STORMWATER MANAGEMENT & EROSION CONTROL REPORT
Belmont Day School
Belmont, Massachusetts

Submitted to:

Belmont Office of Community Development
Homer Municipal Building
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STORMWATER MANAGEMENT & EROSION CONTROL REPORT
BELMONT DAY SCHOOL
BELMONT, MASSACHUSETTS

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I. Executive Summary

Project Description

The Belmont Day School, a private school for children from pre-kindergarten through eighth grade, is proposing to construct a new 21,079 ± s.f. footprint fieldhouse and academic building ("the barn"), and a new entrance only, one-way driveway connecting the campus to Concord Avenue to improve vehicular circulation.

The proposed project involves new utility connections for the barn, site improvements, and drainage improvements.

The existing school campus contains one main building with several accessory buildings, multiple athletic fields, a swimming pool, tennis courts, parking and drive aisles, and other various site features.

Regulatory Authority

Stormwater management methodologies proposed for the site are in compliance with The Town of Belmont Checklist for Stormwater Management and Erosion Control Checklist (10/21/13), and the Stormwater Management and Erosion Control Bylaw (§ 60-325 of the Belmont General Bylaws) and associated regulations adopted September 29, 2014. The Belmont Office of Community Development is the permit granting authority.

The following proposed activities are part of the proposed project and are regulated under the Stormwater Management and Erosion Control Bylaw:

1) Connection of a pipe or other appurtenance to the Belmont Municipal Separate Stormwater System (MS4);

2) Any land disturbance (except exempt activities specified in the Bylaw) that involves:

    - An alteration that will result in land disturbances of 2,500 square feet of total area or more, or that is part of a common plan for development that will disturb 2,500 square feet or more;

    - Storage or permanent placement of more than 100 cubic yards of excavated material, fill, snow or ice.

This submittal includes the following:

1) A completed Stormwater Management and Erosion Control Permit Application

- Application documents included within this report and within the attached site plans.

2) A Stormwater Management and Erosion Control Plan

   - See the Erosion and Sediment Control Plans, Sheets L0.01 and L0.02, included in Appendix M

3) The Checklist for Stormwater Management and Erosion Control Plan

   - See Appendix A of this report.

4) An Operation and Maintenance Plan

   - See Section 9.0 of this report.

Stormwater Management

There are currently three subsurface stormwater basins (Infiltration Basin #1, Infiltration System #2, and Infiltration Basin #3) and one stormwater management basin on-site. The majority of the impervious area for the site is captured by a network of catch basins and drain pipes that direct stormwater to the existing infiltration basins and the pond. The proposed project involves the addition of 37,300 ± s.f. of impervious area and requires the installation of additional stormwater management features in compliance with the Town of Belmont Stormwater Management and Erosion Control Bylaw and Regulations. The majority of the new impervious area is from the construction of the proposed barn and the new entrance driveway.

The stormwater from the roof of the barn will be captured by a network of drain pipes which ultimately discharge to PB4B, a subsurface detention and infiltration system comprised of Cultec chambers. Stormwater from other impervious areas around the barn will be captured by catch basins and directed towards the existing system on site or to the new system. Stormwater from new pavement discharging to the proposed new subsurface detention and infiltration system will be treated by a Contech proprietary water quality device prior to infiltration.

The proposed driveway will be constructed utilizing porous pavement to collect, store and infiltrate stormwater. The porous pavement will have an overflow connection to an outlet control structure that discharges to the municipal drainage system in Concord Avenue.

The proposed stormwater management systems incorporate best management practices that will reduce the rate of runoff from the school's property, promote stormwater recharge, and provide water quality treatment (Total Suspend Solids (TSS) removal). The project has been designed to meet or exceed all of the requirements of the Town of Belmont Stormwater Management and Erosion Control Bylaw and Regulations. As required in the Town Checklist, the following report documents compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook.

This report addresses the following design criteria:

(a) Compliance with all applicable provisions of the Stormwater Management Standards, regardless of the proximity of the development to resource areas or their buffer zones, as defined by the Wetlands Protection Act, M.G.L. c. 131, § 40 and its implementing regulations. Details can be found in Section 1.0 through 10.0 of this report.

(b) Erosion and sediment controls must be implemented to prevent adverse impacts during disturbance and construction activities. Details can be found in Section 8.0 of this report and the Erosion and Sediment Control Plans, Sheets L0.01 and L0.02 included in Appendix M.

(c) There shall be no change to the existing conditions of abutting properties from any increase in volume of stormwater runoff or from erosion, silting, flooding, sedimentation or impacts to wetlands, ground water levels or wells. Details can be found in Section II of this report.

(d) When any proposed discharge may have an impact upon streams, wetlands and/or storm sewers, the OCD may require minimization or elimination of this impact based on site conditions and existing stormwater system capacity. As described in Section II of this report, this project will have no significant impact on streams, wetlands, or storm sewers.

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II. Town of Belmont Stormwater Management and Erosion Control Rules & Regulations

Per the Town of Belmont Stormwater Management and Erosion Control Rules and Regulations, the Belmont Day School Barn project has been designed to comply with state and local regulations. The project will involve a new connection to the Belmont Municipal Separate Stormwater System (MS4), the alteration of more than 2,500 s.f. total area, and the placement of more than 100 cubic yards of excavated material or fill, and is therefore subject to these regulations.

<u>Sanitary Sewer and Storm Drain Connections (Section II of the Regulations)</u>

As shown on the Utility Plans included in Appendix, this project does not involve any new sanitary sewer connections to the Town of Belmont municipal system. The proposed sanitary sewer connection for the barn will reuse the existing sanitary sewer system near the southeast corner of the property. The new connection will be installed with a combination of gravity lines and a force main.

A. Submittal Requirements

The submittal requirements can be found on the Utility Plan, Sheet L3.03 of the site plans, included in Appendix M.

B. Design and Installation Requirements

A new connection to the Town of Belmont municipal storm drainage system will be installed near the end of the new driveway on the Concord Avenue main drainage line with a new drain manhole to provide an overflow for the stormwater runoff from the new porous pavement driveway. The other drainage systems will remain on-site and will not connect to any municipal storm drainage connections. The project does not involve the abandonment of any existing storm drain lines or the installation of any wye connections to any of the Town's systems.

As can be seen on Civil Details, sheet L4.02 of the site plans included in Appendix M, all new catch basins will have a minimum sump of 4' per the Regulations.

C. Inspections

Note 7 of the Drain Manhole detail requires that the new manhole in Concord Avenue shall be inspected by the Town of Belmont prior to backfilling.

Land Disturbance (Section III of the Regulations)

A. Applicability

As previously discussed, this section is applicable because the total land disturbance from this project is greater than 2,500 s.f. and involves the storage or permanent placement of more than 100 cubic yards of excavated material or fill.

B. Submittal Requirements

- Stormwater Management and Erosion Control Application – Detailed within this report and the plans included in Appendix M.
- Stormwater Management and Erosion Control Plan – Stormwater Management detailed within this report and on the Utility Plans and Details included in Appendix M. Erosion Control Plan is shown on the Erosion and Sediment Control Plans included in Appendix M. The Town of Belmont Checklist for Stormwater Management and Erosion Control can be found in Appendix A of this report.
- Operation and Maintenance Plan – Can be found in Section 9.0 of this report.

C. In Lieu Fees

The proposed design satisfies the Bylaw and Regulations and no in-lieu fees are proposed at this time.

D. Operation and Maintenance (O&M) Plan

The O&M Plan can be found in Section 9.0 of this report.

E. Design Criteria

Design Criteria E.1 – Stormwater Management Standards and Handbook

This design standard requires that the project conforms to the Mass DEP Stormwater Handbook and its governing standards, regardless of the proximity of the development to resource areas or their buffer zones. This Stormwater Management Report documents how each of the Mass DEP's standards are met for the proposed project (See Sections 1-10 of this report).

Design Criteria E.2 – Erosion and Sediment Controls

Without proper erosion and sediment controls, there is a potential for erosion for off-site areas, such as abutting properties, Day School Lane, and Concord Avenue. Construction vehicles can potentially track silt and sediment off-site and onto the public roads. Additionally, during activities such as grubbing and clearing, there is a potential for erosion onto abutting properties and onto the street. In particular, the construction of the new driveway involves tree removal on a steep slope along which stormwater flows downslope towards Concord Avenue and may also flow towards the abutting cemetery or 688 Concord Avenue. The clearing for the new barn also has the potential to temporarily increase erosion if best management practices are not implemented since the topography to the west slopes away from Belmont Day School's property.

During construction, sediment and erosion control measures will be implemented to prevent any adverse impact to abutting properties.

The Erosion and Sediment Control Plans included in Appendix M show the practices that will be implemented throughout the duration of construction. This report identifies various means and methods for the implementation and maintenance of these controls including the installation of straw bales and silt sacks, the installation of a sediment tracking pad, slope stabilization, and other best management practices for erosion control. See Section 9.2 and the project's site plans for more information.

Design Criteria E.3 – Changes to Existing Conditions of Abutting Properties

This standard requires that the Applicant identify potential changes to existing conditions of abutting properties from any increase in volume of stormwater runoff from erosion, silting, flooding, sedimentation or impacts to wetlands, ground water levels, or wells. It also requires that stormwater management systems be designed so that the post-development discharge volume does not exceed the pre-development discharge volume for the 2-, 10-, 25-, and 100-year storm events for each design point.

The runoff volume comparison is as follows:

Table II.1 – Peak Discharge Volumes

	2-Year Storm		10-Year Storm	
Discharge Point	**Pre - Dev. Peak Discharge Volume (af)**	**Post – Dev. Peak Discharge Volume (af)**	**Pre - Dev. Peak Discharge Volume (af)**	**Post – Dev. Peak Discharge Volume (af)**
Offsite to Southwest (DP-A)	.208	.205	.586	.576
Offsite to Northwest (DP-B)	.035	.023	.117	.069
To Existing Stormwater Basin (DP-C)	.290	.285	.570	.563
Offsite to Concord Avenue (DP-D)	.044	.016	.146	.056
To CB #2 (DP-E)	.086	.086	.157	.157
To Day School Lane (DP-F)	.059	.059	.106	.106

Discharge Point	25-Year Storm		100-Year Storm	
	Pre - Dev. Peak Discharge Volume (af)	Post – Dev. Peak Discharge Volume (af)	Pre - Dev. Peak Discharge Volume (af)	Post – Dev. Peak Discharge Volume (af)
Offsite to Southwest (DP-A)	.924	.906	1.681	1.645
Offsite to Northwest (DP-B)	.201	.114	.409	.224
To Existing Stormwater Basin (DP-C)	.819	.810	1.413	1.413
Offsite to Concord Avenue (DP-D)	.252	.144	.513	.377
To CB #2 (DP-E)	.217	.217	.342	.342
To Day School Lane (DP-F)	.145	.145	.228	.228

HydroCAD modeling for this project utilized the most current rainfall data published by the Northeast Regional Climate Center in lieu of Technical Paper 40 for the 24-hour design storm precipitation depths for the 2-, 10-, 25- and 100- year frequency storms despite the reduction of runoff volume from existing to proposed conditions.

This design criteria also requires the identification of any potential change from pre-existing and post-development conditions in the seasonal high water table and storm related groundwater mounding at the development site and abutting properties based on the 24-hour 10-year design storm. A Mounding Analysis for the proposed stormwater basins PB4B, the Cultec system, and PB6A and PB6B, the porous pavement systems, has been provided in Appendix L.

The mounding analysis for the proposed Cultec chambers, basin PB4B, shows that the maximum increase in groundwater elevation due to stormwater infiltration will be 4.1'. As will be discussed in Section 2.2.1 of this report, seasonal high groundwater was assumed to be at elevation 277.6. The bottom of the stone for the proposed basin PB4B is located at elevation 282.0 which provides a 4.4' separation. The analysis suggests that the top of the mound will not rise above the proposed bottom of stone.

The mounding analysis also shows the limits of where the mounding is expected to occur during the 10-year storm. Mounding is except to dissipate to the original groundwater elevation approximately 35' from the centerline of the average 31.67' wide system, so mounding will occur approximately 19' beyond the edge of the stone. This confines the mounding to an area located entirely within the property line and mounding is not predicted to occur within any existing or proposed building footprint.

The mounding analysis for the proposed porous pavement PB6A and PB6B shows that the maximum increase in groundwater elevation due to stormwater infiltration will be 1.78'. Similar to the conditions for PB4B, no evidence of groundwater was observed so the mounding analysis was calculated with relation to ledge. During soil explorations, ledge was encountered 5' below existing grade at the most shallow encounter. The bottom of the stone for the porous pavement is located approximately 2.33’ below grade, so this provides 2.67’ separation. The analysis suggests that the top of the mound will not rise above the proposed bottom of stone.

The mounding analysis shows that groundwater elevation is expected to dissipate to the original groundwater elevation within approximately 2.2’ of the edge of pavement, and outside those limits the groundwater elevation should not be affected by the proposed system. That means that mounding will be completely confined to the Belmont Day School property and will not increase groundwater elevation for either the abutting cemetery property or at 688 Concord Avenue. The nearest building at 688 Concord Avenue is located approximately 15’ minimum away from the edge of pavement and should remain unaffected by infiltration from the new system.

Design Criteria E.4 – Impact on Streams, Wetlands, or Storm Sewers

This standard mandates that the plans shall identify any potential impact upon streams, wetlands, and/or storm sewers and identify any mitigating measures. There are no wetlands on the site or in the immediate vicinity and the proposed project does not involve the construction of any new point source discharges. The Erosion and Sediment Control Plans outline the preparation that will be taken during construction to prevent silt and debris from leaving the site to prevent any potential adverse impacts to nearby wetlands or other resource areas. Existing outlet pipes will be utilized for Cultec system PB4B, which ultimately discharges to the existing on-site stormwater management pond, and there will be a new connection for an overflow pipe for the porous pavement system to the municipal system in Concord Avenue. Since there will be a decrease in both runoff volume and rate for stormwater leaving the site for both design points, there will be no adverse impacts from the addition of stormwater.

The Charles River has had a TMDL study that identified pollutants including phosphorus, nutrients, and pathogens. The project will exceed the goals of the TMDL for the Charles River because water quality will be improved and stormwater runoff and volume will be minimized as a result of the installation of the various stormwater management controls throughout the site. The stormwater basin and porous pavement have been sized so that there is no runoff flow or volume leaving the stormwater systems for the 2- and 10- year storm events as runoff from both storms is completely detained and infiltrated on-site. The systems will provide improved water quality as well, which will reduce waste from the site. Because there will be no discharge from the project during storms up to the 10-year storm event, the project will meet or exceed Massachusetts Surface Water Quality Standards.

The Town of Belmont’s Checklist for Stormwater Management and Erosion Control Report has been included in Appendix A.

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III. Project Type

The Belmont Day School proposes **new development** project in accordance with MassDEP Stormwater Handbook Standard 7 (see Section 7, Standard 7: Redevelopment). The project includes new development within a previously developed site. The project is in full compliance with all of the Stormwater Management Standards.

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IV. LID Measures

Key features of Low Impact Development (LID) stormwater management systems include implementing practices to maintain a site's existing hydrology. This is achieved using decentralized practices to manage stormwater close to the source of generation and maximizing onsite infiltration. This reduces runoff and landscape watering requirements. The project will implement low-impact development methods and strategies for treating and mitigating stormwater runoff.

The following LID techniques are Best Management Practices according to MassDEP and are specified in the proposed development program.

LID Techniques Implemented:

- No disturbance to any Wetland Resource Areas
- Subsurface Detention/Infiltration Basins
- Porous Pavement
- Proprietary water quality devices

Additionally, efforts will be made to protect existing trees during the construction period to the maximum feasible extent. Major trees and valued vegetation occurring outside the limit of work will be clearly marked for protection and monitored during the construction process.

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V. Compliance with Massachusetts Stormwater Management Standards

The following sections 1.0 through 10.0 of this report details how each of the Massachusetts Stormwater Management Standards will be achieved with this project.

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1.0 STANDARD 1: NO NEW UNTREATED DISCHARGES

Stormwater Management Standard 1 States:

> *"No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth."*

The project does not have direct discharge of stormwater to waters or wetlands. Standard 1 is therefore met.

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2.0 Standard 2: Peak Rate Attenuation

Stormwater Management Standard 2 States:

> *"Stormwater management systems shall be designed so that the post-development peak discharge rates do not exceed pre-development peak discharge rates."*

2.1 SUMMARY

Per the requirement of the Massachusetts Stormwater Handbook, Standard 2, we evaluated the pre-development (existing condition) and post-development (proposed condition) peak discharge rates for the 2-, 10- and 100-year storm events. The peak discharge rates were calculated at six discharge (design) points. (See Figure 8, Existing Watershed Plan and Figure 9, Proposed Watershed Plan). Below are the results from the analysis.

Table 2.1 – Peak Discharge Rates

	2-Year Storm		10-Year Storm	
Discharge Point	Pre - Dev. Peak Discharge Rate (cfs)	Post – Dev. Peak Discharge Rate (cfs)	Pre - Dev. Peak Discharge Rate (cfs)	Post – Dev. Peak Discharge Rate (cfs)
Offsite to Southwest (DP-A)	2.31	2.31	10.57	10.45
Offsite to Northwest (DP-B)	0.20	0.19	1.37	0.86
To Existing Stormwater Basin (DP-C)	3.58	3.53	7.46	7.37
Offsite to Concord Avenue (DP-D)	0.25	0.09	1.71	0.64
To CB #2 (DP-E)	1.21	1.21	2.20	2.20
To Day School Lane (DP-F)	0.83	0.83	1.48	1.48

	25-Year Storm		100-Year Storm	
Discharge Point	Pre - Dev. Peak Discharge Rate (cfs)	Post – Dev. Peak Discharge Rate (cfs)	Pre - Dev. Peak Discharge Rate (cfs)	Post – Dev. Peak Discharge Rate (cfs)
Offsite to Southwest (DP-A)	15.24	15.00	25.64	25.12
Offsite to Northwest (DP-B)	2.61	1.53	5.67	3.13
To Existing Stormwater Basin (DP-C)	10.87	10.75	18.46	18.28
Offsite to Concord Avenue (DP-D)	3.27	1.47	7.11	6.21
To CB #2 (DP-E)	2.99	2.99	4.61	4.61
To Day School Lane (DP-F)	2.00	2.00	3.06	3.06

The post-development peak discharge rates do not exceed pre-development peak discharge rates. Stormwater Management Standard 2 is met.

This section describes the pre- and post-development conditions and outlines the procedure for determining the peak discharge rates.

2.2 ANALYSIS

2.2.1 Soil Conditions

The Natural Resources Conservation Service (NRCS) shows Newport channery fine sandy loams, a Hydrologic Soil Group ("HSG") D, throughout most of the Belmont Day School property. The majority of the property is mapped within the HSG D soils and partially within Narragansett silt loam, a HSG A soil. Another small portion of the site is mapped as a Woodbridge fine sandy loam which has a C/D rating.

Soil tests were performed by Hilde Karpawich of Stantec on August 8^{th} and October 12^{th} of 2016 in three locations. Test pits 1 through 3 were performed in August near existing Infiltration Basin #2 located in Claflin Field and on the south side of the campus. These soils consisted of sandy loams and loamy sands with refusal from 4'-2" to 9' deep. That same day, a second set of test pits (TP-4 through TP-6) were performed near existing Infiltration Basin #1 where primarily sands and loamy sands were encountered along with some sandy loams. There was no refusal in this area.

In October three more test pits were performed that were located within the footprint of the proposed driveway. These soils primarily consisted of sandy loams with some strata of loamy sands. Refusal was encountered in one test pit at 7' deep and the other test pits extended 10.5' below existing grade but were terminated because the equipment was experiencing difficulty excavating any deeper.

McPhail Associates, LLC performed 6 test pits and 14 rock probes on June 17, 2016. Their geotechnical report considers the results from their investigations as well as their analysis of the results of a test pit exploration program performed by Cardillo and Sons, Inc. in 2015. Test pits were performed in the proposed driveway location that showed refusal ranging from 5 to 5.5' below existing grade which is presumed to be ledge. Glacial till was encountered in this area as well, which is consistent with Stantec's findings during test pits closer to Concord Avenue.

McPhail's test pits in other locations around the site were performed to determine depth to ledge for proposed utility lines and also to design the foundation for the proposed barn. Groundwater was not encountered during any of the test pits or probes performed by McPhail, Cardillo and Sons, Inc., or Stantec. The complete report can be found in Appendix B of this report.

Design assumptions related to soils on site and utilized in the design of the stormwater management system, based on information from the Stantec and McPhail investigations, are summarized below:

Hydrologic Soil Group

During Stantec's two days of soil testing, the majority of the soils encountered were Sandy Loams with some Loamy Sands. Since Sandy Loams were predominantly found, it was assumed that the soils on the Belmont Day site are Hydrologic Group B soils for the purpose of generating hydrographs (TR-55 and TR-20 methodologies, see Appendix C and D).

Soil Infiltration Rates

For the purposes of hydrograph routing, the proposed system PB4B was assumed to have an infiltration rate of 1.02 in/hr which is the Rawl's Rate for a Sandy Loam since sandy loams were encountered in TP-4 and sandy loams feature the lowest infiltration rate of all of the hydrologic soil types encountered in that set of test pits. This is a conservative approach, taken to account for the lowered infiltration typically found in glacial till, although the glacial till consisted of sand.

The assumed infiltration rate was 1.02 in/hr for the porous pavement in the proposed driveway to Concord Avenue since soils found in the driveway area were predominantly Sandy Loams.

For the purpose of calculating required recharge volume drawdown, the Rawl's rate is based on Hydrologic Group B for Sandy Loam since that appears to be the most consistent soil type encountered during Stantec's soil testing. The Rawl's Rate is 1.02 in/hr for Sandy Loams. The Rawl's Rate of 1.02 in/hr was also used in the Mounding Analysis for Hydraulic Conductivity, which is equivalent to 2.04 ft/day.

Seasonal High Groundwater

No evidence of seasonal high groundwater was encountered in any of the nine test pits that were located near either of the proposed stormwater management systems. Redox features were only observed by Stantec in test pits around existing Infiltration System #1, however, the redox features were encountered on top of a dense C layer and does not appear to be representative of seasonal high groundwater. The soil test pits were also performed in August 2016 during low groundwater season. To observe groundwater conditions during the typical high groundwater season, Stantec visited the site on January 6, 2017 to determine where groundwater may be encountered. Robert Corning measured the visible water elevations in the three drywells located within the existing stormwater management pond and encountered no water in two of the drywells and encountered water 3' below the rim of one of the drywells that was installed at elevation 280.6. Therefore, it is assumed that high groundwater is located at 277.6 for the proposed Cultec system PRB4. Details of the drywell exploration are in Appendix B.

In the area of the proposed porous pavement where groundwater was not observed, and for the purpose of our analysis, the bottom of test pits was assumed to represent seasonal high groundwater elevation.

2.2.2 Discharge Points

The project site was divided into nine subcatchment areas for the pre-development conditions, with subcatchment areas contributing to a discharge point (See Appendix C). The peak discharge rate for the pre-and post-development conditions were analyzed for each of these discharge points.

Results of the analysis are found in Table 2.1.

2.2.3 Pre-Development Conditions

Each of the subcatchment areas analyzed for the existing conditions are summarized below:

<u>Subcatchment X1: Offsite to Southwest</u>

Subcatchment area X1 includes an athletic field and is partially forested. Stormwater runoff from X1 flows overland to an offsite area to the southwest of the Belmont Day School property.

<u>Subcatchment X2: To Existing Drainage Basin XB2</u>

Subcatchment area X2 is fully developed and includes roof area, landscaped areas with walkways and lawn area, a swimming pool, and tennis courts. Stormwater runoff is captured by a network of drainage structures and drain lines which discharges to XB2, which is denoted as Infiltration System #2 on the site plans and is a subsurface detention basin. The existing system overflows to a rip-rap slope that discharges offsite to the south of the Belmont Day School property.

<u>Subcatchment X3: Offsite to Northwest</u>

Subcatchment area X3 consists of mostly forested areas with woodland pathways and also includes some landscaped areas along the edge of the existing parking lot. Stormwater runoff from X3 flows overland to an offsite area to the northwest of the Belmont Day School property.

<u>Subcatchment X4: To Existing Drainage Basin XB1</u>

Subcatchment area X4 mostly consists of a paved parking area and a small landscaped area. Stormwater runoff is captured by existing CB#57 which discharges to XB1, which is denoted as Infiltration System #1 on the site plans and is a subsurface detention basin. The existing system overflows to XSW, the existing stormwater basin located within drainage area X7. XSW contains three leaching basins to promote infiltration.

<u>Subcatchment X5: To Existing Drainage Basin XB3</u>

Subcatchment area X5 is fully developed and includes roof area, landscaped areas with walkways and lawn area, parking areas and drive aisles. Stormwater from this area is directed to existing CB#52, CB#53, and CB#55. These catch basins discharge to XB3, which is denoted as Infiltration System #3 on the site plans and is a subsurface detention basin. Infiltration System #3 is not modeled in HydroCAD because there was not enough information on the existing system to do so. The existing system overflows to XSW, the existing stormwater basin located within drainage area X7. XSW contains three leaching basins to promote infiltration.

Subcatchment X6: Offsite to Concord Avenue

Subcatchment area X6 includes forested area, a portion of an athletic field, and a fenced-in garden. Stormwater runoff from X6 flows overland towards Concord Avenue and is then captured by the catch basins that are part of the Town of Belmont municipal drainage system.

Subcatchment X7: To Existing Stormwater Basin XSW

Subcatchment area X7 primarily includes athletic fields but also includes small areas of forested land. Stormwater runoff from this area flows directly overland to XSW, the existing stormwater basin that also captures runoff overflow from existing Infiltration Basins #1 and #3. XSW contains three leaching basins to promote infiltration.

Subcatchment X8: To CB #2

Subcatchment area X8 is fully developed and includes roof area, paved drive aisles and parking areas, and landscaped areas. Stormwater runoff from this area is captured by CB#2 which discharges to a stony area that overflows to the south of the site.

Subcatchment X9: To Day School Lane

Subcatchment area X9 is fully developed and consists of pavement, landscaped areas, and concrete walkways. Stormwater runoff from this area flows directly towards Day School Lane which is ultimately captured by the municipal system in Concord Avenue.

Subcatchment Area Summary

Table 2.3 summarizes the pre-development conditions drainage areas and includes information used for the hydraulic analysis (Appendix C, Existing Conditions HydroCAD Calculations).

Table 2.3 – Pre-Development Conditions Drainage Area Summary

Drainage Area	Area (s.f.)	Curve Number	Time of Concentration (min.)[1]
X1	93,157	60	6
X2	83,789	89	6
X3	59,302	57	6
X4	13,786	97	6
X5	48,503	92	6
X6	74,352	57	6
X7	82,759	61	6

[1] Section 2.3.3

X8	24,445	85	6
X9	16,682	86	6

2.2.4 Post-Development Conditions

For the proposed conditions, twelve (12) subcatchment areas were analyzed. A summary of each of the subcatchments is provided below:

<u>Subcatchment P1</u>

Subcatchment P1 consists of mostly landscaped areas and athletic field area, but also contains some forested area and a small impervious area near the northwest of the proposed barn. Stormwater runoff from this area flows directly over land to the southwest, similar to existing conditions.

<u>Subcatchment P2</u>

Subcatchment P2 is fully developed and includes roof area, paved area, and concrete area. This includes tennis courts, a pool, and a playground area. Stormwater runoff from this area is captured by an existing drainage system consisting of drywells, catch basins, and drain lines. Runoff from this area is directed towards existing Infiltration System #2, or basin XB2 in the stormwater modeling. Overflow from this system discharges near the southerly corner of the property and flows offsite.

<u>Subcatchment P3</u>

Subcatchment P3 is mostly forested area with some landscaping and a small impervious area for equipment for the barn. Stormwater runoff from this area will continue to flow overland and offsite in the northwesterly direction.

<u>Subcatchment P4A</u>

Subcatchment P4A will be fully developed and features pavement, landscaped areas, and some concrete site features. Stormwater runoff from this area is captured by one of two new catch basins in this area that direct stormwater to a Contech proprietary water quality device in a manhole structure. After treatment, stormwater will be directed towards the existing Infiltration Basin #1, or basin XB1 in the stormwater modeling. This existing system overflows to XSW, the existing stormwater basin located within drainage area P7. XSW contains three leaching basins to promote infiltration.

<u>Subcatchment P4B</u>

Subcatchment P4B includes roof area for the proposed barn and includes a section of pavement and landscaping near the northeasterly corner of the building. Stormwater from this area will be captured by roof drains, both internal and guttered, and with a water quality inlet with a drain line which directs the stormwater to a new drainage system PB4B. Overflow from this system discharges to the existing overflow pipe for pond XB1 which then overflows to XSW, the existing stormwater basin located within drainage area P7. XSW contains thee leaching basins to promote infiltration.

Subcatchment P5

Subcatchment P5 is fully developed and features pavement, landscaped areas, and some concrete site features. Stormwater runoff from this area is captured by an existing network of catch basins and drain lines near the module building and maintenance building. Runoff is discharged to existing Infiltration Basin #3. Infiltration Basin #3 is not modeled in HydroCAD because there was not enough information to do so, but the proposed conditions result in a reduction of both impervious and total area so no additional capacity is necessary. This existing system overflows to XSW, the existing stormwater basin located within drainage area P7. XSW contains three leaching basins to promote infiltration.

Subcatchment P6A

Subcatchment P6A includes the upper portion of the new driveway, which consists of some landscaped areas that includes an athletic field, the new porous pavement driveway, and a small pathway to remain. Stormwater runoff from this area will be captured and infiltrated through the proposed porous pavement in pond P6A and any overflow will be captured by the catch basin at the low point of the paved portion. Stormwater overflow will discharge to the infiltration trench along the southeasterly side of the proposed driveway which will then discharge to the municipal system in Concord Avenue.

Subcatchment P6B

Subcatchment P6A includes the lower portion of the new driveway, some landscaped areas that includes an athletic field, and a forested area to remain. Stormwater runoff from this area will be captured and infiltrated through the proposed porous pavement in pond P6B and overflow will be captured by a perforated pipe at the bottom of the driveway that discharges to an outlet control structure. This structure will discharge to the municipal system in Concord Avenue.

Subcatchment P6C

Subcatchment P6C is mostly undeveloped forest area and contains a garden used by the school. This area will remain unchanged after construction and stormwater will continue to flow offsite to the northeast.

Subcatchment P7

Subcatchment area P7 primarily includes athletic fields but also includes small areas of forested land. It will remain unchanged from existing to proposed conditions. Stormwater runoff from this area flows directly overland to XSW, the existing stormwater basin that also captures runoff overflow from existing Infiltration Basins #1 and #3. XSW contains three leaching basins to promote infiltration.

<u>Subcatchment P8</u>

Subcatchment area P8 is fully developed and includes roof area, paved drive aisles and parking areas, and landscaped areas. Layout for this area will be remain unchanged from existing conditions. Stormwater runoff from this area is captured by CB#2 which discharges to a stony area that overflows to the south of the site.

<u>Subcatchment P9</u>

Subcatchment area P9 is fully developed and consists of pavement, landscaped areas, and concrete walkways. Stormwater runoff from this area flows directly towards Day School Lane which is ultimately captured by the municipal system in Concord Avenue.

<u>Drainage Area Summary</u>

Table 2.4 summarizes the post-development conditions drainage areas and includes information used for the hydrologic analysis (Appendix D, Proposed Conditions HydroCAD Calculations).

Table 2.4 – Post-Development Conditions Drainage Area Summary

Drainage Area	Area (s.f.)	Curve Number	Time of Concentration (min.)[2]
P1	87,531	55	6
P2	84,214	89	6
P3	29,480	60	6
P4A	11,312	96	6
P4B	24,468	96	6
P5	47,597	92	6
P6A	13,091	80	6
P6B	43,813	68	6
P6C	30,383	56	6
P7	82,759	61	6
P8	25,445	85	6
P9	16,682	86	6

2.3 METHODOLOGY AND DESIGN CRITERIA

2.3.1 Hydrologic Modeling

The peak discharge rates and stormwater runoff volumes were calculated using the Soil Conservation Service (SCS) TR-55 and TR-20 methodologies and the computer program HydroCAD 10.00 by HydroCAD Software Solutions, LLC.

[2] Section 2.3.3

2.3.2 Design Storms

The analysis was performed on the 2-, 10-, and 100-year frequency rainfall events. The events were based on the 24-hour, type-III duration storm (See Appendix E, Extreme Precipitation Tables).

2.3.3 Time of Concentration

The time of concentration (T_c) for each watershed was determined by finding the time necessary for runoff to travel from the hydraulically most distant point in the watershed to the point of concentration. The travel path was drawn based on the topography and the time was calculated using the HydroCAD. A minimum T_c of 6.0 minutes was used to account for the initial storm fluctuation and depression storage.

2.3.4 Curve Numbers

Curve numbers were developed for each of the different use categories and hydrologic soil group types within each sub-area. The curve numbers were based on the SCS TR-55 methodology and are included in the HydroCAD input and output found in Appendix C and Appendix D.

2.3.5 Rainfall Depth

Rainfall depths were acquired from the Extreme Precipitation Tables provided by Cornell University. Rainfall events for the 2-, 10-, 25-, and 100-year storms were analyzed.

The following rainfall depths were used in the calculations:

Storm Event	Rainfall Depth
2-Year	3.21 inches
10-Year	4.86 inches
25-Year	6.16 inches
100-Year	8.84 inches

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3.0 Standard 3: Recharge

Stormwater Management Standard 3 States:

> *"The annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type."*
>
> *"Infiltration structures must be able to drain fully within 72 hours."*
>
> *"There must be at least a two-foot separation between the bottom of the infiltration structure and the seasonal high groundwater."*

For the project,

- The annual recharge from the post-development condition is able to approximate the annual recharge from the pre-development conditions based on soil type.
- The recharge volumes comprised of subsurface detention/infiltration basins and porous asphalt pavement are able to drain fully within 72 hours.
- There is greater than a two-foot separation between the bottom of the basin (infiltration structure) and the seasonal high groundwater.

Stormwater Management Standard 3 is met.

This section describes the procedures for determining compliancy with Stormwater Management Standard 3.

3.1 RECHARGE REQUIREMENT

3.1.1 Summary

The proposed stormwater management system will consist of subsurface detention basins. The recharge areas for the project provide a recharge volume in excess of what is required based on the observed soils onsite.

Table 3.1 summarizes the recharge required and provided for the project.

Table 3.1 – Recharge Summary

Storage Provided	Recharge Volume Required (cf)	Recharge Volume Provided (cf)
Cultec System PB4B	669	7,205
Porous Pavement PB6A	192	4,022
Porous Pavement PB6B	280	2,306

See Appendix F, Recharge Volume Calculations and Sections 3.1.2 and 3.1.3 for supporting calculations and analysis.

3.1.2 Determining the Recharge Requirement

The standard requires a determination of the Hydrologic Soil Group within the proposed project site. Stantec's subsurface investigation was conducted that verified the most dominant soil type are Sandy Loams, a Hydrologic Group B soil. A complete summary of how the infiltration rate from recharge BMP was developed is provided in Section 2.2.1.

For hydrologic soil group "B," the required recharge volume equals 0.35 inches of runoff multiplied by the total impervious area at the post development condition. Stormwater runoff from the entire developed area discharges to either an existing or a proposed recharge system. This results in an initial required recharge volume of 1,087 cf (Appendix F, Recharge Volume Calculations). This is summarized in Table 3.2 below.

Table 3.2 – Required Recharge Volume

Hydrologic Soil Group	Impervious Area (sf)	Target Depth*	Volume Required (cf)
B	39,107	0.35	1,141
		Initial Required Recharge Volume:	***1,141***

*The Target depth is from the Massachusetts Stormwater Handbook

During post-development conditions, all of the project area's impervious cover is routed through the subsurface detention/infiltration basins so no capture area adjustment was applied to the initial required recharge volume.

3.1.3 Sizing the Recharge Volume

In order to accommodate the required recharge volume, the proposed stormwater management system will consist of subsurface detention/infiltration basins. The recharge volumes were designed and sized using the "Static" method as described in the Massachusetts Stormwater

Handbook, Volume 3, Chapter 1. The “Static” method was used to produce a larger storage volume resulting in a conservative approach. Hydrologic modeling (HydroCAD 10.00) was used to determine the size of the subsurface basin. See Appendix D for pond reports. When designing the basins, the following was taken into consideration:

The basins are designed to accommodate the site characteristics of the ground surface, underlying soil types and subsurface conditions (seasonal high groundwater table, depth to bedrock, hydrologic conductivity rate and type of receiving soil layers). See Section 2.2.1.

Additionally, the basins are sized to provide a recharge volume of **13,149 cubic feet**. This is in excess of what would be the required recharge.

Recharge is provided within the area beneath the outlets for stormwater systems PB4B, PB6A, and PB6B.

3.2 DRAWDOWN WITHIN 72 HOURS

The required drawdown time for the proposed recharge volumes shall be less than or equal to 72 hours. The drawdown time is calculated by dividing the storage volume by the permeability rate times the bottom area of the recharge volume.

Exhibit 3.1 – Drawdown Equation

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

where:

Rv = Required Storage Volume

K = Saturated Hydraulic Conductivity For “Static” and “Simple Dynamic” Methods, use Rawls Rate (Table 2.3.3, Massachusetts Stormwater Handbook). For “Dynamic Field” Method, use 50% of the in-situ saturated hydraulic conductivity.

Bottom Area = Bottom Area of Recharge Structure

The Storage Volume (Rv) for the subsurface basin and the Bottom Area was derived from HydroCAD (Appendix D) The Rawls Rate (K) used for the analysis was 1.02 in/hr (Section 2.2.1). This was the rate determined during the subsurface investigation and is equal to the Rawls Rate corresponding to Hydrologic Soil Group “B”. Supporting calculations are included in Appendix F. Table 3.3 summarizes the drawdown time for the recharge volume.

Table 3.3 – Summary of Drawdown Time

Subsurface Basin	Maximum Drawdown Time (hours)	Drawdown Time Provided (hours)
PB4B	72	1.09
PB6A	72	0.34
PB6B	72	0.34

The drawdown times for all of the recharge volumes are less than the required drawdown time of 72 hours from Standard 3.

3.3 SEPARATION FROM SEASONAL HIGH GROUNDWATER

The Massachusetts Stormwater Handbook requires at least a two-foot separation between the bottom of the infiltration structure and the seasonal high groundwater table. During the subsurface investigations conducted by Stantec, no signs of seasonal high groundwater were observed near the proposed infiltration system or in the area of the proposed porous pavement. However, refusal was encountered in some of the test pits so the bottoms of the crushed stone in areas of porous pavement were designed to provide a minimum of 2’ to the elevation of the refusal. As discussed in Section 2.2.1 of this report, in the area of the proposed subsurface detention and infiltration system, groundwater was assumed to be at elevation 277.60’ based on the elevation of water observed in a nearby drywell. The bottom of the proposed subsurface detention and infiltration system was located at elevation 282.00’, providing a 4.4’ separation to groundwater.

4.0 Standard 4: Water Quality

Stormwater Management Standard 4 states:

> *"Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This standard is met when:*
>
> *a. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained.*
>
> *b. Structural stormwater best management practices are sized to capture the required water quality volume as determined in accordance with the Massachusetts Stormwater Handbook.*
>
> *c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.*

For the project,

- Pollution prevention practices are identified and a long term pollution prevention plan is implemented and maintained.
- The structural stormwater best management practices are sized to capture the required water quality volume as determined in accordance with the Massachusetts Stormwater Handbook
- Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

Stormwater Management Standard 4 is met.

This section describes the procedures for determining compliancy with Stormwater Management Standard 4.

4.1 LONG – TERM POLLUTION PREVENTION PLAN

The complete long-term pollution prevention plan for the project site is included as part of the Operation and Maintenance Plan (Section 9.2). A long term pollution prevention plan that fully meets the requirements of Standard 4 will be implemented and maintained.

- The pollution prevention plan includes; salt, sand and other deicing chemicals; proper management of fertilizers, herbicides, and pesticides; and stabilization of existing eroding surfaces.

- The new development design provides treatment for runoff from proposed impervious surfaces within the project area to achieve 80% TSS removal. Stormwater runoff around the new driveway will achieve 80% TSS removal through the porous pavement system.

- A proprietary water quality device will be installed to provide TSS removal and water quality for some reconfigured pavement in front of the barn. This will achieve 80% TSS removal prior to entering the drain pipes and discharging to the subsurface basin.

- The contributing untreated flow to the proposed Cultec subsurface basin PB4B will be comprised of runoff from the roof of the proposed building. Since this roof will be non-metal its runoff is considered to be “clean” and will not require TSS removal.

- The following pollution prevention measures have been considered:

    - Deicing materials will only be used to the extent needed to make the drive aisle and walkways safe.

    - Fertilizers, herbicides, and pesticides will only be used to the extent needed to maintain healthy plant materials and landscaped areas.

    - Landscaping that reduces the need for fertilizer, herbicides, and pesticides.

    - All catch basin inlets will be inspected at least four times per year and cleaned a minimum of at least once per year. Sediment and/or floatable pollutants will be pumped from the trench drain. During colder periods, the trench drain grates will be kept free of snow and ice. During warmer periods, trench drain grates will be kept free of leaves, litter, sand, and debris.

- There are no discharges to impaired waters.

4.2 WATER QUALITY TREATMENT VOLUME

The project area is not located within a critical area therefore “Water Quality Depth” of 0.5-inches is utilized when computing the required water quality treatment. Water quality calculations are included in Appendix H.

4.3 TSS REMOVAL COMPUTATIONS

Standard 4 requires that a minimum of 80% Total Suspended Solids (TSS) removal rate be achieved in the proposed condition. TSS calculations are included in Appendix G of this report.

The following BMPs are proposed:

<u>Proprietary Water Quality Unit</u>
Two Contech water quality devices are proposed to provide pretreatment before stormwater is directed into subsurface detention/infiltration basins or to the existing drainage system. The

units have been sized based on the water quality volume (WQV) for runoff from a 1/2" storm event, in accordance with MassDEP guidance policies. WQV calculations are provided in Appendix I. The calculations for the TSS removal for the water quality unit and TSS are provided in Appendix G.

Porous Pavement
Porous pavement is proposed in lieu of bituminous concrete within the proposed driveway. TSS removal of 80% will be achieved for this treatment train.

Subsurface Detention/Infiltration Basins
One subsurface detention/infiltration basins are proposed to detain and infiltrate stormwater runoff. The new Cultec system will capture clean roof runoff, which does not require TSS removal, and will also include runoff that will be treated by a Contech water quality device prior to infiltration. TSS removal of 80% will be achieved for this treatment train.

Catch Basins with Deep Sumps
Catch basins with deep sumps will capture and treat portions of the proposed paved areas. TSS removal of 25% will be achieved for this treatment train.

4.4 TSS TREATMENT TRAINS

There are three treatment trains that will enhance water quality for stormwater runoff from the proposed development. They are listed below and can be seen in Appendix G.

Treatment Train #1 – for Drainage Area P4A
Stormwater runoff will be captured by a Contech water quality unit WQU-2 that provides 88.2% TSS removal before discharging to an existing infiltration basin which exceeds the minimum required 80% removal.

Treatment Train #2 – for Drainage Areas P6A & P6B
Stormwater runoff from these areas will be captured and treated by porous pavement asphalt that provides 80% TSS removal, which meets the minimum required 80% TSS removal.

Treatment Train #3 – Roof Area for Drainage Area P4B
Stormwater runoff for the proposed barn will be captured by a network of roof drains that will direct the stormwater runoff to a proposed Cultec subsurface detention / infiltration basin. The roof runoff will be clean and does not require water quality treatment. The basin will provide 80% TSS removal, which meets the minimum required 80% TSS removal.

Treatment Train #4 – Paved and Landscaped Area for Drainage Area P4B
Stormwater runoff for the paved portion of this subcatchment area and the landscaped areas will be treated by a Contech water quality unit WQU-1 that provides 91.5% TSS removal before discharging to a proposed basin PB4B. The basin will provide an additional 80% TSS removal, which meets the minimum required 80% TSS removal.

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5.0 Standard 5: Land Uses with Higher Potential Pollutant Loads

Stormwater Management Standard 5 states:

> *"For land uses with higher potential pollutant loads (LUHPPL), source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable."*
>
> *Stormwater discharges from LUHPPLs requires the use of a treatment train that provides 80% TSS removal prior to discharge and at least 44% TSS removal prior to discharge to the infiltration BMP."*
>
> *"The infiltration BMP shall be designed to treat 1.0 in. of runoff times the total impervious area at the post development site."*

The project is not considered a LUHPPL. Standard 5 is not applicable.

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6.0 Standard 6: Critical Areas

Stormwater Management Standard 6 states:

> *"Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook."*
>
> *Stormwater discharges from Outstanding Resource Waters requires the use of a treatment train that provides 80% TSS removal prior to discharge and at least 44% TSS removal prior to discharge to the infiltration BMP."*
>
> *"The infiltration BMP shall be designed to treat 1.0 in. of runoff times the total impervious area at the post development site."*

The project is not within a critical area. Standard 6 is not applicable.

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7.0 Standard 7: Redevelopment

Stormwater Management Standard 7 states:

> *"A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions."*
>
> *"A new development project must comply fully with all the Stormwater Management Standards."*

The project is considered a new development in accordance with the Stormwater Handbook. The project includes new construction on a previously developed site.

The project is in full compliance with all the Stormwater Management Standards. Stormwater Management Standard 7 is met.

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

Construction period pollution prevention and erosion and sedimentation control measures will be implemented at the project site to control construction related impacts during construction and land disturbance activities. The general contractor for the project will be responsible for implementation of the construction period controls.

8.1 EROSION AND SEDIMENT CONTROL MEASURES

The project will disturb more than one acre of land during the construction process and will require a NPDES Construction General Permit issued by the Environmental Protection Agency. As a result, a stormwater pollution prevention plan (SWPPP) will be required. The SWPPP document will satisfy the requirements of the construction period erosion, sedimentation and pollution prevention plan requirements outlined in Standard 8 of the Massachusetts Stormwater Handbook. A SWPPP has not been prepared for inclusion with this stormwater report; however, one will be prepared and submitted prior to any construction activities at the site.

Without proper erosion and sediment control measures, grading, filling and installation of structures may cause erosion and sedimentation, resulting in temporarily increased turbidity and suspended solid loads. Runoff from construction sites may also transport sediment to downstream watercourses, where sediment deposition and accumulation will occur as flow velocities decrease.

Erosion and sedimentation controls will be employed to prevent the erosion and transport of sediment into adjacent areas and drainage systems 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.

Below is a description of some of the erosion and sediment control measures that will be employed at the project and that will be included in the SWPPP.

Silt Fence and Straw Bale Barriers

Prior to any ground disturbance, a professional engineer or land surveyor will certify that a barrier of staked straw bales and silt fence is in place at the down gradient limit of work in accordance with the design plans. The barrier will be placed to trap sediment transported by runoff before it reaches the drainage system or leaves the construction site. The silt fence is a semi-permeable barrier made of a synthetic porous fabric which provides additional protection when used with straw bale barriers. When necessary, additional straw bale and silt fence barriers will be installed immediately down gradient of erosion-prone areas, such as the base of steep exposed slopes and around the base of stockpiles, throughout the construction phase of the project. The barriers will be entrenched into the substrate to prevent underflow.

The erosion control barriers will be inspected weekly and after every storm event. Any sediment that collects behind the barriers will be removed and will be either reused at the site or disposed of at a suitable offsite location. Any damaged sections of silt fence or hay bales will be repaired or replaced. The underside of straw bales will be kept in close contact with the earth and reset as necessary. Straw bale barriers and silt fences will be maintained and cleaned until slopes have healthy stands of grass.

Catch Basin Inlet Protection

The inlets of proposed and existing catch basins will be protected from sediment inflow during the work period through the installation of Siltsacks™. A layer of filter fabric will be installed beneath the grates of the catch basins. The inlets of existing catch basins will be protected by Siltsacks™. These protection measures will be inspected after every storm event and will be routinely maintained until the drainage area tributary to each inlet has been stabilized with vegetation and/or covered by pavement. Any sediment that collects behind the barrier or in the sacks will be removed and will be either reused onsite or disposed of at a suitable off-site location.

Dust Control

Fugitive dust from large areas of unstabilized soil can be a problem during construction. On dry and windy days when dust generation is a concern, a water truck will traverse the site and spray water as necessary to prevent dust from forming. Calcium chloride may also be applied to the ground in granular form to attract atmospheric moisture, dampening the ground and preventing fugitive dust.

Slope Stabilization

A temporary vegetative cover will be established on areas of exposed soils (including stockpiles) that remain inactive and unstabilized for a period of more than 30 days for slopes, and weather permitting. The seeded surfaces will be covered with a layer of straw mulch or hydro mulch as described above.

Upon completion of final grading, any areas not covered by pavement, other forms of stabilization, or other methods of landscaping will be seeded with an erosion control seed mix. On slopes 4:1 and greater, loamed and seeded areas will be mulched with hay to prevent erosion prior to germination of the seed. 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.

Stabilized Construction Entrance

Temporary stabilized construction entrances will be installed at the 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. The stone will be placed over a layer of non-woven filter fabric. The stabilized construction entrances will remain in place until a binder coat of pavement has been established in areas to be paved.

8.2 MATERIAL MANAGEMENT PRACTICES

The following material management practices will be used to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff. These include good housekeeping practices and guidelines for the handling of hazardous products. The following good housekeeping practices will be followed on-site during the construction period.

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

The following practices will reduce the risks associated with hazardous materials (e.g., petroleum products, solvents):

- A copy of all Material Safety Data Sheets (MSDS) for materials or products used during construction will be kept in the office trailer.
- Products will be kept in original containers unless they are not re-sealable.
- Original labels and material safety data (MSD sheets) will be retained; they contain important product information.
- If surplus product must be disposed, manufacturer's or local- and state-recommended methods for proper disposal will be followed.

8.3 PRODUCT SPECIFIC PRACTICES

The following product-specific practices will be followed on-site. Recommendations are provided for petroleum products, fertilizers, solvents, paints, and other hazardous substances.

Petroleum Products

All on-site vehicles will be monitored for leaks and will receive regular preventive maintenance to reduce the chance of leakage. No vehicle maintenance will occur on site. Petroleum products will be stored in tightly sealed containers that are clearly labeled. Any asphalt substances used on-site will be applied according to manufacturer's recommendations.

Fertilizers

Fertilizers will be applied only in the minimum amounts recommended by the manufacturer. Once applied, the fertilizer will be worked into the soil to limit exposure to stormwater. Storage will be in a covered area; and the contents of any partially used bags will be transferred to a sealable, plastic bin to avoid spills.

Solvents, Paints, and other Hazardous Substances

All containers will be tightly sealed and stored when not required for use. Excess materials will not be discharged to the storm sewer system, but will be properly disposed according to manufacturer's instructions or state and local regulations.

Concrete Trucks

Concrete trucks will not be allowed to wash out or discharge surplus concrete or drum wash water into catch basins or drainage systems that are already in place.

8.4 SPILL CONTROL/NOTIFICATION PRACTICES

In addition to the good housekeeping and material management practices discussed above, the following practices will be followed for spill control, notification and cleanup.

- Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be informed of the procedures and the location of the information and cleanup supplies.
- Materials and equipment necessary for spill cleanup will be kept in the material storage area on-site. Equipment and materials will include, but will not be limited to, shovels, wheel barrows, brooms, dust pans, mops, rags, gloves, goggles, kitty litter or Speedi-Dry, sand, sawdust, and plastic and metal trash containers specifically designated for this purpose.
- All spills will be cleaned up immediately after discovery.
- The spill area will be kept well ventilated and personnel will wear protective clothing to prevent injury from contact with a hazardous substance.
- Spills of toxic or hazardous material in excess of reportable quantities, as established in the Massachusetts Contingency Plan (MCP), will be reported to the Massachusetts Department of Environmental Protection Division of Hazardous Waste [(617) 292-5851 or (978) 661-7679].

- The construction superintendent responsible for the daily operations will be the spill prevention and cleanup coordinator. He will designate at least three other site personnel to receive spill prevention and cleanup training. These individuals will each become responsible for a particular phase of prevention and cleanup. The names of the responsible spill personnel will be posted in the material storage area and in the on-site office trailer.

8.5 MAINTENANCE PROGRAM PRACTICES: PRIOR OR DURING CONSTRUCTION

In addition to the maintenance described for each stormwater control, the following practices should be followed:

- Prior to construction, install erosion and sediment control measures as shown on the plan and details.
- The site contractor shall inspect all sediment and erosion control structures after each rainfall event and at the end of the working day.
- All measures shall be maintained in good working order. If repair is necessary, it shall be initiated within 24 hours of inspection.
- Silt shall be removed from the filter bags if depths reach 6-inches or greater and as-needed.
- Sediment shall be contained within the construction site and away from drainage structures.
- Damaged or deteriorated erosion control measures will be repaired immediately after identification.
- The contractor’s site superintendent will be responsible for inspection, maintenance and repair activities.

Erosion control measures shall remain in place until all construction is completed and all disturbed earth is stabilized.

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9.0 Standard 9: Operation and Maintenance Plan

The goal of the operation and maintenance plan is not only to protect resources on-site or nearby, but also to protect resources in the region that may be affected by the activities at the site. Water quality treatment measures and the implementation of Best Management Practices (BMP's) for structural controls will result in the treatment of site stormwater and the removal of a minimum of 80 percent of the total suspended solids (TSS) load in runoff prior to discharge from the site, consistent with Massachusetts DEP’s TSS removal standard.

The stormwater management system will be owned by the Belmont Day School. They will be responsible for operation and maintenance. An Operation and Maintenance Log has been prepared for this project and is included in this report as Appendix I.

9.1 STRUCTURAL POLLUTANT CONTROLS

The proposed stormwater management system is designed to protect runoff water quality through the removal of sediment and pollutants. Structural pollutant controls used to separate and capture stormwater pollutants are described below.

Proprietary Water Quality Units

Proprietary separators will be inspected and cleaned in strict accordance with the manufacturer’s recommendations and requirements. The manufacturer’s recommendations and requirements are included in Appendix J, Contech Water Quality Device Inspection.

Roof Drain Leaders

Roof runoff from the existing buildings and proposed building will be directed to underground piped drainage systems. Routine roof inspections will be performed. Roofs will be kept clean and free of debris, and the roof drainage systems will be kept clear. Gutters and downspouts connected to the drainage system will be cleaned at least twice per year, or more frequently as necessary.

Subsurface Detention/Infiltration Basins

The subsurface detention/infiltration basins at the proposed project site will be Cultec systems, as well as the three existing infiltration basins. They are used for infiltration and detention. The basins require maintenance to remain functional. Well maintained pretreatment BMP’s (i.e. catch basins with deep sumps) will reduce the need for maintenance of the subsurface basins.

See Appendix K, Cultec Maintenance Guidelines for additional information.

Porous Asphalt Pavement

The proposed driveway consists of porous asphalt pavement. Porous asphalt pavement is a paved surface with a higher than normal percentage of air voids to allow water to pass through it and infiltrate into the underlying soil. Regular maintenance of the pavement is required to prevent clogging. After storms, monitor the surface to ensure that it is draining properly. As needed, clean the surface using a power washer to dislodge trapped particles and then vacuum sweep the area. The surface should be cleaned quarterly with a vacuum sweeping machine. Inspect the surface annually for deterioration. No winter sanding shall be conducted on the porous surface. Salt use shall be minimized during winter months. Do not reseal or repave with any impermeable material.

Catch Basins and Area Drains

All proposed catch basins at the site will be equipped with deep sumps and hooded outlets to trap debris, sediments, and floating contaminants, which are the largest constituents of urban runoff. The proper removal of sediments and associated pollutants and trash occurs only when catch basin inlets and sumps are cleaned out regularly. The more frequent the cleaning, the less likely sediments will be re-suspended and subsequently discharged. In addition, frequent cleaning also results in more volume available for future deposition and enhances overall performance.

Catch basins and area drains, both new and existing, will be cleaned a minimum of four times and inspected monthly for the first year to determine the sediment loading for the site. Any sand, sediment, or debris that collects (when it reaches a depth of more than ½ the sump depth, which is 2 feet for catch basins and area drains) will be removed as needed. After the first year, the frequency of the catch basin cleaning should be reviewed and revised based upon the sediment loading observed in the first year. Any structural damage or other indication of malfunction will be reported to the site manager. During colder periods, the catch basin grates will be kept free of snow and ice.

This practice, in coordination with minimal use of sand, and street sweeping comprises a multi-level source control approach that prevents sand/sediments and litter from exiting off-site and/or ultimately into the resource areas.

Existing Dry Wells

Inspect dry well after every major storm in the first few months, and after construction to ensure proper stabilization and function. All dry wells will be inspected at least one time per year and cleaned as need.

Existing Stormwater Basin

At least twice annually, the inlet pipes and dry wells in the bottom of the stormwater basin shall be checked for debris and removed to ensure unobstructed flow of water through the pond. Following any rainfall event exceeding 2.5 inches in a 24 hour period, the basin shall be inspected for debris, settling, cracking, erosion, sediment accumulation, and health of the lawn area. Remove sediment annually. If standing water is observed for more than 72 hours following a storm event, retain a qualified professional to assess whether the system is adequately infiltrating and take corrective measures as necessary.

Vegetated Areas Maintenance

Although not a structural component of the drainage system, the maintenance of vegetated areas may affect the functioning of stormwater management practices. This includes the health/density of vegetative cover and activities such as the application and disposal of lawn and garden care products, disposal of leaves and yard trimmings.

Initial Post-Construction Inspection

During the initial period of vegetation establishment in disturbed areas pruning and weeding are required twice in first year by contractor or owner. Any dead vegetation/plantings found after the first year will be replaced. Proper mulching is mandatory and regular watering may be required initially to ensure proper establishment of new vegetation.

Long-Term Maintenance

Weeds and invasive plant species will be removed by hand. Leaf litter and other detritus shall be removed twice per year. If needed to maintain aesthetic appearance, perennial plantings may be trimmed at the end of the growing season. Trees and shrubs will be inspected twice per year to evaluate health and attended to as necessary. Seeded ground cover or grass areas shall not receive mulching. PH tests of the soils in the planting bed will occur annually. If the pH is below 5.2, limestone will be applied to increase it. If the pH is above 8.0, iron sulfate plus sulfur will be added accordingly.

9.2 LONG TERM POLLUTION PREVENTION PLAN

The following measures will be employed to control potential sources of contamination and prevent pollution at the project site:

Deicing

To prevent increased pollutant concentrations in stormwater discharges, the amount of road salt applied will be controlled. The amount of deicing materials used will be monitored with the goal of using only enough to make the drive aisle and walkways safe.

Fertilizer/Pesticide/Herbicide Application

The facility will require that landscaping maintenance contractors implement a program to test soils at the site annually and to limit the amount of fertilizer, pesticides and herbicides to only what is needed to maintain healthy plant materials and landscaped areas. PH tests of the soils in the planting bed will occur annually. If the pH is below 5.2, limestone will be applied to increase it. If the pH is above 8.0, iron sulfate plus sulfur will be added accordingly.

No pesticides or herbicides are to be used unless a single spot treatment is required for a specific control application.

Fertilizer usage will be avoided. If deemed necessary, slow release fertilizer will be used, and applied only in the minimum amounts recommended by the manufacturer. Once applied, the fertilizer will be worked into the soil to limit exposure to stormwater. Storage will be in a covered area; and the contents of any partially used bags will be transferred to a sealable, plastic bin to avoid spills.

Fertilizer will be used to begin the establishment of vegetation in bare or damaged areas, but will not be applied on a regular basis unless necessary.

Records of soil management, application dates, planting dates, preventive measures, treatments and other appropriate information should be kept. This information will be used as a reference when fertilizer/pesticide/herbicide management decisions in the future.

Materials Management/Housekeeping Practices

The following product-specific practices will be followed on-site. Recommendations are provided for petroleum products, fertilizers, solvents, paints, and other hazardous substances, and concrete.

> **Petroleum Products** - No vehicle maintenance or handling of petroleum products will occur on site. Petroleum products will be stored in tightly sealed containers that are clearly labeled. Any asphalt substances used on-site will be applied according to manufacturer's recommendations.
>
> **Solvents, Paints, and other Hazardous Substances** - All containers will be tightly sealed and stored indoors when not required for use. Excess materials will not be discharged to the storm sewer system, but will be properly disposed according to manufacturer's instructions or state and local regulations. Outside storage on the property will be prohibited.

Spill Prevention Practices

The facility will implement a spill prevention program that will include storm water contamination assessment, flow diversion, record keeping, internal reporting, employee training, and preventive maintenance. The following specific practices will be followed for spill control, notification and cleanup.

- Manufacturer's recommended methods for spill cleanup for any chemicals used or stored on site will be clearly posted and site personnel will be informed of the procedures and the location of the information and cleanup supplies.
- Materials and equipment necessary for spill cleanup will be kept in the material storage area on-site. Equipment and materials may include, as appropriate, shovels, wheel barrows, brooms, dust pans, mops, rags, gloves, goggles, kitty litter or Speedi-Dry, sand, sawdust, and plastic and metal trash containers specifically designated for this purpose.
- All spills will be cleaned up immediately after discovery.
- The spill area will be kept well ventilated and personnel will wear protective clothing to prevent injury from contact with a hazardous substance.
- Spills of toxic or hazardous material in excess of reportable quantities, as established in the Massachusetts Contingency Plan (MCP), will be reported to the Massachusetts Department of Environmental Protection Division of Hazardous Waste [(617) 292-5851 or (978) 661-7679].

10.0 Standard 10: Prohibition of Illicit Discharges

Standard 10 of the Massachusetts Stormwater Handbook prohibits illicit discharges to stormwater management systems. As stated in the handbook, "The stormwater management system is the system for conveying, treating, and infiltrating stormwater on-site, including stormwater best management practices and any pipes intended to transport stormwater to the groundwater, a surface water, or municipal separate storm sewer system. Illicit discharges to the stormwater management system are discharges that are not entirely comprised of stormwater."

It is fully understood that the Storm Water Pollution Prevention Plan (SWPPP) for the project will include procedures to prevent illicit discharges to the stormwater management system during construction.

Standard 10 also states that "The Illicit Discharge Compliance Statement must be accompanied by a site map that is drawn to scale and that identifies the location of any systems for conveying stormwater on the site and shows that these systems do not allow the entry of any illicit discharges into the stormwater management system. The site map shall identify the location of any systems for conveying wastewater and/or groundwater on the site and show that there are no connections between the stormwater and wastewater management systems and the location of any measures taken to prevent the entry of illicit discharges into the stormwater management system." Included with this report are drawings that display the location of all of the stormwater management components as well as other utilities (existing and proposed) on the project site and conforms to requirements of a "site map" to accompany the Illicit Discharge Compliance Statement.

The Illicit Discharge Compliance Statement for the project is as follows:

Illicit Discharge Compliance Statement

Per the requirements of Standard 10 of the Massachusetts Stormwater Management Standards it shall be stated that No Illicit Discharges exist on the project.

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Figures

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STORMWATER MANAGEMENT & EROSION CONTROL REPORT
BELMONT DAY SCHOOL
BELMONT, MASSACHUSETTS

Figure 1 – USGS Topographic Map

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Stantec
226 Causeway St., 6th Floor
Boston, MA 02114

Figure 1 - USGS Topographic Map
Belmont Day School Barn
Belmont, MA
12/13/2016

Data Source: "Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division"

STORMWATER MANAGEMENT & EROSION CONTROL REPORT
BELMONT DAY SCHOOL
BELMONT, MASSACHUSETTS

Figure 2 – Locus Map

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Figure 2 - Aerial Photo
Belmont Day School Barn
Belmont, MA
12/13/2016

Data Source: "Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division" and aerial from 2014

STORMWATER MANAGEMENT &
EROSION CONTROL REPORT
BELMONT DAY SCHOOL
BELMONT, MASSACHUSETTS

Figure 3 – Soil Map

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Figure 3 - Soils Map
Belmont Day School Barn
Belmont, MA
12/13/2016

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Boston, MA 02114

Data Source: "Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division" and aerial from 2014

Figure 4 – Flood Zones Map

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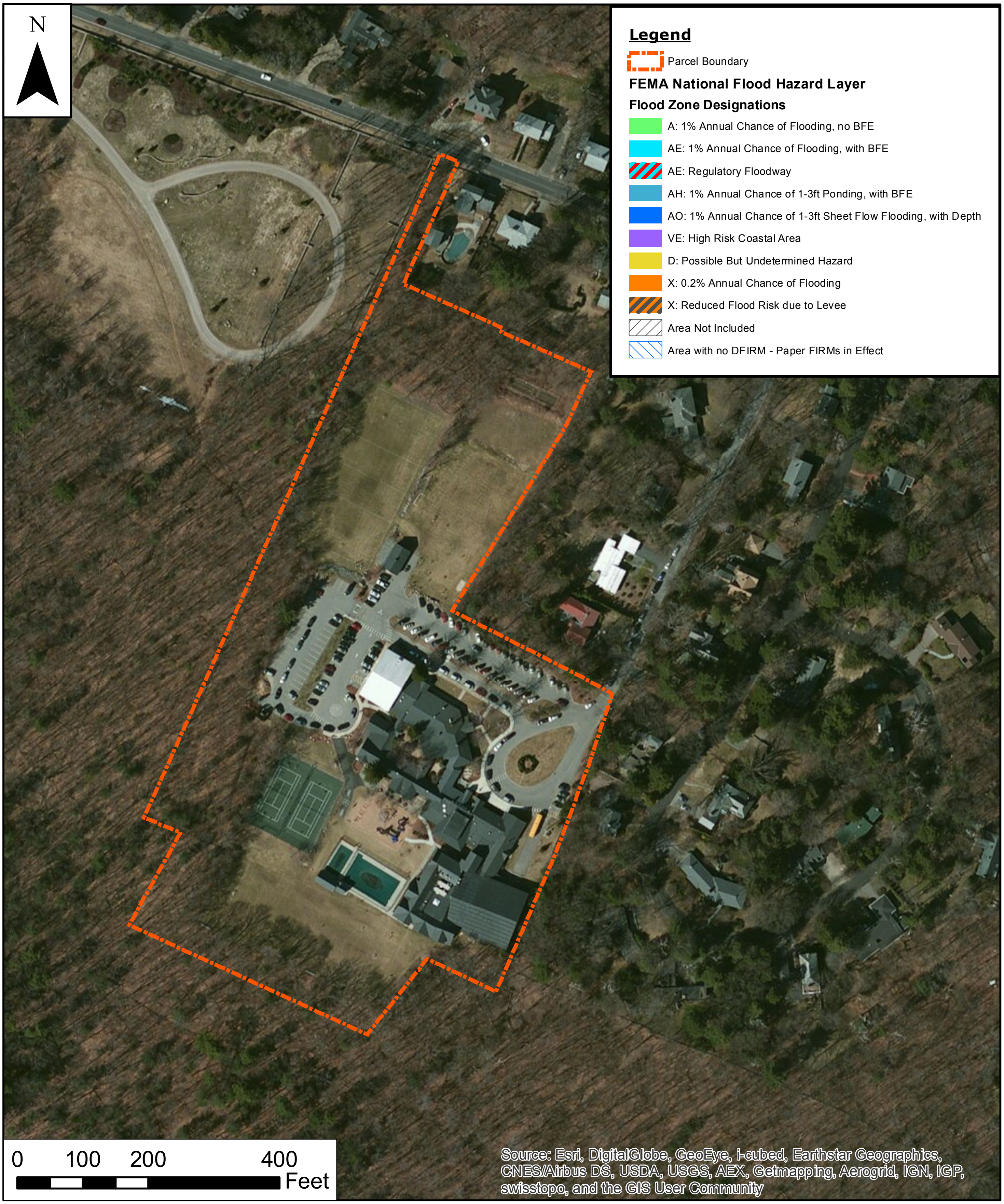

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Boston, MA 02114

Figure 4 - Flood Zones Map
Belmont Day School Barn
Belmont, MA
12/13/2016

Data Source: "Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division" and aerial from 2014

Figure 5 – Protected Areas Map

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Boston, MA 02114

Figure 5 - Protected Areas Map
Belmont Day School Barn
Belmont, MA
12/13/2016

Data Source: "Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division" and aerial from 2014

STORMWATER MANAGEMENT & EROSION CONTROL REPORT
BELMONT DAY SCHOOL
BELMONT, MASSACHUSETTS

Figure 6 – Hydrology Map

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Figure 6- Hydrology Map
Belmont Day School Barn
Belmont, MA

12/13/2016

Data Source: "Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division" and aerial from 2014

Figure 7 – Water Supply Map

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Figure 7 - Water Supply Map
Belmont Day School Barn
Belmont, MA
12/13/2016

Data Source: "Office of Geographic and Environmental Information (MASSGIS), Commonwealth of Massachusetts, Information Technology Division" and aerial from 2014

Figure 8 – Existing Watershed Plan

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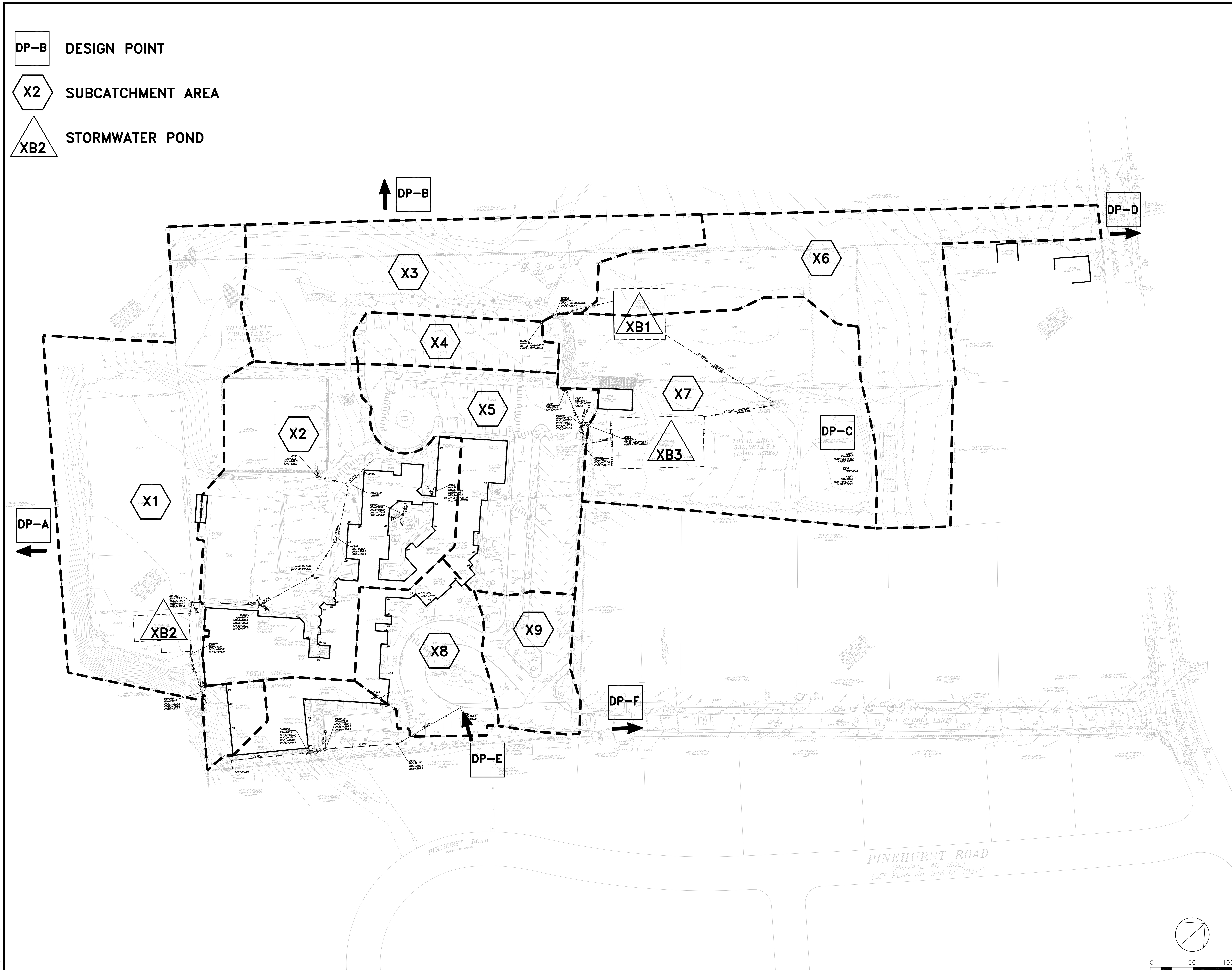

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Consultants

Legend

Notes

Revision	By	Appd.	YY.MM.DD

Existing Drainage Exhibit	HK	FH	2017.01.13
Issued	By	Appd.	YY.MM.DD

File Name:	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
BELMONT DAY SCHOOL

ATHLETIC BARN

Belmont, Massachusetts

Title
EXISTING DRAINAGE EXHIBIT

Project No.	Scale	
210801375		
Drawing No.	Sheet	Revision
	1 of 1	0

ORIGINAL SHEET - ARCH D

Figure 9 – Proposed Watershed Plan

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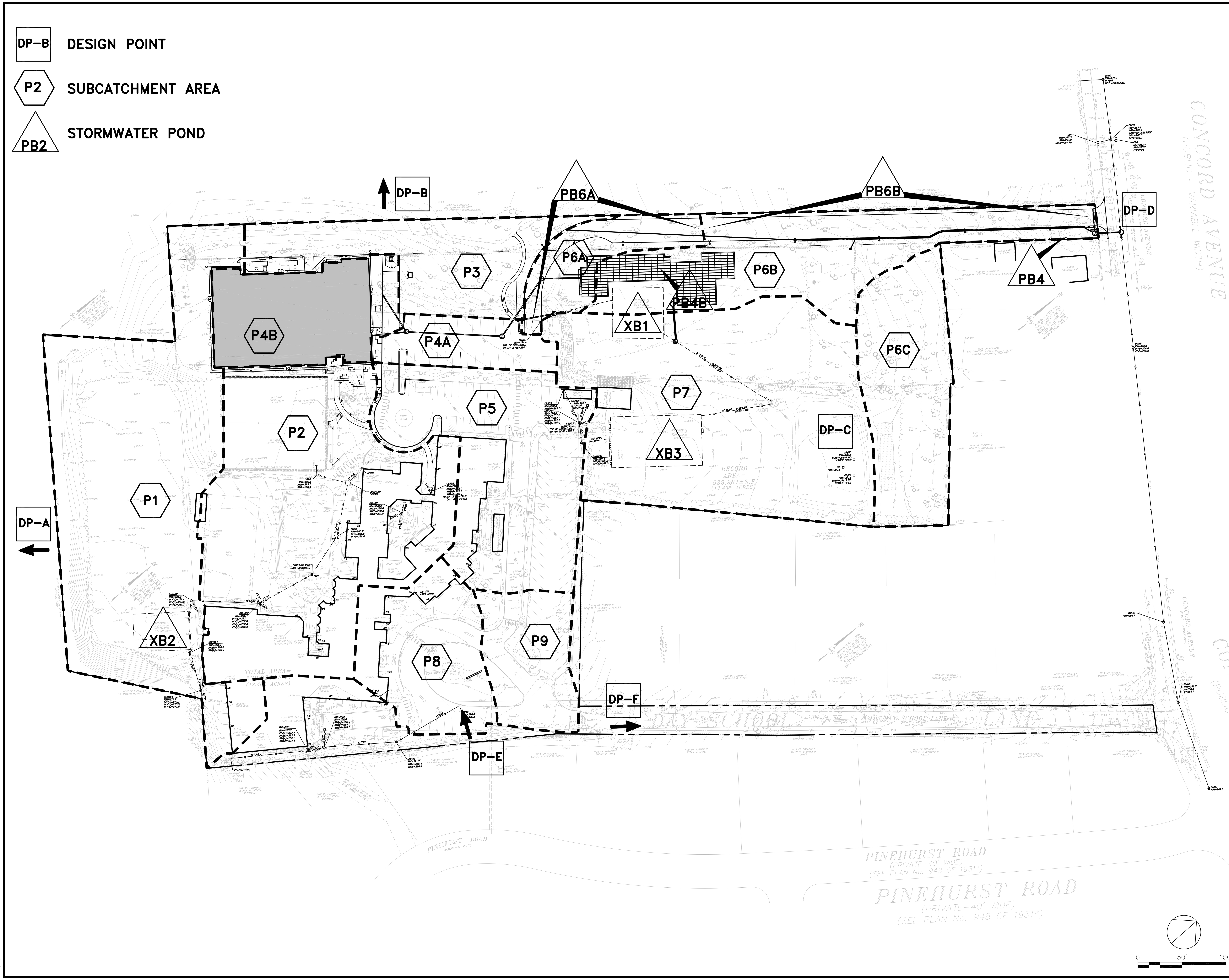

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Revision	By	Appd.	YY.MM.DD
Proposed Drainage Exhibit	HK	FH	2017.01.13

Issued	By	Appd.	YY.MM.DD

File Name:

Dwn. Chkd. Dsgn. YY.MM.DD

Permit-Seal

Client/Project
BELMONT DAY SCHOOL

ATHLETIC BARN

Belmont, Massachusetts

Title
PROPOSED DRAINAGE EXHIBIT

Project No. 210801375
Scale

Drawing No.
Sheet 1 of 1
Revision 0

ORIGINAL SHEET - ARCH D

Appendix

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APPENDIX A – TOWN OF BELMONT CHECKLIST FOR STORMWATER MANAGEMENT AND EROSION CONTROL REPORT AND MASSACHUSETTS STORMWATER REPORT CHECKLIST AND CERTIFICATION

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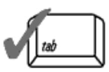
TOWN OF BELMONT
Checklist for Stormwater Management and Erosion Control Report

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 Management and Erosion Control Report must be submitted with the building permit application for a project that is covered by the Town of Belmont Stormwater Management and Erosion Control Bylaw. The following checklist is NOT a substitute for the Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management and Erosion Control documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the 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 Report must include:

- The Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed 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 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 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. The Report shall also document compliance with the Stormwater Management and Erosion Control Bylaw recognizing the bylaw contains provisions that could be more strict or broader in scope than the Stormwater Management Standards.

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

---

[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 a permit 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.

TOWN OF BELMONT
Checklist for Stormwater Management and Erosion Control Report

B. Report 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 Report. The checklist is also intended to provide the reviewing authority with a summary of the components necessary for a comprehensive Report that addresses the ten Stormwater Standards.

Note: Because stormwater requirements vary from project to project, it is possible that a complete 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 Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Management and Erosion Control Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan, 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

COMMONWEALTH OF MASSACHUSETTS
FRANK
HOLMES
CIVIL
No. 40203
REGISTERED
PROFESSIONAL ENGINEER

Frank Holmes

Frank Holmes 2-21-2017
Signature and Date

TOWN OF BELMONT
Checklist for Stormwater Management and Erosion Control Report

60-325 - Stormwater Management and Erosion Control Bylaw (excerpt)

F Stormwater Management and Erosion Control

F (1) Regulated Activities

A Stormwater Management and Erosion Control Permit shall be required prior to undertaking any land disturbance that involves:

(a) An alteration that will result in land disturbances of 2,500 square feet of total area or more, or that is part of a common plan for development that will disturb 2,500 square feet or more;
(b) An alteration that will increase the amount of a lot's impervious surface area to more than 25% of the lot's total area; or
(c) Storage or permanent placement of more than 100 cubic yards of excavated material, fill, snow or ice.

F (3) General Requirements

(a) An Operation and Maintenance Plan shall be submitted to the OCD for approval prior to the issuance of a Stormwater Management and Erosion Control Permit. The Operation and Maintenance Plan shall be designed to ensure compliance with the Stormwater Management and Erosion Control Permit, this Bylaw, and the Massachusetts Surface Water Quality Standards, 314 CMR 4.00, in all seasons and throughout the life of the system.

(b) As-built drawings showing all stormwater management systems shall be submitted to the OCD at the completion of a project.

(c) The OCD may require the applicant to contribute to the cost of design, construction, and maintenance of a public or shared stormwater facility in lieu of an onsite stormwater facility where the OCD determines that there are not sufficient site conditions for onsite Best Management Practices that will satisfy the design criteria set forth in Section 34.6.4.1 of this Bylaw and the performance standards set forth in the regulations promulgated under this Bylaw. Funds so contributed may be used to design, construct, and maintain stormwater projects that will improve the quality and quantity of surface waters in Belmont by treating and recharging stormwater from existing impervious surfaces that is now discharged to said waters with inadequate treatment or recharge. The amount of any required contribution to the fund shall be determined by the OCD pursuant to standards established in the Regulations adopted pursuant to this Bylaw.

F (4) Design Criteria (The Report shall consider all of the design criteria below)

All Development shall satisfy the following design criteria:

(a) Compliance with all applicable provisions of the Stormwater Management Standards, regardless of the proximity of the development to resource areas or their buffer zones, as defined by the *Wetlands Protection Act, M.G.L*. c. 131, § 40 and its implementing regulations.
(b) Erosion and sediment controls must be implemented to prevent adverse impacts during disturbance and construction activities.
(c) There shall be no change to the existing conditions of abutting properties from any increase in volume of stormwater runoff or from erosion, silting, flooding, sedimentation or impacts to wetlands, ground water levels or wells.
(d) When any proposed discharge may have an impact upon streams, wetlands and/or storm sewers, the OCD may require minimization or elimination of this impact based on site conditions and existing stormwater system capacity.

TOWN OF BELMONT
Checklist for Stormwater Management and Erosion Control Report

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

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

☐ 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): Subsurface detention / infiltration basins, porous pavement, proprietary water quality devices

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.

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.

* N/A: Volume of runoff is decreased at all design points.

☐ Any potential change to the existing conditions of abutting properties from any increase in volume of stormwater runoff have been identified in the Report

☒ The Report provides calculations demonstrating that the post-development discharge volume is equal to or less than the pre-development discharge volume from the 2-year and the 10-year 24-hour storms.

☒ The Report provides a quantitative impact of discharge volumes from the 100-year 24-hour storm. If this evaluation shows that increased off-site flooding result from the discharge volumes from the 100-year 24-hour storms, BMPs also are described in the Report that the applicant will implement and maintained to attenuate these discharges.

☒ Any potential change to the existing conditions of abutting properties from erosion, silting, flooding, or sedimentation have been identified in the Report.

☒ The Report describes the practices and controls that the Applicant will implement and maintain to prevent adverse impacts from erosion, silting, flooding, or sedimentation.

☒ Any potential impacts to wetlands have been identified in the Report.

☐ The Report describes the practices and controls that the Applicant will implement and maintain to prevent adverse impacts to wetlands.

Additional Requirements for Projects other than One and Two Family Developments:

☒ Any potential impacts to ground water levels or wells have been identified in the Report, including quantitative projections of changes in the seasonal high water table and quantitative projections of storm-related short-term mounding calculations associated with infiltration BMPs for a 24-hour 10 year design storm.

☐ The Report describes the practices and controls that the Applicant will implement and maintain (if required) to prevent adverse impacts to ground water levels or wells for a 24-hour 10 year design storm.

Requirements Specific to Section F (4)(d)

☒ Is stormwater from the pre-development site discharged directly to (check all that apply):

- ☐ A surface water body (specify the water body)
- ☒ The Belmont MS4 (storm sewers)
- ☐ Another MS4 (specify the MS4)
- ☒ Other (specify) Certain areas discharge offsite. See Stormwater Report.

☒ Will stormwater from the post-development site be discharges directly to (check all that apply):

- ☐ A surface water body (specify the water body)
- ☒ The Belmont MS4 (storm sewers)
- ☐ Another MS4 (specify the MS4)
- ☒ Other (specify) Certain areas will discharge offsite. See Stormwater Report.

☒ Any potential impacts upon streams, wetlands and/or storm sewers have been identified in the Report. (Explain in Report narrative)

- ☐ These will be prevented with mitigating measures that the Applicant will implement and maintain (explain in Report narrative)
- ☒ These will be prevented without mitigating measures (explain in Report narrative)

☒ The Report describes the practices and controls that the Applicant will implement and maintain to prevent any adverse impacts to streams, wetlands and/or storm sewers.

Additional Requirements for Projects other than One and Two Family Developments:

☐ If the discharge is to an MS4, a certification that the discharge meets Massachusetts Surface Water Quality Standards and any applicable approved Total Maximum Daily Load (TMDL) waste load allocation is included in the Report.

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.

☒ 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

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.

☒ 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.

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.

☒ Adverse impacts due to erosion, sedimentation, or both during disturbance and construction activities are prevented:

- ☒ With erosion and sediment controls that the Applicant will implemented and maintain (explain in Report narrative)

- ☐ Without erosion and sediment controls (explain in Report narrative)

TOWN OF BELMONT
Checklist for Stormwater Management and Erosion Control Report

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

☐ 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.

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

Checklist for Stormwater Report

A. Introduction

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

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

The Stormwater Report must include:

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

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

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

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

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

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

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

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

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

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

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

Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature

COMMONWEALTH OF MASSACHUSETTS
FRANK
HOLMES
CIVIL
No. 40203
REGISTERED
PROFESSIONAL ENGINEER

Frank Holmes

Frank Holmes 2-21-2017
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 (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 (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 (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 (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.

STORMWATER MANAGEMENT &
EROSION CONTROL REPORT
BELMONT DAY SCHOOL
BELMONT, MASSACHUSETTS

APPENDIX B – SOILS AND GEOTECHNICAL

- **SOIL EXAMINATION RESULTS, 8/4/16 (STANTEC)**
- **SOIL EXAMINATION RESULTS, 10/12/16 (STANTEC)**
- **SUBSURFACE EXPLORATION REPORT BY MCPHAIL ASSOCIATES, LLC DATED JULY 14, 2016**
- **NRCS WEB SOIL SURVEY MAP**

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BELMONT DAY SCHOOL SOIL EXAMINATION RESULTS

Project:	Belmont Day School 21081375
Date of testing:	4-Aug-16
Weather:	Sunny, 80°
Operator:	Rob Mullen Belmont Landscaping
Soil evaluator:	Hilde Karpawich SE14004 Stantec, Boston

Location 1: Existing southwestern athletic field
Subsurface "Option 1"

TP-1

A_p	0-12"	sandy loam
B_w	12-34"	loamy sand
C_1	34-48"	loamy sand
C_2	48-90"	sandy loam

Refusal @ 90" (7.5')

TP-2

A_p	0-9"	loamy sand
B_w	9-30"	sandy loam
C	30-50"	sandy loam

Refusal @ 50" (4'-2") on southwesterly side of pit
Refusal @ 76" (6'-4") on northeasterly side of pit

TP-3

A_p	0-9"	loamy sand
B_w	9-16"	loamy sand
C_1	16-33"	sandy loam
C_2	33-108"	sandy loam

Bottom of excavation @ 108" (9')

Location 2: Existing northwestern atheletic field
Subsurface "Option 4"

TP-4

A_p	0-8"	sandy loam
B_w	8-22"	loamy sand
C_1	22-48"	loamy sand
C_2	48-102"	sand (gleyed)

Bottom of excavation @ 102" (8.5')
Reddish color @ 28" extending down to top of sand

TP-5

A_p	0-8"	loamy sand
B_w	8-32"	loamy sand
C_1	32-66"	sand
C_2	66"-96"	sand (gleyed)

Bottom of excavation @ 96" (8')
Reddish color @ 30" extending down to top of sand

TP-6

A_p	0-9"	loamy sand
B_w	9-40"	loamy sand
C_1	40-62"	sand
C_2	62-84"	sand (gleyed)

12" metal pipe within fill encountered @ 84" (7')
Bottom of excavation @ 84" (7')
Reddish color @ 34" extending down to top of sand

BELMONT DAY SCHOOL SOIL EXAMINATION RESULTS

Project:	Belmont Day School 21081375	*Operator:*	Belmont Landscaping
Date of testing:	12-Oct-16	*Soil evaluator:*	Hilde Karpawich SE14004
Weather:	Sunny, 50°		Stantec, Boston

Note: No standing water or redox features were observed in any test pit.

Location: Proposed driveway area

TP-7

A_p	0-12"	sandy loam
B_w	12-18"	sandy loam
C_1	18-32"	sandy loam
C_2	32-84"	loamy sand

Refusal @ 84" (7')

TP-8

A_p	0-8"	sandy loam
B_w	8-17"	sandy loam
C_1	17-38"	sandy loam
C_2	38-126"	sandy loam

Bottomof excavation @ 126" (10.5')

TP-9

A_p	0-10"	sandy loam
B_w	10-15"	sandy loam
C_1	15-44"	sandy loam
C_2	44-126"	loamy sand

Bottomof excavation @ 126" (10.5')

McPHAIL
ASSOCIATES, LLC

2269 Massachusetts Avenue
Cambridge, MA 02140
www.mcphailgeo.com
(617) 868-1420

SUBSURFACE EXPLORATION REPORT

BELMONT DAY SCHOOL
PROPOSED SITE IMPROVEMENTS

BELMONT, MASSACHUSETTS

JULY 14, 2016

Prepared For:

Belmont Day School
55 Day School Lane
Belmont, MA 02478

PROJECT NO. 5918.2.01

July 14, 2016

Belmont Day School
55 Day School Lane
Belmont, MA 02478

Attention: Ms. Lucille Kooyoomjian

Reference: Belmont Day School - Proposed Site Improvements; Belmont, Massachusetts
Subsurface Exploration Report

Ladies and Gentlemen:

Enclosed herein is our Subsurface Exploration Report for the proposed site improvements to be constructed as part of the proposed Barn building project (previously known as Classroom building project) located on the campus of the Belmont Day School in Belmont, Massachusetts. Refer to the Project Location Plan, **Figure 1**, for the general site location.

This report was prepared in accordance with our proposal dated May 9, 2016 and the subsequent authorization of Belmont Day School. These services are subject to the limitations contained in **Appendix A.**

Purpose and Scope

The purposes of the subsurface exploration program are to assess the subsurface soil, bedrock and groundwater conditions at the site as they relate to the proposed site improvements, and based on these conditions, to provide construction and design considerations relating to geotechnical aspects of the proposed construction.

Of particular concern is the potential presence of shallow bedrock (within 4 feet of the ground surface) in the areas of the proposed "One Way" road entrance, and the proposed below grade water and sewer utilities as indicated on the drawing designated L1, entitled "Landscape Elements" which indicates the approximate location of the "One Way" road and the drawing C1.01, entitled "Utilities Plan" which indicates the proposed location of the proposed water and sewer services.

Available Information

Information provided to McPhail Associates, LLC (McPhail) included the following drawings/plans:

- Belmont Day School Record Conditions Plan of Land dated December 19, 2012, prepared by Meridian Associates, Inc. (Meridian);

- Landscape Elements drawing L-1 dated April 22, 2016, prepared by Utile Architecture + Urban Design (Utile);

- Utilities Plan drawing C1.01, undated, prepared by Utile; and

- Foundation Engineering Report, Belmont Day School Proposed Classroom Building, Belmont, Massachusetts dated April 23, 2015, prepared by McPhail.

Based on our review of the above drawing, elevations referenced herein are in feet and are understood to refer to the National Geodetic Vertical Datum (N.G.V.D.) of 1929.

Proposed Site Improvements

Based on our review of the above referenced information, the proposed site improvements are understood to include a new one way road located within the existing moderately wooded area along the northwest perimeter of the campus. The approximate 740-foot long and 16.5-foot wide new road will extend from the north corner of the existing parking lot located to the north of the existing tennis courts and will extend northeast and connect to Concord Avenue.

The propose site improvements will also include new water and sewer services for the proposed Barn building to be located northwest of the existing tennis courts and southwest of the parking lot. In general, the water service will extend northeast from the proposed Barn building cross the existing parking lot and connect into the existing water service along the northeast perimeter of the school campus. Similar to the water service, the proposed sewer services will extend from the northeast side of the Barn building, across the existing parking lot, and then turn southeast and down the existing driveway, then turn south and across the landscaped area located at the school entrance, then turn southwest along the driveway located along the southeast side of the existing school, and finally turn south and connect into the existing sewer manhole located at the southern perimeter of the school campus.

Based on our review of the above referenced drawings, excavations for the proposed utilities are anticipated to extend to depths ranging from about 4 to 6 feet below the existing ground surface. With respect to the proposed roadway, excavation required for construction of the proposed one-way road is anticipated to extend less than 5 feet below the existing ground surface.

The approximate location of the proposed utilities are indicated on the enclosed **Figure 2**, Subsurface Exploration Plan.

Subsurface Explorations

A subsurface exploration program consisting of six (6) test pits and fourteen (14) rock probes was completed at the site on June 17, 2016. The test pits were performed by Dooley Construction Co., Inc. of Waltham, Massachusetts and the rock probes were performed by Maine Drilling and Blasting, Inc. both under contract to McPhail. Approximate plan locations of the test pits and rock probes are as indicated on **Figure 2**.

The test pits were performed utilizing a CAT model 304E rubber track-mounted excavator. Test pits terminated upon refusal at depths ranging from about 5 to 6 feet below the ground surface within the glacial till deposit or on what is presumed to be a boulder within the glacial till deposit or bedrock. The rock probes were advanced using a hydraulic drill-rig. Test pit logs prepared by McPhail are presented in Appendix B following the text of this report and a summary of the subsurface conditions encountered at the rock probe locations are provided on **Table 1**.

Previous subsurface explorations performed at the site included nine (9) test pits that were completed at the site on April 16, 2015 by Cardillo and Sons, Inc. of Waltham, Massachusetts under contract to McPhail. These test pits were performed in the approximate location of the proposed Barn building. The approximate locations of the proposed Barn building and test pits are as indicated on the attached Subsurface Exploration Plan, **Figure 2**. The results of the nine (9) test pits are included in Foundation Engineering Report referenced above and is included in **Appendix C**.

Laboratory Testing

At the completion of the field work, soil samples obtained from the test pits were returned to our laboratory for more detailed classification, analysis and testing. The laboratory testing consisted of sieve analyses to determine the gradations and confirm the visual classifications of the glacial till deposit. Laboratory test procedures were in general accordance with applicable ASTM Standards. Results of the gradation testing appear on **Figure 3** following the text of this report.

Subsurface Conditions

A detailed description of the subsurface conditions encountered within the explorations is documented on the test pit logs contained in **Appendix B** and rock probe summary **Table 1**.

Based on the recent subsurface explorations performed at the site, the following is a description of the generalized subsurface conditions across the site encountered from ground surface downward.

Test Pit Explorations – "One Way" Road

The ground surface across the propose one-way road is underlain by an approximate 0.5-foot thick topsoil layer that varies from of a loose, dark brown to black silt, with some to trace gravel and sand and containing variable amounts of roots, leaves, and cobbles.

Underlying the surficial topsoil layer a subsoil deposit was encountered. The subsoil deposit was observed to range from about 1.5 to 2 feet in thickness and varies from a compact, red-brown, sand with some silt and gravel to a sand with some silt and trace gravel.

The subsoil deposit was underlain by a natural glacial till deposit. The surface of the glacial till deposit was encountered at depths ranging from about 2 to 2.5 feet below the existing ground surface. The glacial till deposit was observed to vary from a compact, gray, silty, gravelly sand to a silty sand and gravel containing a variable amount of cobbles and boulders.

With the exception of test pit TP-101, the test pits were terminated upon refusal at depths ranging from about 5 to 5.5 feet below the existing grounds surface, on what is presumed to be bedrock or a boulder present in the glacial till deposit. Based on our observations, the bedrock is likely to consist of diorite.

Test pit TP-101 was terminated within the glacial till deposit at a depth of about 5 feet below the existing ground surface.

Rock Probes - Proposed Utilities

Based on our observations, rock probes identified as probes P-1, P-2, P-5, P-11 and P-13 each encountered what is presumed to be the bedrock surface or a boulder at depths ranging from 2 to 4 feet below the existing ground surface. These probes were terminated at depths ranging from about 6 to 8 feet below the existing grounds surface in what is presumed to be bedrock or a boulder within the glacial till deposit.

The remaining probes identified as P-3, P-4, P-6, P-7, P-8, P-9, P-10, P-12 and P-14 encountered what is presumed to be the bedrock surface or a boulder at depths ranging from 6 to 14 feet below the existing ground surface. These probes were terminated at depths ranging from 9 to 17 feet below the existing ground surface in what is presumed to be bedrock or a boulder within the glacial till deposit.

The depth below the existing ground surface to the bedrock surface or boulder encountered within the rock probe explorations is provided on **Table 1** and **Figure 2**.

Groundwater Observations

Groundwater was not observed upon completion of the test pit and rock probe explorations. It is anticipated that future groundwater levels across the project site may vary from those reported herein based on such factors such as normal seasonal changes, runoff during or following periods of heavy precipitation, alterations to existing drainage patterns or may become perched on the surface of the relatively impervious glacial till deposit or bedrock.

Construction and Design Considerations

Based on the proposed scope of development and the subsurface conditions as indicated above, the following construction and design considerations are provided.

One-Way Road

All surficial topsoil should be removed from the plan area of the proposed one-way road. Following removal of the topsoil layer and prior by the placement of fill up to the proposed bottom of the base course subgrade, the ground surface should be proof-rolled with a minimum of 6-passes with a 5-ton vibratory roller. All soft areas detected during the proof-compaction process should be removed and replaced with ordinary fill. Excavated on-site glacial till and subsoil, including glacial till and subsoil material excavated from the proposed Barn building footprint, may be economically re-used as ordinary fill up to the proposed bottom of base course layer elevations provided it is maintained in a relatively dry condition, can be properly compacted and all material greater than 6-inches in diameter (cobbles and boulders) are culled out.

Excavated on-site glacial till and subsoil are not considered suitable for use as the final base course layer located directly below the asphalt layer.

It is emphasized that the on-site glacial till and subsoil material contains a high percentage of silt and, hence, cannot be compacted when too wet. Also, winter conditions greatly aggravate the ability to reuse the on-site silty soils. Therefore, it is recommended that the placement and compaction of the glacial till for use as structural fill must be carefully monitored.

Where necessary, all imported gravel fill material for use within the proposed road way area and as the base course layer located directly below the asphalt surface should consist of a well-graded sand and gravel containing less than 8 percent passing the No. 200 sieve. All fill material placed below the proposed one-way road should be placed in lifts having a maximum compacted thickness of 6 inches and be compacted to a minimum of 95 percent of its maximum modified Proctor density.

It is recommended that the project civil engineer provide the required thickness of base course material and if necessary additional recommendations to those provided herein associated with the types of base course materials utilized. Should it be required that the proposed roadway be designed for "heavy" traffic loads, such as emergency vehicles, it is anticipated that additional requirements for the types and thickness of base course material may be necessary and should be provided by the project civil engineer.

Based on the results of the test pit explorations and the proposed configuration of the one-way road, rock excavation is not anticipated for construction of the one-way road.

Proposed Water and Service Utilities

The primary purpose of the rock probes was to evaluate the potential for rock excavation along the proposed utility alignments. Based on the results of the rock probes, excavation typically classified as rock excavation should be anticipated in the vicinity of probes P-1, P-2, P-5, P-11 and P-13.

Based on the results of the rock probe explorations and upon finalizing the proposed utility layout, it is recommended that an estimated quantity/volume of trench rock excavation be calculated. This quantity and associated rock removal cost should be included in the earthwork section of the project specifications of the contract documents and indicate that it be included by the Contractor as part of their base bid. Based on the anticipated localized rock excavation to be required, it is anticipated that rock excavation may be performed by a combination mechanical methods such as hoe ramming and ripping, and in some cases may consist of the removal of larger boulders. The project specifications should also define boulders, and trench and open rock excavation for the purpose of applying the appropriate quantities/costs to their removal.

The project's civil engineer should provide typical cross-sections that detail the recommended pipe bedding requirements which include locations where the bottom of the utility trench exaction consists of bedrock.

In consideration of the relatively impervious glacial till and bedrock deposits, trapped surface water and groundwater runoff may accumulate on the surface of the glacial till or bedrock deposits at localized areas within the excavations after periods of heavy precipitation. In general, it is anticipated that dewatering by means of localized trenches and sumps should suffice during foundation construction operations.

Final Comments

It is recommended that McPhail be been retained to provide design assistance during the design phase of this project. The purpose of this involvement is to review the civil drawings and notes for conformance with the recommendations presented herein, to assist in evaluating the rock excavation quantity to be included in the project documents, and to prepare the earthwork specification section for inclusion into the Contract Documents for construction.

It is recommended that McPhail be retained during the construction period to observe earthwork related activities for conformance with the recommendation provided herein. Our involvement during the construction phase should minimize costly delays due to unanticipated field problems since our field engineer would be under the direct supervision of our project manager who was responsible for the subsurface exploration and foundation design recommendations documented herein and to confirm/review the rock excavation quantities.

We trust that the above is sufficient for your present requirements. Should you have any questions concerning the recommendations presented herein, please do not hesitate to call.

Very truly yours,

McPHAIL ASSOCIATES, LLC

Harry J. Berlis

Gary M. O'Neil, P.E.

Enclosures

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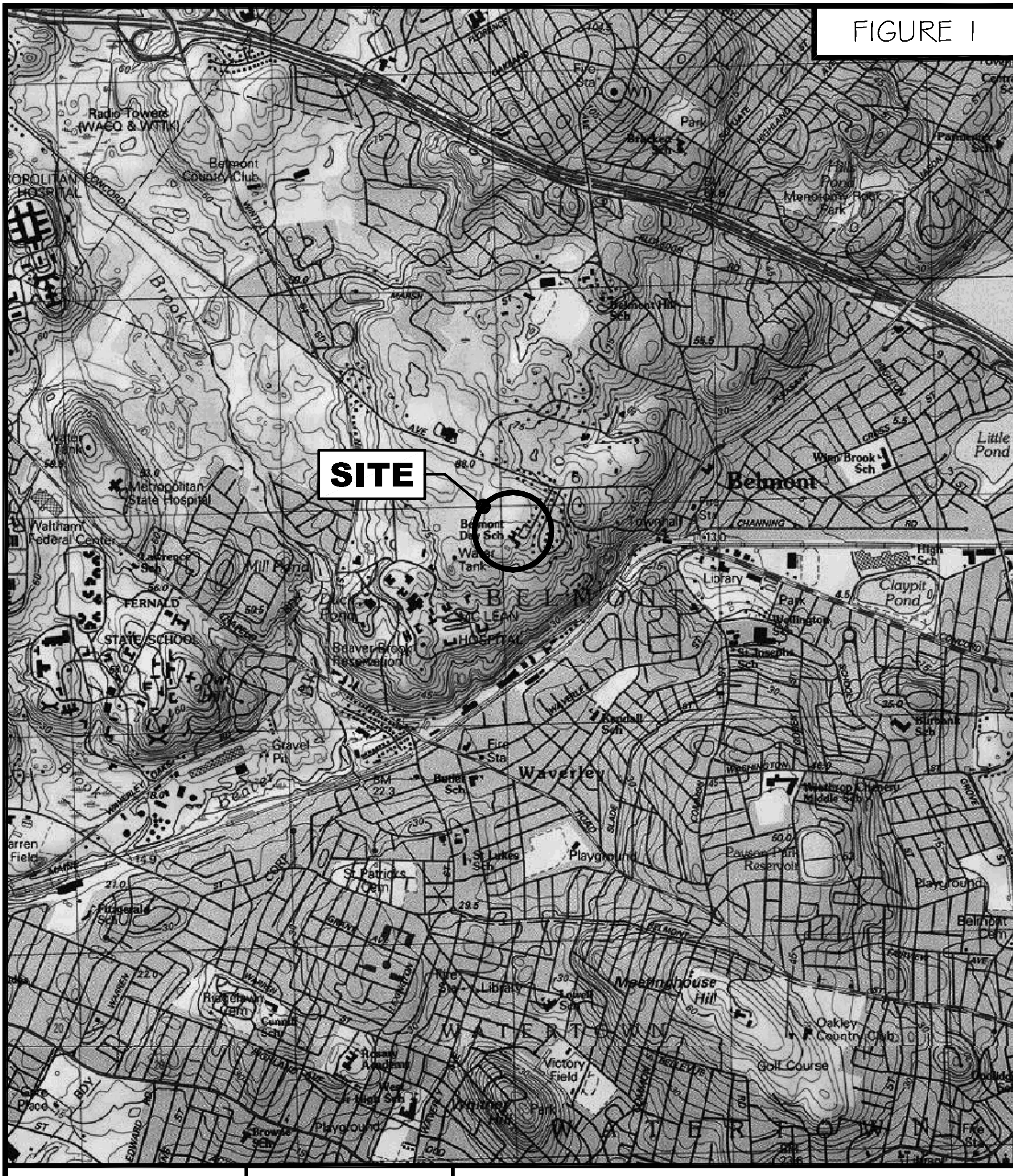
HJB/gon

FIGURE 1



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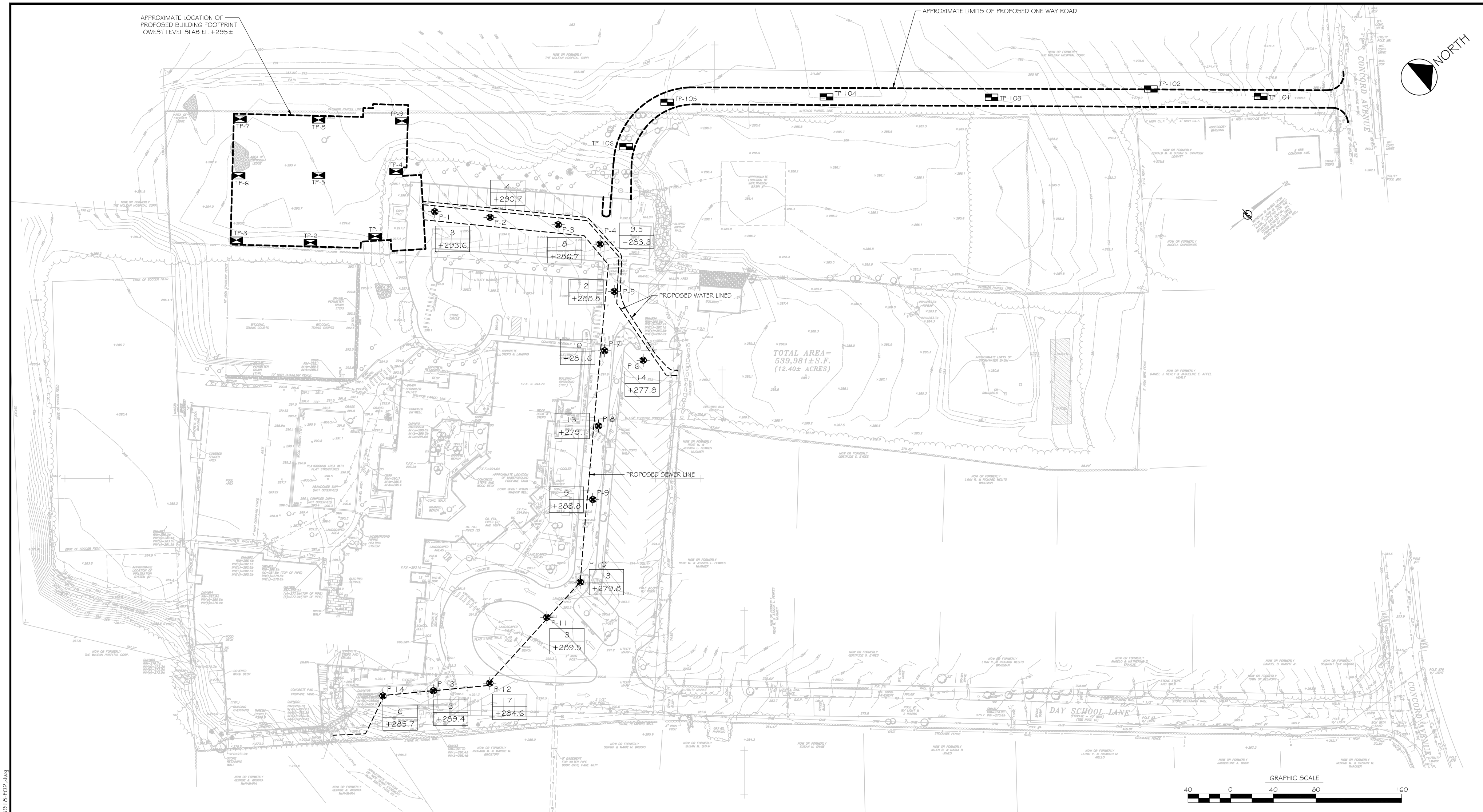
SCALE 1:25,000

PROJECT LOCATION PLAN

BELMONT DAY SCHOOL

PROPOSED SITE IMPROVEMENTS

BELMONT MASSACHUSETTS



LEGEND

- APPROXIMATE LOCATION OF TEST PIT PERFORMED BY CARDILLO & SONS OF WALTHAM, MA ON APRIL 16, 2015 FOR McPHAIL ASSOCIATES, LLC
- APPROXIMATE LOCATION OF TEST PIT PERFORMED BY DOOLEY CONSTRUCTION CO., INC. ON JUNE 17, 2016 FOR McPHAIL ASSOCIATES, LLC
- APPROXIMATE LOCATION OF ROCK PROBE PERFORMED BY MAINE PRILLING AND BLASTING ON JUNE 17, 2016 FOR McPHAIL ASSOCIATES, LLC

3 – DEPTH TO ROCK (FEET)
+293.6 – TOP OF ROCK (ELEVATION)

REFERENCE: THIS PLAN WAS PREPARED FROM A 20-SCALE DRAWING ENTITLED "BELMONT DAY SCHOOL RECORD CONDITIONS PLAN OF LAND" DATED DECEMBER 19, 2012 BY MERIDIAN ASSOCIATES

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BELMONT DAY SCHOOL
PROPOSED SITE IMPROVEMENTS
BELMONT MASSACHUSETTS

SUBSURFACE EXPLORATION PLAN
FOR
BELMONT DAY SCHOOL
BY
McPHAIL ASSOCIATES, LLC

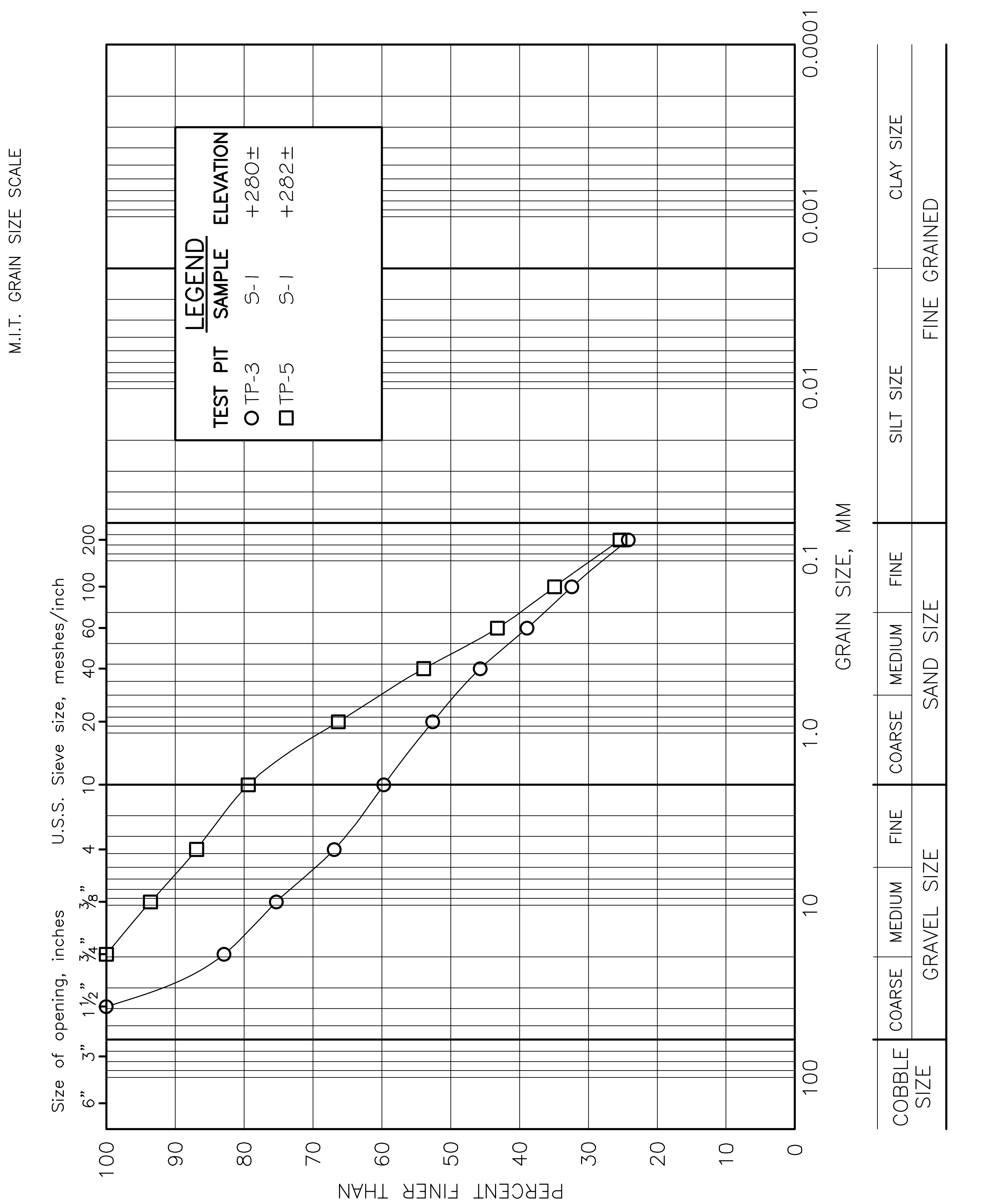
Date: JUNE 2016	Dwn: F.G.P.	Chkd: H.J.B.	Scale: 1" = 40'
Project No: 5918			FIGURE 2

FILE NAME: H:\Acad\JOBS\5918\Site Improvements\5918-F02.dwg

PROJECT No. 5918

GRAIN SIZE DISTRIBUTION
GLACIAL TILL

FIGURE 3



FILE NAME: H:\Acad\JOBS\5918\Site Improvements\5918-F03_Sieve.dwg

McPHAIL ASSOCIATES, LLC

TABLE 1

SUMMARY OF ROCK PROBES
BELMONT DAY SCHOOL
BELMONT, MASSACHUSETTS
McPhail Job No. 5918

Rock Probe	Ground Surface Elevation (feet)	Depth to Bedrock (feet)	Top of Bedrock Elevation (feet)	Total Probe Depth (feet)	Notes:
P-1	+296.6	3	+293.6	7	
P-2	+294.7	4	+290.7	8	
P-3	+294.7	8	+286.7	12	
P-4	+292.8	9.5	+283.3	13	
P-5	+290.8	2	+288.8	6	
P-6	+291.8	14	+277.8	17	
P-7	+291.6	10	+281.6	14	
P-8	+292.1	13	+279.1	16	
P-9	+292.8	9	+283.8	13	
P-10	+292.8	13	+279.8	16	
P-11	+292.5	3	+289.5	6	
P-12	+291.6	7	+284.6	11	
P-13	+292.4	3	+289.4	8	
P-14	+291.7	6	+285.7	9	

APPENDIX A:

LIMITATIONS

LIMITATIONS

This report has been prepared on behalf of and for the exclusive use of Belmont Day School for specific application to the proposed one-way road and site utilities to be constructed as part of the proposed Barn building project on the campus of the Belmont Day School at 55 Day School Lane in Belmont, Massachusetts in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made.

In the event that any changes in nature or design of the proposed site improvements as indicated herein are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing by McPhail Associates, LLC.

The analyses and recommendations presented in this report are based upon the data obtained from the subsurface explorations performed at the approximate locations indicated on the enclosed plan. If variations in the nature and extent of subsurface conditions between the widely spaced explorations become evident during the course of construction, it will be necessary for a re-evaluation of the recommendations of this report to be made after performing on-site observations during the construction period and noting the characteristics of any variations.

It is recommended that McPhail Associates, LLC be been retained to provide design assistance during the design phase of this project. The purpose of this involvement is to review the contact drawings for conformance with the recommendations presented herein and to prepare the earthwork specification section for inclusion into the Contract Documents for construction.

APPENDIX B:

MCPHAIL ASSOICATES, LLC
TEST PIT LOGS

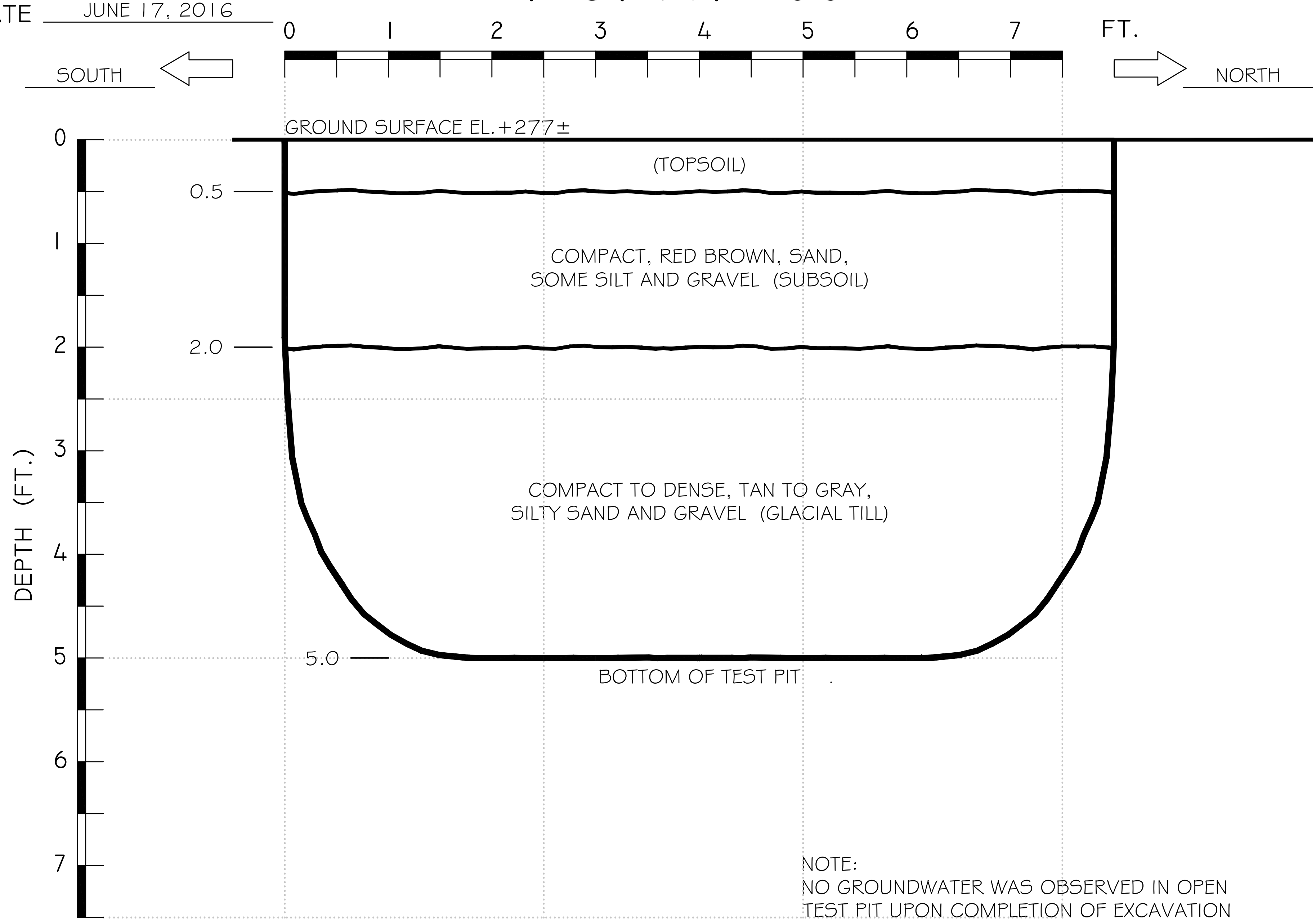
TP-101 THRTOUGH TP-106

JOB NO. 5918

DATE JUNE 17, 2016

TEST PIT LOG

TEST PIT NO. 1



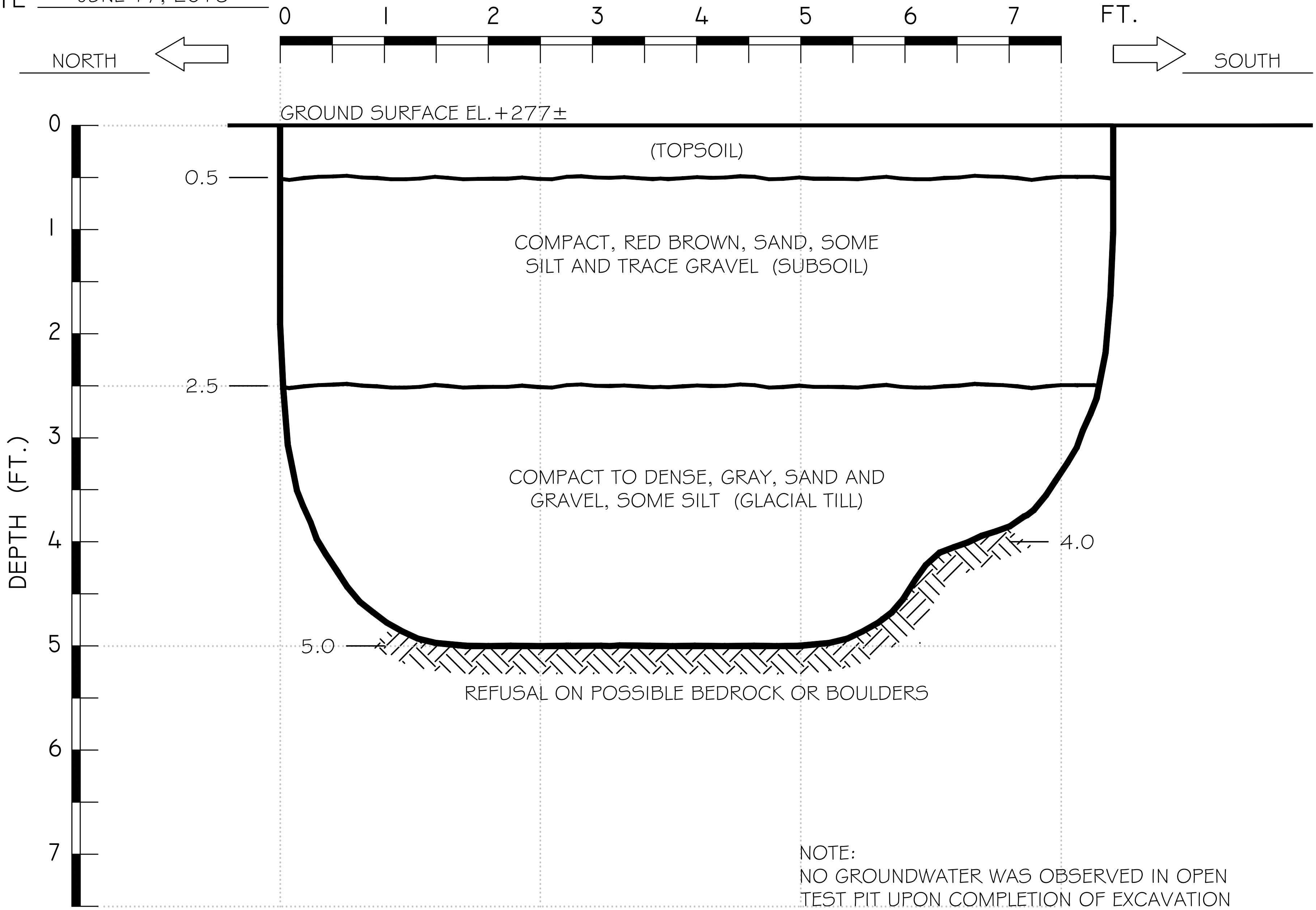
McPHAIL ASSOCIATES, LLC

JOB NO. 5918

DATE JUNE 17, 2016

TEST PIT LOG

TEST PIT NO. 2



NOTE:
NO GROUNDWATER WAS OBSERVED IN OPEN TEST PIT UPON COMPLETION OF EXCAVATION

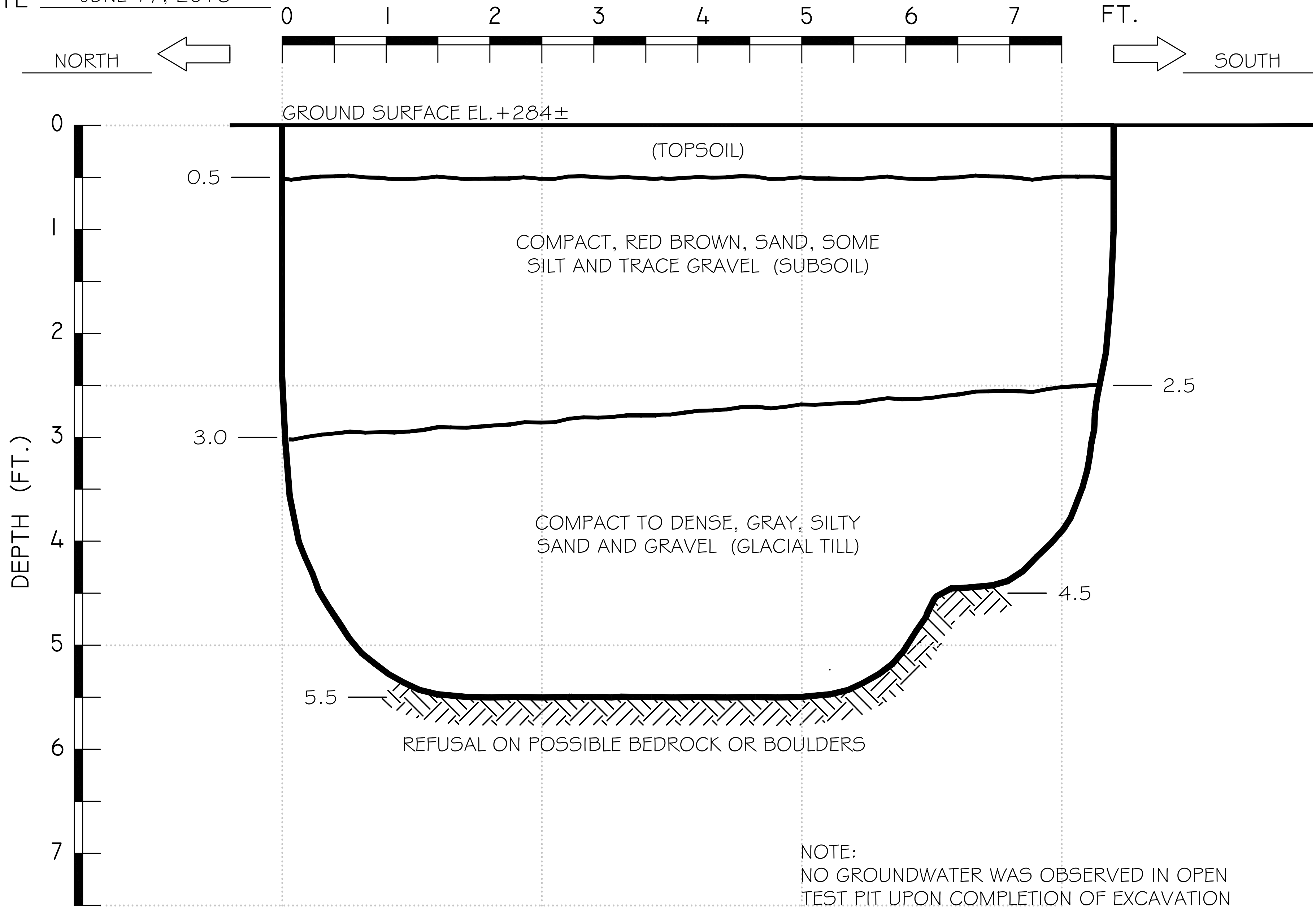
McPHAIL ASSOCIATES, LLC

JOB NO. 5918

DATE JUNE 17, 2016

TEST PIT LOG

TEST PIT NO. 3



NOTE:
NO GROUNDWATER WAS OBSERVED IN OPEN TEST PIT UPON COMPLETION OF EXCAVATION

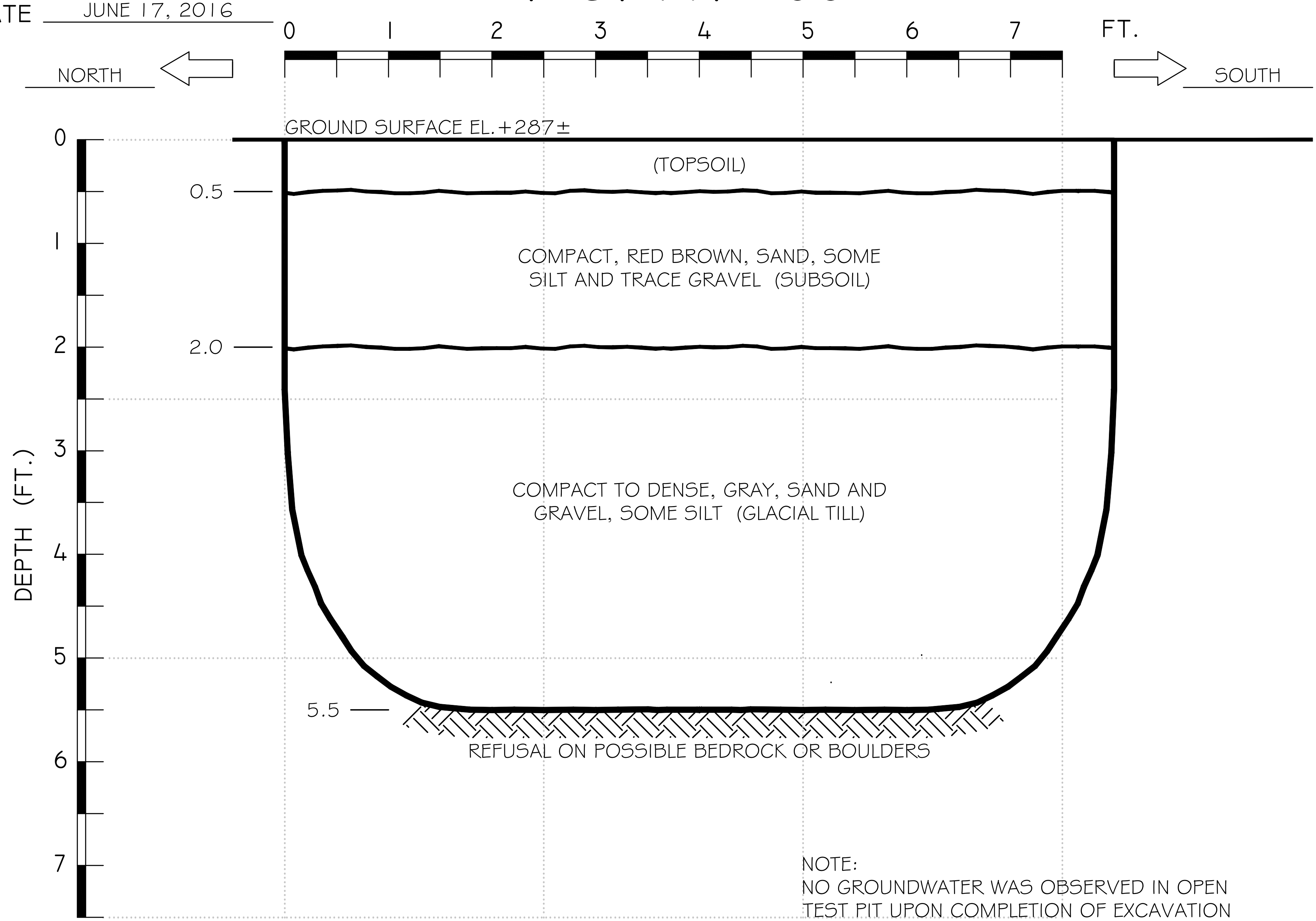
McPHAIL ASSOCIATES, LLC

JOB NO. 5918

DATE JUNE 17, 2016

TEST PIT LOG

TEST PIT NO. 4



NOTE:
NO GROUNDWATER WAS OBSERVED IN OPEN TEST PIT UPON COMPLETION OF EXCAVATION

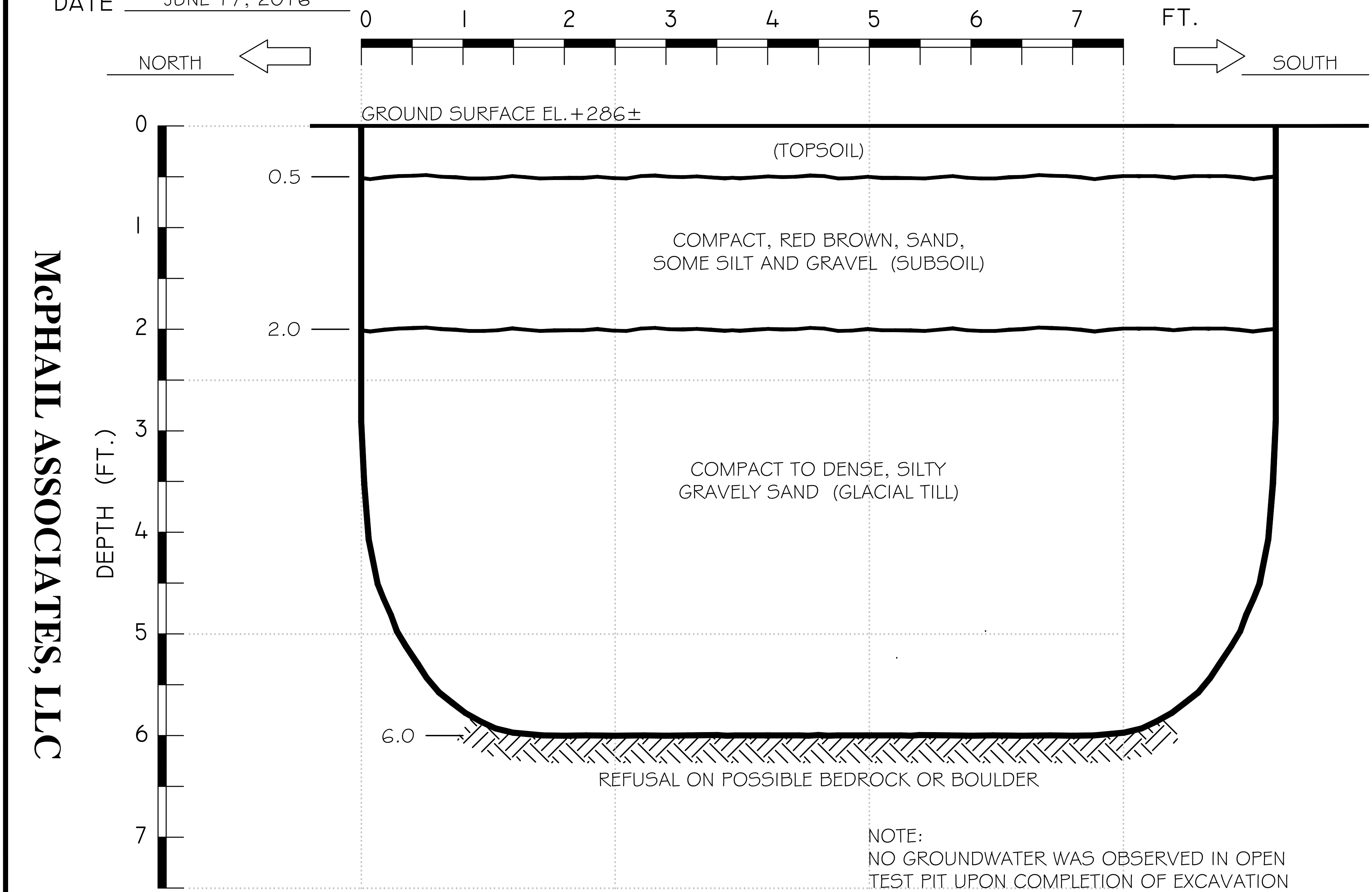
McPHAIL ASSOCIATES, LLC

JOB NO. 5918

DATE JUNE 17, 2016

TEST PIT LOG

TEST PIT NO. 5



NOTE:
NO GROUNDWATER WAS OBSERVED IN OPEN TEST PIT UPON COMPLETION OF EXCAVATION

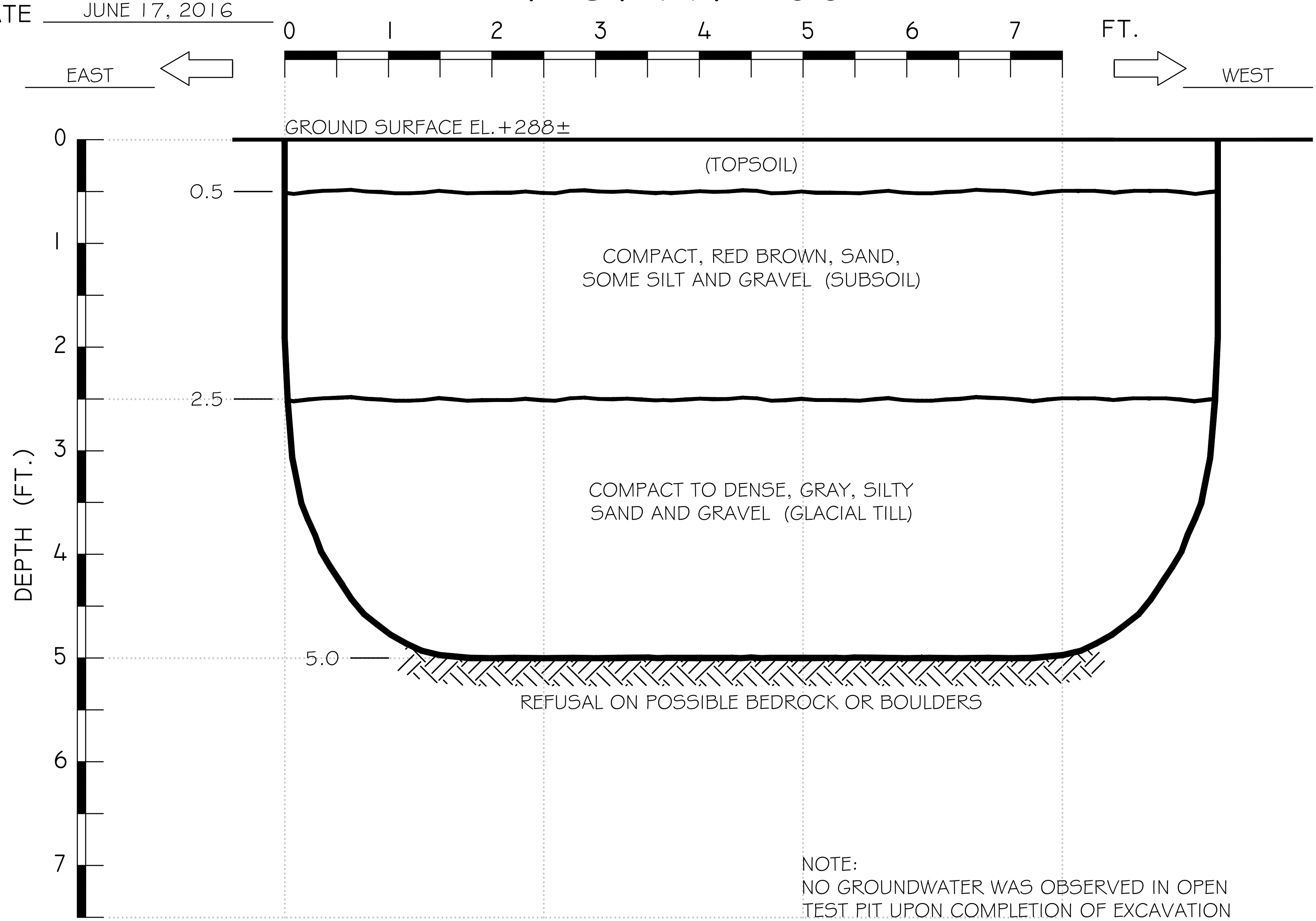
McPHAIL ASSOCIATES, LLC

JOB NO. 5918

DATE JUNE 17, 2016

TEST PIT LOG

TEST PIT NO. 6



NOTE:
NO GROUNDWATER WAS OBSERVED IN OPEN
TEST PIT UPON COMPLETION OF EXCAVATION

McPHAIL ASSOCIATES, LLC

McPHAIL ASSOCIATES, LLC

APPENDIX C:

FOUNDATION ENGINEERING REPORT

BELMONT DAY SCHOOL
PROPOSED CLASSROOM BUILDING

BELMONT, MASSACHUSETTS

DATED APRIL 23, 2015

McPHAIL
ASSOCIATES, LLC

FOUNDATION ENGINEERING REPORT

BELMONT DAY SCHOOL
PROPOSED CLASSROOM BUILDNG

BELMONT, MASSACHUSETTS

APRIL 23, 2015

Prepared For:

Belmont Day School
55 Day School Lane
Belmont, MA 02478

2269 Massachusetts Avenue
Cambridge, MA 02140
www.mcphailgeo.com
(617) 868-1420

PROJECT NO. 5918.2.00

April 23, 2015

Belmont Day School
55 Day School Lane
Belmont, MA 02478

Attention: Ms. Lucille Kooyoomjian

Reference: Belmont Day School - Proposed Classroom Building; Belmont, Massachusetts
Foundation Engineering Report

Ladies and Gentlemen:

Enclosed herein is our Foundation Engineering Report for the proposed classroom building to be located on the campus of the Belmont Day School in Belmont, Massachusetts. Refer to the Project Location Plan, Figure 1, for the general site location.

This report was prepared in accordance with our proposal dated April 2, 2015 and the subsequent authorization of Ms. Lucille Kooyoomjian of Belmont Day School. These services are subject to the limitations contained in Appendix A.

Purpose and Scope

The purposes of the subsurface exploration program and foundation design study are to assess the subsurface soil, bedrock and groundwater conditions at the site as they relate to foundation design, and based on these conditions, to provide safe and economic foundation design recommendations for the proposed addition.

Foundation design includes foundation support of the proposed building and its lowest level slab, treatment of the lowest level slab in consideration of groundwater, lateral earth pressures on foundation walls, and seismic design considerations in accordance with the provisions of the Eighth Edition of the Massachusetts State Building Code (Code).

Foundation construction considerations relating to geotechnical aspects of the proposed construction are also presented herein.

Available Information

Information provided to McPhail Associates, LLC (McPhail) included a 20-scale, progress drawing entitled, "Belmont Day School Record Conditions Plan of Land" dated December 19, 2012 prepared by Meridian Associates, Inc. (Meridian) and included the approximate location of the proposed classroom building footprint.

Based on our review of the above drawing, elevations referenced herein are in feet and are understood to refer to the National Geodetic Vertical Datum (N.G.V.D.) of 1929.

Existing and Proposed Conditions

The proposed building is planned to be located within the southwestern portion of the school grounds and immediately west of the existing tennis courts. The building will be a one to three story structure with a footprint of about 21,000 square feet and a lowest level floor slab at Elevation +295.

The majority of the proposed building site is in an existing wooded area, however, the northeast corner of the proposed building footprint encroaches into an existing paved parking area. The existing ground surface generally slopes gradually downward from about Elevation +296 along the eastern side of the building footprint to about Elevation +293 along the western side of the building footprint. Bedrock outcrops are located in the building footprint near the northwest corner of building, and outside the building footprint near the northeast corner of the building and outside the building footprint near the northwest corner of the building.

Subsurface Explorations

A subsurface exploration program consisting of nine (9) test pits was completed at the site on April 16, 2015 by Cardillo and Sons, Inc. of Waltham, Massachusetts under contract to McPhail. Approximate plan locations of the test pits are as indicated on the attached Subsurface Exploration Plan, Figure 2.

The test pits were performed utilizing a Komatsu PC35 track-mounted excavator. Test pits terminated upon refusal at depths ranging from 1.5 to 7.5 feet below the ground surface on what is presumed to be a boulder within the glacial till deposit or bedrock. Test pit logs prepared by McPhail are presented in Appendix B following the text of this report.

The proposed test pits locations were provided to Meridian by McPhail and were field located at the project site by Meridian. The existing ground surface elevation at each exploration location was provided by Meridian.

Laboratory Testing

At the completion of the field work, soil samples obtained from the test pits were returned to our laboratory for more detailed classification, analysis and testing. The laboratory testing consisted of sieve analyses to determine the gradations and confirm the visual classifications of the fill, subsoil and glacial till deposits. Laboratory test procedures were in general accordance with applicable ASTM Standards. Results of the gradation testing appear on Figures 3, 4, and 5 following the text of this report.

Subsurface Conditions

A detailed description of the subsurface conditions encountered within the explorations is documented on the test pit logs contained in Appendix B and the proximate locations of the test pits are indicated on the enclosed Subsurface Exploration Plan, Figure 2.

Based on the recent subsurface explorations performed at the site, the following is a description of the generalized subsurface conditions across the site encountered from ground surface downward.

The ground surface across the propose building footprint is underlain by an approximate 0.4 to 1-foot thick forest mat layer that varies from of a loose, dark brown to black silt, with some to trace gravel and sand and containing variable amounts of roots, leaves, and cobbles.

Underlying the forest mat layer at test pit TP-4, a fill material was encountered. The fill was observed to extend to about 2.5 feet below the existing ground surface and consists of a compact, brown, silty sand and gravel containing variable amounts of cobbles. Based on the existing site conditions, the fill material is considered indicative of reworked glacial till that was likely utilized in the construction of the existing parking lot located to the northeast of the proposed classroom building. A grain size distribution of a typical sample of the fill material is presented on the enclosed Figure 3. The fill material in test pit TP-4 was observed to be underlain by an approximate 0.5-foot thick topsoil layer which is considered to represent the former ground surface.

Underlying the surficial forest mat and the lower topsoil layer encountered in test pit TP-4, a subsoil deposit was encountered. The subsoil deposit was observed to range from about 0.5 to 2 feet in thickness and varies from a loose to compact, orange to orange-brown, sandy silt with trace to some gravel containing variable amounts of cobbles and boulders. Grain size distributions of two typical samples of the subsoil deposit are presented on the enclosed Figure 4.

With the exception of test pits TP-2 and TP-7, the subsoil deposit was underlain by a natural glacial till deposit. The surface of the glacial till deposit was encountered at depths ranging from about 1.5 to 4 feet below the existing ground surface, corresponding to levels ranging from about Elevation +290.0 to Elevation +294.5. The glacial till deposit was observed to vary from a compact to dense, gray to blue-gray, silty, gravelly sand to a well-graded mixture of sand, silt and gravel, containing variable amount of cobbles and boulders.

With test pits TP-2 and TP-7, refusal was encountered directly below the subsoil deposit at depths ranging from about 1.5 to 2 feet below the existing ground surface, corresponding Elevation +293.5 and Elevation +291.5, respectively, on what is presumed to be bedrock or a boulder present in the glacial till deposit.

Test pits TP-1, TP-3 through TP-6, TP-8 and TP-9, were terminated upon refusal at depths ranging from about 3 to 7.5 feet below the existing grounds surface, corresponding to levels ranging from about Elevation +285.5 to Elevation +293, on what is presumed to be bedrock or a boulder present in the glacial till deposit. Based on our observations, the bedrock is likely to consist of diorite.

Upon completion of the test pit excavations, groundwater was observed within test pit TP-1 at a depth of about 7 feet below the existing ground surface, corresponding to about Elevation +288.5. Groundwater was not observed upon completion of test pits TP-2 through TP-9.

It is anticipated that future groundwater levels across the project site may vary from those reported herein based on such factors such as normal seasonal changes, runoff during or following periods of heavy precipitation, alterations to existing drainage patterns or may become perched on the surface of the relatively impervious glacial till deposit or bedrock.

Foundation Design Recommendations

Based on the proposed scope of development and the subsurface conditions as indicated above, we recommend that foundation support for the proposed building be provided by conventional spread footings in conjunction with slab-on-grade construction.

The spread footings should bear directly on the natural glacial till, bedrock or on compacted structural fill that is placed directly over the natural glacial till or bedrock. For continuity of footing design for the various subsurface conditions, it is recommended that the footings be proportioned utilizing a maximum design bearing pressure of two (2) tons per square-foot.

The lowest level floor slab should be designed as an economical slab-on-grade underlain by a polyethylene vapor barrier spread across a minimum 6-inch thickness of imported gravel fill.

All existing topsoil/forest mat, subsoil and fill material should be removed in their entirety from within the building footprint down to the surface of the natural undisturbed glacial till or bedrock and be replaced as needed with structural fill for support of the footings and floor slab. The removal of the topsoil/forest mat, subsoil and fill material and its replacement of structural fill should extend laterally beyond the perimeter building footprint a distance equal to the depth of structural fill required below the bottom of the footing to reach the surface of the natural glacial till or bedrock deposit plus 2 feet.

Excavated on-site glacial till and fill material may be economically re-used as structural fill within the building for support of the footings and slab-on-grade, or as ordinary fill outside the building footprint provided it is maintained in a relatively dry condition, can be properly compacted to the required density, and all material greater than 4-inches in diameter (cobbles, boulders, building debris, etc.) are removed. The on-site subsoil may be reused as ordinary fill within landscaped areas only where fill is required to raise the existing site grades. As with the glacial till, the subsoil should be maintained in a relatively dry condition so that it can be readily placed and compacted to the required density.

The on-site glacial till, subsoil and fill material are not considered suitable for use as gravel fill as the final 6-inches of material which underlies the slab-on-grade as recommended above.

It is emphasized that the on-site glacial till, subsoil and fill material contain a high percentage of silt and, hence, cannot be compacted when too wet. Also, winter conditions greatly aggravate the ability to reuse the on-site silty soils. Therefore, the placement and compaction of the glacial till and fill for use as structural fill should be carefully monitored on a full-time basis.

All imported gravel fill material for use as structural fill for support of the footings and slab-on-grade should consist of a well-graded sand and gravel containing less than 8 percent passing the No. 200 sieve. All structural fill consisting of either on-site materials or imported gravel fill should be placed in lifts having a maximum compacted thickness of 6 inches and be compacted to a minimum of 95 percent of its maximum modified Proctor density. The placement and compaction of all structural fill utilized within the proposed building area should be monitored by a registered professional engineer, or his designated representative, in accordance with the provisions of the Massachusetts State Building Code.

Perimeter footings located adjacent to non-heated areas and bearing on soil should be provided with a minimum 4-foot thickness of soil cover as frost protection. Interior foundations located in heated areas should be located such that the top of the foundation concrete is a minimum of 6 inches below the underside of the lowest level slab. Perimeter footings located adjacent to non-heated areas and bearing directly on the bedrock deposit should be provided with a minimum 2-foot thickness of soil cover as frost protection. All foundations should be located such that they are below a theoretical line drawn upward and outward at 2 to 1 (horizontal to vertical) from the bottom exterior edge of all adjacent footings, structures and utilities.

Excavation of bedrock at footing locations should extend to a minimum of 4-inches below the bottom of the foundation concrete. The bearing surface should be leveled to a maximum slope of 1 vertical to 12 horizontal and covered with a 4-inch thickness of compacted crushed stone. All displaced or uplifted rock fragments should be removed from the proposed building footprint prior to placement of the crushed stone layer. Additional recommendations associated with excavation of bedrock and preparation of the glacial till bearing surfaces are presented in the following section of this report entitled, “Construction Considerations”.

It is understood that the lowest level floor slab will be located at about Elevation +295 and slightly above the finish grades which surround the proposed building footprint. Therefore, underslab and perimeter foundation drainage is not considered necessary. However, it is recommended that the exterior finish grades around the perimeter of the proposed structure be pitched away from the building to provide for positive drainage away from the building.

All localized depressions in the lowest level slabs extending below the invert elevation of the underslab drainage system (such as elevator pits, etc.) should be provided with properly tied continuous waterstops in all construction joints and crystalline waterproofing on properly prepared interior surfaces to protect against groundwater intrusion.

Below-grade foundation walls receiving lateral support at the top and bottom (i.e. restrained walls) should be designed for a lateral earth pressure corresponding to an equivalent fluid density of 60 pounds per cubic-foot. Similarly, drained cantilevered retaining walls, (i.e. receiving no lateral support at the top) should be designed for a lateral earth pressure corresponding to an equivalent fluid density of 40 pounds per cubic-foot. To these values must be added the pressures attributable to earthquake forces per Section 1610.2 of the Code.

Lateral forces can be considered to be transmitted from the structure to the soil by passive pressure against the foundation walls utilizing an equivalent fluid density of 120 pounds per cubic-foot providing that the walls are designed to resist these pressures. Lateral force can also be considered to be transmitted from the structure to the soil by friction on the base of footings using a coefficient of 0.5, to which a safety factor of 1.5 should be applied.

Seismic Design Considerations

For the purposes of determining parameters for structural seismic design, this site is considered to be a Site Class C as defined in Section 1613 of the Code. Furthermore, the bearing strata on the proposed site is not considered to be subject to liquefaction during an earthquake based on the criterion of Section 1806.4 of the Code

Foundation Construction Considerations

The primary foundation construction considerations include the removal of the existing topsoil/forest mat, subsoil and fill material from beneath proposed building footprint, preparation of the foundation bearing surfaces consisting of glacial till, removal of bedrock, re-use of excavated on-site soil, construction dewatering, and off-site disposal of excess excavated soil.

Preparation of the building pad should include the removal of all existing topsoil/forest mat, subsoil and fill and replacement with structural fill to limits defined in the previous section of this report.

To minimize disturbance to the glacial till deposit, all glacial till bearing surfaces should be excavated with an excavator bucket which has either a smooth, toothless cutting edge or a steel plate welded across the teeth. Further, it is recommended that as soon as the glacial till bearing surfaces are exposed, they be immediately covered with a 4-inch thickness of 3/4-inch crushed stone to prevent disturbance of the subgrade during subsequent forming operations.

Where bedrock removal is required within the building footprint, the Contractor should first attempt to excavate the bedrock surface utilizing a large hydraulic size excavator, such as CAT 330, to remove all rippable rock. Prior to commencing hoe-ramming or drilling and blasting operations, the bedrock surface should be profiled by a registered land surveyor employed by the Contractor in order to quantify the volume of bedrock to be removed. Based on the results of our exploration program, isolated areas of bedrock removal within the building footprint are anticipated for construction of the footings and subslab utilities and is anticipated range in depth from about 2 to 4 feet below the surface of the bedrock deposit.

Following excavation of the soil overburden, should blasting be required to remove bedrock over portions of the building footprint, the rock excavation should be performed utilizing controlled drilling and blasting techniques to limit the extent of overblast below the proposed foundation elevations and minimize the potential of damage to the adjacent structures due to vibration. The contract documents should provide for the blasting contractor to be responsible for the removal of overblast material below the proposed foundation bearing surfaces and its replacement compacted structural fill.

Should drilling and blasting techniques be utilized, a blasting contractor should prepare and submit a blasting plan for review by the design team. A written and visually recorded preconstruction existing conditions survey of adjacent structures within 250 feet of the blasting should be completed by the Contractor and submitted to the Owner prior to commencement of blasting activities.

The construction documents should include criteria limiting the peak particle velocity to levels that are unlikely to damage existing adjacent constructions. In order to minimize damage to the adjacent structures, it is recommended that the vibrations associated with the blasting operations be monitored with a seismograph as a check for compliance with the project documents and with generally accepted standards.

Of particular importance to the proposed construction are the potential impacts associated with bedrock removal to the nearby residential buildings which surround the school campus, and the existing school buildings and outdoor pool located to the south and southeast of the proposed classroom building. If blasting methods are utilized, it is recommended that controlled blasting techniques be employed to limit the overblast below proposed foundation elevations, and minimize the potential of damage to the nearby structures due to vibration. It is recommended that the Contract documents limit the maximum resultant peak particle velocity to 2.0 inches per second (ips) for blasts having a frequency above 40 Hz, 1.5 ips for blasts having a frequency between 30 Hz and 40 Hz, 1.0 ips for blasts having a frequency between 20 Hz and 30 Hz and 0.5 ips for blasts having a frequency below 20 Hz in order to maintain the risk of damage to the adjacent buildings to generally acceptable levels.

As indicate in the previous section of this report, the glacial till and fill material may be re-used on-site as structural fill for support of the proposed footings and slabs-on-grade provided it is maintained in a dry condition and can be properly compacted. The placement and compaction of the structural fill material should be completed during relatively dry and non-freezing conditions. All stockpiled excavated material designated for reuse as structural or ordinary fill should be covered at all times with heavy tarpaulins for protection from precipitation and also as a dust mitigation measure. The explorations indicate the presence of oversized materials in the glacial till, fill and subsoil deposits consisting cobbles and/or possible boulders. Prior to reusing this material, it will be necessary to cull out all material in excess of 4 inches in largest dimension. On-site topsoil/forest mat and subsoil material should be kept separated from on-site glacial till at all times.

In consideration of the relatively impervious glacial till and bedrock deposits, trapped surface water and groundwater runoff may accumulate on the surface of the glacial till or bedrock deposits at localized areas within the excavations after periods of heavy precipitation. In general, it is anticipated that dewatering by means of localized trenches and sumps should suffice during foundation construction operations.

Our scope of services to date specifically excludes geoenvironmental engineering services pursuant to the Massachusetts Oil and Hazardous Materials Release Prevention and Response Act (MGL Chapter 21E) and pursuant to the Massachusetts Contingency Plan (310 CMR 40.00). However, should disposal of excess excavated soil from the proposed addition become necessary, chemical analysis of the excess soil will be required in order to conform with the regulations and policies of the Department of Environmental Protection (DEP). The requirement to perform chemical analysis in preparation for off-site disposal would not be present if the excess excavated material remains on the site.

Final Comments

It is recommended that McPhail be been retained to provide design assistance during the design phase of this project. The purpose of this involvement is to review the structural foundation drawings and foundation notes for conformance with the recommendations presented herein and to prepare the earthwork specification section for inclusion into the Contract Documents for construction.
It is recommended that McPhail be retained during the construction period to observe the construction of the building pad as indicated herein and preparation of foundation bearing surfaces. Our involvement during the construction phase of the work should minimize costly delays due to unanticipated field problems since our field engineer would be under the direct supervision of our project manager who was responsible for the subsurface exploration and foundation design recommendations documented herein.

Based on the presence of relatively shallow bedrock on the project site, it is recommended that additional subsurface explorations be performed where proposed underground site utilities are planned as part of this building project. The purpose of these explorations would be to evaluate the anticipated need for rock removal associated with their installation. McPhail would be pleased to provide a proposal for these additional services should they be requested.

We trust that the above is sufficient for your present requirements. Should you have any questions concerning the recommendations presented herein, please do not hesitate to call.

Very truly yours,

McPHAIL ASSOCIATES, LLC

Harry J. Berlis

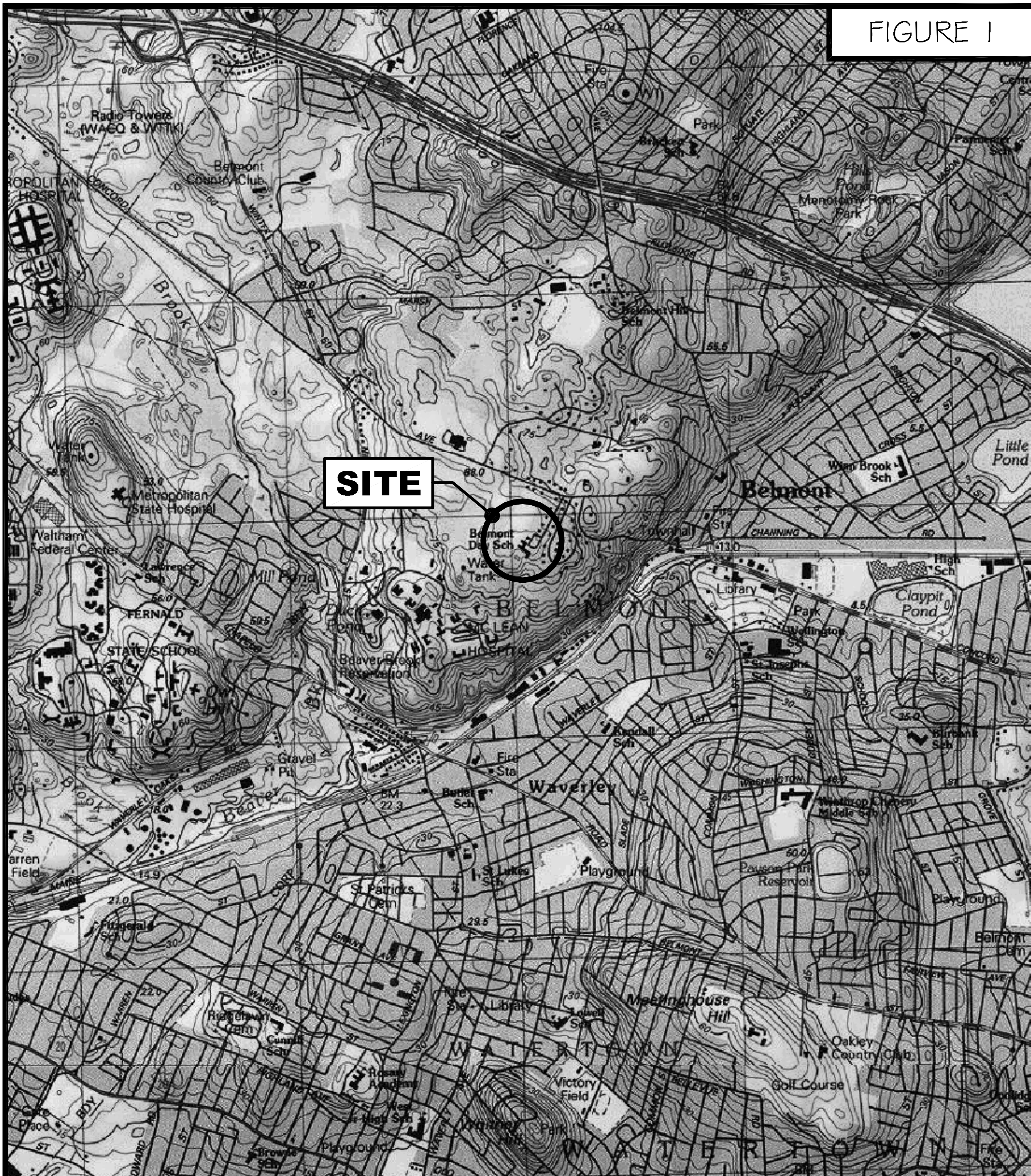
Gary M. O'Neil, P.E.

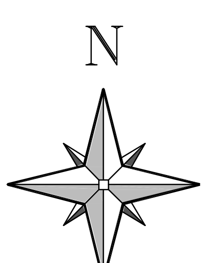
Enclosures

F:\WP5\REPORTS\5918-F.docx

HJB/gon

FIGURE 1





McPHAIL ASSOCIATES, LLC

Geotechnical and Geoenvironmental Engineers
2269 Massachusetts Avenue
Cambridge, MA 02140
617/868-1420
617/868-1423 (Fax)
www.mcphailgeo.com

SCALE 1:25,000

PROJECT LOCATION PLAN

BELMONT DAY SCHOOL

BELMONT MASSACHUSETTS

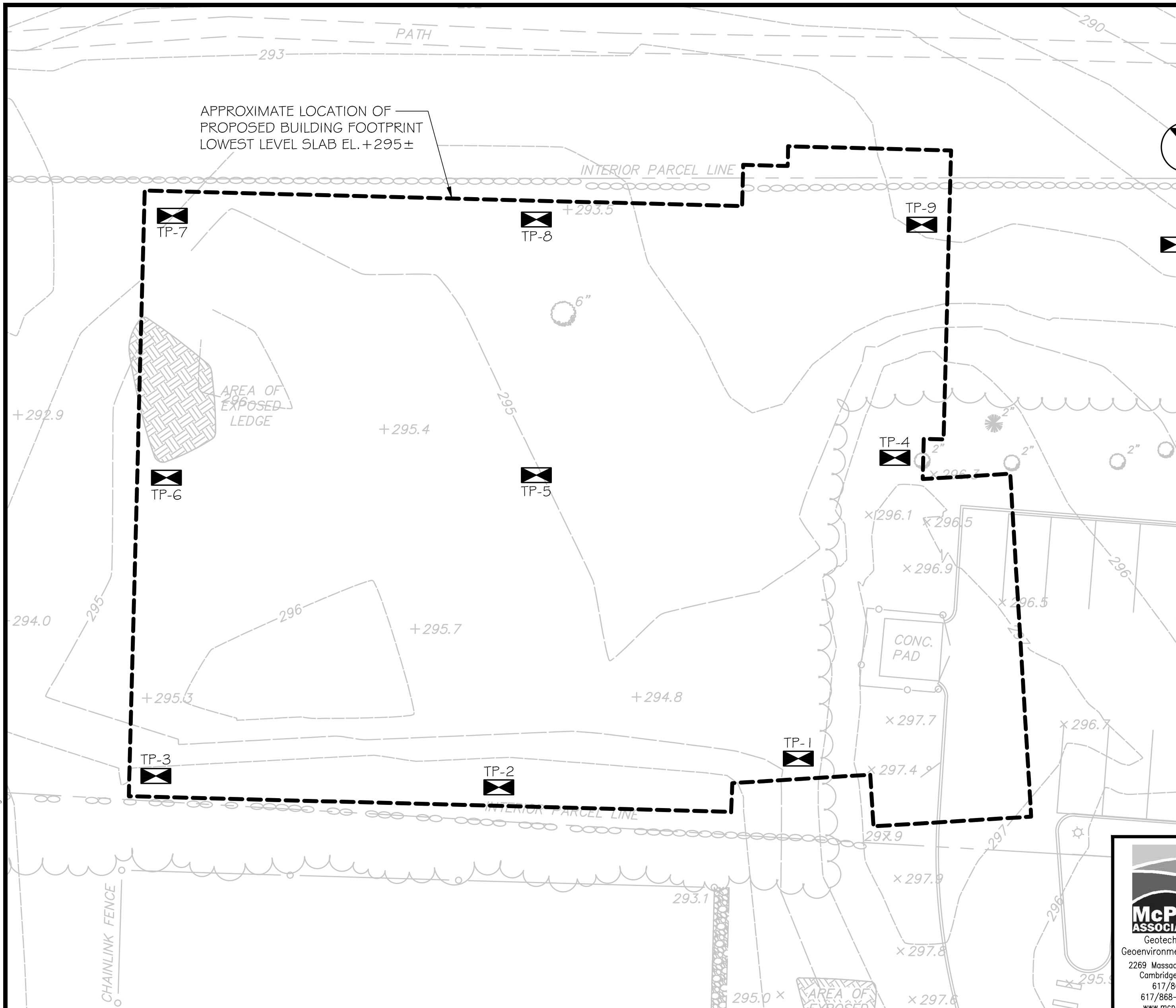


FIGURE 2

LEGEND

— APPROXIMATE LOCATION OF TEST PIT PERFORMED BY CARDILLO & SONS OF WALTHAM, MA ON APRIL 16, 2015 FOR McPHAIL ASSOCIATES, LLC

REFERENCE: THIS PLAN WAS PREPARED FROM A 20-SCALE DRAWING ENTITLED "BELMONT DAY SCHOOL RECORD CONDITIONS PLAN OF LAND" DATED DECEMBER 19, 2012 BY MERIDIAN ASSOCIATES

GRAPHIC SCALE

20 0 20 40

McPHAIL ASSOCIATES, LLC
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BELMONT DAY SCHOOL

BELMONT MASSACHUSETTS

SUBSURFACE EXPLORATION PLAN

FOR

BELMONT DAY SCHOOL

BY

McPHAIL ASSOCIATES, LLC

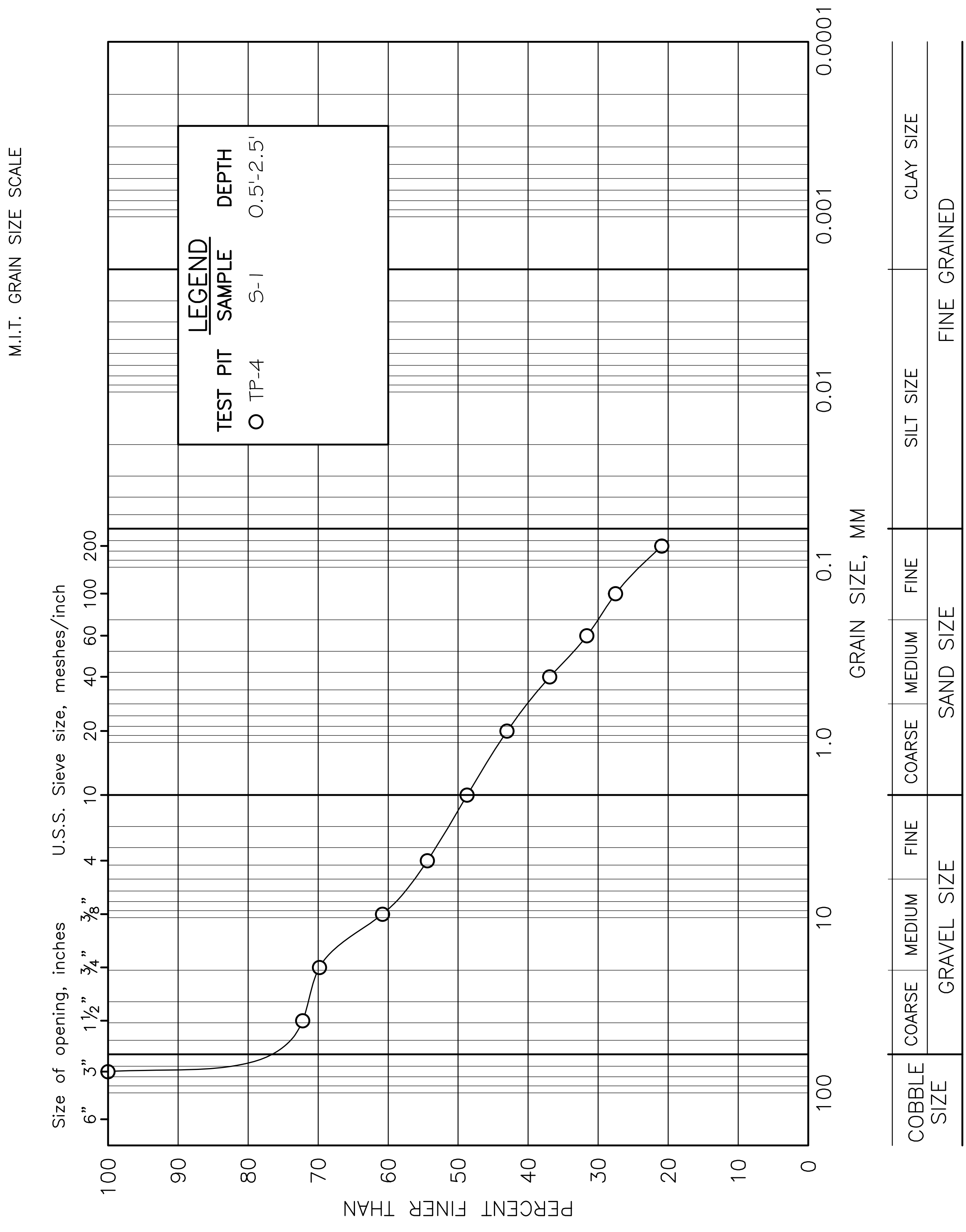
Date: APRIL 2015	Dwn: I.J.M.	Chkd: H.J.B.	Scale: 1" = 20'
Project No: 5918			

FILE NAME: H:\Acad\JOBS\5918\5918-F02.dwg

PROJECT No. 5918

GRAIN SIZE DISTRIBUTION
FILL

FIGURE 3



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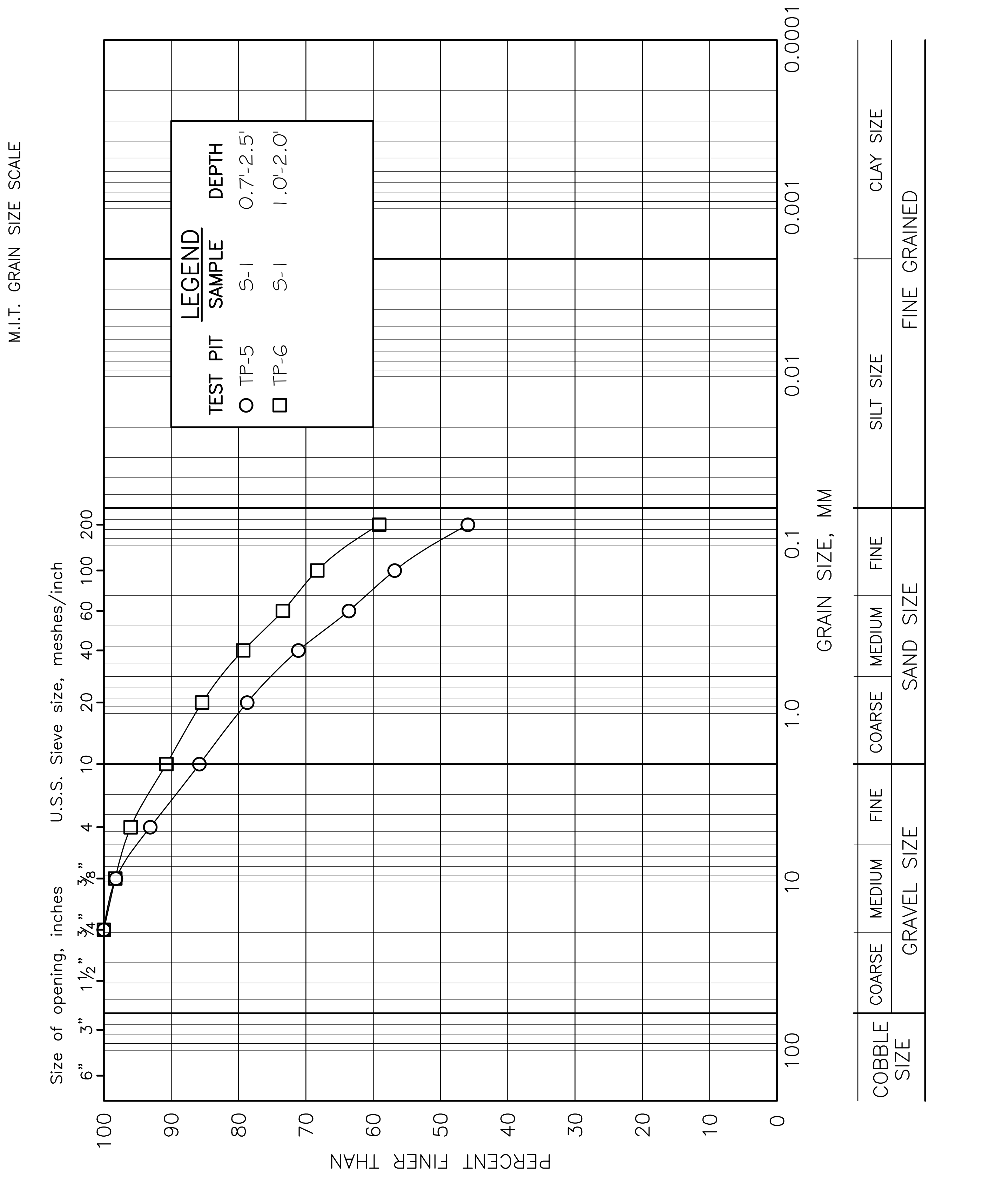
McPHAIL ASSOCIATES, LLC

GRAIN SIZE DISTRIBUTION
SUBSOIL

FIGURE 4

PROJECT No. 5918



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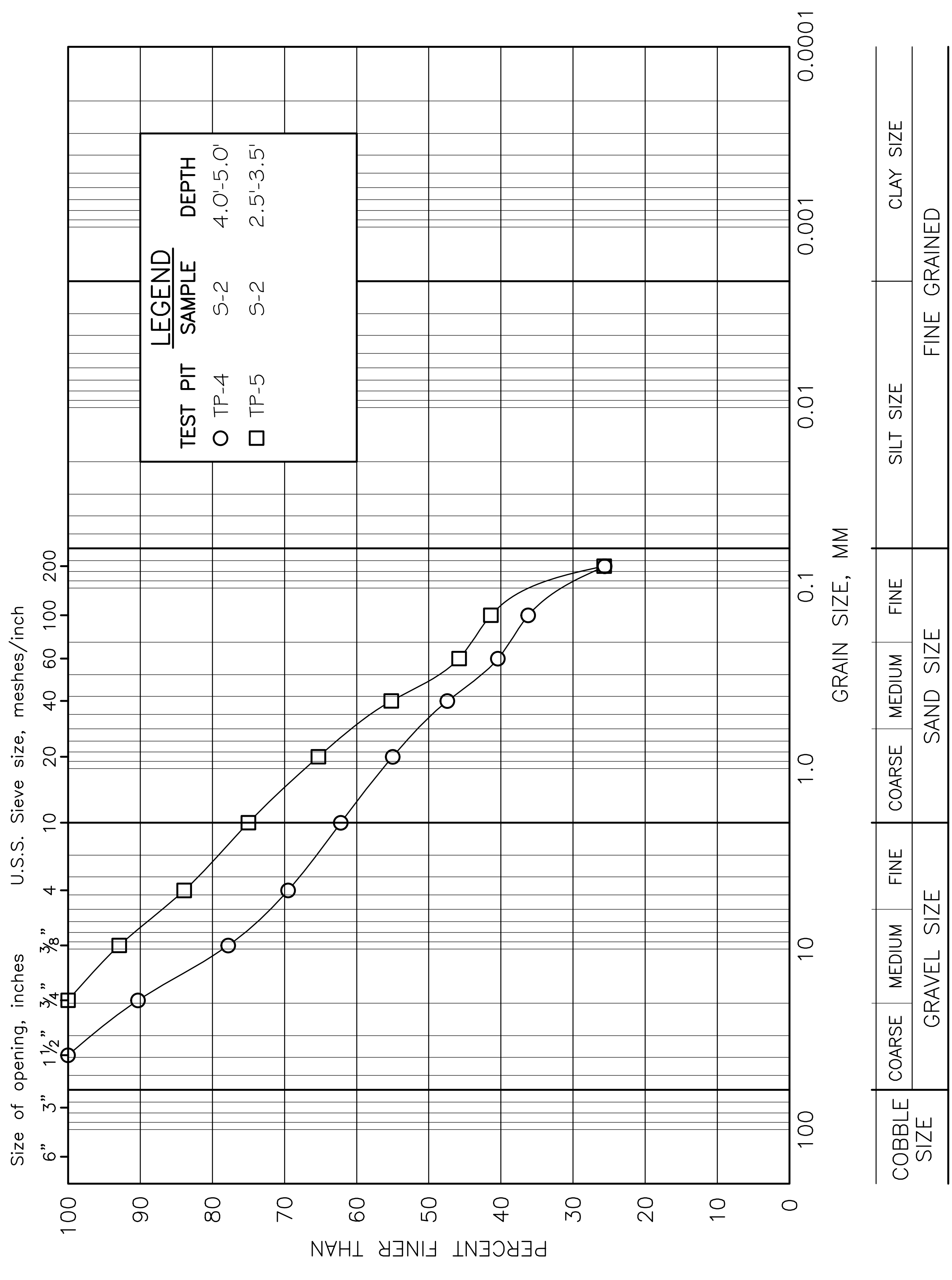
McPHAIL ASSOCIATES, LLC

PROJECT No. 5918

GRAIN SIZE DISTRIBUTION
GLACIAL TILL

FIGURE 5



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McPHAIL ASSOCIATES, LLC

McPHAIL ASSOCIATES, LLC

APPENDIX A:

LIMITATIONS

LIMITATIONS

This report has been prepared on behalf of and for the exclusive use of Belmont Day School for specific application to the proposed classroom building to be located on the campus of the Belmont Day School at 55 Day School Lane in Belmont, Massachusetts in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made.

In the event that any changes in nature or design of the proposed building are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing by McPhail Associates, LLC.

The analyses and recommendations presented in this report are based upon the data obtained from the subsurface explorations performed at the approximate locations indicated on the enclosed plan. If variations in the nature and extent of subsurface conditions between the widely spaced explorations become evident during the course of construction, it will be necessary for a re-evaluation of the recommendations of this report to be made after performing on-site observations during the construction period and noting the characteristics of any variations.

It is recommended that McPhail Associates, LLC be been retained to provide design assistance during the design phase of this project. The purpose of this involvement is to review the structural foundation drawings and foundation notes for conformance with the recommendations presented herein and to prepare the earthwork specification section for inclusion into the Contract Documents for construction.

APPENDIX B:

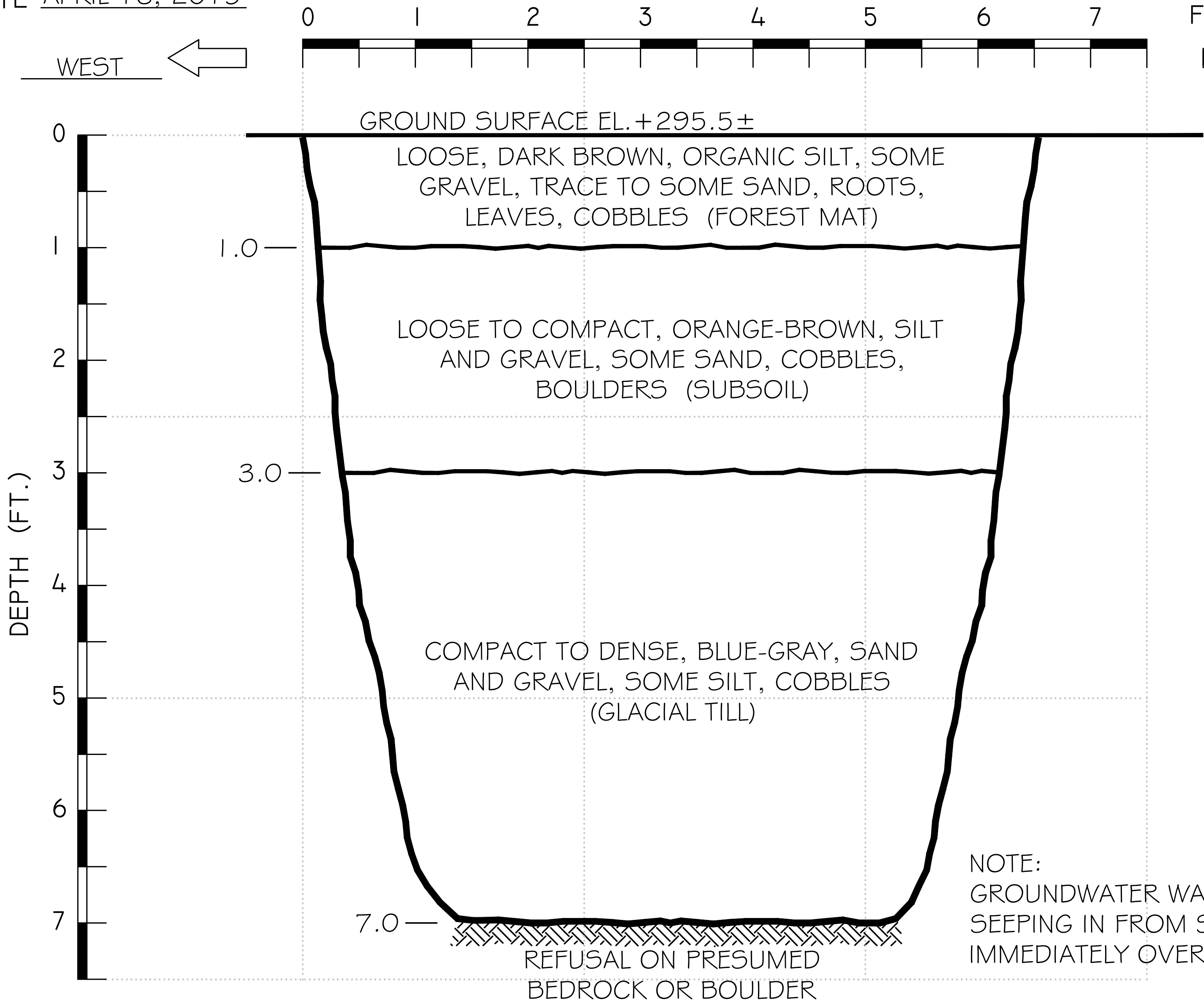
MCPHAIL ASSOICATES, LLC
TEST PIT LOGS
TP-1 THRTOUGH TP-9

JOB NO. 5918

DATE APRIL 16, 2015

TEST PIT LOG

TEST PIT NO. 1



NOTE:
GROUNDWATER WAS OBSERVED SEEPING IN FROM SIDEWALLS IMMEDIATELY OVERLYING BEDROCK

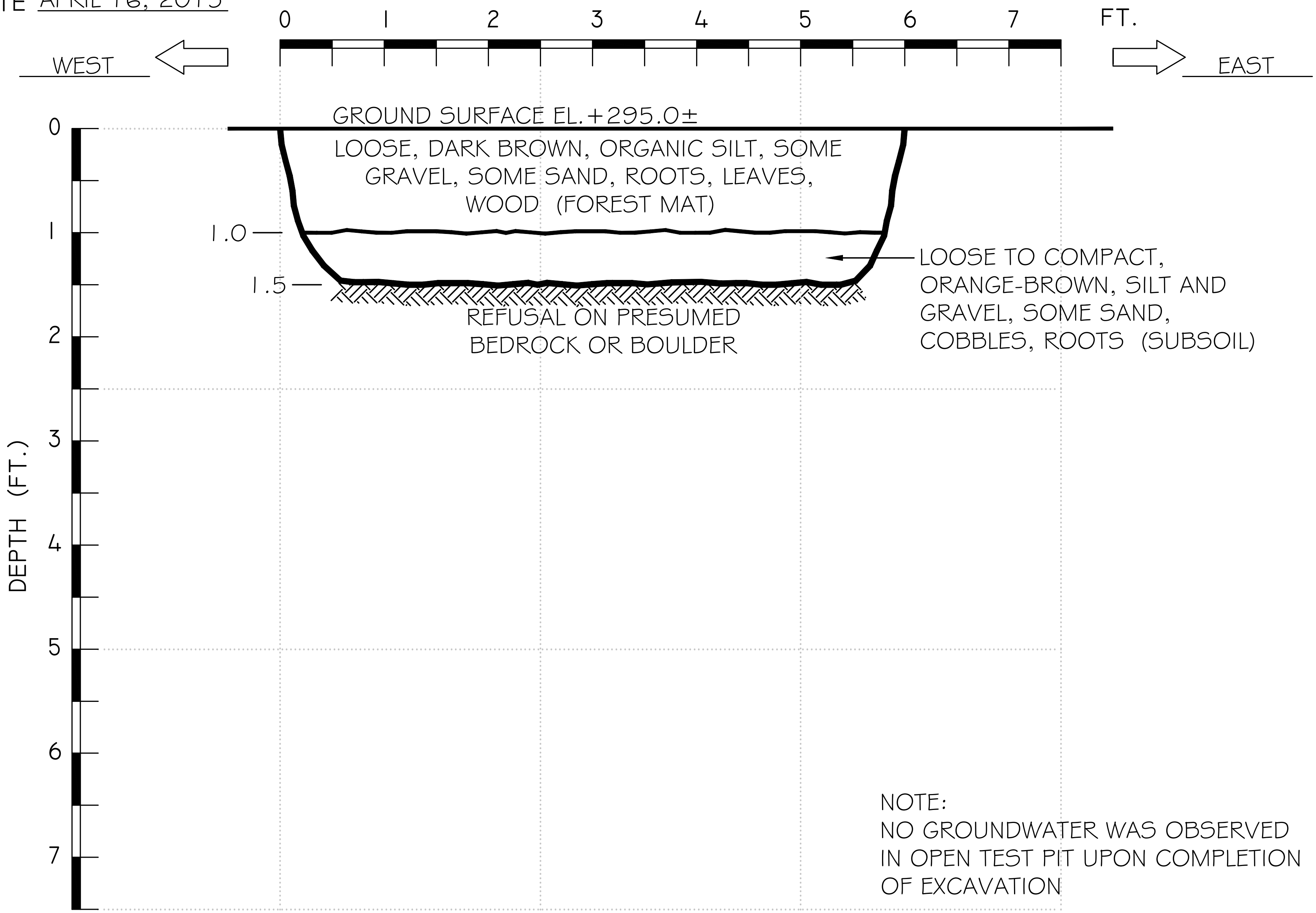
McPHAIL ASSOCIATES, LLC

JOB NO. 5918

DATE APRIL 16, 2015

TEST PIT LOG

TEST PIT NO. 2



NOTE:
NO GROUNDWATER WAS OBSERVED IN OPEN TEST PIT UPON COMPLETION OF EXCAVATION

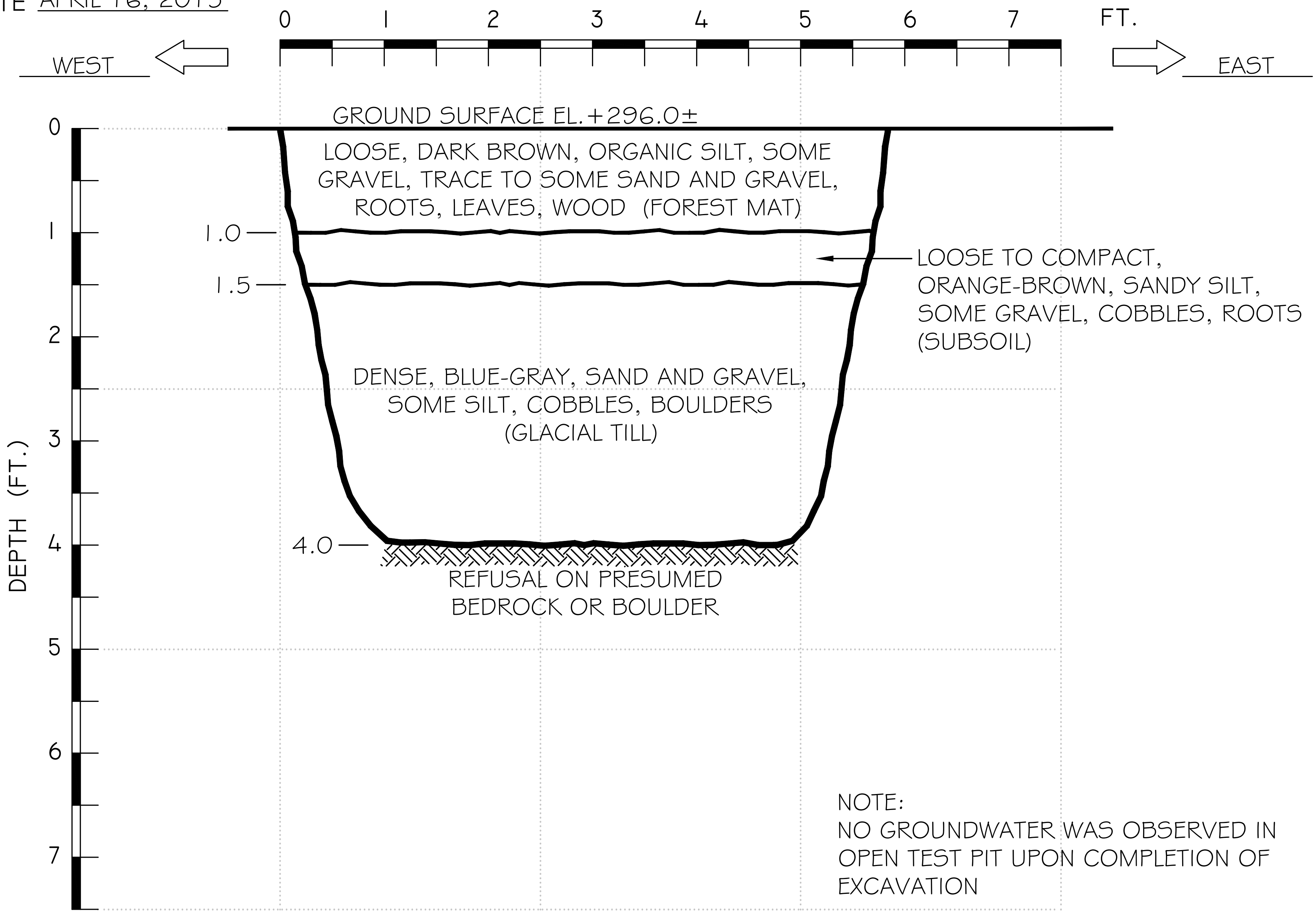
McPHAIL ASSOCIATES, LLC

JOB NO. 5918

DATE APRIL 16, 2015

TEST PIT LOG

TEST PIT NO. 3



NOTE:
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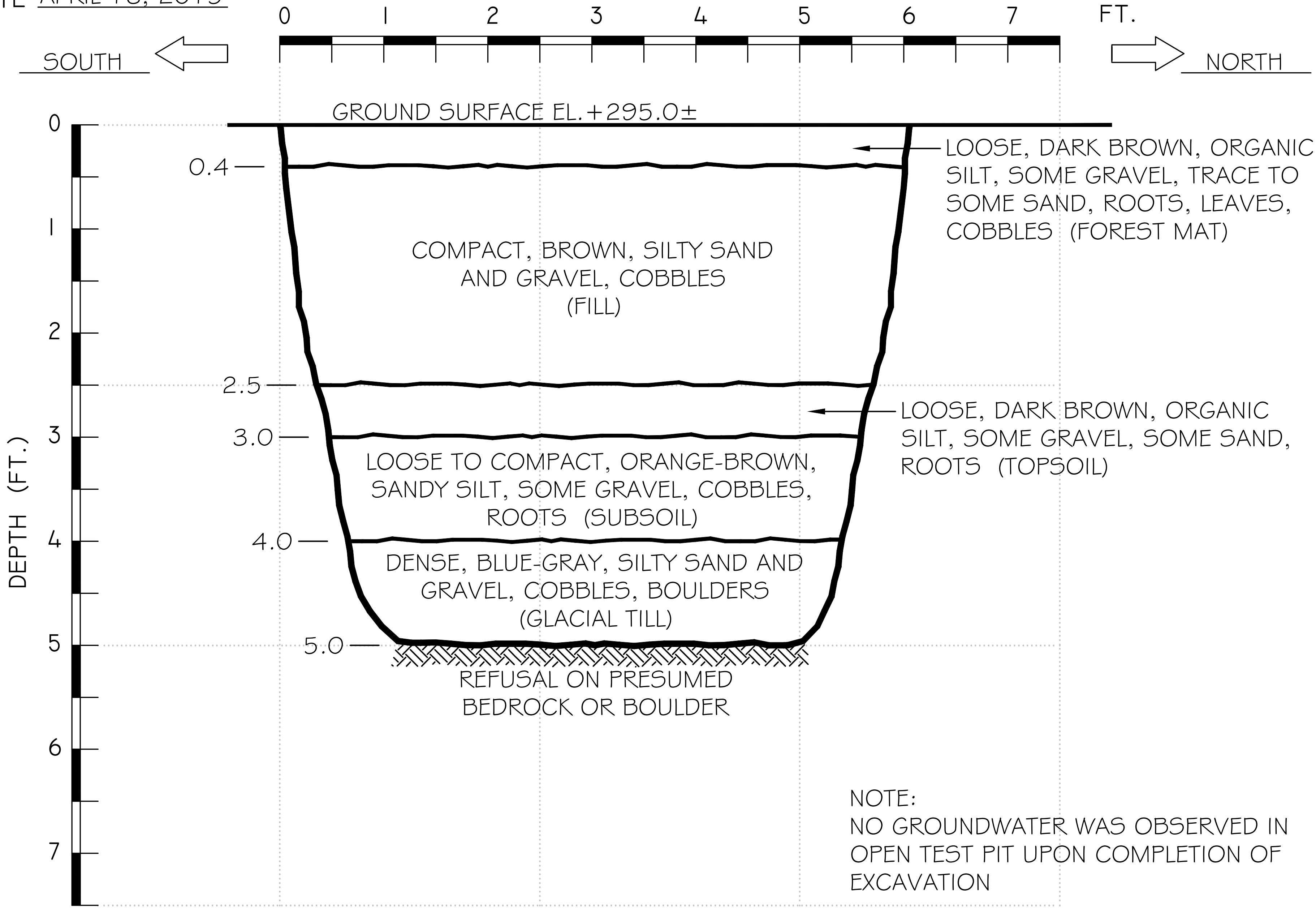
McPHAIL ASSOCIATES, LLC

JOB NO. 5918

DATE APRIL 16, 2015

TEST PIT LOG

TEST PIT NO. 4



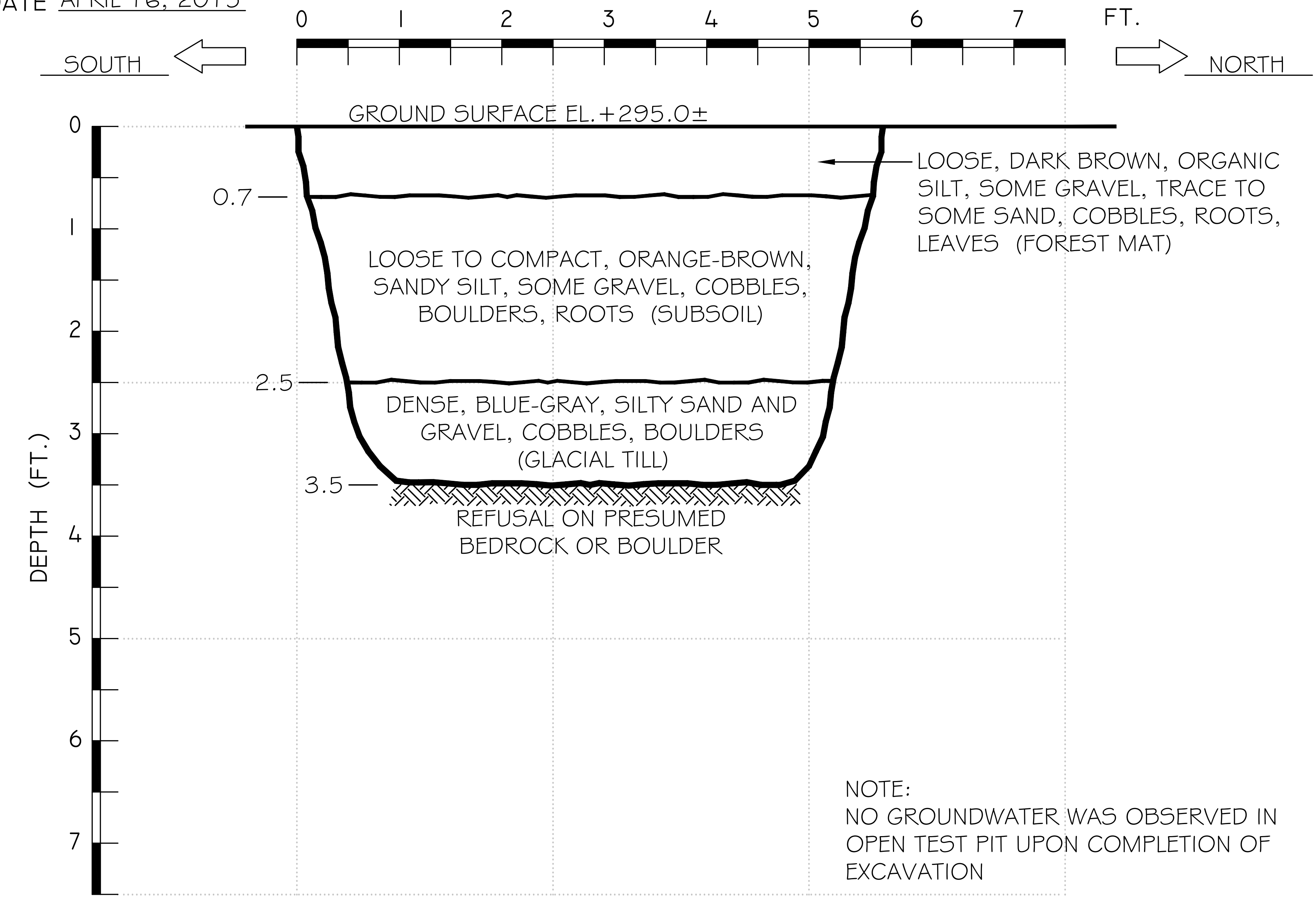
McPHAIL ASSOCIATES, LLC

JOB NO. 5918

DATE APRIL 16, 2015

TEST PIT LOG

TEST PIT NO. 5



NOTE:
NO GROUNDWATER WAS OBSERVED IN OPEN TEST PIT UPON COMPLETION OF EXCAVATION

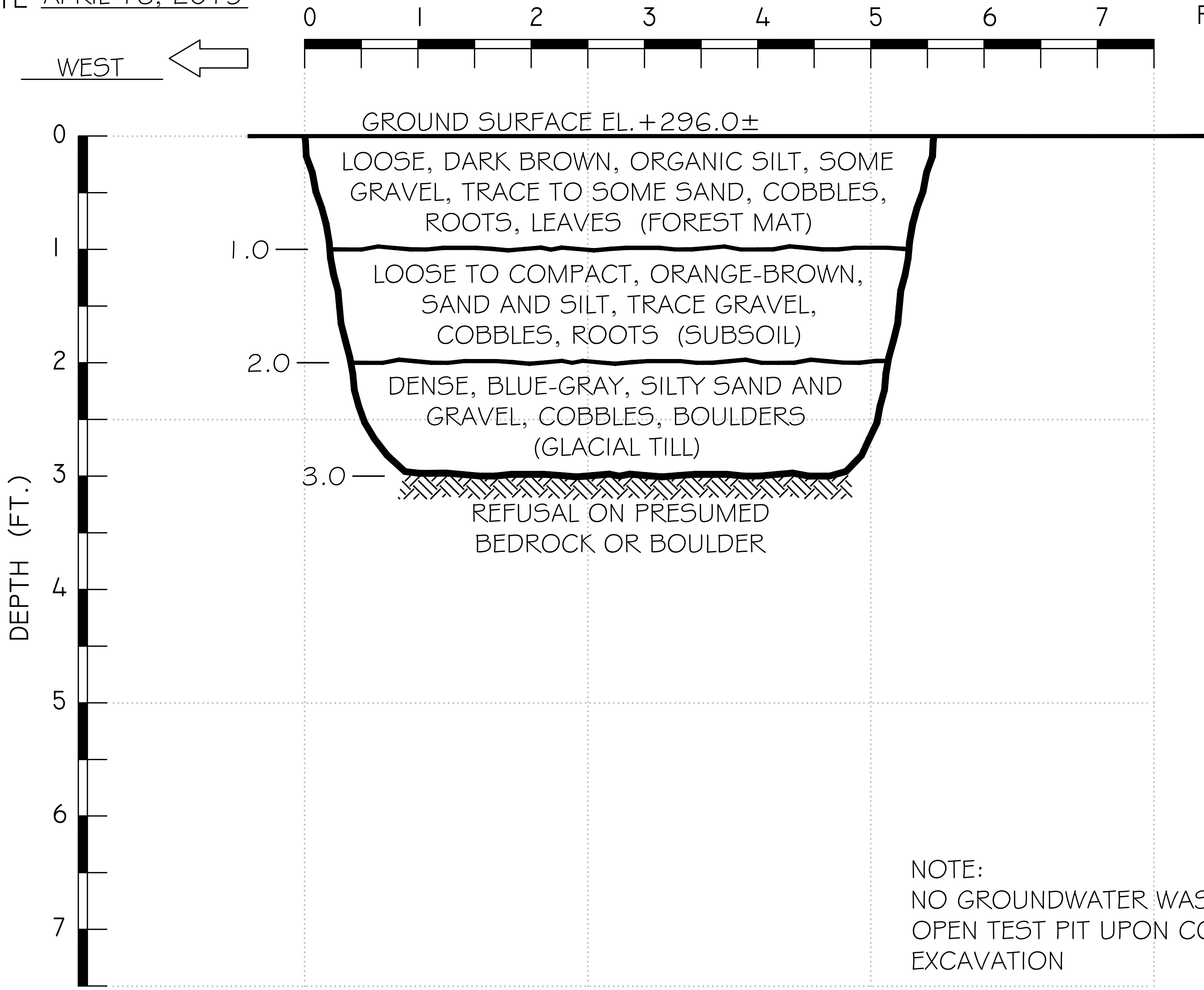
McPHAIL ASSOCIATES, LLC

JOB NO. 5918

DATE APRIL 16, 2015

TEST PIT LOG

TEST PIT NO. 6



NOTE:
NO GROUNDWATER WAS OBSERVED IN OPEN TEST PIT UPON COMPLETION OF EXCAVATION

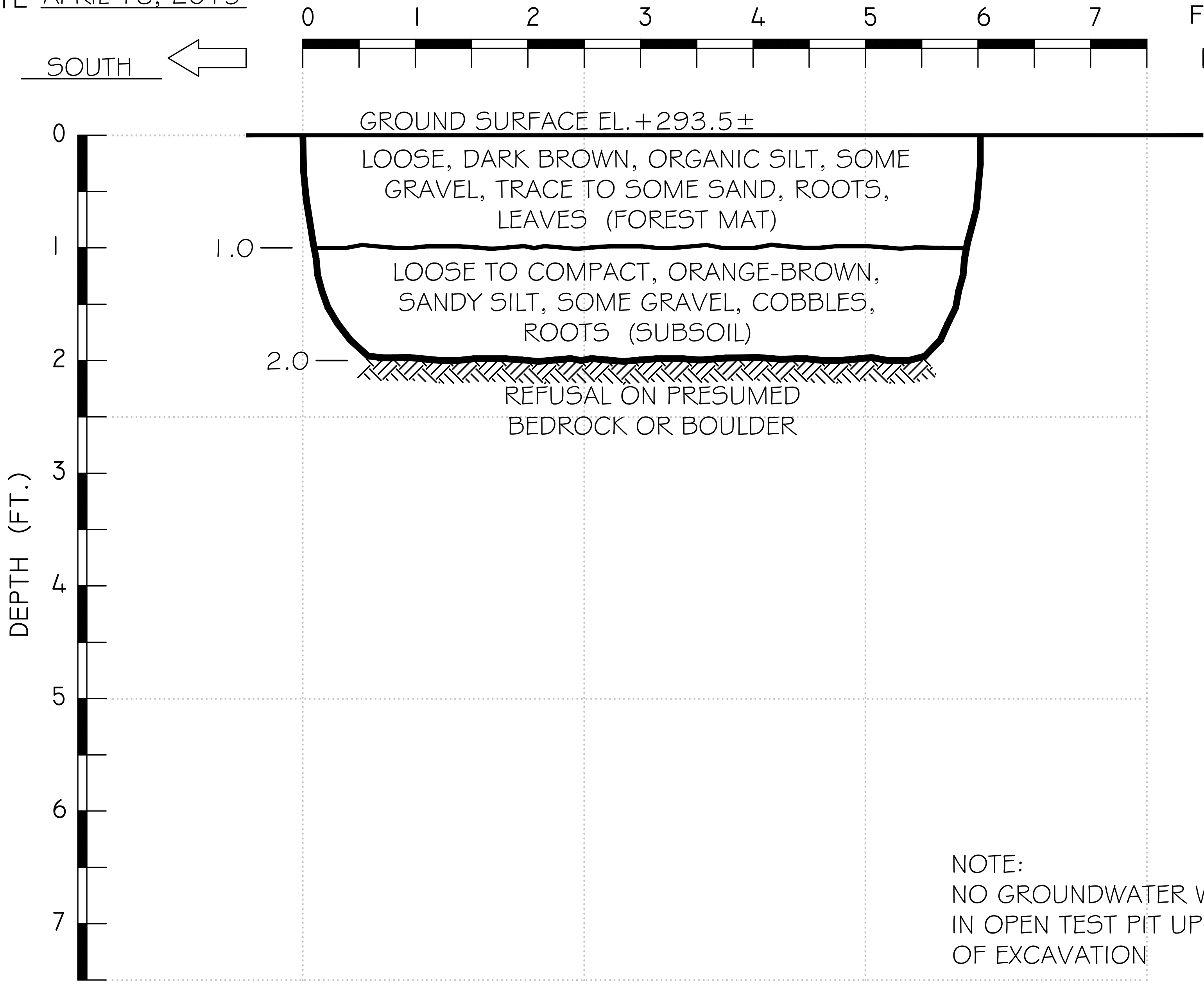
McPHAIL ASSOCIATES, LLC

JOB NO. 5918

DATE APRIL 16, 2015

TEST PIT LOG

TEST PIT NO. 7



NOTE:
NO GROUNDWATER WAS OBSERVED IN OPEN TEST PIT UPON COMPLETION OF EXCAVATION

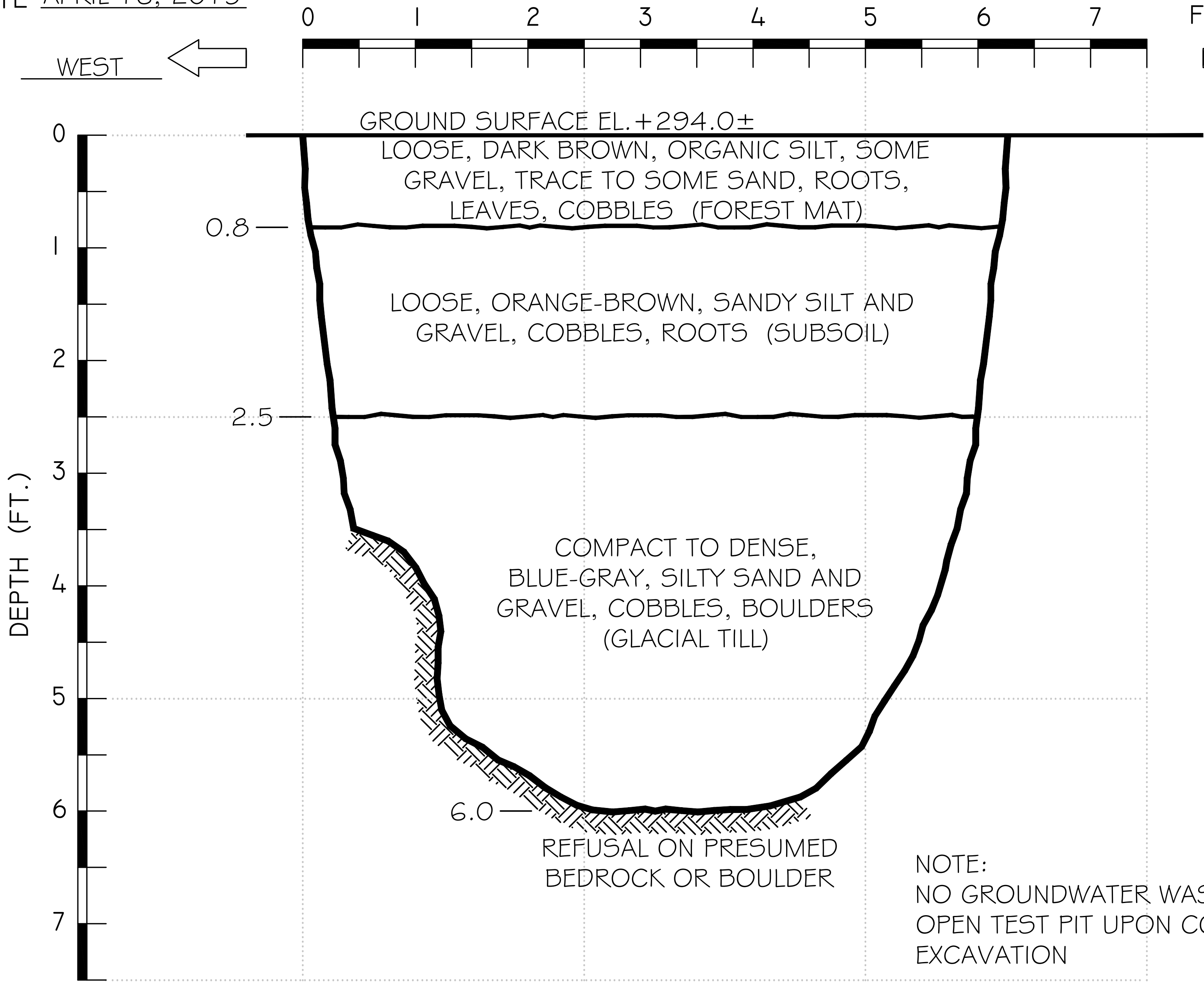
McPHAIL ASSOCIATES, LLC

JOB NO. 5918

DATE APRIL 16, 2015

TEST PIT LOG

TEST PIT NO. 8



NOTE:
NO GROUNDWATER WAS OBSERVED IN OPEN TEST PIT UPON COMPLETION OF EXCAVATION

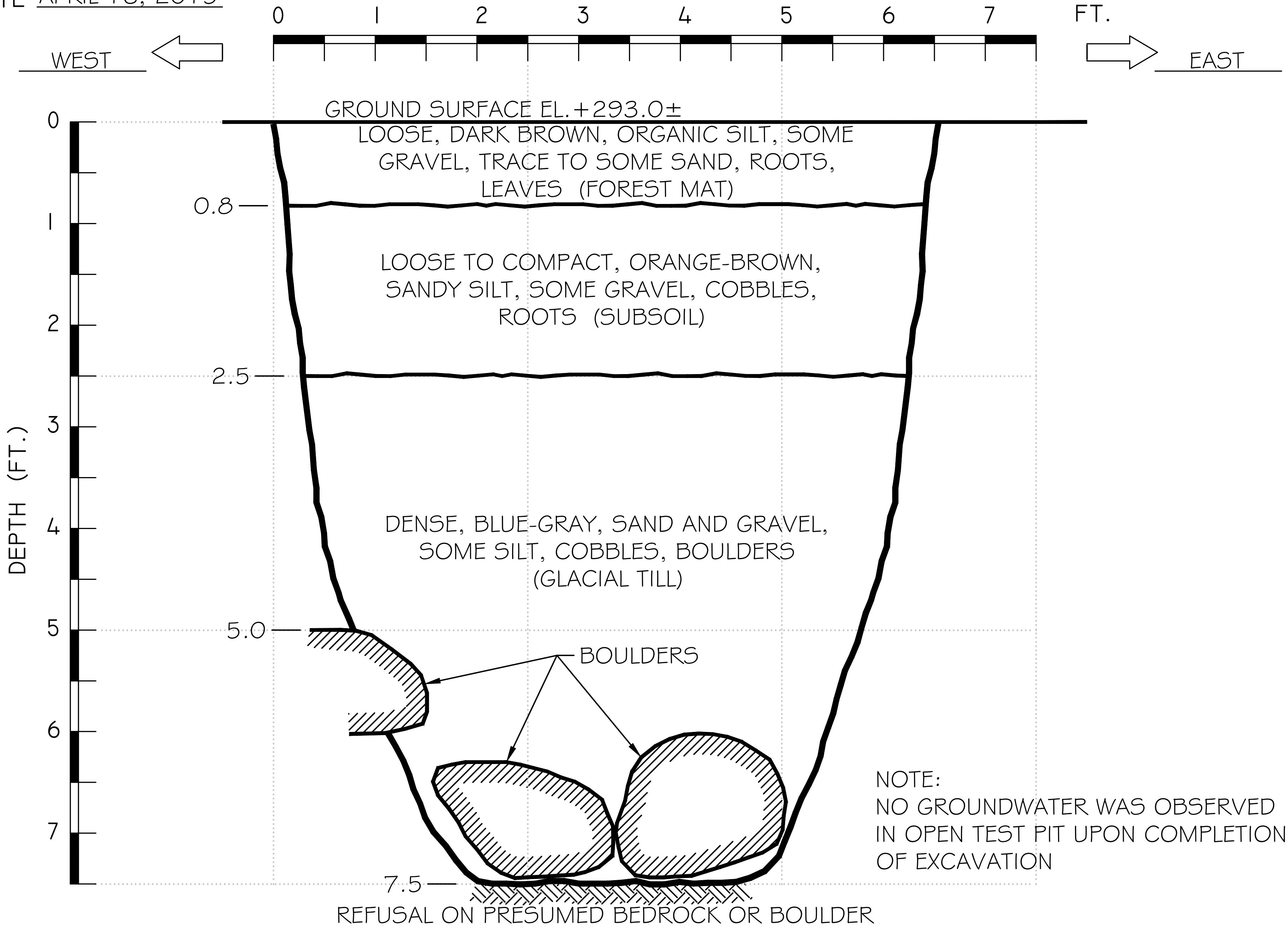
McPHAIL ASSOCIATES, LLC

JOB NO. 5918

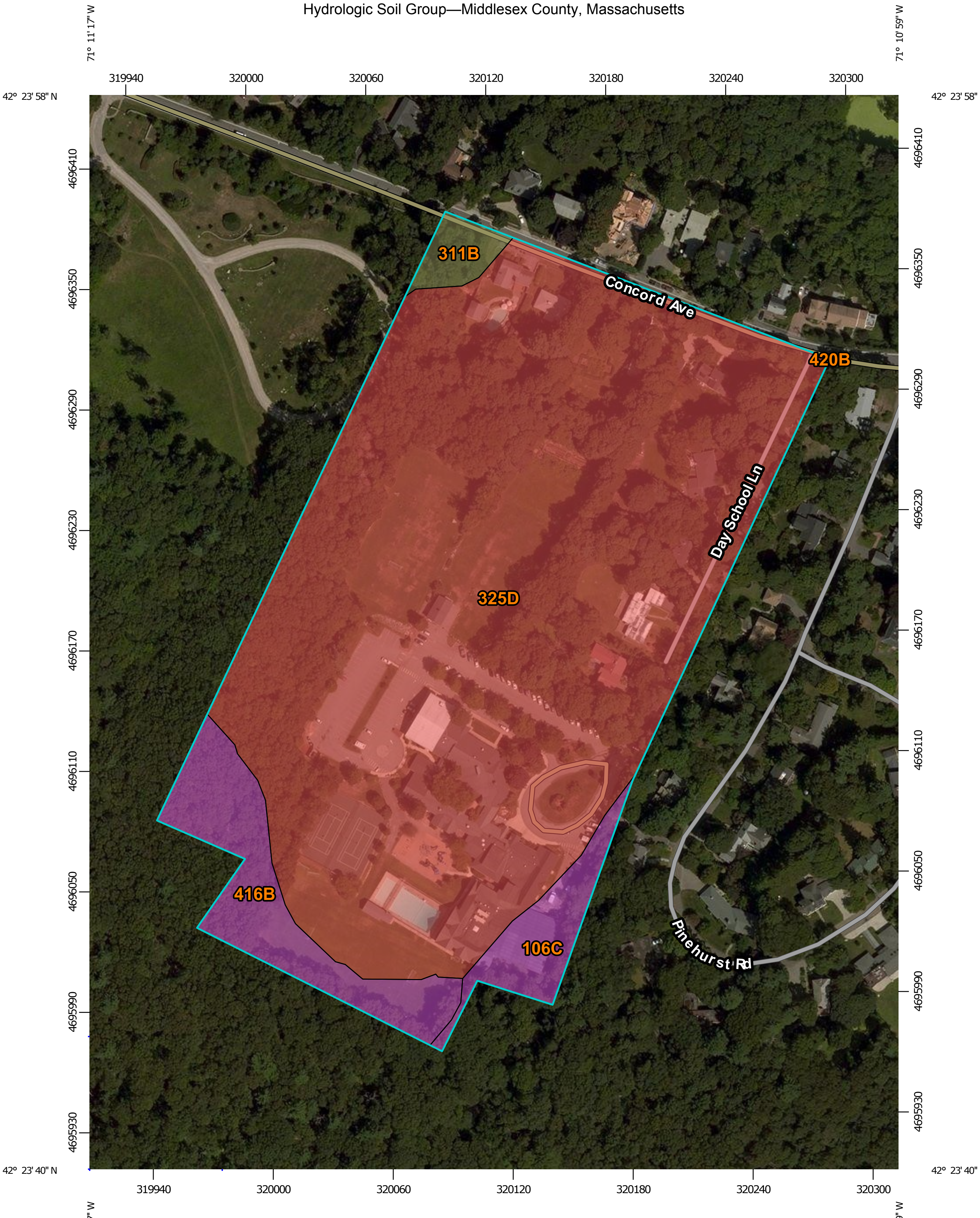
DATE APRIL 16, 2015

TEST PIT LOG

TEST PIT NO. 9



McPHAIL ASSOCIATES, LLC



Map Scale: 1:2,610 if printed on A portrait (8.5" x 11") sheet.

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
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: Middlesex County, Massachusetts
Survey Area Data: Version 15, Sep 28, 2015

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

Date(s) aerial images were photographed: Aug 10, 2014—Aug 25, 2014

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

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Middlesex County, Massachusetts (MA017)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
106C	Narragansett-Hollis-Rock outcrop complex, 3 to 15 percent slopes	A	0.7	3.5%
311B	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony	C/D	0.3	1.5%
325D	Newport channery fine sandy loam, 8 to 25 percent slopes	D	16.7	87.4%
416B	Narragansett silt loam, 3 to 8 percent slopes, very stony	A	1.5	7.6%
420B	Canton fine sandy loam, 3 to 8 percent slopes	A	0.0	0.0%
Totals for Area of Interest			**19.1**	**100.0%**

Description

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

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

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

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

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

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

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

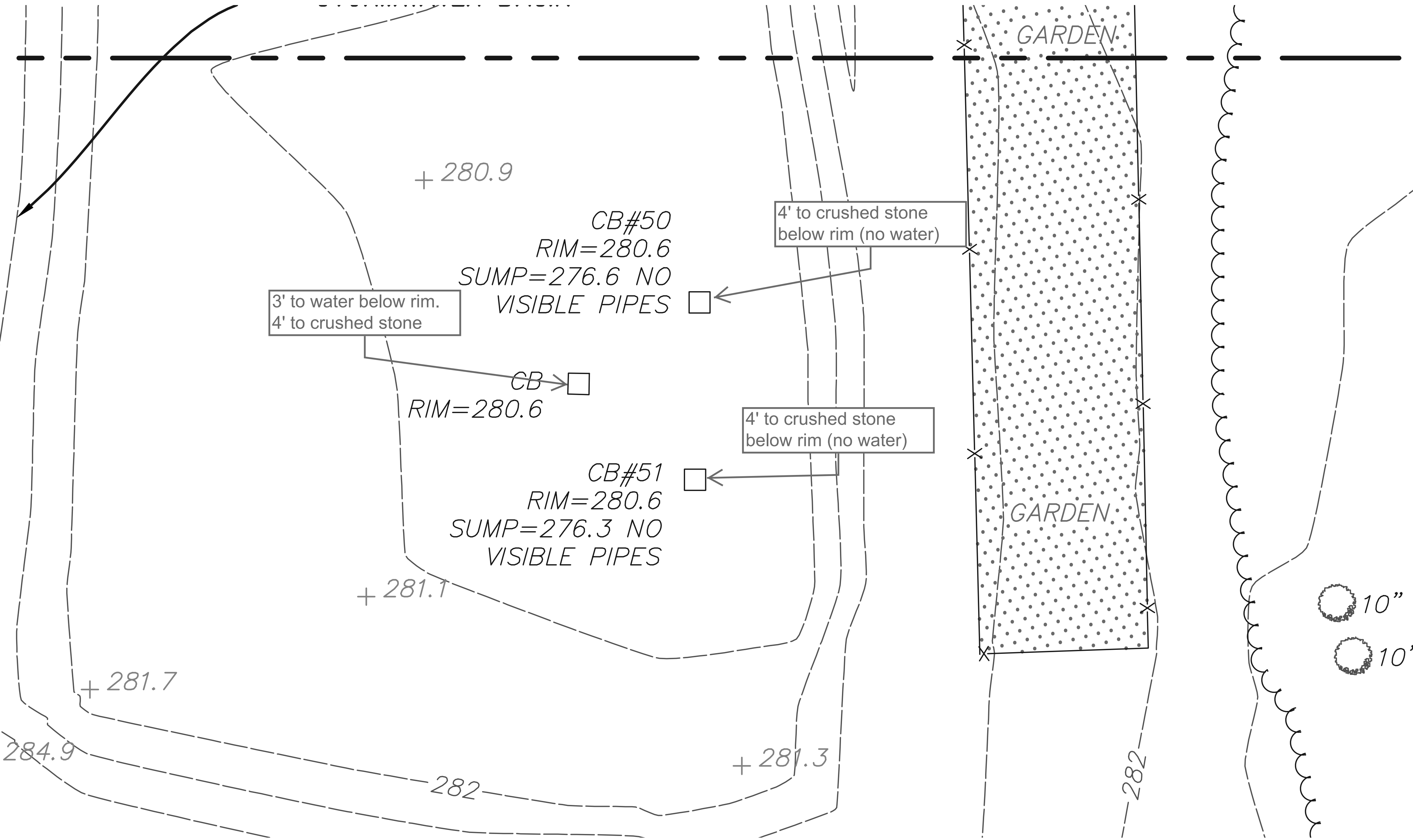
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

DRYWELL GROUNDWATER EXPLORATION
BY ROBERT CORNING, STANTEC
1/6/17



APPENDIX C – EXISTING CONDITIONS HYDROCAD CALCULATIONS

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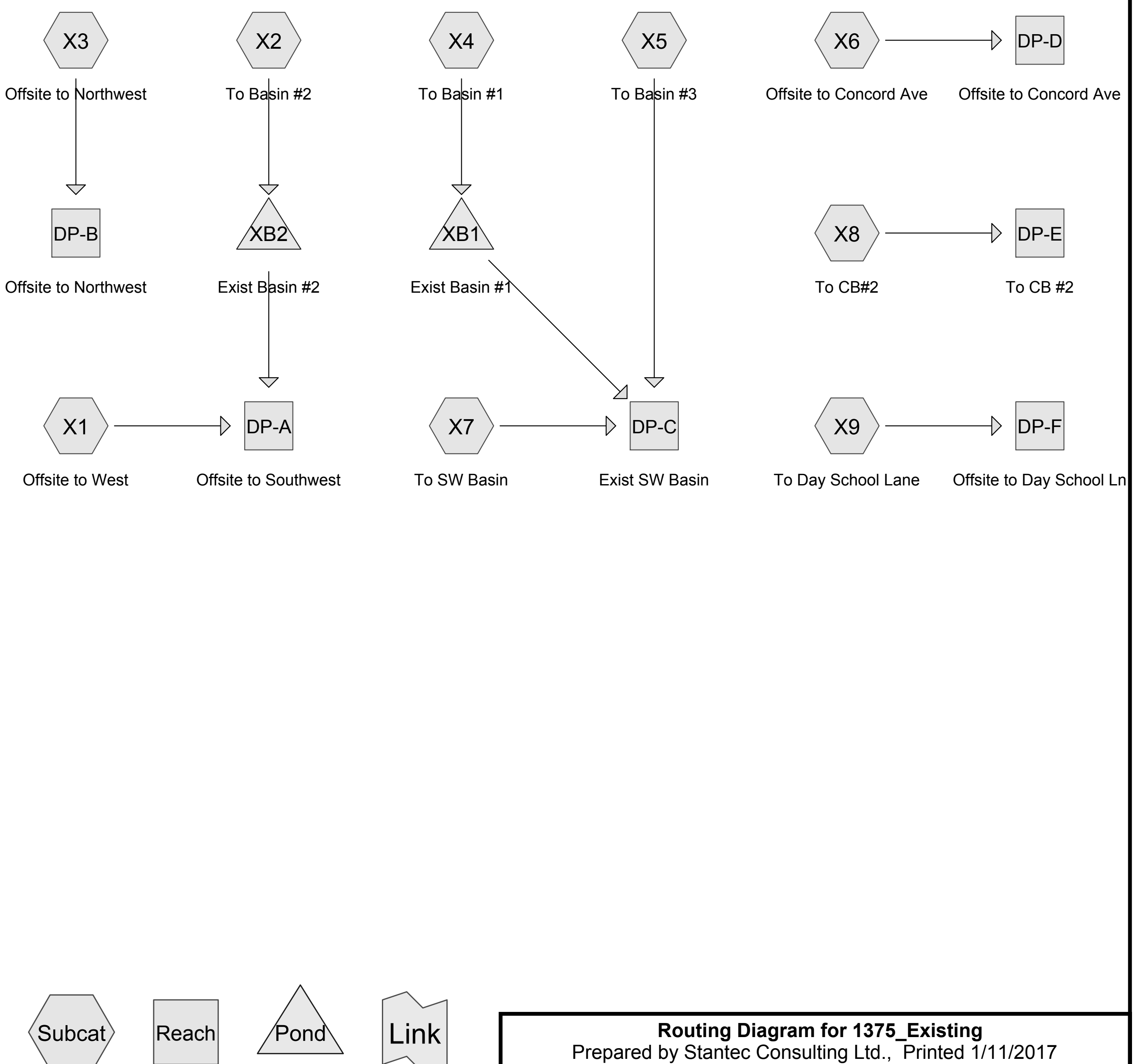


Routing Diagram for 1375_Existing
Prepared by Stantec Consulting Ltd., Printed 1/11/2017
HydroCAD® 10.00-13 s/n 02809 © 2014 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
4.734	61	>75% Grass cover, Good, HSG B (X1, X2, X3, X4, X5, X6, X7, X8, X9)
2.483	98	Impervious (X1, X2, X4, X5, X7, X8, X9)
0.965	98	Roof (X1, X2, X5, X7, X8)
3.245	55	Woods, Good, HSG B (X1, X2, X3, X6, X7)
11.427	**70**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
7.979	HSG B	X1, X2, X3, X4, X5, X6, X7, X8, X9
0.000	HSG C	
0.000	HSG D	
3.448	Other	X1, X2, X4, X5, X7, X8, X9
11.427		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	4.734	0.000	0.000	0.000	4.734	>75% Grass cover, Good	X1, X2, X3, X4, X5, X6, X7, X8, X9
0.000	0.000	0.000	0.000	2.483	2.483	Impervious	X1, X2, X4, X5, X7, X8, X9
0.000	0.000	0.000	0.000	0.965	0.965	Roof	X1, X2, X5, X7, X8
0.000	3.245	0.000	0.000	0.000	3.245	Woods, Good	X1, X2, X3, X6, X7
0.000	**7.979**	**0.000**	**0.000**	**3.448**	**11.427**	**TOTAL AREA**	

Summary for Subcatchment X1: Offsite to West

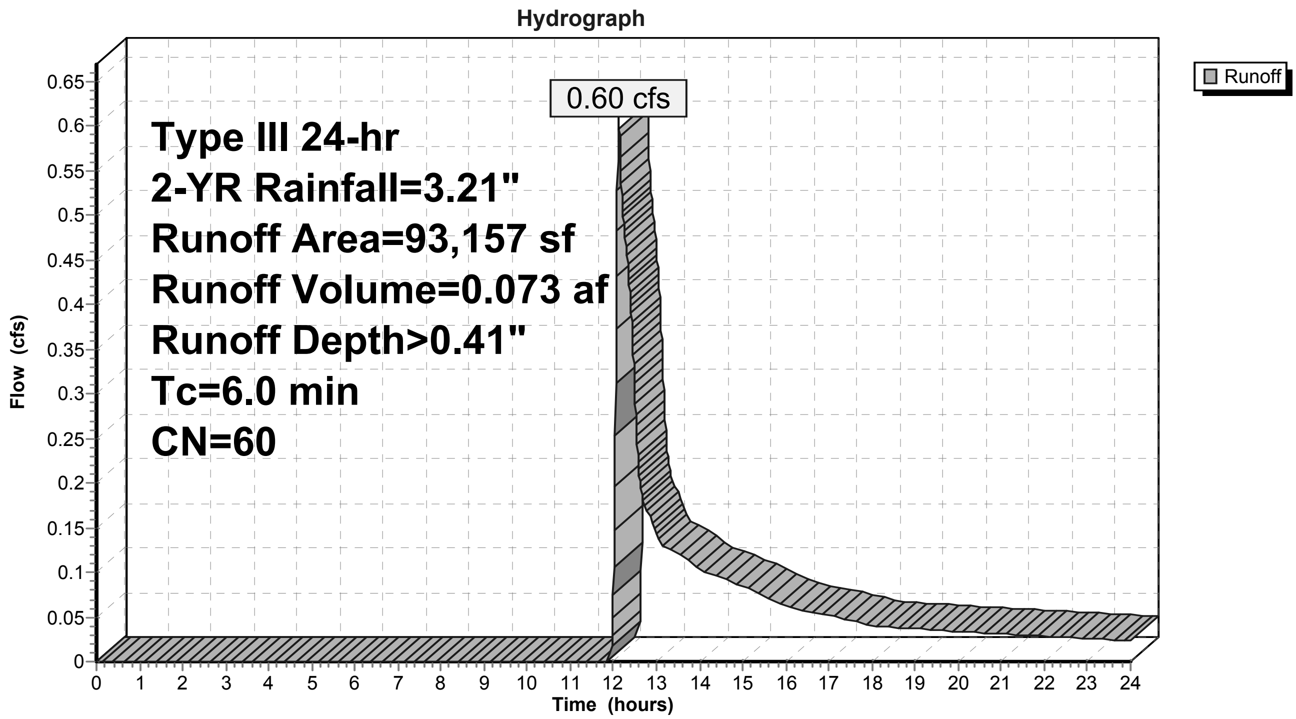
Runoff = 0.60 cfs @ 12.13 hrs, Volume= 0.073 af, Depth> 0.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.21"

	Area (sf)	CN	Description
	37,205	55	Woods, Good, HSG B
*	3,150	98	Roof
*	170	98	Impervious
	52,632	61	>75% Grass cover, Good, HSG B
	93,157	60	Weighted Average
	89,837		96.44% Pervious Area
	3,320		3.56% Impervious Area

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

Subcatchment X1: Offsite to West



Summary for Subcatchment X2: To Basin #2

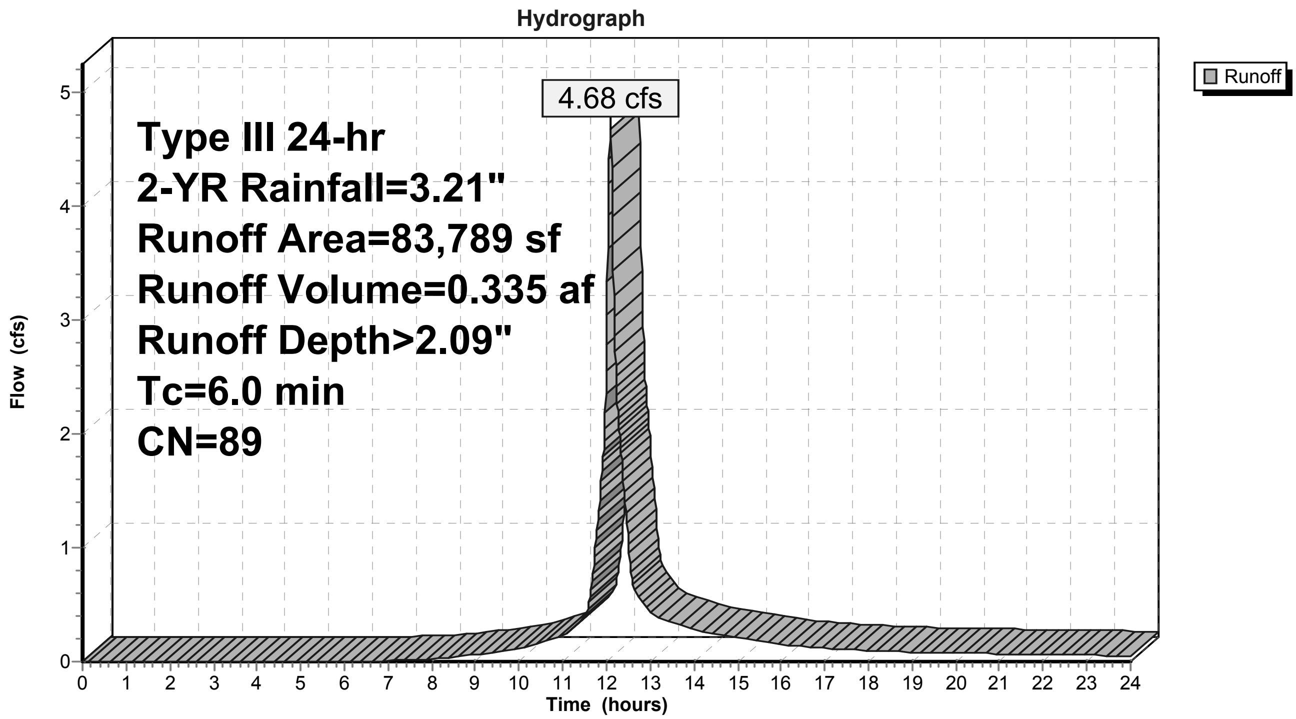
Runoff = 4.68 cfs @ 12.09 hrs, Volume= 0.335 af, Depth> 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.21"

	Area (sf)	CN	Description
	1,934	55	Woods, Good, HSG B
*	26,065	98	Roof
*	38,252	98	Impervious
	17,538	61	>75% Grass cover, Good, HSG B
	83,789	89	Weighted Average
	19,472		23.24% Pervious Area
	64,317		76.76% Impervious Area

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

Subcatchment X2: To Basin #2



Summary for Subcatchment X3: Offsite to Northwest

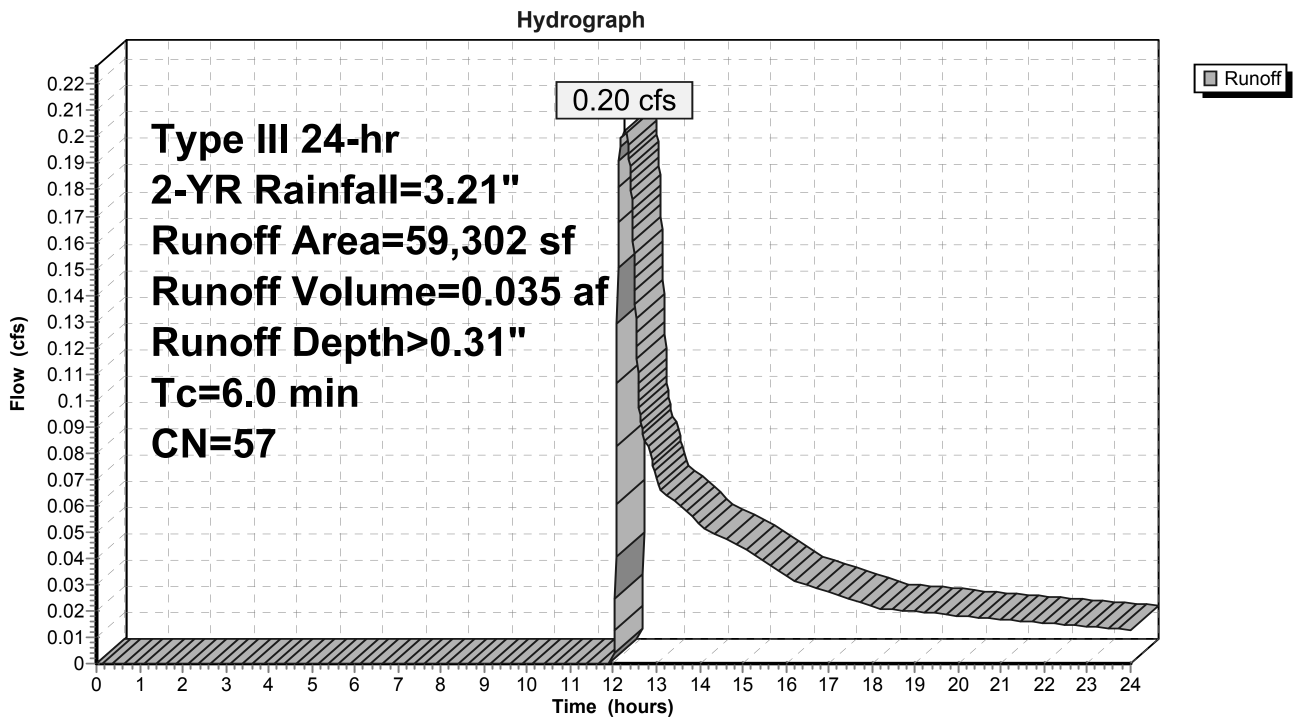
Runoff = 0.20 cfs @ 12.27 hrs, Volume= 0.035 af, Depth> 0.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.21"

	Area (sf)	CN	Description
	44,265	55	Woods, Good, HSG B
*	0	98	Roof
*	0	98	Impervious
	15,037	61	>75% Grass cover, Good, HSG B
	59,302	57	Weighted Average
	59,302		100.00% Pervious Area

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

Subcatchment X3: Offsite to Northwest



Summary for Subcatchment X4: To Basin #1

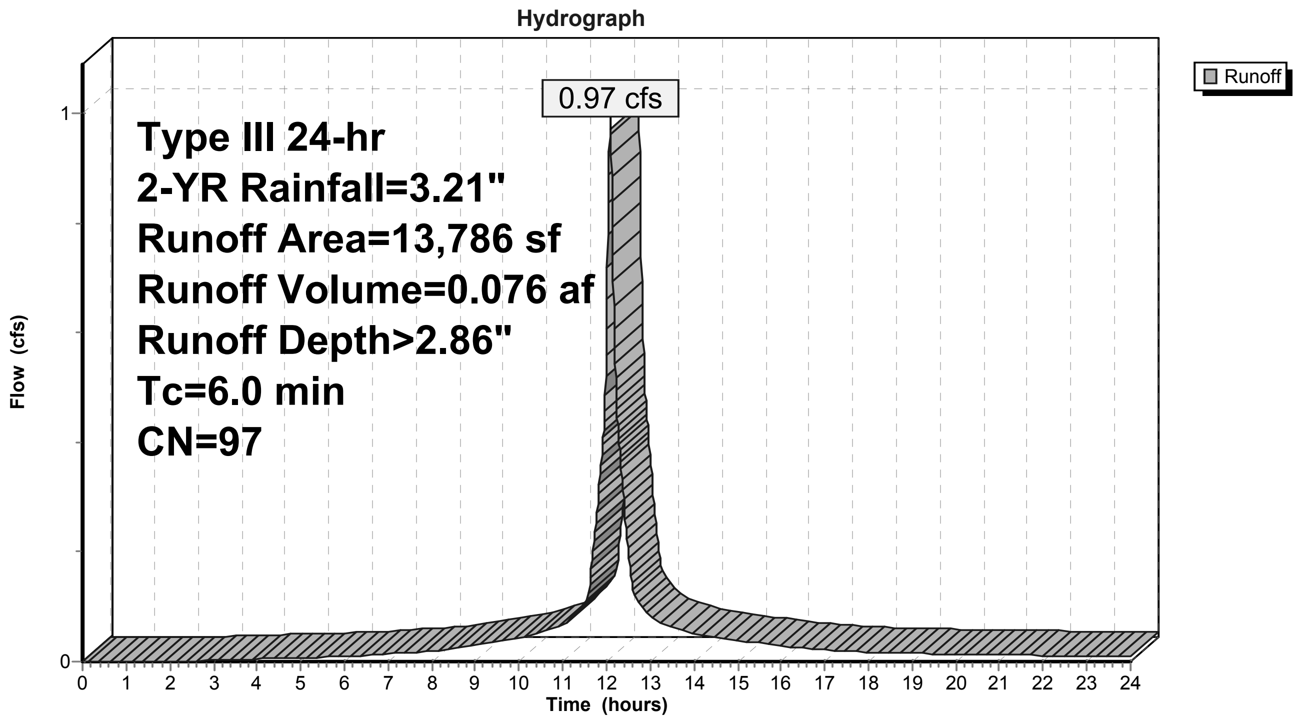
Runoff = 0.97 cfs @ 12.08 hrs, Volume= 0.076 af, Depth> 2.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.21"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	0	98	Roof
*	13,338	98	Impervious
	448	61	>75% Grass cover, Good, HSG B
	13,786	97	Weighted Average
	448		3.25% Pervious Area
	13,338		96.75% Impervious Area

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

Subcatchment X4: To Basin #1



Summary for Subcatchment X5: To Basin #3

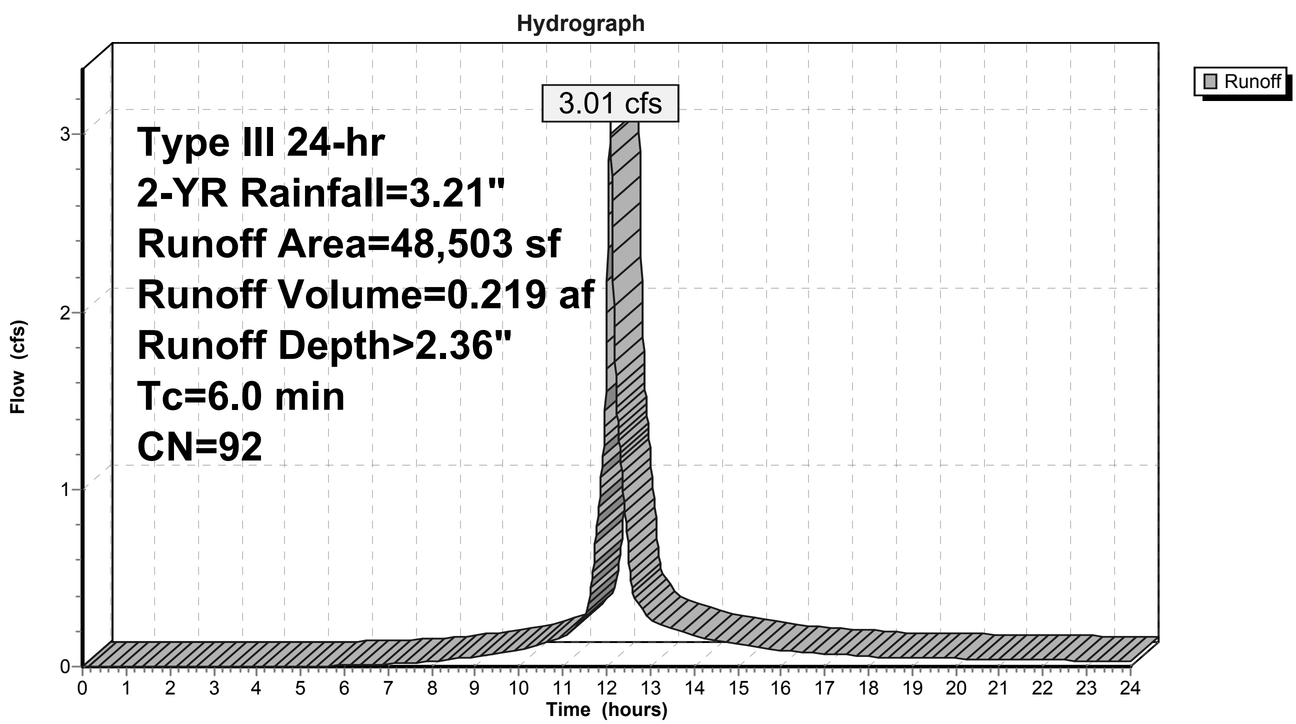
Runoff = 3.01 cfs @ 12.09 hrs, Volume= 0.219 af, Depth> 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.21"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	5,950	98	Roof
*	34,380	98	Impervious
	8,173	61	>75% Grass cover, Good, HSG B
	48,503	92	Weighted Average
	8,173		16.85% Pervious Area
	40,330		83.15% Impervious Area

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

Subcatchment X5: To Basin #3



Summary for Subcatchment X6: Offsite to Concord Ave

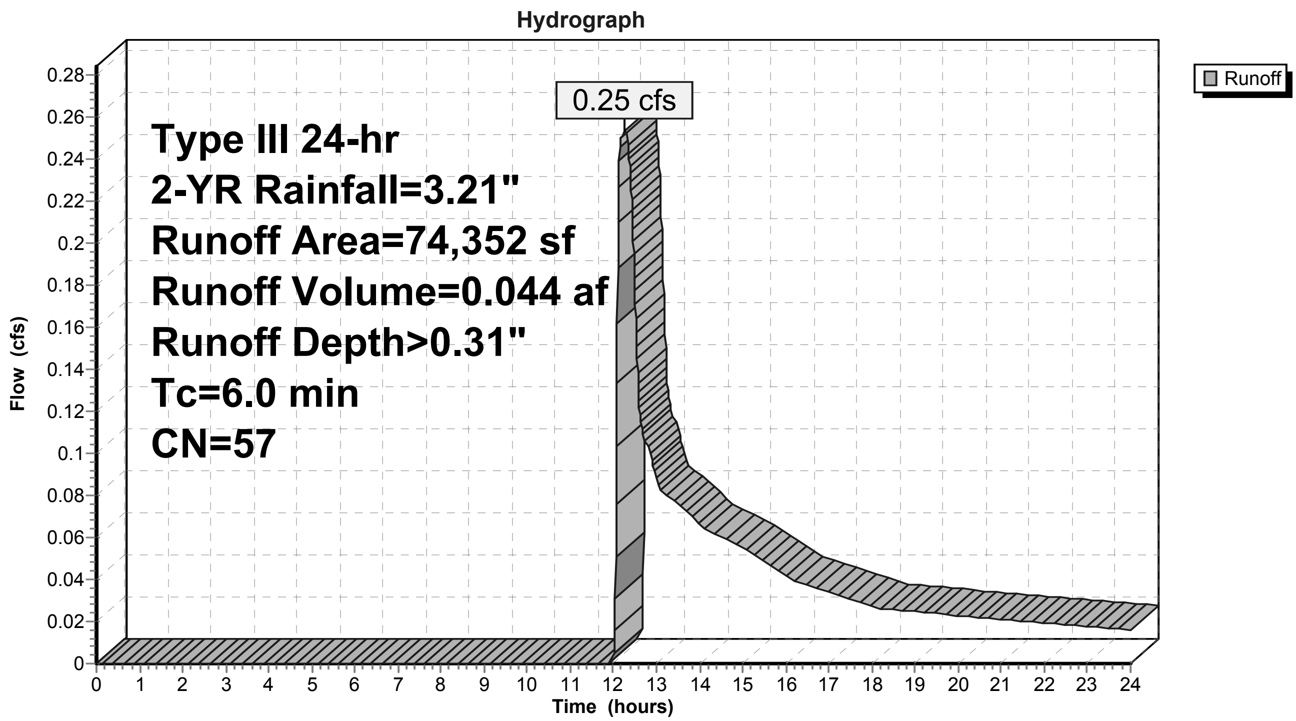
Runoff = 0.25 cfs @ 12.27 hrs, Volume= 0.044 af, Depth> 0.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.21"

	Area (sf)	CN	Description
	49,297	55	Woods, Good, HSG B
*	0	98	Roof
*	0	98	Impervious
	25,055	61	>75% Grass cover, Good, HSG B
	74,352	57	Weighted Average
	74,352		100.00% Pervious Area

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

Subcatchment X6: Offsite to Concord Ave



Summary for Subcatchment X7: To SW Basin

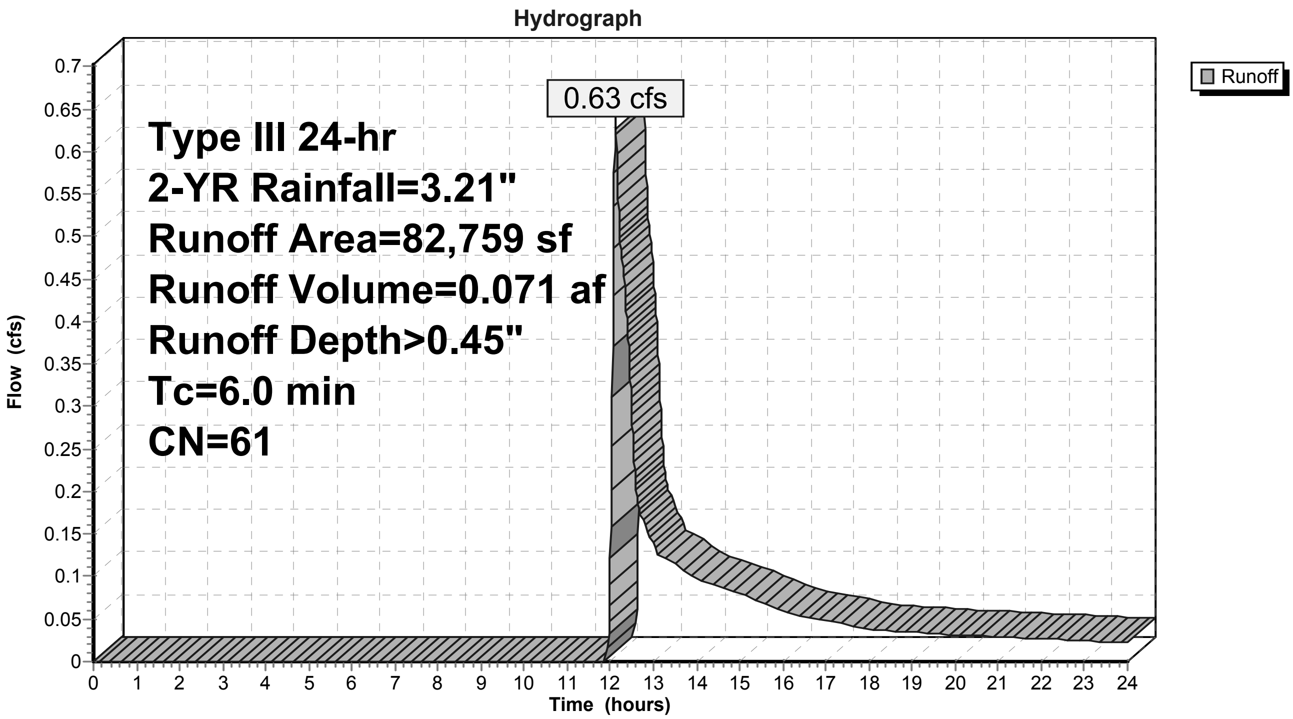
Runoff = 0.63 cfs @ 12.12 hrs, Volume= 0.071 af, Depth> 0.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.21"

	Area (sf)	CN	Description
	8,668	55	Woods, Good, HSG B
*	979	98	Roof
*	265	98	Impervious
	72,847	61	>75% Grass cover, Good, HSG B
	82,759	61	Weighted Average
	81,515		98.50% Pervious Area
	1,244		1.50% Impervious Area

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

Subcatchment X7: To SW Basin



Summary for Subcatchment X8: To CB#2

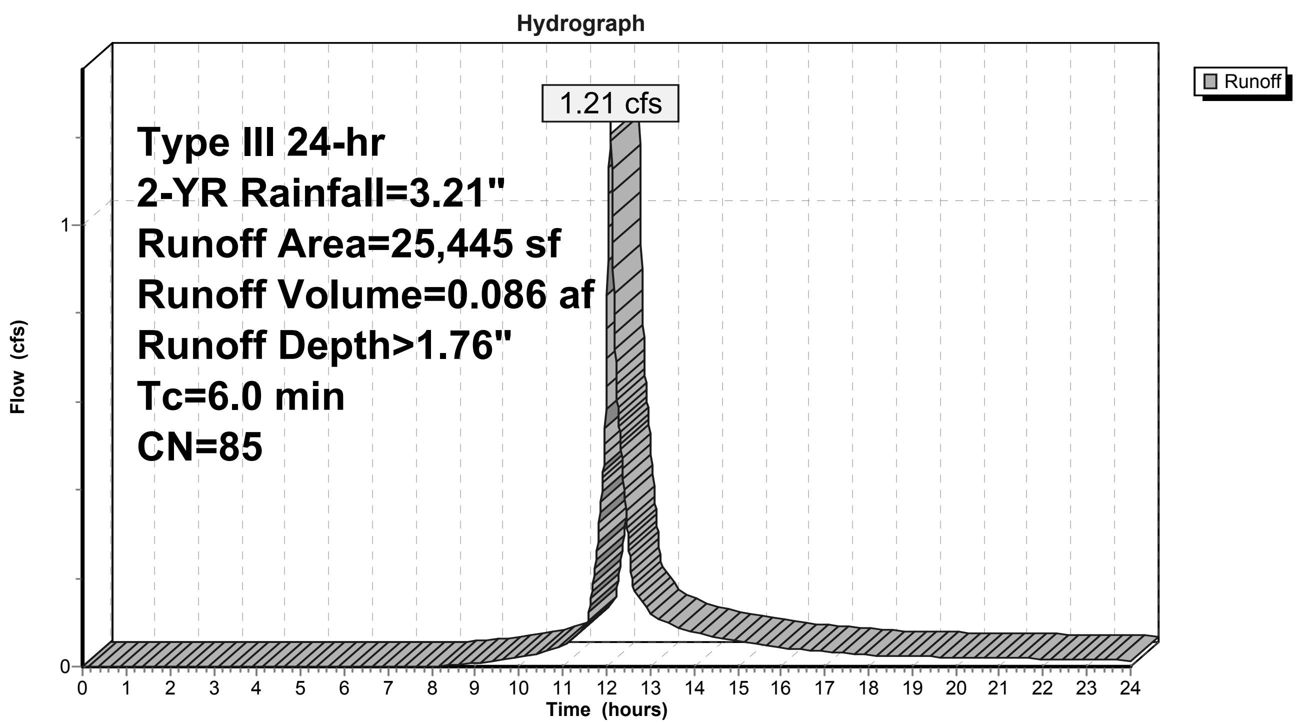
Runoff = 1.21 cfs @ 12.09 hrs, Volume= 0.086 af, Depth> 1.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.21"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	5,898	98	Roof
*	10,557	98	Impervious
	8,990	61	>75% Grass cover, Good, HSG B
	25,445	85	Weighted Average
	8,990		35.33% Pervious Area
	16,455		64.67% Impervious Area

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

Subcatchment X8: To CB#2



Summary for Subcatchment X9: To Day School Lane

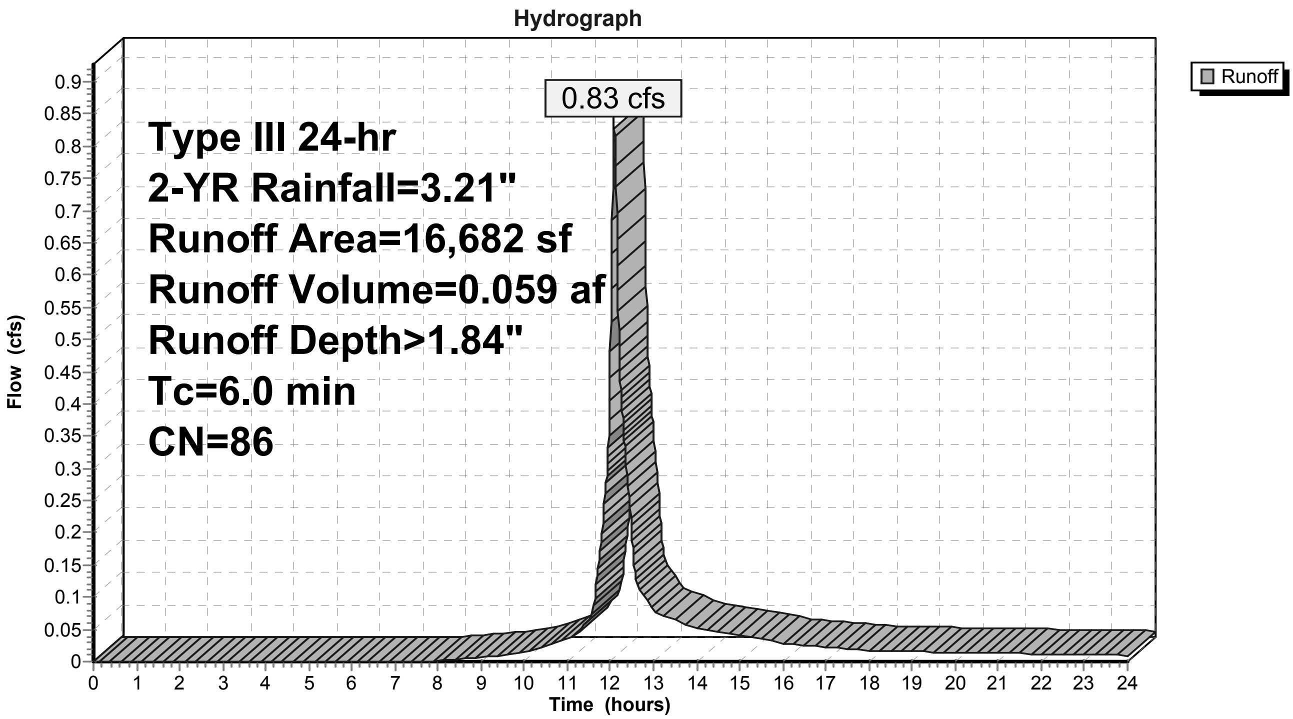
Runoff = 0.83 cfs @ 12.09 hrs, Volume= 0.059 af, Depth> 1.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.21"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	0	98	Roof
*	11,199	98	Impervious
	5,483	61	>75% Grass cover, Good, HSG B
	16,682	86	Weighted Average
	5,483		32.87% Pervious Area
	11,199		67.13% Impervious Area

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

Subcatchment X9: To Day School Lane

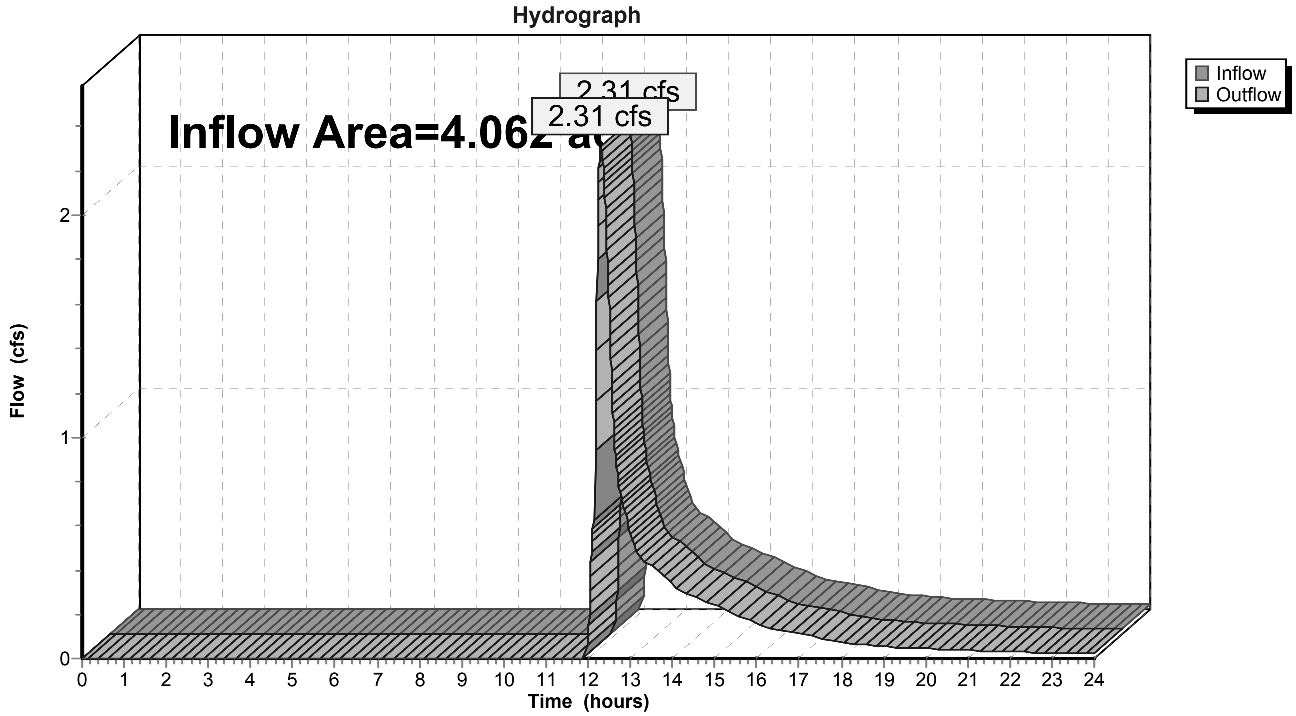


Summary for Reach DP-A: Offsite to Southwest

Inflow Area = 4.062 ac, 38.22% Impervious, Inflow Depth > 0.61" for 2-YR event
Inflow = 2.31 cfs @ 12.30 hrs, Volume= 0.208 af
Outflow = 2.31 cfs @ 12.30 hrs, Volume= 0.208 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-A: Offsite to Southwest

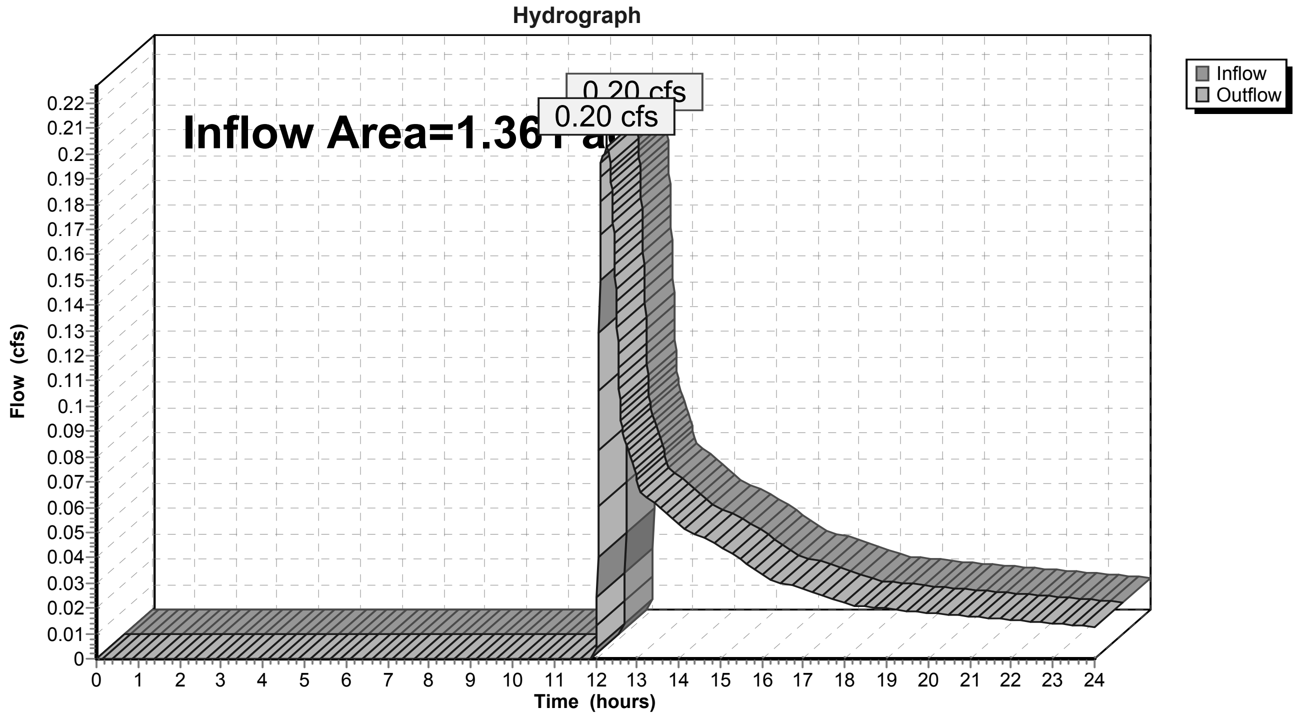


Summary for Reach DP-B: Offsite to Northwest

Inflow Area =	1.361 ac,	0.00% Impervious,	Inflow Depth > 0.31"	for 2-YR event
Inflow =	0.20 cfs @	12.27 hrs, Volume=	0.035 af	
Outflow =	0.20 cfs @	12.27 hrs, Volume=	0.035 af, Atten= 0%, Lag= 0.0 min	

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

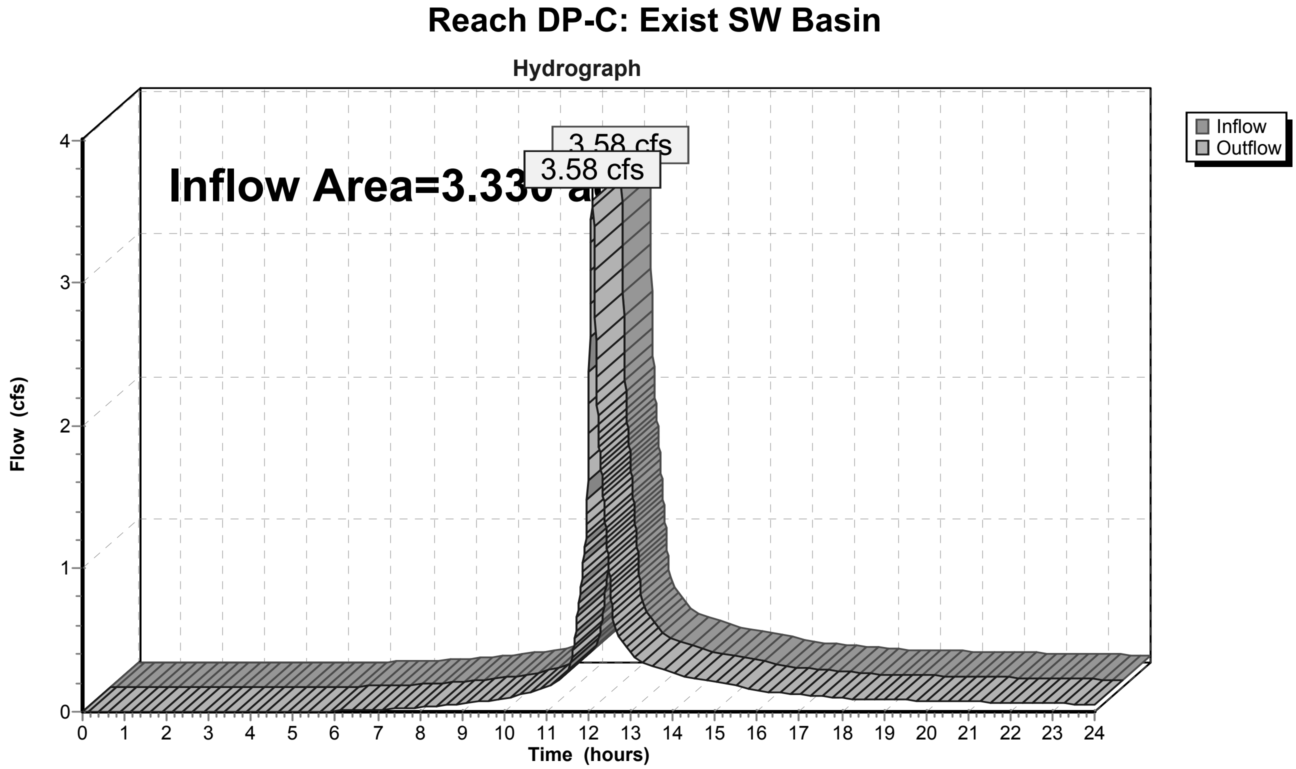
Reach DP-B: Offsite to Northwest



Summary for Reach DP-C: Exist SW Basin

Inflow Area =	3.330 ac, 37.86% Impervious,	Inflow Depth > 1.04"	for 2-YR event
Inflow =	3.58 cfs @ 12.09 hrs,	Volume=	0.290 af
Outflow =	3.58 cfs @ 12.09 hrs,	Volume=	0.290 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

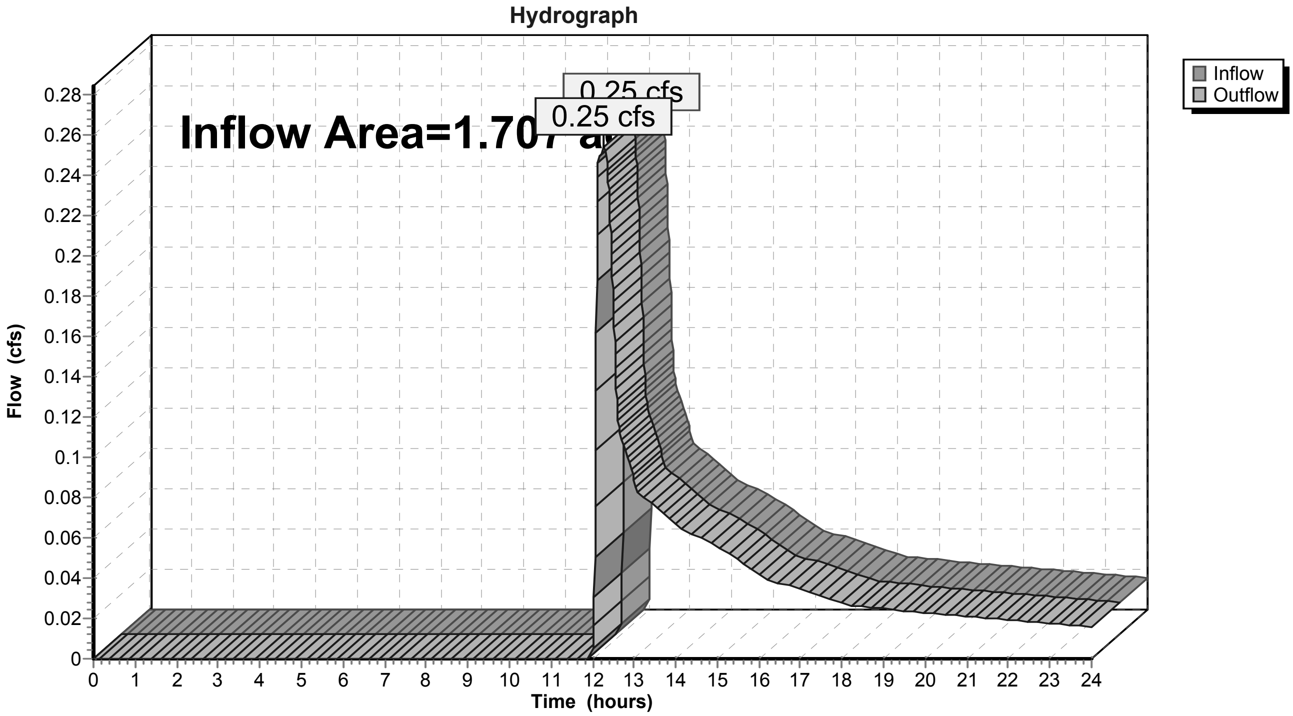


Summary for Reach DP-D: Offsite to Concord Ave

Inflow Area =	1.707 ac,	0.00% Impervious, Inflow Depth > 0.31"		for 2-YR event
Inflow =	0.25 cfs @	12.27 hrs, Volume=	0.044 af	
Outflow =	0.25 cfs @	12.27 hrs, Volume=	0.044 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-D: Offsite to Concord Ave

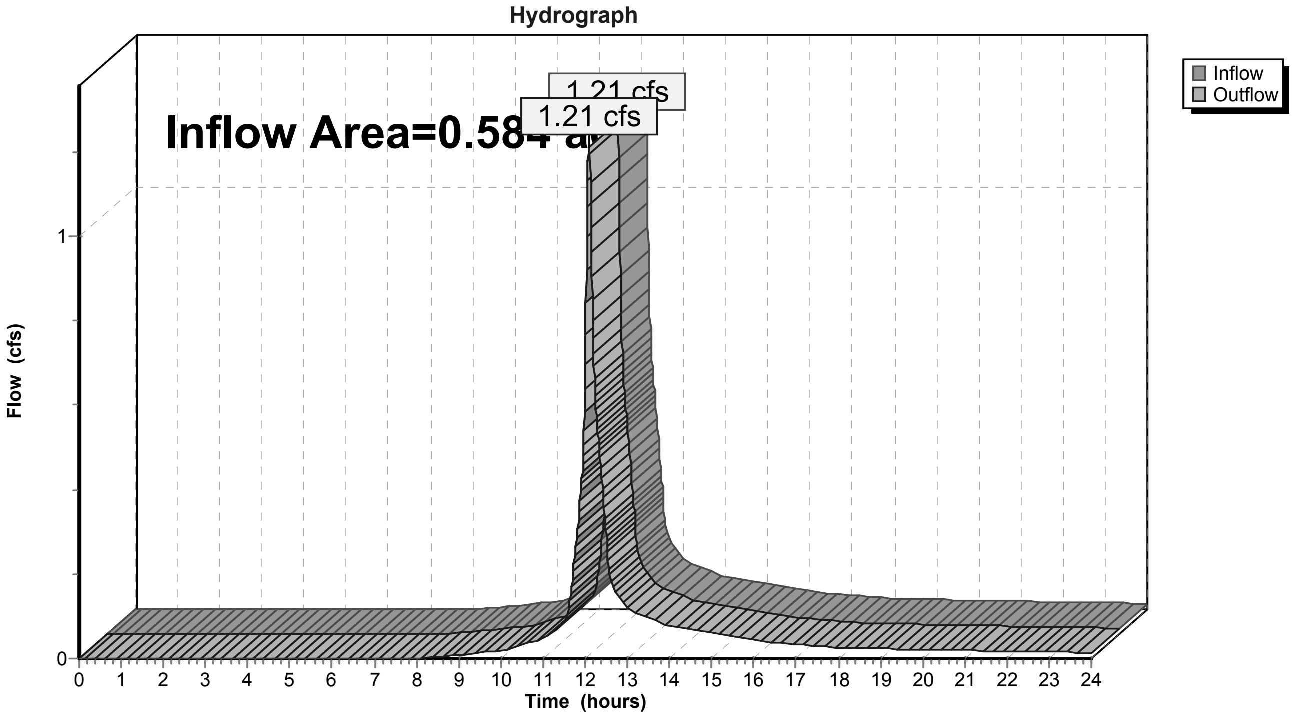


Summary for Reach DP-E: To CB #2

Inflow Area = 0.584 ac, 64.67% Impervious, Inflow Depth > 1.76" for 2-YR event
Inflow = 1.21 cfs @ 12.09 hrs, Volume= 0.086 af
Outflow = 1.21 cfs @ 12.09 hrs, Volume= 0.086 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-E: To CB #2

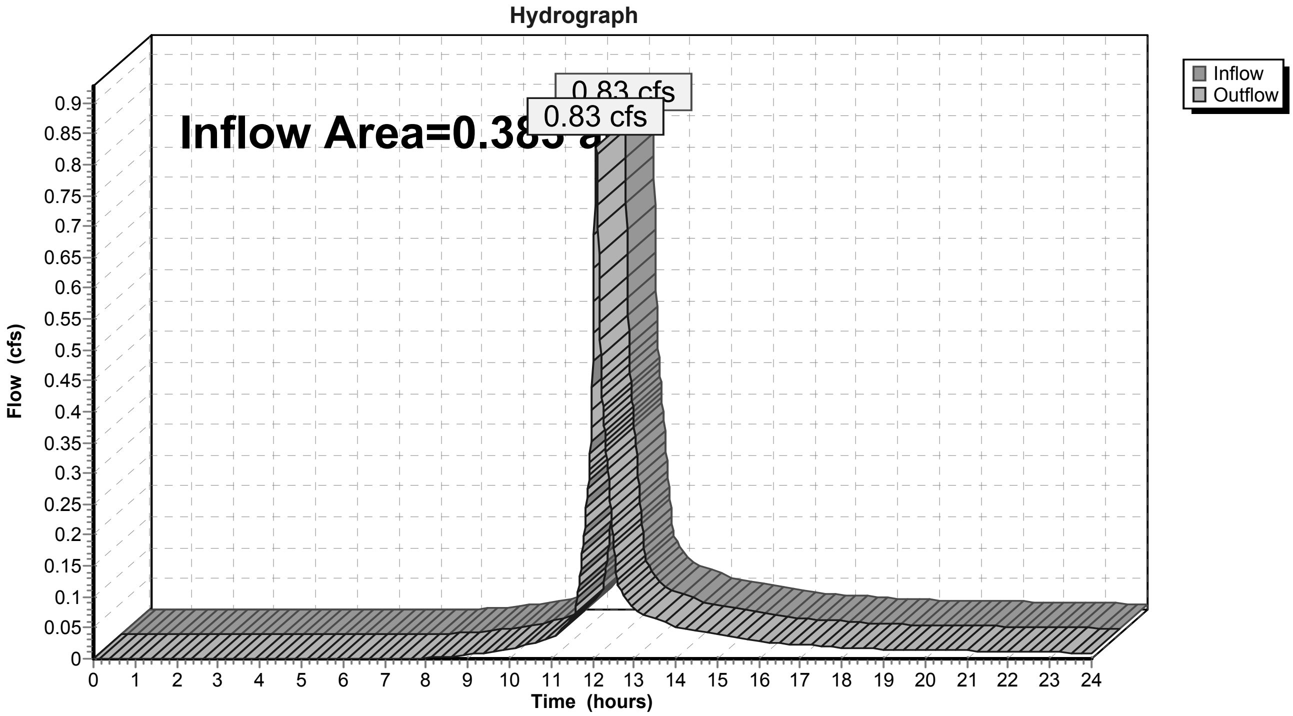


Summary for Reach DP-F: Offsite to Day School Ln

Inflow Area =	0.383 ac,	67.13% Impervious,	Inflow Depth > 1.84"	for 2-YR event	
Inflow =	0.83 cfs @	12.09 hrs,	Volume=	0.059 af	
Outflow =	0.83 cfs @	12.09 hrs,	Volume=	0.059 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-F: Offsite to Day School Ln



Summary for Pond XB1: Exist Basin #1

Inflow Area =	0.316 ac,	96.75% Impervious,	Inflow Depth > 2.86"	for 2-YR event
Inflow =	0.97 cfs @	12.08 hrs, Volume=	0.076 af	
Outflow =	0.09 cfs @	12.97 hrs, Volume=	0.075 af,	Atten= 91%, Lag= 53.1 min
Discarded =	0.09 cfs @	12.97 hrs, Volume=	0.075 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= 0.01 hrs
Peak Elev= 283.67' @ 12.97 hrs Surf.Area= 3,600 sf Storage= 1,200 cf

Plug-Flow detention time= 103.1 min calculated for 0.075 af (100% of inflow)
Center-of-Mass det. time= 102.6 min (867.9 - 765.4)

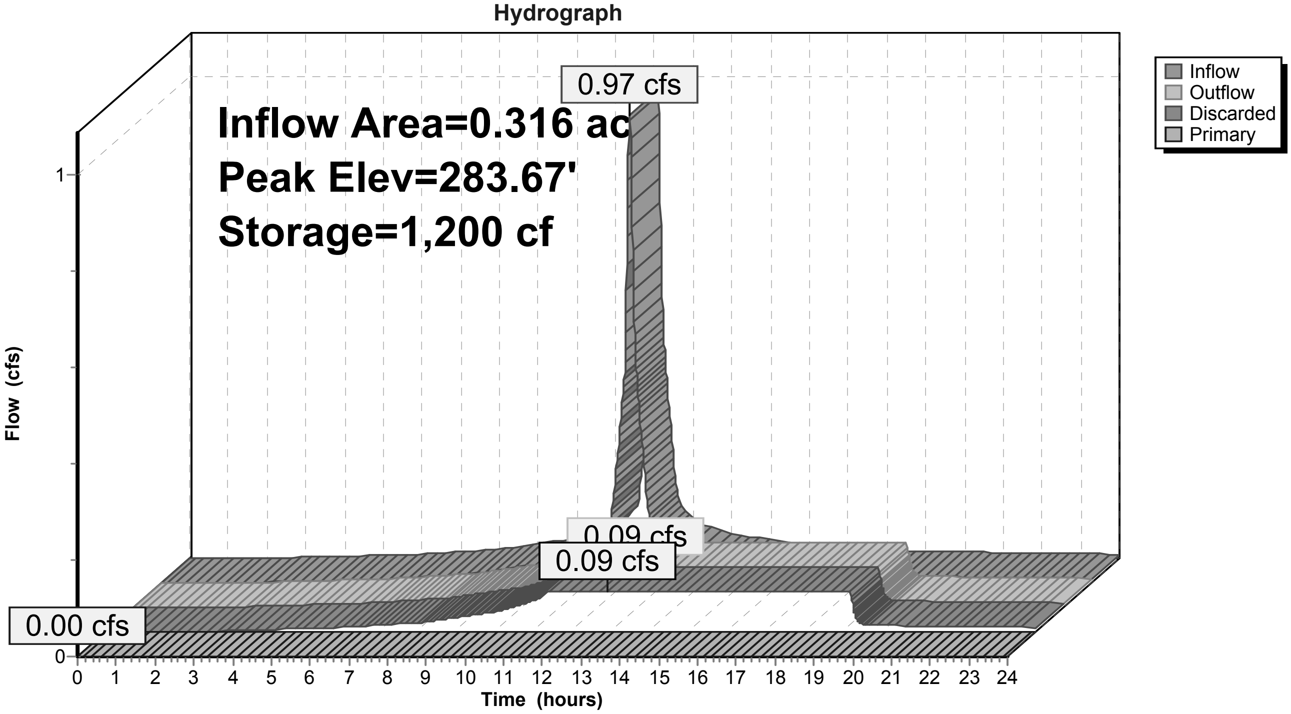
Volume	Invert	Avail.Storage	Storage Description
#1	283.50'	3,335 cf	**30.0"W x 18.0"H x 58.00'L Cultec Contactor 125**x 23 Inside #2
#2	283.00'	1,353 cf	**60.00'W x 60.00'L x 2.00'H Stone** 7,200 cf Overall - 3,335 cf Embedded = 3,865 cf x 35.0% Voids
		4,688 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	284.50'	**4.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	283.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.09 cfs @ 12.97 hrs HW=283.67' (Free Discharge)
└─**2=Exfiltration** (Controls 0.09 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.00' (Free Discharge)
└─**1=Orifice/Grate** (Controls 0.00 cfs)

Pond XB1: Exist Basin #1



Stage-Discharge for Pond XB1: Exist Basin #1

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
283.00	0.00	0.00	0.00
283.02	0.09	0.09	0.00
283.04	0.09	0.09	0.00
283.06	0.09	0.09	0.00
283.08	0.09	0.09	0.00
283.10	0.09	0.09	0.00
283.12	0.09	0.09	0.00
283.14	0.09	0.09	0.00
283.16	0.09	0.09	0.00
283.18	0.09	0.09	0.00
283.20	0.09	0.09	0.00
283.22	0.09	0.09	0.00
283.24	0.09	0.09	0.00
283.26	0.09	0.09	0.00
283.28	0.09	0.09	0.00
283.30	0.09	0.09	0.00
283.32	0.09	0.09	0.00
283.34	0.09	0.09	0.00
283.36	0.09	0.09	0.00
283.38	0.09	0.09	0.00
283.40	0.09	0.09	0.00
283.42	0.09	0.09	0.00
283.44	0.09	0.09	0.00
283.46	0.09	0.09	0.00
283.48	0.09	0.09	0.00
283.50	0.09	0.09	0.00
283.52	0.09	0.09	0.00
283.54	0.09	0.09	0.00
283.56	0.09	0.09	0.00
283.58	0.09	0.09	0.00
283.60	0.09	0.09	0.00
283.62	0.09	0.09	0.00
283.64	0.09	0.09	0.00
283.66	0.09	0.09	0.00
283.68	0.09	0.09	0.00
283.70	0.09	0.09	0.00
283.72	0.09	0.09	0.00
283.74	0.09	0.09	0.00
283.76	0.09	0.09	0.00
283.78	0.09	0.09	0.00
283.80	0.09	0.09	0.00
283.82	0.09	0.09	0.00
283.84	0.09	0.09	0.00
283.86	0.09	0.09	0.00
283.88	0.09	0.09	0.00
283.90	0.09	0.09	0.00
283.92	0.09	0.09	0.00
283.94	0.09	0.09	0.00
283.96	0.09	0.09	0.00
283.98	0.09	0.09	0.00
284.00	0.09	0.09	0.00
284.02	0.09	0.09	0.00
284.04	0.09	0.09	0.00
284.06	0.09	0.09	0.00
284.08	0.09	0.09	0.00
284.10	0.09	0.09	0.00
284.12	0.09	0.09	0.00
284.14	0.09	0.09	0.00
284.16	0.09	0.09	0.00
284.18	0.09	0.09	0.00
284.20	0.09	0.09	0.00
284.22	0.09	0.09	0.00
284.24	0.09	0.09	0.00
284.26	0.09	0.09	0.00
284.28	0.09	0.09	0.00
284.30	0.09	0.09	0.00
284.32	0.09	0.09	0.00
284.34	0.09	0.09	0.00
284.36	0.09	0.09	0.00
284.38	0.09	0.09	0.00
284.40	0.09	0.09	0.00
284.42	0.09	0.09	0.00
284.44	0.09	0.09	0.00
284.46	0.09	0.09	0.00
284.48	0.09	0.09	0.00
284.50	0.09	0.09	0.00
284.52	0.09	0.09	0.00
284.54	0.09	0.09	0.00
284.56	0.09	0.09	0.01
284.58	0.10	0.09	0.02
284.60	0.11	0.09	0.02
284.62	0.12	0.09	0.03
284.64	0.13	0.09	0.04
284.66	0.14	0.09	0.06
284.68	0.15	0.09	0.07
284.70	0.17	0.09	0.08
284.72	0.18	0.09	0.10
284.74	0.20	0.09	0.11
284.76	0.21	0.09	0.13
284.78	0.23	0.09	0.14
284.80	0.24	0.09	0.15
284.82	0.25	0.09	0.17
284.84	0.26	0.09	0.17
284.86	0.27	0.09	0.18
284.88	0.28	0.09	0.19
284.90	0.29	0.09	0.20
284.92	0.30	0.09	0.21
284.94	0.31	0.09	0.22
284.96	0.31	0.09	0.23
284.98	0.32	0.09	0.24
285.00	**0.33**	**0.09**	**0.24**

Stage-Area-Storage for Pond XB1: Exist Basin #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.00	**3,600**	0	284.06	3,600	2,428
283.02	3,600	25	284.08	3,600	2,487
283.04	3,600	50	284.10	3,600	2,546
283.06	3,600	76	284.12	3,600	2,605
283.08	3,600	101	284.14	3,600	2,663
283.10	3,600	126	284.16	3,600	2,721
283.12	3,600	151	284.18	3,600	2,778
283.14	3,600	176	284.20	3,600	2,835
283.16	3,600	202	284.22	3,600	2,892
283.18	3,600	227	284.24	3,600	2,948
283.20	3,600	252	284.26	3,600	3,004
283.22	3,600	277	284.28	3,600	3,060
283.24	3,600	302	284.30	3,600	3,115
283.26	3,600	328	284.32	3,600	3,169
283.28	3,600	353	284.34	3,600	3,223
283.30	3,600	378	284.36	3,600	3,277
283.32	3,600	403	284.38	3,600	3,331
283.34	3,600	428	284.40	3,600	3,383
283.36	3,600	454	284.42	3,600	3,436
283.38	3,600	479	284.44	3,600	3,488
283.40	3,600	504	284.46	3,600	3,539
283.42	3,600	529	284.48	3,600	3,590
283.44	3,600	554	284.50	3,600	3,641
283.46	3,600	580	284.52	3,600	3,691
283.48	3,600	605	284.54	3,600	3,740
283.50	3,600	630	284.56	3,600	3,789
283.52	3,600	698	284.58	3,600	3,837
283.54	3,600	767	284.60	3,600	3,885
283.56	3,600	834	284.62	3,600	3,933
283.58	3,600	902	284.64	3,600	3,979
283.60	3,600	969	284.66	3,600	4,025
283.62	3,600	1,036	284.68	3,600	4,071
283.64	3,600	1,103	284.70	3,600	4,116
283.66	3,600	1,169	284.72	3,600	4,160
283.68	3,600	1,235	284.74	3,600	4,204
283.70	3,600	1,301	284.76	3,600	4,247
283.72	3,600	1,366	284.78	3,600	4,289
283.74	3,600	1,431	284.80	3,600	4,330
283.76	3,600	1,496	284.82	3,600	4,371
283.78	3,600	1,560	284.84	3,600	4,411
283.80	3,600	1,625	284.86	3,600	4,450
283.82	3,600	1,688	284.88	3,600	4,487
283.84	3,600	1,752	284.90	3,600	4,524
283.86	3,600	1,815	284.92	3,600	4,560
283.88	3,600	1,878	284.94	3,600	4,595
283.90	3,600	1,940	284.96	3,600	4,628
283.92	3,600	2,003	284.98	3,600	4,659
283.94	3,600	2,064	285.00	3,600	**4,688**
283.96	3,600	2,126			
283.98	3,600	2,187			
284.00	3,600	2,248			
284.02	3,600	2,308			
284.04	3,600	2,368			

Summary for Pond XB2: Exist Basin #2

Inflow Area = 1.924 ac, 76.76% Impervious, Inflow Depth > 2.09" for 2-YR event
Inflow = 4.68 cfs @ 12.09 hrs, Volume= 0.335 af
Outflow = 1.92 cfs @ 12.31 hrs, Volume= 0.224 af, Atten= 59%, Lag= 13.5 min
Discarded = 0.07 cfs @ 12.31 hrs, Volume= 0.089 af
Primary = 1.85 cfs @ 12.31 hrs, Volume= 0.134 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 282.49' @ 12.31 hrs Surf.Area= 2,870 sf Storage= 5,643 cf

Plug-Flow detention time= 165.0 min calculated for 0.224 af (67% of inflow)
Center-of-Mass det. time= 67.4 min (877.7 - 810.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	279.50'	1,268 cf	**30.50'W x 73.50'L x 3.04'H Field A** 6,819 cf Overall - 3,196 cf Embedded = 3,622 cf x 35.0% Voids
#2A	280.00'	3,196 cf	**Cultec R-330XLHD** x 60 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
#3B	279.50'	370 cf	**16.00'W x 38.50'L x 3.04'H Field B** 1,874 cf Overall - 816 cf Embedded = 1,058 cf x 35.0% Voids
#4B	280.00'	816 cf	**Cultec R-330XLHD** x 15 Inside #3 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 3 rows
#5	279.00'	148 cf	**4.00'D x 11.80'H Vertical Cone/Cylinder**
#6	286.20'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**
		5,874 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	282.00'	**6.0" Vert. Orifice/Grate X 4.00** C= 0.600
#2	Primary	290.70'	**2.3" x 2.3" Horiz. Grate X 36.00** C= 0.600 in 24.0" x 24.0" Grate (33% open area) Limited to weir flow at low heads
#3	Primary	292.10'	**2.3" x 2.3" Horiz. Grate X 36.00** C= 0.600 in 24.0" x 24.0" Grate (33% open area) Limited to weir flow at low heads
#4	Discarded	279.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.07 cfs @ 12.31 hrs HW=282.49' (Free Discharge)
└─**4=Exfiltration** (Controls 0.07 cfs)

Primary OutFlow Max=1.86 cfs @ 12.31 hrs HW=282.49' (Free Discharge)
├─**1=Orifice/Grate** (Orifice Controls 1.86 cfs @ 2.38 fps)
├─**2=Grate** (Controls 0.00 cfs)
└─**3=Grate** (Controls 0.00 cfs)

Pond XB2: Exist Basin #2 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

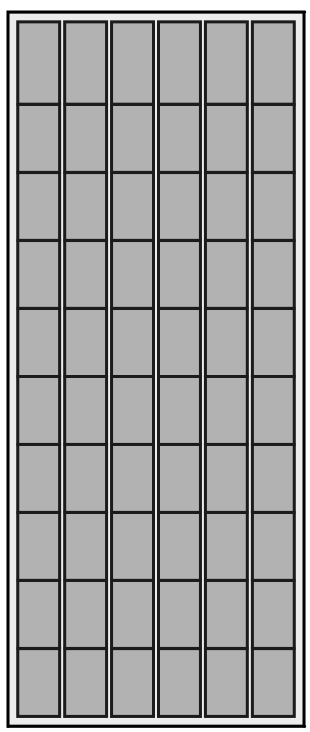
10 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 71.50' Row Length +12.0" End Stone x 2 = 73.50' Base Length
6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width
6.0" Base + 30.5" Chamber Height = 3.04' Field Height

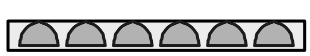
60 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 3,196.5 cf Chamber Storage

6,818.7 cf Field - 3,196.5 cf Chambers = 3,622.2 cf Stone x 35.0% Voids = 1,267.8 cf Stone Storage

Chamber Storage + Stone Storage = 4,464.2 cf = 0.102 af
Overall Storage Efficiency = 65.5%

60 Chambers
252.5 cy Field
134.2 cy Stone





Pond XB2: Exist Basin #2 - Chamber Wizard Field B

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 3 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

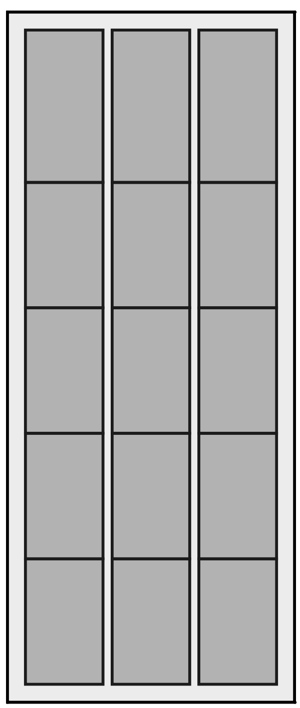
5 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 36.50' Row Length +12.0" End Stone x 2 = 38.50' Base Length
3 Rows x 52.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 16.00' Base Width
6.0" Base + 30.5" Chamber Height = 3.04' Field Height

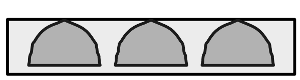
15 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 3 Rows = 815.9 cf Chamber Storage

1,873.7 cf Field - 815.9 cf Chambers = 1,057.8 cf Stone x 35.0% Voids = 370.2 cf Stone Storage

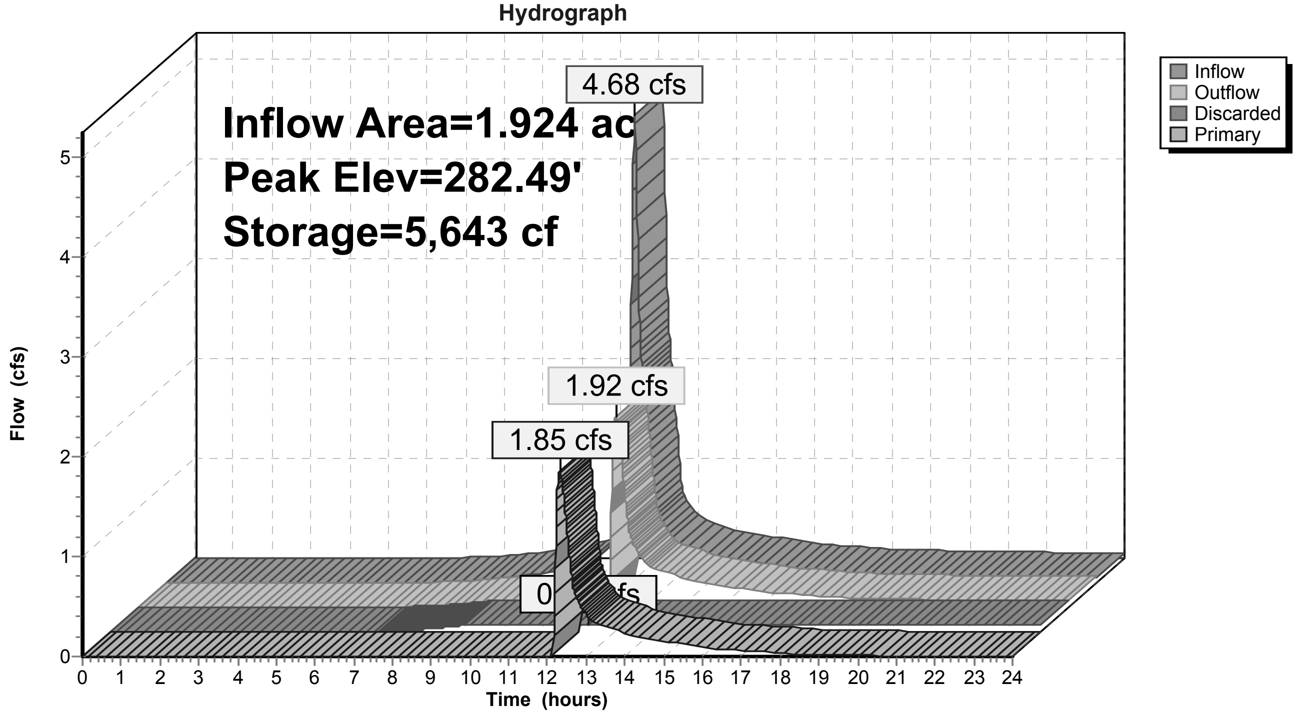
Chamber Storage + Stone Storage = 1,186.1 cf = 0.027 af
Overall Storage Efficiency = 63.3%

15 Chambers
69.4 cy Field
39.2 cy Stone





Pond XB2: Exist Basin #2



Stage-Discharge for Pond XB2: Exist Basin #2

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
279.00	0.00	0.00	0.00
279.15	0.00	0.00	0.00
279.30	0.00	0.00	0.00
279.45	0.00	0.00	0.00
279.60	0.07	0.07	0.00
279.75	0.07	0.07	0.00
279.90	0.07	0.07	0.00
280.05	0.07	0.07	0.00
280.20	0.07	0.07	0.00
280.35	0.07	0.07	0.00
280.50	0.07	0.07	0.00
280.65	0.07	0.07	0.00
280.80	0.07	0.07	0.00
280.95	0.07	0.07	0.00
281.10	0.07	0.07	0.00
281.25	0.07	0.07	0.00
281.40	0.07	0.07	0.00
281.55	0.07	0.07	0.00
281.70	0.07	0.07	0.00
281.85	0.07	0.07	0.00
282.00	0.07	0.07	0.00
282.15	0.33	0.07	0.26
282.30	0.99	0.07	0.92
282.45	1.77	0.07	1.70
282.60	2.31	0.07	2.24
282.75	2.74	0.07	2.67
282.90	3.12	0.07	3.05
283.05	3.45	0.07	3.38
283.20	3.75	0.07	3.69
283.35	4.03	0.07	3.97
283.50	4.30	0.07	4.23
283.65	4.54	0.07	4.47
283.80	4.78	0.07	4.71
283.95	5.00	0.07	4.93
284.10	5.21	0.07	5.14
284.25	5.42	0.07	5.35
284.40	5.61	0.07	5.55
284.55	5.80	0.07	5.74
284.70	5.99	0.07	5.92
284.85	6.17	0.07	6.10
285.00	6.34	0.07	6.27
285.15	6.51	0.07	6.44
285.30	6.67	0.07	6.60
285.45	6.83	0.07	6.76
285.60	6.99	0.07	6.92
285.75	7.14	0.07	7.07
285.90	7.29	0.07	7.22
286.05	7.44	0.07	7.37
286.20	7.59	0.07	7.52
286.35	7.73	0.07	7.66
286.50	7.87	0.07	7.80
286.65	8.00	0.07	7.93
286.80	8.14	0.07	8.07
286.95	8.27	0.07	8.20
287.10	8.40	0.07	8.33
287.25	8.53	0.07	8.46
287.40	8.65	0.07	8.58
287.55	8.78	0.07	8.71
287.70	8.90	0.07	8.83
287.85	9.02	0.07	8.95
288.00	9.14	0.07	9.07
288.15	9.26	0.07	9.19
288.30	9.37	0.07	9.30
288.45	9.49	0.07	9.42
288.60	9.60	0.07	9.53
288.75	9.71	0.07	9.64
288.90	9.82	0.07	9.75
289.05	9.93	0.07	9.86
289.20	10.04	0.07	9.97
289.35	10.15	0.07	10.08
289.50	10.25	0.07	10.18
289.65	10.36	0.07	10.29
289.80	10.46	0.07	10.39
289.95	10.56	0.07	10.49
290.10	10.67	0.07	10.60
290.25	10.77	0.07	10.70
290.40	10.87	0.07	10.80
290.55	10.97	0.07	10.89
290.70	11.06	0.07	10.99
290.85	12.68	0.07	12.61
291.00	14.74	0.07	14.67
291.15	15.62	0.07	15.55
291.30	16.38	0.07	16.31
291.45	17.06	0.07	16.99
291.60	17.68	0.07	17.60
291.75	18.25	0.07	18.18
291.90	18.79	0.07	18.72
292.05	19.31	0.07	19.24
292.20	**20.63**	**0.07**	**20.55**

Stage-Area-Storage for Pond XB2: Exist Basin #2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
279.00	13	0	286.95	2,883	5,760
279.15	13	2	287.10	2,883	5,763
279.30	13	4	287.25	2,883	5,767
279.45	13	6	287.40	2,883	5,771
279.60	2,870	108	287.55	2,883	5,775
279.75	2,870	259	287.70	2,883	5,779
279.90	2,870	411	287.85	2,883	5,782
280.05	2,870	633	288.00	2,883	5,786
280.20	2,870	991	288.15	2,883	5,790
280.35	2,870	1,348	288.30	2,883	5,794
280.50	2,870	1,703	288.45	2,883	5,797
280.65	2,870	2,054	288.60	2,883	5,801
280.80	2,870	2,399	288.75	2,883	5,805
280.95	2,870	2,742	288.90	2,883	5,809
281.10	2,870	3,082	289.05	2,883	5,812
281.25	2,870	3,419	289.20	2,883	5,816
281.40	2,870	3,747	289.35	2,883	5,820
281.55	2,870	4,063	289.50	2,883	5,824
281.70	2,870	4,369	289.65	2,883	5,828
281.85	2,870	4,661	289.80	2,883	5,831
282.00	2,870	4,937	289.95	2,883	5,835
282.15	2,870	5,192	290.10	2,883	5,839
282.30	2,870	5,415	290.25	2,883	5,843
282.45	2,870	5,599	290.40	2,883	5,846
282.60	2,870	5,696	290.55	2,883	5,850
282.75	2,870	5,697	290.70	2,883	5,854
282.90	2,870	5,699	290.85	2,883	5,857
283.05	2,870	5,701	291.00	2,883	5,859
283.20	2,870	5,703	291.15	2,883	5,861
283.35	2,870	5,705	291.30	2,883	5,863
283.50	2,870	5,707	291.45	2,883	5,865
283.65	2,870	5,709	291.60	2,883	5,866
283.80	2,870	5,711	291.75	2,883	5,868
283.95	2,870	5,713	291.90	2,883	5,870
284.10	2,870	5,714	292.05	2,883	5,872
284.25	2,870	5,716	292.20	2,883	**5,874**
284.40	2,870	5,718			
284.55	2,870	5,720			
284.70	2,870	5,722			
284.85	2,870	5,724			
285.00	2,870	5,726			
285.15	2,870	5,728			
285.30	2,870	5,730			
285.45	2,870	5,731			
285.60	2,870	5,733			
285.75	2,870	5,735			
285.90	2,870	5,737			
286.05	2,870	5,739			
286.20	**2,883**	5,741			
286.35	2,883	5,745			
286.50	2,883	5,748			
286.65	2,883	5,752			
286.80	2,883	5,756			

Summary for Subcatchment X1: Offsite to West

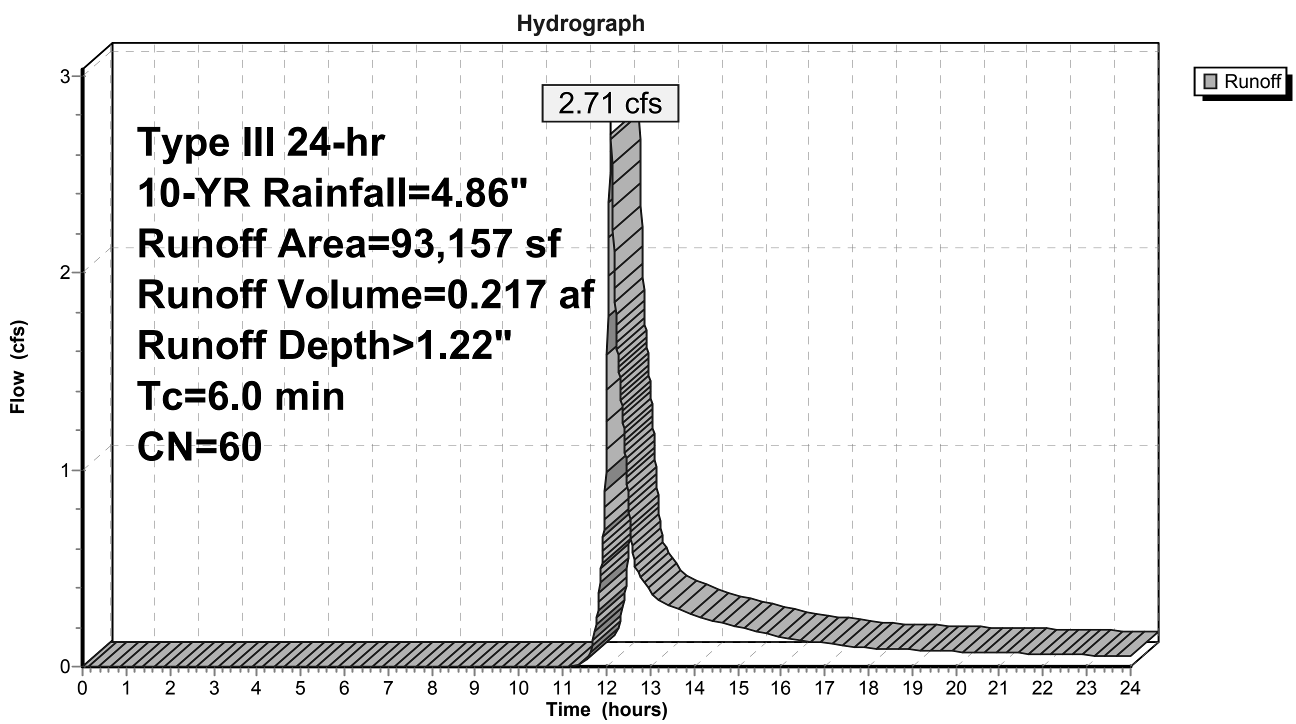
Runoff = 2.71 cfs @ 12.10 hrs, Volume= 0.217 af, Depth> 1.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (sf)	CN	Description
	37,205	55	Woods, Good, HSG B
*	3,150	98	Roof
*	170	98	Impervious
	52,632	61	>75% Grass cover, Good, HSG B
	93,157	60	Weighted Average
	89,837		96.44% Pervious Area
	3,320		3.56% Impervious Area

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

Subcatchment X1: Offsite to West



Summary for Subcatchment X2: To Basin #2

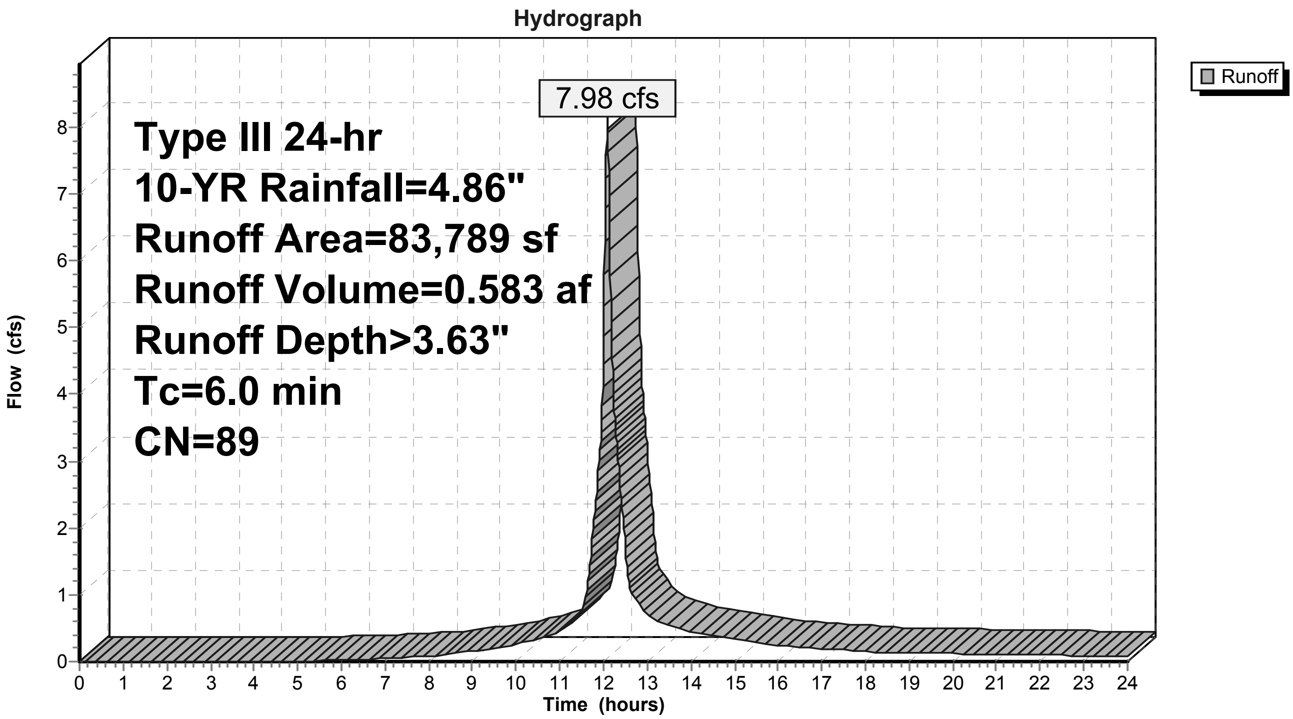
Runoff = 7.98 cfs @ 12.09 hrs, Volume= 0.583 af, Depth> 3.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (sf)	CN	Description
	1,934	55	Woods, Good, HSG B
*	26,065	98	Roof
*	38,252	98	Impervious
	17,538	61	>75% Grass cover, Good, HSG B
	83,789	89	Weighted Average
	19,472		23.24% Pervious Area
	64,317		76.76% Impervious Area

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

Subcatchment X2: To Basin #2



Summary for Subcatchment X3: Offsite to Northwest

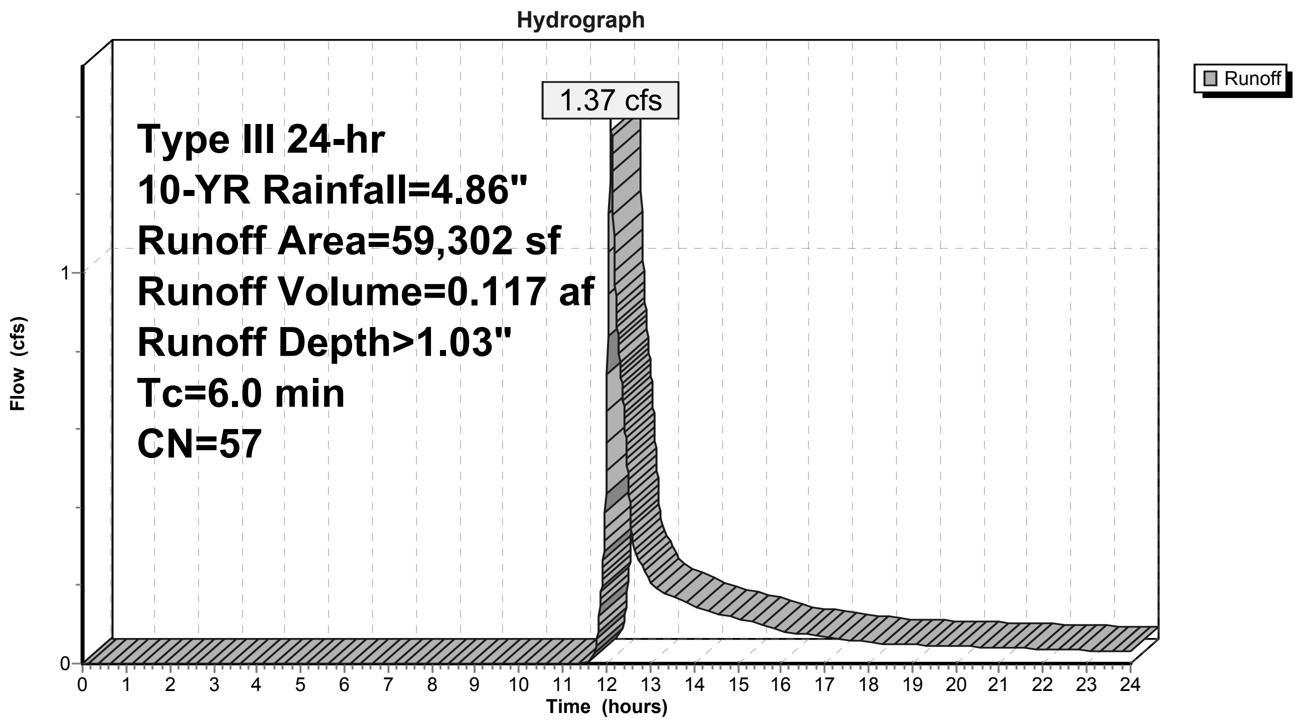
Runoff = 1.37 cfs @ 12.10 hrs, Volume= 0.117 af, Depth> 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (sf)	CN	Description
	44,265	55	Woods, Good, HSG B
*	0	98	Roof
*	0	98	Impervious
	15,037	61	>75% Grass cover, Good, HSG B
	59,302	57	Weighted Average
	59,302		100.00% Pervious Area

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

Subcatchment X3: Offsite to Northwest



Summary for Subcatchment X4: To Basin #1

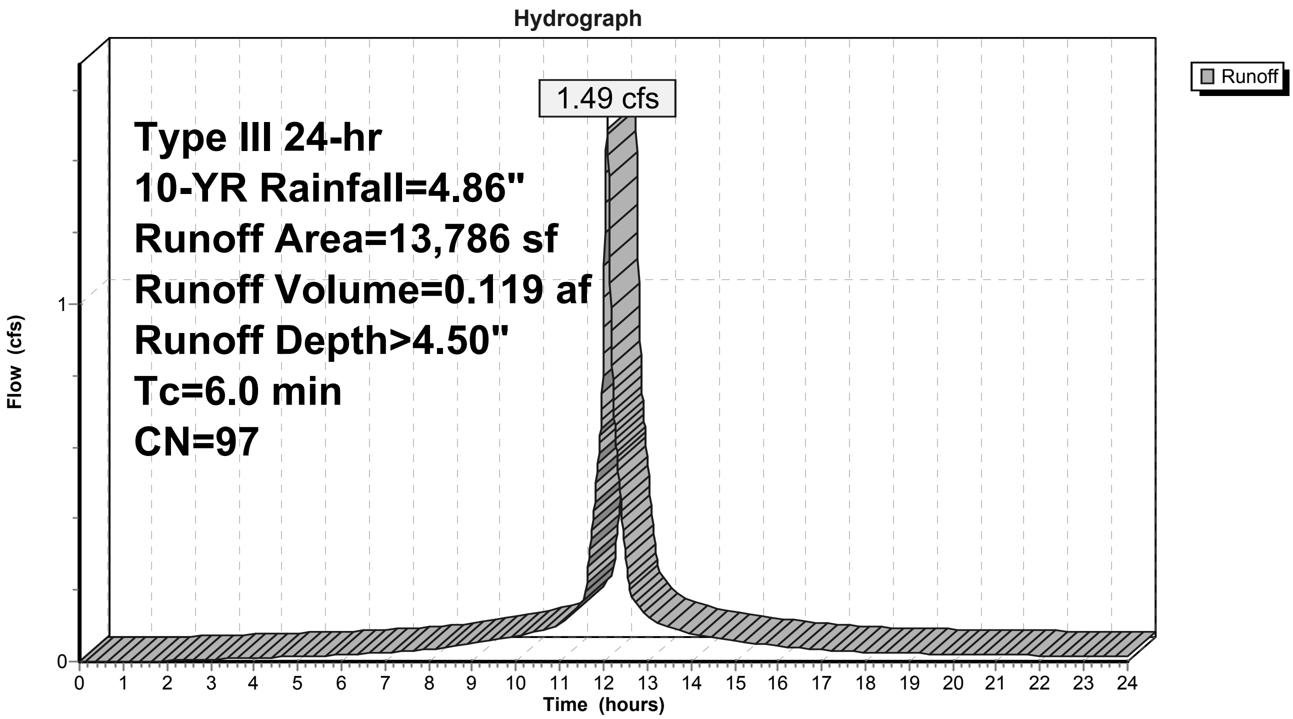
Runoff = 1.49 cfs @ 12.08 hrs, Volume= 0.119 af, Depth> 4.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	0	98	Roof
*	13,338	98	Impervious
	448	61	>75% Grass cover, Good, HSG B
	13,786	97	Weighted Average
	448		3.25% Pervious Area
	13,338		96.75% Impervious Area

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

Subcatchment X4: To Basin #1



Summary for Subcatchment X5: To Basin #3

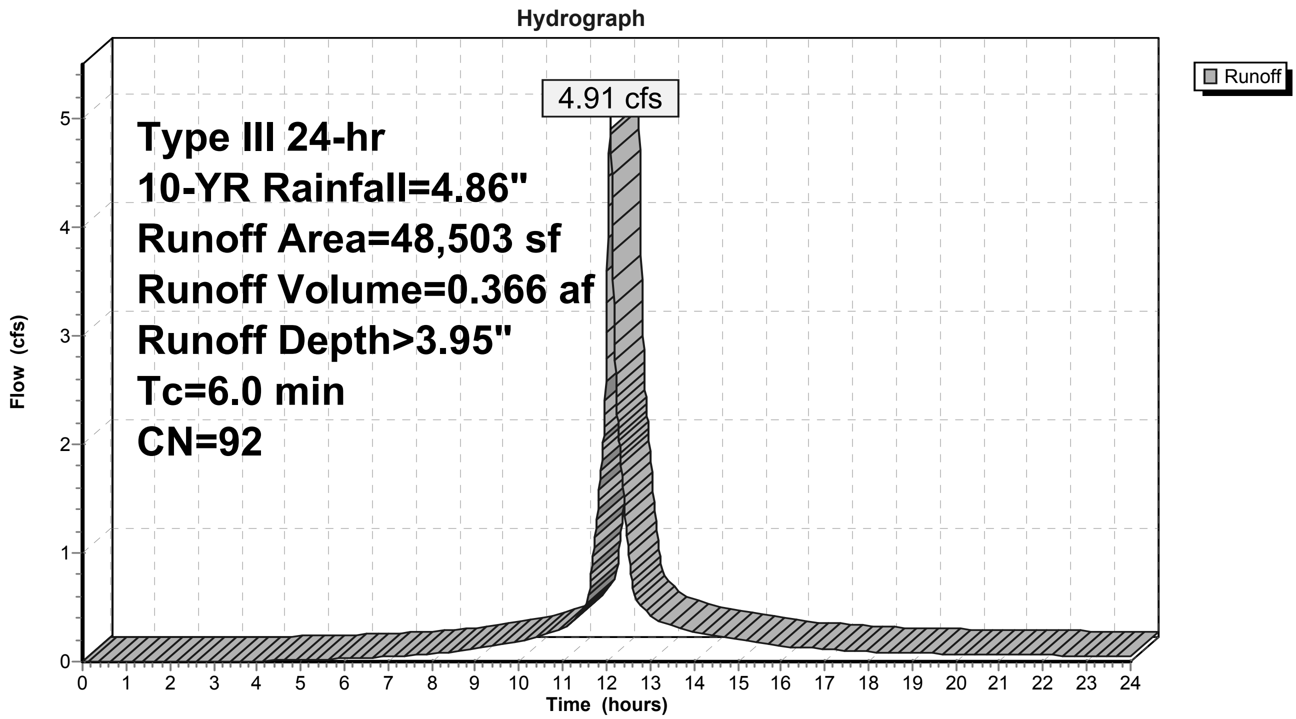
Runoff = 4.91 cfs @ 12.08 hrs, Volume= 0.366 af, Depth> 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	5,950	98	Roof
*	34,380	98	Impervious
	8,173	61	>75% Grass cover, Good, HSG B
	48,503	92	Weighted Average
	8,173		16.85% Pervious Area
	40,330		83.15% Impervious Area

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

Subcatchment X5: To Basin #3



Summary for Subcatchment X6: Offsite to Concord Ave

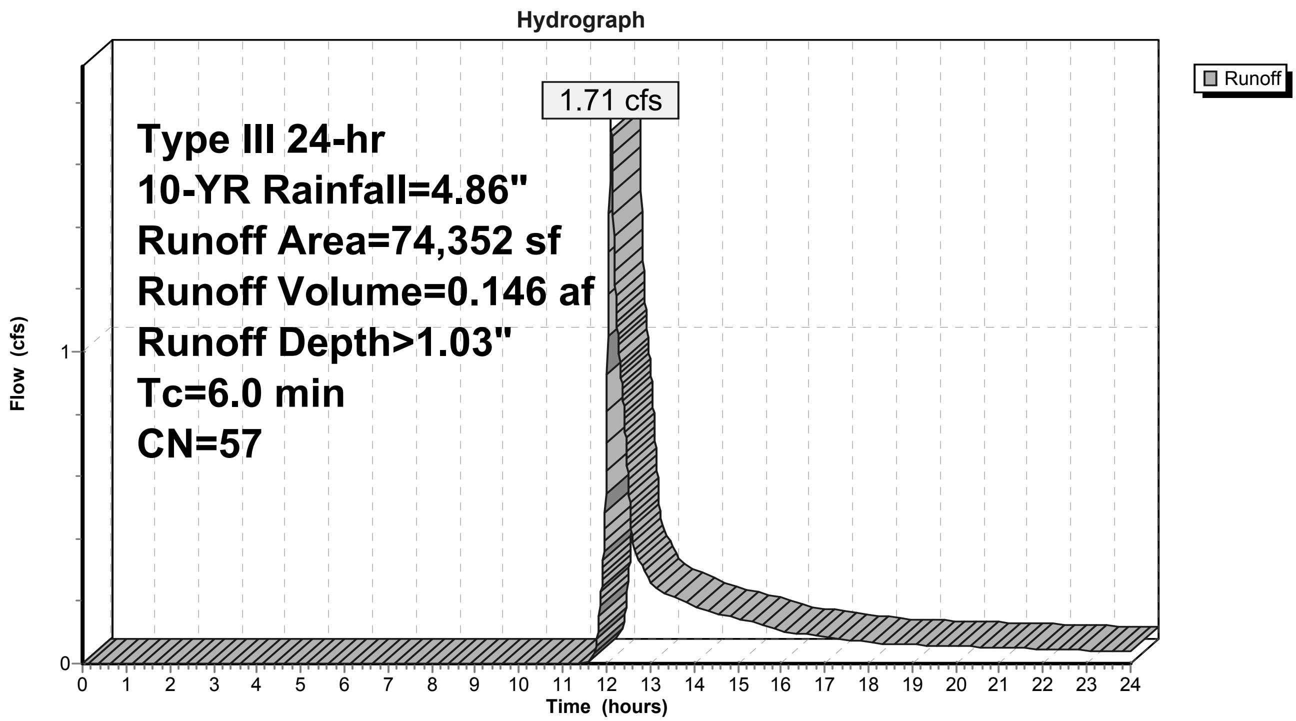
Runoff = 1.71 cfs @ 12.10 hrs, Volume= 0.146 af, Depth> 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (sf)	CN	Description
	49,297	55	Woods, Good, HSG B
*	0	98	Roof
*	0	98	Impervious
	25,055	61	>75% Grass cover, Good, HSG B
	74,352	57	Weighted Average
	74,352		100.00% Pervious Area

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

Subcatchment X6: Offsite to Concord Ave



Summary for Subcatchment X7: To SW Basin

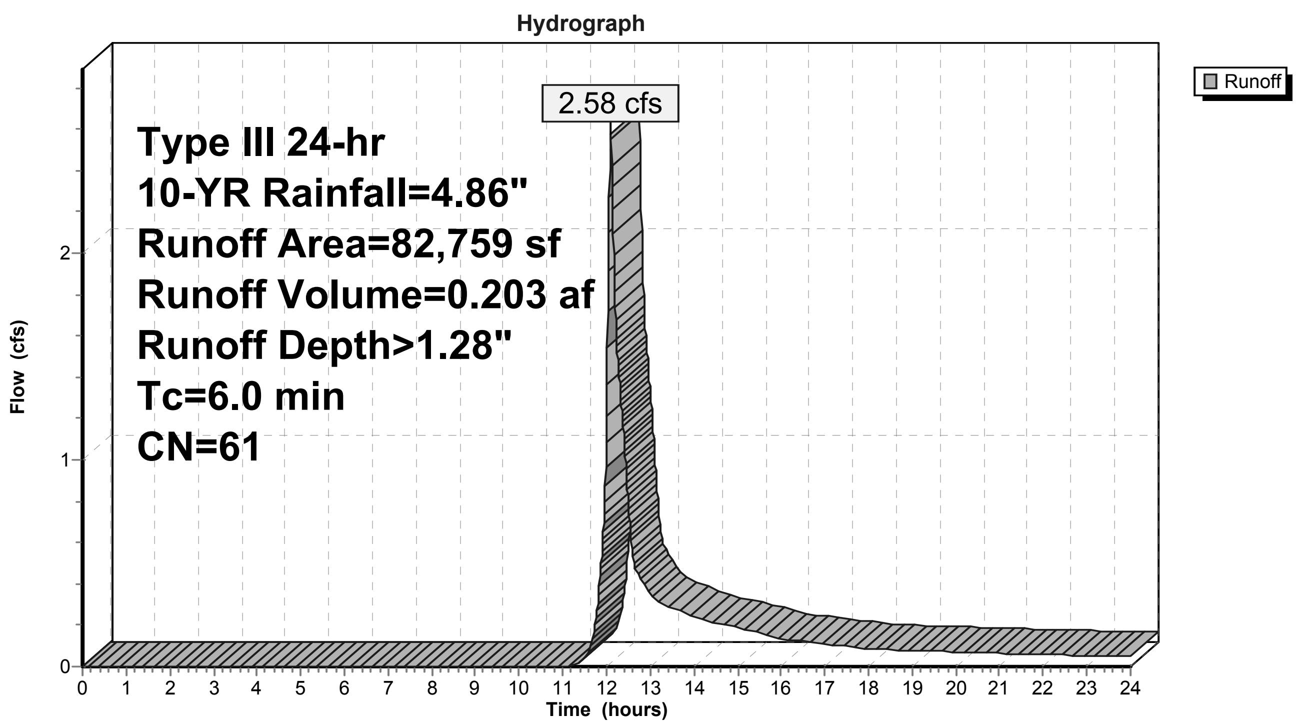
Runoff = 2.58 cfs @ 12.10 hrs, Volume= 0.203 af, Depth> 1.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (sf)	CN	Description
	8,668	55	Woods, Good, HSG B
*	979	98	Roof
*	265	98	Impervious
	72,847	61	>75% Grass cover, Good, HSG B
	82,759	61	Weighted Average
	81,515		98.50% Pervious Area
	1,244		1.50% Impervious Area

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

Subcatchment X7: To SW Basin



Summary for Subcatchment X8: To CB#2

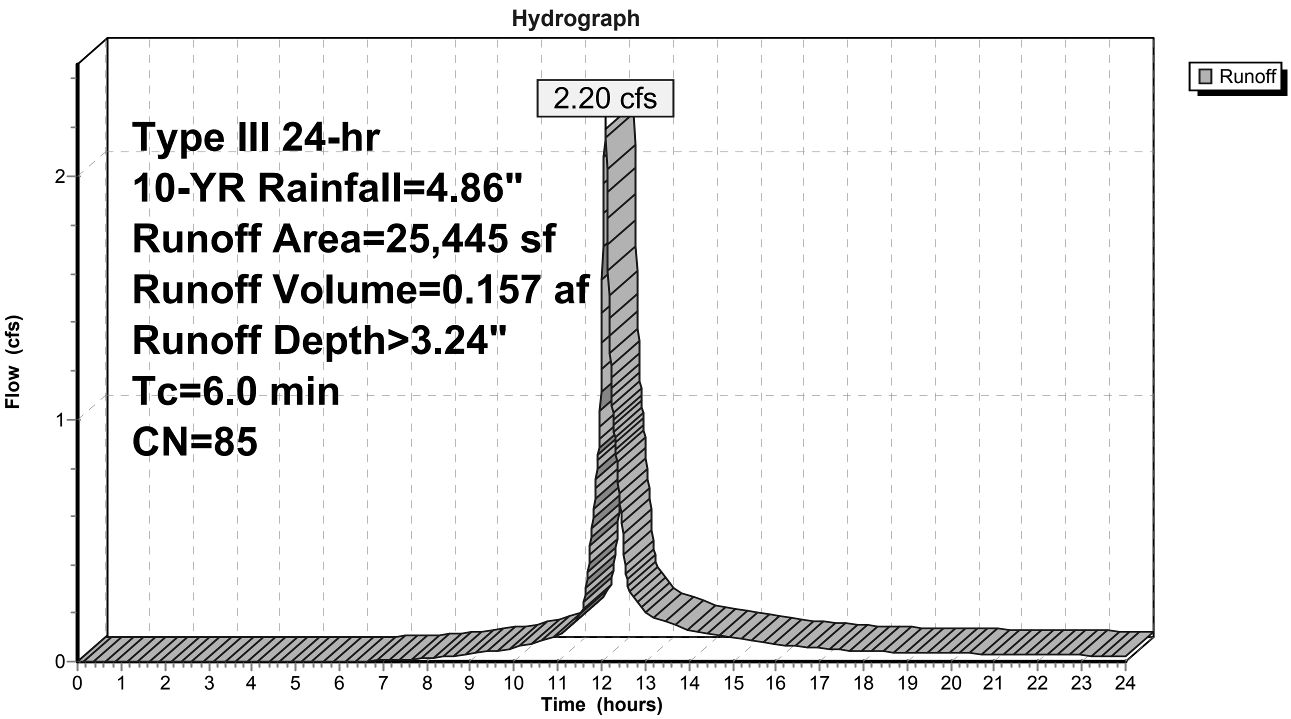
Runoff = 2.20 cfs @ 12.09 hrs, Volume= 0.157 af, Depth> 3.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	5,898	98	Roof
*	10,557	98	Impervious
	8,990	61	>75% Grass cover, Good, HSG B
	25,445	85	Weighted Average
	8,990		35.33% Pervious Area
	16,455		64.67% Impervious Area

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

Subcatchment X8: To CB#2



Summary for Subcatchment X9: To Day School Lane

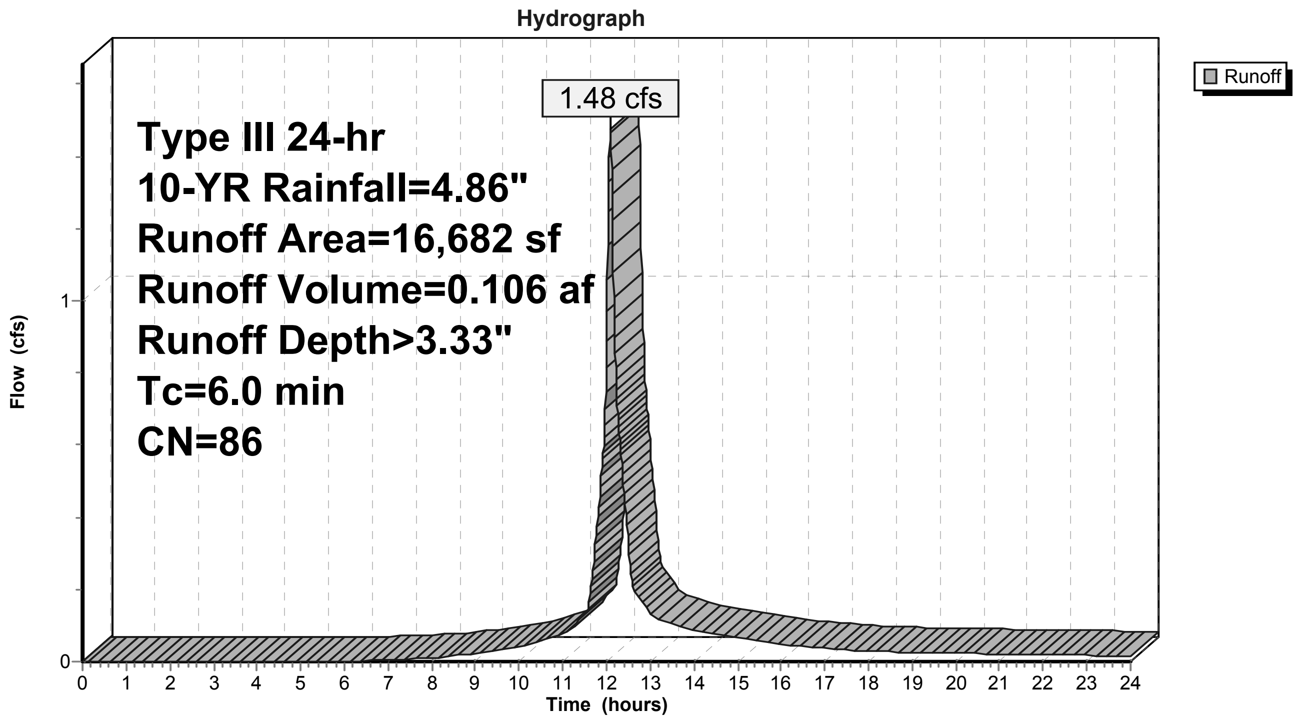
Runoff = 1.48 cfs @ 12.09 hrs, Volume= 0.106 af, Depth> 3.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	0	98	Roof
*	11,199	98	Impervious
	5,483	61	>75% Grass cover, Good, HSG B
	16,682	86	Weighted Average
	5,483		32.87% Pervious Area
	11,199		67.13% Impervious Area

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

Subcatchment X9: To Day School Lane

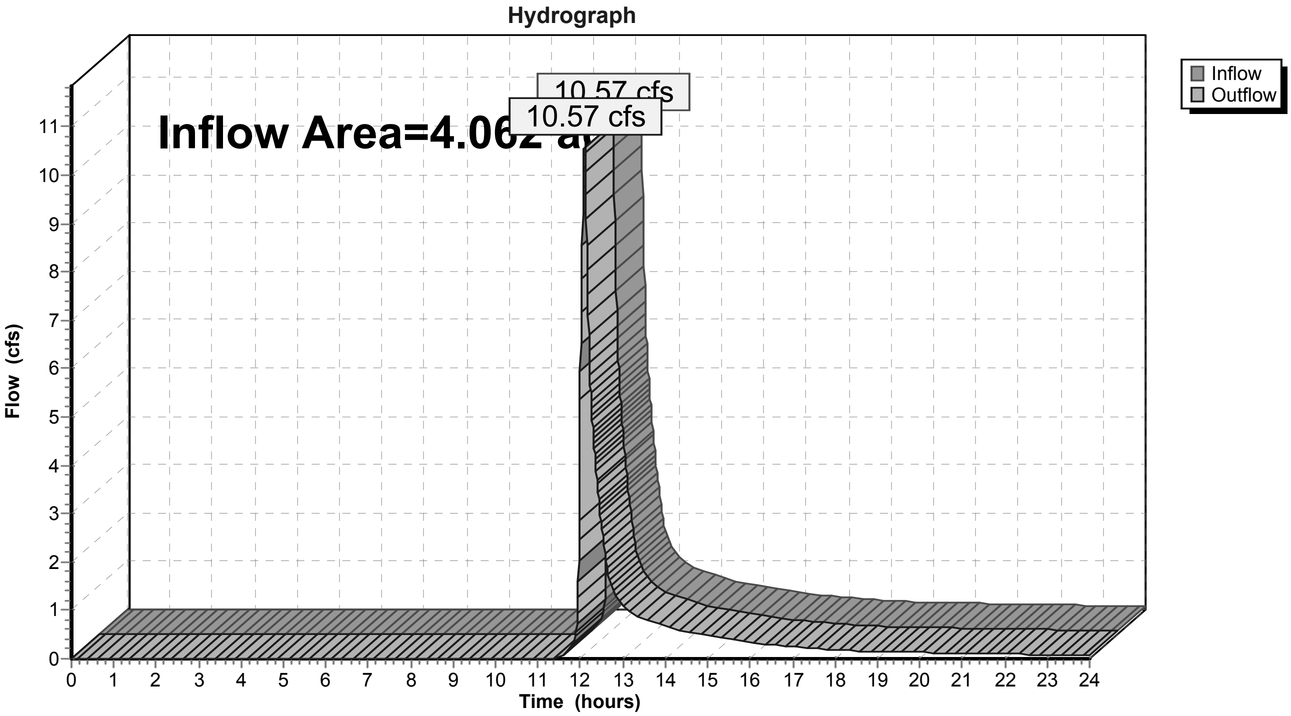


Summary for Reach DP-A: Offsite to Southwest

Inflow Area =	4.062 ac,	38.22% Impervious,	Inflow Depth > 1.73"	for 10-YR event
Inflow =	10.57 cfs @	12.09 hrs, Volume=	0.586 af	
Outflow =	10.57 cfs @	12.09 hrs, Volume=	0.586 af, Atten= 0%, Lag= 0.0 min	

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-A: Offsite to Southwest

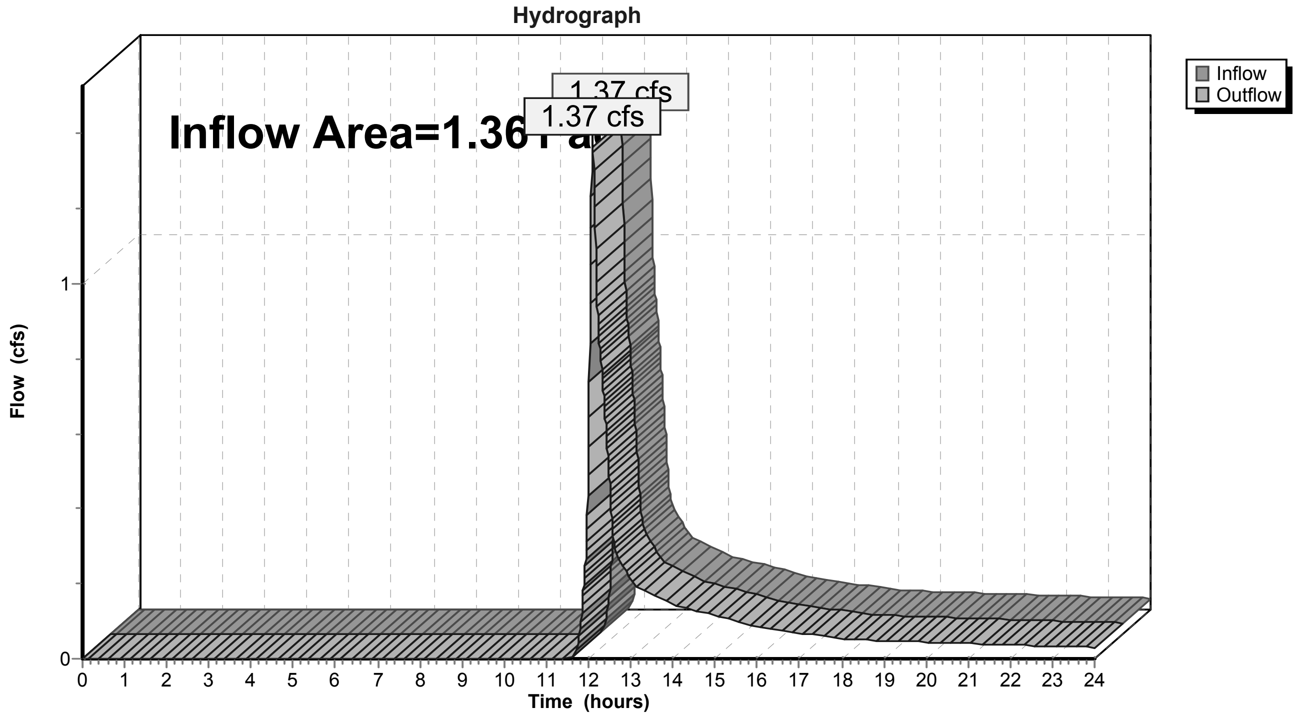


Summary for Reach DP-B: Offsite to Northwest

Inflow Area =	1.361 ac,	0.00% Impervious, Inflow Depth > 1.03"	for 10-YR event	
Inflow =	1.37 cfs @	12.10 hrs, Volume=	0.117 af	
Outflow =	1.37 cfs @	12.10 hrs, Volume=	0.117 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-B: Offsite to Northwest

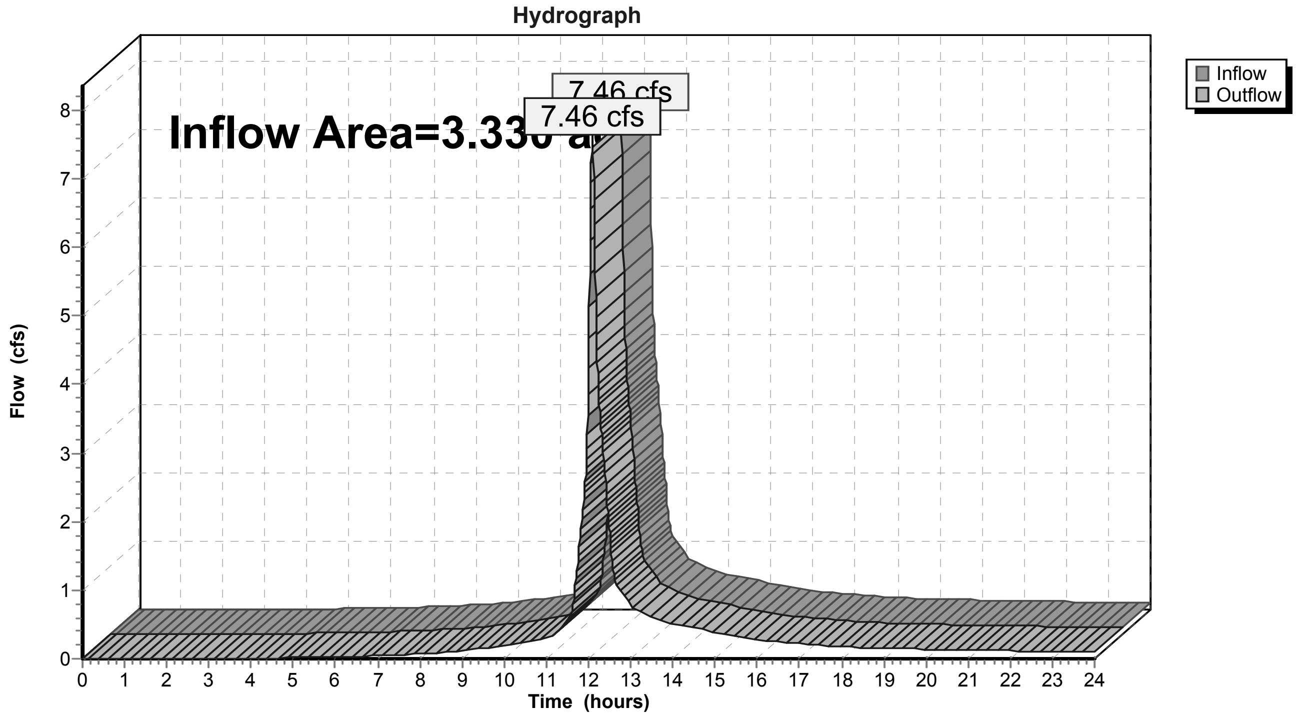


Summary for Reach DP-C: Exist SW Basin

Inflow Area =	3.330 ac, 37.86% Impervious, Inflow Depth > 2.05"	for 10-YR event
Inflow =	7.46 cfs @ 12.09 hrs, Volume=	0.570 af
Outflow =	7.46 cfs @ 12.09 hrs, Volume=	0.570 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-C: Exist SW Basin

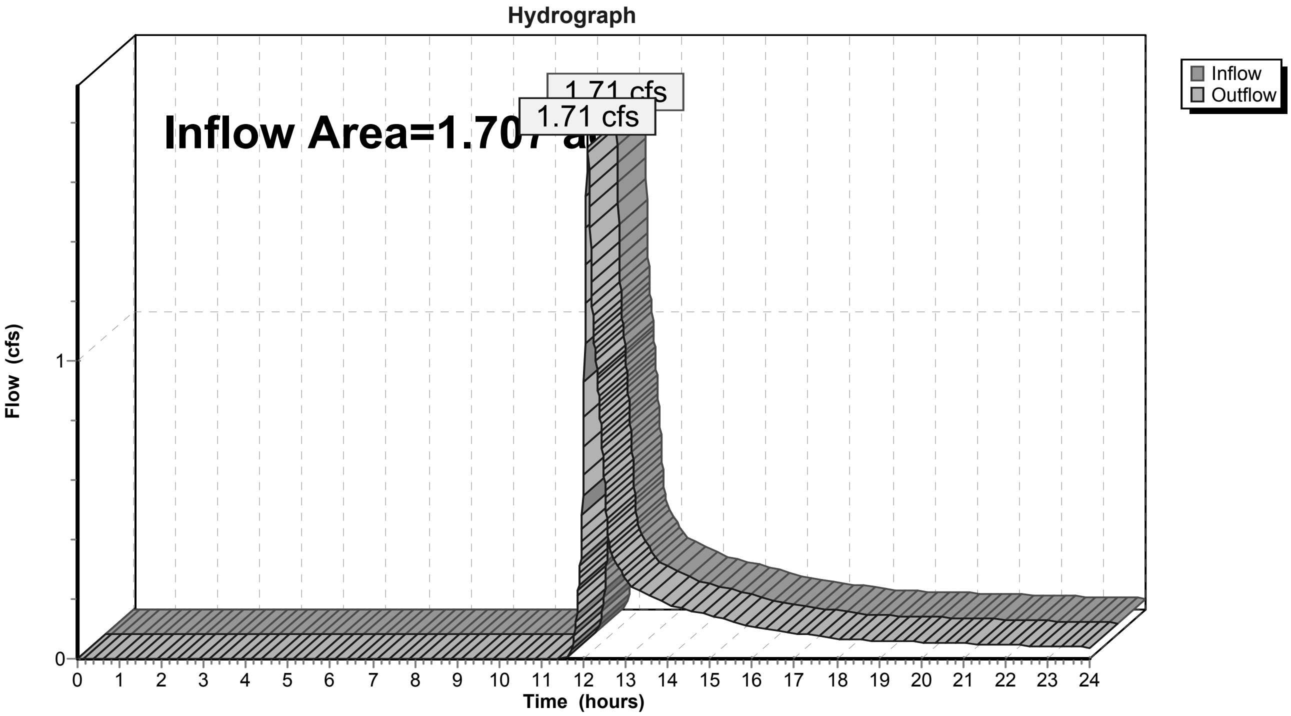


Summary for Reach DP-D: Offsite to Concord Ave

Inflow Area =	1.707 ac,	0.00% Impervious,	Inflow Depth > 1.03"	for 10-YR event
Inflow =	1.71 cfs @	12.10 hrs,	Volume=	0.146 af
Outflow =	1.71 cfs @	12.10 hrs,	Volume=	0.146 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-D: Offsite to Concord Ave

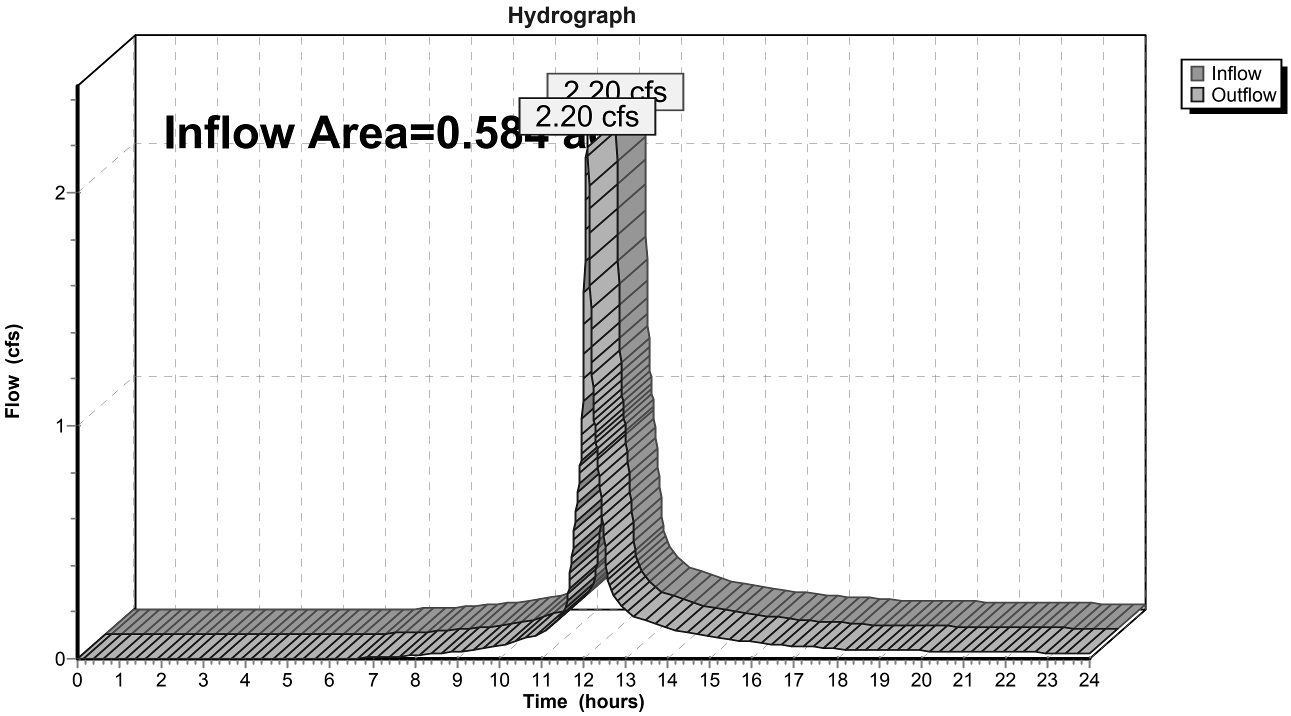


Summary for Reach DP-E: To CB #2

Inflow Area = 0.584 ac, 64.67% Impervious, Inflow Depth > 3.24" for 10-YR event
Inflow = 2.20 cfs @ 12.09 hrs, Volume= 0.157 af
Outflow = 2.20 cfs @ 12.09 hrs, Volume= 0.157 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-E: To CB #2

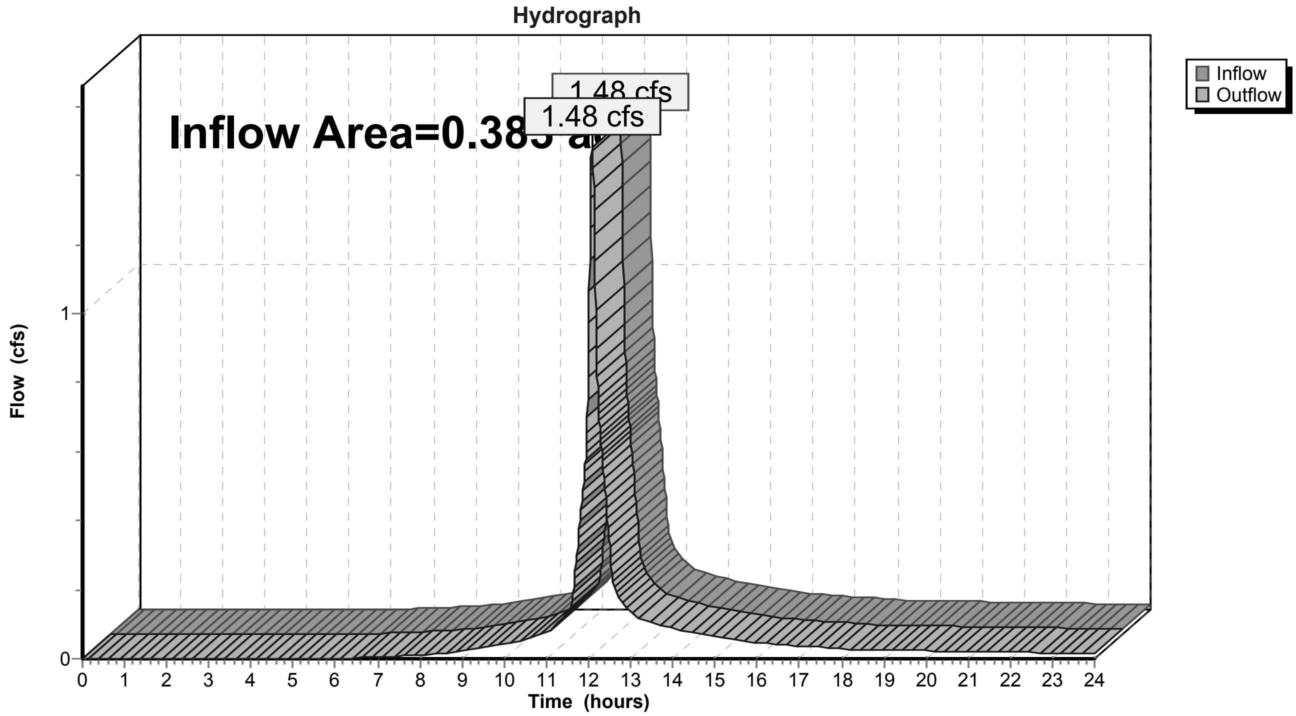


Summary for Reach DP-F: Offsite to Day School Ln

Inflow Area =	0.383 ac, 67.13% Impervious, Inflow Depth > 3.33" for 10-YR event		
Inflow =	1.48 cfs @ 12.09 hrs, Volume=	0.106 af	
Outflow =	1.48 cfs @ 12.09 hrs, Volume=	0.106 af, Atten= 0%, Lag= 0.0 min	

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-F: Offsite to Day School Ln



Summary for Pond XB1: Exist Basin #1

Inflow Area = 0.316 ac, 96.75% Impervious, Inflow Depth > 4.50" for 10-YR event
Inflow = 1.49 cfs @ 12.08 hrs, Volume= 0.119 af
Outflow = 0.09 cfs @ 13.83 hrs, Volume= 0.114 af, Atten= 94%, Lag= 104.8 min
Discarded = 0.09 cfs @ 13.83 hrs, Volume= 0.114 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= 0.01 hrs
Peak Elev= 283.99' @ 13.83 hrs Surf.Area= 3,600 sf Storage= 2,218 cf

Plug-Flow detention time= 213.4 min calculated for 0.114 af (96% of inflow)
Center-of-Mass det. time= 188.4 min (944.2 - 755.8)

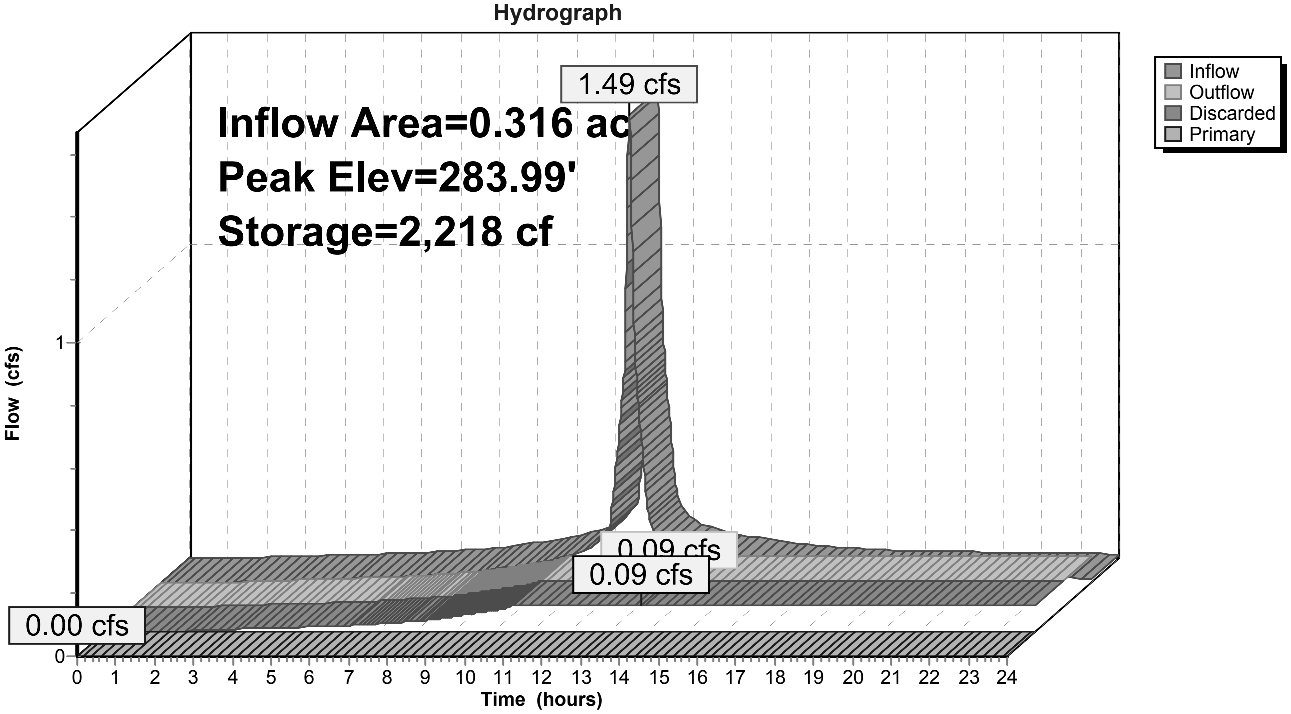
Volume	Invert	Avail.Storage	Storage Description
#1	283.50'	3,335 cf	**30.0"W x 18.0"H x 58.00'L Cultec Contactor 125**x 23 Inside #2
#2	283.00'	1,353 cf	**60.00'W x 60.00'L x 2.00'H Stone**
			7,200 cf Overall - 3,335 cf Embedded = 3,865 cf x 35.0% Voids
		4,688 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	284.50'	**4.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	283.00'	**1.020 in/hr Exfiltration over Surface area**
			Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.09 cfs @ 13.83 hrs HW=283.99' (Free Discharge)
└─**2=Exfiltration** (Controls 0.09 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.00' (Free Discharge)
└─**1=Orifice/Grate** (Controls 0.00 cfs)

Pond XB1: Exist Basin #1



Stage-Discharge for Pond XB1: Exist Basin #1

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
283.00	0.00	0.00	0.00	284.06	0.09	0.09	0.00
283.02	0.09	0.09	0.00	284.08	0.09	0.09	0.00
283.04	0.09	0.09	0.00	284.10	0.09	0.09	0.00
283.06	0.09	0.09	0.00	284.12	0.09	0.09	0.00
283.08	0.09	0.09	0.00	284.14	0.09	0.09	0.00
283.10	0.09	0.09	0.00	284.16	0.09	0.09	0.00
283.12	0.09	0.09	0.00	284.18	0.09	0.09	0.00
283.14	0.09	0.09	0.00	284.20	0.09	0.09	0.00
283.16	0.09	0.09	0.00	284.22	0.09	0.09	0.00
283.18	0.09	0.09	0.00	284.24	0.09	0.09	0.00
283.20	0.09	0.09	0.00	284.26	0.09	0.09	0.00
283.22	0.09	0.09	0.00	284.28	0.09	0.09	0.00
283.24	0.09	0.09	0.00	284.30	0.09	0.09	0.00
283.26	0.09	0.09	0.00	284.32	0.09	0.09	0.00
283.28	0.09	0.09	0.00	284.34	0.09	0.09	0.00
283.30	0.09	0.09	0.00	284.36	0.09	0.09	0.00
283.32	0.09	0.09	0.00	284.38	0.09	0.09	0.00
283.34	0.09	0.09	0.00	284.40	0.09	0.09	0.00
283.36	0.09	0.09	0.00	284.42	0.09	0.09	0.00
283.38	0.09	0.09	0.00	284.44	0.09	0.09	0.00
283.40	0.09	0.09	0.00	284.46	0.09	0.09	0.00
283.42	0.09	0.09	0.00	284.48	0.09	0.09	0.00
283.44	0.09	0.09	0.00	284.50	0.09	0.09	0.00
283.46	0.09	0.09	0.00	284.52	0.09	0.09	0.00
283.48	0.09	0.09	0.00	284.54	0.09	0.09	0.00
283.50	0.09	0.09	0.00	284.56	0.09	0.09	0.01
283.52	0.09	0.09	0.00	284.58	0.10	0.09	0.02
283.54	0.09	0.09	0.00	284.60	0.11	0.09	0.02
283.56	0.09	0.09	0.00	284.62	0.12	0.09	0.03
283.58	0.09	0.09	0.00	284.64	0.13	0.09	0.04
283.60	0.09	0.09	0.00	284.66	0.14	0.09	0.06
283.62	0.09	0.09	0.00	284.68	0.15	0.09	0.07
283.64	0.09	0.09	0.00	284.70	0.17	0.09	0.08
283.66	0.09	0.09	0.00	284.72	0.18	0.09	0.10
283.68	0.09	0.09	0.00	284.74	0.20	0.09	0.11
283.70	0.09	0.09	0.00	284.76	0.21	0.09	0.13
283.72	0.09	0.09	0.00	284.78	0.23	0.09	0.14
283.74	0.09	0.09	0.00	284.80	0.24	0.09	0.15
283.76	0.09	0.09	0.00	284.82	0.25	0.09	0.17
283.78	0.09	0.09	0.00	284.84	0.26	0.09	0.17
283.80	0.09	0.09	0.00	284.86	0.27	0.09	0.18
283.82	0.09	0.09	0.00	284.88	0.28	0.09	0.19
283.84	0.09	0.09	0.00	284.90	0.29	0.09	0.20
283.86	0.09	0.09	0.00	284.92	0.30	0.09	0.21
283.88	0.09	0.09	0.00	284.94	0.31	0.09	0.22
283.90	0.09	0.09	0.00	284.96	0.31	0.09	0.23
283.92	0.09	0.09	0.00	284.98	0.32	0.09	0.24
283.94	0.09	0.09	0.00	285.00	**0.33**	**0.09**	**0.24**
283.96	0.09	0.09	0.00				
283.98	0.09	0.09	0.00				
284.00	0.09	0.09	0.00				
284.02	0.09	0.09	0.00				
284.04	0.09	0.09	0.00				

Stage-Area-Storage for Pond XB1: Exist Basin #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.00	**3,600**	0	284.06	3,600	2,428
283.02	3,600	25	284.08	3,600	2,487
283.04	3,600	50	284.10	3,600	2,546
283.06	3,600	76	284.12	3,600	2,605
283.08	3,600	101	284.14	3,600	2,663
283.10	3,600	126	284.16	3,600	2,721
283.12	3,600	151	284.18	3,600	2,778
283.14	3,600	176	284.20	3,600	2,835
283.16	3,600	202	284.22	3,600	2,892
283.18	3,600	227	284.24	3,600	2,948
283.20	3,600	252	284.26	3,600	3,004
283.22	3,600	277	284.28	3,600	3,060
283.24	3,600	302	284.30	3,600	3,115
283.26	3,600	328	284.32	3,600	3,169
283.28	3,600	353	284.34	3,600	3,223
283.30	3,600	378	284.36	3,600	3,277
283.32	3,600	403	284.38	3,600	3,331
283.34	3,600	428	284.40	3,600	3,383
283.36	3,600	454	284.42	3,600	3,436
283.38	3,600	479	284.44	3,600	3,488
283.40	3,600	504	284.46	3,600	3,539
283.42	3,600	529	284.48	3,600	3,590
283.44	3,600	554	284.50	3,600	3,641
283.46	3,600	580	284.52	3,600	3,691
283.48	3,600	605	284.54	3,600	3,740
283.50	3,600	630	284.56	3,600	3,789
283.52	3,600	698	284.58	3,600	3,837
283.54	3,600	767	284.60	3,600	3,885
283.56	3,600	834	284.62	3,600	3,933
283.58	3,600	902	284.64	3,600	3,979
283.60	3,600	969	284.66	3,600	4,025
283.62	3,600	1,036	284.68	3,600	4,071
283.64	3,600	1,103	284.70	3,600	4,116
283.66	3,600	1,169	284.72	3,600	4,160
283.68	3,600	1,235	284.74	3,600	4,204
283.70	3,600	1,301	284.76	3,600	4,247
283.72	3,600	1,366	284.78	3,600	4,289
283.74	3,600	1,431	284.80	3,600	4,330
283.76	3,600	1,496	284.82	3,600	4,371
283.78	3,600	1,560	284.84	3,600	4,411
283.80	3,600	1,625	284.86	3,600	4,450
283.82	3,600	1,688	284.88	3,600	4,487
283.84	3,600	1,752	284.90	3,600	4,524
283.86	3,600	1,815	284.92	3,600	4,560
283.88	3,600	1,878	284.94	3,600	4,595
283.90	3,600	1,940	284.96	3,600	4,628
283.92	3,600	2,003	284.98	3,600	4,659
283.94	3,600	2,064	285.00	3,600	**4,688**
283.96	3,600	2,126			
283.98	3,600	2,187			
284.00	3,600	2,248			
284.02	3,600	2,308			
284.04	3,600	2,368			

Summary for Pond XB2: Exist Basin #2

Inflow Area = 1.924 ac, 76.76% Impervious, Inflow Depth > 3.63" for 10-YR event
Inflow = 7.98 cfs @ 12.09 hrs, Volume= 0.583 af
Outflow = 7.94 cfs @ 12.09 hrs, Volume= 0.468 af, Atten= 0%, Lag= 0.4 min
Discarded = 0.07 cfs @ 12.09 hrs, Volume= 0.099 af
Primary = 7.87 cfs @ 12.09 hrs, Volume= 0.369 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 286.58' @ 12.09 hrs Surf.Area= 2,883 sf Storage= 5,750 cf

Plug-Flow detention time= 111.4 min calculated for 0.468 af (80% of inflow)
Center-of-Mass det. time= 37.1 min (831.9 - 794.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	279.50'	1,268 cf	**30.50'W x 73.50'L x 3.04'H Field A** 6,819 cf Overall - 3,196 cf Embedded = 3,622 cf x 35.0% Voids
#2A	280.00'	3,196 cf	**Cultec R-330XLHD** x 60 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
#3B	279.50'	370 cf	**16.00'W x 38.50'L x 3.04'H Field B** 1,874 cf Overall - 816 cf Embedded = 1,058 cf x 35.0% Voids
#4B	280.00'	816 cf	**Cultec R-330XLHD** x 15 Inside #3 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 3 rows
#5	279.00'	148 cf	**4.00'D x 11.80'H Vertical Cone/Cylinder**
#6	286.20'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**
		5,874 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	282.00'	**6.0" Vert. Orifice/Grate X 4.00** C= 0.600
#2	Primary	290.70'	**2.3" x 2.3" Horiz. Grate X 36.00** C= 0.600 in 24.0" x 24.0" Grate (33% open area) Limited to weir flow at low heads
#3	Primary	292.10'	**2.3" x 2.3" Horiz. Grate X 36.00** C= 0.600 in 24.0" x 24.0" Grate (33% open area) Limited to weir flow at low heads
#4	Discarded	279.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.07 cfs @ 12.09 hrs HW=286.57' (Free Discharge)
└─**4=Exfiltration** (Controls 0.07 cfs)

Primary OutFlow Max=7.86 cfs @ 12.09 hrs HW=286.57' (Free Discharge)
├─**1=Orifice/Grate** (Orifice Controls 7.86 cfs @ 10.01 fps)
├─**2=Grate** (Controls 0.00 cfs)
└─**3=Grate** (Controls 0.00 cfs)

Pond XB2: Exist Basin #2 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

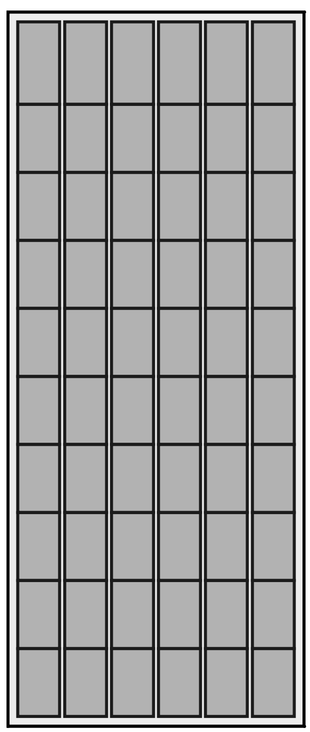
10 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 71.50' Row Length +12.0" End Stone x 2 = 73.50' Base Length
6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width
6.0" Base + 30.5" Chamber Height = 3.04' Field Height

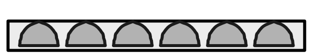
60 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 3,196.5 cf Chamber Storage

6,818.7 cf Field - 3,196.5 cf Chambers = 3,622.2 cf Stone x 35.0% Voids = 1,267.8 cf Stone Storage

Chamber Storage + Stone Storage = 4,464.2 cf = 0.102 af
Overall Storage Efficiency = 65.5%

60 Chambers
252.5 cy Field
134.2 cy Stone





Pond XB2: Exist Basin #2 - Chamber Wizard Field B

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 3 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

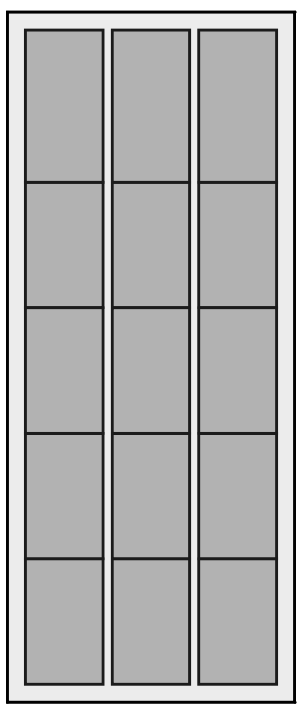
5 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 36.50' Row Length +12.0" End Stone x 2 = 38.50' Base Length
3 Rows x 52.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 16.00' Base Width
6.0" Base + 30.5" Chamber Height = 3.04' Field Height

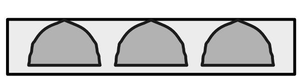
15 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 3 Rows = 815.9 cf Chamber Storage

1,873.7 cf Field - 815.9 cf Chambers = 1,057.8 cf Stone x 35.0% Voids = 370.2 cf Stone Storage

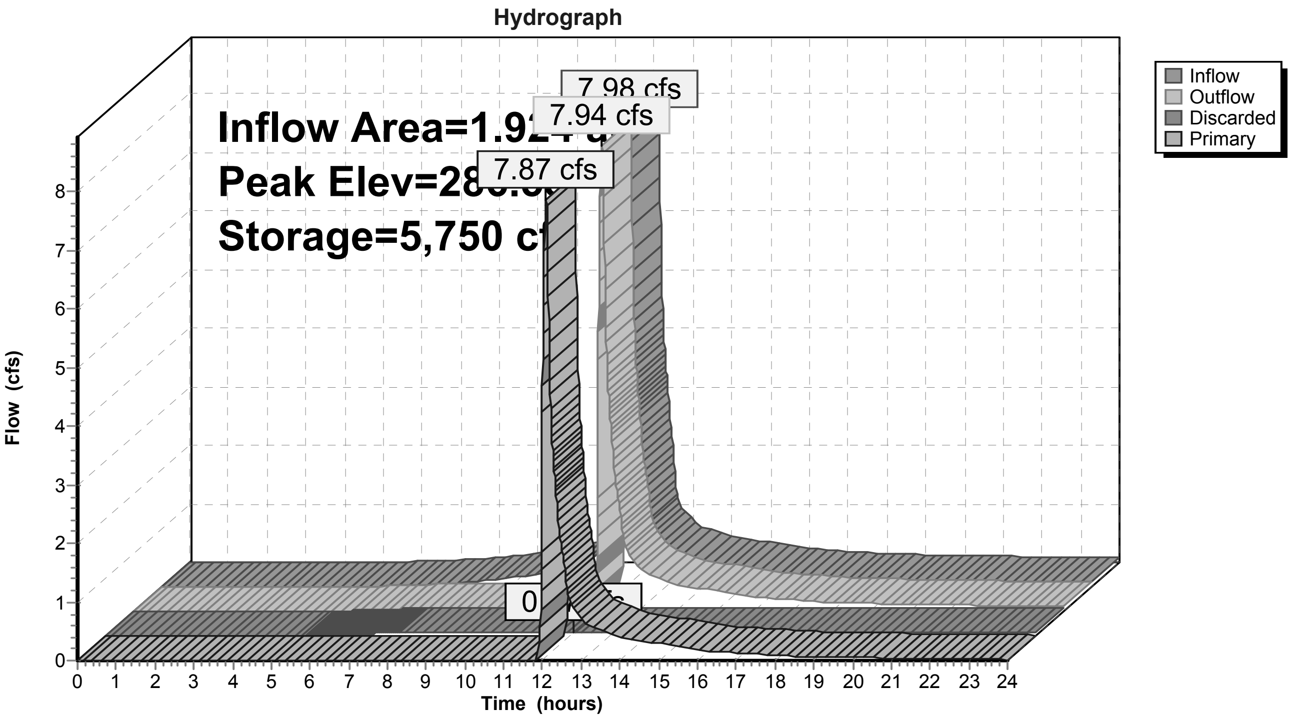
Chamber Storage + Stone Storage = 1,186.1 cf = 0.027 af
Overall Storage Efficiency = 63.3%

15 Chambers
69.4 cy Field
39.2 cy Stone





Pond XB2: Exist Basin #2



Stage-Discharge for Pond XB2: Exist Basin #2

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
279.00	0.00	0.00	0.00
279.15	0.00	0.00	0.00
279.30	0.00	0.00	0.00
279.45	0.00	0.00	0.00
279.60	0.07	0.07	0.00
279.75	0.07	0.07	0.00
279.90	0.07	0.07	0.00
280.05	0.07	0.07	0.00
280.20	0.07	0.07	0.00
280.35	0.07	0.07	0.00
280.50	0.07	0.07	0.00
280.65	0.07	0.07	0.00
280.80	0.07	0.07	0.00
280.95	0.07	0.07	0.00
281.10	0.07	0.07	0.00
281.25	0.07	0.07	0.00
281.40	0.07	0.07	0.00
281.55	0.07	0.07	0.00
281.70	0.07	0.07	0.00
281.85	0.07	0.07	0.00
282.00	0.07	0.07	0.00
282.15	0.33	0.07	0.26
282.30	0.99	0.07	0.92
282.45	1.77	0.07	1.70
282.60	2.31	0.07	2.24
282.75	2.74	0.07	2.67
282.90	3.12	0.07	3.05
283.05	3.45	0.07	3.38
283.20	3.75	0.07	3.69
283.35	4.03	0.07	3.97
283.50	4.30	0.07	4.23
283.65	4.54	0.07	4.47
283.80	4.78	0.07	4.71
283.95	5.00	0.07	4.93
284.10	5.21	0.07	5.14
284.25	5.42	0.07	5.35
284.40	5.61	0.07	5.55
284.55	5.80	0.07	5.74
284.70	5.99	0.07	5.92
284.85	6.17	0.07	6.10
285.00	6.34	0.07	6.27
285.15	6.51	0.07	6.44
285.30	6.67	0.07	6.60
285.45	6.83	0.07	6.76
285.60	6.99	0.07	6.92
285.75	7.14	0.07	7.07
285.90	7.29	0.07	7.22
286.05	7.44	0.07	7.37
286.20	7.59	0.07	7.52
286.35	7.73	0.07	7.66
286.50	7.87	0.07	7.80
286.65	8.00	0.07	7.93
286.80	8.14	0.07	8.07
286.95	8.27	0.07	8.20
287.10	8.40	0.07	8.33
287.25	8.53	0.07	8.46
287.40	8.65	0.07	8.58
287.55	8.78	0.07	8.71
287.70	8.90	0.07	8.83
287.85	9.02	0.07	8.95
288.00	9.14	0.07	9.07
288.15	9.26	0.07	9.19
288.30	9.37	0.07	9.30
288.45	9.49	0.07	9.42
288.60	9.60	0.07	9.53
288.75	9.71	0.07	9.64
288.90	9.82	0.07	9.75
289.05	9.93	0.07	9.86
289.20	10.04	0.07	9.97
289.35	10.15	0.07	10.08
289.50	10.25	0.07	10.18
289.65	10.36	0.07	10.29
289.80	10.46	0.07	10.39
289.95	10.56	0.07	10.49
290.10	10.67	0.07	10.60
290.25	10.77	0.07	10.70
290.40	10.87	0.07	10.80
290.55	10.97	0.07	10.89
290.70	11.06	0.07	10.99
290.85	12.68	0.07	12.61
291.00	14.74	0.07	14.67
291.15	15.62	0.07	15.55
291.30	16.38	0.07	16.31
291.45	17.06	0.07	16.99
291.60	17.68	0.07	17.60
291.75	18.25	0.07	18.18
291.90	18.79	0.07	18.72
292.05	19.31	0.07	19.24
292.20	**20.63**	**0.07**	**20.55**

Stage-Area-Storage for Pond XB2: Exist Basin #2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
279.00	13	0	286.95	2,883	5,760
279.15	13	2	287.10	2,883	5,763
279.30	13	4	287.25	2,883	5,767
279.45	13	6	287.40	2,883	5,771
279.60	2,870	108	287.55	2,883	5,775
279.75	2,870	259	287.70	2,883	5,779
279.90	2,870	411	287.85	2,883	5,782
280.05	2,870	633	288.00	2,883	5,786
280.20	2,870	991	288.15	2,883	5,790
280.35	2,870	1,348	288.30	2,883	5,794
280.50	2,870	1,703	288.45	2,883	5,797
280.65	2,870	2,054	288.60	2,883	5,801
280.80	2,870	2,399	288.75	2,883	5,805
280.95	2,870	2,742	288.90	2,883	5,809
281.10	2,870	3,082	289.05	2,883	5,812
281.25	2,870	3,419	289.20	2,883	5,816
281.40	2,870	3,747	289.35	2,883	5,820
281.55	2,870	4,063	289.50	2,883	5,824
281.70	2,870	4,369	289.65	2,883	5,828
281.85	2,870	4,661	289.80	2,883	5,831
282.00	2,870	4,937	289.95	2,883	5,835
282.15	2,870	5,192	290.10	2,883	5,839
282.30	2,870	5,415	290.25	2,883	5,843
282.45	2,870	5,599	290.40	2,883	5,846
282.60	2,870	5,696	290.55	2,883	5,850
282.75	2,870	5,697	290.70	2,883	5,854
282.90	2,870	5,699	290.85	2,883	5,857
283.05	2,870	5,701	291.00	2,883	5,859
283.20	2,870	5,703	291.15	2,883	5,861
283.35	2,870	5,705	291.30	2,883	5,863
283.50	2,870	5,707	291.45	2,883	5,865
283.65	2,870	5,709	291.60	2,883	5,866
283.80	2,870	5,711	291.75	2,883	5,868
283.95	2,870	5,713	291.90	2,883	5,870
284.10	2,870	5,714	292.05	2,883	5,872
284.25	2,870	5,716	292.20	2,883	**5,874**
284.40	2,870	5,718			
284.55	2,870	5,720			
284.70	2,870	5,722			
284.85	2,870	5,724			
285.00	2,870	5,726			
285.15	2,870	5,728			
285.30	2,870	5,730			
285.45	2,870	5,731			
285.60	2,870	5,733			
285.75	2,870	5,735			
285.90	2,870	5,737			
286.05	2,870	5,739			
286.20	**2,883**	5,741			
286.35	2,883	5,745			
286.50	2,883	5,748			
286.65	2,883	5,752			
286.80	2,883	5,756			

Summary for Subcatchment X1: Offsite to West

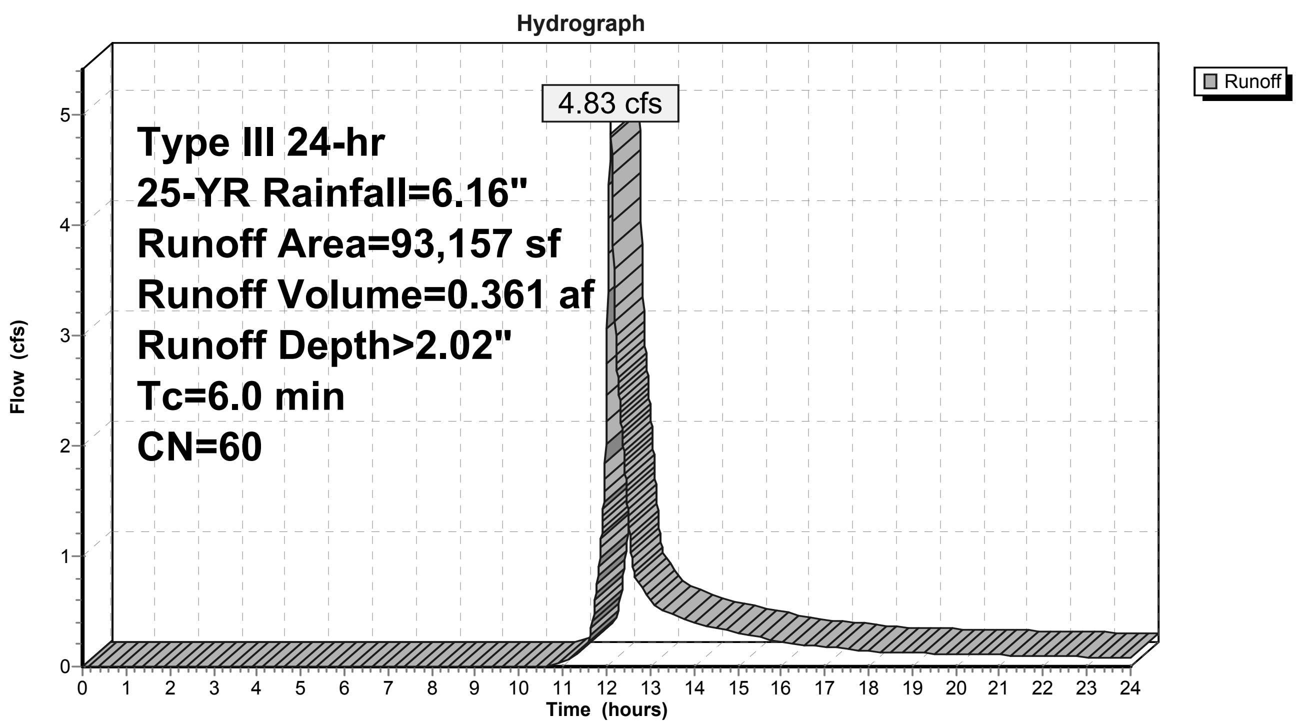
Runoff = 4.83 cfs @ 12.10 hrs, Volume= 0.361 af, Depth> 2.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.16"

	Area (sf)	CN	Description
	37,205	55	Woods, Good, HSG B
*	3,150	98	Roof
*	170	98	Impervious
	52,632	61	>75% Grass cover, Good, HSG B
	93,157	60	Weighted Average
	89,837		96.44% Pervious Area
	3,320		3.56% Impervious Area

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

Subcatchment X1: Offsite to West



Summary for Subcatchment X2: To Basin #2

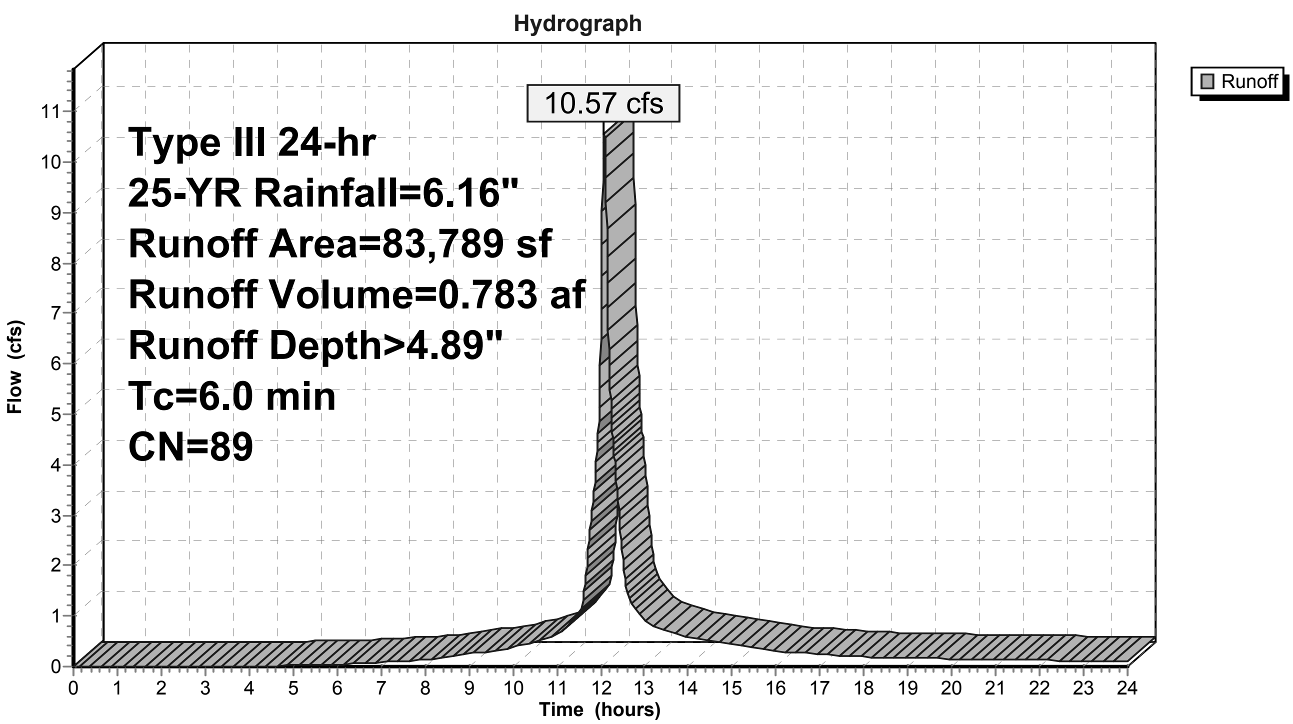
Runoff = 10.57 cfs @ 12.08 hrs, Volume= 0.783 af, Depth> 4.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.16"

	Area (sf)	CN	Description
	1,934	55	Woods, Good, HSG B
*	26,065	98	Roof
*	38,252	98	Impervious
	17,538	61	>75% Grass cover, Good, HSG B
	83,789	89	Weighted Average
	19,472		23.24% Pervious Area
	64,317		76.76% Impervious Area

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

Subcatchment X2: To Basin #2



Summary for Subcatchment X3: Offsite to Northwest

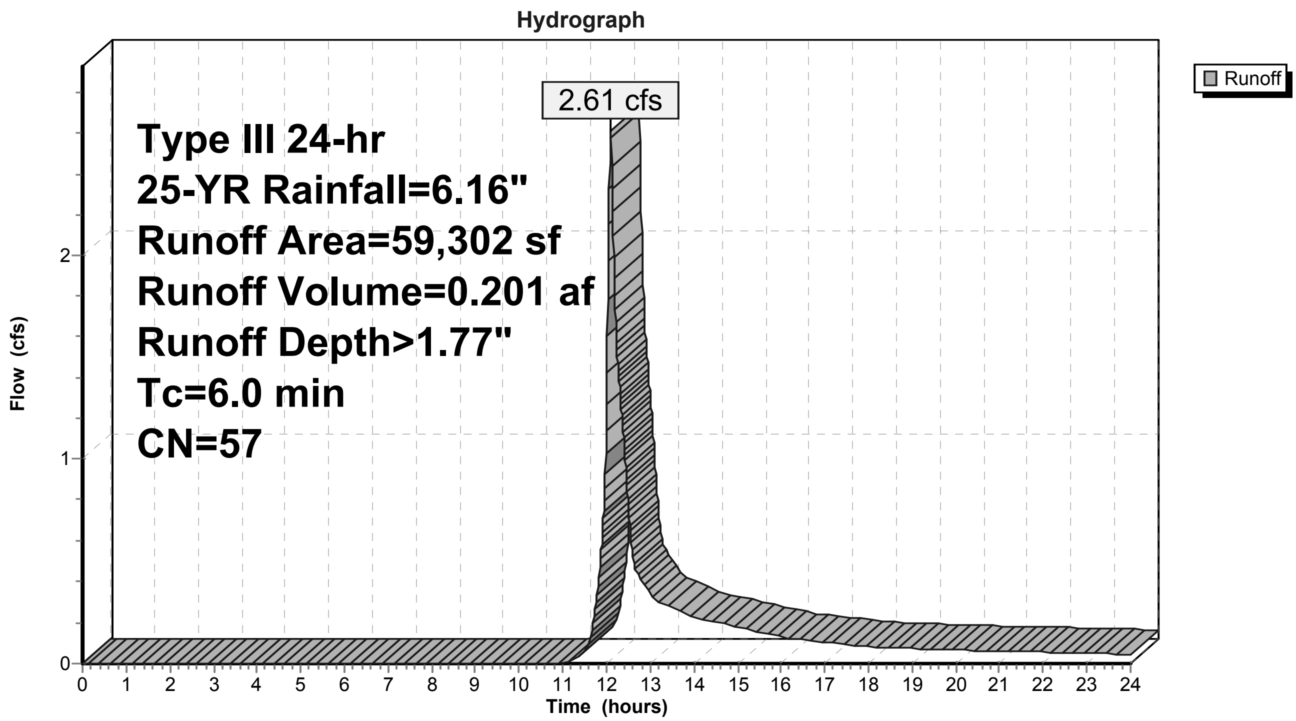
Runoff = 2.61 cfs @ 12.10 hrs, Volume= 0.201 af, Depth> 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.16"

	Area (sf)	CN	Description
	44,265	55	Woods, Good, HSG B
*	0	98	Roof
*	0	98	Impervious
	15,037	61	>75% Grass cover, Good, HSG B
	59,302	57	Weighted Average
	59,302		100.00% Pervious Area

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

Subcatchment X3: Offsite to Northwest



Summary for Subcatchment X4: To Basin #1

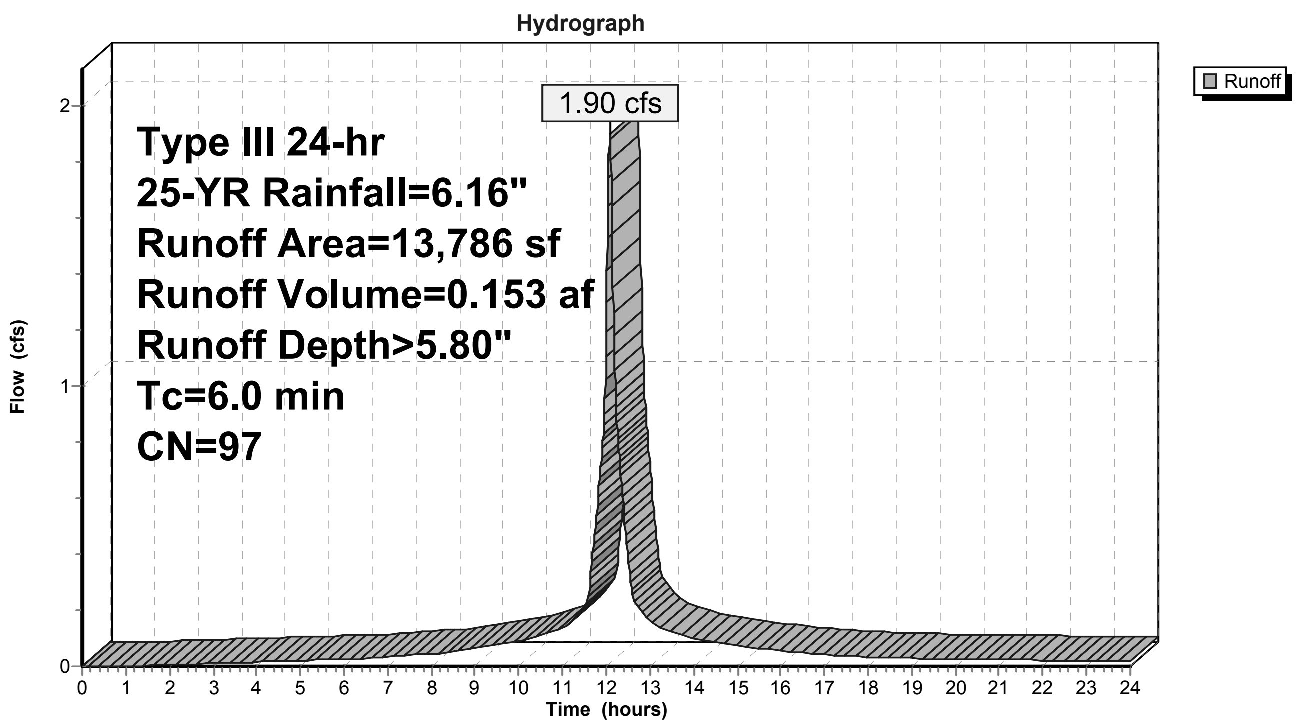
Runoff = 1.90 cfs @ 12.08 hrs, Volume= 0.153 af, Depth> 5.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.16"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	0	98	Roof
*	13,338	98	Impervious
	448	61	>75% Grass cover, Good, HSG B
	13,786	97	Weighted Average
	448		3.25% Pervious Area
	13,338		96.75% Impervious Area

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

Subcatchment X4: To Basin #1



Summary for Subcatchment X5: To Basin #3

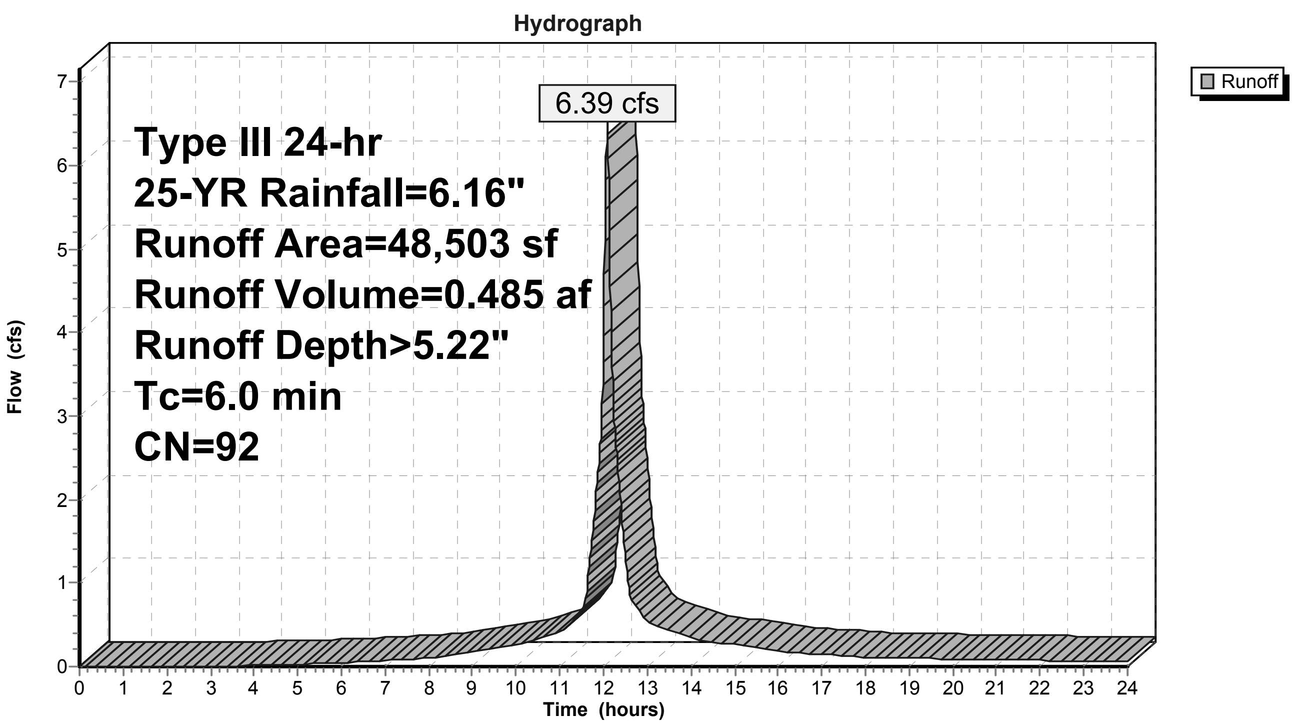
Runoff = 6.39 cfs @ 12.08 hrs, Volume= 0.485 af, Depth> 5.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.16"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	5,950	98	Roof
*	34,380	98	Impervious
	8,173	61	>75% Grass cover, Good, HSG B
	48,503	92	Weighted Average
	8,173		16.85% Pervious Area
	40,330		83.15% Impervious Area

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

Subcatchment X5: To Basin #3



Summary for Subcatchment X6: Offsite to Concord Ave

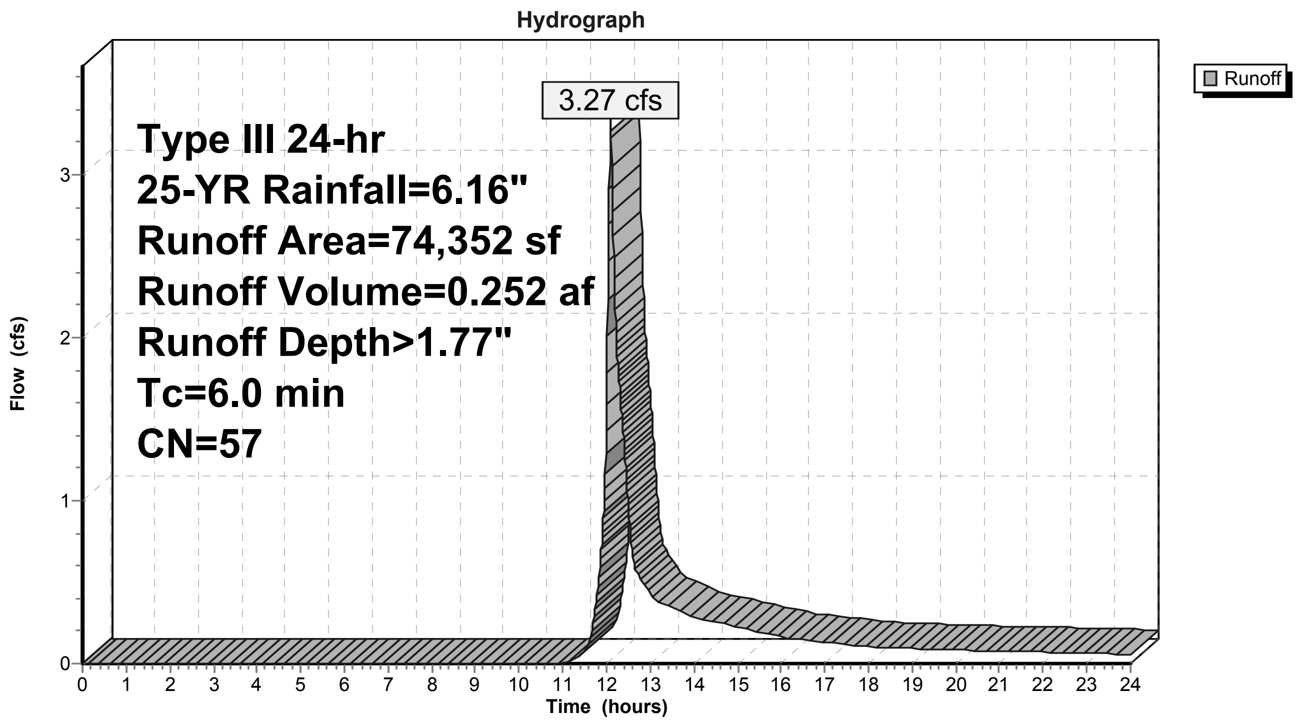
Runoff = 3.27 cfs @ 12.10 hrs, Volume= 0.252 af, Depth> 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.16"

	Area (sf)	CN	Description
	49,297	55	Woods, Good, HSG B
*	0	98	Roof
*	0	98	Impervious
	25,055	61	>75% Grass cover, Good, HSG B
	74,352	57	Weighted Average
	74,352		100.00% Pervious Area

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

Subcatchment X6: Offsite to Concord Ave



Summary for Subcatchment X7: To SW Basin

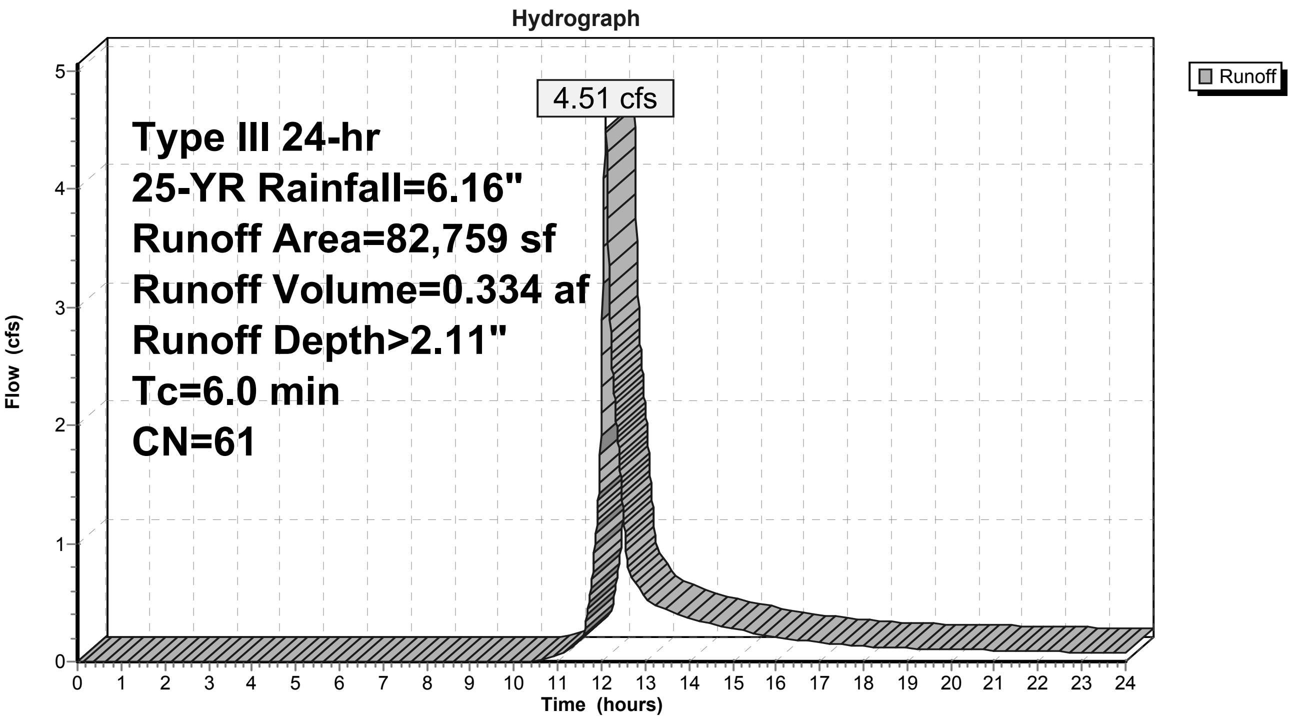
Runoff = 4.51 cfs @ 12.09 hrs, Volume= 0.334 af, Depth> 2.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.16"

	Area (sf)	CN	Description
	8,668	55	Woods, Good, HSG B
*	979	98	Roof
*	265	98	Impervious
	72,847	61	>75% Grass cover, Good, HSG B
	82,759	61	Weighted Average
	81,515		98.50% Pervious Area
	1,244		1.50% Impervious Area

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

Subcatchment X7: To SW Basin



Summary for Subcatchment X8: To CB#2

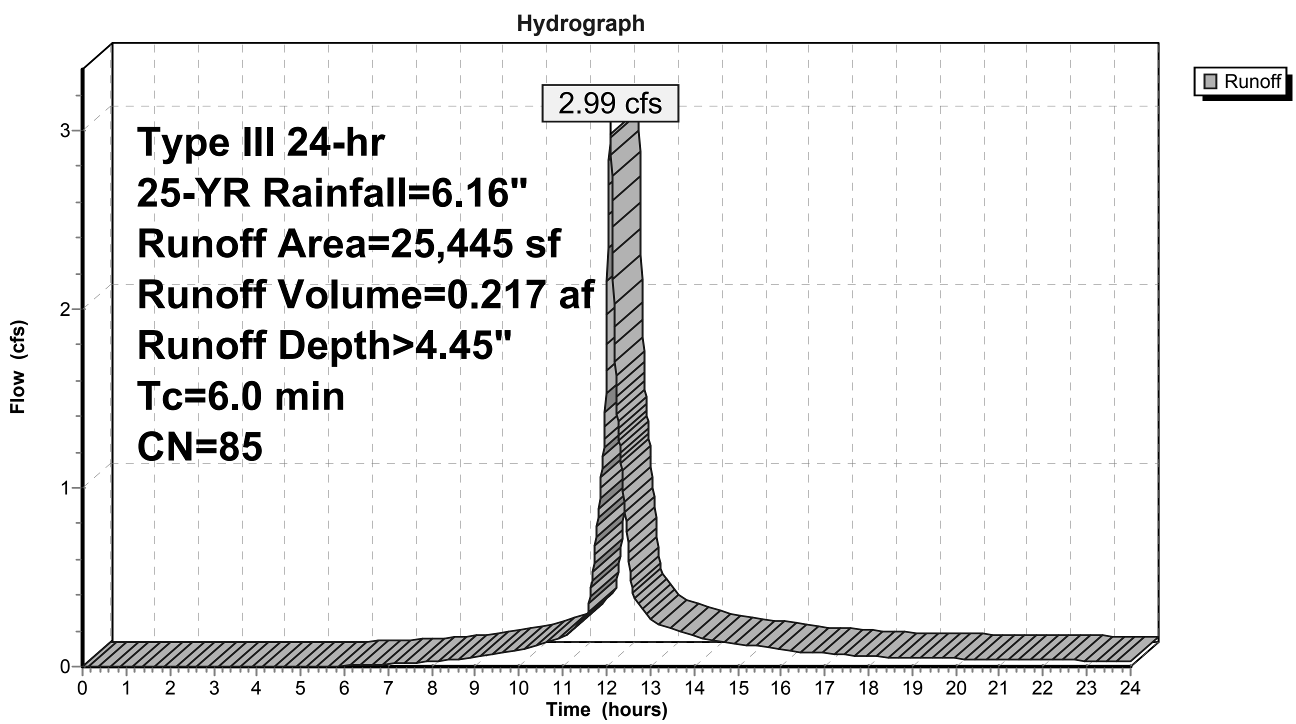
Runoff = 2.99 cfs @ 12.09 hrs, Volume= 0.217 af, Depth> 4.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.16"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	5,898	98	Roof
*	10,557	98	Impervious
	8,990	61	>75% Grass cover, Good, HSG B
	25,445	85	Weighted Average
	8,990		35.33% Pervious Area
	16,455		64.67% Impervious Area

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

Subcatchment X8: To CB#2



Summary for Subcatchment X9: To Day School Lane

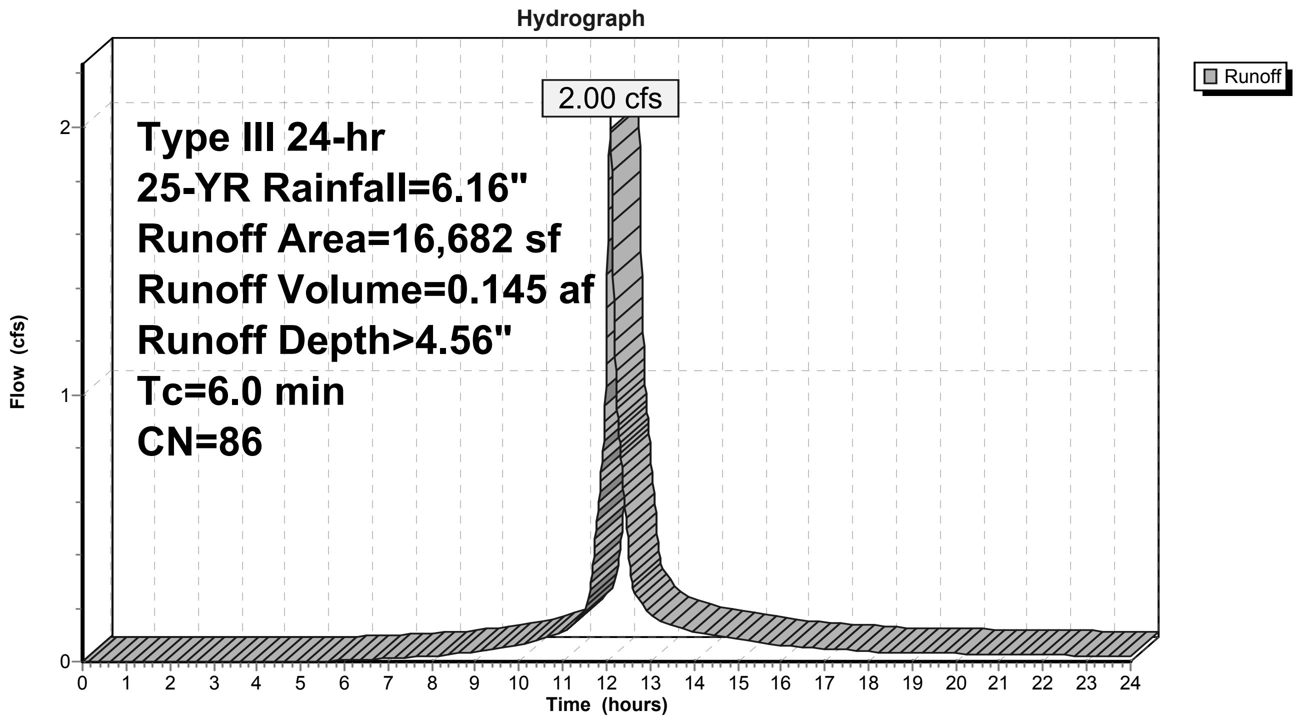
Runoff = 2.00 cfs @ 12.09 hrs, Volume= 0.145 af, Depth> 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.16"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	0	98	Roof
*	11,199	98	Impervious
	5,483	61	>75% Grass cover, Good, HSG B
	16,682	86	Weighted Average
	5,483		32.87% Pervious Area
	11,199		67.13% Impervious Area

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

Subcatchment X9: To Day School Lane

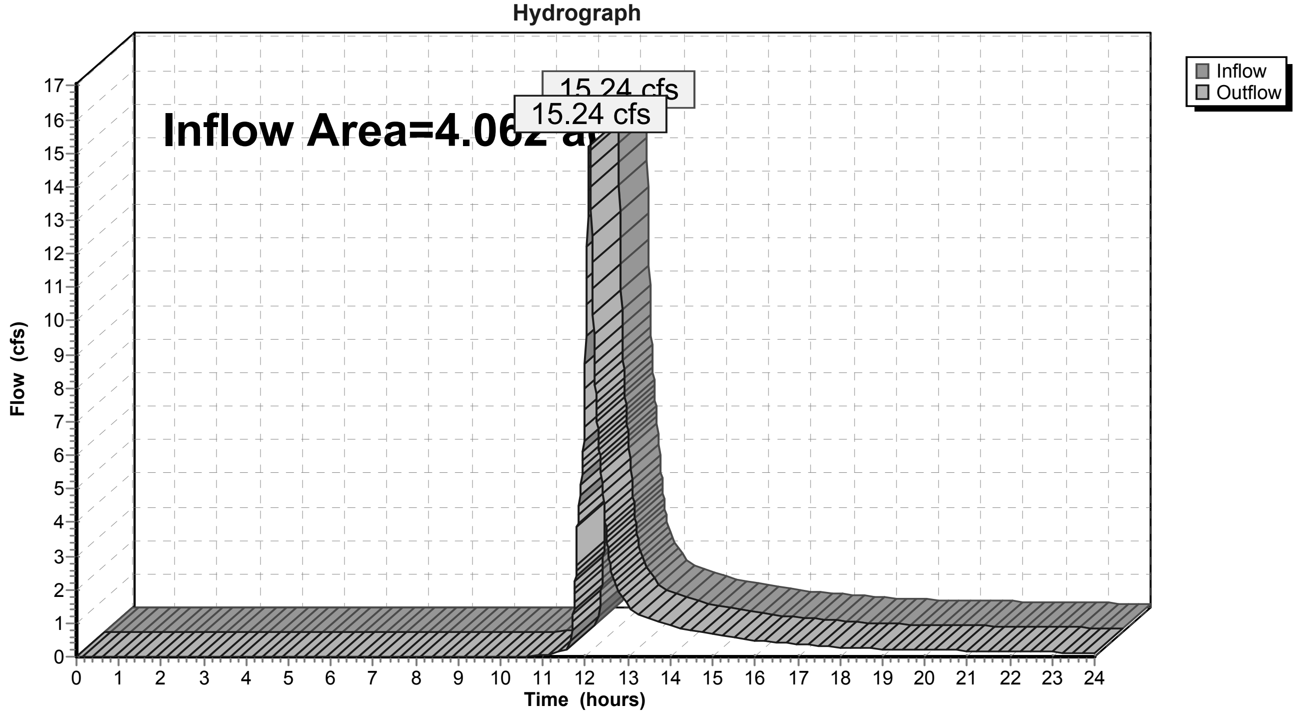


Summary for Reach DP-A: Offsite to Southwest

Inflow Area = 4.062 ac, 38.22% Impervious, Inflow Depth > 2.73" for 25-YR event
Inflow = 15.24 cfs @ 12.09 hrs, Volume= 0.924 af
Outflow = 15.24 cfs @ 12.09 hrs, Volume= 0.924 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-A: Offsite to Southwest

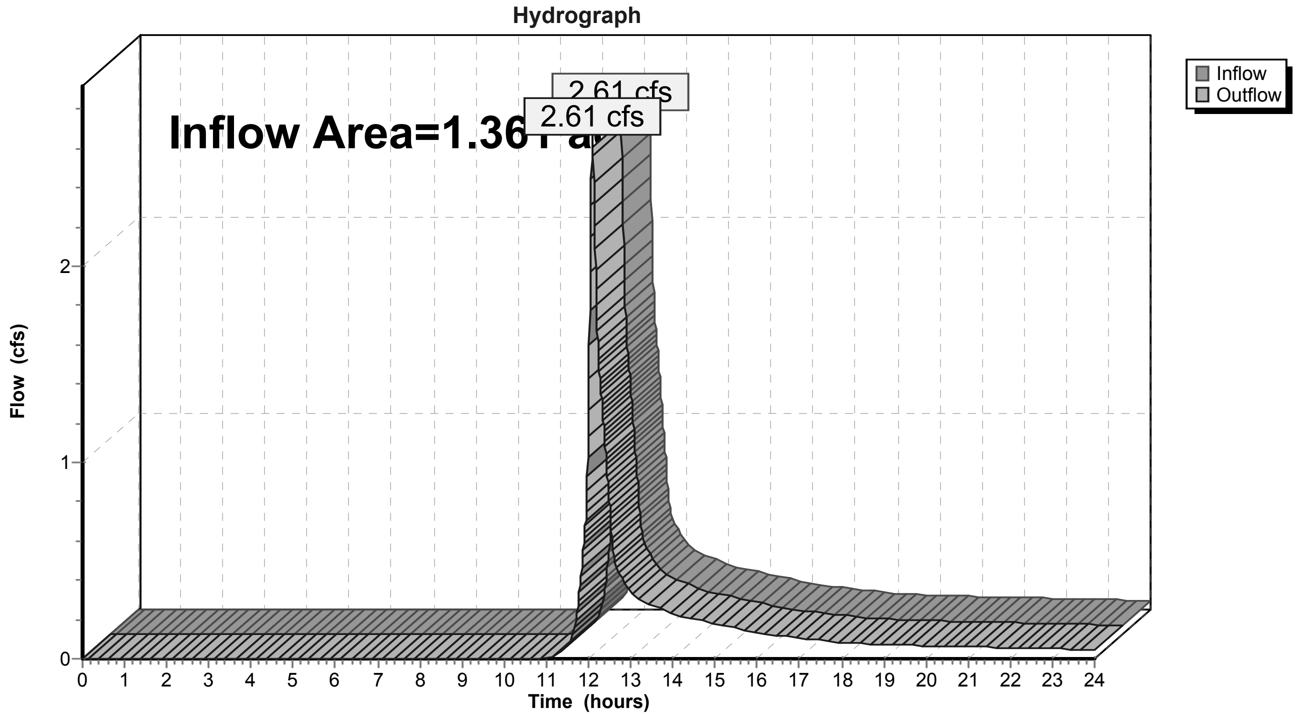


Summary for Reach DP-B: Offsite to Northwest

Inflow Area = 1.361 ac, 0.00% Impervious, Inflow Depth > 1.77" for 25-YR event
Inflow = 2.61 cfs @ 12.10 hrs, Volume= 0.201 af
Outflow = 2.61 cfs @ 12.10 hrs, Volume= 0.201 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-B: Offsite to Northwest

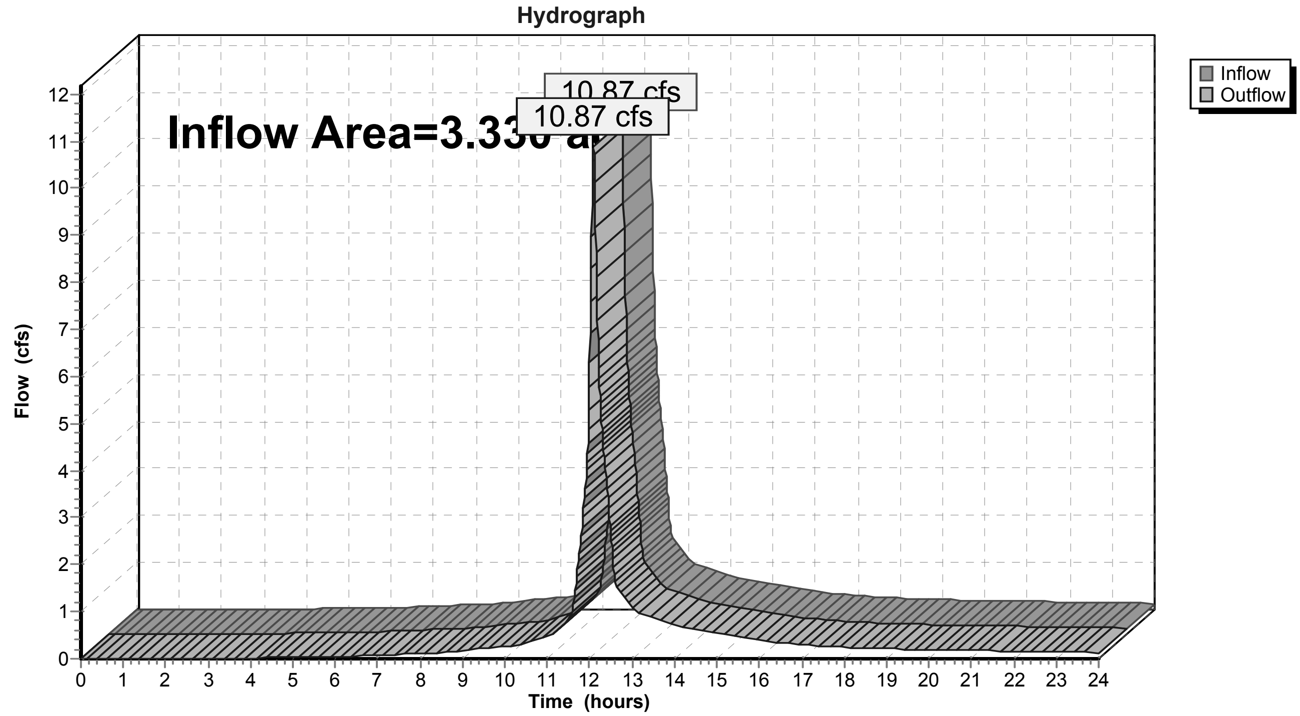


Summary for Reach DP-C: Exist SW Basin

Inflow Area =	3.330 ac, 37.86% Impervious, Inflow Depth > 2.95"	for 25-YR event	
Inflow =	10.87 cfs @ 12.09 hrs, Volume=	0.819 af	
Outflow =	10.87 cfs @ 12.09 hrs, Volume=	0.819 af, Atten= 0%, Lag= 0.0 min	

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-C: Exist SW Basin

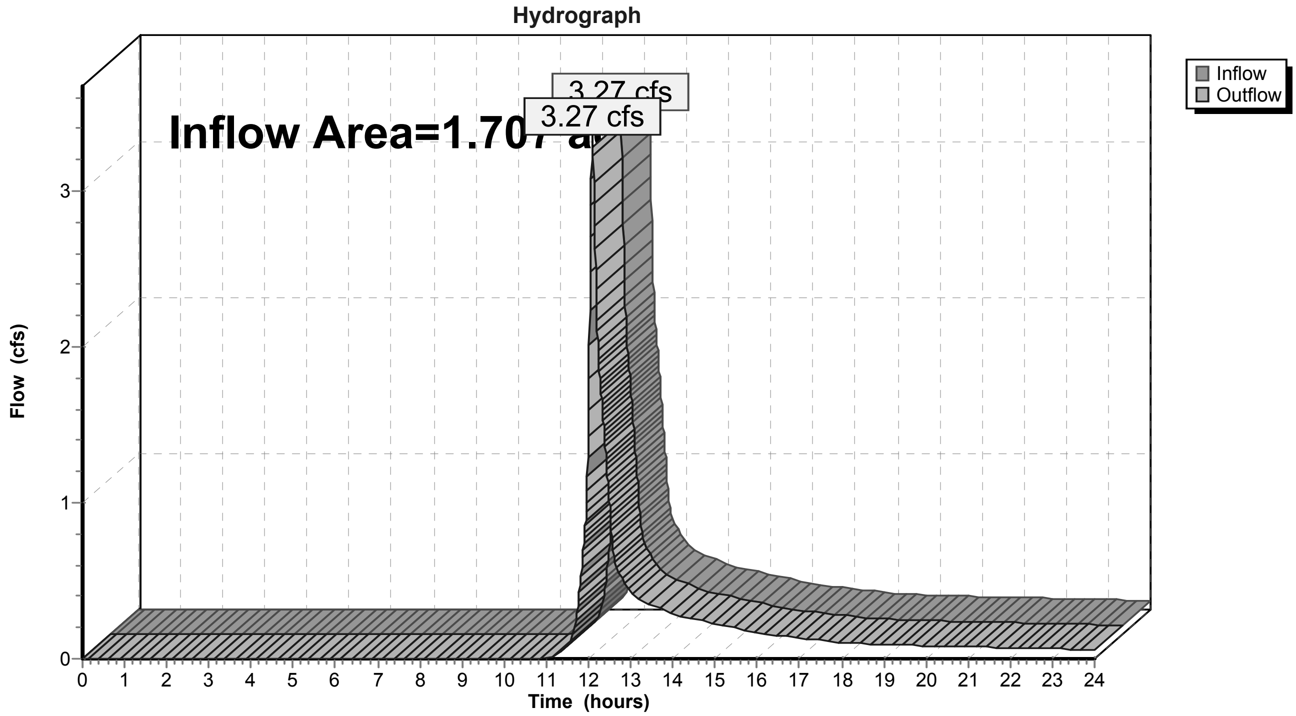


Summary for Reach DP-D: Offsite to Concord Ave

Inflow Area =	1.707 ac,	0.00% Impervious, Inflow Depth > 1.77"	for 25-YR event
Inflow =	3.27 cfs @	12.10 hrs, Volume=	0.252 af
Outflow =	3.27 cfs @	12.10 hrs, Volume=	0.252 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-D: Offsite to Concord Ave

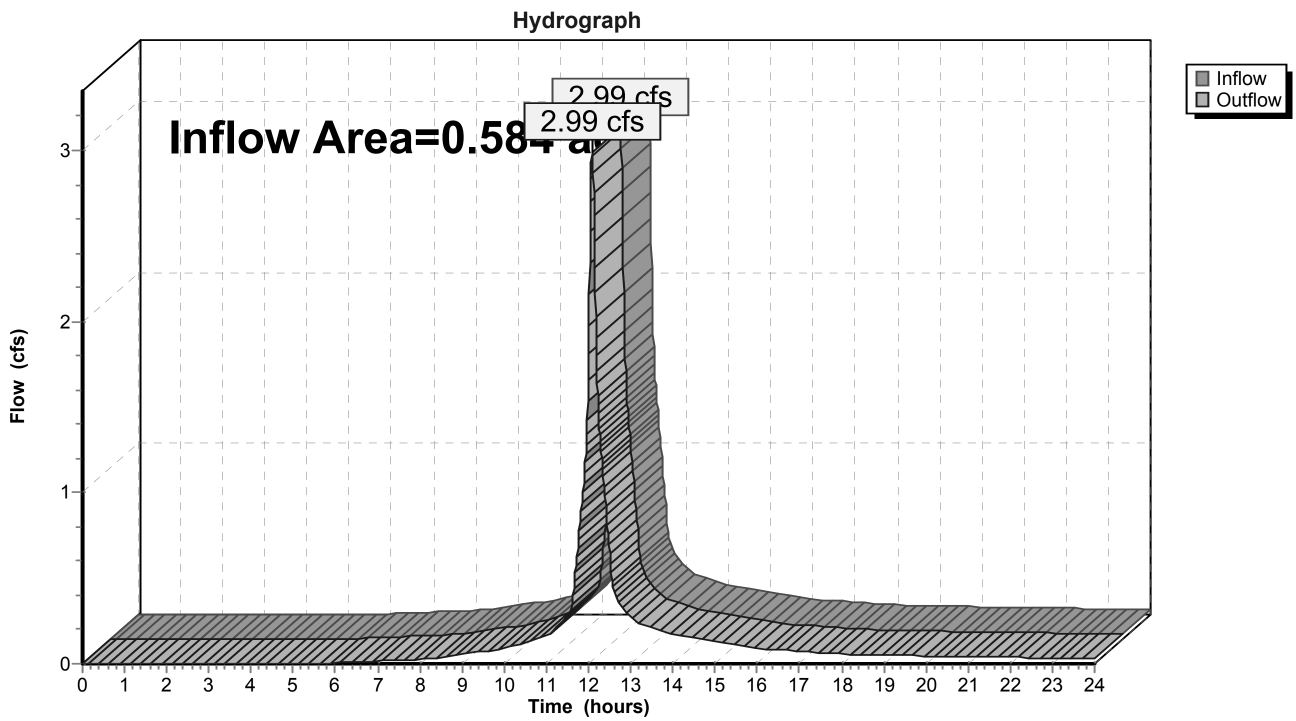


Summary for Reach DP-E: To CB #2

Inflow Area = 0.584 ac, 64.67% Impervious, Inflow Depth > 4.45" for 25-YR event
Inflow = 2.99 cfs @ 12.09 hrs, Volume= 0.217 af
Outflow = 2.99 cfs @ 12.09 hrs, Volume= 0.217 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-E: To CB #2

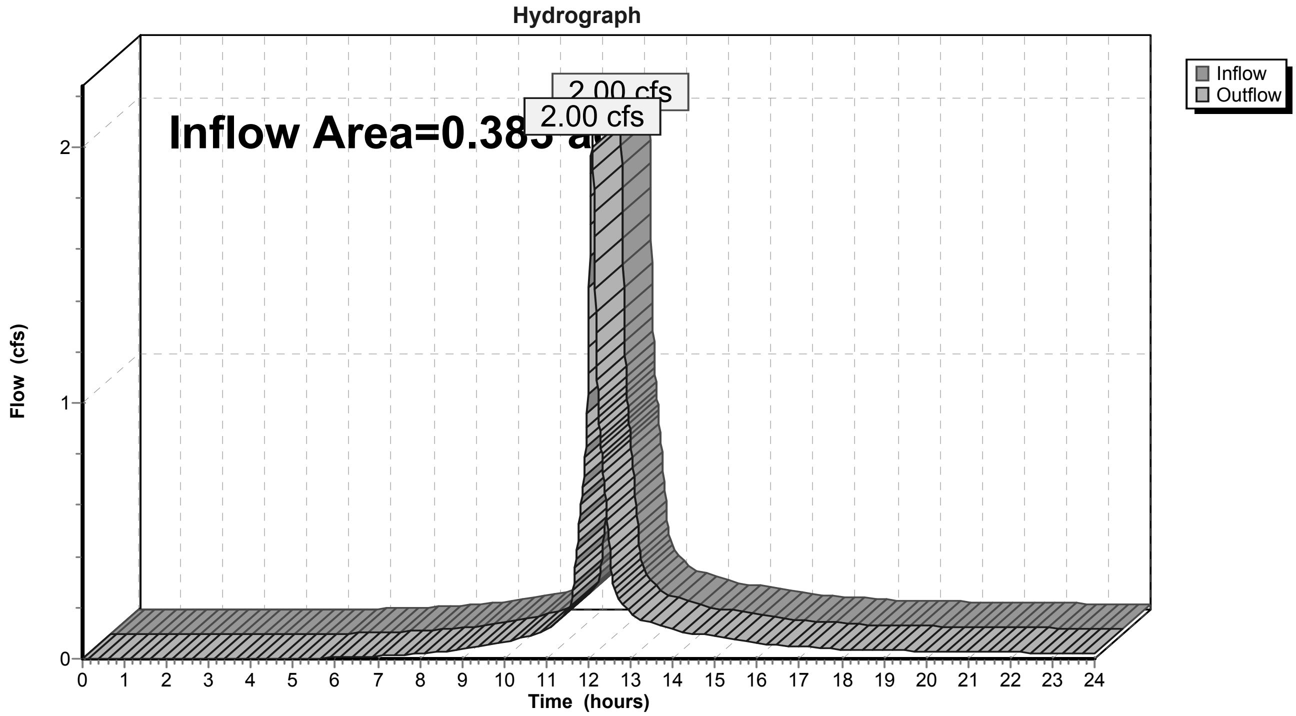


Summary for Reach DP-F: Offsite to Day School Ln

Inflow Area =	0.383 ac, 67.13% Impervious, Inflow Depth > 4.56" for 25-YR event			
Inflow =	2.00 cfs @	12.09 hrs, Volume=	0.145 af	
Outflow =	2.00 cfs @	12.09 hrs, Volume=	0.145 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-F: Offsite to Day School Ln



Summary for Pond XB1: Exist Basin #1

Inflow Area = 0.316 ac, 96.75% Impervious, Inflow Depth > 5.80" for 25-YR event
Inflow = 1.90 cfs @ 12.08 hrs, Volume= 0.153 af
Outflow = 0.09 cfs @ 14.56 hrs, Volume= 0.120 af, Atten= 96%, Lag= 148.8 min
Discarded = 0.09 cfs @ 14.56 hrs, Volume= 0.120 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= 0.01 hrs
Peak Elev= 284.31' @ 14.56 hrs Surf.Area= 3,600 sf Storage= 3,155 cf

Plug-Flow detention time= 246.2 min calculated for 0.120 af (79% of inflow)
Center-of-Mass det. time= 166.8 min (917.9 - 751.1)

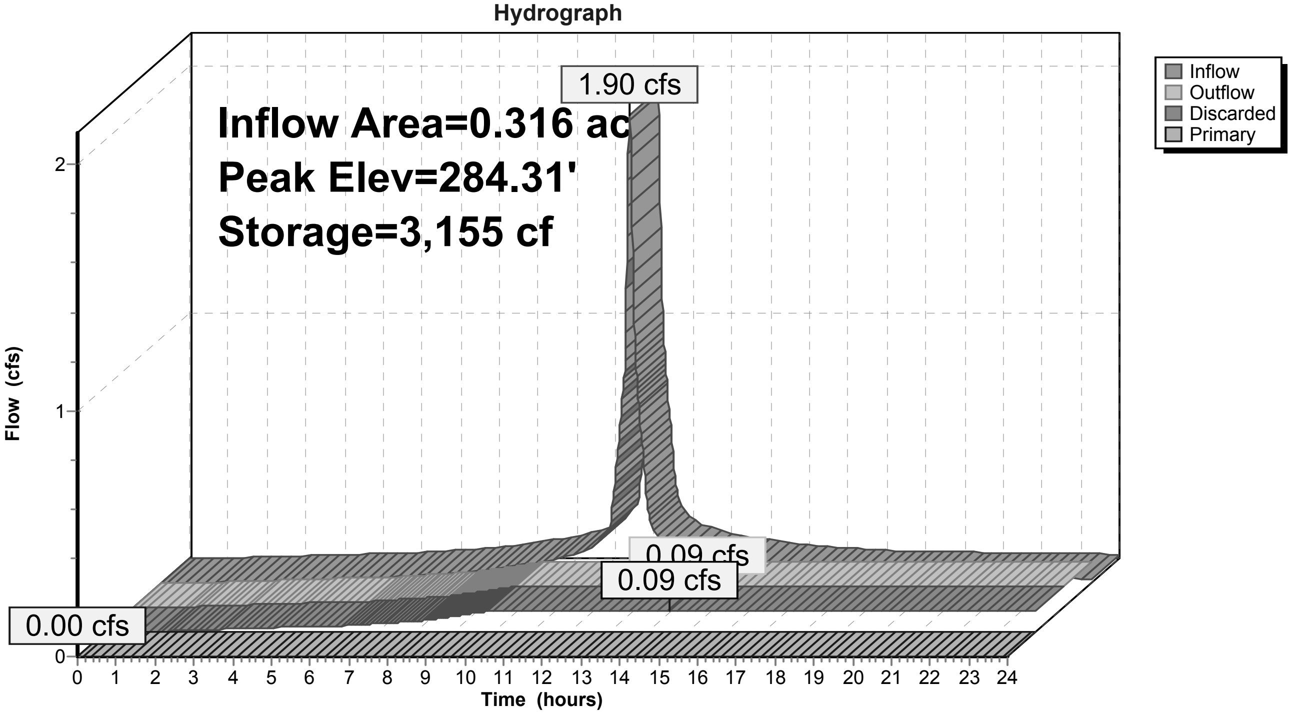
Volume	Invert	Avail.Storage	Storage Description
#1	283.50'	3,335 cf	**30.0"W x 18.0"H x 58.00'L Cultec Contactor 125** x 23 Inside #2
#2	283.00'	1,353 cf	**60.00'W x 60.00'L x 2.00'H Stone** 7,200 cf Overall - 3,335 cf Embedded = 3,865 cf x 35.0% Voids
		4,688 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	284.50'	**4.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	283.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.09 cfs @ 14.56 hrs HW=284.31' (Free Discharge)
└─**2=Exfiltration** (Controls 0.09 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.00' (Free Discharge)
└─**1=Orifice/Grate** (Controls 0.00 cfs)

Pond XB1: Exist Basin #1



Stage-Discharge for Pond XB1: Exist Basin #1

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
283.00	0.00	0.00	0.00
283.02	0.09	0.09	0.00
283.04	0.09	0.09	0.00
283.06	0.09	0.09	0.00
283.08	0.09	0.09	0.00
283.10	0.09	0.09	0.00
283.12	0.09	0.09	0.00
283.14	0.09	0.09	0.00
283.16	0.09	0.09	0.00
283.18	0.09	0.09	0.00
283.20	0.09	0.09	0.00
283.22	0.09	0.09	0.00
283.24	0.09	0.09	0.00
283.26	0.09	0.09	0.00
283.28	0.09	0.09	0.00
283.30	0.09	0.09	0.00
283.32	0.09	0.09	0.00
283.34	0.09	0.09	0.00
283.36	0.09	0.09	0.00
283.38	0.09	0.09	0.00
283.40	0.09	0.09	0.00
283.42	0.09	0.09	0.00
283.44	0.09	0.09	0.00
283.46	0.09	0.09	0.00
283.48	0.09	0.09	0.00
283.50	0.09	0.09	0.00
283.52	0.09	0.09	0.00
283.54	0.09	0.09	0.00
283.56	0.09	0.09	0.00
283.58	0.09	0.09	0.00
283.60	0.09	0.09	0.00
283.62	0.09	0.09	0.00
283.64	0.09	0.09	0.00
283.66	0.09	0.09	0.00
283.68	0.09	0.09	0.00
283.70	0.09	0.09	0.00
283.72	0.09	0.09	0.00
283.74	0.09	0.09	0.00
283.76	0.09	0.09	0.00
283.78	0.09	0.09	0.00
283.80	0.09	0.09	0.00
283.82	0.09	0.09	0.00
283.84	0.09	0.09	0.00
283.86	0.09	0.09	0.00
283.88	0.09	0.09	0.00
283.90	0.09	0.09	0.00
283.92	0.09	0.09	0.00
283.94	0.09	0.09	0.00
283.96	0.09	0.09	0.00
283.98	0.09	0.09	0.00
284.00	0.09	0.09	0.00
284.02	0.09	0.09	0.00
284.04	0.09	0.09	0.00
284.06	0.09	0.09	0.00
284.08	0.09	0.09	0.00
284.10	0.09	0.09	0.00
284.12	0.09	0.09	0.00
284.14	0.09	0.09	0.00
284.16	0.09	0.09	0.00
284.18	0.09	0.09	0.00
284.20	0.09	0.09	0.00
284.22	0.09	0.09	0.00
284.24	0.09	0.09	0.00
284.26	0.09	0.09	0.00
284.28	0.09	0.09	0.00
284.30	0.09	0.09	0.00
284.32	0.09	0.09	0.00
284.34	0.09	0.09	0.00
284.36	0.09	0.09	0.00
284.38	0.09	0.09	0.00
284.40	0.09	0.09	0.00
284.42	0.09	0.09	0.00
284.44	0.09	0.09	0.00
284.46	0.09	0.09	0.00
284.48	0.09	0.09	0.00
284.50	0.09	0.09	0.00
284.52	0.09	0.09	0.00
284.54	0.09	0.09	0.00
284.56	0.09	0.09	0.01
284.58	0.10	0.09	0.02
284.60	0.11	0.09	0.02
284.62	0.12	0.09	0.03
284.64	0.13	0.09	0.04
284.66	0.14	0.09	0.06
284.68	0.15	0.09	0.07
284.70	0.17	0.09	0.08
284.72	0.18	0.09	0.10
284.74	0.20	0.09	0.11
284.76	0.21	0.09	0.13
284.78	0.23	0.09	0.14
284.80	0.24	0.09	0.15
284.82	0.25	0.09	0.17
284.84	0.26	0.09	0.17
284.86	0.27	0.09	0.18
284.88	0.28	0.09	0.19
284.90	0.29	0.09	0.20
284.92	0.30	0.09	0.21
284.94	0.31	0.09	0.22
284.96	0.31	0.09	0.23
284.98	0.32	0.09	0.24
285.00	**0.33**	**0.09**	**0.24**

Stage-Area-Storage for Pond XB1: Exist Basin #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.00	**3,600**	0	284.06	3,600	2,428
283.02	3,600	25	284.08	3,600	2,487
283.04	3,600	50	284.10	3,600	2,546
283.06	3,600	76	284.12	3,600	2,605
283.08	3,600	101	284.14	3,600	2,663
283.10	3,600	126	284.16	3,600	2,721
283.12	3,600	151	284.18	3,600	2,778
283.14	3,600	176	284.20	3,600	2,835
283.16	3,600	202	284.22	3,600	2,892
283.18	3,600	227	284.24	3,600	2,948
283.20	3,600	252	284.26	3,600	3,004
283.22	3,600	277	284.28	3,600	3,060
283.24	3,600	302	284.30	3,600	3,115
283.26	3,600	328	284.32	3,600	3,169
283.28	3,600	353	284.34	3,600	3,223
283.30	3,600	378	284.36	3,600	3,277
283.32	3,600	403	284.38	3,600	3,331
283.34	3,600	428	284.40	3,600	3,383
283.36	3,600	454	284.42	3,600	3,436
283.38	3,600	479	284.44	3,600	3,488
283.40	3,600	504	284.46	3,600	3,539
283.42	3,600	529	284.48	3,600	3,590
283.44	3,600	554	284.50	3,600	3,641
283.46	3,600	580	284.52	3,600	3,691
283.48	3,600	605	284.54	3,600	3,740
283.50	3,600	630	284.56	3,600	3,789
283.52	3,600	698	284.58	3,600	3,837
283.54	3,600	767	284.60	3,600	3,885
283.56	3,600	834	284.62	3,600	3,933
283.58	3,600	902	284.64	3,600	3,979
283.60	3,600	969	284.66	3,600	4,025
283.62	3,600	1,036	284.68	3,600	4,071
283.64	3,600	1,103	284.70	3,600	4,116
283.66	3,600	1,169	284.72	3,600	4,160
283.68	3,600	1,235	284.74	3,600	4,204
283.70	3,600	1,301	284.76	3,600	4,247
283.72	3,600	1,366	284.78	3,600	4,289
283.74	3,600	1,431	284.80	3,600	4,330
283.76	3,600	1,496	284.82	3,600	4,371
283.78	3,600	1,560	284.84	3,600	4,411
283.80	3,600	1,625	284.86	3,600	4,450
283.82	3,600	1,688	284.88	3,600	4,487
283.84	3,600	1,752	284.90	3,600	4,524
283.86	3,600	1,815	284.92	3,600	4,560
283.88	3,600	1,878	284.94	3,600	4,595
283.90	3,600	1,940	284.96	3,600	4,628
283.92	3,600	2,003	284.98	3,600	4,659
283.94	3,600	2,064	285.00	3,600	**4,688**
283.96	3,600	2,126			
283.98	3,600	2,187			
284.00	3,600	2,248			
284.02	3,600	2,308			
284.04	3,600	2,368			

Summary for Pond XB2: Exist Basin #2

Inflow Area = 1.924 ac, 76.76% Impervious, Inflow Depth > 4.89" for 25-YR event
Inflow = 10.57 cfs @ 12.08 hrs, Volume= 0.783 af
Outflow = 10.48 cfs @ 12.09 hrs, Volume= 0.668 af, Atten= 1%, Lag= 0.6 min
Discarded = 0.07 cfs @ 12.09 hrs, Volume= 0.105 af
Primary = 10.41 cfs @ 12.09 hrs, Volume= 0.563 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 289.83' @ 12.09 hrs Surf.Area= 2,883 sf Storage= 5,832 cf

Plug-Flow detention time= 94.5 min calculated for 0.668 af (85% of inflow)
Center-of-Mass det. time= 32.1 min (818.8 - 786.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	279.50'	1,268 cf	**30.50'W x 73.50'L x 3.04'H Field A** 6,819 cf Overall - 3,196 cf Embedded = 3,622 cf x 35.0% Voids
#2A	280.00'	3,196 cf	**Cultec R-330XLHD** x 60 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
#3B	279.50'	370 cf	**16.00'W x 38.50'L x 3.04'H Field B** 1,874 cf Overall - 816 cf Embedded = 1,058 cf x 35.0% Voids
#4B	280.00'	816 cf	**Cultec R-330XLHD** x 15 Inside #3 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 3 rows
#5	279.00'	148 cf	**4.00'D x 11.80'H Vertical Cone/Cylinder**
#6	286.20'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**
		5,874 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	282.00'	**6.0" Vert. Orifice/Grate X 4.00** C= 0.600
#2	Primary	290.70'	**2.3" x 2.3" Horiz. Grate X 36.00** C= 0.600 in 24.0" x 24.0" Grate (33% open area) Limited to weir flow at low heads
#3	Primary	292.10'	**2.3" x 2.3" Horiz. Grate X 36.00** C= 0.600 in 24.0" x 24.0" Grate (33% open area) Limited to weir flow at low heads
#4	Discarded	279.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.07 cfs @ 12.09 hrs HW=289.80' (Free Discharge)
└─**4=Exfiltration** (Controls 0.07 cfs)

Primary OutFlow Max=10.39 cfs @ 12.09 hrs HW=289.80' (Free Discharge)
├─**1=Orifice/Grate** (Orifice Controls 10.39 cfs @ 13.23 fps)
├─**2=Grate** (Controls 0.00 cfs)
└─**3=Grate** (Controls 0.00 cfs)

Pond XB2: Exist Basin #2 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

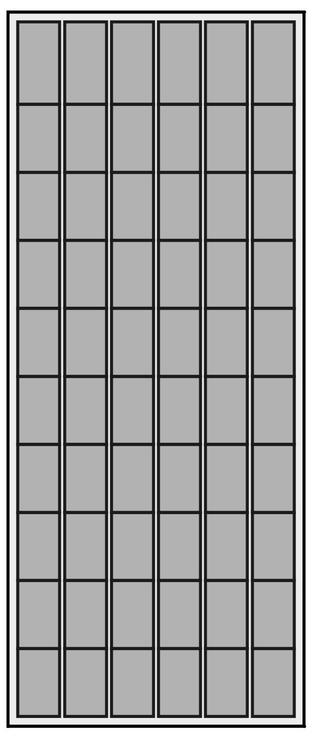
10 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 71.50' Row Length +12.0" End Stone x 2 = 73.50' Base Length
6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width
6.0" Base + 30.5" Chamber Height = 3.04' Field Height

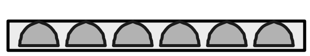
60 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 3,196.5 cf Chamber Storage

6,818.7 cf Field - 3,196.5 cf Chambers = 3,622.2 cf Stone x 35.0% Voids = 1,267.8 cf Stone Storage

Chamber Storage + Stone Storage = 4,464.2 cf = 0.102 af
Overall Storage Efficiency = 65.5%

60 Chambers
252.5 cy Field
134.2 cy Stone





Pond XB2: Exist Basin #2 - Chamber Wizard Field B

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 3 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

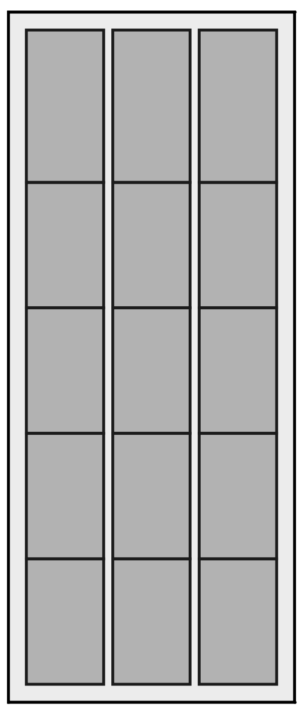
5 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 36.50' Row Length +12.0" End Stone x 2 = 38.50' Base Length
3 Rows x 52.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 16.00' Base Width
6.0" Base + 30.5" Chamber Height = 3.04' Field Height

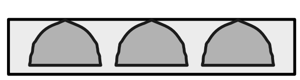
15 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 3 Rows = 815.9 cf Chamber Storage

1,873.7 cf Field - 815.9 cf Chambers = 1,057.8 cf Stone x 35.0% Voids = 370.2 cf Stone Storage

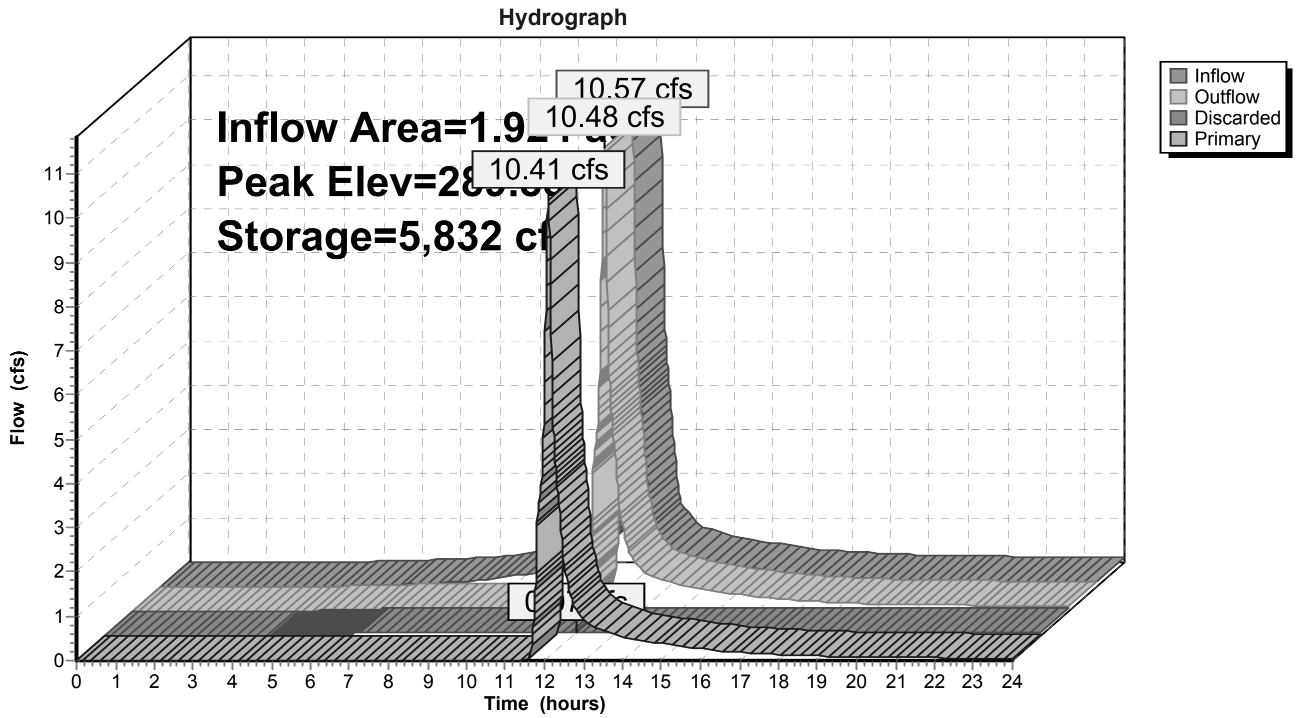
Chamber Storage + Stone Storage = 1,186.1 cf = 0.027 af
Overall Storage Efficiency = 63.3%

15 Chambers
69.4 cy Field
39.2 cy Stone





Pond XB2: Exist Basin #2



Stage-Discharge for Pond XB2: Exist Basin #2

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
279.00	0.00	0.00	0.00
279.15	0.00	0.00	0.00
279.30	0.00	0.00	0.00
279.45	0.00	0.00	0.00
279.60	0.07	0.07	0.00
279.75	0.07	0.07	0.00
279.90	0.07	0.07	0.00
280.05	0.07	0.07	0.00
280.20	0.07	0.07	0.00
280.35	0.07	0.07	0.00
280.50	0.07	0.07	0.00
280.65	0.07	0.07	0.00
280.80	0.07	0.07	0.00
280.95	0.07	0.07	0.00
281.10	0.07	0.07	0.00
281.25	0.07	0.07	0.00
281.40	0.07	0.07	0.00
281.55	0.07	0.07	0.00
281.70	0.07	0.07	0.00
281.85	0.07	0.07	0.00
282.00	0.07	0.07	0.00
282.15	0.33	0.07	0.26
282.30	0.99	0.07	0.92
282.45	1.77	0.07	1.70
282.60	2.31	0.07	2.24
282.75	2.74	0.07	2.67
282.90	3.12	0.07	3.05
283.05	3.45	0.07	3.38
283.20	3.75	0.07	3.69
283.35	4.03	0.07	3.97
283.50	4.30	0.07	4.23
283.65	4.54	0.07	4.47
283.80	4.78	0.07	4.71
283.95	5.00	0.07	4.93
284.10	5.21	0.07	5.14
284.25	5.42	0.07	5.35
284.40	5.61	0.07	5.55
284.55	5.80	0.07	5.74
284.70	5.99	0.07	5.92
284.85	6.17	0.07	6.10
285.00	6.34	0.07	6.27
285.15	6.51	0.07	6.44
285.30	6.67	0.07	6.60
285.45	6.83	0.07	6.76
285.60	6.99	0.07	6.92
285.75	7.14	0.07	7.07
285.90	7.29	0.07	7.22
286.05	7.44	0.07	7.37
286.20	7.59	0.07	7.52
286.35	7.73	0.07	7.66
286.50	7.87	0.07	7.80
286.65	8.00	0.07	7.93
286.80	8.14	0.07	8.07
286.95	8.27	0.07	8.20
287.10	8.40	0.07	8.33
287.25	8.53	0.07	8.46
287.40	8.65	0.07	8.58
287.55	8.78	0.07	8.71
287.70	8.90	0.07	8.83
287.85	9.02	0.07	8.95
288.00	9.14	0.07	9.07
288.15	9.26	0.07	9.19
288.30	9.37	0.07	9.30
288.45	9.49	0.07	9.42
288.60	9.60	0.07	9.53
288.75	9.71	0.07	9.64
288.90	9.82	0.07	9.75
289.05	9.93	0.07	9.86
289.20	10.04	0.07	9.97
289.35	10.15	0.07	10.08
289.50	10.25	0.07	10.18
289.65	10.36	0.07	10.29
289.80	10.46	0.07	10.39
289.95	10.56	0.07	10.49
290.10	10.67	0.07	10.60
290.25	10.77	0.07	10.70
290.40	10.87	0.07	10.80
290.55	10.97	0.07	10.89
290.70	11.06	0.07	10.99
290.85	12.68	0.07	12.61
291.00	14.74	0.07	14.67
291.15	15.62	0.07	15.55
291.30	16.38	0.07	16.31
291.45	17.06	0.07	16.99
291.60	17.68	0.07	17.60
291.75	18.25	0.07	18.18
291.90	18.79	0.07	18.72
292.05	19.31	0.07	19.24
292.20	**20.63**	**0.07**	**20.55**

Stage-Area-Storage for Pond XB2: Exist Basin #2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
279.00	13	0
279.15	13	2
279.30	13	4
279.45	13	6
279.60	2,870	108
279.75	2,870	259
279.90	2,870	411
280.05	2,870	633
280.20	2,870	991
280.35	2,870	1,348
280.50	2,870	1,703
280.65	2,870	2,054
280.80	2,870	2,399
280.95	2,870	2,742
281.10	2,870	3,082
281.25	2,870	3,419
281.40	2,870	3,747
281.55	2,870	4,063
281.70	2,870	4,369
281.85	2,870	4,661
282.00	2,870	4,937
282.15	2,870	5,192
282.30	2,870	5,415
282.45	2,870	5,599
282.60	2,870	5,696
282.75	2,870	5,697
282.90	2,870	5,699
283.05	2,870	5,701
283.20	2,870	5,703
283.35	2,870	5,705
283.50	2,870	5,707
283.65	2,870	5,709
283.80	2,870	5,711
283.95	2,870	5,713
284.10	2,870	5,714
284.25	2,870	5,716
284.40	2,870	5,718
284.55	2,870	5,720
284.70	2,870	5,722
284.85	2,870	5,724
285.00	2,870	5,726
285.15	2,870	5,728
285.30	2,870	5,730
285.45	2,870	5,731
285.60	2,870	5,733
285.75	2,870	5,735
285.90	2,870	5,737
286.05	2,870	5,739
286.20	**2,883**	5,741
286.35	2,883	5,745
286.50	2,883	5,748
286.65	2,883	5,752
286.80	2,883	5,756
286.95	2,883	5,760
287.10	2,883	5,763
287.25	2,883	5,767
287.40	2,883	5,771
287.55	2,883	5,775
287.70	2,883	5,779
287.85	2,883	5,782
288.00	2,883	5,786
288.15	2,883	5,790
288.30	2,883	5,794
288.45	2,883	5,797
288.60	2,883	5,801
288.75	2,883	5,805
288.90	2,883	5,809
289.05	2,883	5,812
289.20	2,883	5,816
289.35	2,883	5,820
289.50	2,883	5,824
289.65	2,883	5,828
289.80	2,883	5,831
289.95	2,883	5,835
290.10	2,883	5,839
290.25	2,883	5,843
290.40	2,883	5,846
290.55	2,883	5,850
290.70	2,883	5,854
290.85	2,883	5,857
291.00	2,883	5,859
291.15	2,883	5,861
291.30	2,883	5,863
291.45	2,883	5,865
291.60	2,883	5,866
291.75	2,883	5,868
291.90	2,883	5,870
292.05	2,883	5,872
292.20	2,883	**5,874**

Summary for Subcatchment X1: Offsite to West

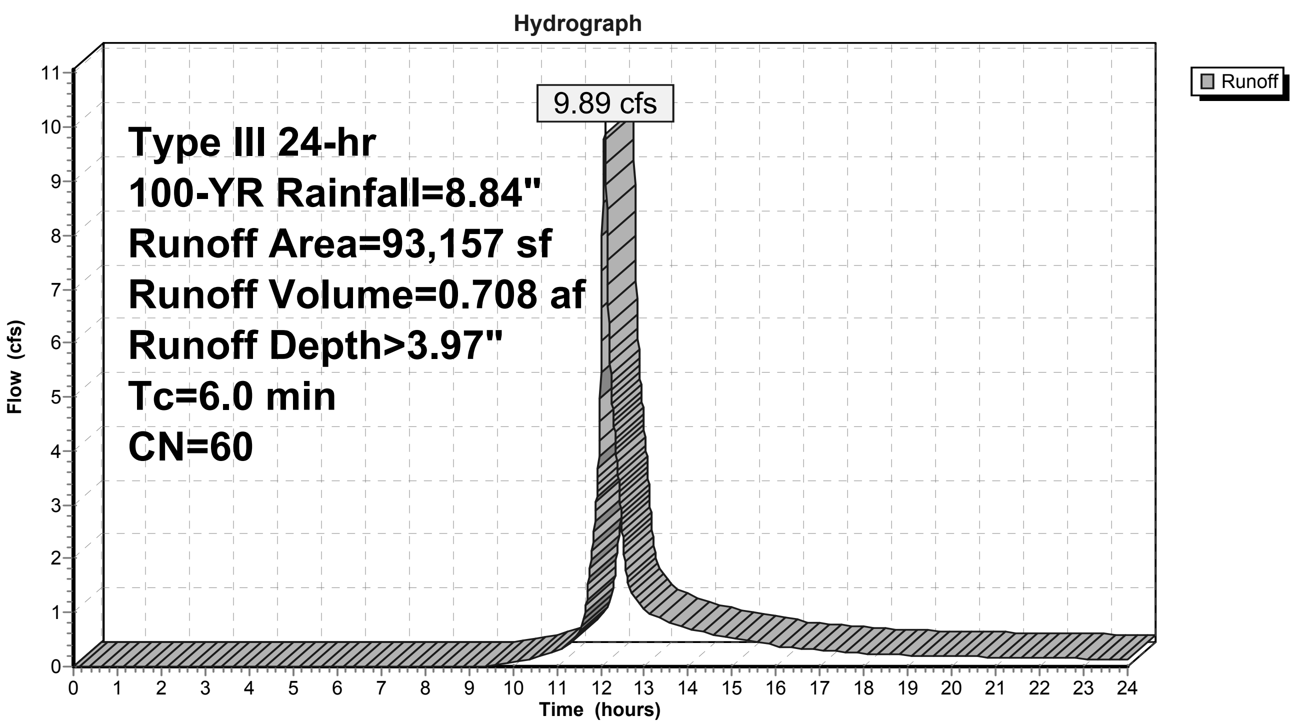
Runoff = 9.89 cfs @ 12.09 hrs, Volume= 0.708 af, Depth> 3.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.84"

	Area (sf)	CN	Description
	37,205	55	Woods, Good, HSG B
*	3,150	98	Roof
*	170	98	Impervious
	52,632	61	>75% Grass cover, Good, HSG B
	93,157	60	Weighted Average
	89,837		96.44% Pervious Area
	3,320		3.56% Impervious Area

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

Subcatchment X1: Offsite to West



Summary for Subcatchment X2: To Basin #2

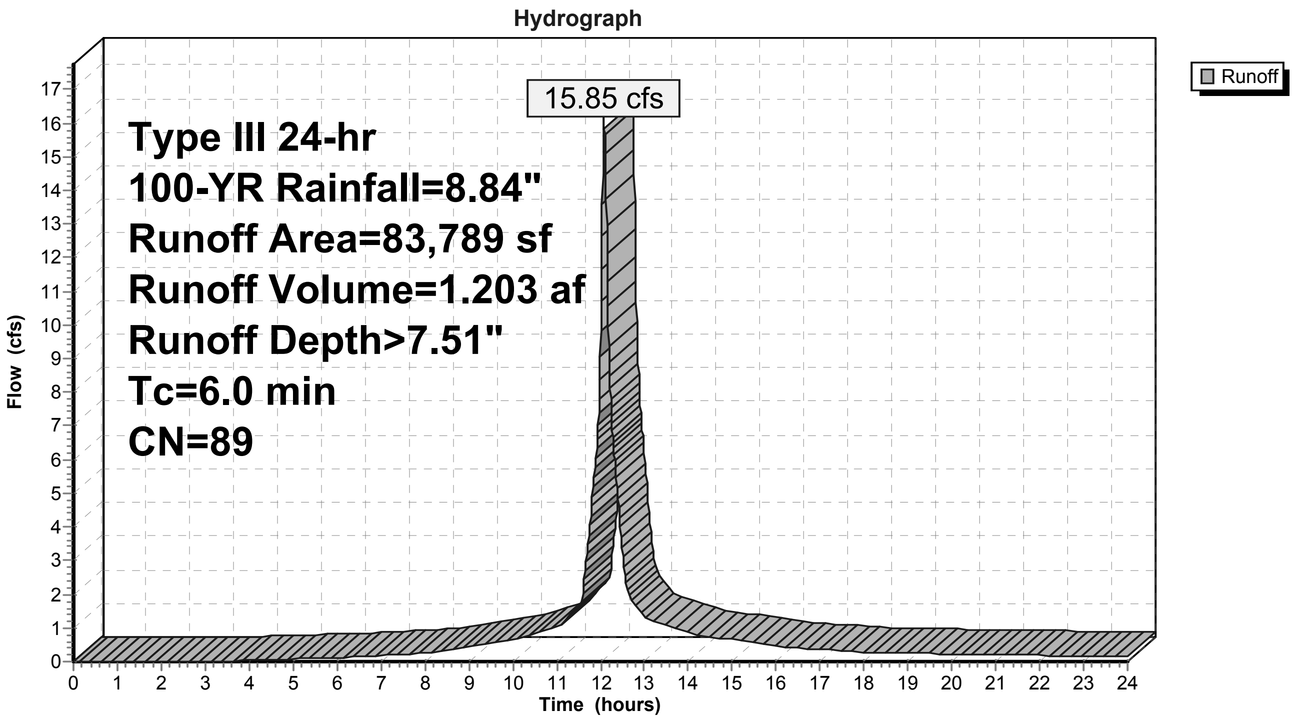
Runoff = 15.85 cfs @ 12.08 hrs, Volume= 1.203 af, Depth> 7.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.84"

	Area (sf)	CN	Description
	1,934	55	Woods, Good, HSG B
*	26,065	98	Roof
*	38,252	98	Impervious
	17,538	61	>75% Grass cover, Good, HSG B
	83,789	89	Weighted Average
	19,472		23.24% Pervious Area
	64,317		76.76% Impervious Area

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

Subcatchment X2: To Basin #2



Summary for Subcatchment X3: Offsite to Northwest

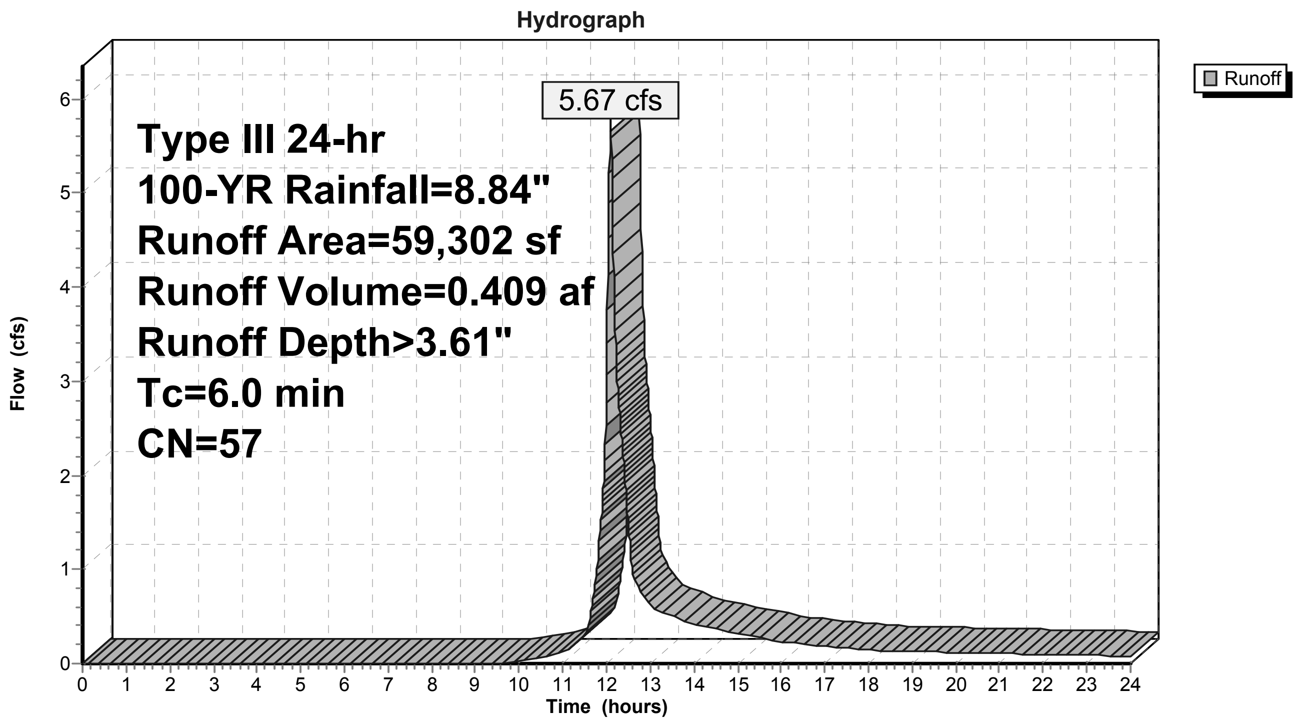
Runoff = 5.67 cfs @ 12.09 hrs, Volume= 0.409 af, Depth> 3.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.84"

	Area (sf)	CN	Description
	44,265	55	Woods, Good, HSG B
*	0	98	Roof
*	0	98	Impervious
	15,037	61	>75% Grass cover, Good, HSG B
	59,302	57	Weighted Average
	59,302		100.00% Pervious Area

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

Subcatchment X3: Offsite to Northwest



Summary for Subcatchment X4: To Basin #1

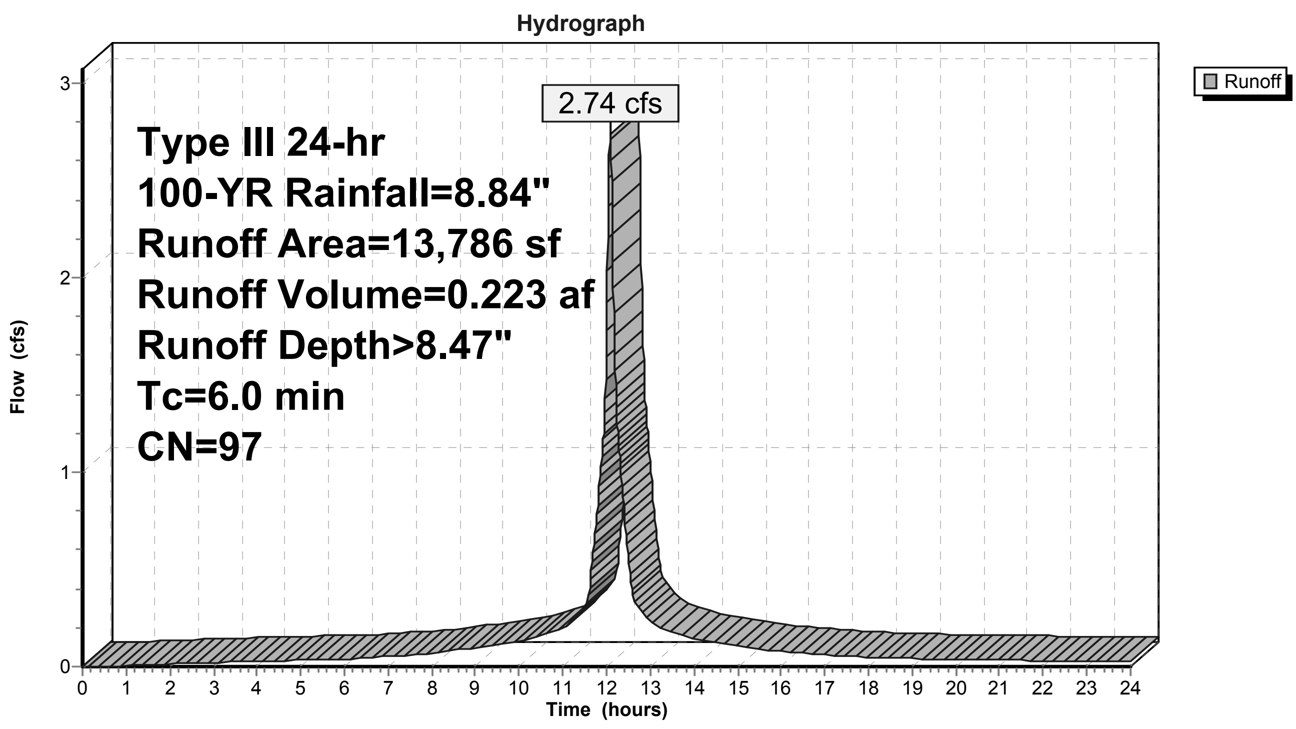
Runoff = 2.74 cfs @ 12.08 hrs, Volume= 0.223 af, Depth> 8.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.84"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	0	98	Roof
*	13,338	98	Impervious
	448	61	>75% Grass cover, Good, HSG B
	13,786	97	Weighted Average
	448		3.25% Pervious Area
	13,338		96.75% Impervious Area

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

Subcatchment X4: To Basin #1



Summary for Subcatchment X5: To Basin #3

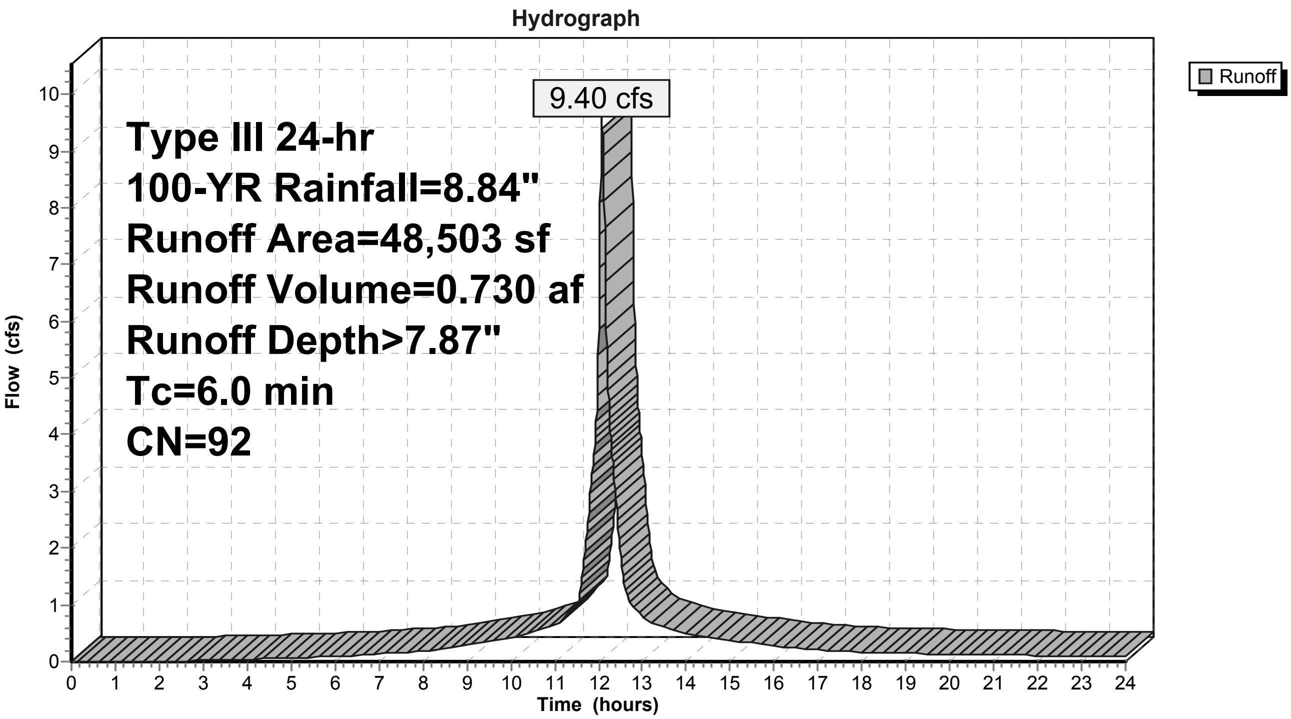
Runoff = 9.40 cfs @ 12.08 hrs, Volume= 0.730 af, Depth> 7.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.84"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	5,950	98	Roof
*	34,380	98	Impervious
	8,173	61	>75% Grass cover, Good, HSG B
	48,503	92	Weighted Average
	8,173		16.85% Pervious Area
	40,330		83.15% Impervious Area

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

Subcatchment X5: To Basin #3



Summary for Subcatchment X6: Offsite to Concord Ave

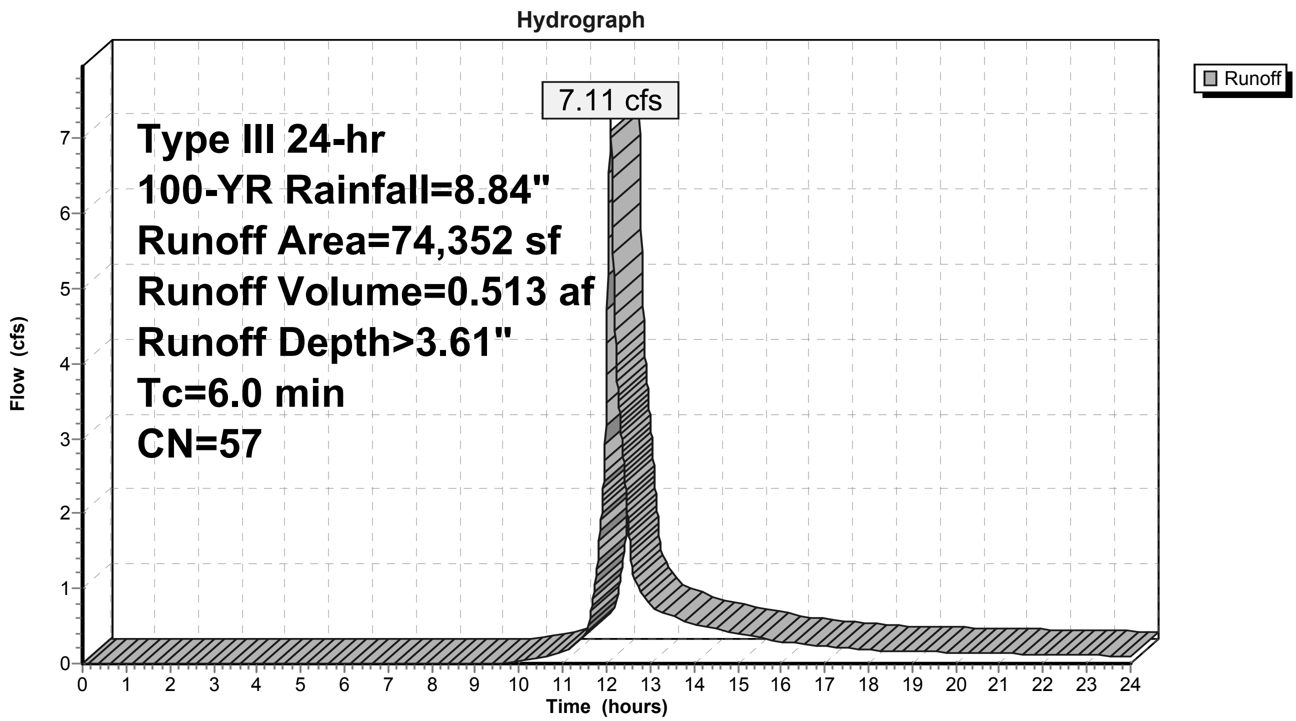
Runoff = 7.11 cfs @ 12.09 hrs, Volume= 0.513 af, Depth> 3.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.84"

	Area (sf)	CN	Description
	49,297	55	Woods, Good, HSG B
*	0	98	Roof
*	0	98	Impervious
	25,055	61	>75% Grass cover, Good, HSG B
	74,352	57	Weighted Average
	74,352		100.00% Pervious Area

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

Subcatchment X6: Offsite to Concord Ave



Summary for Subcatchment X7: To SW Basin

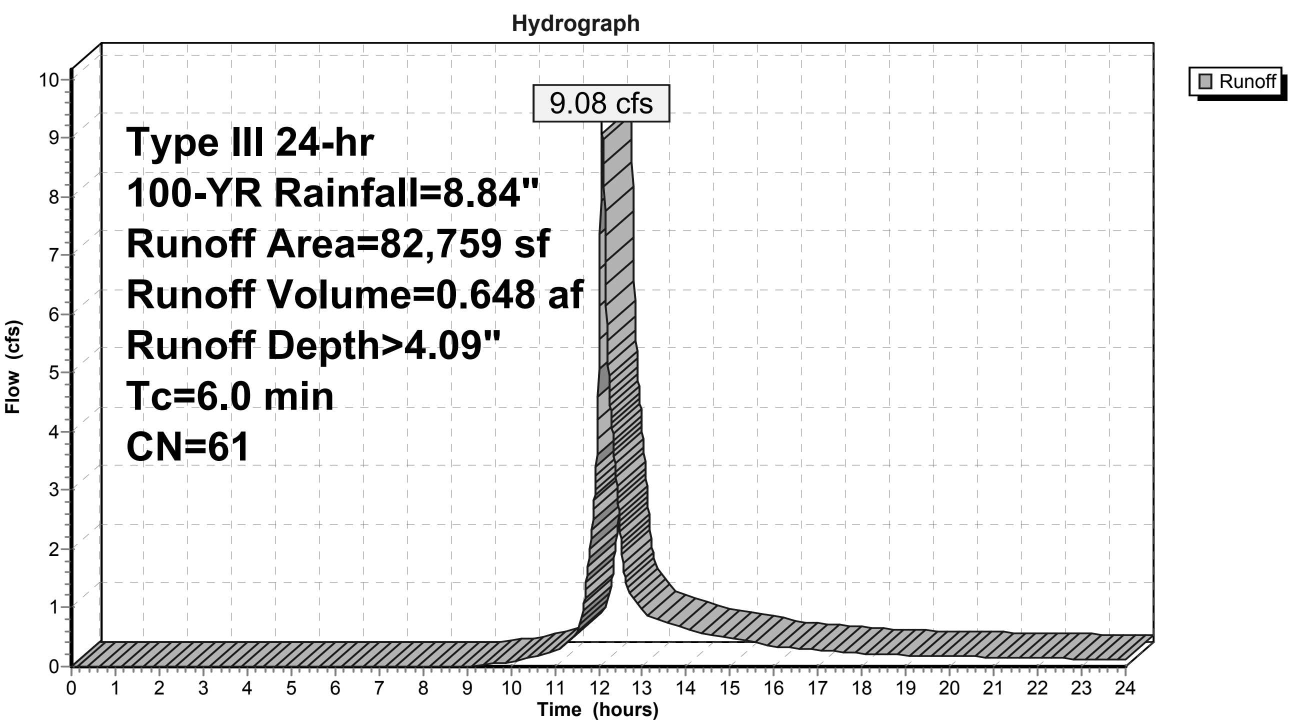
Runoff = 9.08 cfs @ 12.09 hrs, Volume= 0.648 af, Depth> 4.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.84"

	Area (sf)	CN	Description
	8,668	55	Woods, Good, HSG B
*	979	98	Roof
*	265	98	Impervious
	72,847	61	>75% Grass cover, Good, HSG B
	82,759	61	Weighted Average
	81,515		98.50% Pervious Area
	1,244		1.50% Impervious Area

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

Subcatchment X7: To SW Basin



Summary for Subcatchment X8: To CB#2

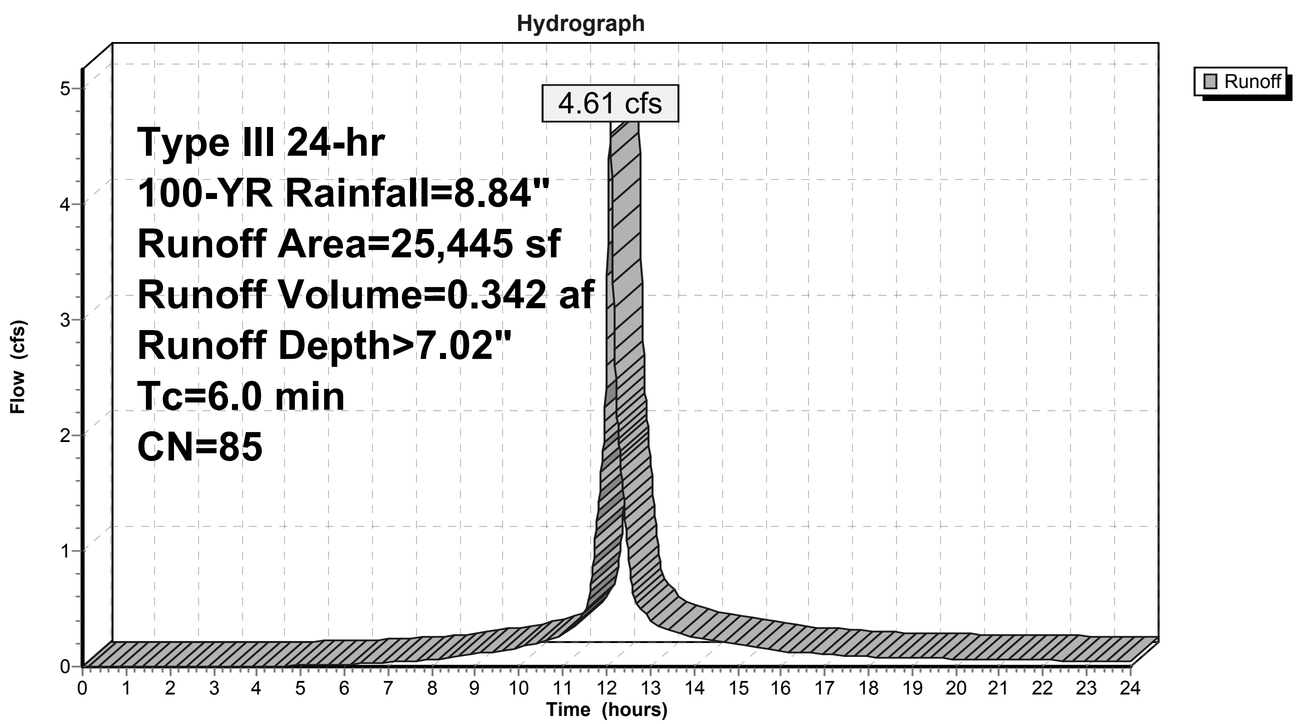
Runoff = 4.61 cfs @ 12.08 hrs, Volume= 0.342 af, Depth> 7.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.84"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	5,898	98	Roof
*	10,557	98	Impervious
	8,990	61	>75% Grass cover, Good, HSG B
	25,445	85	Weighted Average
	8,990		35.33% Pervious Area
	16,455		64.67% Impervious Area

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

Subcatchment X8: To CB#2



Summary for Subcatchment X9: To Day School Lane

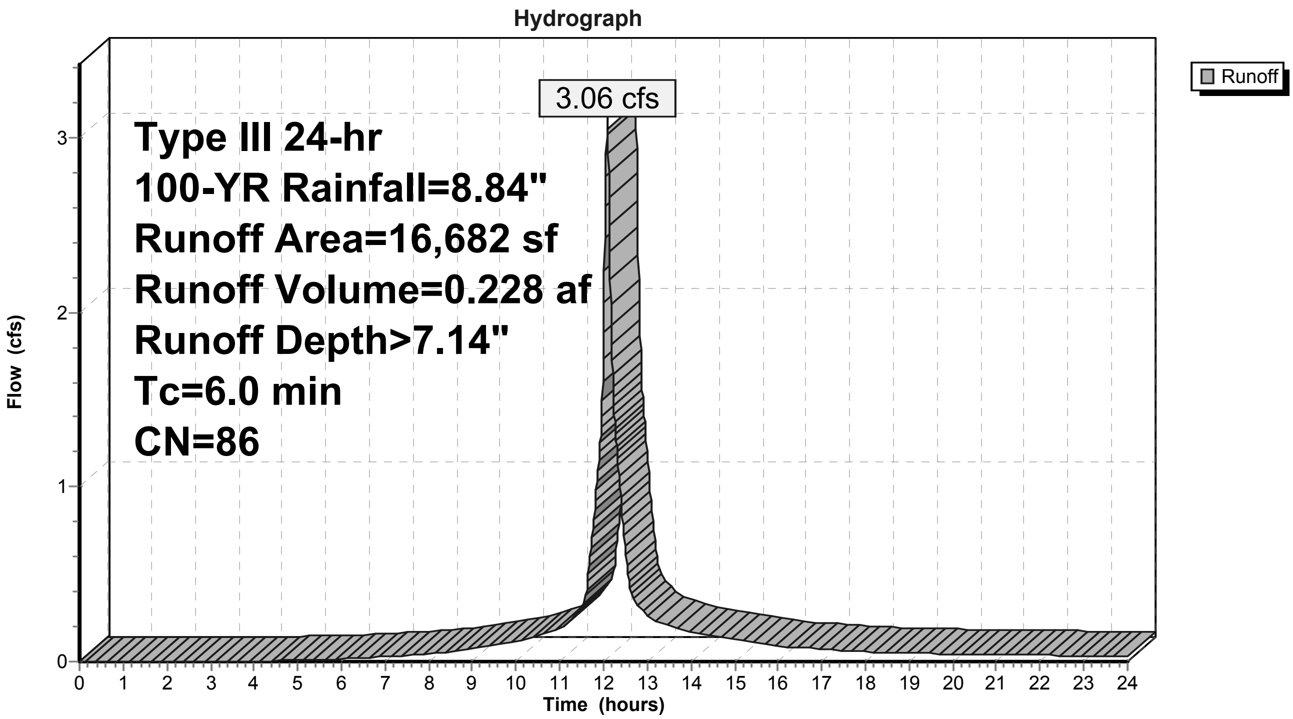
Runoff = 3.06 cfs @ 12.08 hrs, Volume= 0.228 af, Depth> 7.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.84"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	0	98	Roof
*	11,199	98	Impervious
	5,483	61	>75% Grass cover, Good, HSG B
	16,682	86	Weighted Average
	5,483		32.87% Pervious Area
	11,199		67.13% Impervious Area

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

Subcatchment X9: To Day School Lane

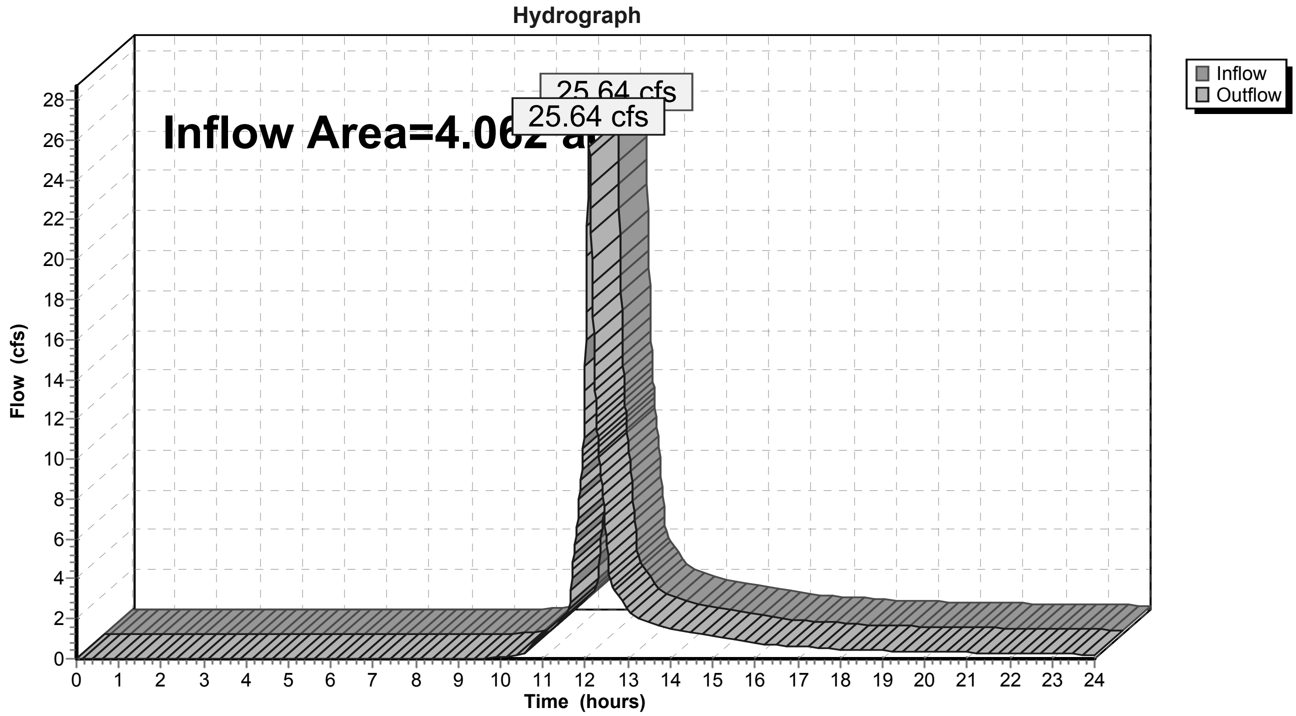


Summary for Reach DP-A: Offsite to Southwest

Inflow Area =	4.062 ac,	38.22% Impervious,	Inflow Depth > 4.97"	for 100-YR event
Inflow =	25.64 cfs @	12.09 hrs,	Volume=	1.681 af
Outflow =	25.64 cfs @	12.09 hrs,	Volume=	1.681 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-A: Offsite to Southwest

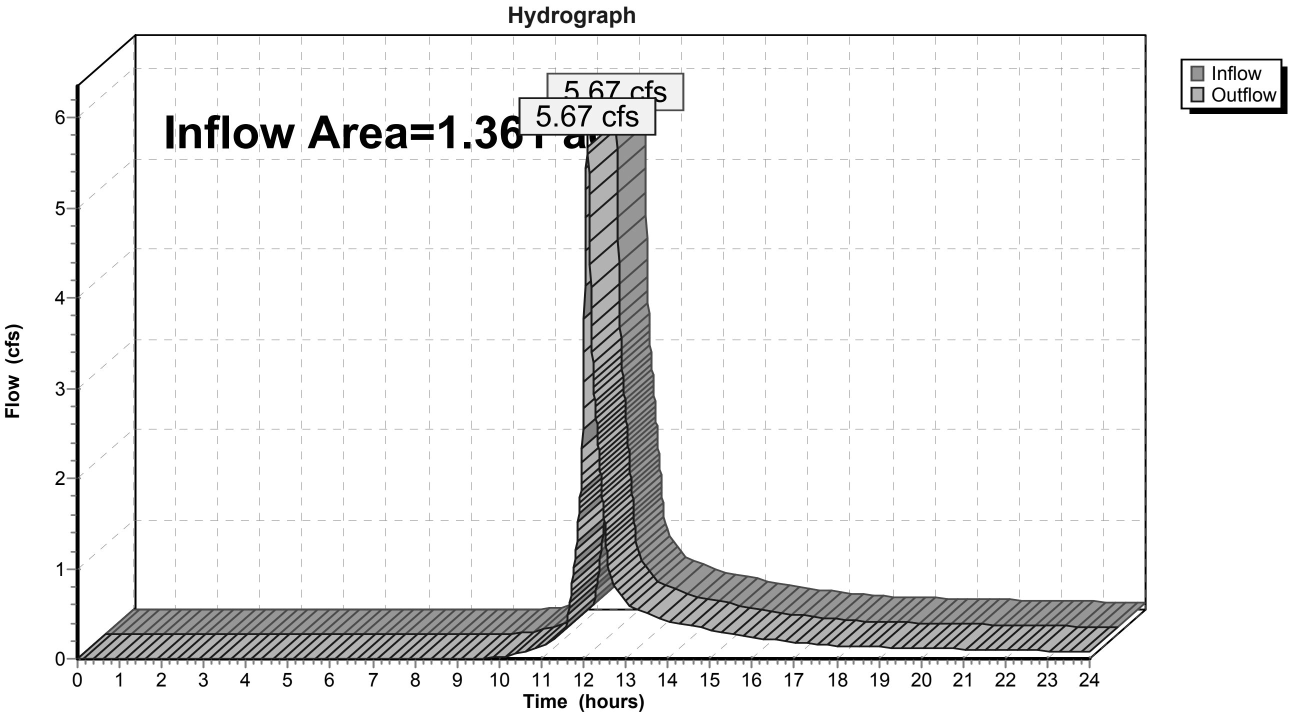


Summary for Reach DP-B: Offsite to Northwest

Inflow Area = 1.361 ac, 0.00% Impervious, Inflow Depth > 3.61" for 100-YR event
Inflow = 5.67 cfs @ 12.09 hrs, Volume= 0.409 af
Outflow = 5.67 cfs @ 12.09 hrs, Volume= 0.409 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-B: Offsite to Northwest

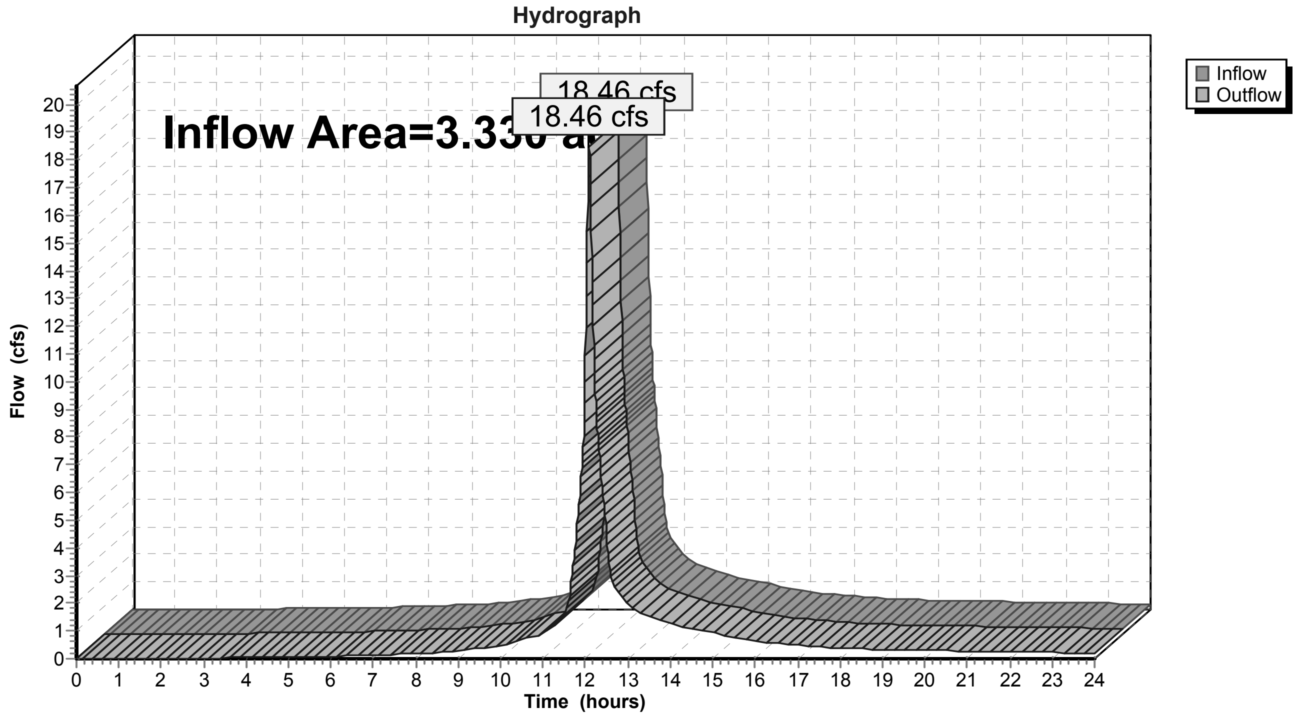


Summary for Reach DP-C: Exist SW Basin

Inflow Area = 3.330 ac, 37.86% Impervious, Inflow Depth > 5.09" for 100-YR event
Inflow = 18.46 cfs @ 12.09 hrs, Volume= 1.413 af
Outflow = 18.46 cfs @ 12.09 hrs, Volume= 1.413 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-C: Exist SW Basin

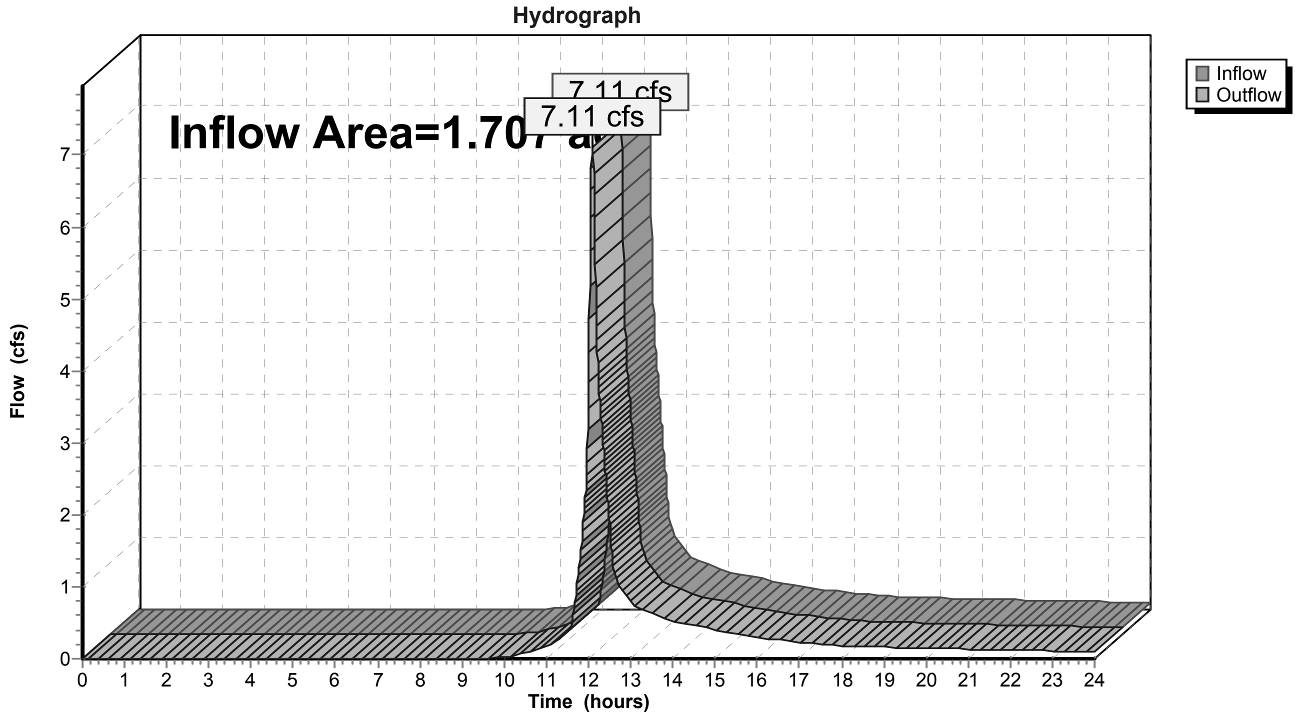


Summary for Reach DP-D: Offsite to Concord Ave

Inflow Area =	1.707 ac,	0.00% Impervious,	Inflow Depth > 3.61"	for 100-YR event	
Inflow =	7.11 cfs @	12.09 hrs,	Volume=	0.513 af	
Outflow =	7.11 cfs @	12.09 hrs,	Volume=	0.513 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-D: Offsite to Concord Ave

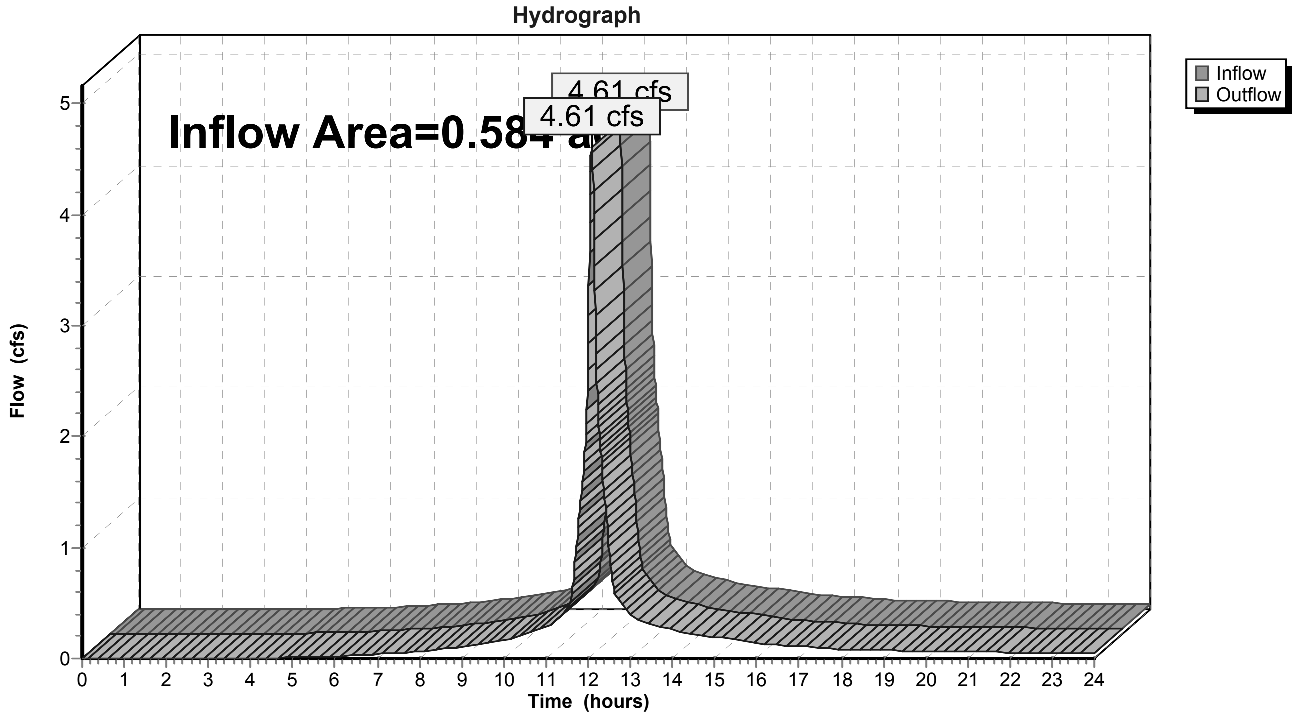


Summary for Reach DP-E: To CB #2

Inflow Area = 0.584 ac, 64.67% Impervious, Inflow Depth > 7.02" for 100-YR event
Inflow = 4.61 cfs @ 12.08 hrs, Volume= 0.342 af
Outflow = 4.61 cfs @ 12.08 hrs, Volume= 0.342 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-E: To CB #2

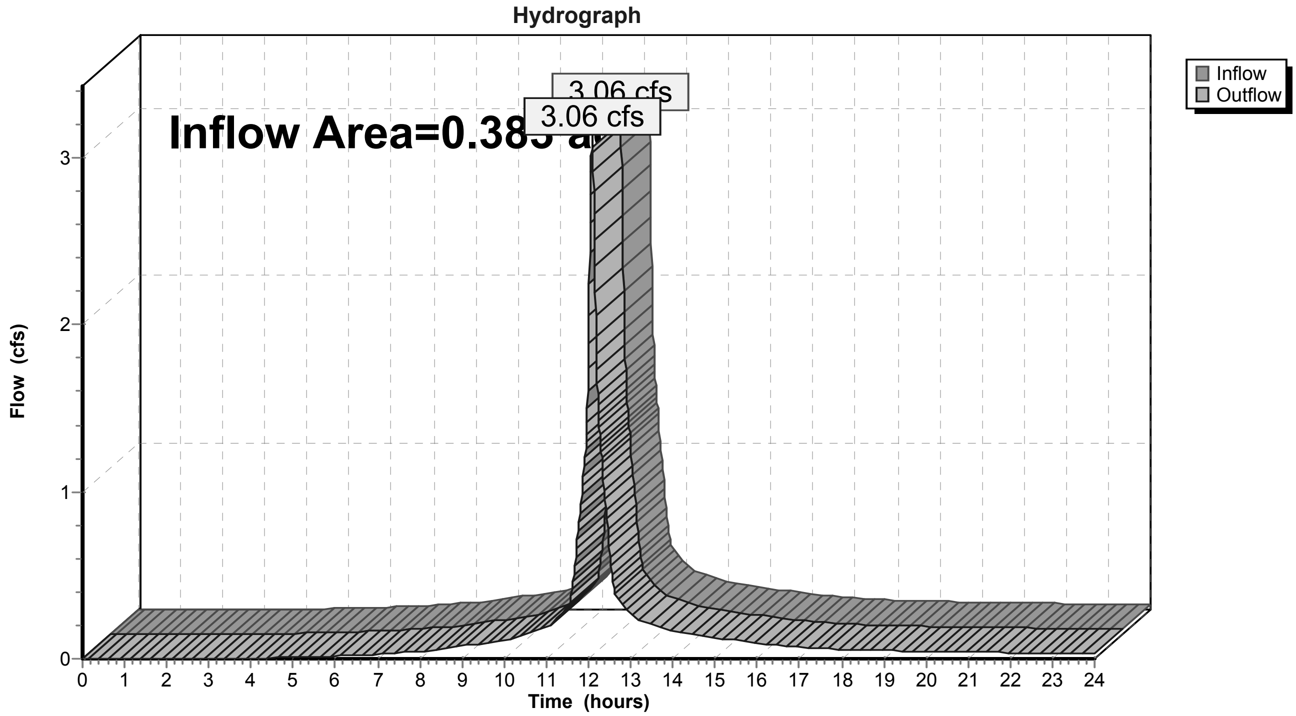


Summary for Reach DP-F: Offsite to Day School Ln

Inflow Area =	0.383 ac, 67.13% Impervious, Inflow Depth > 7.14" for 100-YR event			
Inflow =	3.06 cfs @	12.08 hrs, Volume=	0.228 af	
Outflow =	3.06 cfs @	12.08 hrs, Volume=	0.228 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-F: Offsite to Day School Ln



Summary for Pond XB1: Exist Basin #1

Inflow Area = 0.316 ac, 96.75% Impervious, Inflow Depth > 8.47" for 100-YR event
Inflow = 2.74 cfs @ 12.08 hrs, Volume= 0.223 af
Outflow = 0.27 cfs @ 12.84 hrs, Volume= 0.165 af, Atten= 90%, Lag= 45.1 min
Discarded = 0.09 cfs @ 12.84 hrs, Volume= 0.130 af
Primary = 0.19 cfs @ 12.84 hrs, Volume= 0.035 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 284.86' @ 12.84 hrs Surf.Area= 3,600 sf Storage= 4,457 cf

Plug-Flow detention time= 210.6 min calculated for 0.165 af (74% of inflow)
Center-of-Mass det. time= 121.7 min (866.8 - 745.0)

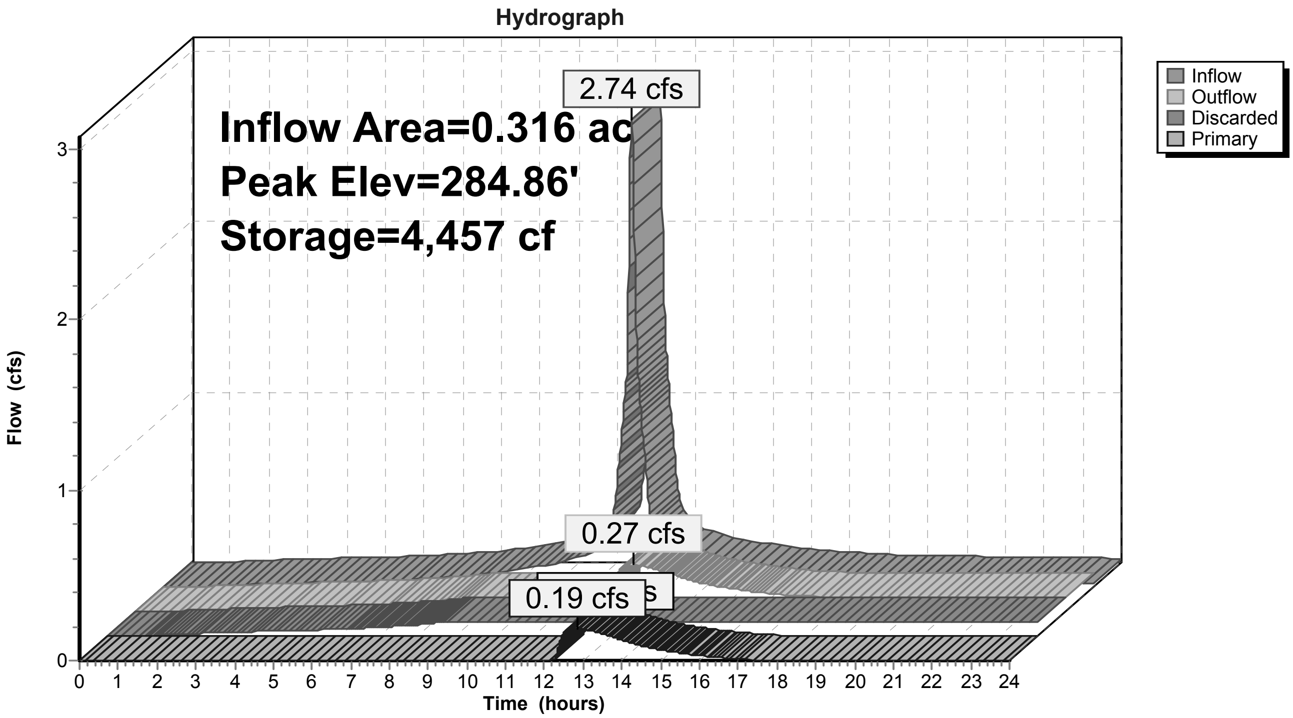
Volume	Invert	Avail.Storage	Storage Description
#1	283.50'	3,335 cf	**30.0"W x 18.0"H x 58.00'L Cultec Contactor 125**x 23 Inside #2
#2	283.00'	1,353 cf	**60.00'W x 60.00'L x 2.00'H Stone**
			7,200 cf Overall - 3,335 cf Embedded = 3,865 cf x 35.0% Voids
		4,688 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	284.50'	**4.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	283.00'	**1.020 in/hr Exfiltration over Surface area**
			Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.09 cfs @ 12.84 hrs HW=284.86' (Free Discharge)
└─**2=Exfiltration** (Controls 0.09 cfs)

Primary OutFlow Max=0.19 cfs @ 12.84 hrs HW=284.86' (Free Discharge)
└─**1=Orifice/Grate** (Orifice Controls 0.19 cfs @ 2.14 fps)

Pond XB1: Exist Basin #1



Stage-Discharge for Pond XB1: Exist Basin #1

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
283.00	0.00	0.00	0.00
283.02	0.09	0.09	0.00
283.04	0.09	0.09	0.00
283.06	0.09	0.09	0.00
283.08	0.09	0.09	0.00
283.10	0.09	0.09	0.00
283.12	0.09	0.09	0.00
283.14	0.09	0.09	0.00
283.16	0.09	0.09	0.00
283.18	0.09	0.09	0.00
283.20	0.09	0.09	0.00
283.22	0.09	0.09	0.00
283.24	0.09	0.09	0.00
283.26	0.09	0.09	0.00
283.28	0.09	0.09	0.00
283.30	0.09	0.09	0.00
283.32	0.09	0.09	0.00
283.34	0.09	0.09	0.00
283.36	0.09	0.09	0.00
283.38	0.09	0.09	0.00
283.40	0.09	0.09	0.00
283.42	0.09	0.09	0.00
283.44	0.09	0.09	0.00
283.46	0.09	0.09	0.00
283.48	0.09	0.09	0.00
283.50	0.09	0.09	0.00
283.52	0.09	0.09	0.00
283.54	0.09	0.09	0.00
283.56	0.09	0.09	0.00
283.58	0.09	0.09	0.00
283.60	0.09	0.09	0.00
283.62	0.09	0.09	0.00
283.64	0.09	0.09	0.00
283.66	0.09	0.09	0.00
283.68	0.09	0.09	0.00
283.70	0.09	0.09	0.00
283.72	0.09	0.09	0.00
283.74	0.09	0.09	0.00
283.76	0.09	0.09	0.00
283.78	0.09	0.09	0.00
283.80	0.09	0.09	0.00
283.82	0.09	0.09	0.00
283.84	0.09	0.09	0.00
283.86	0.09	0.09	0.00
283.88	0.09	0.09	0.00
283.90	0.09	0.09	0.00
283.92	0.09	0.09	0.00
283.94	0.09	0.09	0.00
283.96	0.09	0.09	0.00
283.98	0.09	0.09	0.00
284.00	0.09	0.09	0.00
284.02	0.09	0.09	0.00
284.04	0.09	0.09	0.00
284.06	0.09	0.09	0.00
284.08	0.09	0.09	0.00
284.10	0.09	0.09	0.00
284.12	0.09	0.09	0.00
284.14	0.09	0.09	0.00
284.16	0.09	0.09	0.00
284.18	0.09	0.09	0.00
284.20	0.09	0.09	0.00
284.22	0.09	0.09	0.00
284.24	0.09	0.09	0.00
284.26	0.09	0.09	0.00
284.28	0.09	0.09	0.00
284.30	0.09	0.09	0.00
284.32	0.09	0.09	0.00
284.34	0.09	0.09	0.00
284.36	0.09	0.09	0.00
284.38	0.09	0.09	0.00
284.40	0.09	0.09	0.00
284.42	0.09	0.09	0.00
284.44	0.09	0.09	0.00
284.46	0.09	0.09	0.00
284.48	0.09	0.09	0.00
284.50	0.09	0.09	0.00
284.52	0.09	0.09	0.00
284.54	0.09	0.09	0.00
284.56	0.09	0.09	0.01
284.58	0.10	0.09	0.02
284.60	0.11	0.09	0.02
284.62	0.12	0.09	0.03
284.64	0.13	0.09	0.04
284.66	0.14	0.09	0.06
284.68	0.15	0.09	0.07
284.70	0.17	0.09	0.08
284.72	0.18	0.09	0.10
284.74	0.20	0.09	0.11
284.76	0.21	0.09	0.13
284.78	0.23	0.09	0.14
284.80	0.24	0.09	0.15
284.82	0.25	0.09	0.17
284.84	0.26	0.09	0.17
284.86	0.27	0.09	0.18
284.88	0.28	0.09	0.19
284.90	0.29	0.09	0.20
284.92	0.30	0.09	0.21
284.94	0.31	0.09	0.22
284.96	0.31	0.09	0.23
284.98	0.32	0.09	0.24
285.00	**0.33**	**0.09**	**0.24**

Stage-Area-Storage for Pond XB1: Exist Basin #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.00	**3,600**	0	284.06	3,600	2,428
283.02	3,600	25	284.08	3,600	2,487
283.04	3,600	50	284.10	3,600	2,546
283.06	3,600	76	284.12	3,600	2,605
283.08	3,600	101	284.14	3,600	2,663
283.10	3,600	126	284.16	3,600	2,721
283.12	3,600	151	284.18	3,600	2,778
283.14	3,600	176	284.20	3,600	2,835
283.16	3,600	202	284.22	3,600	2,892
283.18	3,600	227	284.24	3,600	2,948
283.20	3,600	252	284.26	3,600	3,004
283.22	3,600	277	284.28	3,600	3,060
283.24	3,600	302	284.30	3,600	3,115
283.26	3,600	328	284.32	3,600	3,169
283.28	3,600	353	284.34	3,600	3,223
283.30	3,600	378	284.36	3,600	3,277
283.32	3,600	403	284.38	3,600	3,331
283.34	3,600	428	284.40	3,600	3,383
283.36	3,600	454	284.42	3,600	3,436
283.38	3,600	479	284.44	3,600	3,488
283.40	3,600	504	284.46	3,600	3,539
283.42	3,600	529	284.48	3,600	3,590
283.44	3,600	554	284.50	3,600	3,641
283.46	3,600	580	284.52	3,600	3,691
283.48	3,600	605	284.54	3,600	3,740
283.50	3,600	630	284.56	3,600	3,789
283.52	3,600	698	284.58	3,600	3,837
283.54	3,600	767	284.60	3,600	3,885
283.56	3,600	834	284.62	3,600	3,933
283.58	3,600	902	284.64	3,600	3,979
283.60	3,600	969	284.66	3,600	4,025
283.62	3,600	1,036	284.68	3,600	4,071
283.64	3,600	1,103	284.70	3,600	4,116
283.66	3,600	1,169	284.72	3,600	4,160
283.68	3,600	1,235	284.74	3,600	4,204
283.70	3,600	1,301	284.76	3,600	4,247
283.72	3,600	1,366	284.78	3,600	4,289
283.74	3,600	1,431	284.80	3,600	4,330
283.76	3,600	1,496	284.82	3,600	4,371
283.78	3,600	1,560	284.84	3,600	4,411
283.80	3,600	1,625	284.86	3,600	4,450
283.82	3,600	1,688	284.88	3,600	4,487
283.84	3,600	1,752	284.90	3,600	4,524
283.86	3,600	1,815	284.92	3,600	4,560
283.88	3,600	1,878	284.94	3,600	4,595
283.90	3,600	1,940	284.96	3,600	4,628
283.92	3,600	2,003	284.98	3,600	4,659
283.94	3,600	2,064	285.00	3,600	**4,688**
283.96	3,600	2,126			
283.98	3,600	2,187			
284.00	3,600	2,248			
284.02	3,600	2,308			
284.04	3,600	2,368			

Summary for Pond XB2: Exist Basin #2

Inflow Area = 1.924 ac, 76.76% Impervious, Inflow Depth > 7.51" for 100-YR event
Inflow = 15.85 cfs @ 12.08 hrs, Volume= 1.203 af
Outflow = 15.84 cfs @ 12.08 hrs, Volume= 1.087 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.07 cfs @ 12.08 hrs, Volume= 0.114 af
Primary = 15.76 cfs @ 12.08 hrs, Volume= 0.974 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 291.19' @ 12.08 hrs Surf.Area= 2,883 sf Storage= 5,861 cf

Plug-Flow detention time= 75.0 min calculated for 1.087 af (90% of inflow)
Center-of-Mass det. time= 27.7 min (803.2 - 775.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	279.50'	1,268 cf	**30.50'W x 73.50'L x 3.04'H Field A**
			6,819 cf Overall - 3,196 cf Embedded = 3,622 cf x 35.0% Voids
#2A	280.00'	3,196 cf	**Cultec R-330XLHD** x 60 Inside #1
			Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
			Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
			Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
#3B	279.50'	370 cf	**16.00'W x 38.50'L x 3.04'H Field B**
			1,874 cf Overall - 816 cf Embedded = 1,058 cf x 35.0% Voids
#4B	280.00'	816 cf	**Cultec R-330XLHD** x 15 Inside #3
			Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
			Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
			Row Length Adjustment= +1.50' x 7.45 sf x 3 rows
#5	279.00'	148 cf	**4.00'D x 11.80'H Vertical Cone/Cylinder**
#6	286.20'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**
		5,874 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	282.00'	**6.0" Vert. Orifice/Grate X 4.00** C= 0.600
#2	Primary	290.70'	**2.3" x 2.3" Horiz. Grate X 36.00**
			C= 0.600 in 24.0" x 24.0" Grate (33% open area)
			Limited to weir flow at low heads
#3	Primary	292.10'	**2.3" x 2.3" Horiz. Grate X 36.00**
			C= 0.600 in 24.0" x 24.0" Grate (33% open area)
			Limited to weir flow at low heads
#4	Discarded	279.00'	**1.020 in/hr Exfiltration over Surface area**
			Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.07 cfs @ 12.08 hrs HW=291.19' (Free Discharge)
└─**4=Exfiltration** (Controls 0.07 cfs)

Primary OutFlow Max=15.75 cfs @ 12.08 hrs HW=291.19' (Free Discharge)
├─**1=Orifice/Grate** (Orifice Controls 11.30 cfs @ 14.39 fps)
├─**2=Grate** (Orifice Controls 4.44 cfs @ 3.36 fps)
└─**3=Grate** (Controls 0.00 cfs)

Pond XB2: Exist Basin #2 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

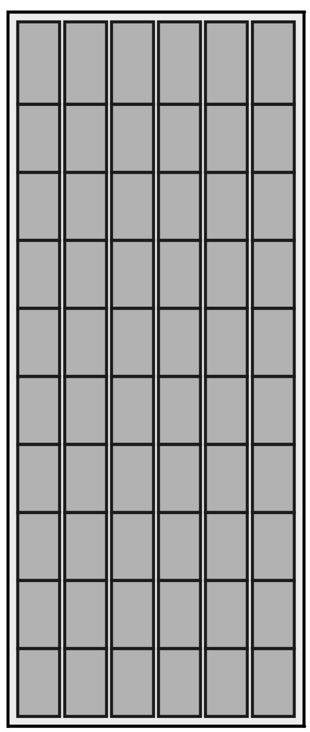
10 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 71.50' Row Length +12.0" End Stone x 2 = 73.50' Base Length
6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width
6.0" Base + 30.5" Chamber Height = 3.04' Field Height

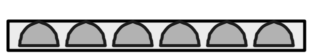
60 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 3,196.5 cf Chamber Storage

6,818.7 cf Field - 3,196.5 cf Chambers = 3,622.2 cf Stone x 35.0% Voids = 1,267.8 cf Stone Storage

Chamber Storage + Stone Storage = 4,464.2 cf = 0.102 af
Overall Storage Efficiency = 65.5%

60 Chambers
252.5 cy Field
134.2 cy Stone





Pond XB2: Exist Basin #2 - Chamber Wizard Field B

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 3 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

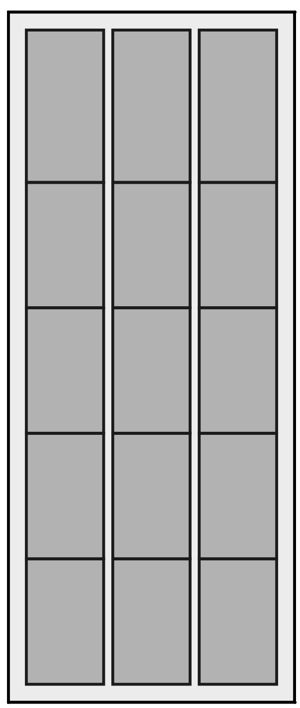
5 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 36.50' Row Length +12.0" End Stone x 2 = 38.50' Base Length
3 Rows x 52.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 16.00' Base Width
6.0" Base + 30.5" Chamber Height = 3.04' Field Height

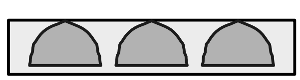
15 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 3 Rows = 815.9 cf Chamber Storage

1,873.7 cf Field - 815.9 cf Chambers = 1,057.8 cf Stone x 35.0% Voids = 370.2 cf Stone Storage

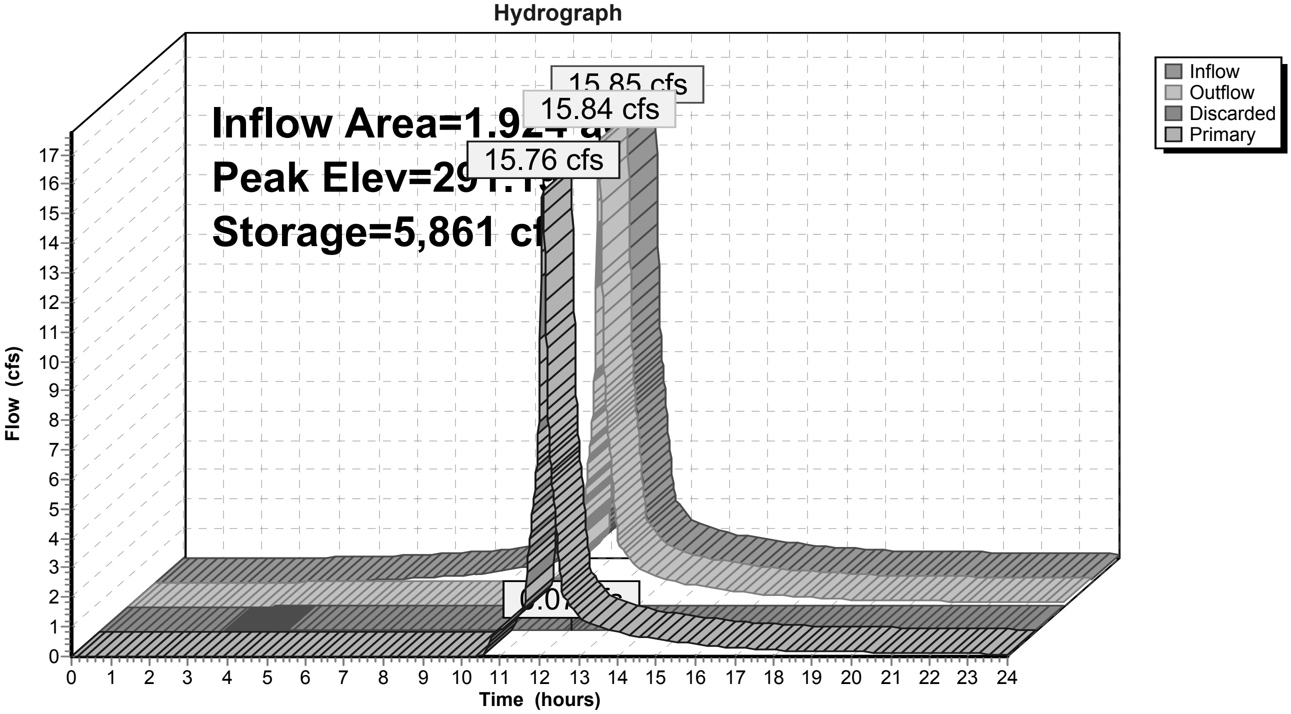
Chamber Storage + Stone Storage = 1,186.1 cf = 0.027 af
Overall Storage Efficiency = 63.3%

15 Chambers
69.4 cy Field
39.2 cy Stone





Pond XB2: Exist Basin #2



Stage-Discharge for Pond XB2: Exist Basin #2

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
279.00	0.00	0.00	0.00	286.95	8.27	0.07	8.20
279.15	0.00	0.00	0.00	287.10	8.40	0.07	8.33
279.30	0.00	0.00	0.00	287.25	8.53	0.07	8.46
279.45	0.00	0.00	0.00	287.40	8.65	0.07	8.58
279.60	0.07	0.07	0.00	287.55	8.78	0.07	8.71
279.75	0.07	0.07	0.00	287.70	8.90	0.07	8.83
279.90	0.07	0.07	0.00	287.85	9.02	0.07	8.95
280.05	0.07	0.07	0.00	288.00	9.14	0.07	9.07
280.20	0.07	0.07	0.00	288.15	9.26	0.07	9.19
280.35	0.07	0.07	0.00	288.30	9.37	0.07	9.30
280.50	0.07	0.07	0.00	288.45	9.49	0.07	9.42
280.65	0.07	0.07	0.00	288.60	9.60	0.07	9.53
280.80	0.07	0.07	0.00	288.75	9.71	0.07	9.64
280.95	0.07	0.07	0.00	288.90	9.82	0.07	9.75
281.10	0.07	0.07	0.00	289.05	9.93	0.07	9.86
281.25	0.07	0.07	0.00	289.20	10.04	0.07	9.97
281.40	0.07	0.07	0.00	289.35	10.15	0.07	10.08
281.55	0.07	0.07	0.00	289.50	10.25	0.07	10.18
281.70	0.07	0.07	0.00	289.65	10.36	0.07	10.29
281.85	0.07	0.07	0.00	289.80	10.46	0.07	10.39
282.00	0.07	0.07	0.00	289.95	10.56	0.07	10.49
282.15	0.33	0.07	0.26	290.10	10.67	0.07	10.60
282.30	0.99	0.07	0.92	290.25	10.77	0.07	10.70
282.45	1.77	0.07	1.70	290.40	10.87	0.07	10.80
282.60	2.31	0.07	2.24	290.55	10.97	0.07	10.89
282.75	2.74	0.07	2.67	290.70	11.06	0.07	10.99
282.90	3.12	0.07	3.05	290.85	12.68	0.07	12.61
283.05	3.45	0.07	3.38	291.00	14.74	0.07	14.67
283.20	3.75	0.07	3.69	291.15	15.62	0.07	15.55
283.35	4.03	0.07	3.97	291.30	16.38	0.07	16.31
283.50	4.30	0.07	4.23	291.45	17.06	0.07	16.99
283.65	4.54	0.07	4.47	291.60	17.68	0.07	17.60
283.80	4.78	0.07	4.71	291.75	18.25	0.07	18.18
283.95	5.00	0.07	4.93	291.90	18.79	0.07	18.72
284.10	5.21	0.07	5.14	292.05	19.31	0.07	19.24
284.25	5.42	0.07	5.35	292.20	**20.63**	**0.07**	**20.55**
284.40	5.61	0.07	5.55				
284.55	5.80	0.07	5.74				
284.70	5.99	0.07	5.92				
284.85	6.17	0.07	6.10				
285.00	6.34	0.07	6.27				
285.15	6.51	0.07	6.44				
285.30	6.67	0.07	6.60				
285.45	6.83	0.07	6.76				
285.60	6.99	0.07	6.92				
285.75	7.14	0.07	7.07				
285.90	7.29	0.07	7.22				
286.05	7.44	0.07	7.37				
286.20	7.59	0.07	7.52				
286.35	7.73	0.07	7.66				
286.50	7.87	0.07	7.80				
286.65	8.00	0.07	7.93				
286.80	8.14	0.07	8.07				

Stage-Area-Storage for Pond XB2: Exist Basin #2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
279.00	13	0	286.95	2,883	5,760
279.15	13	2	287.10	2,883	5,763
279.30	13	4	287.25	2,883	5,767
279.45	13	6	287.40	2,883	5,771
279.60	2,870	108	287.55	2,883	5,775
279.75	2,870	259	287.70	2,883	5,779
279.90	2,870	411	287.85	2,883	5,782
280.05	2,870	633	288.00	2,883	5,786
280.20	2,870	991	288.15	2,883	5,790
280.35	2,870	1,348	288.30	2,883	5,794
280.50	2,870	1,703	288.45	2,883	5,797
280.65	2,870	2,054	288.60	2,883	5,801
280.80	2,870	2,399	288.75	2,883	5,805
280.95	2,870	2,742	288.90	2,883	5,809
281.10	2,870	3,082	289.05	2,883	5,812
281.25	2,870	3,419	289.20	2,883	5,816
281.40	2,870	3,747	289.35	2,883	5,820
281.55	2,870	4,063	289.50	2,883	5,824
281.70	2,870	4,369	289.65	2,883	5,828
281.85	2,870	4,661	289.80	2,883	5,831
282.00	2,870	4,937	289.95	2,883	5,835
282.15	2,870	5,192	290.10	2,883	5,839
282.30	2,870	5,415	290.25	2,883	5,843
282.45	2,870	5,599	290.40	2,883	5,846
282.60	2,870	5,696	290.55	2,883	5,850
282.75	2,870	5,697	290.70	2,883	5,854
282.90	2,870	5,699	290.85	2,883	5,857
283.05	2,870	5,701	291.00	2,883	5,859
283.20	2,870	5,703	291.15	2,883	5,861
283.35	2,870	5,705	291.30	2,883	5,863
283.50	2,870	5,707	291.45	2,883	5,865
283.65	2,870	5,709	291.60	2,883	5,866
283.80	2,870	5,711	291.75	2,883	5,868
283.95	2,870	5,713	291.90	2,883	5,870
284.10	2,870	5,714	292.05	2,883	5,872
284.25	2,870	5,716	292.20	2,883	**5,874**
284.40	2,870	5,718			
284.55	2,870	5,720			
284.70	2,870	5,722			
284.85	2,870	5,724			
285.00	2,870	5,726			
285.15	2,870	5,728			
285.30	2,870	5,730			
285.45	2,870	5,731			
285.60	2,870	5,733			
285.75	2,870	5,735			
285.90	2,870	5,737			
286.05	2,870	5,739			
286.20	**2,883**	5,741			
286.35	2,883	5,745			
286.50	2,883	5,748			
286.65	2,883	5,752			
286.80	2,883	5,756			

APPENDIX D – PROPOSED CONDITIONS HYDROCAD CALCULATIONS

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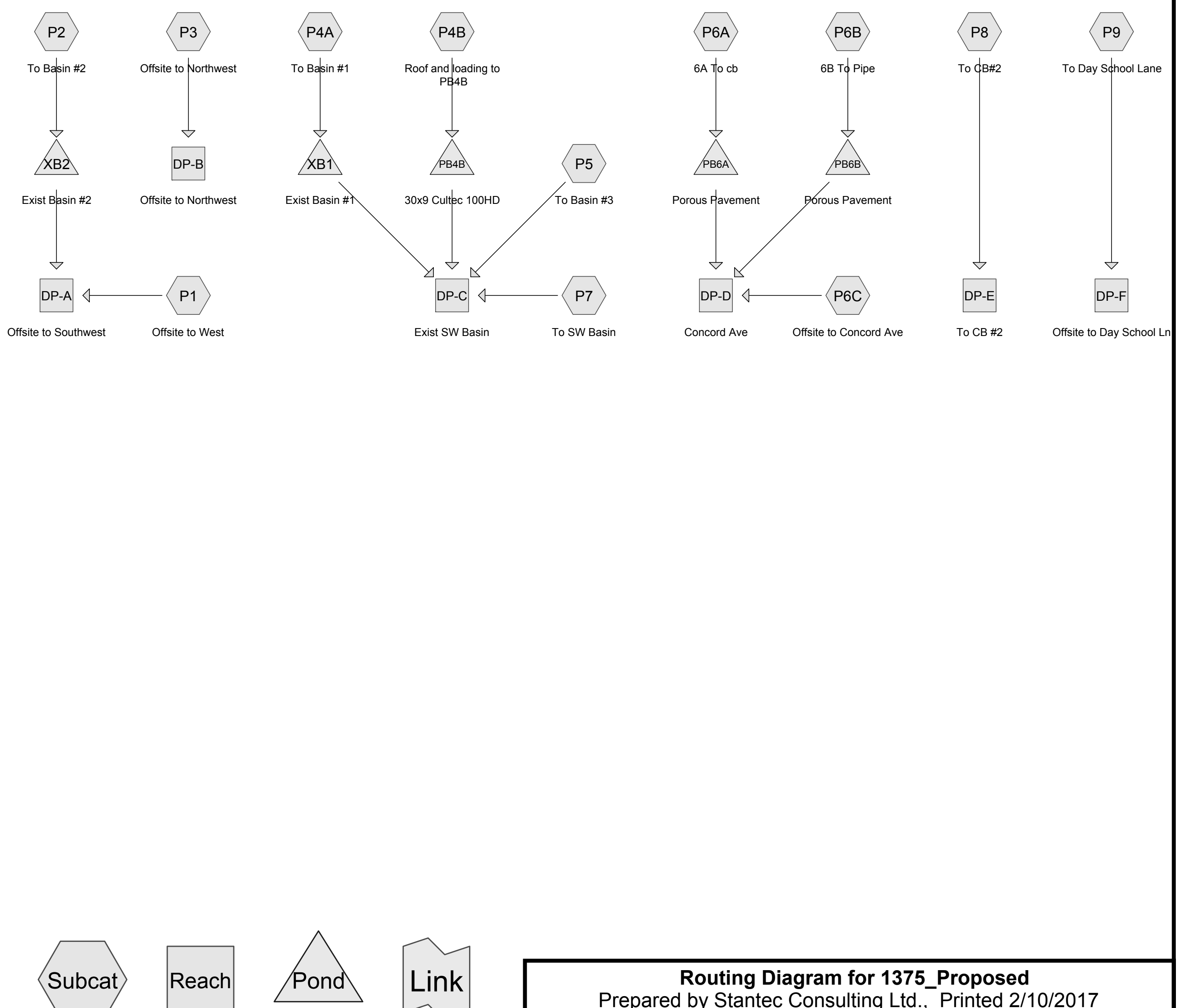


Routing Diagram for 1375_Proposed
Prepared by Stantec Consulting Ltd., Printed 2/10/2017
HydroCAD® 10.00-13 s/n 02809 © 2014 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
5.170	61	>75% Grass cover, Good, HSG B (P1, P2, P3, P4A, P4B, P5, P6A, P6B, P6C, P7, P8, P9)
2.847	98	Impervious (P2, P3, P4A, P4B, P5, P6A, P6B, P7, P8, P9)
1.449	98	Roof (P1, P2, P4B, P5, P7, P8)
1.938	55	Woods, Good, HSG B (P1, P3, P6B, P6C, P7)
11.404	**74**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
7.108	HSG B	P1, P2, P3, P4A, P4B, P5, P6A, P6B, P6C, P7, P8, P9
0.000	HSG C	
0.000	HSG D	
4.296	Other	P1, P2, P3, P4A, P4B, P5, P6A, P6B, P7, P8, P9
11.404		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	5.170	0.000	0.000	0.000	5.170	>75% Grass cover, Good	P1, P2, P3, P4A, P4B, P5, P6A, P6B, P6C, P7, P8, P9
0.000	0.000	0.000	0.000	2.847	2.847	Impervious	P2, P3, P4A, P4B, P5, P6A, P6B, P7, P8, P9
0.000	0.000	0.000	0.000	1.449	1.449	Roof	P1, P2, P4B, P5, P7, P8
0.000	1.938	0.000	0.000	0.000	1.938	Woods, Good	P1, P3, P6B, P6C, P7
0.000	**7.108**	**0.000**	**0.000**	**4.296**	**11.404**	**TOTAL AREA**	

Summary for Subcatchment P1: Offsite to West

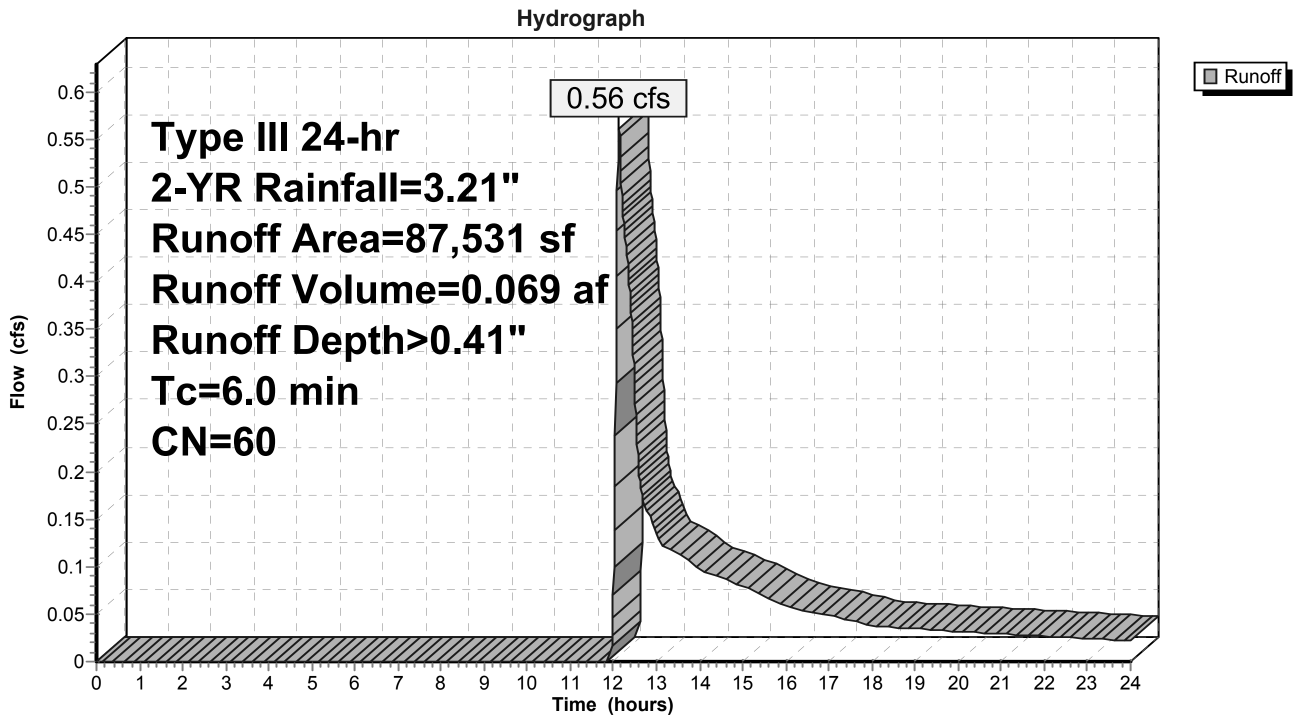
Runoff = 0.56 cfs @ 12.13 hrs, Volume= 0.069 af, Depth> 0.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.21"

	Area (sf)	CN	Description
	27,387	55	Woods, Good, HSG B
*	3,150	98	Roof
*	0	98	Impervious
	56,994	61	>75% Grass cover, Good, HSG B
	87,531	60	Weighted Average
	84,381		96.40% Pervious Area
	3,150		3.60% Impervious Area

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

Subcatchment P1: Offsite to West



Summary for Subcatchment P2: To Basin #2

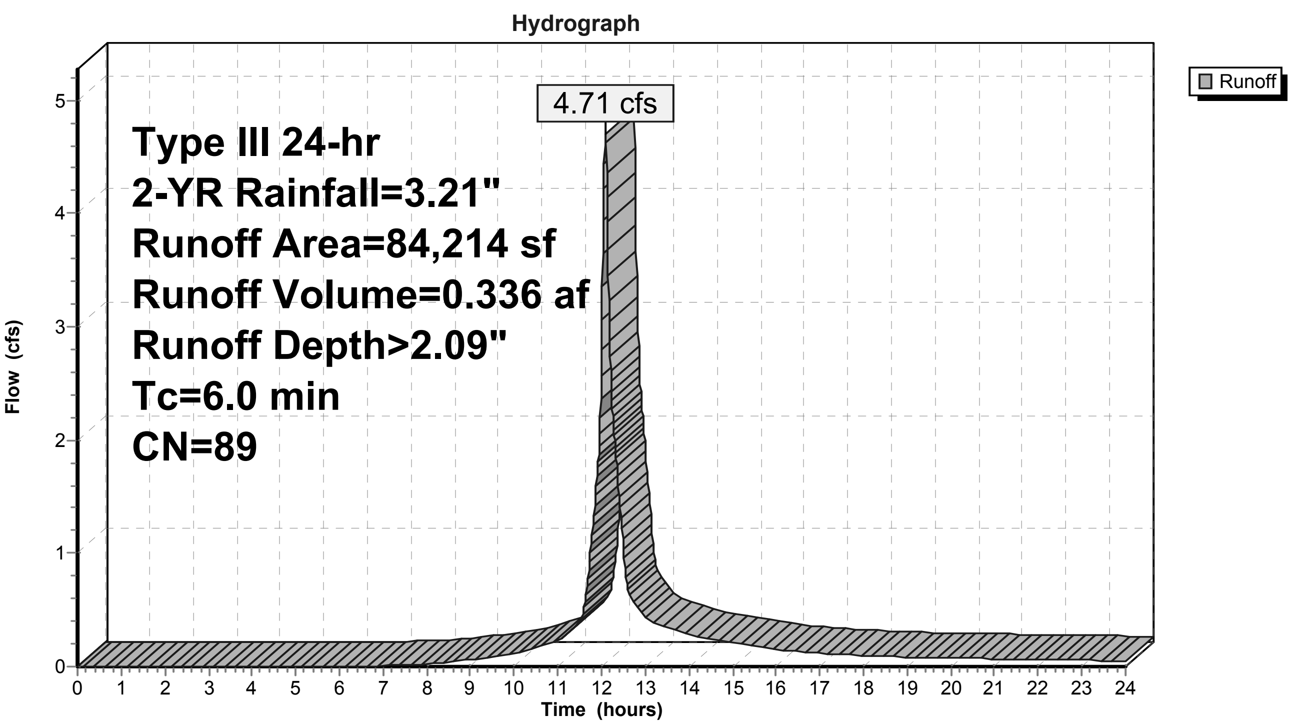
Runoff = 4.71 cfs @ 12.09 hrs, Volume= 0.336 af, Depth> 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.21"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	26,065	98	Roof
*	37,469	98	Impervious
	20,680	61	>75% Grass cover, Good, HSG B
	84,214	89	Weighted Average
	20,680		24.56% Pervious Area
	63,534		75.44% Impervious Area

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

Subcatchment P2: To Basin #2



Summary for Subcatchment P3: Offsite to Northwest

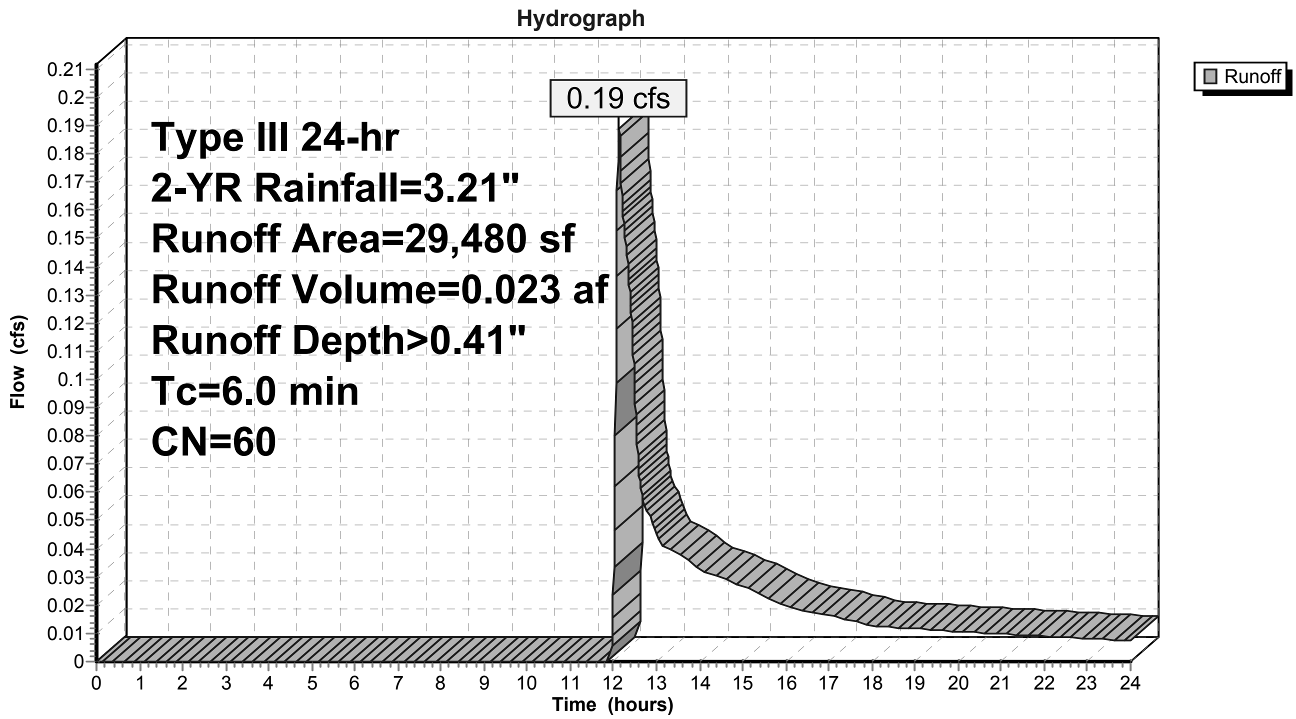
Runoff = 0.19 cfs @ 12.13 hrs, Volume= 0.023 af, Depth> 0.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.21"

	Area (sf)	CN	Description
	14,592	55	Woods, Good, HSG B
*	0	98	Roof
*	1,579	98	Impervious
	13,309	61	>75% Grass cover, Good, HSG B
	29,480	60	Weighted Average
	27,901		94.64% Pervious Area
	1,579		5.36% Impervious Area

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

Subcatchment P3: Offsite to Northwest



Summary for Subcatchment P4A: To Basin #1

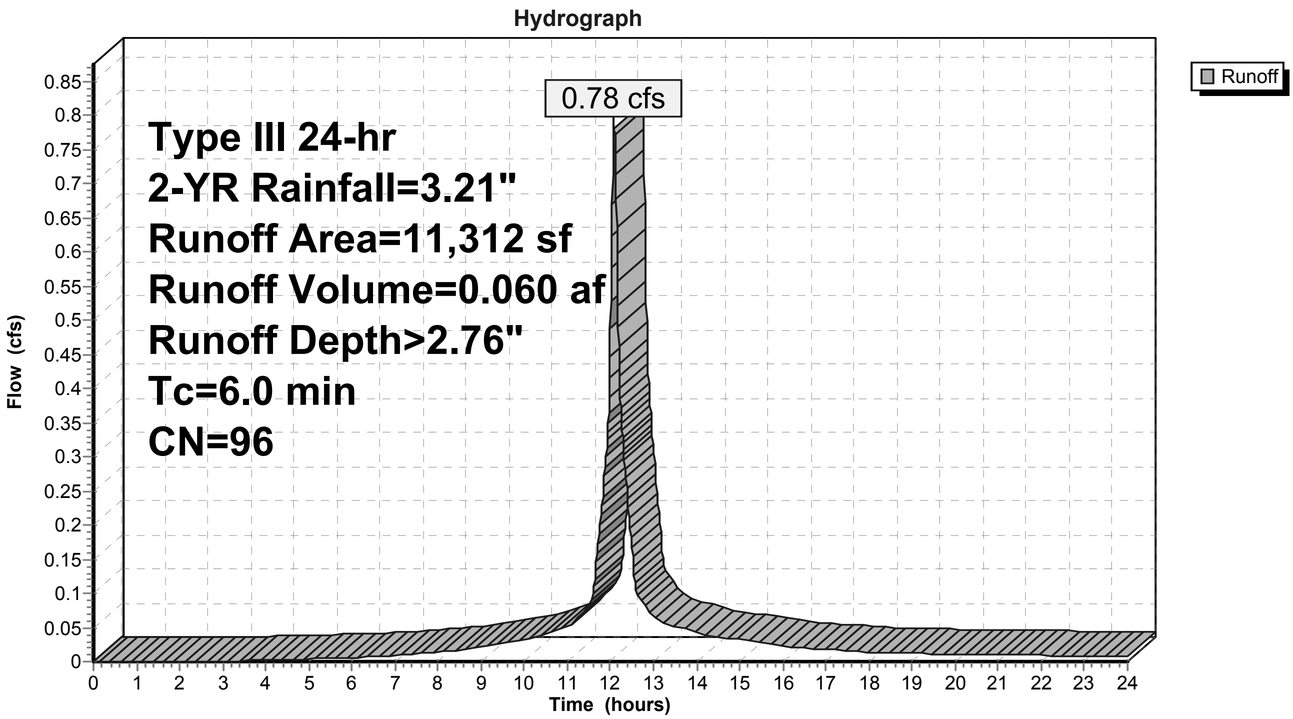
Runoff = 0.78 cfs @ 12.08 hrs, Volume= 0.060 af, Depth> 2.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.21"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	0	98	Roof
*	10,818	98	Impervious
	494	61	>75% Grass cover, Good, HSG B
	11,312	96	Weighted Average
	494		4.37% Pervious Area
	10,818		95.63% Impervious Area

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

Subcatchment P4A: To Basin #1



Summary for Subcatchment P4B: Roof and loading to PB4B

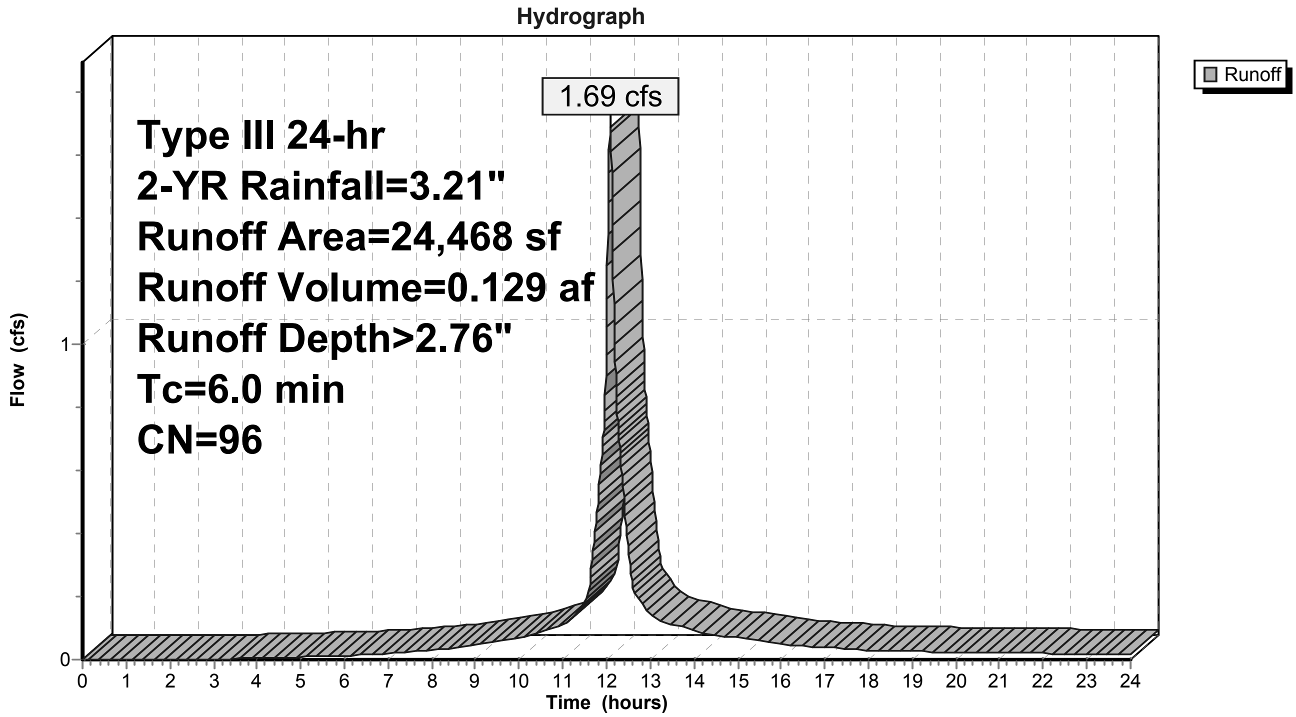
Runoff = 1.69 cfs @ 12.08 hrs, Volume= 0.129 af, Depth> 2.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.21"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	21,079	98	Roof
*	1,841	98	Impervious
	1,548	61	>75% Grass cover, Good, HSG B
*	0	69	Grasspave
	24,468	96	Weighted Average
	1,548		6.33% Pervious Area
	22,920		93.67% Impervious Area

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

Subcatchment P4B: Roof and loading to PB4B



Summary for Subcatchment P5: To Basin #3

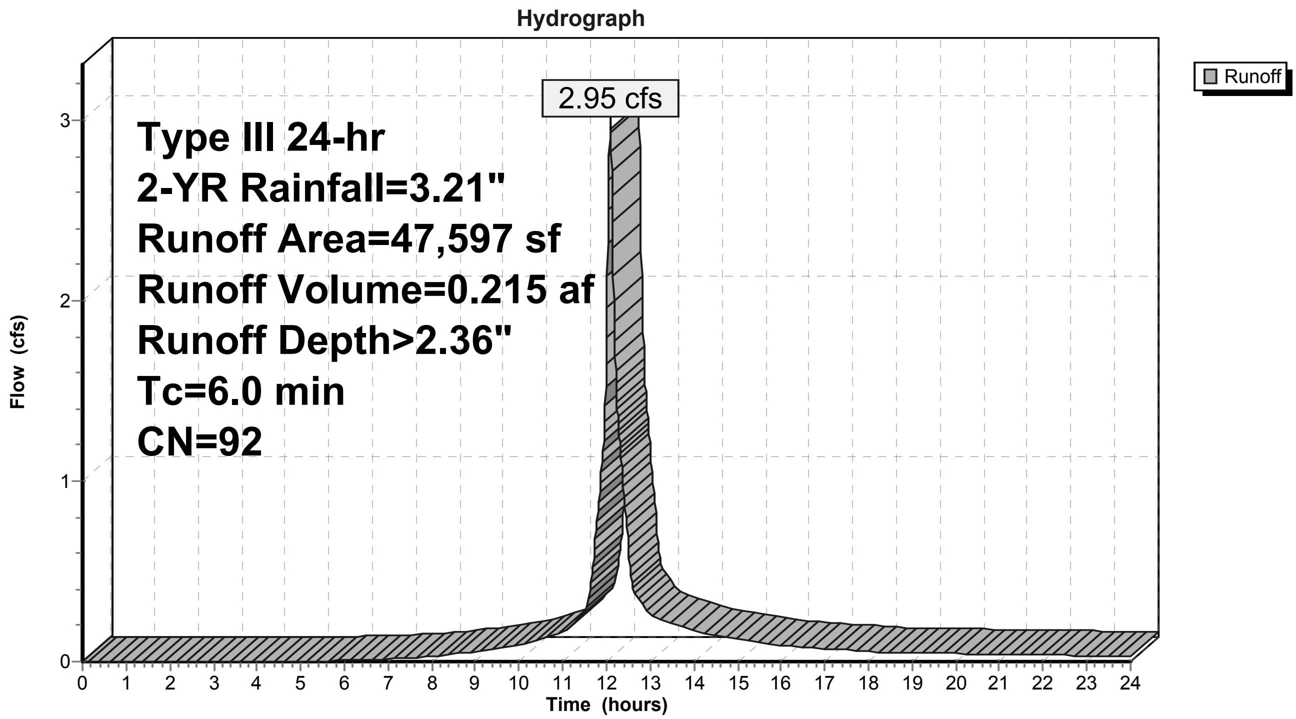
Runoff = 2.95 cfs @ 12.09 hrs, Volume= 0.215 af, Depth> 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.21"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	5,950	98	Roof
*	34,115	98	Impervious
	7,532	61	>75% Grass cover, Good, HSG B
	47,597	92	Weighted Average
	7,532		15.82% Pervious Area
	40,065		84.18% Impervious Area

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

Subcatchment P5: To Basin #3



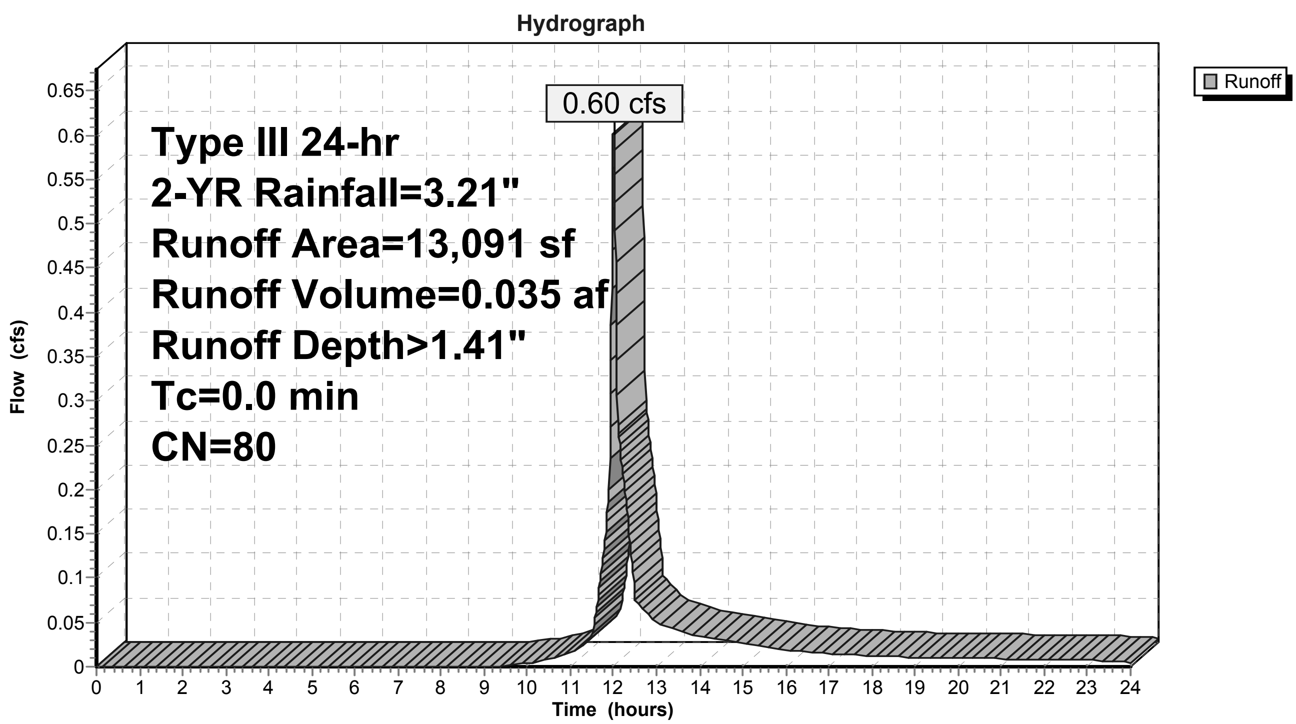
Summary for Subcatchment P6A: 6A To cb

Runoff = 0.60 cfs @ 12.00 hrs, Volume= 0.035 af, Depth> 1.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.21"

	Area (sf)	CN	Description
	6,512	61	>75% Grass cover, Good, HSG B
*	6,579	98	Impervious
	0	55	Woods, Good, HSG B
	13,091	80	Weighted Average
	6,512		49.74% Pervious Area
	6,579		50.26% Impervious Area

Subcatchment P6A: 6A To cb



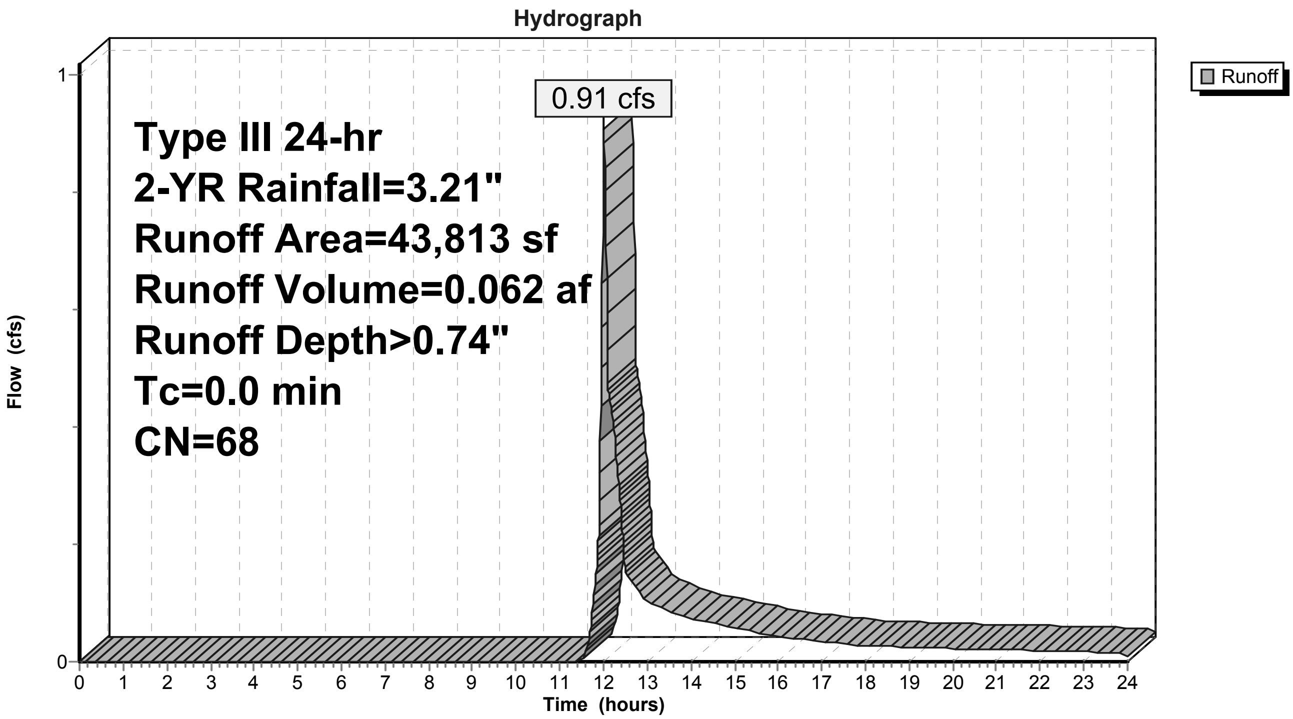
Summary for Subcatchment P6B: 6B To Pipe

Runoff = 0.91 cfs @ 12.00 hrs, Volume= 0.062 af, Depth> 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.21"

	Area (sf)	CN	Description
	25,289	61	>75% Grass cover, Good, HSG B
*	9,608	98	Impervious
	8,916	55	Woods, Good, HSG B
	43,813	68	Weighted Average
	34,205		78.07% Pervious Area
	9,608		21.93% Impervious Area

Subcatchment P6B: 6B To Pipe



Summary for Subcatchment P6C: Offsite to Concord Ave

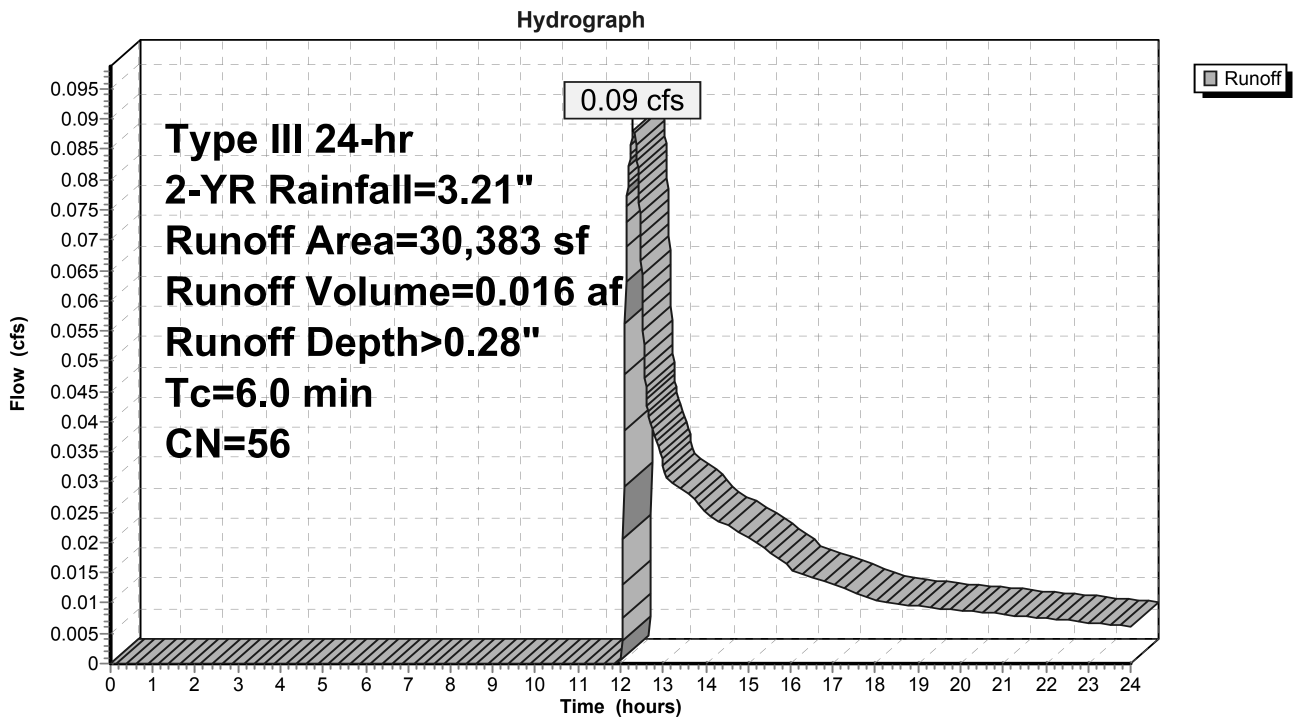
Runoff = 0.09 cfs @ 12.30 hrs, Volume= 0.016 af, Depth> 0.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.21"

	Area (sf)	CN	Description
	24,840	55	Woods, Good, HSG B
*	0	98	Roof
*	0	98	Impervious
	5,543	61	>75% Grass cover, Good, HSG B
	30,383	56	Weighted Average
	30,383		100.00% Pervious Area

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

Subcatchment P6C: Offsite to Concord Ave



Summary for Subcatchment P7: To SW Basin

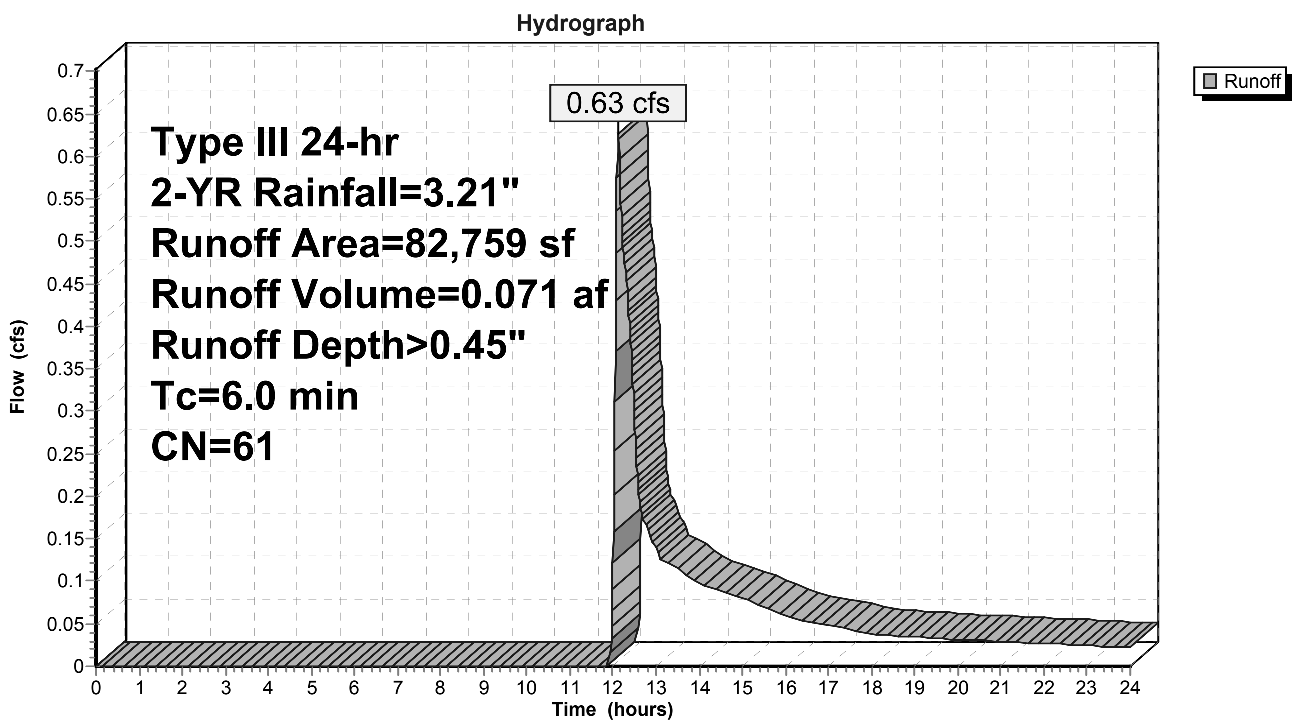
Runoff = 0.63 cfs @ 12.12 hrs, Volume= 0.071 af, Depth> 0.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.21"

	Area (sf)	CN	Description
	8,668	55	Woods, Good, HSG B
*	979	98	Roof
*	265	98	Impervious
	72,847	61	>75% Grass cover, Good, HSG B
	82,759	61	Weighted Average
	81,515		98.50% Pervious Area
	1,244		1.50% Impervious Area

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

Subcatchment P7: To SW Basin



Summary for Subcatchment P8: To CB#2

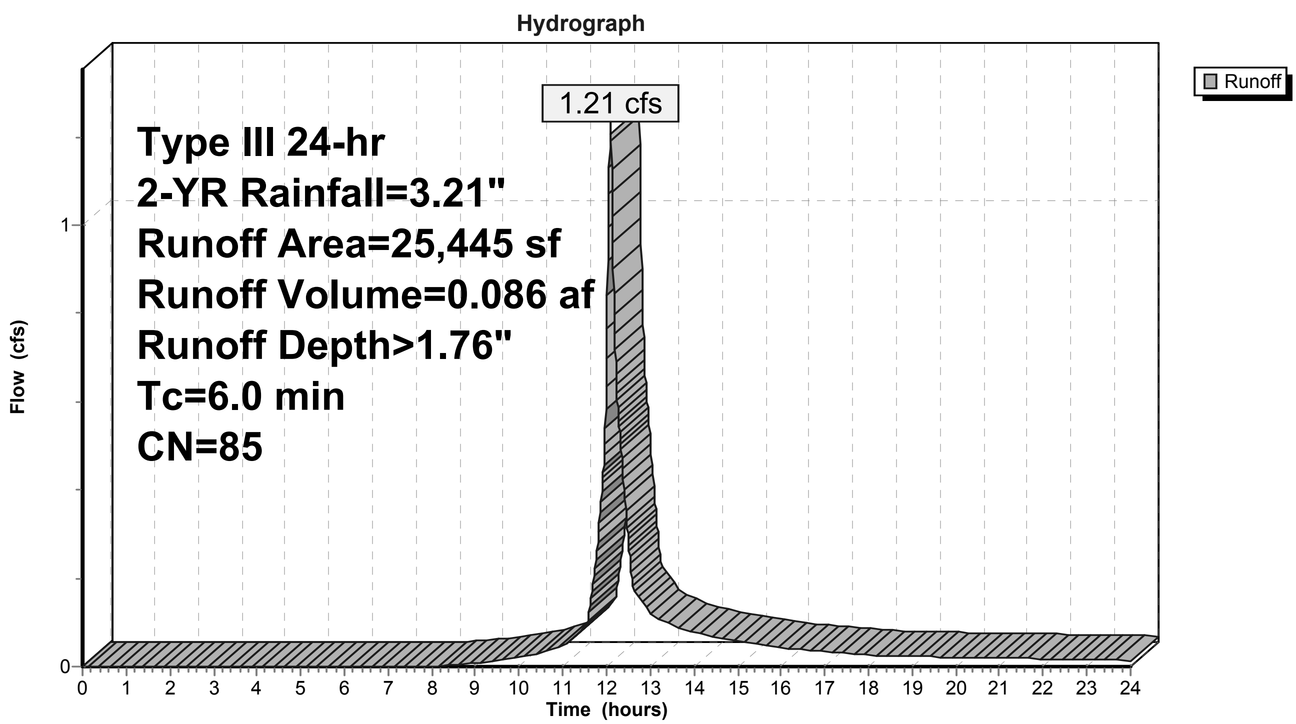
Runoff = 1.21 cfs @ 12.09 hrs, Volume= 0.086 af, Depth> 1.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.21"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	5,898	98	Roof
*	10,557	98	Impervious
	8,990	61	>75% Grass cover, Good, HSG B
	25,445	85	Weighted Average
	8,990		35.33% Pervious Area
	16,455		64.67% Impervious Area

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

Subcatchment P8: To CB#2



Summary for Subcatchment P9: To Day School Lane

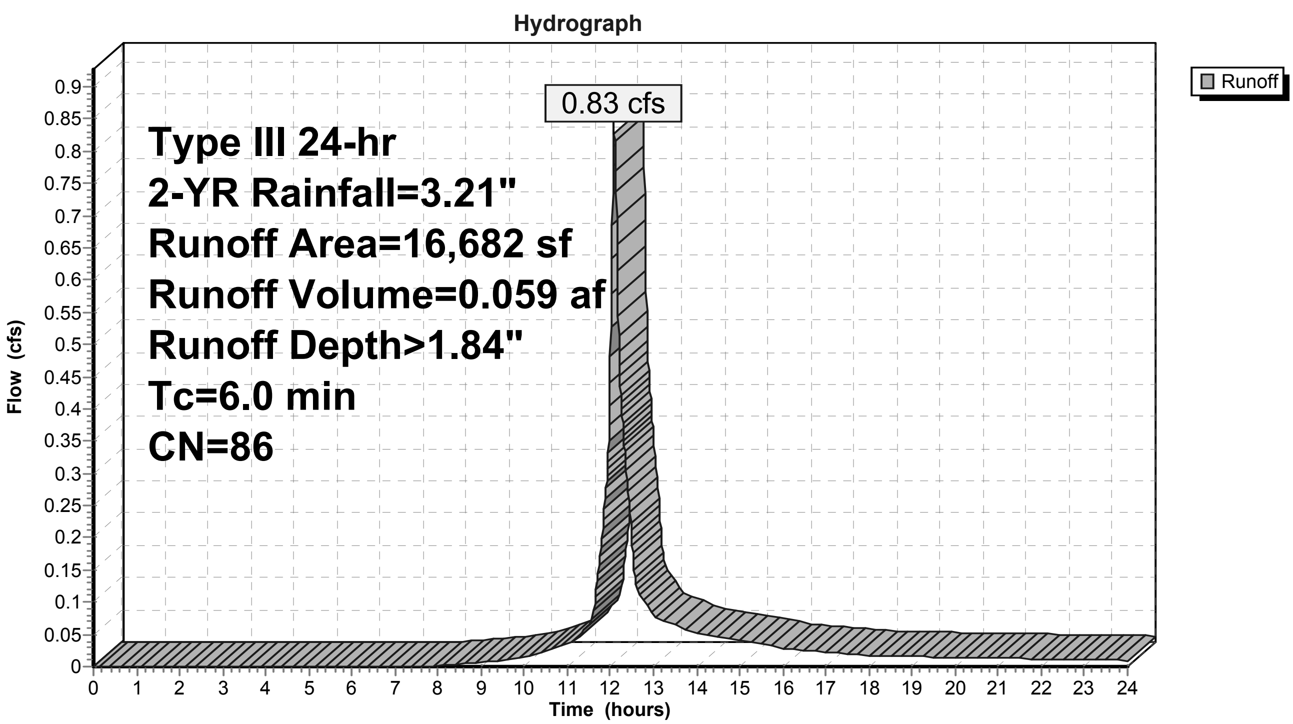
Runoff = 0.83 cfs @ 12.09 hrs, Volume= 0.059 af, Depth> 1.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.21"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	0	98	Roof
*	11,199	98	Impervious
	5,483	61	>75% Grass cover, Good, HSG B
	16,682	86	Weighted Average
	5,483		32.87% Pervious Area
	11,199		67.13% Impervious Area

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

Subcatchment P9: To Day School Lane

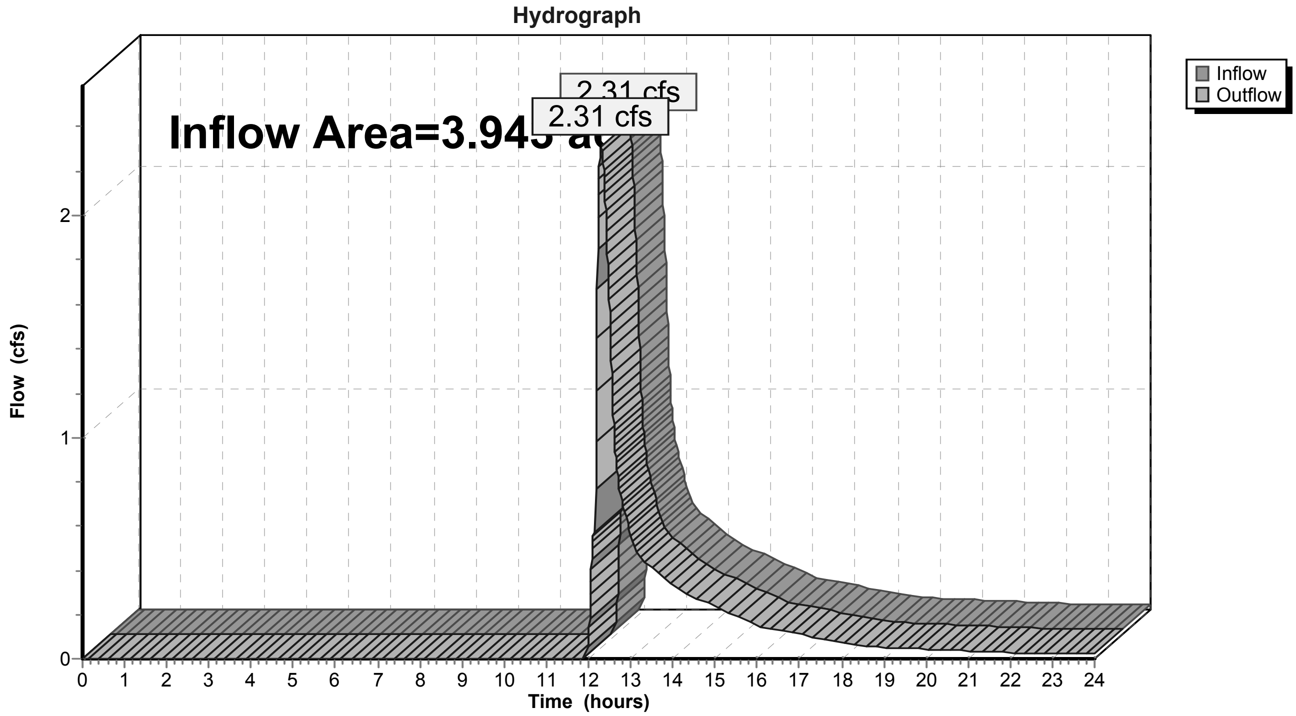


Summary for Reach DP-A: Offsite to Southwest

Inflow Area = 3.943 ac, 38.83% Impervious, Inflow Depth > 0.62" for 2-YR event
Inflow = 2.31 cfs @ 12.30 hrs, Volume= 0.205 af
Outflow = 2.31 cfs @ 12.30 hrs, Volume= 0.205 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-A: Offsite to Southwest

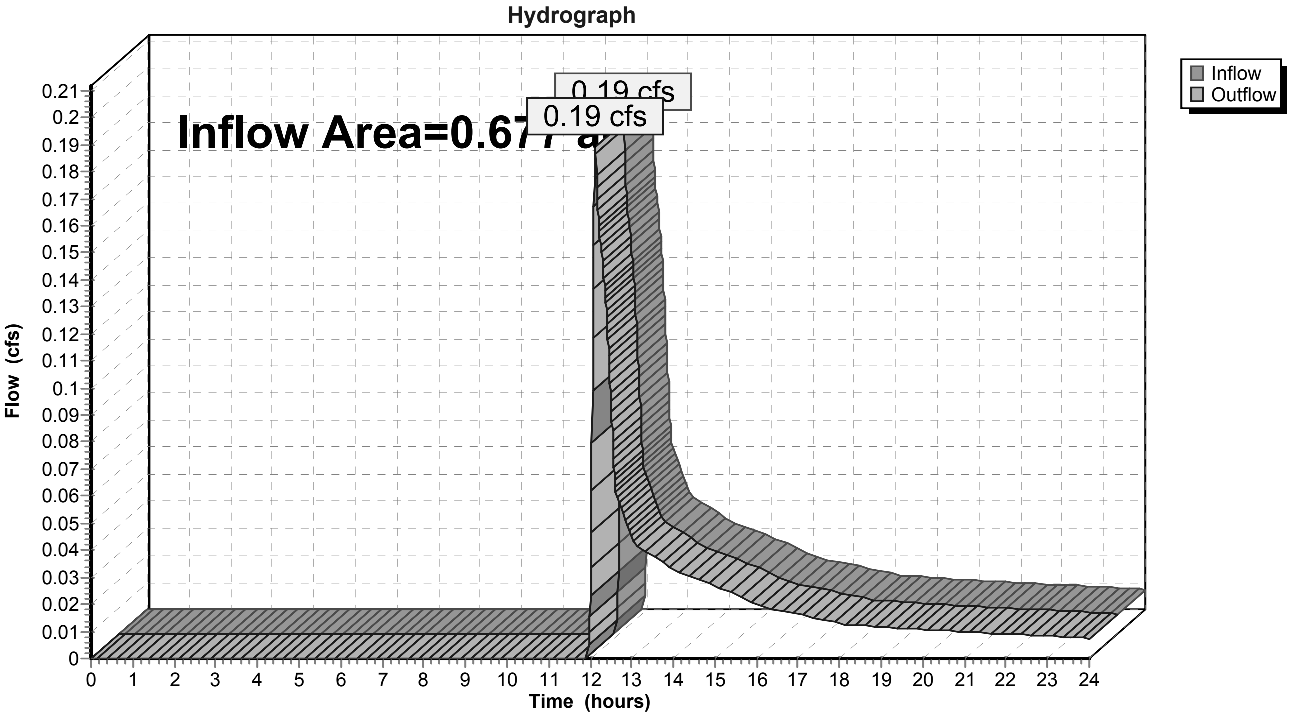


Summary for Reach DP-B: Offsite to Northwest

Inflow Area = 0.677 ac, 5.36% Impervious, Inflow Depth > 0.41" for 2-YR event
Inflow = 0.19 cfs @ 12.13 hrs, Volume= 0.023 af
Outflow = 0.19 cfs @ 12.13 hrs, Volume= 0.023 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-B: Offsite to Northwest

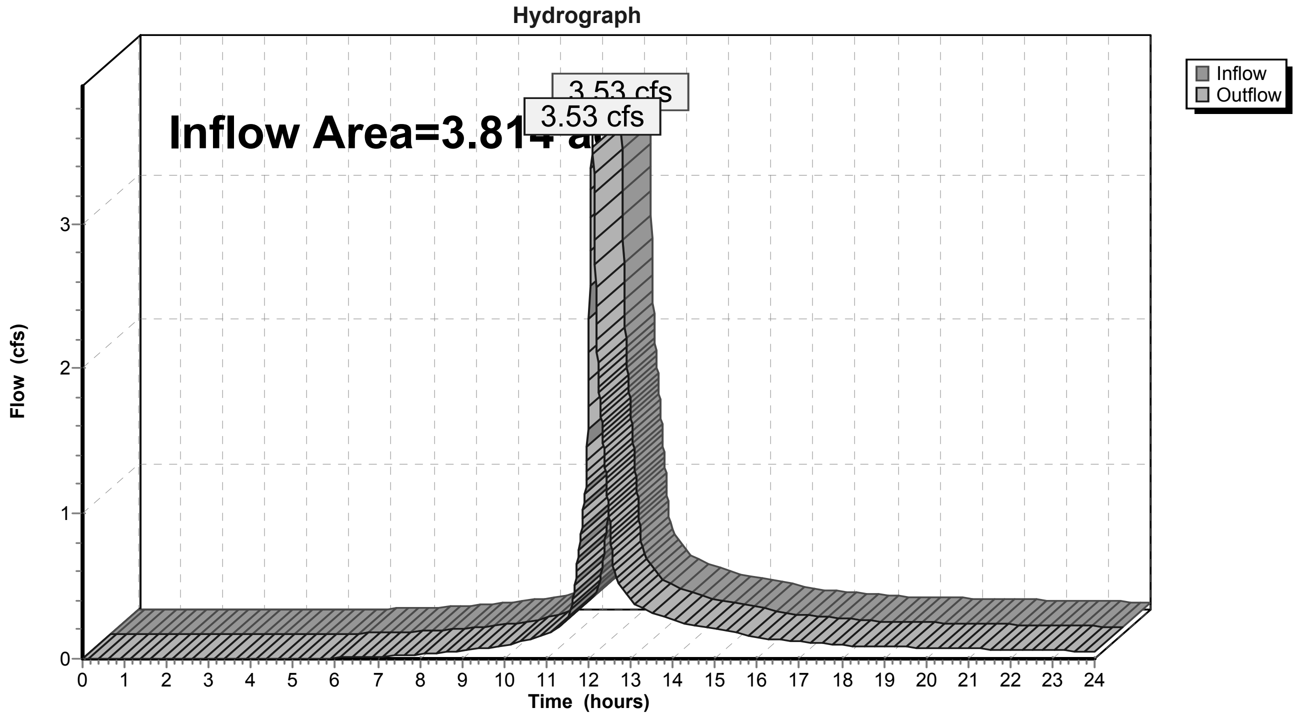


Summary for Reach DP-C: Exist SW Basin

Inflow Area =	3.814 ac, 45.17% Impervious,	Inflow Depth > 0.90" for 2-YR event		
Inflow =	3.53 cfs @	12.09 hrs, Volume=	0.285 af	
Outflow =	3.53 cfs @	12.09 hrs, Volume=	0.285 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-C: Exist SW Basin

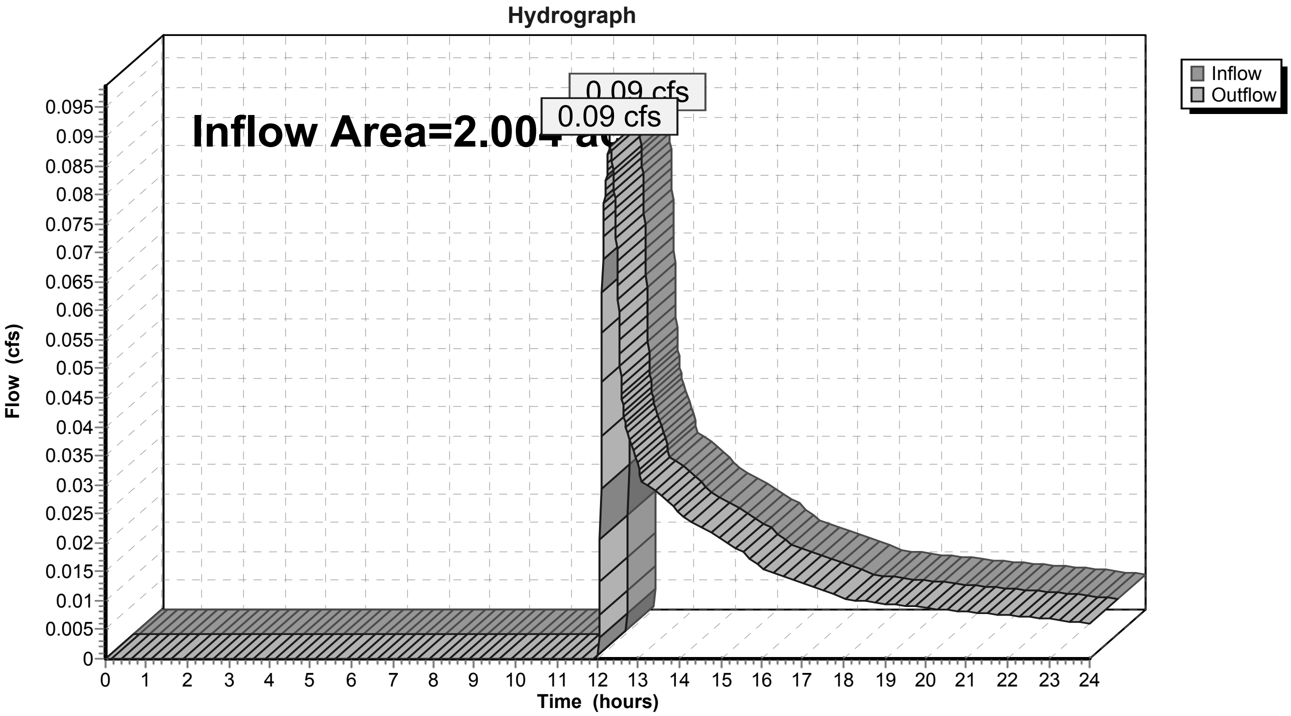


Summary for Reach DP-D: Concord Ave

Inflow Area =	2.004 ac, 18.54% Impervious, Inflow Depth > 0.10"	for 2-YR event	
Inflow =	0.09 cfs @ 12.30 hrs, Volume=	0.016 af	
Outflow =	0.09 cfs @ 12.30 hrs, Volume=	0.016 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-D: Concord Ave

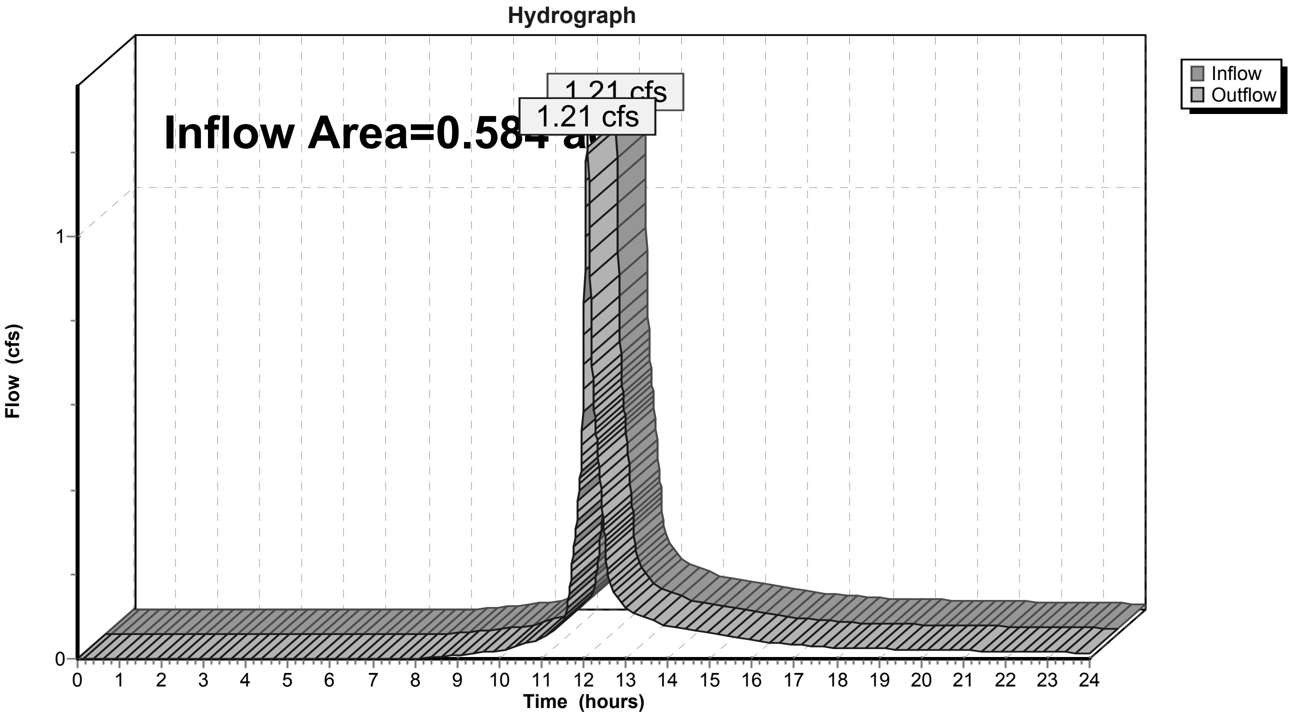


Summary for Reach DP-E: To CB #2

Inflow Area =	0.584 ac,	64.67% Impervious,	Inflow Depth > 1.76"	for 2-YR event
Inflow =	1.21 cfs @	12.09 hrs, Volume=	0.086 af	
Outflow =	1.21 cfs @	12.09 hrs, Volume=	0.086 af, Atten= 0%, Lag= 0.0 min	

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-E: To CB #2

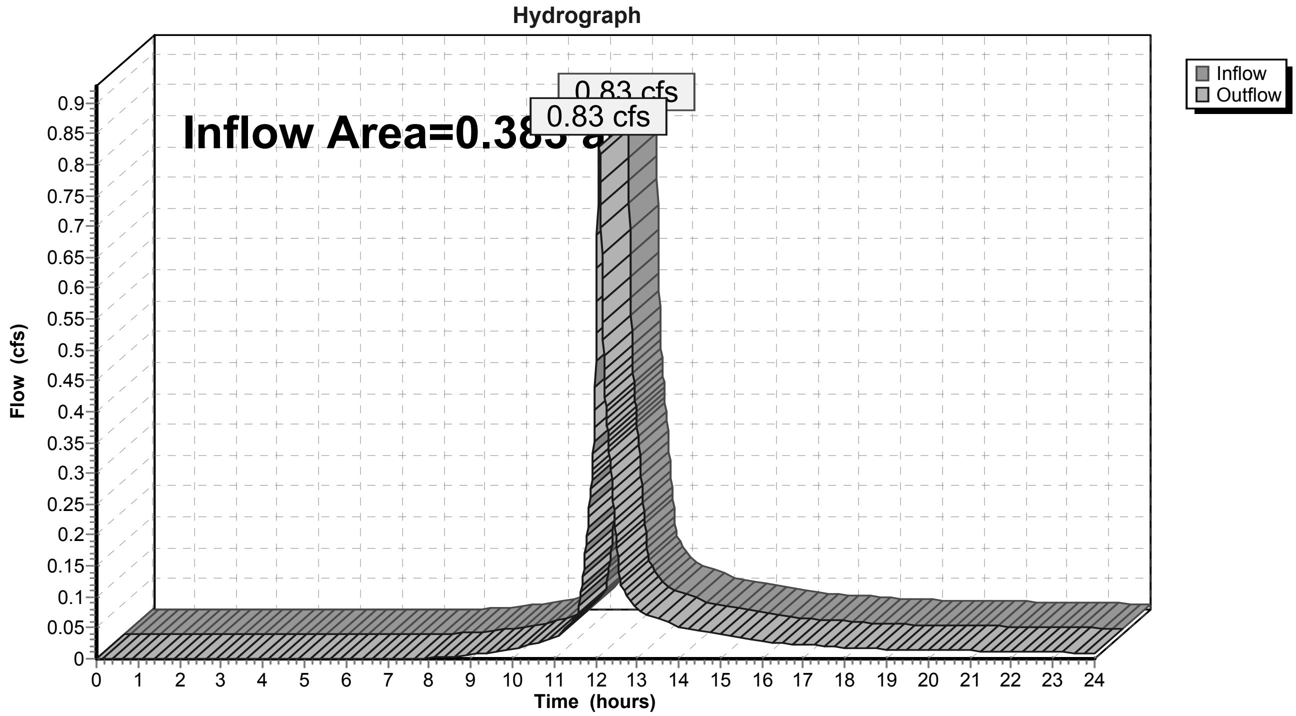


Summary for Reach DP-F: Offsite to Day School Ln

Inflow Area =	0.383 ac,	67.13% Impervious,	Inflow Depth > 1.84"	for 2-YR event	
Inflow =	0.83 cfs @	12.09 hrs,	Volume=	0.059 af	
Outflow =	0.83 cfs @	12.09 hrs,	Volume=	0.059 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-F: Offsite to Day School Ln



Summary for Pond PB4B: 30x9 Cultec 100HD

Inflow Area =	0.562 ac, 93.67% Impervious, Inflow Depth > 2.76" for 2-YR event			
Inflow =	1.69 cfs @	12.08 hrs, Volume=	0.129 af	
Outflow =	0.17 cfs @	12.84 hrs, Volume=	0.129 af,	Atten= 90%, Lag= 45.4 min
Discarded =	0.17 cfs @	12.84 hrs, Volume=	0.129 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= 0.01 hrs / 2
Peak Elev= 282.66' @ 12.84 hrs Surf.Area= 7,204 sf Storage= 2,002 cf

Plug-Flow detention time= 86.3 min calculated for 0.129 af (100% of inflow)
Center-of-Mass det. time= 85.3 min (858.7 - 773.4)

Volume	Invert	Avail.Storage	Storage Description
#1C	282.00'	3,279 cf	**31.67'W x 227.50'L x 2.04'H Field C**
			14,709 cf Overall - 3,778 cf Embedded = 10,931 cf x 30.0% Voids
#2C	282.50'	3,778 cf	**Cultec C-100HD** x 270 Inside #1
			Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf
			Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
			Row Length Adjustment= +0.50' x 1.86 sf x 9 rows
#3	282.00'	53 cf	**4.00'D x 4.20'H Vertical Cone/Cylinder**-Impervious
		7,110 cf	Total Available Storage

Storage Group C created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	282.00'	**1.020 in/hr Exfiltration over Surface area**
			Conductivity to Groundwater Elevation = 0.00'
#2	Primary	284.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600

Discarded OutFlow Max=0.17 cfs @ 12.84 hrs HW=282.66' (Free Discharge)
└─**1=Exfiltration** (Controls 0.17 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=282.00' (Free Discharge)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond PB4B: 30x9 Cultec 100HD - Chamber Wizard Field C

Chamber Model = Cultec C-100HD (Cultec Contactor® 100HD)
Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf
Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
Row Length Adjustment= +0.50' x 1.86 sf x 9 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

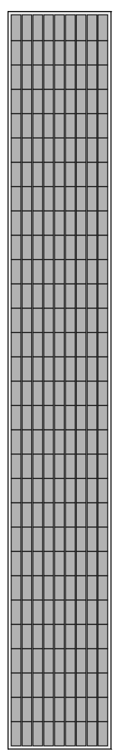
30 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 225.50' Row Length +12.0" End Stone x 2 = 227.50' Base Length
9 Rows x 36.0" Wide + 4.0" Spacing x 8 + 12.0" Side Stone x 2 = 31.67' Base Width
6.0" Base + 12.5" Chamber Height + 6.0" Cover = 2.04' Field Height

270 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 9 Rows = 3,777.9 cf Chamber Storage

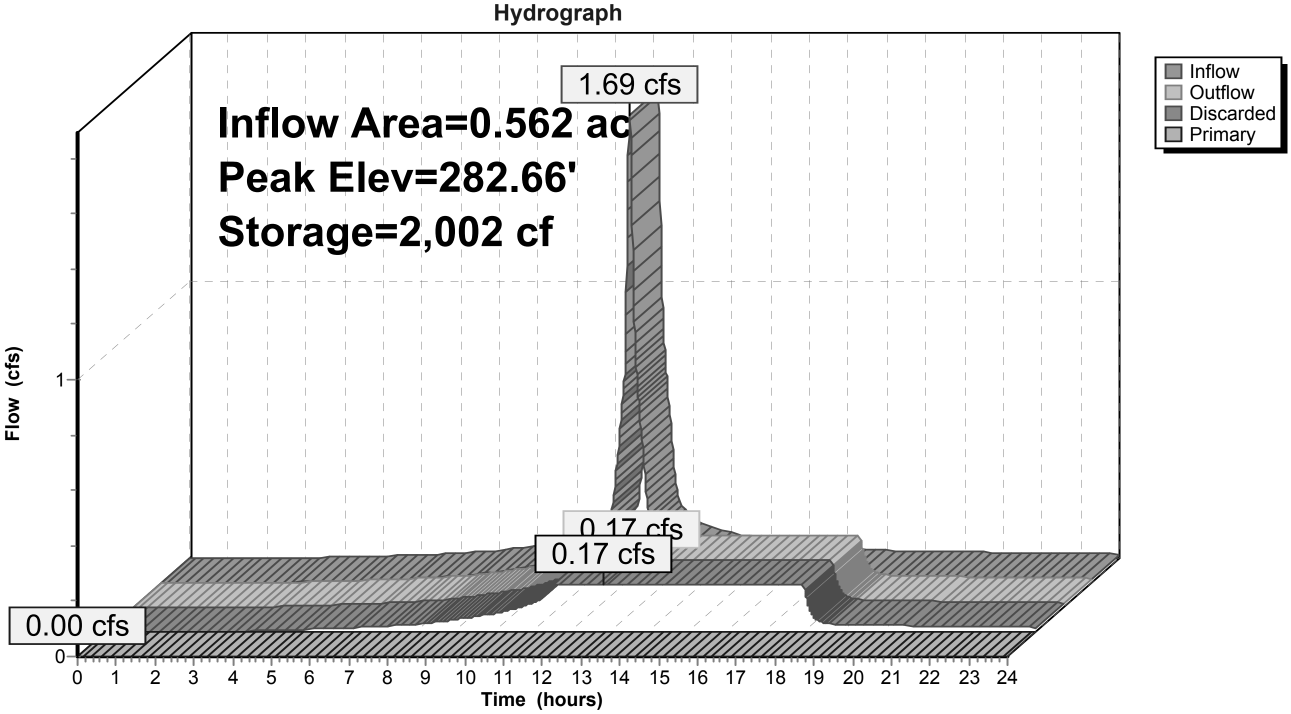
14,708.5 cf Field - 3,777.9 cf Chambers = 10,930.6 cf Stone x 30.0% Voids = 3,279.2 cf Stone Storage

Chamber Storage + Stone Storage = 7,057.1 cf = 0.162 af
Overall Storage Efficiency = 48.0%

270 Chambers
544.8 cy Field
404.8 cy Stone



Pond PB4B: 30x9 Cultec 100HD



Stage-Discharge for Pond PB4B: 30x9 Cultec 100HD

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
282.00	0.00	0.00	0.00
282.05	0.17	0.17	0.00
282.10	0.17	0.17	0.00
282.15	0.17	0.17	0.00
282.20	0.17	0.17	0.00
282.25	0.17	0.17	0.00
282.30	0.17	0.17	0.00
282.35	0.17	0.17	0.00
282.40	0.17	0.17	0.00
282.45	0.17	0.17	0.00
282.50	0.17	0.17	0.00
282.55	0.17	0.17	0.00
282.60	0.17	0.17	0.00
282.65	0.17	0.17	0.00
282.70	0.17	0.17	0.00
282.75	0.17	0.17	0.00
282.80	0.17	0.17	0.00
282.85	0.17	0.17	0.00
282.90	0.17	0.17	0.00
282.95	0.17	0.17	0.00
283.00	0.17	0.17	0.00
283.05	0.17	0.17	0.00
283.10	0.17	0.17	0.00
283.15	0.17	0.17	0.00
283.20	0.17	0.17	0.00
283.25	0.17	0.17	0.00
283.30	0.17	0.17	0.00
283.35	0.17	0.17	0.00
283.40	0.17	0.17	0.00
283.45	0.17	0.17	0.00
283.50	0.17	0.17	0.00
283.55	0.17	0.17	0.00
283.60	0.17	0.17	0.00
283.65	0.17	0.17	0.00
283.70	0.17	0.17	0.00
283.75	0.17	0.17	0.00
283.80	0.17	0.17	0.00
283.85	0.17	0.17	0.00
283.90	0.17	0.17	0.00
283.95	0.17	0.17	0.00
284.00	0.17	0.17	0.00
284.05	0.17	0.17	0.00
284.10	0.17	0.17	0.00
284.15	0.17	0.17	0.00
284.20	0.17	0.17	0.00
284.25	0.17	0.17	0.00
284.30	0.17	0.17	0.00
284.35	0.17	0.17	0.00
284.40	0.17	0.17	0.00
284.45	0.17	0.17	0.00
284.50	0.17	0.17	0.00
284.55	0.19	0.17	0.02
284.60	0.23	0.17	0.06
284.65	0.30	0.17	0.13
284.70	0.40	0.17	0.22
284.75	0.51	0.17	0.33
284.80	0.63	0.17	0.46
284.85	0.76	0.17	0.59
284.90	0.90	0.17	0.73
284.95	1.02	0.17	0.85
285.00	1.12	0.17	0.95
285.05	1.21	0.17	1.04
285.10	1.29	0.17	1.12
285.15	1.37	0.17	1.20
285.20	1.44	0.17	1.27
285.25	1.51	0.17	1.34
285.30	1.57	0.17	1.40
285.35	1.64	0.17	1.46
285.40	1.70	0.17	1.52
285.45	1.75	0.17	1.58
285.50	1.81	0.17	1.64
285.55	1.86	0.17	1.69
285.60	1.92	0.17	1.74
285.65	1.97	0.17	1.79
285.70	2.02	0.17	1.84
285.75	2.06	0.17	1.89
285.80	2.11	0.17	1.94
285.85	2.16	0.17	1.98
285.90	2.20	0.17	2.03
285.95	2.24	0.17	2.07
286.00	2.29	0.17	2.11
286.05	2.33	0.17	2.16
286.10	2.37	0.17	2.20
286.15	2.41	0.17	2.24
286.20	**2.45**	**0.17**	**2.28**

Stage-Area-Storage for Pond PB4B: 30x9 Cultec 100HD

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
282.00	**7,204**	0	284.65	7,204	7,090
282.05	7,204	109	284.70	7,204	7,091
282.10	7,204	217	284.75	7,204	7,092
282.15	7,204	326	284.80	7,204	7,092
282.20	7,204	435	284.85	7,204	7,093
282.25	7,204	543	284.90	7,204	7,094
282.30	7,204	652	284.95	7,204	7,094
282.35	7,204	761	285.00	7,204	7,095
282.40	7,204	870	285.05	7,204	7,095
282.45	7,204	978	285.10	7,204	7,096
282.50	7,204	1,087	285.15	7,204	7,097
282.55	7,204	1,383	285.20	7,204	7,097
282.60	7,204	1,674	285.25	7,204	7,098
282.65	7,204	1,960	285.30	7,204	7,099
282.70	7,204	2,242	285.35	7,204	7,099
282.75	7,204	2,524	285.40	7,204	7,100
282.80	7,204	2,804	285.45	7,204	7,100
282.85	7,204	3,082	285.50	7,204	7,101
282.90	7,204	3,355	285.55	7,204	7,102
282.95	7,204	3,623	285.60	7,204	7,102
283.00	7,204	3,886	285.65	7,204	7,103
283.05	7,204	4,144	285.70	7,204	7,104
283.10	7,204	4,396	285.75	7,204	7,104
283.15	7,204	4,639	285.80	7,204	7,105
283.20	7,204	4,873	285.85	7,204	7,105
283.25	7,204	5,094	285.90	7,204	7,106
283.30	7,204	5,299	285.95	7,204	7,107
283.35	7,204	5,486	286.00	7,204	7,107
283.40	7,204	5,649	286.05	7,204	7,108
283.45	7,204	5,787	286.10	7,204	7,109
283.50	7,204	5,905	286.15	7,204	7,109
283.55	7,204	6,014	286.20	7,204	**7,110**
283.60	7,204	6,123			
283.65	7,204	6,231			
283.70	7,204	6,340			
283.75	7,204	6,449			
283.80	7,204	6,557			
283.85	7,204	6,666			
283.90	7,204	6,775			
283.95	7,204	6,883			
284.00	7,204	6,992			
284.05	7,204	7,083			
284.10	7,204	7,083			
284.15	7,204	7,084			
284.20	7,204	7,085			
284.25	7,204	7,085			
284.30	7,204	7,086			
284.35	7,204	7,087			
284.40	7,204	7,087			
284.45	7,204	7,088			
284.50	7,204	7,089			
284.55	7,204	7,089			
284.60	7,204	7,090			

Summary for Pond PB6A: Porous Pavement

Inflow Area = 0.301 ac, 50.26% Impervious, Inflow Depth > 1.41" for 2-YR event
Inflow = 0.60 cfs @ 12.00 hrs, Volume= 0.035 af
Outflow = 0.16 cfs @ 12.35 hrs, Volume= 0.034 af, Atten= 74%, Lag= 20.9 min
Discarded = 0.16 cfs @ 12.35 hrs, Volume= 0.034 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= 0.01 hrs / 2
Peak Elev= 282.38' @ 12.35 hrs Surf.Area= 6,592 sf Storage= 297 cf

Plug-Flow detention time= 29.9 min calculated for 0.034 af (97% of inflow)
Center-of-Mass det. time= 13.8 min (850.8 - 837.0)

Volume	Invert	Avail.Storage	Storage Description
#1	282.25'	3,947 cf	**Porous Pavement (Irregular)**Listed below (Recalc) 13,158 cf Overall x 30.0% Voids
#2	278.60'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**
		4,023 cf	Total Available Storage

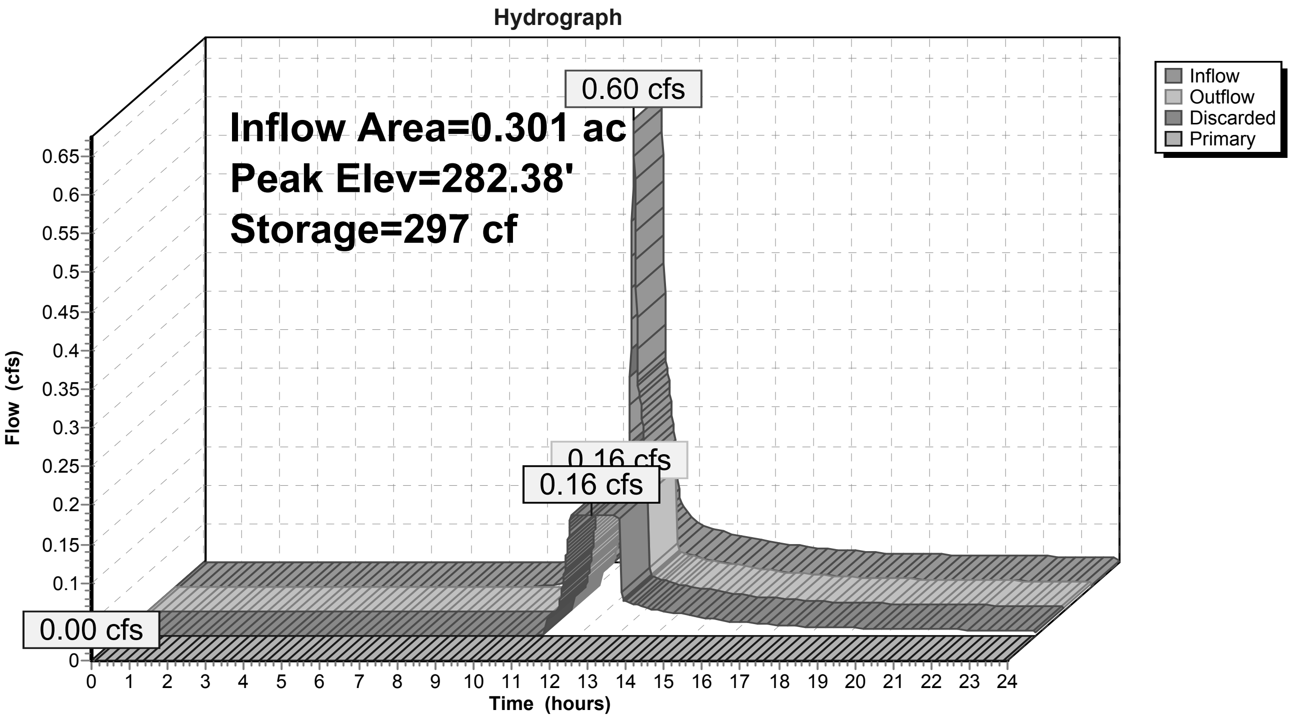
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
282.25	6,579	629.0	0	0	6,579
284.25	6,579	629.0	13,158	13,158	7,837

Device	Routing	Invert	Outlet Devices
#1	Discarded	278.60'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	284.58'	**2.3" x 2.3" Horiz. Orifice/Grate X 36.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.16 cfs @ 12.35 hrs HW=282.38' (Free Discharge)
└─**1=Exfiltration** (Controls 0.16 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=278.60' (Free Discharge)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond PB6A: Porous Pavement



Stage-Discharge for Pond PB6A: Porous Pavement

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
278.60	0.00	0.00	0.00
278.70	0.00	0.00	0.00
278.80	0.00	0.00	0.00
278.90	0.00	0.00	0.00
279.00	0.00	0.00	0.00
279.10	0.00	0.00	0.00
279.20	0.00	0.00	0.00
279.30	0.00	0.00	0.00
279.40	0.00	0.00	0.00
279.50	0.00	0.00	0.00
279.60	0.00	0.00	0.00
279.70	0.00	0.00	0.00
279.80	0.00	0.00	0.00
279.90	0.00	0.00	0.00
280.00	0.00	0.00	0.00
280.10	0.00	0.00	0.00
280.20	0.00	0.00	0.00
280.30	0.00	0.00	0.00
280.40	0.00	0.00	0.00
280.50	0.00	0.00	0.00
280.60	0.00	0.00	0.00
280.70	0.00	0.00	0.00
280.80	0.00	0.00	0.00
280.90	0.00	0.00	0.00
281.00	0.00	0.00	0.00
281.10	0.00	0.00	0.00
281.20	0.00	0.00	0.00
281.30	0.00	0.00	0.00
281.40	0.00	0.00	0.00
281.50	0.00	0.00	0.00
281.60	0.00	0.00	0.00
281.70	0.00	0.00	0.00
281.80	0.00	0.00	0.00
281.90	0.00	0.00	0.00
282.00	0.00	0.00	0.00
282.10	0.00	0.00	0.00
282.20	0.00	0.00	0.00
282.30	0.16	0.16	0.00
282.40	0.16	0.16	0.00
282.50	0.16	0.16	0.00
282.60	0.16	0.16	0.00
282.70	0.16	0.16	0.00
282.80	0.16	0.16	0.00
282.90	0.16	0.16	0.00
283.00	0.16	0.16	0.00
283.10	0.16	0.16	0.00
283.20	0.16	0.16	0.00
283.30	0.16	0.16	0.00
283.40	0.16	0.16	0.00
283.50	0.16	0.16	0.00
283.60	0.16	0.16	0.00
283.70	0.16	0.16	0.00
283.80	0.16	0.16	0.00
283.90	0.16	0.16	0.00
284.00	0.16	0.16	0.00
284.10	0.16	0.16	0.00
284.20	0.16	0.16	0.00
284.30	0.16	0.16	0.00
284.40	0.16	0.16	0.00
284.50	0.16	0.16	0.00
284.60	**0.41**	**0.16**	**0.26**

Stage-Area-Storage for Pond PB6A: Porous Pavement

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
278.60	13	0
278.70	13	1
278.80	13	3
278.90	13	4
279.00	13	5
279.10	13	6
279.20	13	8
279.30	13	9
279.40	13	10
279.50	13	11
279.60	13	13
279.70	13	14
279.80	13	15
279.90	13	16
280.00	13	18
280.10	13	19
280.20	13	20
280.30	13	21
280.40	13	23
280.50	13	24
280.60	13	25
280.70	13	26
280.80	13	28
280.90	13	29
281.00	13	30
281.10	13	31
281.20	13	33
281.30	13	34
281.40	13	35
281.50	13	36
281.60	13	38
281.70	13	39
281.80	13	40
281.90	13	41
282.00	13	43
282.10	13	44
282.20	**13**	45
282.30	**6,592**	145
282.40	6,592	344
282.50	6,592	542
282.60	6,592	741
282.70	6,592	940
282.80	6,592	1,138
282.90	6,592	1,337
283.00	6,592	1,536
283.10	6,592	1,734
283.20	6,592	1,933
283.30	6,592	2,131
283.40	6,592	2,330
283.50	6,592	2,529
283.60	6,592	2,727
283.70	6,592	2,926
283.80	6,592	3,125
283.90	6,592	3,323
284.00	6,592	3,522
284.10	6,592	3,720
284.20	6,592	3,919
284.30	6,592	4,019
284.40	6,592	4,020
284.50	6,592	4,022
284.60	6,592	**4,023**

Summary for Pond PB6B: Porous Pavement

Inflow Area = 1.006 ac, 21.93% Impervious, Inflow Depth > 0.74" for 2-YR event
Inflow = 0.91 cfs @ 12.00 hrs, Volume= 0.062 af
Outflow = 0.23 cfs @ 12.43 hrs, Volume= 0.062 af, Atten= 75%, Lag= 25.4 min
Discarded = 0.23 cfs @ 12.43 hrs, Volume= 0.062 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= 0.01 hrs / 2
Peak Elev= 263.17' @ 12.43 hrs Surf.Area= 9,608 sf Storage= 499 cf

Plug-Flow detention time= 13.6 min calculated for 0.062 af (100% of inflow)
Center-of-Mass det. time= 12.8 min (890.2 - 877.3)

Volume	Invert	Avail.Storage	Storage Description
#1	263.00'	5,765 cf	**Porous Pavement (Irregular)**Listed below (Recalc) 19,216 cf Overall x 30.0% Voids

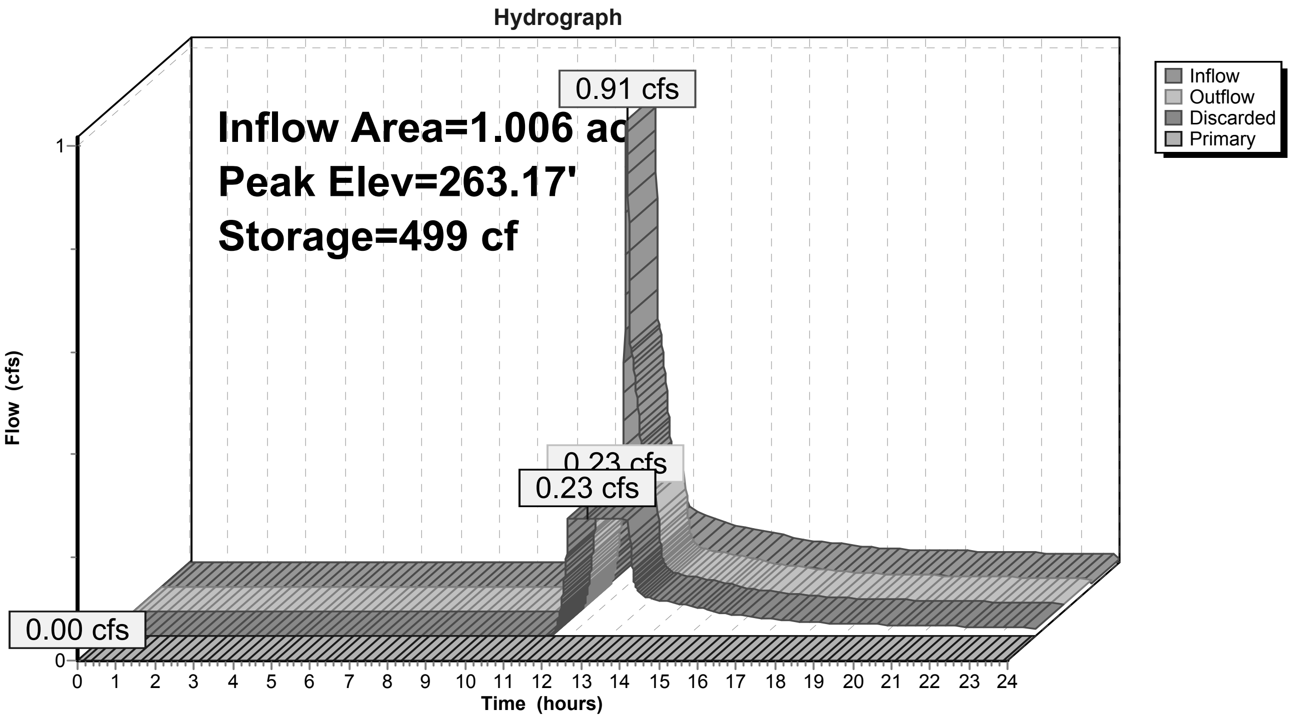
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
263.00	9,608	1,042.0	0	0	9,608
265.00	9,608	1,042.0	19,216	19,216	11,692

Device	Routing	Invert	Outlet Devices
#1	Discarded	263.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	263.80'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Discarded OutFlow Max=0.23 cfs @ 12.43 hrs HW=263.17' (Free Discharge)
└**1=Exfiltration** (Controls 0.23 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=263.00' (Free Discharge)
└**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond PB6B: Porous Pavement



Stage-Discharge for Pond PB6B: Porous Pavement

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
263.00	0.00	0.00	0.00
263.02	0.23	0.23	0.00
263.04	0.23	0.23	0.00
263.06	0.23	0.23	0.00
263.08	0.23	0.23	0.00
263.10	0.23	0.23	0.00
263.12	0.23	0.23	0.00
263.14	0.23	0.23	0.00
263.16	0.23	0.23	0.00
263.18	0.23	0.23	0.00
263.20	0.23	0.23	0.00
263.22	0.23	0.23	0.00
263.24	0.23	0.23	0.00
263.26	0.23	0.23	0.00
263.28	0.23	0.23	0.00
263.30	0.23	0.23	0.00
263.32	0.23	0.23	0.00
263.34	0.23	0.23	0.00
263.36	0.23	0.23	0.00
263.38	0.23	0.23	0.00
263.40	0.23	0.23	0.00
263.42	0.23	0.23	0.00
263.44	0.23	0.23	0.00
263.46	0.23	0.23	0.00
263.48	0.23	0.23	0.00
263.50	0.23	0.23	0.00
263.52	0.23	0.23	0.00
263.54	0.23	0.23	0.00
263.56	0.23	0.23	0.00
263.58	0.23	0.23	0.00
263.60	0.23	0.23	0.00
263.62	0.23	0.23	0.00
263.64	0.23	0.23	0.00
263.66	0.23	0.23	0.00
263.68	0.23	0.23	0.00
263.70	0.23	0.23	0.00
263.72	0.23	0.23	0.00
263.74	0.23	0.23	0.00
263.76	0.23	0.23	0.00
263.78	0.23	0.23	0.00
263.80	0.23	0.23	0.00
263.82	0.25	0.23	0.02
263.84	0.28	0.23	0.05
263.86	0.32	0.23	0.10
263.88	0.37	0.23	0.15
263.90	0.43	0.23	0.20
263.92	0.50	0.23	0.27
263.94	0.57	0.23	0.34
263.96	0.64	0.23	0.41
263.98	0.72	0.23	0.49
264.00	0.80	0.23	0.57
264.02	0.89	0.23	0.66
264.04	0.98	0.23	0.75
264.06	1.07	0.23	0.84
264.08	1.17	0.23	0.94
264.10	1.27	0.23	1.04
264.12	1.37	0.23	1.15
264.14	1.48	0.23	1.25
264.16	1.59	0.23	1.36
264.18	1.70	0.23	1.47
264.20	1.82	0.23	1.59
264.22	1.93	0.23	1.71
264.24	2.05	0.23	1.82
264.26	2.17	0.23	1.95
264.28	2.30	0.23	2.07
264.30	2.42	0.23	2.20
264.32	2.55	0.23	2.32
264.34	2.68	0.23	2.46
264.36	2.82	0.23	2.59
264.38	2.95	0.23	2.72
264.40	3.09	0.23	2.86
264.42	3.22	0.23	2.99
264.44	3.36	0.23	3.13
264.46	3.50	0.23	3.28
264.48	3.65	0.23	3.42
264.50	3.79	0.23	3.56
264.52	3.94	0.23	3.71
264.54	4.08	0.23	3.86
264.56	4.23	0.23	4.00
264.58	4.38	0.23	4.15
264.60	4.53	0.23	4.31
264.62	4.69	0.23	4.46
264.64	4.84	0.23	4.61
264.66	5.00	0.23	4.77
264.68	5.15	0.23	4.92
264.70	5.31	0.23	5.08
264.72	5.47	0.23	5.24
264.74	5.63	0.23	5.40
264.76	5.79	0.23	5.56
264.78	5.95	0.23	5.72
264.80	6.11	0.23	5.89
264.82	6.28	0.23	6.05
264.84	6.44	0.23	6.21
264.86	6.61	0.23	6.38
264.88	6.78	0.23	6.55
264.90	6.94	0.23	6.72
264.92	7.11	0.23	6.88
264.94	7.28	0.23	7.05
264.96	7.45	0.23	7.22
264.98	7.62	0.23	7.39
265.00	**7.79**	**0.23**	**7.57**

Stage-Area-Storage for Pond PB6B: Porous Pavement

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
263.00	**9,608**	0	264.06	9,608	3,055
263.02	9,608	58	264.08	9,608	3,113
263.04	9,608	115	264.10	9,608	3,171
263.06	9,608	173	264.12	9,608	3,228
263.08	9,608	231	264.14	9,608	3,286
263.10	9,608	288	264.16	9,608	3,344
263.12	9,608	346	264.18	9,608	3,401
263.14	9,608	404	264.20	9,608	3,459
263.16	9,608	461	264.22	9,608	3,517
263.18	9,608	519	264.24	9,608	3,574
263.20	9,608	576	264.26	9,608	3,632
263.22	9,608	634	264.28	9,608	3,689
263.24	9,608	692	264.30	9,608	3,747
263.26	9,608	749	264.32	9,608	3,805
263.28	9,608	807	264.34	9,608	3,862
263.30	9,608	865	264.36	9,608	3,920
263.32	9,608	922	264.38	9,608	3,978
263.34	9,608	980	264.40	9,608	4,035
263.36	9,608	1,038	264.42	9,608	4,093
263.38	9,608	1,095	264.44	9,608	4,151
263.40	9,608	1,153	264.46	9,608	4,208
263.42	9,608	1,211	264.48	9,608	4,266
263.44	9,608	1,268	264.50	9,608	4,324
263.46	9,608	1,326	264.52	9,608	4,381
263.48	9,608	1,384	264.54	9,608	4,439
263.50	9,608	1,441	264.56	9,608	4,497
263.52	9,608	1,499	264.58	9,608	4,554
263.54	9,608	1,556	264.60	9,608	4,612
263.56	9,608	1,614	264.62	9,608	4,669
263.58	9,608	1,672	264.64	9,608	4,727
263.60	9,608	1,729	264.66	9,608	4,785
263.62	9,608	1,787	264.68	9,608	4,842
263.64	9,608	1,845	264.70	9,608	4,900
263.66	9,608	1,902	264.72	9,608	4,958
263.68	9,608	1,960	264.74	9,608	5,015
263.70	9,608	2,018	264.76	9,608	5,073
263.72	9,608	2,075	264.78	9,608	5,131
263.74	9,608	2,133	264.80	9,608	5,188
263.76	9,608	2,191	264.82	9,608	5,246
263.78	9,608	2,248	264.84	9,608	5,304
263.80	9,608	2,306	264.86	9,608	5,361
263.82	9,608	2,364	264.88	9,608	5,419
263.84	9,608	2,421	264.90	9,608	5,477
263.86	9,608	2,479	264.92	9,608	5,534
263.88	9,608	2,537	264.94	9,608	5,592
263.90	9,608	2,594	264.96	9,608	5,650
263.92	9,608	2,652	264.98	9,608	5,707
263.94	9,608	2,709	265.00	9,608	**5,765**
263.96	9,608	2,767			
263.98	9,608	2,825			
264.00	9,608	2,882			
264.02	9,608	2,940			
264.04	9,608	2,998			

Summary for Pond XB1: Exist Basin #1

Inflow Area = 0.260 ac, 95.63% Impervious, Inflow Depth > 2.76" for 2-YR event
Inflow = 0.78 cfs @ 12.08 hrs, Volume= 0.060 af
Outflow = 0.09 cfs @ 12.76 hrs, Volume= 0.060 af, Atten= 89%, Lag= 40.4 min
Discarded = 0.09 cfs @ 12.76 hrs, Volume= 0.060 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= 0.01 hrs
Peak Elev= 283.57' @ 12.76 hrs Surf.Area= 3,600 sf Storage= 880 cf

Plug-Flow detention time= 72.2 min calculated for 0.060 af (100% of inflow)
Center-of-Mass det. time= 71.7 min (845.0 - 773.4)

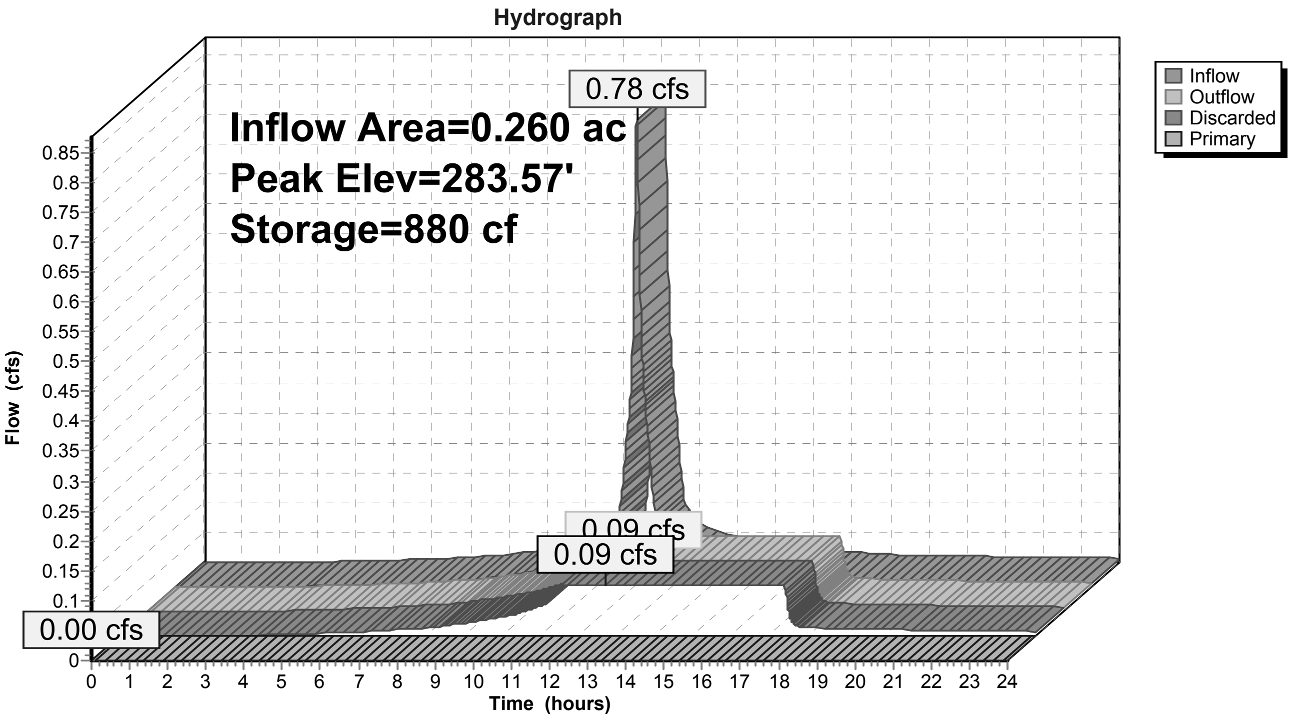
Volume	Invert	Avail.Storage	Storage Description
#1	283.50'	3,335 cf	**30.0"W x 18.0"H x 58.00'L Cultec Contactor 125**x 23 Inside #2
#2	283.00'	1,353 cf	**60.00'W x 60.00'L x 2.00'H Stone**
			7,200 cf Overall - 3,335 cf Embedded = 3,865 cf x 35.0% Voids
		4,688 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	284.50'	**4.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	283.00'	**1.020 in/hr Exfiltration over Surface area**
			Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.09 cfs @ 12.76 hrs HW=283.57' (Free Discharge)
└─**2=Exfiltration** (Controls 0.09 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.00' (Free Discharge)
└─**1=Orifice/Grate** (Controls 0.00 cfs)

Pond XB1: Exist Basin #1



Stage-Discharge for Pond XB1: Exist Basin #1

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
283.00	0.00	0.00	0.00
283.02	0.09	0.09	0.00
283.04	0.09	0.09	0.00
283.06	0.09	0.09	0.00
283.08	0.09	0.09	0.00
283.10	0.09	0.09	0.00
283.12	0.09	0.09	0.00
283.14	0.09	0.09	0.00
283.16	0.09	0.09	0.00
283.18	0.09	0.09	0.00
283.20	0.09	0.09	0.00
283.22	0.09	0.09	0.00
283.24	0.09	0.09	0.00
283.26	0.09	0.09	0.00
283.28	0.09	0.09	0.00
283.30	0.09	0.09	0.00
283.32	0.09	0.09	0.00
283.34	0.09	0.09	0.00
283.36	0.09	0.09	0.00
283.38	0.09	0.09	0.00
283.40	0.09	0.09	0.00
283.42	0.09	0.09	0.00
283.44	0.09	0.09	0.00
283.46	0.09	0.09	0.00
283.48	0.09	0.09	0.00
283.50	0.09	0.09	0.00
283.52	0.09	0.09	0.00
283.54	0.09	0.09	0.00
283.56	0.09	0.09	0.00
283.58	0.09	0.09	0.00
283.60	0.09	0.09	0.00
283.62	0.09	0.09	0.00
283.64	0.09	0.09	0.00
283.66	0.09	0.09	0.00
283.68	0.09	0.09	0.00
283.70	0.09	0.09	0.00
283.72	0.09	0.09	0.00
283.74	0.09	0.09	0.00
283.76	0.09	0.09	0.00
283.78	0.09	0.09	0.00
283.80	0.09	0.09	0.00
283.82	0.09	0.09	0.00
283.84	0.09	0.09	0.00
283.86	0.09	0.09	0.00
283.88	0.09	0.09	0.00
283.90	0.09	0.09	0.00
283.92	0.09	0.09	0.00
283.94	0.09	0.09	0.00
283.96	0.09	0.09	0.00
283.98	0.09	0.09	0.00
284.00	0.09	0.09	0.00
284.02	0.09	0.09	0.00
284.04	0.09	0.09	0.00
284.06	0.09	0.09	0.00
284.08	0.09	0.09	0.00
284.10	0.09	0.09	0.00
284.12	0.09	0.09	0.00
284.14	0.09	0.09	0.00
284.16	0.09	0.09	0.00
284.18	0.09	0.09	0.00
284.20	0.09	0.09	0.00
284.22	0.09	0.09	0.00
284.24	0.09	0.09	0.00
284.26	0.09	0.09	0.00
284.28	0.09	0.09	0.00
284.30	0.09	0.09	0.00
284.32	0.09	0.09	0.00
284.34	0.09	0.09	0.00
284.36	0.09	0.09	0.00
284.38	0.09	0.09	0.00
284.40	0.09	0.09	0.00
284.42	0.09	0.09	0.00
284.44	0.09	0.09	0.00
284.46	0.09	0.09	0.00
284.48	0.09	0.09	0.00
284.50	0.09	0.09	0.00
284.52	0.09	0.09	0.00
284.54	0.09	0.09	0.00
284.56	0.09	0.09	0.01
284.58	0.10	0.09	0.02
284.60	0.11	0.09	0.02
284.62	0.12	0.09	0.03
284.64	0.13	0.09	0.04
284.66	0.14	0.09	0.06
284.68	0.15	0.09	0.07
284.70	0.17	0.09	0.08
284.72	0.18	0.09	0.10
284.74	0.20	0.09	0.11
284.76	0.21	0.09	0.13
284.78	0.23	0.09	0.14
284.80	0.24	0.09	0.15
284.82	0.25	0.09	0.17
284.84	0.26	0.09	0.17
284.86	0.27	0.09	0.18
284.88	0.28	0.09	0.19
284.90	0.29	0.09	0.20
284.92	0.30	0.09	0.21
284.94	0.31	0.09	0.22
284.96	0.31	0.09	0.23
284.98	0.32	0.09	0.24
285.00	**0.33**	**0.09**	**0.24**

Stage-Area-Storage for Pond XB1: Exist Basin #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.00	**3,600**	0	284.06	3,600	2,428
283.02	3,600	25	284.08	3,600	2,487
283.04	3,600	50	284.10	3,600	2,546
283.06	3,600	76	284.12	3,600	2,605
283.08	3,600	101	284.14	3,600	2,663
283.10	3,600	126	284.16	3,600	2,721
283.12	3,600	151	284.18	3,600	2,778
283.14	3,600	176	284.20	3,600	2,835
283.16	3,600	202	284.22	3,600	2,892
283.18	3,600	227	284.24	3,600	2,948
283.20	3,600	252	284.26	3,600	3,004
283.22	3,600	277	284.28	3,600	3,060
283.24	3,600	302	284.30	3,600	3,115
283.26	3,600	328	284.32	3,600	3,169
283.28	3,600	353	284.34	3,600	3,223
283.30	3,600	378	284.36	3,600	3,277
283.32	3,600	403	284.38	3,600	3,331
283.34	3,600	428	284.40	3,600	3,383
283.36	3,600	454	284.42	3,600	3,436
283.38	3,600	479	284.44	3,600	3,488
283.40	3,600	504	284.46	3,600	3,539
283.42	3,600	529	284.48	3,600	3,590
283.44	3,600	554	284.50	3,600	3,641
283.46	3,600	580	284.52	3,600	3,691
283.48	3,600	605	284.54	3,600	3,740
283.50	3,600	630	284.56	3,600	3,789
283.52	3,600	698	284.58	3,600	3,837
283.54	3,600	767	284.60	3,600	3,885
283.56	3,600	834	284.62	3,600	3,933
283.58	3,600	902	284.64	3,600	3,979
283.60	3,600	969	284.66	3,600	4,025
283.62	3,600	1,036	284.68	3,600	4,071
283.64	3,600	1,103	284.70	3,600	4,116
283.66	3,600	1,169	284.72	3,600	4,160
283.68	3,600	1,235	284.74	3,600	4,204
283.70	3,600	1,301	284.76	3,600	4,247
283.72	3,600	1,366	284.78	3,600	4,289
283.74	3,600	1,431	284.80	3,600	4,330
283.76	3,600	1,496	284.82	3,600	4,371
283.78	3,600	1,560	284.84	3,600	4,411
283.80	3,600	1,625	284.86	3,600	4,450
283.82	3,600	1,688	284.88	3,600	4,487
283.84	3,600	1,752	284.90	3,600	4,524
283.86	3,600	1,815	284.92	3,600	4,560
283.88	3,600	1,878	284.94	3,600	4,595
283.90	3,600	1,940	284.96	3,600	4,628
283.92	3,600	2,003	284.98	3,600	4,659
283.94	3,600	2,064	285.00	3,600	**4,688**
283.96	3,600	2,126			
283.98	3,600	2,187			
284.00	3,600	2,248			
284.02	3,600	2,308			
284.04	3,600	2,368			

Summary for Pond XB2: Exist Basin #2

Inflow Area = 1.933 ac, 75.44% Impervious, Inflow Depth > 2.09" for 2-YR event
Inflow = 4.71 cfs @ 12.09 hrs, Volume= 0.336 af
Outflow = 1.95 cfs @ 12.31 hrs, Volume= 0.225 af, Atten= 59%, Lag= 13.3 min
Discarded = 0.07 cfs @ 12.31 hrs, Volume= 0.089 af
Primary = 1.88 cfs @ 12.31 hrs, Volume= 0.136 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 282.50' @ 12.31 hrs Surf.Area= 2,870 sf Storage= 5,649 cf

Plug-Flow detention time= 164.1 min calculated for 0.225 af (67% of inflow)
Center-of-Mass det. time= 66.9 min (877.2 - 810.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	279.50'	1,268 cf	**30.50'W x 73.50'L x 3.04'H Field A**
			6,819 cf Overall - 3,196 cf Embedded = 3,622 cf x 35.0% Voids
#2A	280.00'	3,196 cf	**Cultec R-330XLHD** x 60 Inside #1
			Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
			Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
			Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
#3B	279.50'	370 cf	**16.00'W x 38.50'L x 3.04'H Field B**
			1,874 cf Overall - 816 cf Embedded = 1,058 cf x 35.0% Voids
#4B	280.00'	816 cf	**Cultec R-330XLHD** x 15 Inside #3
			Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
			Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
			Row Length Adjustment= +1.50' x 7.45 sf x 3 rows
#5	279.00'	148 cf	**4.00'D x 11.80'H Vertical Cone/Cylinder**
#6	286.20'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**
		5,874 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	282.00'	**6.0" Vert. Orifice/Grate X 4.00** C= 0.600
#2	Primary	290.70'	**2.3" x 2.3" Horiz. Grate X 36.00**
			C= 0.600 in 24.0" x 24.0" Grate (33% open area)
			Limited to weir flow at low heads
#3	Primary	292.10'	**2.3" x 2.3" Horiz. Grate X 36.00**
			C= 0.600 in 24.0" x 24.0" Grate (33% open area)
			Limited to weir flow at low heads
#4	Discarded	279.00'	**1.020 in/hr Exfiltration over Surface area**
			Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.07 cfs @ 12.31 hrs HW=282.50' (Free Discharge)
└—**4=Exfiltration** (Controls 0.07 cfs)

Primary OutFlow Max=1.88 cfs @ 12.31 hrs HW=282.50' (Free Discharge)
├—**1=Orifice/Grate** (Orifice Controls 1.88 cfs @ 2.40 fps)
├—**2=Grate** (Controls 0.00 cfs)
└—**3=Grate** (Controls 0.00 cfs)

Pond XB2: Exist Basin #2 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

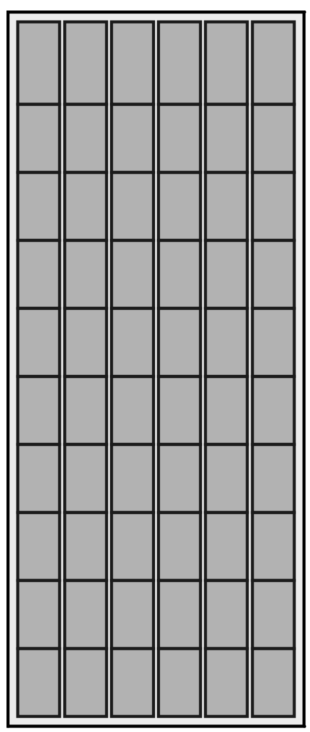
10 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 71.50' Row Length +12.0" End Stone x 2 = 73.50' Base Length
6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width
6.0" Base + 30.5" Chamber Height = 3.04' Field Height

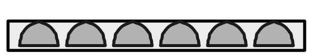
60 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 3,196.5 cf Chamber Storage

6,818.7 cf Field - 3,196.5 cf Chambers = 3,622.2 cf Stone x 35.0% Voids = 1,267.8 cf Stone Storage

Chamber Storage + Stone Storage = 4,464.2 cf = 0.102 af
Overall Storage Efficiency = 65.5%

60 Chambers
252.5 cy Field
134.2 cy Stone





Pond XB2: Exist Basin #2 - Chamber Wizard Field B

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 3 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

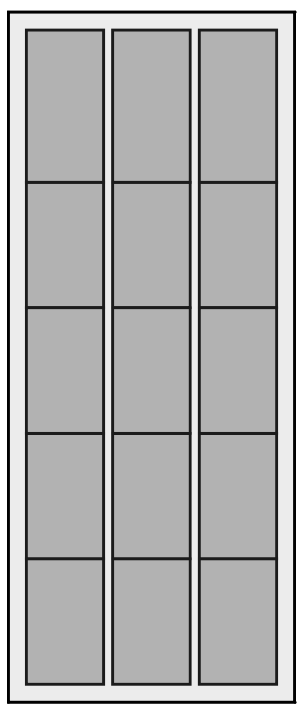
5 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 36.50' Row Length +12.0" End Stone x 2 = 38.50' Base Length
3 Rows x 52.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 16.00' Base Width
6.0" Base + 30.5" Chamber Height = 3.04' Field Height

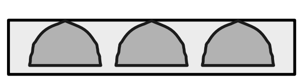
15 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 3 Rows = 815.9 cf Chamber Storage

1,873.7 cf Field - 815.9 cf Chambers = 1,057.8 cf Stone x 35.0% Voids = 370.2 cf Stone Storage

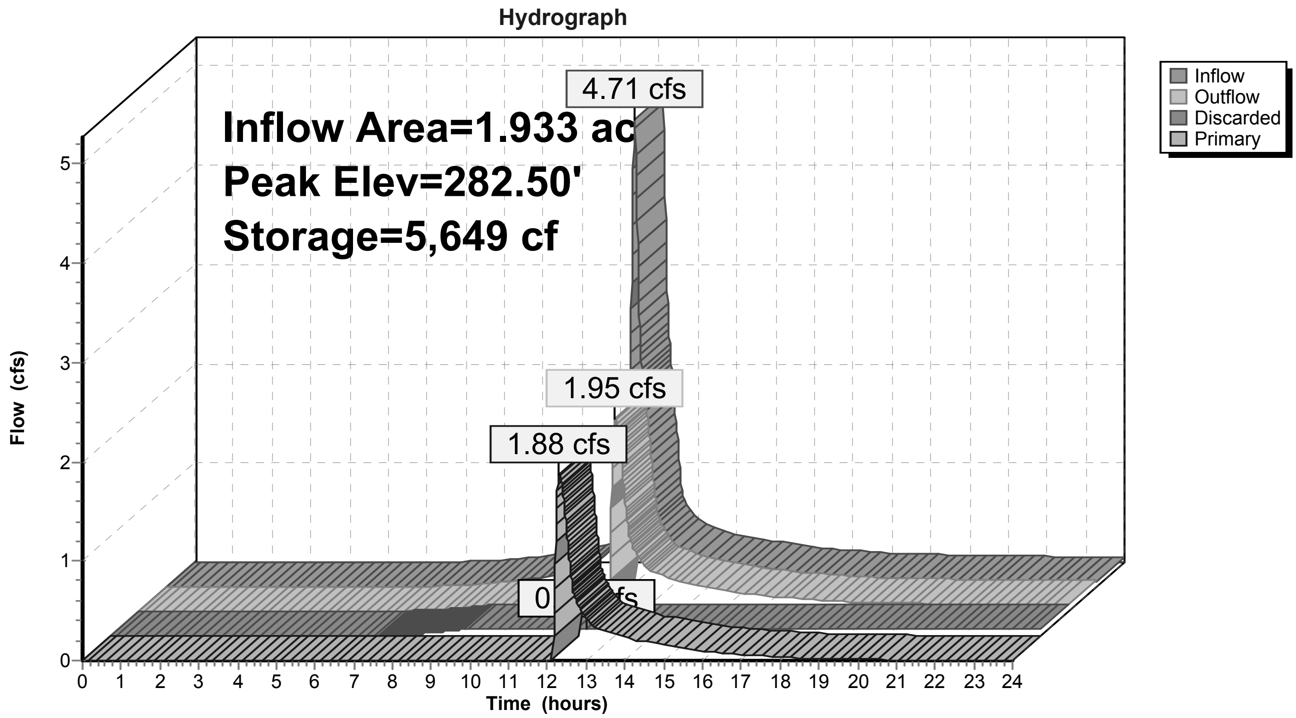
Chamber Storage + Stone Storage = 1,186.1 cf = 0.027 af
Overall Storage Efficiency = 63.3%

15 Chambers
69.4 cy Field
39.2 cy Stone





Pond XB2: Exist Basin #2



Stage-Discharge for Pond XB2: Exist Basin #2

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
279.00	0.00	0.00	0.00
279.15	0.00	0.00	0.00
279.30	0.00	0.00	0.00
279.45	0.00	0.00	0.00
279.60	0.07	0.07	0.00
279.75	0.07	0.07	0.00
279.90	0.07	0.07	0.00
280.05	0.07	0.07	0.00
280.20	0.07	0.07	0.00
280.35	0.07	0.07	0.00
280.50	0.07	0.07	0.00
280.65	0.07	0.07	0.00
280.80	0.07	0.07	0.00
280.95	0.07	0.07	0.00
281.10	0.07	0.07	0.00
281.25	0.07	0.07	0.00
281.40	0.07	0.07	0.00
281.55	0.07	0.07	0.00
281.70	0.07	0.07	0.00
281.85	0.07	0.07	0.00
282.00	0.07	0.07	0.00
282.15	0.33	0.07	0.26
282.30	0.99	0.07	0.92
282.45	1.77	0.07	1.70
282.60	2.31	0.07	2.24
282.75	2.74	0.07	2.67
282.90	3.12	0.07	3.05
283.05	3.45	0.07	3.38
283.20	3.75	0.07	3.69
283.35	4.03	0.07	3.97
283.50	4.30	0.07	4.23
283.65	4.54	0.07	4.47
283.80	4.78	0.07	4.71
283.95	5.00	0.07	4.93
284.10	5.21	0.07	5.14
284.25	5.42	0.07	5.35
284.40	5.61	0.07	5.55
284.55	5.80	0.07	5.74
284.70	5.99	0.07	5.92
284.85	6.17	0.07	6.10
285.00	6.34	0.07	6.27
285.15	6.51	0.07	6.44
285.30	6.67	0.07	6.60
285.45	6.83	0.07	6.76
285.60	6.99	0.07	6.92
285.75	7.14	0.07	7.07
285.90	7.29	0.07	7.22
286.05	7.44	0.07	7.37
286.20	7.59	0.07	7.52
286.35	7.73	0.07	7.66
286.50	7.87	0.07	7.80
286.65	8.00	0.07	7.93
286.80	8.14	0.07	8.07
286.95	8.27	0.07	8.20
287.10	8.40	0.07	8.33
287.25	8.53	0.07	8.46
287.40	8.65	0.07	8.58
287.55	8.78	0.07	8.71
287.70	8.90	0.07	8.83
287.85	9.02	0.07	8.95
288.00	9.14	0.07	9.07
288.15	9.26	0.07	9.19
288.30	9.37	0.07	9.30
288.45	9.49	0.07	9.42
288.60	9.60	0.07	9.53
288.75	9.71	0.07	9.64
288.90	9.82	0.07	9.75
289.05	9.93	0.07	9.86
289.20	10.04	0.07	9.97
289.35	10.15	0.07	10.08
289.50	10.25	0.07	10.18
289.65	10.36	0.07	10.29
289.80	10.46	0.07	10.39
289.95	10.56	0.07	10.49
290.10	10.67	0.07	10.60
290.25	10.77	0.07	10.70
290.40	10.87	0.07	10.80
290.55	10.97	0.07	10.89
290.70	11.06	0.07	10.99
290.85	12.68	0.07	12.61
291.00	14.74	0.07	14.67
291.15	15.62	0.07	15.55
291.30	16.38	0.07	16.31
291.45	17.06	0.07	16.99
291.60	17.68	0.07	17.60
291.75	18.25	0.07	18.18
291.90	18.79	0.07	18.72
292.05	19.31	0.07	19.24
292.20	**20.63**	**0.07**	**20.55**

Stage-Area-Storage for Pond XB2: Exist Basin #2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
279.00	13	0	286.95	2,883	5,760
279.15	13	2	287.10	2,883	5,763
279.30	13	4	287.25	2,883	5,767
279.45	13	6	287.40	2,883	5,771
279.60	2,870	108	287.55	2,883	5,775
279.75	2,870	259	287.70	2,883	5,779
279.90	2,870	411	287.85	2,883	5,782
280.05	2,870	633	288.00	2,883	5,786
280.20	2,870	991	288.15	2,883	5,790
280.35	2,870	1,348	288.30	2,883	5,794
280.50	2,870	1,703	288.45	2,883	5,797
280.65	2,870	2,054	288.60	2,883	5,801
280.80	2,870	2,399	288.75	2,883	5,805
280.95	2,870	2,742	288.90	2,883	5,809
281.10	2,870	3,082	289.05	2,883	5,812
281.25	2,870	3,419	289.20	2,883	5,816
281.40	2,870	3,747	289.35	2,883	5,820
281.55	2,870	4,063	289.50	2,883	5,824
281.70	2,870	4,369	289.65	2,883	5,828
281.85	2,870	4,661	289.80	2,883	5,831
282.00	2,870	4,937	289.95	2,883	5,835
282.15	2,870	5,192	290.10	2,883	5,839
282.30	2,870	5,415	290.25	2,883	5,843
282.45	2,870	5,599	290.40	2,883	5,846
282.60	2,870	5,696	290.55	2,883	5,850
282.75	2,870	5,697	290.70	2,883	5,854
282.90	2,870	5,699	290.85	2,883	5,857
283.05	2,870	5,701	291.00	2,883	5,859
283.20	2,870	5,703	291.15	2,883	5,861
283.35	2,870	5,705	291.30	2,883	5,863
283.50	2,870	5,707	291.45	2,883	5,865
283.65	2,870	5,709	291.60	2,883	5,866
283.80	2,870	5,711	291.75	2,883	5,868
283.95	2,870	5,713	291.90	2,883	5,870
284.10	2,870	5,714	292.05	2,883	5,872
284.25	2,870	5,716	292.20	2,883	**5,874**
284.40	2,870	5,718			
284.55	2,870	5,720			
284.70	2,870	5,722			
284.85	2,870	5,724			
285.00	2,870	5,726			
285.15	2,870	5,728			
285.30	2,870	5,730			
285.45	2,870	5,731			
285.60	2,870	5,733			
285.75	2,870	5,735			
285.90	2,870	5,737			
286.05	2,870	5,739			
286.20	**2,883**	5,741			
286.35	2,883	5,745			
286.50	2,883	5,748			
286.65	2,883	5,752			
286.80	2,883	5,756			

Summary for Subcatchment P1: Offsite to West

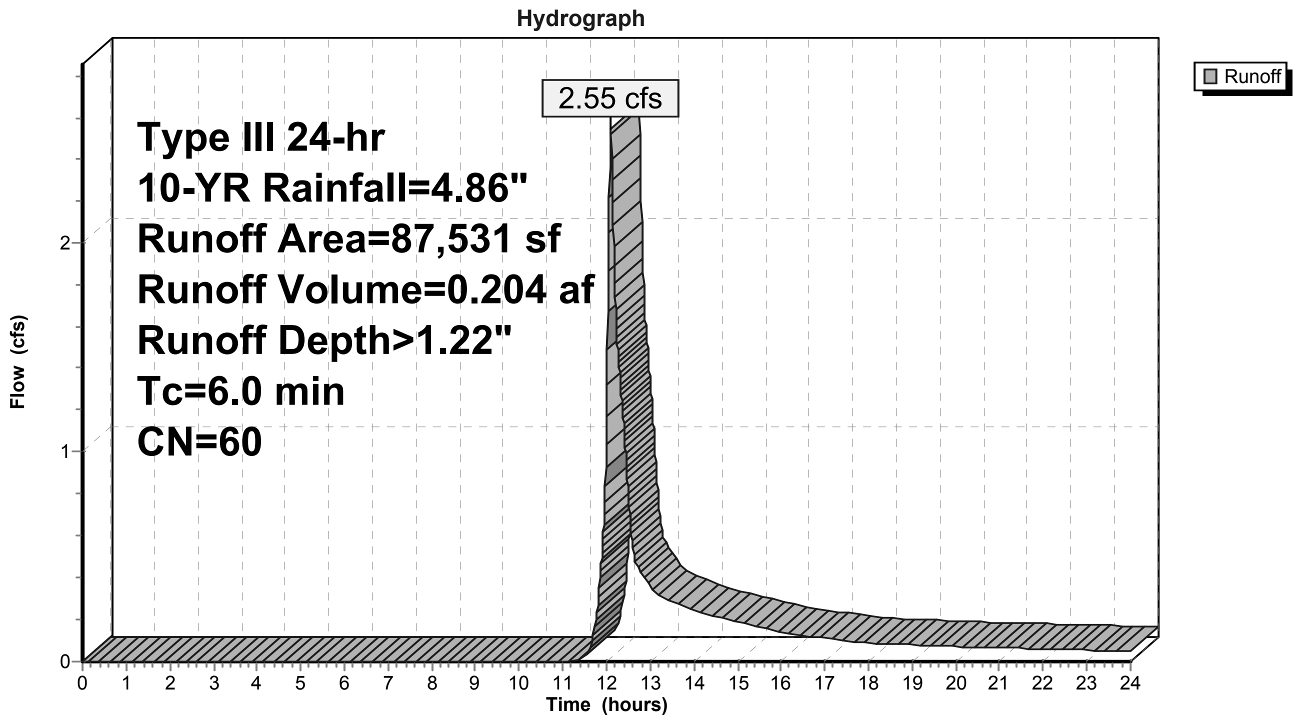
Runoff = 2.55 cfs @ 12.10 hrs, Volume= 0.204 af, Depth> 1.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (sf)	CN	Description
	27,387	55	Woods, Good, HSG B
*	3,150	98	Roof
*	0	98	Impervious
	56,994	61	>75% Grass cover, Good, HSG B
	87,531	60	Weighted Average
	84,381		96.40% Pervious Area
	3,150		3.60% Impervious Area

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

Subcatchment P1: Offsite to West



Summary for Subcatchment P2: To Basin #2

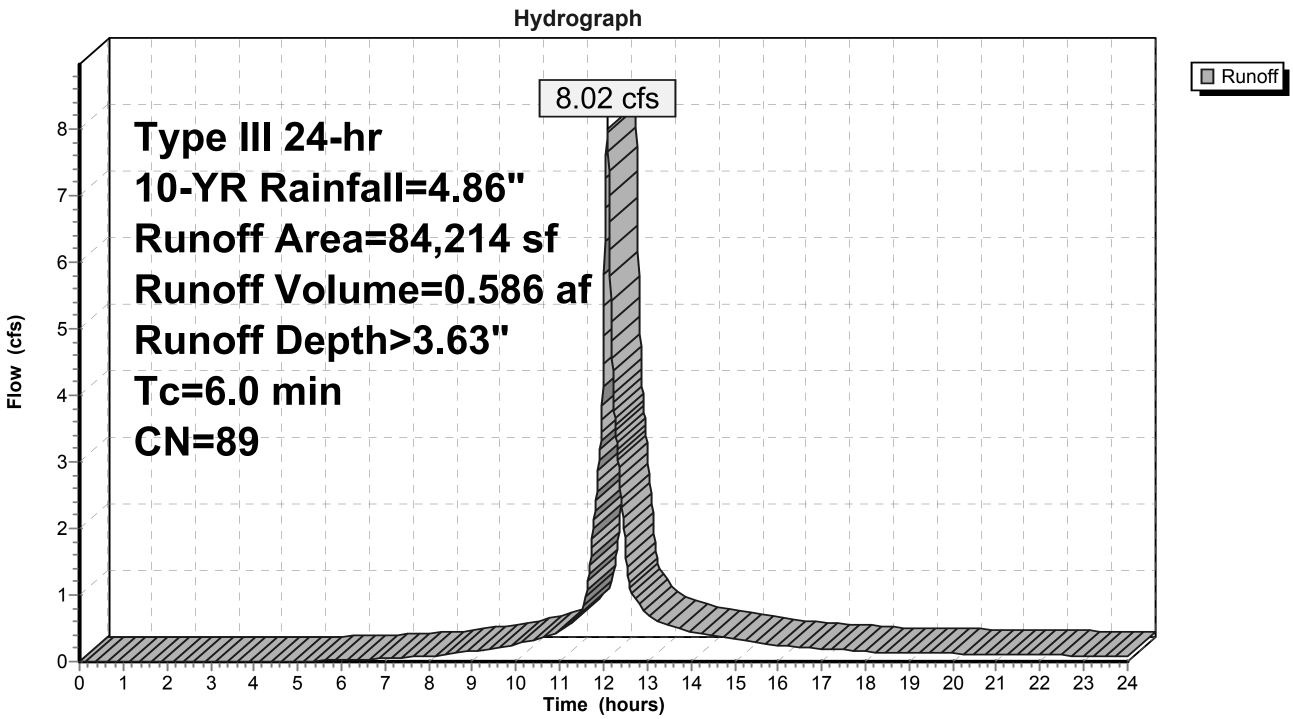
Runoff = 8.02 cfs @ 12.09 hrs, Volume= 0.586 af, Depth> 3.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	26,065	98	Roof
*	37,469	98	Impervious
	20,680	61	>75% Grass cover, Good, HSG B
	84,214	89	Weighted Average
	20,680		24.56% Pervious Area
	63,534		75.44% Impervious Area

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

Subcatchment P2: To Basin #2



Summary for Subcatchment P3: Offsite to Northwest

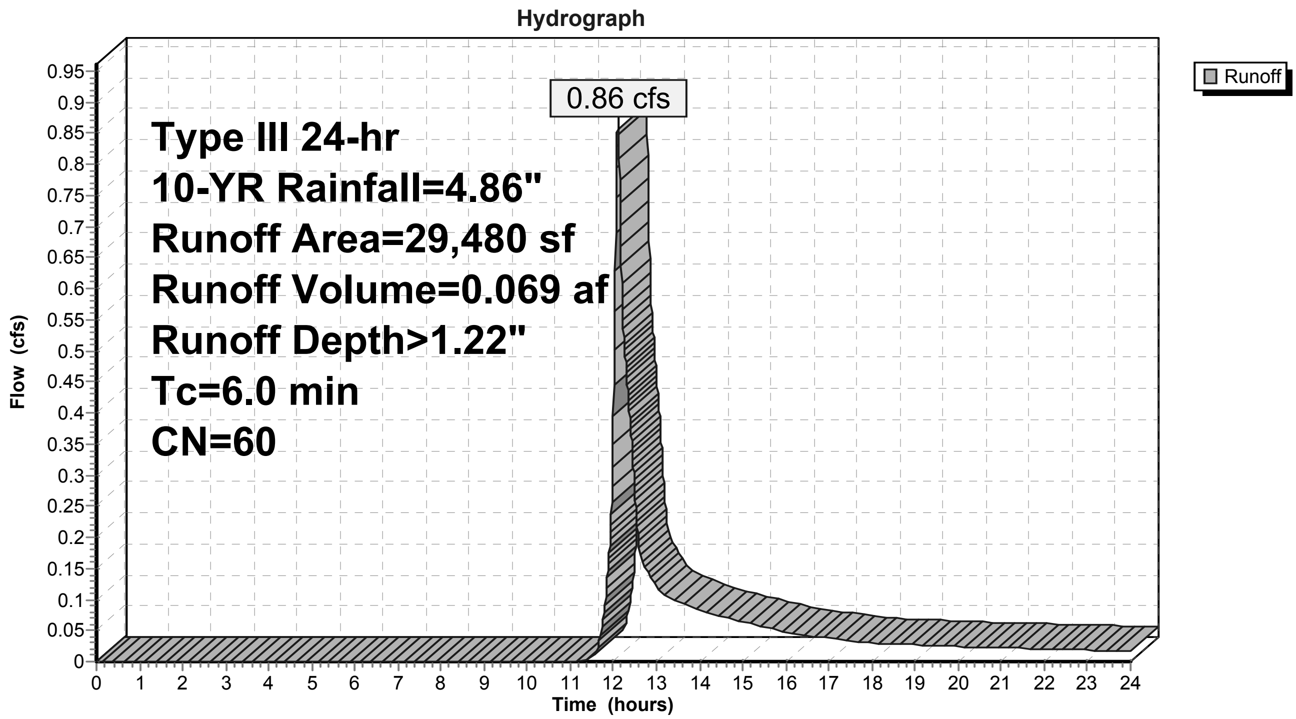
Runoff = 0.86 cfs @ 12.10 hrs, Volume= 0.069 af, Depth> 1.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (sf)	CN	Description
	14,592	55	Woods, Good, HSG B
*	0	98	Roof
*	1,579	98	Impervious
	13,309	61	>75% Grass cover, Good, HSG B
	29,480	60	Weighted Average
	27,901		94.64% Pervious Area
	1,579		5.36% Impervious Area

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

Subcatchment P3: Offsite to Northwest



Summary for Subcatchment P4A: To Basin #1

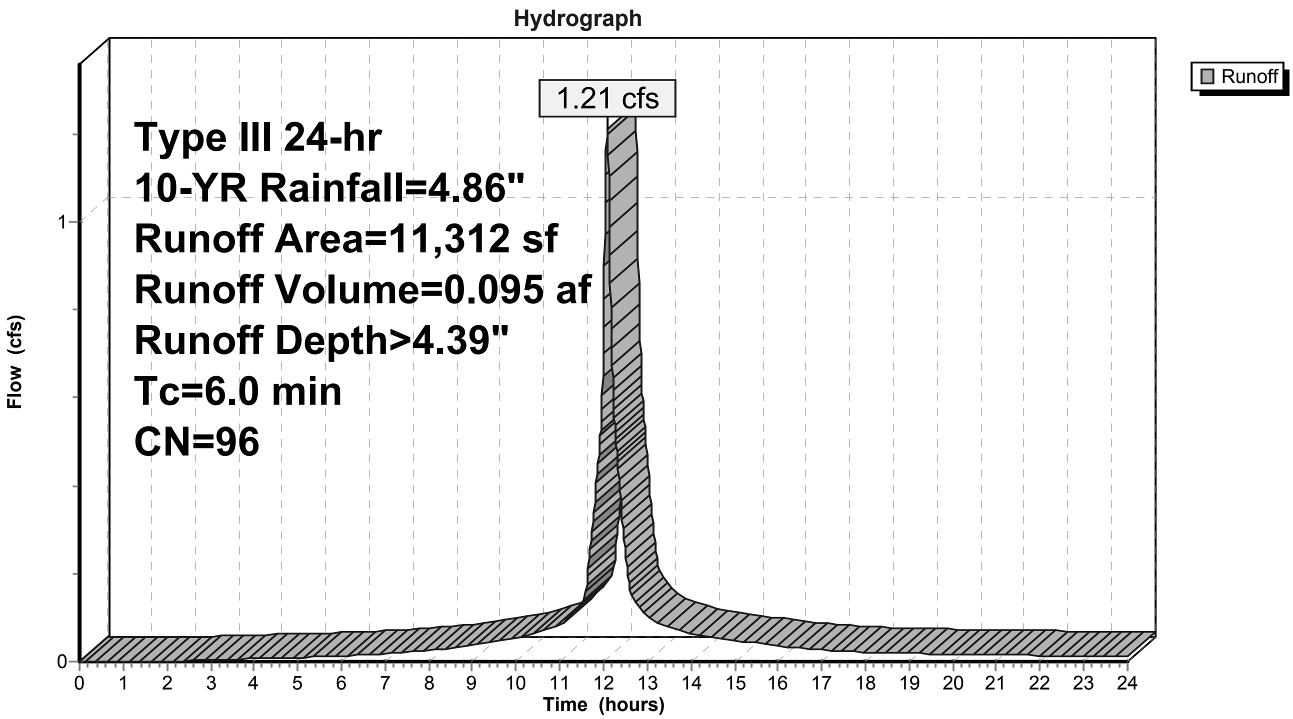
Runoff = 1.21 cfs @ 12.08 hrs, Volume= 0.095 af, Depth> 4.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	0	98	Roof
*	10,818	98	Impervious
	494	61	>75% Grass cover, Good, HSG B
	11,312	96	Weighted Average
	494		4.37% Pervious Area
	10,818		95.63% Impervious Area

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

Subcatchment P4A: To Basin #1



Summary for Subcatchment P4B: Roof and loading to PB4B

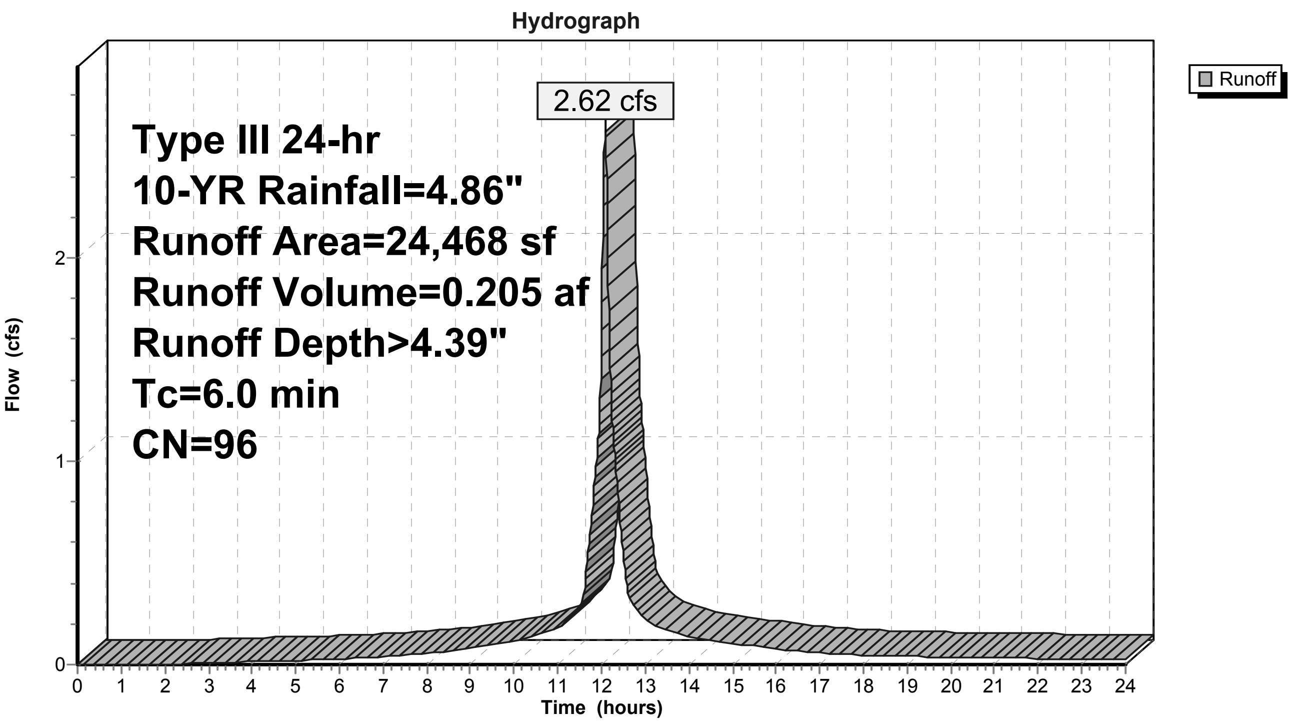
Runoff = 2.62 cfs @ 12.08 hrs, Volume= 0.205 af, Depth> 4.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	21,079	98	Roof
*	1,841	98	Impervious
	1,548	61	>75% Grass cover, Good, HSG B
*	0	69	Grasspave
	24,468	96	Weighted Average
	1,548		6.33% Pervious Area
	22,920		93.67% Impervious Area

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

Subcatchment P4B: Roof and loading to PB4B



Summary for Subcatchment P5: To Basin #3

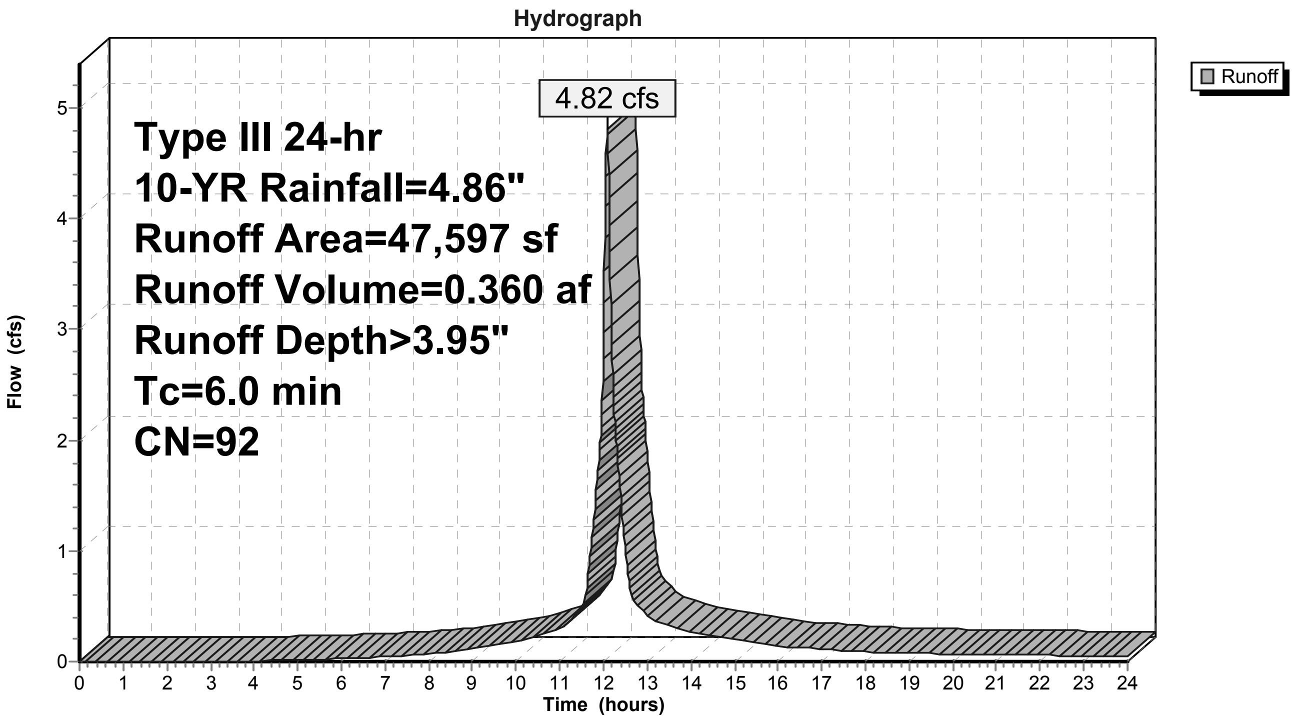
Runoff = 4.82 cfs @ 12.08 hrs, Volume= 0.360 af, Depth> 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	5,950	98	Roof
*	34,115	98	Impervious
	7,532	61	>75% Grass cover, Good, HSG B
	47,597	92	Weighted Average
	7,532		15.82% Pervious Area
	40,065		84.18% Impervious Area

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

Subcatchment P5: To Basin #3



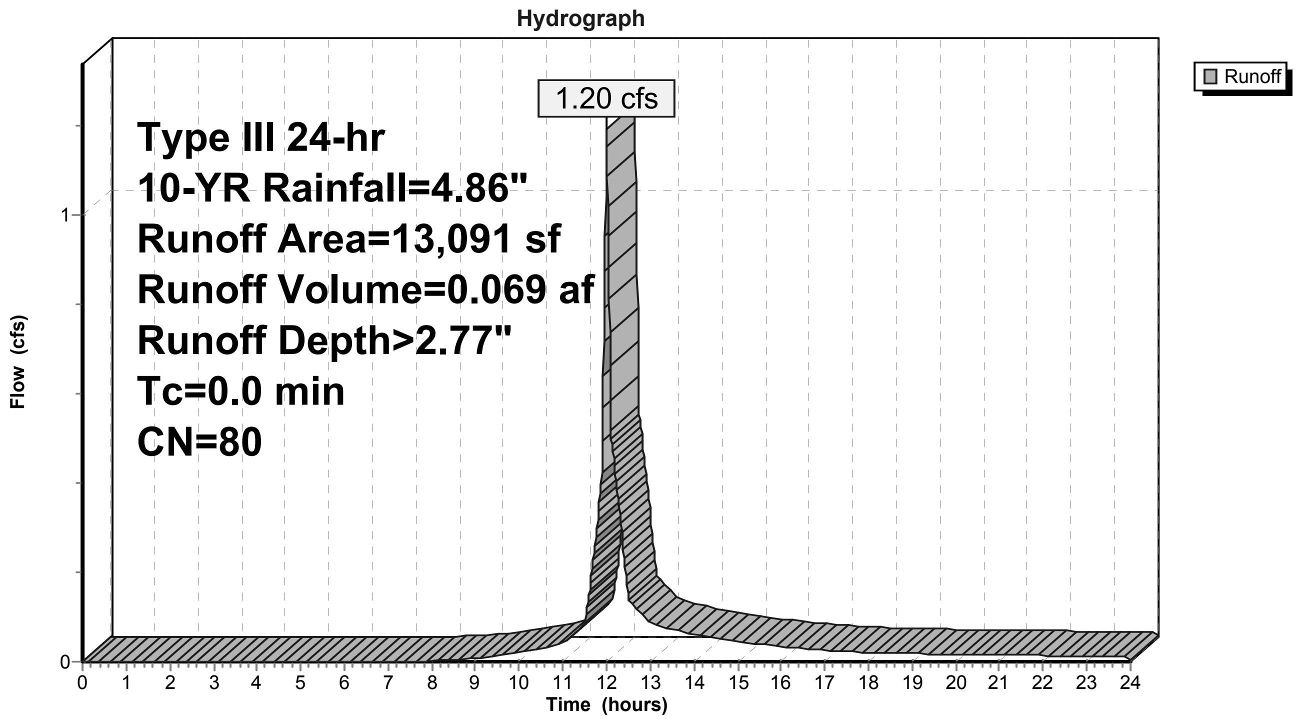
Summary for Subcatchment P6A: 6A To cb

Runoff = 1.20 cfs @ 12.00 hrs, Volume= 0.069 af, Depth> 2.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (sf)	CN	Description
	6,512	61	>75% Grass cover, Good, HSG B
*	6,579	98	Impervious
	0	55	Woods, Good, HSG B
	13,091	80	Weighted Average
	6,512		49.74% Pervious Area
	6,579		50.26% Impervious Area

Subcatchment P6A: 6A To cb



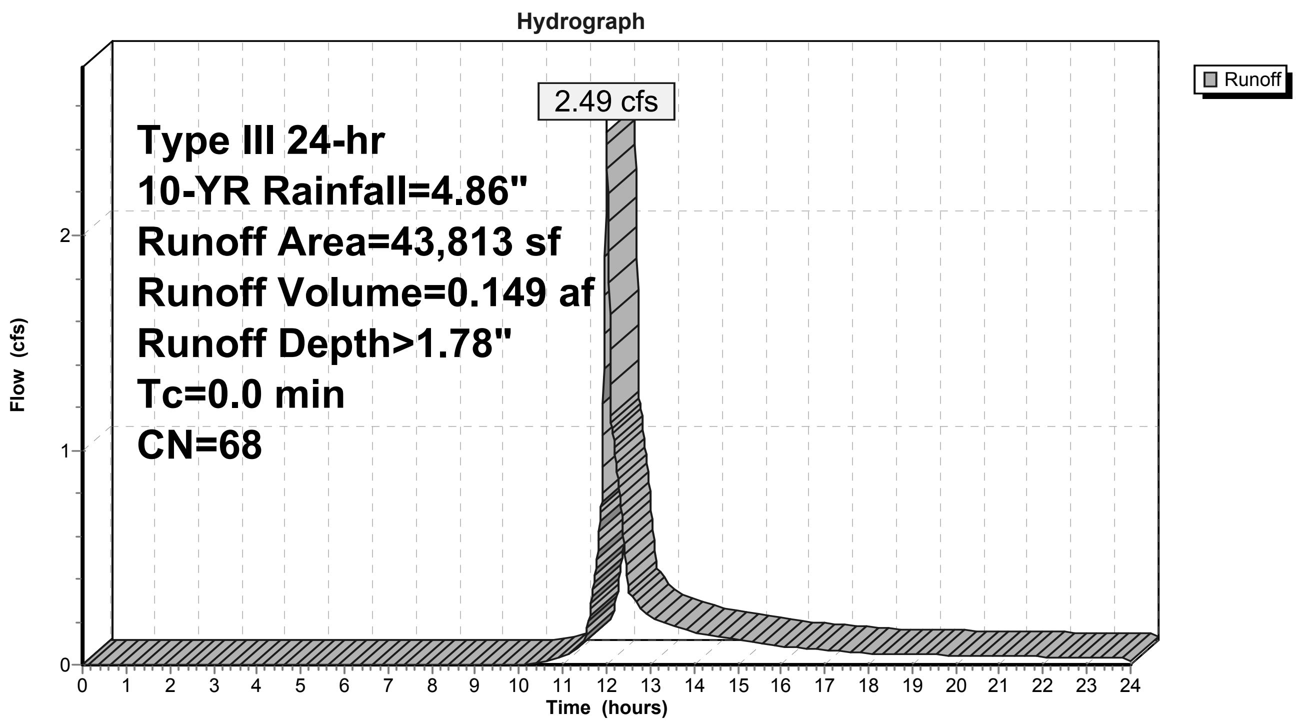
Summary for Subcatchment P6B: 6B To Pipe

Runoff = 2.49 cfs @ 12.00 hrs, Volume= 0.149 af, Depth> 1.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (sf)	CN	Description
	25,289	61	>75% Grass cover, Good, HSG B
*	9,608	98	Impervious
	8,916	55	Woods, Good, HSG B
	43,813	68	Weighted Average
	34,205		78.07% Pervious Area
	9,608		21.93% Impervious Area

Subcatchment P6B: 6B To Pipe



Summary for Subcatchment P6C: Offsite to Concord Ave

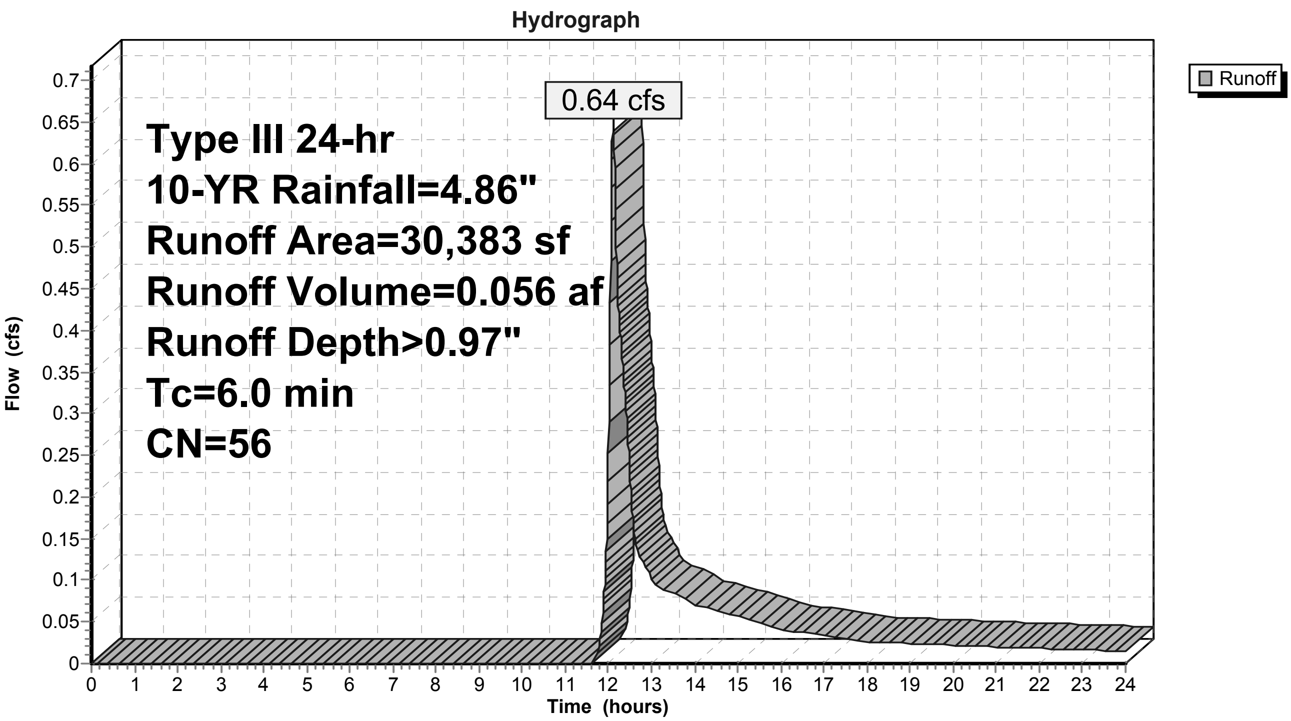
Runoff = 0.64 cfs @ 12.11 hrs, Volume= 0.056 af, Depth> 0.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (sf)	CN	Description
	24,840	55	Woods, Good, HSG B
*	0	98	Roof
*	0	98	Impervious
	5,543	61	>75% Grass cover, Good, HSG B
	30,383	56	Weighted Average
	30,383		100.00% Pervious Area

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

Subcatchment P6C: Offsite to Concord Ave



Summary for Subcatchment P7: To SW Basin

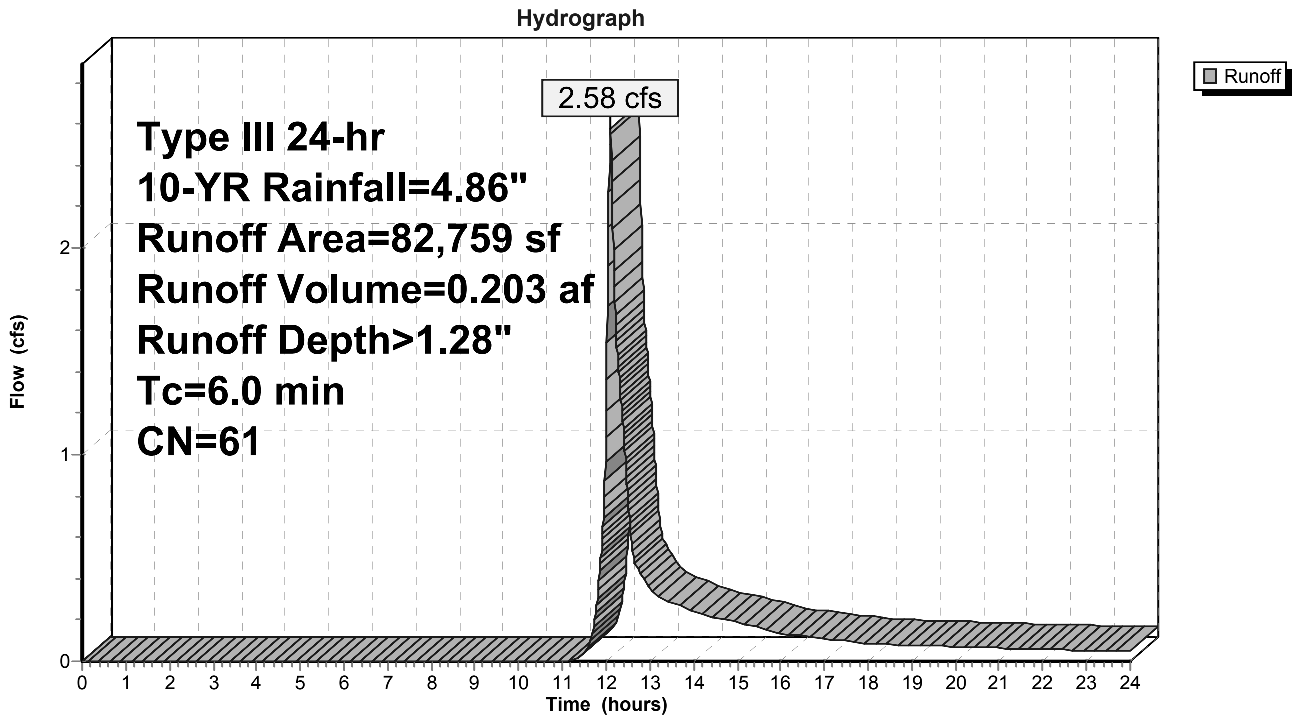
Runoff = 2.58 cfs @ 12.10 hrs, Volume= 0.203 af, Depth> 1.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (sf)	CN	Description
	8,668	55	Woods, Good, HSG B
*	979	98	Roof
*	265	98	Impervious
	72,847	61	>75% Grass cover, Good, HSG B
	82,759	61	Weighted Average
	81,515		98.50% Pervious Area
	1,244		1.50% Impervious Area

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

Subcatchment P7: To SW Basin



Summary for Subcatchment P8: To CB#2

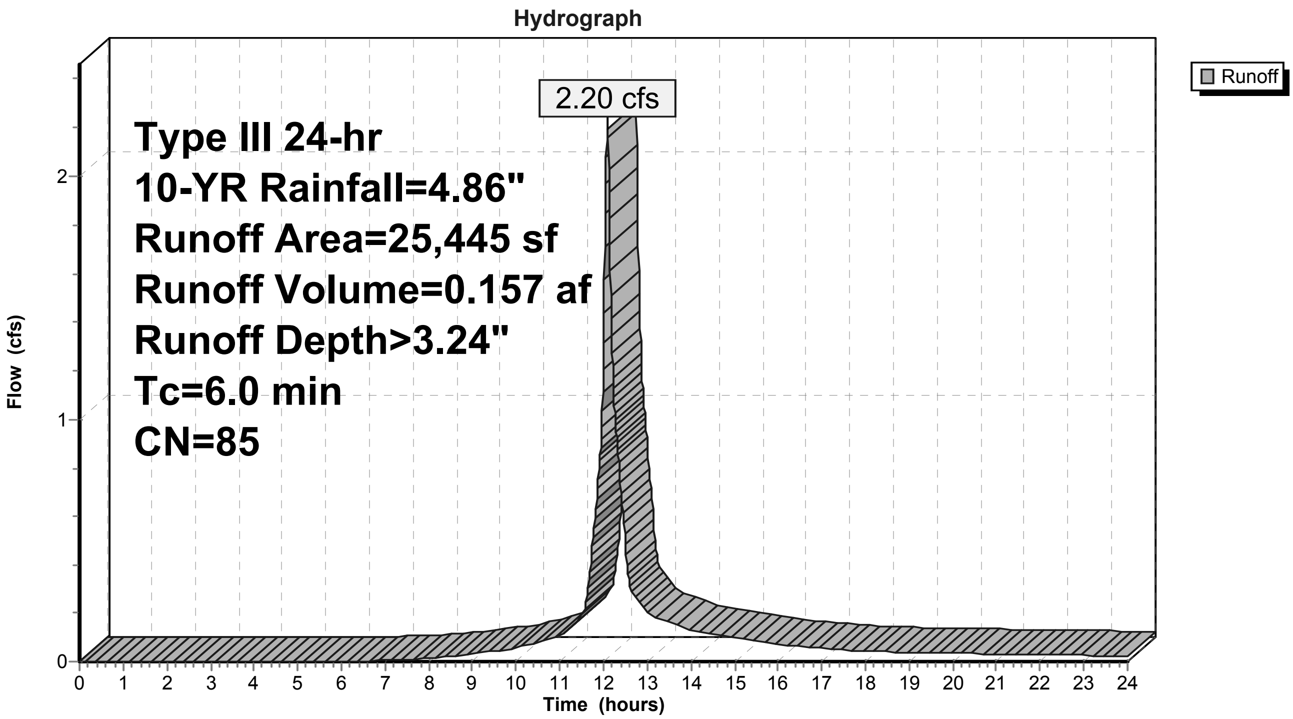
Runoff = 2.20 cfs @ 12.09 hrs, Volume= 0.157 af, Depth> 3.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	5,898	98	Roof
*	10,557	98	Impervious
	8,990	61	>75% Grass cover, Good, HSG B
	25,445	85	Weighted Average
	8,990		35.33% Pervious Area
	16,455		64.67% Impervious Area

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

Subcatchment P8: To CB#2



Summary for Subcatchment P9: To Day School Lane

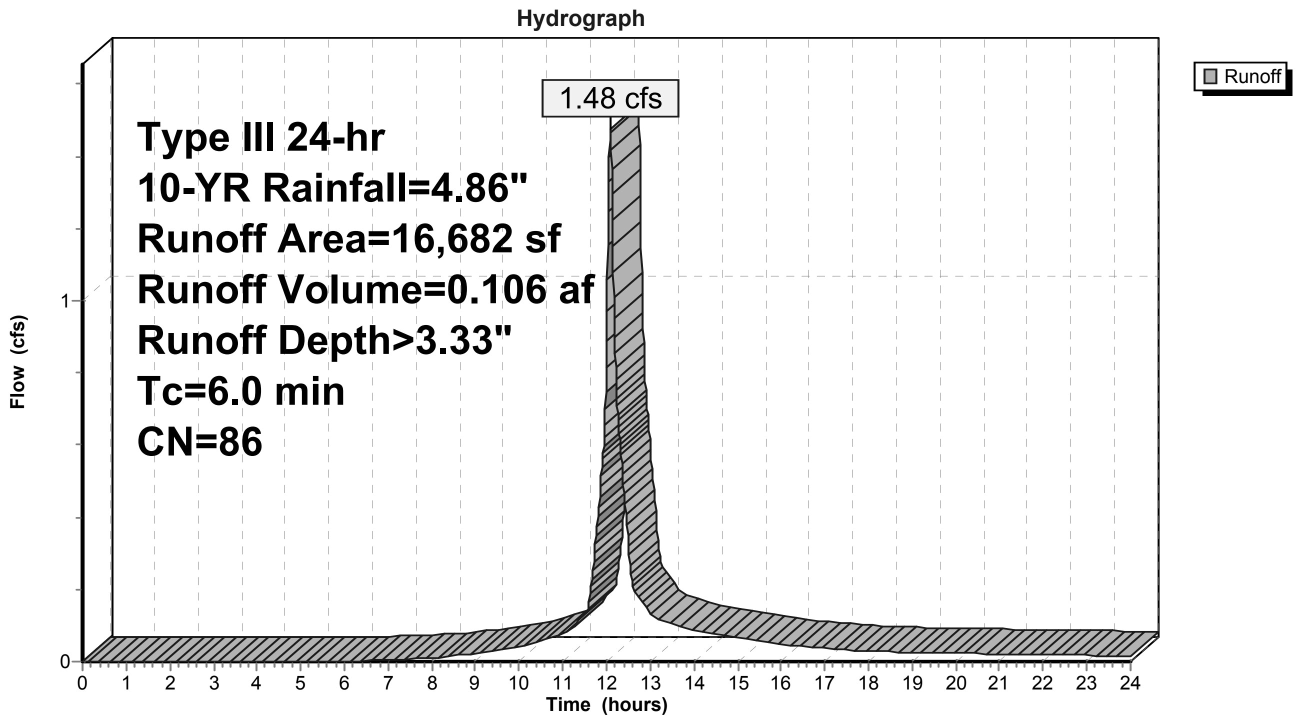
Runoff = 1.48 cfs @ 12.09 hrs, Volume= 0.106 af, Depth> 3.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.86"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	0	98	Roof
*	11,199	98	Impervious
	5,483	61	>75% Grass cover, Good, HSG B
	16,682	86	Weighted Average
	5,483		32.87% Pervious Area
	11,199		67.13% Impervious Area

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

Subcatchment P9: To Day School Lane

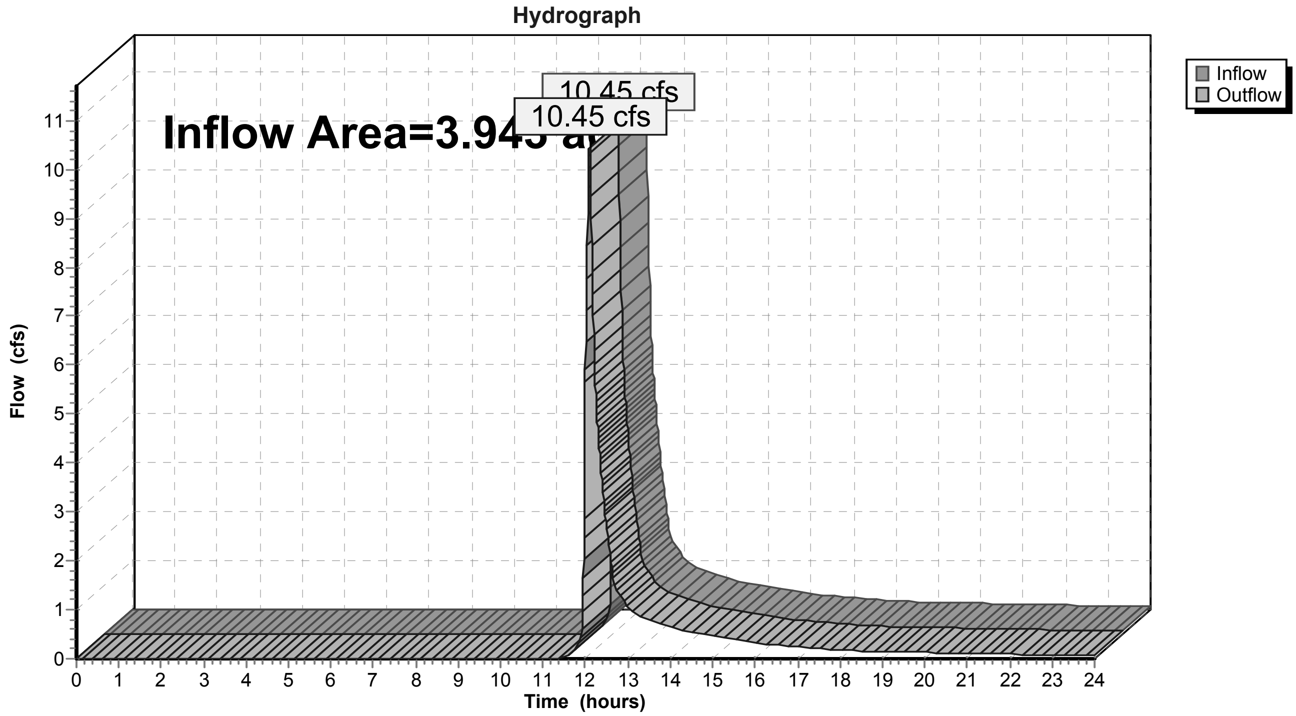


Summary for Reach DP-A: Offsite to Southwest

Inflow Area =	3.943 ac, 38.83% Impervious, Inflow Depth > 1.75" for 10-YR event			
Inflow =	10.45 cfs @	12.09 hrs, Volume=	0.576 af	
Outflow =	10.45 cfs @	12.09 hrs, Volume=	0.576 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-A: Offsite to Southwest

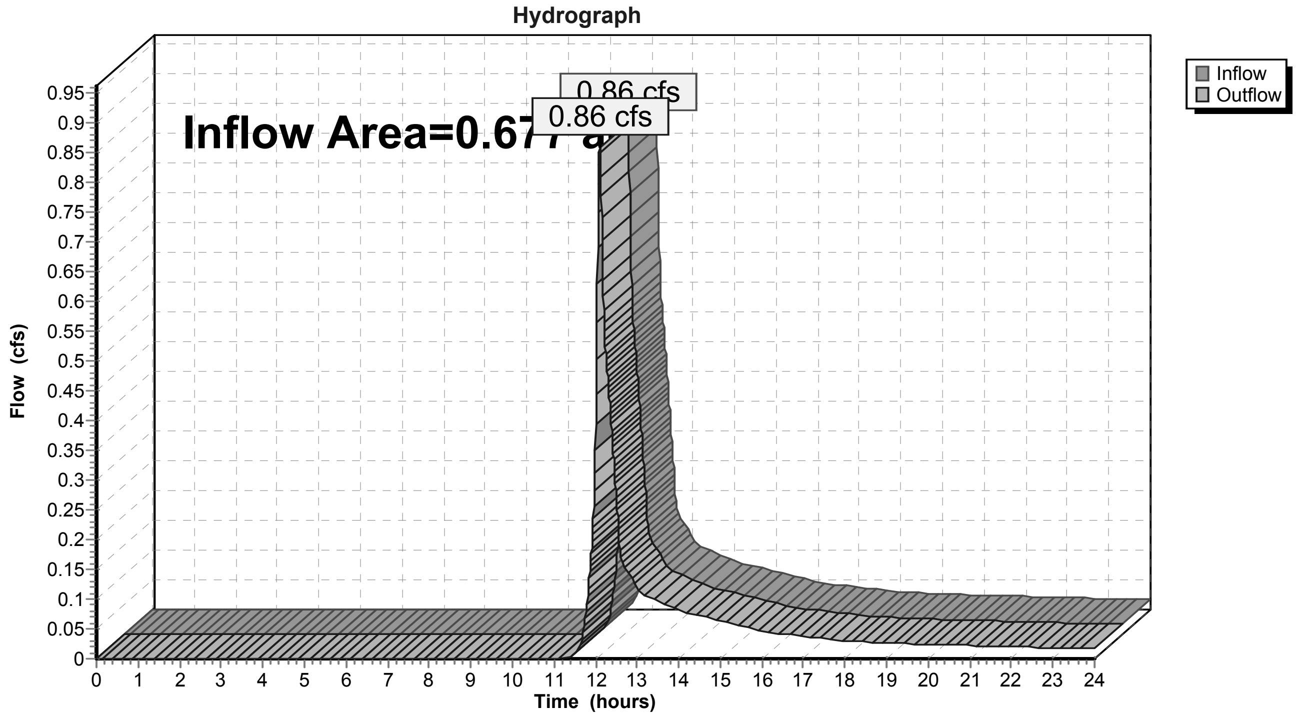


Summary for Reach DP-B: Offsite to Northwest

Inflow Area =	0.677 ac,	5.36% Impervious, Inflow Depth > 1.22" for 10-YR event		
Inflow =	0.86 cfs @	12.10 hrs, Volume=	0.069 af	
Outflow =	0.86 cfs @	12.10 hrs, Volume=	0.069 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-B: Offsite to Northwest

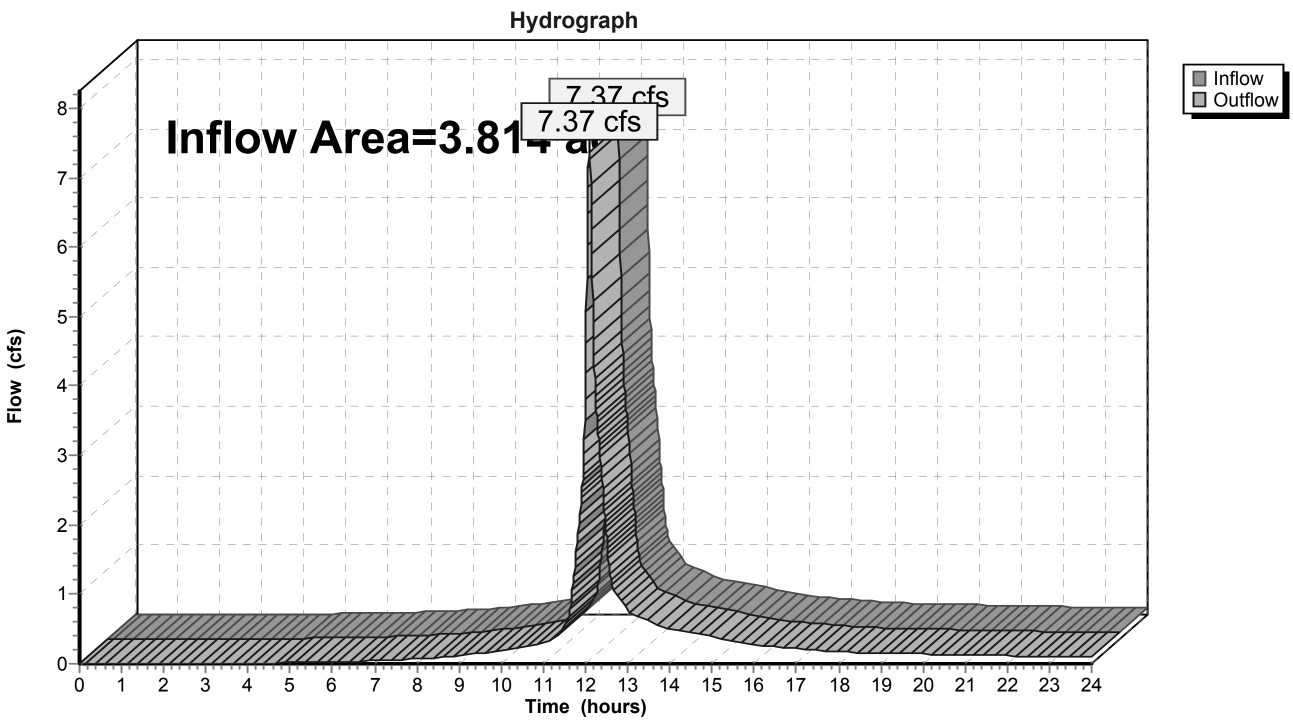


Summary for Reach DP-C: Exist SW Basin

Inflow Area =	3.814 ac, 45.17% Impervious, Inflow Depth > 1.77" for 10-YR event				
Inflow =	7.37 cfs @	12.09 hrs, Volume=	0.563 af		
Outflow =	7.37 cfs @	12.09 hrs, Volume=	0.563 af,	Atten= 0%,	Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-C: Exist SW Basin

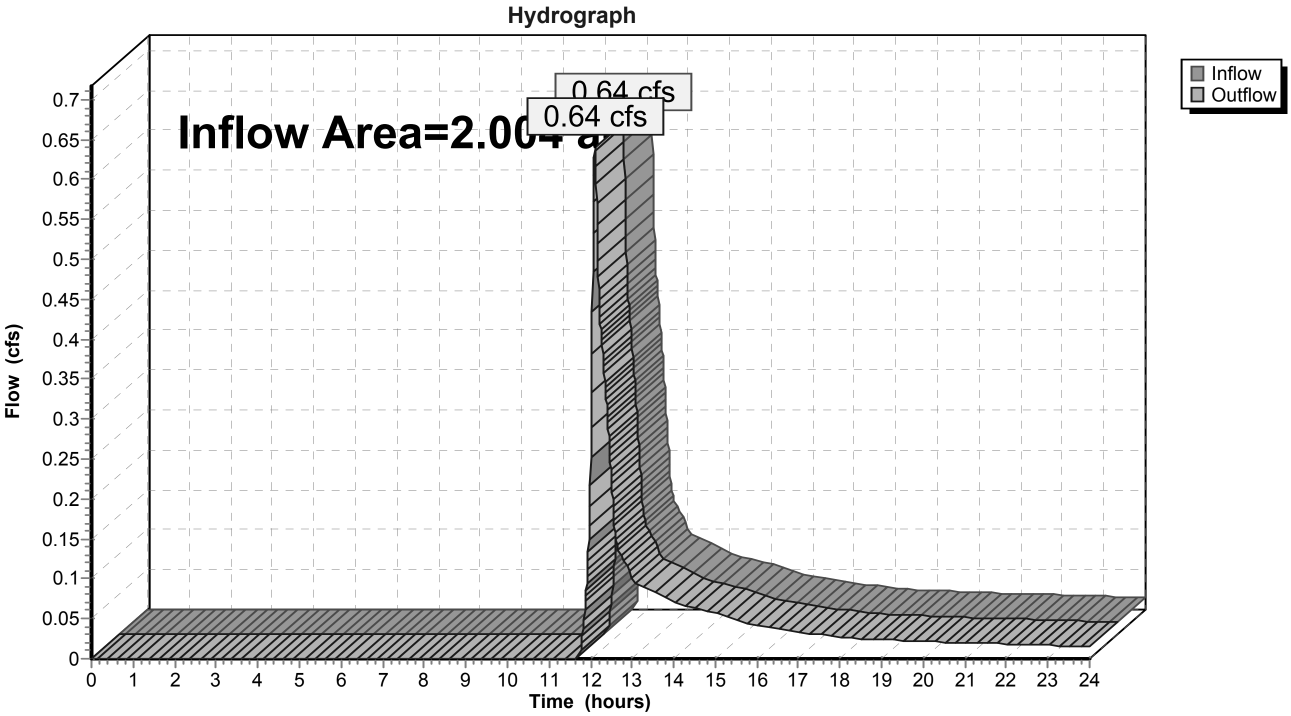


Summary for Reach DP-D: Concord Ave

Inflow Area =	2.004 ac, 18.54% Impervious, Inflow Depth > 0.34"	for 10-YR event	
Inflow =	0.64 cfs @ 12.11 hrs, Volume=	0.056 af	
Outflow =	0.64 cfs @ 12.11 hrs, Volume=	0.056 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-D: Concord Ave

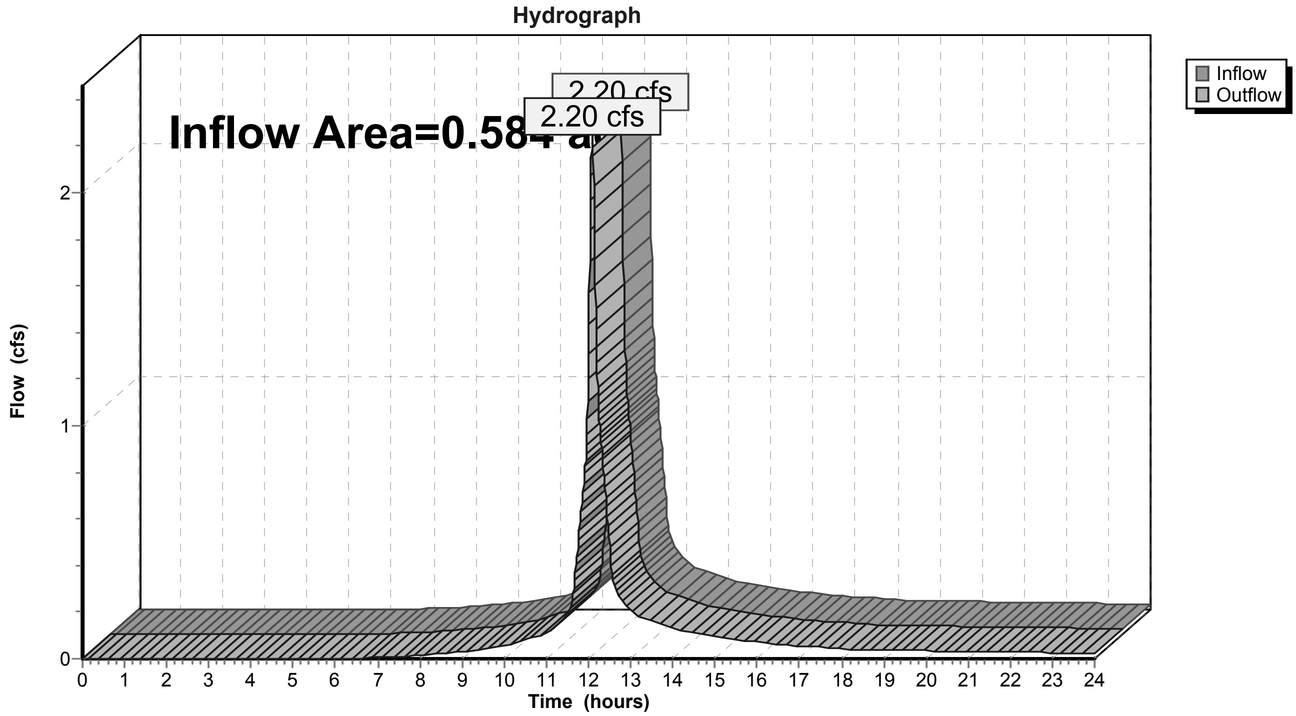


Summary for Reach DP-E: To CB #2

Inflow Area = 0.584 ac, 64.67% Impervious, Inflow Depth > 3.24" for 10-YR event
Inflow = 2.20 cfs @ 12.09 hrs, Volume= 0.157 af
Outflow = 2.20 cfs @ 12.09 hrs, Volume= 0.157 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-E: To CB #2

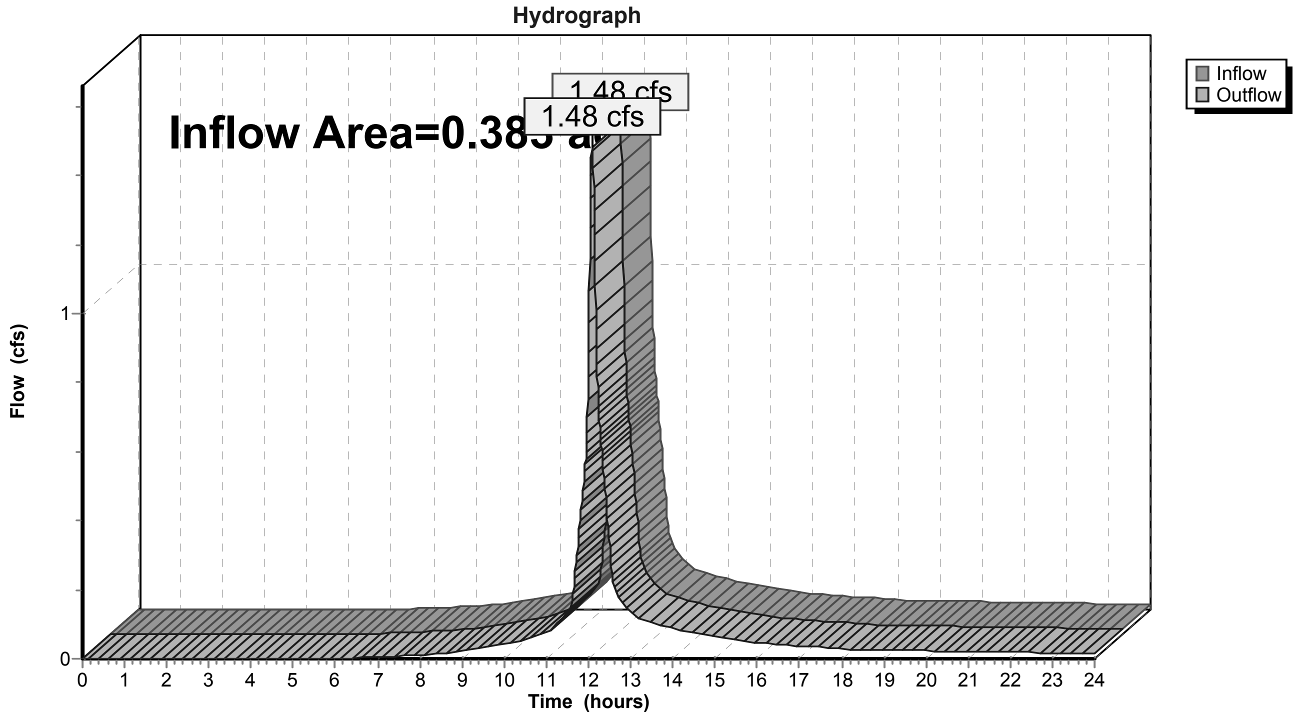


Summary for Reach DP-F: Offsite to Day School Ln

Inflow Area =	0.383 ac,	67.13% Impervious,	Inflow Depth > 3.33"	for 10-YR event	
Inflow =	1.48 cfs @	12.09 hrs,	Volume=	0.106 af	
Outflow =	1.48 cfs @	12.09 hrs,	Volume=	0.106 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-F: Offsite to Day School Ln



Summary for Pond PB4B: 30x9 Cultec 100HD

Inflow Area =	0.562 ac,	93.67% Impervious,	Inflow Depth > 4.39"	for 10-YR event	
Inflow =	2.62 cfs @	12.08 hrs,	Volume=	0.205 af	
Outflow =	0.17 cfs @	13.52 hrs,	Volume=	0.205 af,	Atten= 93%, Lag= 86.4 min
Discarded =	0.17 cfs @	13.52 hrs,	Volume=	0.205 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= 0.01 hrs / 2
Peak Elev= 282.97' @ 13.52 hrs Surf.Area= 7,204 sf Storage= 3,705 cf

Plug-Flow detention time= 174.6 min calculated for 0.205 af (100% of inflow)
Center-of-Mass det. time= 173.6 min (936.1 - 762.5)

Volume	Invert	Avail.Storage	Storage Description
#1C	282.00'	3,279 cf	**31.67'W x 227.50'L x 2.04'H Field C** 14,709 cf Overall - 3,778 cf Embedded = 10,931 cf x 30.0% Voids
#2C	282.50'	3,778 cf	**Cultec C-100HD** x 270 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 9 rows
#3	282.00'	53 cf	**4.00'D x 4.20'H Vertical Cone/Cylinder**-Impervious
		7,110 cf	Total Available Storage

Storage Group C created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	282.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	284.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600

Discarded OutFlow Max=0.17 cfs @ 13.52 hrs HW=282.97' (Free Discharge)
└─**1=Exfiltration** (Controls 0.17 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=282.00' (Free Discharge)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond PB4B: 30x9 Cultec 100HD - Chamber Wizard Field C

Chamber Model = Cultec C-100HD (Cultec Contactor® 100HD)
Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf
Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
Row Length Adjustment= +0.50' x 1.86 sf x 9 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

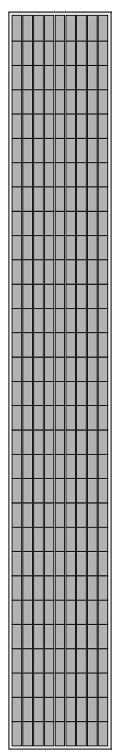
30 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 225.50' Row Length +12.0" End Stone x 2 = 227.50' Base Length
9 Rows x 36.0" Wide + 4.0" Spacing x 8 + 12.0" Side Stone x 2 = 31.67' Base Width
6.0" Base + 12.5" Chamber Height + 6.0" Cover = 2.04' Field Height

270 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 9 Rows = 3,777.9 cf Chamber Storage

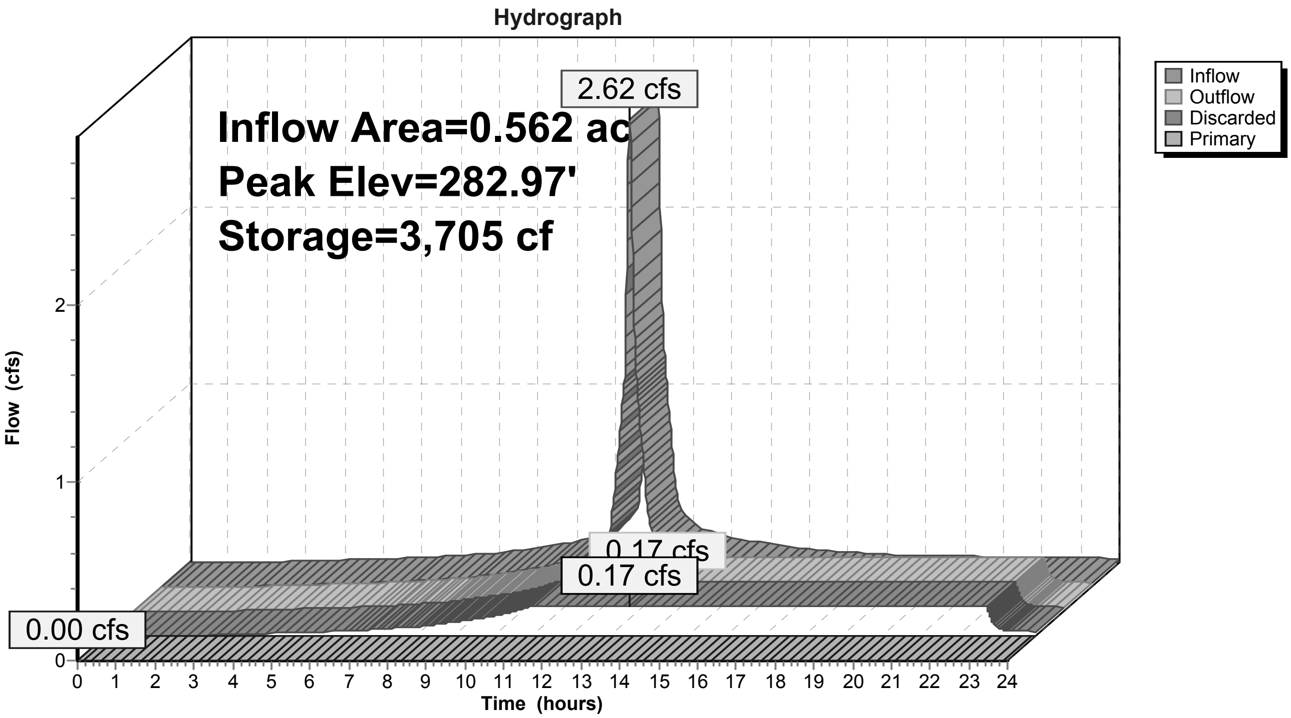
14,708.5 cf Field - 3,777.9 cf Chambers = 10,930.6 cf Stone x 30.0% Voids = 3,279.2 cf Stone Storage

Chamber Storage + Stone Storage = 7,057.1 cf = 0.162 af
Overall Storage Efficiency = 48.0%

270 Chambers
544.8 cy Field
404.8 cy Stone



Pond PB4B: 30x9 Cultec 100HD



Stage-Discharge for Pond PB4B: 30x9 Cultec 100HD

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
282.00	0.00	0.00	0.00
282.05	0.17	0.17	0.00
282.10	0.17	0.17	0.00
282.15	0.17	0.17	0.00
282.20	0.17	0.17	0.00
282.25	0.17	0.17	0.00
282.30	0.17	0.17	0.00
282.35	0.17	0.17	0.00
282.40	0.17	0.17	0.00
282.45	0.17	0.17	0.00
282.50	0.17	0.17	0.00
282.55	0.17	0.17	0.00
282.60	0.17	0.17	0.00
282.65	0.17	0.17	0.00
282.70	0.17	0.17	0.00
282.75	0.17	0.17	0.00
282.80	0.17	0.17	0.00
282.85	0.17	0.17	0.00
282.90	0.17	0.17	0.00
282.95	0.17	0.17	0.00
283.00	0.17	0.17	0.00
283.05	0.17	0.17	0.00
283.10	0.17	0.17	0.00
283.15	0.17	0.17	0.00
283.20	0.17	0.17	0.00
283.25	0.17	0.17	0.00
283.30	0.17	0.17	0.00
283.35	0.17	0.17	0.00
283.40	0.17	0.17	0.00
283.45	0.17	0.17	0.00
283.50	0.17	0.17	0.00
283.55	0.17	0.17	0.00
283.60	0.17	0.17	0.00
283.65	0.17	0.17	0.00
283.70	0.17	0.17	0.00
283.75	0.17	0.17	0.00
283.80	0.17	0.17	0.00
283.85	0.17	0.17	0.00
283.90	0.17	0.17	0.00
283.95	0.17	0.17	0.00
284.00	0.17	0.17	0.00
284.05	0.17	0.17	0.00
284.10	0.17	0.17	0.00
284.15	0.17	0.17	0.00
284.20	0.17	0.17	0.00
284.25	0.17	0.17	0.00
284.30	0.17	0.17	0.00
284.35	0.17	0.17	0.00
284.40	0.17	0.17	0.00
284.45	0.17	0.17	0.00
284.50	0.17	0.17	0.00
284.55	0.19	0.17	0.02
284.60	0.23	0.17	0.06
284.65	0.30	0.17	0.13
284.70	0.40	0.17	0.22
284.75	0.51	0.17	0.33
284.80	0.63	0.17	0.46
284.85	0.76	0.17	0.59
284.90	0.90	0.17	0.73
284.95	1.02	0.17	0.85
285.00	1.12	0.17	0.95
285.05	1.21	0.17	1.04
285.10	1.29	0.17	1.12
285.15	1.37	0.17	1.20
285.20	1.44	0.17	1.27
285.25	1.51	0.17	1.34
285.30	1.57	0.17	1.40
285.35	1.64	0.17	1.46
285.40	1.70	0.17	1.52
285.45	1.75	0.17	1.58
285.50	1.81	0.17	1.64
285.55	1.86	0.17	1.69
285.60	1.92	0.17	1.74
285.65	1.97	0.17	1.79
285.70	2.02	0.17	1.84
285.75	2.06	0.17	1.89
285.80	2.11	0.17	1.94
285.85	2.16	0.17	1.98
285.90	2.20	0.17	2.03
285.95	2.24	0.17	2.07
286.00	2.29	0.17	2.11
286.05	2.33	0.17	2.16
286.10	2.37	0.17	2.20
286.15	2.41	0.17	2.24
286.20	**2.45**	**0.17**	**2.28**

Stage-Area-Storage for Pond PB4B: 30x9 Cultec 100HD

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
282.00	**7,204**	0	284.65	7,204	7,090
282.05	7,204	109	284.70	7,204	7,091
282.10	7,204	217	284.75	7,204	7,092
282.15	7,204	326	284.80	7,204	7,092
282.20	7,204	435	284.85	7,204	7,093
282.25	7,204	543	284.90	7,204	7,094
282.30	7,204	652	284.95	7,204	7,094
282.35	7,204	761	285.00	7,204	7,095
282.40	7,204	870	285.05	7,204	7,095
282.45	7,204	978	285.10	7,204	7,096
282.50	7,204	1,087	285.15	7,204	7,097
282.55	7,204	1,383	285.20	7,204	7,097
282.60	7,204	1,674	285.25	7,204	7,098
282.65	7,204	1,960	285.30	7,204	7,099
282.70	7,204	2,242	285.35	7,204	7,099
282.75	7,204	2,524	285.40	7,204	7,100
282.80	7,204	2,804	285.45	7,204	7,100
282.85	7,204	3,082	285.50	7,204	7,101
282.90	7,204	3,355	285.55	7,204	7,102
282.95	7,204	3,623	285.60	7,204	7,102
283.00	7,204	3,886	285.65	7,204	7,103
283.05	7,204	4,144	285.70	7,204	7,104
283.10	7,204	4,396	285.75	7,204	7,104
283.15	7,204	4,639	285.80	7,204	7,105
283.20	7,204	4,873	285.85	7,204	7,105
283.25	7,204	5,094	285.90	7,204	7,106
283.30	7,204	5,299	285.95	7,204	7,107
283.35	7,204	5,486	286.00	7,204	7,107
283.40	7,204	5,649	286.05	7,204	7,108
283.45	7,204	5,787	286.10	7,204	7,109
283.50	7,204	5,905	286.15	7,204	7,109
283.55	7,204	6,014	286.20	7,204	**7,110**
283.60	7,204	6,123			
283.65	7,204	6,231			
283.70	7,204	6,340			
283.75	7,204	6,449			
283.80	7,204	6,557			
283.85	7,204	6,666			
283.90	7,204	6,775			
283.95	7,204	6,883			
284.00	7,204	6,992			
284.05	7,204	7,083			
284.10	7,204	7,083			
284.15	7,204	7,084			
284.20	7,204	7,085			
284.25	7,204	7,085			
284.30	7,204	7,086			
284.35	7,204	7,087			
284.40	7,204	7,087			
284.45	7,204	7,088			
284.50	7,204	7,089			
284.55	7,204	7,089			
284.60	7,204	7,090			

Summary for Pond PB6A: Porous Pavement

Inflow Area = 0.301 ac, 50.26% Impervious, Inflow Depth > 2.77" for 10-YR event
Inflow = 1.20 cfs @ 12.00 hrs, Volume= 0.069 af
Outflow = 0.16 cfs @ 12.48 hrs, Volume= 0.068 af, Atten= 87%, Lag= 28.9 min
Discarded = 0.16 cfs @ 12.48 hrs, Volume= 0.068 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= 0.01 hrs / 2
Peak Elev= 282.69' @ 12.48 hrs Surf.Area= 6,592 sf Storage= 924 cf

Plug-Flow detention time= 50.2 min calculated for 0.068 af (98% of inflow)
Center-of-Mass det. time= 41.1 min (858.5 - 817.5)

Volume	Invert	Avail.Storage	Storage Description
#1	282.25'	3,947 cf	**Porous Pavement (Irregular)**Listed below (Recalc) 13,158 cf Overall x 30.0% Voids
#2	278.60'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**
		4,023 cf	Total Available Storage

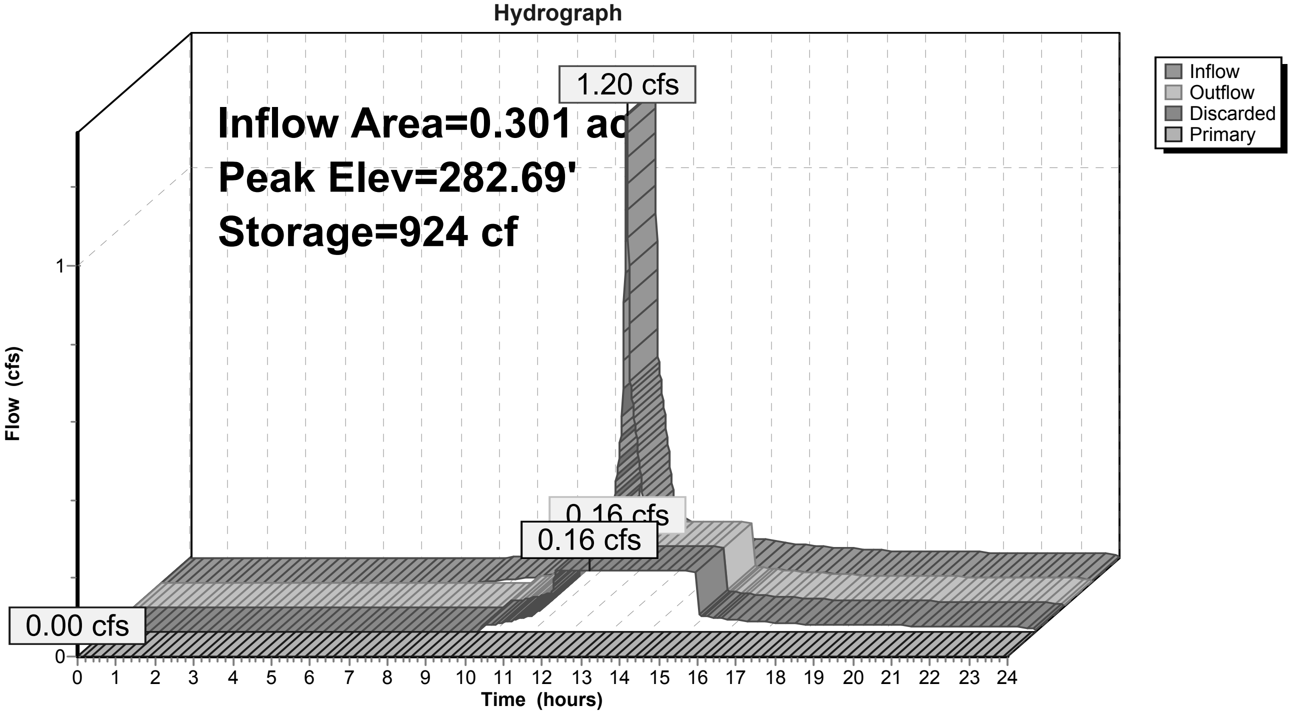
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
282.25	6,579	629.0	0	0	6,579
284.25	6,579	629.0	13,158	13,158	7,837

Device	Routing	Invert	Outlet Devices
#1	Discarded	278.60'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	284.58'	**2.3" x 2.3" Horiz. Orifice/Grate X 36.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.16 cfs @ 12.48 hrs HW=282.69' (Free Discharge)
└─**1=Exfiltration** (Controls 0.16 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=278.60' (Free Discharge)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond PB6A: Porous Pavement



Stage-Discharge for Pond PB6A: Porous Pavement

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
278.60	0.00	0.00	0.00
278.70	0.00	0.00	0.00
278.80	0.00	0.00	0.00
278.90	0.00	0.00	0.00
279.00	0.00	0.00	0.00
279.10	0.00	0.00	0.00
279.20	0.00	0.00	0.00
279.30	0.00	0.00	0.00
279.40	0.00	0.00	0.00
279.50	0.00	0.00	0.00
279.60	0.00	0.00	0.00
279.70	0.00	0.00	0.00
279.80	0.00	0.00	0.00
279.90	0.00	0.00	0.00
280.00	0.00	0.00	0.00
280.10	0.00	0.00	0.00
280.20	0.00	0.00	0.00
280.30	0.00	0.00	0.00
280.40	0.00	0.00	0.00
280.50	0.00	0.00	0.00
280.60	0.00	0.00	0.00
280.70	0.00	0.00	0.00
280.80	0.00	0.00	0.00
280.90	0.00	0.00	0.00
281.00	0.00	0.00	0.00
281.10	0.00	0.00	0.00
281.20	0.00	0.00	0.00
281.30	0.00	0.00	0.00
281.40	0.00	0.00	0.00
281.50	0.00	0.00	0.00
281.60	0.00	0.00	0.00
281.70	0.00	0.00	0.00
281.80	0.00	0.00	0.00
281.90	0.00	0.00	0.00
282.00	0.00	0.00	0.00
282.10	0.00	0.00	0.00
282.20	0.00	0.00	0.00
282.30	0.16	0.16	0.00
282.40	0.16	0.16	0.00
282.50	0.16	0.16	0.00
282.60	0.16	0.16	0.00
282.70	0.16	0.16	0.00
282.80	0.16	0.16	0.00
282.90	0.16	0.16	0.00
283.00	0.16	0.16	0.00
283.10	0.16	0.16	0.00
283.20	0.16	0.16	0.00
283.30	0.16	0.16	0.00
283.40	0.16	0.16	0.00
283.50	0.16	0.16	0.00
283.60	0.16	0.16	0.00
283.70	0.16	0.16	0.00
283.80	0.16	0.16	0.00
283.90	0.16	0.16	0.00
284.00	0.16	0.16	0.00
284.10	0.16	0.16	0.00
284.20	0.16	0.16	0.00
284.30	0.16	0.16	0.00
284.40	0.16	0.16	0.00
284.50	0.16	0.16	0.00
284.60	**0.41**	**0.16**	**0.26**

Stage-Area-Storage for Pond PB6A: Porous Pavement

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
278.60	13	0	283.90	6,592	3,323
278.70	13	1	284.00	6,592	3,522
278.80	13	3	284.10	6,592	3,720
278.90	13	4	284.20	6,592	3,919
279.00	13	5	284.30	6,592	4,019
279.10	13	6	284.40	6,592	4,020
279.20	13	8	284.50	6,592	4,022
279.30	13	9	284.60	6,592	**4,023**
279.40	13	10			
279.50	13	11			
279.60	13	13			
279.70	13	14			
279.80	13	15			
279.90	13	16			
280.00	13	18			
280.10	13	19			
280.20	13	20			
280.30	13	21			
280.40	13	23			
280.50	13	24			
280.60	13	25			
280.70	13	26			
280.80	13	28			
280.90	13	29			
281.00	13	30			
281.10	13	31			
281.20	13	33			
281.30	13	34			
281.40	13	35			
281.50	13	36			
281.60	13	38			
281.70	13	39			
281.80	13	40			
281.90	13	41			
282.00	13	43			
282.10	13	44			
282.20	**13**	45			
282.30	**6,592**	145			
282.40	6,592	344			
282.50	6,592	542			
282.60	6,592	741			
282.70	6,592	940			
282.80	6,592	1,138			
282.90	6,592	1,337			
283.00	6,592	1,536			
283.10	6,592	1,734			
283.20	6,592	1,933			
283.30	6,592	2,131			
283.40	6,592	2,330			
283.50	6,592	2,529			
283.60	6,592	2,727			
283.70	6,592	2,926			
283.80	6,592	3,125			

Summary for Pond PB6B: Porous Pavement

Inflow Area = 1.006 ac, 21.93% Impervious, Inflow Depth > 1.78" for 10-YR event
Inflow = 2.49 cfs @ 12.00 hrs, Volume= 0.149 af
Outflow = 0.23 cfs @ 12.95 hrs, Volume= 0.149 af, Atten= 91%, Lag= 56.8 min
Discarded = 0.23 cfs @ 12.95 hrs, Volume= 0.149 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= 0.01 hrs / 2
Peak Elev= 263.79' @ 12.95 hrs Surf.Area= 9,608 sf Storage= 2,270 cf

Plug-Flow detention time= 87.6 min calculated for 0.149 af (100% of inflow)
Center-of-Mass det. time= 86.9 min (935.8 - 848.9)

Volume	Invert	Avail.Storage	Storage Description
#1	263.00'	5,765 cf	**Porous Pavement (Irregular)**Listed below (Recalc) 19,216 cf Overall x 30.0% Voids

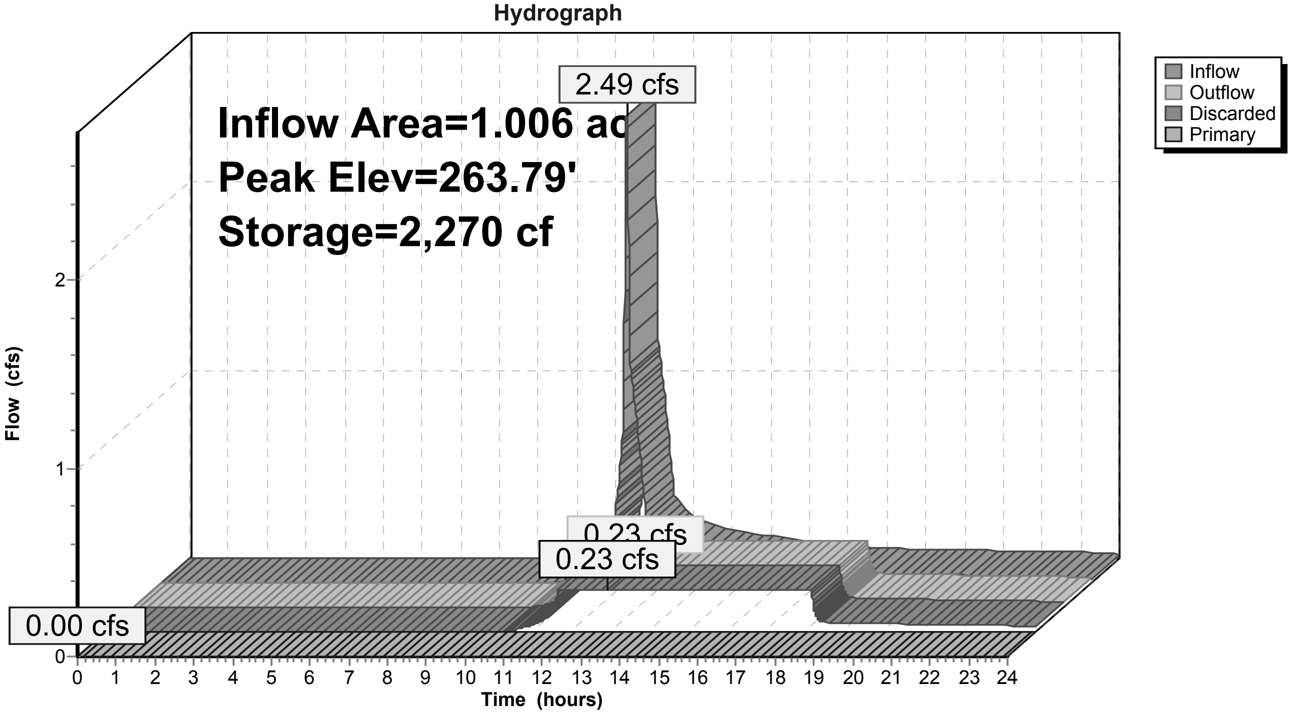
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
263.00	9,608	1,042.0	0	0	9,608
265.00	9,608	1,042.0	19,216	19,216	11,692

Device	Routing	Invert	Outlet Devices
#1	Discarded	263.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	263.80'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Discarded OutFlow Max=0.23 cfs @ 12.95 hrs HW=263.79' (Free Discharge)
└─**1=Exfiltration** (Controls 0.23 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=263.00' (Free Discharge)
└─**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond PB6B: Porous Pavement



Stage-Discharge for Pond PB6B: Porous Pavement

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
263.00	0.00	0.00	0.00	264.06	1.07	0.23	0.84
263.02	0.23	0.23	0.00	264.08	1.17	0.23	0.94
263.04	0.23	0.23	0.00	264.10	1.27	0.23	1.04
263.06	0.23	0.23	0.00	264.12	1.37	0.23	1.15
263.08	0.23	0.23	0.00	264.14	1.48	0.23	1.25
263.10	0.23	0.23	0.00	264.16	1.59	0.23	1.36
263.12	0.23	0.23	0.00	264.18	1.70	0.23	1.47
263.14	0.23	0.23	0.00	264.20	1.82	0.23	1.59
263.16	0.23	0.23	0.00	264.22	1.93	0.23	1.71
263.18	0.23	0.23	0.00	264.24	2.05	0.23	1.82
263.20	0.23	0.23	0.00	264.26	2.17	0.23	1.95
263.22	0.23	0.23	0.00	264.28	2.30	0.23	2.07
263.24	0.23	0.23	0.00	264.30	2.42	0.23	2.20
263.26	0.23	0.23	0.00	264.32	2.55	0.23	2.32
263.28	0.23	0.23	0.00	264.34	2.68	0.23	2.46
263.30	0.23	0.23	0.00	264.36	2.82	0.23	2.59
263.32	0.23	0.23	0.00	264.38	2.95	0.23	2.72
263.34	0.23	0.23	0.00	264.40	3.09	0.23	2.86
263.36	0.23	0.23	0.00	264.42	3.22	0.23	2.99
263.38	0.23	0.23	0.00	264.44	3.36	0.23	3.13
263.40	0.23	0.23	0.00	264.46	3.50	0.23	3.28
263.42	0.23	0.23	0.00	264.48	3.65	0.23	3.42
263.44	0.23	0.23	0.00	264.50	3.79	0.23	3.56
263.46	0.23	0.23	0.00	264.52	3.94	0.23	3.71
263.48	0.23	0.23	0.00	264.54	4.08	0.23	3.86
263.50	0.23	0.23	0.00	264.56	4.23	0.23	4.00
263.52	0.23	0.23	0.00	264.58	4.38	0.23	4.15
263.54	0.23	0.23	0.00	264.60	4.53	0.23	4.31
263.56	0.23	0.23	0.00	264.62	4.69	0.23	4.46
263.58	0.23	0.23	0.00	264.64	4.84	0.23	4.61
263.60	0.23	0.23	0.00	264.66	5.00	0.23	4.77
263.62	0.23	0.23	0.00	264.68	5.15	0.23	4.92
263.64	0.23	0.23	0.00	264.70	5.31	0.23	5.08
263.66	0.23	0.23	0.00	264.72	5.47	0.23	5.24
263.68	0.23	0.23	0.00	264.74	5.63	0.23	5.40
263.70	0.23	0.23	0.00	264.76	5.79	0.23	5.56
263.72	0.23	0.23	0.00	264.78	5.95	0.23	5.72
263.74	0.23	0.23	0.00	264.80	6.11	0.23	5.89
263.76	0.23	0.23	0.00	264.82	6.28	0.23	6.05
263.78	0.23	0.23	0.00	264.84	6.44	0.23	6.21
263.80	0.23	0.23	0.00	264.86	6.61	0.23	6.38
263.82	0.25	0.23	0.02	264.88	6.78	0.23	6.55
263.84	0.28	0.23	0.05	264.90	6.94	0.23	6.72
263.86	0.32	0.23	0.10	264.92	7.11	0.23	6.88
263.88	0.37	0.23	0.15	264.94	7.28	0.23	7.05
263.90	0.43	0.23	0.20	264.96	7.45	0.23	7.22
263.92	0.50	0.23	0.27	264.98	7.62	0.23	7.39
263.94	0.57	0.23	0.34	265.00	**7.79**	**0.23**	**7.57**
263.96	0.64	0.23	0.41				
263.98	0.72	0.23	0.49				
264.00	0.80	0.23	0.57				
264.02	0.89	0.23	0.66				
264.04	0.98	0.23	0.75				

Stage-Area-Storage for Pond PB6B: Porous Pavement

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
263.00	**9,608**	0	264.06	9,608	3,055
263.02	9,608	58	264.08	9,608	3,113
263.04	9,608	115	264.10	9,608	3,171
263.06	9,608	173	264.12	9,608	3,228
263.08	9,608	231	264.14	9,608	3,286
263.10	9,608	288	264.16	9,608	3,344
263.12	9,608	346	264.18	9,608	3,401
263.14	9,608	404	264.20	9,608	3,459
263.16	9,608	461	264.22	9,608	3,517
263.18	9,608	519	264.24	9,608	3,574
263.20	9,608	576	264.26	9,608	3,632
263.22	9,608	634	264.28	9,608	3,689
263.24	9,608	692	264.30	9,608	3,747
263.26	9,608	749	264.32	9,608	3,805
263.28	9,608	807	264.34	9,608	3,862
263.30	9,608	865	264.36	9,608	3,920
263.32	9,608	922	264.38	9,608	3,978
263.34	9,608	980	264.40	9,608	4,035
263.36	9,608	1,038	264.42	9,608	4,093
263.38	9,608	1,095	264.44	9,608	4,151
263.40	9,608	1,153	264.46	9,608	4,208
263.42	9,608	1,211	264.48	9,608	4,266
263.44	9,608	1,268	264.50	9,608	4,324
263.46	9,608	1,326	264.52	9,608	4,381
263.48	9,608	1,384	264.54	9,608	4,439
263.50	9,608	1,441	264.56	9,608	4,497
263.52	9,608	1,499	264.58	9,608	4,554
263.54	9,608	1,556	264.60	9,608	4,612
263.56	9,608	1,614	264.62	9,608	4,669
263.58	9,608	1,672	264.64	9,608	4,727
263.60	9,608	1,729	264.66	9,608	4,785
263.62	9,608	1,787	264.68	9,608	4,842
263.64	9,608	1,845	264.70	9,608	4,900
263.66	9,608	1,902	264.72	9,608	4,958
263.68	9,608	1,960	264.74	9,608	5,015
263.70	9,608	2,018	264.76	9,608	5,073
263.72	9,608	2,075	264.78	9,608	5,131
263.74	9,608	2,133	264.80	9,608	5,188
263.76	9,608	2,191	264.82	9,608	5,246
263.78	9,608	2,248	264.84	9,608	5,304
263.80	9,608	2,306	264.86	9,608	5,361
263.82	9,608	2,364	264.88	9,608	5,419
263.84	9,608	2,421	264.90	9,608	5,477
263.86	9,608	2,479	264.92	9,608	5,534
263.88	9,608	2,537	264.94	9,608	5,592
263.90	9,608	2,594	264.96	9,608	5,650
263.92	9,608	2,652	264.98	9,608	5,707
263.94	9,608	2,709	265.00	9,608	**5,765**
263.96	9,608	2,767			
263.98	9,608	2,825			
264.00	9,608	2,882			
264.02	9,608	2,940			
264.04	9,608	2,998			

Summary for Pond XB1: Exist Basin #1

Inflow Area = 0.260 ac, 95.63% Impervious, Inflow Depth > 4.39" for 10-YR event
Inflow = 1.21 cfs @ 12.08 hrs, Volume= 0.095 af
Outflow = 0.09 cfs @ 13.31 hrs, Volume= 0.095 af, Atten= 93%, Lag= 73.8 min
Discarded = 0.09 cfs @ 13.31 hrs, Volume= 0.095 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= 0.01 hrs
Peak Elev= 283.80' @ 13.31 hrs Surf.Area= 3,600 sf Storage= 1,640 cf

Plug-Flow detention time= 149.6 min calculated for 0.095 af (100% of inflow)
Center-of-Mass det. time= 149.1 min (911.6 - 762.5)

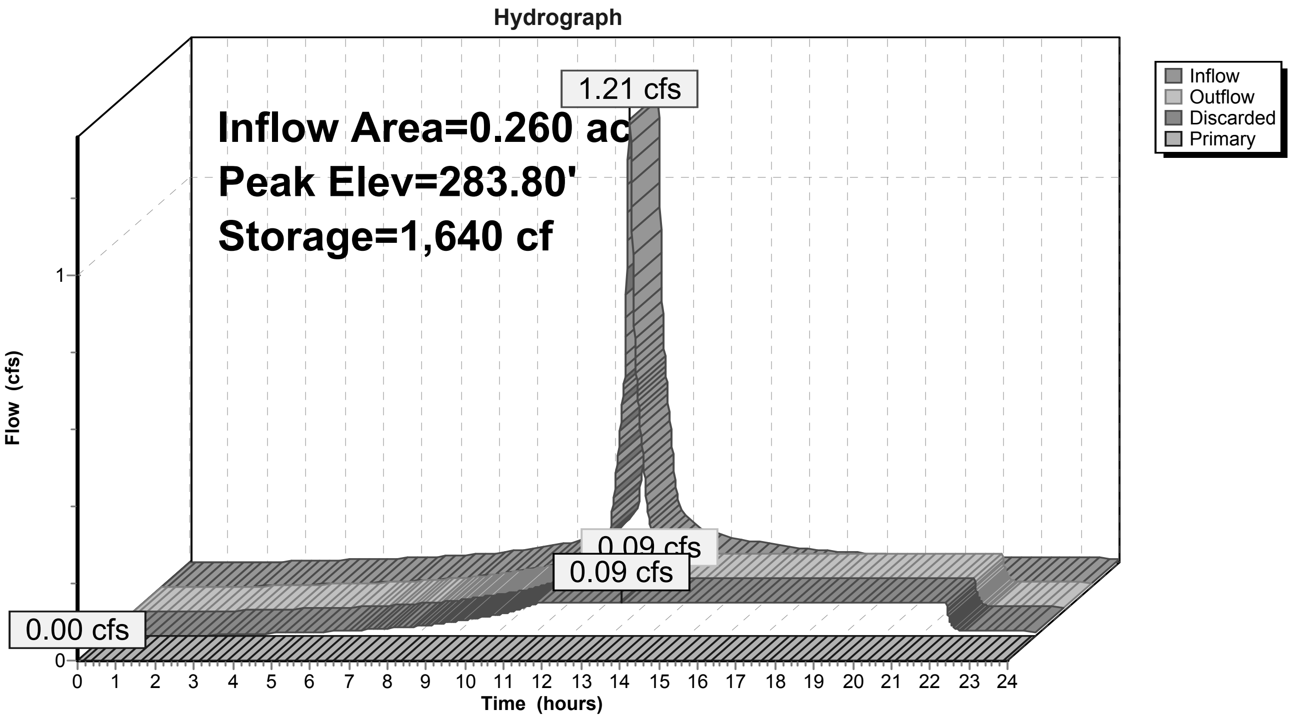
Volume	Invert	Avail.Storage	Storage Description
#1	283.50'	3,335 cf	**30.0"W x 18.0"H x 58.00'L Cultec Contactor 125**x 23 Inside #2
#2	283.00'	1,353 cf	**60.00'W x 60.00'L x 2.00'H Stone**
			7,200 cf Overall - 3,335 cf Embedded = 3,865 cf x 35.0% Voids
		4,688 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	284.50'	**4.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	283.00'	**1.020 in/hr Exfiltration over Surface area**
			Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.09 cfs @ 13.31 hrs HW=283.80' (Free Discharge)
└─**2=Exfiltration** (Controls 0.09 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.00' (Free Discharge)
└─**1=Orifice/Grate** (Controls 0.00 cfs)

Pond XB1: Exist Basin #1



Stage-Discharge for Pond XB1: Exist Basin #1

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
283.00	0.00	0.00	0.00	284.06	0.09	0.09	0.00
283.02	0.09	0.09	0.00	284.08	0.09	0.09	0.00
283.04	0.09	0.09	0.00	284.10	0.09	0.09	0.00
283.06	0.09	0.09	0.00	284.12	0.09	0.09	0.00
283.08	0.09	0.09	0.00	284.14	0.09	0.09	0.00
283.10	0.09	0.09	0.00	284.16	0.09	0.09	0.00
283.12	0.09	0.09	0.00	284.18	0.09	0.09	0.00
283.14	0.09	0.09	0.00	284.20	0.09	0.09	0.00
283.16	0.09	0.09	0.00	284.22	0.09	0.09	0.00
283.18	0.09	0.09	0.00	284.24	0.09	0.09	0.00
283.20	0.09	0.09	0.00	284.26	0.09	0.09	0.00
283.22	0.09	0.09	0.00	284.28	0.09	0.09	0.00
283.24	0.09	0.09	0.00	284.30	0.09	0.09	0.00
283.26	0.09	0.09	0.00	284.32	0.09	0.09	0.00
283.28	0.09	0.09	0.00	284.34	0.09	0.09	0.00
283.30	0.09	0.09	0.00	284.36	0.09	0.09	0.00
283.32	0.09	0.09	0.00	284.38	0.09	0.09	0.00
283.34	0.09	0.09	0.00	284.40	0.09	0.09	0.00
283.36	0.09	0.09	0.00	284.42	0.09	0.09	0.00
283.38	0.09	0.09	0.00	284.44	0.09	0.09	0.00
283.40	0.09	0.09	0.00	284.46	0.09	0.09	0.00
283.42	0.09	0.09	0.00	284.48	0.09	0.09	0.00
283.44	0.09	0.09	0.00	284.50	0.09	0.09	0.00
283.46	0.09	0.09	0.00	284.52	0.09	0.09	0.00
283.48	0.09	0.09	0.00	284.54	0.09	0.09	0.00
283.50	0.09	0.09	0.00	284.56	0.09	0.09	0.01
283.52	0.09	0.09	0.00	284.58	0.10	0.09	0.02
283.54	0.09	0.09	0.00	284.60	0.11	0.09	0.02
283.56	0.09	0.09	0.00	284.62	0.12	0.09	0.03
283.58	0.09	0.09	0.00	284.64	0.13	0.09	0.04
283.60	0.09	0.09	0.00	284.66	0.14	0.09	0.06
283.62	0.09	0.09	0.00	284.68	0.15	0.09	0.07
283.64	0.09	0.09	0.00	284.70	0.17	0.09	0.08
283.66	0.09	0.09	0.00	284.72	0.18	0.09	0.10
283.68	0.09	0.09	0.00	284.74	0.20	0.09	0.11
283.70	0.09	0.09	0.00	284.76	0.21	0.09	0.13
283.72	0.09	0.09	0.00	284.78	0.23	0.09	0.14
283.74	0.09	0.09	0.00	284.80	0.24	0.09	0.15
283.76	0.09	0.09	0.00	284.82	0.25	0.09	0.17
283.78	0.09	0.09	0.00	284.84	0.26	0.09	0.17
283.80	0.09	0.09	0.00	284.86	0.27	0.09	0.18
283.82	0.09	0.09	0.00	284.88	0.28	0.09	0.19
283.84	0.09	0.09	0.00	284.90	0.29	0.09	0.20
283.86	0.09	0.09	0.00	284.92	0.30	0.09	0.21
283.88	0.09	0.09	0.00	284.94	0.31	0.09	0.22
283.90	0.09	0.09	0.00	284.96	0.31	0.09	0.23
283.92	0.09	0.09	0.00	284.98	0.32	0.09	0.24
283.94	0.09	0.09	0.00	285.00	**0.33**	**0.09**	**0.24**
283.96	0.09	0.09	0.00				
283.98	0.09	0.09	0.00				
284.00	0.09	0.09	0.00				
284.02	0.09	0.09	0.00				
284.04	0.09	0.09	0.00				

Stage-Area-Storage for Pond XB1: Exist Basin #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.00	**3,600**	0	284.06	3,600	2,428
283.02	3,600	25	284.08	3,600	2,487
283.04	3,600	50	284.10	3,600	2,546
283.06	3,600	76	284.12	3,600	2,605
283.08	3,600	101	284.14	3,600	2,663
283.10	3,600	126	284.16	3,600	2,721
283.12	3,600	151	284.18	3,600	2,778
283.14	3,600	176	284.20	3,600	2,835
283.16	3,600	202	284.22	3,600	2,892
283.18	3,600	227	284.24	3,600	2,948
283.20	3,600	252	284.26	3,600	3,004
283.22	3,600	277	284.28	3,600	3,060
283.24	3,600	302	284.30	3,600	3,115
283.26	3,600	328	284.32	3,600	3,169
283.28	3,600	353	284.34	3,600	3,223
283.30	3,600	378	284.36	3,600	3,277
283.32	3,600	403	284.38	3,600	3,331
283.34	3,600	428	284.40	3,600	3,383
283.36	3,600	454	284.42	3,600	3,436
283.38	3,600	479	284.44	3,600	3,488
283.40	3,600	504	284.46	3,600	3,539
283.42	3,600	529	284.48	3,600	3,590
283.44	3,600	554	284.50	3,600	3,641
283.46	3,600	580	284.52	3,600	3,691
283.48	3,600	605	284.54	3,600	3,740
283.50	3,600	630	284.56	3,600	3,789
283.52	3,600	698	284.58	3,600	3,837
283.54	3,600	767	284.60	3,600	3,885
283.56	3,600	834	284.62	3,600	3,933
283.58	3,600	902	284.64	3,600	3,979
283.60	3,600	969	284.66	3,600	4,025
283.62	3,600	1,036	284.68	3,600	4,071
283.64	3,600	1,103	284.70	3,600	4,116
283.66	3,600	1,169	284.72	3,600	4,160
283.68	3,600	1,235	284.74	3,600	4,204
283.70	3,600	1,301	284.76	3,600	4,247
283.72	3,600	1,366	284.78	3,600	4,289
283.74	3,600	1,431	284.80	3,600	4,330
283.76	3,600	1,496	284.82	3,600	4,371
283.78	3,600	1,560	284.84	3,600	4,411
283.80	3,600	1,625	284.86	3,600	4,450
283.82	3,600	1,688	284.88	3,600	4,487
283.84	3,600	1,752	284.90	3,600	4,524
283.86	3,600	1,815	284.92	3,600	4,560
283.88	3,600	1,878	284.94	3,600	4,595
283.90	3,600	1,940	284.96	3,600	4,628
283.92	3,600	2,003	284.98	3,600	4,659
283.94	3,600	2,064	285.00	3,600	**4,688**
283.96	3,600	2,126			
283.98	3,600	2,187			
284.00	3,600	2,248			
284.02	3,600	2,308			
284.04	3,600	2,368			

Summary for Pond XB2: Exist Basin #2

Inflow Area = 1.933 ac, 75.44% Impervious, Inflow Depth > 3.63" for 10-YR event
Inflow = 8.02 cfs @ 12.09 hrs, Volume= 0.586 af
Outflow = 7.98 cfs @ 12.09 hrs, Volume= 0.471 af, Atten= 1%, Lag= 0.4 min
Discarded = 0.07 cfs @ 12.09 hrs, Volume= 0.099 af
Primary = 7.91 cfs @ 12.09 hrs, Volume= 0.372 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 286.63' @ 12.09 hrs Surf.Area= 2,883 sf Storage= 5,752 cf

Plug-Flow detention time= 110.9 min calculated for 0.471 af (80% of inflow)
Center-of-Mass det. time= 37.0 min (831.7 - 794.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	279.50'	1,268 cf	**30.50'W x 73.50'L x 3.04'H Field A**
			6,819 cf Overall - 3,196 cf Embedded = 3,622 cf x 35.0% Voids
#2A	280.00'	3,196 cf	**Cultec R-330XLHD** x 60 Inside #1
			Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
			Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
			Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
#3B	279.50'	370 cf	**16.00'W x 38.50'L x 3.04'H Field B**
			1,874 cf Overall - 816 cf Embedded = 1,058 cf x 35.0% Voids
#4B	280.00'	816 cf	**Cultec R-330XLHD** x 15 Inside #3
			Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
			Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
			Row Length Adjustment= +1.50' x 7.45 sf x 3 rows
#5	279.00'	148 cf	**4.00'D x 11.80'H Vertical Cone/Cylinder**
#6	286.20'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**
		5,874 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	282.00'	**6.0" Vert. Orifice/Grate X 4.00** C= 0.600
#2	Primary	290.70'	**2.3" x 2.3" Horiz. Grate X 36.00**
			C= 0.600 in 24.0" x 24.0" Grate (33% open area)
			Limited to weir flow at low heads
#3	Primary	292.10'	**2.3" x 2.3" Horiz. Grate X 36.00**
			C= 0.600 in 24.0" x 24.0" Grate (33% open area)
			Limited to weir flow at low heads
#4	Discarded	279.00'	**1.020 in/hr Exfiltration over Surface area**
			Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.07 cfs @ 12.09 hrs HW=286.62' (Free Discharge)
└─**4=Exfiltration** (Controls 0.07 cfs)

Primary OutFlow Max=7.90 cfs @ 12.09 hrs HW=286.62' (Free Discharge)
├─**1=Orifice/Grate** (Orifice Controls 7.90 cfs @ 10.06 fps)
├─**2=Grate** (Controls 0.00 cfs)
└─**3=Grate** (Controls 0.00 cfs)

Pond XB2: Exist Basin #2 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

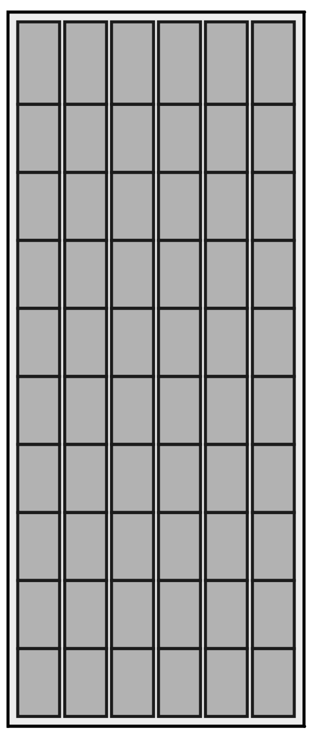
10 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 71.50' Row Length +12.0" End Stone x 2 = 73.50' Base Length
6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width
6.0" Base + 30.5" Chamber Height = 3.04' Field Height

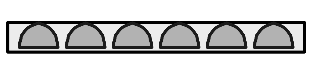
60 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 3,196.5 cf Chamber Storage

6,818.7 cf Field - 3,196.5 cf Chambers = 3,622.2 cf Stone x 35.0% Voids = 1,267.8 cf Stone Storage

Chamber Storage + Stone Storage = 4,464.2 cf = 0.102 af
Overall Storage Efficiency = 65.5%

60 Chambers
252.5 cy Field
134.2 cy Stone





Pond XB2: Exist Basin #2 - Chamber Wizard Field B

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 3 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

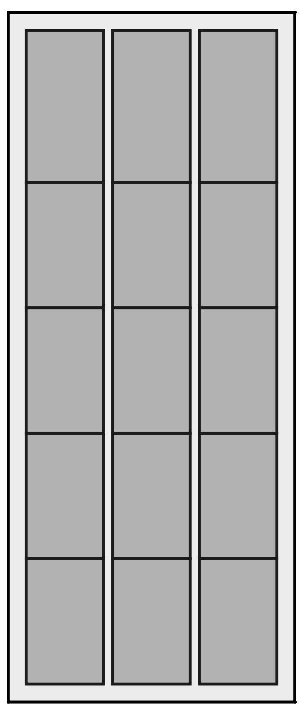
5 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 36.50' Row Length +12.0" End Stone x 2 = 38.50' Base Length
3 Rows x 52.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 16.00' Base Width
6.0" Base + 30.5" Chamber Height = 3.04' Field Height

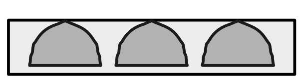
15 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 3 Rows = 815.9 cf Chamber Storage

1,873.7 cf Field - 815.9 cf Chambers = 1,057.8 cf Stone x 35.0% Voids = 370.2 cf Stone Storage

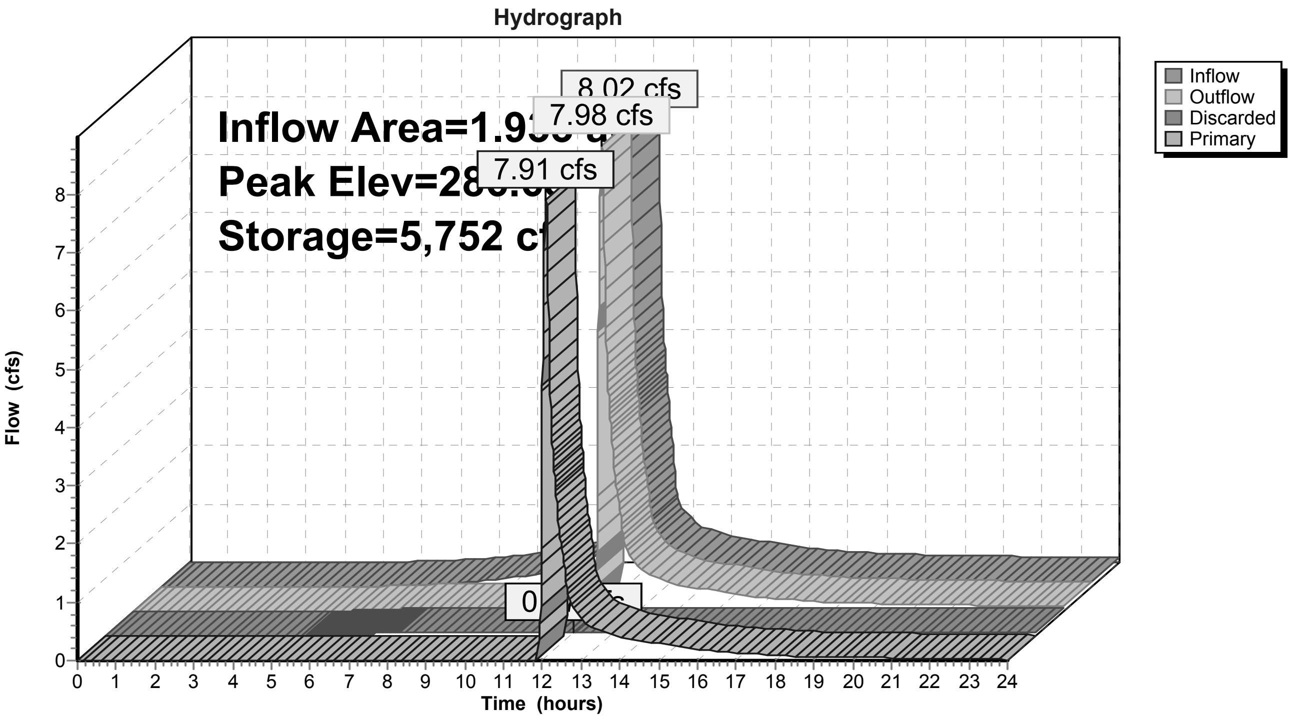
Chamber Storage + Stone Storage = 1,186.1 cf = 0.027 af
Overall Storage Efficiency = 63.3%

15 Chambers
69.4 cy Field
39.2 cy Stone





Pond XB2: Exist Basin #2



Stage-Discharge for Pond XB2: Exist Basin #2

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
279.00	0.00	0.00	0.00	286.95	8.27	0.07	8.20
279.15	0.00	0.00	0.00	287.10	8.40	0.07	8.33
279.30	0.00	0.00	0.00	287.25	8.53	0.07	8.46
279.45	0.00	0.00	0.00	287.40	8.65	0.07	8.58
279.60	0.07	0.07	0.00	287.55	8.78	0.07	8.71
279.75	0.07	0.07	0.00	287.70	8.90	0.07	8.83
279.90	0.07	0.07	0.00	287.85	9.02	0.07	8.95
280.05	0.07	0.07	0.00	288.00	9.14	0.07	9.07
280.20	0.07	0.07	0.00	288.15	9.26	0.07	9.19
280.35	0.07	0.07	0.00	288.30	9.37	0.07	9.30
280.50	0.07	0.07	0.00	288.45	9.49	0.07	9.42
280.65	0.07	0.07	0.00	288.60	9.60	0.07	9.53
280.80	0.07	0.07	0.00	288.75	9.71	0.07	9.64
280.95	0.07	0.07	0.00	288.90	9.82	0.07	9.75
281.10	0.07	0.07	0.00	289.05	9.93	0.07	9.86
281.25	0.07	0.07	0.00	289.20	10.04	0.07	9.97
281.40	0.07	0.07	0.00	289.35	10.15	0.07	10.08
281.55	0.07	0.07	0.00	289.50	10.25	0.07	10.18
281.70	0.07	0.07	0.00	289.65	10.36	0.07	10.29
281.85	0.07	0.07	0.00	289.80	10.46	0.07	10.39
282.00	0.07	0.07	0.00	289.95	10.56	0.07	10.49
282.15	0.33	0.07	0.26	290.10	10.67	0.07	10.60
282.30	0.99	0.07	0.92	290.25	10.77	0.07	10.70
282.45	1.77	0.07	1.70	290.40	10.87	0.07	10.80
282.60	2.31	0.07	2.24	290.55	10.97	0.07	10.89
282.75	2.74	0.07	2.67	290.70	11.06	0.07	10.99
282.90	3.12	0.07	3.05	290.85	12.68	0.07	12.61
283.05	3.45	0.07	3.38	291.00	14.74	0.07	14.67
283.20	3.75	0.07	3.69	291.15	15.62	0.07	15.55
283.35	4.03	0.07	3.97	291.30	16.38	0.07	16.31
283.50	4.30	0.07	4.23	291.45	17.06	0.07	16.99
283.65	4.54	0.07	4.47	291.60	17.68	0.07	17.60
283.80	4.78	0.07	4.71	291.75	18.25	0.07	18.18
283.95	5.00	0.07	4.93	291.90	18.79	0.07	18.72
284.10	5.21	0.07	5.14	292.05	19.31	0.07	19.24
284.25	5.42	0.07	5.35	292.20	**20.63**	**0.07**	**20.55**
284.40	5.61	0.07	5.55				
284.55	5.80	0.07	5.74				
284.70	5.99	0.07	5.92				
284.85	6.17	0.07	6.10				
285.00	6.34	0.07	6.27				
285.15	6.51	0.07	6.44				
285.30	6.67	0.07	6.60				
285.45	6.83	0.07	6.76				
285.60	6.99	0.07	6.92				
285.75	7.14	0.07	7.07				
285.90	7.29	0.07	7.22				
286.05	7.44	0.07	7.37				
286.20	7.59	0.07	7.52				
286.35	7.73	0.07	7.66				
286.50	7.87	0.07	7.80				
286.65	8.00	0.07	7.93				
286.80	8.14	0.07	8.07				

Stage-Area-Storage for Pond XB2: Exist Basin #2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
279.00	13	0	286.95	2,883	5,760
279.15	13	2	287.10	2,883	5,763
279.30	13	4	287.25	2,883	5,767
279.45	13	6	287.40	2,883	5,771
279.60	2,870	108	287.55	2,883	5,775
279.75	2,870	259	287.70	2,883	5,779
279.90	2,870	411	287.85	2,883	5,782
280.05	2,870	633	288.00	2,883	5,786
280.20	2,870	991	288.15	2,883	5,790
280.35	2,870	1,348	288.30	2,883	5,794
280.50	2,870	1,703	288.45	2,883	5,797
280.65	2,870	2,054	288.60	2,883	5,801
280.80	2,870	2,399	288.75	2,883	5,805
280.95	2,870	2,742	288.90	2,883	5,809
281.10	2,870	3,082	289.05	2,883	5,812
281.25	2,870	3,419	289.20	2,883	5,816
281.40	2,870	3,747	289.35	2,883	5,820
281.55	2,870	4,063	289.50	2,883	5,824
281.70	2,870	4,369	289.65	2,883	5,828
281.85	2,870	4,661	289.80	2,883	5,831
282.00	2,870	4,937	289.95	2,883	5,835
282.15	2,870	5,192	290.10	2,883	5,839
282.30	2,870	5,415	290.25	2,883	5,843
282.45	2,870	5,599	290.40	2,883	5,846
282.60	2,870	5,696	290.55	2,883	5,850
282.75	2,870	5,697	290.70	2,883	5,854
282.90	2,870	5,699	290.85	2,883	5,857
283.05	2,870	5,701	291.00	2,883	5,859
283.20	2,870	5,703	291.15	2,883	5,861
283.35	2,870	5,705	291.30	2,883	5,863
283.50	2,870	5,707	291.45	2,883	5,865
283.65	2,870	5,709	291.60	2,883	5,866
283.80	2,870	5,711	291.75	2,883	5,868
283.95	2,870	5,713	291.90	2,883	5,870
284.10	2,870	5,714	292.05	2,883	5,872
284.25	2,870	5,716	292.20	2,883	**5,874**
284.40	2,870	5,718			
284.55	2,870	5,720			
284.70	2,870	5,722			
284.85	2,870	5,724			
285.00	2,870	5,726			
285.15	2,870	5,728			
285.30	2,870	5,730			
285.45	2,870	5,731			
285.60	2,870	5,733			
285.75	2,870	5,735			
285.90	2,870	5,737			
286.05	2,870	5,739			
286.20	**2,883**	5,741			
286.35	2,883	5,745			
286.50	2,883	5,748			
286.65	2,883	5,752			
286.80	2,883	5,756			

Summary for Subcatchment P1: Offsite to West

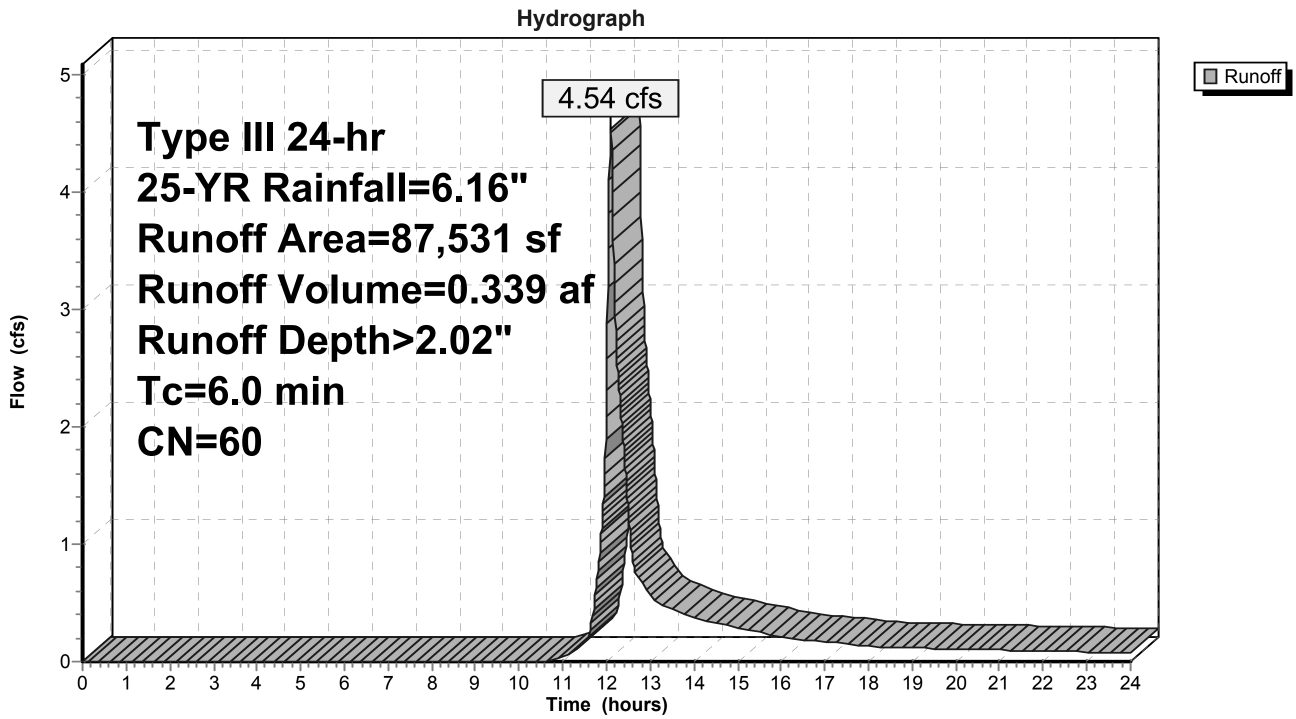
Runoff = 4.54 cfs @ 12.10 hrs, Volume= 0.339 af, Depth> 2.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.16"

	Area (sf)	CN	Description
	27,387	55	Woods, Good, HSG B
*	3,150	98	Roof
*	0	98	Impervious
	56,994	61	>75% Grass cover, Good, HSG B
	87,531	60	Weighted Average
	84,381		96.40% Pervious Area
	3,150		3.60% Impervious Area

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

Subcatchment P1: Offsite to West



Summary for Subcatchment P2: To Basin #2

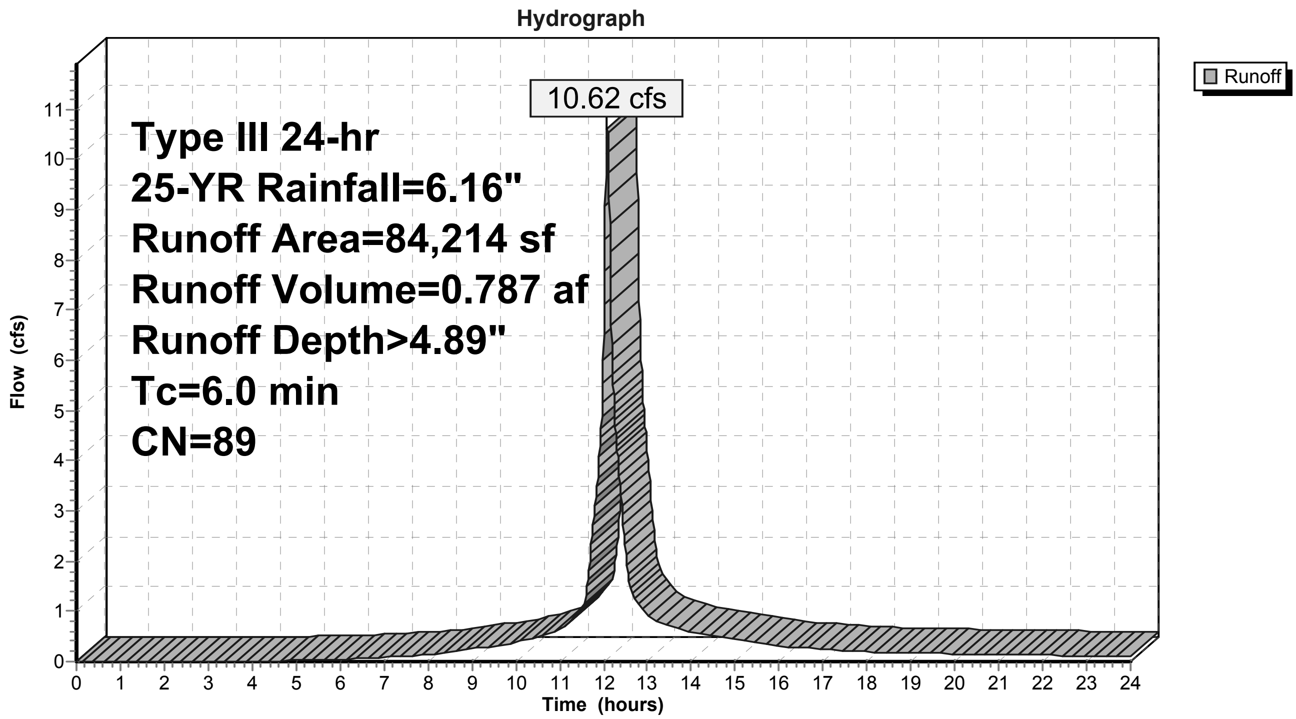
Runoff = 10.62 cfs @ 12.08 hrs, Volume= 0.787 af, Depth> 4.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.16"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	26,065	98	Roof
*	37,469	98	Impervious
	20,680	61	>75% Grass cover, Good, HSG B
	84,214	89	Weighted Average
	20,680		24.56% Pervious Area
	63,534		75.44% Impervious Area

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

Subcatchment P2: To Basin #2



Summary for Subcatchment P3: Offsite to Northwest

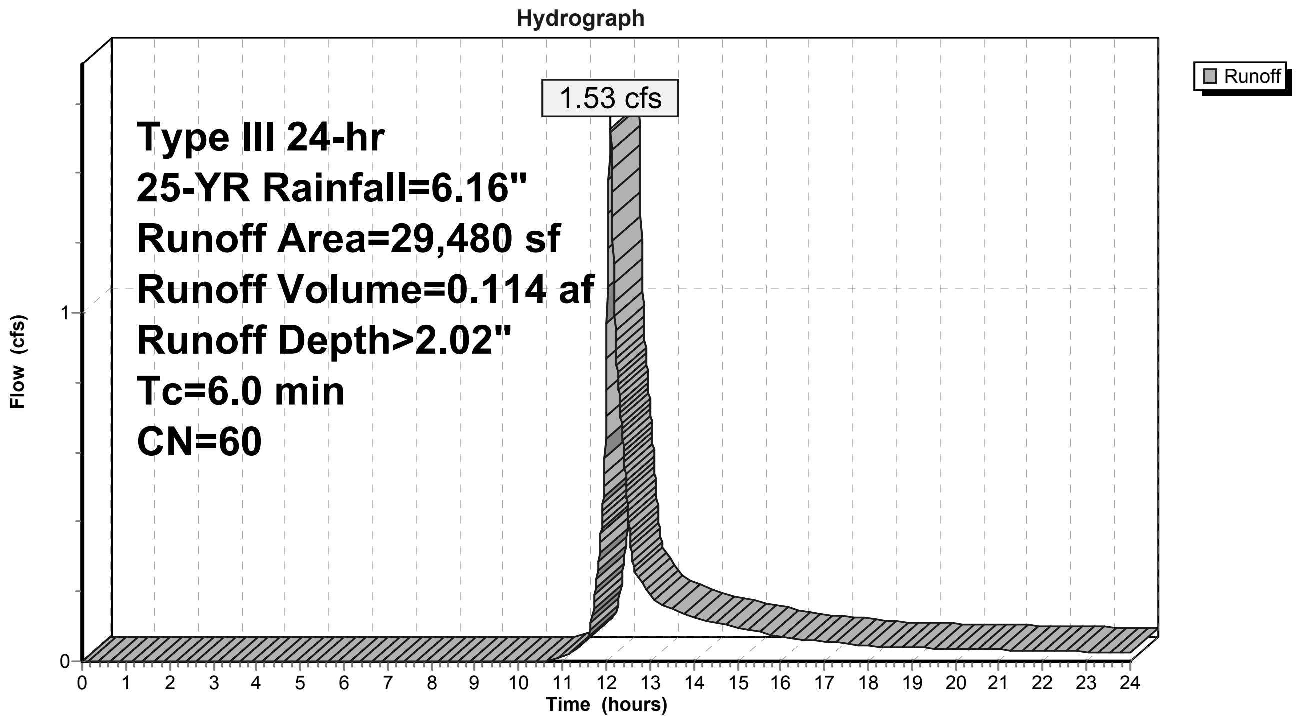
Runoff = 1.53 cfs @ 12.10 hrs, Volume= 0.114 af, Depth> 2.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.16"

	Area (sf)	CN	Description
	14,592	55	Woods, Good, HSG B
*	0	98	Roof
*	1,579	98	Impervious
	13,309	61	>75% Grass cover, Good, HSG B
	29,480	60	Weighted Average
	27,901		94.64% Pervious Area
	1,579		5.36% Impervious Area

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

Subcatchment P3: Offsite to Northwest



Summary for Subcatchment P4A: To Basin #1

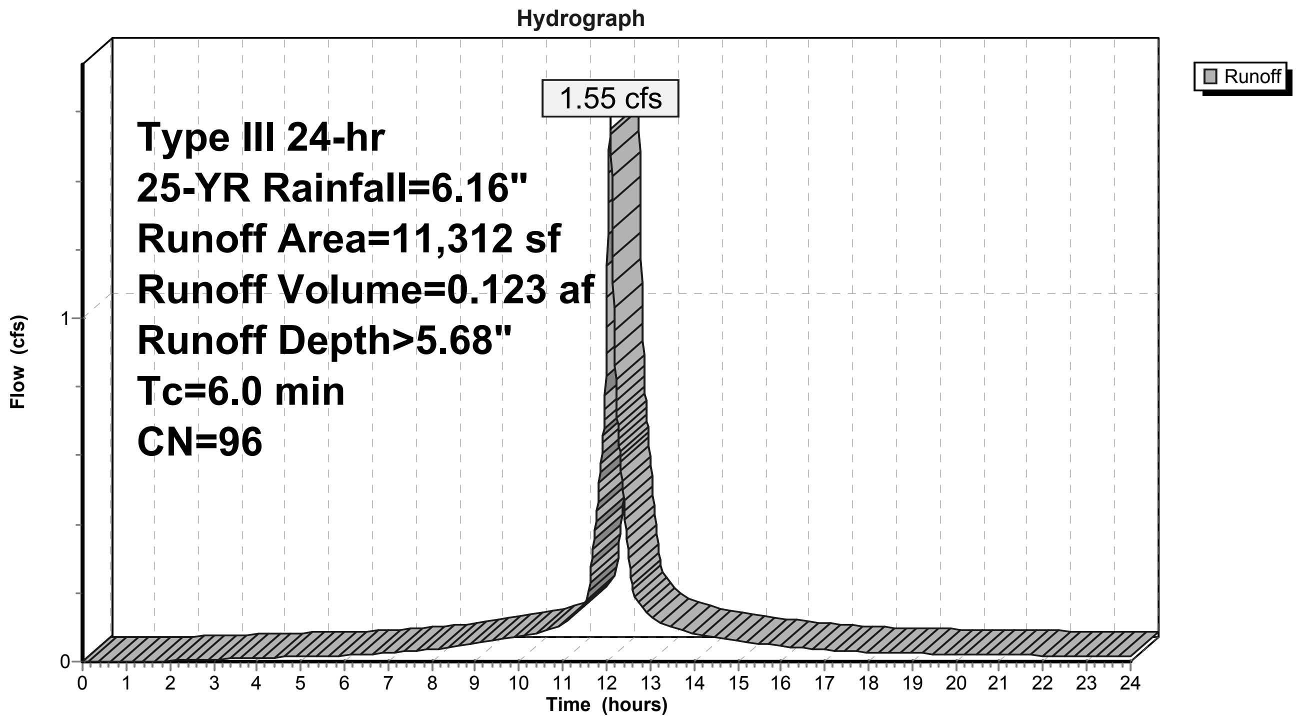
Runoff = 1.55 cfs @ 12.08 hrs, Volume= 0.123 af, Depth> 5.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.16"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	0	98	Roof
*	10,818	98	Impervious
	494	61	>75% Grass cover, Good, HSG B
	11,312	96	Weighted Average
	494		4.37% Pervious Area
	10,818		95.63% Impervious Area

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

Subcatchment P4A: To Basin #1



Summary for Subcatchment P4B: Roof and loading to PB4B

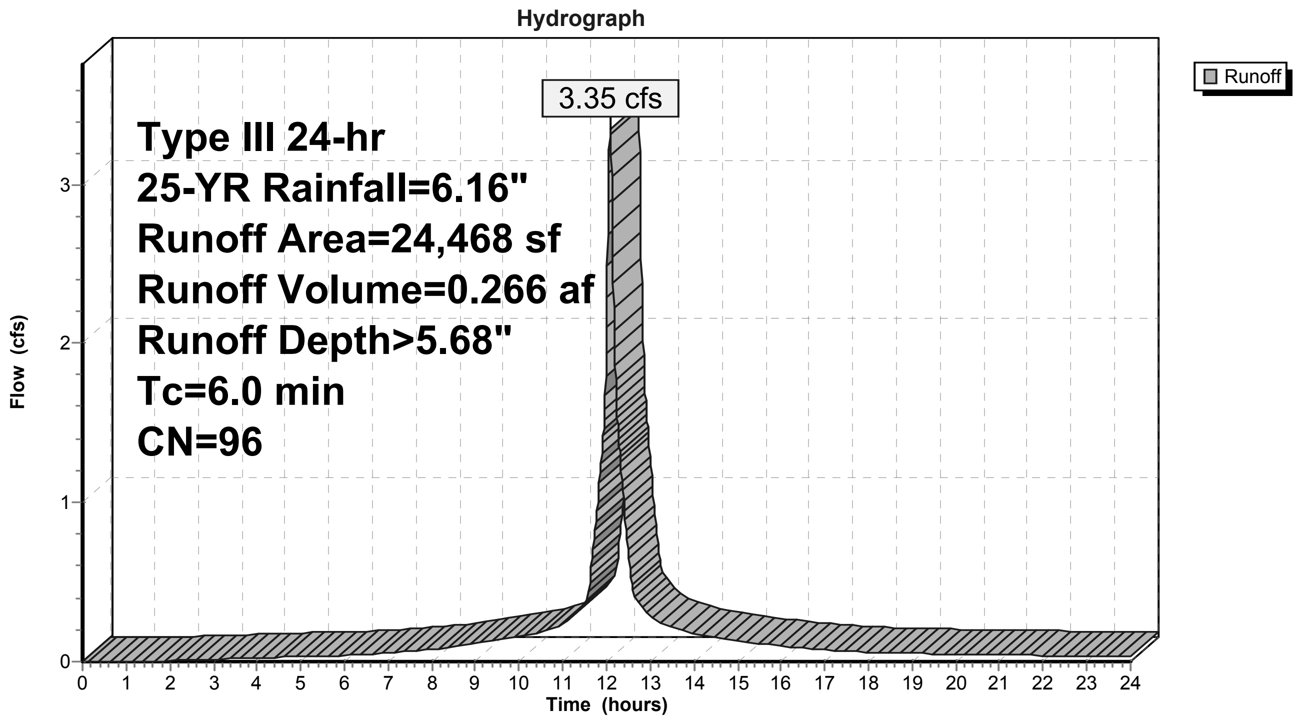
Runoff = 3.35 cfs @ 12.08 hrs, Volume= 0.266 af, Depth> 5.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.16"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	21,079	98	Roof
*	1,841	98	Impervious
	1,548	61	>75% Grass cover, Good, HSG B
*	0	69	Grasspave
	24,468	96	Weighted Average
	1,548		6.33% Pervious Area
	22,920		93.67% Impervious Area

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

Subcatchment P4B: Roof and loading to PB4B



Summary for Subcatchment P5: To Basin #3

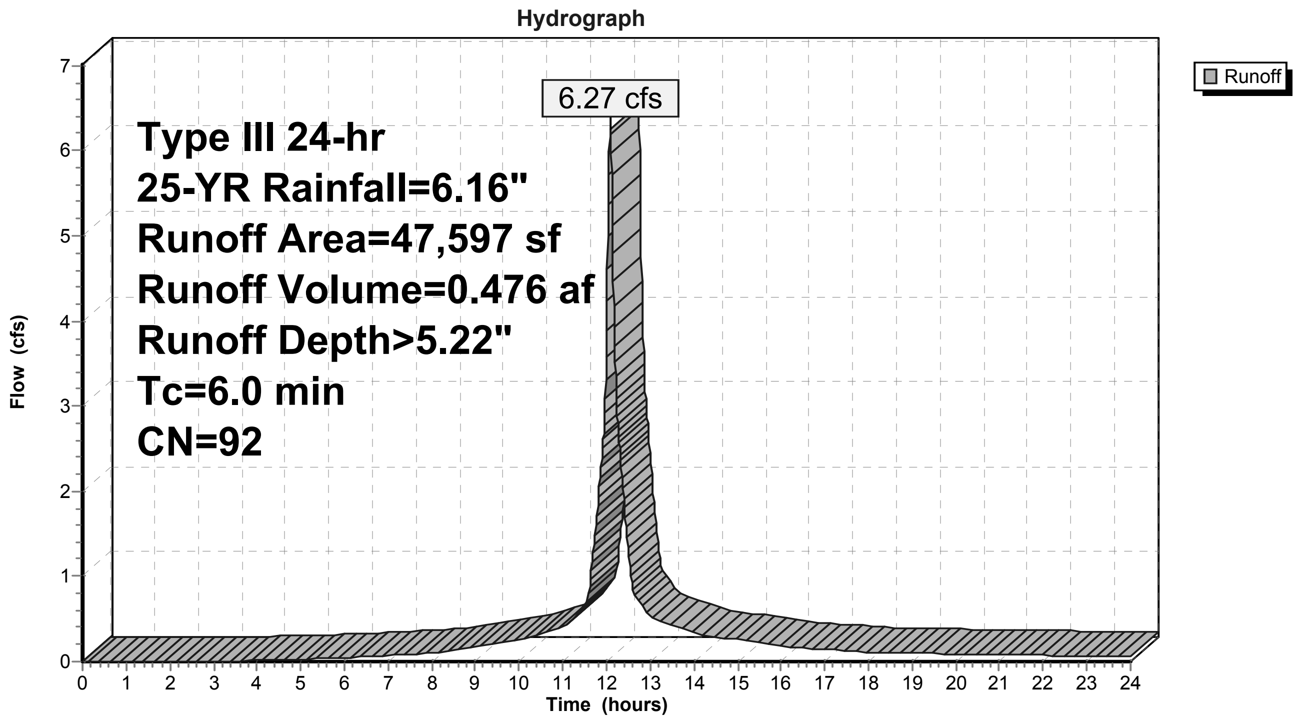
Runoff = 6.27 cfs @ 12.08 hrs, Volume= 0.476 af, Depth> 5.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.16"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	5,950	98	Roof
*	34,115	98	Impervious
	7,532	61	>75% Grass cover, Good, HSG B
	47,597	92	Weighted Average
	7,532		15.82% Pervious Area
	40,065		84.18% Impervious Area

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

Subcatchment P5: To Basin #3



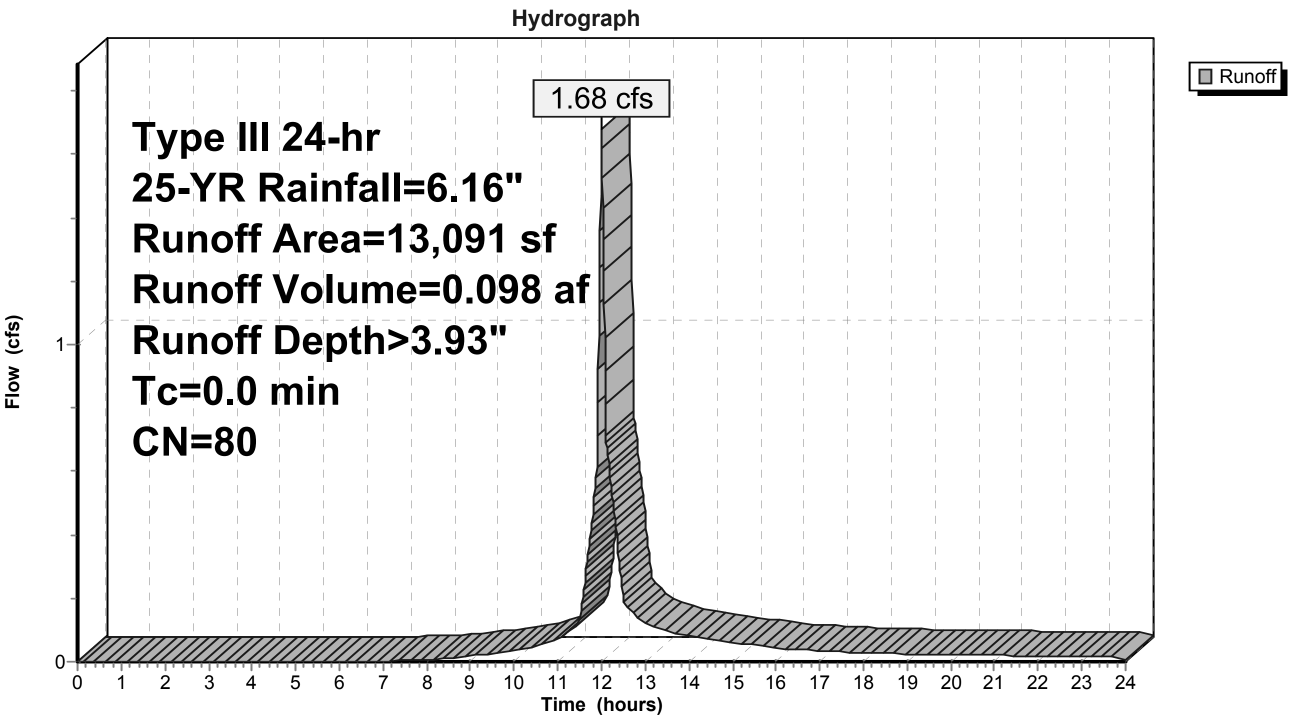
Summary for Subcatchment P6A: 6A To cb

Runoff = 1.68 cfs @ 12.00 hrs, Volume= 0.098 af, Depth> 3.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.16"

	Area (sf)	CN	Description
	6,512	61	>75% Grass cover, Good, HSG B
*	6,579	98	Impervious
	0	55	Woods, Good, HSG B
	13,091	80	Weighted Average
	6,512		49.74% Pervious Area
	6,579		50.26% Impervious Area

Subcatchment P6A: 6A To cb



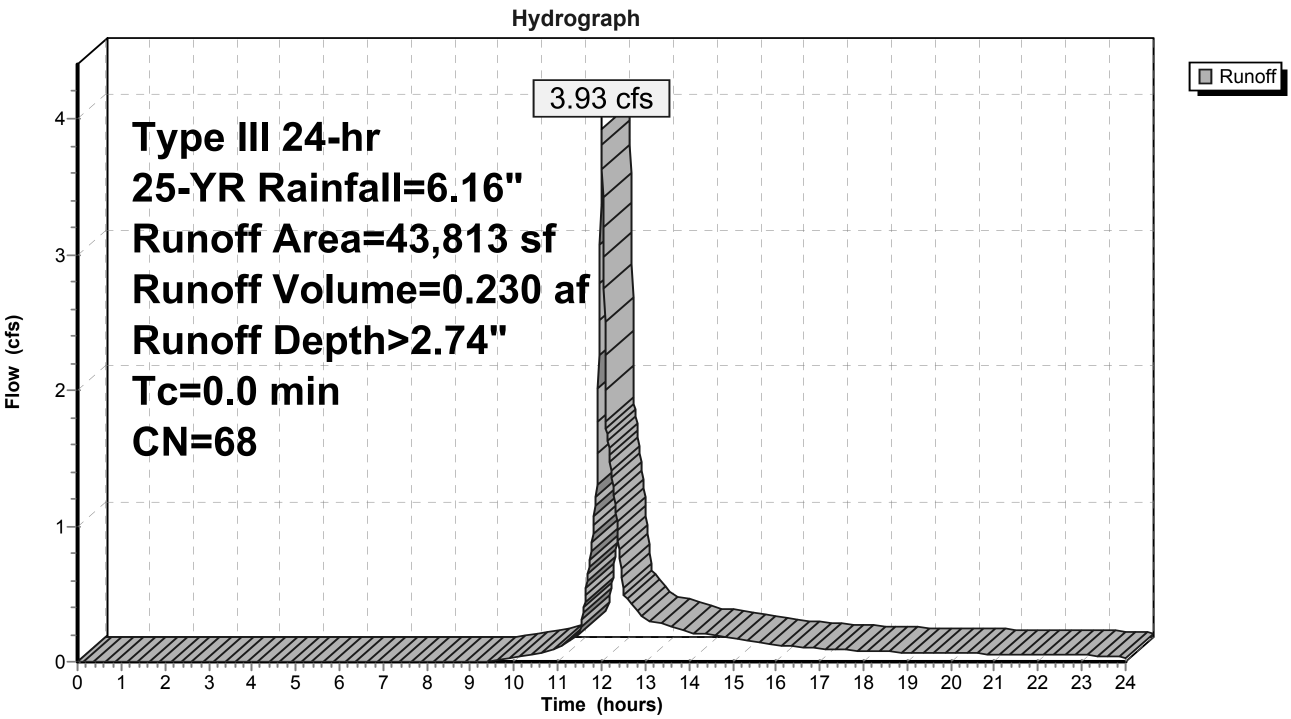
Summary for Subcatchment P6B: 6B To Pipe

Runoff = 3.93 cfs @ 12.00 hrs, Volume= 0.230 af, Depth> 2.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.16"

	Area (sf)	CN	Description
	25,289	61	>75% Grass cover, Good, HSG B
*	9,608	98	Impervious
	8,916	55	Woods, Good, HSG B
	43,813	68	Weighted Average
	34,205		78.07% Pervious Area
	9,608		21.93% Impervious Area

Subcatchment P6B: 6B To Pipe



Summary for Subcatchment P6C: Offsite to Concord Ave

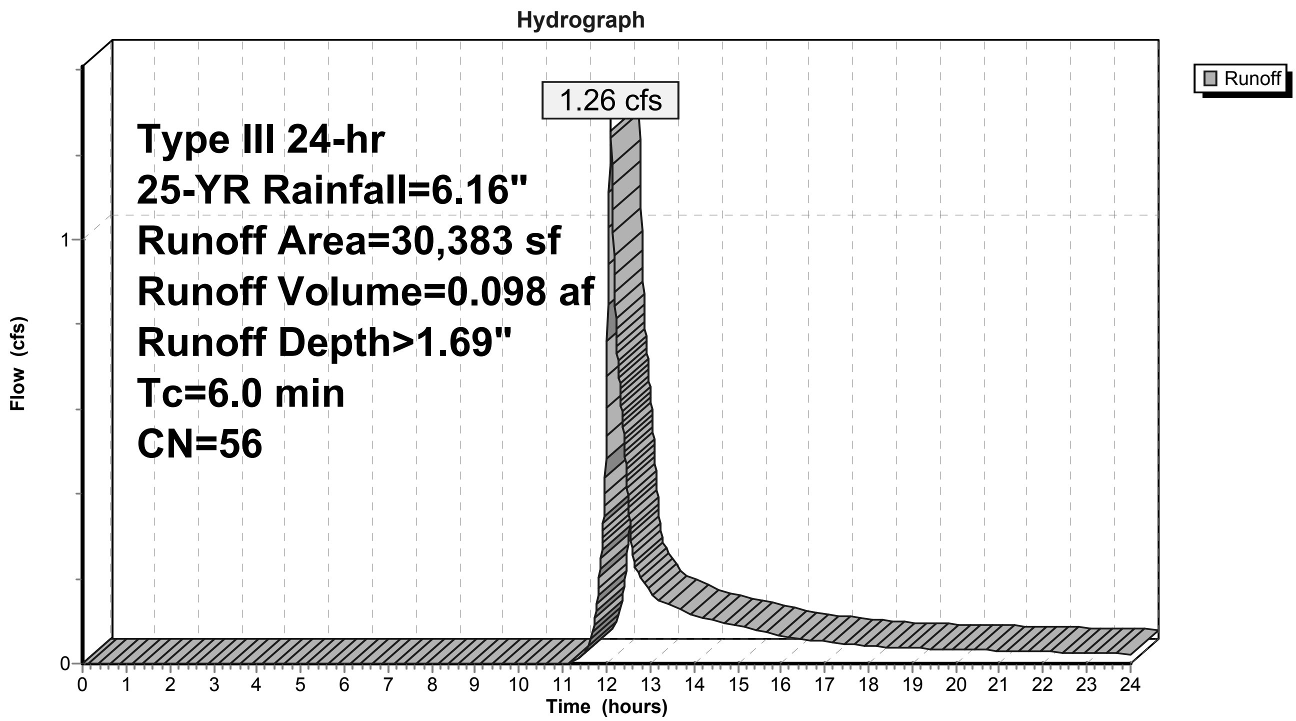
Runoff = 1.26 cfs @ 12.10 hrs, Volume= 0.098 af, Depth> 1.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.16"

	Area (sf)	CN	Description
	24,840	55	Woods, Good, HSG B
*	0	98	Roof
*	0	98	Impervious
	5,543	61	>75% Grass cover, Good, HSG B
	30,383	56	Weighted Average
	30,383		100.00% Pervious Area

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

Subcatchment P6C: Offsite to Concord Ave



Summary for Subcatchment P7: To SW Basin

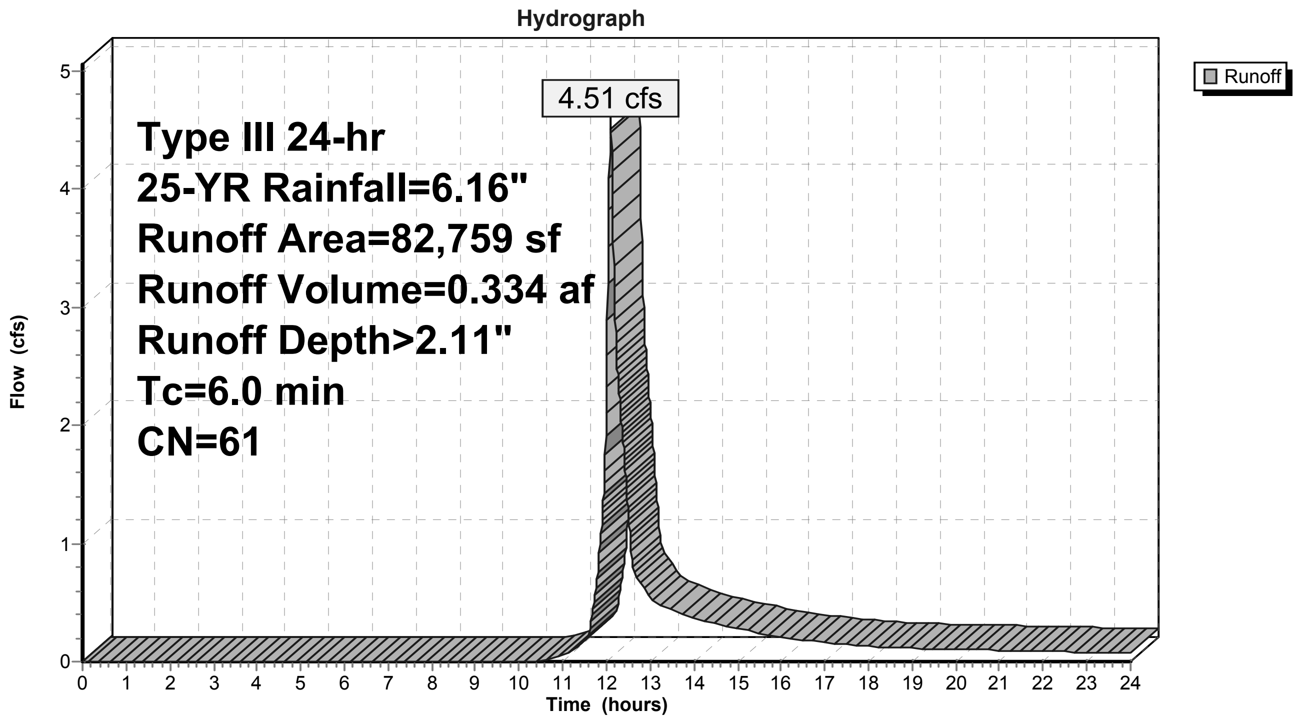
Runoff = 4.51 cfs @ 12.09 hrs, Volume= 0.334 af, Depth> 2.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.16"

	Area (sf)	CN	Description
	8,668	55	Woods, Good, HSG B
*	979	98	Roof
*	265	98	Impervious
	72,847	61	>75% Grass cover, Good, HSG B
	82,759	61	Weighted Average
	81,515		98.50% Pervious Area
	1,244		1.50% Impervious Area

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

Subcatchment P7: To SW Basin



Summary for Subcatchment P8: To CB#2

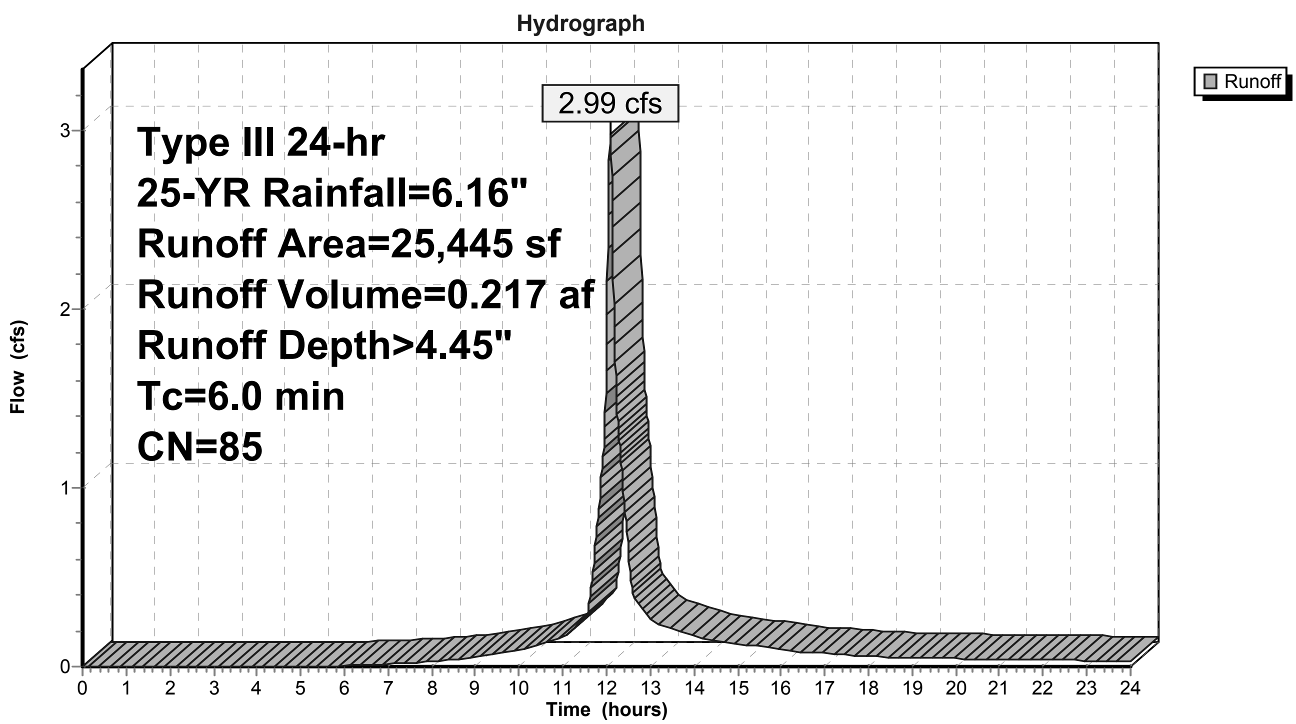
Runoff = 2.99 cfs @ 12.09 hrs, Volume= 0.217 af, Depth> 4.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.16"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	5,898	98	Roof
*	10,557	98	Impervious
	8,990	61	>75% Grass cover, Good, HSG B
	25,445	85	Weighted Average
	8,990		35.33% Pervious Area
	16,455		64.67% Impervious Area

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

Subcatchment P8: To CB#2



Summary for Subcatchment P9: To Day School Lane

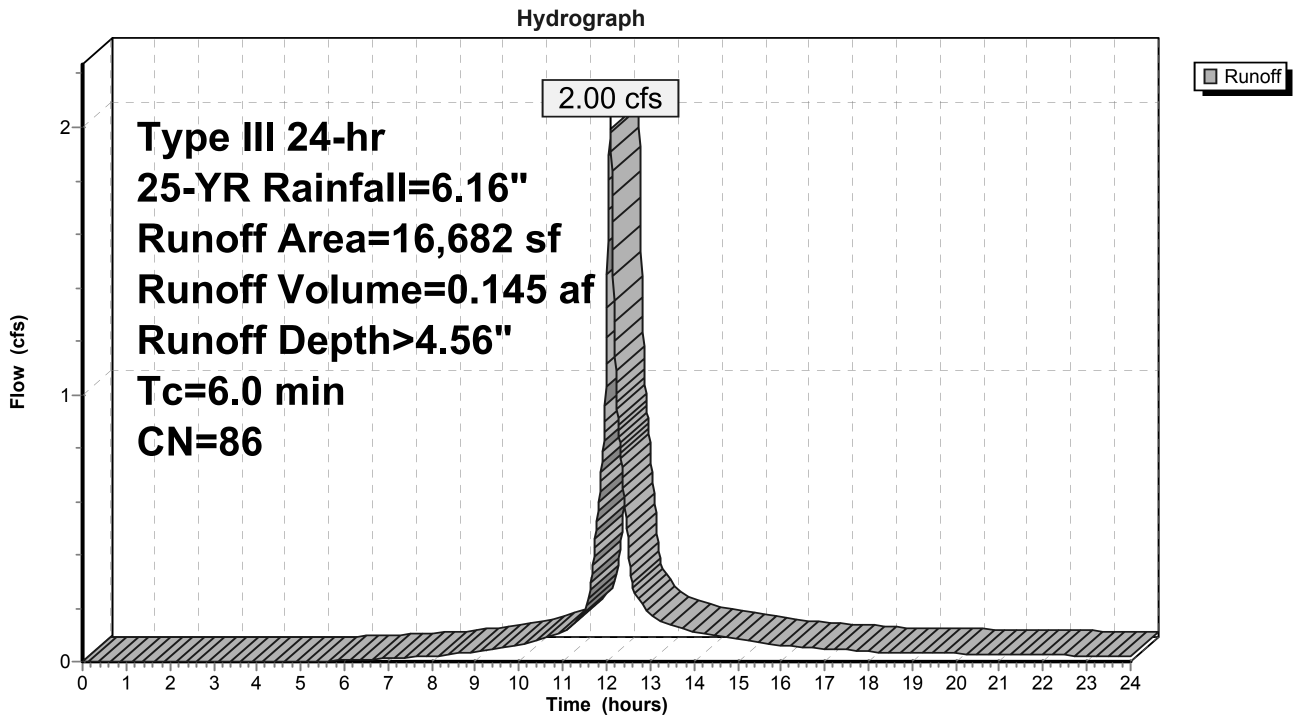
Runoff = 2.00 cfs @ 12.09 hrs, Volume= 0.145 af, Depth> 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.16"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	0	98	Roof
*	11,199	98	Impervious
	5,483	61	>75% Grass cover, Good, HSG B
	16,682	86	Weighted Average
	5,483		32.87% Pervious Area
	11,199		67.13% Impervious Area

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

Subcatchment P9: To Day School Lane

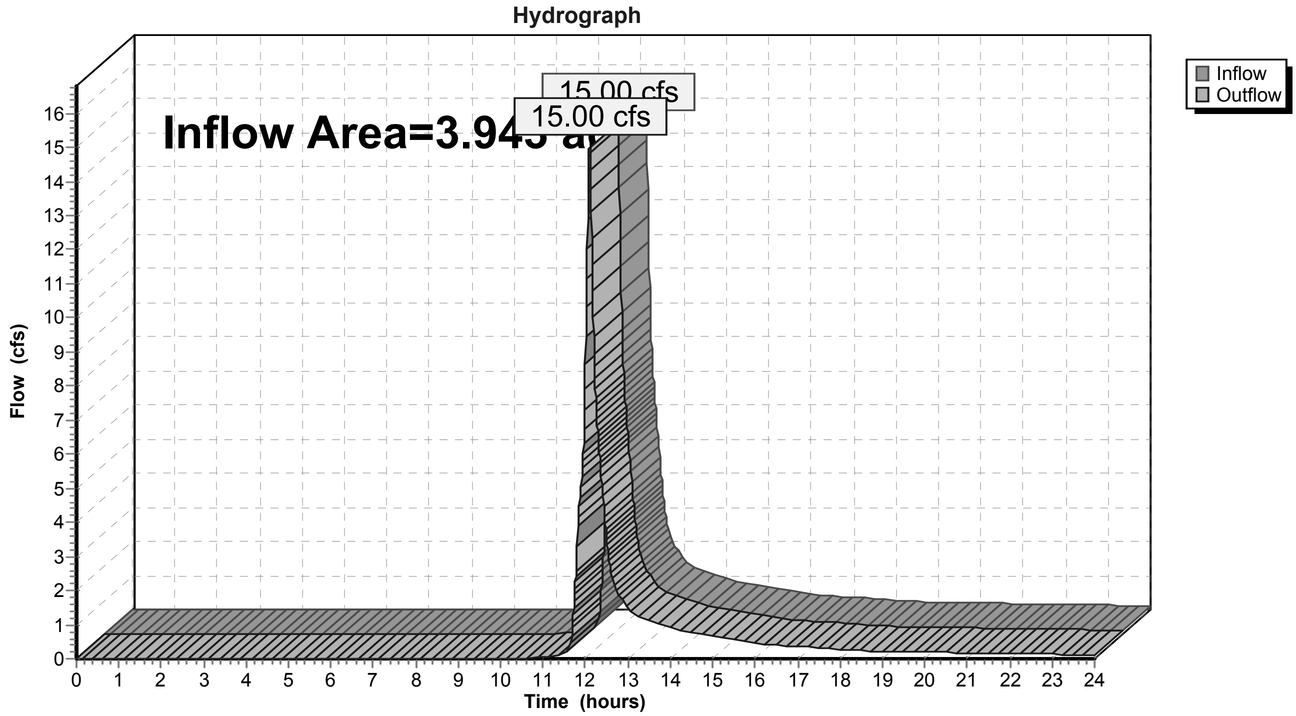


Summary for Reach DP-A: Offsite to Southwest

Inflow Area =	3.943 ac,	38.83% Impervious,	Inflow Depth > 2.76"	for 25-YR event	
Inflow =	15.00 cfs @	12.09 hrs,	Volume=	0.906 af	
Outflow =	15.00 cfs @	12.09 hrs,	Volume=	0.906 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-A: Offsite to Southwest

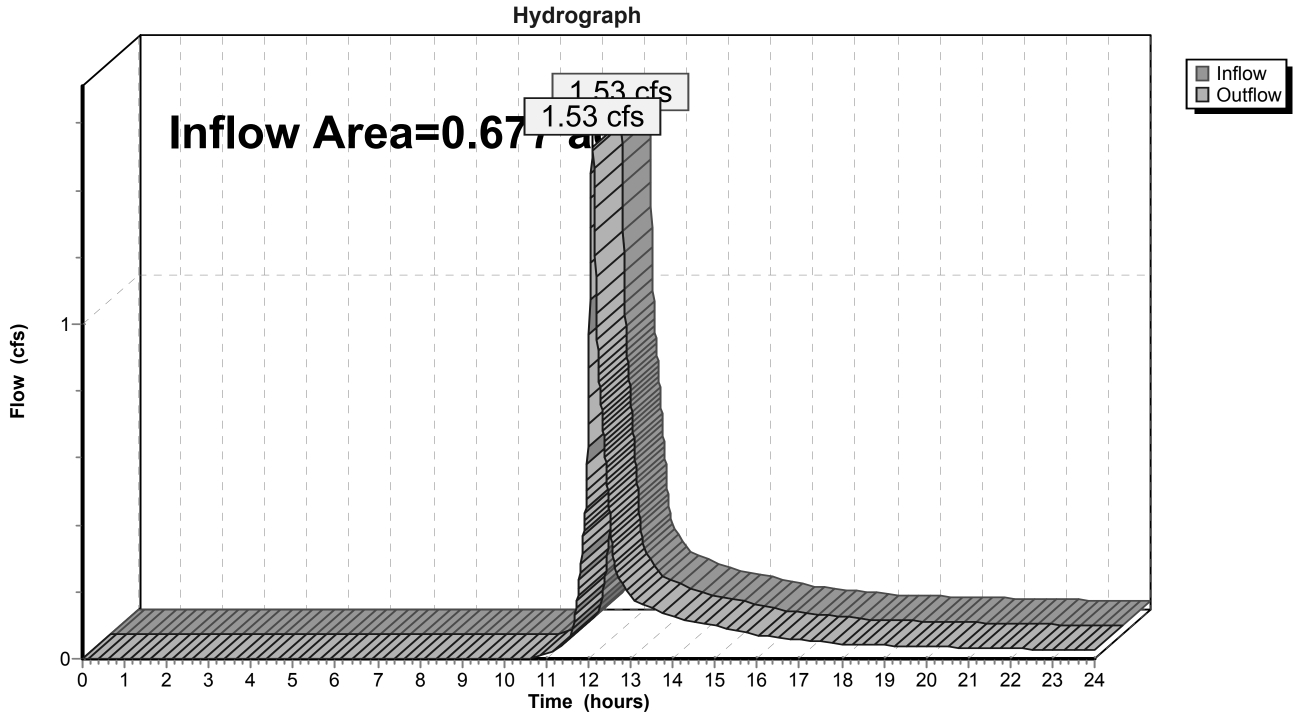


Summary for Reach DP-B: Offsite to Northwest

Inflow Area =	0.677 ac,	5.36% Impervious, Inflow Depth > 2.02"	for 25-YR event	
Inflow =	1.53 cfs @	12.10 hrs, Volume=	0.114 af	
Outflow =	1.53 cfs @	12.10 hrs, Volume=	0.114 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

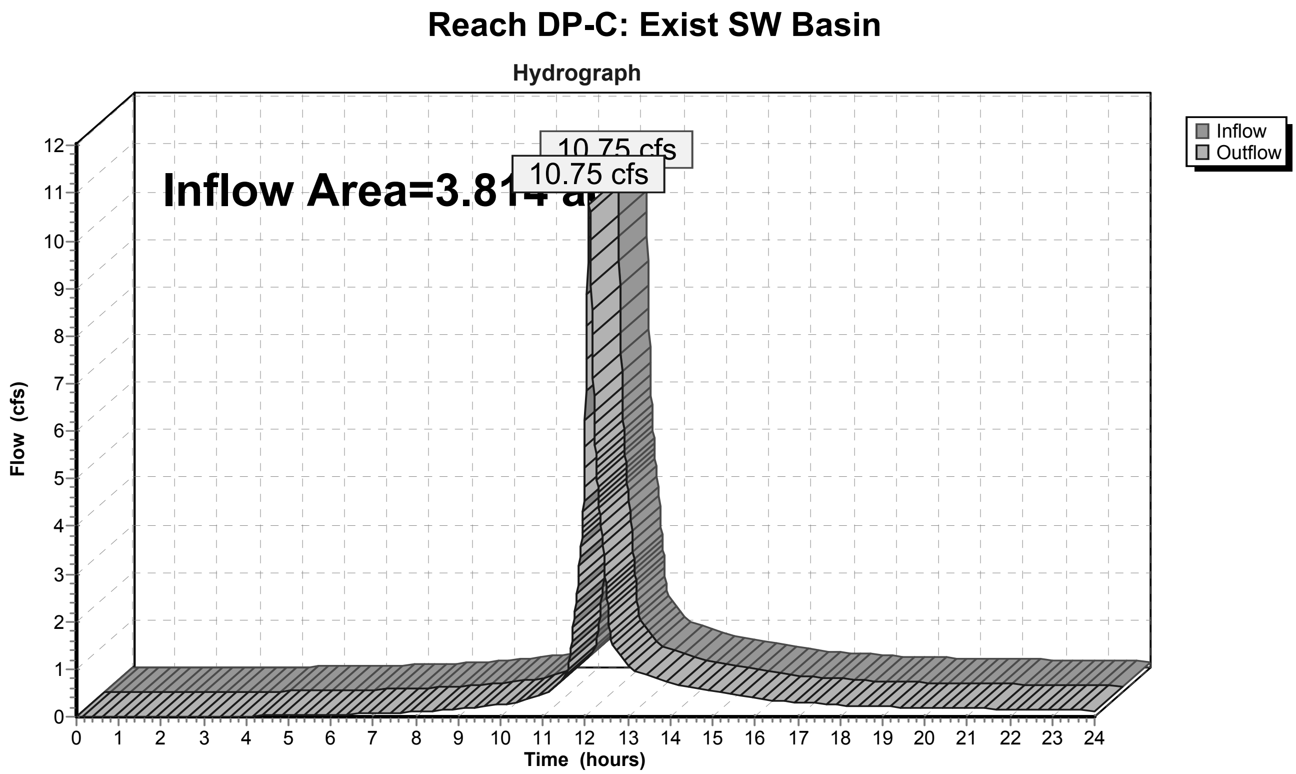
Reach DP-B: Offsite to Northwest



Summary for Reach DP-C: Exist SW Basin

Inflow Area =	3.814 ac,	45.17% Impervious,	Inflow Depth > 2.55"	for 25-YR event	
Inflow =	10.75 cfs @	12.09 hrs,	Volume=	0.810 af	
Outflow =	10.75 cfs @	12.09 hrs,	Volume=	0.810 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

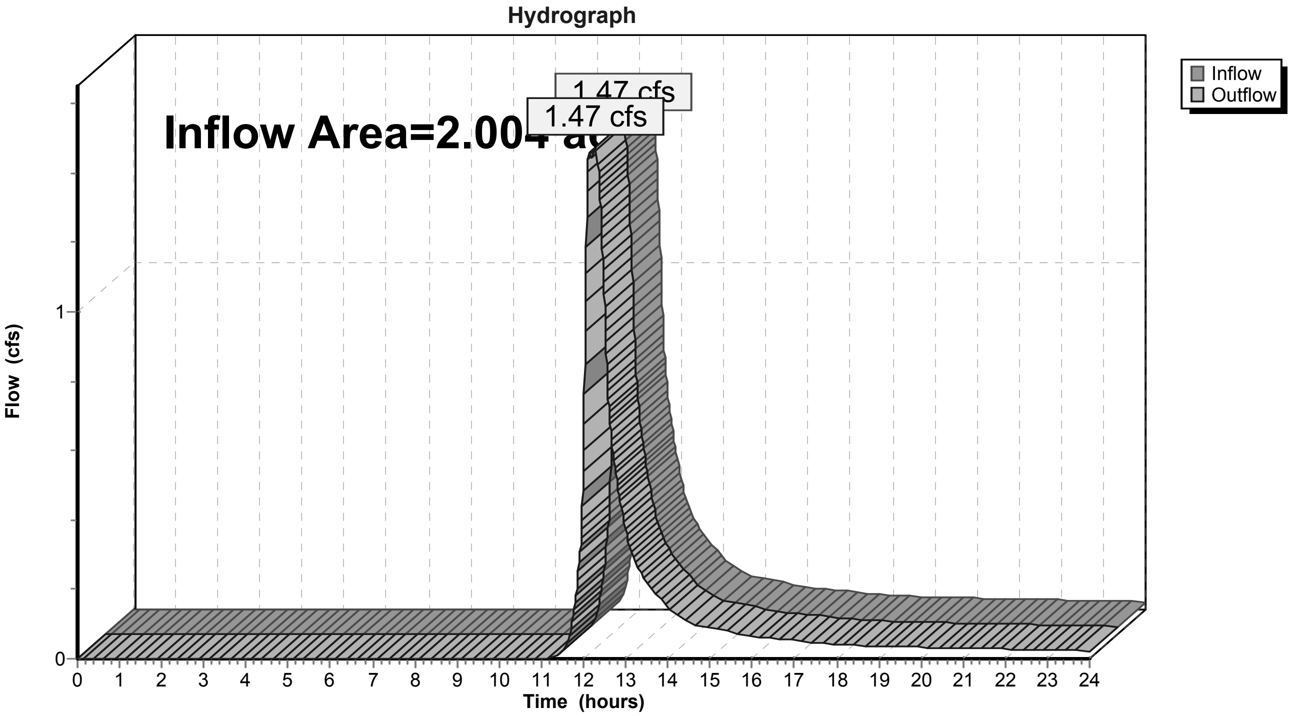


Summary for Reach DP-D: Concord Ave

Inflow Area =	2.004 ac, 18.54% Impervious, Inflow Depth > 0.86"	for 25-YR event	
Inflow =	1.47 cfs @ 12.28 hrs, Volume=	0.144 af	
Outflow =	1.47 cfs @ 12.28 hrs, Volume=	0.144 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

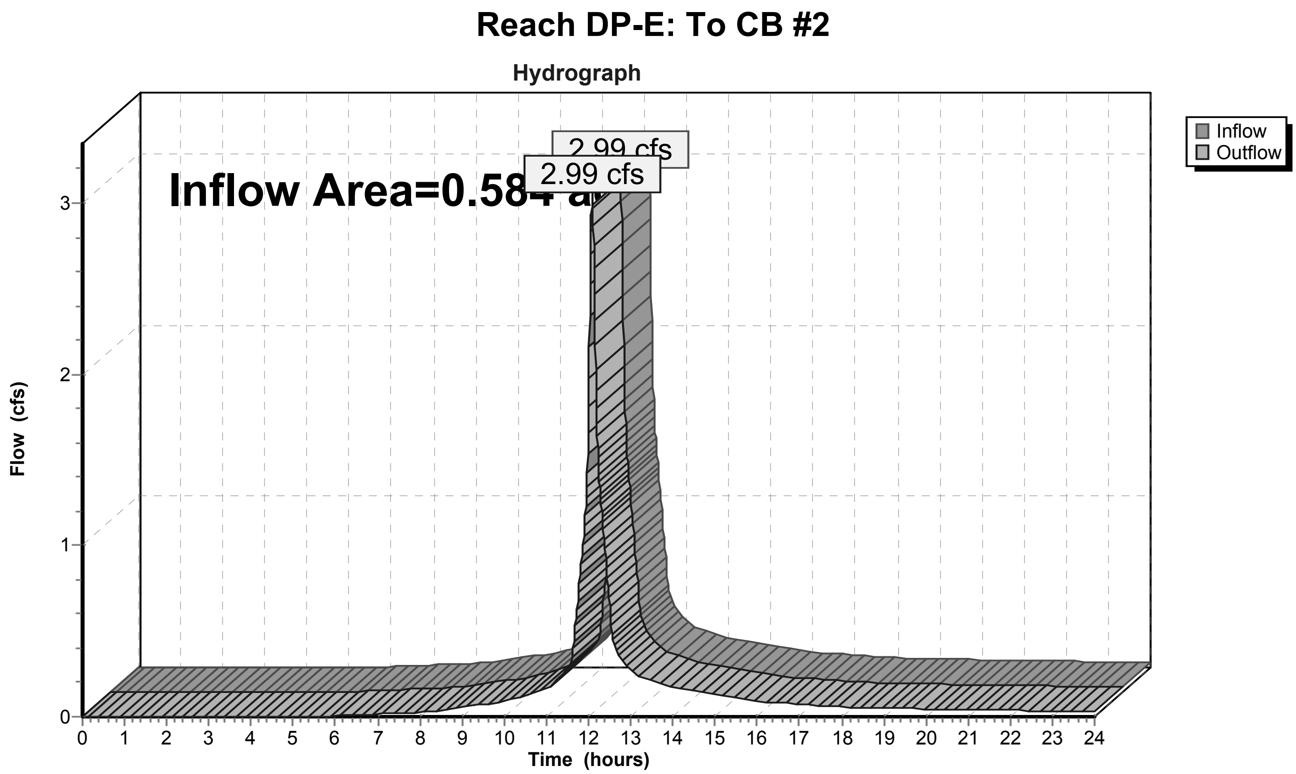
Reach DP-D: Concord Ave



Summary for Reach DP-E: To CB #2

Inflow Area = 0.584 ac, 64.67% Impervious, Inflow Depth > 4.45" for 25-YR event
Inflow = 2.99 cfs @ 12.09 hrs, Volume= 0.217 af
Outflow = 2.99 cfs @ 12.09 hrs, Volume= 0.217 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

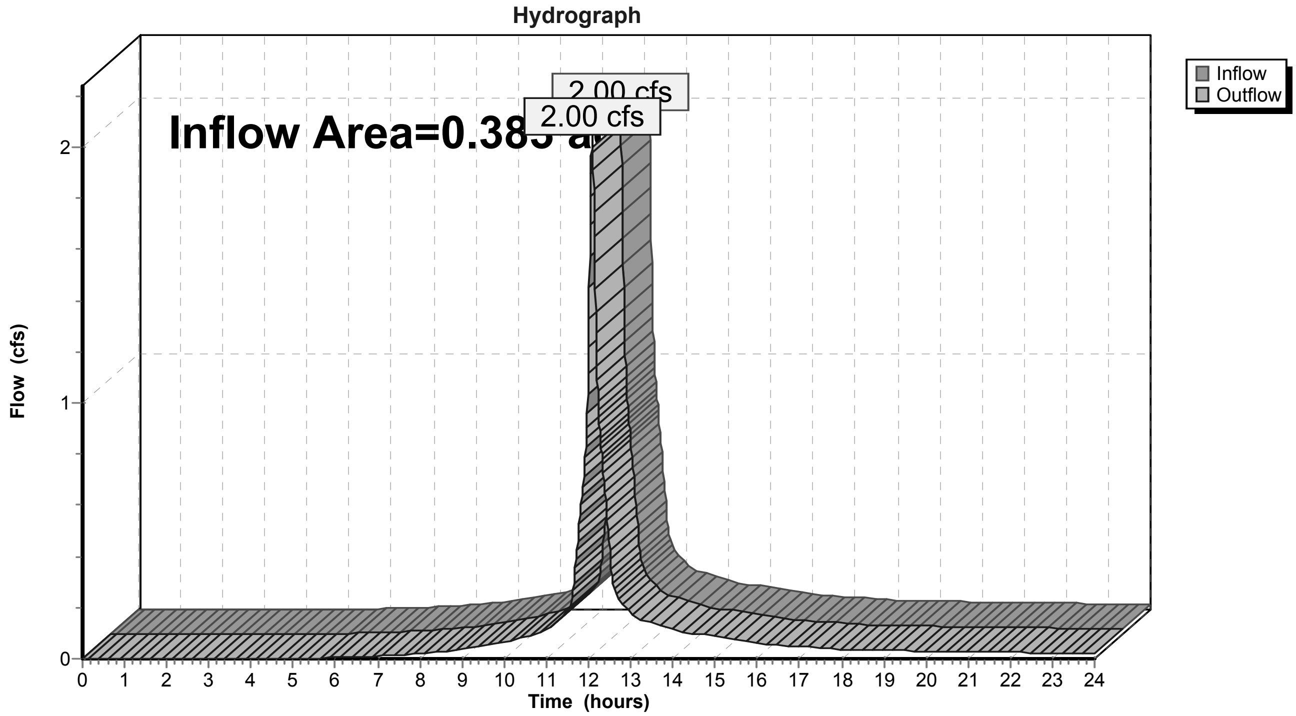


Summary for Reach DP-F: Offsite to Day School Ln

Inflow Area =	0.383 ac, 67.13% Impervious, Inflow Depth > 4.56" for 25-YR event			
Inflow =	2.00 cfs @	12.09 hrs, Volume=	0.145 af	
Outflow =	2.00 cfs @	12.09 hrs, Volume=	0.145 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-F: Offsite to Day School Ln



Summary for Pond PB4B: 30x9 Cultec 100HD

Inflow Area = 0.562 ac, 93.67% Impervious, Inflow Depth > 5.68" for 25-YR event
Inflow = 3.35 cfs @ 12.08 hrs, Volume= 0.266 af
Outflow = 0.17 cfs @ 14.09 hrs, Volume= 0.231 af, Atten= 95%, Lag= 120.3 min
Discarded = 0.17 cfs @ 14.09 hrs, Volume= 0.231 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= 0.01 hrs / 2
Peak Elev= 283.29' @ 14.09 hrs Surf.Area= 7,204 sf Storage= 5,279 cf

Plug-Flow detention time= 241.5 min calculated for 0.231 af (87% of inflow)
Center-of-Mass det. time= 182.0 min (939.1 - 757.1)

Volume	Invert	Avail.Storage	Storage Description
#1C	282.00'	3,279 cf	**31.67'W x 227.50'L x 2.04'H Field C**
			14,709 cf Overall - 3,778 cf Embedded = 10,931 cf x 30.0% Voids
#2C	282.50'	3,778 cf	**Cultec C-100HD** x 270 Inside #1
			Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf
			Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
			Row Length Adjustment= +0.50' x 1.86 sf x 9 rows
#3	282.00'	53 cf	**4.00'D x 4.20'H Vertical Cone/Cylinder**-Impervious
		7,110 cf	Total Available Storage

Storage Group C created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	282.00'	**1.020 in/hr Exfiltration over Surface area**
			Conductivity to Groundwater Elevation = 0.00'
#2	Primary	284.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600

Discarded OutFlow Max=0.17 cfs @ 14.09 hrs HW=283.29' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.17 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=282.00' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond PB4B: 30x9 Cultec 100HD - Chamber Wizard Field C

Chamber Model = Cultec C-100HD (Cultec Contactor® 100HD)
Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf
Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
Row Length Adjustment= +0.50' x 1.86 sf x 9 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

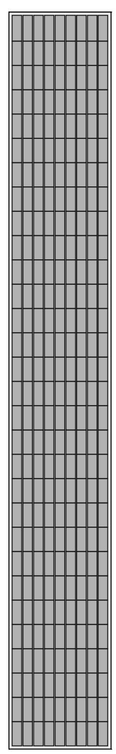
30 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 225.50' Row Length +12.0" End Stone x 2 = 227.50' Base Length
9 Rows x 36.0" Wide + 4.0" Spacing x 8 + 12.0" Side Stone x 2 = 31.67' Base Width
6.0" Base + 12.5" Chamber Height + 6.0" Cover = 2.04' Field Height

270 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 9 Rows = 3,777.9 cf Chamber Storage

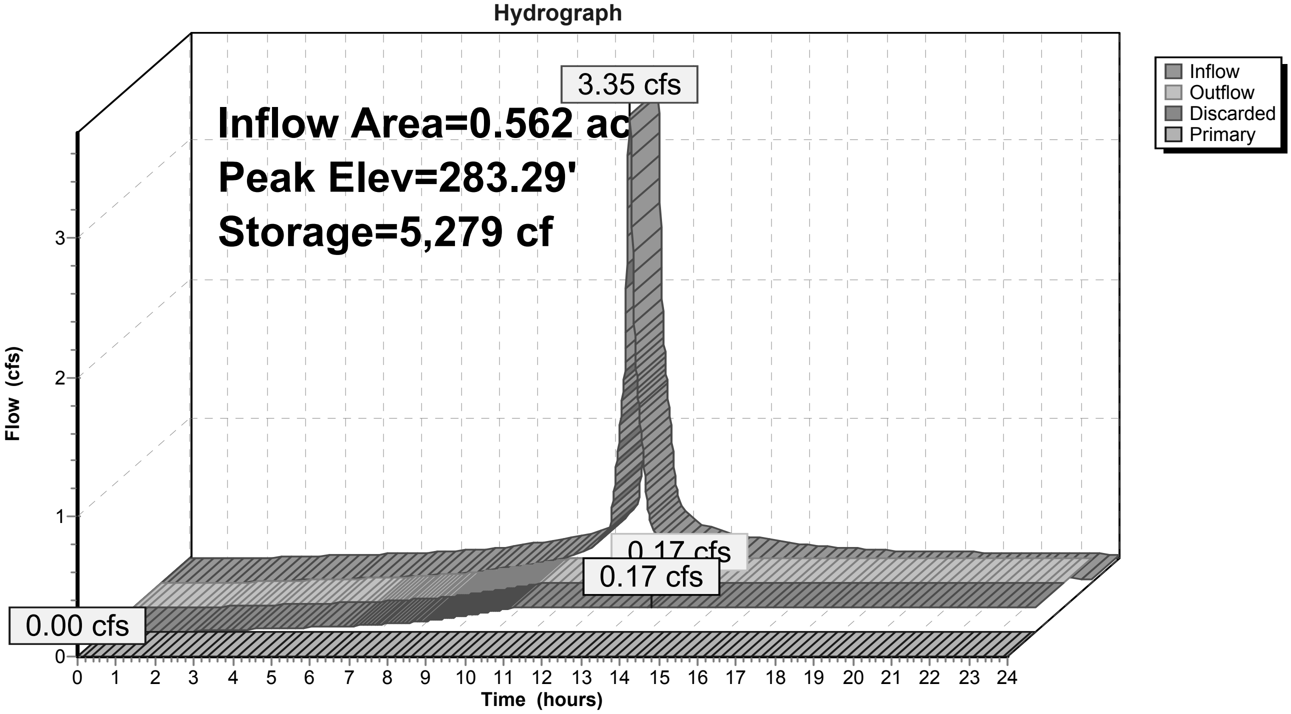
14,708.5 cf Field - 3,777.9 cf Chambers = 10,930.6 cf Stone x 30.0% Voids = 3,279.2 cf Stone Storage

Chamber Storage + Stone Storage = 7,057.1 cf = 0.162 af
Overall Storage Efficiency = 48.0%

270 Chambers
544.8 cy Field
404.8 cy Stone



Pond PB4B: 30x9 Cultec 100HD



Stage-Discharge for Pond PB4B: 30x9 Cultec 100HD

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
282.00	0.00	0.00	0.00
282.05	0.17	0.17	0.00
282.10	0.17	0.17	0.00
282.15	0.17	0.17	0.00
282.20	0.17	0.17	0.00
282.25	0.17	0.17	0.00
282.30	0.17	0.17	0.00
282.35	0.17	0.17	0.00
282.40	0.17	0.17	0.00
282.45	0.17	0.17	0.00
282.50	0.17	0.17	0.00
282.55	0.17	0.17	0.00
282.60	0.17	0.17	0.00
282.65	0.17	0.17	0.00
282.70	0.17	0.17	0.00
282.75	0.17	0.17	0.00
282.80	0.17	0.17	0.00
282.85	0.17	0.17	0.00
282.90	0.17	0.17	0.00
282.95	0.17	0.17	0.00
283.00	0.17	0.17	0.00
283.05	0.17	0.17	0.00
283.10	0.17	0.17	0.00
283.15	0.17	0.17	0.00
283.20	0.17	0.17	0.00
283.25	0.17	0.17	0.00
283.30	0.17	0.17	0.00
283.35	0.17	0.17	0.00
283.40	0.17	0.17	0.00
283.45	0.17	0.17	0.00
283.50	0.17	0.17	0.00
283.55	0.17	0.17	0.00
283.60	0.17	0.17	0.00
283.65	0.17	0.17	0.00
283.70	0.17	0.17	0.00
283.75	0.17	0.17	0.00
283.80	0.17	0.17	0.00
283.85	0.17	0.17	0.00
283.90	0.17	0.17	0.00
283.95	0.17	0.17	0.00
284.00	0.17	0.17	0.00
284.05	0.17	0.17	0.00
284.10	0.17	0.17	0.00
284.15	0.17	0.17	0.00
284.20	0.17	0.17	0.00
284.25	0.17	0.17	0.00
284.30	0.17	0.17	0.00
284.35	0.17	0.17	0.00
284.40	0.17	0.17	0.00
284.45	0.17	0.17	0.00
284.50	0.17	0.17	0.00
284.55	0.19	0.17	0.02
284.60	0.23	0.17	0.06
284.65	0.30	0.17	0.13
284.70	0.40	0.17	0.22
284.75	0.51	0.17	0.33
284.80	0.63	0.17	0.46
284.85	0.76	0.17	0.59
284.90	0.90	0.17	0.73
284.95	1.02	0.17	0.85
285.00	1.12	0.17	0.95
285.05	1.21	0.17	1.04
285.10	1.29	0.17	1.12
285.15	1.37	0.17	1.20
285.20	1.44	0.17	1.27
285.25	1.51	0.17	1.34
285.30	1.57	0.17	1.40
285.35	1.64	0.17	1.46
285.40	1.70	0.17	1.52
285.45	1.75	0.17	1.58
285.50	1.81	0.17	1.64
285.55	1.86	0.17	1.69
285.60	1.92	0.17	1.74
285.65	1.97	0.17	1.79
285.70	2.02	0.17	1.84
285.75	2.06	0.17	1.89
285.80	2.11	0.17	1.94
285.85	2.16	0.17	1.98
285.90	2.20	0.17	2.03
285.95	2.24	0.17	2.07
286.00	2.29	0.17	2.11
286.05	2.33	0.17	2.16
286.10	2.37	0.17	2.20
286.15	2.41	0.17	2.24
286.20	**2.45**	**0.17**	**2.28**

Stage-Area-Storage for Pond PB4B: 30x9 Cultec 100HD

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
282.00	**7,204**	0	284.65	7,204	7,090
282.05	7,204	109	284.70	7,204	7,091
282.10	7,204	217	284.75	7,204	7,092
282.15	7,204	326	284.80	7,204	7,092
282.20	7,204	435	284.85	7,204	7,093
282.25	7,204	543	284.90	7,204	7,094
282.30	7,204	652	284.95	7,204	7,094
282.35	7,204	761	285.00	7,204	7,095
282.40	7,204	870	285.05	7,204	7,095
282.45	7,204	978	285.10	7,204	7,096
282.50	7,204	1,087	285.15	7,204	7,097
282.55	7,204	1,383	285.20	7,204	7,097
282.60	7,204	1,674	285.25	7,204	7,098
282.65	7,204	1,960	285.30	7,204	7,099
282.70	7,204	2,242	285.35	7,204	7,099
282.75	7,204	2,524	285.40	7,204	7,100
282.80	7,204	2,804	285.45	7,204	7,100
282.85	7,204	3,082	285.50	7,204	7,101
282.90	7,204	3,355	285.55	7,204	7,102
282.95	7,204	3,623	285.60	7,204	7,102
283.00	7,204	3,886	285.65	7,204	7,103
283.05	7,204	4,144	285.70	7,204	7,104
283.10	7,204	4,396	285.75	7,204	7,104
283.15	7,204	4,639	285.80	7,204	7,105
283.20	7,204	4,873	285.85	7,204	7,105
283.25	7,204	5,094	285.90	7,204	7,106
283.30	7,204	5,299	285.95	7,204	7,107
283.35	7,204	5,486	286.00	7,204	7,107
283.40	7,204	5,649	286.05	7,204	7,108
283.45	7,204	5,787	286.10	7,204	7,109
283.50	7,204	5,905	286.15	7,204	7,109
283.55	7,204	6,014	286.20	7,204	**7,110**
283.60	7,204	6,123			
283.65	7,204	6,231			
283.70	7,204	6,340			
283.75	7,204	6,449			
283.80	7,204	6,557			
283.85	7,204	6,666			
283.90	7,204	6,775			
283.95	7,204	6,883			
284.00	7,204	6,992			
284.05	7,204	7,083			
284.10	7,204	7,083			
284.15	7,204	7,084			
284.20	7,204	7,085			
284.25	7,204	7,085			
284.30	7,204	7,086			
284.35	7,204	7,087			
284.40	7,204	7,087			
284.45	7,204	7,088			
284.50	7,204	7,089			
284.55	7,204	7,089			
284.60	7,204	7,090			

Summary for Pond PB6A: Porous Pavement

Inflow Area = 0.301 ac, 50.26% Impervious, Inflow Depth > 3.93" for 25-YR event
Inflow = 1.68 cfs @ 12.00 hrs, Volume= 0.098 af
Outflow = 0.16 cfs @ 12.73 hrs, Volume= 0.097 af, Atten= 91%, Lag= 43.5 min
Discarded = 0.16 cfs @ 12.73 hrs, Volume= 0.097 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= 0.01 hrs / 2
Peak Elev= 282.99' @ 12.73 hrs Surf.Area= 6,592 sf Storage= 1,514 cf

Plug-Flow detention time= 80.8 min calculated for 0.097 af (99% of inflow)
Center-of-Mass det. time= 74.2 min (881.8 - 807.5)

Volume	Invert	Avail.Storage	Storage Description
#1	282.25'	3,947 cf	**Porous Pavement (Irregular)**Listed below (Recalc) 13,158 cf Overall x 30.0% Voids
#2	278.60'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**
		4,023 cf	Total Available Storage

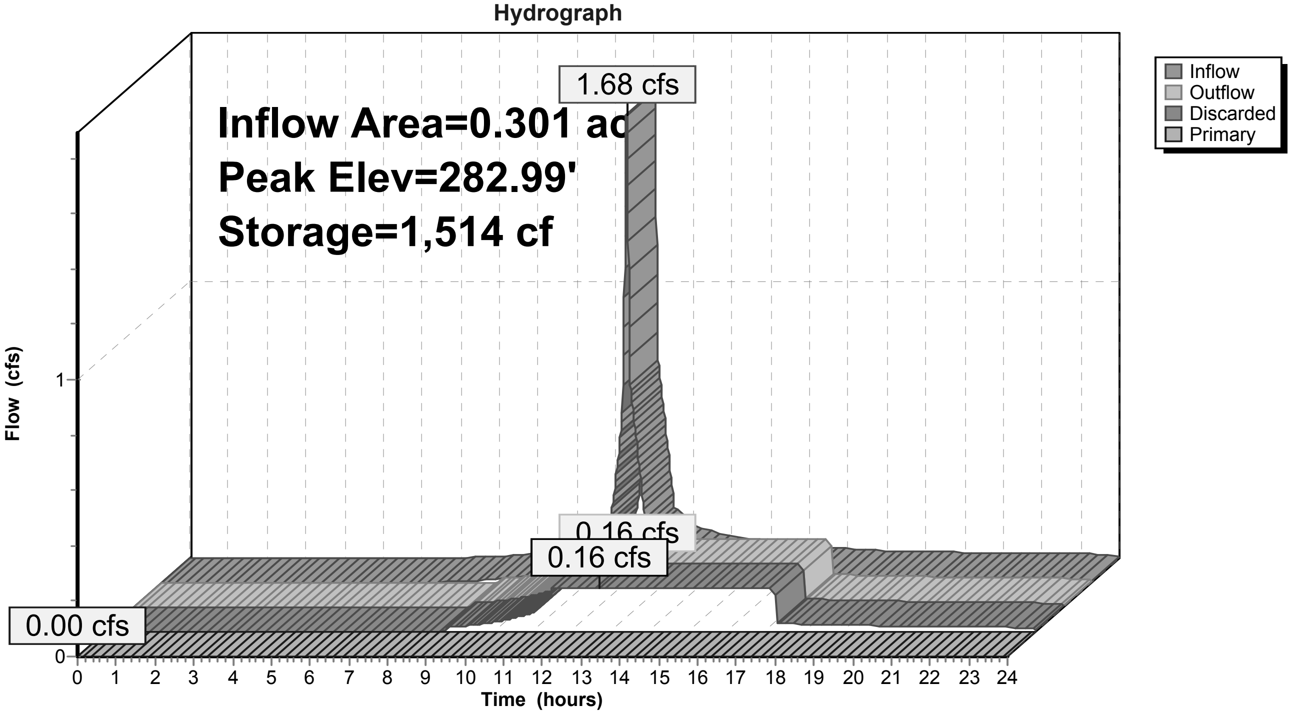
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
282.25	6,579	629.0	0	0	6,579
284.25	6,579	629.0	13,158	13,158	7,837

Device	Routing	Invert	Outlet Devices
#1	Discarded	278.60'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	284.58'	**2.3" x 2.3" Horiz. Orifice/Grate X 36.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.16 cfs @ 12.73 hrs HW=282.99' (Free Discharge)
└─**1=Exfiltration** (Controls 0.16 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=278.60' (Free Discharge)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond PB6A: Porous Pavement



Stage-Discharge for Pond PB6A: Porous Pavement

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
278.60	0.00	0.00	0.00
278.70	0.00	0.00	0.00
278.80	0.00	0.00	0.00
278.90	0.00	0.00	0.00
279.00	0.00	0.00	0.00
279.10	0.00	0.00	0.00
279.20	0.00	0.00	0.00
279.30	0.00	0.00	0.00
279.40	0.00	0.00	0.00
279.50	0.00	0.00	0.00
279.60	0.00	0.00	0.00
279.70	0.00	0.00	0.00
279.80	0.00	0.00	0.00
279.90	0.00	0.00	0.00
280.00	0.00	0.00	0.00
280.10	0.00	0.00	0.00
280.20	0.00	0.00	0.00
280.30	0.00	0.00	0.00
280.40	0.00	0.00	0.00
280.50	0.00	0.00	0.00
280.60	0.00	0.00	0.00
280.70	0.00	0.00	0.00
280.80	0.00	0.00	0.00
280.90	0.00	0.00	0.00
281.00	0.00	0.00	0.00
281.10	0.00	0.00	0.00
281.20	0.00	0.00	0.00
281.30	0.00	0.00	0.00
281.40	0.00	0.00	0.00
281.50	0.00	0.00	0.00
281.60	0.00	0.00	0.00
281.70	0.00	0.00	0.00
281.80	0.00	0.00	0.00
281.90	0.00	0.00	0.00
282.00	0.00	0.00	0.00
282.10	0.00	0.00	0.00
282.20	0.00	0.00	0.00
282.30	0.16	0.16	0.00
282.40	0.16	0.16	0.00
282.50	0.16	0.16	0.00
282.60	0.16	0.16	0.00
282.70	0.16	0.16	0.00
282.80	0.16	0.16	0.00
282.90	0.16	0.16	0.00
283.00	0.16	0.16	0.00
283.10	0.16	0.16	0.00
283.20	0.16	0.16	0.00
283.30	0.16	0.16	0.00
283.40	0.16	0.16	0.00
283.50	0.16	0.16	0.00
283.60	0.16	0.16	0.00
283.70	0.16	0.16	0.00
283.80	0.16	0.16	0.00
283.90	0.16	0.16	0.00
284.00	0.16	0.16	0.00
284.10	0.16	0.16	0.00
284.20	0.16	0.16	0.00
284.30	0.16	0.16	0.00
284.40	0.16	0.16	0.00
284.50	0.16	0.16	0.00
284.60	**0.41**	**0.16**	**0.26**

Stage-Area-Storage for Pond PB6A: Porous Pavement

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
278.60	13	0
278.70	13	1
278.80	13	3
278.90	13	4
279.00	13	5
279.10	13	6
279.20	13	8
279.30	13	9
279.40	13	10
279.50	13	11
279.60	13	13
279.70	13	14
279.80	13	15
279.90	13	16
280.00	13	18
280.10	13	19
280.20	13	20
280.30	13	21
280.40	13	23
280.50	13	24
280.60	13	25
280.70	13	26
280.80	13	28
280.90	13	29
281.00	13	30
281.10	13	31
281.20	13	33
281.30	13	34
281.40	13	35
281.50	13	36
281.60	13	38
281.70	13	39
281.80	13	40
281.90	13	41
282.00	13	43
282.10	13	44
282.20	**13**	45
282.30	**6,592**	145
282.40	6,592	344
282.50	6,592	542
282.60	6,592	741
282.70	6,592	940
282.80	6,592	1,138
282.90	6,592	1,337
283.00	6,592	1,536
283.10	6,592	1,734
283.20	6,592	1,933
283.30	6,592	2,131
283.40	6,592	2,330
283.50	6,592	2,529
283.60	6,592	2,727
283.70	6,592	2,926
283.80	6,592	3,125
283.90	6,592	3,323
284.00	6,592	3,522
284.10	6,592	3,720
284.20	6,592	3,919
284.30	6,592	4,019
284.40	6,592	4,020
284.50	6,592	4,022
284.60	6,592	**4,023**

Summary for Pond PB6B: Porous Pavement

Inflow Area = 1.006 ac, 21.93% Impervious, Inflow Depth > 2.74" for 25-YR event
Inflow = 3.93 cfs @ 12.00 hrs, Volume= 0.230 af
Outflow = 1.05 cfs @ 12.34 hrs, Volume= 0.230 af, Atten= 73%, Lag= 20.2 min
Discarded = 0.23 cfs @ 12.34 hrs, Volume= 0.184 af
Primary = 0.82 cfs @ 12.34 hrs, Volume= 0.045 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 264.06' @ 12.34 hrs Surf.Area= 9,608 sf Storage= 3,042 cf

Plug-Flow detention time= 83.2 min calculated for 0.230 af (100% of inflow)
Center-of-Mass det. time= 82.6 min (918.6 - 836.1)

Volume	Invert	Avail.Storage	Storage Description
#1	263.00'	5,765 cf	**Porous Pavement (Irregular)**Listed below (Recalc) 19,216 cf Overall x 30.0% Voids

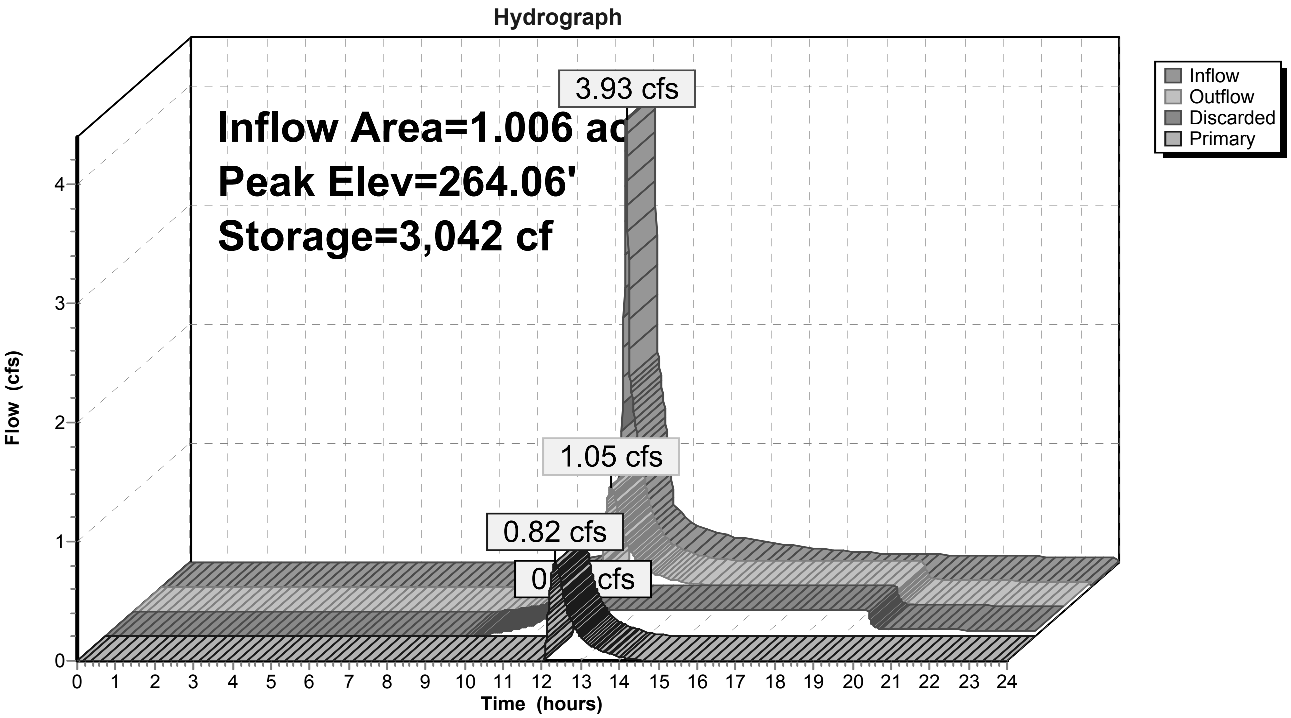
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
263.00	9,608	1,042.0	0	0	9,608
265.00	9,608	1,042.0	19,216	19,216	11,692

Device	Routing	Invert	Outlet Devices
#1	Discarded	263.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	263.80'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Discarded OutFlow Max=0.23 cfs @ 12.34 hrs HW=264.06' (Free Discharge)
└─**1=Exfiltration** (Controls 0.23 cfs)

Primary OutFlow Max=0.82 cfs @ 12.34 hrs HW=264.06' (Free Discharge)
└─**2=Sharp-Crested Rectangular Weir** (Weir Controls 0.82 cfs @ 1.65 fps)

Pond PB6B: Porous Pavement



Stage-Discharge for Pond PB6B: Porous Pavement

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
263.00	0.00	0.00	0.00
263.02	0.23	0.23	0.00
263.04	0.23	0.23	0.00
263.06	0.23	0.23	0.00
263.08	0.23	0.23	0.00
263.10	0.23	0.23	0.00
263.12	0.23	0.23	0.00
263.14	0.23	0.23	0.00
263.16	0.23	0.23	0.00
263.18	0.23	0.23	0.00
263.20	0.23	0.23	0.00
263.22	0.23	0.23	0.00
263.24	0.23	0.23	0.00
263.26	0.23	0.23	0.00
263.28	0.23	0.23	0.00
263.30	0.23	0.23	0.00
263.32	0.23	0.23	0.00
263.34	0.23	0.23	0.00
263.36	0.23	0.23	0.00
263.38	0.23	0.23	0.00
263.40	0.23	0.23	0.00
263.42	0.23	0.23	0.00
263.44	0.23	0.23	0.00
263.46	0.23	0.23	0.00
263.48	0.23	0.23	0.00
263.50	0.23	0.23	0.00
263.52	0.23	0.23	0.00
263.54	0.23	0.23	0.00
263.56	0.23	0.23	0.00
263.58	0.23	0.23	0.00
263.60	0.23	0.23	0.00
263.62	0.23	0.23	0.00
263.64	0.23	0.23	0.00
263.66	0.23	0.23	0.00
263.68	0.23	0.23	0.00
263.70	0.23	0.23	0.00
263.72	0.23	0.23	0.00
263.74	0.23	0.23	0.00
263.76	0.23	0.23	0.00
263.78	0.23	0.23	0.00
263.80	0.23	0.23	0.00
263.82	0.25	0.23	0.02
263.84	0.28	0.23	0.05
263.86	0.32	0.23	0.10
263.88	0.37	0.23	0.15
263.90	0.43	0.23	0.20
263.92	0.50	0.23	0.27
263.94	0.57	0.23	0.34
263.96	0.64	0.23	0.41
263.98	0.72	0.23	0.49
264.00	0.80	0.23	0.57
264.02	0.89	0.23	0.66
264.04	0.98	0.23	0.75
264.06	1.07	0.23	0.84
264.08	1.17	0.23	0.94
264.10	1.27	0.23	1.04
264.12	1.37	0.23	1.15
264.14	1.48	0.23	1.25
264.16	1.59	0.23	1.36
264.18	1.70	0.23	1.47
264.20	1.82	0.23	1.59
264.22	1.93	0.23	1.71
264.24	2.05	0.23	1.82
264.26	2.17	0.23	1.95
264.28	2.30	0.23	2.07
264.30	2.42	0.23	2.20
264.32	2.55	0.23	2.32
264.34	2.68	0.23	2.46
264.36	2.82	0.23	2.59
264.38	2.95	0.23	2.72
264.40	3.09	0.23	2.86
264.42	3.22	0.23	2.99
264.44	3.36	0.23	3.13
264.46	3.50	0.23	3.28
264.48	3.65	0.23	3.42
264.50	3.79	0.23	3.56
264.52	3.94	0.23	3.71
264.54	4.08	0.23	3.86
264.56	4.23	0.23	4.00
264.58	4.38	0.23	4.15
264.60	4.53	0.23	4.31
264.62	4.69	0.23	4.46
264.64	4.84	0.23	4.61
264.66	5.00	0.23	4.77
264.68	5.15	0.23	4.92
264.70	5.31	0.23	5.08
264.72	5.47	0.23	5.24
264.74	5.63	0.23	5.40
264.76	5.79	0.23	5.56
264.78	5.95	0.23	5.72
264.80	6.11	0.23	5.89
264.82	6.28	0.23	6.05
264.84	6.44	0.23	6.21
264.86	6.61	0.23	6.38
264.88	6.78	0.23	6.55
264.90	6.94	0.23	6.72
264.92	7.11	0.23	6.88
264.94	7.28	0.23	7.05
264.96	7.45	0.23	7.22
264.98	7.62	0.23	7.39
265.00	**7.79**	**0.23**	**7.57**

Stage-Area-Storage for Pond PB6B: Porous Pavement

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
263.00	**9,608**	0
263.02	9,608	58
263.04	9,608	115
263.06	9,608	173
263.08	9,608	231
263.10	9,608	288
263.12	9,608	346
263.14	9,608	404
263.16	9,608	461
263.18	9,608	519
263.20	9,608	576
263.22	9,608	634
263.24	9,608	692
263.26	9,608	749
263.28	9,608	807
263.30	9,608	865
263.32	9,608	922
263.34	9,608	980
263.36	9,608	1,038
263.38	9,608	1,095
263.40	9,608	1,153
263.42	9,608	1,211
263.44	9,608	1,268
263.46	9,608	1,326
263.48	9,608	1,384
263.50	9,608	1,441
263.52	9,608	1,499
263.54	9,608	1,556
263.56	9,608	1,614
263.58	9,608	1,672
263.60	9,608	1,729
263.62	9,608	1,787
263.64	9,608	1,845
263.66	9,608	1,902
263.68	9,608	1,960
263.70	9,608	2,018
263.72	9,608	2,075
263.74	9,608	2,133
263.76	9,608	2,191
263.78	9,608	2,248
263.80	9,608	2,306
263.82	9,608	2,364
263.84	9,608	2,421
263.86	9,608	2,479
263.88	9,608	2,537
263.90	9,608	2,594
263.92	9,608	2,652
263.94	9,608	2,709
263.96	9,608	2,767
263.98	9,608	2,825
264.00	9,608	2,882
264.02	9,608	2,940
264.04	9,608	2,998
264.06	9,608	3,055
264.08	9,608	3,113
264.10	9,608	3,171
264.12	9,608	3,228
264.14	9,608	3,286
264.16	9,608	3,344
264.18	9,608	3,401
264.20	9,608	3,459
264.22	9,608	3,517
264.24	9,608	3,574
264.26	9,608	3,632
264.28	9,608	3,689
264.30	9,608	3,747
264.32	9,608	3,805
264.34	9,608	3,862
264.36	9,608	3,920
264.38	9,608	3,978
264.40	9,608	4,035
264.42	9,608	4,093
264.44	9,608	4,151
264.46	9,608	4,208
264.48	9,608	4,266
264.50	9,608	4,324
264.52	9,608	4,381
264.54	9,608	4,439
264.56	9,608	4,497
264.58	9,608	4,554
264.60	9,608	4,612
264.62	9,608	4,669
264.64	9,608	4,727
264.66	9,608	4,785
264.68	9,608	4,842
264.70	9,608	4,900
264.72	9,608	4,958
264.74	9,608	5,015
264.76	9,608	5,073
264.78	9,608	5,131
264.80	9,608	5,188
264.82	9,608	5,246
264.84	9,608	5,304
264.86	9,608	5,361
264.88	9,608	5,419
264.90	9,608	5,477
264.92	9,608	5,534
264.94	9,608	5,592
264.96	9,608	5,650
264.98	9,608	5,707
265.00	9,608	**5,765**

Summary for Pond XB1: Exist Basin #1

Inflow Area = 0.260 ac, 95.63% Impervious, Inflow Depth > 5.68" for 25-YR event
Inflow = 1.55 cfs @ 12.08 hrs, Volume= 0.123 af
Outflow = 0.09 cfs @ 13.92 hrs, Volume= 0.114 af, Atten= 94%, Lag= 110.0 min
Discarded = 0.09 cfs @ 13.92 hrs, Volume= 0.114 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= 0.01 hrs
Peak Elev= 284.03' @ 13.92 hrs Surf.Area= 3,600 sf Storage= 2,340 cf

Plug-Flow detention time= 224.6 min calculated for 0.114 af (93% of inflow)
Center-of-Mass det. time= 186.1 min (943.2 - 757.1)

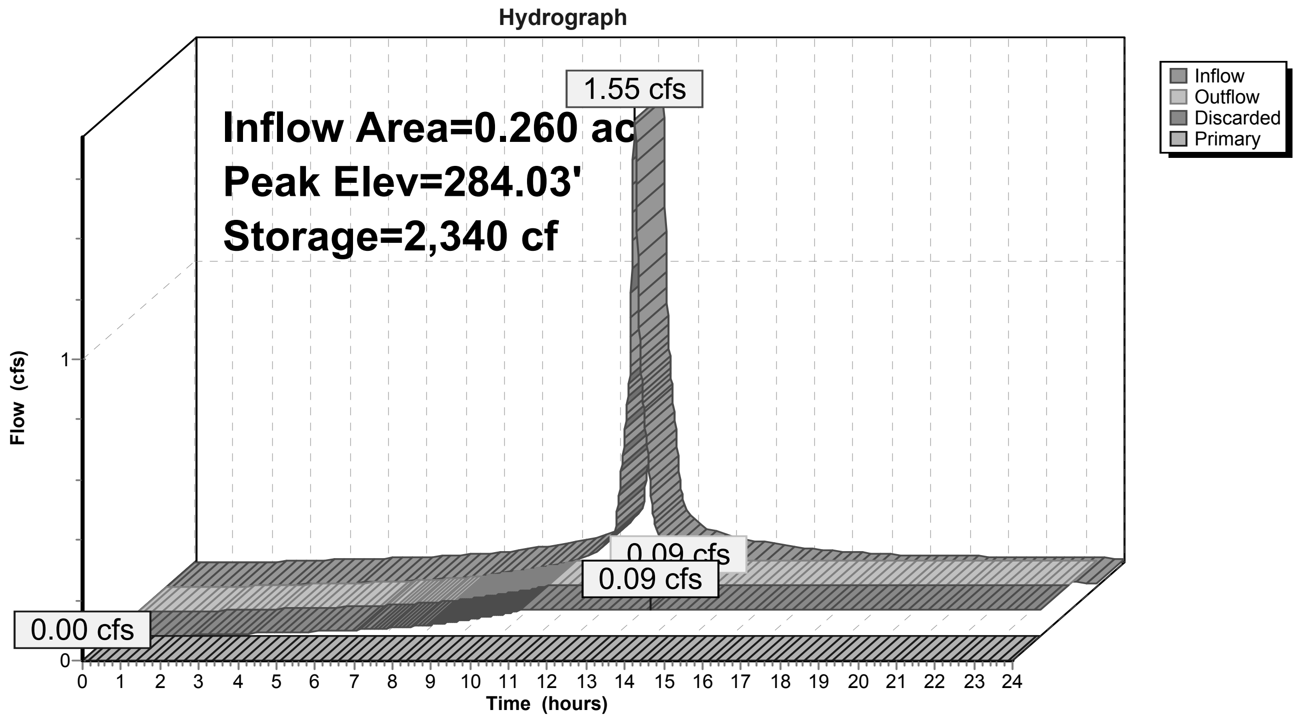
Volume	Invert	Avail.Storage	Storage Description
#1	283.50'	3,335 cf	**30.0"W x 18.0"H x 58.00'L Cultec Contactor 125**x 23 Inside #2
#2	283.00'	1,353 cf	**60.00'W x 60.00'L x 2.00'H Stone** 7,200 cf Overall - 3,335 cf Embedded = 3,865 cf x 35.0% Voids
		4,688 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	284.50'	**4.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	283.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.09 cfs @ 13.92 hrs HW=284.03' (Free Discharge)
└─**2=Exfiltration** (Controls 0.09 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.00' (Free Discharge)
└─**1=Orifice/Grate** (Controls 0.00 cfs)

Pond XB1: Exist Basin #1



Stage-Discharge for Pond XB1: Exist Basin #1

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
283.00	0.00	0.00	0.00	284.06	0.09	0.09	0.00
283.02	0.09	0.09	0.00	284.08	0.09	0.09	0.00
283.04	0.09	0.09	0.00	284.10	0.09	0.09	0.00
283.06	0.09	0.09	0.00	284.12	0.09	0.09	0.00
283.08	0.09	0.09	0.00	284.14	0.09	0.09	0.00
283.10	0.09	0.09	0.00	284.16	0.09	0.09	0.00
283.12	0.09	0.09	0.00	284.18	0.09	0.09	0.00
283.14	0.09	0.09	0.00	284.20	0.09	0.09	0.00
283.16	0.09	0.09	0.00	284.22	0.09	0.09	0.00
283.18	0.09	0.09	0.00	284.24	0.09	0.09	0.00
283.20	0.09	0.09	0.00	284.26	0.09	0.09	0.00
283.22	0.09	0.09	0.00	284.28	0.09	0.09	0.00
283.24	0.09	0.09	0.00	284.30	0.09	0.09	0.00
283.26	0.09	0.09	0.00	284.32	0.09	0.09	0.00
283.28	0.09	0.09	0.00	284.34	0.09	0.09	0.00
283.30	0.09	0.09	0.00	284.36	0.09	0.09	0.00
283.32	0.09	0.09	0.00	284.38	0.09	0.09	0.00
283.34	0.09	0.09	0.00	284.40	0.09	0.09	0.00
283.36	0.09	0.09	0.00	284.42	0.09	0.09	0.00
283.38	0.09	0.09	0.00	284.44	0.09	0.09	0.00
283.40	0.09	0.09	0.00	284.46	0.09	0.09	0.00
283.42	0.09	0.09	0.00	284.48	0.09	0.09	0.00
283.44	0.09	0.09	0.00	284.50	0.09	0.09	0.00
283.46	0.09	0.09	0.00	284.52	0.09	0.09	0.00
283.48	0.09	0.09	0.00	284.54	0.09	0.09	0.00
283.50	0.09	0.09	0.00	284.56	0.09	0.09	0.01
283.52	0.09	0.09	0.00	284.58	0.10	0.09	0.02
283.54	0.09	0.09	0.00	284.60	0.11	0.09	0.02
283.56	0.09	0.09	0.00	284.62	0.12	0.09	0.03
283.58	0.09	0.09	0.00	284.64	0.13	0.09	0.04
283.60	0.09	0.09	0.00	284.66	0.14	0.09	0.06
283.62	0.09	0.09	0.00	284.68	0.15	0.09	0.07
283.64	0.09	0.09	0.00	284.70	0.17	0.09	0.08
283.66	0.09	0.09	0.00	284.72	0.18	0.09	0.10
283.68	0.09	0.09	0.00	284.74	0.20	0.09	0.11
283.70	0.09	0.09	0.00	284.76	0.21	0.09	0.13
283.72	0.09	0.09	0.00	284.78	0.23	0.09	0.14
283.74	0.09	0.09	0.00	284.80	0.24	0.09	0.15
283.76	0.09	0.09	0.00	284.82	0.25	0.09	0.17
283.78	0.09	0.09	0.00	284.84	0.26	0.09	0.17
283.80	0.09	0.09	0.00	284.86	0.27	0.09	0.18
283.82	0.09	0.09	0.00	284.88	0.28	0.09	0.19
283.84	0.09	0.09	0.00	284.90	0.29	0.09	0.20
283.86	0.09	0.09	0.00	284.92	0.30	0.09	0.21
283.88	0.09	0.09	0.00	284.94	0.31	0.09	0.22
283.90	0.09	0.09	0.00	284.96	0.31	0.09	0.23
283.92	0.09	0.09	0.00	284.98	0.32	0.09	0.24
283.94	0.09	0.09	0.00	285.00	**0.33**	**0.09**	**0.24**
283.96	0.09	0.09	0.00				
283.98	0.09	0.09	0.00				
284.00	0.09	0.09	0.00				
284.02	0.09	0.09	0.00				
284.04	0.09	0.09	0.00				

Stage-Area-Storage for Pond XB1: Exist Basin #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.00	**3,600**	0	284.06	3,600	2,428
283.02	3,600	25	284.08	3,600	2,487
283.04	3,600	50	284.10	3,600	2,546
283.06	3,600	76	284.12	3,600	2,605
283.08	3,600	101	284.14	3,600	2,663
283.10	3,600	126	284.16	3,600	2,721
283.12	3,600	151	284.18	3,600	2,778
283.14	3,600	176	284.20	3,600	2,835
283.16	3,600	202	284.22	3,600	2,892
283.18	3,600	227	284.24	3,600	2,948
283.20	3,600	252	284.26	3,600	3,004
283.22	3,600	277	284.28	3,600	3,060
283.24	3,600	302	284.30	3,600	3,115
283.26	3,600	328	284.32	3,600	3,169
283.28	3,600	353	284.34	3,600	3,223
283.30	3,600	378	284.36	3,600	3,277
283.32	3,600	403	284.38	3,600	3,331
283.34	3,600	428	284.40	3,600	3,383
283.36	3,600	454	284.42	3,600	3,436
283.38	3,600	479	284.44	3,600	3,488
283.40	3,600	504	284.46	3,600	3,539
283.42	3,600	529	284.48	3,600	3,590
283.44	3,600	554	284.50	3,600	3,641
283.46	3,600	580	284.52	3,600	3,691
283.48	3,600	605	284.54	3,600	3,740
283.50	3,600	630	284.56	3,600	3,789
283.52	3,600	698	284.58	3,600	3,837
283.54	3,600	767	284.60	3,600	3,885
283.56	3,600	834	284.62	3,600	3,933
283.58	3,600	902	284.64	3,600	3,979
283.60	3,600	969	284.66	3,600	4,025
283.62	3,600	1,036	284.68	3,600	4,071
283.64	3,600	1,103	284.70	3,600	4,116
283.66	3,600	1,169	284.72	3,600	4,160
283.68	3,600	1,235	284.74	3,600	4,204
283.70	3,600	1,301	284.76	3,600	4,247
283.72	3,600	1,366	284.78	3,600	4,289
283.74	3,600	1,431	284.80	3,600	4,330
283.76	3,600	1,496	284.82	3,600	4,371
283.78	3,600	1,560	284.84	3,600	4,411
283.80	3,600	1,625	284.86	3,600	4,450
283.82	3,600	1,688	284.88	3,600	4,487
283.84	3,600	1,752	284.90	3,600	4,524
283.86	3,600	1,815	284.92	3,600	4,560
283.88	3,600	1,878	284.94	3,600	4,595
283.90	3,600	1,940	284.96	3,600	4,628
283.92	3,600	2,003	284.98	3,600	4,659
283.94	3,600	2,064	285.00	3,600	**4,688**
283.96	3,600	2,126			
283.98	3,600	2,187			
284.00	3,600	2,248			
284.02	3,600	2,308			
284.04	3,600	2,368			

Summary for Pond XB2: Exist Basin #2

Inflow Area = 1.933 ac, 75.44% Impervious, Inflow Depth > 4.89" for 25-YR event
Inflow = 10.62 cfs @ 12.08 hrs, Volume= 0.787 af
Outflow = 10.54 cfs @ 12.09 hrs, Volume= 0.672 af, Atten= 1%, Lag= 0.6 min
Discarded = 0.07 cfs @ 12.09 hrs, Volume= 0.105 af
Primary = 10.46 cfs @ 12.09 hrs, Volume= 0.567 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 289.91' @ 12.09 hrs Surf.Area= 2,883 sf Storage= 5,834 cf

Plug-Flow detention time= 94.3 min calculated for 0.672 af (85% of inflow)
Center-of-Mass det. time= 32.0 min (818.7 - 786.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	279.50'	1,268 cf	**30.50'W x 73.50'L x 3.04'H Field A**
			6,819 cf Overall - 3,196 cf Embedded = 3,622 cf x 35.0% Voids
#2A	280.00'	3,196 cf	**Cultec R-330XLHD** x 60 Inside #1
			Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
			Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
			Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
#3B	279.50'	370 cf	**16.00'W x 38.50'L x 3.04'H Field B**
			1,874 cf Overall - 816 cf Embedded = 1,058 cf x 35.0% Voids
#4B	280.00'	816 cf	**Cultec R-330XLHD** x 15 Inside #3
			Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
			Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
			Row Length Adjustment= +1.50' x 7.45 sf x 3 rows
#5	279.00'	148 cf	**4.00'D x 11.80'H Vertical Cone/Cylinder**
#6	286.20'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**
		5,874 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	282.00'	**6.0" Vert. Orifice/Grate X 4.00** C= 0.600
#2	Primary	290.70'	**2.3" x 2.3" Horiz. Grate X 36.00**
			C= 0.600 in 24.0" x 24.0" Grate (33% open area)
			Limited to weir flow at low heads
#3	Primary	292.10'	**2.3" x 2.3" Horiz. Grate X 36.00**
			C= 0.600 in 24.0" x 24.0" Grate (33% open area)
			Limited to weir flow at low heads
#4	Discarded	279.00'	**1.020 in/hr Exfiltration over Surface area**
			Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.07 cfs @ 12.09 hrs HW=289.88' (Free Discharge)
└─**4=Exfiltration** (Controls 0.07 cfs)

Primary OutFlow Max=10.45 cfs @ 12.09 hrs HW=289.88' (Free Discharge)
├─**1=Orifice/Grate** (Orifice Controls 10.45 cfs @ 13.30 fps)
├─**2=Grate** (Controls 0.00 cfs)
└─**3=Grate** (Controls 0.00 cfs)

Pond XB2: Exist Basin #2 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

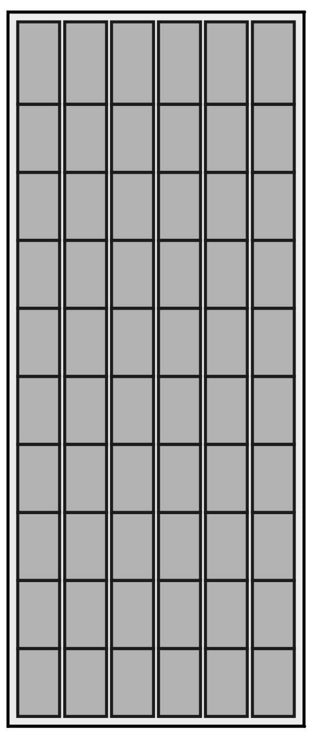
10 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 71.50' Row Length +12.0" End Stone x 2 = 73.50' Base Length
6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width
6.0" Base + 30.5" Chamber Height = 3.04' Field Height

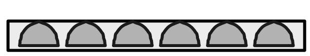
60 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 3,196.5 cf Chamber Storage

6,818.7 cf Field - 3,196.5 cf Chambers = 3,622.2 cf Stone x 35.0% Voids = 1,267.8 cf Stone Storage

Chamber Storage + Stone Storage = 4,464.2 cf = 0.102 af
Overall Storage Efficiency = 65.5%

60 Chambers
252.5 cy Field
134.2 cy Stone





Pond XB2: Exist Basin #2 - Chamber Wizard Field B

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 3 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

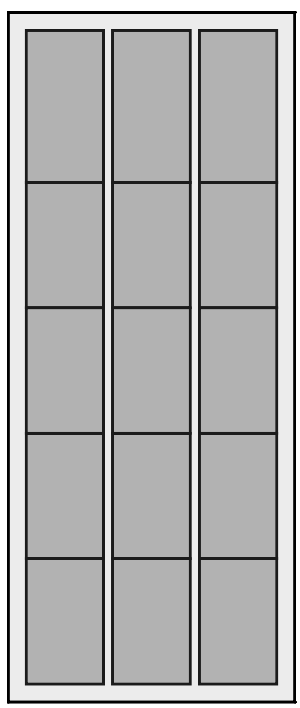
5 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 36.50' Row Length +12.0" End Stone x 2 = 38.50' Base Length
3 Rows x 52.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 16.00' Base Width
6.0" Base + 30.5" Chamber Height = 3.04' Field Height

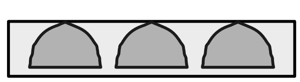
15 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 3 Rows = 815.9 cf Chamber Storage

1,873.7 cf Field - 815.9 cf Chambers = 1,057.8 cf Stone x 35.0% Voids = 370.2 cf Stone Storage

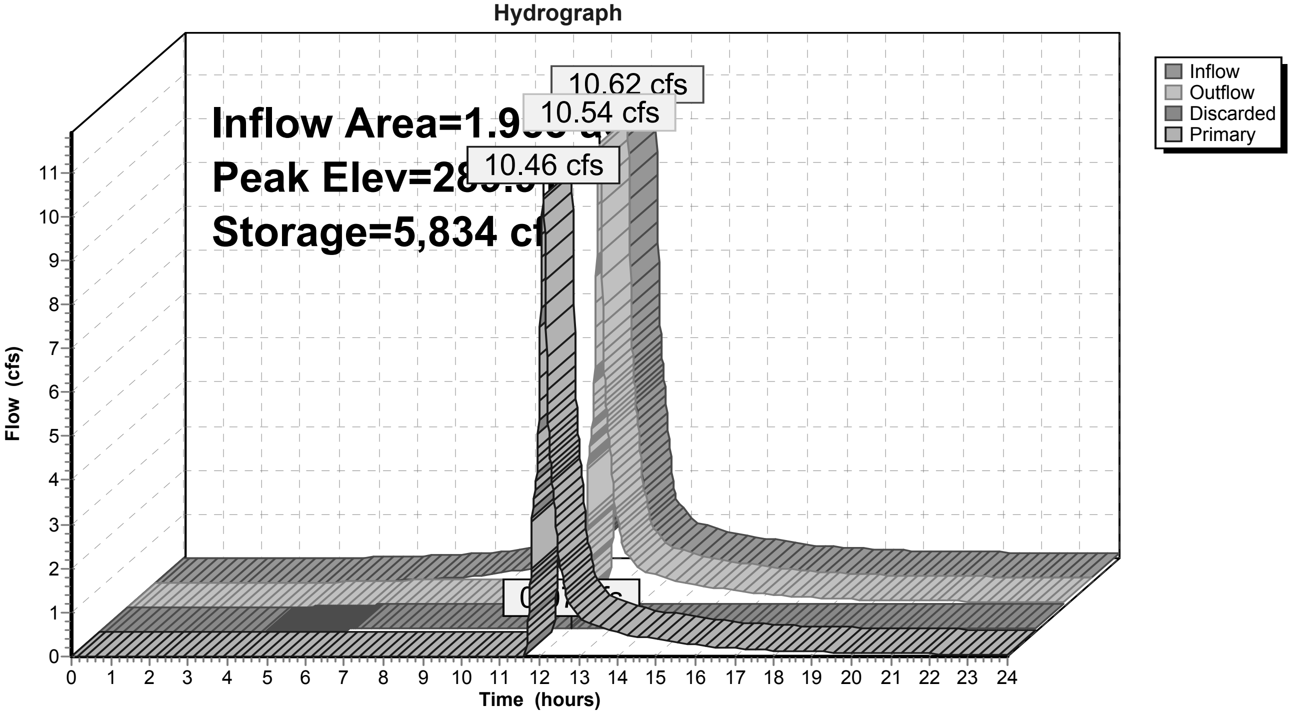
Chamber Storage + Stone Storage = 1,186.1 cf = 0.027 af
Overall Storage Efficiency = 63.3%

15 Chambers
69.4 cy Field
39.2 cy Stone





Pond XB2: Exist Basin #2



Stage-Discharge for Pond XB2: Exist Basin #2

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
279.00	0.00	0.00	0.00	286.95	8.27	0.07	8.20
279.15	0.00	0.00	0.00	287.10	8.40	0.07	8.33
279.30	0.00	0.00	0.00	287.25	8.53	0.07	8.46
279.45	0.00	0.00	0.00	287.40	8.65	0.07	8.58
279.60	0.07	0.07	0.00	287.55	8.78	0.07	8.71
279.75	0.07	0.07	0.00	287.70	8.90	0.07	8.83
279.90	0.07	0.07	0.00	287.85	9.02	0.07	8.95
280.05	0.07	0.07	0.00	288.00	9.14	0.07	9.07
280.20	0.07	0.07	0.00	288.15	9.26	0.07	9.19
280.35	0.07	0.07	0.00	288.30	9.37	0.07	9.30
280.50	0.07	0.07	0.00	288.45	9.49	0.07	9.42
280.65	0.07	0.07	0.00	288.60	9.60	0.07	9.53
280.80	0.07	0.07	0.00	288.75	9.71	0.07	9.64
280.95	0.07	0.07	0.00	288.90	9.82	0.07	9.75
281.10	0.07	0.07	0.00	289.05	9.93	0.07	9.86
281.25	0.07	0.07	0.00	289.20	10.04	0.07	9.97
281.40	0.07	0.07	0.00	289.35	10.15	0.07	10.08
281.55	0.07	0.07	0.00	289.50	10.25	0.07	10.18
281.70	0.07	0.07	0.00	289.65	10.36	0.07	10.29
281.85	0.07	0.07	0.00	289.80	10.46	0.07	10.39
282.00	0.07	0.07	0.00	289.95	10.56	0.07	10.49
282.15	0.33	0.07	0.26	290.10	10.67	0.07	10.60
282.30	0.99	0.07	0.92	290.25	10.77	0.07	10.70
282.45	1.77	0.07	1.70	290.40	10.87	0.07	10.80
282.60	2.31	0.07	2.24	290.55	10.97	0.07	10.89
282.75	2.74	0.07	2.67	290.70	11.06	0.07	10.99
282.90	3.12	0.07	3.05	290.85	12.68	0.07	12.61
283.05	3.45	0.07	3.38	291.00	14.74	0.07	14.67
283.20	3.75	0.07	3.69	291.15	15.62	0.07	15.55
283.35	4.03	0.07	3.97	291.30	16.38	0.07	16.31
283.50	4.30	0.07	4.23	291.45	17.06	0.07	16.99
283.65	4.54	0.07	4.47	291.60	17.68	0.07	17.60
283.80	4.78	0.07	4.71	291.75	18.25	0.07	18.18
283.95	5.00	0.07	4.93	291.90	18.79	0.07	18.72
284.10	5.21	0.07	5.14	292.05	19.31	0.07	19.24
284.25	5.42	0.07	5.35	292.20	**20.63**	**0.07**	**20.55**
284.40	5.61	0.07	5.55				
284.55	5.80	0.07	5.74				
284.70	5.99	0.07	5.92				
284.85	6.17	0.07	6.10				
285.00	6.34	0.07	6.27				
285.15	6.51	0.07	6.44				
285.30	6.67	0.07	6.60				
285.45	6.83	0.07	6.76				
285.60	6.99	0.07	6.92				
285.75	7.14	0.07	7.07				
285.90	7.29	0.07	7.22				
286.05	7.44	0.07	7.37				
286.20	7.59	0.07	7.52				
286.35	7.73	0.07	7.66				
286.50	7.87	0.07	7.80				
286.65	8.00	0.07	7.93				
286.80	8.14	0.07	8.07				

Stage-Area-Storage for Pond XB2: Exist Basin #2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
279.00	13	0	286.95	2,883	5,760
279.15	13	2	287.10	2,883	5,763
279.30	13	4	287.25	2,883	5,767
279.45	13	6	287.40	2,883	5,771
279.60	2,870	108	287.55	2,883	5,775
279.75	2,870	259	287.70	2,883	5,779
279.90	2,870	411	287.85	2,883	5,782
280.05	2,870	633	288.00	2,883	5,786
280.20	2,870	991	288.15	2,883	5,790
280.35	2,870	1,348	288.30	2,883	5,794
280.50	2,870	1,703	288.45	2,883	5,797
280.65	2,870	2,054	288.60	2,883	5,801
280.80	2,870	2,399	288.75	2,883	5,805
280.95	2,870	2,742	288.90	2,883	5,809
281.10	2,870	3,082	289.05	2,883	5,812
281.25	2,870	3,419	289.20	2,883	5,816
281.40	2,870	3,747	289.35	2,883	5,820
281.55	2,870	4,063	289.50	2,883	5,824
281.70	2,870	4,369	289.65	2,883	5,828
281.85	2,870	4,661	289.80	2,883	5,831
282.00	2,870	4,937	289.95	2,883	5,835
282.15	2,870	5,192	290.10	2,883	5,839
282.30	2,870	5,415	290.25	2,883	5,843
282.45	2,870	5,599	290.40	2,883	5,846
282.60	2,870	5,696	290.55	2,883	5,850
282.75	2,870	5,697	290.70	2,883	5,854
282.90	2,870	5,699	290.85	2,883	5,857
283.05	2,870	5,701	291.00	2,883	5,859
283.20	2,870	5,703	291.15	2,883	5,861
283.35	2,870	5,705	291.30	2,883	5,863
283.50	2,870	5,707	291.45	2,883	5,865
283.65	2,870	5,709	291.60	2,883	5,866
283.80	2,870	5,711	291.75	2,883	5,868
283.95	2,870	5,713	291.90	2,883	5,870
284.10	2,870	5,714	292.05	2,883	5,872
284.25	2,870	5,716	292.20	2,883	**5,874**
284.40	2,870	5,718			
284.55	2,870	5,720			
284.70	2,870	5,722			
284.85	2,870	5,724			
285.00	2,870	5,726			
285.15	2,870	5,728			
285.30	2,870	5,730			
285.45	2,870	5,731			
285.60	2,870	5,733			
285.75	2,870	5,735			
285.90	2,870	5,737			
286.05	2,870	5,739			
286.20	**2,883**	5,741			
286.35	2,883	5,745			
286.50	2,883	5,748			
286.65	2,883	5,752			
286.80	2,883	5,756			

Summary for Subcatchment P1: Offsite to West

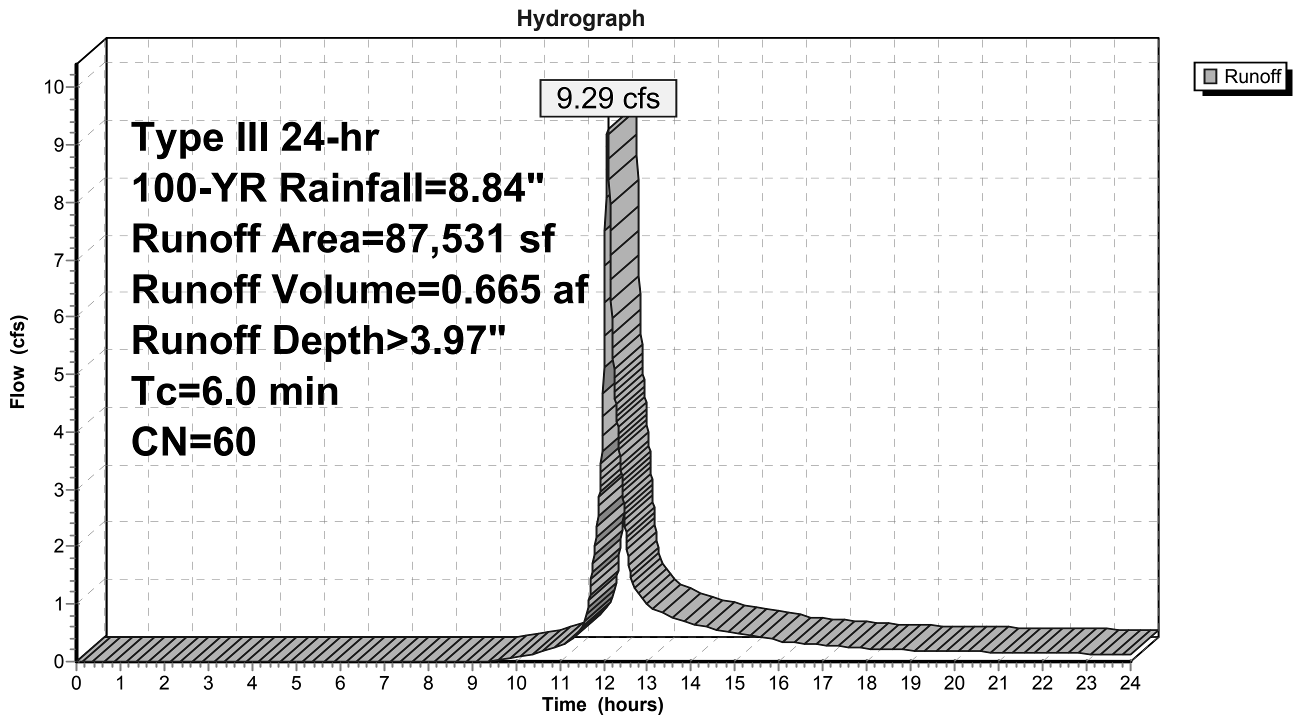
Runoff = 9.29 cfs @ 12.09 hrs, Volume= 0.665 af, Depth> 3.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.84"

	Area (sf)	CN	Description
	27,387	55	Woods, Good, HSG B
*	3,150	98	Roof
*	0	98	Impervious
	56,994	61	>75% Grass cover, Good, HSG B
	87,531	60	Weighted Average
	84,381		96.40% Pervious Area
	3,150		3.60% Impervious Area

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

Subcatchment P1: Offsite to West



Summary for Subcatchment P2: To Basin #2

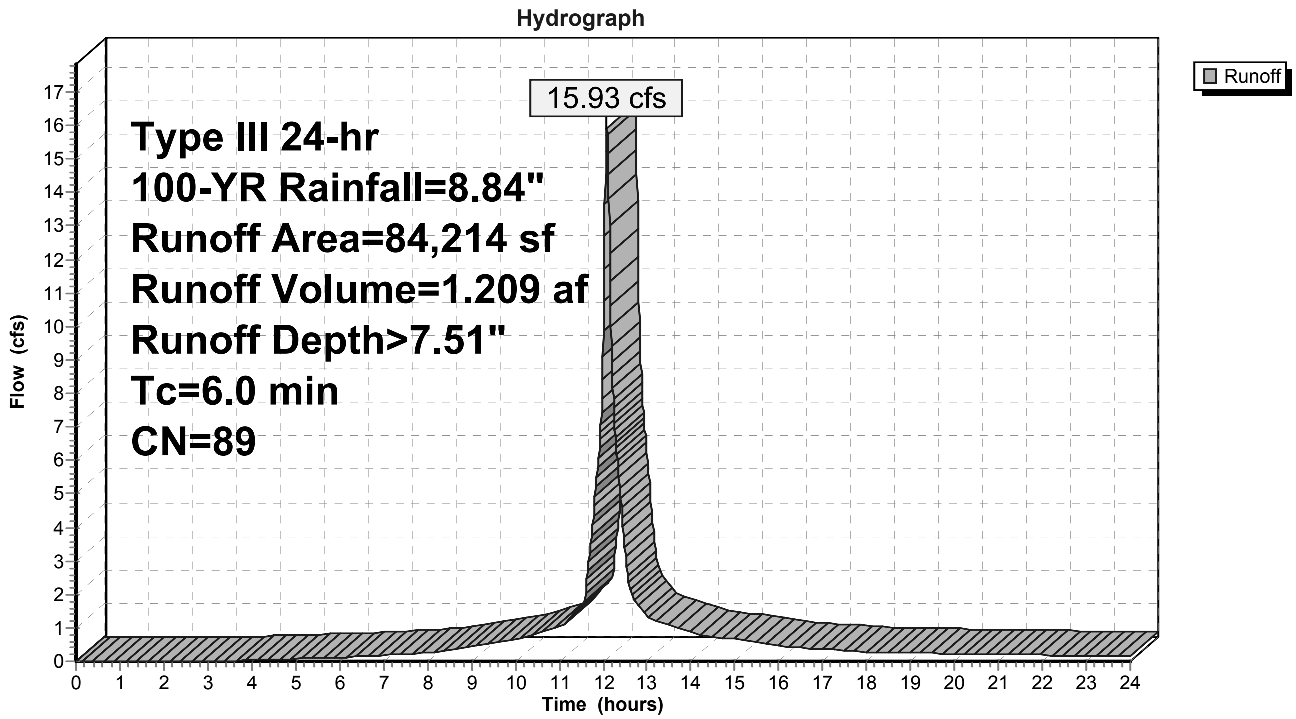
Runoff = 15.93 cfs @ 12.08 hrs, Volume= 1.209 af, Depth> 7.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.84"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	26,065	98	Roof
*	37,469	98	Impervious
	20,680	61	>75% Grass cover, Good, HSG B
	84,214	89	Weighted Average
	20,680		24.56% Pervious Area
	63,534		75.44% Impervious Area

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

Subcatchment P2: To Basin #2



Summary for Subcatchment P3: Offsite to Northwest

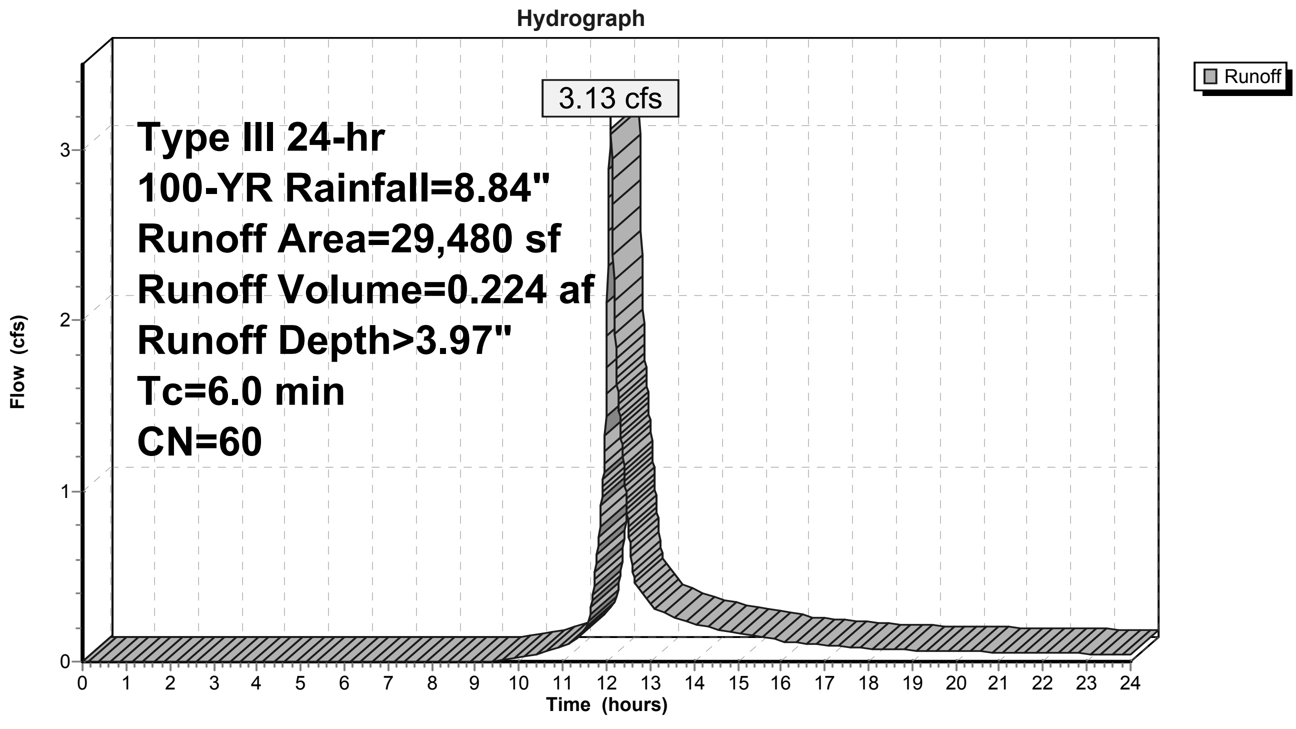
Runoff = 3.13 cfs @ 12.09 hrs, Volume= 0.224 af, Depth> 3.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.84"

	Area (sf)	CN	Description
	14,592	55	Woods, Good, HSG B
*	0	98	Roof
*	1,579	98	Impervious
	13,309	61	>75% Grass cover, Good, HSG B
	29,480	60	Weighted Average
	27,901		94.64% Pervious Area
	1,579		5.36% Impervious Area

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

Subcatchment P3: Offsite to Northwest



Summary for Subcatchment P4A: To Basin #1

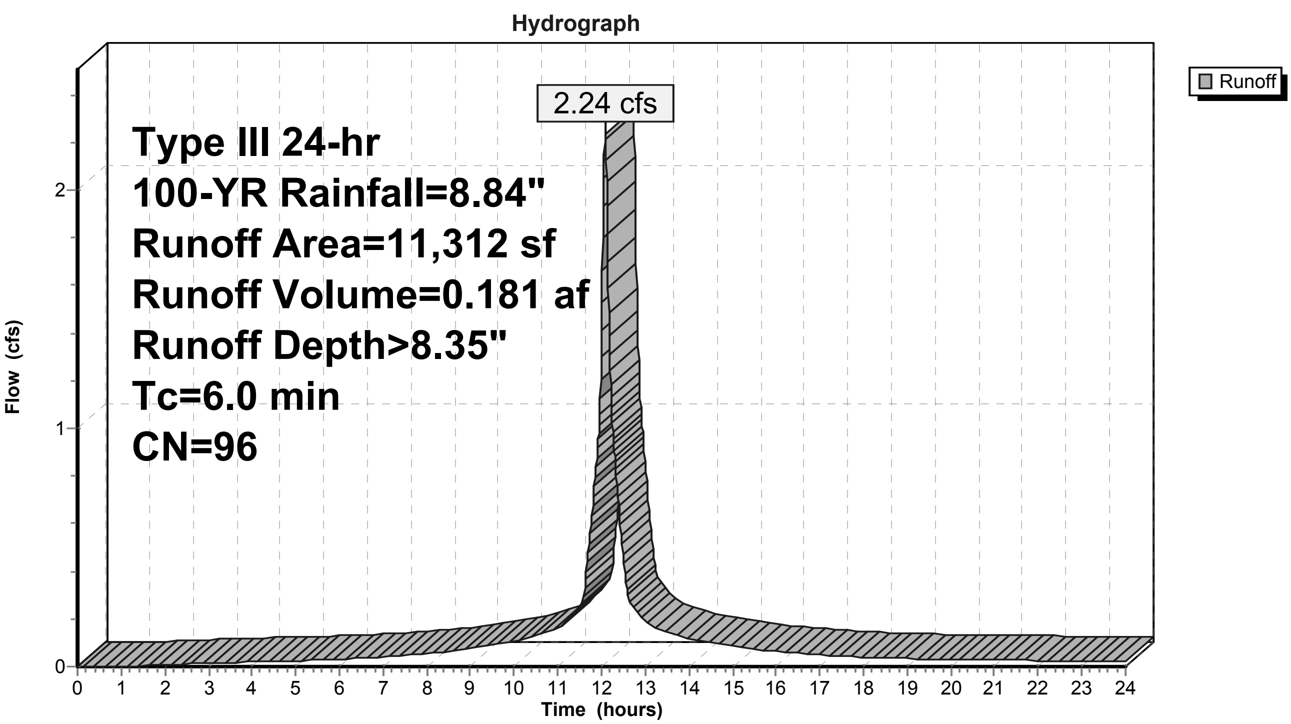
Runoff = 2.24 cfs @ 12.08 hrs, Volume= 0.181 af, Depth> 8.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.84"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	0	98	Roof
*	10,818	98	Impervious
	494	61	>75% Grass cover, Good, HSG B
	11,312	96	Weighted Average
	494		4.37% Pervious Area
	10,818		95.63% Impervious Area

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

Subcatchment P4A: To Basin #1



Summary for Subcatchment P4B: Roof and loading to PB4B

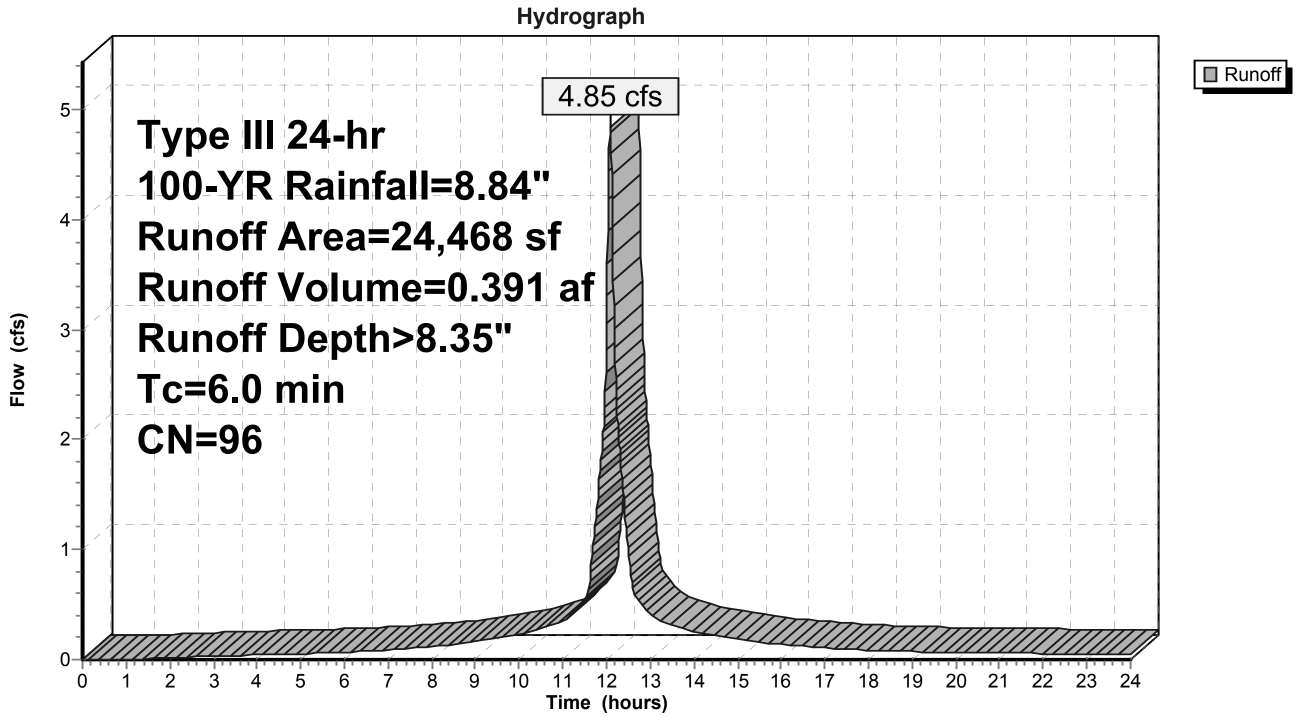
Runoff = 4.85 cfs @ 12.08 hrs, Volume= 0.391 af, Depth> 8.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.84"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	21,079	98	Roof
*	1,841	98	Impervious
	1,548	61	>75% Grass cover, Good, HSG B
*	0	69	Grasspave
	24,468	96	Weighted Average
	1,548		6.33% Pervious Area
	22,920		93.67% Impervious Area

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

Subcatchment P4B: Roof and loading to PB4B



Summary for Subcatchment P5: To Basin #3

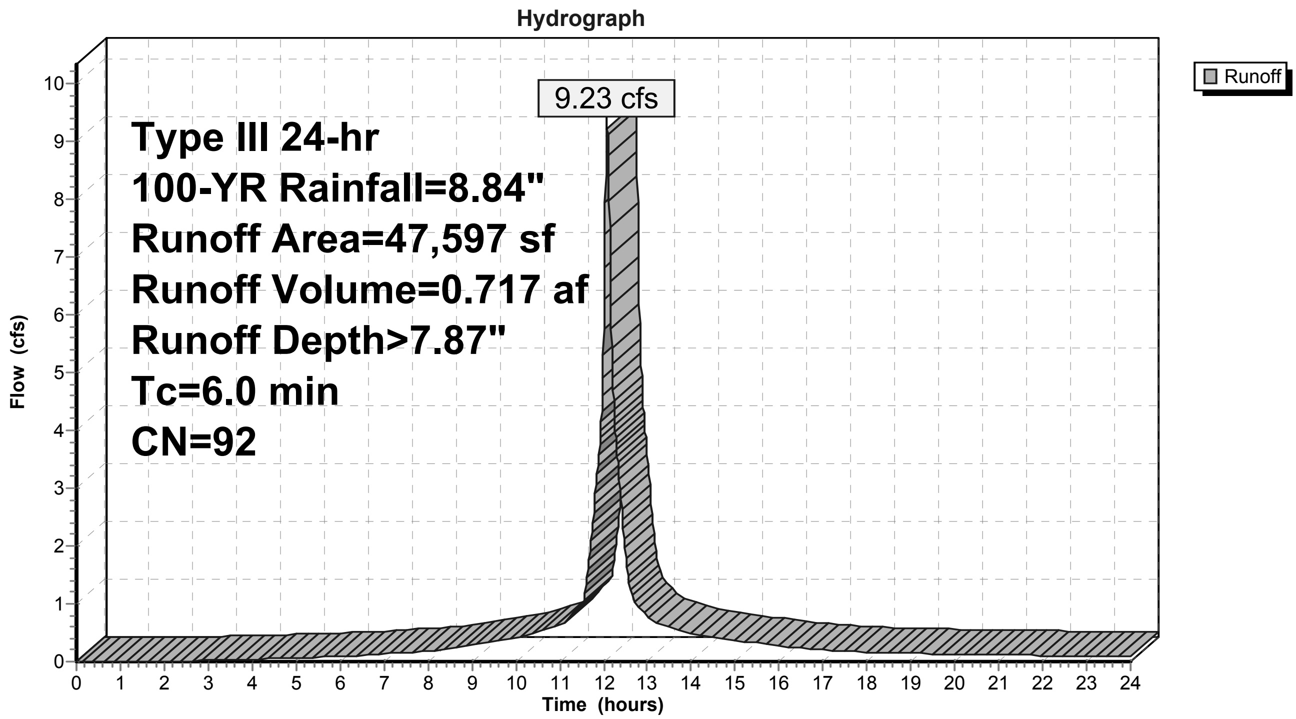
Runoff = 9.23 cfs @ 12.08 hrs, Volume= 0.717 af, Depth> 7.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.84"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	5,950	98	Roof
*	34,115	98	Impervious
	7,532	61	>75% Grass cover, Good, HSG B
	47,597	92	Weighted Average
	7,532		15.82% Pervious Area
	40,065		84.18% Impervious Area

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

Subcatchment P5: To Basin #3



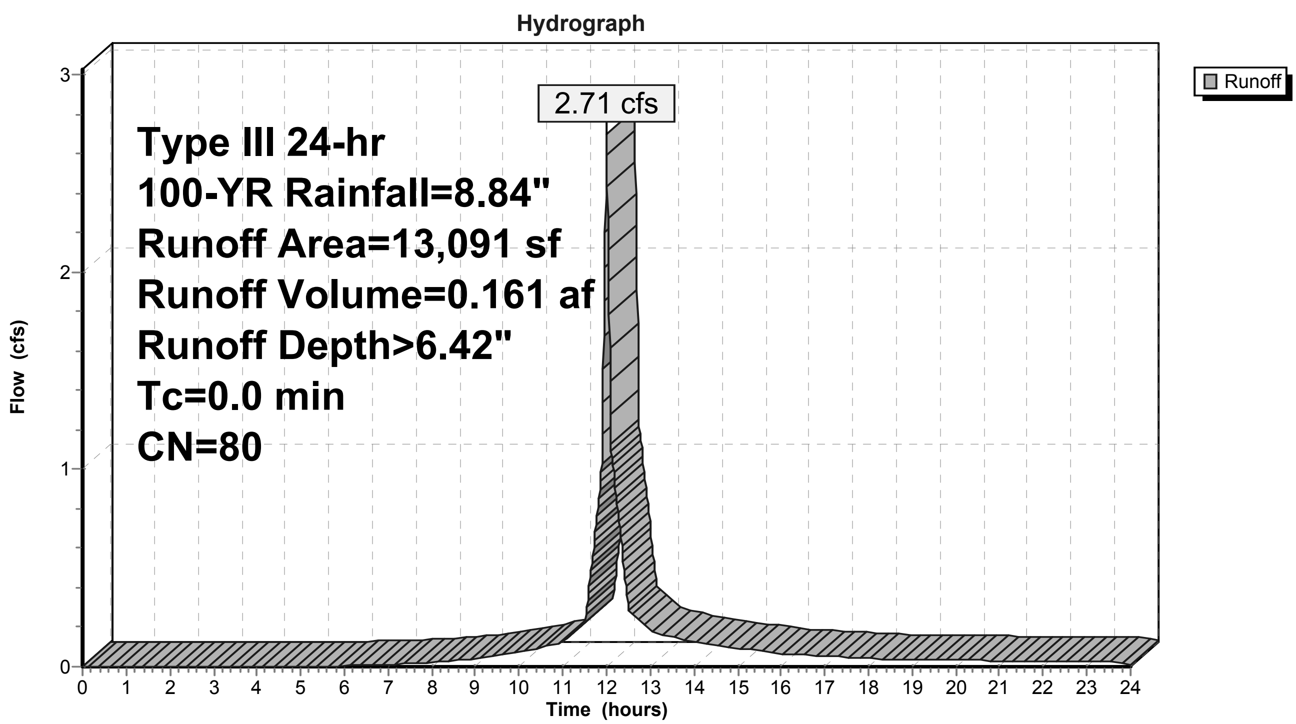
Summary for Subcatchment P6A: 6A To cb

Runoff = 2.71 cfs @ 12.00 hrs, Volume= 0.161 af, Depth> 6.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.84"

	Area (sf)	CN	Description
	6,512	61	>75% Grass cover, Good, HSG B
*	6,579	98	Impervious
	0	55	Woods, Good, HSG B
	13,091	80	Weighted Average
	6,512		49.74% Pervious Area
	6,579		50.26% Impervious Area

Subcatchment P6A: 6A To cb



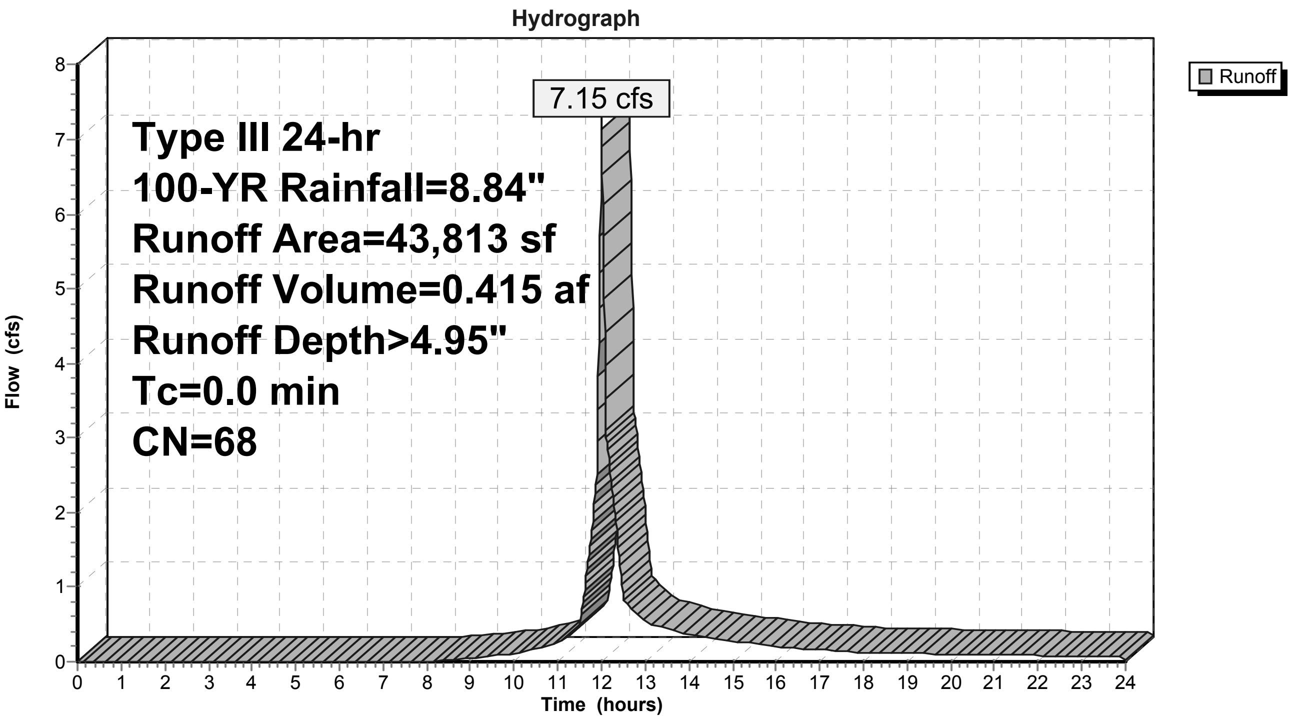
Summary for Subcatchment P6B: 6B To Pipe

Runoff = 7.15 cfs @ 12.00 hrs, Volume= 0.415 af, Depth> 4.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.84"

	Area (sf)	CN	Description
	25,289	61	>75% Grass cover, Good, HSG B
*	9,608	98	Impervious
	8,916	55	Woods, Good, HSG B
	43,813	68	Weighted Average
	34,205		78.07% Pervious Area
	9,608		21.93% Impervious Area

Subcatchment P6B: 6B To Pipe



Summary for Subcatchment P6C: Offsite to Concord Ave

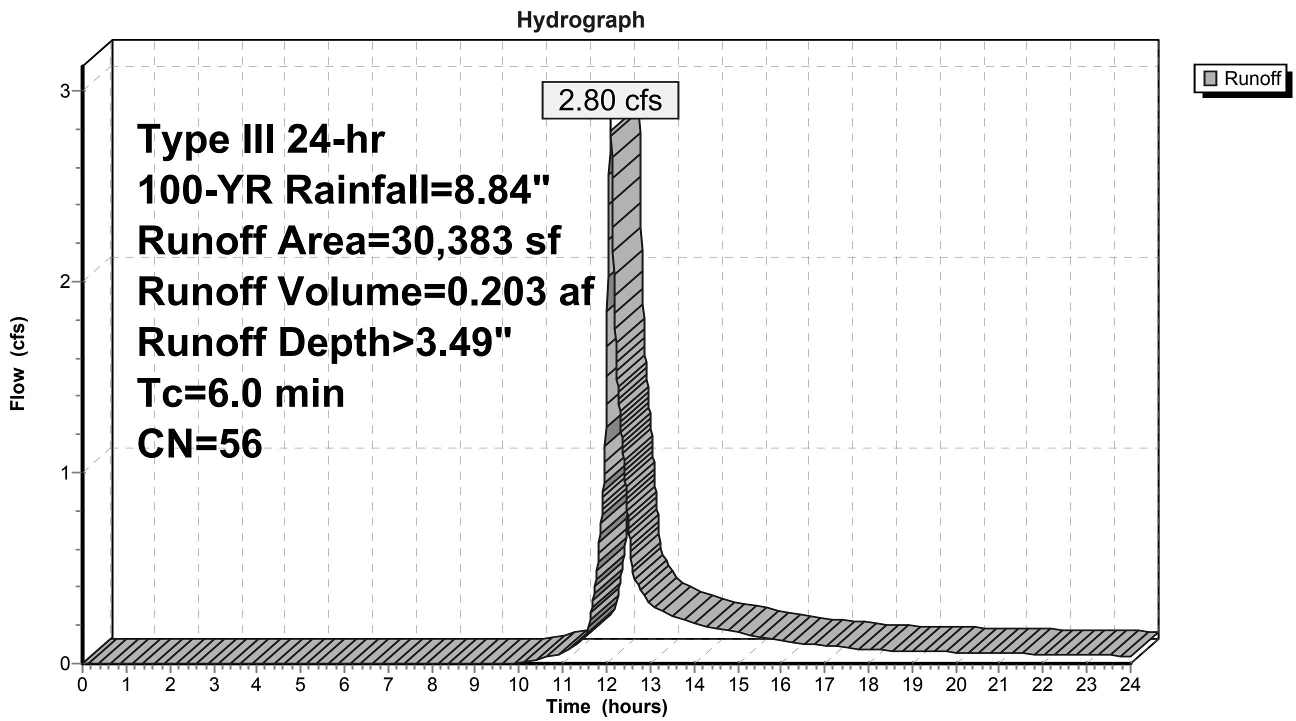
Runoff = 2.80 cfs @ 12.09 hrs, Volume= 0.203 af, Depth> 3.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.84"

	Area (sf)	CN	Description
	24,840	55	Woods, Good, HSG B
*	0	98	Roof
*	0	98	Impervious
	5,543	61	>75% Grass cover, Good, HSG B
	30,383	56	Weighted Average
	30,383		100.00% Pervious Area

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

Subcatchment P6C: Offsite to Concord Ave



Summary for Subcatchment P7: To SW Basin

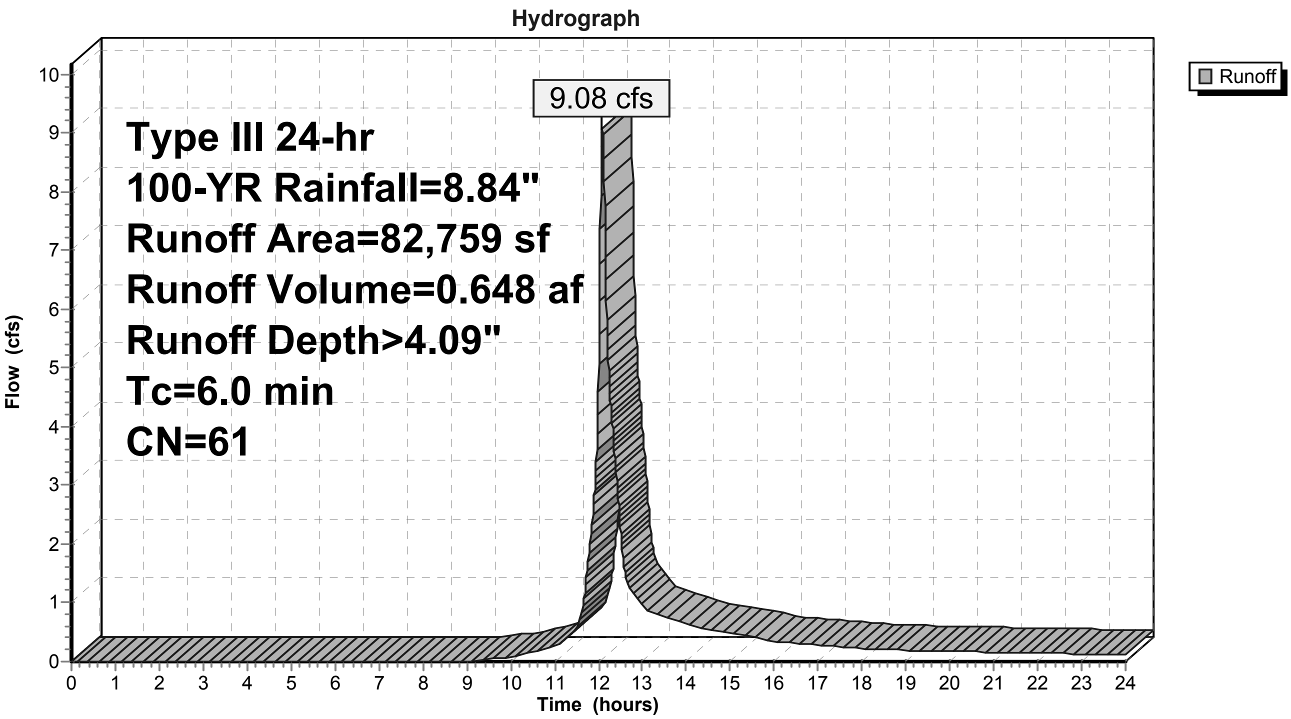
Runoff = 9.08 cfs @ 12.09 hrs, Volume= 0.648 af, Depth> 4.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.84"

	Area (sf)	CN	Description
	8,668	55	Woods, Good, HSG B
*	979	98	Roof
*	265	98	Impervious
	72,847	61	>75% Grass cover, Good, HSG B
	82,759	61	Weighted Average
	81,515		98.50% Pervious Area
	1,244		1.50% Impervious Area

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

Subcatchment P7: To SW Basin



Summary for Subcatchment P8: To CB#2

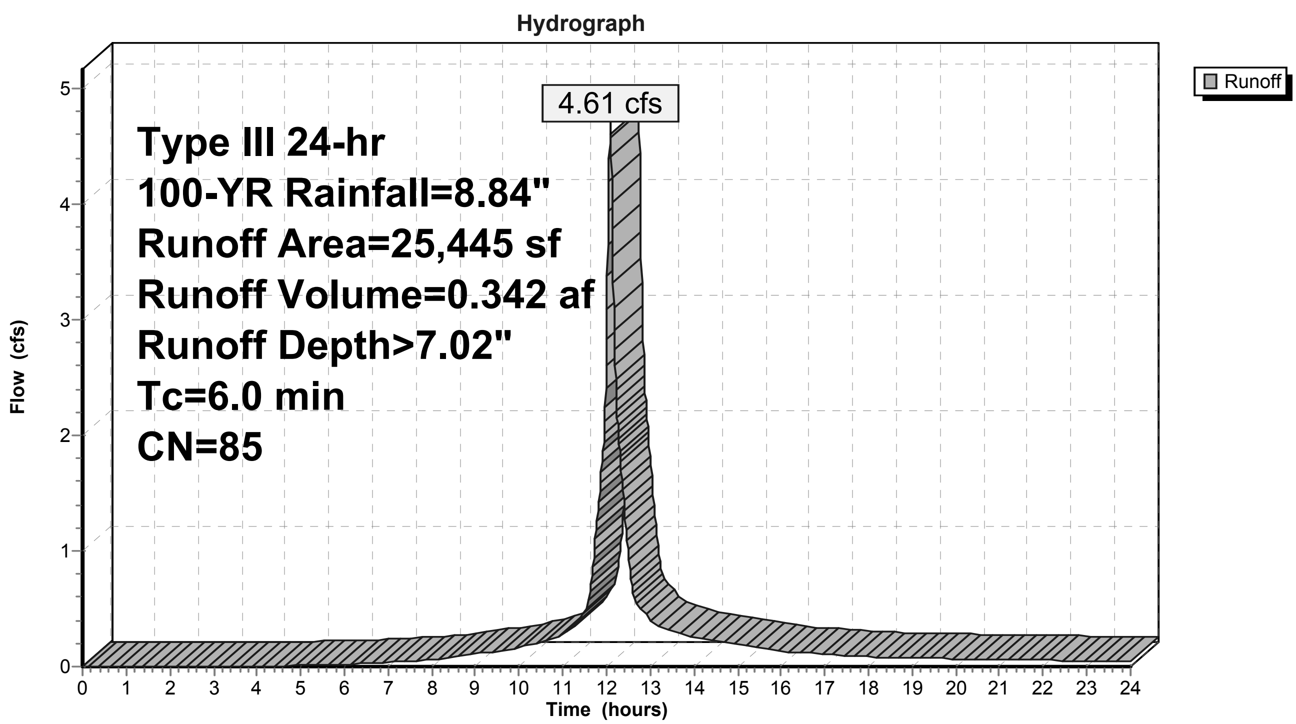
Runoff = 4.61 cfs @ 12.08 hrs, Volume= 0.342 af, Depth> 7.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.84"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	5,898	98	Roof
*	10,557	98	Impervious
	8,990	61	>75% Grass cover, Good, HSG B
	25,445	85	Weighted Average
	8,990		35.33% Pervious Area
	16,455		64.67% Impervious Area

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

Subcatchment P8: To CB#2



Summary for Subcatchment P9: To Day School Lane

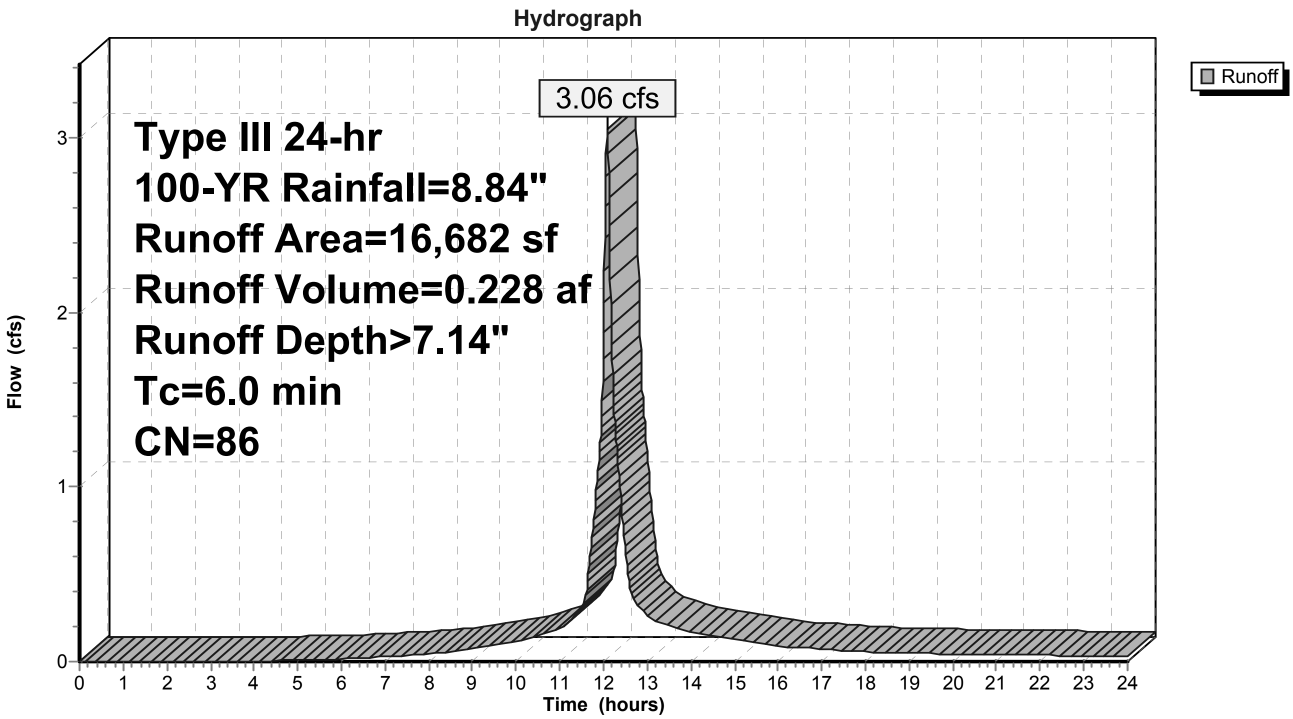
Runoff = 3.06 cfs @ 12.08 hrs, Volume= 0.228 af, Depth> 7.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.84"

	Area (sf)	CN	Description
	0	55	Woods, Good, HSG B
*	0	98	Roof
*	11,199	98	Impervious
	5,483	61	>75% Grass cover, Good, HSG B
	16,682	86	Weighted Average
	5,483		32.87% Pervious Area
	11,199		67.13% Impervious Area

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

Subcatchment P9: To Day School Lane

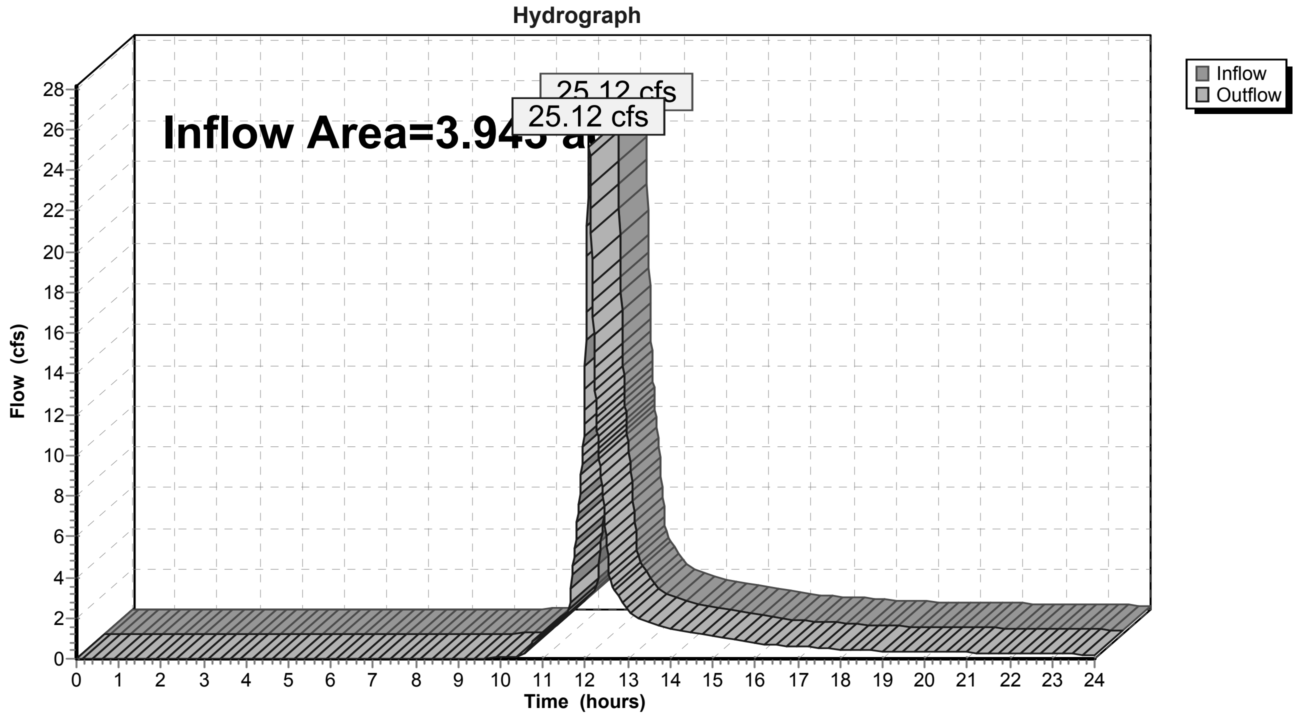


Summary for Reach DP-A: Offsite to Southwest

Inflow Area =	3.943 ac, 38.83% Impervious,	Inflow Depth >	5.01"	for 100-YR event	
Inflow =	25.12 cfs @	12.09 hrs,	Volume=	1.645 af	
Outflow =	25.12 cfs @	12.09 hrs,	Volume=	1.645 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-A: Offsite to Southwest

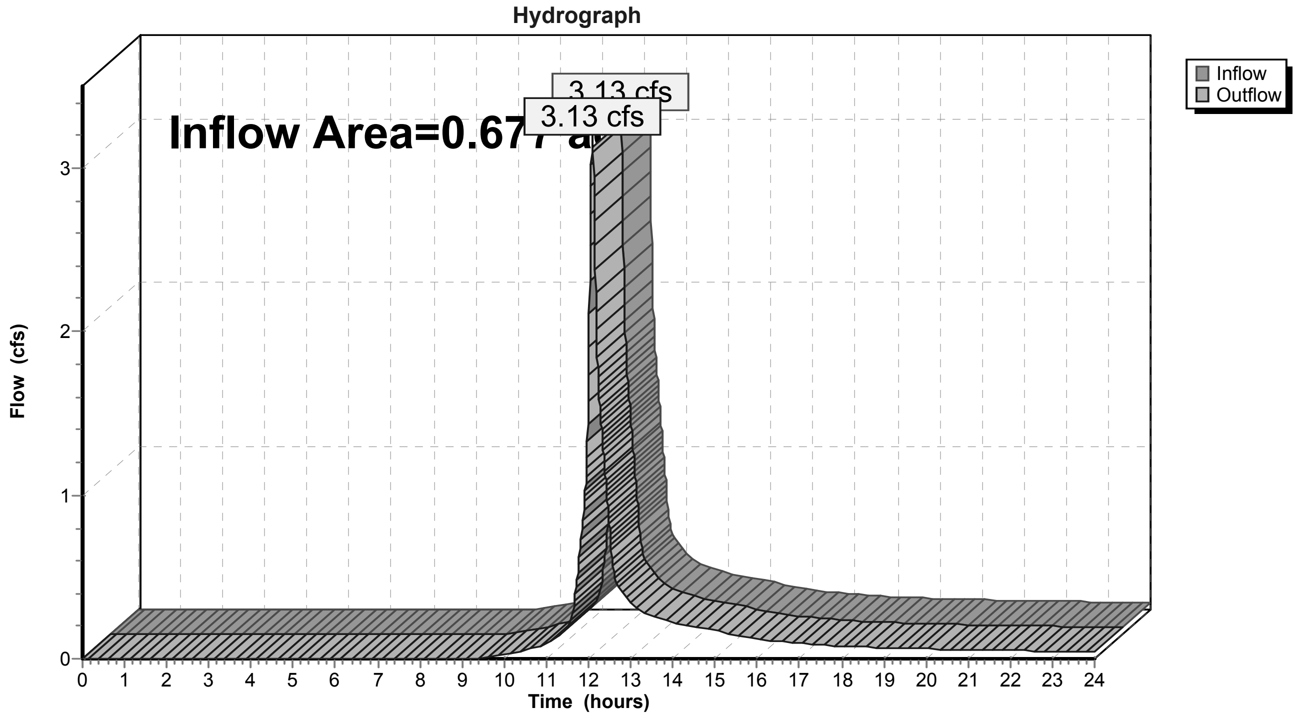


Summary for Reach DP-B: Offsite to Northwest

Inflow Area =	0.677 ac,	5.36% Impervious, Inflow Depth > 3.97"	for 100-YR event	
Inflow =	3.13 cfs @	12.09 hrs, Volume=	0.224 af	
Outflow =	3.13 cfs @	12.09 hrs, Volume=	0.224 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-B: Offsite to Northwest

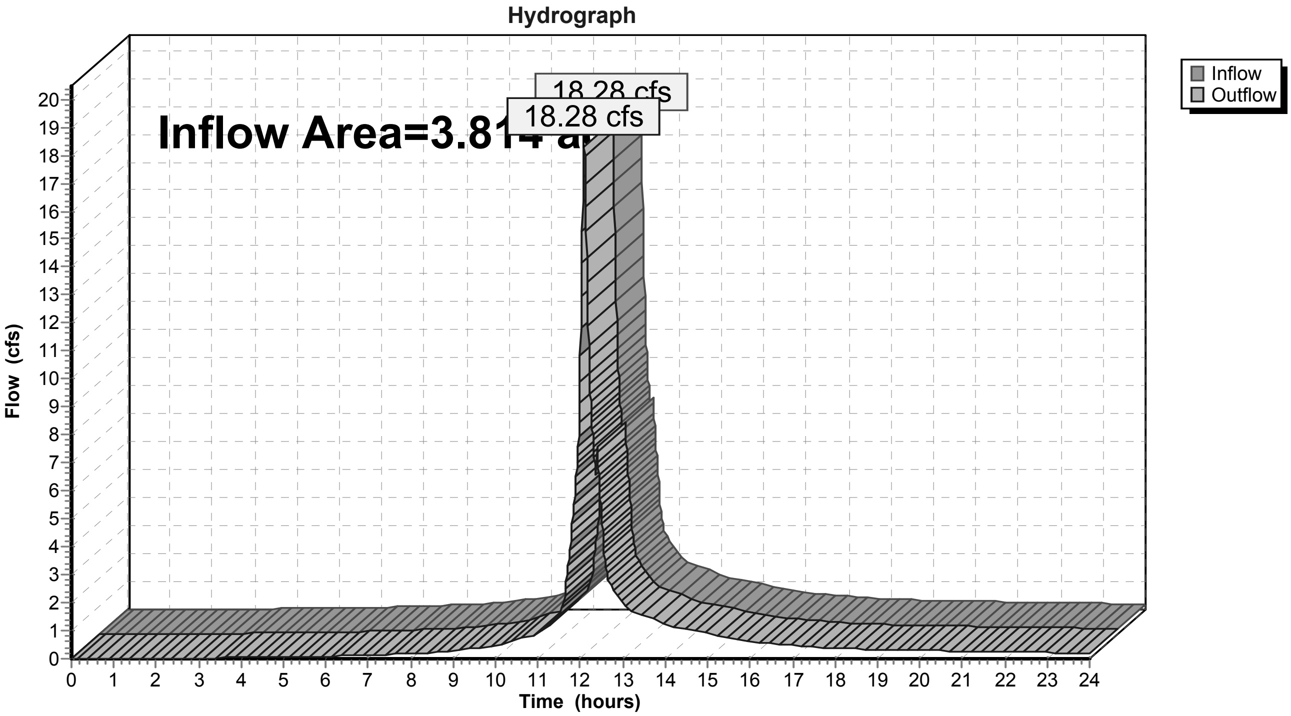


Summary for Reach DP-C: Exist SW Basin

Inflow Area =	3.814 ac, 45.17% Impervious, Inflow Depth > 4.45"	for 100-YR event	
Inflow =	18.28 cfs @ 12.09 hrs, Volume=	1.413 af	
Outflow =	18.28 cfs @ 12.09 hrs, Volume=	1.413 af, Atten= 0%, Lag= 0.0 min	

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-C: Exist SW Basin

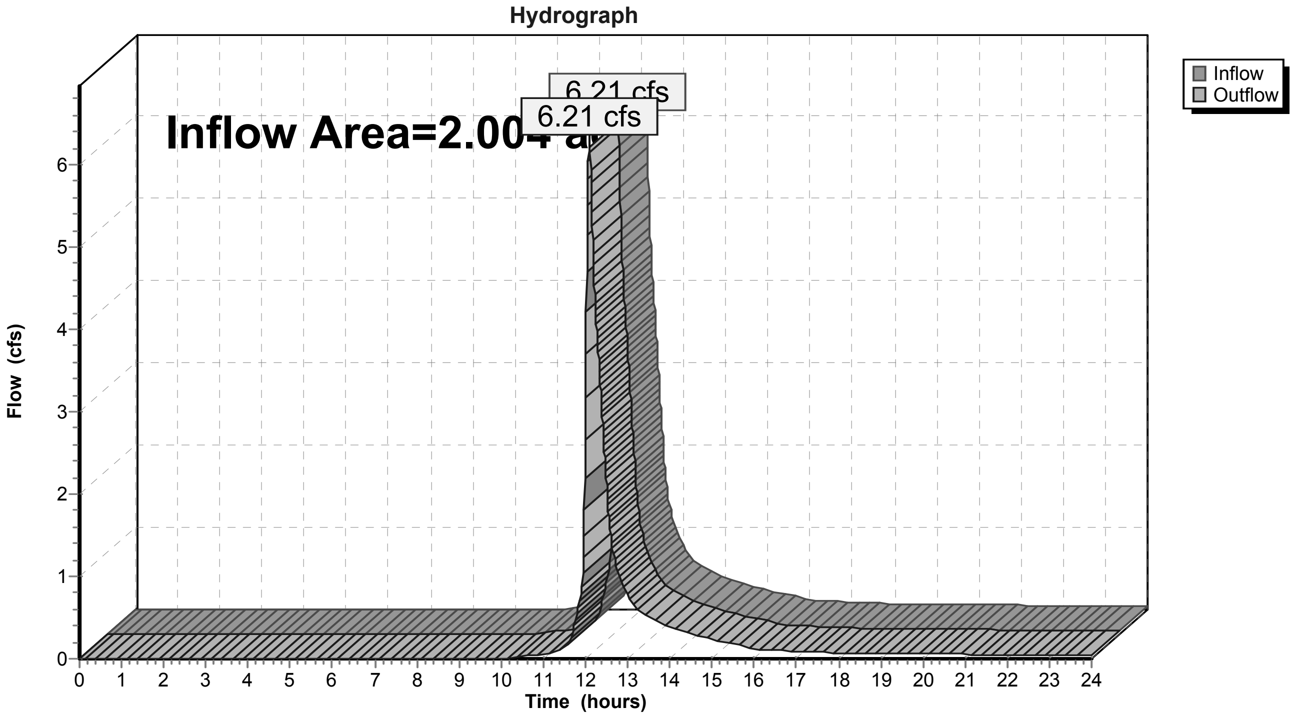


Summary for Reach DP-D: Concord Ave

Inflow Area = 2.004 ac, 18.54% Impervious, Inflow Depth > 2.26" for 100-YR event
Inflow = 6.21 cfs @ 12.09 hrs, Volume= 0.377 af
Outflow = 6.21 cfs @ 12.09 hrs, Volume= 0.377 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-D: Concord Ave

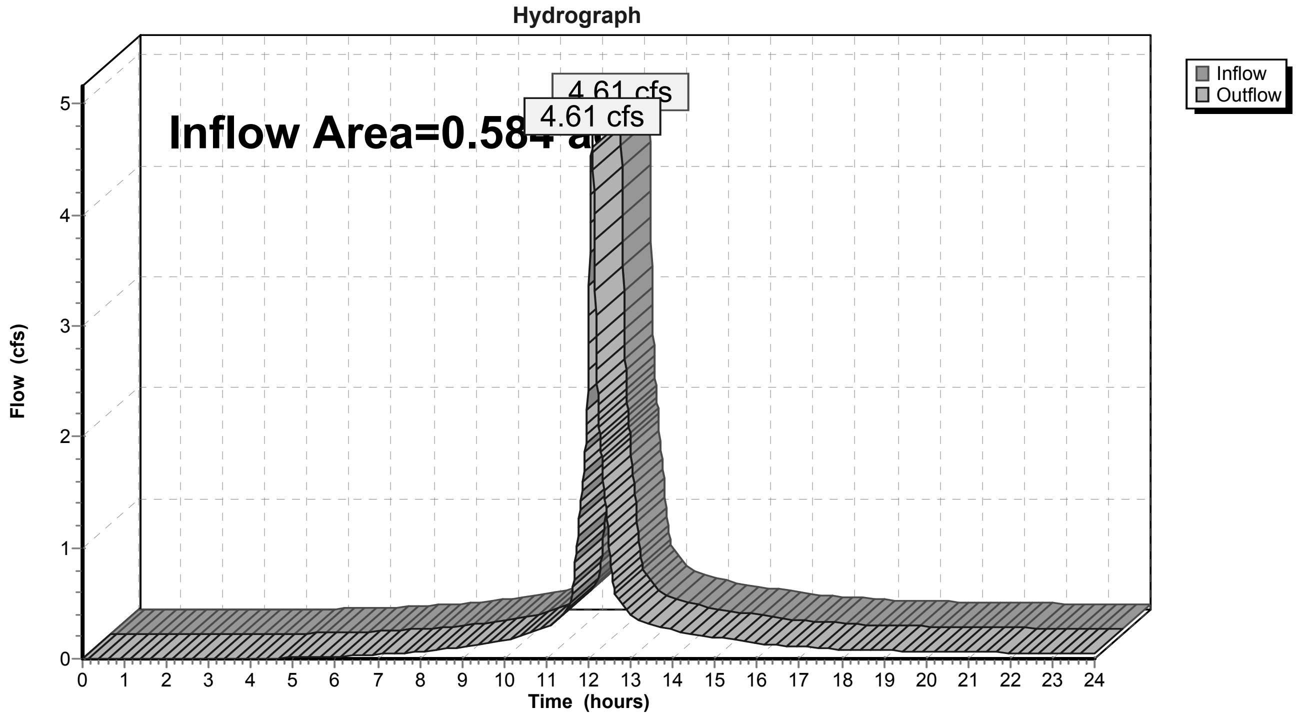


Summary for Reach DP-E: To CB #2

Inflow Area =	0.584 ac, 64.67% Impervious, Inflow Depth > 7.02" for 100-YR event			
Inflow =	4.61 cfs @	12.08 hrs, Volume=	0.342 af	
Outflow =	4.61 cfs @	12.08 hrs, Volume=	0.342 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-E: To CB #2

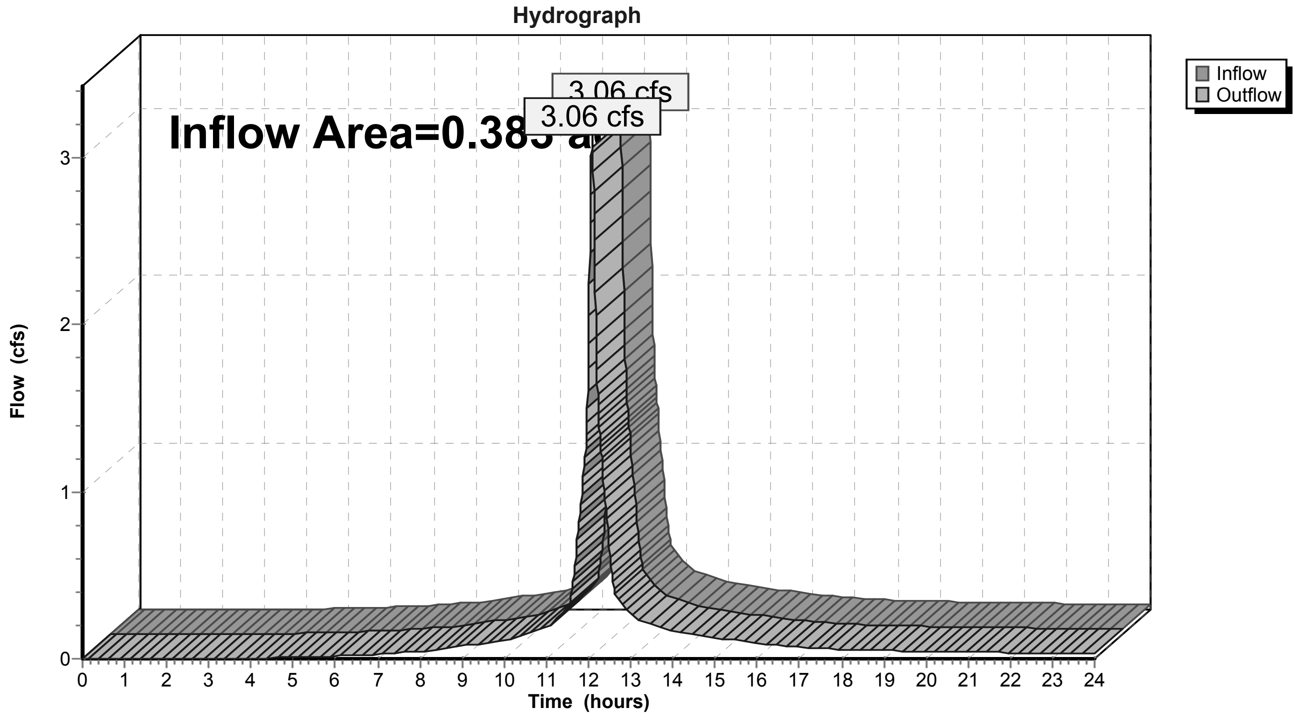


Summary for Reach DP-F: Offsite to Day School Ln

Inflow Area =	0.383 ac, 67.13% Impervious, Inflow Depth > 7.14" for 100-YR event			
Inflow =	3.06 cfs @	12.08 hrs, Volume=	0.228 af	
Outflow =	3.06 cfs @	12.08 hrs, Volume=	0.228 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-F: Offsite to Day School Ln



Summary for Pond PB4B: 30x9 Cultec 100HD

Inflow Area = 0.562 ac, 93.67% Impervious, Inflow Depth > 8.35" for 100-YR event
Inflow = 4.85 cfs @ 12.08 hrs, Volume= 0.391 af
Outflow = 1.50 cfs @ 12.39 hrs, Volume= 0.295 af, Atten= 69%, Lag= 18.5 min
Discarded = 0.17 cfs @ 12.39 hrs, Volume= 0.251 af
Primary = 1.32 cfs @ 12.39 hrs, Volume= 0.044 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 285.24' @ 12.39 hrs Surf.Area= 7,204 sf Storage= 7,098 cf

Plug-Flow detention time= 216.2 min calculated for 0.295 af (75% of inflow)
Center-of-Mass det. time= 130.6 min (880.6 - 750.0)

Volume	Invert	Avail.Storage	Storage Description
#1C	282.00'	3,279 cf	**31.67'W x 227.50'L x 2.04'H Field C** 14,709 cf Overall - 3,778 cf Embedded = 10,931 cf x 30.0% Voids
#2C	282.50'	3,778 cf	**Cultec C-100HD** x 270 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 9 rows
#3	282.00'	53 cf	**4.00'D x 4.20'H Vertical Cone/Cylinder**-Impervious
		7,110 cf	Total Available Storage

Storage Group C created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	282.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	284.50'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600

Discarded OutFlow Max=0.17 cfs @ 12.39 hrs HW=285.24' (Free Discharge)
└─**1=Exfiltration** (Controls 0.17 cfs)

Primary OutFlow Max=1.32 cfs @ 12.39 hrs HW=285.24' (Free Discharge)
└─**2=Orifice/Grate** (Orifice Controls 1.32 cfs @ 3.36 fps)

Pond PB4B: 30x9 Cultec 100HD - Chamber Wizard Field C

Chamber Model = Cultec C-100HD (Cultec Contactor® 100HD)
Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf
Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
Row Length Adjustment= +0.50' x 1.86 sf x 9 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

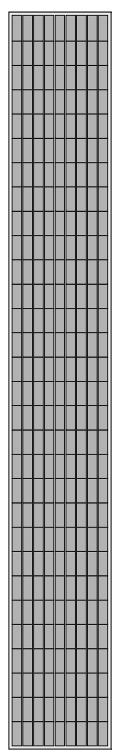
30 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 225.50' Row Length +12.0" End Stone x 2 = 227.50' Base Length
9 Rows x 36.0" Wide + 4.0" Spacing x 8 + 12.0" Side Stone x 2 = 31.67' Base Width
6.0" Base + 12.5" Chamber Height + 6.0" Cover = 2.04' Field Height

270 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 9 Rows = 3,777.9 cf Chamber Storage

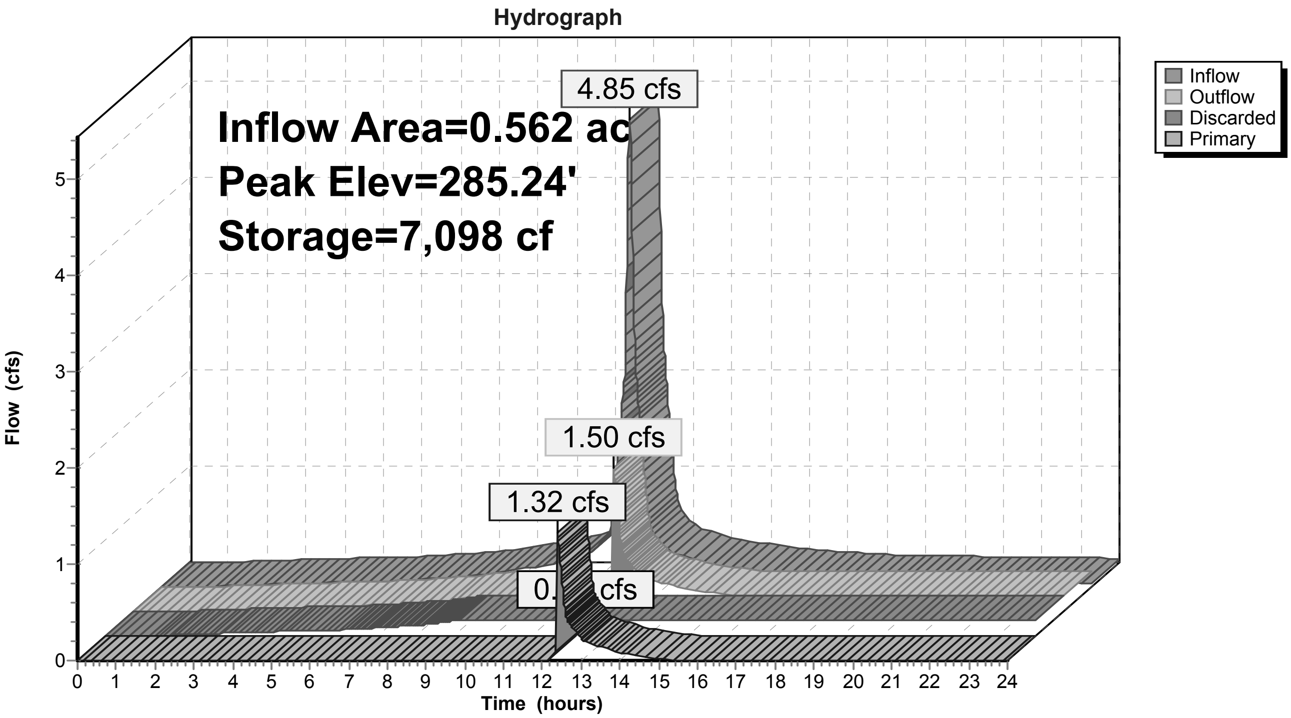
14,708.5 cf Field - 3,777.9 cf Chambers = 10,930.6 cf Stone x 30.0% Voids = 3,279.2 cf Stone Storage

Chamber Storage + Stone Storage = 7,057.1 cf = 0.162 af
Overall Storage Efficiency = 48.0%

270 Chambers
544.8 cy Field
404.8 cy Stone



Pond PB4B: 30x9 Cultec 100HD



Stage-Discharge for Pond PB4B: 30x9 Cultec 100HD

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
282.00	0.00	0.00	0.00
282.05	0.17	0.17	0.00
282.10	0.17	0.17	0.00
282.15	0.17	0.17	0.00
282.20	0.17	0.17	0.00
282.25	0.17	0.17	0.00
282.30	0.17	0.17	0.00
282.35	0.17	0.17	0.00
282.40	0.17	0.17	0.00
282.45	0.17	0.17	0.00
282.50	0.17	0.17	0.00
282.55	0.17	0.17	0.00
282.60	0.17	0.17	0.00
282.65	0.17	0.17	0.00
282.70	0.17	0.17	0.00
282.75	0.17	0.17	0.00
282.80	0.17	0.17	0.00
282.85	0.17	0.17	0.00
282.90	0.17	0.17	0.00
282.95	0.17	0.17	0.00
283.00	0.17	0.17	0.00
283.05	0.17	0.17	0.00
283.10	0.17	0.17	0.00
283.15	0.17	0.17	0.00
283.20	0.17	0.17	0.00
283.25	0.17	0.17	0.00
283.30	0.17	0.17	0.00
283.35	0.17	0.17	0.00
283.40	0.17	0.17	0.00
283.45	0.17	0.17	0.00
283.50	0.17	0.17	0.00
283.55	0.17	0.17	0.00
283.60	0.17	0.17	0.00
283.65	0.17	0.17	0.00
283.70	0.17	0.17	0.00
283.75	0.17	0.17	0.00
283.80	0.17	0.17	0.00
283.85	0.17	0.17	0.00
283.90	0.17	0.17	0.00
283.95	0.17	0.17	0.00
284.00	0.17	0.17	0.00
284.05	0.17	0.17	0.00
284.10	0.17	0.17	0.00
284.15	0.17	0.17	0.00
284.20	0.17	0.17	0.00
284.25	0.17	0.17	0.00
284.30	0.17	0.17	0.00
284.35	0.17	0.17	0.00
284.40	0.17	0.17	0.00
284.45	0.17	0.17	0.00
284.50	0.17	0.17	0.00
284.55	0.19	0.17	0.02
284.60	0.23	0.17	0.06
284.65	0.30	0.17	0.13
284.70	0.40	0.17	0.22
284.75	0.51	0.17	0.33
284.80	0.63	0.17	0.46
284.85	0.76	0.17	0.59
284.90	0.90	0.17	0.73
284.95	1.02	0.17	0.85
285.00	1.12	0.17	0.95
285.05	1.21	0.17	1.04
285.10	1.29	0.17	1.12
285.15	1.37	0.17	1.20
285.20	1.44	0.17	1.27
285.25	1.51	0.17	1.34
285.30	1.57	0.17	1.40
285.35	1.64	0.17	1.46
285.40	1.70	0.17	1.52
285.45	1.75	0.17	1.58
285.50	1.81	0.17	1.64
285.55	1.86	0.17	1.69
285.60	1.92	0.17	1.74
285.65	1.97	0.17	1.79
285.70	2.02	0.17	1.84
285.75	2.06	0.17	1.89
285.80	2.11	0.17	1.94
285.85	2.16	0.17	1.98
285.90	2.20	0.17	2.03
285.95	2.24	0.17	2.07
286.00	2.29	0.17	2.11
286.05	2.33	0.17	2.16
286.10	2.37	0.17	2.20
286.15	2.41	0.17	2.24
286.20	**2.45**	**0.17**	**2.28**

Stage-Area-Storage for Pond PB4B: 30x9 Cultec 100HD

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
282.00	**7,204**	0	284.65	7,204	7,090
282.05	7,204	109	284.70	7,204	7,091
282.10	7,204	217	284.75	7,204	7,092
282.15	7,204	326	284.80	7,204	7,092
282.20	7,204	435	284.85	7,204	7,093
282.25	7,204	543	284.90	7,204	7,094
282.30	7,204	652	284.95	7,204	7,094
282.35	7,204	761	285.00	7,204	7,095
282.40	7,204	870	285.05	7,204	7,095
282.45	7,204	978	285.10	7,204	7,096
282.50	7,204	1,087	285.15	7,204	7,097
282.55	7,204	1,383	285.20	7,204	7,097
282.60	7,204	1,674	285.25	7,204	7,098
282.65	7,204	1,960	285.30	7,204	7,099
282.70	7,204	2,242	285.35	7,204	7,099
282.75	7,204	2,524	285.40	7,204	7,100
282.80	7,204	2,804	285.45	7,204	7,100
282.85	7,204	3,082	285.50	7,204	7,101
282.90	7,204	3,355	285.55	7,204	7,102
282.95	7,204	3,623	285.60	7,204	7,102
283.00	7,204	3,886	285.65	7,204	7,103
283.05	7,204	4,144	285.70	7,204	7,104
283.10	7,204	4,396	285.75	7,204	7,104
283.15	7,204	4,639	285.80	7,204	7,105
283.20	7,204	4,873	285.85	7,204	7,105
283.25	7,204	5,094	285.90	7,204	7,106
283.30	7,204	5,299	285.95	7,204	7,107
283.35	7,204	5,486	286.00	7,204	7,107
283.40	7,204	5,649	286.05	7,204	7,108
283.45	7,204	5,787	286.10	7,204	7,109
283.50	7,204	5,905	286.15	7,204	7,109
283.55	7,204	6,014	286.20	7,204	**7,110**
283.60	7,204	6,123			
283.65	7,204	6,231			
283.70	7,204	6,340			
283.75	7,204	6,449			
283.80	7,204	6,557			
283.85	7,204	6,666			
283.90	7,204	6,775			
283.95	7,204	6,883			
284.00	7,204	6,992			
284.05	7,204	7,083			
284.10	7,204	7,083			
284.15	7,204	7,084			
284.20	7,204	7,085			
284.25	7,204	7,085			
284.30	7,204	7,086			
284.35	7,204	7,087			
284.40	7,204	7,087			
284.45	7,204	7,088			
284.50	7,204	7,089			
284.55	7,204	7,089			
284.60	7,204	7,090			

Summary for Pond PB6A: Porous Pavement

Inflow Area = 0.301 ac, 50.26% Impervious, Inflow Depth > 6.42" for 100-YR event
Inflow = 2.71 cfs @ 12.00 hrs, Volume= 0.161 af
Outflow = 0.16 cfs @ 13.40 hrs, Volume= 0.160 af, Atten= 94%, Lag= 83.9 min
Discarded = 0.16 cfs @ 13.40 hrs, Volume= 0.160 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= 0.01 hrs / 2
Peak Elev= 283.71' @ 13.40 hrs Surf.Area= 6,592 sf Storage= 2,939 cf

Plug-Flow detention time= 164.1 min calculated for 0.160 af (99% of inflow)
Center-of-Mass det. time= 160.1 min (953.7 - 793.6)

Volume	Invert	Avail.Storage	Storage Description
#1	282.25'	3,947 cf	**Porous Pavement (Irregular)**Listed below (Recalc) 13,158 cf Overall x 30.0% Voids
#2	278.60'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**
		4,023 cf	Total Available Storage

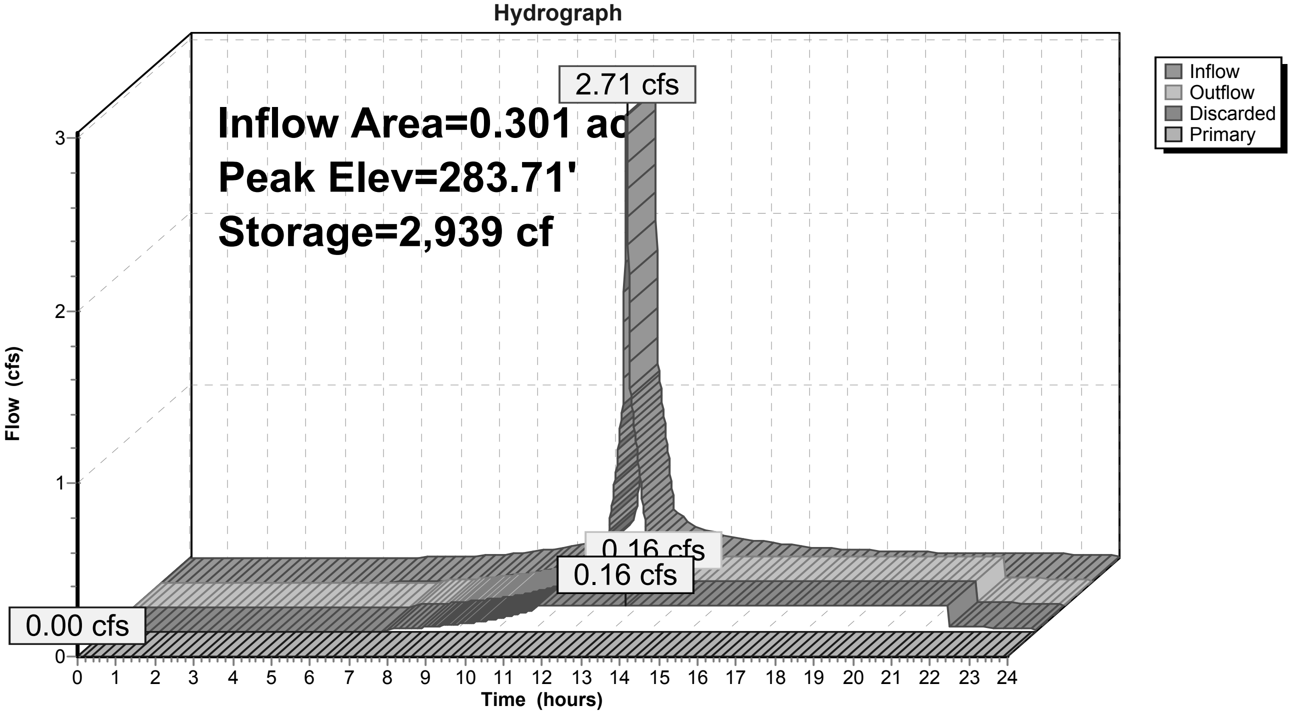
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
282.25	6,579	629.0	0	0	6,579
284.25	6,579	629.0	13,158	13,158	7,837

Device	Routing	Invert	Outlet Devices
#1	Discarded	278.60'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	284.58'	**2.3" x 2.3" Horiz. Orifice/Grate X 36.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.16 cfs @ 13.40 hrs HW=283.71' (Free Discharge)
└─**1=Exfiltration** (Controls 0.16 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=278.60' (Free Discharge)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond PB6A: Porous Pavement



Stage-Discharge for Pond PB6A: Porous Pavement

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
278.60	0.00	0.00	0.00
278.70	0.00	0.00	0.00
278.80	0.00	0.00	0.00
278.90	0.00	0.00	0.00
279.00	0.00	0.00	0.00
279.10	0.00	0.00	0.00
279.20	0.00	0.00	0.00
279.30	0.00	0.00	0.00
279.40	0.00	0.00	0.00
279.50	0.00	0.00	0.00
279.60	0.00	0.00	0.00
279.70	0.00	0.00	0.00
279.80	0.00	0.00	0.00
279.90	0.00	0.00	0.00
280.00	0.00	0.00	0.00
280.10	0.00	0.00	0.00
280.20	0.00	0.00	0.00
280.30	0.00	0.00	0.00
280.40	0.00	0.00	0.00
280.50	0.00	0.00	0.00
280.60	0.00	0.00	0.00
280.70	0.00	0.00	0.00
280.80	0.00	0.00	0.00
280.90	0.00	0.00	0.00
281.00	0.00	0.00	0.00
281.10	0.00	0.00	0.00
281.20	0.00	0.00	0.00
281.30	0.00	0.00	0.00
281.40	0.00	0.00	0.00
281.50	0.00	0.00	0.00
281.60	0.00	0.00	0.00
281.70	0.00	0.00	0.00
281.80	0.00	0.00	0.00
281.90	0.00	0.00	0.00
282.00	0.00	0.00	0.00
282.10	0.00	0.00	0.00
282.20	0.00	0.00	0.00
282.30	0.16	0.16	0.00
282.40	0.16	0.16	0.00
282.50	0.16	0.16	0.00
282.60	0.16	0.16	0.00
282.70	0.16	0.16	0.00
282.80	0.16	0.16	0.00
282.90	0.16	0.16	0.00
283.00	0.16	0.16	0.00
283.10	0.16	0.16	0.00
283.20	0.16	0.16	0.00
283.30	0.16	0.16	0.00
283.40	0.16	0.16	0.00
283.50	0.16	0.16	0.00
283.60	0.16	0.16	0.00
283.70	0.16	0.16	0.00
283.80	0.16	0.16	0.00
283.90	0.16	0.16	0.00
284.00	0.16	0.16	0.00
284.10	0.16	0.16	0.00
284.20	0.16	0.16	0.00
284.30	0.16	0.16	0.00
284.40	0.16	0.16	0.00
284.50	0.16	0.16	0.00
284.60	**0.41**	**0.16**	**0.26**

Stage-Area-Storage for Pond PB6A: Porous Pavement

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
278.60	13	0
278.70	13	1
278.80	13	3
278.90	13	4
279.00	13	5
279.10	13	6
279.20	13	8
279.30	13	9
279.40	13	10
279.50	13	11
279.60	13	13
279.70	13	14
279.80	13	15
279.90	13	16
280.00	13	18
280.10	13	19
280.20	13	20
280.30	13	21
280.40	13	23
280.50	13	24
280.60	13	25
280.70	13	26
280.80	13	28
280.90	13	29
281.00	13	30
281.10	13	31
281.20	13	33
281.30	13	34
281.40	13	35
281.50	13	36
281.60	13	38
281.70	13	39
281.80	13	40
281.90	13	41
282.00	13	43
282.10	13	44
282.20	**13**	45
282.30	**6,592**	145
282.40	6,592	344
282.50	6,592	542
282.60	6,592	741
282.70	6,592	940
282.80	6,592	1,138
282.90	6,592	1,337
283.00	6,592	1,536
283.10	6,592	1,734
283.20	6,592	1,933
283.30	6,592	2,131
283.40	6,592	2,330
283.50	6,592	2,529
283.60	6,592	2,727
283.70	6,592	2,926
283.80	6,592	3,125
283.90	6,592	3,323
284.00	6,592	3,522
284.10	6,592	3,720
284.20	6,592	3,919
284.30	6,592	4,019
284.40	6,592	4,020
284.50	6,592	4,022
284.60	6,592	**4,023**

Summary for Pond PB6B: Porous Pavement

Inflow Area = 1.006 ac, 21.93% Impervious, Inflow Depth > 4.95" for 100-YR event
Inflow = 7.15 cfs @ 12.00 hrs, Volume= 0.415 af
Outflow = 3.65 cfs @ 12.09 hrs, Volume= 0.415 af, Atten= 49%, Lag= 5.2 min
Discarded = 0.23 cfs @ 12.09 hrs, Volume= 0.240 af
Primary = 3.42 cfs @ 12.09 hrs, Volume= 0.174 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 264.48' @ 12.09 hrs Surf.Area= 9,608 sf Storage= 4,267 cf

Plug-Flow detention time= 66.3 min calculated for 0.415 af (100% of inflow)
Center-of-Mass det. time= 65.7 min (884.7 - 819.0)

Volume	Invert	Avail.Storage	Storage Description
#1	263.00'	5,765 cf	**Porous Pavement (Irregular)**Listed below (Recalc) 19,216 cf Overall x 30.0% Voids

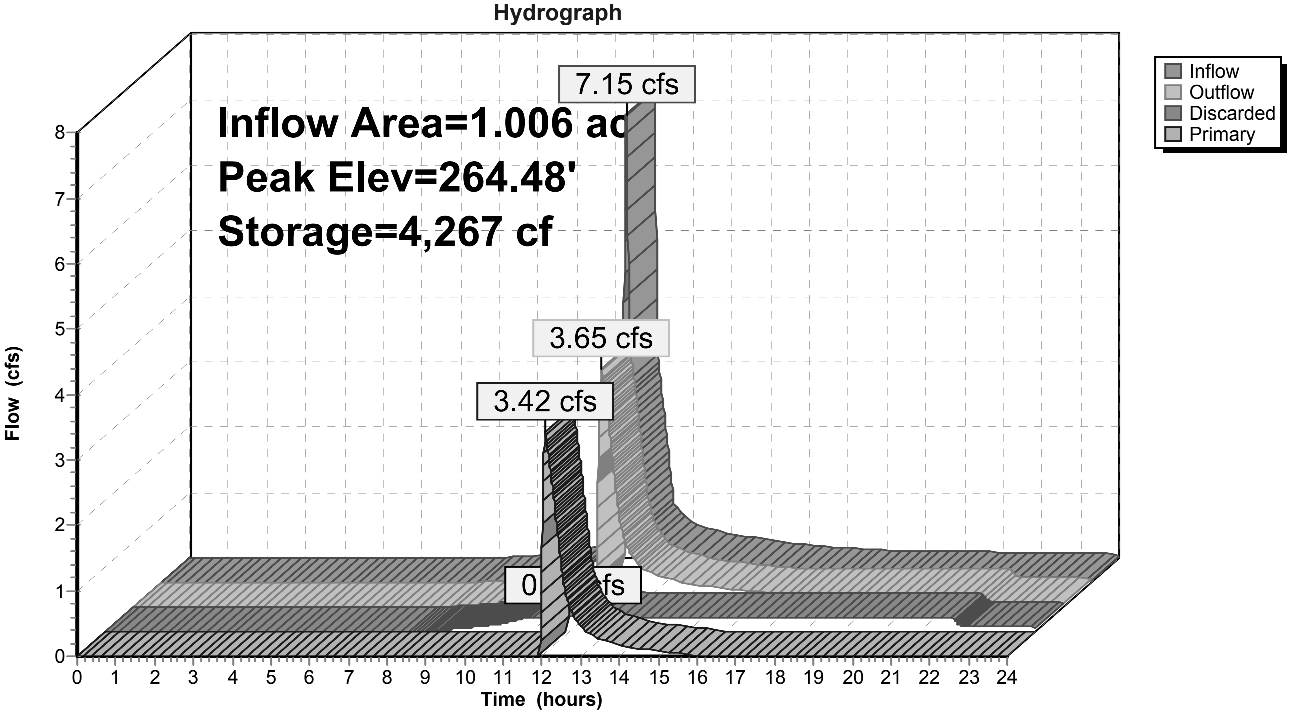
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
263.00	9,608	1,042.0	0	0	9,608
265.00	9,608	1,042.0	19,216	19,216	11,692

Device	Routing	Invert	Outlet Devices
#1	Discarded	263.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	263.80'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Discarded OutFlow Max=0.23 cfs @ 12.09 hrs HW=264.48' (Free Discharge)
└─**1=Exfiltration** (Controls 0.23 cfs)

Primary OutFlow Max=3.42 cfs @ 12.09 hrs HW=264.48' (Free Discharge)
└─**2=Sharp-Crested Rectangular Weir** (Weir Controls 3.42 cfs @ 2.70 fps)

Pond PB6B: Porous Pavement



Stage-Discharge for Pond PB6B: Porous Pavement

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
263.00	0.00	0.00	0.00
263.02	0.23	0.23	0.00
263.04	0.23	0.23	0.00
263.06	0.23	0.23	0.00
263.08	0.23	0.23	0.00
263.10	0.23	0.23	0.00
263.12	0.23	0.23	0.00
263.14	0.23	0.23	0.00
263.16	0.23	0.23	0.00
263.18	0.23	0.23	0.00
263.20	0.23	0.23	0.00
263.22	0.23	0.23	0.00
263.24	0.23	0.23	0.00
263.26	0.23	0.23	0.00
263.28	0.23	0.23	0.00
263.30	0.23	0.23	0.00
263.32	0.23	0.23	0.00
263.34	0.23	0.23	0.00
263.36	0.23	0.23	0.00
263.38	0.23	0.23	0.00
263.40	0.23	0.23	0.00
263.42	0.23	0.23	0.00
263.44	0.23	0.23	0.00
263.46	0.23	0.23	0.00
263.48	0.23	0.23	0.00
263.50	0.23	0.23	0.00
263.52	0.23	0.23	0.00
263.54	0.23	0.23	0.00
263.56	0.23	0.23	0.00
263.58	0.23	0.23	0.00
263.60	0.23	0.23	0.00
263.62	0.23	0.23	0.00
263.64	0.23	0.23	0.00
263.66	0.23	0.23	0.00
263.68	0.23	0.23	0.00
263.70	0.23	0.23	0.00
263.72	0.23	0.23	0.00
263.74	0.23	0.23	0.00
263.76	0.23	0.23	0.00
263.78	0.23	0.23	0.00
263.80	0.23	0.23	0.00
263.82	0.25	0.23	0.02
263.84	0.28	0.23	0.05
263.86	0.32	0.23	0.10
263.88	0.37	0.23	0.15
263.90	0.43	0.23	0.20
263.92	0.50	0.23	0.27
263.94	0.57	0.23	0.34
263.96	0.64	0.23	0.41
263.98	0.72	0.23	0.49
264.00	0.80	0.23	0.57
264.02	0.89	0.23	0.66
264.04	0.98	0.23	0.75
264.06	1.07	0.23	0.84
264.08	1.17	0.23	0.94
264.10	1.27	0.23	1.04
264.12	1.37	0.23	1.15
264.14	1.48	0.23	1.25
264.16	1.59	0.23	1.36
264.18	1.70	0.23	1.47
264.20	1.82	0.23	1.59
264.22	1.93	0.23	1.71
264.24	2.05	0.23	1.82
264.26	2.17	0.23	1.95
264.28	2.30	0.23	2.07
264.30	2.42	0.23	2.20
264.32	2.55	0.23	2.32
264.34	2.68	0.23	2.46
264.36	2.82	0.23	2.59
264.38	2.95	0.23	2.72
264.40	3.09	0.23	2.86
264.42	3.22	0.23	2.99
264.44	3.36	0.23	3.13
264.46	3.50	0.23	3.28
264.48	3.65	0.23	3.42
264.50	3.79	0.23	3.56
264.52	3.94	0.23	3.71
264.54	4.08	0.23	3.86
264.56	4.23	0.23	4.00
264.58	4.38	0.23	4.15
264.60	4.53	0.23	4.31
264.62	4.69	0.23	4.46
264.64	4.84	0.23	4.61
264.66	5.00	0.23	4.77
264.68	5.15	0.23	4.92
264.70	5.31	0.23	5.08
264.72	5.47	0.23	5.24
264.74	5.63	0.23	5.40
264.76	5.79	0.23	5.56
264.78	5.95	0.23	5.72
264.80	6.11	0.23	5.89
264.82	6.28	0.23	6.05
264.84	6.44	0.23	6.21
264.86	6.61	0.23	6.38
264.88	6.78	0.23	6.55
264.90	6.94	0.23	6.72
264.92	7.11	0.23	6.88
264.94	7.28	0.23	7.05
264.96	7.45	0.23	7.22
264.98	7.62	0.23	7.39
265.00	**7.79**	**0.23**	**7.57**

Stage-Area-Storage for Pond PB6B: Porous Pavement

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
263.00	**9,608**	0	264.06	9,608	3,055
263.02	9,608	58	264.08	9,608	3,113
263.04	9,608	115	264.10	9,608	3,171
263.06	9,608	173	264.12	9,608	3,228
263.08	9,608	231	264.14	9,608	3,286
263.10	9,608	288	264.16	9,608	3,344
263.12	9,608	346	264.18	9,608	3,401
263.14	9,608	404	264.20	9,608	3,459
263.16	9,608	461	264.22	9,608	3,517
263.18	9,608	519	264.24	9,608	3,574
263.20	9,608	576	264.26	9,608	3,632
263.22	9,608	634	264.28	9,608	3,689
263.24	9,608	692	264.30	9,608	3,747
263.26	9,608	749	264.32	9,608	3,805
263.28	9,608	807	264.34	9,608	3,862
263.30	9,608	865	264.36	9,608	3,920
263.32	9,608	922	264.38	9,608	3,978
263.34	9,608	980	264.40	9,608	4,035
263.36	9,608	1,038	264.42	9,608	4,093
263.38	9,608	1,095	264.44	9,608	4,151
263.40	9,608	1,153	264.46	9,608	4,208
263.42	9,608	1,211	264.48	9,608	4,266
263.44	9,608	1,268	264.50	9,608	4,324
263.46	9,608	1,326	264.52	9,608	4,381
263.48	9,608	1,384	264.54	9,608	4,439
263.50	9,608	1,441	264.56	9,608	4,497
263.52	9,608	1,499	264.58	9,608	4,554
263.54	9,608	1,556	264.60	9,608	4,612
263.56	9,608	1,614	264.62	9,608	4,669
263.58	9,608	1,672	264.64	9,608	4,727
263.60	9,608	1,729	264.66	9,608	4,785
263.62	9,608	1,787	264.68	9,608	4,842
263.64	9,608	1,845	264.70	9,608	4,900
263.66	9,608	1,902	264.72	9,608	4,958
263.68	9,608	1,960	264.74	9,608	5,015
263.70	9,608	2,018	264.76	9,608	5,073
263.72	9,608	2,075	264.78	9,608	5,131
263.74	9,608	2,133	264.80	9,608	5,188
263.76	9,608	2,191	264.82	9,608	5,246
263.78	9,608	2,248	264.84	9,608	5,304
263.80	9,608	2,306	264.86	9,608	5,361
263.82	9,608	2,364	264.88	9,608	5,419
263.84	9,608	2,421	264.90	9,608	5,477
263.86	9,608	2,479	264.92	9,608	5,534
263.88	9,608	2,537	264.94	9,608	5,592
263.90	9,608	2,594	264.96	9,608	5,650
263.92	9,608	2,652	264.98	9,608	5,707
263.94	9,608	2,709	265.00	9,608	**5,765**
263.96	9,608	2,767			
263.98	9,608	2,825			
264.00	9,608	2,882			
264.02	9,608	2,940			
264.04	9,608	2,998			

Summary for Pond XB1: Exist Basin #1

Inflow Area =	0.260 ac,	95.63% Impervious,	Inflow Depth > 8.35"	for 100-YR event
Inflow =	2.24 cfs @	12.08 hrs, Volume=	0.181 af	
Outflow =	0.11 cfs @	14.19 hrs, Volume=	0.129 af,	Atten= 95%, Lag= 126.5 min
Discarded =	0.09 cfs @	14.19 hrs, Volume=	0.124 af	
Primary =	0.02 cfs @	14.19 hrs, Volume=	0.005 af	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 284.60' @ 14.19 hrs Surf.Area= 3,600 sf Storage= 3,892 cf

Plug-Flow detention time= 244.2 min calculated for 0.129 af (71% of inflow)
Center-of-Mass det. time= 151.7 min (901.6 - 750.0)

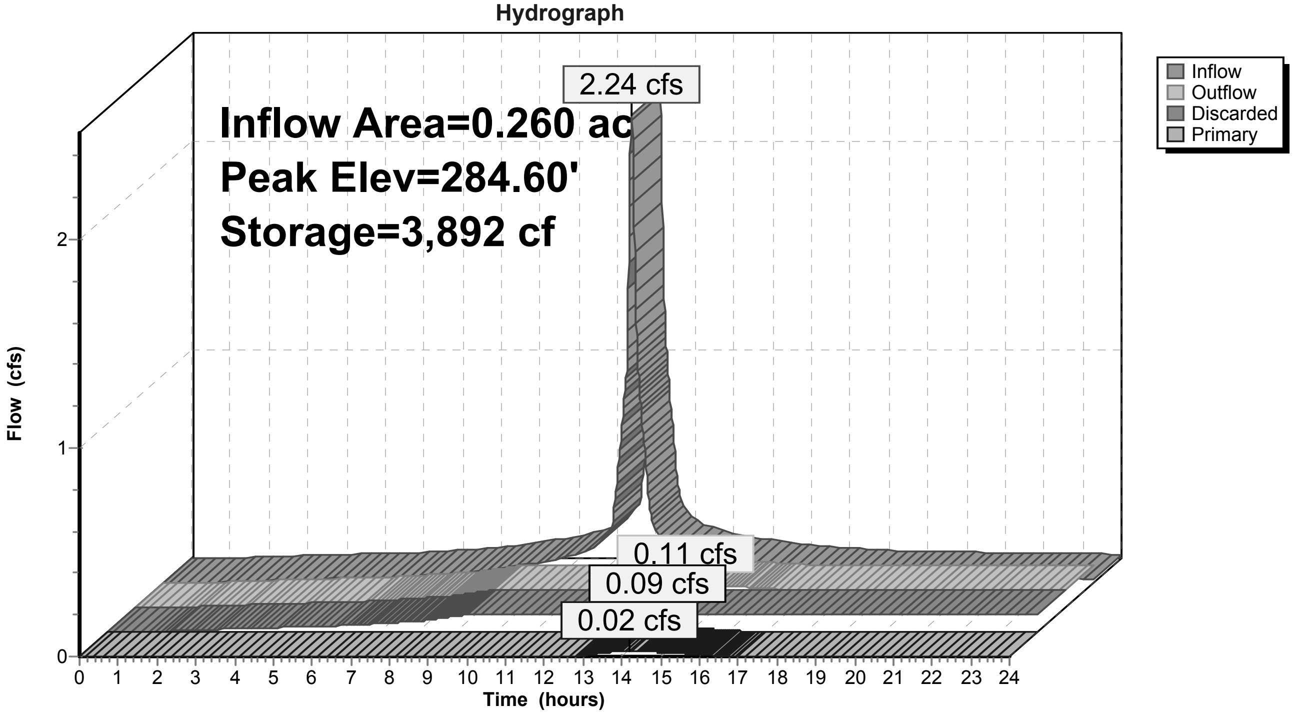
Volume	Invert	Avail.Storage	Storage Description
#1	283.50'	3,335 cf	**30.0"W x 18.0"H x 58.00'L Cultec Contactor 125** x 23 Inside #2
#2	283.00'	1,353 cf	**60.00'W x 60.00'L x 2.00'H Stone** 7,200 cf Overall - 3,335 cf Embedded = 3,865 cf x 35.0% Voids
		4,688 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	284.50'	**4.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	283.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.09 cfs @ 14.19 hrs HW=284.60' (Free Discharge)
└─**2=Exfiltration** (Controls 0.09 cfs)

Primary OutFlow Max=0.02 cfs @ 14.19 hrs HW=284.60' (Free Discharge)
└─**1=Orifice/Grate** (Orifice Controls 0.02 cfs @ 1.09 fps)

Pond XB1: Exist Basin #1



Stage-Discharge for Pond XB1: Exist Basin #1

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
283.00	0.00	0.00	0.00
283.02	0.09	0.09	0.00
283.04	0.09	0.09	0.00
283.06	0.09	0.09	0.00
283.08	0.09	0.09	0.00
283.10	0.09	0.09	0.00
283.12	0.09	0.09	0.00
283.14	0.09	0.09	0.00
283.16	0.09	0.09	0.00
283.18	0.09	0.09	0.00
283.20	0.09	0.09	0.00
283.22	0.09	0.09	0.00
283.24	0.09	0.09	0.00
283.26	0.09	0.09	0.00
283.28	0.09	0.09	0.00
283.30	0.09	0.09	0.00
283.32	0.09	0.09	0.00
283.34	0.09	0.09	0.00
283.36	0.09	0.09	0.00
283.38	0.09	0.09	0.00
283.40	0.09	0.09	0.00
283.42	0.09	0.09	0.00
283.44	0.09	0.09	0.00
283.46	0.09	0.09	0.00
283.48	0.09	0.09	0.00
283.50	0.09	0.09	0.00
283.52	0.09	0.09	0.00
283.54	0.09	0.09	0.00
283.56	0.09	0.09	0.00
283.58	0.09	0.09	0.00
283.60	0.09	0.09	0.00
283.62	0.09	0.09	0.00
283.64	0.09	0.09	0.00
283.66	0.09	0.09	0.00
283.68	0.09	0.09	0.00
283.70	0.09	0.09	0.00
283.72	0.09	0.09	0.00
283.74	0.09	0.09	0.00
283.76	0.09	0.09	0.00
283.78	0.09	0.09	0.00
283.80	0.09	0.09	0.00
283.82	0.09	0.09	0.00
283.84	0.09	0.09	0.00
283.86	0.09	0.09	0.00
283.88	0.09	0.09	0.00
283.90	0.09	0.09	0.00
283.92	0.09	0.09	0.00
283.94	0.09	0.09	0.00
283.96	0.09	0.09	0.00
283.98	0.09	0.09	0.00
284.00	0.09	0.09	0.00
284.02	0.09	0.09	0.00
284.04	0.09	0.09	0.00
284.06	0.09	0.09	0.00
284.08	0.09	0.09	0.00
284.10	0.09	0.09	0.00
284.12	0.09	0.09	0.00
284.14	0.09	0.09	0.00
284.16	0.09	0.09	0.00
284.18	0.09	0.09	0.00
284.20	0.09	0.09	0.00
284.22	0.09	0.09	0.00
284.24	0.09	0.09	0.00
284.26	0.09	0.09	0.00
284.28	0.09	0.09	0.00
284.30	0.09	0.09	0.00
284.32	0.09	0.09	0.00
284.34	0.09	0.09	0.00
284.36	0.09	0.09	0.00
284.38	0.09	0.09	0.00
284.40	0.09	0.09	0.00
284.42	0.09	0.09	0.00
284.44	0.09	0.09	0.00
284.46	0.09	0.09	0.00
284.48	0.09	0.09	0.00
284.50	0.09	0.09	0.00
284.52	0.09	0.09	0.00
284.54	0.09	0.09	0.00
284.56	0.09	0.09	0.01
284.58	0.10	0.09	0.02
284.60	0.11	0.09	0.02
284.62	0.12	0.09	0.03
284.64	0.13	0.09	0.04
284.66	0.14	0.09	0.06
284.68	0.15	0.09	0.07
284.70	0.17	0.09	0.08
284.72	0.18	0.09	0.10
284.74	0.20	0.09	0.11
284.76	0.21	0.09	0.13
284.78	0.23	0.09	0.14
284.80	0.24	0.09	0.15
284.82	0.25	0.09	0.17
284.84	0.26	0.09	0.17
284.86	0.27	0.09	0.18
284.88	0.28	0.09	0.19
284.90	0.29	0.09	0.20
284.92	0.30	0.09	0.21
284.94	0.31	0.09	0.22
284.96	0.31	0.09	0.23
284.98	0.32	0.09	0.24
285.00	**0.33**	**0.09**	**0.24**

Stage-Area-Storage for Pond XB1: Exist Basin #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.00	**3,600**	0	284.06	3,600	2,428
283.02	3,600	25	284.08	3,600	2,487
283.04	3,600	50	284.10	3,600	2,546
283.06	3,600	76	284.12	3,600	2,605
283.08	3,600	101	284.14	3,600	2,663
283.10	3,600	126	284.16	3,600	2,721
283.12	3,600	151	284.18	3,600	2,778
283.14	3,600	176	284.20	3,600	2,835
283.16	3,600	202	284.22	3,600	2,892
283.18	3,600	227	284.24	3,600	2,948
283.20	3,600	252	284.26	3,600	3,004
283.22	3,600	277	284.28	3,600	3,060
283.24	3,600	302	284.30	3,600	3,115
283.26	3,600	328	284.32	3,600	3,169
283.28	3,600	353	284.34	3,600	3,223
283.30	3,600	378	284.36	3,600	3,277
283.32	3,600	403	284.38	3,600	3,331
283.34	3,600	428	284.40	3,600	3,383
283.36	3,600	454	284.42	3,600	3,436
283.38	3,600	479	284.44	3,600	3,488
283.40	3,600	504	284.46	3,600	3,539
283.42	3,600	529	284.48	3,600	3,590
283.44	3,600	554	284.50	3,600	3,641
283.46	3,600	580	284.52	3,600	3,691
283.48	3,600	605	284.54	3,600	3,740
283.50	3,600	630	284.56	3,600	3,789
283.52	3,600	698	284.58	3,600	3,837
283.54	3,600	767	284.60	3,600	3,885
283.56	3,600	834	284.62	3,600	3,933
283.58	3,600	902	284.64	3,600	3,979
283.60	3,600	969	284.66	3,600	4,025
283.62	3,600	1,036	284.68	3,600	4,071
283.64	3,600	1,103	284.70	3,600	4,116
283.66	3,600	1,169	284.72	3,600	4,160
283.68	3,600	1,235	284.74	3,600	4,204
283.70	3,600	1,301	284.76	3,600	4,247
283.72	3,600	1,366	284.78	3,600	4,289
283.74	3,600	1,431	284.80	3,600	4,330
283.76	3,600	1,496	284.82	3,600	4,371
283.78	3,600	1,560	284.84	3,600	4,411
283.80	3,600	1,625	284.86	3,600	4,450
283.82	3,600	1,688	284.88	3,600	4,487
283.84	3,600	1,752	284.90	3,600	4,524
283.86	3,600	1,815	284.92	3,600	4,560
283.88	3,600	1,878	284.94	3,600	4,595
283.90	3,600	1,940	284.96	3,600	4,628
283.92	3,600	2,003	284.98	3,600	4,659
283.94	3,600	2,064	285.00	3,600	**4,688**
283.96	3,600	2,126			
283.98	3,600	2,187			
284.00	3,600	2,248			
284.02	3,600	2,308			
284.04	3,600	2,368			

Summary for Pond XB2: Exist Basin #2

Inflow Area = 1.933 ac, 75.44% Impervious, Inflow Depth > 7.51" for 100-YR event
Inflow = 15.93 cfs @ 12.08 hrs, Volume= 1.209 af
Outflow = 15.91 cfs @ 12.08 hrs, Volume= 1.093 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.07 cfs @ 12.08 hrs, Volume= 0.114 af
Primary = 15.84 cfs @ 12.08 hrs, Volume= 0.980 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 291.21' @ 12.08 hrs Surf.Area= 2,883 sf Storage= 5,862 cf

Plug-Flow detention time= 74.8 min calculated for 1.093 af (90% of inflow)
Center-of-Mass det. time= 27.7 min (803.2 - 775.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	279.50'	1,268 cf	**30.50'W x 73.50'L x 3.04'H Field A** 6,819 cf Overall - 3,196 cf Embedded = 3,622 cf x 35.0% Voids
#2A	280.00'	3,196 cf	**Cultec R-330XLHD** x 60 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
#3B	279.50'	370 cf	**16.00'W x 38.50'L x 3.04'H Field B** 1,874 cf Overall - 816 cf Embedded = 1,058 cf x 35.0% Voids
#4B	280.00'	816 cf	**Cultec R-330XLHD** x 15 Inside #3 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 3 rows
#5	279.00'	148 cf	**4.00'D x 11.80'H Vertical Cone/Cylinder**
#6	286.20'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**
		5,874 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	282.00'	**6.0" Vert. Orifice/Grate X 4.00** C= 0.600
#2	Primary	290.70'	**2.3" x 2.3" Horiz. Grate X 36.00** C= 0.600 in 24.0" x 24.0" Grate (33% open area) Limited to weir flow at low heads
#3	Primary	292.10'	**2.3" x 2.3" Horiz. Grate X 36.00** C= 0.600 in 24.0" x 24.0" Grate (33% open area) Limited to weir flow at low heads
#4	Discarded	279.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.07 cfs @ 12.08 hrs HW=291.20' (Free Discharge)
└─**4=Exfiltration** (Controls 0.07 cfs)

Primary OutFlow Max=15.82 cfs @ 12.08 hrs HW=291.20' (Free Discharge)
├─**1=Orifice/Grate** (Orifice Controls 11.31 cfs @ 14.41 fps)
├─**2=Grate** (Orifice Controls 4.51 cfs @ 3.41 fps)
└─**3=Grate** (Controls 0.00 cfs)

Pond XB2: Exist Basin #2 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

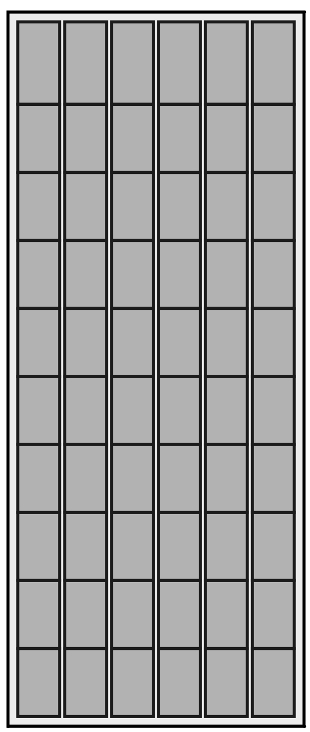
10 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 71.50' Row Length +12.0" End Stone x 2 = 73.50' Base Length
6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width
6.0" Base + 30.5" Chamber Height = 3.04' Field Height

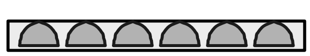
60 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 3,196.5 cf Chamber Storage

6,818.7 cf Field - 3,196.5 cf Chambers = 3,622.2 cf Stone x 35.0% Voids = 1,267.8 cf Stone Storage

Chamber Storage + Stone Storage = 4,464.2 cf = 0.102 af
Overall Storage Efficiency = 65.5%

60 Chambers
252.5 cy Field
134.2 cy Stone





Pond XB2: Exist Basin #2 - Chamber Wizard Field B

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 3 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

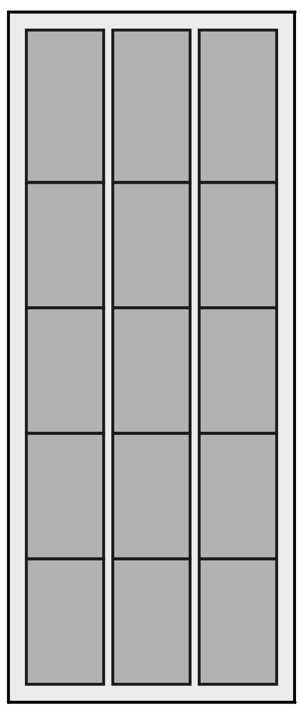
5 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 36.50' Row Length +12.0" End Stone x 2 = 38.50' Base Length
3 Rows x 52.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 16.00' Base Width
6.0" Base + 30.5" Chamber Height = 3.04' Field Height

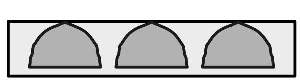
15 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 3 Rows = 815.9 cf Chamber Storage

1,873.7 cf Field - 815.9 cf Chambers = 1,057.8 cf Stone x 35.0% Voids = 370.2 cf Stone Storage

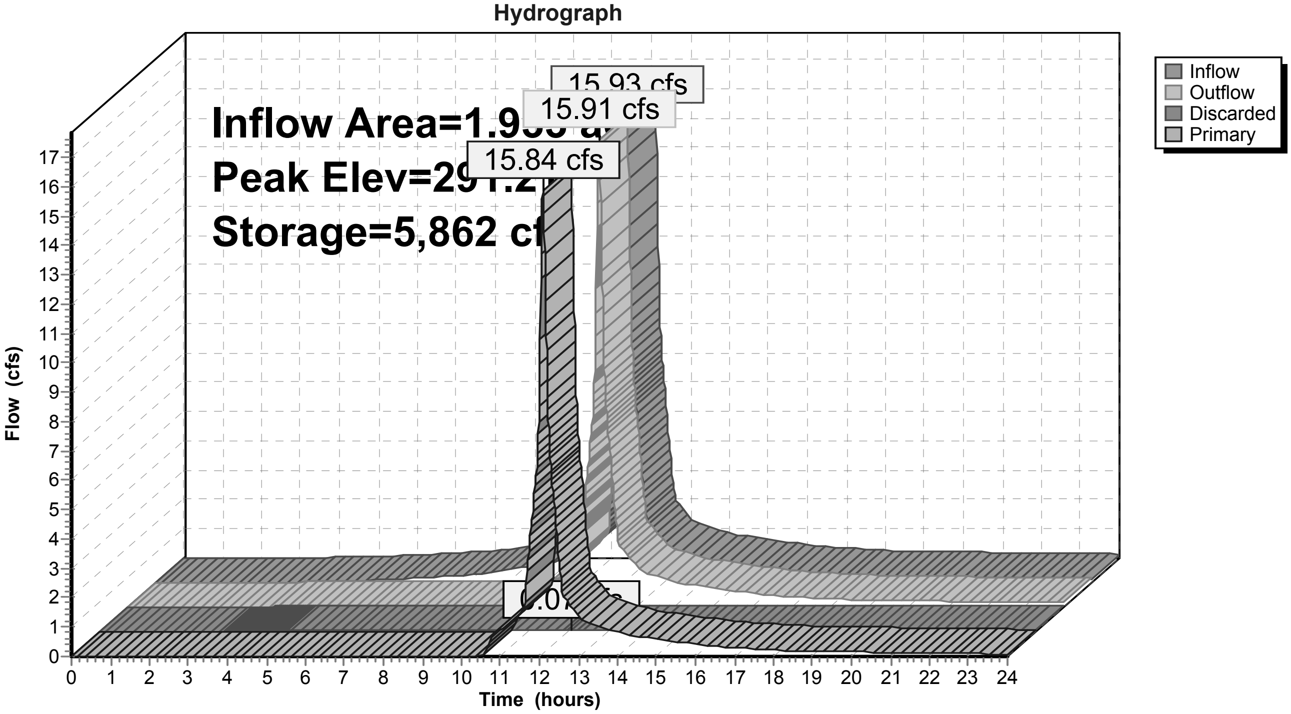
Chamber Storage + Stone Storage = 1,186.1 cf = 0.027 af
Overall Storage Efficiency = 63.3%

15 Chambers
69.4 cy Field
39.2 cy Stone





Pond XB2: Exist Basin #2



Stage-Discharge for Pond XB2: Exist Basin #2

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
279.00	0.00	0.00	0.00
279.15	0.00	0.00	0.00
279.30	0.00	0.00	0.00
279.45	0.00	0.00	0.00
279.60	0.07	0.07	0.00
279.75	0.07	0.07	0.00
279.90	0.07	0.07	0.00
280.05	0.07	0.07	0.00
280.20	0.07	0.07	0.00
280.35	0.07	0.07	0.00
280.50	0.07	0.07	0.00
280.65	0.07	0.07	0.00
280.80	0.07	0.07	0.00
280.95	0.07	0.07	0.00
281.10	0.07	0.07	0.00
281.25	0.07	0.07	0.00
281.40	0.07	0.07	0.00
281.55	0.07	0.07	0.00
281.70	0.07	0.07	0.00
281.85	0.07	0.07	0.00
282.00	0.07	0.07	0.00
282.15	0.33	0.07	0.26
282.30	0.99	0.07	0.92
282.45	1.77	0.07	1.70
282.60	2.31	0.07	2.24
282.75	2.74	0.07	2.67
282.90	3.12	0.07	3.05
283.05	3.45	0.07	3.38
283.20	3.75	0.07	3.69
283.35	4.03	0.07	3.97
283.50	4.30	0.07	4.23
283.65	4.54	0.07	4.47
283.80	4.78	0.07	4.71
283.95	5.00	0.07	4.93
284.10	5.21	0.07	5.14
284.25	5.42	0.07	5.35
284.40	5.61	0.07	5.55
284.55	5.80	0.07	5.74
284.70	5.99	0.07	5.92
284.85	6.17	0.07	6.10
285.00	6.34	0.07	6.27
285.15	6.51	0.07	6.44
285.30	6.67	0.07	6.60
285.45	6.83	0.07	6.76
285.60	6.99	0.07	6.92
285.75	7.14	0.07	7.07
285.90	7.29	0.07	7.22
286.05	7.44	0.07	7.37
286.20	7.59	0.07	7.52
286.35	7.73	0.07	7.66
286.50	7.87	0.07	7.80
286.65	8.00	0.07	7.93
286.80	8.14	0.07	8.07
286.95	8.27	0.07	8.20
287.10	8.40	0.07	8.33
287.25	8.53	0.07	8.46
287.40	8.65	0.07	8.58
287.55	8.78	0.07	8.71
287.70	8.90	0.07	8.83
287.85	9.02	0.07	8.95
288.00	9.14	0.07	9.07
288.15	9.26	0.07	9.19
288.30	9.37	0.07	9.30
288.45	9.49	0.07	9.42
288.60	9.60	0.07	9.53
288.75	9.71	0.07	9.64
288.90	9.82	0.07	9.75
289.05	9.93	0.07	9.86
289.20	10.04	0.07	9.97
289.35	10.15	0.07	10.08
289.50	10.25	0.07	10.18
289.65	10.36	0.07	10.29
289.80	10.46	0.07	10.39
289.95	10.56	0.07	10.49
290.10	10.67	0.07	10.60
290.25	10.77	0.07	10.70
290.40	10.87	0.07	10.80
290.55	10.97	0.07	10.89
290.70	11.06	0.07	10.99
290.85	12.68	0.07	12.61
291.00	14.74	0.07	14.67
291.15	15.62	0.07	15.55
291.30	16.38	0.07	16.31
291.45	17.06	0.07	16.99
291.60	17.68	0.07	17.60
291.75	18.25	0.07	18.18
291.90	18.79	0.07	18.72
292.05	19.31	0.07	19.24
292.20	**20.63**	**0.07**	**20.55**

Stage-Area-Storage for Pond XB2: Exist Basin #2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
279.00	13	0	286.95	2,883	5,760
279.15	13	2	287.10	2,883	5,763
279.30	13	4	287.25	2,883	5,767
279.45	13	6	287.40	2,883	5,771
279.60	2,870	108	287.55	2,883	5,775
279.75	2,870	259	287.70	2,883	5,779
279.90	2,870	411	287.85	2,883	5,782
280.05	2,870	633	288.00	2,883	5,786
280.20	2,870	991	288.15	2,883	5,790
280.35	2,870	1,348	288.30	2,883	5,794
280.50	2,870	1,703	288.45	2,883	5,797
280.65	2,870	2,054	288.60	2,883	5,801
280.80	2,870	2,399	288.75	2,883	5,805
280.95	2,870	2,742	288.90	2,883	5,809
281.10	2,870	3,082	289.05	2,883	5,812
281.25	2,870	3,419	289.20	2,883	5,816
281.40	2,870	3,747	289.35	2,883	5,820
281.55	2,870	4,063	289.50	2,883	5,824
281.70	2,870	4,369	289.65	2,883	5,828
281.85	2,870	4,661	289.80	2,883	5,831
282.00	2,870	4,937	289.95	2,883	5,835
282.15	2,870	5,192	290.10	2,883	5,839
282.30	2,870	5,415	290.25	2,883	5,843
282.45	2,870	5,599	290.40	2,883	5,846
282.60	2,870	5,696	290.55	2,883	5,850
282.75	2,870	5,697	290.70	2,883	5,854
282.90	2,870	5,699	290.85	2,883	5,857
283.05	2,870	5,701	291.00	2,883	5,859
283.20	2,870	5,703	291.15	2,883	5,861
283.35	2,870	5,705	291.30	2,883	5,863
283.50	2,870	5,707	291.45	2,883	5,865
283.65	2,870	5,709	291.60	2,883	5,866
283.80	2,870	5,711	291.75	2,883	5,868
283.95	2,870	5,713	291.90	2,883	5,870
284.10	2,870	5,714	292.05	2,883	5,872
284.25	2,870	5,716	292.20	2,883	**5,874**
284.40	2,870	5,718			
284.55	2,870	5,720			
284.70	2,870	5,722			
284.85	2,870	5,724			
285.00	2,870	5,726			
285.15	2,870	5,728			
285.30	2,870	5,730			
285.45	2,870	5,731			
285.60	2,870	5,733			
285.75	2,870	5,735			
285.90	2,870	5,737			
286.05	2,870	5,739			
286.20	**2,883**	5,741			
286.35	2,883	5,745			
286.50	2,883	5,748			
286.65	2,883	5,752			
286.80	2,883	5,756			

APPENDIX E – CORNELL EXTREME PRECIPITATION TABLES

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Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	Massachusetts
Location	
Longitude	71.186 degrees West
Latitude	42.396 degrees North
Elevation	Unknown/Unavailable
Date/Time	Tue, 12 Jul 2016 12:00:58 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.53	0.70	0.87	1.10	**1yr**	0.75	1.04	1.28	1.63	2.08	2.67	2.91	**1yr**	2.36	2.80	3.27	3.95	4.63	**1yr**
2yr	0.35	0.54	0.67	0.88	1.11	1.40	**2yr**	0.96	1.28	1.62	2.03	2.55	3.21	3.56	**2yr**	2.84	3.42	3.92	4.67	5.32	**2yr**
5yr	0.42	0.65	0.81	1.09	1.39	1.77	**5yr**	1.20	1.61	2.06	2.59	3.25	4.06	4.53	**5yr**	3.60	4.36	4.98	5.93	6.65	**5yr**
10yr	0.47	0.74	0.93	1.27	1.65	2.12	**10yr**	1.43	1.91	2.47	3.12	3.90	4.86	5.44	**10yr**	4.30	5.23	5.96	7.12	7.87	**10yr**
25yr	0.56	0.89	1.13	1.56	2.07	2.68	**25yr**	1.79	2.40	3.14	3.96	4.96	6.16	6.92	**25yr**	5.45	6.66	7.57	9.06	9.85	**25yr**
50yr	0.63	1.02	1.30	1.83	2.47	3.22	**50yr**	2.13	2.85	3.78	4.78	5.96	7.38	8.32	**50yr**	6.53	8.00	9.08	10.87	11.69	**50yr**
100yr	0.73	1.19	1.53	2.16	2.94	3.86	**100yr**	2.53	3.39	4.53	5.74	7.15	8.84	10.00	**100yr**	7.82	9.62	10.88	13.06	13.86	**100yr**
200yr	0.84	1.37	1.77	2.54	3.50	4.62	**200yr**	3.02	4.04	5.45	6.90	8.59	10.59	12.03	**200yr**	9.37	11.57	13.05	15.69	16.44	**200yr**
500yr	1.02	1.67	2.18	3.16	4.41	5.88	**500yr**	3.81	5.08	6.94	8.80	10.95	13.46	15.37	**500yr**	11.91	14.78	16.61	20.01	20.62	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.24	0.37	0.46	0.62	0.76	0.84	**1yr**	0.65	0.82	1.14	1.45	1.78	2.44	2.51	**1yr**	2.16	2.41	2.90	3.51	4.13	**1yr**
2yr	0.33	0.51	0.63	0.85	1.05	1.26	**2yr**	0.91	1.23	1.44	1.91	2.47	3.10	3.44	**2yr**	2.74	3.31	3.79	4.50	5.15	**2yr**
5yr	0.39	0.60	0.75	1.02	1.30	1.50	**5yr**	1.13	1.47	1.73	2.24	2.89	3.74	4.16	**5yr**	3.31	4.00	4.56	5.44	6.12	**5yr**
10yr	0.44	0.67	0.83	1.16	1.50	1.72	**10yr**	1.30	1.68	1.94	2.53	3.24	4.32	4.79	**10yr**	3.82	4.61	5.24	6.25	6.96	**10yr**
25yr	0.50	0.77	0.96	1.36	1.79	2.04	**25yr**	1.55	1.99	2.28	2.97	3.78	5.19	5.76	**25yr**	4.60	5.53	6.30	7.48	8.22	**25yr**
50yr	0.56	0.85	1.06	1.53	2.05	2.33	**50yr**	1.77	2.28	2.58	3.35	4.25	5.97	6.61	**50yr**	5.28	6.35	7.22	8.55	9.32	**50yr**
100yr	0.63	0.95	1.19	1.71	2.35	2.65	**100yr**	2.03	2.59	2.91	3.55	4.79	6.87	7.56	**100yr**	6.08	7.27	8.29	9.74	10.57	**100yr**
200yr	0.70	1.06	1.34	1.94	2.71	3.03	**200yr**	2.34	2.96	3.30	3.96	5.40	7.91	8.65	**200yr**	7.00	8.32	9.51	11.07	11.97	**200yr**
500yr	0.82	1.23	1.58	2.29	3.26	3.60	**500yr**	2.81	3.52	3.88	4.57	6.34	9.53	10.29	**500yr**	8.43	9.90	11.41	13.08	14.08	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.31	0.48	0.59	0.79	0.97	1.14	**1yr**	0.84	1.11	1.33	1.78	2.26	2.85	3.12	**1yr**	2.52	3.00	3.49	4.25	5.00	**1yr**
2yr	0.36	0.56	0.69	0.94	1.16	1.36	**2yr**	1.00	1.33	1.57	2.08	2.68	3.33	3.71	**2yr**	2.94	3.56	4.09	4.85	5.52	**2yr**
5yr	0.45	0.70	0.86	1.19	1.51	1.79	**5yr**	1.30	1.75	2.05	2.65	3.38	4.40	4.96	**5yr**	3.90	4.77	5.39	6.45	7.18	**5yr**
10yr	0.55	0.84	1.04	1.46	1.88	2.21	**10yr**	1.62	2.16	2.56	3.21	4.05	5.46	6.20	**10yr**	4.84	5.97	6.68	8.03	8.77	**10yr**
25yr	0.71	1.08	1.34	1.92	2.52	2.91	**25yr**	2.18	2.85	3.41	4.15	5.16	7.25	8.38	**25yr**	6.41	8.05	8.87	10.74	11.47	**25yr**
50yr	0.86	1.31	1.63	2.34	3.15	3.61	**50yr**	2.72	3.52	4.23	5.03	6.20	8.98	10.51	**50yr**	7.95	10.11	10.98	13.42	14.06	**50yr**
100yr	1.05	1.58	1.99	2.87	3.93	4.45	**100yr**	3.39	4.35	5.26	6.47	7.44	11.14	13.21	**100yr**	9.86	12.70	13.59	16.79	17.26	**100yr**
200yr	1.28	1.92	2.43	3.52	4.91	5.50	**200yr**	4.24	5.37	6.54	7.91	8.93	13.85	16.63	**200yr**	12.25	15.99	16.86	21.02	21.21	**200yr**
500yr	1.66	2.47	3.18	4.62	6.56	7.25	**500yr**	5.66	7.09	8.73	10.36	11.37	18.45	22.57	**500yr**	16.33	21.70	22.40	28.34	27.89	**500yr**

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APPENDIX F – RECHARGE VOLUME AND DRAWDOWN TIME CALCULATIONS

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RECHARGE VOLUME CALCULATIONS, PART I

Date: January 13, 2017
Project: Belmont Day School Athletic Barn
Project No: 210801375
Location: Belmont, MA

Prepared By: HK
Checked By: FH

Recharge Area Design

Objective: Size an infiltration basin that will approximate the annual recharge from the existing conditions

Methodology: MA Department of Environmental Protection (DEP) Stormwater Management (Vol.3, Ch.1)

Design Criteria:

The required recharge volume equals a depth of runoff corresponding to the soil type times the impervious areas covering that soil type within the project's limit of work. A subsurface investigation verified that the soils onsite are classified as HSG "B" soils.

Based on the Site Hydrologic Soil Group:

Hydrologic Soil Group	Soil Texture	Target Depth Factor (F)
A	Sand	0.60 inches
B	Loam	0.35 inches
C	Silty Loam	0.25 inches
D	Clay	0.10 inches

Recharge Volume Required:

	Impervious Area (sf)	Target Depth (in)	Volume Required (cf)
	39,107	0.35	1,141

	Impervious area routed through stormwater systems:	Capture Area Adjustment	
A	39,107	1.00	
B	0	0	
C	0	0	
D	0	0	
Total	39,107	1,141	(cf)

Recharge Volume Provided:

Cultec System PB4B

Outlet Elevation =	284.50				
Bottom Basin Elev =	282.00	Area of system =	7,205 sf	Vol. of Recharge:	7,089 cf *

Porous Pavement PB6A

Outlet Elevation =	284.58				
Bottom Basin Elev =	282.25	Area of system =	6,579 sf	Vol. of Recharge:	4,022 cf *

Porous Pavement PB6B

Outlet Elevation =	263.80				
Bottom Basin Elev =	263.00	Area of system =	9,608 sf	Vol. of Recharge:	2,306 cf *

Trenches Total **13,417 cf** > 1,141 cf

* From HydroCAD storage table

Stantec

RECHARGE VOLUME CALCULATIONS, PART II

Date: January 13, 2017
Project: Belmont Day School Athletic Barn
Project No: 210801375
Location: Belmont, MA
Prepared By: HK
Checked By: FH

Required Drawdown Time

Objective: Size an infiltration basin that will approximate the annual recharge from the existing conditions

Methodology: MA Department of Environmental Protection (DEP) Stormwater Management (Vol. 3, Ch. 1)

Design Criteria: The required recharge volume equals a depth of runoff corresponding to the soil type times the impervious areas covering that soil type at the post-development site.

Based on the Site Hydrologic Soil Group:

Hydrologic Soil Group	Soil Texture	Target Depth Factor (F)
A	Sand	0.60 inches
$\boxed{B}$	Loam	0.35 inches
C	Silty Loam	0.25 inches
D	Clay	0.10 inches

Required Recharge Volume Required Recharge Volume = Target Depth Factor x Post Development Impervious Area/12

Cultec System PB4B

Total Impervious Area:	22,920	sf
Total Required Recharge Volume:	669	cf

Porous Pavement PB6A

Total Impervious Area:	6,579	sf
Total Required Recharge Volume:	192	cf

Porous Pavement PB6B

Total Impervious Area:	9,608	sf
Total Required Recharge Volume:	280	cf

Required Drawdown Time: Maximum of 72 Hours using the following equation:

$$\text{Drawdown Time} = \frac{R_v}{(K x A_{Bot})}$$

R_v = Required Recharge Volume
K = the Permeability Rate
A_{Bot} = Bottom area of Infiltration basin

Cultec System PB4B

Outlet Elevation		R_v cf	K in/hr	A_{Bot} sf	Drawdown Time Hours
284.50	100%	669	1.02	7,205	1.09

Porous Pavement PB6A

Outlet Elevation		R_v cf	K in/hr	A_{Bot} sf	Drawdown Time Hours
284.58	100%	192	1.02	6,579	0.34

Porous Pavement PB6B

Outlet Elevation		R_v cf	K in/hr	A_{Bot} sf	Drawdown Time Hours
263.80	100%	280	1.02	9,608	0.34

Stantec Planning and Landscape Architecture P.C.
226 Causeway Street
Boston, MA 02114
Tel: (617) 523-8103 Fax: (617) 523-4333

Stage-Area-Storage for Pond PB4B: 30x9 Cultec 100HD

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
282.00	**7,204**	0	284.65	7,204	7,090
282.05	7,204	109	284.70	7,204	7,091
282.10	7,204	217	284.75	7,204	7,092
282.15	7,204	326	284.80	7,204	7,092
282.20	7,204	435	284.85	7,204	7,093
282.25	7,204	543	284.90	7,204	7,094
282.30	7,204	652	284.95	7,204	7,094
282.35	7,204	761	285.00	7,204	7,095
282.40	7,204	870	285.05	7,204	7,095
282.45	7,204	978	285.10	7,204	7,096
282.50	7,204	1,087	285.15	7,204	7,097
282.55	7,204	1,383	285.20	7,204	7,097
282.60	7,204	1,674	285.25	7,204	7,098
282.65	7,204	1,960	285.30	7,204	7,099
282.70	7,204	2,242	285.35	7,204	7,099
282.75	7,204	2,524	285.40	7,204	7,100
282.80	7,204	2,804	285.45	7,204	7,100
282.85	7,204	3,082	285.50	7,204	7,101
282.90	7,204	3,355	285.55	7,204	7,102
282.95	7,204	3,623	285.60	7,204	7,102
283.00	7,204	3,886	285.65	7,204	7,103
283.05	7,204	4,144	285.70	7,204	7,104
283.10	7,204	4,396	285.75	7,204	7,104
283.15	7,204	4,639	285.80	7,204	7,105
283.20	7,204	4,873	285.85	7,204	7,105
283.25	7,204	5,094	285.90	7,204	7,106
283.30	7,204	5,299	285.95	7,204	7,107
283.35	7,204	5,486	286.00	7,204	7,107
283.40	7,204	5,649	286.05	7,204	7,108
283.45	7,204	5,787	286.10	7,204	7,109
283.50	7,204	5,905	286.15	7,204	7,109
283.55	7,204	6,014	286.20	7,204	**7,110**
283.60	7,204	6,123			
283.65	7,204	6,231			
283.70	7,204	6,340			
283.75	7,204	6,449			
283.80	7,204	6,557			
283.85	7,204	6,666			
283.90	7,204	6,775			
283.95	7,204	6,883			
284.00	7,204	6,992			
284.05	7,204	7,083			
284.10	7,204	7,083			
284.15	7,204	7,084			
284.20	7,204	7,085			
284.25	7,204	7,085			
284.30	7,204	7,086			
284.35	7,204	7,087			
284.40	7,204	7,087			
284.45	7,204	7,088			
284.50	7,204	7,089			
284.55	7,204	7,089			
284.60	7,204	7,090			

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VOL = 7,089 C.F.

Stage-Area-Storage for Pond PB6A: Porous Pavement

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
278.60	13	0
278.70	13	1
278.80	13	3
278.90	13	4
279.00	13	5
279.10	13	6
279.20	13	8
279.30	13	9
279.40	13	10
279.50	13	11
279.60	13	13
279.70	13	14
279.80	13	15
279.90	13	16
280.00	13	18
280.10	13	19
280.20	13	20
280.30	13	21
280.40	13	23
280.50	13	24
280.60	13	25
280.70	13	26
280.80	13	28
280.90	13	29
281.00	13	30
281.10	13	31
281.20	13	33
281.30	13	34
281.40	13	35
281.50	13	36
281.60	13	38
281.70	13	39
281.80	13	40
281.90	13	41
282.00	13	43
282.10	13	44
282.20	**13**	45
282.30	**6,592**	145
282.40	6,592	344
282.50	6,592	542
282.60	6,592	741
282.70	6,592	940
282.80	6,592	1,138
282.90	6,592	1,337
283.00	6,592	1,536
283.10	6,592	1,734
283.20	6,592	1,933
283.30	6,592	2,131
283.40	6,592	2,330
283.50	6,592	2,529
283.60	6,592	2,727
283.70	6,592	2,926
283.80	6,592	3,125
283.90	6,592	3,323
284.00	6,592	3,522
284.10	6,592	3,720
284.20	6,592	3,919
284.30	6,592	4,019
284.40	6,592	4,020
284.50	6,592	4,022
284.60	6,592	**4,023**

OUTLET @ 284.58

VOL = 4,022 CF

Stage-Area-Storage for Pond PB6B: Porous Pavement

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
263.00	**9,608**	0
263.02	9,608	58
263.04	9,608	115
263.06	9,608	173
263.08	9,608	231
263.10	9,608	288
263.12	9,608	346
263.14	9,608	404
263.16	9,608	461
263.18	9,608	519
263.20	9,608	576
263.22	9,608	634
263.24	9,608	692
263.26	9,608	749
263.28	9,608	807
263.30	9,608	865
263.32	9,608	922
263.34	9,608	980
263.36	9,608	1,038
263.38	9,608	1,095
263.40	9,608	1,153
263.42	9,608	1,211
263.44	9,608	1,268
263.46	9,608	1,326
263.48	9,608	1,384
263.50	9,608	1,441
263.52	9,608	1,499
263.54	9,608	1,556
263.56	9,608	1,614
263.58	9,608	1,672
263.60	9,608	1,729
263.62	9,608	1,787
263.64	9,608	1,845
263.66	9,608	1,902
263.68	9,608	1,960
263.70	9,608	2,018
263.72	9,608	2,075
263.74	9,608	2,133
263.76	9,608	2,191
263.78	9,608	2,248
263.80	9,608	2,306
263.82	9,608	2,364
263.84	9,608	2,421
263.86	9,608	2,479
263.88	9,608	2,537
263.90	9,608	2,594
263.92	9,608	2,652
263.94	9,608	2,709
263.96	9,608	2,767
263.98	9,608	2,825
264.00	9,608	2,882
264.02	9,608	2,940
264.04	9,608	2,998
264.06	9,608	3,055
264.08	9,608	3,113
264.10	9,608	3,171
264.12	9,608	3,228
264.14	9,608	3,286
264.16	9,608	3,344
264.18	9,608	3,401
264.20	9,608	3,459
264.22	9,608	3,517
264.24	9,608	3,574
264.26	9,608	3,632
264.28	9,608	3,689
264.30	9,608	3,747
264.32	9,608	3,805
264.34	9,608	3,862
264.36	9,608	3,920
264.38	9,608	3,978
264.40	9,608	4,035
264.42	9,608	4,093
264.44	9,608	4,151
264.46	9,608	4,208
264.48	9,608	4,266
264.50	9,608	4,324
264.52	9,608	4,381
264.54	9,608	4,439
264.56	9,608	4,497
264.58	9,608	4,554
264.60	9,608	4,612
264.62	9,608	4,669
264.64	9,608	4,727
264.66	9,608	4,785
264.68	9,608	4,842
264.70	9,608	4,900
264.72	9,608	4,958
264.74	9,608	5,015
264.76	9,608	5,073
264.78	9,608	5,131
264.80	9,608	5,188
264.82	9,608	5,246
264.84	9,608	5,304
264.86	9,608	5,361
264.88	9,608	5,419
264.90	9,608	5,477
264.92	9,608	5,534
264.94	9,608	5,592
264.96	9,608	5,650
264.98	9,608	5,707
265.00	9,608	**5,765**

OUTLET@ 263.80
VOL = 2,306 CF

STORMWATER MANAGEMENT &
EROSION CONTROL REPORT
BELMONT DAY SCHOOL
BELMONT, MASSACHUSETTS

APPENDIX G – TSS REMOVAL WORKSHEETS

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TSS Removal Treatment Train Summary

Date:	January 13, 2017
Project:	Belmont Day School Barn
Project No:	210801375
Location:	Belmont, MA
Prepared By:	HK
Checked By:	FH
Objective:	Stormwater management systems will be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This will be achieved by the use of following treatment trains.

Treatment Train 1: Contech WQU-2

Treatment Train 2: Porous Asphalt Pavement

Treatment Train 3: Clean Roof Runoff → Subsurface Detention / Infiltration PB4B

Treatment Train 4: Contech WQU-1 → Subsurface Detention / Infiltration PB4B

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Stantec Planning and Landscape Architecture P.C.
226 Causeway Street, 6th Floor
Boston Massachusetts 02114

TOTAL SUSPENDED SOLIDS (TSS) REMOVAL WORKSHEET

Project	Belmont Day School Barn	**Project #**	210801375
Location	Belmont, MA	**Date**	1/13/2017
Calculated By	HK	**Checked By**	FH

Calculations

Treatment Train 1 - Contech Water Quality Unit

Subcatchment Location: **Drainage Area P4A**

A BMP	B TSS Removal Rate	C Starting TSS Load	D Amount Removed (BxC)	E Remaining Load (C-D)	F TSS Removal Rate
Contech VSHS36 Water Quality Unit WQU-2	**0.882**	**1.00**	**0.88**	**0.12**	**88%**

Total TSS Removal = **88%**

Treatment Train 2 - Porous Asphalt Pavement

Subcatchment Location: **Drainage Areas P6A & P6B**

A BMP	B TSS Removal Rate	C Starting TSS Load	D Amount Removed (BxC)	E Remaining Load (C-D)	F TSS Removal Rate
Porous Asphalt Pavement	**0.800**	**1.00**	**0.80**	**0.20**	**80%**

Total TSS Removal = **80%**

Stantec Planning and Landscape Architecture P.C.
226 Causeway Street, 6th Floor
Boston Massachusetts 02114

TOTAL SUSPENDED SOLIDS (TSS) REMOVAL WORKSHEET

Project	Belmont Day School Barn	**Project #**	210801375
Location	Belmont, MA	**Date**	1/13/2017
Calculated By	HK	**Checked By**	FH

Calculations

Treatment Train 3 - Roof Area to Subsurface Basin PB4B

Subcatchment Location: **Drainage Area P2B**

A BMP	B TSS Removal Rate	C Starting TSS Load	D Amount Removed (BxC)	E Remaining Load (C-D)	F TSS Removal Rate
Subsurface Detention / Infiltration PB4B	**0.800**	**1.00**	**0.80**	**0.20**	**80%**

Total TSS Removal = **80%**

Treatment Train 4 - Paved and Landscaped to Subsurface Basin PB4B

Subcatchment Location: **Drainage Area P4B**

A BMP	B TSS Removal Rate	C Starting TSS Load	D Amount Removed (BxC)	E Remaining Load (C-D)	F TSS Removal Rate
Contech VSHS36 Water Quality Inlet WQU-1	**0.915**	**1.00**	**0.92**	**0.09**	**92%**
Subsurface Detention / Infiltration PB4B	**0.800**	**0.09**	**0.07**	**0.02**	**98%**

Total TSS Removal = **98%**

VortSentry® HS Estimated Net Annual TSS Reduction

BELMONT DAY SCHOOL BARN
BELMONT, MA
Model VSHS36
System WQU-1

CONTECH ENGINEERED SOLUTIONS

Design Ratio[1] = $\dfrac{0.04 \text{ acres} \times 0.9}{27 \text{ ft3}}$ **= 0.001**

Rainfall Intensity "/hr	Flow Rate cfs	Operating Rate[2] cfs/ft^3	% Total Rainfall Depth[3]	Rmvl. Effcy[4] (%)	Rel. Effcy (%)
0.02	0.00	0.00003	10.2%	98.0%	10.0%
0.04	0.00	0.00005	9.6%	98.0%	9.5%
0.06	0.00	0.00008	9.4%	98.0%	9.3%
0.08	0.00	0.00011	7.7%	98.0%	7.6%
0.10	0.00	0.00014	8.6%	98.0%	8.4%
0.12	0.00	0.00016	6.3%	98.0%	6.2%
0.14	0.01	0.00019	4.7%	98.0%	4.6%
0.16	0.01	0.00022	4.6%	98.0%	4.5%
0.18	0.01	0.00024	3.5%	98.0%	3.5%
0.20	0.01	0.00027	4.3%	98.0%	4.3%
0.25	0.01	0.00034	8.0%	98.0%	7.8%
0.30	0.01	0.00041	5.6%	98.0%	5.5%
0.35	0.01	0.00048	4.4%	98.0%	4.3%
0.40	0.01	0.00054	2.5%	98.0%	2.5%
0.45	0.02	0.00061	2.5%	98.0%	2.5%
0.50	0.02	0.00068	1.4%	98.0%	1.4%
0.75	0.03	0.00102	5.0%	98.0%	4.9%
1.00	0.04	0.00136	1.0%	98.0%	1.0%
1.50	0.05	0.00204	0.0%	98.0%	0.0%
2.00	0.07	0.00272	0.0%	98.0%	0.0%
3.00	0.11	0.00407	0.5%	98.0%	0.5%
					98.0%
				% rain falling at >3"/hr =	0.0%
				Removal Efficiency Adjustment[4] =	6.5%
				Predicted Net Annual Load Removal Efficiency =	**91.5%**

1 - Design Ratio = (Total Drainage Area x Runoff Coefficient) / VortSentry HS Treatment Volume
= The Total Drainage Area and Runoff Coefficient are specified by the site engineer.
2 - Operating Rate (cfs/ft^3) = Rainfall Intensity ("/hr) x Design Ratio
3 - Based on 10 years of hourly precipitation data from NCDC Station 770, Boston WSFO AP, Suffolk County, MA
4 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

Calculated by:	CJA	Date:	01/12/17	Checked by:		Date:	

VortSentry® HS Estimated Net Annual TSS Reduction

BELMONT DAY SCHOOL BARN
BELMONT, MA
Model VSHS36
System WQU-2

CONTECH ENGINEERED SOLUTIONS

Design Ratio[1] = $\frac{0.25 \text{ acres} \times 0.9}{27 \text{ ft3}}$ **= 0.008**

Rainfall Intensity "/hr	Flow Rate cfs	Operating Rate[2] cfs/ft^3	% Total Rainfall Depth[3]	Rmvl. Effcy[4] (%)	Rel. Effcy (%)
0.02	0.00	0.00017	10.2%	98.0%	10.0%
0.04	0.01	0.00034	9.6%	98.0%	9.5%
0.06	0.01	0.00051	9.4%	98.0%	9.3%
0.08	0.02	0.00068	7.7%	98.0%	7.6%
0.10	0.02	0.00085	8.6%	98.0%	8.4%
0.12	0.03	0.00102	6.3%	98.0%	6.2%
0.14	0.03	0.00119	4.7%	98.0%	4.6%
0.16	0.04	0.00136	4.6%	98.0%	4.5%
0.18	0.04	0.00153	3.5%	98.0%	3.5%
0.20	0.05	0.00170	4.3%	98.0%	4.3%
0.25	0.06	0.00212	8.0%	98.0%	7.8%
0.30	0.07	0.00255	5.6%	98.0%	5.5%
0.35	0.08	0.00297	4.4%	98.0%	4.3%
0.40	0.09	0.00340	2.5%	98.0%	2.5%
0.45	0.10	0.00382	2.5%	98.0%	2.5%
0.50	0.11	0.00424	1.4%	98.0%	1.4%
0.75	0.17	0.00637	2.5%	98.0%	2.5%
1.00	0.23	0.00849	0.3%	97.8%	0.3%
1.50	0.34	0.01273	0.0%	90.3%	0.0%
2.00	0.45	0.01698	0.0%	88.6%	0.0%
3.00	0.68	0.02546	0.5%	69.2%	0.3%
					94.7%
				% rain falling at >3"/hr =	3.2%
				Removal Efficiency Adjustment[4] =	6.5%
				Predicted Net Annual Load Removal Efficiency =	**88.2%**

1 - Design Ratio = (Total Drainage Area x Runoff Coefficient) / VortSentry HS Treatment Volume
= The Total Drainage Area and Runoff Coefficient are specified by the site engineer.
2 - Operating Rate (cfs/ft^3) = Rainfall Intensity ("/hr) x Design Ratio
3 - Based on 10 years of hourly precipitation data from NCDC Station 770, Boston WSFO AP, Suffolk County, MA
4 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

Calculated by:	CJA	Date:	01/12/17	Checked by:	Date:

STORMWATER MANAGEMENT &
EROSION CONTROL REPORT
BELMONT DAY SCHOOL
BELMONT, MASSACHUSETTS

APPENDIX H – WATER QUALITY CALCULATIONS

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WATER QUALITY VOLUME CALCULATIONS

Date:	January 13, 2017
Project:	Belmont Day School Athletic Barn
Project No:	210801375
Location:	Belmont, MA
Prepared By:	HK
Checked By:	FH

Water Quality Volume

Objective: To size a water quality volume.

Methodology: MA Department of Environmental Protection (DEP) Stormwater Management (Volume Three)

Design Criteria:

The project site is subject to a "Water Quality Depth" of one-half inch over the contributing impervious area when computing the required water quality treatment volume.

Water Quality Required:

Cultec System PB4B

The total impervious area within contributing area = 22,920
Required Water Quality Volume (Cubic Feet) = **955**

Porous Pavement PB6A

The total impervious area within contributing area = 6,579
Required Water Quality Volume (Cubic Feet) = **274**

Porous Pavement PB6B

The total impervious area within contributing area = 9,608
Required Water Quality Volume (Cubic Feet) = **400**

Water Quality Provided: Water Quality Volumes were determined using HydroCAD Tables.

Cultec System PB4B

Outlet Elevation= 284.50
Bottom Elev = 282.00
Cumulative Storage = 7,089 cubic feet
(Volume from Proposed HydroCAD Model)

Total Storage Volume 7,089 cubic feet

7,089 > 955 OK

Porous Pavement PB6A

Outlet Elevation= 284.58
Bottom Elev = 282.25
Cumulative Storage = 4,022 cubic feet
(Volume from Proposed HydroCAD Model)

Total Storage Volume 4,022 cubic feet

4,022 > 274 OK

Porous Pavement PB6B

Outlet Elevation= 263.80
Bottom Elev = 263.00
Cumulative Storage = 2,306 cubic feet
(Volume from Proposed HydroCAD Model)

Total Storage Volume 2,306 cubic feet

2,306 > 400 OK

Project: Belmont Day School Barn (rev. 1/12/17)
Location: Belmont, MA
Prepared For: Hilde Karpawich - Stantec

CONTECH ENGINEERED SOLUTIONS

Purpose: To calculate the water quality flow rate (WQF) over a given site area. In this situation the WQF is derived from the first 0.50" of runoff.

Reference: Massachusetts Dept. of Environmental Protection Wetlands Program / United States Department of Agriculture Natural Resources Conservation Service TR-55 Manual

Given:

Structure Name	Impv. (acres)	A (miles^2)	t_c (min)	t_c (hr)	WQV (in)
WQU-1	0.04	0.0000660	6.0	0.100	0.50
WQU-2	0.25	0.0003880	6.0	0.100	0.50

Procedure:

Determine unit peak discharge using Figure 1 or 2. Figure 2 is in tabular form so is preferred. Using the tc, read the unit peak discharge (qu) from Figure 1 or Table in Figure 2. qu is expressed in the following units: cfs/mi^2/watershed inches (csm/in).

Structure Name	qu (csm/in.)
WQU-1	752.00
WQU-2	752.00

1. Compute Q Rate using the following equation:

$$Q_{0.5} = (qu)\ (A)\ (WQV)$$

where:

$Q_{0.5}$ = flow fate associated with first 1/2" of runoff
qu = the unit peak discharge, in csm/in.
A = impervious surface drainage area (in square miles)
WQV = water quality volume in watershed inches (1/2" in this case)

Structure Name	$Q_{0.5}$ (cfs)
WQU-1	0.02
WQU-2	0.15

STORMWATER MANAGEMENT &
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BELMONT DAY SCHOOL
BELMONT, MASSACHUSETTS

APPENDIX I – OPERATION AND MAINTENANCE LOG AND OPERATIONS AND MAINTENANCE PLAN

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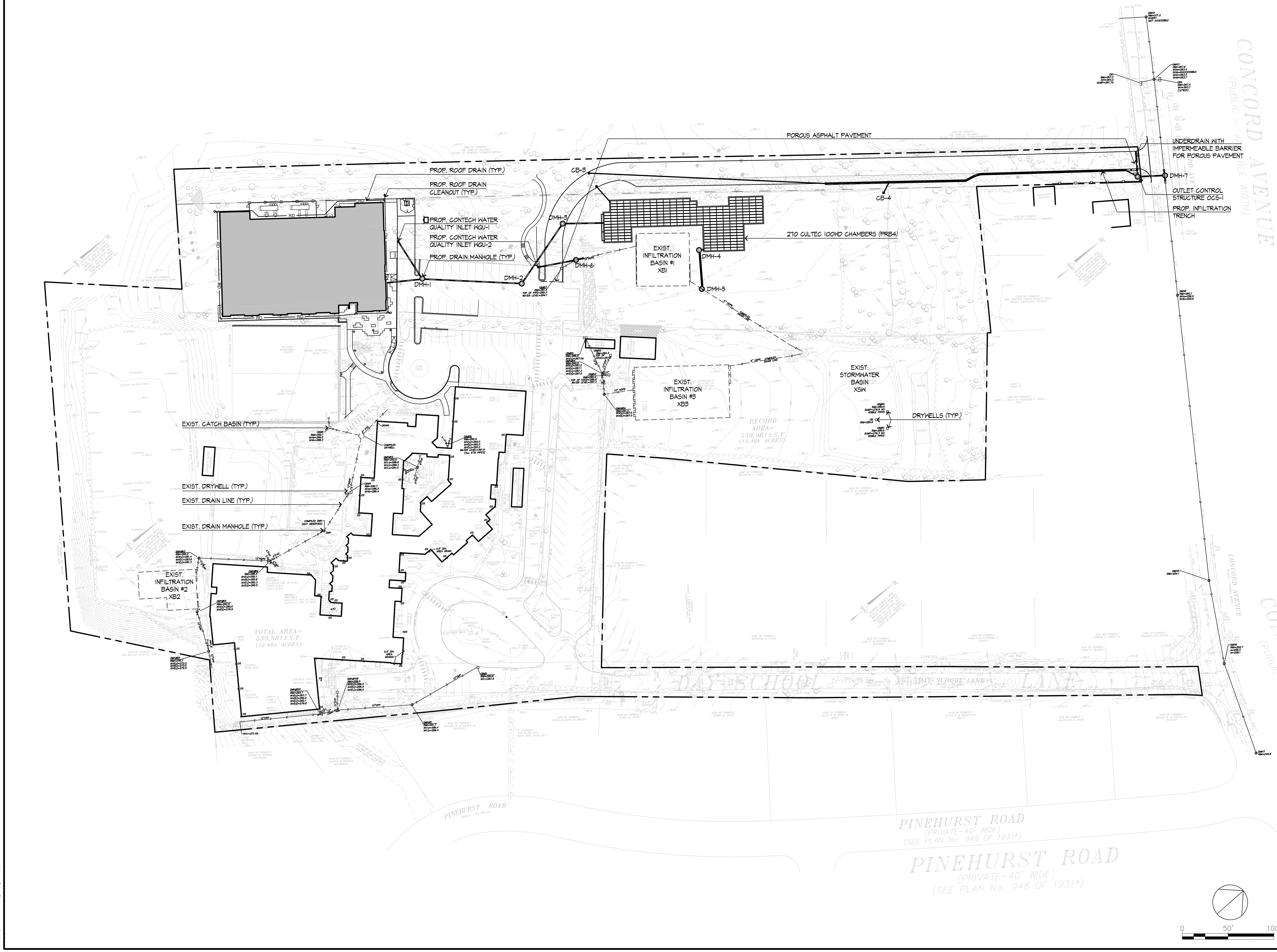

Stantec

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Consultants

Legend

Notes

Revision	By	Appd.	YY.MM.DD

Issued	By	Appd.	YY.MM.DD
Proposed Drainage Exhibit	HK	FH	2017.01.13

File Name:

Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
BELMONT DAY SCHOOL

ATHLETIC BARN

Belmont, Massachusetts

Title
OPERATION AND MAINTENANCE PLAN

Project No.	Scale
210801375	

Drawing No.	Sheet	Revision
	1 of 1	0

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2017/02/10 11:55 AM By: Karpowich, Hilde

ORIGINAL SHEET - ARCH D

Belmont Day School Barn

Operation and Maintenance Log

Structural Best Management Practice	Action	Date Completed	Comments	Completed By	Action	Date Completed	Comments	Completed By
Catch Basin – Inspect monthly for the first year. Then inspect four times per year. Clean when the sump is half full (2 feet) of sediment.	Inspect				Inspect			
	Inspect				Inspect			
	Clean				Clean			
Roof Leaders – Clean four times per year or more frequently as necessary	Clean				Clean			
Subsurface Detention/Infiltration Basin – Inspect the basin after each major rainstorm for the first service year of operation, and per manufactures recommendation, minimum.	Inspect				Inspect			
Vegetated Areas Maintenance – Prune and weed twice per year, inspect trees and shrubs four times per year	Prune / Weed				Prune / Weed			
	Inspect				Inspect			
WQU (Contech) – Inspect annually, clean as required.	Clean				Clean			
Porous Pavement – Vacuum sweep quarterly, inspect annually for deterioration	Vacuum Sweep				Vacuum Sweep			

Inspections for Year:__________
NOTE: See Section 9.0, Standard 9: Operations and Maintenance Plan for additional details.

STORMWATER MANAGEMENT & EROSION CONTROL REPORT
BELMONT DAY SCHOOL
BELMONT, MASSACHUSETTS

APPENDIX J – CONTECH WATER QUALITY DEVICE INSPECTION AND MAINTENANCE INFORMATION

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CONTECH®
ENGINEERED SOLUTIONS

CDS® Inspection and Maintenance Guide

CDS TECHNOLOGIES

Maintenance

The CDS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit. For example, unstable soils or heavy winter sanding will cause the grit chamber to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. The inspection should also quantify the accumulation of hydrocarbons, trash, and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided.

Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point would allows both sump cleanout and access outside the screen.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine weather the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump.

Cleaning

Cleaning of a CDS systems should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill should be cleaned out immediately. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. The screen should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes.

CDS Model	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	yd3	m3
CDS2015-4	4	1.2	3.0	0.9	0.9	0.7
CDS2015	5	1.5	3.0	0.9	1.3	1.0
CDS2020	5	1.5	3.5	1.1	1.3	1.0
CDS2025	5	1.5	4.0	1.2	1.3	1.0
CDS3020	6	1.8	4.0	1.2	2.1	1.6
CDS3030	6	1.8	4.6	1.4	2.1	1.6
CDS3035	6	1.8	5.0	1.5	2.1	1.6
CDS4030	8	2.4	4.6	1.4	5.6	4.3
CDS4040	8	2.4	5.7	1.7	5.6	4.3
CDS4045	8	2.4	6.2	1.9	5.6	4.3
CDS5640	10	3.0	6.3	1.9	8.7	6.7
CDS5653	10	3.0	7.7	2.3	8.7	6.7
CDS5668	10	3.0	9.3	2.8	8.7	6.7
CDS5678	10	3.0	10.3	3.1	8.7	6.7

Table 1: CDS Maintenance Indicators and Sediment Storage Capacities

Support

- Drawings and specifications are available at www.contechstormwater.com.
- Site-specific design support is available from our engineers.

Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, sanitary sewer, stormwater, earth stabilization and wastewater treament products. For information, visit www.ContechES.com or call 800.338.1122

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The product(s) described may be protected by one or more of the following US patents: 5,322,629; 5,624,576; 5,707,527; 5,759,415; 5,788,848; 5,985,157; 6,027,639; 6,350,374; 6,406,218; 6,641,720; 6,511,595; 6,649,048; 6,991,114; 6,998,038; 7,186,058; 7,296,692; 7,297,266; 7,517,450 related foreign patents or other patents pending.

CONTECH ENGINEERED SOLUTIONS
800.925.5240
www.ContechES.com

CDS Inspection & Maintenance Log

CDS Model: ______________________ Location: ______________________

Date	Water depth to sediment[1]	Floatable Layer Thickness[2]	Describe Maintenance Performed	Maintenance Personnel	Comments

1. The water depth to sediment is determined by taking two measurements with a stadia rod: one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. If the difference between these measurements is less than the values listed in table 1 the system should be cleaned out. **Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.**

2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.

Stantec

STORMWATER MANAGEMENT &
EROSION CONTROL REPORT
BELMONT DAY SCHOOL
BELMONT, MASSACHUSETTS

APPENDIX K – CULTEC MAINTENANCE GUIDELINES

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Contactor® & Recharger®

Stormwater Chambers The Chamber With The Stripe®

Operation and Maintenance Guidelines

CULTEC™

Operation & Maintenance

This manual contains guidelines recommended by CULTEC, Inc. and may be used in conjunction with, but not to supersede, local regulations or regulatory authorities. OSHA Guidelines must be followed when inspecting or cleaning any structure.

Introduction

The CULTEC Subsurface Stormwater Management System is a high-density polyethylene (HDPE) chamber system arranged in parallel rows surrounded by washed stone. The CULTEC chambers create arch-shaped voids within the washed stone to provide stormwater detention, retention, infiltration, and reclamation. Filter fabric is placed between the native soil and stone interface to prevent the intrusion of fines into the system. In order to minimize the amount of sediment which may enter the CULTEC system, a sediment collection device (stormwater pretreatment device) is recommended upstream from the CULTEC chamber system. Examples of pretreatment devices include, but are not limited to, an appropriately sized catch basin with sump, pretreatment catchment device, oil grit separator, or baffled distribution box. Manufactured pretreatment devices may also be used in accordance with CULTEC chambers. Installation, operation, and maintenance of these devices shall be in accordance with manufacturer's recommendations. Almost all of the sediment entering the stormwater management system will be collected within the pretreatment device.

Best Management Practices allow for the maintenance of the preliminary collection systems prior to feeding the CULTEC chambers. The pretreatment structures shall be inspected for any debris that will restrict inlet flow rates. Outfall structures, if any, such as outlet control must also be inspected for any obstructions that would restrict outlet flow rates. OSHA Guidelines must be followed when inspecting or cleaning any structure.

Operation and Maintenance Requirements

I. Operation

CULTEC stormwater management systems shall be operated to receive only stormwater run-off in accordance with applicable local regulations. CULTEC subsurface stormwater management chambers operate at peak performance when installed in series with pretreatment. Pretreatment of suspended solids is superior to treatment of solids once they have been introduced into the system. The use of pretreatment is adequate as long as the structure is maintained and the site remains stable with finished impervious surfaces such as parking lots, walkways, and pervious areas are properly maintained. If there is to be an unstable condition, such as improvements to buildings or parking areas, all proper silt control measures shall be implemented according to local regulations.

II. Inspection and Maintenance Options

A. The CULTEC system may be equipped with an inspection port located on the inlet row. The inspection port is a circular cast box placed in a rectangular concrete collar. When the lid is removed, a 6-inch (150 mm) pipe with a screw-in plug will be exposed. Remove the plug. This will provide access to the CULTEC Chamber row below. From the surface, through this access, the sediment may be measured at this location. A stadia rod may be used to measure the depth of sediment if any in this row. If the depth of sediment is in excess of 3 inches (76 mm), then this row should be cleaned with high pressure water through a culvert cleaning nozzle. This would be carried out through an upstream manhole or through the CULTEC StormFilter Unit (or other pre-treatment device). CCTV inspection of this row can be deployed through this access port to determine if any sediment has accumulated in the inlet row.

B. If the CULTEC bed is not equipped with an inspection port, then access to the inlet row will be through an upstream manhole or the CULTEC StormFilter.

1. Manhole Access
This inspection should only be carried out by persons trained in confined space entry and sewer inspection services. After the manhole cover has been removed a gas detector must be lowered into the manhole to ensure that there are not high concentrations of toxic gases present. The inspector should be lowered into the manhole with the proper safety equipment as per OSHA requirements. The inspector may be able to observe sediment from this location. If this is not possible, the inspector will need to deploy a CCTV robot to permit viewing of the sediment.

2. **StormFilter Access**
Remove the manhole cover to allow access to the unit. Typically a 30-inch (750 mm) pipe is used as a riser from the StormFilter to the surface. As in the case with manhole access, this access point requires a technician trained in confined space entry with proper gas detection equipment. This individual must be equipped with the proper safety equipment for entry into the StormFilter. The technician will be lowered onto the StormFilter unit. The hatch on the unit must be removed. Inside the unit are two filters which may be removed according to StormFilter maintenance guidelines. Once these filters are removed the inspector can enter the StormFilter unit to launch the CCTV camera robot.

C. The inlet row of the CULTEC system is placed on a polyethylene liner to prevent scouring of the washed stone beneath this row. This also facilitates the flushing of this row with high pressure water through a culvert cleaning nozzle. The nozzle is deployed through a manhole or the StormFilter and extended to the end of the row. The water is turned on and the inlet row is back-flushed into the manhole or StormFilter. This water is to be removed from the manhole or StormFilter using a vacuum truck.

III. Maintenance Guidelines

The following guidelines shall be adhered to for the operation and maintenance of the CULTEC stormwater management system:

A. The owner shall keep a maintenance log which shall include details of any events which would have an effect on the system's operational capacity.

B. The operation and maintenance procedure shall be reviewed periodically and changed to meet site conditions.

C. Maintenance of the stormwater management system shall be performed by qualified workers and shall follow applicable occupational health and safety requirements.

D. Debris removed from the stormwater management system shall be disposed of in accordance with applicable laws and regulations.

IV. Suggested Maintenance Schedules

A. **Minor Maintenance**
The following suggested schedule shall be followed for routine maintenance during the regular operation of the stormwater system:

Frequency	Action
Monthly in first year	Check inlets and outlets for clogging and remove any debris as required.
Spring and Fall	Check inlets and outlets for clogging and remove any debris as required.
One year after commissioning and every third year following	Check inlets and outlets for clogging and remove any debris as required.

B. **Major Maintenance**
The following suggested maintenance schedule shall be followed to maintain the performance of the CULTEC stormwater management chambers. Additional work may be necessary due to insufficient performance and other issues that might be found during the inspection of the stormwater management chambers. (See table on next page)

Major Maintenance *(continued)*

	Frequency	Action
Inlets and Outlets	Every 3 years	• Obtain documentation that the inlets, outlets and vents have been cleaned and will function as intended.
	Spring and Fall	• Check inlet and outlets for clogging and remove any debris as required.
CULTEC Stormwater Chambers	2 years after commissioning	• Inspect the interior of the stormwater management chambers through inspection port for deficiencies using CCTV or comparable technique. • Obtain documentation that the stormwater management chambers and feed connectors will function as anticipated.
	9 years after commissioning every 9 years following	• Clean stormwater management chambers and feed connectors of any debris. • Inspect the interior of the stormwater management structures for deficiencies using CCTV or comparable technique. • Obtain documentation that the stormwater management chambers and feed connectors have been cleaned and will function as intended.
	45 years after commissioning	• Clean stormwater management chambers and feed connectors of any debris. • Determine the remaining life expectancy of the stormwater management chambers and recommended schedule and actions to rehabilitate the stormwater management chambers as required. • Inspect the interior of the stormwater management chambers for deficiencies using CCTV or comparable technique.
	45 to 50 years after commissioning	• Replace or restore the stormwater management chambers in accordance with the schedule determined at the 45-year inspection. • Attain the appropriate approvals as required. • Establish a new operation and maintenance schedule.
Surrounding Site	Monthly in 1st year	• Check for depressions in areas over and surrounding the stormwater management system.
	Spring and Fall	• Check for depressions in areas over and surrounding the stormwater management system.
	Yearly	• Confirm that no unauthorized modifications have been performed to the site.

For additional information concerning the maintenance of CULTEC Subsurface Stormwater Management Chambers, please contact CULTEC, Inc. at 1-800-428-5832.

CULTEC

Chamber of Choice™

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Phone: 203-775-4416 • Toll Free: 800-4-CULTEC • Fax: 203-775-1462
Web: www.cultec.com • E-mail: custservice@cultec.com

STORMWATER MANAGEMENT &
EROSION CONTROL REPORT

BELMONT DAY SCHOOL

BELMONT, MASSACHUSETTS

APPENDIX L – MOUNDING ANALYSIS

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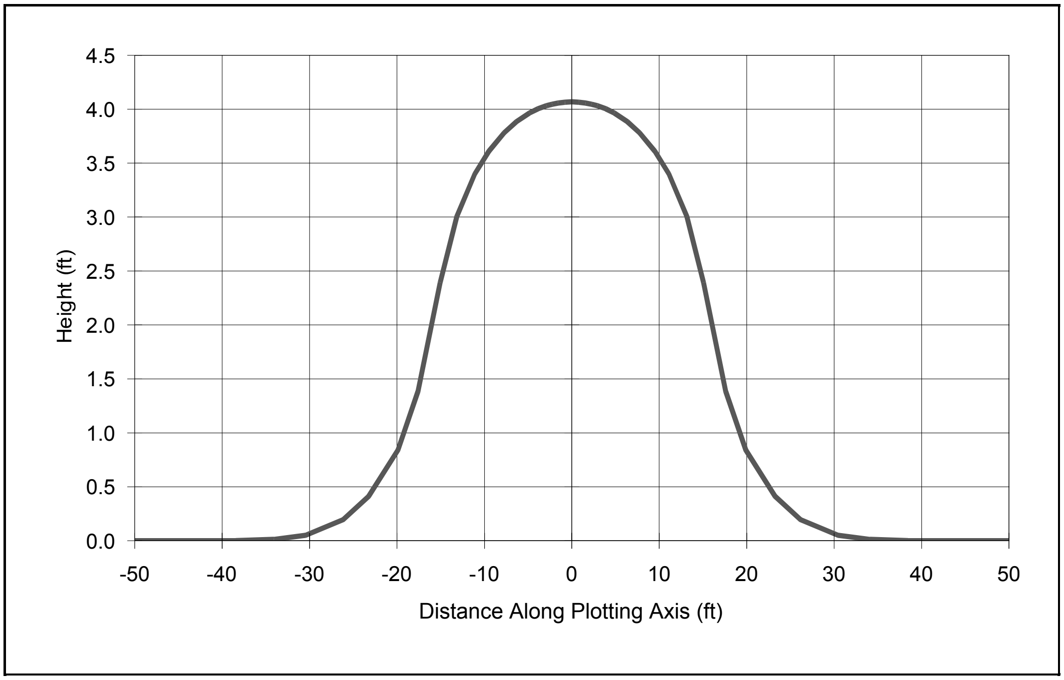
PB4B CHAMBERS

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: Stantec

PROJECT: Belmont Day School - Chambers

ANALYST: RBL

DATE: 1/11/2017 TIME: 1:45:09 PM

INPUT PARAMETERS

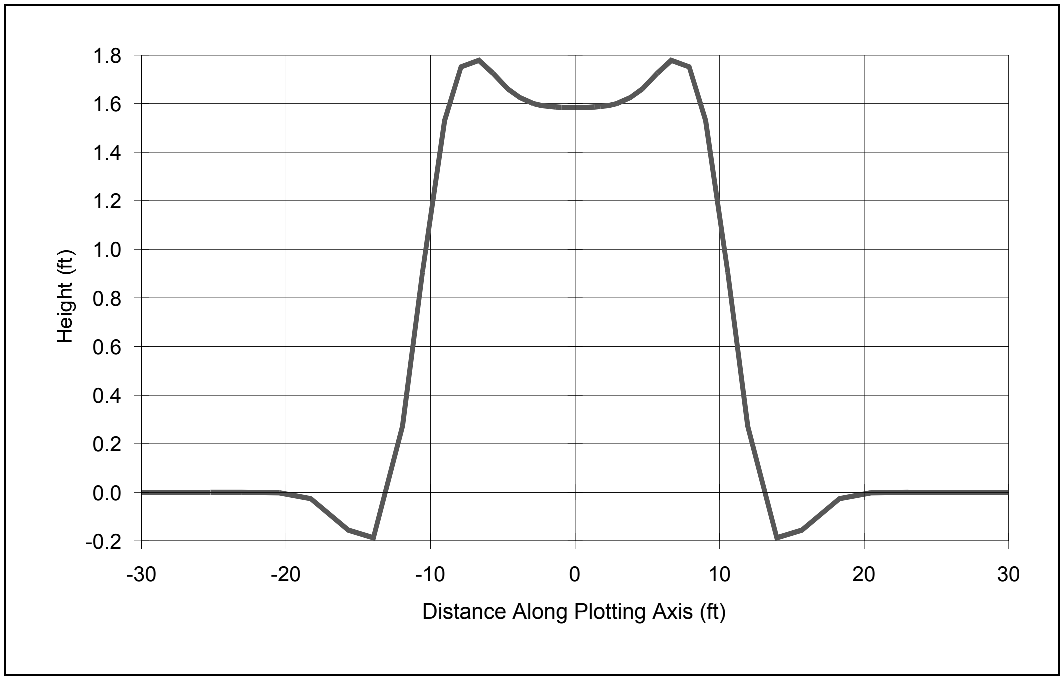
Application rate: 1.24 c.ft/day/sq. ft
Duration of application: 1 days
Fillable porosity: 0.3
Hydraulic conductivity: 2.04 ft/day
Initial saturated thickness: 4.4 ft
Length of application area: 227.5 ft
Width of application area: 31.67 ft
No constant head boundary used
Plotting axis from Y-Axis: 90 degrees
Edge of recharge area:
positive X: 15.8 ft
positive Y: 0 ft
Total volume applied: 8934.107 c.ft

MODEL RESULTS

X (ft)	Y (ft)	Plot Axis (ft)	Mound Height (ft)
-50	0	-50	0
-42	0	-42	0
-34.1	0	-34	0.01
-26.1	0	-26	0.2
-19.9	0	-20	0.84
-15	0	-15	2.39
-11.1	0	-11	3.4
-7.7	0	-8	3.78
-4.8	0	-5	3.96
-2.9	0	-3	4.03
-1.6	0	-2	4.06
0	0	0	4.07
1.6	0	2	4.06
2.9	0	3	4.03
4.8	0	5	3.96
7.7	0	8	3.78
11.1	0	11	3.4
15	0	15	2.39
19.9	0	20	0.84
26.1	0	26	0.2
34.1	0	34	0.01
42	0	42	0
50	0	50	0

POROUS PAVEMENT PB6A & PB6B

Groundwater Mounding Analysis (Hantush's Method using Glover's Solution)



COMPANY: Stantec

PROJECT: Belmont Day School - Porous Pavement

ANALYST: RBL

DATE: 12/20/2016 TIME: 9:59:11 AM

INPUT PARAMETERS

Application rate: 0.475 c.ft/day/sq. ft
Duration of application: 1 days
Fillable porosity: 0.3
Hydraulic conductivity: 2.04 ft/day
Initial saturated thickness: 0.5 ft
Length of application area: 700 ft
Width of application area: 21.6 ft
No constant head boundary used
Plotting axis from Y-Axis: 90 degrees
Edge of recharge area:
positive X: 10.8 ft
positive Y: 0 ft
Total volume applied: 7182 c.ft

MODEL RESULTS

X (ft)	Y (ft)	Plot Axis (ft)	Mound Height (ft)
-30	0	-30	0
-25.2	0	-25	0
-20.5	0	-20	0
-15.7	0	-16	-0.16
-11.9	0	-12	0.27
-9	0	-9	1.53
-6.7	0	-7	1.78
-4.6	0	-5	1.66
-2.9	0	-3	1.6
-1.7	0	-2	1.59
-0.9	0	-1	1.58
0	0	0	1.58
0.9	0	1	1.58
1.7	0	2	1.59
2.9	0	3	1.6
4.6	0	5	1.66
6.7	0	7	1.78
9	0	9	1.53
11.9	0	12	0.27
15.7	0	16	-0.16
20.5	0	20	0
25.2	0	25	0
30	0	30	0

APPENDIX M – SITE PLANS (BOUND SEPARATELY)

L0.01 – Erosion and Sediment Control Plan

L0.02 – Erosion and Sediment Control Plan

L3.01 – Utility Plan

L3.02 - Utility Plan

L4.02 – Utility Details