The Jillson Company Inc.
35 Main Street, S-4B
Wayland , MA 01778

October 15, 2026

Stormwater & Erosion Control Report

Project Site:
#48 Livermore Road
Wellesley, MASS

Prepared For:
Sam and Nicole Hawkey
#48 Livermore Road
Wellesley, MA 02481

SUMMARY

The property is located at 48 Livermore Road. The property is developed with a single family house and detached garage. A new addition attached to the existing house is proposed with a side-load garage entry. The existing detached garage will be razed & old driveway removed. A new driveway & curb opening is proposed to serve the new building addition.

The proposed addition roof area and most of the new driveway pavement will capture stormwater run-off via gutters, downspouts, underground piping and a driveway drainage catch basin. Stormwater will discharge into chambered, Cul-Tec underground storage units for recharge to under-lying soils.

The drainage analysis was prepared to demonstrate the project development complies with Mass. Stormwater Management Requirements. The attenuation of stormwater flows has been achieved by routing runoff from the proposed roof and a portion of the driveway to an underground storage chamber systems.

The analysis has been revised to use precipitation rates from Urban Hydrology for Small Watersheds TR-55 and demonstrate runoff volumes & rates from Post-Development conditions are less than Pre-Development.

This analysis is divided into the following sections:

Section I	Compliance with Massachusetts Stormwater Management Regulations
Section II	Overall Site Analysis - HydroCAD Hydrographs
Section III	Figures – Locus map, SCS soils map
Section IV	Operation & Maintenance

The calculations have been performed for the 2, 10, 25, and 100-year 24 hour storm event, using the HydroCAD 10.0 Stormwater Modeling System. This computer program is based upon the TR-55 computer models and uses the SCS Curvilinear Unit rainfall distribution.

Stormwater Summary

Stormwater Summary Table

48 Livermore Road
Analysis at front property line

Dated: 10/15/25

Total Site Runoff to DP-1:

Storm Event	Existing Conditions uncontrolled runoff (cfs)	(ft^3)	Proposed Conditions uncontrolled runoff (cfs)	(ft^3)	Reduction Percentage (cfs)	(ft^3)
2 Year	0.023	276	0.006	159	73%	42%
10 Year	0.30	1,301	0.18	944	40%	27%
25 Year	0.60	2,205	0.42	1,676	30%	24%
100 Year	1.16	3,851	0.89	3,044	23%	20%

Conclusion

The Post-Development hydrological conditions, which incorporates run-off flows piped from the garage roof & a portion of the proposed driveway to a Recharge Basin, **reduce** run-off flow rates & volumes from Pre-Development conditions to Design Point 1 (DP-1; see "Post-Development Sub-Area Plan" dated 10/15/25).

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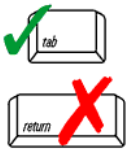
Checklist for Stormwater Report

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.

[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

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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

Kevin O'Leary 10/15/25

Signature and Date

Checklist

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

☐ New development

☒ Redevelopment

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Checklist for Stormwater Report

☒ Redevelopment

☐ Mix of New Development and Redevelopment

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

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☒ 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:

Checklist for Stormwater Report

☐ 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.

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
☒ 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;
- Street sweeping schedules;

- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- 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.

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

☐ 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.

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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

☐ 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

☐ 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

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- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- 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.

Standard 4: Water Quality (continued)

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

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☐ 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.

☐ 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

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☐ 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

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.

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☐ 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 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:

☐ 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

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

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;

☐ 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.

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

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

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Checklist for Stormwater Report

STANDARD 1. NO UNTREATED DISCHARGES OR EROSION TO WETLANDS
Applicants must demonstrate that there are no new untreated discharges. To demonstrate that all new discharges are adequately treated, applicants may rely on the computations required to demonstrate compliance with Standards 4 through 6. No additional computations are required.

A portion of the roof runoff from the proposed addition piped to a proposed underground infiltration chamber system as shown on the Site Plan.

STANDARD 2. PEAK RATE ATTENUATION
"Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates."

No increases in Post-Development peak discharge rates are proposed. Calculations demonstrating this are located in Section II. No increase in Post Development volumes are proposed.

STANDARD 3. STORMWATER RECHARGE
"Loss of annual recharge to ground water shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook."

Based on the Natural Resources Conservation Service and soil evaluation, the soils were determined to consist of Hydrologic Soils Group "Type A", loamy sand with Infiltration Rates of 2.4 Inches/hour.

REQUIRED RECHARGE VOLUME AND DRAWDOWN

Subareas	Impervious Area (SF)	Required Recharge Volume (Rv) (CF)	Proposed Recharge Volume(1) (CF)	Bottom Area (SF)	Drawdown (Hrs)
Post	1,790	89.5	481	574	4.0

Impervious area includes buildings. Proposed Recharge Volume is calculated for 100 yr storm

Sample Calculation Recharge Basin

Impervious Area = 1,790 SF

Target Depth Factor (F) = 0.6"

Rv = F x impervious area = 0.6"x 1,790 SF x 1'/12"= 89.5 CF

Sizing Storage Volume

Using the "static method", the proposed infiltration device must provide sufficient storage capacity to hold the Required Recharge Volume without taking any infiltration into account. Storage Volume calculated using the average end area shown in Table 1 above and the Pond Reports in Section II

The storage volumes for each building and basin are shown in Table 1.

Drawdown Within 72 Hours

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

Where:

Rv = Storage Volume

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

Bottom Area = Bottom Area of Recharge Structure

$$\text{Time} = \frac{481\ CF}{(2.4")(1'/12")(574\ SF)} = 4.2\ \text{hours} < 72\ \text{hours}$$

Mounding Analysis

"Mounding analysis is required when the vertical separation from the bottom of an exfiltration system to seasonal high groundwater is less than four (4) feet and the recharge system is proposed to attenuate the peak discharge from a 10-year or higher 24-hour storm (e.g., 10-year, 25-year, 50-year, or 100-year 24-hour storm). In such cases, the mounding analysis must demonstrate that the Required Recharge Volume (e.g., infiltration basin storage) is fully dewatered within 72 hours (so the next storm can be stored for exfiltration). The mounding analysis must also show that the groundwater mound that forms under the recharge system will not break out above the land or water surface of a wetland (e.g., it doesn't increase the water sheet elevation in a Bordering Vegetated Wetland, Salt Marsh, or Land Under Water within the 72-hour evaluation period)."

"The Hantush[1] or other equivalent method may be used to conduct the mounding analysis. The Hantush method predicts the maximum height of the groundwater mound beneath a rectangular or circular recharge area. It assumes unconfined groundwater flow, and that a linear relation exists between the water table elevation and water table decline rate. It results in a water table recession hydrograph depicting exponential decline. The Hantush method is available in

[1] Hantush 1967 – See Reference for Standard 3.

proprietary software and free on-line calculators on theWeb in automated format. If the analysis indicates the mound will prevent the infiltration BMP from fully draining within the 72-hour period, an iterative process must be employed to determine an alternative design that drains within the 72-hour period."

Using the Hantush Method, 336 SF (42'long x 14'wide) drain field, a recharge infiltration rate of (481 cf /336 sf)[1] = 1.4 hydraulic conductivity of 4.8 ft/day and an initial saturated thickness of 15 feet we calculated groundwater mounding of 0.406 feet or an elevation of 161.9 The mounding will not interfere with dewatering within 72 hours or result in breakout above land.

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater

The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated.
Cells highlighted in yellow are values that can be changed by the user. Cells highlighted in red are output values based on user-specified inputs.
The user MUST click the blue "Re-Calculate Now" button each time ANY of the user-specified inputs are changed otherwise necessary iterations to converge on the correct solution will not be done and values shown will be incorrect. Use consistent units for all input values (for

use consistent units (e.g. feet & days **or** inches & hours **Conversion Table**

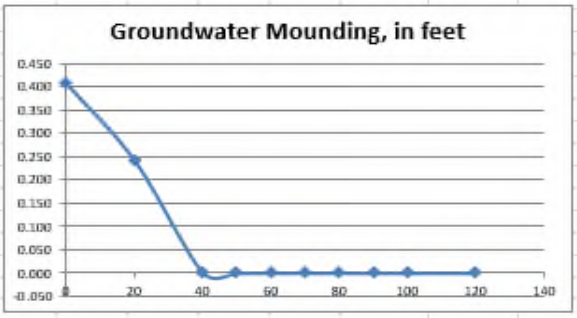
Input Values			inch/hou	feet/day
1.3300	R	Recharge (infiltration) rate (feet/day)	0.67	1.33
2.500	Sy	Specific yield, Sy (dimensionless, between 0 and 1)		
4.80	K	Horizontal hydraulic conductivity, Kh (fe	2.00	4.00
21.000	x	1/2 length of basin (x direction, in feet)		
7.000	y	1/2 width of basin (y direction, in feet)	hours	days
1.000	t	duration of infiltration period (days)	36	1.50
20.000	hi(0)	initial thickness of saturated zone (feet)		

In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).

20.406	h(max)	maximum thickness of saturated zone (beneath center of basin at end of infiltration period)
0.406	Δh(max)	maximum groundwater mounding (beneath center of basin at end of infiltration period)

Ground-water Mounding, in feet	from center of basin in x direction,
0.406	0
0.242	20
0.001	40
0.000	50
0.000	60
0.000	70
0.000	80
0.000	90
0.000	100
0.000	120

Re-Calculate Now



Disclaimer

This spreadsheet solving the Hantush (1967) equation for ground-water mounding beneath an infiltration basin is made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.

STANDARD 4. WATER QUALITY

"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; and
c) Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

This standard applies after the site is stabilized.[2] Since removal efficiency may vary with each storm, 80% TSS removal is not required for each storm. It is the average removal over the year that is required to meet the standard. The required water quality volume, the runoff volume requiring TSS treatment, is calculated as follows:

The required water quality volume equals 1.0 inch of runoff times the total impervious area of the post-development project site for a discharge

- *from a land use with a higher potential pollutant load;*
- *within an area with a rapid infiltration rate (greater than 2.4 inches per hour);*
- *within a Zone II or Interim Wellhead Protection Area;*
- *near or to the following critical areas:*
  - *Outstanding Resource Waters,*
  - *Special Resource Waters,*
  - *bathing beaches,*
  - *shellfish growing areas,*
  - *cold-water fisheries.*

The required water quality volume equals 0.5 inches of runoff times the total impervious area of the post-development site for all other discharges."

The proposed work meets the requirement for removal of total suspended solids (TSS).

Standard 4 requires the development and implementation of suitable practices for source control and pollution prevention. These measures must be identified in a long-term pollution prevention plan. The long-term pollution prevention plan shall include the proper procedures for the following:

- *good housekeeping;*
- *storing materials and waste products inside or under cover;*
- *vehicle washing;*
- *routine inspections and maintenance of stormwater BMPs;*

- *spill prevention and response;*
- *maintenance of lawns, gardens, and other landscaped areas;*
- *storage and use of fertilizers, herbicides, and pesticides;*
- *pet waste management;*
- *operation and management of septic systems; and*
  proper management of deicing chemicals and snow.

The long-term pollution prevention plan shall provide that sand piles be contained and stabilized to prevent the discharge of sand to wetlands or water bodies, and, where feasible, covered. If a Total Maximum Daily Load (TMDL) has been developed that indicates that use of fertilizers containing nutrients must be reduced, the long-term pollution prevention plan shall also include a nutrient management plan. The long-term pollution prevention plan may be prepared as a separate document or combined with the Operation and Maintenance Plan required by Standard 9.

The long-term pollution prevention plan will be combined with the Operation and Maintenance Plan required by Standard 9.

WATER QUALITY TREATMENT VOLUME

V_{WQ} = (D_{WQ}/12 inches/foot) * (A_{IMP} * 43,560 square feet/acre)

V_{WQ} = *Required Water Quality Volume* (in cubic feet)
D_{WQ} = Water Quality Depth: one-inch for discharges within a Zone II or Interim Wellhead Protection Area, to or near another critical area, runoff from a LUHPPL, or exfiltration to soils with infiltration rate greater than 2.4 inches/hour or greater; ½-inch for discharges near or to other areas.
A_{IMP} = Impervious Area (in acres)

The site is located in soils with an infiltration rate greater than 2.4 inches/hour so a Water Quality Depth of one-inch is required.

See Table 1, Proposed Recharge Volume (100 year storm volume) above, for calculations

INSTRUCTIONS:

Version 1, Automated: Mar. 4, 2008

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.

Location: 48 Livermore Road, Wellesley

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)
Infiltration Basin	**0.80**	**1.00**	**0.80**	**0.20**
Deep Sump and Hooded Catch Basin	**0.25**	**0.20**	**0.05**	**0.15**
	0.00	**0.15**	**0.00**	**0.15**
	0.00	**0.15**	**0.00**	**0.15**
	0.00	**0.15**	**0.00**	**0.15**

Total TSS Removal = **85%**

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

Project: **Hawkey**

Prepared By: **The Jillson Company**

Date: **10/15/2025**

*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

STANDARD 5 LAND USES WITH HIGHER POTENTIAL POLLUTANT LOADS

The land use, residential, is not considered a higher potential pollutant load.

STANDARD 6. CRITICAL AREAS

The land use is not located within a critical area.

STANDARD 7. REDEVELOPMENT PROJECT

"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 stormwater 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."

The project is partially a redevelopment project.

STANDARD 8. CONSTRUCTION PERIOD CONTROLS

A plan to control construction-related impacts, including erosion, sedimentation, and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

The proposed project will disturb less than one acre of land and will not be required to obtain coverage under the NPDES Construction General Permit issued by EPA

STANDARD 9. LONG-TERM OPERATION AND MAINTENANCE (O&M) PLAN

A Long -Term Operation and Maintenance (O&M) Plan shall be developed and implemented to ensure that stormwater management systems function as designed.

The Long-Term Operation and Maintenance Plan shall at a minimum include:

1. *Stormwater management system(s) owners;*
2. *The party or parties responsible for operation and maintenance, including how future property owners will be notified of the presence of the stormwater management system and the requirement for proper operation and maintenance;*
3. *The routine and non-routine maintenance tasks to be undertaken after construction is complete and a schedule for implementing those tasks;*
4. *A plan that is drawn to scale and shows the location of all stormwater BMPs in each treatment train along with the discharge point;*
5. *A description and delineation of public safety features; and*
6. *An estimated operations and maintenance budget.*

STANDARD 10. ILLICIT DISCHARGES PROHIBITED

There are no existing illicit discharges on site. All illicit discharges to the stormwater management system are prohibited.

Illicit Discharge Statement

This statement is intended to meet Standard #10 of the Stormwater Management requirements

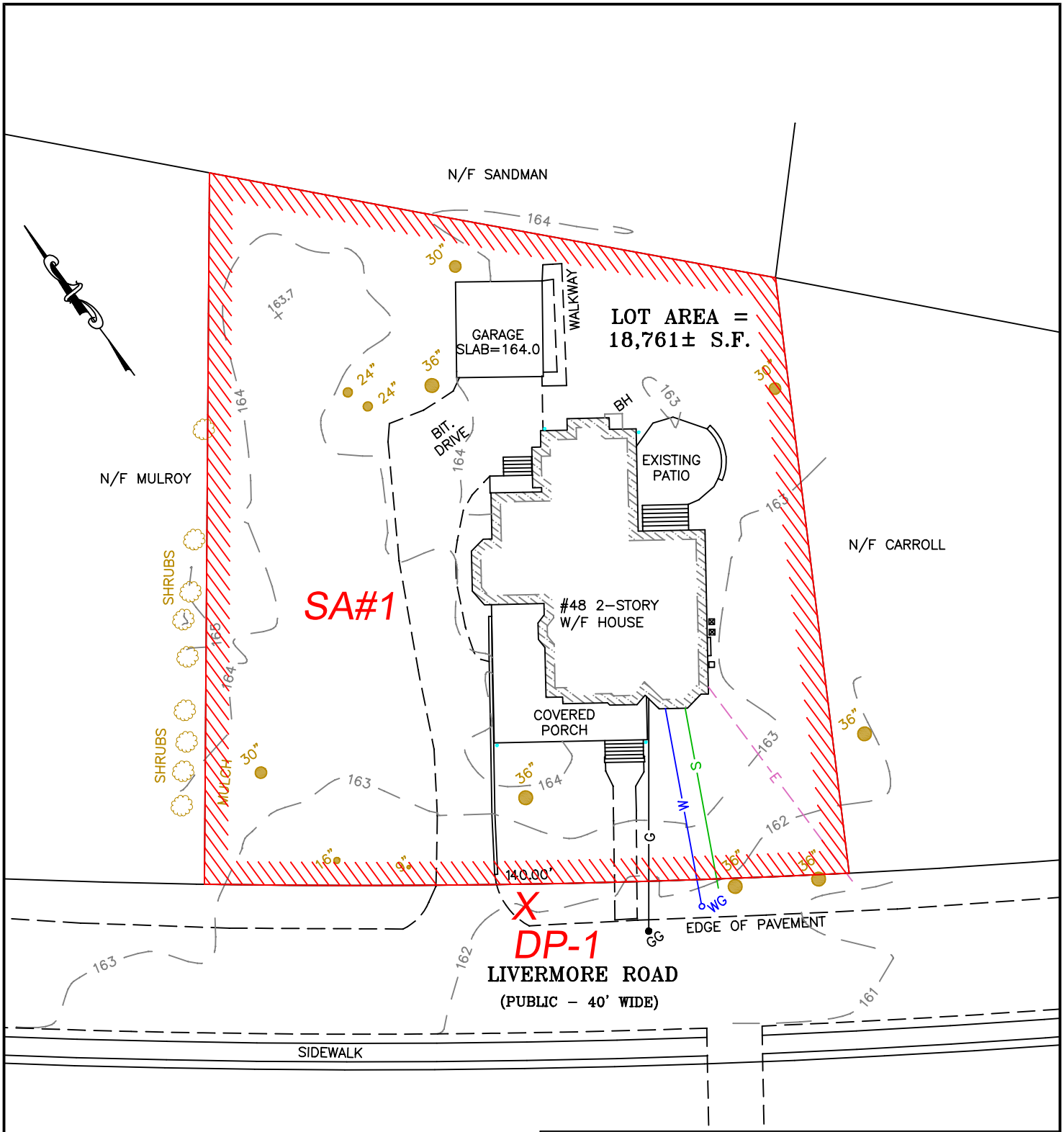
Illicit discharges to the stormwater management system are discharges that are not entirely comprised of stormwater.

Except for the potential for deliberate criminal act of discharge by an unauthorized entity for which the property owner has no control, there are to be no illicit discharges into the stormwater system.

_____

Sam & Nicole Hawkey

Section II Overall Site Analysis



"PRE-DEVLOPMENT SUB-AREA MAP"

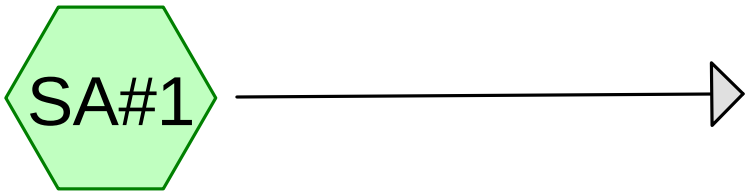
LAND IN

WELLESLEY, MASS.

SCALE: 1" =30' | DATE: 10/15/25

PREPARED BY: THE JILLSON COMPANY, INC.
35 MAIN STREET, S-4B
WAYLAND, MA 01778
(508) 653-1001
www.JILLSONCOMPANY.com

JOB #3176



SUB-AREA #1

DESIGN POINT #1-LIVERMORE RD

Subcat Reach Pond Link

Routing Diagram for #3176 Hawkey-PRE
Prepared by Microsoft, Printed 10/16/2025

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
1,838.0	98.0	DWAY (SA#1)
390.0	98.0	GARAGE (SA#1)
2,710.0	98.0	HOUSE (SA#1)
352.0	98.0	PATIO (SA#1)
140.0	98.0	WALKWAY (SA#1)
13,225.0	32.0	Woods/grass comb., Good, HSG A (SA#1)
18,655.0	**51.2**	**TOTAL AREA**

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 SA#1: SUB-AREA #1 Runoff Area=18,655.0 sf 29.11% Impervious Runoff Depth=0.18"
Tc=6.00 min CN=51.2 Runoff=0.0225 cfs 276.4 cf

Reach DP#1: DESIGN POINT #1-LIVERMORE RD Inflow=0.0225 cfs 276.4 cf
Outflow=0.0225 cfs 276.4 cf

Total Runoff Area = 18,655.0 sf Runoff Volume = 276.4 cf Average Runoff Depth = 0.18"
70.89% Pervious = 13,225.0 sf 29.11% Impervious = 5,430.0 sf

Summary for Subcatchment SA#1: SUB-AREA #1

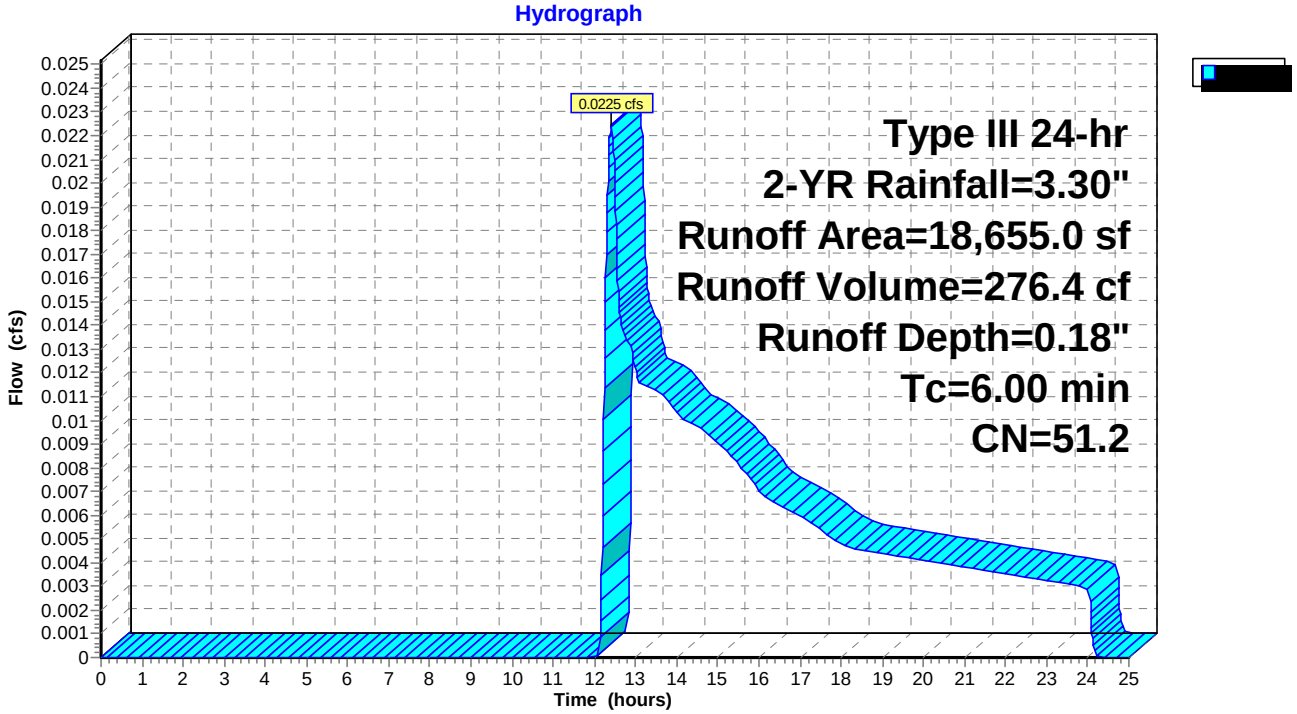
Runoff = 0.0225 cfs @ 12.41 hrs, Volume= 276.4 cf, Depth= 0.18"

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-YR Rainfall=3.30"

	Area (sf)	CN	Description
*	2,710.0	98.0	HOUSE
*	1,838.0	98.0	DWAY
*	140.0	98.0	WALKWAY
*	390.0	98.0	GARAGE
	13,225.0	32.0	Woods/grass comb., Good, HSG A
*	352.0	98.0	PATIO
	18,655.0	51.2	Weighted Average
	13,225.0		70.89% Pervious Area
	5,430.0		29.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.00					**Direct Entry, SA#1 TO LIVERMORE RD**

Subcatchment SA#1: SUB-AREA #1

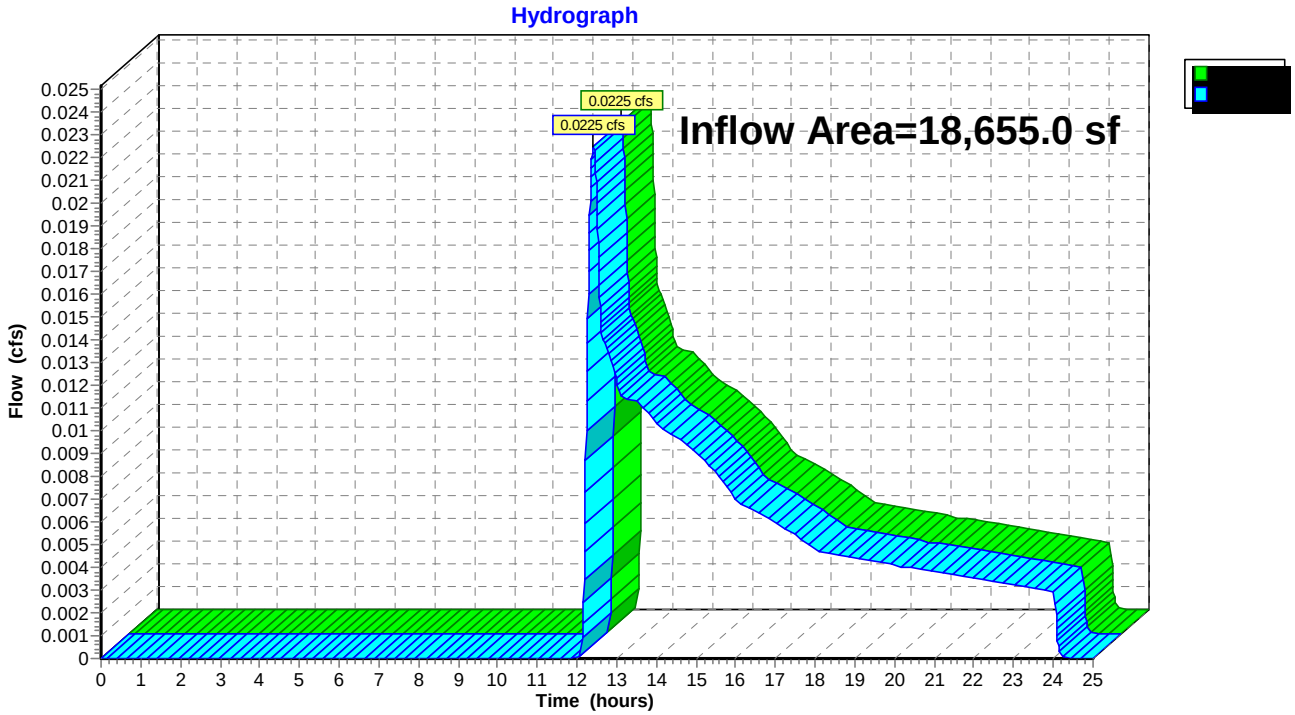


Summary for Reach DP#1: DESIGN POINT #1-LIVERMORE RD

Inflow Area = 18,655.0 sf, 29.11% Impervious, Inflow Depth = 0.18" for 2-YR event
Inflow = 0.0225 cfs @ 12.41 hrs, Volume= 276.4 cf
Outflow = 0.0225 cfs @ 12.41 hrs, Volume= 276.4 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Reach DP#1: DESIGN POINT #1-LIVERMORE RD



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 SA#1: SUB-AREA #1 Runoff Area=18,655.0 sf 29.11% Impervious Runoff Depth=0.84"
Tc=6.00 min CN=51.2 Runoff=0.2984 cfs 1,301.1 cf

Reach DP#1: DESIGN POINT #1-LIVERMORE RD Inflow=0.2984 cfs 1,301.1 cf
Outflow=0.2984 cfs 1,301.1 cf

Total Runoff Area = 18,655.0 sf Runoff Volume = 1,301.1 cf Average Runoff Depth = 0.84"
70.89% Pervious = 13,225.0 sf 29.11% Impervious = 5,430.0 sf

Summary for Subcatchment SA#1: SUB-AREA #1

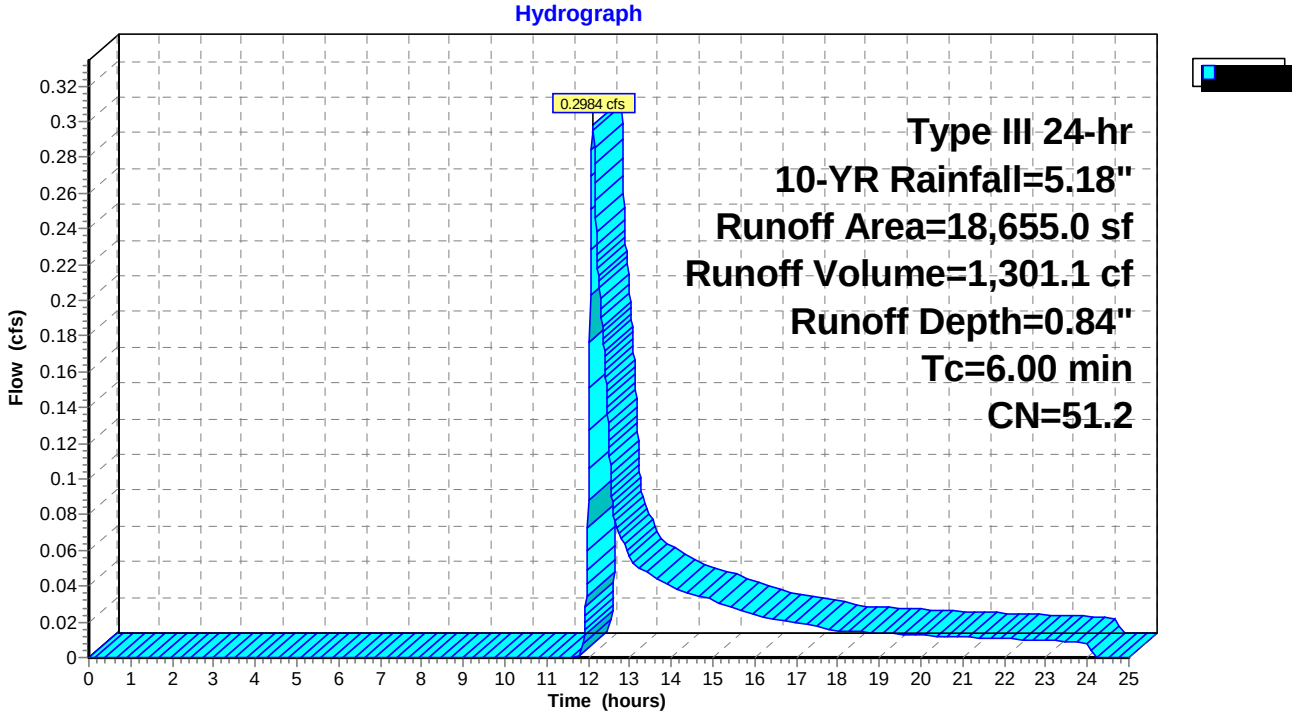
Runoff = 0.2984 cfs @ 12.11 hrs, Volume= 1,301.1 cf, Depth= 0.84"

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-YR Rainfall=5.18"

	Area (sf)	CN	Description
*	2,710.0	98.0	HOUSE
*	1,838.0	98.0	DWAY
*	140.0	98.0	WALKWAY
*	390.0	98.0	GARAGE
	13,225.0	32.0	Woods/grass comb., Good, HSG A
*	352.0	98.0	PATIO
	18,655.0	51.2	Weighted Average
	13,225.0		70.89% Pervious Area
	5,430.0		29.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.00					**Direct Entry, SA#1 TO LIVERMORE RD**

Subcatchment SA#1: SUB-AREA #1

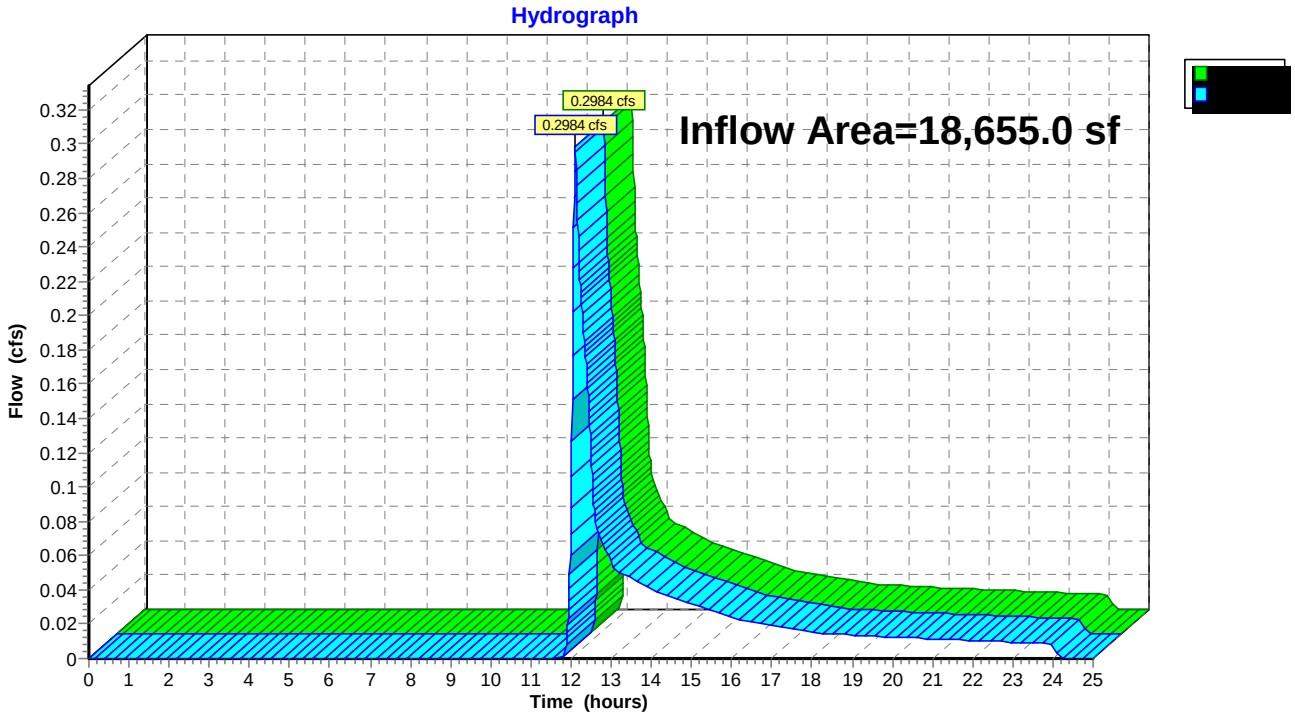


Summary for Reach DP#1: DESIGN POINT #1-LIVERMORE RD

Inflow Area = 18,655.0 sf, 29.11% Impervious, Inflow Depth = 0.84" for 10-YR event
Inflow = 0.2984 cfs @ 12.11 hrs, Volume= 1,301.1 cf
Outflow = 0.2984 cfs @ 12.11 hrs, Volume= 1,301.1 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Reach DP#1: DESIGN POINT #1-LIVERMORE RD



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 SA#1: SUB-AREA #1 Runoff Area=18,655.0 sf 29.11% Impervious Runoff Depth=1.42"
Tc=6.00 min CN=51.2 Runoff=0.6042 cfs 2,205.0 cf

Reach DP#1: DESIGN POINT #1-LIVERMORE RD Inflow=0.6042 cfs 2,205.0 cf
Outflow=0.6042 cfs 2,205.0 cf

Total Runoff Area = 18,655.0 sf Runoff Volume = 2,205.0 cf Average Runoff Depth = 1.42"
70.89% Pervious = 13,225.0 sf 29.11% Impervious = 5,430.0 sf

Summary for Subcatchment SA#1: SUB-AREA #1

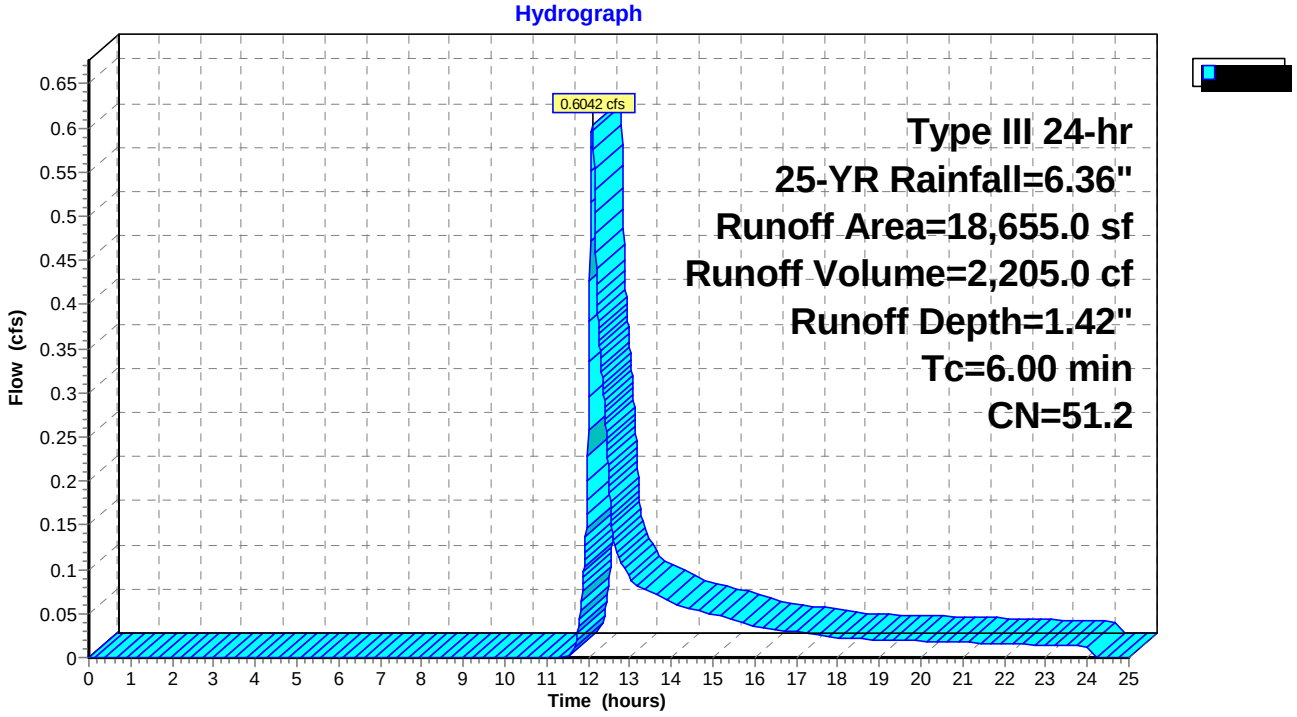
Runoff = 0.6042 cfs @ 12.10 hrs, Volume= 2,205.0 cf, Depth= 1.42"

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-YR Rainfall=6.36"

	Area (sf)	CN	Description
*	2,710.0	98.0	HOUSE
*	1,838.0	98.0	DWAY
*	140.0	98.0	WALKWAY
*	390.0	98.0	GARAGE
	13,225.0	32.0	Woods/grass comb., Good, HSG A
*	352.0	98.0	PATIO
	18,655.0	51.2	Weighted Average
	13,225.0		70.89% Pervious Area
	5,430.0		29.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.00					**Direct Entry, SA#1 TO LIVERMORE RD**

Subcatchment SA#1: SUB-AREA #1

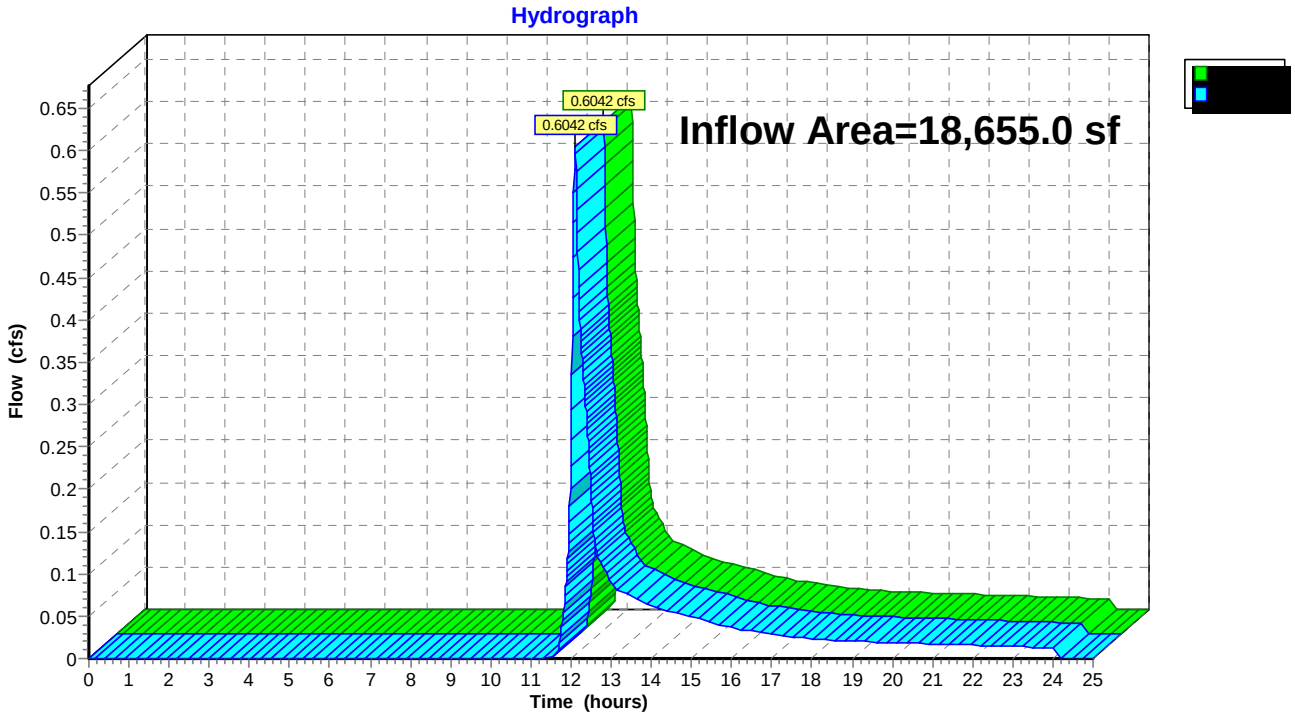


Summary for Reach DP#1: DESIGN POINT #1-LIVERMORE RD

Inflow Area = 18,655.0 sf, 29.11% Impervious, Inflow Depth = 1.42" for 25-YR event
Inflow = 0.6042 cfs @ 12.10 hrs, Volume= 2,205.0 cf
Outflow = 0.6042 cfs @ 12.10 hrs, Volume= 2,205.0 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Reach DP#1: DESIGN POINT #1-LIVERMORE RD



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 SA#1: SUB-AREA #1 Runoff Area=18,655.0 sf 29.11% Impervious Runoff Depth=2.48"
Tc=6.00 min CN=51.2 Runoff=1.1624 cfs 3,851.7 cf

Reach DP#1: DESIGN POINT #1-LIVERMORE RD Inflow=1.1624 cfs 3,851.7 cf
Outflow=1.1624 cfs 3,851.7 cf

Total Runoff Area = 18,655.0 sf Runoff Volume = 3,851.7 cf Average Runoff Depth = 2.48"
70.89% Pervious = 13,225.0 sf 29.11% Impervious = 5,430.0 sf

Summary for Subcatchment SA#1: SUB-AREA #1

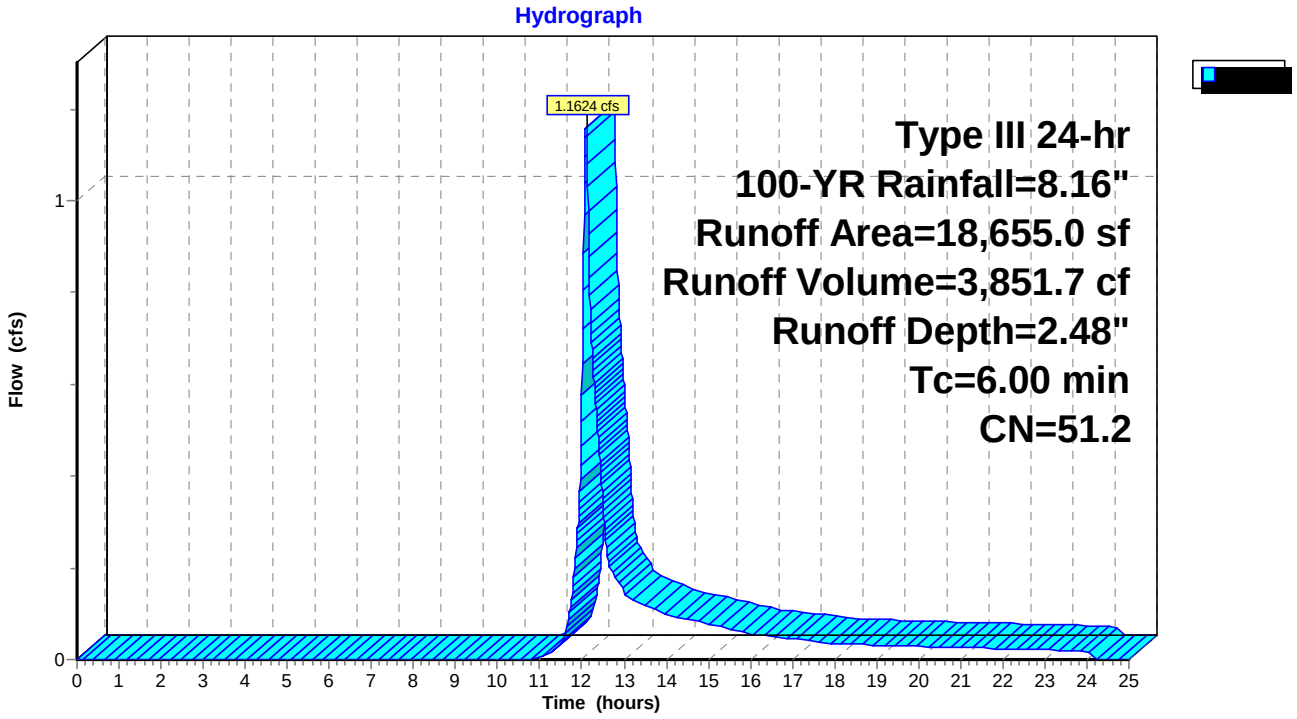
Runoff = 1.1624 cfs @ 12.10 hrs, Volume= 3,851.7 cf, Depth= 2.48"

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-YR Rainfall=8.16"

	Area (sf)	CN	Description
*	2,710.0	98.0	HOUSE
*	1,838.0	98.0	DWAY
*	140.0	98.0	WALKWAY
*	390.0	98.0	GARAGE
	13,225.0	32.0	Woods/grass comb., Good, HSG A
*	352.0	98.0	PATIO
	18,655.0	51.2	Weighted Average
	13,225.0		70.89% Pervious Area
	5,430.0		29.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.00					**Direct Entry, SA#1 TO LIVERMORE RD**

Subcatchment SA#1: SUB-AREA #1

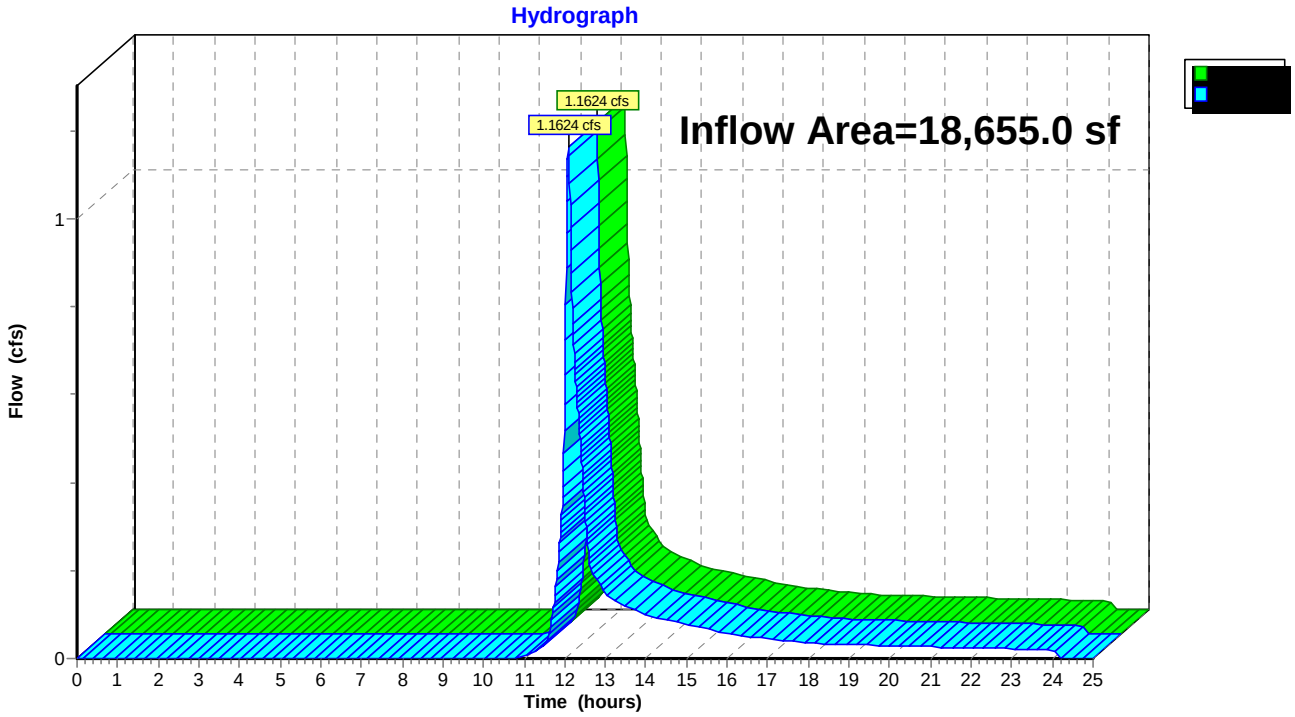


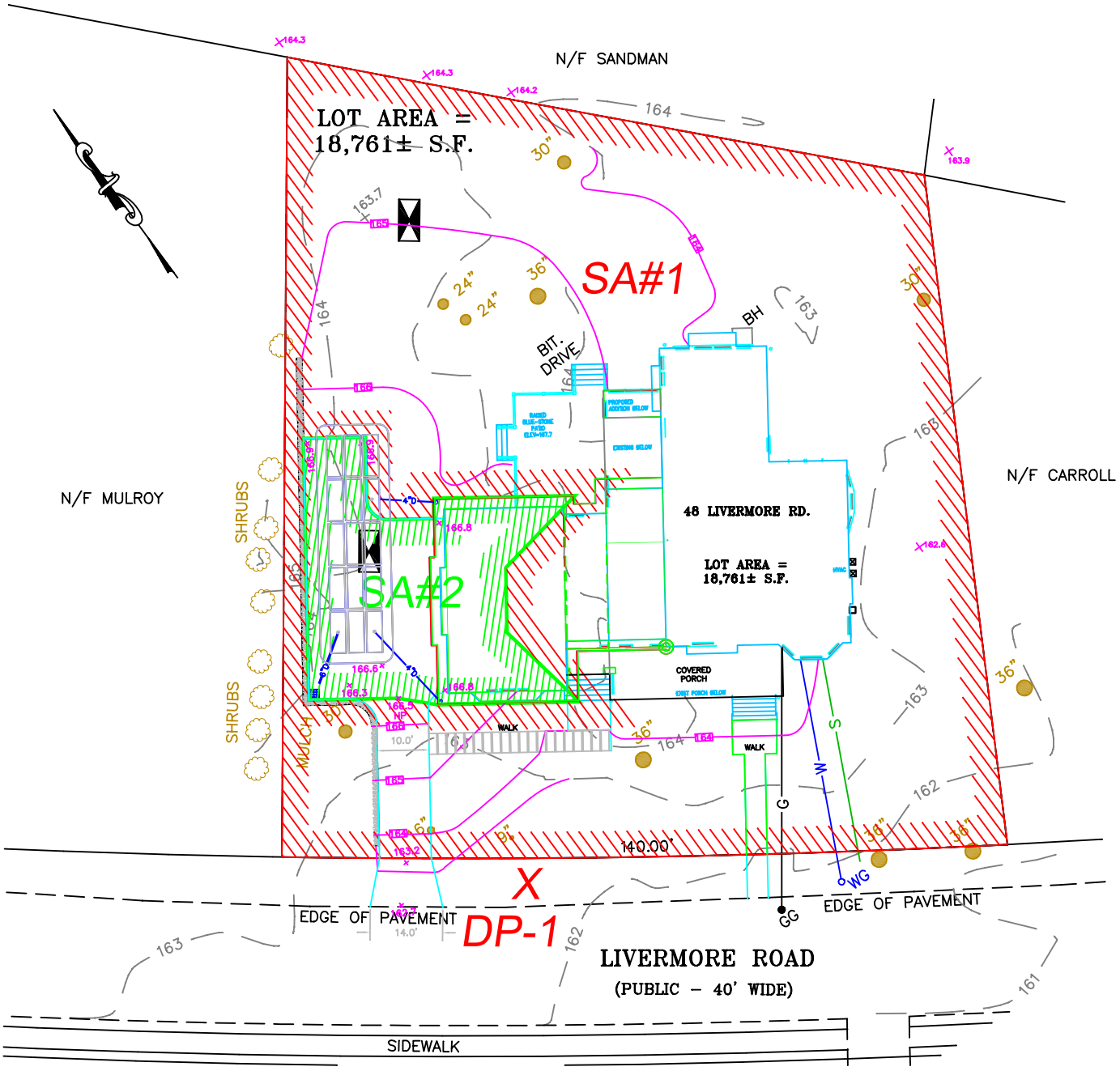
Summary for Reach DP#1: DESIGN POINT #1-LIVERMORE RD

Inflow Area = 18,655.0 sf, 29.11% Impervious, Inflow Depth = 2.48" for 100-YR event
Inflow = 1.1624 cfs @ 12.10 hrs, Volume= 3,851.7 cf
Outflow = 1.1624 cfs @ 12.10 hrs, Volume= 3,851.7 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Reach DP#1: DESIGN POINT #1-LIVERMORE RD





"POST-DEVLOPMENT SUB-AREA MAP"

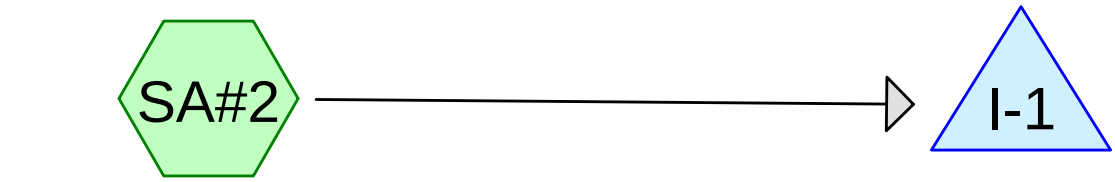
LAND IN

WELLESLEY, MASS.

SCALE: 1" =30'	DATE: 10/15/25

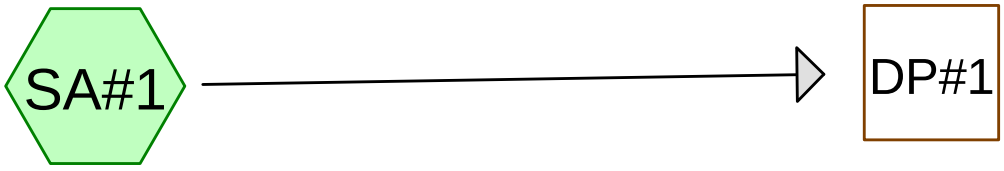
PREPARED BY: THE JILLSON COMPANY, INC.
35 MAIN STREET, S-4B
WAYLAND, MA 01778
(508) 653-1001
www.JILLSONCOMPANY.com

JOB #3176



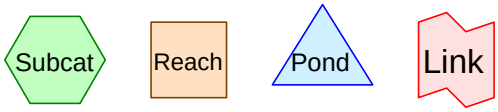
NEW ROOF AREAS

15 CULTEC 100



SUB-AREA #1

DESIGN POINT
#1-LIVERMORE RD



Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
311.0	98.0	Driveway (not fo infiltration) (SA#1)
1,042.0	98.0	New Driveway to DCB-1 (SA#2)
748.0	98.0	New Garge roof to infiltration (SA#2)
3,714.0	98.0	Roof & Patio (to downspouts) (SA#1)
325.0	60.0	Walkways (SA#1)
12,515.0	32.0	Woods/grass comb., Good, HSG A (SA#1)
18,655.0	**53.1**	**TOTAL AREA**

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 SA#1: SUB-AREA #1 Runoff Area=16,865.0 sf 23.87% Impervious Runoff Depth=0.11"
Tc=6.00 min CN=48.3 Runoff=0.0061 cfs 159.2 cf

Subcatchment SA#2: NEW ROOF AREAS Runoff Area=1,790.0 sf 100.00% Impervious Runoff Depth=3.07"
Tc=6.00 min CN=98.0 Runoff=0.1317 cfs 457.5 cf

Reach DP#1: DESIGN POINT #1-LIVERMORE RD Inflow=0.0061 cfs 159.2 cf
Outflow=0.0061 cfs 159.2 cf

Pond I-1: 15 CULTEC 100 Peak Elev=163.73' Storage=91.5 cf Inflow=0.1317 cfs 457.5 cf
Outflow=0.0320 cfs 457.5 cf

Total Runoff Area = 18,655.0 sf Runoff Volume = 616.7 cf Average Runoff Depth = 0.40"
68.83% Pervious = 12,840.0 sf 31.17% Impervious = 5,815.0 sf

Summary for Subcatchment SA#1: SUB-AREA #1

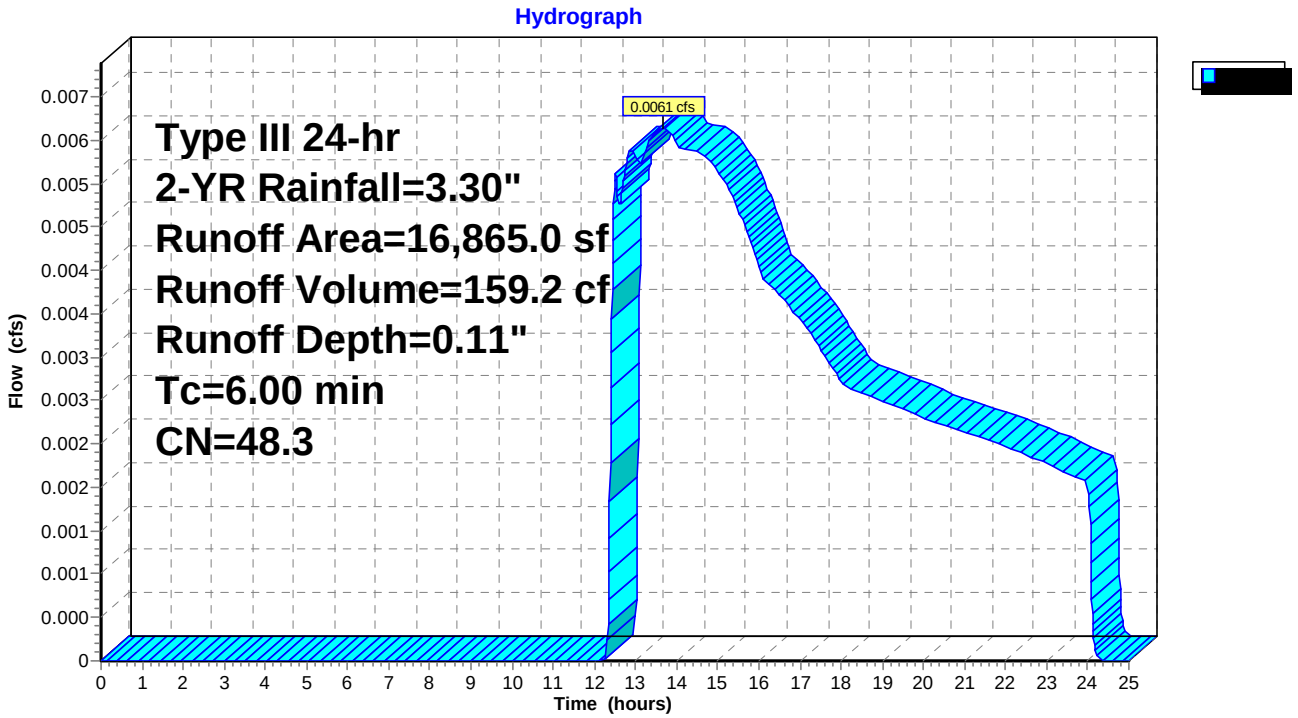
Runoff = 0.0061 cfs @ 13.66 hrs, Volume= 159.2 cf, Depth= 0.11"

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-YR Rainfall=3.30"

	Area (sf)	CN	Description
*	3,714.0	98.0	Roof & Patio (to downspouts)
*	325.0	60.0	Walkways
	12,515.0	32.0	Woods/grass comb., Good, HSG A
*	311.0	98.0	Driveway (not fo infiltration)
	16,865.0	48.3	Weighted Average
	12,840.0		76.13% Pervious Area
	4,025.0		23.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.00					**Direct Entry, SA#1 TO LIVERMORE RD**

Subcatchment SA#1: SUB-AREA #1



Summary for Subcatchment SA#2: NEW ROOF AREAS

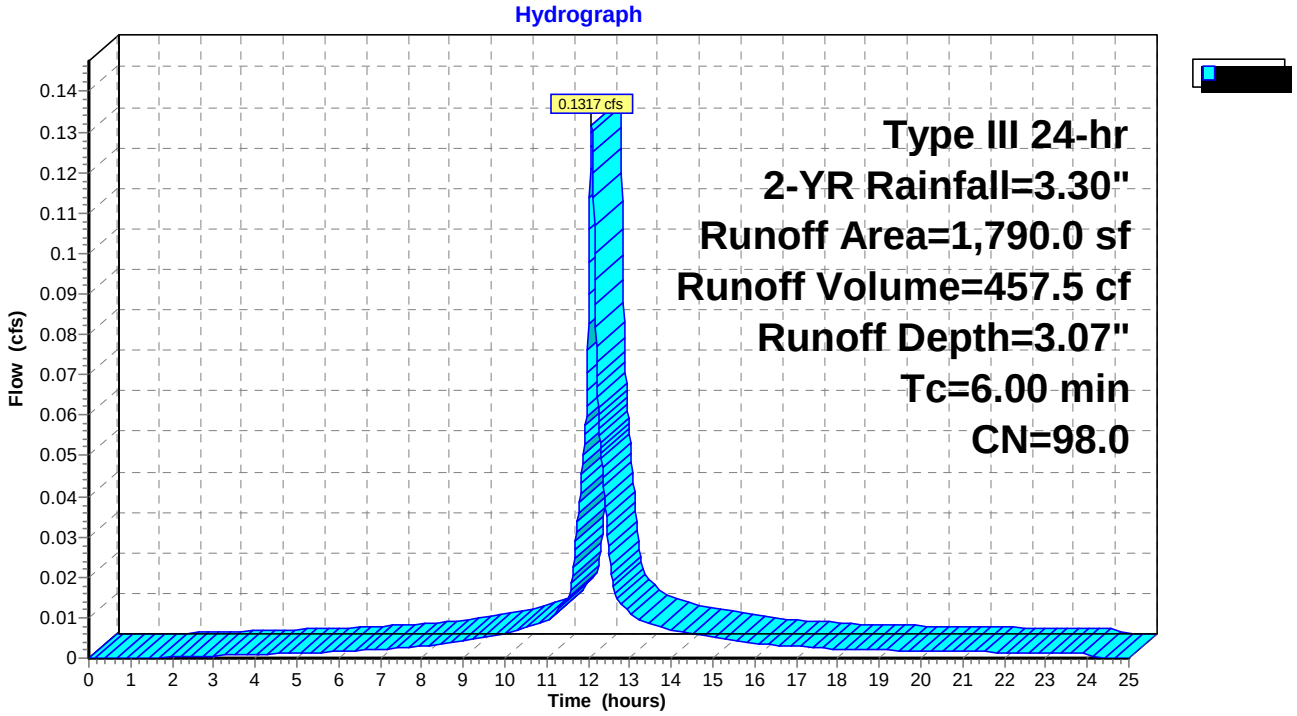
Runoff = 0.1317 cfs @ 12.08 hrs, Volume= 457.5 cf, Depth= 3.07"

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-YR Rainfall=3.30"

	Area (sf)	CN	Description
*	748.0	98.0	New Garge roof to infiltration
*	1,042.0	98.0	New Driveway to DCB-1
	1,790.0	98.0	Weighted Average
	1,790.0		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.00					**Direct Entry, ROOFS TO CULTEC**

Subcatchment SA#2: NEW ROOF AREAS

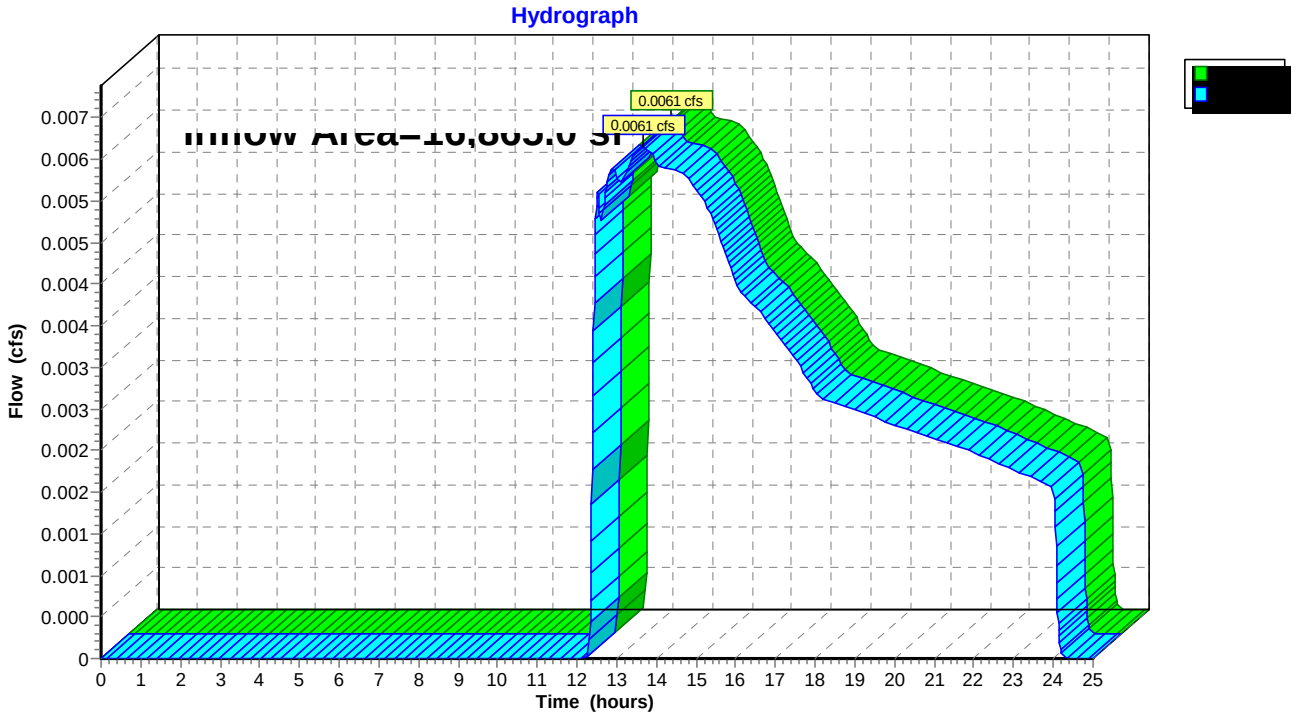


Summary for Reach DP#1: DESIGN POINT #1-LIVERMORE RD

Inflow Area = 16,865.0 sf, 23.87% Impervious, Inflow Depth = 0.11" for 2-YR event
Inflow = 0.0061 cfs @ 13.66 hrs, Volume= 159.2 cf
Outflow = 0.0061 cfs @ 13.66 hrs, Volume= 159.2 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Reach DP#1: DESIGN POINT #1-LIVERMORE RD



Summary for Pond I-1: 15 CULTEC 100

Inflow Area = 1,790.0 sf,100.00% Impervious, Inflow Depth = 3.07" for 2-YR event
Inflow = 0.1317 cfs @ 12.08 hrs, Volume= 457.5 cf
Outflow = 0.0320 cfs @ 11.84 hrs, Volume= 457.5 cf, Atten= 76%, Lag= 0.0 min
Discarded = 0.0320 cfs @ 11.84 hrs, Volume= 457.5 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 163.73' @ 12.46 hrs Surf.Area= 574.0 sf Storage= 91.5 cf

Plug-Flow detention time= 14.3 min calculated for 457.3 cf (100% of inflow)
Center-of-Mass det. time= 14.3 min (770.0 - 755.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	163.50'	269.1 cf	**13.67'W x 42.00'L x 1.54'H Field A** 884.9 cf Overall - 212.2 cf Embedded = 672.7 cf x 40.0% Voids
#2A	163.50'	212.2 cf	**Cultec C-100HD** x 15 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 3 rows
		481.3 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	163.50'	**2.41000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.0320 cfs @ 11.84 hrs HW=163.52' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.0320 cfs)

Pond I-1: 15 CULTEC 100 - Chamber Wizard Field A

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 3 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

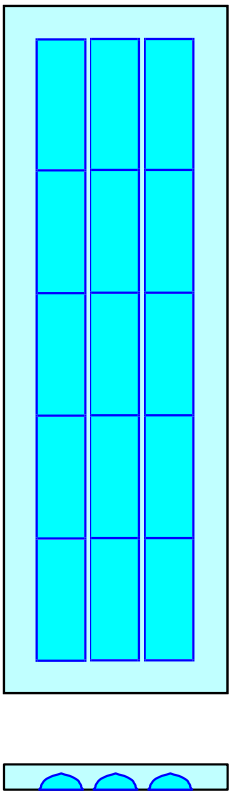
5 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 38.00' Row Length +24.0" End Stone x 2 = 42.00' Base Length
3 Rows x 36.0" Wide + 4.0" Spacing x 2 + 24.0" Side Stone x 2 = 13.67' Base Width
12.5" Chamber Height + 6.0" Cover = 1.54' Field Height

15 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 3 Rows = 212.2 cf Chamber Storage

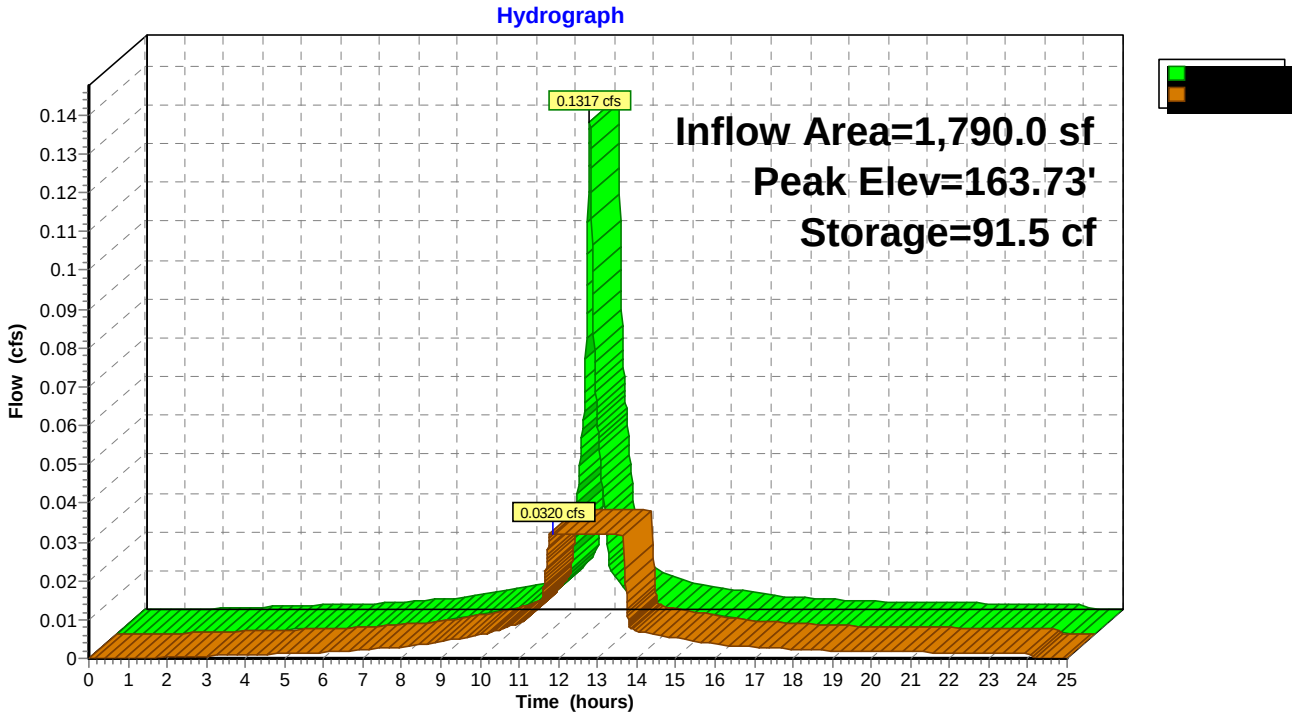
884.9 cf Field - 212.2 cf Chambers = 672.7 cf Stone x 40.0% Voids = 269.1 cf Stone Storage

Chamber Storage + Stone Storage = 481.3 cf = 0.011 af
Overall Storage Efficiency = 54.4%
Overall System Size = 42.00' x 13.67' x 1.54'

15 Chambers
32.8 cy Field
24.9 cy Stone



Pond I-1: 15 CULTEC 100



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 SA#1: SUB-AREA #1 Runoff Area=16,865.0 sf 23.87% Impervious Runoff Depth=0.67"
Tc=6.00 min CN=48.3 Runoff=0.1783 cfs 944.6 cf

Subcatchment SA#2: NEW ROOF AREAS Runoff Area=1,790.0 sf 100.00% Impervious Runoff Depth=4.94"
Tc=6.00 min CN=98.0 Runoff=0.2083 cfs 737.3 cf

Reach DP#1: DESIGN POINT #1-LIVERMORE RD Inflow=0.1783 cfs 944.6 cf
Outflow=0.1783 cfs 944.6 cf

Pond I-1: 15 CULTEC 100 Peak Elev=164.00' Storage=198.4 cf Inflow=0.2083 cfs 737.3 cf
Outflow=0.0320 cfs 737.3 cf

Total Runoff Area = 18,655.0 sf Runoff Volume = 1,681.9 cf Average Runoff Depth = 1.08"
68.83% Pervious = 12,840.0 sf 31.17% Impervious = 5,815.0 sf

Summary for Subcatchment SA#1: SUB-AREA #1

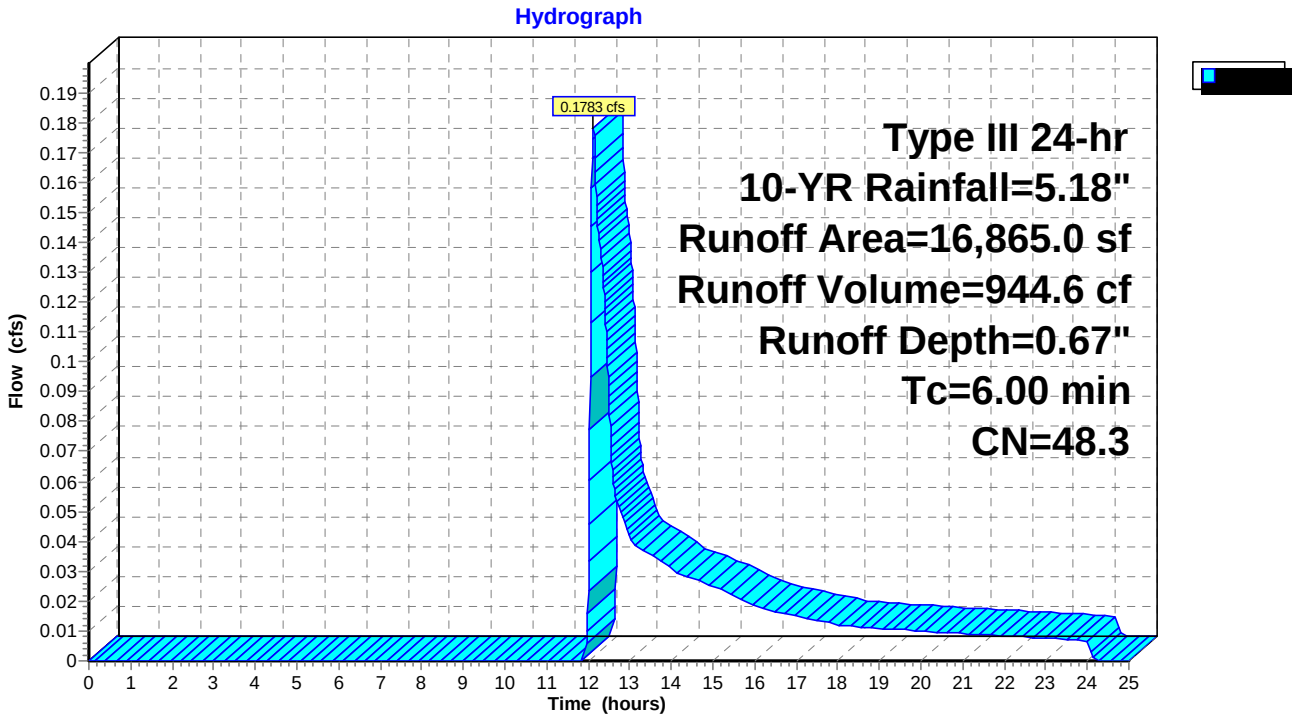
Runoff = 0.1783 cfs @ 12.13 hrs, Volume= 944.6 cf, Depth= 0.67"

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-YR Rainfall=5.18"

	Area (sf)	CN	Description
*	3,714.0	98.0	Roof & Patio (to downspouts)
*	325.0	60.0	Walkways
	12,515.0	32.0	Woods/grass comb., Good, HSG A
*	311.0	98.0	Driveway (not fo infiltration)
	16,865.0	48.3	Weighted Average
	12,840.0		76.13% Pervious Area
	4,025.0		23.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.00					**Direct Entry, SA#1 TO LIVERMORE RD**

Subcatchment SA#1: SUB-AREA #1



Summary for Subcatchment SA#2: NEW ROOF AREAS

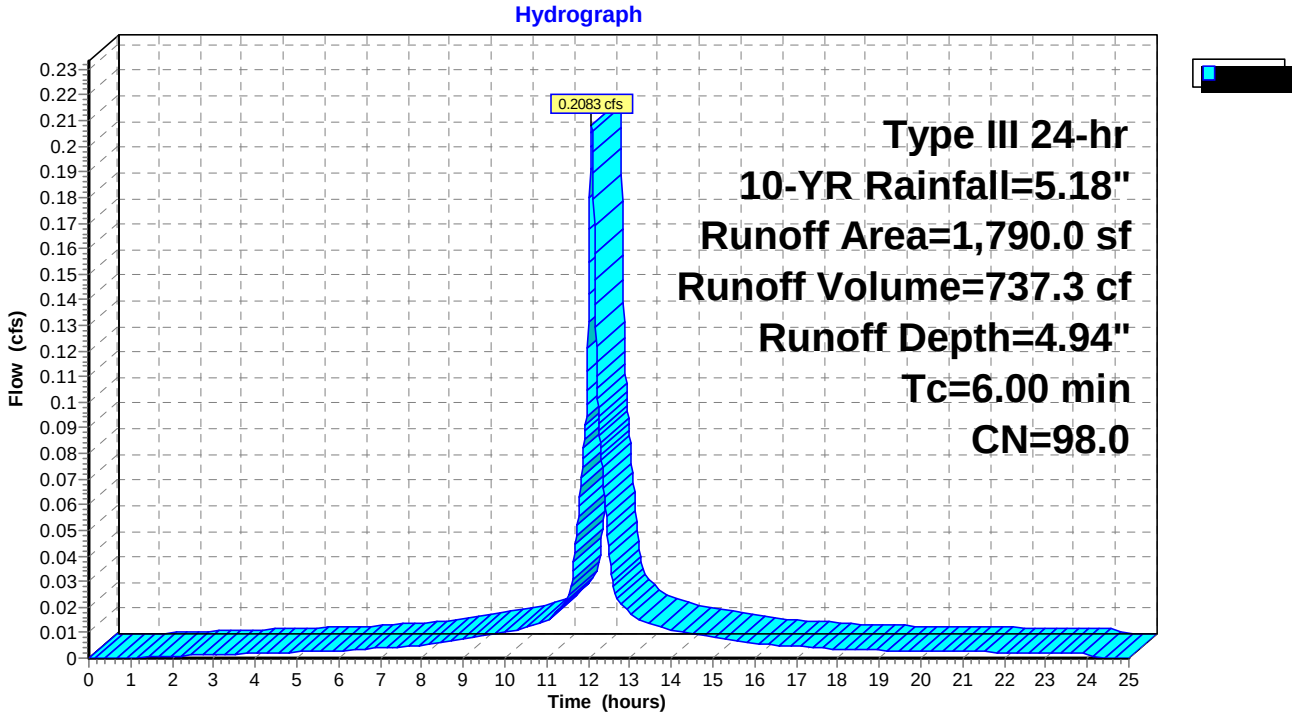
Runoff = 0.2083 cfs @ 12.08 hrs, Volume= 737.3 cf, Depth= 4.94"

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-YR Rainfall=5.18"

	Area (sf)	CN	Description
*	748.0	98.0	New Garge roof to infiltration
*	1,042.0	98.0	New Driveway to DCB-1
	1,790.0	98.0	Weighted Average
	1,790.0		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.00					**Direct Entry, ROOFS TO CULTEC**

Subcatchment SA#2: NEW ROOF AREAS

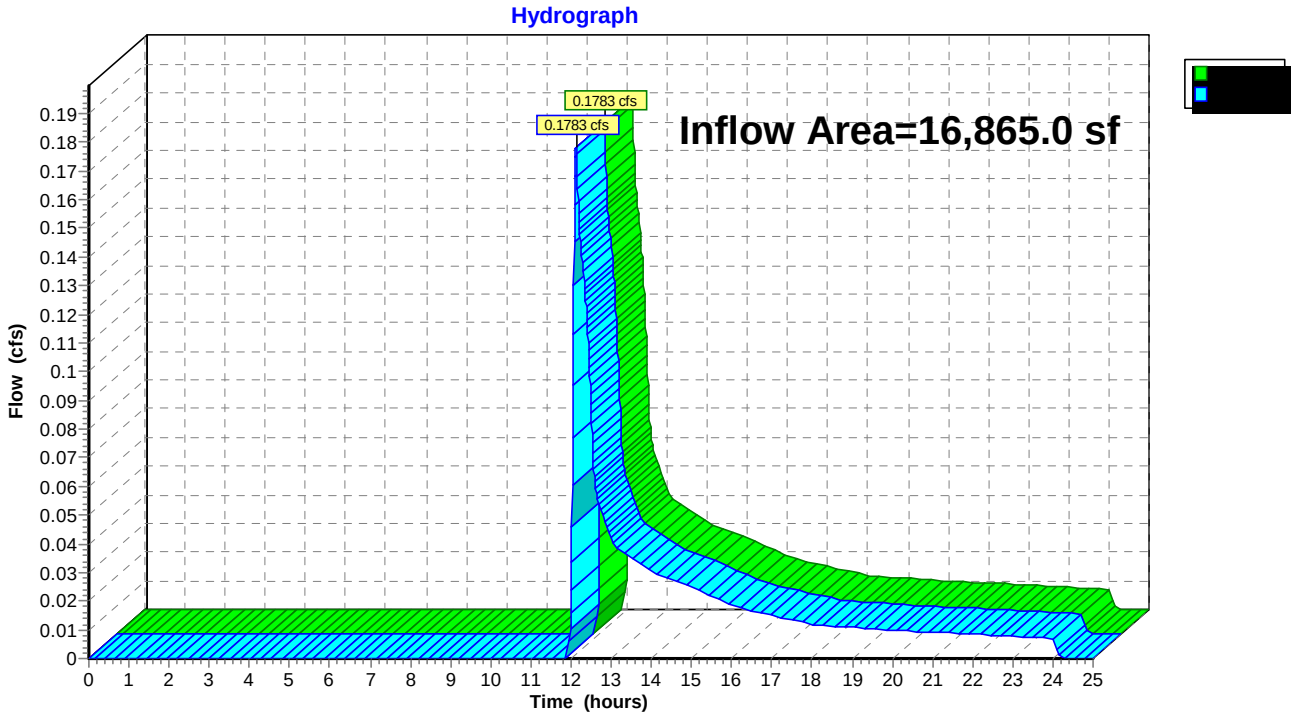


Summary for Reach DP#1: DESIGN POINT #1-LIVERMORE RD

Inflow Area = 16,865.0 sf, 23.87% Impervious, Inflow Depth = 0.67" for 10-YR event
Inflow = 0.1783 cfs @ 12.13 hrs, Volume= 944.6 cf
Outflow = 0.1783 cfs @ 12.13 hrs, Volume= 944.6 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Reach DP#1: DESIGN POINT #1-LIVERMORE RD



Summary for Pond I-1: 15 CULTEC 100

Inflow Area = 1,790.0 sf,100.00% Impervious, Inflow Depth = 4.94" for 10-YR event
Inflow = 0.2083 cfs @ 12.08 hrs, Volume= 737.3 cf
Outflow = 0.0320 cfs @ 11.72 hrs, Volume= 737.3 cf, Atten= 85%, Lag= 0.0 min
Discarded = 0.0320 cfs @ 11.72 hrs, Volume= 737.3 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 164.00' @ 12.56 hrs Surf.Area= 574.0 sf Storage= 198.4 cf

Plug-Flow detention time= 34.7 min calculated for 737.0 cf (100% of inflow)
Center-of-Mass det. time= 34.7 min (782.1 - 747.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	163.50'	269.1 cf	**13.67'W x 42.00'L x 1.54'H Field A** 884.9 cf Overall - 212.2 cf Embedded = 672.7 cf x 40.0% Voids
#2A	163.50'	212.2 cf	**Cultec C-100HD** x 15 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 3 rows
		481.3 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	163.50'	**2.41000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.0320 cfs @ 11.72 hrs HW=163.52' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.0320 cfs)

Pond I-1: 15 CULTEC 100 - Chamber Wizard Field A

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 3 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

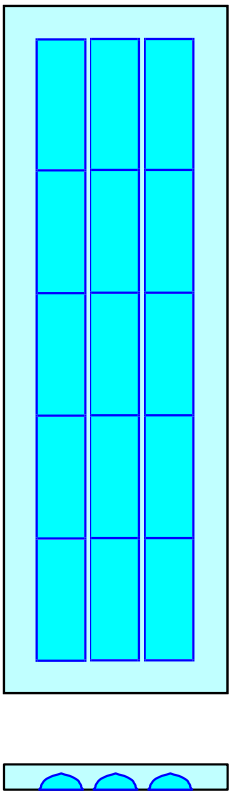
5 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 38.00' Row Length +24.0" End Stone x 2 = 42.00' Base Length
3 Rows x 36.0" Wide + 4.0" Spacing x 2 + 24.0" Side Stone x 2 = 13.67' Base Width
12.5" Chamber Height + 6.0" Cover = 1.54' Field Height

15 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 3 Rows = 212.2 cf Chamber Storage

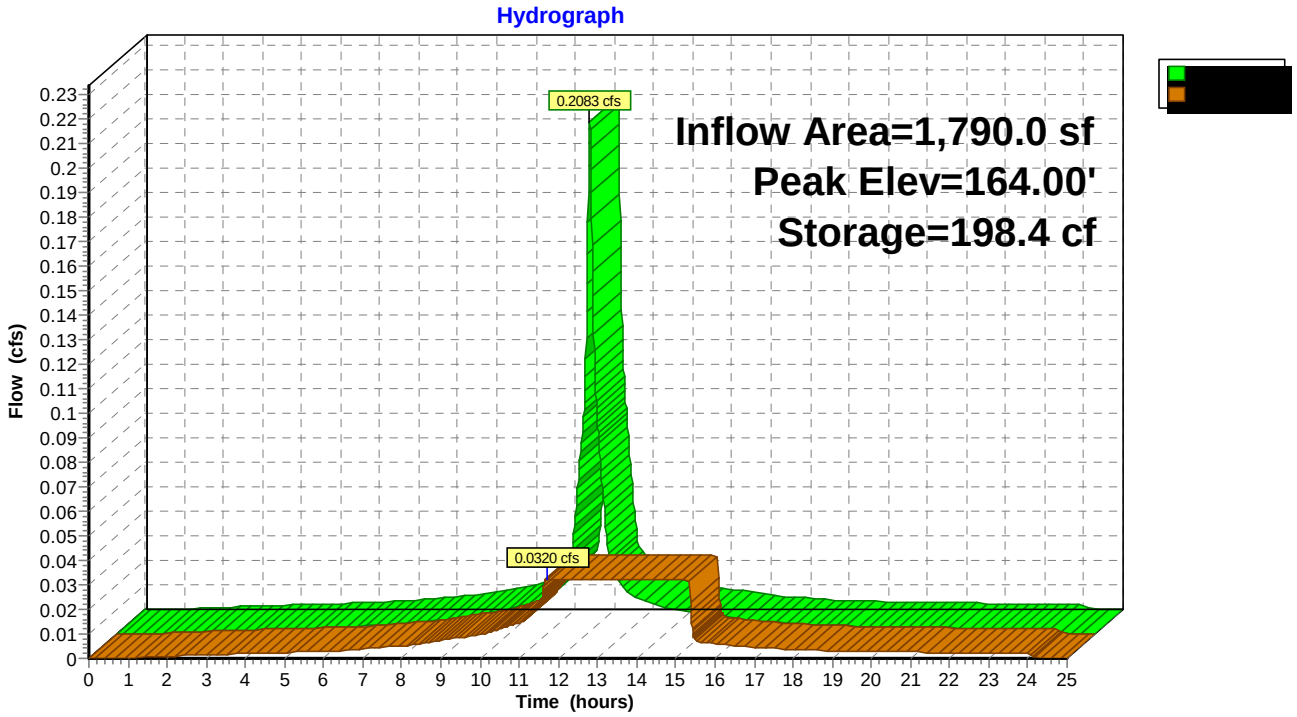
884.9 cf Field - 212.2 cf Chambers = 672.7 cf Stone x 40.0% Voids = 269.1 cf Stone Storage

Chamber Storage + Stone Storage = 481.3 cf = 0.011 af
Overall Storage Efficiency = 54.4%
Overall System Size = 42.00' x 13.67' x 1.54'

15 Chambers
32.8 cy Field
24.9 cy Stone



Pond I-1: 15 CULTEC 100



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 SA#1: SUB-AREA #1 Runoff Area=16,865.0 sf 23.87% Impervious Runoff Depth=1.19"
Tc=6.00 min CN=48.3 Runoff=0.4228 cfs 1,676.5 cf

Subcatchment SA#2: NEW ROOF AREAS Runoff Area=1,790.0 sf 100.00% Impervious Runoff Depth=6.12"
Tc=6.00 min CN=98.0 Runoff=0.2562 cfs 913.1 cf

Reach DP#1: DESIGN POINT #1-LIVERMORE RD Inflow=0.4228 cfs 1,676.5 cf
Outflow=0.4228 cfs 1,676.5 cf

Pond I-1: 15 CULTEC 100 Peak Elev=164.20' Storage=269.6 cf Inflow=0.2562 cfs 913.1 cf
Outflow=0.0320 cfs 913.1 cf

Total Runoff Area = 18,655.0 sf Runoff Volume = 2,589.6 cf Average Runoff Depth = 1.67"
68.83% Pervious = 12,840.0 sf 31.17% Impervious = 5,815.0 sf

Summary for Subcatchment SA#1: SUB-AREA #1

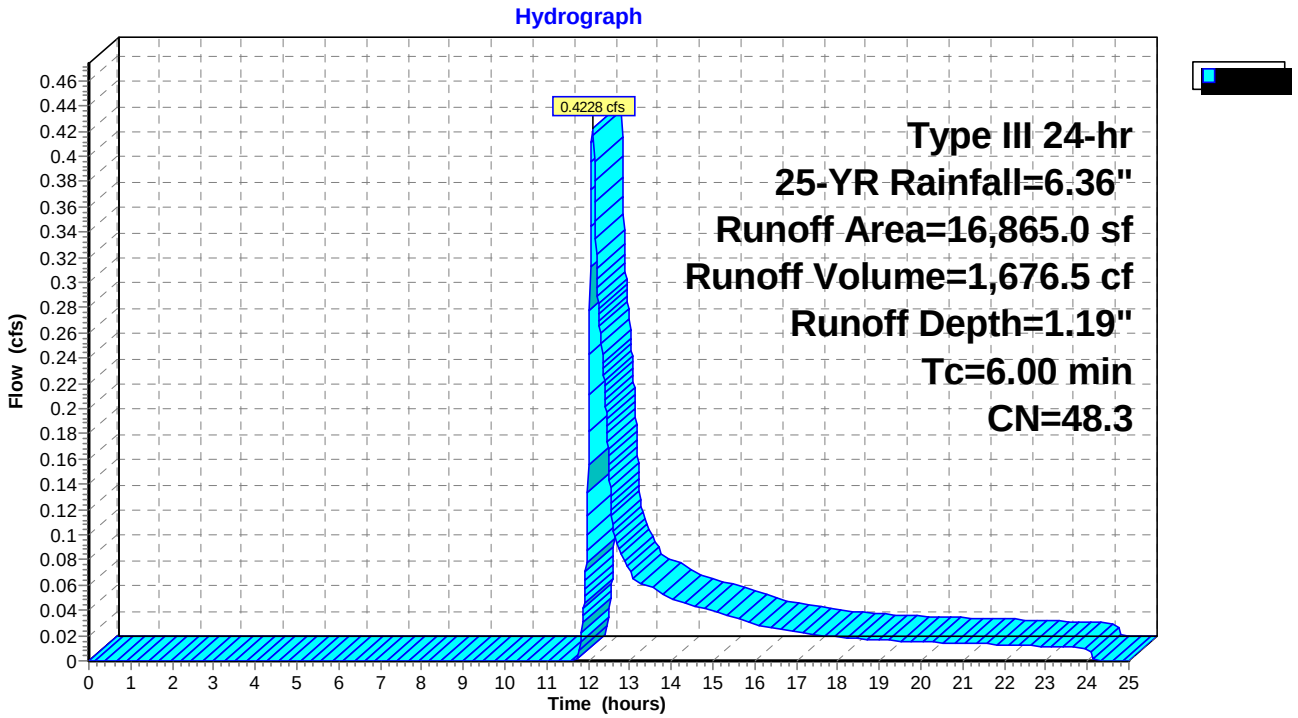
Runoff = 0.4228 cfs @ 12.11 hrs, Volume= 1,676.5 cf, Depth= 1.19"

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-YR Rainfall=6.36"

	Area (sf)	CN	Description
*	3,714.0	98.0	Roof & Patio (to downspouts)
*	325.0	60.0	Walkways
	12,515.0	32.0	Woods/grass comb., Good, HSG A
*	311.0	98.0	Driveway (not fo infiltration)
	16,865.0	48.3	Weighted Average
	12,840.0		76.13% Pervious Area
	4,025.0		23.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.00					**Direct Entry, SA#1 TO LIVERMORE RD**

Subcatchment SA#1: SUB-AREA #1



Summary for Subcatchment SA#2: NEW ROOF AREAS

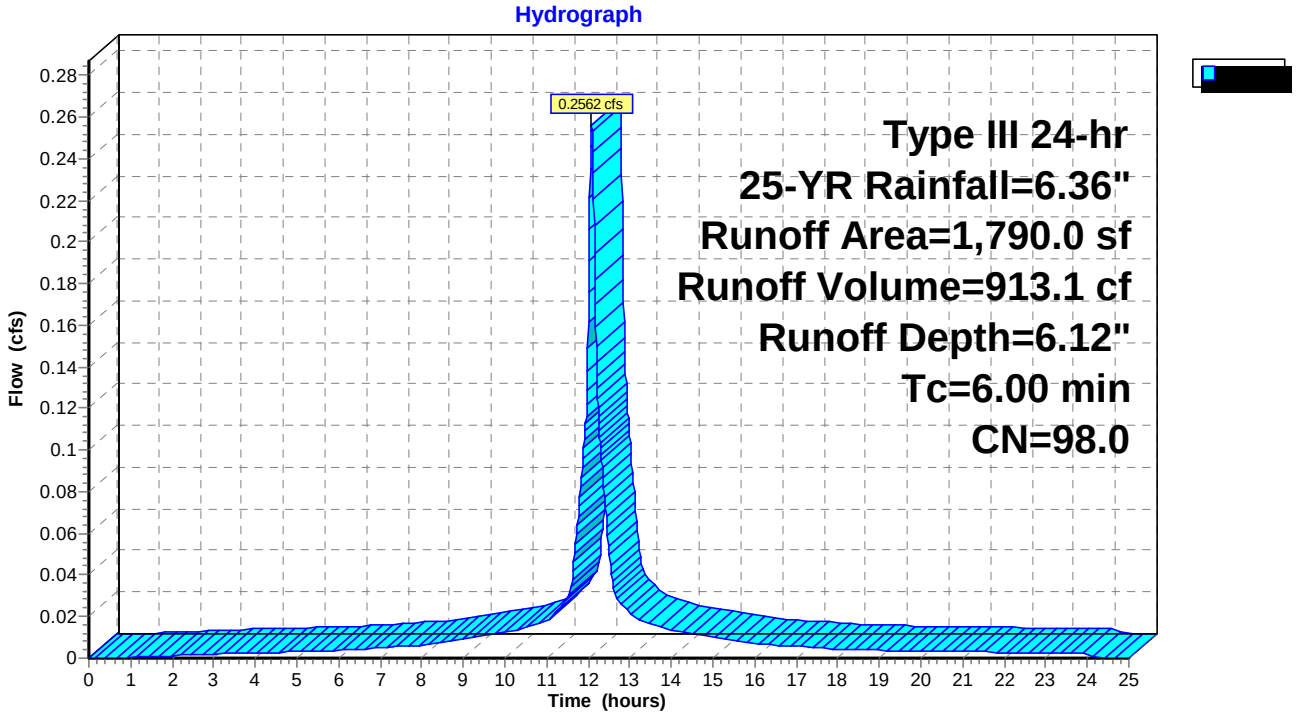
Runoff = 0.2562 cfs @ 12.08 hrs, Volume= 913.1 cf, Depth= 6.12"

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-YR Rainfall=6.36"

	Area (sf)	CN	Description
*	748.0	98.0	New Garge roof to infiltration
*	1,042.0	98.0	New Driveway to DCB-1
	1,790.0	98.0	Weighted Average
	1,790.0		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.00					**Direct Entry, ROOFS TO CULTEC**

Subcatchment SA#2: NEW ROOF AREAS

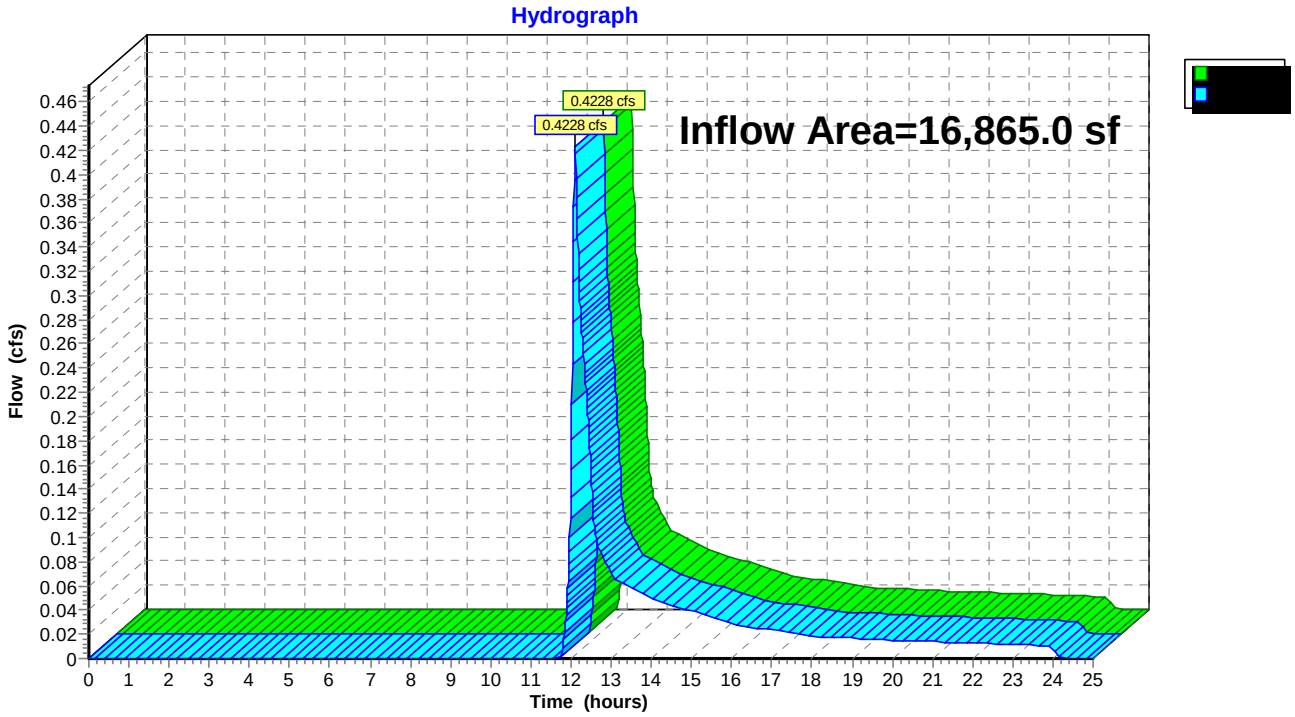


Summary for Reach DP#1: DESIGN POINT #1-LIVERMORE RD

Inflow Area = 16,865.0 sf, 23.87% Impervious, Inflow Depth = 1.19" for 25-YR event
Inflow = 0.4228 cfs @ 12.11 hrs, Volume= 1,676.5 cf
Outflow = 0.4228 cfs @ 12.11 hrs, Volume= 1,676.5 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Reach DP#1: DESIGN POINT #1-LIVERMORE RD



Summary for Pond I-1: 15 CULTEC 100

Inflow Area = 1,790.0 sf,100.00% Impervious, Inflow Depth = 6.12" for 25-YR event
Inflow = 0.2562 cfs @ 12.08 hrs, Volume= 913.1 cf
Outflow = 0.0320 cfs @ 11.67 hrs, Volume= 913.1 cf, Atten= 88%, Lag= 0.0 min
Discarded = 0.0320 cfs @ 11.67 hrs, Volume= 913.1 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 164.20' @ 12.63 hrs Surf.Area= 574.0 sf Storage= 269.6 cf

Plug-Flow detention time= 50.6 min calculated for 912.8 cf (100% of inflow)
Center-of-Mass det. time= 50.6 min (794.9 - 744.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	163.50'	269.1 cf	**13.67'W x 42.00'L x 1.54'H Field A** 884.9 cf Overall - 212.2 cf Embedded = 672.7 cf x 40.0% Voids
#2A	163.50'	212.2 cf	**Cultec C-100HD** x 15 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 3 rows
		481.3 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	163.50'	**2.41000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.0320 cfs @ 11.67 hrs HW=163.52' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.0320 cfs)

Pond I-1: 15 CULTEC 100 - Chamber Wizard Field A

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 3 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

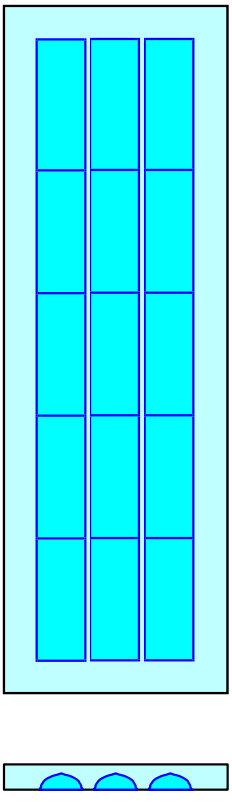
5 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 38.00' Row Length +24.0" End Stone x 2 = 42.00' Base Length
3 Rows x 36.0" Wide + 4.0" Spacing x 2 + 24.0" Side Stone x 2 = 13.67' Base Width
12.5" Chamber Height + 6.0" Cover = 1.54' Field Height

15 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 3 Rows = 212.2 cf Chamber Storage

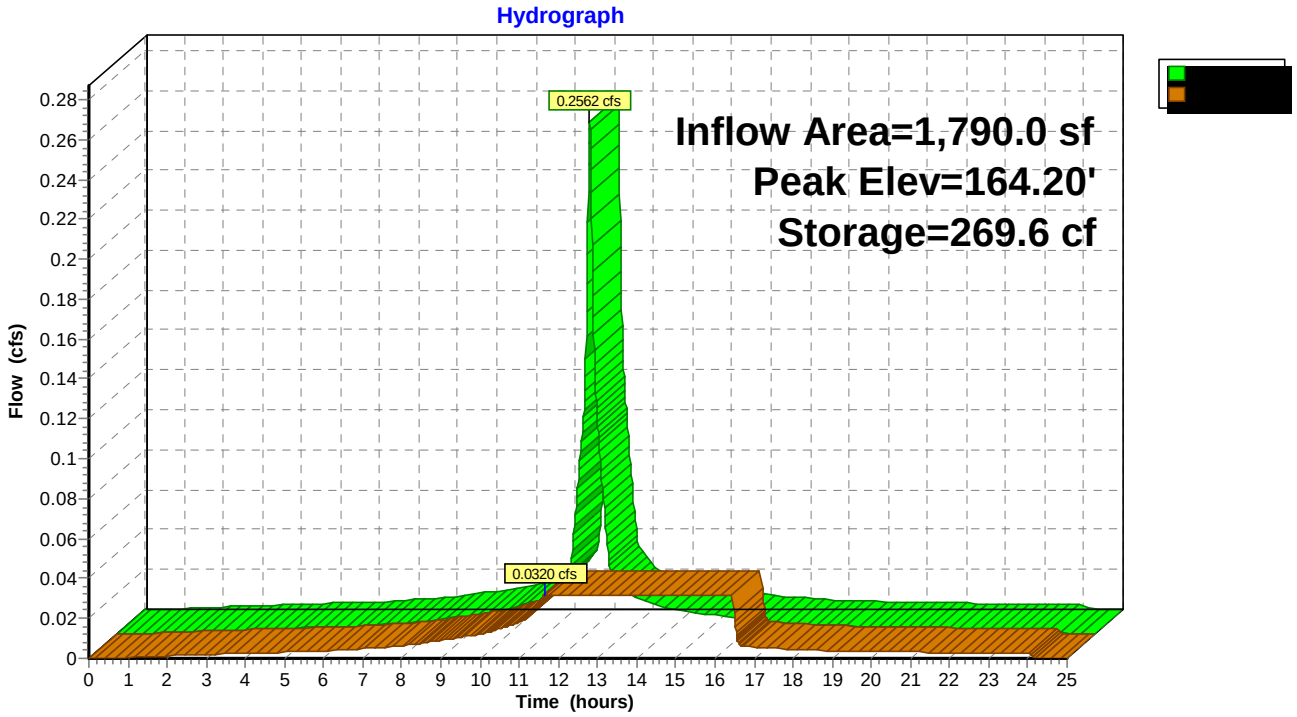
884.9 cf Field - 212.2 cf Chambers = 672.7 cf Stone x 40.0% Voids = 269.1 cf Stone Storage

Chamber Storage + Stone Storage = 481.3 cf = 0.011 af
Overall Storage Efficiency = 54.4%
Overall System Size = 42.00' x 13.67' x 1.54'

15 Chambers
32.8 cy Field
24.9 cy Stone



Pond I-1: 15 CULTEC 100



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 SA#1: SUB-AREA #1 Runoff Area=16,865.0 sf 23.87% Impervious Runoff Depth=2.17"
Tc=6.00 min CN=48.3 Runoff=0.8870 cfs 3,044.9 cf

Subcatchment SA#2: NEW ROOF AREAS Runoff Area=1,790.0 sf 100.00% Impervious Runoff Depth=7.92"
Tc=6.00 min CN=98.0 Runoff=0.3292 cfs 1,181.4 cf

Reach DP#1: DESIGN POINT #1-LIVERMORE RD Inflow=0.8870 cfs 3,044.9 cf
Outflow=0.8870 cfs 3,044.9 cf

Pond I-1: 15 CULTEC 100 Peak Elev=164.63' Storage=386.5 cf Inflow=0.3292 cfs 1,181.4 cf
Outflow=0.0320 cfs 1,181.4 cf

Total Runoff Area = 18,655.0 sf Runoff Volume = 4,226.3 cf Average Runoff Depth = 2.72"
68.83% Pervious = 12,840.0 sf 31.17% Impervious = 5,815.0 sf

Summary for Subcatchment SA#1: SUB-AREA #1

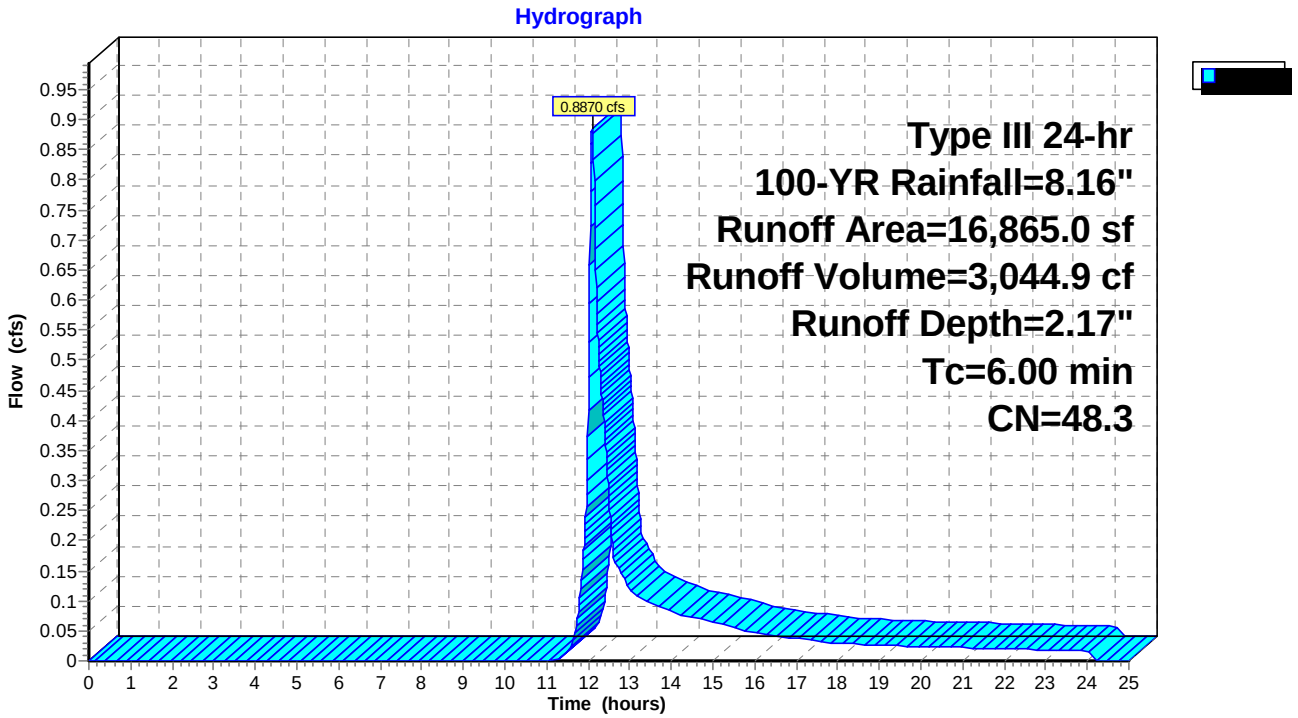
Runoff = 0.8870 cfs @ 12.10 hrs, Volume= 3,044.9 cf, Depth= 2.17"

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-YR Rainfall=8.16"

	Area (sf)	CN	Description
*	3,714.0	98.0	Roof & Patio (to downspouts)
*	325.0	60.0	Walkways
	12,515.0	32.0	Woods/grass comb., Good, HSG A
*	311.0	98.0	Driveway (not fo infiltration)
	16,865.0	48.3	Weighted Average
	12,840.0		76.13% Pervious Area
	4,025.0		23.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.00					**Direct Entry, SA#1 TO LIVERMORE RD**

Subcatchment SA#1: SUB-AREA #1



Summary for Subcatchment SA#2: NEW ROOF AREAS

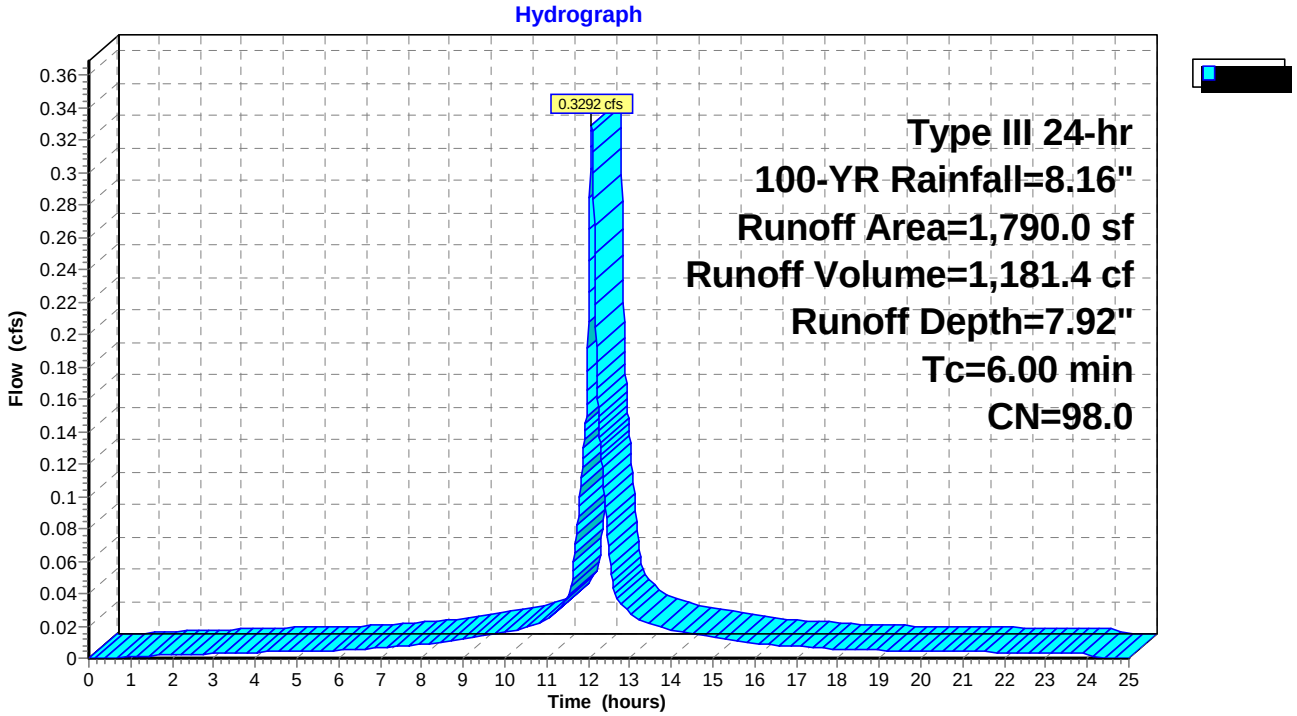
Runoff = 0.3292 cfs @ 12.08 hrs, Volume= 1,181.4 cf, Depth= 7.92"

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-YR Rainfall=8.16"

	Area (sf)	CN	Description
*	748.0	98.0	New Garge roof to infiltration
*	1,042.0	98.0	New Driveway to DCB-1
	1,790.0	98.0	Weighted Average
	1,790.0		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.00					**Direct Entry, ROOFS TO CULTEC**

Subcatchment SA#2: NEW ROOF AREAS

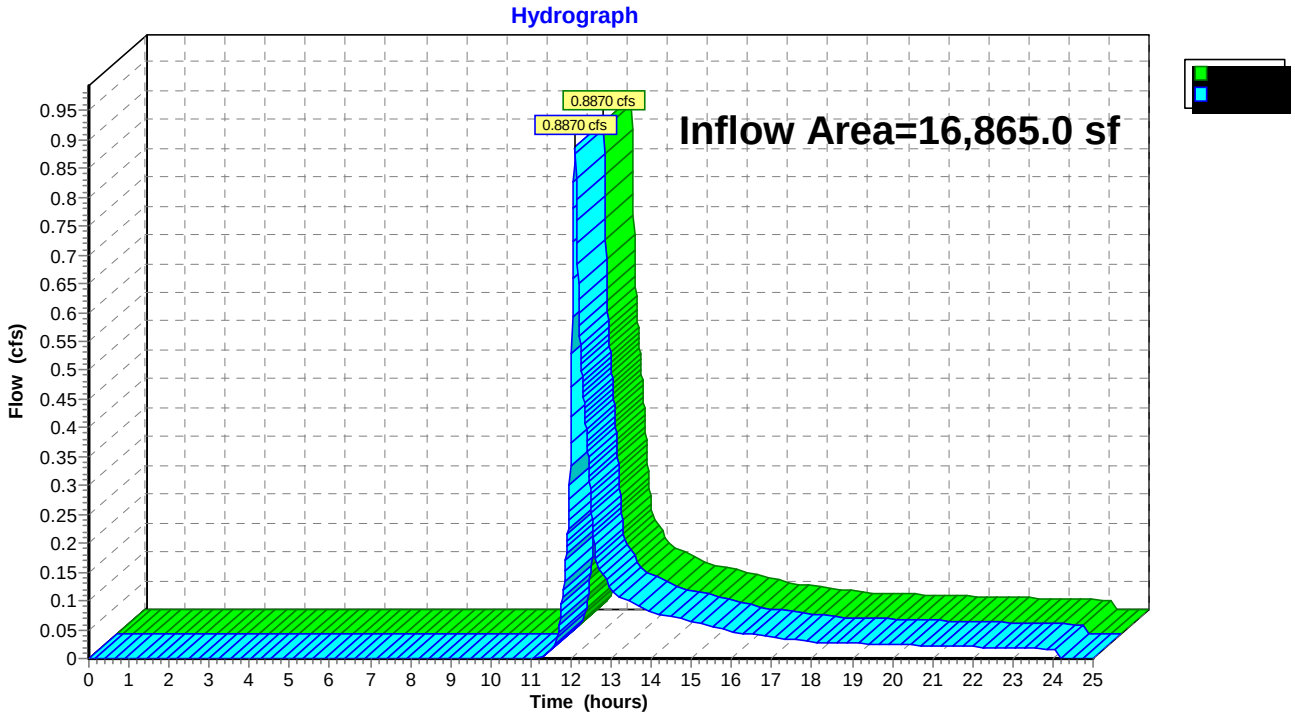


Summary for Reach DP#1: DESIGN POINT #1-LIVERMORE RD

Inflow Area = 16,865.0 sf, 23.87% Impervious, Inflow Depth = 2.17" for 100-YR event
Inflow = 0.8870 cfs @ 12.10 hrs, Volume= 3,044.9 cf
Outflow = 0.8870 cfs @ 12.10 hrs, Volume= 3,044.9 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Reach DP#1: DESIGN POINT #1-LIVERMORE RD



Summary for Pond I-1: 15 CULTEC 100

Inflow Area = 1,790.0 sf,100.00% Impervious, Inflow Depth = 7.92" for 100-YR event
Inflow = 0.3292 cfs @ 12.08 hrs, Volume= 1,181.4 cf
Outflow = 0.0320 cfs @ 11.54 hrs, Volume= 1,181.4 cf, Atten= 90%, Lag= 0.0 min
Discarded = 0.0320 cfs @ 11.54 hrs, Volume= 1,181.4 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 164.63' @ 12.86 hrs Surf.Area= 574.0 sf Storage= 386.5 cf

Plug-Flow detention time= 79.1 min calculated for 1,180.9 cf (100% of inflow)
Center-of-Mass det. time= 79.0 min (820.0 - 741.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	163.50'	269.1 cf	**13.67'W x 42.00'L x 1.54'H Field A** 884.9 cf Overall - 212.2 cf Embedded = 672.7 cf x 40.0% Voids
#2A	163.50'	212.2 cf	**Cultec C-100HD** x 15 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 3 rows
		481.3 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	163.50'	**2.41000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.0320 cfs @ 11.54 hrs HW=163.52' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.0320 cfs)

Pond I-1: 15 CULTEC 100 - Chamber Wizard Field A

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 3 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

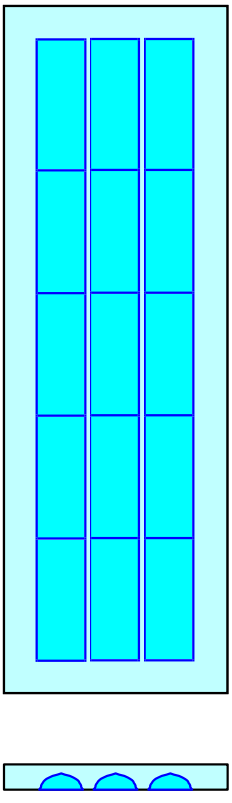
5 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 38.00' Row Length +24.0" End Stone x 2 = 42.00' Base Length
3 Rows x 36.0" Wide + 4.0" Spacing x 2 + 24.0" Side Stone x 2 = 13.67' Base Width
12.5" Chamber Height + 6.0" Cover = 1.54' Field Height

15 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 3 Rows = 212.2 cf Chamber Storage

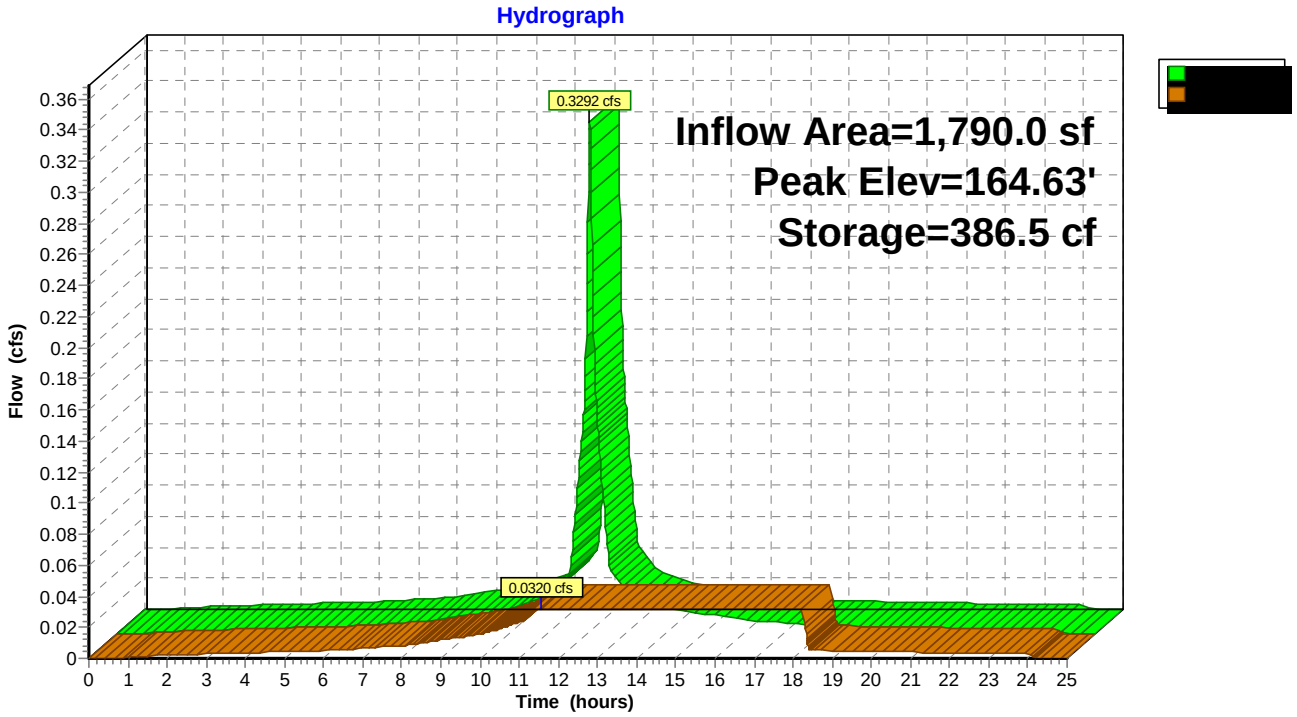
884.9 cf Field - 212.2 cf Chambers = 672.7 cf Stone x 40.0% Voids = 269.1 cf Stone Storage

Chamber Storage + Stone Storage = 481.3 cf = 0.011 af
Overall Storage Efficiency = 54.4%
Overall System Size = 42.00' x 13.67' x 1.54'

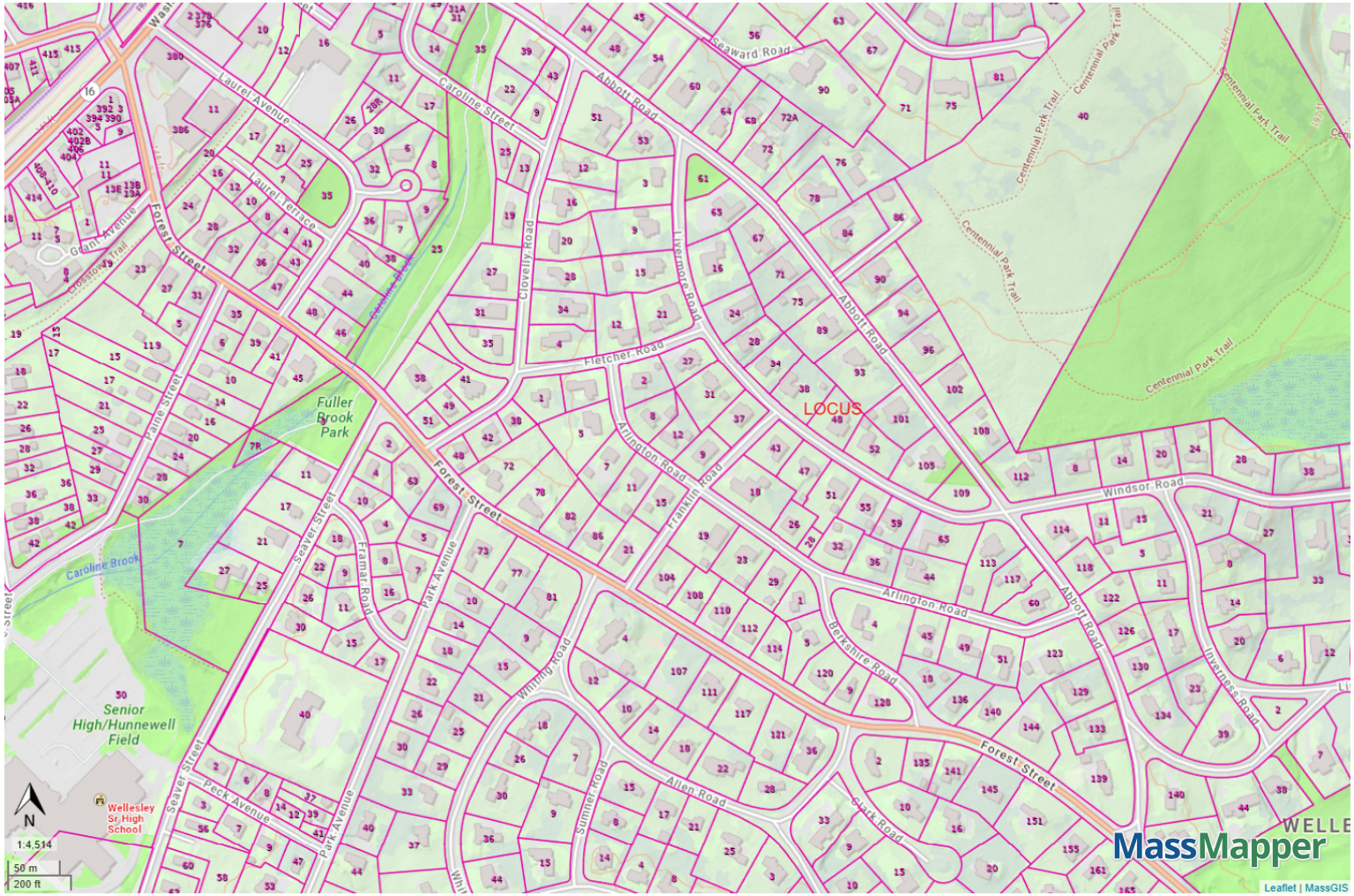
15 Chambers
32.8 cy Field
24.9 cy Stone



Pond I-1: 15 CULTEC 100



#48 Livermore Road



Surface Water Supply Watersheds

- Surface Water (Active or Inactive)
- Emergency Surface Water
- Rhode Island Source

Outstanding Resource Waters Outlines

- ACEC
- Cape Cod National Seashore
- Protected Shoreline
- Public Water Supply Watershed
- Retired Public Water Supply
- Scenic/Protected River
- Wildlife Refuge

Property Tax Parcels

Section III Figures

Printed Oct 16, 2025

Map Scale: 1:1,750 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 20, Aug 27, 2024

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

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

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
307C	Paxton fine sandy loam, 8 to 15 percent slopes, extremely stony	C	3.7	22.8%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	A	8.2	51.1%
630C	Charlton-Hollis-Urban land complex, 3 to 15 percent slopes		4.2	26.1%
Totals for Area of Interest			**16.0**	**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

Section IV Operation & Maintenance

OPERATION AND MAINTENANCE PLAN
PROPOSED DRAINAGE SYSTEM – DURING CONSTRUCTION
48 Livermore Road
Wellesley, MA 02481

Owner: Sam & Nicole Hawkey
48 Livermore Road
Wellesley, MA 02481

Party Responsible for Operation and Maintenance:
Sam & Nicole Hawkey
48 Livermore Road
Wellesley, MA 02481

Source of Funding:

Operation and Maintenance of this stormwater management system will be the responsibility of the property owner(s) to include its successor and/or assigns, as the same appears on record with Register of Deeds.

During Construction:

Construction activities shall follow the Construction Sequence shown on the approved plan. During periods of active construction the stormwater management system shall be inspected on a weekly basis and within 24 hours of a storm event of greater than ½". Maintenance tasks shall be performed monthly or after significant rainfall events of 1" of rain or greater. During construction, silt-laden runoff shall be prevented from entering the drainage system and off-site properties. Temporary swales shall be constructed as needed during construction to direct runoff to sediment traps. Infiltration systems shall not be placed in service until after the installation of base course pavement and vegetative stabilization of the areas contributing to the systems.

During dewatering operations, all water pumped from the dewatering shall be directed to a "dirt bag" pumped sediment removal system (or approved equal) as manufactured by ACF Environmental. The unit shall be placed on a crushed stone blanket. Disposal of such "dirt bag" shall occur when the device is full and can no longer effectively filter sediment or allow water to pass at a reasonable flow rate. Disposal of this unit shall be the responsibility of the contractor and shall be as directed by the owner in accordance with applicable local, state, and federal guidelines and regulations.

A stabilized construction entrance shall be placed at the proposed driveway and shall consist of 1½" to 2" stone and be constructed as shown on the approved plans. The construction entrance shall be inspected daily or as needed.

All erosion and sedimentation control measures, where needed, shall be in place prior to the commencement of any site work or earthwork operations, shall be maintained during construction, and shall remain in place until all site work is complete and ground cover is established.

Heavy equipment shall not be used on the bottoms of the chamber system beds or on the top of the chamber systems after backfill.

All exposed soils not to be paved shall be stabilized as soon as practical. Seed mixes shall only be applied during appropriate periods as recommended by the seed supplier, typically May 1 to October 15. Any exposed soils that cannot be stabilized by vegetation during these dates shall be stabilized with hay bales, hay mulch, check dams, jute netting or other acceptable means.

Once each structure is in place, it should be maintained in accordance with the procedures described in the post-construction Operations and Maintenance Plan.

During dry periods where dust is created by construction activities the following control measures should be implemented.

- Sprinkling – The contractor may sprinkle the ground in traffic areas until moist.
- Vegetative cover – Areas that are not expected to be disturbed regularly may be stabilized with vegetative cover.
- Mulch – Mulching can be used as a quick and effective means of dust control in recently disturbed areas.
- Spray on chemical soil treatments may be utilized. Application rates shall conform to manufacturers recommendations.

Inspections

The Owner shall be responsible to secure the services of a Professional Engineer to perform inspections as required. Inspections during periods of active construction shall be weekly and within 24 hours of a storm event of greater than ½ “. The Professional Engineer shall perform inspections to insure that the approved plan is being followed with particular attention to the Planning Board Approval and the Construction Sequencing. The Engineer shall be responsible for inspecting the roadway construction and the construction of the stormwater management system. The Engineer shall prepare and submit to the Planning Board, the Inspection Schedule and Evaluation Checklist (see attached) and, if necessary, request the required maintenance and/or repair of the necessary items. This form shall be stamped by the Engineer and the Owner shall be notified that specific changes and/or repairs are necessary.

For additional information, refer to Performance, Standards and Guidelines for Stormwater Management in Massachusetts, published by the Department of Environmental Protection.

STORMWATER MANAGEMENT
BEST MANAGEMENT PRACTICES
INSPECTION SCHEDULE AND EVALUATION CHECKLIST – CONSTRUCTION PHASE

PROJECT LOCATION: 48 Livermore Road – Wellesley, MA Latest Revision: 10/15/25

Stormwater Control Manager: _____ **Stamp**

Best Management Practice	Inspection Frequency (1)	Date Inspected	Inspector	Minimum Maintenance and Key Items to Check	Cleaning/ Repair Needed yes/no List items	Date of Cleaning/Repair	Performed By	Water Level in Detention System
Silt fence & silt traps	After every major storm event							
Deep Sump Catch Basins	Weekly or after major storm event.							
Subsurface Infiltration System(s)	Weekly or after major storm event.							
Dewatering Operations	Daily-during actual dewatering							
Temporary Construction Entrance	Daily or as needed.							

(1) Refer to the Massachusetts Stormwater Management, Volume Two: Stormwater Technical Handbook for recommendations regarding frequency for inspection and maintenance of specific BMPs.

Limited or no use of sodium chloride salts, fertilizers or pesticides recommended. Slow release fertilizer recommended.
Other notes:(Include deviations from: Con Com Order of Conditions, PB Approval, Construction Sequence and Approved Plan)

OPERATION AND MAINTENANCE PLAN
PROPOSED DRAINAGE SYSTEM – POST CONSTRUCTION
48 Livermore Road
Wellesley, MA 02481

Owner: Sam & Nicole Hawkey
48 Livermore Road
Wellesley, MA 02481

Party Responsible for Operation and Maintenance:

Sam & Nicole Hawkey
48 Livermore Road
Wellesley, MA 02481

Source of Funding:
Operation and Maintenance of this stormwater management system will be the responsibility of the owner and shall include its successor and/or assigns or future homeowners association, as the same appears on record with the Registry of Deeds

Post-Development Inspection and Maintenance:

Driveway Sweeping

Driveway shall be swept at least two times per year. Sweeping shall be completed during the early spring, no later than May 1st, and before leaf, evergreen needles & grass clippings from ordinary property use is washed into the drainage system. Disposal of the accumulated materials shall be in accordance with applicable local, state, and federal guidelines and regulations.

Deep Sump Catch Basins

Deep sump catch basins shall be inspected after every major storm event during construction and cleaned when sediment exceeds 18" depth.

Subsurface Structures

Responsibility for maintenance: Owner

After construction, the subsurface structures shall be inspected for proper function and stabilization after every major storm event until the lot is completely developed and stabilized. Inspect each subsurface structure at least twice per year or if lack of performance is observed and perform necessary corrective measures to maintain infiltration capacity; as required by the Stormwater Management Policy.

Lawn Fertilization

Lawn fertilizer shall be slow release and limited to 3 lbs per 1000 s.f. per year.

Snow Management

Snow shall be collected and stored adjacent to the driveway as shown on the plans. The party responsible for snow plowing is the party listed at the beginning of the Operation and Maintenance Plan.

Records

Records of inspection and maintenance shall be kept up to date and available for review and inspection by the Town's official, if requested.

Estimated Annual Budget

TOTAL:	$1000 - $2,000

This estimated O&M ANNUAL BUDGET has been formulated by the Declarant. It does not include items that are unknown or unlikely to occur. Actual annual costs to comply with the Approved O&M Plan requirements will be determined annually.

STANDARD 10. ILLICIT DISCHARGES PROHIBITED

There are no existing illicit discharges on site. All illicit discharges to the stormwater management system are prohibited.

Illicit Discharge Statement

This statement is intended to meet Standard #10 of the Stormwater Management requirements

Illicit discharges to the stormwater management system are discharges that are not entirely comprised of stormwater.

Except for the potential for deliberate criminal act of discharge by an unauthorized entity for which the property owner has no control, there are to be no illicit discharges into the stormwater system.

_____

Sam & Nicole Hawkey

STORMWATER MANAGEMENT
BEST MANAGEMENT PRACTICES

INSPECTION SCHEDULE AND EVALUATION CHECKLIST – POST CONSTRUCTION PHASE

PROJECT LOCATION: 48 Livermore Road –Wellesley MA

Best Management Practice	Inspection Frequency (1)	Date Inspected	Inspector	Minimum Maintenance and Key Items to Check	Cleaning/ Repair Needed yes/no List items	Date of Cleaning/Repair	Performed By	Water Level in Detention System
Deep Sump Catch Basins	Four times per year							
Subsurface Infiltration System(s)	Twice per year							

(1) Refer to the Massachusetts Stormwater Management, Volume Two: Stormwater Technical Handbook for recommendations regarding frequency for inspection and maintenance of specific BMPs.

Stormwater Control Manager: **Stamp**