSS Removal = Sum All Values in Column D

Location: Underground Storage #2

TSS Removal Calculation Worksheet

A BMP[1]	B TSS Removal Rate[1]	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
SC-740	80%	1.00	0.80	0.20

Total TSS Removal = 80%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: WHA Neponset View

Prepared By: JRM

Date: 1/18/24

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed

1. From MassDEP Stormwater Handbook Vol. 1

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD

NEPONSET VIEW TERRACE
WALPOLE, MA

Area	**0.10 ac**	Unit Site Designation	**PS #1**
Weighted C	**0.9**	Rainfall Station #	**68**
t_c	**6 min**		
CDS Model	**1515-3**	CDS Treatment Capacity	**1.0 cfs**

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.02	9.3%	9.3%	0.00	0.00	9.1
0.04	9.5%	18.8%	0.00	0.00	9.2
0.06	8.7%	27.5%	0.01	0.01	8.4
0.08	10.1%	37.6%	0.01	0.01	9.8
0.10	7.2%	44.8%	0.01	0.01	6.9
0.12	6.0%	50.8%	0.01	0.01	5.8
0.14	6.3%	57.1%	0.01	0.01	6.1
0.16	5.6%	62.7%	0.01	0.01	5.4
0.18	4.7%	67.4%	0.02	0.02	4.5
0.20	3.6%	71.0%	0.02	0.02	3.5
0.25	8.2%	79.1%	0.02	0.02	7.8
0.50	14.9%	94.0%	0.04	0.04	14.1
0.75	3.2%	97.3%	0.07	0.07	3.0
1.00	1.2%	98.5%	0.09	0.09	1.1
1.50	0.7%	99.2%	0.13	0.13	0.6
2.00	0.8%	100.0%	0.17	0.17	0.7
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
					95.9
				Removal Efficiency Adjustment[2] =	6.5%
				Predicted % Annual Rainfall Treated =	93.5%
				Predicted Net Annual Load Removal Efficiency =	**89.4%**

1 - Based on 10 years of rainfall data from NCDC station 736, Blue Hill, Norfolk County, MA
2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

CONTECH ENGINEERED SOLUTIONS

CDS TECHNOLOGIES

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD

NEPONSET VIEW TERRACE
WALPOLE, MA

Area	0.06 ac	Unit Site Designation	PS #2
Weighted C	0.9	Rainfall Station #	68
t_c	6 min		
CDS Model	1515-3	CDS Treatment Capacity	**1.0 cfs**

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.02	9.3%	9.3%	0.00	0.00	9.1
0.04	9.5%	18.8%	0.00	0.00	9.2
0.06	8.7%	27.5%	0.00	0.00	8.5
0.08	10.1%	37.6%	0.00	0.00	9.8
0.10	7.2%	44.8%	0.01	0.01	6.9
0.12	6.0%	50.8%	0.01	0.01	5.8
0.14	6.3%	57.1%	0.01	0.01	6.1
0.16	5.6%	62.7%	0.01	0.01	5.4
0.18	4.7%	67.4%	0.01	0.01	4.5
0.20	3.6%	71.0%	0.01	0.01	3.5
0.25	8.2%	79.1%	0.01	0.01	7.9
0.50	14.9%	94.0%	0.03	0.03	14.2
0.75	3.2%	97.3%	0.04	0.04	3.0
1.00	1.2%	98.5%	0.05	0.05	1.2
1.50	0.7%	99.2%	0.08	0.08	0.7
2.00	0.8%	100.0%	0.11	0.11	0.7
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
					96.4
				Removal Efficiency Adjustment[2] =	6.5%
				Predicted % Annual Rainfall Treated =	93.5%
				Predicted Net Annual Load Removal Efficiency =	**89.9%**

1 - Based on 10 years of rainfall data from NCDC station 736, Blue Hill, Norfolk County, MA
2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

INFILTRATION DRAWDOWN/WATER QUALITY CALCULATIONS

Project Name:	Neponset View Terrace	Sheet No.:	1
Done by:	JRM	Date:	4/10/2024

Infiltration Calculations

WQV#1: Impervious Area Behind Building #4 with New Pavement= 3,421 SF
(including roof)

WQV#2: Impervious Area in Front of Building #4 with New Pavement = 2,551 SF
(no roof)

Total New Impervious Pavement = 4,482 SF
(less than New Pavement watersheds)

Water Quality Volume (WQV) = 0.5"/12 0.04166667 ft.
(infiltration units are providing treatment - 1/2")

WQV #1 = .042 ft. * 2278 SF 96 cu. ft.

WQV #2 = .042 ft. * 2551 SF 107 cu. ft.

Recharge Rate Hydrologic Group B = 0.35 inches of runoff

Recharge Volume (RV)= 0.35"/12 0.02916667

RV #1 = 0.029 ft. * 2278 SF 66 cu. ft.

RV #2 = 0.029 ft. * 2551 SF 74 cu. ft.

Volume Provided
WQV #1/RV #1 (From HydroCAD 1P) = 751 cu. ft.

WQV #2/RV #2 (From HydroCAD 2P) = 204 cu. ft.

Therefore the infiltration volume is in excess of standard.

44% TSS has been removed prior to infiltation as required.

Time to empty based on Rawls Rate for B Soils:

WQV #1 = 145.36-142.50 = 2.9' = 34.32"

Rate from Table (B Soil) = 1.02 in./hr.

Time to empty = 34.32"/1.02 in./hr. = 33.6 hrs.

33.6 hrs. < 72 hrs.

GWT - ESHGWT = 138.83 (See Soil Logs)

Bottom of Stone = 142.00 > 2 foot seperation provided

WQV #2 = 149.04-145.70 = 3.3' = 40"

Rate from Table (B Soil) = 1.02 in./hr.

Time to empty = 40.08"/1.02 in./hr. = 39.3 hrs.

39.3 hrs. < 72 hrs.

GWT - ESHGWT = 141.83 (See Soil Logs)

Bottom of Stone = 145.70 > 2 foot seperation provided

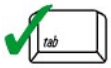
CHECKLIST FOR STORMWATER REPORT

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.

[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.

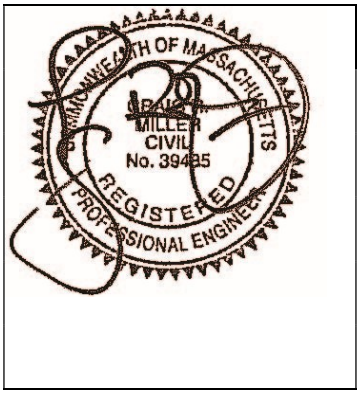
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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



April 10, 2024

Signature and Date

Checklist

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

☐ 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;

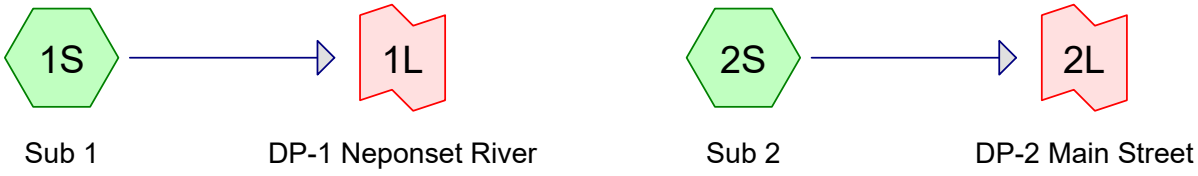
☒ An Illicit Discharge Compliance Statement is attached;

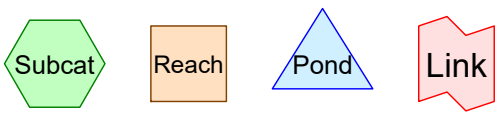
☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

EXISTING CONDITIONS

RUNOFF CALCULATIONS

(2, 10, 25, & 100 YEAR STORMS)





Routing Diagram for Existing Condition
Prepared by Waterfield Design Group, Printed 4/8/2024

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Sub 1 Runoff Area=78,483 sf 62.27% Impervious Runoff Depth>1.68"
Tc=6.0 min CN=84 Runoff=3.48 cfs 0.252 af

Subcatchment 2S: Sub 2 Runoff Area=2,287 sf 95.15% Impervious Runoff Depth>2.75"
Tc=6.0 min CN=96 Runoff=0.15 cfs 0.012 af

Link 1L: DP-1 Neponset River Inflow=3.48 cfs 0.252 af
Primary=3.48 cfs 0.252 af

Link 2L: DP-2 Main Street Inflow=0.15 cfs 0.012 af
Primary=0.15 cfs 0.012 af

Summary for Subcatchment 1S: Sub 1

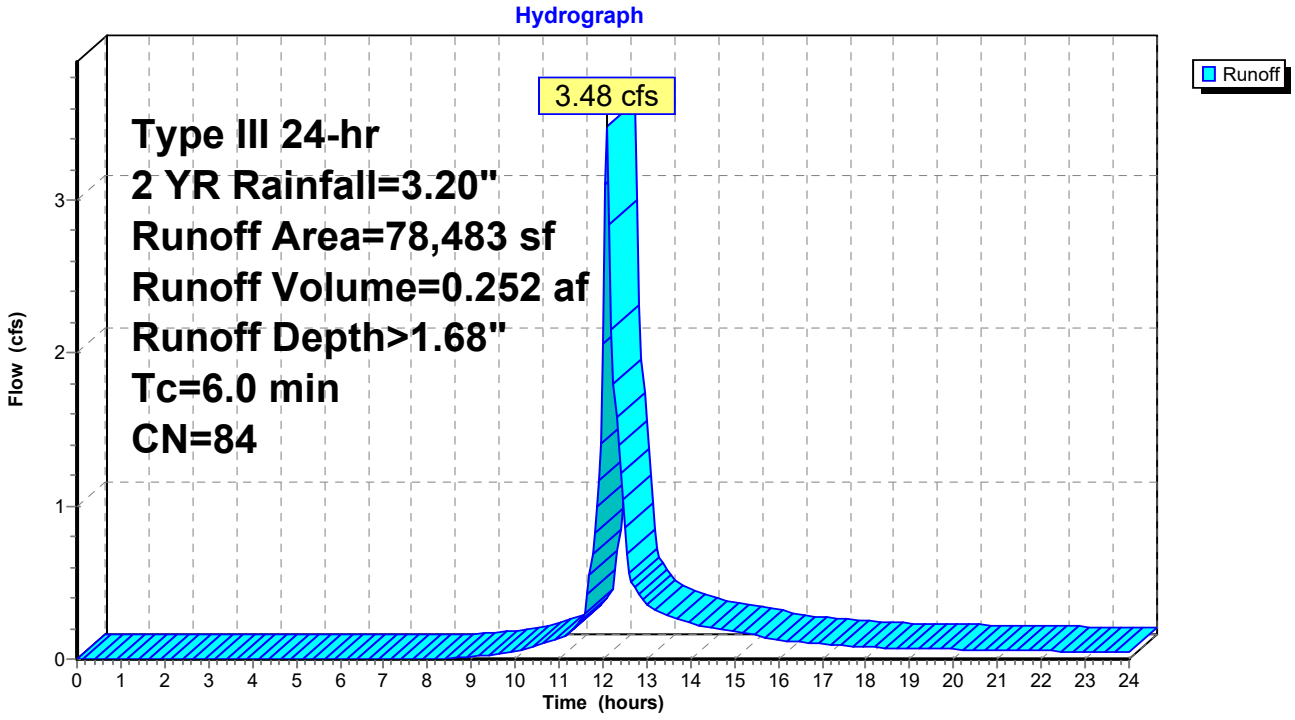
Runoff = 3.48 cfs @ 12.09 hrs, Volume= 0.252 af, Depth> 1.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.20"

Area (sf)	CN	Description
32,132	98	Paved parking, HSG A
16,736	98	Roofs, HSG A
29,615	61	>75% Grass cover, Good, HSG B
78,483	84	Weighted Average
29,615		37.73% Pervious Area
48,868		62.27% Impervious Area

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

Subcatchment 1S: Sub 1



Summary for Subcatchment 2S: Sub 2

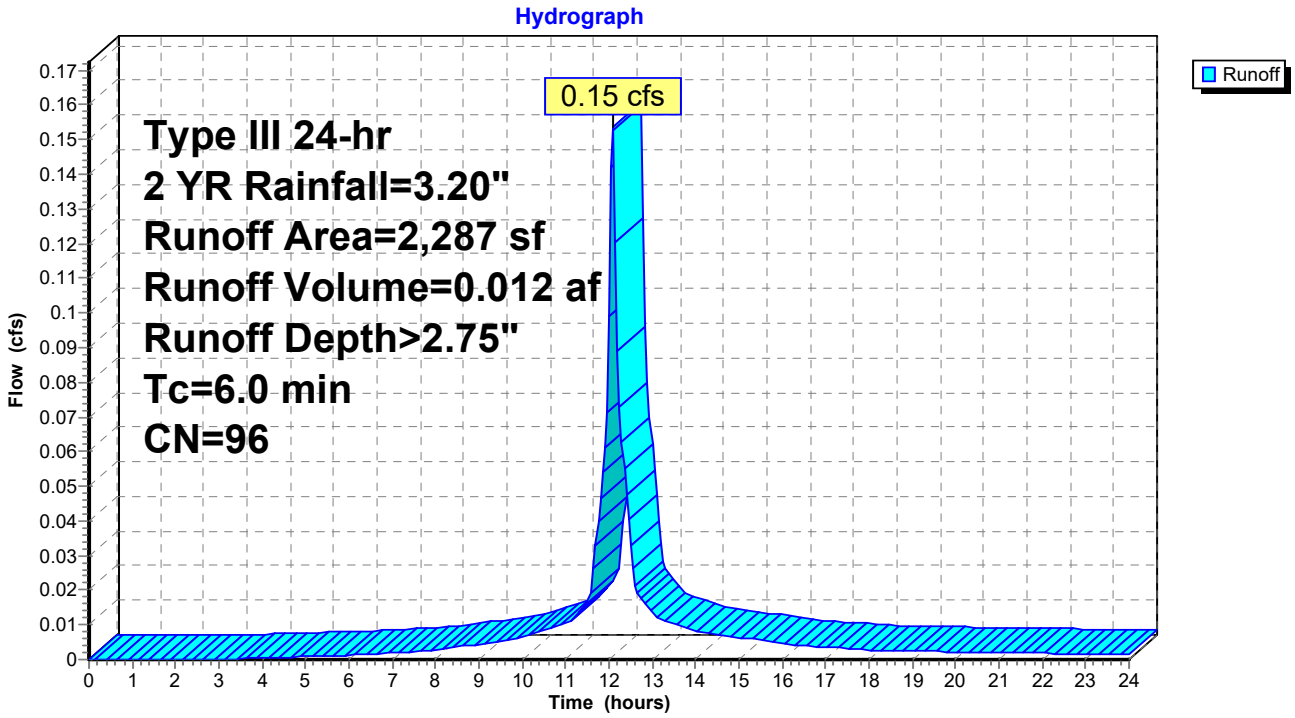
Runoff = 0.15 cfs @ 12.09 hrs, Volume= 0.012 af, Depth> 2.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.20"

Area (sf)	CN	Description
2,176	98	Paved parking, HSG A
111	61	>75% Grass cover, Good, HSG B
2,287	96	Weighted Average
111		4.85% Pervious Area
2,176		95.15% Impervious Area

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

Subcatchment 2S: Sub 2

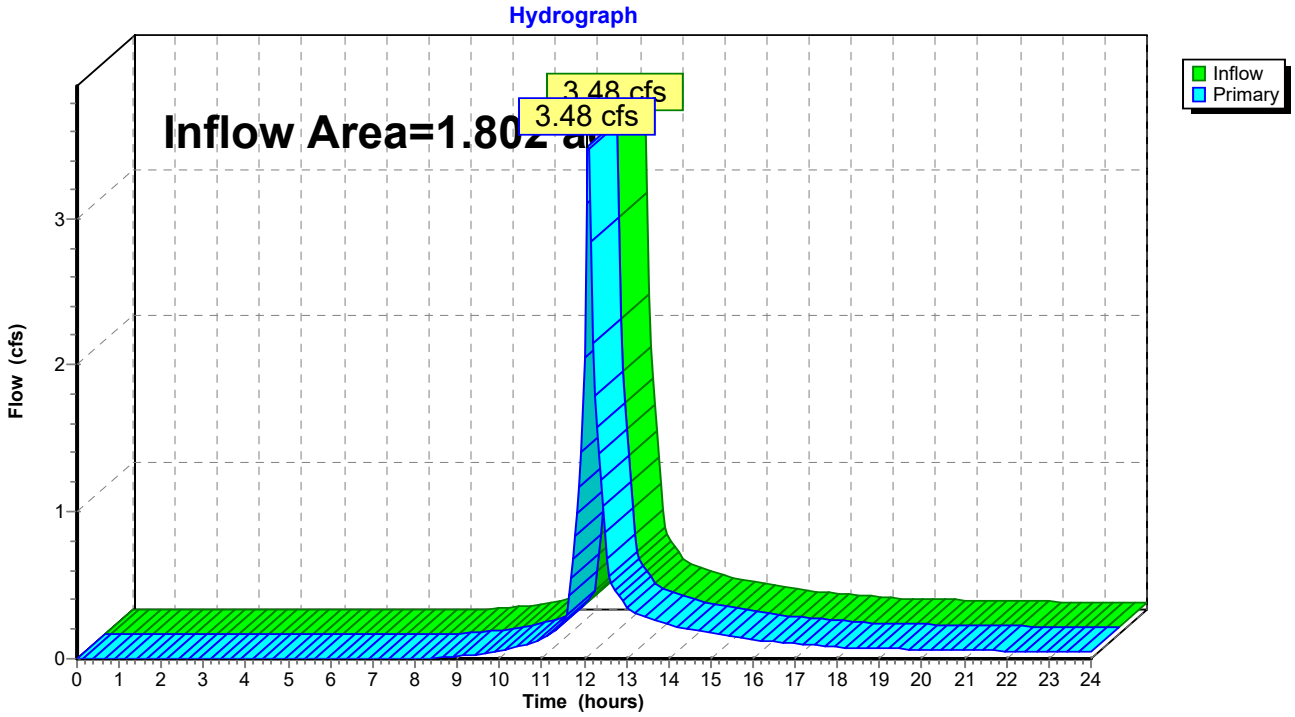


Summary for Link 1L: DP-1 Neponset River

Inflow Area = 1.802 ac, 62.27% Impervious, Inflow Depth > 1.68" for 2 YR event
Inflow = 3.48 cfs @ 12.09 hrs, Volume= 0.252 af
Primary = 3.48 cfs @ 12.09 hrs, Volume= 0.252 af, Atten= 0%, Lag= 0.0 min

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

Link 1L: DP-1 Neponset River

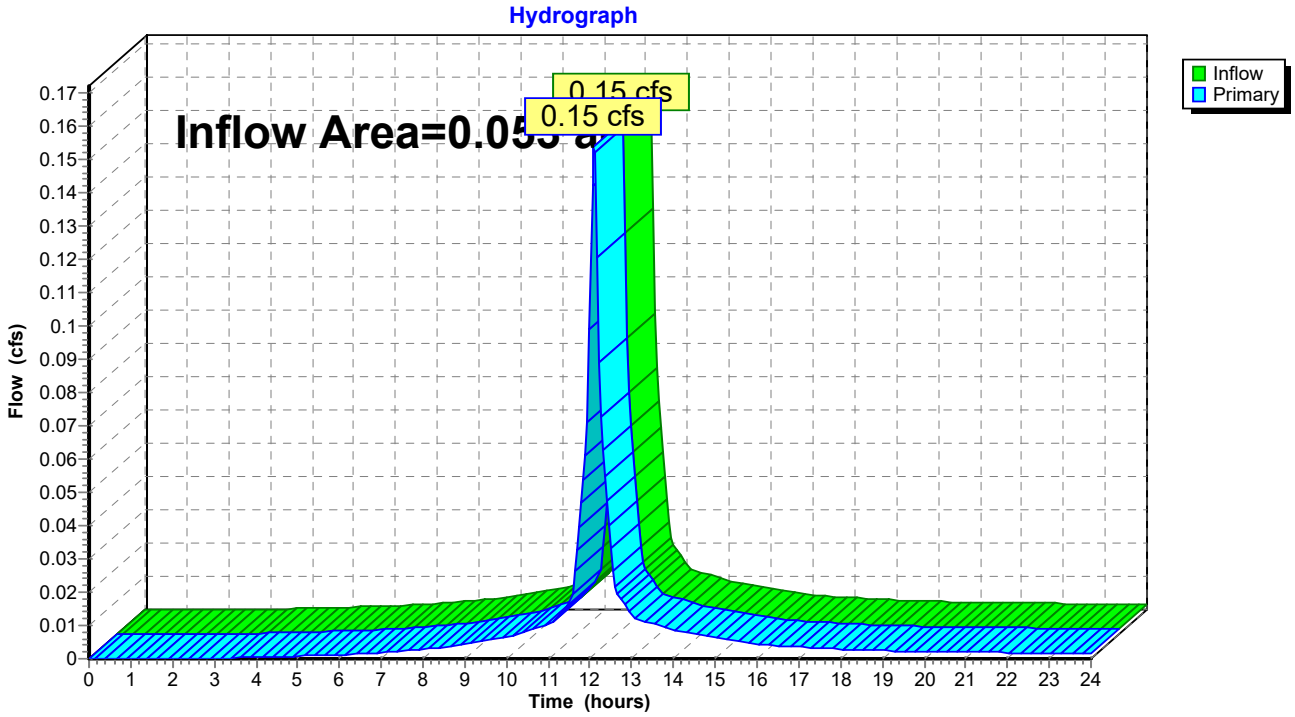


Summary for Link 2L: DP-2 Main Street

Inflow Area = 0.053 ac, 95.15% Impervious, Inflow Depth > 2.75" for 2 YR event
Inflow = 0.15 cfs @ 12.09 hrs, Volume= 0.012 af
Primary = 0.15 cfs @ 12.09 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min

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

Link 2L: DP-2 Main Street



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Sub 1 Runoff Area=78,483 sf 62.27% Impervious Runoff Depth>2.90"
Tc=6.0 min CN=84 Runoff=5.99 cfs 0.436 af

Subcatchment 2S: Sub 2 Runoff Area=2,287 sf 95.15% Impervious Runoff Depth>4.13"
Tc=6.0 min CN=96 Runoff=0.23 cfs 0.018 af

Link 1L: DP-1 Neponset River Inflow=5.99 cfs 0.436 af
Primary=5.99 cfs 0.436 af

Link 2L: DP-2 Main Street Inflow=0.23 cfs 0.018 af
Primary=0.23 cfs 0.018 af

Summary for Subcatchment 1S: Sub 1

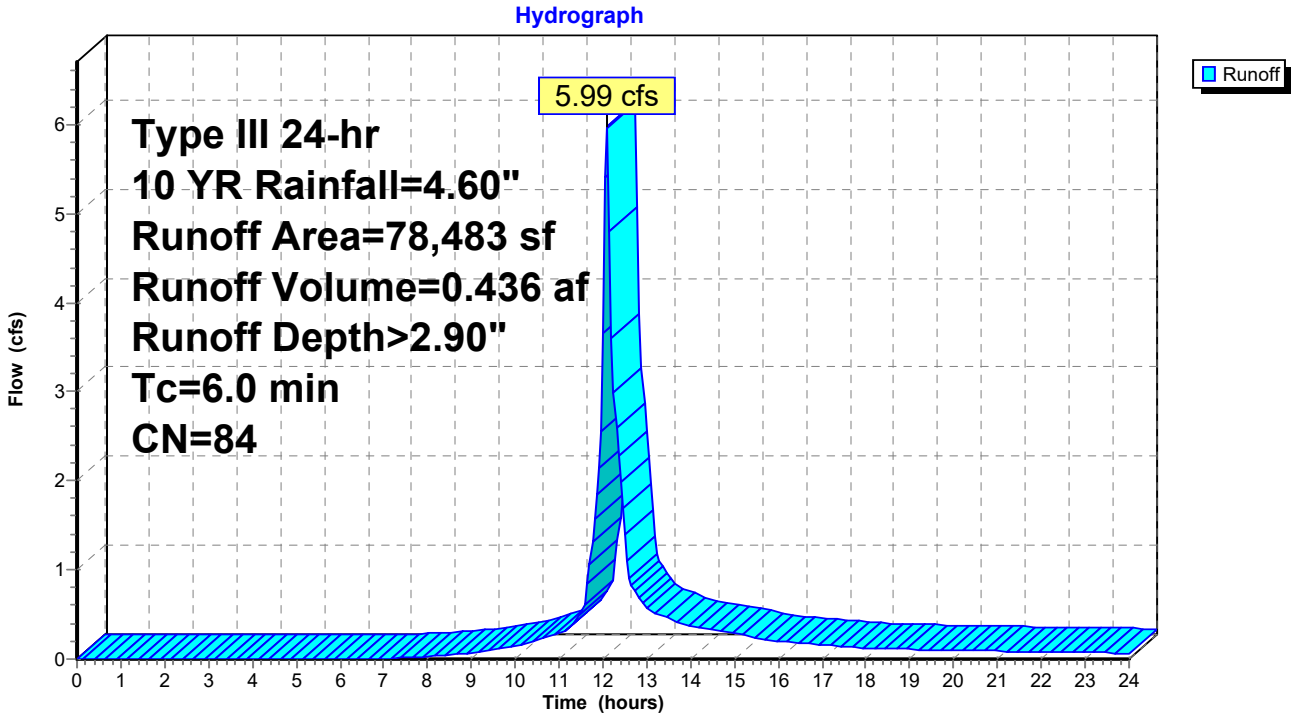
Runoff = 5.99 cfs @ 12.09 hrs, Volume= 0.436 af, Depth> 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.60"

Area (sf)	CN	Description
32,132	98	Paved parking, HSG A
16,736	98	Roofs, HSG A
29,615	61	>75% Grass cover, Good, HSG B
78,483	84	Weighted Average
29,615		37.73% Pervious Area
48,868		62.27% Impervious Area

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

Subcatchment 1S: Sub 1



Summary for Subcatchment 2S: Sub 2

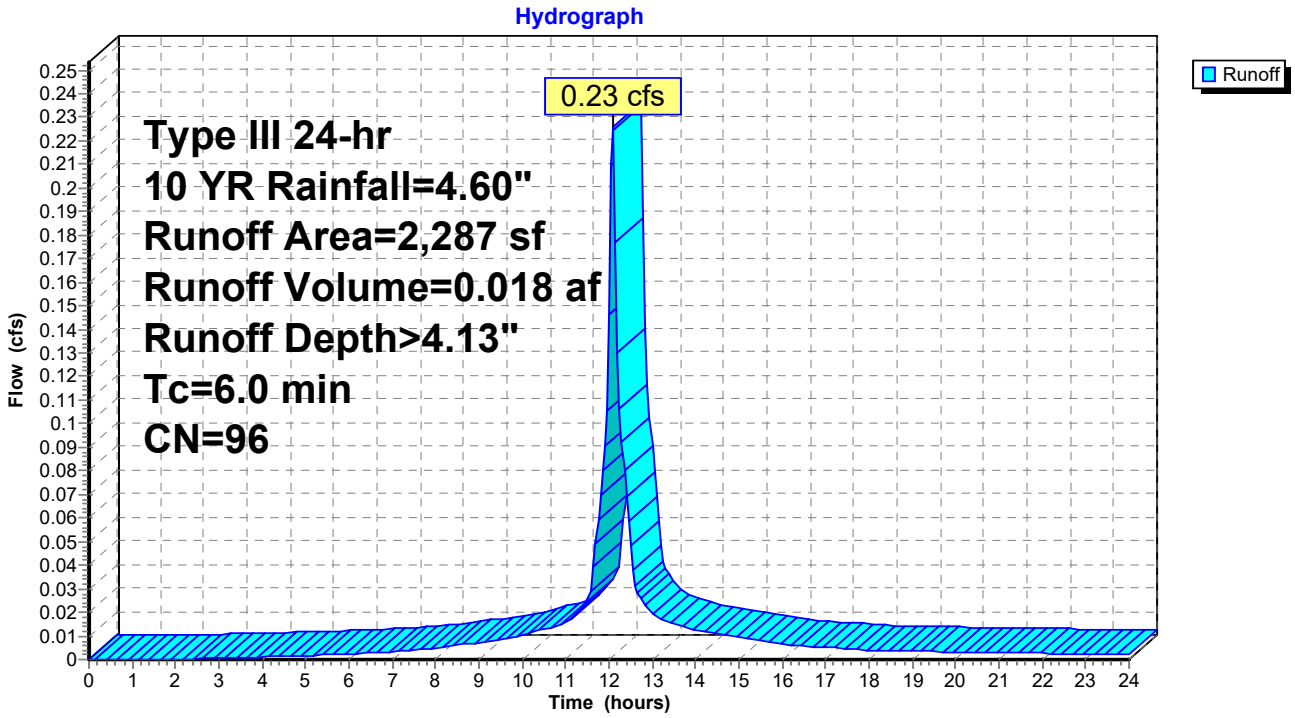
Runoff = 0.23 cfs @ 12.09 hrs, Volume= 0.018 af, Depth> 4.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.60"

Area (sf)	CN	Description
2,176	98	Paved parking, HSG A
111	61	>75% Grass cover, Good, HSG B
2,287	96	Weighted Average
111		4.85% Pervious Area
2,176		95.15% Impervious Area

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

Subcatchment 2S: Sub 2

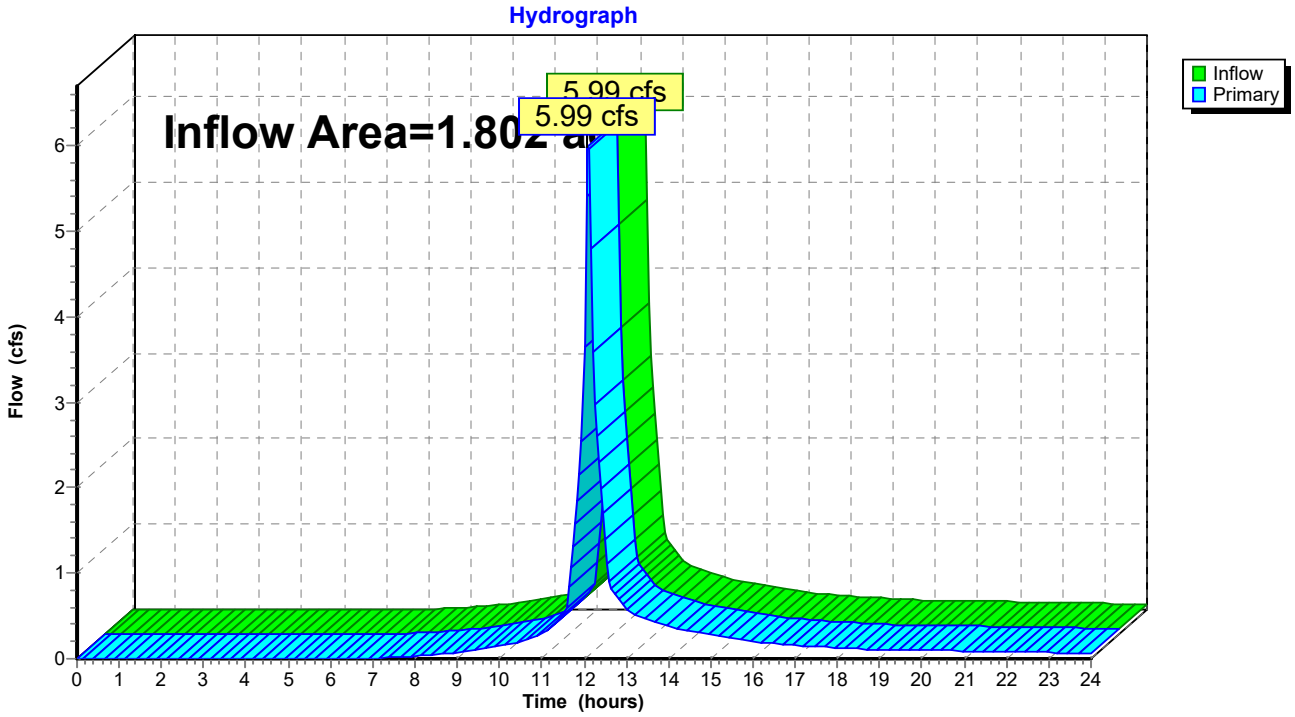


Summary for Link 1L: DP-1 Neponset River

Inflow Area = 1.802 ac, 62.27% Impervious, Inflow Depth > 2.90" for 10 YR event
Inflow = 5.99 cfs @ 12.09 hrs, Volume= 0.436 af
Primary = 5.99 cfs @ 12.09 hrs, Volume= 0.436 af, Atten= 0%, Lag= 0.0 min

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

Link 1L: DP-1 Neponset River

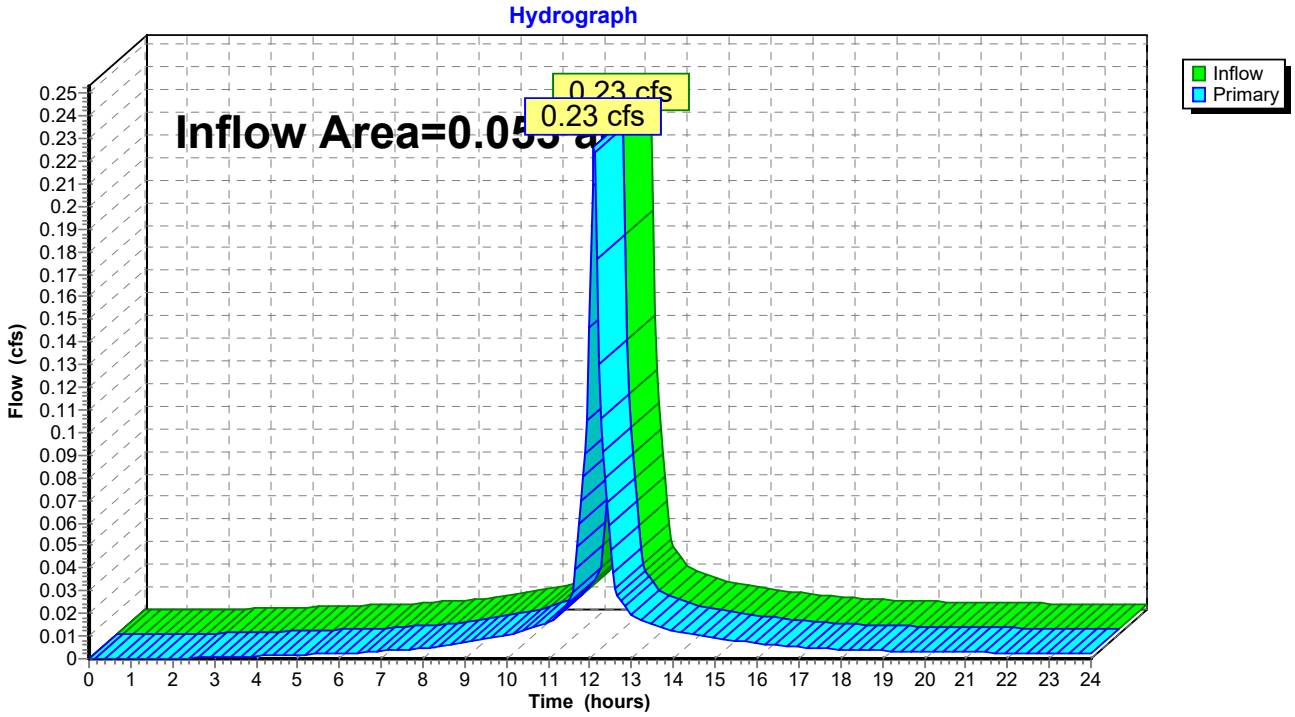


Summary for Link 2L: DP-2 Main Street

Inflow Area = 0.053 ac, 95.15% Impervious, Inflow Depth > 4.13" for 10 YR event
Inflow = 0.23 cfs @ 12.09 hrs, Volume= 0.018 af
Primary = 0.23 cfs @ 12.09 hrs, Volume= 0.018 af, Atten= 0%, Lag= 0.0 min

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

Link 2L: DP-2 Main Street



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Sub 1 Runoff Area=78,483 sf 62.27% Impervious Runoff Depth>3.82"
Tc=6.0 min CN=84 Runoff=7.81 cfs 0.574 af

Subcatchment 2S: Sub 2 Runoff Area=2,287 sf 95.15% Impervious Runoff Depth>5.13"
Tc=6.0 min CN=96 Runoff=0.28 cfs 0.022 af

Link 1L: DP-1 Neponset River Inflow=7.81 cfs 0.574 af
Primary=7.81 cfs 0.574 af

Link 2L: DP-2 Main Street Inflow=0.28 cfs 0.022 af
Primary=0.28 cfs 0.022 af

Summary for Subcatchment 1S: Sub 1

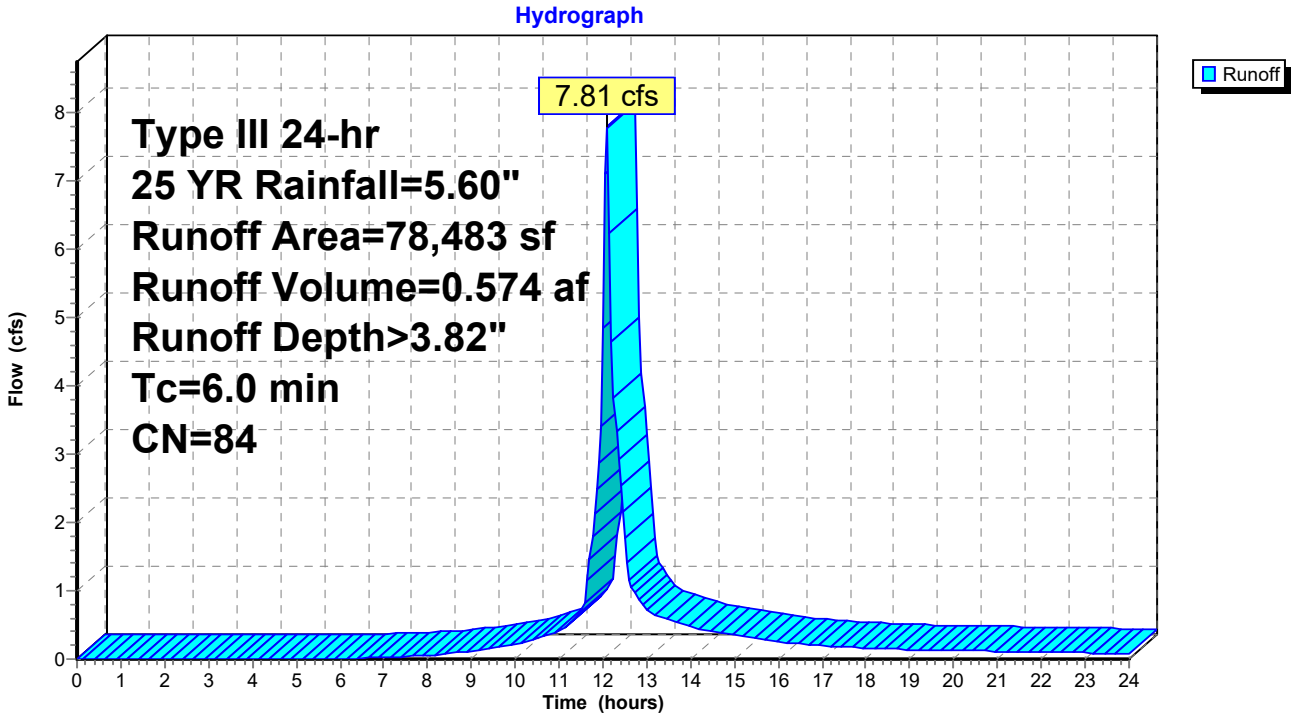
Runoff = 7.81 cfs @ 12.09 hrs, Volume= 0.574 af, Depth> 3.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=5.60"

Area (sf)	CN	Description
32,132	98	Paved parking, HSG A
16,736	98	Roofs, HSG A
29,615	61	>75% Grass cover, Good, HSG B
78,483	84	Weighted Average
29,615		37.73% Pervious Area
48,868		62.27% Impervious Area

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

Subcatchment 1S: Sub 1



Summary for Subcatchment 2S: Sub 2

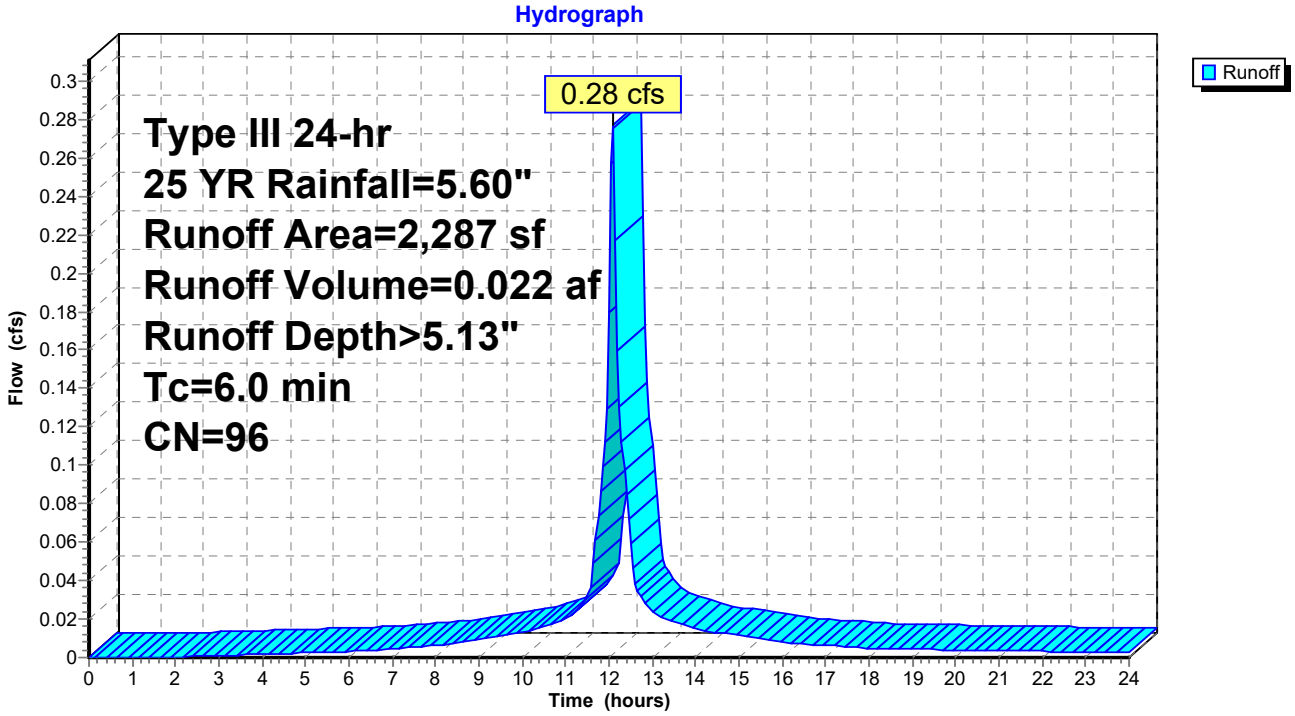
Runoff = 0.28 cfs @ 12.09 hrs, Volume= 0.022 af, Depth> 5.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=5.60"

Area (sf)	CN	Description
2,176	98	Paved parking, HSG A
111	61	>75% Grass cover, Good, HSG B
2,287	96	Weighted Average
111		4.85% Pervious Area
2,176		95.15% Impervious Area

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

Subcatchment 2S: Sub 2

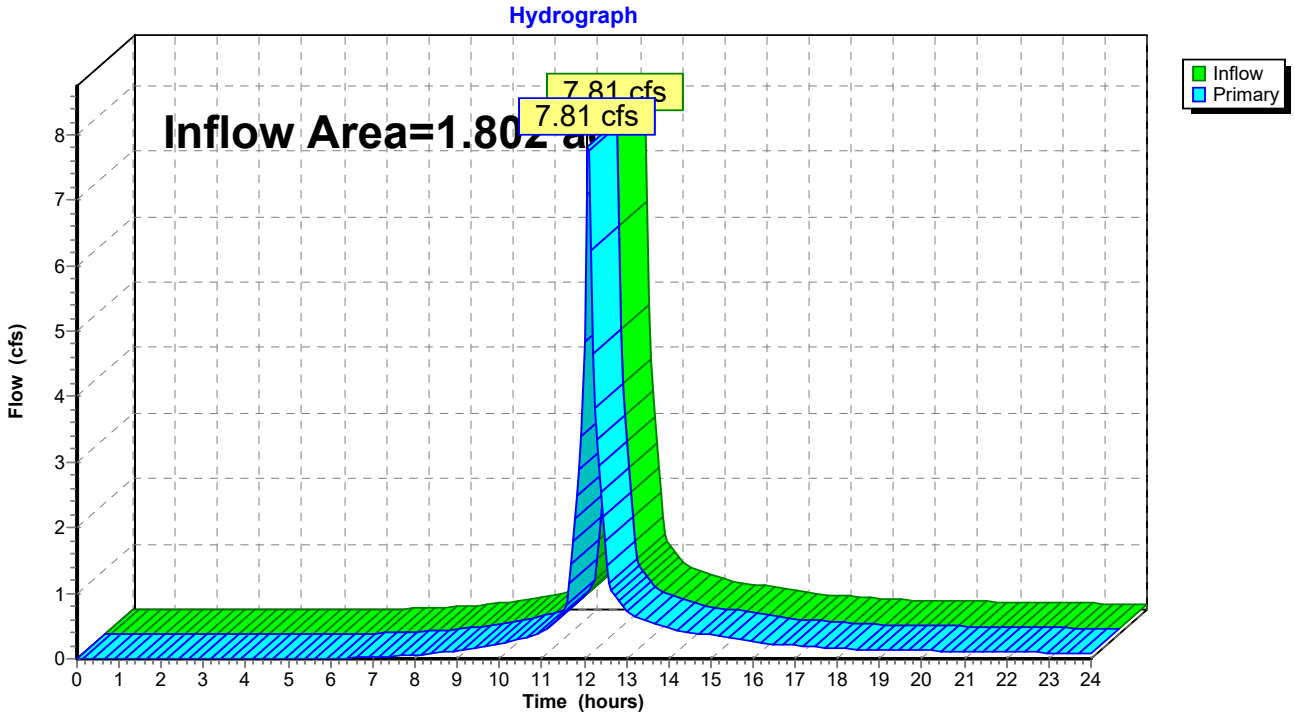


Summary for Link 1L: DP-1 Neponset River

Inflow Area = 1.802 ac, 62.27% Impervious, Inflow Depth > 3.82" for 25 YR event
Inflow = 7.81 cfs @ 12.09 hrs, Volume= 0.574 af
Primary = 7.81 cfs @ 12.09 hrs, Volume= 0.574 af, Atten= 0%, Lag= 0.0 min

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

Link 1L: DP-1 Neponset River

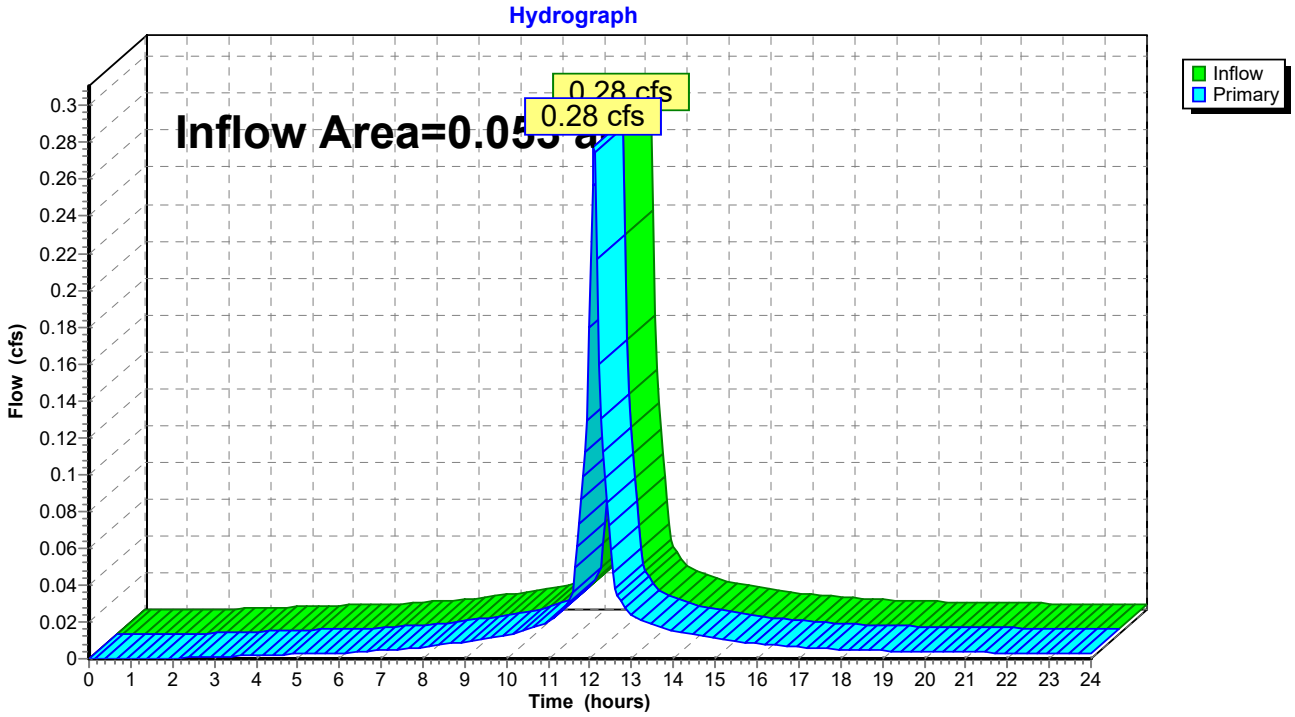


Summary for Link 2L: DP-2 Main Street

Inflow Area = 0.053 ac, 95.15% Impervious, Inflow Depth > 5.13" for 25 YR event
Inflow = 0.28 cfs @ 12.09 hrs, Volume= 0.022 af
Primary = 0.28 cfs @ 12.09 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min

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

Link 2L: DP-2 Main Street



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Sub 1 Runoff Area=78,483 sf 62.27% Impervious Runoff Depth>4.95"
Tc=6.0 min CN=84 Runoff=10.00 cfs 0.743 af

Subcatchment 2S: Sub 2 Runoff Area=2,287 sf 95.15% Impervious Runoff Depth>6.32"
Tc=6.0 min CN=96 Runoff=0.34 cfs 0.028 af

Link 1L: DP-1 Neponset River Inflow=10.00 cfs 0.743 af
Primary=10.00 cfs 0.743 af

Link 2L: DP-2 Main Street Inflow=0.34 cfs 0.028 af
Primary=0.34 cfs 0.028 af

Summary for Subcatchment 1S: Sub 1

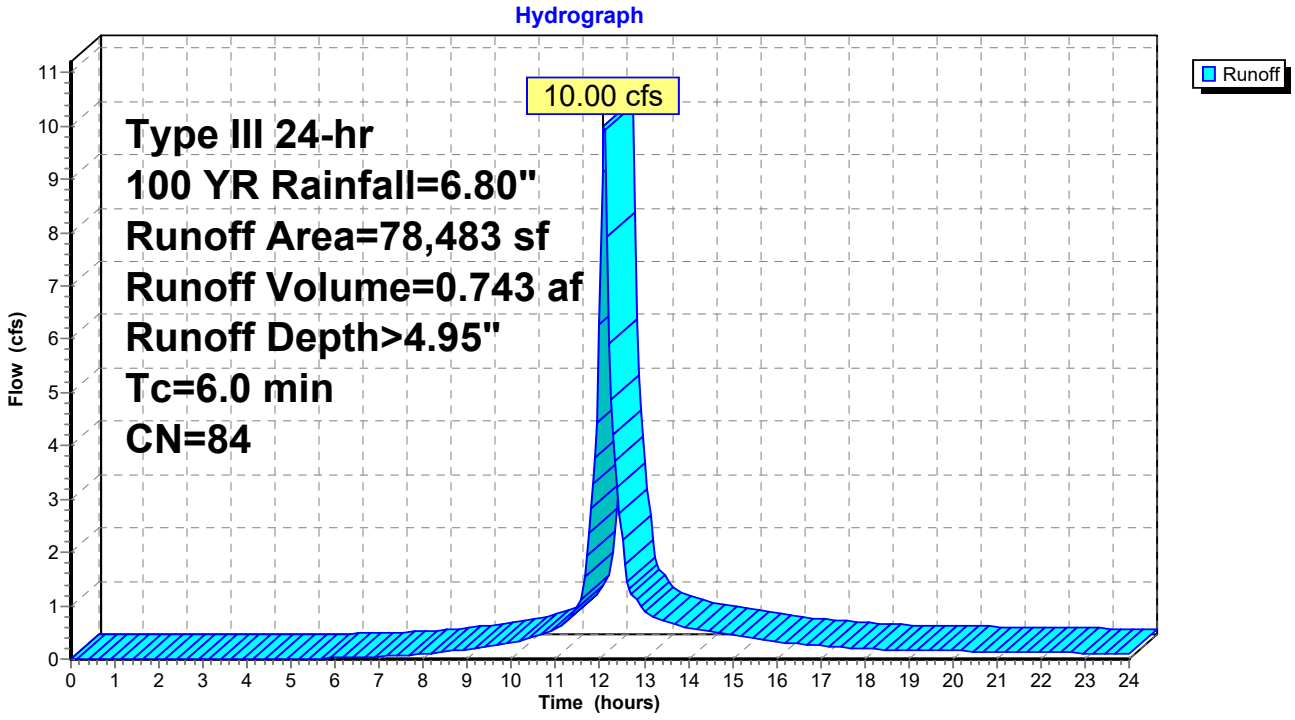
Runoff = 10.00 cfs @ 12.09 hrs, Volume= 0.743 af, Depth> 4.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=6.80"

Area (sf)	CN	Description
32,132	98	Paved parking, HSG A
16,736	98	Roofs, HSG A
29,615	61	>75% Grass cover, Good, HSG B
78,483	84	Weighted Average
29,615		37.73% Pervious Area
48,868		62.27% Impervious Area

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

Subcatchment 1S: Sub 1



Summary for Subcatchment 2S: Sub 2

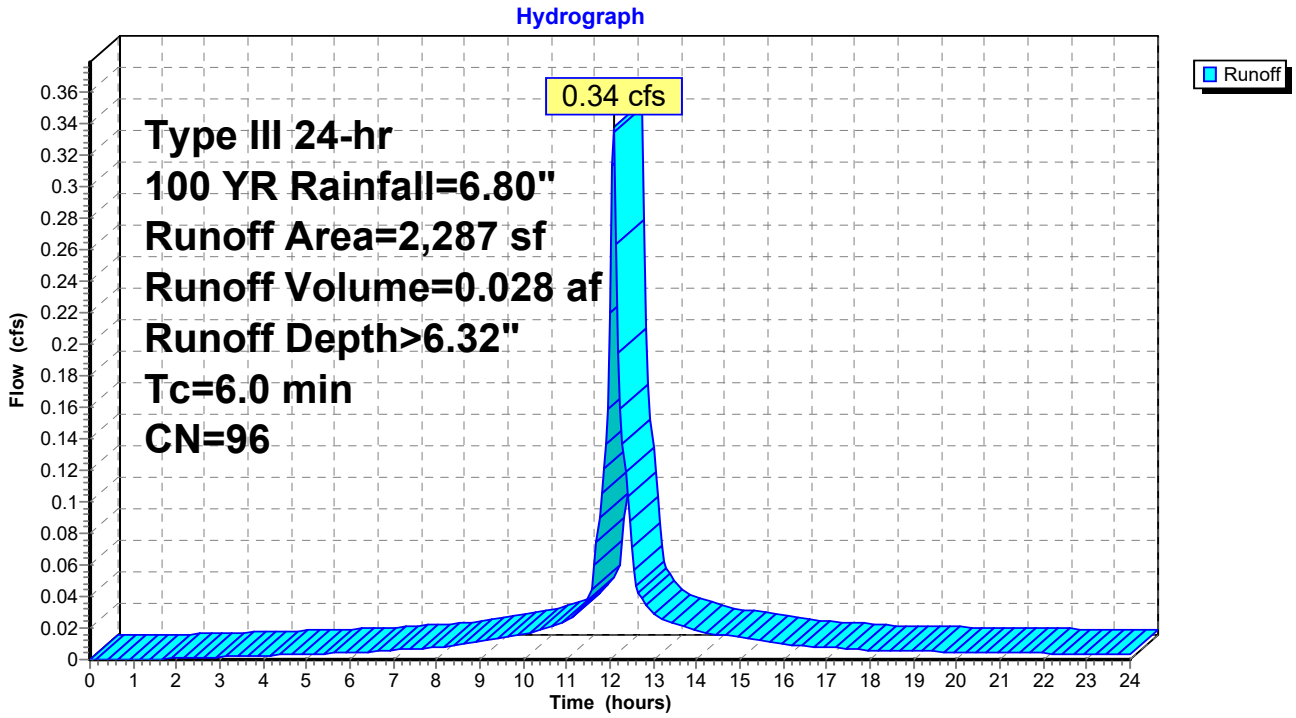
Runoff = 0.34 cfs @ 12.09 hrs, Volume= 0.028 af, Depth> 6.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=6.80"

Area (sf)	CN	Description
2,176	98	Paved parking, HSG A
111	61	>75% Grass cover, Good, HSG B
2,287	96	Weighted Average
111		4.85% Pervious Area
2,176		95.15% Impervious Area

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

Subcatchment 2S: Sub 2

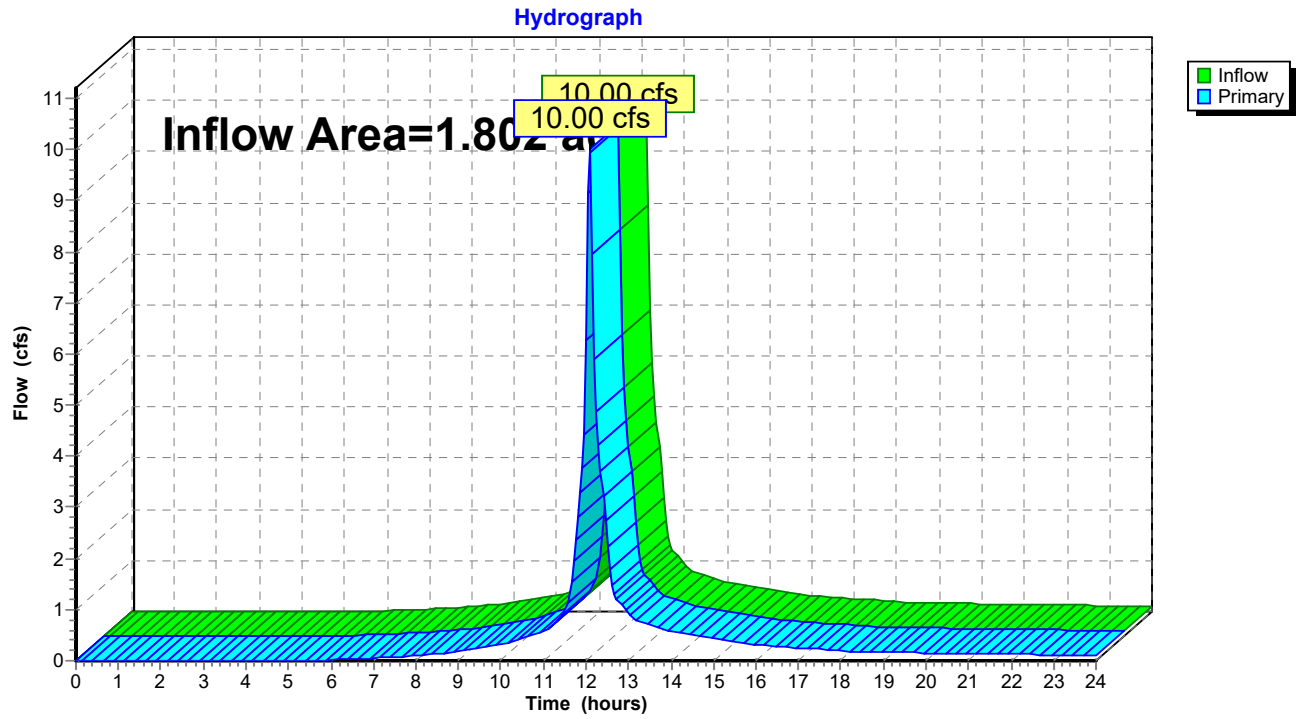


Summary for Link 1L: DP-1 Neponset River

Inflow Area = 1.802 ac, 62.27% Impervious, Inflow Depth > 4.95" for 100 YR event
Inflow = 10.00 cfs @ 12.09 hrs, Volume= 0.743 af
Primary = 10.00 cfs @ 12.09 hrs, Volume= 0.743 af, Atten= 0%, Lag= 0.0 min

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

Link 1L: DP-1 Neponset River

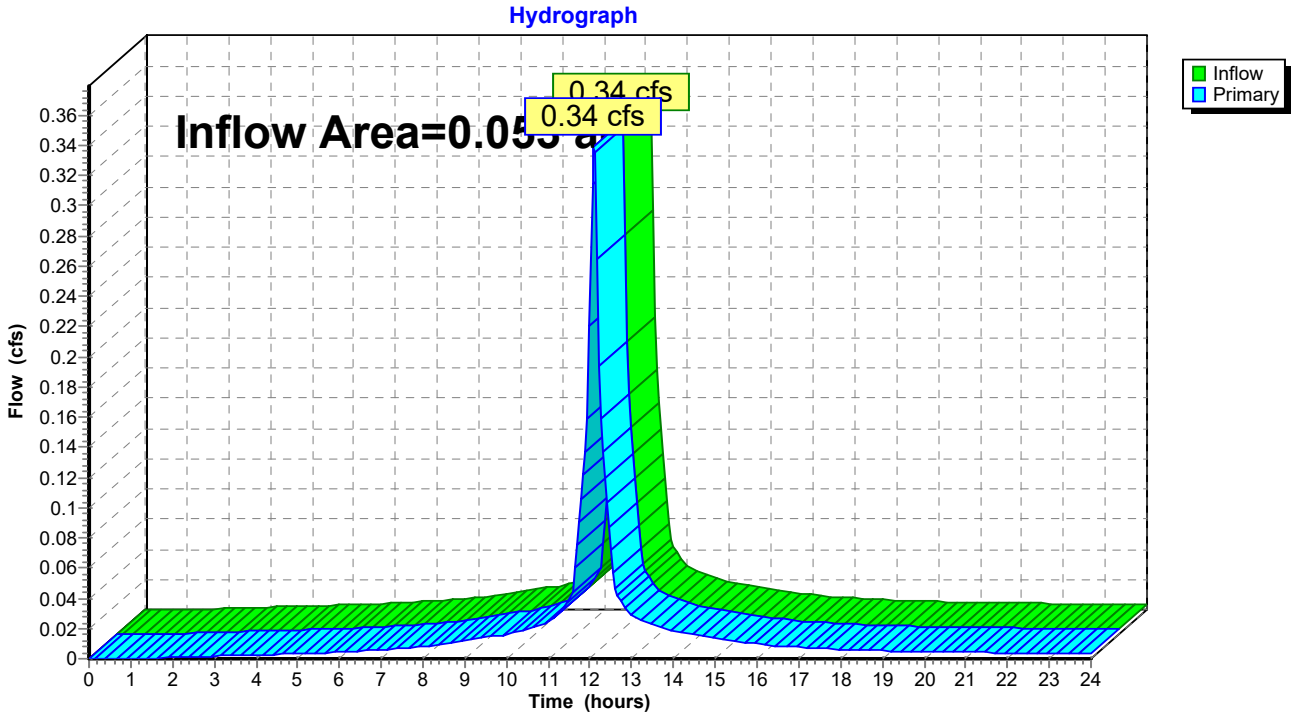


Summary for Link 2L: DP-2 Main Street

Inflow Area = 0.053 ac, 95.15% Impervious, Inflow Depth > 6.32" for 100 YR event
Inflow = 0.34 cfs @ 12.09 hrs, Volume= 0.028 af
Primary = 0.34 cfs @ 12.09 hrs, Volume= 0.028 af, Atten= 0%, Lag= 0.0 min

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

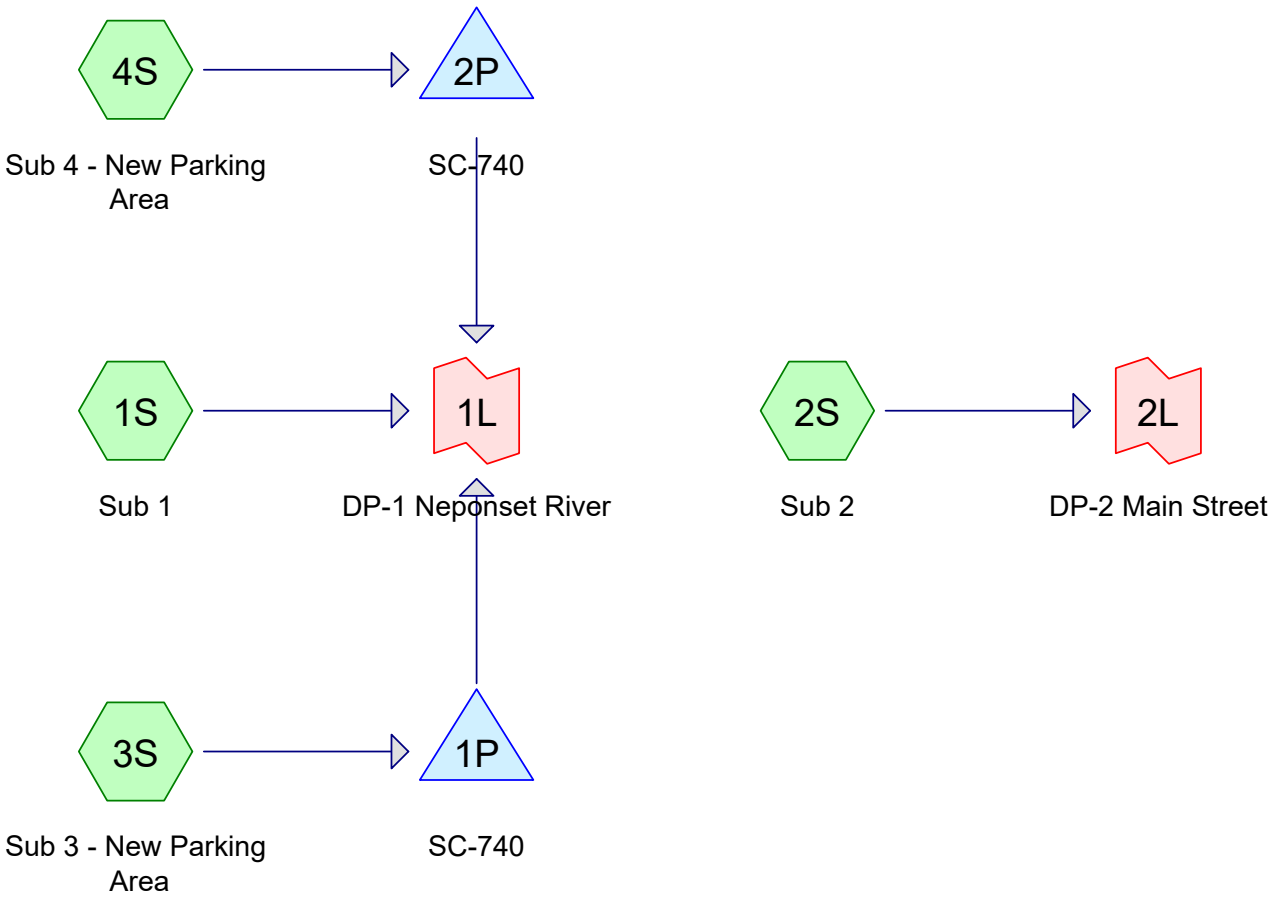
Link 2L: DP-2 Main Street



PROPOSED (SITE DEVELOPED) CONDITIONS

RUNOFF CALCULATIONS

(2, 10, 25, & 100 YEAR STORMS)



Subcat Reach Pond Link

Routing Diagram for Proposed Condition
Prepared by Waterfield Design Group, Printed 4/8/2024

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Sub 1 Runoff Area=71,581 sf 66.20% Impervious Runoff Depth>1.76"
Tc=6.0 min CN=85 Runoff=3.32 cfs 0.240 af

Subcatchment 2S: Sub 2 Runoff Area=2,287 sf 95.15% Impervious Runoff Depth>2.75"
Tc=6.0 min CN=96 Runoff=0.15 cfs 0.012 af

Subcatchment 3S: Sub 3 - New Parking Area Runoff Area=4,245 sf 80.59% Impervious Runoff Depth>2.26"
Tc=6.0 min CN=91 Runoff=0.25 cfs 0.018 af

Subcatchment 4S: Sub 4 - New Parking Area Runoff Area=2,657 sf 96.01% Impervious Runoff Depth>2.85"
Tc=6.0 min CN=97 Runoff=0.18 cfs 0.015 af

Pond 1P: SC-740 Peak Elev=143.85' Storage=443 cf Inflow=0.25 cfs 0.018 af
Discarded=0.01 cfs 0.012 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.012 af

Pond 2P: SC-740 Peak Elev=149.00' Storage=196 cf Inflow=0.18 cfs 0.015 af
Discarded=0.00 cfs 0.004 af Primary=0.17 cfs 0.006 af Outflow=0.17 cfs 0.010 af

Link 1L: DP-1 Neponset River Inflow=3.47 cfs 0.246 af
Primary=3.47 cfs 0.246 af

Link 2L: DP-2 Main Street Inflow=0.15 cfs 0.012 af
Primary=0.15 cfs 0.012 af

Summary for Subcatchment 1S: Sub 1

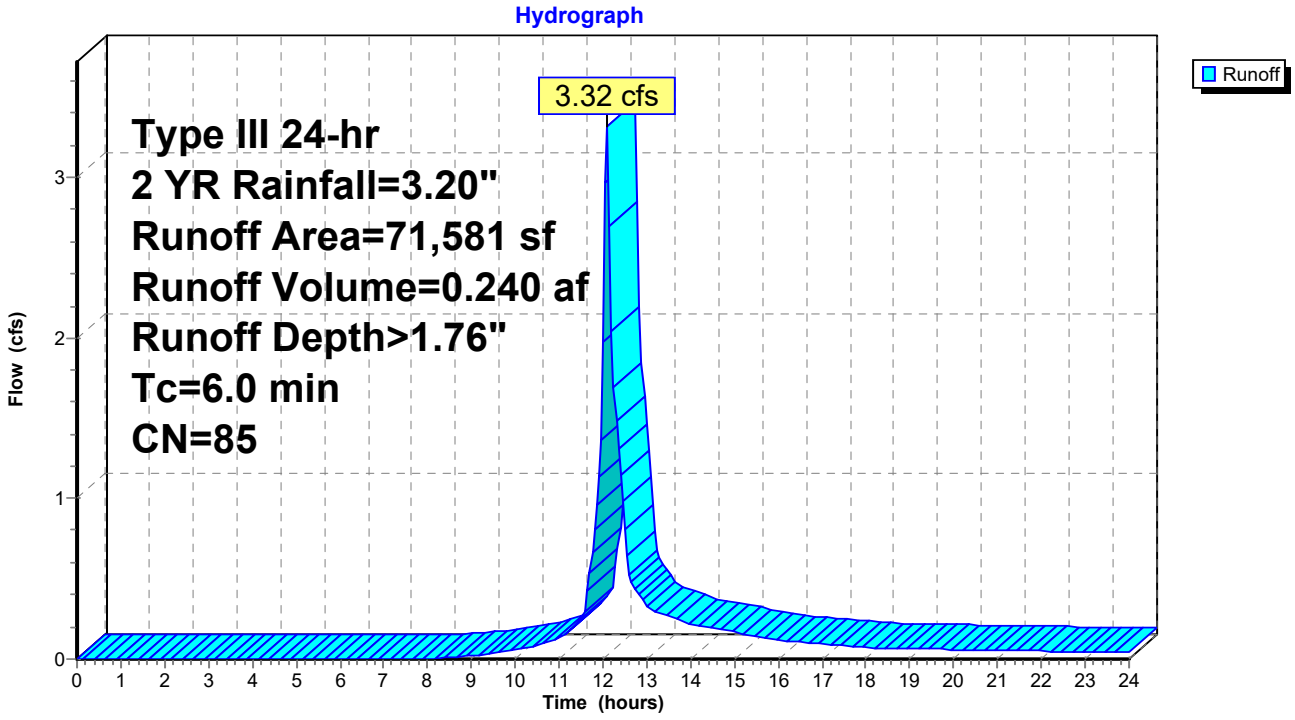
Runoff = 3.32 cfs @ 12.09 hrs, Volume= 0.240 af, Depth> 1.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.20"

Area (sf)	CN	Description
31,792	98	Paved parking, HSG A
15,592	98	Roofs, HSG A
24,197	61	>75% Grass cover, Good, HSG B
71,581	85	Weighted Average
24,197		33.80% Pervious Area
47,384		66.20% Impervious Area

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

Subcatchment 1S: Sub 1



Summary for Subcatchment 2S: Sub 2

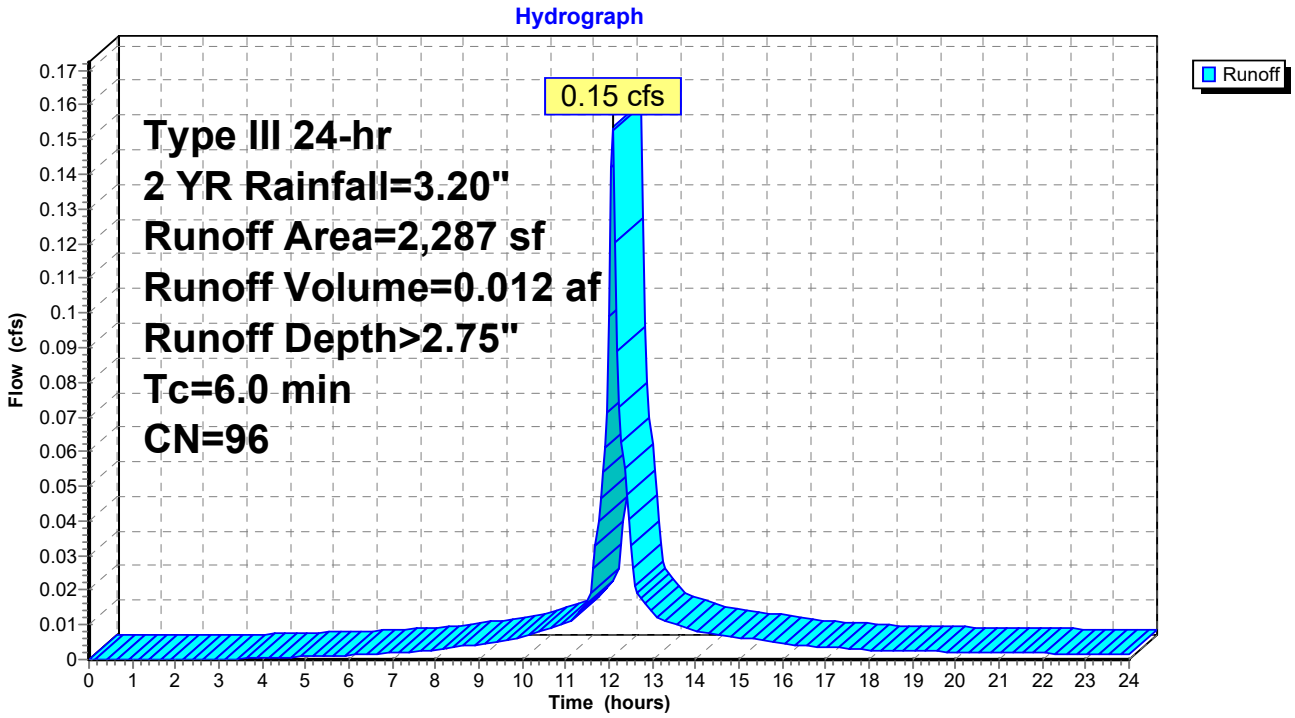
Runoff = 0.15 cfs @ 12.09 hrs, Volume= 0.012 af, Depth> 2.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.20"

Area (sf)	CN	Description
2,176	98	Paved parking, HSG A
111	61	>75% Grass cover, Good, HSG B
2,287	96	Weighted Average
111		4.85% Pervious Area
2,176		95.15% Impervious Area

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

Subcatchment 2S: Sub 2



Summary for Subcatchment 3S: Sub 3 - New Parking Area

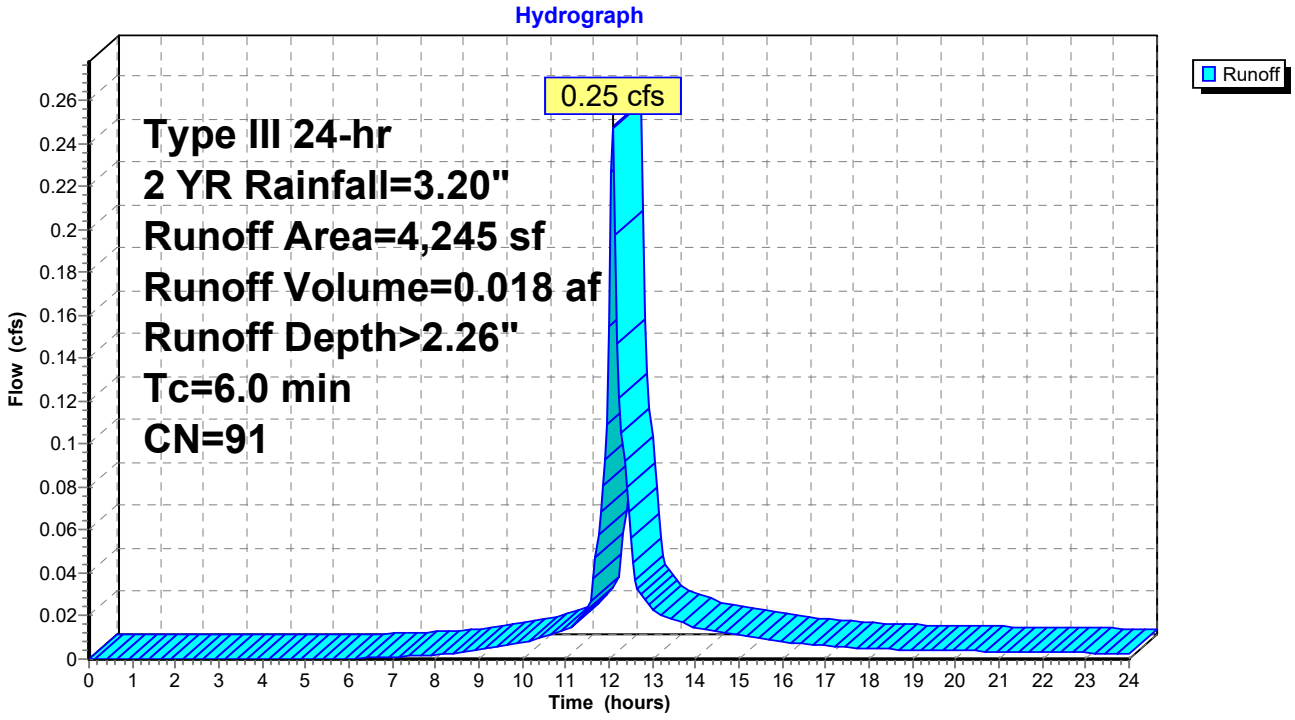
Runoff = 0.25 cfs @ 12.09 hrs, Volume= 0.018 af, Depth> 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.20"

	Area (sf)	CN	Description
*	2,278	98	Paved parking, HSG B
	824	61	>75% Grass cover, Good, HSG B
*	1,143	98	Roof HSG B
	4,245	91	Weighted Average
	824		19.41% Pervious Area
	3,421		80.59% Impervious Area

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

Subcatchment 3S: Sub 3 - New Parking Area



Summary for Subcatchment 4S: Sub 4 - New Parking Area

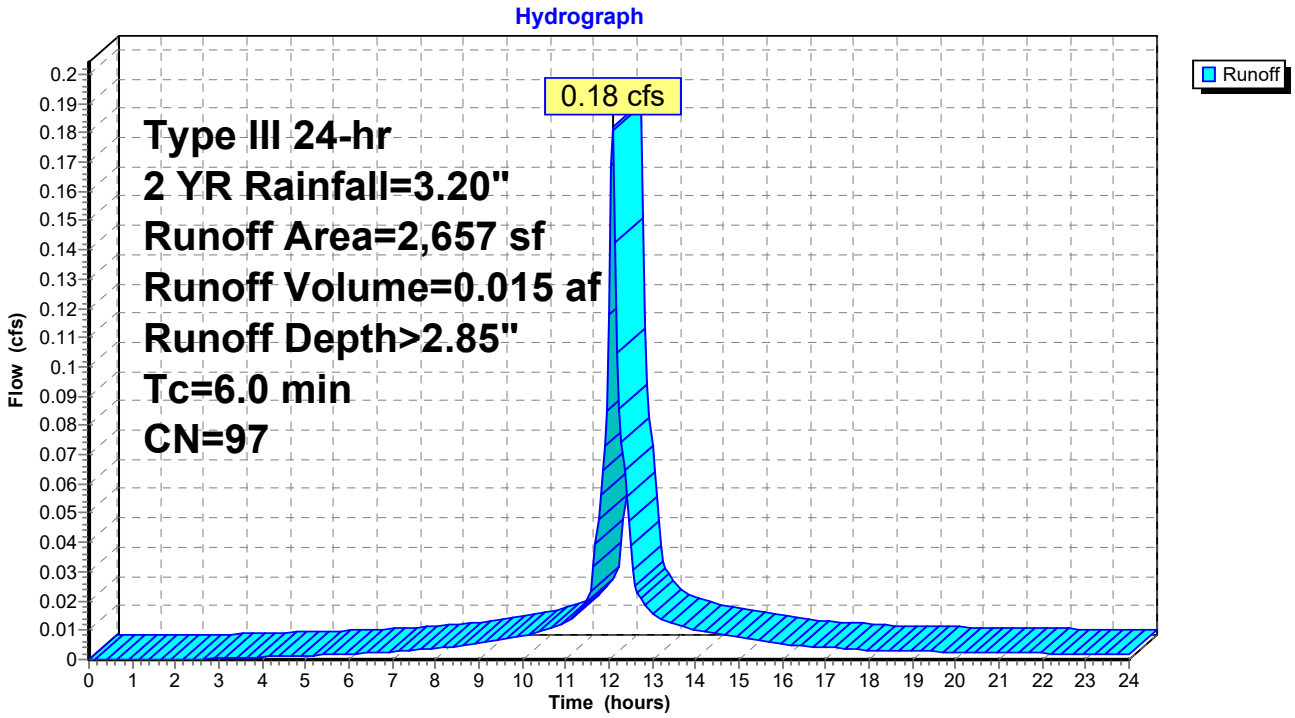
Runoff = 0.18 cfs @ 12.09 hrs, Volume= 0.015 af, Depth> 2.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.20"

	Area (sf)	CN	Description
*	2,551	98	Paved parking, HSG A
	106	61	>75% Grass cover, Good, HSG B
	2,657	97	Weighted Average
	106		3.99% Pervious Area
	2,551		96.01% Impervious Area

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

Subcatchment 4S: Sub 4 - New Parking Area



Summary for Pond 1P: SC-740

Inflow Area = 0.097 ac, 80.59% Impervious, Inflow Depth > 2.26" for 2 YR event
Inflow = 0.25 cfs @ 12.09 hrs, Volume= 0.018 af
Outflow = 0.01 cfs @ 10.55 hrs, Volume= 0.012 af, Atten= 96%, Lag= 0.0 min
Discarded = 0.01 cfs @ 10.55 hrs, Volume= 0.012 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 143.85' @ 15.57 hrs Surf.Area= 393 sf Storage= 443 cf

Plug-Flow detention time= 285.5 min calculated for 0.012 af (63% of inflow)
Center-of-Mass det. time= 185.7 min (987.7 - 802.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	142.00'	337 cf	**15.75'W x 24.98'L x 3.50'H Field A** 1,377 cf Overall - 413 cf Embedded = 963 cf x 35.0% Voids
#2A	142.50'	413 cf	**ADS_StormTech SC-740 +Cap** x 9 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 3 Rows of 3 Chambers
		751 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	142.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	145.25'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.01 cfs @ 10.55 hrs HW=142.04' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=142.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: SC-740 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

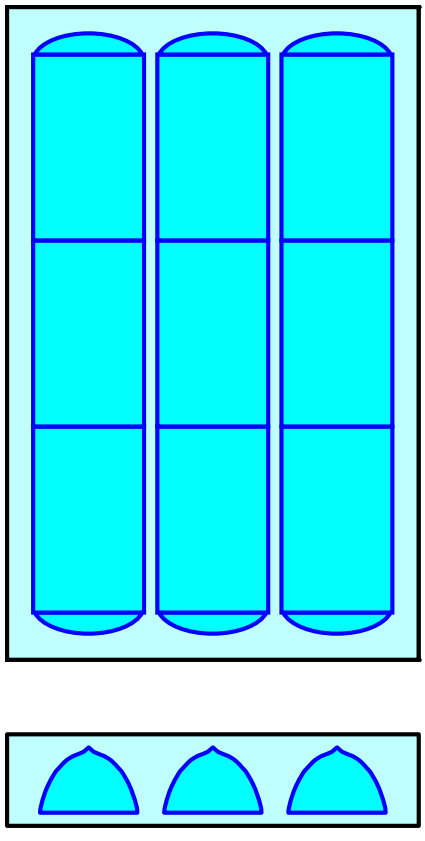
3 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 22.98' Row Length +12.0" End Stone x 2 = 24.98' Base Length
3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

9 Chambers x 45.9 cf = 413.5 cf Chamber Storage

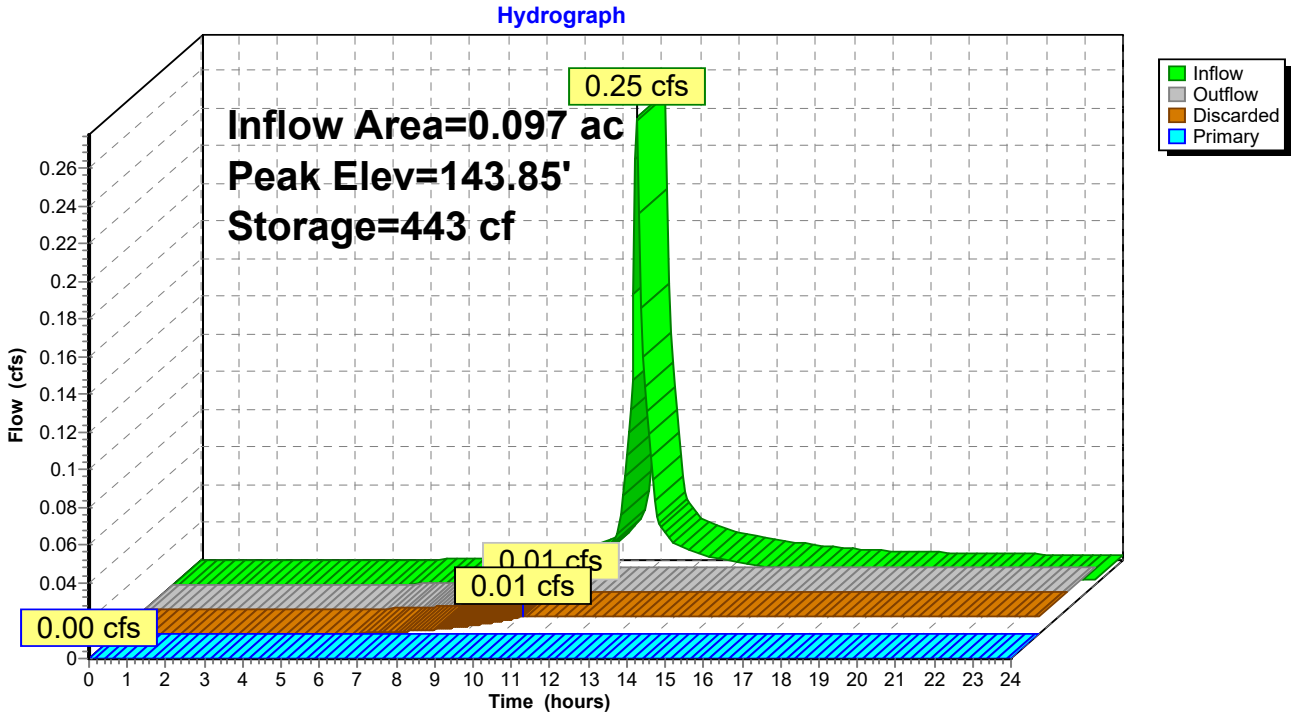
1,376.8 cf Field - 413.5 cf Chambers = 963.4 cf Stone x 35.0% Voids = 337.2 cf Stone Storage

Chamber Storage + Stone Storage = 750.6 cf = 0.017 af
Overall Storage Efficiency = 54.5%
Overall System Size = 24.98' x 15.75' x 3.50'

9 Chambers
51.0 cy Field
35.7 cy Stone



Pond 1P: SC-740



Summary for Pond 2P: SC-740

Inflow Area = 0.061 ac, 96.01% Impervious, Inflow Depth > 2.85" for 2 YR event
Inflow = 0.18 cfs @ 12.09 hrs, Volume= 0.015 af
Outflow = 0.17 cfs @ 12.12 hrs, Volume= 0.010 af, Atten= 5%, Lag= 2.1 min
Discarded = 0.00 cfs @ 7.30 hrs, Volume= 0.004 af
Primary = 0.17 cfs @ 12.12 hrs, Volume= 0.006 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 149.00' @ 12.10 hrs Surf.Area= 118 sf Storage= 196 cf

Plug-Flow detention time= 147.1 min calculated for 0.010 af (69% of inflow)
Center-of-Mass det. time= 54.8 min (820.4 - 765.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	145.70'	113 cf	**11.00'W x 10.74'L x 3.50'H Field A** 413 cf Overall - 92 cf Embedded = 321 cf x 35.0% Voids
#2A	146.20'	92 cf	**ADS_StormTech SC-740 +Cap** x 2 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 2 Rows of 1 Chambers
		204 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	145.70'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	148.95'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.00 cfs @ 7.30 hrs HW=145.74' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.15 cfs @ 12.12 hrs HW=149.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.15 cfs @ 0.61 fps)

Pond 2P: SC-740 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

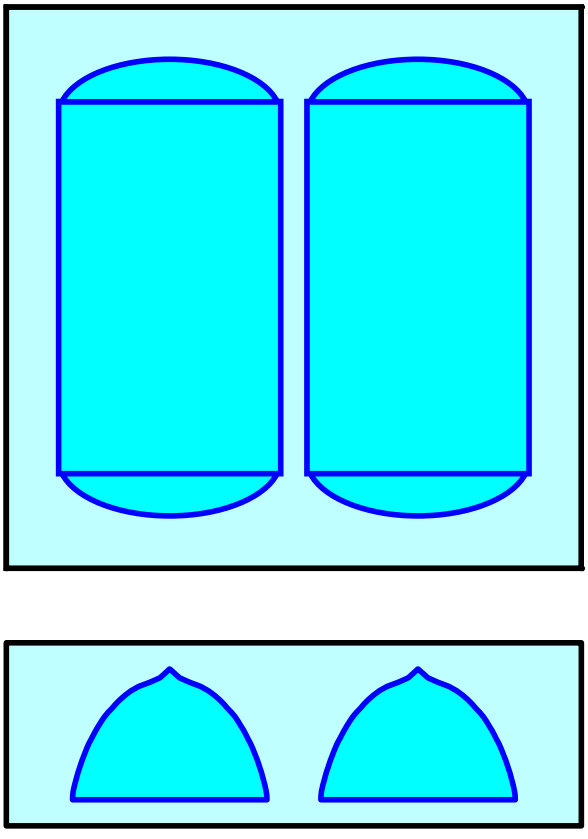
1 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 8.74' Row Length +12.0" End Stone x 2 = 10.74' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

2 Chambers x 45.9 cf = 91.9 cf Chamber Storage

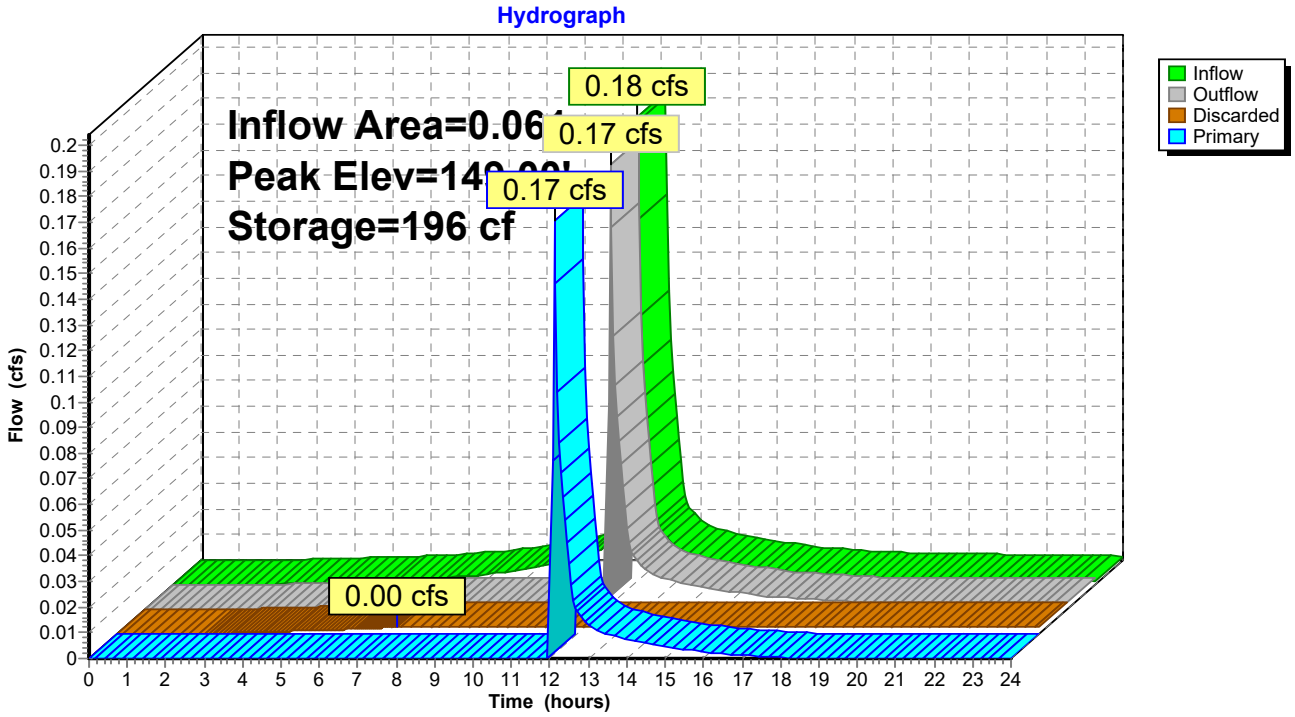
413.4 cf Field - 91.9 cf Chambers = 321.5 cf Stone x 35.0% Voids = 112.5 cf Stone Storage

Chamber Storage + Stone Storage = 204.4 cf = 0.005 af
Overall Storage Efficiency = 49.4%
Overall System Size = 10.74' x 11.00' x 3.50'

2 Chambers
15.3 cy Field
11.9 cy Stone



Pond 2P: SC-740

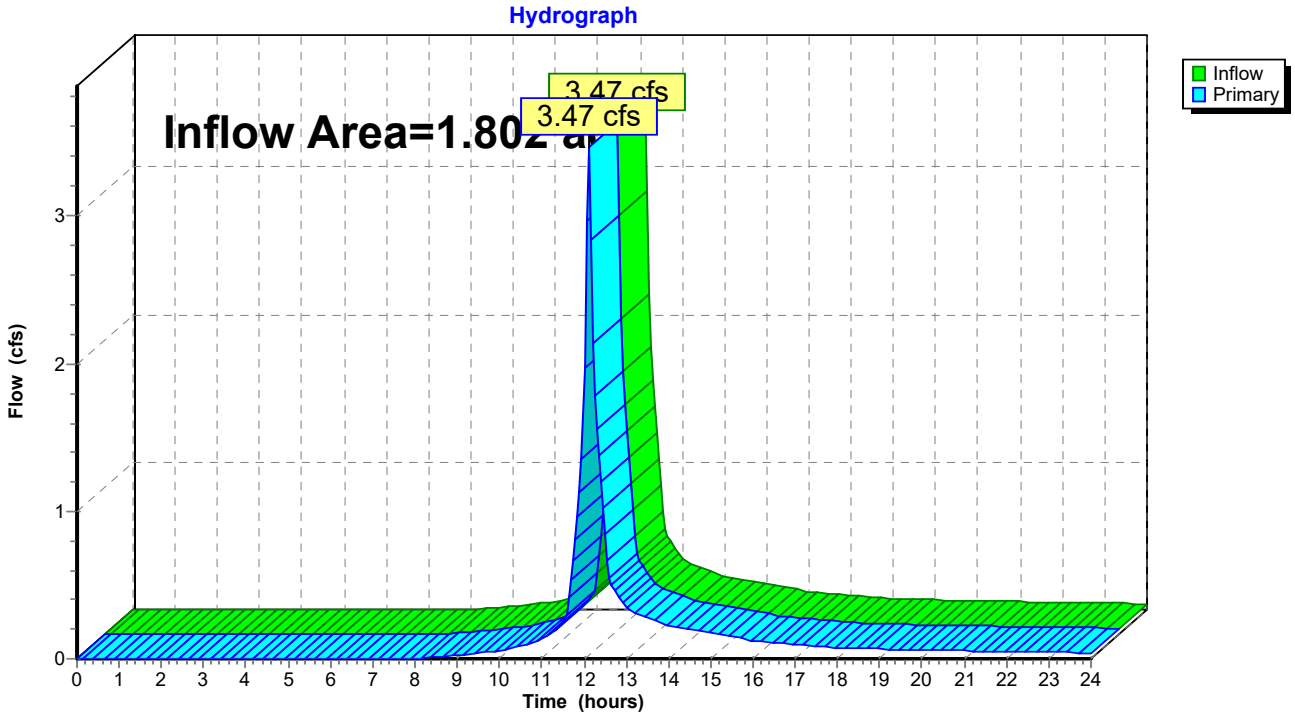


Summary for Link 1L: DP-1 Neponset River

Inflow Area = 1.802 ac, 67.98% Impervious, Inflow Depth > 1.64" for 2 YR event
Inflow = 3.47 cfs @ 12.10 hrs, Volume= 0.246 af
Primary = 3.47 cfs @ 12.10 hrs, Volume= 0.246 af, Atten= 0%, Lag= 0.0 min

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

Link 1L: DP-1 Neponset River

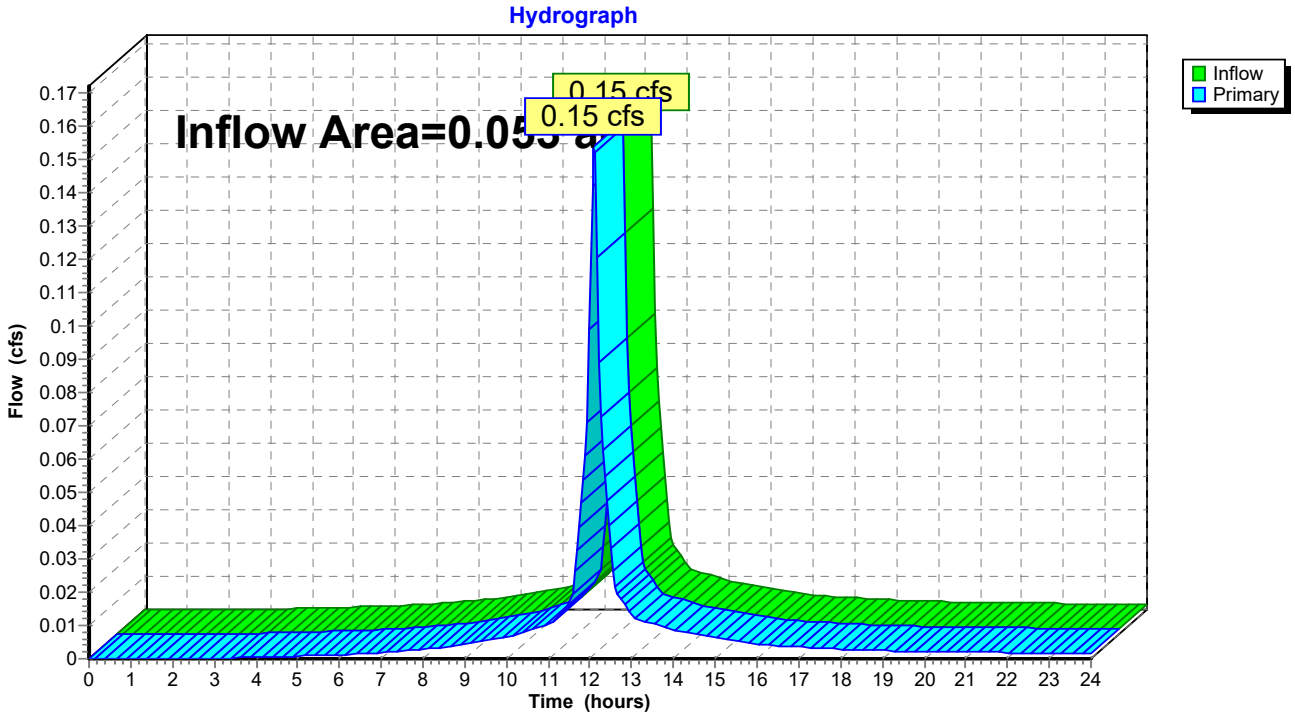


Summary for Link 2L: DP-2 Main Street

Inflow Area = 0.053 ac, 95.15% Impervious, Inflow Depth > 2.75" for 2 YR event
Inflow = 0.15 cfs @ 12.09 hrs, Volume= 0.012 af
Primary = 0.15 cfs @ 12.09 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min

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

Link 2L: DP-2 Main Street



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Sub 1 Runoff Area=71,581 sf 66.20% Impervious Runoff Depth>3.00"
Tc=6.0 min CN=85 Runoff=5.62 cfs 0.411 af

Subcatchment 2S: Sub 2 Runoff Area=2,287 sf 95.15% Impervious Runoff Depth>4.13"
Tc=6.0 min CN=96 Runoff=0.23 cfs 0.018 af

Subcatchment 3S: Sub 3 - New Parking Area Runoff Area=4,245 sf 80.59% Impervious Runoff Depth>3.59"
Tc=6.0 min CN=91 Runoff=0.39 cfs 0.029 af

Subcatchment 4S: Sub 4 - New Parking Area Runoff Area=2,657 sf 96.01% Impervious Runoff Depth>4.25"
Tc=6.0 min CN=97 Runoff=0.27 cfs 0.022 af

Pond 1P: SC-740 Peak Elev=145.26' Storage=718 cf Inflow=0.39 cfs 0.029 af
Discarded=0.01 cfs 0.013 af Primary=0.02 cfs 0.002 af Outflow=0.03 cfs 0.015 af

Pond 2P: SC-740 Peak Elev=149.02' Storage=197 cf Inflow=0.27 cfs 0.022 af
Discarded=0.00 cfs 0.005 af Primary=0.26 cfs 0.012 af Outflow=0.26 cfs 0.017 af

Link 1L: DP-1 Neponset River Inflow=5.88 cfs 0.425 af
Primary=5.88 cfs 0.425 af

Link 2L: DP-2 Main Street Inflow=0.23 cfs 0.018 af
Primary=0.23 cfs 0.018 af

Summary for Subcatchment 1S: Sub 1

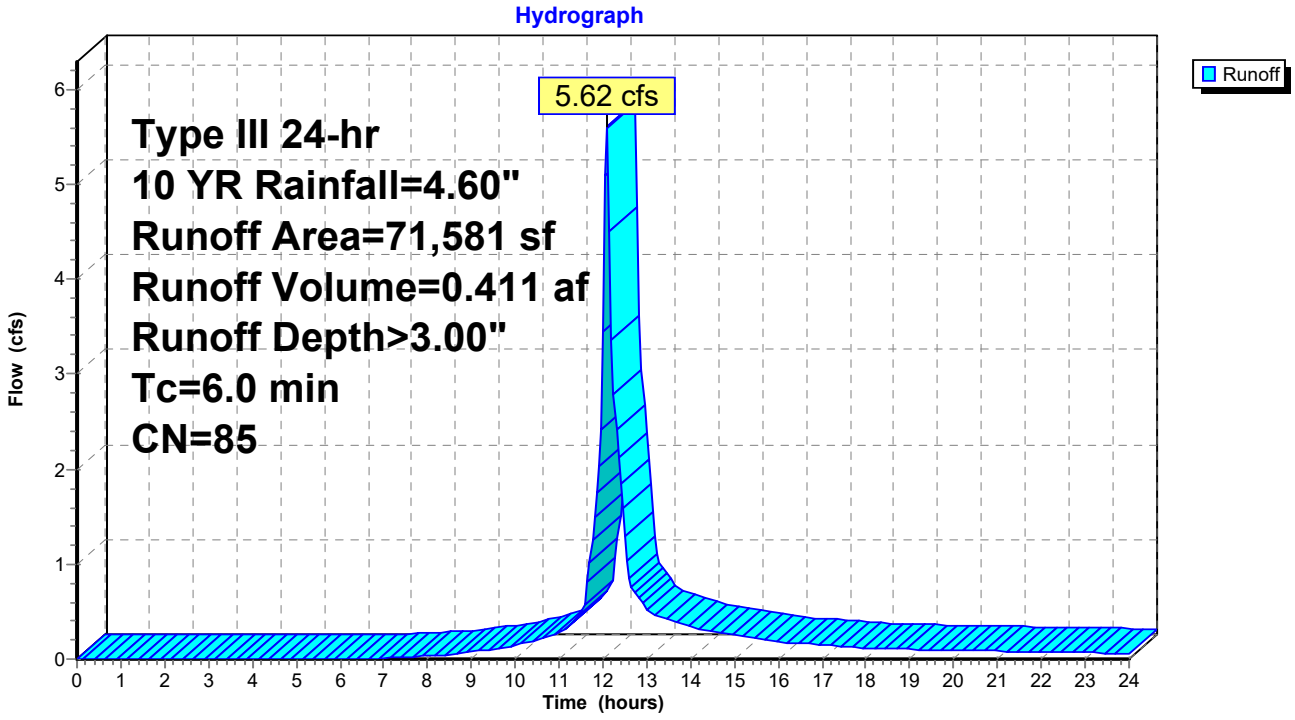
Runoff = 5.62 cfs @ 12.09 hrs, Volume= 0.411 af, Depth> 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.60"

Area (sf)	CN	Description
31,792	98	Paved parking, HSG A
15,592	98	Roofs, HSG A
24,197	61	>75% Grass cover, Good, HSG B
71,581	85	Weighted Average
24,197		33.80% Pervious Area
47,384		66.20% Impervious Area

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

Subcatchment 1S: Sub 1



Summary for Subcatchment 2S: Sub 2

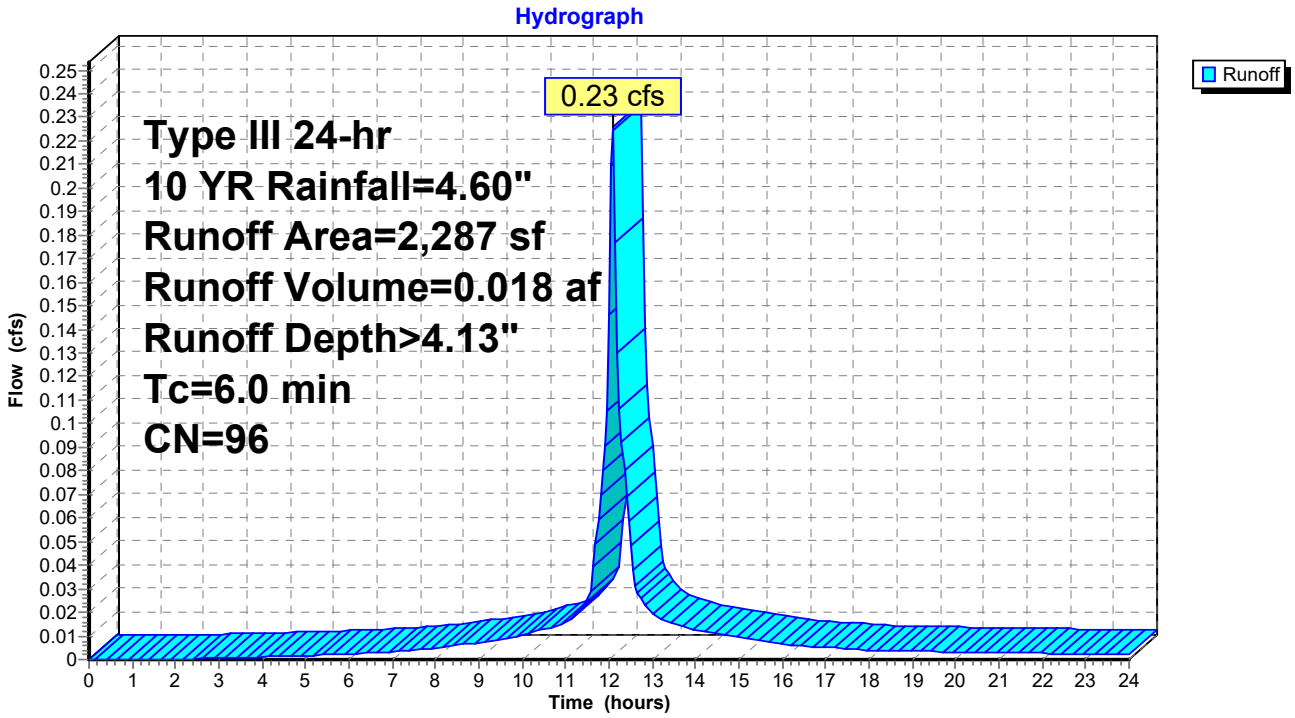
Runoff = 0.23 cfs @ 12.09 hrs, Volume= 0.018 af, Depth> 4.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.60"

Area (sf)	CN	Description
2,176	98	Paved parking, HSG A
111	61	>75% Grass cover, Good, HSG B
2,287	96	Weighted Average
111		4.85% Pervious Area
2,176		95.15% Impervious Area

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

Subcatchment 2S: Sub 2



Summary for Subcatchment 3S: Sub 3 - New Parking Area

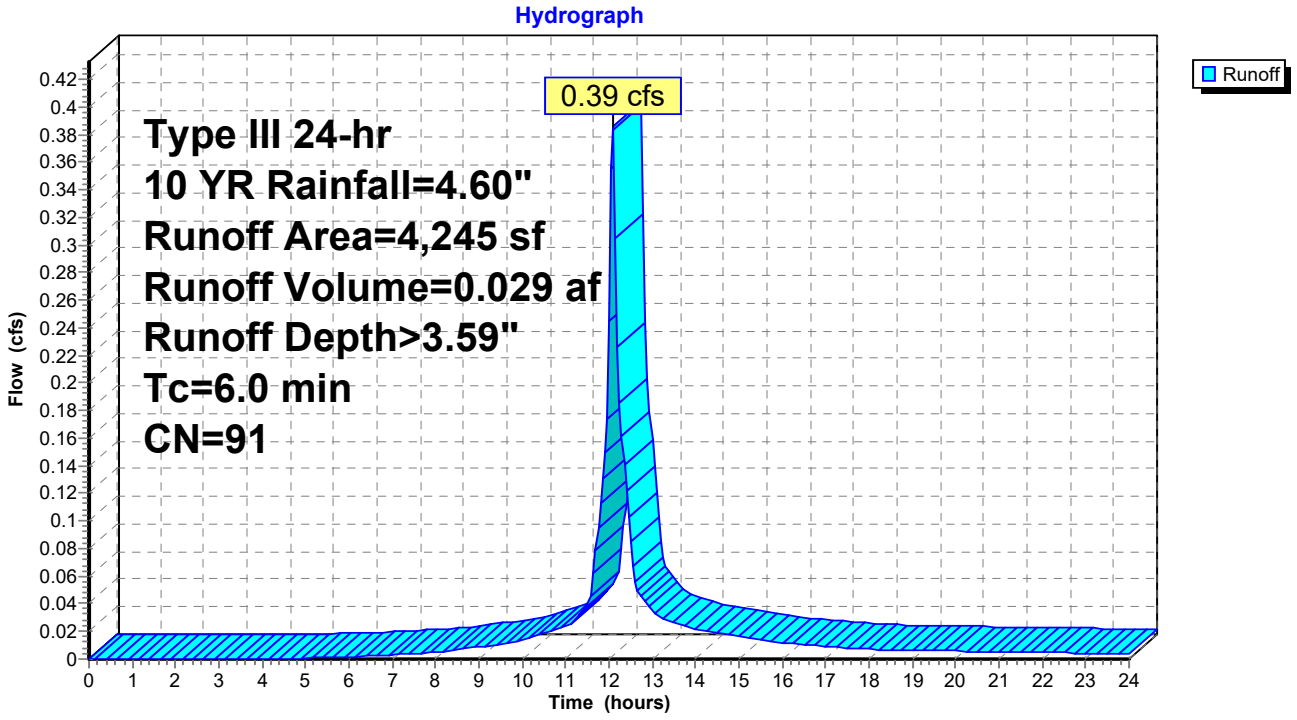
Runoff = 0.39 cfs @ 12.09 hrs, Volume= 0.029 af, Depth> 3.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.60"

	Area (sf)	CN	Description
*	2,278	98	Paved parking, HSG B
	824	61	>75% Grass cover, Good, HSG B
*	1,143	98	Roof HSG B
	4,245	91	Weighted Average
	824		19.41% Pervious Area
	3,421		80.59% Impervious Area

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

Subcatchment 3S: Sub 3 - New Parking Area



Summary for Subcatchment 4S: Sub 4 - New Parking Area

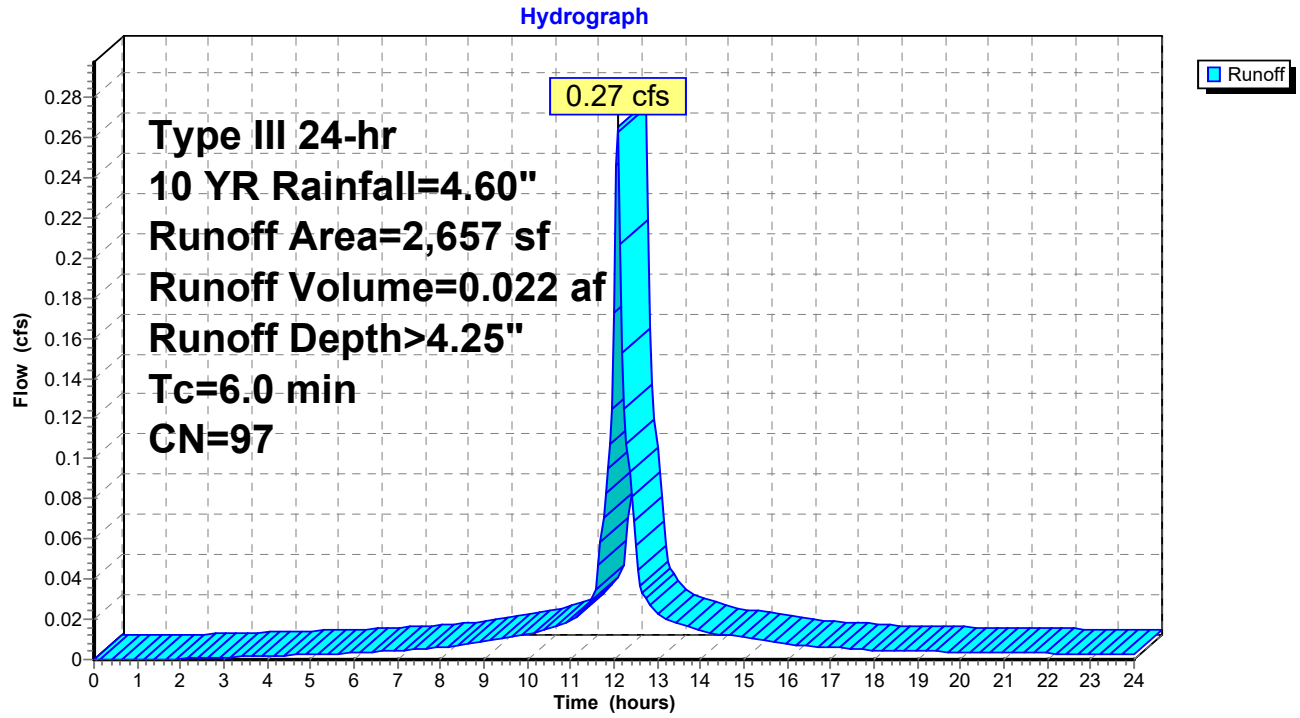
Runoff = 0.27 cfs @ 12.09 hrs, Volume= 0.022 af, Depth> 4.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.60"

	Area (sf)	CN	Description
*	2,551	98	Paved parking, HSG A
	106	61	>75% Grass cover, Good, HSG B
	2,657	97	Weighted Average
	106		3.99% Pervious Area
	2,551		96.01% Impervious Area

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

Subcatchment 4S: Sub 4 - New Parking Area



Summary for Pond 1P: SC-740

Inflow Area = 0.097 ac, 80.59% Impervious, Inflow Depth > 3.59" for 10 YR event
Inflow = 0.39 cfs @ 12.09 hrs, Volume= 0.029 af
Outflow = 0.03 cfs @ 13.42 hrs, Volume= 0.015 af, Atten= 93%, Lag= 79.9 min
Discarded = 0.01 cfs @ 9.30 hrs, Volume= 0.013 af
Primary = 0.02 cfs @ 13.42 hrs, Volume= 0.002 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 145.26' @ 13.40 hrs Surf.Area= 393 sf Storage= 718 cf

Plug-Flow detention time= 256.7 min calculated for 0.015 af (51% of inflow)
Center-of-Mass det. time= 144.4 min (933.5 - 789.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	142.00'	337 cf	**15.75'W x 24.98'L x 3.50'H Field A** 1,377 cf Overall - 413 cf Embedded = 963 cf x 35.0% Voids
#2A	142.50'	413 cf	**ADS_StormTech SC-740 +Cap** x 9 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 3 Rows of 3 Chambers
		751 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	142.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	145.25'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.01 cfs @ 9.30 hrs HW=142.04' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.01 cfs @ 13.42 hrs HW=145.26' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.01 cfs @ 0.27 fps)

Pond 1P: SC-740 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

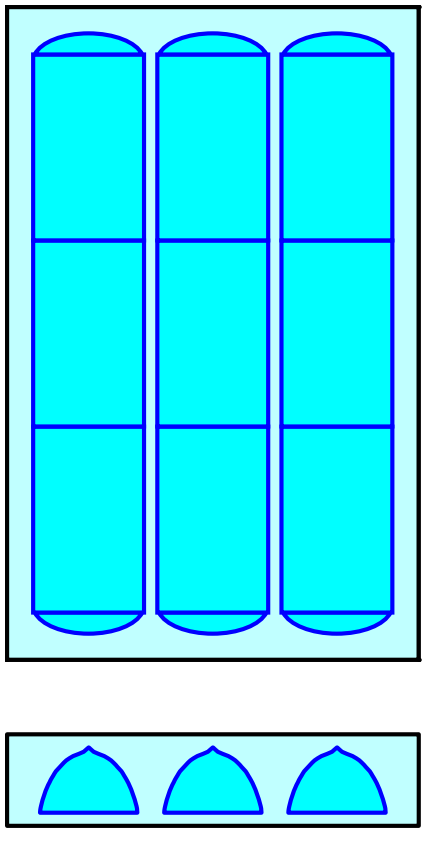
3 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 22.98' Row Length +12.0" End Stone x 2 = 24.98' Base Length
3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

9 Chambers x 45.9 cf = 413.5 cf Chamber Storage

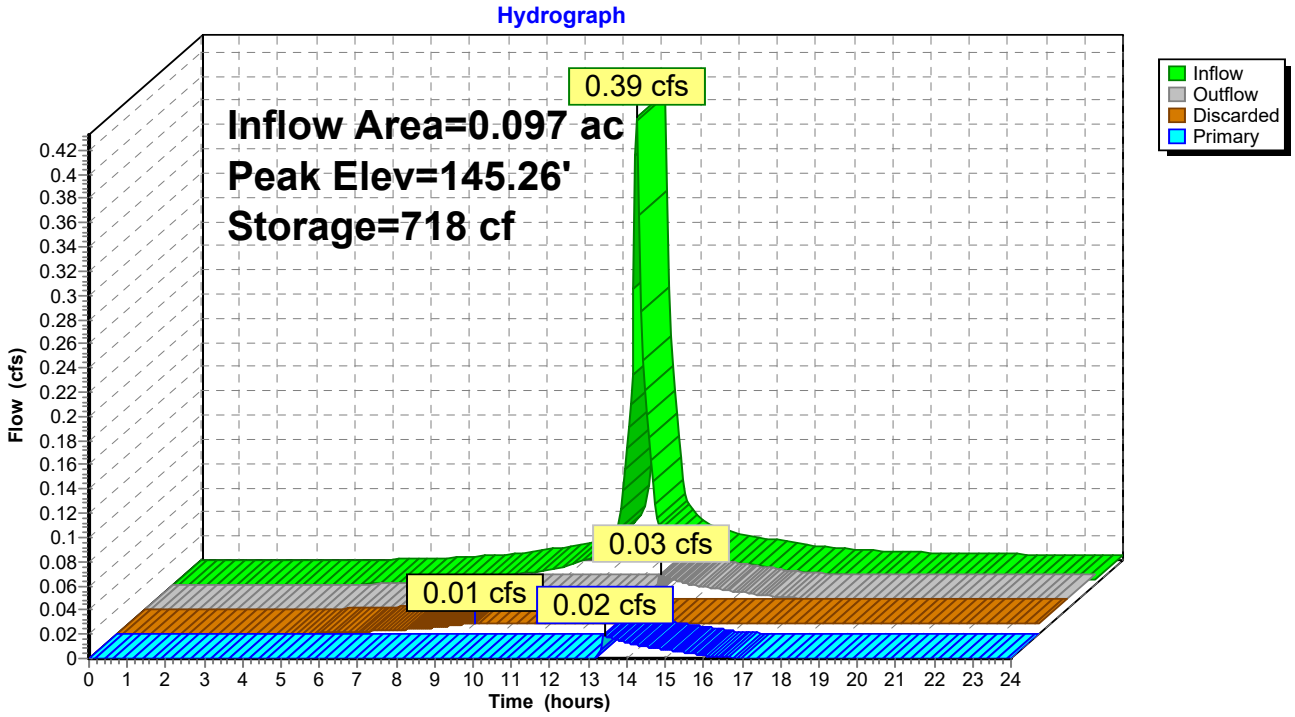
1,376.8 cf Field - 413.5 cf Chambers = 963.4 cf Stone x 35.0% Voids = 337.2 cf Stone Storage

Chamber Storage + Stone Storage = 750.6 cf = 0.017 af
Overall Storage Efficiency = 54.5%
Overall System Size = 24.98' x 15.75' x 3.50'

9 Chambers
51.0 cy Field
35.7 cy Stone



Pond 1P: SC-740



Summary for Pond 2P: SC-740

Inflow Area = 0.061 ac, 96.01% Impervious, Inflow Depth > 4.25" for 10 YR event
Inflow = 0.27 cfs @ 12.09 hrs, Volume= 0.022 af
Outflow = 0.26 cfs @ 12.09 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.1 min
Discarded = 0.00 cfs @ 5.55 hrs, Volume= 0.005 af
Primary = 0.26 cfs @ 12.09 hrs, Volume= 0.012 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 149.02' @ 12.09 hrs Surf.Area= 118 sf Storage= 197 cf

Plug-Flow detention time= 113.5 min calculated for 0.017 af (79% of inflow)
Center-of-Mass det. time= 36.0 min (793.1 - 757.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	145.70'	113 cf	**11.00'W x 10.74'L x 3.50'H Field A** 413 cf Overall - 92 cf Embedded = 321 cf x 35.0% Voids
#2A	146.20'	92 cf	**ADS_StormTech SC-740 +Cap** x 2 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 2 Rows of 1 Chambers
		204 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	145.70'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	148.95'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.00 cfs @ 5.55 hrs HW=145.74' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.25 cfs @ 12.09 hrs HW=149.02' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.25 cfs @ 0.73 fps)

Pond 2P: SC-740 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

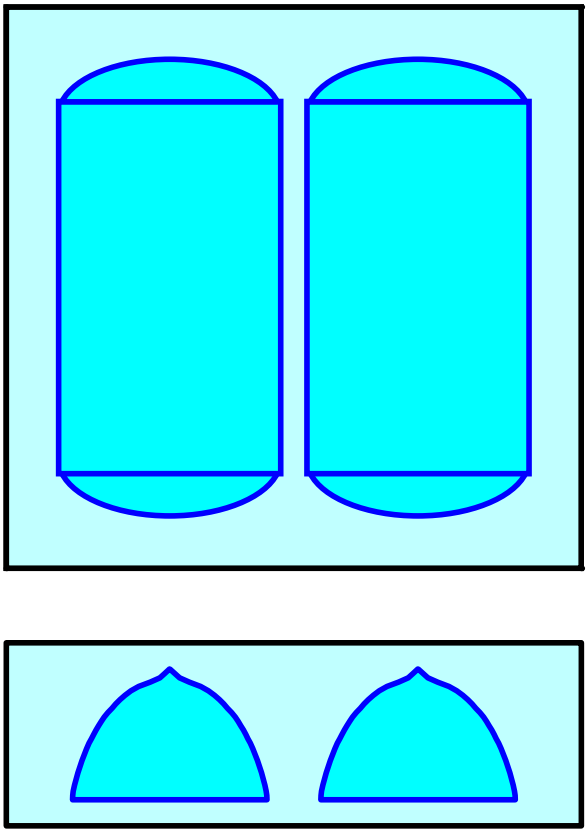
1 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 8.74' Row Length +12.0" End Stone x 2 = 10.74' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

2 Chambers x 45.9 cf = 91.9 cf Chamber Storage

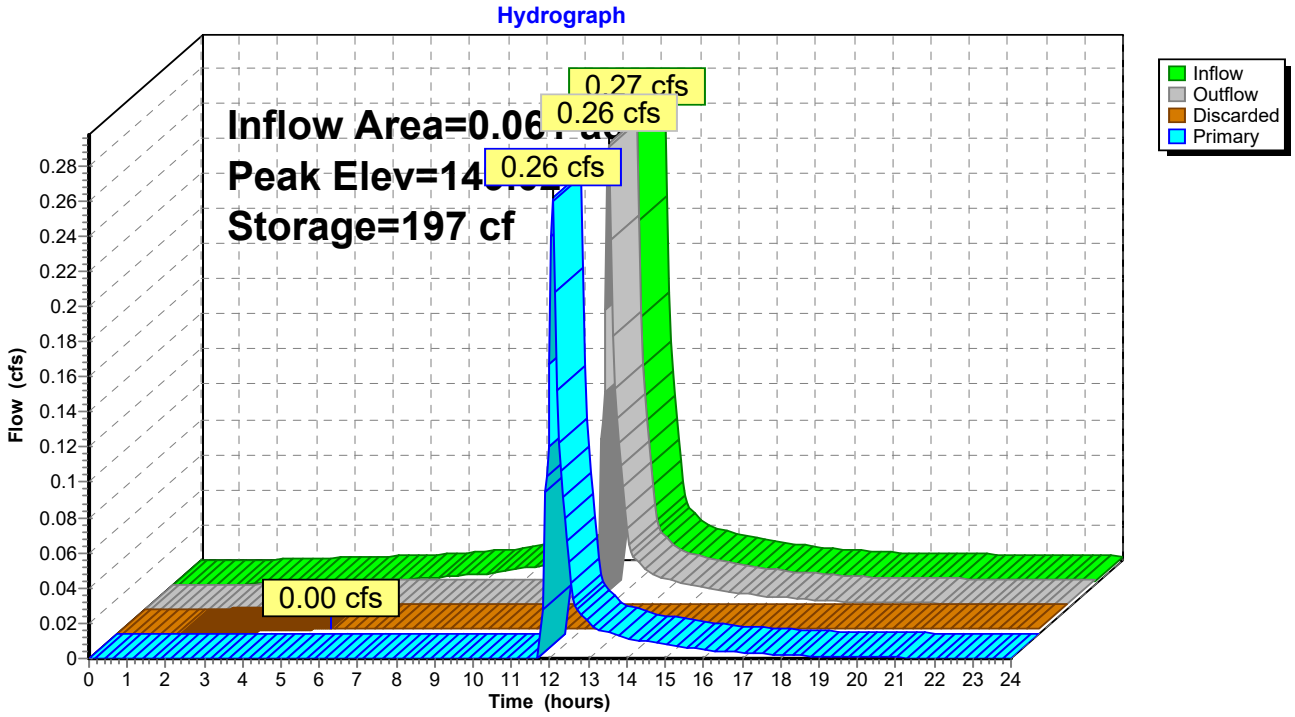
413.4 cf Field - 91.9 cf Chambers = 321.5 cf Stone x 35.0% Voids = 112.5 cf Stone Storage

Chamber Storage + Stone Storage = 204.4 cf = 0.005 af
Overall Storage Efficiency = 49.4%
Overall System Size = 10.74' x 11.00' x 3.50'

2 Chambers
15.3 cy Field
11.9 cy Stone



Pond 2P: SC-740

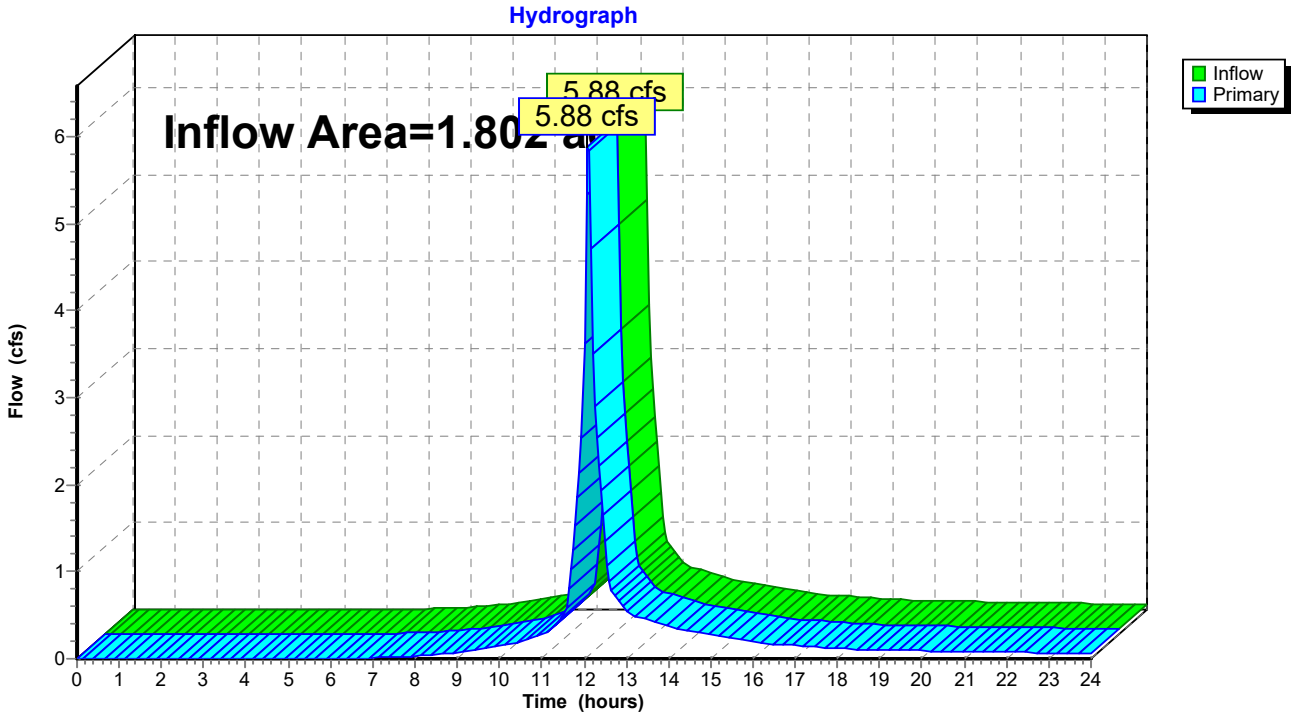


Summary for Link 1L: DP-1 Neponset River

Inflow Area = 1.802 ac, 67.98% Impervious, Inflow Depth > 2.83" for 10 YR event
Inflow = 5.88 cfs @ 12.09 hrs, Volume= 0.425 af
Primary = 5.88 cfs @ 12.09 hrs, Volume= 0.425 af, Atten= 0%, Lag= 0.0 min

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

Link 1L: DP-1 Neponset River

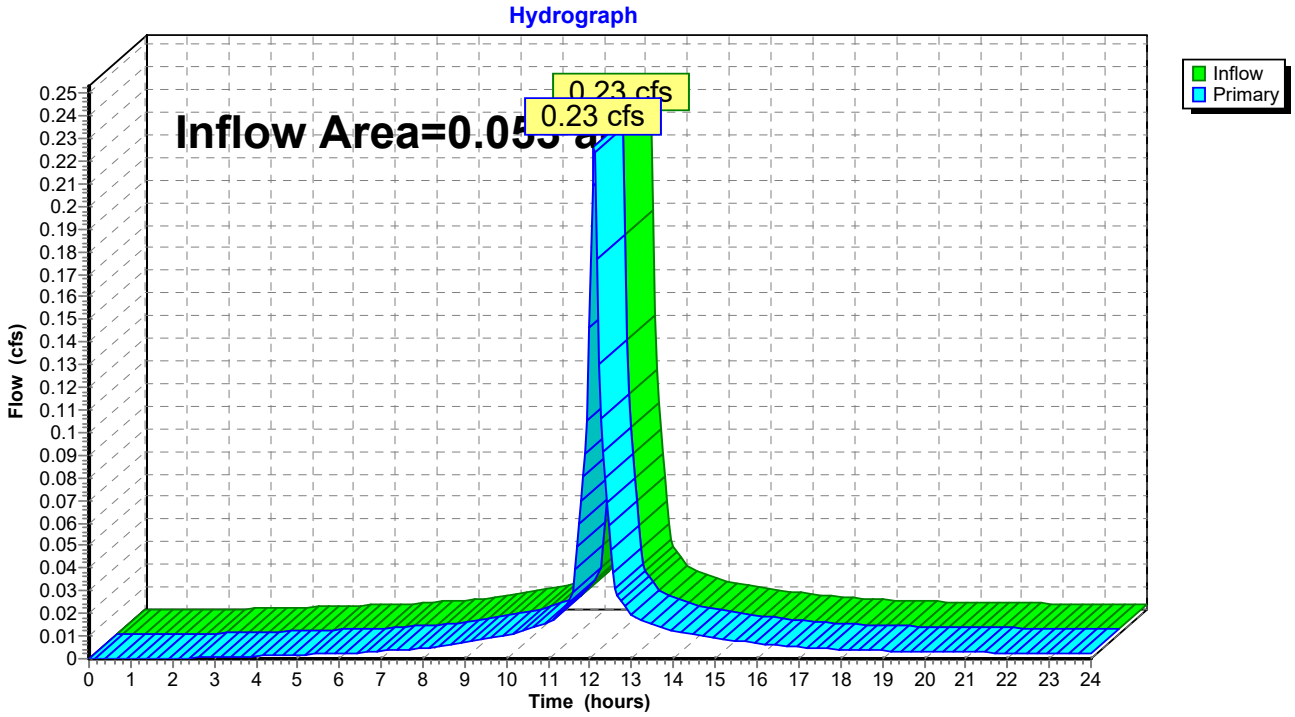


Summary for Link 2L: DP-2 Main Street

Inflow Area = 0.053 ac, 95.15% Impervious, Inflow Depth > 4.13" for 10 YR event
Inflow = 0.23 cfs @ 12.09 hrs, Volume= 0.018 af
Primary = 0.23 cfs @ 12.09 hrs, Volume= 0.018 af, Atten= 0%, Lag= 0.0 min

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

Link 2L: DP-2 Main Street



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Sub 1 Runoff Area=71,581 sf 66.20% Impervious Runoff Depth>3.92"
Tc=6.0 min CN=85 Runoff=7.29 cfs 0.537 af

Subcatchment 2S: Sub 2 Runoff Area=2,287 sf 95.15% Impervious Runoff Depth>5.13"
Tc=6.0 min CN=96 Runoff=0.28 cfs 0.022 af

Subcatchment 3S: Sub 3 - New Parking Area Runoff Area=4,245 sf 80.59% Impervious Runoff Depth>4.56"
Tc=6.0 min CN=91 Runoff=0.48 cfs 0.037 af

Subcatchment 4S: Sub 4 - New Parking Area Runoff Area=2,657 sf 96.01% Impervious Runoff Depth>5.24"
Tc=6.0 min CN=97 Runoff=0.32 cfs 0.027 af

Pond 1P: SC-740 Peak Elev=145.30' Storage=723 cf Inflow=0.48 cfs 0.037 af
Discarded=0.01 cfs 0.013 af Primary=0.17 cfs 0.009 af Outflow=0.18 cfs 0.022 af

Pond 2P: SC-740 Peak Elev=149.03' Storage=197 cf Inflow=0.32 cfs 0.027 af
Discarded=0.00 cfs 0.005 af Primary=0.32 cfs 0.017 af Outflow=0.32 cfs 0.022 af

Link 1L: DP-1 Neponset River Inflow=7.61 cfs 0.563 af
Primary=7.61 cfs 0.563 af

Link 2L: DP-2 Main Street Inflow=0.28 cfs 0.022 af
Primary=0.28 cfs 0.022 af

Summary for Subcatchment 1S: Sub 1

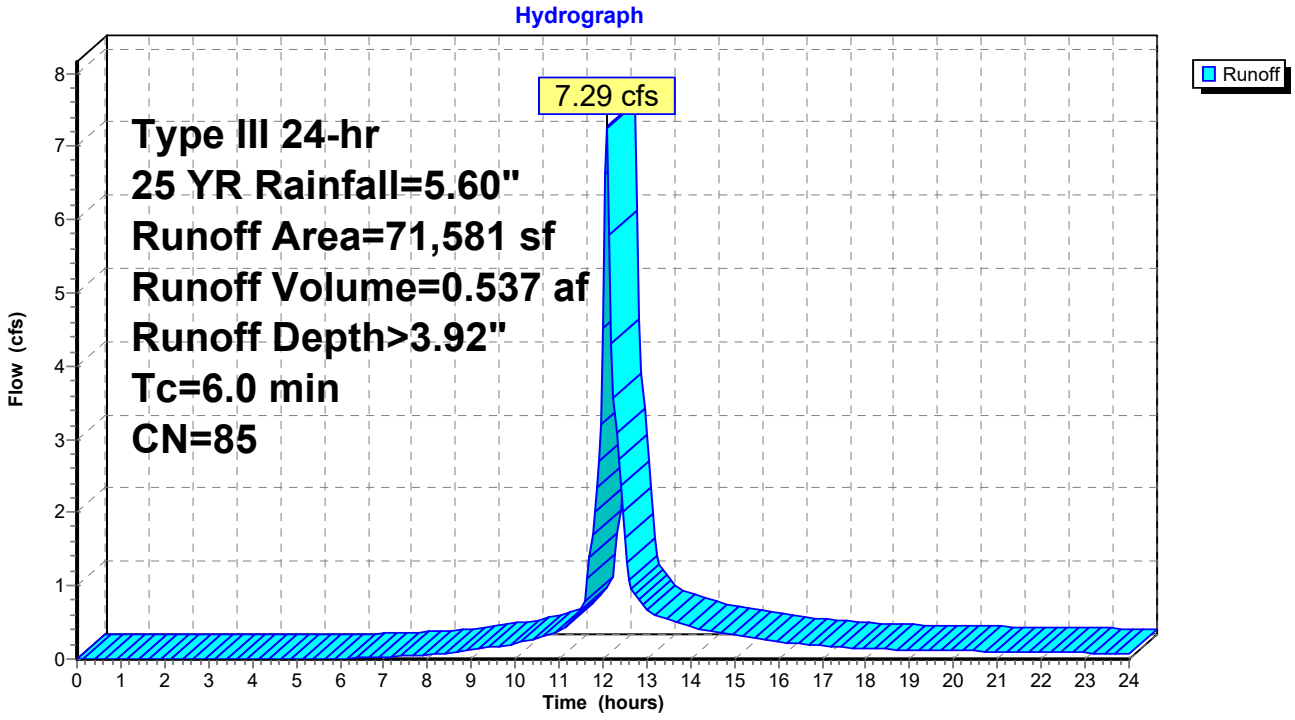
Runoff = 7.29 cfs @ 12.09 hrs, Volume= 0.537 af, Depth> 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=5.60"

Area (sf)	CN	Description
31,792	98	Paved parking, HSG A
15,592	98	Roofs, HSG A
24,197	61	>75% Grass cover, Good, HSG B
71,581	85	Weighted Average
24,197		33.80% Pervious Area
47,384		66.20% Impervious Area

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

Subcatchment 1S: Sub 1



Summary for Subcatchment 2S: Sub 2

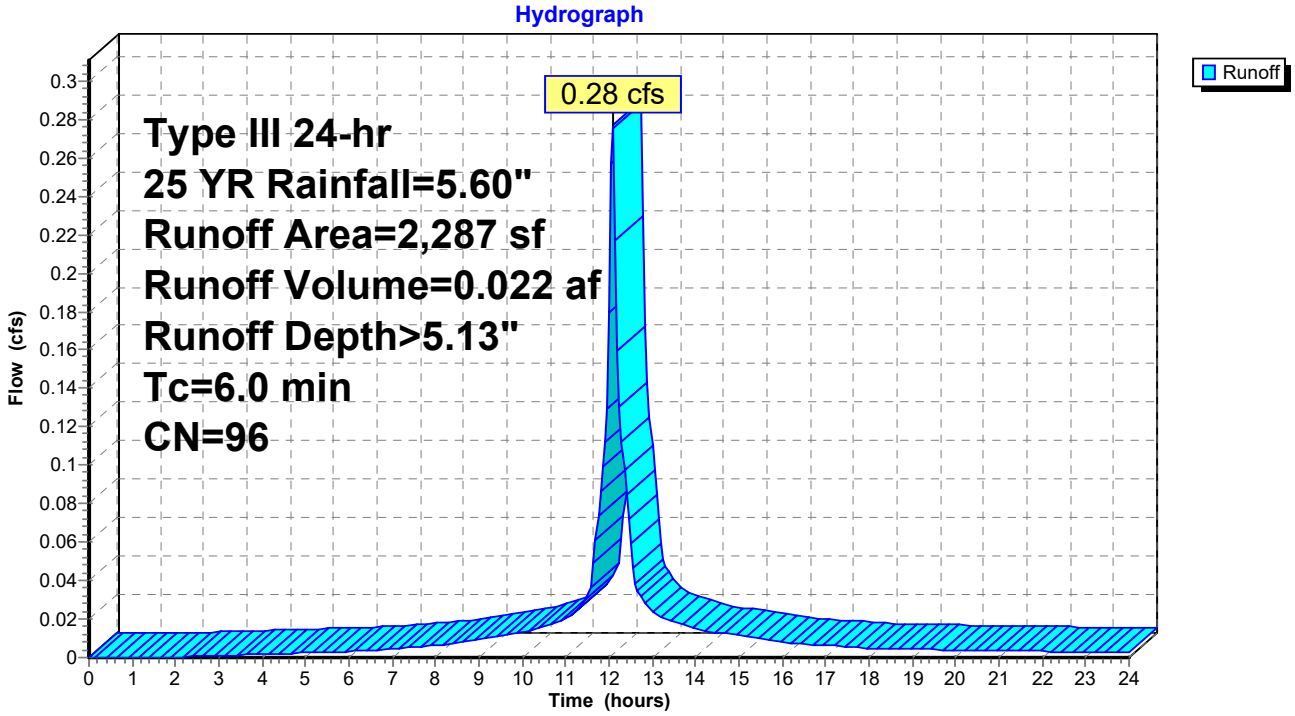
Runoff = 0.28 cfs @ 12.09 hrs, Volume= 0.022 af, Depth> 5.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=5.60"

Area (sf)	CN	Description
2,176	98	Paved parking, HSG A
111	61	>75% Grass cover, Good, HSG B
2,287	96	Weighted Average
111		4.85% Pervious Area
2,176		95.15% Impervious Area

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

Subcatchment 2S: Sub 2



Summary for Subcatchment 3S: Sub 3 - New Parking Area

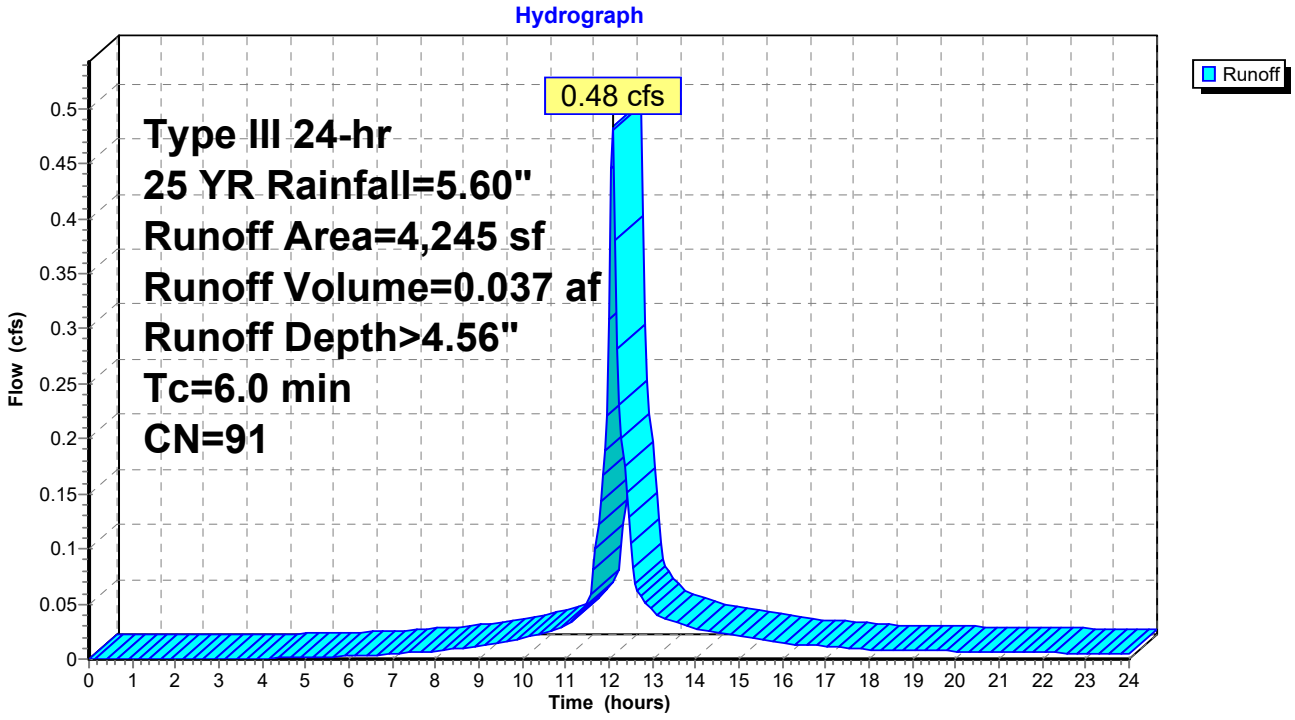
Runoff = 0.48 cfs @ 12.09 hrs, Volume= 0.037 af, Depth> 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=5.60"

	Area (sf)	CN	Description
*	2,278	98	Paved parking, HSG B
	824	61	>75% Grass cover, Good, HSG B
*	1,143	98	Roof HSG B
	4,245	91	Weighted Average
	824		19.41% Pervious Area
	3,421		80.59% Impervious Area

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

Subcatchment 3S: Sub 3 - New Parking Area



Summary for Subcatchment 4S: Sub 4 - New Parking Area

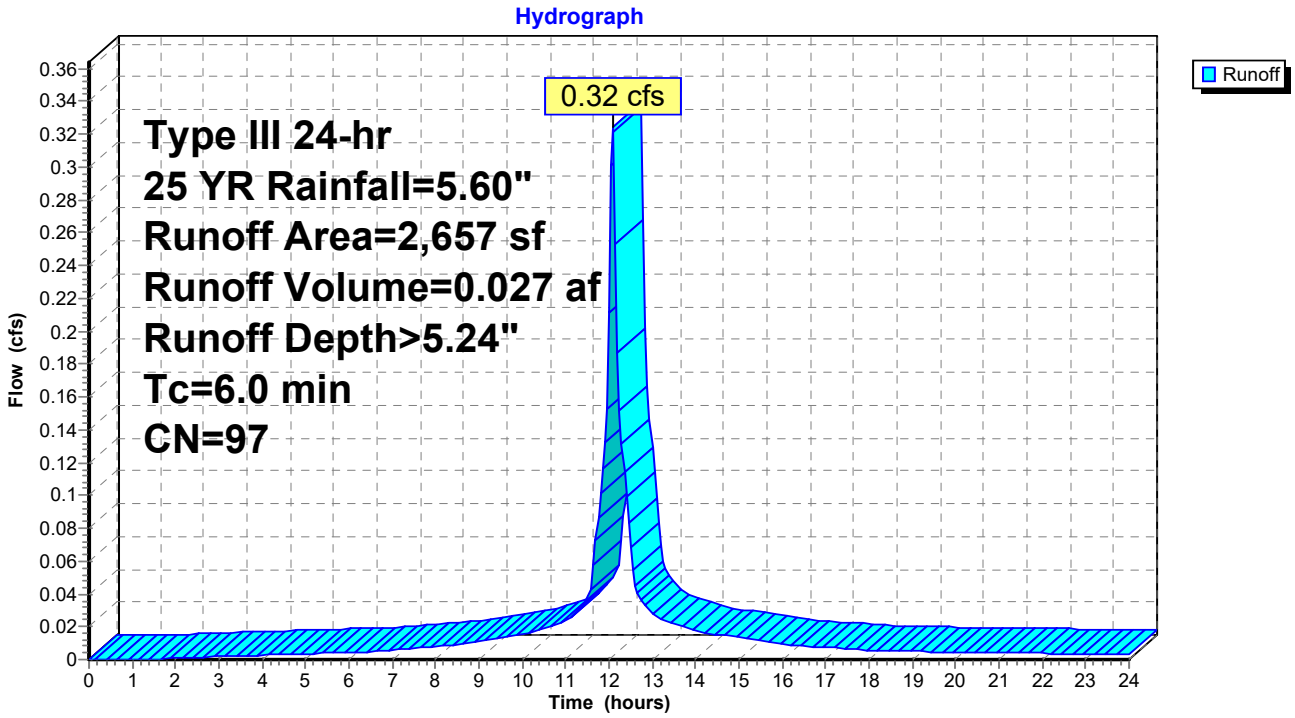
Runoff = 0.32 cfs @ 12.09 hrs, Volume= 0.027 af, Depth> 5.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=5.60"

	Area (sf)	CN	Description
*	2,551	98	Paved parking, HSG A
	106	61	>75% Grass cover, Good, HSG B
	2,657	97	Weighted Average
	106		3.99% Pervious Area
	2,551		96.01% Impervious Area

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

Subcatchment 4S: Sub 4 - New Parking Area



Summary for Pond 1P: SC-740

Inflow Area = 0.097 ac, 80.59% Impervious, Inflow Depth > 4.56" for 25 YR event
Inflow = 0.48 cfs @ 12.09 hrs, Volume= 0.037 af
Outflow = 0.18 cfs @ 12.37 hrs, Volume= 0.022 af, Atten= 62%, Lag= 16.7 min
Discarded = 0.01 cfs @ 8.65 hrs, Volume= 0.013 af
Primary = 0.17 cfs @ 12.37 hrs, Volume= 0.009 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 145.30' @ 12.35 hrs Surf.Area= 393 sf Storage= 723 cf

Plug-Flow detention time= 196.7 min calculated for 0.022 af (59% of inflow)
Center-of-Mass det. time= 92.9 min (875.6 - 782.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	142.00'	337 cf	**15.75'W x 24.98'L x 3.50'H Field A** 1,377 cf Overall - 413 cf Embedded = 963 cf x 35.0% Voids
#2A	142.50'	413 cf	**ADS_StormTech SC-740 +Cap** x 9 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 3 Rows of 3 Chambers
		751 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	142.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	145.25'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.01 cfs @ 8.65 hrs HW=142.04' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.16 cfs @ 12.37 hrs HW=145.30' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.16 cfs @ 0.63 fps)

Pond 1P: SC-740 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

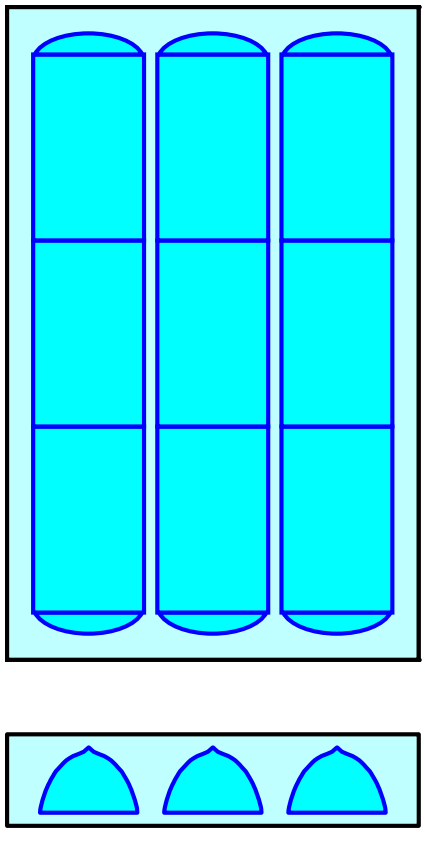
3 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 22.98' Row Length +12.0" End Stone x 2 = 24.98' Base Length
3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

9 Chambers x 45.9 cf = 413.5 cf Chamber Storage

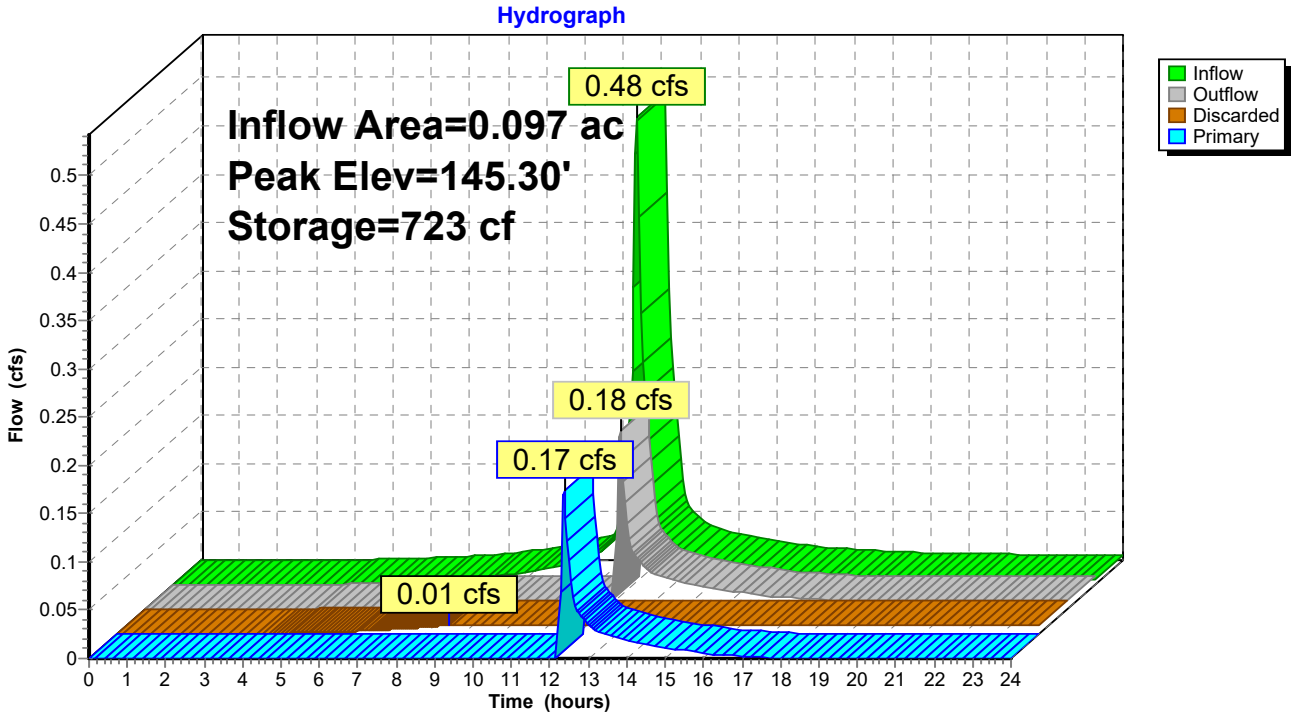
1,376.8 cf Field - 413.5 cf Chambers = 963.4 cf Stone x 35.0% Voids = 337.2 cf Stone Storage

Chamber Storage + Stone Storage = 750.6 cf = 0.017 af
Overall Storage Efficiency = 54.5%
Overall System Size = 24.98' x 15.75' x 3.50'

9 Chambers
51.0 cy Field
35.7 cy Stone



Pond 1P: SC-740



Summary for Pond 2P: SC-740

Inflow Area = 0.061 ac, 96.01% Impervious, Inflow Depth > 5.24" for 25 YR event
Inflow = 0.32 cfs @ 12.09 hrs, Volume= 0.027 af
Outflow = 0.32 cfs @ 12.09 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.1 min
Discarded = 0.00 cfs @ 4.40 hrs, Volume= 0.005 af
Primary = 0.32 cfs @ 12.09 hrs, Volume= 0.017 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 149.03' @ 12.09 hrs Surf.Area= 118 sf Storage= 197 cf

Plug-Flow detention time= 103.8 min calculated for 0.022 af (83% of inflow)
Center-of-Mass det. time= 34.8 min (787.8 - 753.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	145.70'	113 cf	**11.00'W x 10.74'L x 3.50'H Field A** 413 cf Overall - 92 cf Embedded = 321 cf x 35.0% Voids
#2A	146.20'	92 cf	**ADS_StormTech SC-740 +Cap** x 2 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 2 Rows of 1 Chambers
		204 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	145.70'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	148.95'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.00 cfs @ 4.40 hrs HW=145.74' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.31 cfs @ 12.09 hrs HW=149.03' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.31 cfs @ 0.79 fps)

Pond 2P: SC-740 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

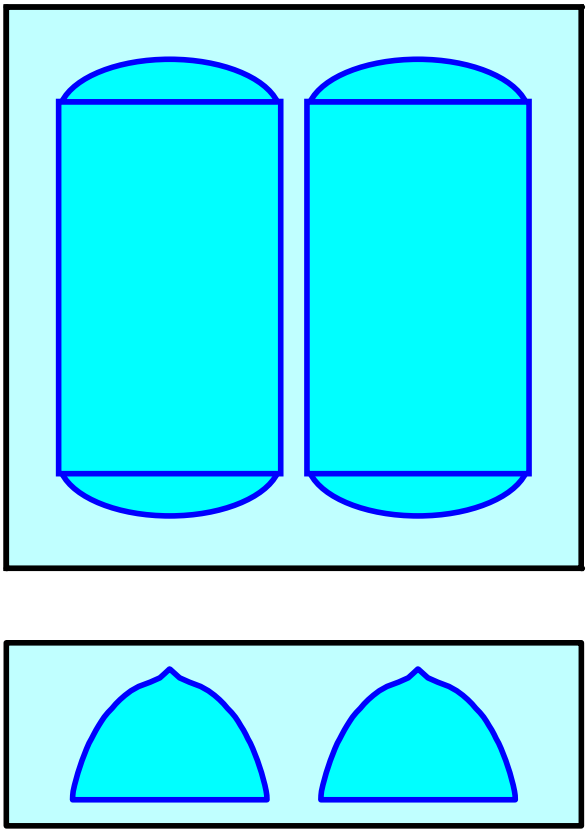
1 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 8.74' Row Length +12.0" End Stone x 2 = 10.74' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

2 Chambers x 45.9 cf = 91.9 cf Chamber Storage

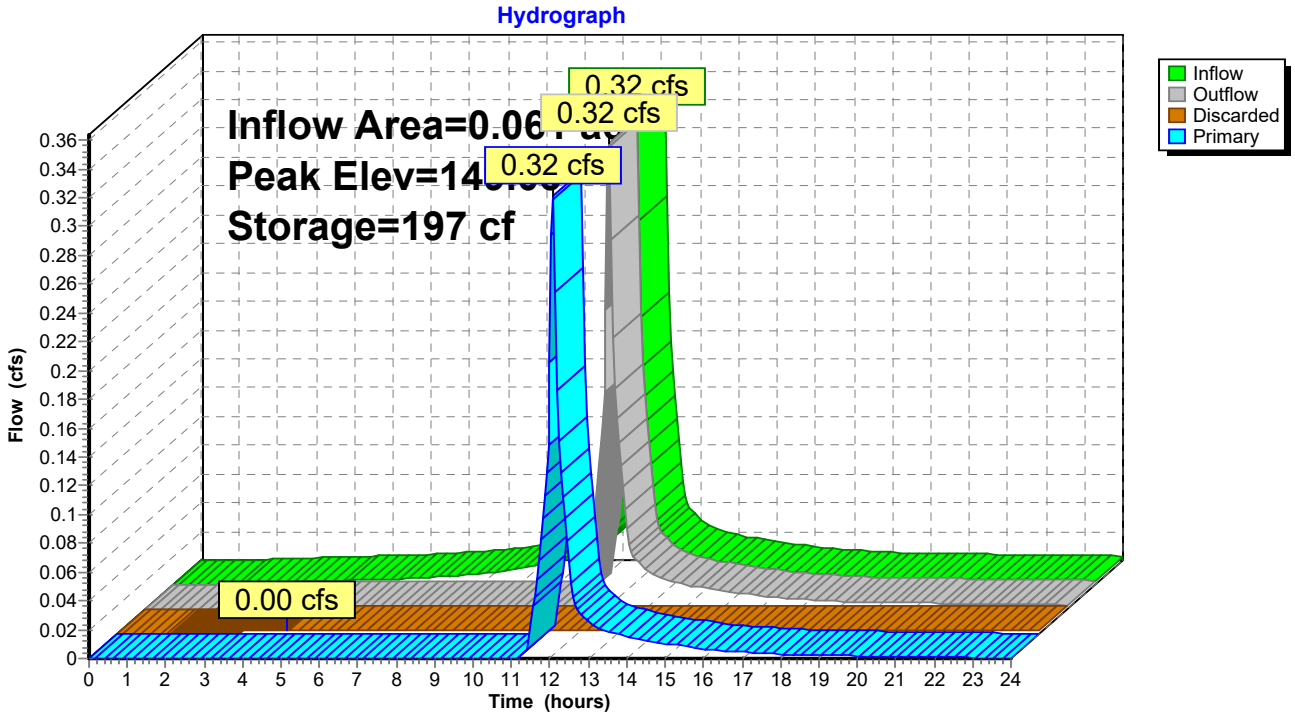
413.4 cf Field - 91.9 cf Chambers = 321.5 cf Stone x 35.0% Voids = 112.5 cf Stone Storage

Chamber Storage + Stone Storage = 204.4 cf = 0.005 af
Overall Storage Efficiency = 49.4%
Overall System Size = 10.74' x 11.00' x 3.50'

2 Chambers
15.3 cy Field
11.9 cy Stone



Pond 2P: SC-740

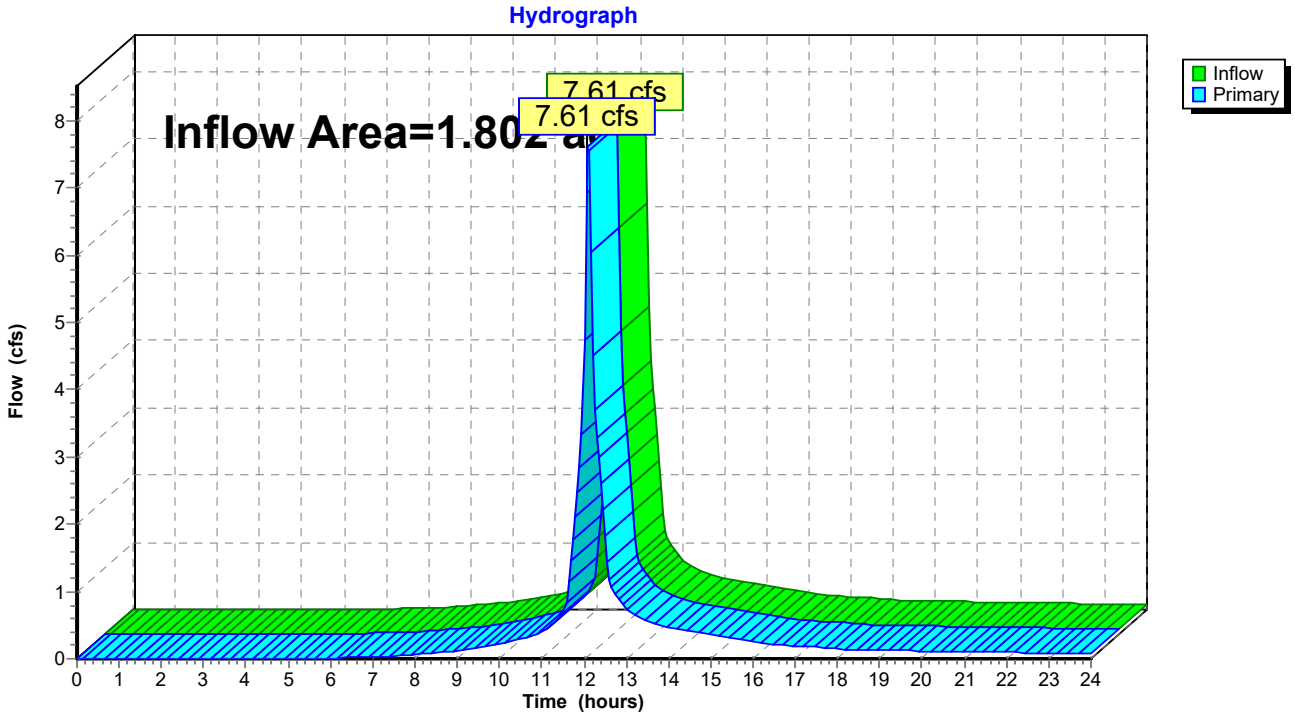


Summary for Link 1L: DP-1 Neponset River

Inflow Area = 1.802 ac, 67.98% Impervious, Inflow Depth > 3.75" for 25 YR event
Inflow = 7.61 cfs @ 12.09 hrs, Volume= 0.563 af
Primary = 7.61 cfs @ 12.09 hrs, Volume= 0.563 af, Atten= 0%, Lag= 0.0 min

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

Link 1L: DP-1 Neponset River

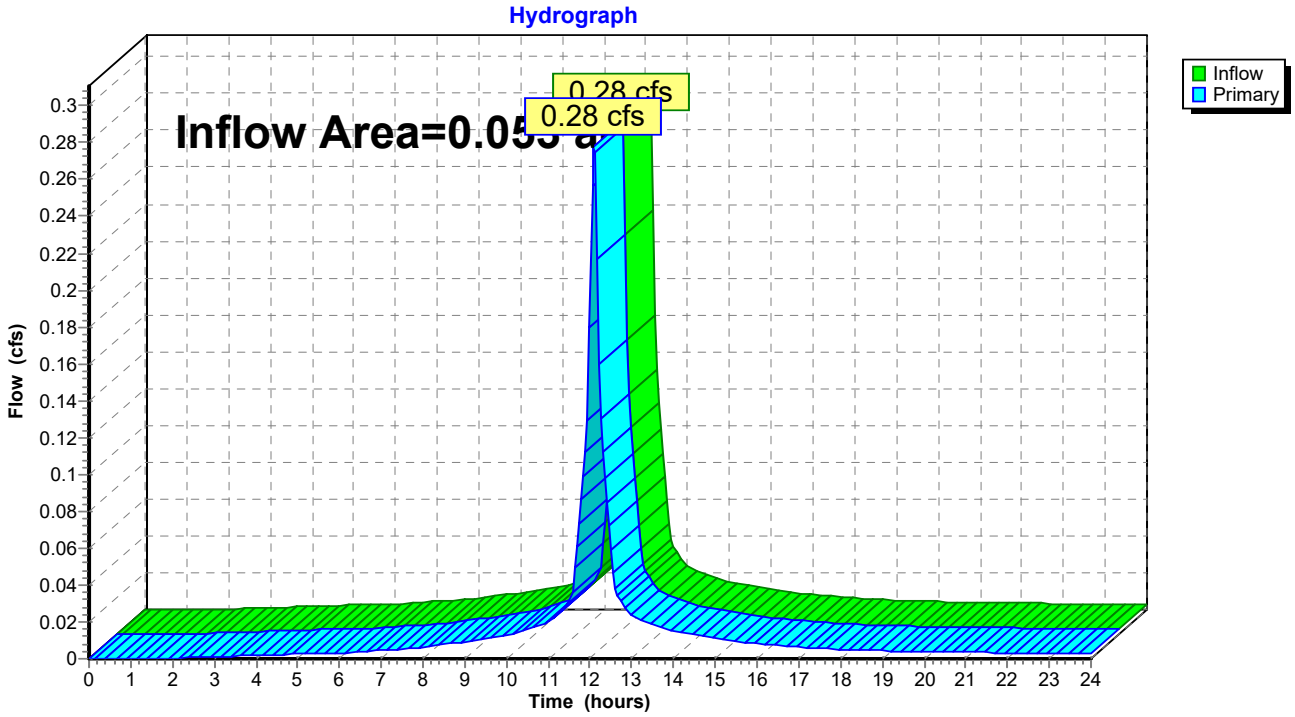


Summary for Link 2L: DP-2 Main Street

Inflow Area = 0.053 ac, 95.15% Impervious, Inflow Depth > 5.13" for 25 YR event
Inflow = 0.28 cfs @ 12.09 hrs, Volume= 0.022 af
Primary = 0.28 cfs @ 12.09 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min

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

Link 2L: DP-2 Main Street



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Sub 1 Runoff Area=71,581 sf 66.20% Impervious Runoff Depth>5.06"
Tc=6.0 min CN=85 Runoff=9.29 cfs 0.693 af

Subcatchment 2S: Sub 2 Runoff Area=2,287 sf 95.15% Impervious Runoff Depth>6.32"
Tc=6.0 min CN=96 Runoff=0.34 cfs 0.028 af

Subcatchment 3S: Sub 3 - New Parking Area Runoff Area=4,245 sf 80.59% Impervious Runoff Depth>5.74"
Tc=6.0 min CN=91 Runoff=0.60 cfs 0.047 af

Subcatchment 4S: Sub 4 - New Parking Area Runoff Area=2,657 sf 96.01% Impervious Runoff Depth>6.44"
Tc=6.0 min CN=97 Runoff=0.40 cfs 0.033 af

Pond 1P: SC-740 Peak Elev=145.36' Storage=731 cf Inflow=0.60 cfs 0.047 af
Discarded=0.01 cfs 0.014 af Primary=0.51 cfs 0.017 af Outflow=0.51 cfs 0.031 af

Pond 2P: SC-740 Peak Elev=149.04' Storage=198 cf Inflow=0.40 cfs 0.033 af
Discarded=0.00 cfs 0.005 af Primary=0.39 cfs 0.023 af Outflow=0.39 cfs 0.028 af

Link 1L: DP-1 Neponset River Inflow=9.64 cfs 0.733 af
Primary=9.64 cfs 0.733 af

Link 2L: DP-2 Main Street Inflow=0.34 cfs 0.028 af
Primary=0.34 cfs 0.028 af

Summary for Subcatchment 1S: Sub 1

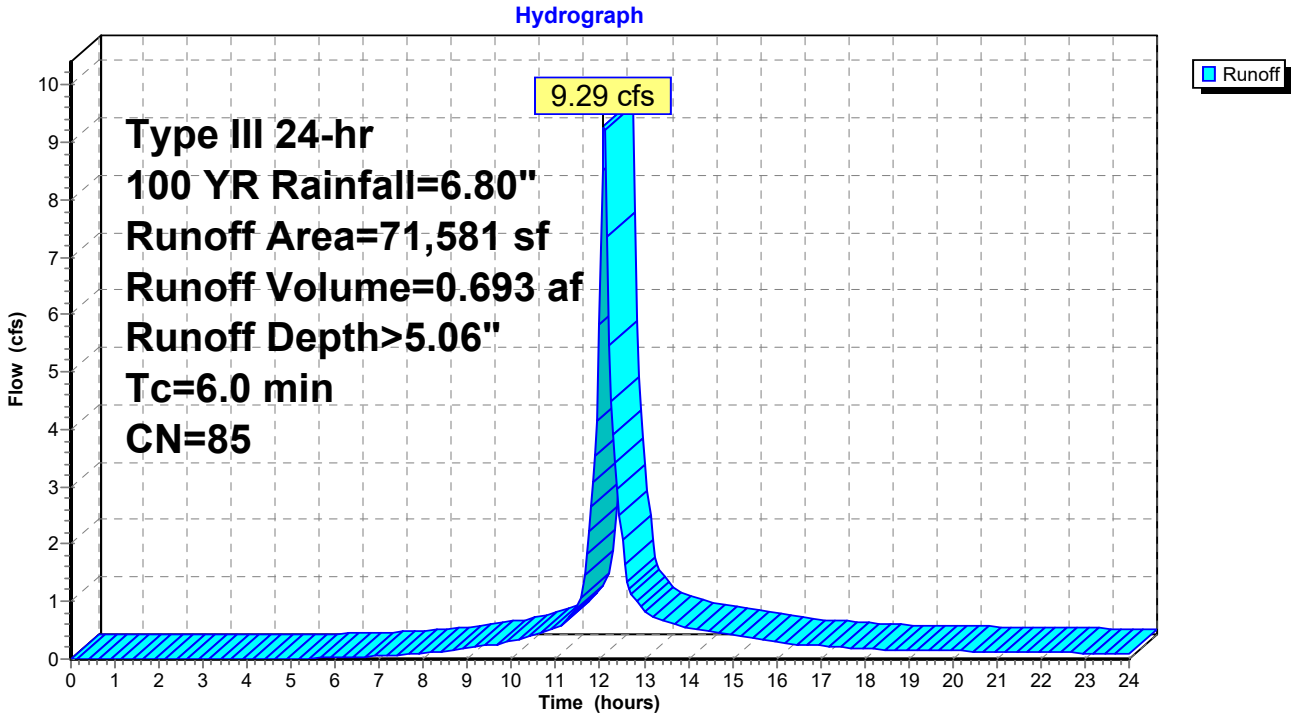
Runoff = 9.29 cfs @ 12.09 hrs, Volume= 0.693 af, Depth> 5.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=6.80"

Area (sf)	CN	Description
31,792	98	Paved parking, HSG A
15,592	98	Roofs, HSG A
24,197	61	>75% Grass cover, Good, HSG B
71,581	85	Weighted Average
24,197		33.80% Pervious Area
47,384		66.20% Impervious Area

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

Subcatchment 1S: Sub 1



Summary for Subcatchment 2S: Sub 2

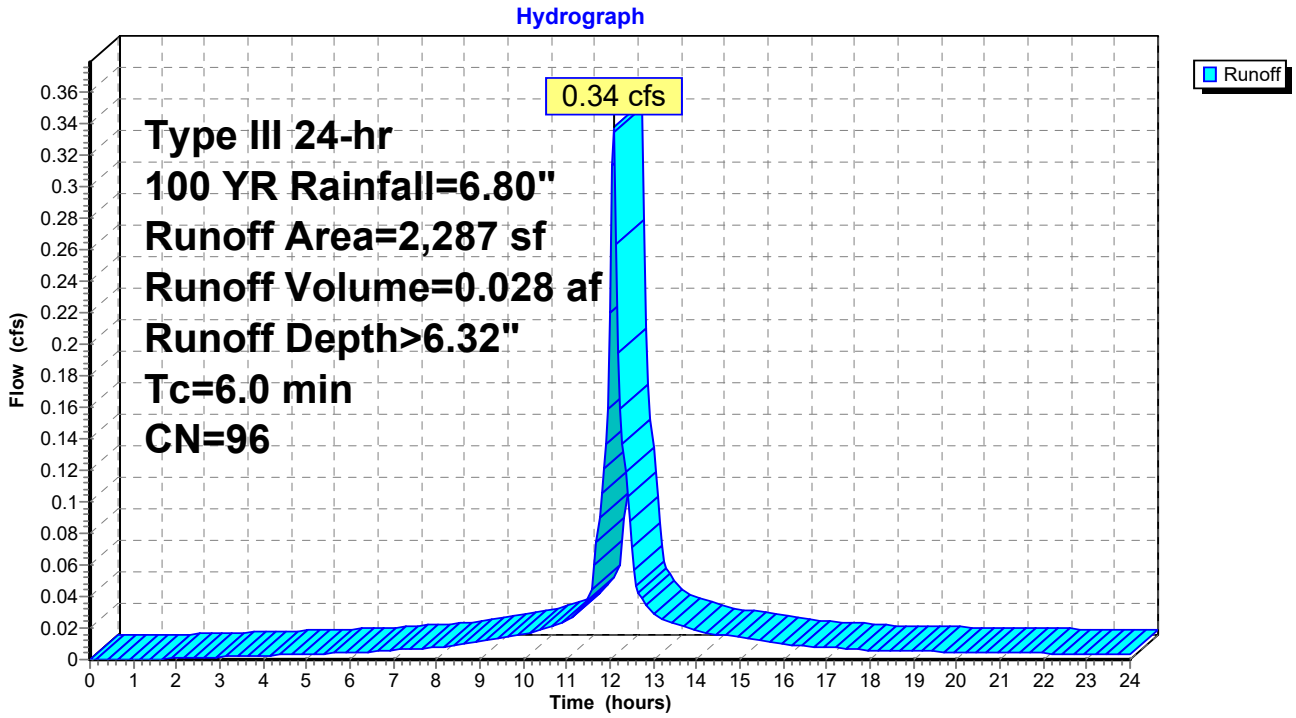
Runoff = 0.34 cfs @ 12.09 hrs, Volume= 0.028 af, Depth> 6.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=6.80"

Area (sf)	CN	Description
2,176	98	Paved parking, HSG A
111	61	>75% Grass cover, Good, HSG B
2,287	96	Weighted Average
111		4.85% Pervious Area
2,176		95.15% Impervious Area

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

Subcatchment 2S: Sub 2



Summary for Subcatchment 3S: Sub 3 - New Parking Area

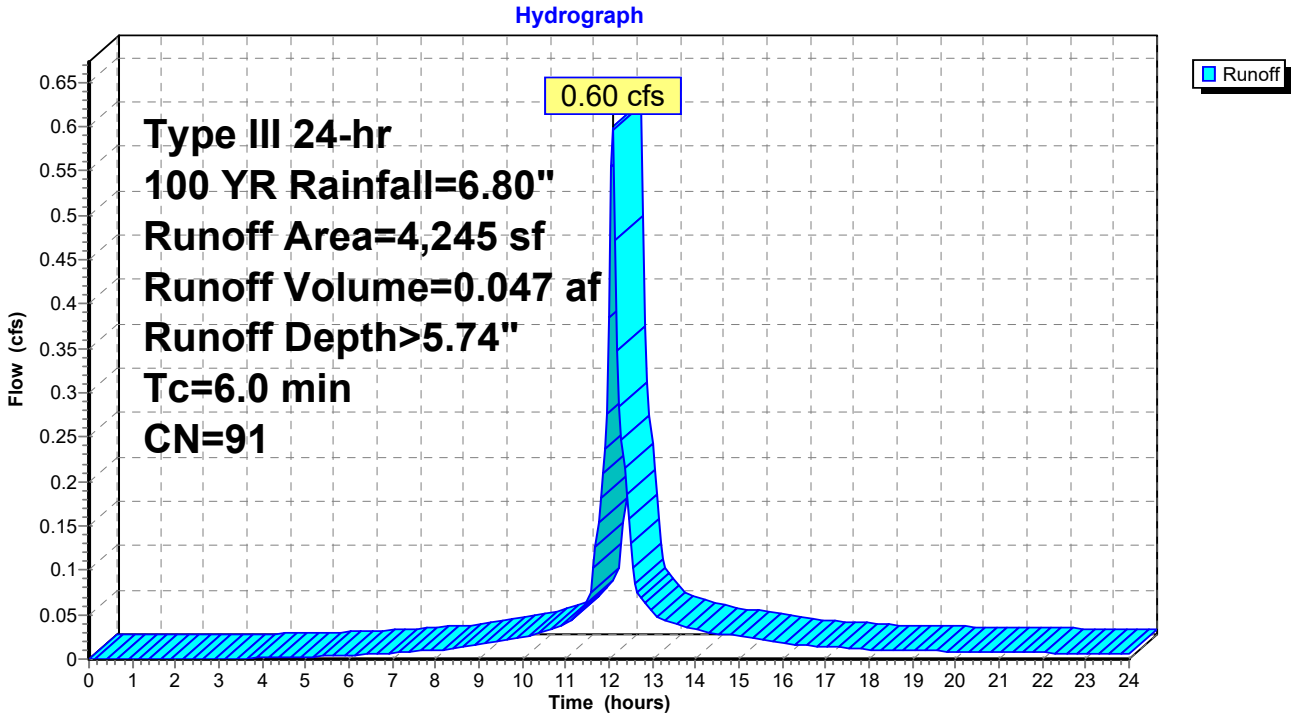
Runoff = 0.60 cfs @ 12.09 hrs, Volume= 0.047 af, Depth> 5.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=6.80"

	Area (sf)	CN	Description
*	2,278	98	Paved parking, HSG B
	824	61	>75% Grass cover, Good, HSG B
*	1,143	98	Roof HSG B
	4,245	91	Weighted Average
	824		19.41% Pervious Area
	3,421		80.59% Impervious Area

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

Subcatchment 3S: Sub 3 - New Parking Area



Summary for Subcatchment 4S: Sub 4 - New Parking Area

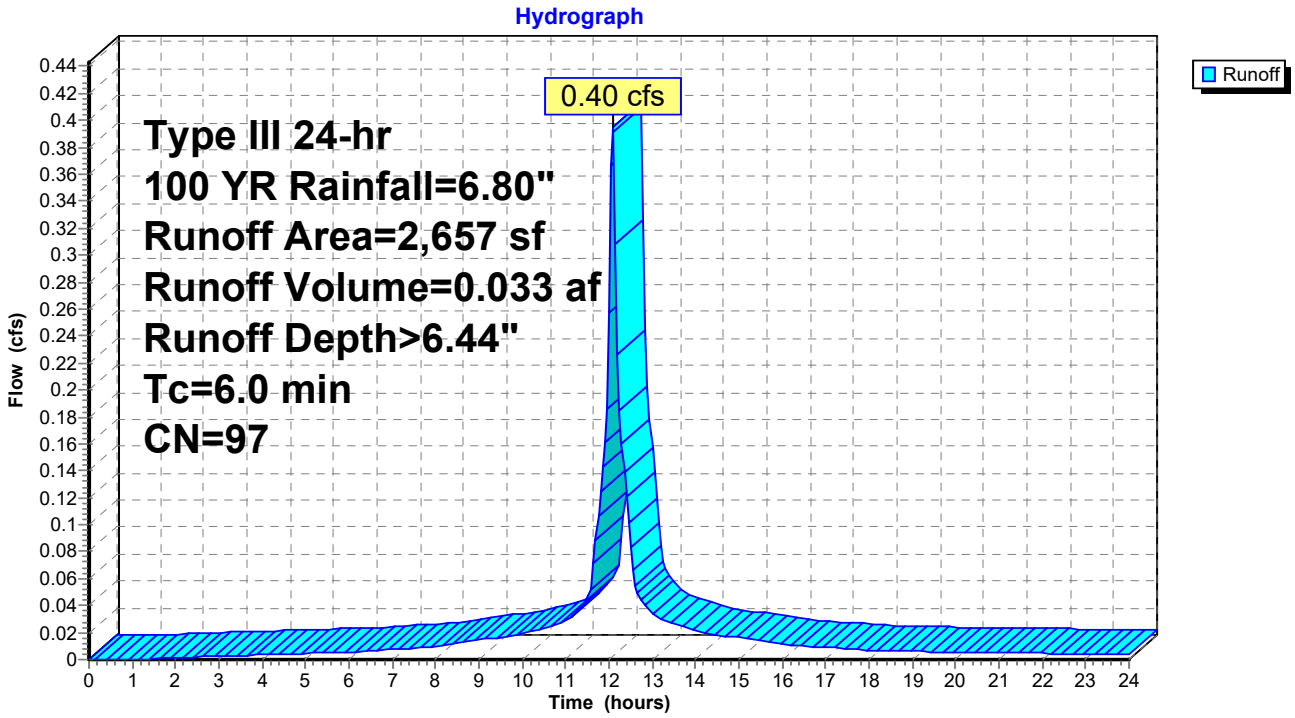
Runoff = 0.40 cfs @ 12.09 hrs, Volume= 0.033 af, Depth> 6.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=6.80"

	Area (sf)	CN	Description
*	2,551	98	Paved parking, HSG A
	106	61	>75% Grass cover, Good, HSG B
	2,657	97	Weighted Average
	106		3.99% Pervious Area
	2,551		96.01% Impervious Area

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

Subcatchment 4S: Sub 4 - New Parking Area



Summary for Pond 1P: SC-740

Inflow Area = 0.097 ac, 80.59% Impervious, Inflow Depth > 5.74" for 100 YR event
Inflow = 0.60 cfs @ 12.09 hrs, Volume= 0.047 af
Outflow = 0.51 cfs @ 12.16 hrs, Volume= 0.031 af, Atten= 14%, Lag= 4.6 min
Discarded = 0.01 cfs @ 7.95 hrs, Volume= 0.014 af
Primary = 0.51 cfs @ 12.16 hrs, Volume= 0.017 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 145.36' @ 12.15 hrs Surf.Area= 393 sf Storage= 731 cf

Plug-Flow detention time= 156.6 min calculated for 0.031 af (66% of inflow)
Center-of-Mass det. time= 61.3 min (838.1 - 776.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	142.00'	337 cf	**15.75'W x 24.98'L x 3.50'H Field A** 1,377 cf Overall - 413 cf Embedded = 963 cf x 35.0% Voids
#2A	142.50'	413 cf	**ADS_StormTech SC-740 +Cap** x 9 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 3 Rows of 3 Chambers
		751 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	142.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	145.25'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.01 cfs @ 7.95 hrs HW=142.04' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.44 cfs @ 12.16 hrs HW=145.35' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.44 cfs @ 0.88 fps)

Pond 1P: SC-740 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

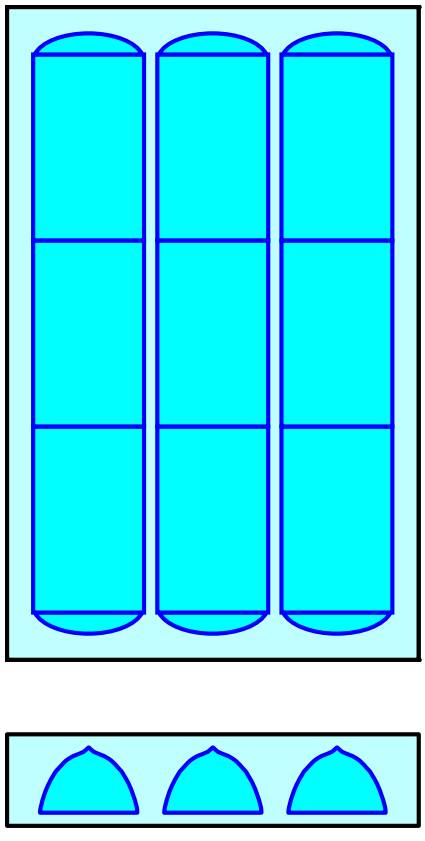
3 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 22.98' Row Length +12.0" End Stone x 2 = 24.98' Base Length
3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

9 Chambers x 45.9 cf = 413.5 cf Chamber Storage

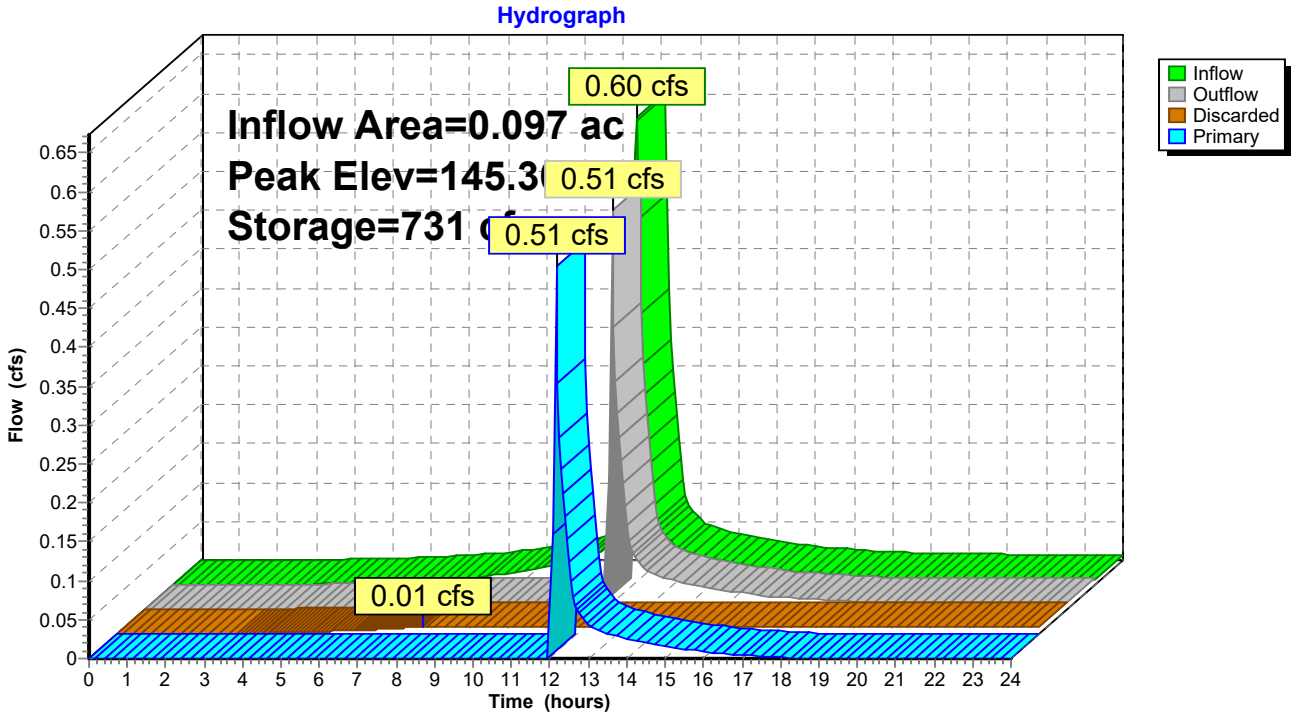
1,376.8 cf Field - 413.5 cf Chambers = 963.4 cf Stone x 35.0% Voids = 337.2 cf Stone Storage

Chamber Storage + Stone Storage = 750.6 cf = 0.017 af
Overall Storage Efficiency = 54.5%
Overall System Size = 24.98' x 15.75' x 3.50'

9 Chambers
51.0 cy Field
35.7 cy Stone



Pond 1P: SC-740



Summary for Pond 2P: SC-740

Inflow Area = 0.061 ac, 96.01% Impervious, Inflow Depth > 6.44" for 100 YR event
Inflow = 0.40 cfs @ 12.09 hrs, Volume= 0.033 af
Outflow = 0.39 cfs @ 12.09 hrs, Volume= 0.028 af, Atten= 0%, Lag= 0.1 min
Discarded = 0.00 cfs @ 3.45 hrs, Volume= 0.005 af
Primary = 0.39 cfs @ 12.09 hrs, Volume= 0.023 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 149.04' @ 12.09 hrs Surf.Area= 118 sf Storage= 198 cf

Plug-Flow detention time= 95.6 min calculated for 0.028 af (86% of inflow)
Center-of-Mass det. time= 34.4 min (783.8 - 749.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	145.70'	113 cf	**11.00'W x 10.74'L x 3.50'H Field A** 413 cf Overall - 92 cf Embedded = 321 cf x 35.0% Voids
#2A	146.20'	92 cf	**ADS_StormTech SC-740 +Cap** x 2 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 2 Rows of 1 Chambers
		204 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	145.70'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	148.95'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.00 cfs @ 3.45 hrs HW=145.74' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.38 cfs @ 12.09 hrs HW=149.04' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.38 cfs @ 0.84 fps)

Pond 2P: SC-740 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

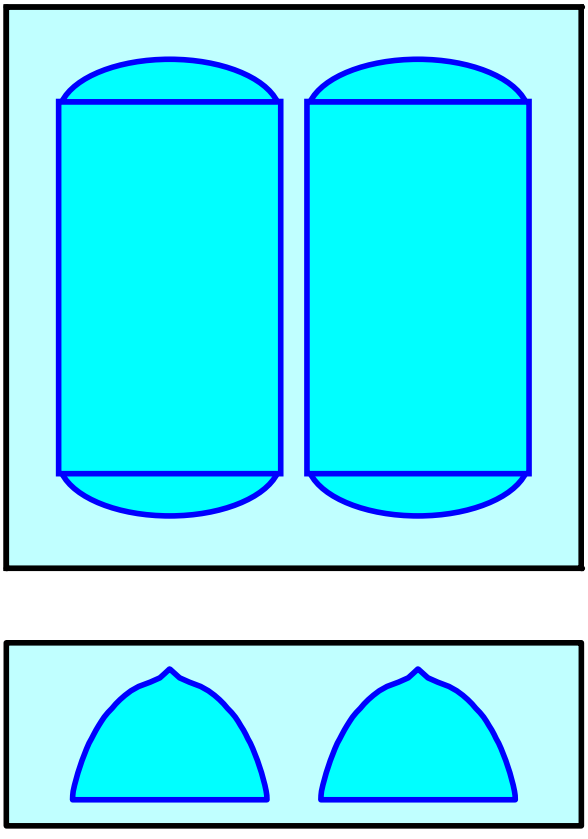
1 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 8.74' Row Length +12.0" End Stone x 2 = 10.74' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

2 Chambers x 45.9 cf = 91.9 cf Chamber Storage

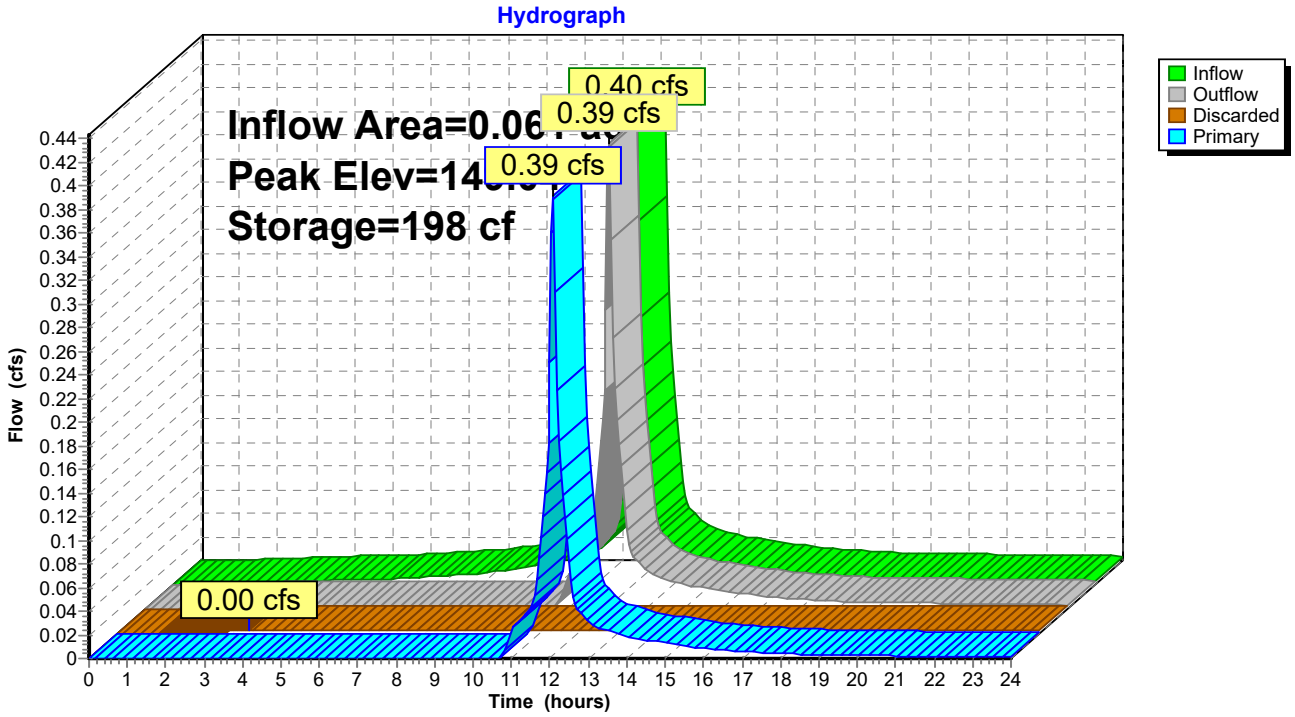
413.4 cf Field - 91.9 cf Chambers = 321.5 cf Stone x 35.0% Voids = 112.5 cf Stone Storage

Chamber Storage + Stone Storage = 204.4 cf = 0.005 af
Overall Storage Efficiency = 49.4%
Overall System Size = 10.74' x 11.00' x 3.50'

2 Chambers
15.3 cy Field
11.9 cy Stone



Pond 2P: SC-740

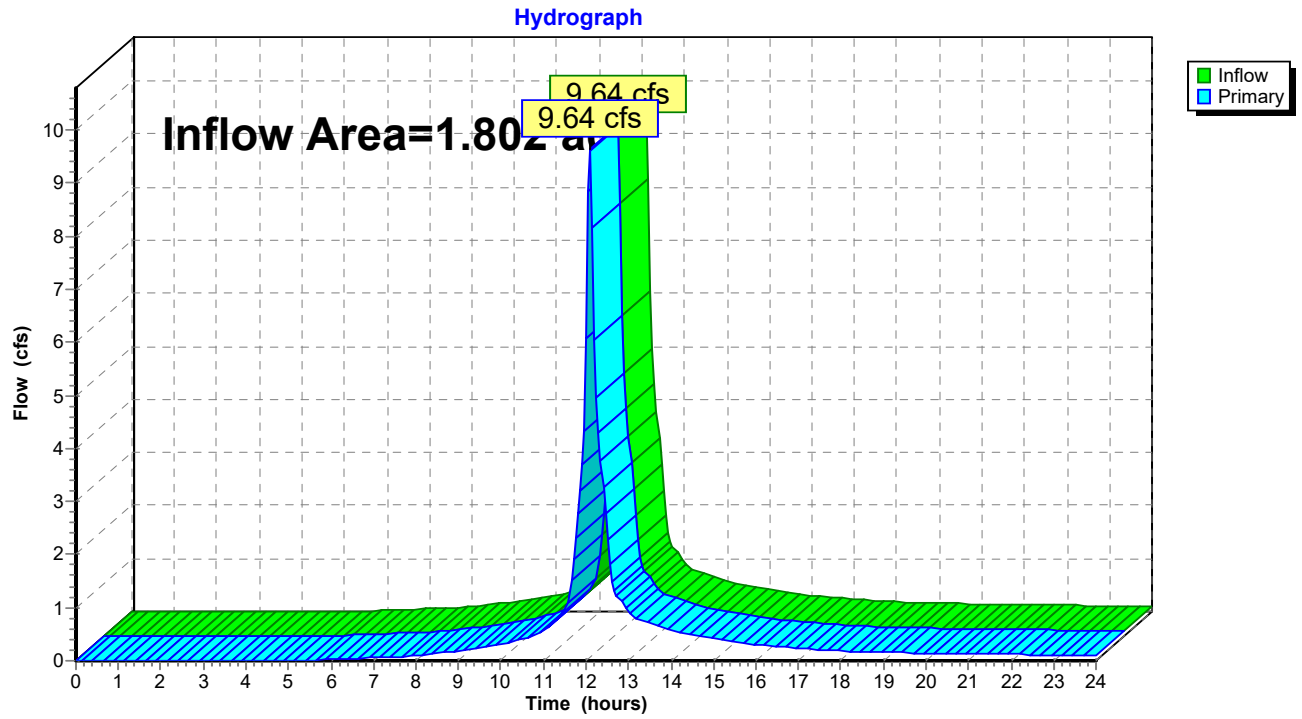


Summary for Link 1L: DP-1 Neponset River

Inflow Area = 1.802 ac, 67.98% Impervious, Inflow Depth > 4.88" for 100 YR event
Inflow = 9.64 cfs @ 12.09 hrs, Volume= 0.733 af
Primary = 9.64 cfs @ 12.09 hrs, Volume= 0.733 af, Atten= 0%, Lag= 0.0 min

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

Link 1L: DP-1 Neponset River

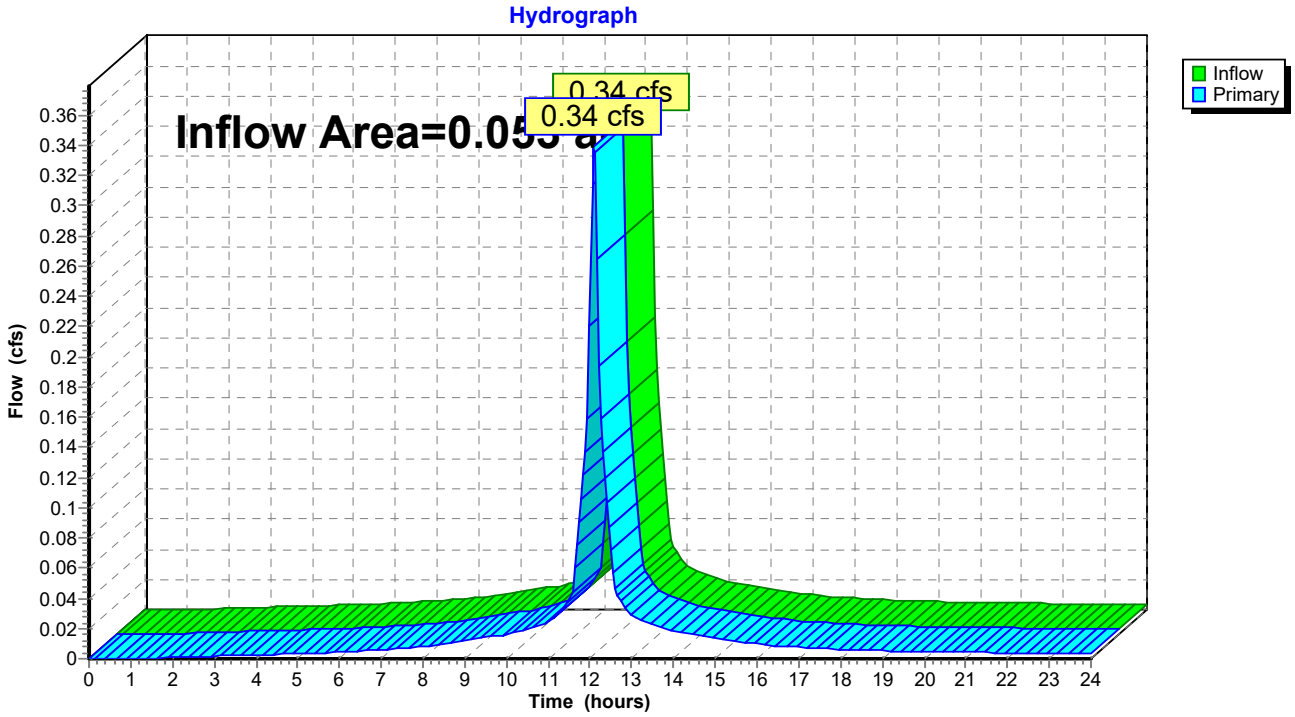


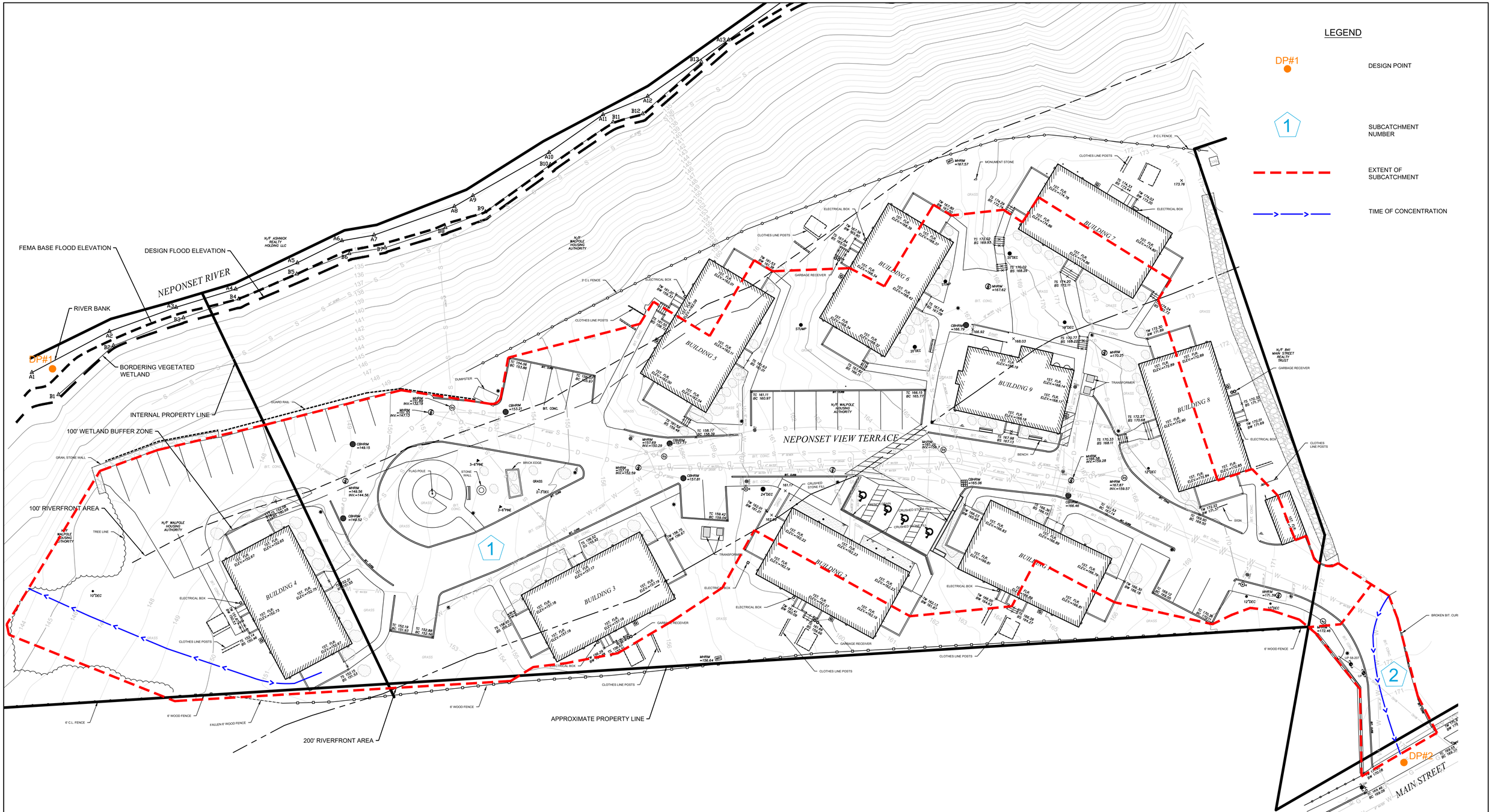
Summary for Link 2L: DP-2 Main Street

Inflow Area = 0.053 ac, 95.15% Impervious, Inflow Depth > 6.32" for 100 YR event
Inflow = 0.34 cfs @ 12.09 hrs, Volume= 0.028 af
Primary = 0.34 cfs @ 12.09 hrs, Volume= 0.028 af, Atten= 0%, Lag= 0.0 min

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

Link 2L: DP-2 Main Street





DESIGN BY:	DRAWING TITLE: **EXISTING WATERSHED**	CLIENT: **MASSACHUSETTS EXECUTIVE OFFICE OF HOUSING AND LIVABLE COMMUNITIES** 100 CAMBRIDGE ST. SUITE 300 BOSTON, MA 02114	PROJECT TITLE: **ROADWAY, PARKING LOT, & SIDEWALK REPLACEMENT** **NEPONSET VIEW TERRACE** **WALPOLE, MASSACHUSETTS**	WDG Waterfield Design Group 50 Cross Street | Winchester, Massachusetts | 01890 T 781.756.0001 F 781.756.0007	SCALE: 1" = 20'
DRAWN BY: AM	REV / DATE / BY				DATE: 4-10-24
CHECK BY:					FILENAME: W-1666
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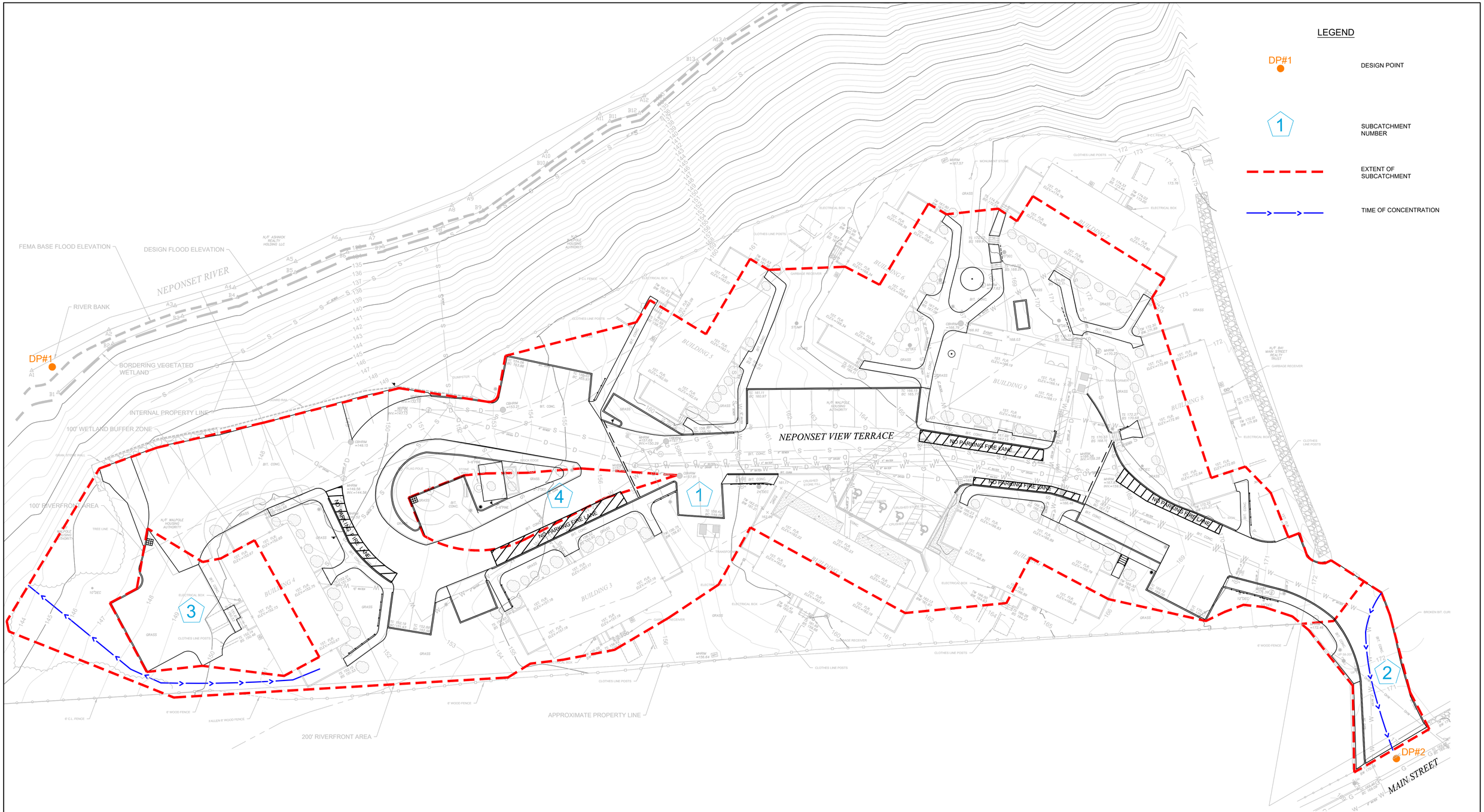

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