J.M. O'REILLY & ASSOCIATES, INC.
PROFESSIONAL ENGINEERING, LAND SURVEYING & ENVIRONMENTAL SERVICES
Site Development • Property Line • Subdivision • Sanitary • Land Court • Environmental Permitting

STORMWATER MANAGEMENT REPORT
&
OPERATION & MAINTENANCE MANUAL

OVERFLOW PARKING PROJECT

TO THE REAR OF
133 QUEEN ANNE ROAD
Assessors' Map 58, Parcel G3-13
Harwich, MA

February 14, 2024

PREPARED FOR:

THE FAMILY PANTRY
133 QUEEN ANNE ROAD
HARWICH, MA

PREPARED BY:

J.M. O'REILLY & ASSOCIATES, INC.
1573 MAIN STREET
P.O. BOX 1773
BREWSTER, MA 02631
508-896-6601

John M. O'Reilly, P.E., P.L.S.
J.M. O'REILLY & ASSOCIATES, INC.

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1. Property Description

Lot Area:	25,425 SF+/-
Parcel Improvements:	The parcel is vacant and is adjacent to the rear garden and parking areas for the Pantry.
Wetlands:	There are no wetlands within 100 feet of project area.
Soils:	The Barnstable Soil Survey (1993) places the parcel within the CdB soil unit, Carver- Medium to Coarse sand, 3 to 8 percent.
Groundwater:	Groundwater elevation is anticipated to be about elevation 16 to 18. Depth to groundwater is estimated to be 31 feet or greater below the existing grade of the project site. See attached Cape Cod Commission GW Data Viewer's printout map for the property (attached), which shows 2' groundwater contours.
Zone II:	The parcel is not located within a Zone II Groundwater Recharge mapped area.
Topography:	The topography of the project area slopes to the north with about a 3 to 4 foot drop on elevation.
Site Conditions:	The project site is vacant woodlands and is a portion of the Town of Harwich's property.

2. Stormwater Management Plan Overview

Stormwater management controls are proposed for the leased portion of the Town of Harwich municipal property which will serve as overflow parking for the Family Pantry of Cape Cod (Pantry) operation. The overflow parking will provide much needed parking space for the staff & clients associated with the Pantry.

The Pantry has obtained a lease with the Town of Harwich to utilize a portion of the Town's land for the parking area. The parking area is located to the east of a previously leased area from the town which is currently the garden area for the Pantry. The project area of land to be developed is 25,425 SF+/-.

The proposed project area consists of the entire proposed gravel/T-base parking area, and surrounding landscaped/grassed areas. The parking area is graded to match the existing topography which currently slopes to the north. The slope through the parking area is about 3%. (Note: HydroCAD calculations used a CN=98 for impervious pavement in this area, so that in the event this parking lot is paved in the future, the stormwater system will be adequately sized.)

The proposed post-development stormwater management plan consists of one bio-retention swale to provide treatment of parking area runoff. The swale is then connected to two (2) 12" dia. raised inlet drains which will allow stormwater from larger storms to overflow into the proposed 62' x 12' x 6' leaching facility. The stormwater system has been designed to retain all runoff from the 100-year storm event.

As shown in the HydroCAD Modeling report, the stormwater system has been designed to retain all stormwater runoff for the 100-year storm event. See Table 1 below for peak discharge comparison.

Table 1: Peak Discharge Comparison

Storm Event (year)	Total Discharge	
	Pre-Dev. (ft^3/sec)	Post-Dev. (ft^3/sec)
2	0	0
10	0.01	0
25	0.02	0
100	0.14	0

For HydroCAD modeling analysis of the stormwater systems, the following methods and assumptions were used:

- Simple Dynamic
- Rawls Rate of 8.27 in/hr for sands within the subsoil layers for subsurface leaching galleys.

The proposed stormwater controls also meet the minimum 90% Total Suspended Solids (TSS) removal requirements of the Town of Brewster Stormwater Management Bylaw, as shown in Appendix C: TSS Removal Sheets. The proposed TSS removal rate is 94%.

3. Erosion Control Plan - Temporary Siltation Barrier & Silt Socks

Prior to start of construction, the following steps shall be taken to address erosion:

- The erosion controls shall include a row of staked 9-inch straw wattles surrounding the project area. the project area is defined by the property boundaries to the north and south and the leased boundaries to the west and west.
- Once the driveway stormwater systems are installed, a row of staked 9-inch straw wattles shall be set surrounding the swale, to prevent silt and debris from clogging and/or damaging the dry water quality swales and subsurface leaching facilities.
- The erosion controls shall be monitored and corrected during the entire construction phase and until the site has been stabilized with ground cover and/or landscape mulch.
- Contractor shall be required to provide extra siltation controls in case a repair is needed to the straw wattles.

4. Massachusetts Stormwater Management Design Standards

The following is a description of how the proposed project meets the Massachusetts Stormwater Handbook design standards.

Standard 1: No new untreated discharges:
This standard is met since there are no new untreated stormwater discharges proposed. See Standards 4-6 calculations.

Standard 2: Maintain Pre-development peak discharge rate:
This standard has been met. As shown in the HydroCAD Modeling report, the proposed stormwater controls will retain all stormwater at the peak discharge rate for the 2-, 10-, 25- and 100-year storms. See Table 1 in the Stormwater Management Plan Overview section.

Standard 3: Groundwater Recharge:
This standard is met. The proposed stormwater management systems are sized so that the total recharge volume provided exceeds the minimum groundwater recharge volume specified in the handbook and the proposed stormwater recharge galleys will drawdown within 72 hours of a storm event. In accordance with the MA Stormwater Manual, the required recharge volume factor (F) required across the impervious area (A) is 0.6 inches per hour for hydraulic soil group A soils. Coarse Sand (Rawls Rate: 8.27 inches per hour) has been used in the sizing of the stormwater recharge galleys. Refer to the HydroCAD Stormwater Modeling Report in Appendix. The required recharge volume is calculated based on the total parking area.

- Required Recharge Volume $R_v = F \times A$ = (0.6 in)(1 ft/12 in)(17,987 sf) = 900 cf (parking area)
- Recharge Storage Provided (Subsurface leaching facility) = 2,489 cf > 900 cf
- The drawdown for the subsurface leaching facilities for the parking area is 24 hours < 72 hour maximum allowance.

Standard 4: Water Quality:
This standard has been met. Driveway area stormwater controls will remove 94% of TSS with the bio-retention swale followed by a sub-surface leaching facility. TSS removal calculation tables for roadway runoff are included in the Appendix. In accordance with the MA Stormwater Manual, the required water quality depth (Dwq) across the impervious area (A) is 1.0 inches per hour in areas containing soils with rapid infiltration rate greater than 2.4 in/hr. The required water quality volume is based on the total parking area.

- Required Water Quality Volume $V_{wq} = D_{wq} \times A$ = (1.0 in)(1 ft/12 in)(17,987 sf) = 1,499 cf (parking area)
- Water Quality Storage Provided (Bio-Retention Swale) = 1,576 cf > 1,499 cf

Standard 5: Land uses with higher potential pollutant loads:
This standard has been met. The proposed use is a single-family residence.

Standard 6: Stormwater discharges within Zone II or Interim Wellhead protection area of a public water supply and stormwater discharges near or to any critical area.

This standard has been met. Not applicable as the site is not within a Zone 2 contributory area.

Standard 7: Redevelopment:

This standard is not applicable, the project is a new development.

Standard 8: Construction Erosion Control Plan:

The project is subject to the proposed Erosion Control Plan as described in this report. Straw wattles and erosion control blankets shall be implemented as required to mitigate soil erosion.

Standard 9: Long Term Operation and Maintenance Plan:

A long-term O&M plan has been submitted with this report, refer to Stormwater Operation and Maintenance Manual. The property owners will operate and maintain the stormwater systems.

Standard 10: Illicit Discharges:

This standard is met since there are no illicit discharges at this site and no illicit discharges proposed.

OPERATION AND MAINTENANCE:

5. Owner and Responsible Party

The owner and responsible party for all Stormwater Pollution Control tasks detailed in this Stormwater Operation & Maintenance Manual for 133 Queen Anne Road Rear Parking Area, Harwich, MA:

Owner & Operator:

The Family Pantry of Cape Cod
133 Queen Anne Road
Harwich, MA 02645

508-432-6519

6. Schedule of Inspection and Maintenance of Stormwater Management Systems

Bio-Retention Swale

The swale is to be inspected and maintained by the owner. The following responsibilities are included:

- Inspections:
  - Inspect the swales quarterly.
  - Ensure the swales are operating as designed and completely draining in between storm events.
  - Inspect swales for subsidence, erosion, cracking or tree growth on the embankment and sediment accumulation / erosion within the swale.
- Maintenance:
  - Remove accumulated trash, leaves and debris at least monthly.
  - Remove accumulated sediment at least quarterly.
  - Mulch areas once per year.
  - Remove dead vegetation twice per year.
  - Prune once per year.
  - Do not store snow in swale areas.
  - Check for signs of erosion and repair as needed. After removing sediment, replace any vegetation damaged during clean-out by either reseeding or re-sodding.
- Long Term:
  - Replace entire soil media and all vegetation when the swale is experiencing slow drainage and extended ponding within the swale. It would be recommended that a professional engineer evaluate the swale and then make final corrective action proposal.

Subsurface Leaching Facility

The subsurface leaching facility is to be inspected and maintained by the owner. The following responsibilities are included:

- Inspections:
  - Inspect the subsurface leaching facility at least twice per year.
- Maintenance:
  - If inspection of leaching facility shows that it does not dewater completely within 72 hours of a storm event, the owner shall take immediate steps to restore the function of the system and shall consult a qualified stormwater professional.
  - Remove any trash or debris that may clog the system.
  - Cleaning may be done by vacuum truck. All sediment and hydrocarbons shall be properly disposed of in accordance with local, state and federal guidelines and regulations.

7. Long Term Lawn Care & Pollution Prevention Plan

Description of Pollutant Sources:

- Light vehicle traffic

Source Control Best Management Practices

- There shall be no storage of items or materials which will be subject to the weather.
- Good housekeeping measures shall be implemented throughout the site to keep the parking areas clean of debris. Regularly pick up areas as needed.
- The use of winter de-icing sand and salt materials shall be minimized to the maximum extent practicable.
- Winter de-icing sand and salt materials shall be stored indoors.
- Snow storage shall be on paved or gravel surfaces and not within the swale.
- Immediately clean up any spillage on paved areas and dispose of wastes properly.

8. Emergency Spill Cleanup Plan

1. The owner of the facility shall have a designated person with overall responsibility for spill response cleanup.

2. In the event of a spill the following shall be notified:

A. Harwich Fire Department	(508) 430-7546
(for a gasoline or hazardous material spill)	911
B. Massachusetts D.E.P. Emergency Response	(800) 304-1133
C. Harwich Health Department	(508) 430-7509

3. Cleanup of spills shall begin immediately.

O&M Log Form

Inspector Initials	Item Inspected	Date	Time	Condition: Good	Condition: Clean-out Needed	Condition: Repair Needed	Repaired Date

O&M Log form records to be maintained by property manager for a minimum of three years

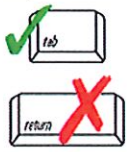
APPENDICES

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

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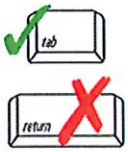

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Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

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.

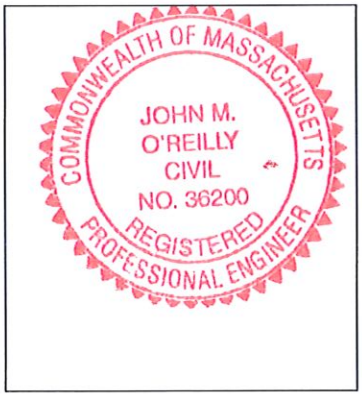
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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



Signature and Date 2.14.24

Checklist

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

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

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

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

Standard 1: No New Untreated Discharges

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

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

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

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

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

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

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

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

☐ Static ☒ Simple Dynamic ☐ Dynamic Field[1]

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

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

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

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

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

Standard 4: Water Quality

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

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

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

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

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

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

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

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

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

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

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

☐ All exposure has been eliminated.

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

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

Standard 6: Critical Areas

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

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

Checklist for Stormwater Report

Checklist (continued)

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

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

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

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

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

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

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

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

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

Standard 9: Operation and Maintenance Plan

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

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

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

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

Standard 10: Prohibition of Illicit Discharges

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

☐ An Illicit Discharge Compliance Statement is attached;

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

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: PARKING AREA FOR PANTRY

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Water Quality Swale - Dry	0.70	1.00	0.70	0.30
Subsurface Infiltration Structure	0.80	0.30	0.24	0.06
	0.00	0.06	0.00	0.06
	0.00	0.06	0.00	0.06
	0.00	0.06	0.00	0.06

Total TSS Removal = 94%

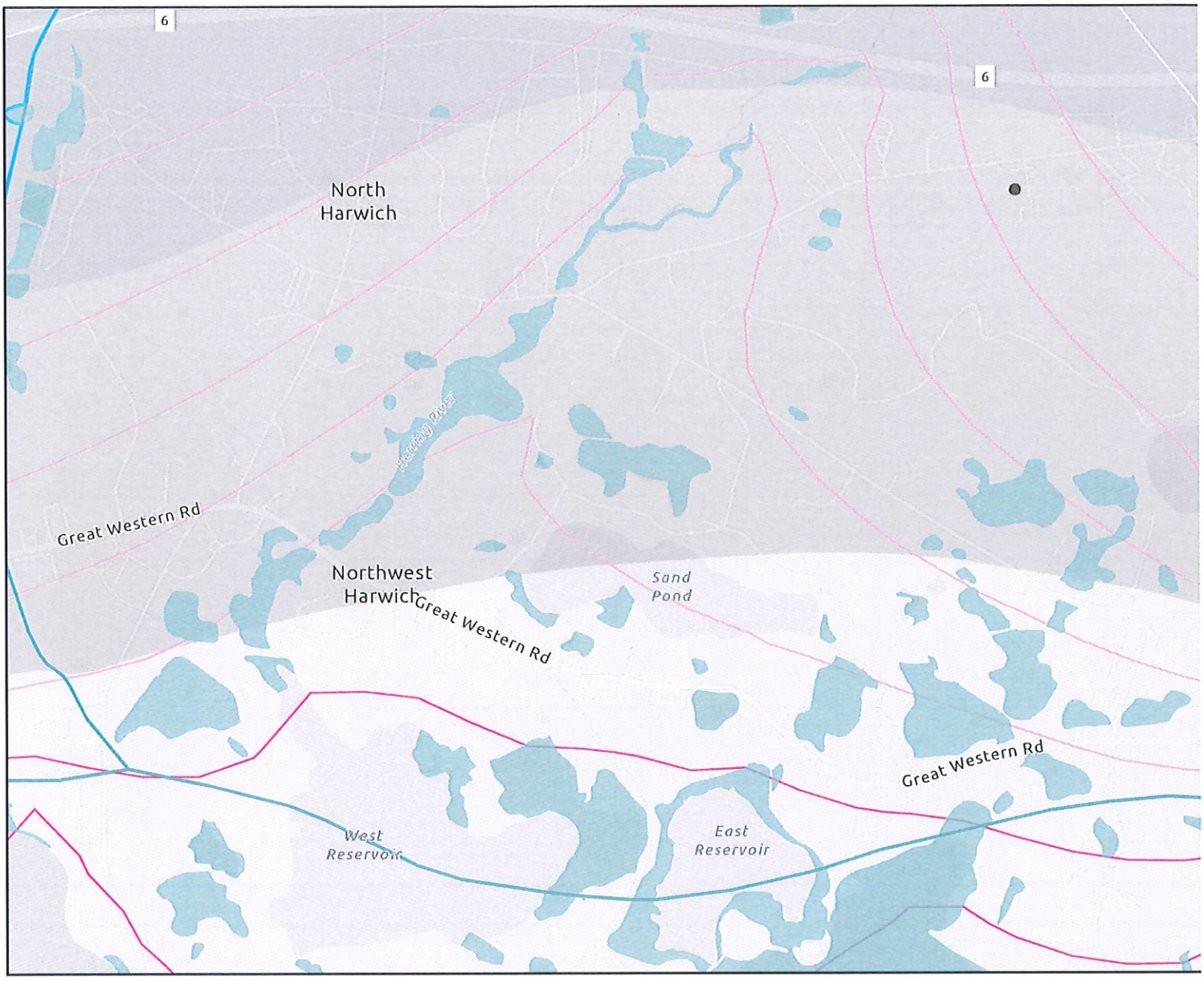
Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: FAMILY PANTRY 9516
Prepared By: JMO
Date: 1/12/2023

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

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

ArcGIS Web Map



2/13/2024, 1:42:50 PM

Index Well Area
Wetland
Cape Cod Water Tables: 2ft contours
< 10 ft.
< 10 ft.
< 20 ft.
< 20 ft.
< 20 ft.
< 20 ft.
< 20 ft.
< 30 ft.
< 30 ft.
< 30 ft.
Zone, Annual Range of Groundwater Level
A, 0-2 feet
B, 2-3 feet
C, 3-4 feet

0
0

Esri Community
GeoTechnologies,

Esri Community Maps Contributors, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS | Cape Cod Commission: Water Resou

PRE-CONSTRUCTION
- WATERSHEDS

VACANT PROPERTY -
LEASED LAND

SITE RUNOFF

Subcat Reach Pond Link

Routing Diagram for PRE-DEV
Prepared by J M O'Reilly & Associates Inc, Printed 2/13/2024

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	Type III 24-hr		Default	24.00	1	3.26	2
2	10-Year	Type III 24-hr		Default	24.00	1	4.72	2
3	25-Year	Type III 24-hr		Default	24.00	1	5.64	2
4	100-Year	Type III 24-hr		Default	24.00	1	7.04	2

Time span=0.00-25.00 hrs, dt=0.01 hrs, 2501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1W: VACANT PROPERTY - Runoff Area=25,425 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=36 Runoff=0.00 cfs 0.000 af

Link 1: SITE RUNOFF Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 0.584 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
100.00% Pervious = 0.584 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1W: VACANT PROPERTY - LEASED LAND

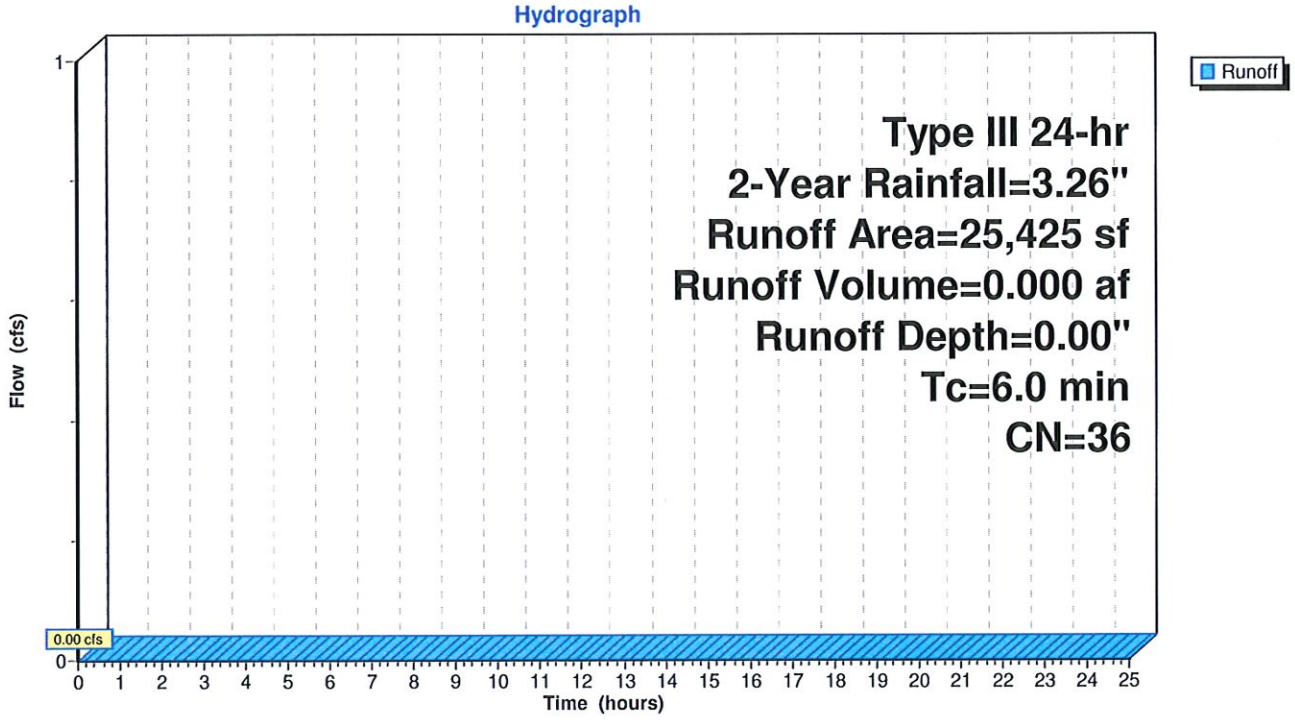
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link 1 : SITE RUNOFF

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.26"

Area (sf)	CN	Description
25,425	36	Woods, Fair, HSG A
25,425		100.00% Pervious Area

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

Subcatchment 1W: VACANT PROPERTY - LEASED LAND

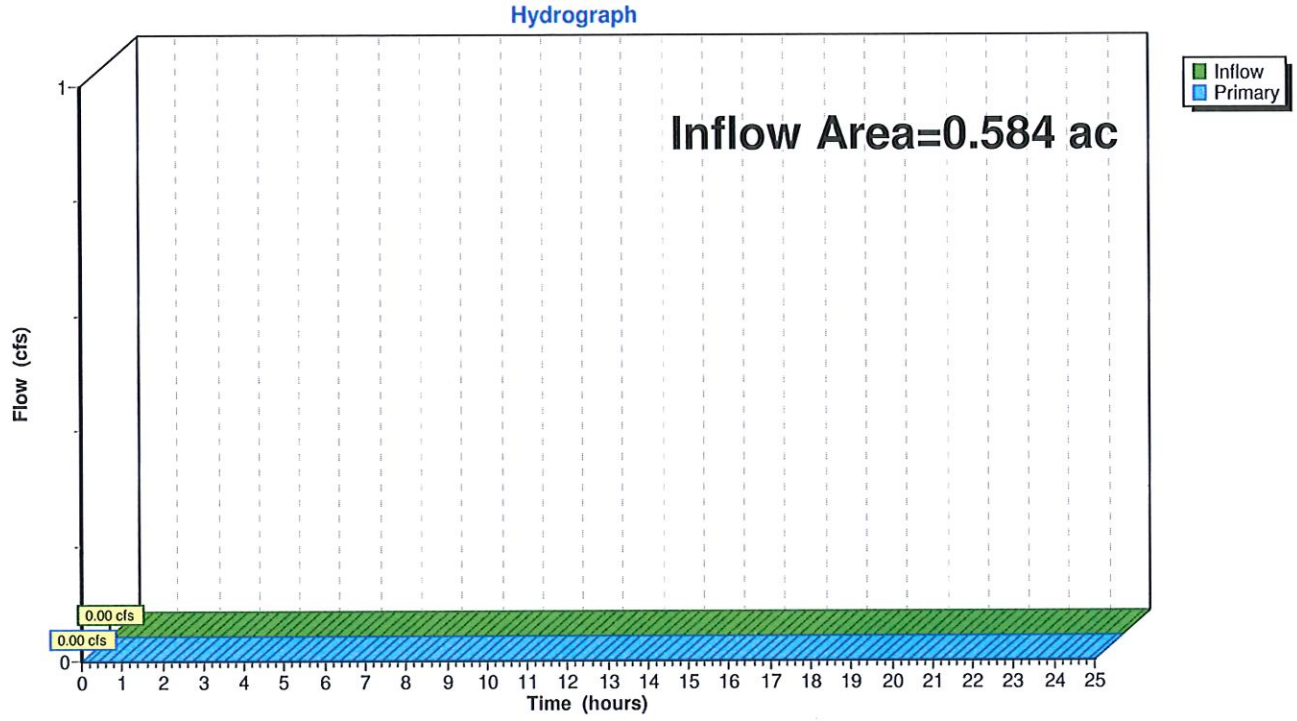


Summary for Link 1: SITE RUNOFF

Inflow Area = 0.584 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node LP

Primary outflow = Inflow, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Link 1: SITE RUNOFF



Time span=0.00-25.00 hrs, dt=0.01 hrs, 2501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1W: VACANT PROPERTY - Runoff Area=25,425 sf 0.00% Impervious Runoff Depth=0.07"
Tc=6.0 min CN=36 Runoff=0.01 cfs 0.003 af

Link 1: SITE RUNOFF Inflow=0.01 cfs 0.003 af
Primary=0.01 cfs 0.003 af

Total Runoff Area = 0.584 ac Runoff Volume = 0.003 af Average Runoff Depth = 0.07"
100.00% Pervious = 0.584 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1W: VACANT PROPERTY - LEASED LAND

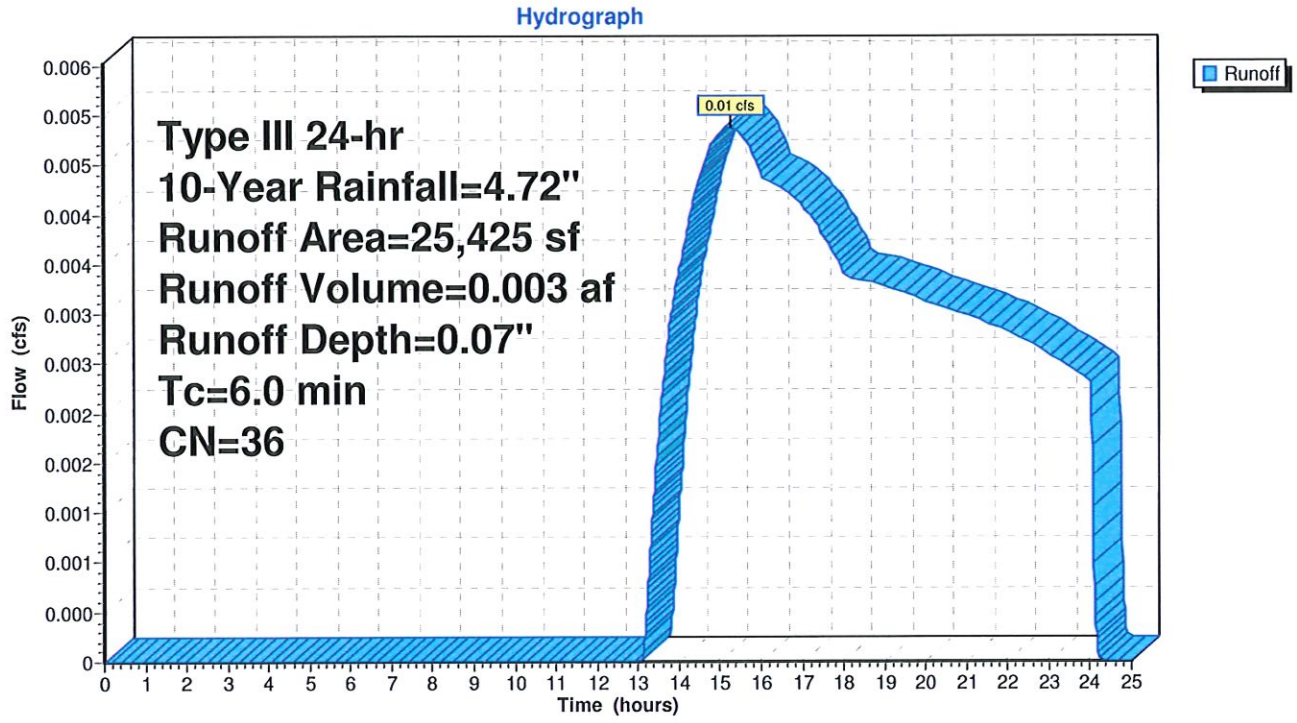
Runoff = 0.01 cfs @ 15.26 hrs, Volume= 0.003 af, Depth= 0.07"
Routed to Link 1 : SITE RUNOFF

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.72"

Area (sf)	CN	Description
25,425	36	Woods, Fair, HSG A
25,425		100.00% Pervious Area

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

Subcatchment 1W: VACANT PROPERTY - LEASED LAND

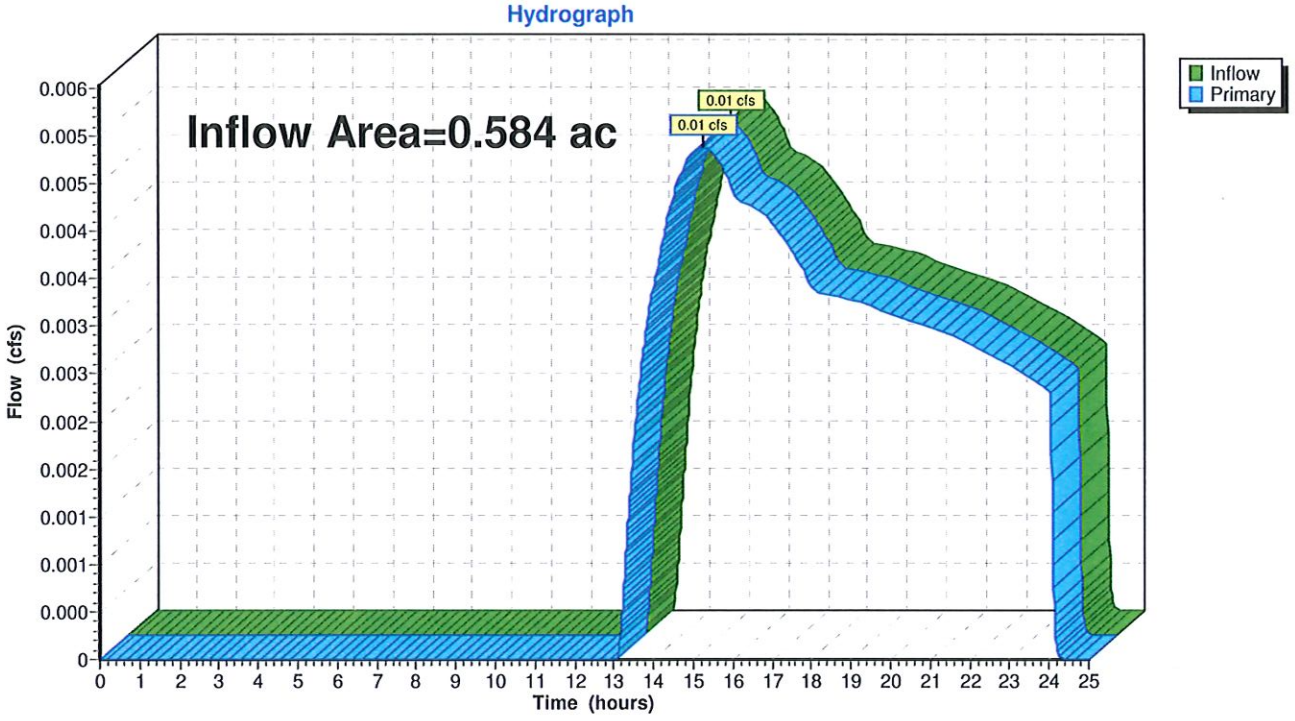


Summary for Link 1: SITE RUNOFF

Inflow Area = 0.584 ac, 0.00% Impervious, Inflow Depth = 0.07" for 10-Year event
Inflow = 0.01 cfs @ 15.26 hrs, Volume= 0.003 af
Primary = 0.01 cfs @ 15.26 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node LP

Primary outflow = Inflow, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Link 1: SITE RUNOFF



Time span=0.00-25.00 hrs, dt=0.01 hrs, 2501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1W: VACANT PROPERTY - Runoff Area=25,425 sf 0.00% Impervious Runoff Depth=0.22"
Tc=6.0 min CN=36 Runoff=0.02 cfs 0.011 af

Link 1: SITE RUNOFF Inflow=0.02 cfs 0.011 af
Primary=0.02 cfs 0.011 af

Total Runoff Area = 0.584 ac Runoff Volume = 0.011 af Average Runoff Depth = 0.22"
100.00% Pervious = 0.584 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1W: VACANT PROPERTY - LEASED LAND

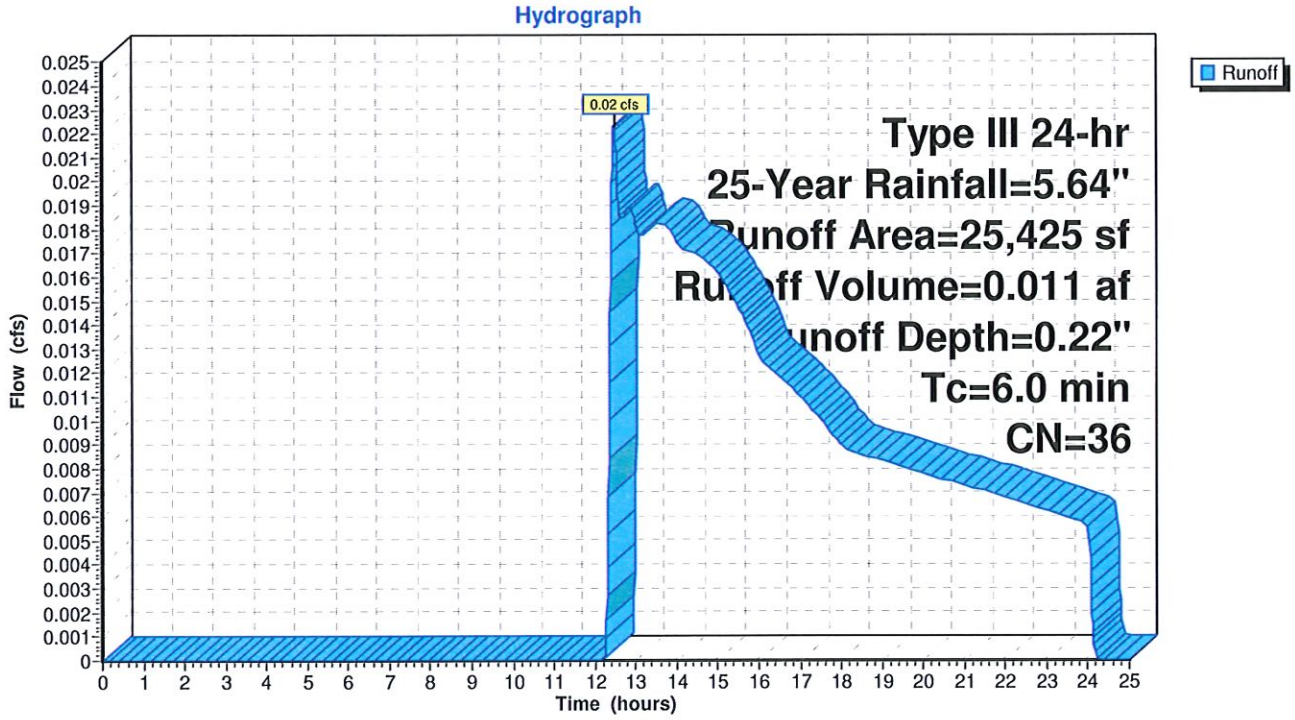
Runoff = 0.02 cfs @ 12.48 hrs, Volume= 0.011 af, Depth= 0.22"
Routed to Link 1 : SITE RUNOFF

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.64"

Area (sf)	CN	Description
25,425	36	Woods, Fair, HSG A
25,425		100.00% Pervious Area

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

Subcatchment 1W: VACANT PROPERTY - LEASED LAND

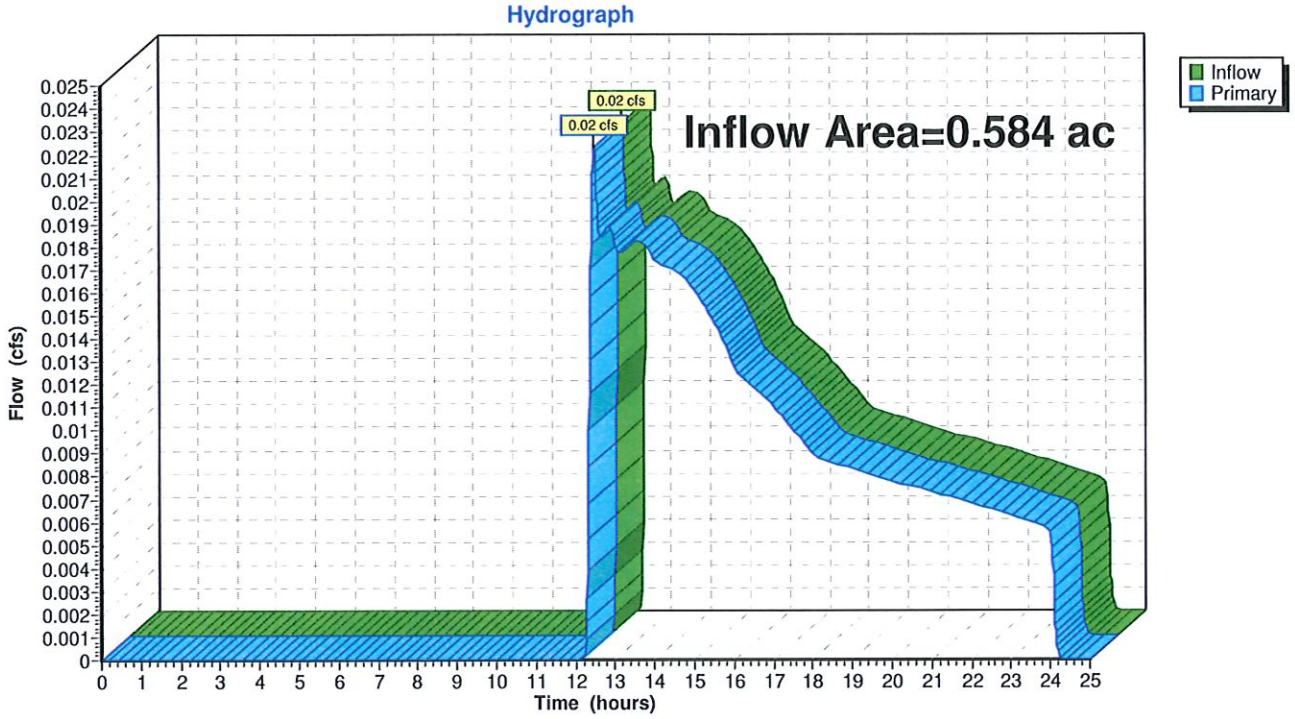


Summary for Link 1: SITE RUNOFF

Inflow Area = 0.584 ac, 0.00% Impervious, Inflow Depth = 0.22" for 25-Year event
Inflow = 0.02 cfs @ 12.48 hrs, Volume= 0.011 af
Primary = 0.02 cfs @ 12.48 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node LP

Primary outflow = Inflow, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Link 1: SITE RUNOFF



Time span=0.00-25.00 hrs, dt=0.01 hrs, 2501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1W: VACANT PROPERTY - Runoff Area=25,425 sf 0.00% Impervious Runoff Depth=0.57"
Tc=6.0 min CN=36 Runoff=0.14 cfs 0.028 af

Link 1: SITE RUNOFF Inflow=0.14 cfs 0.028 af
Primary=0.14 cfs 0.028 af

Total Runoff Area = 0.584 ac Runoff Volume = 0.028 af Average Runoff Depth = 0.57"
100.00% Pervious = 0.584 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1W: VACANT PROPERTY - LEASED LAND

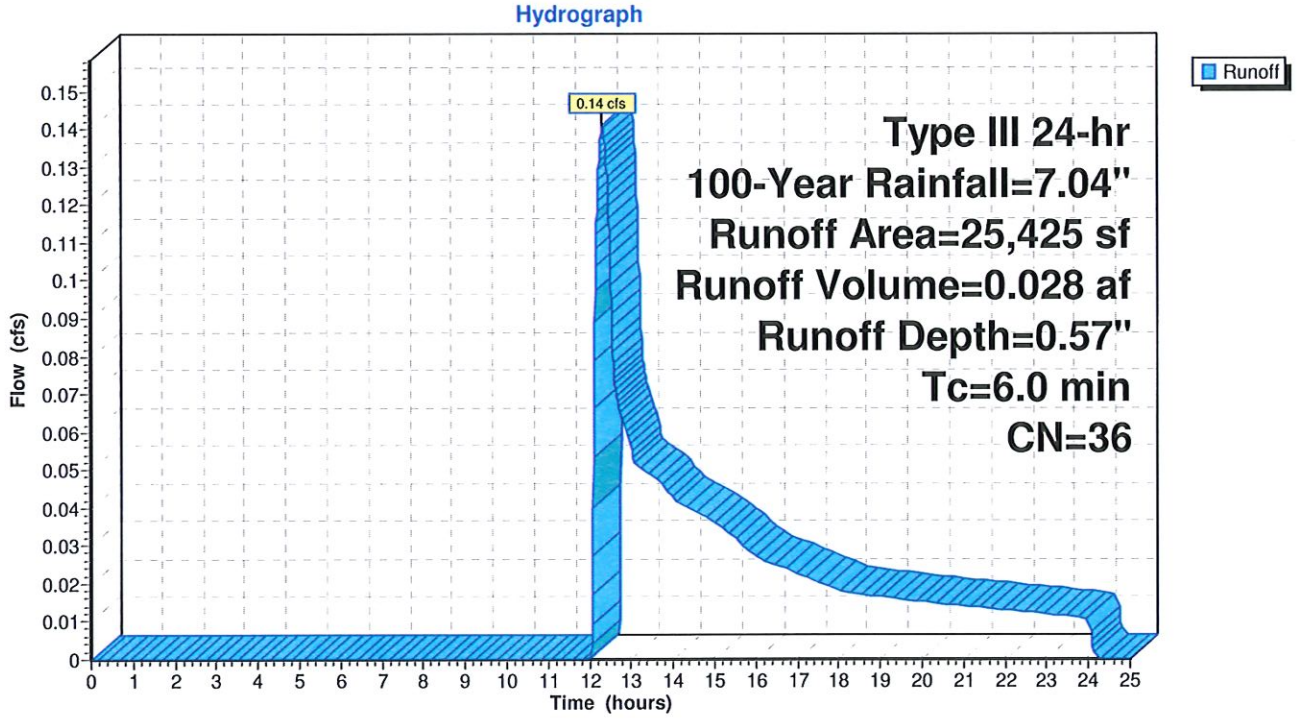
Runoff = 0.14 cfs @ 12.33 hrs, Volume= 0.028 af, Depth= 0.57"
Routed to Link 1 : SITE RUNOFF

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.04"

Area (sf)	CN	Description
25,425	36	Woods, Fair, HSG A
25,425		100.00% Pervious Area

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

Subcatchment 1W: VACANT PROPERTY - LEASED LAND

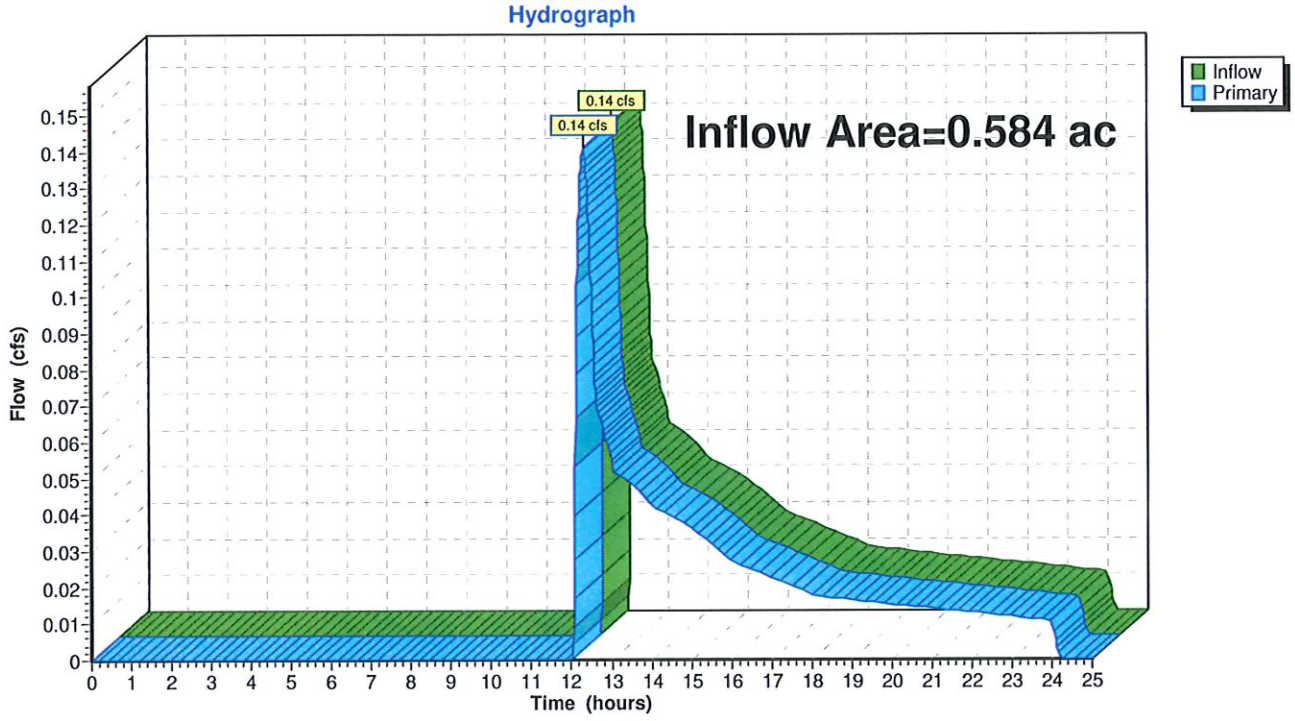


Summary for Link 1: SITE RUNOFF

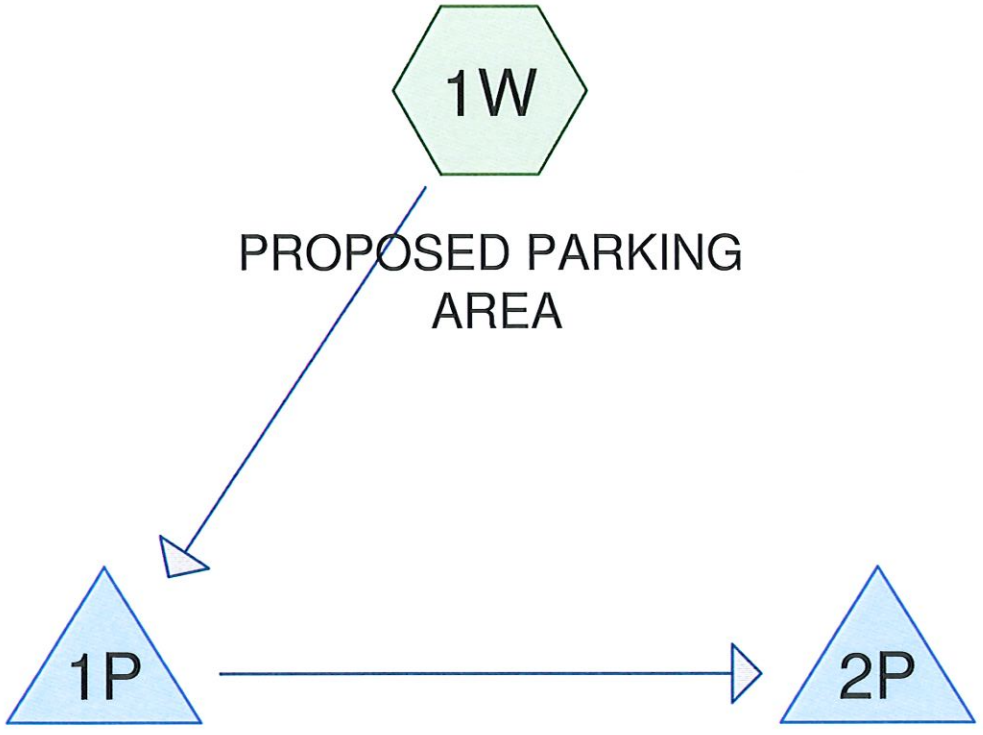
Inflow Area = 0.584 ac, 0.00% Impervious, Inflow Depth = 0.57" for 100-Year event
Inflow = 0.14 cfs @ 12.33 hrs, Volume= 0.028 af
Primary = 0.14 cfs @ 12.33 hrs, Volume= 0.028 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node LP

Primary outflow = Inflow, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Link 1: SITE RUNOFF



POST-CONSTRUCTION WATERSHEDS



Subcat Reach Pond Link

Routing Diagram for POST-DEV - PARKING AREA
Prepared by J M O'Reilly & Associates Inc, Printed 2/13/2024

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	Type III 24-hr		Default	24.00	1	3.26	2
2	10-Year	Type III 24-hr		Default	24.00	1	4.72	2
3	25-Year	Type III 24-hr		Default	24.00	1	5.64	2
4	100-Year	Type III 24-hr		Default	24.00	1	7.04	2

Time span=0.00-25.00 hrs, dt=0.01 hrs, 2501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1W: PROPOSED PARKING Runoff Area=25,425 sf 70.75% Impervious Runoff Depth=1.52"
Tc=6.0 min CN=81 Runoff=1.03 cfs 0.074 af

Pond 1P: BIO-RETENTION SWALE Peak Elev=49.10' Storage=1,112 cf Inflow=1.03 cfs 0.074 af
Discarded=0.12 cfs 0.074 af Primary=0.00 cfs 0.000 af Outflow=0.12 cfs 0.074 af

Pond 2P: LEACHING FACILITY (62' x 12' x 6') Peak Elev=40.50' Storage=0 cf Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 0.584 ac Runoff Volume = 0.074 af Average Runoff Depth = 1.52"
29.25% Pervious = 0.171 ac 70.75% Impervious = 0.413 ac

Summary for Subcatchment 1W: PROPOSED PARKING AREA

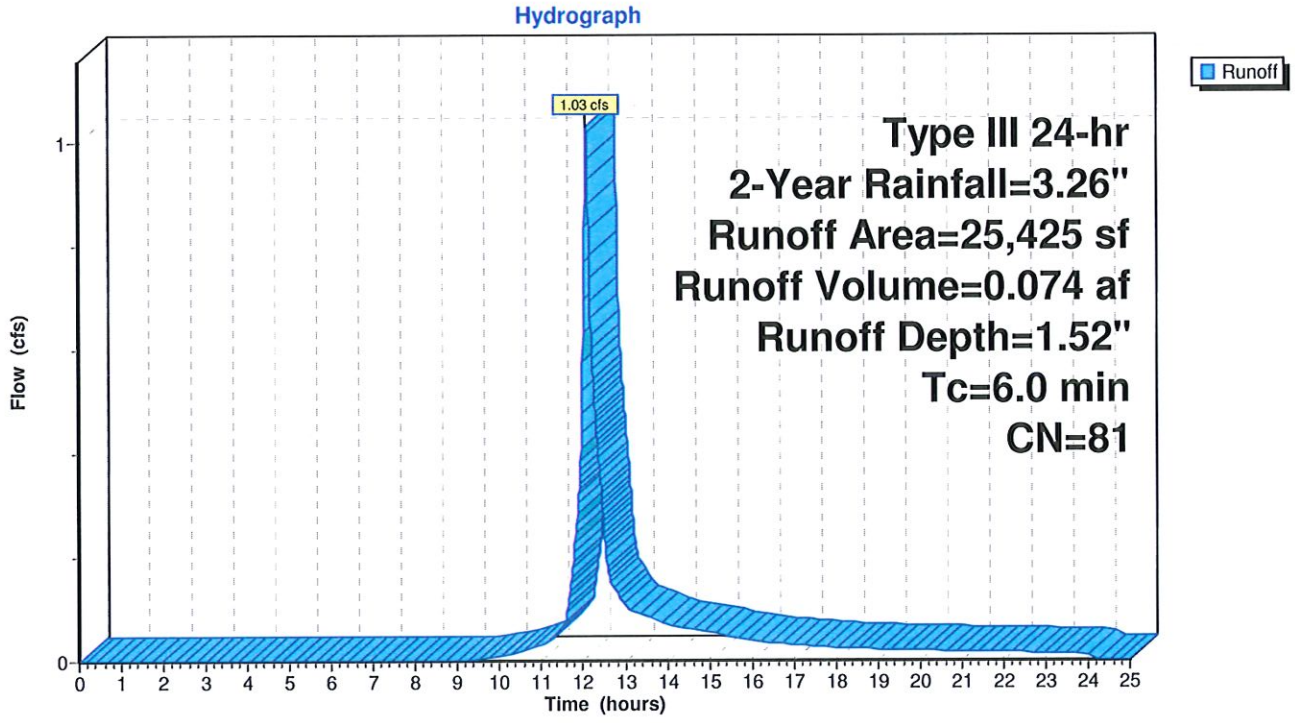
Runoff = 1.03 cfs @ 12.09 hrs, Volume= 0.074 af, Depth= 1.52"
Routed to Pond 1P : BIO-RETENTION SWALE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.26"

Area (sf)	CN	Description
17,987	98	Paved parking, HSG A
7,438	39	>75% Grass cover, Good, HSG A
25,425	81	Weighted Average
7,438		29.25% Pervious Area
17,987		70.75% Impervious Area

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

Subcatchment 1W: PROPOSED PARKING AREA



Summary for Pond 1P: BIO-RETENTION SWALE

Inflow Area = 0.584 ac, 70.75% Impervious, Inflow Depth = 1.52" for 2-Year event
Inflow = 1.03 cfs @ 12.09 hrs, Volume= 0.074 af
Outflow = 0.12 cfs @ 12.93 hrs, Volume= 0.074 af, Atten= 89%, Lag= 50.6 min
Discarded = 0.12 cfs @ 12.93 hrs, Volume= 0.074 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 2P : LEACHING FACILITY (62' x 12' x 6')

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 49.10' @ 12.93 hrs Surf.Area= 614 sf Storage= 1,112 cf

Plug-Flow detention time= 78.5 min calculated for 0.074 af (100% of inflow)
Center-of-Mass det. time= 78.5 min (917.1 - 838.6)

Volume	Invert	Avail.Storage	Storage Description
#1	44.00'	2,182 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

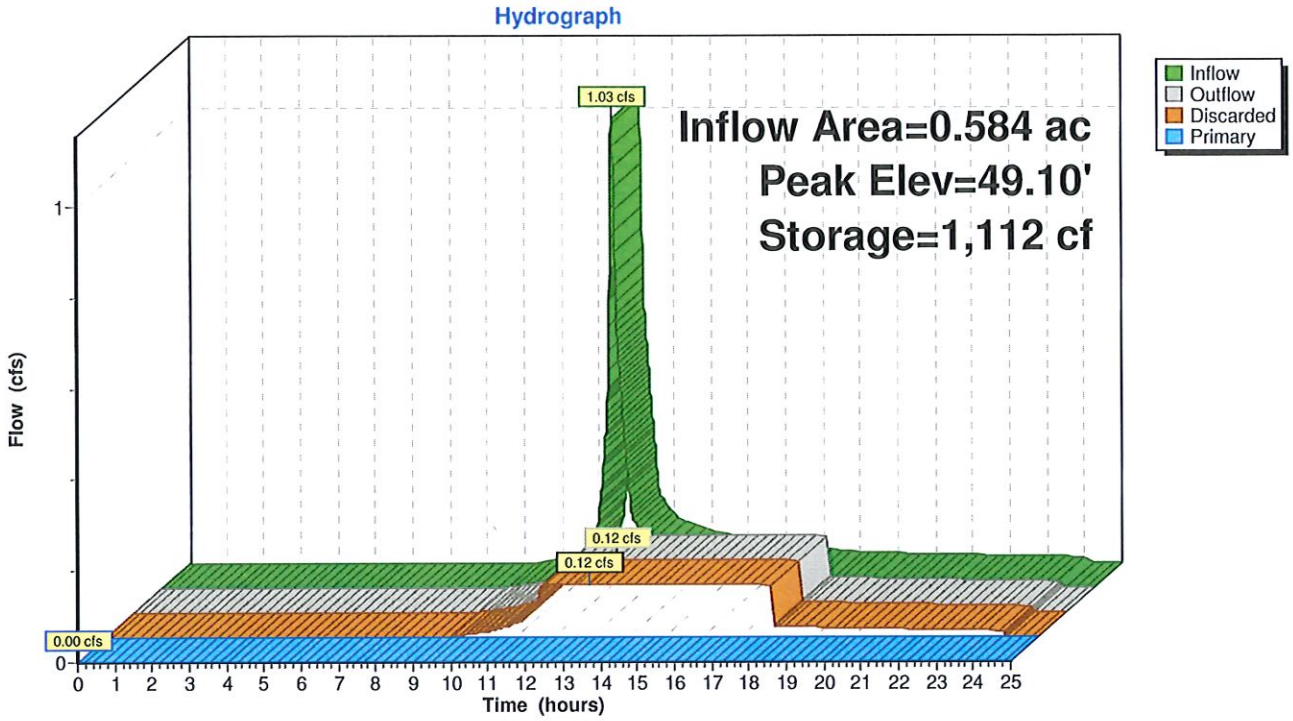
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
44.00	600	212.0	0.0	0	0	600
45.00	600	212.0	45.0	270	270	812
46.00	600	212.0	45.0	270	540	1,024
47.00	600	212.0	45.0	270	810	1,236
49.00	600	212.0	20.0	240	1,050	1,660
49.80	717	210.0	100.0	526	1,576	1,842
50.00	803	214.0	100.0	152	1,728	1,983
50.50	1,019	219.0	100.0	454	2,182	2,187

Device	Routing	Invert	Outlet Devices
#1	Discarded	44.00'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	49.80'	**12.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.12 cfs @ 12.93 hrs HW=49.10' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=44.00' TW=40.50' (Dynamic Tailwater)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: BIO-RETENTION SWALE



Summary for Pond 2P: LEACHING FACILITY (62' x 12' x 6')

Inflow Area = 0.584 ac, 70.75% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 40.50' @ 0.00 hrs Surf.Area= 744 sf Storage= 0 cf

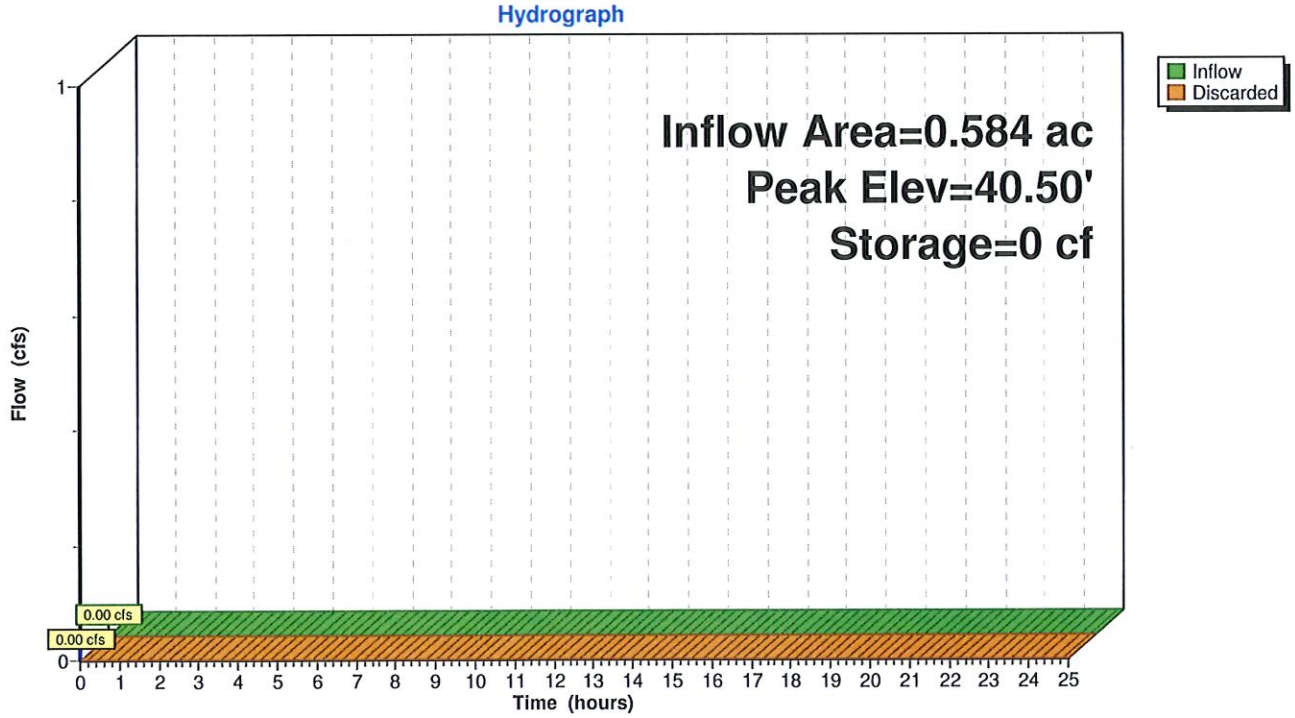
Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	40.50'	1,018 cf	**6.00'D x 6.00'H Vertical Cone/Cylinder** x 6 Inside #2 1,195 cf Overall - 3.0" Wall Thickness = 1,018 cf
#2	40.50'	1,471 cf	**12.00'W x 62.00'L x 6.00'H Prismatoid** 4,464 cf Overall - 1,195 cf Embedded = 3,269 cf x 45.0% Voids
		2,489 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	40.50'	**8.270 in/hr Exfiltration over Wetted area** Phase-In= 0.01'

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=40.50' (Free Discharge)
1=Exfiltration (Controls 0.00 cfs)

Pond 2P: LEACHING FACILITY (62' x 12' x 6')



Time span=0.00-25.00 hrs, dt=0.01 hrs, 2501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1W: PROPOSED PARKING Runoff Area=25,425 sf 70.75% Impervious Runoff Depth=2.74"
Tc=6.0 min CN=81 Runoff=1.87 cfs 0.133 af

Pond 1P: BIO-RETENTION SWALE Peak Elev=49.91' Storage=1,657 cf Inflow=1.87 cfs 0.133 af
Discarded=0.15 cfs 0.113 af Primary=0.75 cfs 0.020 af Outflow=0.90 cfs 0.133 af

Pond 2P: LEACHING FACILITY (62' x 12' x 6') Peak Elev=41.61' Storage=461 cf Inflow=0.75 cfs 0.020 af
Outflow=0.17 cfs 0.020 af

Total Runoff Area = 0.584 ac Runoff Volume = 0.133 af Average Runoff Depth = 2.74"
29.25% Pervious = 0.171 ac 70.75% Impervious = 0.413 ac

Summary for Subcatchment 1W: PROPOSED PARKING AREA

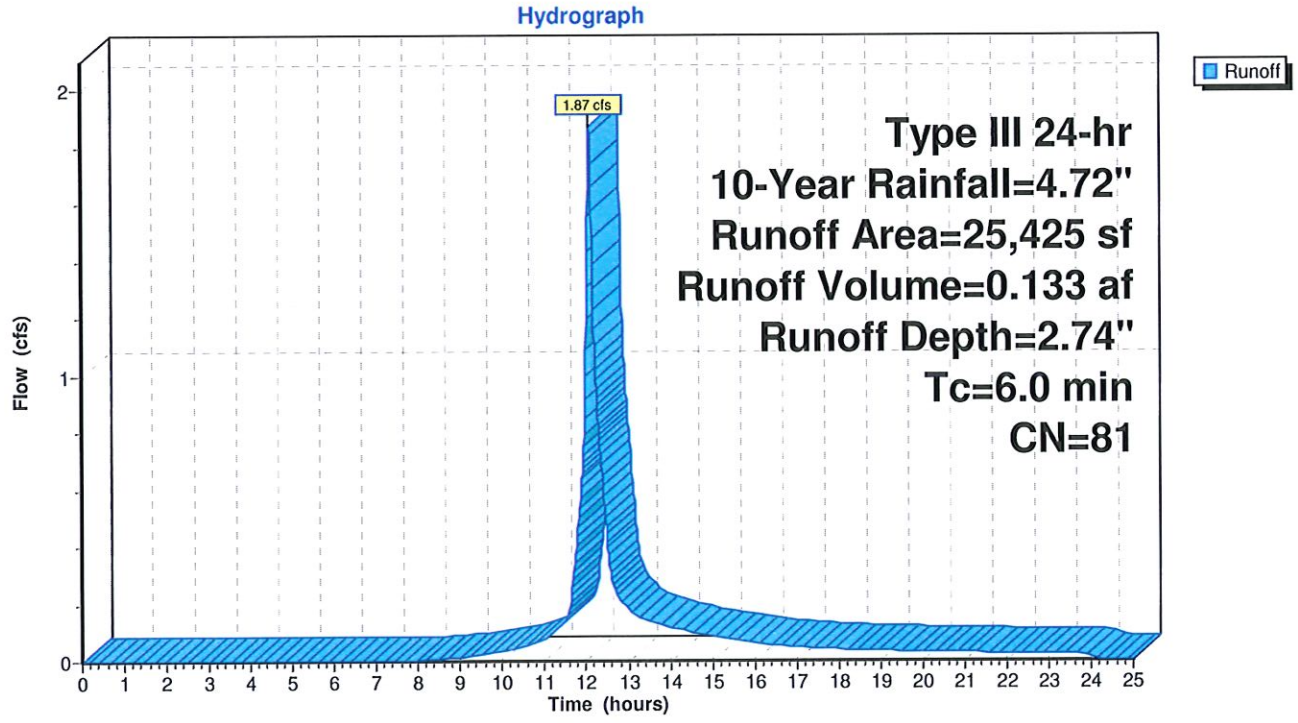
Runoff = 1.87 cfs @ 12.09 hrs, Volume= 0.133 af, Depth= 2.74"
Routed to Pond 1P : BIO-RETENTION SWALE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.72"

Area (sf)	CN	Description
17,987	98	Paved parking, HSG A
7,438	39	>75% Grass cover, Good, HSG A
25,425	81	Weighted Average
7,438		29.25% Pervious Area
17,987		70.75% Impervious Area

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

Subcatchment 1W: PROPOSED PARKING AREA



Summary for Pond 1P: BIO-RETENTION SWALE

Inflow Area = 0.584 ac, 70.75% Impervious, Inflow Depth = 2.74" for 10-Year event
Inflow = 1.87 cfs @ 12.09 hrs, Volume= 0.133 af
Outflow = 0.90 cfs @ 12.26 hrs, Volume= 0.133 af, Atten= 52%, Lag= 10.5 min
Discarded = 0.15 cfs @ 12.26 hrs, Volume= 0.113 af
Primary = 0.75 cfs @ 12.26 hrs, Volume= 0.020 af
Routed to Pond 2P : LEACHING FACILITY (62' x 12' x 6')

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 49.91' @ 12.26 hrs Surf.Area= 764 sf Storage= 1,657 cf

Plug-Flow detention time= 95.4 min calculated for 0.133 af (100% of inflow)
Center-of-Mass det. time= 95.4 min (916.9 - 821.5)

Volume	Invert	Avail.Storage	Storage Description
#1	44.00'	2,182 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

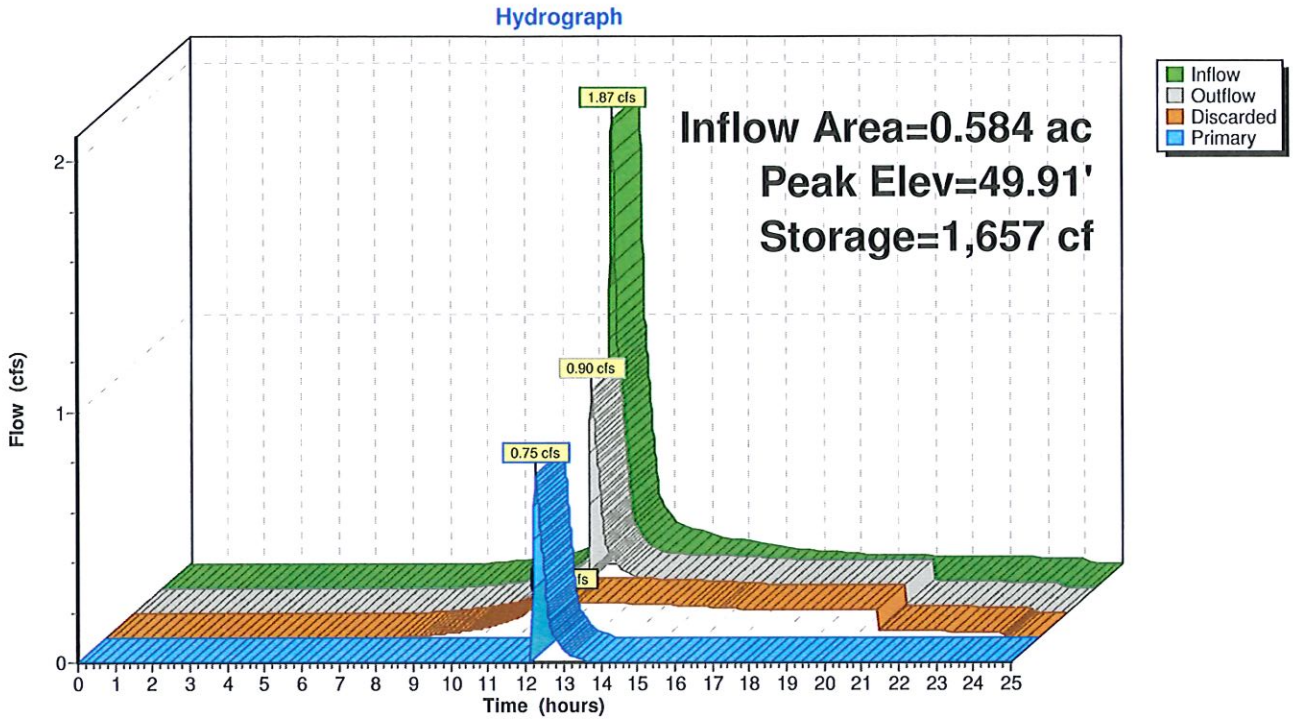
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
44.00	600	212.0	0.0	0	0	600
45.00	600	212.0	45.0	270	270	812
46.00	600	212.0	45.0	270	540	1,024
47.00	600	212.0	45.0	270	810	1,236
49.00	600	212.0	20.0	240	1,050	1,660
49.80	717	210.0	100.0	526	1,576	1,842
50.00	803	214.0	100.0	152	1,728	1,983
50.50	1,019	219.0	100.0	454	2,182	2,187

Device	Routing	Invert	Outlet Devices
#1	Discarded	44.00'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	49.80'	**12.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.15 cfs @ 12.26 hrs HW=49.91' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.15 cfs)

Primary OutFlow Max=0.75 cfs @ 12.26 hrs HW=49.91' TW=40.73' (Dynamic Tailwater)
↑—**2=Orifice/Grate** (Weir Controls 0.75 cfs @ 1.08 fps)

Pond 1P: BIO-RETENTION SWALE



Summary for Pond 2P: LEACHING FACILITY (62' x 12' x 6')

Inflow Area = 0.584 ac, 70.75% Impervious, Inflow Depth = 0.42" for 10-Year event
Inflow = 0.75 cfs @ 12.26 hrs, Volume= 0.020 af
Outflow = 0.17 cfs @ 12.61 hrs, Volume= 0.020 af, Atten= 77%, Lag= 20.7 min
Discarded = 0.17 cfs @ 12.61 hrs, Volume= 0.020 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 41.61' @ 12.61 hrs Surf.Area= 744 sf Storage= 461 cf

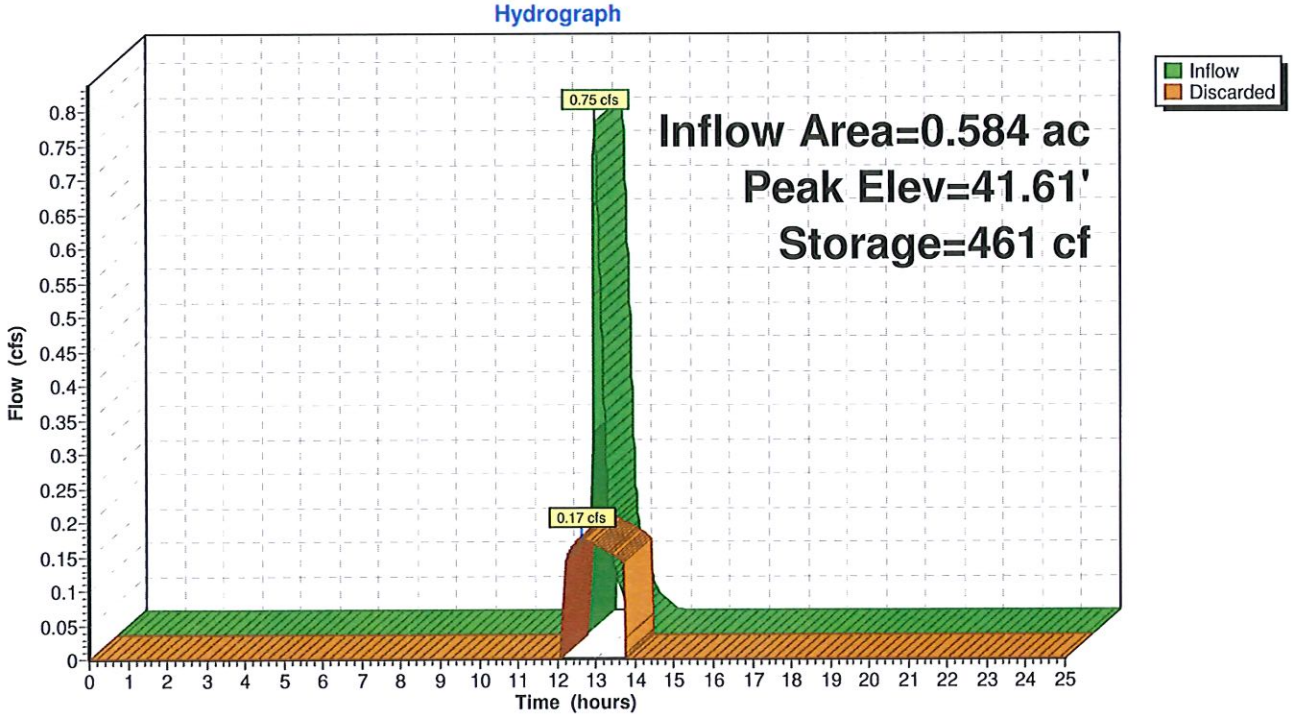
Plug-Flow detention time= 28.4 min calculated for 0.020 af (100% of inflow)
Center-of-Mass det. time= 28.3 min (777.1 - 748.7)

Volume	Invert	Avail.Storage	Storage Description
#1	40.50'	1,018 cf	**6.00'D x 6.00'H Vertical Cone/Cylinder** x 6 Inside #2 1,195 cf Overall - 3.0" Wall Thickness = 1,018 cf
#2	40.50'	1,471 cf	**12.00'W x 62.00'L x 6.00'H Prismatoid** 4,464 cf Overall - 1,195 cf Embedded = 3,269 cf x 45.0% Voids
		2,489 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	40.50'	**8.270 in/hr Exfiltration over Wetted area** Phase-In= 0.01'

Discarded OutFlow Max=0.17 cfs @ 12.61 hrs HW=41.61' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.17 cfs)

Pond 2P: LEACHING FACILITY (62' x 12' x 6')



Time span=0.00-25.00 hrs, dt=0.01 hrs, 2501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1W: PROPOSED PARKING Runoff Area=25,425 sf 70.75% Impervious Runoff Depth=3.56"
Tc=6.0 min CN=81 Runoff=2.42 cfs 0.173 af

Pond 1P: BIO-RETENTION SWALE Peak Elev=50.00' Storage=1,726 cf Inflow=2.42 cfs 0.173 af
Discarded=0.15 cfs 0.128 af Primary=1.80 cfs 0.045 af Outflow=1.95 cfs 0.173 af

Pond 2P: LEACHING FACILITY (62' x 12' x 6') Peak Elev=43.41' Storage=1,206 cf Inflow=1.80 cfs 0.045 af
Outflow=0.22 cfs 0.045 af

Total Runoff Area = 0.584 ac Runoff Volume = 0.173 af Average Runoff Depth = 3.56"
29.25% Pervious = 0.171 ac 70.75% Impervious = 0.413 ac

Summary for Subcatchment 1W: PROPOSED PARKING AREA

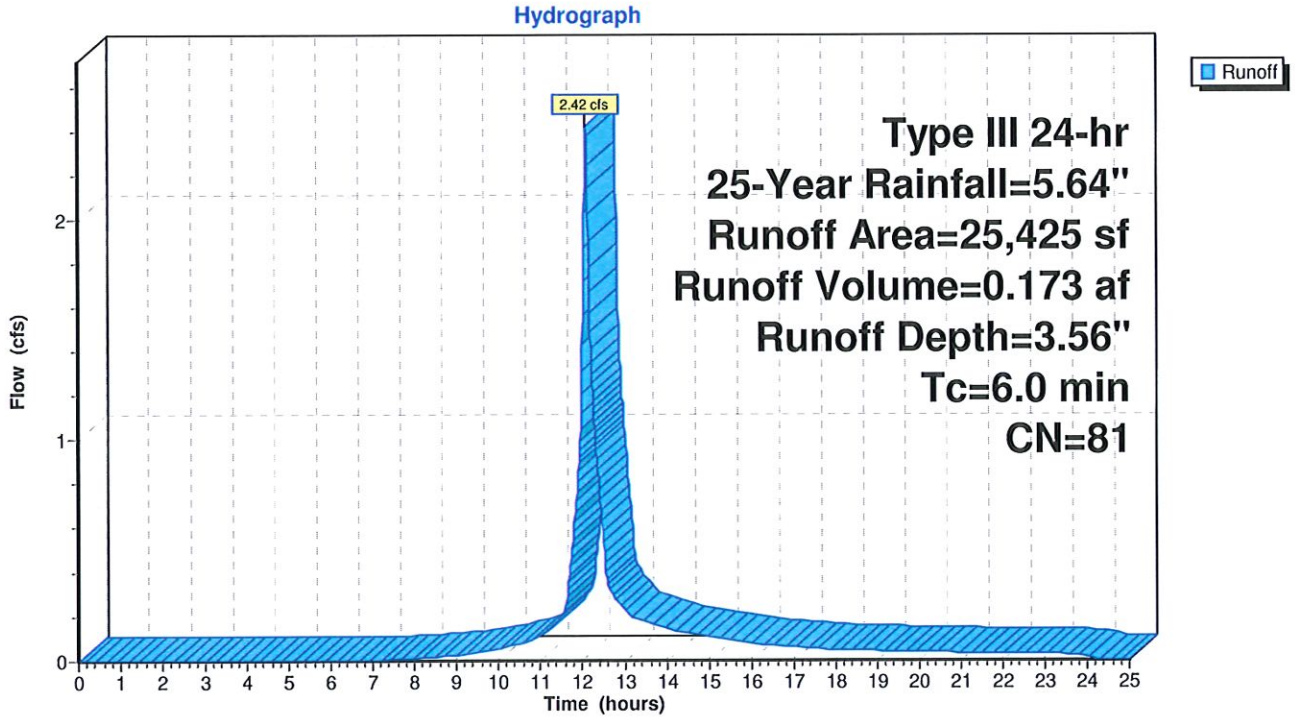
Runoff = 2.42 cfs @ 12.09 hrs, Volume= 0.173 af, Depth= 3.56"
Routed to Pond 1P : BIO-RETENTION SWALE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.64"

Area (sf)	CN	Description
17,987	98	Paved parking, HSG A
7,438	39	>75% Grass cover, Good, HSG A
25,425	81	Weighted Average
7,438		29.25% Pervious Area
17,987		70.75% Impervious Area

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

Subcatchment 1W: PROPOSED PARKING AREA



Summary for Pond 1P: BIO-RETENTION SWALE

Inflow Area = 0.584 ac, 70.75% Impervious, Inflow Depth = 3.56" for 25-Year event
Inflow = 2.42 cfs @ 12.09 hrs, Volume= 0.173 af
Outflow = 1.95 cfs @ 12.15 hrs, Volume= 0.173 af, Atten= 20%, Lag= 3.6 min
Discarded = 0.15 cfs @ 12.15 hrs, Volume= 0.128 af
Primary = 1.80 cfs @ 12.15 hrs, Volume= 0.045 af
Routed to Pond 2P : LEACHING FACILITY (62' x 12' x 6')

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 50.00' @ 12.15 hrs Surf.Area= 802 sf Storage= 1,726 cf

Plug-Flow detention time= 85.1 min calculated for 0.173 af (100% of inflow)
Center-of-Mass det. time= 85.1 min (899.2 - 814.1)

Volume	Invert	Avail.Storage	Storage Description
#1	44.00'	2,182 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

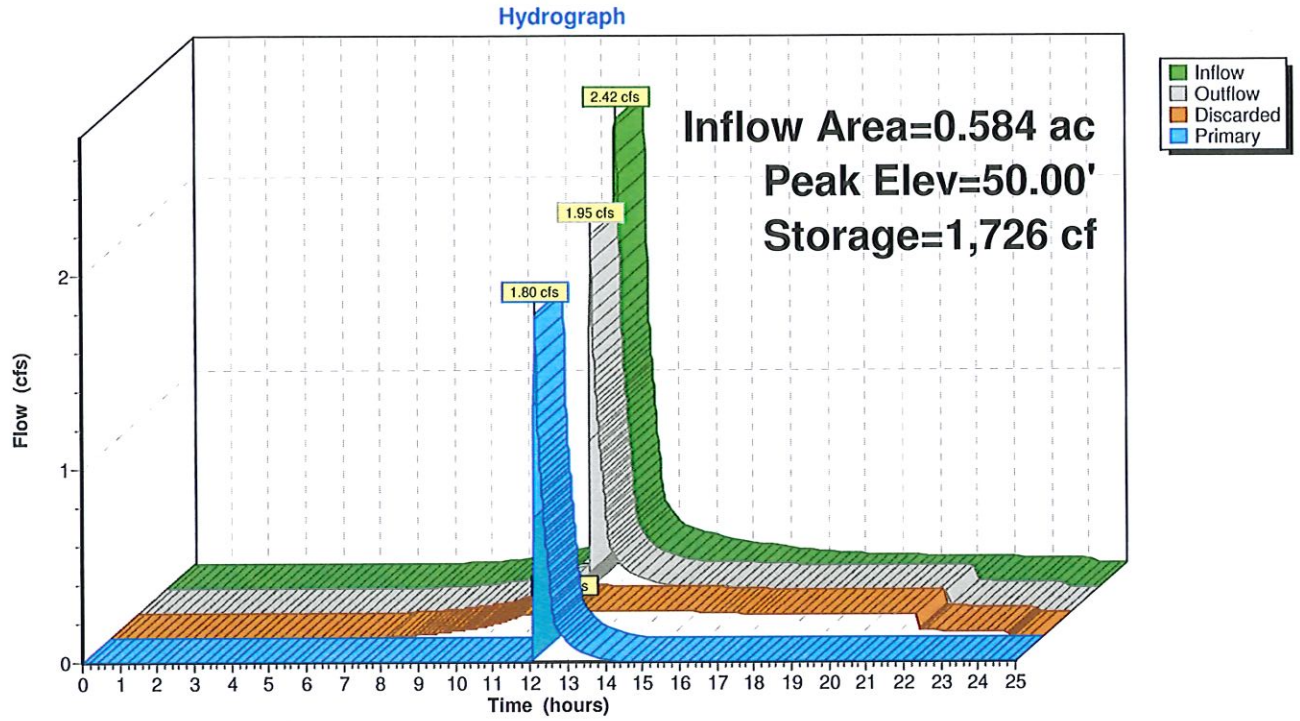
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
44.00	600	212.0	0.0	0	0	600
45.00	600	212.0	45.0	270	270	812
46.00	600	212.0	45.0	270	540	1,024
47.00	600	212.0	45.0	270	810	1,236
49.00	600	212.0	20.0	240	1,050	1,660
49.80	717	210.0	100.0	526	1,576	1,842
50.00	803	214.0	100.0	152	1,728	1,983
50.50	1,019	219.0	100.0	454	2,182	2,187

Device	Routing	Invert	Outlet Devices
#1	Discarded	44.00'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	49.80'	**12.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.15 cfs @ 12.15 hrs HW=50.00' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.15 cfs)

Primary OutFlow Max=1.79 cfs @ 12.15 hrs HW=50.00' TW=40.96' (Dynamic Tailwater)
↑—**2=Orifice/Grate** (Weir Controls 1.79 cfs @ 1.45 fps)

Pond 1P: BIO-RETENTION SWALE



Summary for Pond 2P: LEACHING FACILITY (62' x 12' x 6')

Inflow Area = 0.584 ac, 70.75% Impervious, Inflow Depth = 0.92" for 25-Year event
Inflow = 1.80 cfs @ 12.15 hrs, Volume= 0.045 af
Outflow = 0.22 cfs @ 12.63 hrs, Volume= 0.045 af, Atten= 87%, Lag= 28.9 min
Discarded = 0.22 cfs @ 12.63 hrs, Volume= 0.045 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 43.41' @ 12.63 hrs Surf.Area= 744 sf Storage= 1,206 cf

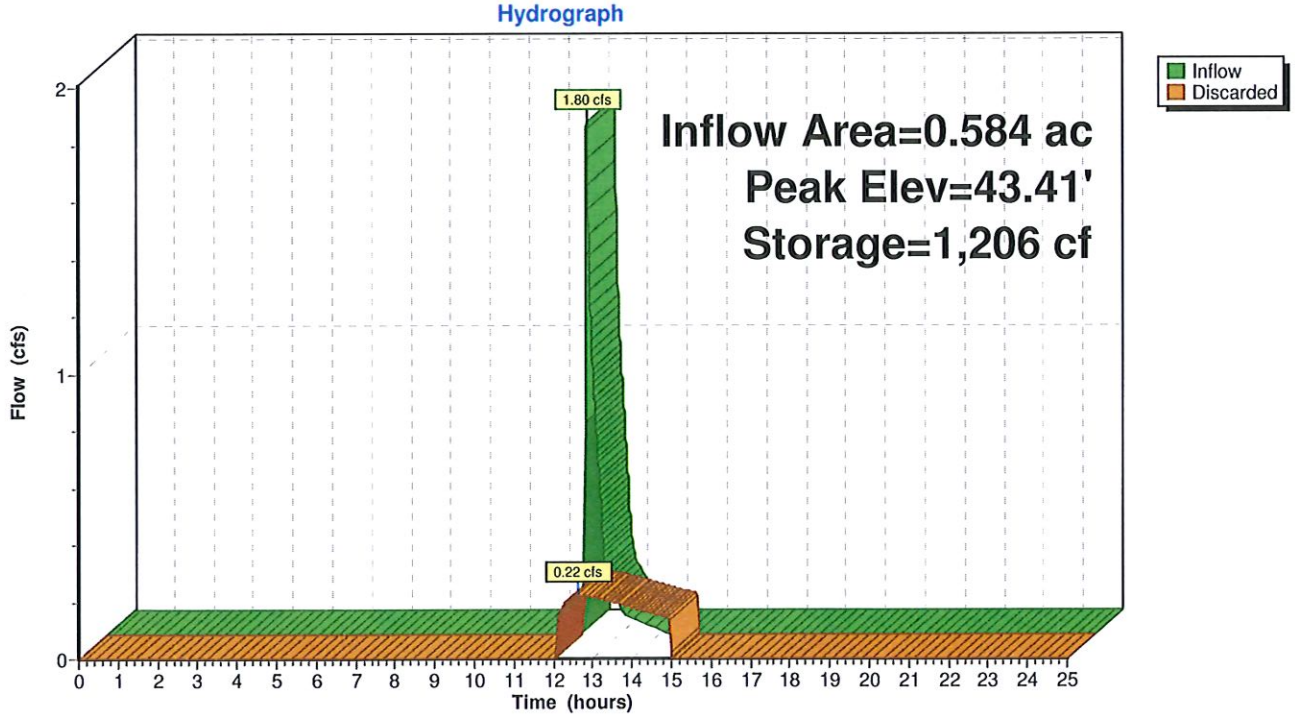
Plug-Flow detention time= 60.7 min calculated for 0.045 af (100% of inflow)
Center-of-Mass det. time= 60.7 min (807.2 - 746.5)

Volume	Invert	Avail.Storage	Storage Description
#1	40.50'	1,018 cf	**6.00'D x 6.00'H Vertical Cone/Cylinder** x 6 Inside #2 1,195 cf Overall - 3.0" Wall Thickness = 1,018 cf
#2	40.50'	1,471 cf	**12.00'W x 62.00'L x 6.00'H Prismatoid** 4,464 cf Overall - 1,195 cf Embedded = 3,269 cf x 45.0% Voids
		2,489 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	40.50'	**8.270 in/hr Exfiltration over Wetted area** Phase-In= 0.01'

Discarded OutFlow Max=0.22 cfs @ 12.63 hrs HW=43.41' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.22 cfs)

Pond 2P: LEACHING FACILITY (62' x 12' x 6')



Time span=0.00-25.00 hrs, dt=0.01 hrs, 2501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1W: PROPOSED PARKING Runoff Area=25,425 sf 70.75% Impervious Runoff Depth=4.84"
Tc=6.0 min CN=81 Runoff=3.27 cfs 0.236 af

Pond 1P: BIO-RETENTION SWALE Peak Elev=50.08' Storage=1,794 cf Inflow=3.27 cfs 0.236 af
Discarded=0.16 cfs 0.147 af Primary=3.05 cfs 0.088 af Outflow=3.21 cfs 0.236 af

Pond 2P: LEACHING FACILITY (62' x 12' x 6') Peak Elev=46.45' Storage=2,466 cf Inflow=3.05 cfs 0.088 af
Outflow=0.31 cfs 0.088 af

Total Runoff Area = 0.584 ac Runoff Volume = 0.236 af Average Runoff Depth = 4.84"
29.25% Pervious = 0.171 ac 70.75% Impervious = 0.413 ac

Summary for Subcatchment 1W: PROPOSED PARKING AREA

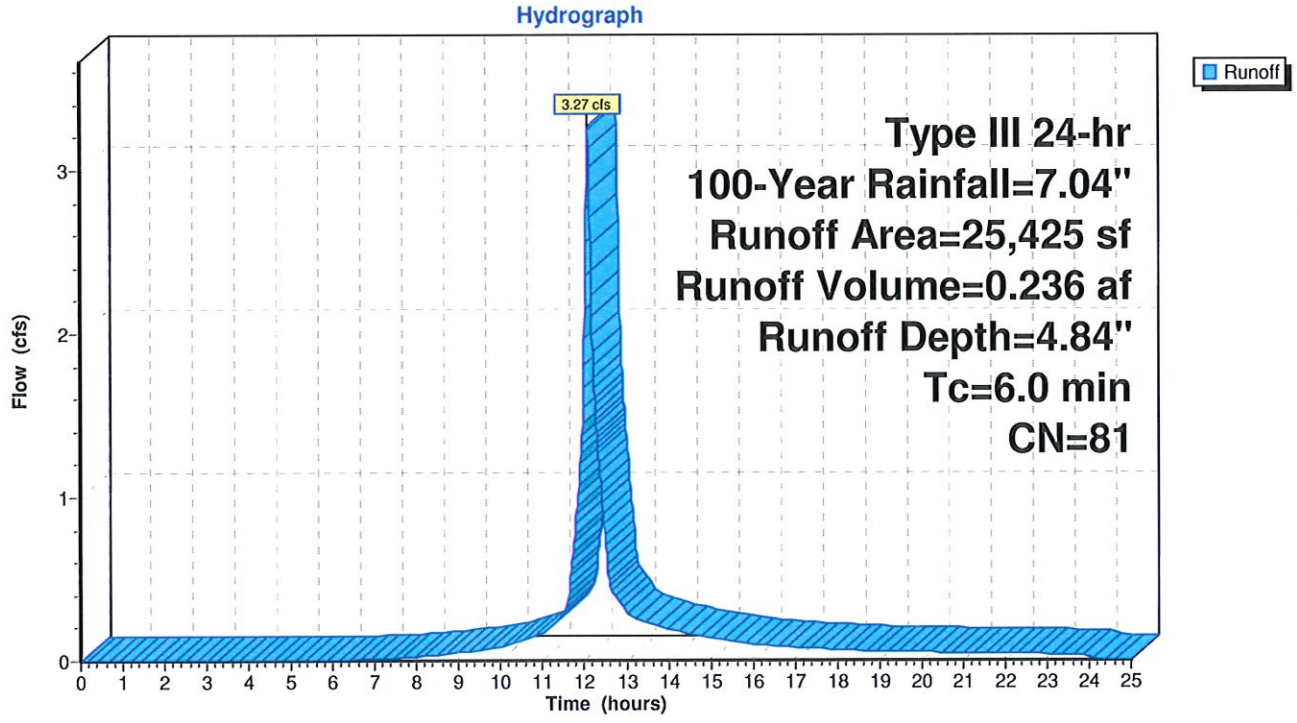
Runoff = 3.27 cfs @ 12.09 hrs, Volume= 0.236 af, Depth= 4.84"
Routed to Pond 1P : BIO-RETENTION SWALE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.04"

Area (sf)	CN	Description
17,987	98	Paved parking, HSG A
7,438	39	>75% Grass cover, Good, HSG A
25,425	81	Weighted Average
7,438		29.25% Pervious Area
17,987		70.75% Impervious Area

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

Subcatchment 1W: PROPOSED PARKING AREA



Summary for Pond 1P: BIO-RETENTION SWALE

Inflow Area = 0.584 ac, 70.75% Impervious, Inflow Depth = 4.84" for 100-Year event
Inflow = 3.27 cfs @ 12.09 hrs, Volume= 0.236 af
Outflow = 3.21 cfs @ 12.10 hrs, Volume= 0.236 af, Atten= 2%, Lag= 0.9 min
Discarded = 0.16 cfs @ 12.10 hrs, Volume= 0.147 af
Primary = 3.05 cfs @ 12.10 hrs, Volume= 0.088 af
Routed to Pond 2P : LEACHING FACILITY (62' x 12' x 6')

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 50.08' @ 12.10 hrs Surf.Area= 836 sf Storage= 1,794 cf

Plug-Flow detention time= 74.3 min calculated for 0.235 af (100% of inflow)
Center-of-Mass det. time= 74.3 min (879.6 - 805.3)

Volume	Invert	Avail.Storage	Storage Description
#1	44.00'	2,182 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

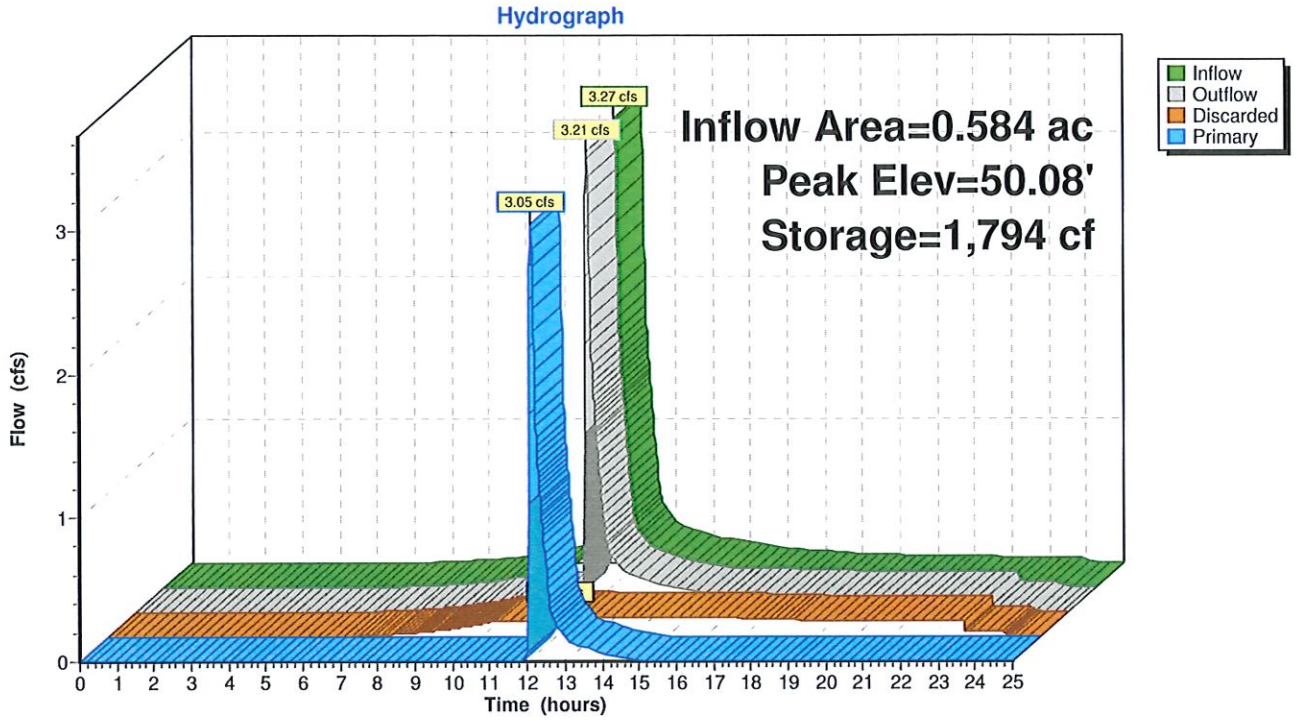
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
44.00	600	212.0	0.0	0	0	600
45.00	600	212.0	45.0	270	270	812
46.00	600	212.0	45.0	270	540	1,024
47.00	600	212.0	45.0	270	810	1,236
49.00	600	212.0	20.0	240	1,050	1,660
49.80	717	210.0	100.0	526	1,576	1,842
50.00	803	214.0	100.0	152	1,728	1,983
50.50	1,019	219.0	100.0	454	2,182	2,187

Device	Routing	Invert	Outlet Devices
#1	Discarded	44.00'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	49.80'	**12.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.16 cfs @ 12.10 hrs HW=50.08' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.16 cfs)

Primary OutFlow Max=3.05 cfs @ 12.10 hrs HW=50.08' TW=42.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** (Weir Controls 3.05 cfs @ 1.73 fps)

Pond 1P: BIO-RETENTION SWALE



Summary for Pond 2P: LEACHING FACILITY (62' x 12' x 6')

Inflow Area = 0.584 ac, 70.75% Impervious, Inflow Depth = 1.81" for 100-Year event
Inflow = 3.05 cfs @ 12.10 hrs, Volume= 0.088 af
Outflow = 0.31 cfs @ 12.65 hrs, Volume= 0.088 af, Atten= 90%, Lag= 32.9 min
Discarded = 0.31 cfs @ 12.65 hrs, Volume= 0.088 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 46.45' @ 12.65 hrs Surf.Area= 744 sf Storage= 2,466 cf

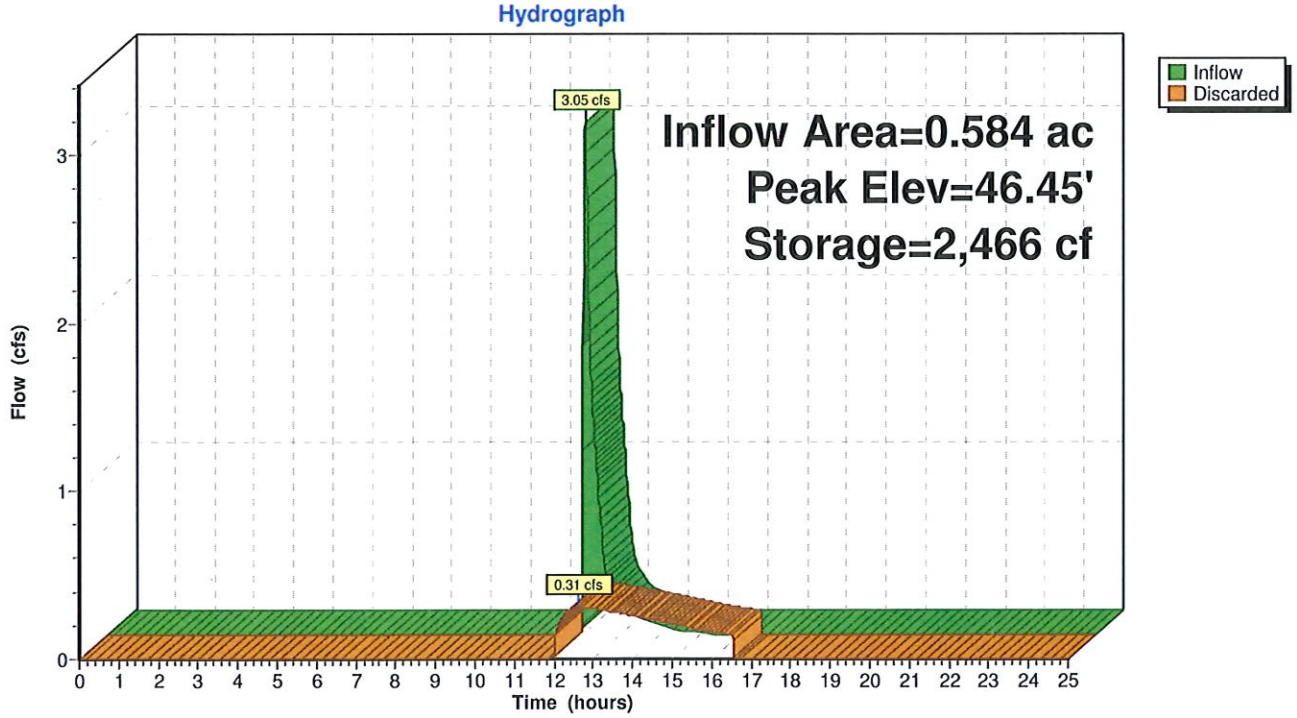
Plug-Flow detention time= 95.2 min calculated for 0.088 af (100% of inflow)
Center-of-Mass det. time= 95.2 min (842.7 - 747.5)

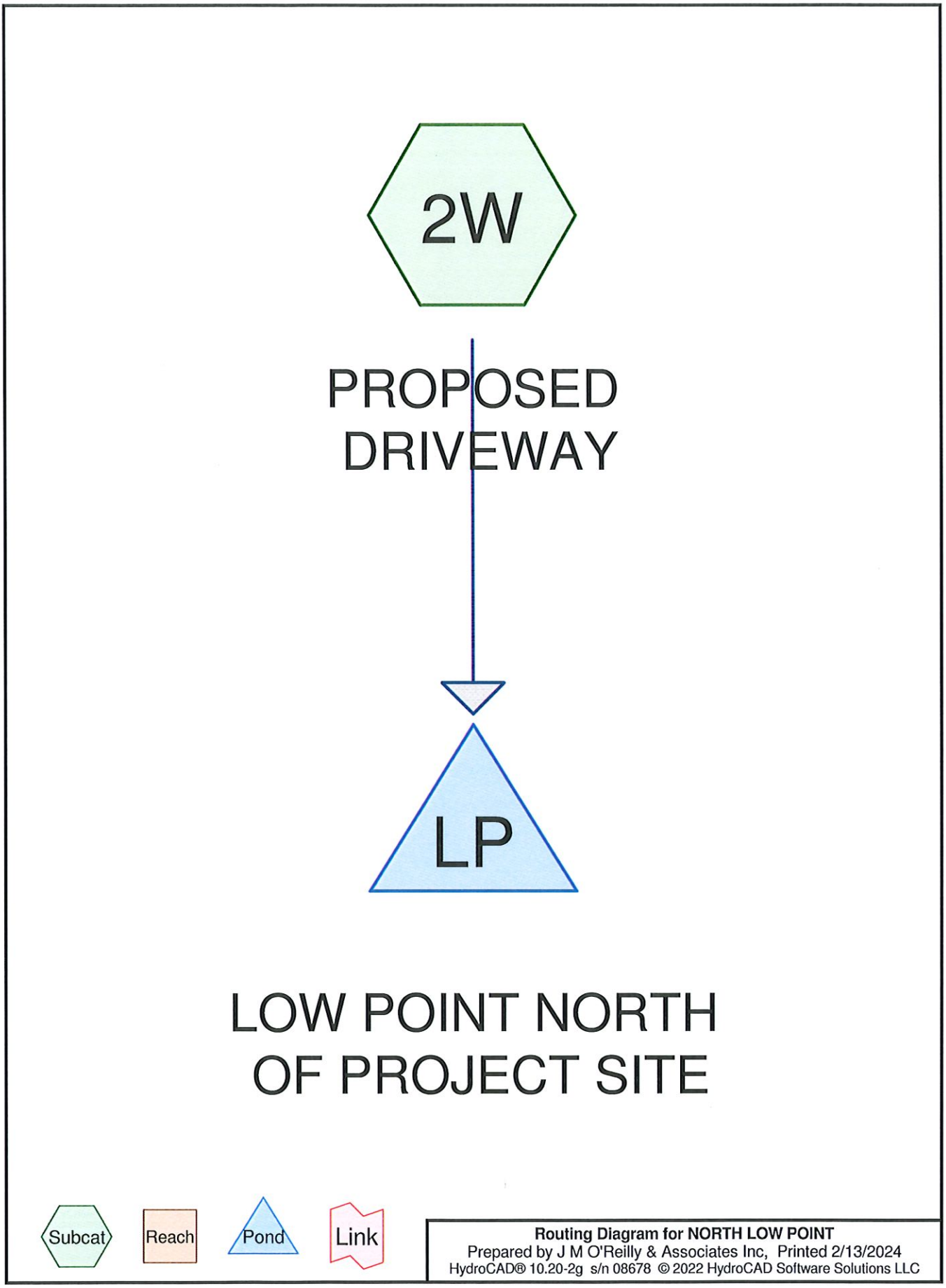
Volume	Invert	Avail.Storage	Storage Description
#1	40.50'	1,018 cf	**6.00'D x 6.00'H Vertical Cone/Cylinder** x 6 Inside #2 1,195 cf Overall - 3.0" Wall Thickness = 1,018 cf
#2	40.50'	1,471 cf	**12.00'W x 62.00'L x 6.00'H Prismatoid** 4,464 cf Overall - 1,195 cf Embedded = 3,269 cf x 45.0% Voids
		2,489 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	40.50'	**8.270 in/hr Exfiltration over Wetted area** Phase-In= 0.01'

Discarded OutFlow Max=0.31 cfs @ 12.65 hrs HW=46.45' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.31 cfs)

Pond 2P: LEACHING FACILITY (62' x 12' x 6')




2W
PROPOSED
DRIVEWAY
LP
LOW POINT NORTH
OF PROJECT SITE
Subcat
Reach
Pond
Link
Routing Diagram for NORTH LOW POINT
Prepared by J M O'Reilly & Associates Inc, Printed 2/13/2024
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Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	Type III 24-hr		Default	24.00	1	3.26	2
2	10-Year	Type III 24-hr		Default	24.00	1	4.72	2
3	25-Year	Type III 24-hr		Default	24.00	1	5.64	2
4	100-Year	Type III 24-hr		Default	24.00	1	7.04	2

Time span=0.00-25.00 hrs, dt=0.01 hrs, 2501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 2W: PROPOSED Runoff Area=1,195 sf 100.00% Impervious Runoff Depth=3.03"
Tc=6.0 min CN=98 Runoff=0.09 cfs 0.007 af

Pond LP: LOW POINT NORTH OF PROJECT Peak Elev=39.73' Storage=301 cf Inflow=0.09 cfs 0.007 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 0.027 ac Runoff Volume = 0.007 af Average Runoff Depth = 3.03"
0.00% Pervious = 0.000 ac 100.00% Impervious = 0.027 ac

Summary for Subcatchment 2W: PROPOSED DRIVEWAY

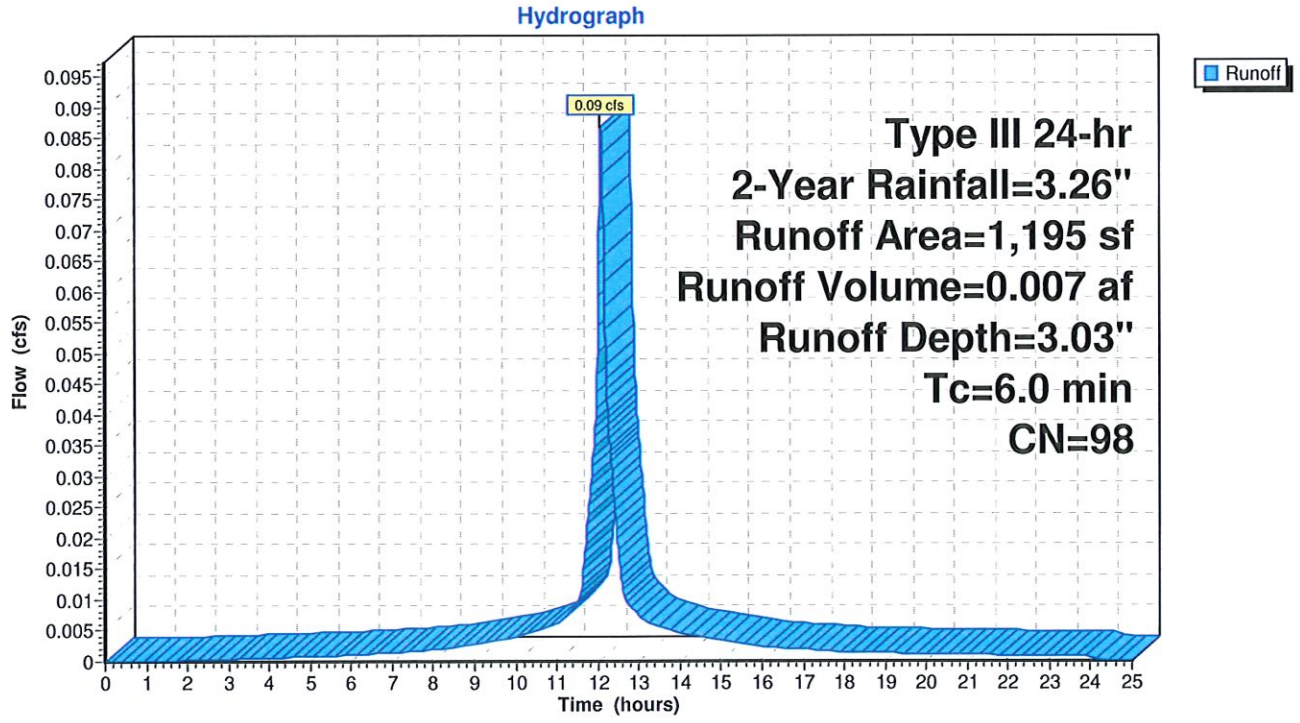
Runoff = 0.09 cfs @ 12.08 hrs, Volume= 0.007 af, Depth= 3.03"
Routed to Pond LP : LOW POINT NORTH OF PROJECT SITE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.26"

Area (sf)	CN	Description
1,195	98	Paved parking, HSG A
1,195		100.00% Impervious Area

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

Subcatchment 2W: PROPOSED DRIVEWAY



Summary for Pond LP: LOW POINT NORTH OF PROJECT SITE

Inflow Area = 0.027 ac,100.00% Impervious, Inflow Depth = 3.03" for 2-Year event
Inflow = 0.09 cfs @ 12.08 hrs, Volume= 0.007 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

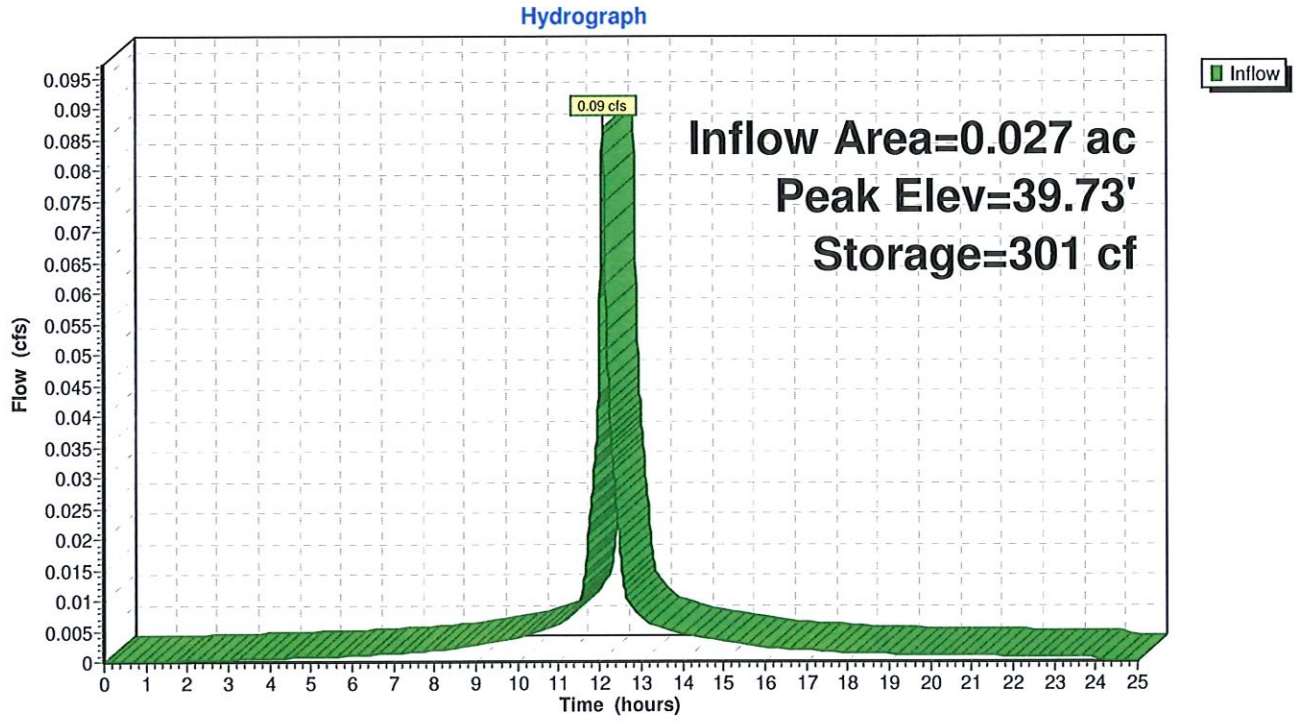
Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 39.73' @ 24.34 hrs Surf.Area= 505 sf Storage= 301 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	39.00'	4,518 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
39.00	325	104.0	0.0	0	0	325
40.00	580	128.0	100.0	446	446	783
42.00	1,611	175.0	100.0	2,105	2,551	1,956
43.00	2,344	196.0	100.0	1,966	4,518	2,603

Pond LP: LOW POINT NORTH OF PROJECT SITE



Time span=0.00-25.00 hrs, dt=0.01 hrs, 2501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 2W: PROPOSED Runoff Area=1,195 sf 100.00% Impervious Runoff Depth=4.48"
Tc=6.0 min CN=98 Runoff=0.13 cfs 0.010 af

Pond LP: LOW POINT NORTH OF PROJECT Peak Elev=40.00' Storage=446 cf Inflow=0.13 cfs 0.010 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 0.027 ac Runoff Volume = 0.010 af Average Runoff Depth = 4.48"
0.00% Pervious = 0.000 ac 100.00% Impervious = 0.027 ac

Summary for Subcatchment 2W: PROPOSED DRIVEWAY

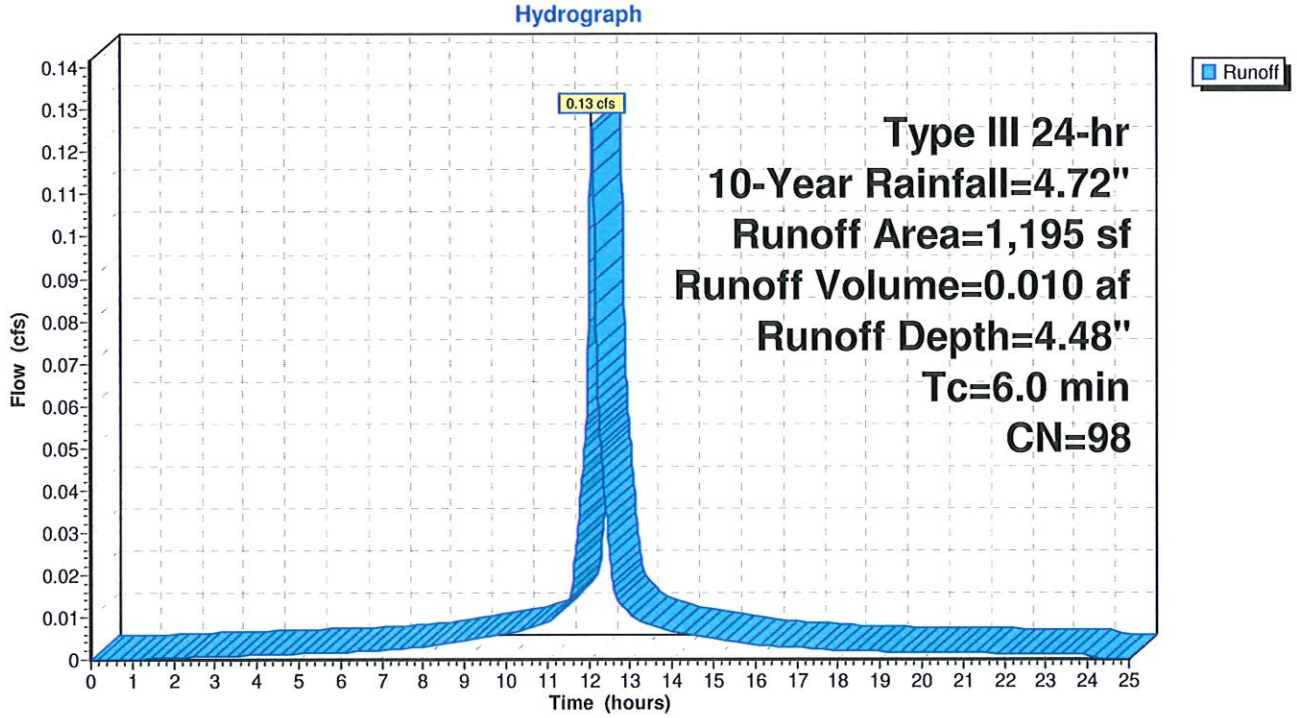
Runoff = 0.13 cfs @ 12.08 hrs, Volume= 0.010 af, Depth= 4.48"
Routed to Pond LP : LOW POINT NORTH OF PROJECT SITE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.72"

Area (sf)	CN	Description
1,195	98	Paved parking, HSG A
1,195		100.00% Impervious Area

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

Subcatchment 2W: PROPOSED DRIVEWAY



Summary for Pond LP: LOW POINT NORTH OF PROJECT SITE

Inflow Area = 0.027 ac,100.00% Impervious, Inflow Depth = 4.48" for 10-Year event
Inflow = 0.13 cfs @ 12.08 hrs, Volume= 0.010 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

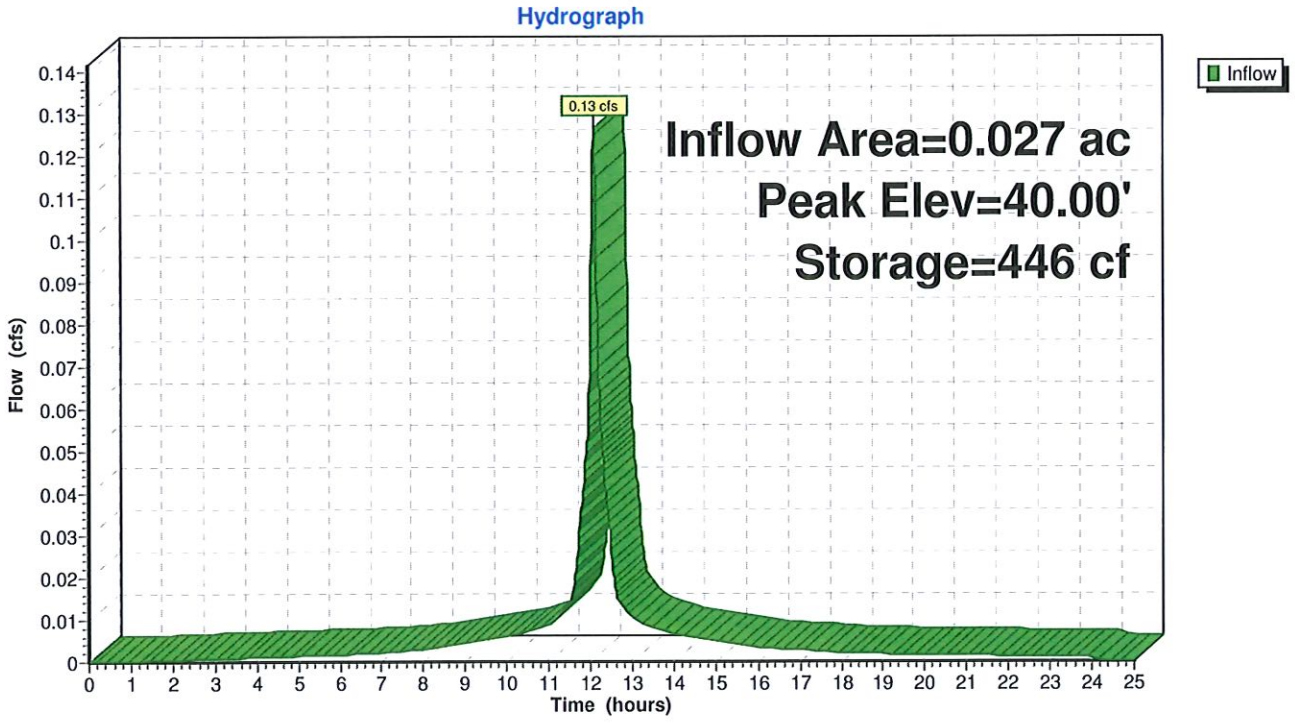
Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 40.00' @ 24.34 hrs Surf.Area= 580 sf Storage= 446 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	39.00'	4,518 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
39.00	325	104.0	0.0	0	0	325
40.00	580	128.0	100.0	446	446	783
42.00	1,611	175.0	100.0	2,105	2,551	1,956
43.00	2,344	196.0	100.0	1,966	4,518	2,603

Pond LP: LOW POINT NORTH OF PROJECT SITE



Time span=0.00-25.00 hrs, dt=0.01 hrs, 2501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 2W: PROPOSED Runoff Area=1,195 sf 100.00% Impervious Runoff Depth=5.40"
Tc=6.0 min CN=98 Runoff=0.15 cfs 0.012 af

Pond LP: LOW POINT NORTH OF PROJECT Peak Elev=40.15' Storage=538 cf Inflow=0.15 cfs 0.012 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 0.027 ac Runoff Volume = 0.012 af Average Runoff Depth = 5.40"
0.00% Pervious = 0.000 ac 100.00% Impervious = 0.027 ac

Summary for Subcatchment 2W: PROPOSED DRIVEWAY

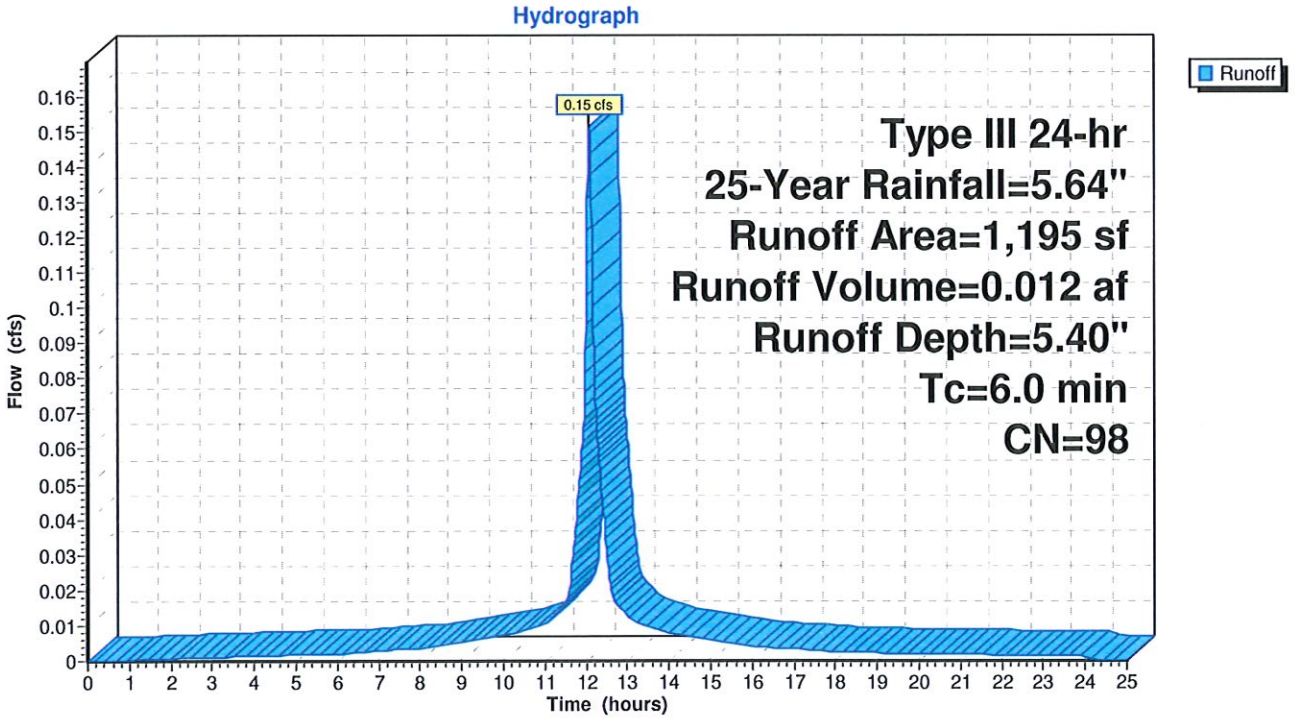
Runoff = 0.15 cfs @ 12.08 hrs, Volume= 0.012 af, Depth= 5.40"
Routed to Pond LP : LOW POINT NORTH OF PROJECT SITE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.64"

Area (sf)	CN	Description
1,195	98	Paved parking, HSG A
1,195		100.00% Impervious Area

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

Subcatchment 2W: PROPOSED DRIVEWAY



Summary for Pond LP: LOW POINT NORTH OF PROJECT SITE

Inflow Area = 0.027 ac,100.00% Impervious, Inflow Depth = 5.40" for 25-Year event
Inflow = 0.15 cfs @ 12.08 hrs, Volume= 0.012 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

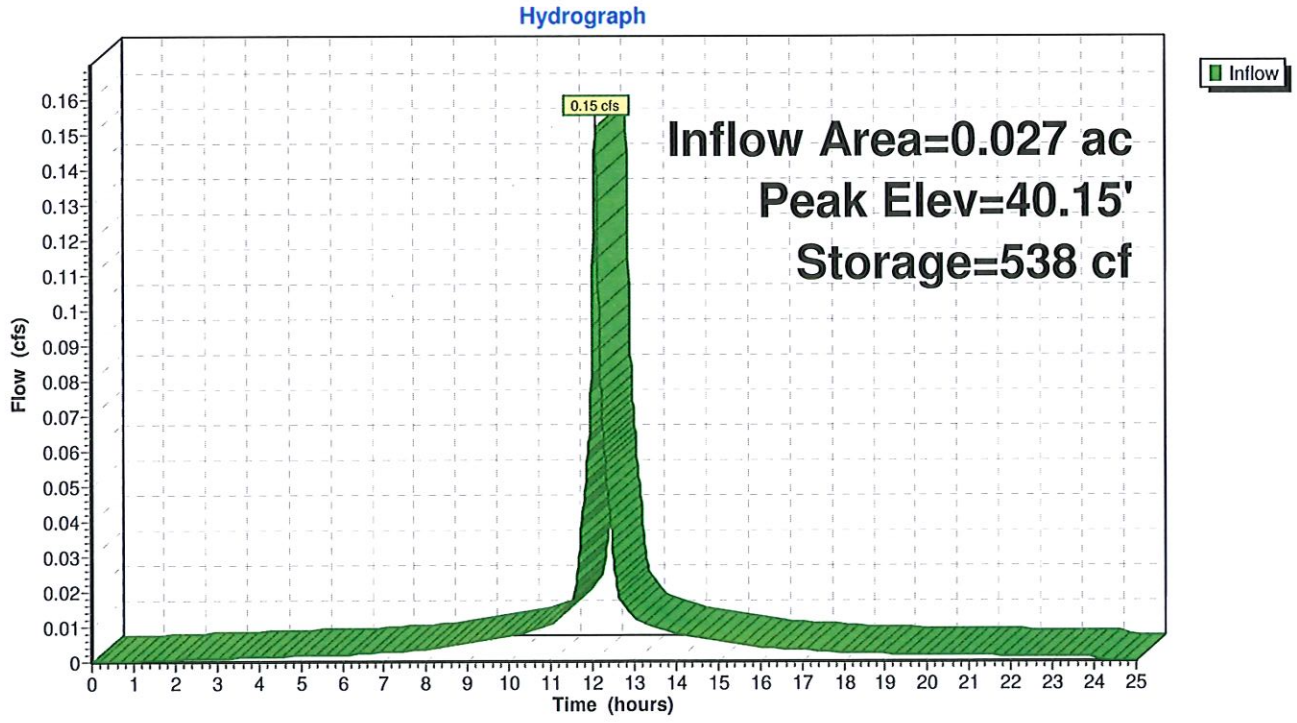
Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 40.15' @ 24.34 hrs Surf.Area= 640 sf Storage= 538 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	39.00'	4,518 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
39.00	325	104.0	0.0	0	0	325
40.00	580	128.0	100.0	446	446	783
42.00	1,611	175.0	100.0	2,105	2,551	1,956
43.00	2,344	196.0	100.0	1,966	4,518	2,603

Pond LP: LOW POINT NORTH OF PROJECT SITE



Time span=0.00-25.00 hrs, dt=0.01 hrs, 2501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 2W: PROPOSED Runoff Area=1,195 sf 100.00% Impervious Runoff Depth=6.80"
Tc=6.0 min CN=98 Runoff=0.19 cfs 0.016 af

Pond LP: LOW POINT NORTH OF PROJECT Peak Elev=40.35' Storage=677 cf Inflow=0.19 cfs 0.016 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 0.027 ac Runoff Volume = 0.016 af Average Runoff Depth = 6.80"
0.00% Pervious = 0.000 ac 100.00% Impervious = 0.027 ac

Summary for Subcatchment 2W: PROPOSED DRIVEWAY

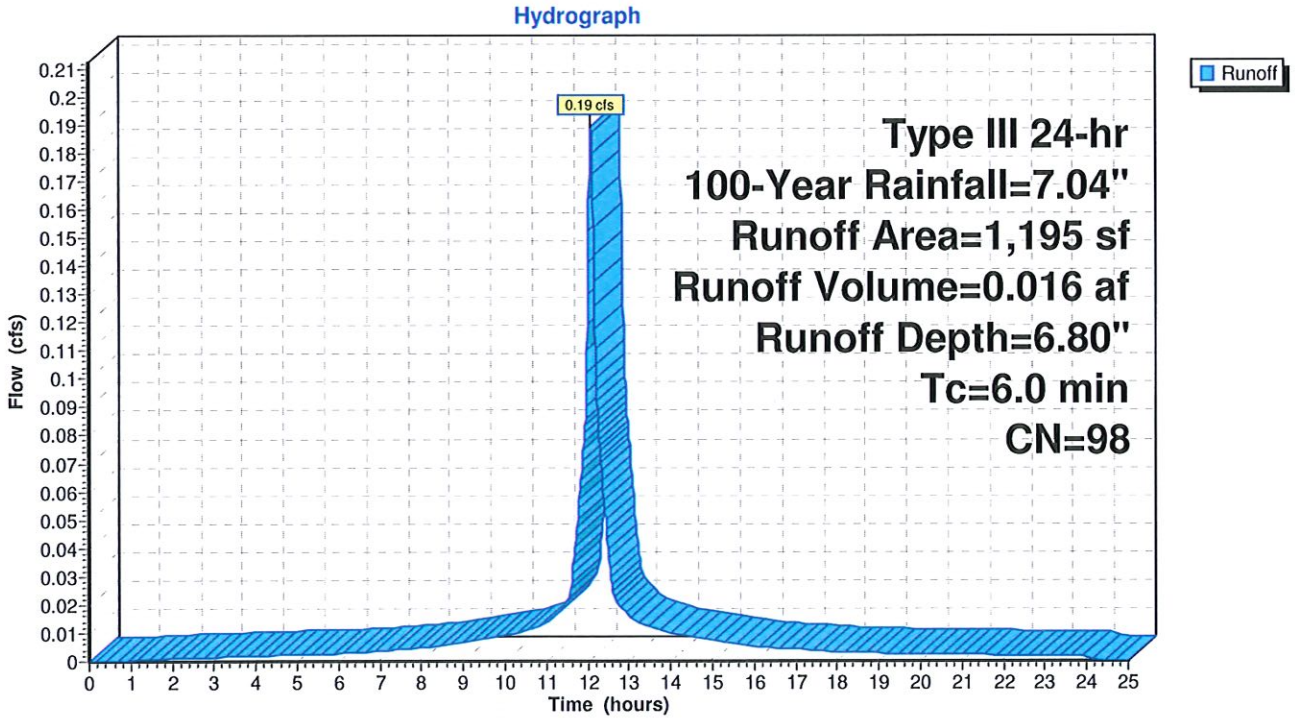
Runoff = 0.19 cfs @ 12.08 hrs, Volume= 0.016 af, Depth= 6.80"
Routed to Pond LP : LOW POINT NORTH OF PROJECT SITE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.04"

Area (sf)	CN	Description
1,195	98	Paved parking, HSG A
1,195		100.00% Impervious Area

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

Subcatchment 2W: PROPOSED DRIVEWAY



Summary for Pond LP: LOW POINT NORTH OF PROJECT SITE

Inflow Area = 0.027 ac,100.00% Impervious, Inflow Depth = 6.80" for 100-Year event
Inflow = 0.19 cfs @ 12.08 hrs, Volume= 0.016 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 40.35' @ 24.34 hrs Surf.Area= 725 sf Storage= 677 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	39.00'	4,518 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
39.00	325	104.0	0.0	0	0	325
40.00	580	128.0	100.0	446	446	783
42.00	1,611	175.0	100.0	2,105	2,551	1,956
43.00	2,344	196.0	100.0	1,966	4,518	2,603

Pond LP: LOW POINT NORTH OF PROJECT SITE