Stormwater Management Report

Proposed Addition
18 Independence Drive
Devens, Massachusetts

Prepared For:

Mack Devens Development, LLC
330 SMC Drive
Somerset, WI 54025

Prepared By:

McCarty Engineering, Inc.
42 Tucker Drive
Leominster, MA 01453

Submitted to:

Devens Enterprise Commission

July 3, 2025

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Mack Devens Development
18 Independence Drive
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INTRODUCTION

The proposed project site is 21.6 acres zoned in the Rail, Industrial & Trade Related District located at 18 Independence Drive in Devens, Massachusetts. The property is identified by Devens Assessors office as Parcel#026.0-0013-0600.0 and is the location of SMC Ltd. This property is bounded by Saratoga Boulevard to the South, Independence Drive to the West, and industrial properties to the North and East. Refer to **Figure 1** for the Locus Plan.

The proposed project includes the construction of a 60,214-sf addition to the existing building with associated site work including the construction of parking spaces, installation of new drainage improvements and utility connections, site grading and the installation of new site lighting and landscaping. Access to the proposed addition will be from Independence Drive, while access to the proposed parking field will be located off Saratoga Boulevard. Runoff from the proposed addition will be collected by the proposed roof leader system and conveyed to the proposed underground infiltration system. Runoff from the proposed loading area will be directed to the trench drain located at the loading docks and will be conveyed through a water quality unit prior to underground infiltration system. The proposed parking field has been graded so that approximately half of the parking field is conveyed to the underground infiltration system through a catch basin and the other half is graded to sheet flow to a proposed peastone diaphragm prior to existing at grade infiltration basin, which will be expanded as part of this project. In addition, porous pavement is proposed within the parking field to further provide direct infiltration.

The hydrologic study area is comprised of approximately 7.57 acres. Based on the USDA Natural Resources Conservation Service soil survey the site is comprised of Windsor Loamy Sand which is a Hydrologic Soil Group (HSG) “A” Soil, and Charlton-Hollis Rock outcrop which is a HSG “B” Soil. In addition, Udorthents consisting of “A” soils were found on site. Test pits were conducted by McCarty Engineering, Inc. (MEI) on June 20, 2025 and material was found to be sand and gravel with little fines. Based on the findings, the Rawls Rate for an “A” sand soil (8.27 in/hr) has been used in this analysis for the infiltration basins as detailed within the MA Stormwater Handbook. Refer to **Appendix A** for the NRCS soil survey and soil logs.

EXISTING CONDITIONS

As described above, the existing site is the location of SMC Ltd. The existing hydrologic study area is comprised of approximately 4.23 ac of grass, 0.38 ac of concrete, 2.73 ac of pavement, and 0.23 ac of woods. The existing site is made up of nine watershed areas.

Area 1 includes a portion of the field adjacent to along with a portion of Saratoga Boulevard. This area sheet flows to the existing catch basin in Saratoga Boulevard and is conveyed to the municipal drainage system, which is considered Point of Analysis 1 (POA-1).

Area 2 includes a portion of the landscaped and field area at the corner of Saratoga Boulevard and Independence Drive and a portion of Saratoga Boulevard. This area sheet flows to the existing catch basin in Saratoga Boulevard and is ultimately conveyed to POA-1.

Area 3 includes the remaining landscaped and field area along Independence Drive and a portion of Independence Drive. This area sheets flows to the existing catch basin located in Independence Drive and is ultimately conveyed to POA-1.

Area 4 includes the landscaped area along Independence Drive and a portion of Independence Drive along the entrance to the site. This area sheet flows to the existing catch basin located in Independence Drive and is ultimately conveyed to POA-1.

Area 5 includes the portion of the landscaped area adjacent to the existing parking field on site and a portion of Independence Drive. This area sheet flows to the existing basin located in Independence Drive at the entrance and is ultimately conveyed to POA-1.

Area 6 includes a portion of the existing parking area adjacent to Independence Drive. This area sheet flows to the existing catch basin located in the parking lot and is ultimately conveyed to POA-1.

Area 7 includes a portion of the existing parking area adjacent to the existing building. This area sheet flows to the existing catch basin located in the parking lot and is ultimately conveyed to POA-1.

Area 8 includes a portion of the entrance and the loading area for the existing building. This area sheet flows to the existing trench drain and is ultimately conveyed to POA-1.

Area 9 includes the remaining area of the field located on the western side of the building. This area Sheet flows to the existing infiltration basin along the southern property boundary, which is considered Point of Analysis 2 (POA-2). Refer to **Figure 2** – Existing Watershed Plan.

PROPOSED CONDITIONS

Under proposed conditions, the site is comprised of approximately 3.1 ac of grass, 0.33 ac of concrete, 2.76 ac of pavement, and 1.38 ac of building. The proposed site is comprised of 12 watershed areas.

Area 1 includes a portion of the proposed landscaped berm, a portion of the proposed entrance along Saratoga Boulevard, and a portion of Saratoga Boulevard itself. This area sheet flows to the existing catch basin in Saratoga Boulevard and ultimately into the municipal drainage system, which is considered Point of Analysis 1 (POA-1).

Area 2 includes a portion of the landscaped berm and a portion of Saratoga Boulevard. This area sheet flows to the existing catch located in Saratoga Boulevard. This area sheet flows to the existing catch basin in Saratoga Boulevard and is ultimately conveyed to POA-1.

Area 3 includes a portion of the landscaped berm, a portion of Independence Drive and the proposed entrance along Independence Drive. This area sheet flows to the existing catch basin located in Independence Drive and is ultimately conveyed to POA-1.

Area 4 includes a portion of the proposed landscaped berm in front of the proposed addition and a portion of Independence Drive. This area sheet flows to the existing catch basin located in Independence Drive and is ultimately conveyed to POA-1.

Area 5 includes the portion of the landscaped area adjacent to the existing parking field on site and a portion of Independence Drive. This area sheet flows to the existing basin located in Independence Drive at the entrance and is ultimately conveyed to POA-1.

Area 6 includes a portion of the existing parking area adjacent to Independence Drive. This area sheet flows to the existing catch basin located in the parking lot and is ultimately conveyed to POA-1.

Area 7 includes a portion of the existing parking area adjacent to the existing building. This area sheet flows to the existing catch basin located in the parking lot and is ultimately conveyed to POA-1.

Area 8 has been eliminated as part of the proposed condition and is replaced with Area 10.

Area 9 includes the proposed expansion of the existing above ground infiltration basin south and west of the existing building. This area sheets flows to the proposed expansion area of the existing infiltration basin. The existing basin is considered Point of Analysis 2 (POA-2).

Area 10 includes the proposed addition. This area is conveyed through a roof leader system to the underground infiltration system, which ultimately discharges to POA-1.

Area 11 includes the entrance off of Independence Drive and the associated loading area. This area sheet flows to the proposed trench drain, and is conveyed to the underground infiltration system through a water quality unit. The underground infiltration system ultimately discharges to POA-1.

Area 12 includes approximately half of the proposed parking field. This area sheet flows over the proposed porous pavement and is conveyed through a catch basin to the underground infiltration system through a water quality unit. The underground infiltration system ultimately discharges to POA-1.

Area 13 includes the other half of the proposed parking field. This area is sheet flows over the porous pavement to the proposed curb break and into the peastone diaphragm. This area is conveyed to the proposed infiltration basin expansion. The existing basin is considered POA-2. Refer to **Figure 3**- Proposed Watershed Plan.

STORMWATER MANAGEMENT

The proposed drainage design was based on the Massachusetts Department of Environmental Protection (MADEP) Stormwater Management Standards (Stormwater Policy, latest edition). The standards have been revised to promote increased stormwater recharge, the treatment of more runoff from polluting land uses, pollution prevention, the removal of illicit discharges to stormwater management systems, and improved operation and maintenance of stormwater best management practices (BMP's). In addition to the MADEP Stormwater Policy, 974 CMR 4.08 requires that the project provide 90% TSS removal and 60% Phosphorus removal in addition to meeting the 10 MADEP Stormwater Standards. The following summarizes the proposed project's compliance with both the MADEP Stormwater Management Standards and 974 CMR 4.08.

Standard #1 Untreated Storm Water: No new untreated storm water conveyances have been proposed to discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth. Storm water Best Management Practices (BMP's), such as deep sump catch basins, water quality unit, underground infiltration basins, and porous asphalt are proposed within the project to provide stormwater quality control prior to discharging runoff from the site.

Standard #2 Post-Development Peak Discharge Rates: As a result of the increase in net impervious area from existing to proposed conditions, storm water BMP's have been developed to attenuate the peak discharge rates for the 2, 10, 25, 50 and 100 year, 24-hour storm events from the site. Refer to **Table 1** for the pre and post-development peak discharge rates.

Standard #3 Recharge to Groundwater: The project site is located within Hydrologic Soil Group (HSG) "A" & "B" classified soils. Per MA DEP standards, recharge is required to eliminate or minimize the loss of annual recharge to groundwater using environmentally sensitive site design, BMP's and good operation and maintenance. The required recharge volume for the proposed project is 0.221 AC-FT. For the 2-year storm event, the proposed infiltration basins will provide approximately 0.382 AC-FT of recharge. Refer to the HydroCAD model in **Appendix B**. In addition, the project will provide approximately 0.41 AC-FT of volume (>1" water quality volume) below the outlet of the infiltration basins. Because the basins are located within an "A" soil, the water quality volume will draw down within 25 hours. Refer to **Appendix A** for the recharge calculations and drawdown analysis.

Standard #4 80 Percent TSS Removal: Based on the proposed stormwater management system design, the proposed BMP's will remove more than 90% of the Total Suspended Solids (TSS) and 60% of Phosphorus from the stormwater runoff discharging from the site to meet compliance with the Stormwater Bylaws. The infiltration basins alone achieve the required Phosphorus removal. Additionally, because the site is located within an A soil with a rapid infiltration rate, at least 44% of the TSS must be removed prior to discharge to the infiltration basins. This is being achieved through the use of water quality units, deep sump catch basins, isolator row, peastone diaphragm, and a sediment forebay. These BMP's are sized to capture in excess of the required water quality volume.

Section 974CMR 4.08(3)(i) states that "Stormwater management systems shall be designed to meet an average annual pollutant removal equivalent to 90% of the average annual load of Total Suspended Solids (TSS) related to the total post-construction impervious area on the site AND 60% of the average annual load of Total Phosphorus (TP) related to the total post-construction area on the site." Section 974CMR4.08(3)(i)1 states "Average annual pollutant removal requirements in 974CMR(3)(i) are achieved through one of the follow methods:" and under section 974CMR(3)(i)1(b) that method is "Retaining the volume of runoff equivalent to, or greater than, one inch multiplied by the total post-construction impervious surface on the development site."

As noted above, the proposed BMPs were designed to treat greater than the 1" Water Quality Volume. Based on this, the proposed project provides the required 90% treatment of TSS **and** the required 60% TP removal. Refer to **Appendix A** for the Water Quality Volume calculations and the TSS Removal Worksheet.

Standard #5 Higher Potential Pollutant Loads: The proposed project is not classified by the DEP as a source for higher pollutant loads.

Standard #6 Protection of Critical Areas: The project site is not considered a critical area as defined by the MA DEP.

Standard #7 Redevelopment Project: The project is considered a mix of new development and redevelopment. All applicable standards for new development have been met for this project.

Standard #8 Erosion/Sediment Control: Erosion and sediment controls are incorporated into the project design to prevent erosion, control sediment movement, and stabilize exposed soils during construction. During construction, control practices will be utilized such as the placement of straw wattles / bales barriers, silt fencing, and the implementation of soil stabilization practices. These control measures will be periodically checked and maintained as necessary throughout the entire construction duration. As the project is disturbing more than one acre, a Stormwater Pollution Prevention Plan (SWPPP) is required. A SWPPP will be developed and submitted to the Devens Enterprise Commission and the US EPA prior to the start of land disturbing activities.

Standard #9 Operation/Maintenance Plan: A long term operation and maintenance plan has been developed to ensure the stormwater management system will function as designed. See **Appendix A** for the Operation and Maintenance Plan.

Standard #10 Illicit Discharges to Stormwater Management System: The Stormwater Management System associated with the development of the proposed Development has been designed such that prior to storm water runoff discharging from the site, it is treated through a series of best management practices. To the Engineer's knowledge, there are no known or designed non-storm water discharges that are or will be connected to the storm water collection system that would convey pollutants directly to groundwater or surface waters. Refer to **Appendix A** for the Illicit Discharge Compliance Statement.

The proposed design meets **all** applicable DEP Stormwater Management Standards and 974 CMR 4.08 Bylaws. Refer to **Appendix A** for the MADEP Stormwater Checklist.

DRAINAGE COLLECTION SYSTEM DESIGN

The proposed drain pipe network is composed of deep sump catch basins and manholes that will collect runoff from the parking and landscaped areas within the proposed development and convey it to the proposed infiltration basins. The pipe layout is depicted on the Grading and Drainage Plan in the plan set.

Pipe sizes were determined using the SCS TR-20 method to determine contributing flows to catch basins, as well as the Manning's Equation to calculate pipe flows (refer to **Appendix B** for pipe sizing calculations.)

The following criteria were used to design the pipe network:

- Manholes are provided at all changes in direction or changes in pipe size.
- Pipe sizes are based on flows for the 25-year storm frequency.
- Storm drain pipes shall be HDPE unless otherwise noted.
- Pipe flow velocities are maintained at a maximum of 12 fps.

STORMWATER QUANTITY

Due to the proposed increase in impervious area, the project will require BMP's for infiltration and detention in order to comply with Standards # 2 and #3 of the DEP Stormwater Management Policy. The stormwater facilities proposed will include underground infiltration basin, the expansion of the existing above ground infiltration basin and porous pavement. The proposed basins will recharge the required water quality volume in addition to attenuating the peak runoff rates for the 2, 10, 25, 50 and 100-year, 24-hour storm events.

Hydrologic analyses were performed utilizing the computer program, HydroCAD©. In order to determine the peak rate of discharge for existing and proposed conditions, runoff hydrographs were generated for the 2, 10, 25, 50 and 100-year, 24-hour storm events using the SCS TR-20 Method and Type III rainfall distribution. Precipitation amounts utilized in the analysis are as defined by NRCC Extreme Precipitation Data (refer to **Appendix A** for the NRCC Precipitation Tables and **Appendix B** for the existing and proposed HydroCAD models). Under proposed conditions, the post development runoff hydrographs were flood routed through the proposed stormwater management facilities.

Table 1 compares peak runoff rates for the 2-year, 10-year, 25-year, 50-year and 100-year storm events for existing and proposed conditions.

Table 1 Comparison of Peak Runoff Rates

Storm Event	Existing Flow (cfs)	Proposed Flow (cfs)	Existing Flow (cfs)	Proposed Flow (cfs)
	POA-1	POA-1	POA-2	POA-2
2-Year	4.89	2.84	0.00	0.00
10-Year	10.76	6.93	0.03	0.00
25-Year	16.30	10.50	0.22	0.00
50-Year	21.81	13.21	0.53	0.00
100-Year	27.86	16.04	1.16	0.00

As shown in Table 1, peak runoff rates under proposed conditions are less than existing conditions for the 2-, 10-, 25-, 50-year and 100-year storm events. Therefore, the proposed stormwater design complies with Standard #2 of the MA DEP Stormwater Management Policy.

STORMWATER QUALITY

All stormwater runoff will be treated to address water quality concerns through the use of DEP approved BMP's. The following BMP's will be provided on-site and when combined will achieve an excess of 90% TSS removal: deep sump hooded catch basins, water quality unit, porous asphalt, infiltration basins. (See **Appendix A** for TSS Removal Worksheets)

Deep Sump Catch Basins

The catch basins on the proposed site will be deep sump/hooded catch basins, which will serve to trap sediment and floatables before entering the drainage system. The sump will be four feet deep. A hood will be provided with a vacuum-break to avoid siphoning of floatables out of the catch basin. Inlets in the catch basin should be cleaned a minimum of four times per year and inspected monthly. All sediments and hydrocarbons should be properly handled and disposed, in accordance with local, state, and federal guidelines and regulations.

Water Quality Unit

The proposed design of the on-site drainage system will incorporate Hydroworks water quality units prior to connecting to the at grade infiltration basins on site. Maintenance will be performed per the manufacturer's recommendations; however basic maintenance will consist of monthly inspections and after each major storm event during the first year of installation to accurately establish the required maintenance schedule. The structures will be cleaned out twice per year or upon the stored volume reaching 15% of the particle separator's capacity, or immediately in the event of a spill.

Underground Infiltration Basin

Once constructed, the infiltration basin will be inspected at a minimum after several storm events for the first year and annually thereafter to confirm drainage system functions as designed. Problems will be addressed immediately. System shall be cleaned as required per the manufacturer's recommendations.

Porous Pavement

Regular inspection and maintenance of the porous pavement surface is critical to its long term operation. After construction, the pavement surface shall be checked for standing water after a rainfall event. If water remains after 30 minutes, cleaning is recommended by a vacuum sweeper. Vacuuming shall also be conducted during spring cleanup following the last snowfall event, and during fall cleanup to remove accumulated debris. Power washing can be an effective tool for cleaning clogged areas. Check for damage to porous pavements from non-design loads. Damaged areas may be repaired by use of infrared heating and rerolling of pavement. This shall occur only on an as needed basis.

Sediment Forebay

A sediment forebay will precede the at grade detention basin. It has been sized to capture in excess of 0.1” of runoff over the impervious area. This will provide both velocity dissipation and additional TSS removal. The forebay will be cleaned four times per year and inspected monthly. All sediments and hydrocarbons will be properly handled and disposed of off-site.

At Grade Infiltration Basin

Once constructed, the infiltration basin will be inspected after several storm events to confirm drainage system functions, bank stability, and vegetation growth. Any problems will be addressed immediately. The basin will be inspected for property operation at least once per year. Inspections will be conducted during wet weather to determine if the basin is functioning properly. At least twice during the growing season, the upper-stage, side slopes, and embankment will be mowed. Accumulated trash and debris will be removed. Sediment will be removed from the basin as necessary, at least once every 10 years.

Phosphorus Removal

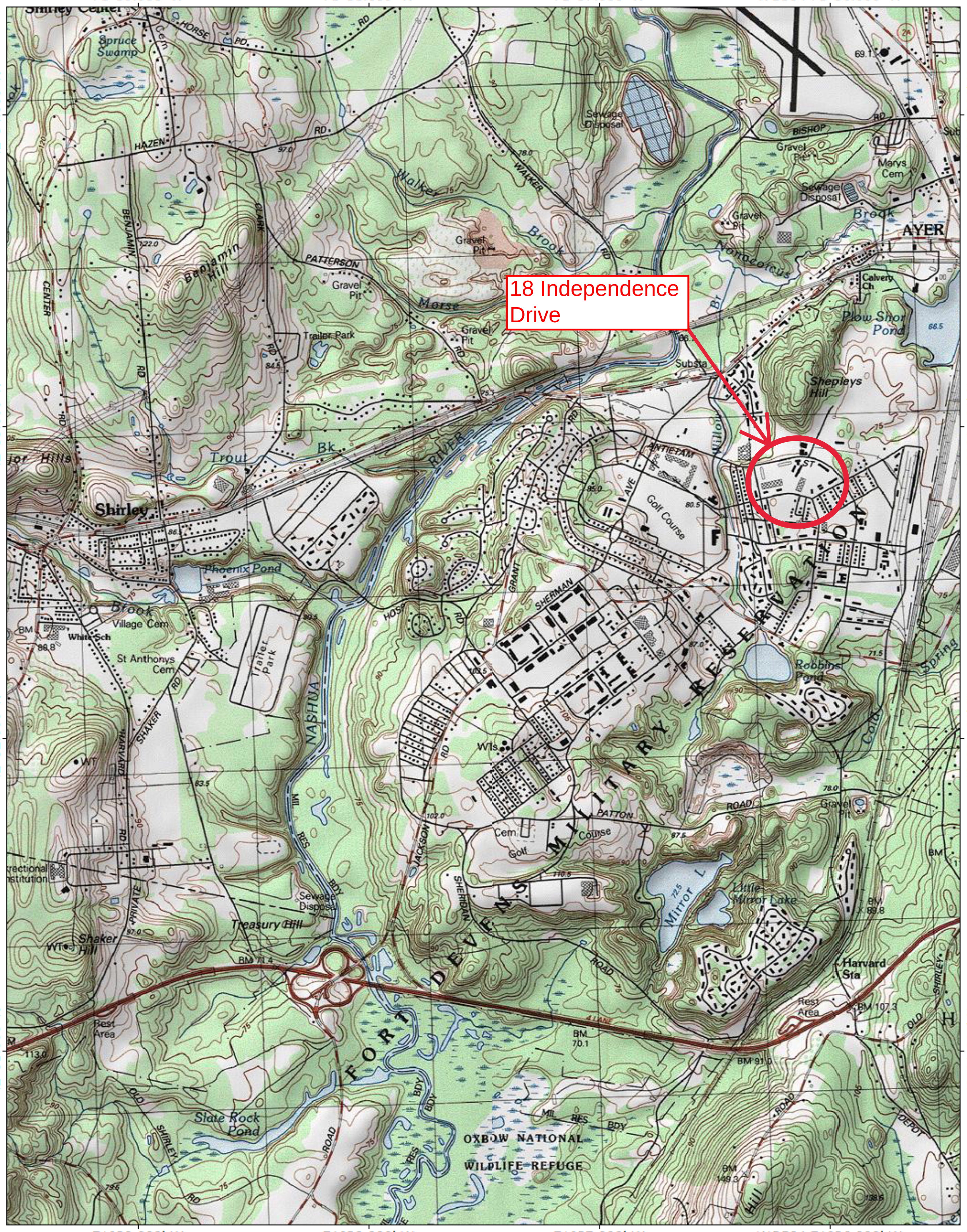
The 60% phosphorus removal requirement has been achieved through the use of stormwater BMP’s that are documented within Volume 2 of the Massachusetts Stormwater Handbook and as allowed by 974CMR4.08. The proposed water quality units have been sized to treat the 1” Water Quality Volume as well as the below grade infiltration basins.

CONCLUSION

The proposed stormwater management plan for the project addresses both water quantity and quality issues and conforms to the standards outlined in the revised MADEP Stormwater Management Policy.

Figures

TOPO! map printed on 02/22/23 from "Northeast.tpo" and "Untitled.tpg"



71°39.000' W 71°38.000' W 71°37.000' W WGS84 71°36.000' W

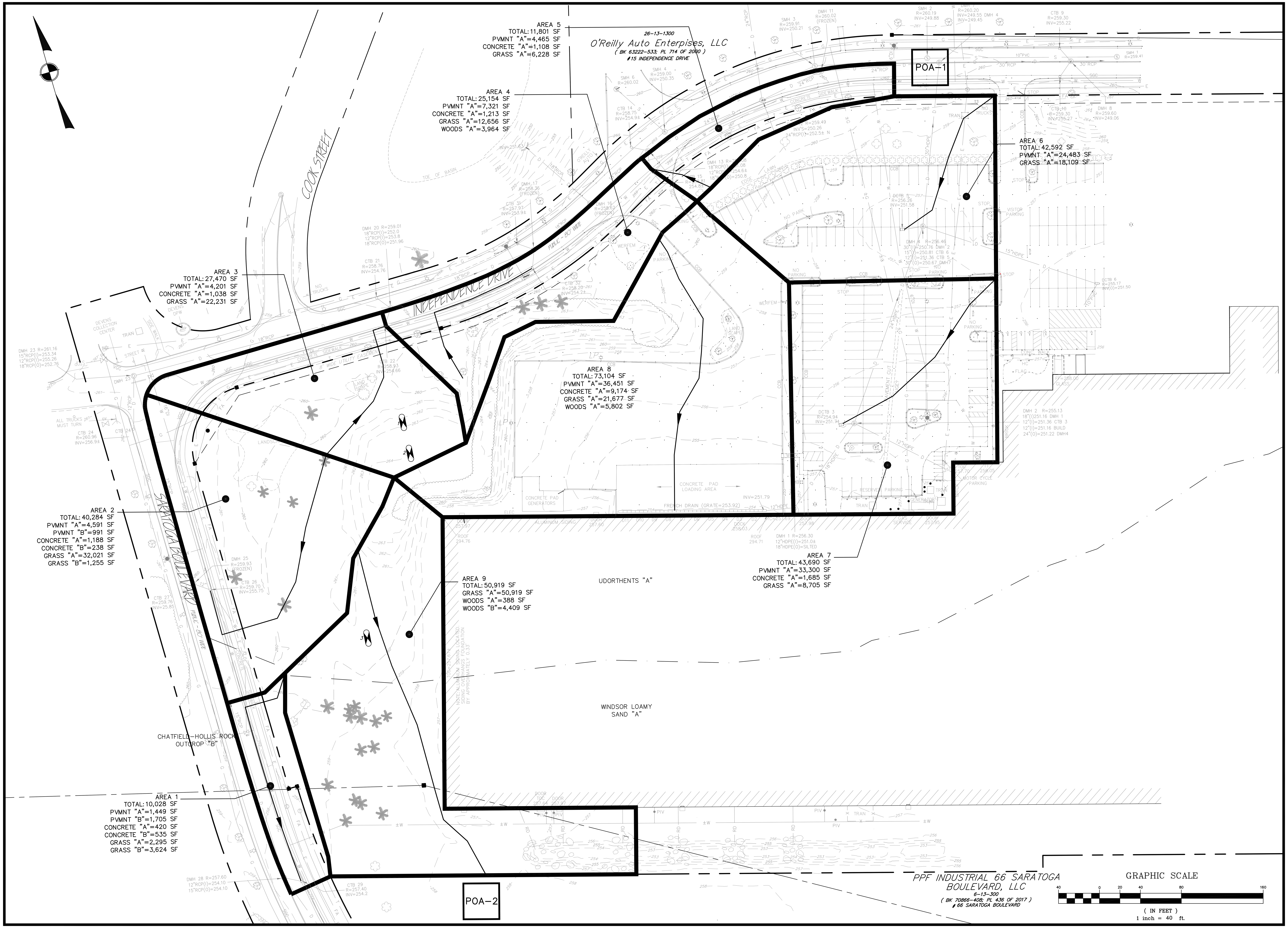
MN TN 15°

0 .5 1 MILE
0 1000 FEET 0 500 1000 METERS

Printed from TOPO! ©2000 Wildflower Productions (www.topo.com)

SITE LOCUS MAP

FIGURE 1



No.	Date	Revision

Drawn By: JLL
Designed By: JLL
Checked By:

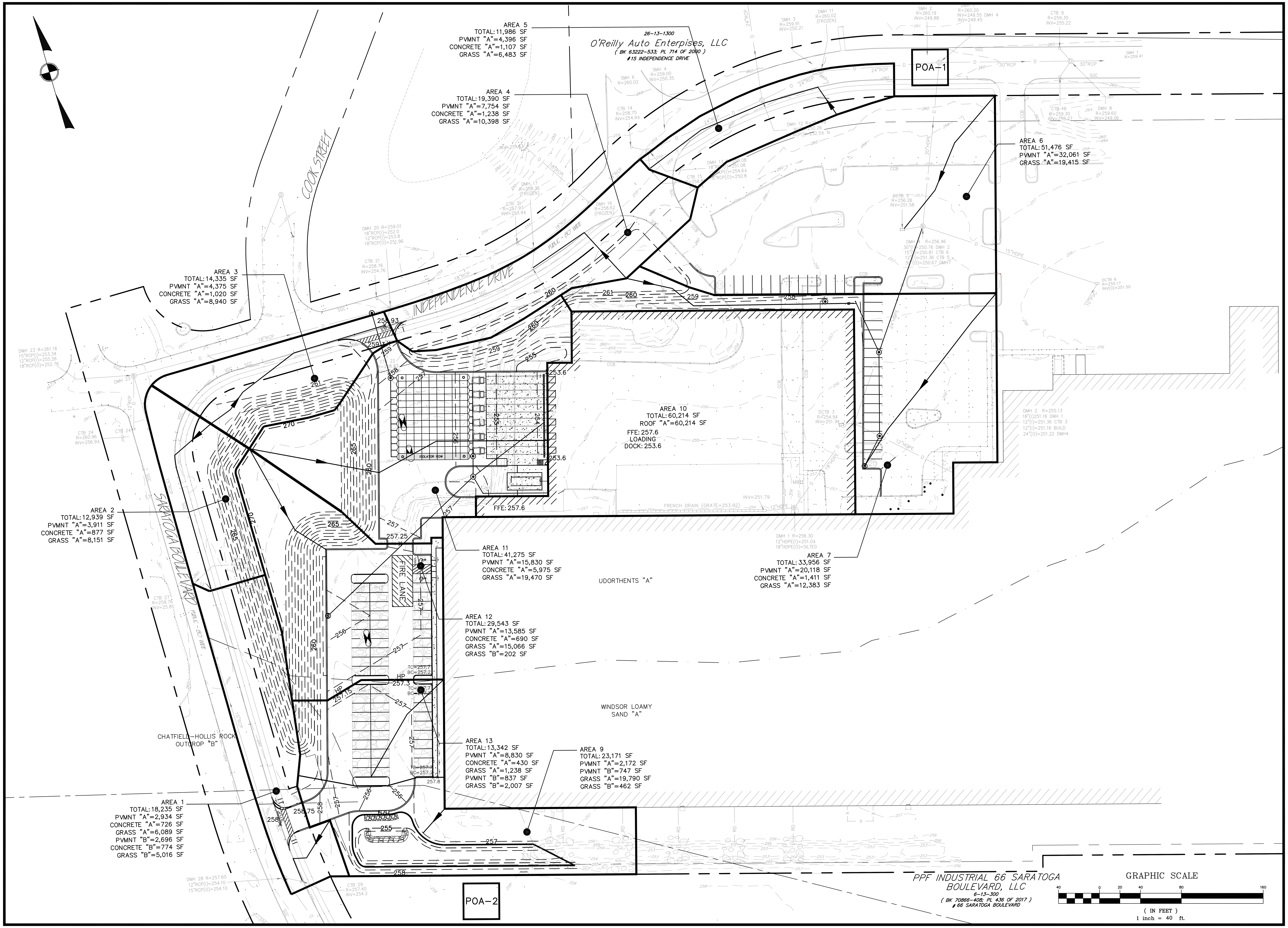
McCarty Engineering, Inc.
Civil Engineers
42 Tucker Drive, Leominster, MA 01453
phone:(978) 534-1318 fax: (978) 840-6907
www.mccartydb.com

Project Name
Mack Devens Development, LLC.
18 Independence Drive
Devens, MA

Sheet Title
Existing Drainage Figure

Job No: 127.01.001
File Name: Existing Drainage
Date: July 3, 2025
Scale: 1"=40'

Sheet No.
2



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42 Tucker Drive, Leominster, MA 01453
phone:(978) 534-1318 fax: (978) 840-6907
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Sheet Title
Proposed Drainage Figure

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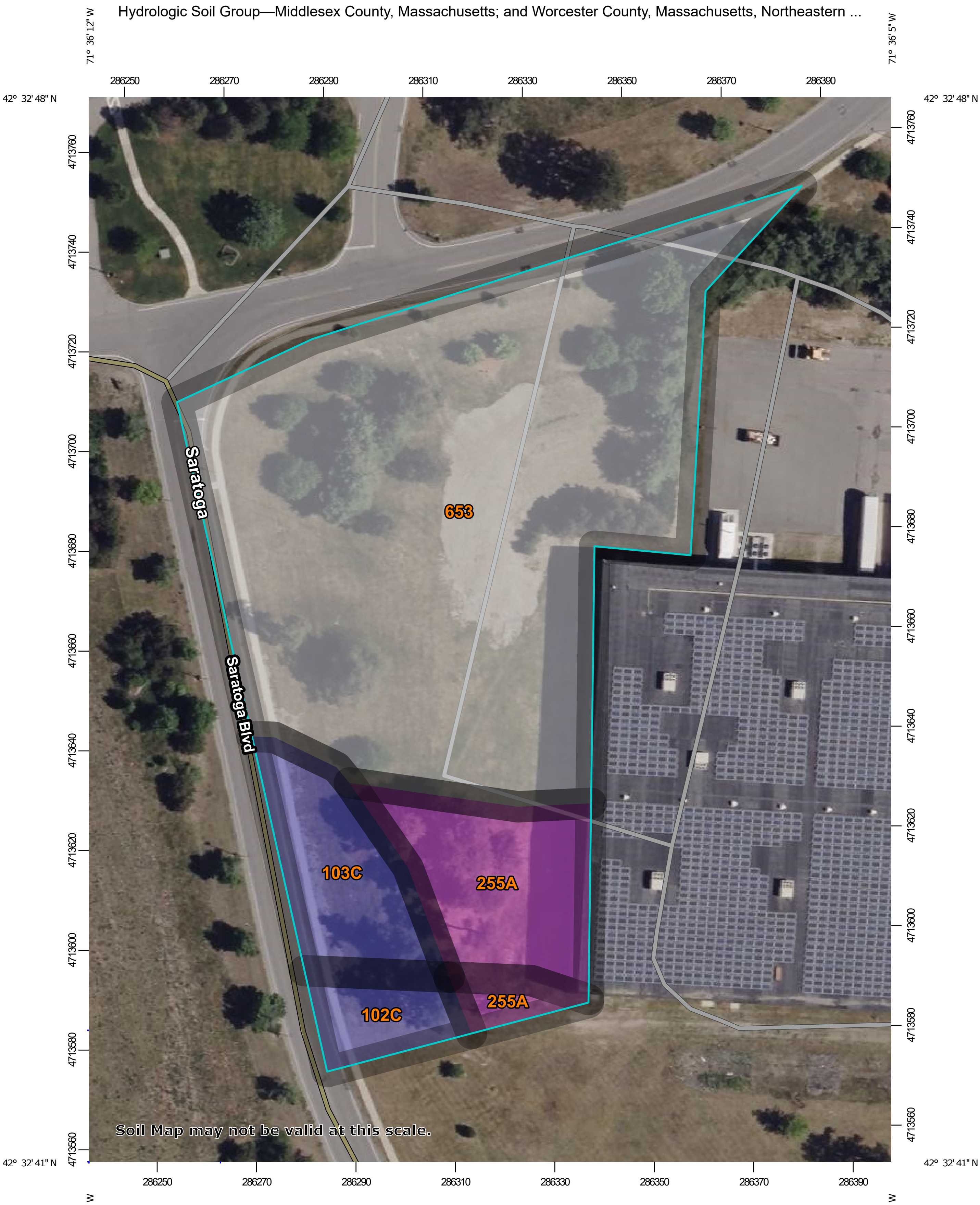
Sheet No.
3

Appendix A

NRCS Soil Survey



Map Scale: 1:1,040 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 15, 30, 60, 90

Feet: 0, 50, 100, 200, 300

N

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 scales ranging from 1:20,000 to 1:24,000.

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: Middlesex County, Massachusetts
Survey Area Data: Version 24, Aug 27, 2024

Soil Survey Area: Worcester County, Massachusetts, Northeastern Part
Survey Area Data: Version 19, Aug 27, 2024

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

MAP LEGEND

MAP INFORMATION

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
103C	Charlton-Hollis-Rock outcrop complex, 8 to 15 percent slopes	B	0.3	9.0%
255A	Windsor loamy sand, 0 to 3 percent slopes	A	0.3	11.3%
653	Udorthents, sandy		2.2	74.1%
Subtotals for Soil Survey Area			**2.7**	**94.4%**
Totals for Area of Interest			**2.9**	**100.0%**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
102C	Chatfield-Hollis-Rock outcrop complex, 0 to 15 percent slopes	B	0.1	4.0%
255A	Windsor loamy sand, 0 to 3 percent slopes	A	0.0	1.6%
Subtotals for Soil Survey Area			**0.2**	**5.6%**
Totals for Area of Interest			**2.9**	**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

Soil Logs

Commonwealth of Massachusetts
City/Town of

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

C. On-Site Review (*minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: TP 1 (Hole #) 6/20/2025 (Date) 9:00 am (Time) Sunny 60's (Weather) ______ (Latitude) ______ (Longitude)

1. Land Use Open field (e.g., woodland, agricultural field, vacant lot, etc.) grass (Vegetation) none (Surface Stones (e.g., cobbles, stones, boulders, etc.)) 0-5 (Slope (%))

Description of Location: field area at the corner of Saratoga Blvd and Independence Dr

2. Soil Parent Material: Sand/Gravel Outwash (Landform) SH (Position on Landscape (SU, SH, BS, FS, TS, Plain))

3. Distances from: Open Water Body N/A feet Drainage Way N/A feet Wetlands N/A feet
Property Line >10 feet Drinking Water Well N/A feet Other ______ feet

4. Unsuitable Materials Present: ☐ Yes ☐ No If Yes: ☑ Disturbed Soil/Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☑ No If yes: ______ Depth to Weeping in Hole ______ Depth to Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-44	Fill	LS	10 YR 5/3		Cnc : Dpl:						
44-54	Ab	SL	10 YR 2/2		Cnc : Dpl:						
54-66	B	LS	10 YR 6/4		Cnc : Dpl:						
66-180	C	S	2.5Y 6/4		Cnc : Dpl:						
					Cnc : Dpl:						
					Cnc : Dpl:						

Additional Notes:

Commonwealth of Massachusetts
City/Town of

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

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: TP 2 (Hole #) | 6/20/2025 (Date) | 9:00 am (Time) | Sunny 60's (Weather) | ______ (Latitude) | ______ (Longitude)

1. Land Use: Open field (e.g., woodland, agricultural field, vacant lot, etc.) | grass (Vegetation) | none (Surface Stones (e.g., cobbles, stones, boulders, etc.)) | 0-5 (Slope (%))

   Description of Location: Open field

2. Soil Parent Material: Sand/Gravel | Outwash (Landform) | SH (Position on Landscape (SU, SH, BS, FS, TS, Plain))

3. Distances from: Open Water Body N/A feet | Drainage Way N/A feet | Wetlands N/A feet

   Property Line >10 feet | Drinking Water Well N/A feet | Other ______ feet

4. Unsuitable Materials Present: ☐ Yes ☐ No If Yes: ☑ Disturbed Soil/Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☑ No If yes: ______ Depth to Weeping in Hole ______ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-72	Fill	LS	10 YR 5/3		Cnc : Dpl:						
72-83	Ab	SL	10 YR 2/2		Cnc : Dpl:						
83-94	B	LS	10 YR 6/4		Cnc : Dpl:						
94-204	C	S	2.5Y 6/4		Cnc : Dpl:						
					Cnc : Dpl:						
					Cnc : Dpl:						

Additional Notes:

Commonwealth of Massachusetts
City/Town of

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

C. On-Site Review (*minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: TP 3 (Hole #) 6/20/2025 (Date) 9:00 am (Time) Sunny 60's (Weather) ______ (Latitude) ______ (Longitude)

1. Land Use: Open field (e.g., woodland, agricultural field, vacant lot, etc.) grass (Vegetation) none (Surface Stones (e.g., cobbles, stones, boulders, etc.)) 0-5 (Slope (%))

   Description of Location: Open field

2. Soil Parent Material: Sand/Gravel Outwash (Landform) Plain (Position on Landscape (SU, SH, BS, FS, TS, Plain))

3. Distances from: Open Water Body N/A feet Drainage Way N/A feet Wetlands N/A feet

   Property Line >10 feet Drinking Water Well N/A feet Other ______ feet

4. Unsuitable Materials Present: ☐ Yes ☐ No If Yes: ☑ Disturbed Soil/Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☑ No If yes: ______ Depth to Weeping in Hole ______ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-30	Fill	LS	10 YR 5/3		Cnc : Dpl:						
30-40	Ab	SL	10 YR 2/2		Cnc : Dpl:						
40-52	B	LS	10 YR 6/4		Cnc : Dpl:						
52-118	C	S	2.5Y 6/4		Cnc : Dpl:						
					Cnc : Dpl:						
					Cnc : Dpl:						

Additional Notes:

Commonwealth of Massachusetts
City/Town of

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

F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

[signature]	6/20/2025
Signature of Soil Evaluator	Date
Justin LeClair SE14371	6/30/2025
Typed or Printed Name of Soil Evaluator / License #	Expiration Date of License
Name of Approving Authority Witness	Approving Authority

Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with Percolation Test Form 12.

Field Diagrams: Use this area for field diagrams:

Recharge Calculations

McCarty Engineering, INC. Project: Mack Devens Development
Stormwater Recharge

		Date:	6/24/25
		Comp:	JLL
City:	Devens	Check :	WRF
State:	MA		

<u>Recharge Required</u>

Hydrologic Soil Goup	Volume to Recharge (in)
A	**0.6**
B	**0.35**

The areas included in the Required Recharge Volume calculations reflect the increase in impervious area resulting from the proposed development.

Required Recharge Volume

Soil group	Impervious Area (ac)	Required Volume (ac-ft)
A	4.35	0.218
B	0.12	0.004
	Total	0.221

<u>Recharge Provided</u>

***Total Recharge Provided in Proposed Infiltration Basins during the 2-year storm= 0.382 AC-FT**

**All recharge is taking place through the bottom of the infiltration basins. Refer to the Proposed Conditions HydroCAD Model for the Recharge Volume for all storm events.*

Drawdown Analysis

Drawdown Analysis-Underground Infiltration Basin System

Hydrograph for Pond 1P: Underground Infiltration System

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	249.00	0.00	0.00	**0.00**
1.00	0.00	0	249.00	0.00	0.00	0.00
2.00	0.01	1	249.00	0.01	0.01	0.00
3.00	0.02	2	249.00	0.02	0.02	0.00
4.00	0.03	3	249.00	0.03	0.03	0.00
5.00	0.04	4	249.00	0.04	0.04	0.00
6.00	0.05	5	249.00	0.05	0.05	0.00
7.00	0.07	8	249.00	0.07	0.07	0.00
8.00	0.09	10	249.00	0.09	0.09	0.00
9.00	0.14	15	249.01	0.13	0.13	0.00
10.00	0.19	21	249.01	0.18	0.18	0.00
11.00	0.28	32	249.01	0.28	0.28	0.00
12.00	**2.60**	**527**	**249.22**	**1.20**	**1.20**	0.00
13.00	**0.45**	**1,506**	**249.63**	**1.32**	**1.32**	0.00
14.00	0.29	33	249.01	0.29	0.29	0.00
15.00	0.22	25	249.01	0.22	0.22	0.00
16.00	0.16	18	249.01	0.16	0.16	0.00
17.00	0.12	14	249.01	0.12	0.12	0.00
18.00	0.10	11	249.00	0.10	0.10	0.00
19.00	0.08	10	249.00	0.08	0.08	0.00
20.00	0.08	9	249.00	0.08	0.08	0.00
21.00	0.07	8	249.00	0.07	0.07	0.00
22.00	0.06	7	249.00	0.06	0.06	0.00
23.00	0.06	6	249.00	0.06	0.06	0.00
24.00	0.05	6	249.00	0.05	0.05	0.00
25.00	0.00	0	249.00	0.00	0.00	0.00
26.00	0.00	0	249.00	0.00	0.00	0.00
27.00	0.00	0	249.00	0.00	0.00	0.00
28.00	0.00	0	249.00	0.00	0.00	0.00
29.00	0.00	0	249.00	0.00	0.00	0.00
30.00	0.00	0	249.00	0.00	0.00	0.00
31.00	0.00	0	249.00	0.00	0.00	0.00
32.00	0.00	0	249.00	0.00	0.00	0.00
33.00	0.00	0	249.00	0.00	0.00	0.00
34.00	0.00	0	249.00	0.00	0.00	0.00
35.00	0.00	0	249.00	0.00	0.00	0.00
36.00	0.00	0	249.00	0.00	0.00	0.00
37.00	0.00	0	249.00	0.00	0.00	0.00
38.00	0.00	0	249.00	0.00	0.00	0.00
39.00	0.00	0	249.00	0.00	0.00	0.00
40.00	0.00	0	249.00	0.00	0.00	0.00
41.00	0.00	0	249.00	0.00	0.00	0.00
42.00	0.00	0	249.00	0.00	0.00	0.00
43.00	0.00	0	249.00	0.00	0.00	0.00
44.00	0.00	0	249.00	0.00	0.00	0.00
45.00	0.00	0	249.00	0.00	0.00	0.00
46.00	0.00	0	249.00	0.00	0.00	0.00
47.00	0.00	0	249.00	0.00	0.00	0.00
48.00	0.00	0	249.00	0.00	0.00	0.00

Time of Drawdown

Drawdown Analysis-At Grade Infiltration Basin

Hydrograph for Pond 4P: At Grade Infiltration Sytem

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	254.00	0.00	0.00	**0.00**
1.00	0.00	0	254.00	0.00	0.00	0.00
2.00	0.00	0	254.00	0.00	0.00	0.00
3.00	0.00	0	254.00	0.00	0.00	0.00
4.00	0.00	0	254.00	0.00	0.00	0.00
5.00	0.00	0	254.00	0.00	0.00	0.00
6.00	0.00	0	254.00	0.00	0.00	0.00
7.00	0.00	0	254.00	0.00	0.00	0.00
8.00	0.00	0	254.00	0.00	0.00	0.00
9.00	0.00	0	254.00	0.00	0.00	0.00
10.00	0.00	0	254.00	0.00	0.00	0.00
11.00	0.00	0	254.00	0.00	0.00	0.00
12.00	0.00	0	254.00	0.00	0.00	0.00
13.00	0.00	0	254.00	0.00	0.00	0.00
14.00	0.00	0	254.00	0.00	0.00	0.00
15.00	**0.00**	**0**	**254.00**	**0.00**	**0.00**	0.00
16.00	**0.00**	**0**	**254.00**	**0.00**	**0.00**	0.00
17.00	0.00	0	254.00	0.00	0.00	0.00
18.00	0.00	0	254.00	0.00	0.00	0.00
19.00	0.00	0	254.00	0.00	0.00	0.00
20.00	0.00	0	254.00	0.00	0.00	0.00
21.00	0.00	0	254.00	0.00	0.00	0.00
22.00	0.00	0	254.00	0.00	0.00	0.00
23.00	0.00	0	254.00	0.00	0.00	0.00
24.00	0.00	0	254.00	0.00	0.00	0.00
25.00	0.00	0	254.00	0.00	0.00	0.00
26.00	0.00	0	254.00	0.00	0.00	0.00
27.00	0.00	0	254.00	0.00	0.00	0.00
28.00	0.00	0	254.00	0.00	0.00	0.00
29.00	0.00	0	254.00	0.00	0.00	0.00
30.00	0.00	0	254.00	0.00	0.00	0.00
31.00	0.00	0	254.00	0.00	0.00	0.00
32.00	0.00	0	254.00	0.00	0.00	0.00
33.00	0.00	0	254.00	0.00	0.00	0.00
34.00	0.00	0	254.00	0.00	0.00	0.00
35.00	0.00	0	254.00	0.00	0.00	0.00
36.00	0.00	0	254.00	0.00	0.00	0.00
37.00	0.00	0	254.00	0.00	0.00	0.00
38.00	0.00	0	254.00	0.00	0.00	0.00
39.00	0.00	0	254.00	0.00	0.00	0.00
40.00	0.00	0	254.00	0.00	0.00	0.00
41.00	0.00	0	254.00	0.00	0.00	0.00
42.00	0.00	0	254.00	0.00	0.00	0.00
43.00	0.00	0	254.00	0.00	0.00	0.00
44.00	0.00	0	254.00	0.00	0.00	0.00
45.00	0.00	0	254.00	0.00	0.00	0.00
46.00	0.00	0	254.00	0.00	0.00	0.00
47.00	0.00	0	254.00	0.00	0.00	0.00
48.00	0.00	0	254.00	0.00	0.00	0.00

Time of Drawdown

Drawdown Analysis-Porous Pavement

Hydrograph for Pond 2P: Pervious Pavement

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	253.24	0.00	0.00	**0.00**
1.00	0.00	0	253.24	0.00	0.00	0.00
2.00	0.00	0	253.24	0.00	0.00	0.00
3.00	0.00	0	253.24	0.00	0.00	0.00
4.00	0.00	0	253.24	0.00	0.00	0.00
5.00	0.00	0	253.24	0.00	0.00	0.00
6.00	0.00	0	253.24	0.00	0.00	0.00
7.00	0.00	0	253.24	0.00	0.00	0.00
8.00	0.00	0	253.24	0.00	0.00	0.00
9.00	0.00	0	253.24	0.00	0.00	0.00
10.00	0.00	0	253.24	0.00	0.00	0.00
11.00	0.00	0	253.24	0.00	0.00	0.00
12.00	**0.12**	**2**	**253.24**	**0.11**	**0.11**	0.00
13.00	**0.07**	**1**	**253.24**	**0.07**	**0.07**	0.00
14.00	0.05	1	253.24	0.05	0.05	0.00
15.00	0.04	1	253.24	0.04	0.04	0.00
16.00	0.03	1	253.24	0.03	0.03	0.00
17.00	0.02	0	253.24	0.02	0.02	0.00
18.00	0.02	0	253.24	0.02	0.02	0.00
19.00	0.02	0	253.24	0.02	0.02	0.00
20.00	0.01	0	253.24	0.01	0.01	0.00
21.00	0.01	0	253.24	0.01	0.01	0.00
22.00	0.01	0	253.24	0.01	0.01	0.00
23.00	0.01	0	253.24	0.01	0.01	0.00
24.00	0.01	0	253.24	0.01	0.01	0.00
25.00	0.00	0	253.24	0.00	0.00	0.00
26.00	0.00	0	253.24	0.00	0.00	0.00
27.00	0.00	0	253.24	0.00	0.00	0.00
28.00	0.00	0	253.24	0.00	0.00	0.00
29.00	0.00	0	253.24	0.00	0.00	0.00
30.00	0.00	0	253.24	0.00	0.00	0.00
31.00	0.00	0	253.24	0.00	0.00	0.00
32.00	0.00	0	253.24	0.00	0.00	0.00
33.00	0.00	0	253.24	0.00	0.00	0.00
34.00	0.00	0	253.24	0.00	0.00	0.00
35.00	0.00	0	253.24	0.00	0.00	0.00
36.00	0.00	0	253.24	0.00	0.00	0.00
37.00	0.00	0	253.24	0.00	0.00	0.00
38.00	0.00	0	253.24	0.00	0.00	0.00
39.00	0.00	0	253.24	0.00	0.00	0.00
40.00	0.00	0	253.24	0.00	0.00	0.00
41.00	0.00	0	253.24	0.00	0.00	0.00
42.00	0.00	0	253.24	0.00	0.00	0.00
43.00	0.00	0	253.24	0.00	0.00	0.00
44.00	0.00	0	253.24	0.00	0.00	0.00
45.00	0.00	0	253.24	0.00	0.00	0.00
46.00	0.00	0	253.24	0.00	0.00	0.00
47.00	0.00	0	253.24	0.00	0.00	0.00
48.00	0.00	0	253.24	0.00	0.00	0.00

Time of Drawdown

Drawdown Analysis-Porous Pavement

Hydrograph for Pond 3P: Pervious Pavement

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	254.24	0.00	0.00	**0.00**
1.00	0.00	0	254.24	0.00	0.00	0.00
2.00	0.00	0	254.24	0.00	0.00	0.00
3.00	0.00	0	254.24	0.00	0.00	0.00
4.00	0.00	0	254.24	0.00	0.00	0.00
5.00	0.00	0	254.24	0.00	0.00	0.00
6.00	0.00	0	254.24	0.00	0.00	0.00
7.00	0.00	0	254.24	0.00	0.00	0.00
8.00	0.00	0	254.24	0.00	0.00	0.00
9.00	0.01	0	254.24	0.01	0.01	0.00
10.00	0.01	0	254.24	0.01	0.01	0.00
11.00	0.03	1	254.24	0.03	0.03	0.00
12.00	**0.37**	**7**	**254.25**	**0.35**	**0.35**	0.00
13.00	**0.06**	**1**	**254.24**	**0.06**	**0.06**	0.00
14.00	0.04	1	254.24	0.04	0.04	0.00
15.00	0.03	1	254.24	0.03	0.03	0.00
16.00	0.02	0	254.24	0.02	0.02	0.00
17.00	0.02	0	254.24	0.02	0.02	0.00
18.00	0.01	0	254.24	0.01	0.01	0.00
19.00	0.01	0	254.24	0.01	0.01	0.00
20.00	0.01	0	254.24	0.01	0.01	0.00
21.00	0.01	0	254.24	0.01	0.01	0.00
22.00	0.01	0	254.24	0.01	0.01	0.00
23.00	0.01	0	254.24	0.01	0.01	0.00
24.00	0.01	0	254.24	0.01	0.01	0.00
25.00	0.00	0	254.24	0.00	0.00	0.00
26.00	0.00	0	254.24	0.00	0.00	0.00
27.00	0.00	0	254.24	0.00	0.00	0.00
28.00	0.00	0	254.24	0.00	0.00	0.00
29.00	0.00	0	254.24	0.00	0.00	0.00
30.00	0.00	0	254.24	0.00	0.00	0.00
31.00	0.00	0	254.24	0.00	0.00	0.00
32.00	0.00	0	254.24	0.00	0.00	0.00
33.00	0.00	0	254.24	0.00	0.00	0.00
34.00	0.00	0	254.24	0.00	0.00	0.00
35.00	0.00	0	254.24	0.00	0.00	0.00
36.00	0.00	0	254.24	0.00	0.00	0.00
37.00	0.00	0	254.24	0.00	0.00	0.00
38.00	0.00	0	254.24	0.00	0.00	0.00
39.00	0.00	0	254.24	0.00	0.00	0.00
40.00	0.00	0	254.24	0.00	0.00	0.00
41.00	0.00	0	254.24	0.00	0.00	0.00
42.00	0.00	0	254.24	0.00	0.00	0.00
43.00	0.00	0	254.24	0.00	0.00	0.00
44.00	0.00	0	254.24	0.00	0.00	0.00
45.00	0.00	0	254.24	0.00	0.00	0.00
46.00	0.00	0	254.24	0.00	0.00	0.00
47.00	0.00	0	254.24	0.00	0.00	0.00
48.00	0.00	0	254.24	0.00	0.00	0.00

Time of Drawdown

Water Quality Volume Calculations

Water Quality Volume Calculation-Underground Infiltration Basin

Stage-Area-Storage for Pond 1P: Underground Infiltration System (continued)

Outlet Invert =

WQv Provided

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
251.12	5,954	8,561	252.18	5,954	13,331
251.14	5,954	8,656	252.20	5,954	13,415
251.16	5,954	8,751	252.22	5,954	13,498
251.18	5,954	8,846	252.24	5,954	13,581
251.20	5,954	8,940	252.26	5,954	13,664
251.22	5,954	9,034	252.28	5,954	13,746
251.24	5,954	9,128	252.30	5,954	13,828
251.26	5,954	9,222	252.32	5,954	13,910
251.28	5,954	9,316	252.34	5,954	13,992
251.30	5,954	9,410	252.36	5,954	14,073
251.32	5,954	9,503	252.38	5,954	14,153
251.34	5,954	9,[illegible]	252.40	5,954	14,234
251.36	5,954	9,[illegible]	252.42	5,954	14,314
251.38	5,954	9,[illegible]	252.44	5,954	14,394
251.40	5,954	9,875	252.46	5,954	14,473
251.42	5,954	9,968	252.48	5,954	14,552
251.44	5,954	10,060	252.50	5,954	14,631
251.46	5,954	10,152	252.52	5,954	14,709
251.48	5,954	10,245	252.54	5,954	14,787
251.50	5,954	10,336	252.56	5,954	14,864
251.52	5,954	10,428	252.58	5,954	14,941
251.54	5,954	10,520	252.60	5,954	15,018
251.56	5,954	10,611	252.62	5,954	15,094
251.58	5,954	10,702	252.64	5,954	15,170
251.60	5,954	10,793	252.66	5,954	15,245
251.62	5,954	10,884	252.68	5,954	15,320
251.64	5,954	10,974	252.70	5,954	15,395
251.66	5,954	11,064	252.72	5,954	15,469
251.68	5,954	11,155	252.74	5,954	15,542
251.70	5,954	11,244	252.76	5,954	15,615
251.72	5,954	11,334	252.78	5,954	15,688
251.74	5,954	11,424	252.80	5,954	15,760
251.76	5,954	11,513	252.82	5,954	15,831
251.78	5,954	11,602	252.84	5,954	15,902
251.80	5,954	11,691	252.86	5,954	15,972
251.82	5,954	11,779	252.88	5,954	16,042
251.84	5,954	11,868	252.90	5,954	16,111
251.86	5,954	11,956	252.92	5,954	16,180
251.88	5,954	12,044	252.94	5,954	16,247
251.90	5,954	12,131	252.96	5,954	16,314
251.92	5,954	12,219	252.98	5,954	16,381
251.94	5,954	12,306	253.00	5,954	16,446
251.96	5,954	12,393	253.02	5,954	16,511
251.98	5,954	12,479	253.04	5,954	16,575
252.00	5,954	12,566	253.06	5,954	16,637
252.02	5,954	12,652	253.08	5,954	16,699
252.04	5,954	12,738	253.10	5,954	16,759
252.06	5,954	12,823	253.12	5,954	16,819
252.08	5,954	12,909	253.14	5,954	16,877
252.10	5,954	12,994	253.16	5,954	16,934
252.12	5,954	13,079	253.18	5,954	16,990
252.14	5,954	13,163	253.20	5,954	17,045
252.16	5,954	13,247	253.22	5,954	17,100

WQv Required=1.0in x Area Imp. sf x 1ft/12in

WQv Required=1.0in x 96,294 sf x 1ft/12in = 8,024.5 cf

14,394 cf > 8,024.5 cf

Water Quality Volume Calculation-At Grade Infiltration System

Stage-Area-Storage for Pond 4P: At Grade Infiltration Sytem

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
254.00	3,426	0	254.53	4,090	1,992
254.01	3,439	34	254.54	4,102	2,033
254.02	3,451	69	254.55	4,115	2,074
254.03	3,464	103	254.56	4,127	2,115
254.04	3,476	138	254.57	4,140	2,156
254.05	3,489	173	254.58	4,152	2,198
254.06	3,501	208	254.59	4,165	2,239
254.07	3,514	243	254.60	4,177	2,281
254.08	3,526	278	254.61	4,190	2,323
254.09	3,539	313	254.62	4,202	2,365
254.10	3,551	349	254.63	4,215	2,407
254.11	3,564	384	254.64	4,227	2,449
254.12	3,576	420	254.65	4,240	2,491
254.13	3,589	456	254.66	4,252	2,534
254.14	3,601	492	254.67	4,265	2,576
254.15	3,614	528	254.68	4,277	2,619
254.16	3,626	564	254.69	4,290	2,662
254.17	3,639	601	254.70	4,302	2,705
254.18	3,651	637	254.71	4,315	2,748
254.19	3,664	674	254.72	4,327	2,791
254.20	3,676	710	254.73	4,340	2,835
254.21	3,689	747	254.74	4,352	2,878
254.22	3,701	784	254.75	4,365	2,922
254.23	3,714	821	254.76	4,378	2,965
254.24	3,726	858	254.77	4,390	3,009
254.25	3,739	896	254.78	4,403	3,053
254.26	3,752	933	254.79	4,415	3,097
254.27	3,764	971	254.80	4,428	3,141
254.28	3,777	1,008	254.81	4,440	3,186
254.29	3,789	1,046	254.82	4,453	3,230
254.30	3,802	1,084	254.83	4,465	3,275
254.31	3,814	1,122	254.84	4,478	3,320
254.32	3,827	1,160	254.85	4,490	3,364
254.33	3,839	1,199	254.86	4,503	3,409
254.34	3,852	1,237	254.87	4,515	3,454
254.35	3,864	1,	254.88	4,528	3,500
254.36	3,877	1,	254.89	4,540	3,545
254.37	3,889	1,	254.90	4,553	3,590
254.38	3,902	1,392	254.91	4,565	3,636
254.39	3,914	1,431	254.92	4,578	3,682
254.40	3,927	1,471	254.93	4,590	3,728
254.41	3,939	1,510	254.94	4,603	3,774
254.42	3,952	1,549	254.95	4,615	3,820
254.43	3,964	1,589	254.96	4,628	3,866
254.44	3,977	1,629	254.97	4,640	3,912
254.45	3,989	1,668	254.98	4,653	3,959
254.46	4,002	1,708	254.99	4,665	4,005
254.47	4,014	1,749	255.00	4,678	4,052
254.48	4,027	1,789	255.01	4,691	4,099
254.49	4,039	1,829	255.02	4,705	4,146
254.50	4,052	1,870	255.03	4,718	4,193
254.51	4,065	1,910	255.04	4,731	4,240
254.52	4,077	1,951	255.05	4,745	4,288

Outlet Invert =

WQv Provided

WQv Required=1.0in x Area Imp. sf x 1ft/12in

WQv Required=1.0in x 13,016 sf x 1ft/12in = 1,084.67 cf

3,590 cf > 1,084.67 cf

TSS Removal Worksheets

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: Trench Drain to Underground Infiltration Basin

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 Unit	**0.76**	**1.00**	**0.76**	**0.24**
Infiltration Basin	**0.80**	**0.24**	**0.192**	**0.048**
	0.00	**0.048**	**0.00**	**0.048**
	0.00	**0.048**	**0.00**	**0.048**
	0.00	**0.048**	**0.00**	**0.048**

Total TSS Removal = **95.2%**

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

Project: **Mack Devens**
Prepared By: **JLL**
Date: **6/24/2025**

*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

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: Porous Pavement to Underground Infiltration Basin

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)
Porous Pavement	**0.80**	**1.00**	**0.80**	**0.20**
Deep Sump and Hooded Catch Basin	**0.25**	**0.20**	**0.05**	**0.15**
Water Quality Unit	**0.76**	**0.15**	**0.114**	**0.036**
Infiltration Basin	**0.80**	**0.036**	**0.029**	**0.007**
	0.00	**0.007**	**0.00**	**0.007**

Total TSS Removal = 99.3%

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

Project: **Mack Devens**
Prepared By: **JLL**
Date: **6/24/2025**

*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

Mass. Dept. of Environmental Protection

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: Trench Drain to Underground Infiltration Basin

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)
Porous Pavement	**0.80**	**1.00**	**0.80**	**0.20**
Peastone Diaphragm	**0.25**	**0.20**	**0.05**	**0.15**
Infiltration Basin	**0.80**	**0.15**	**0.12**	**0.03**
	0.00	**0.03**	**0.00**	**0.03**
	0.00	**0.03**	**0.00**	**0.03**

Total TSS Removal = 97%

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

Project: **Mack Devens**
Prepared By: **JLL**
Date: **6/24/2025**

*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

Mass. Dept. of Environmental Protection

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: Pre-Treatment to At Grade Infiltration

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)
Peastone Diaphragm	**0.25**	**1.00**	**0.25**	**0.75**
Sediment Forebay	**0.25**	**0.75**	**0.19**	**0.56**
	0.00	**0.56**	**0.00**	**0.56**
	0.00	**0.56**	**0.00**	**0.56**
	0.00	**0.56**	**0.00**	**0.56**

Total TSS Removal = 44%

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

Project: **Mack Devens**
Prepared By: **JLL**
Date: **6/24/2025**

*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

Hydroworks Sizing Summary

18 Independence Dr   DMH-1

Devens Ma

06-24-2025

Recommended Size: HydroDome HD 5

Hydroworks Sizing Program Version 5.8.5

A HydroDome HD 5 is recommended to provide 76 % annual TSS removal based on a drainage area of 3 (ac) with an imperviousness of 73.5 % and Sterling 2 Nnw, Massachusetts rainfall for the NJDEP particle size distribution.

The recommended HydroDome HD 5 treats 100 % of the annual runoff and provides 76 % annual TSS removal for the Sterling 2 Nnw rainfall records and NJDEP particle size distribution.

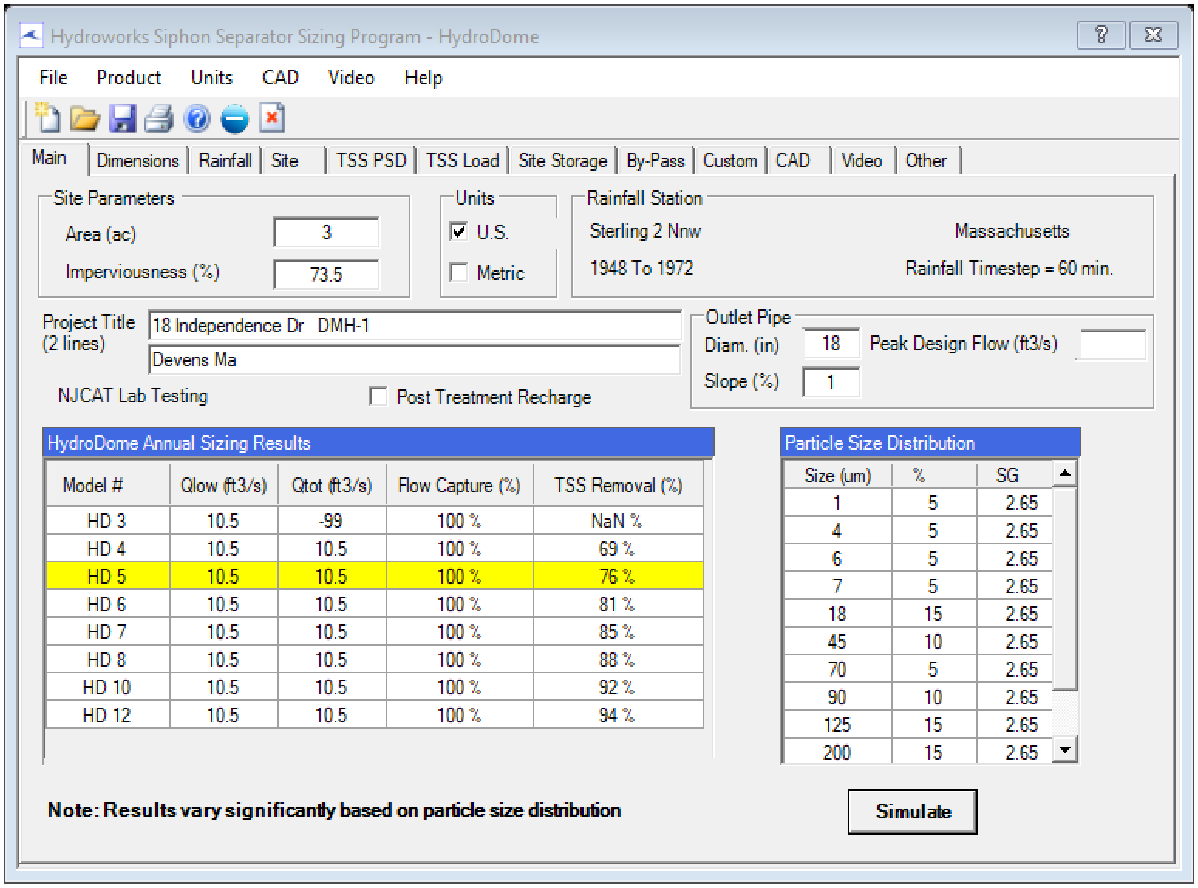
The HydroDome has a siphon which creates a discontinuity in headloss. Since a peak flow was not specified, headloss was calculated using the full pipe flow of -99 (ft3/s) for the given 18 (in) pipe diameter at 1% slope. The headloss was calculated to be 17 (in) above the crown of the 18 (in) outlet pipe.

This summary report provides the main parameters that were used for sizing. These parameters are shown on the summary tables and graphs provided in this report.

If you have any questions regarding this sizing summary please do not hesitate to contact Hydroworks at 888-290-7900 or email us at support@hydroworks.com.

The sizing program is for sizing purposes only and does not address any site specific parameters such as hydraulic gradeline, tailwater submergence, groundwater, soils bearing capacity, etc. Headloss calculations are not a hydraulic gradeline calculation since this requires a starting water level and an analysis of the entire system downstream of the HydroDome .

TSS Removal Sizing Summary



Hydroworks Siphon Separator Sizing Program - HydroDome

File Product Units CAD Video Help

Main | Dimensions | Rainfall | Site | TSS PSD | TSS Load | Site Storage | By-Pass | Custom | CAD | Video | Other

Site Parameters
Area (ac) 3
Imperviousness (%) 73.5

Units
☑ U.S.
☐ Metric

Rainfall Station
Sterling 2 Nnw Massachusetts
1948 To 1972 Rainfall Timestep = 60 min.

Project Title (2 lines) 18 Independence Dr DMH-1
Devens Ma

Outlet Pipe
Diam. (in) 18 Peak Design Flow (ft3/s)
Slope (%) 1

NJCAT Lab Testing ☐ Post Treatment Recharge

HydroDome Annual Sizing Results

Model #	Qlow (ft3/s)	Qtot (ft3/s)	Flow Capture (%)	TSS Removal (%)
HD 3	10.5	-99	100 %	NaN %
HD 4	10.5	10.5	100 %	69 %
HD 5	10.5	10.5	100 %	76 %
HD 6	10.5	10.5	100 %	81 %
HD 7	10.5	10.5	100 %	85 %
HD 8	10.5	10.5	100 %	88 %
HD 10	10.5	10.5	100 %	92 %
HD 12	10.5	10.5	100 %	94 %

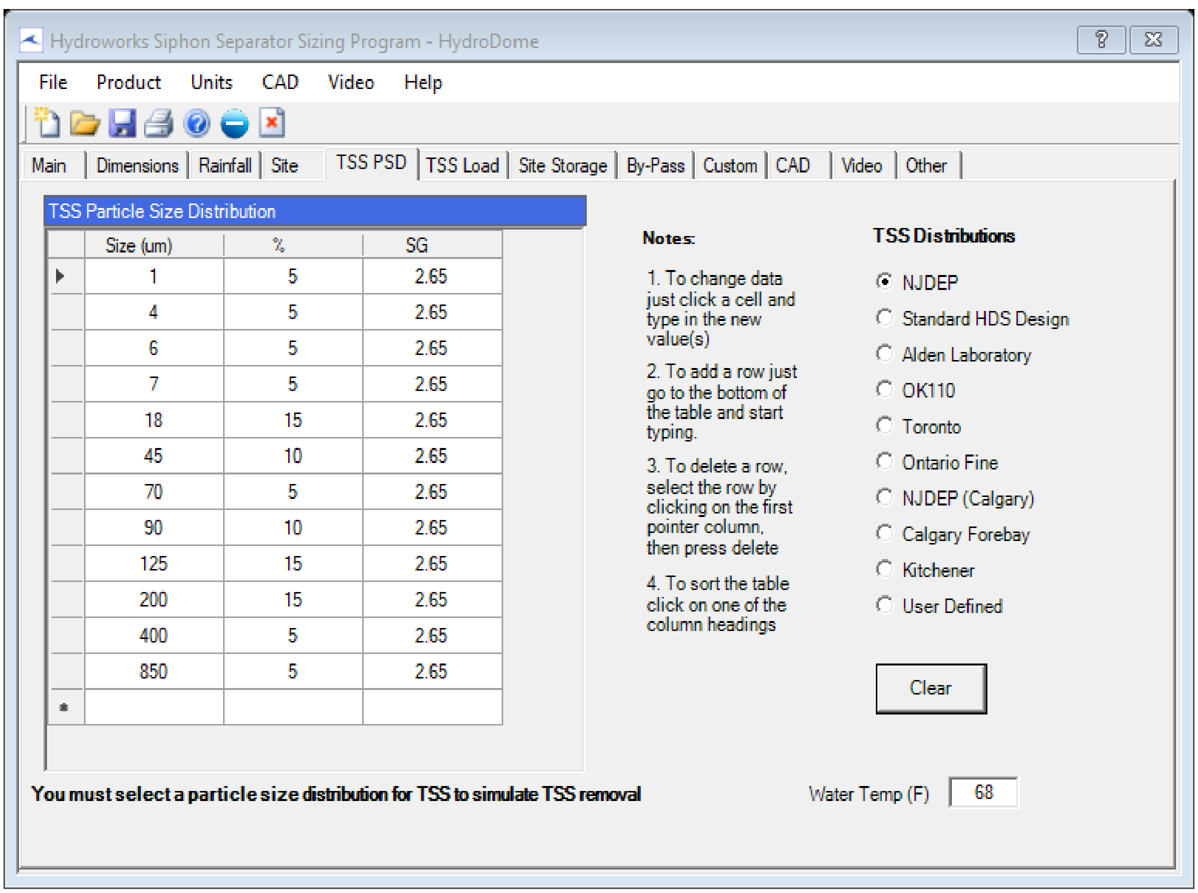
Particle Size Distribution

Size (um)	%	SG
1	5	2.65
4	5	2.65
6	5	2.65
7	5	2.65
18	15	2.65
45	10	2.65
70	5	2.65
90	10	2.65
125	15	2.65
200	15	2.65

Note: Results vary significantly based on particle size distribution

Simulate

TSS Particle Size Distribution



Hydroworks Siphon Separator Sizing Program - HydroDome

File Product Units CAD Video Help

Main | Dimensions | Rainfall | Site | TSS PSD | TSS Load | Site Storage | By-Pass | Custom | CAD | Video | Other

TSS Particle Size Distribution

Size (um)	%	SG
1	5	2.65
4	5	2.65
6	5	2.65
7	5	2.65
18	15	2.65
45	10	2.65
70	5	2.65
90	10	2.65
125	15	2.65
200	15	2.65
400	5	2.65
850	5	2.65

Notes:

1. To change data just click a cell and type in the new value(s)
2. To add a row just go to the bottom of the table and start typing.
3. To delete a row, select the row by clicking on the first pointer column, then press delete
4. To sort the table click on one of the column headings

TSS Distributions

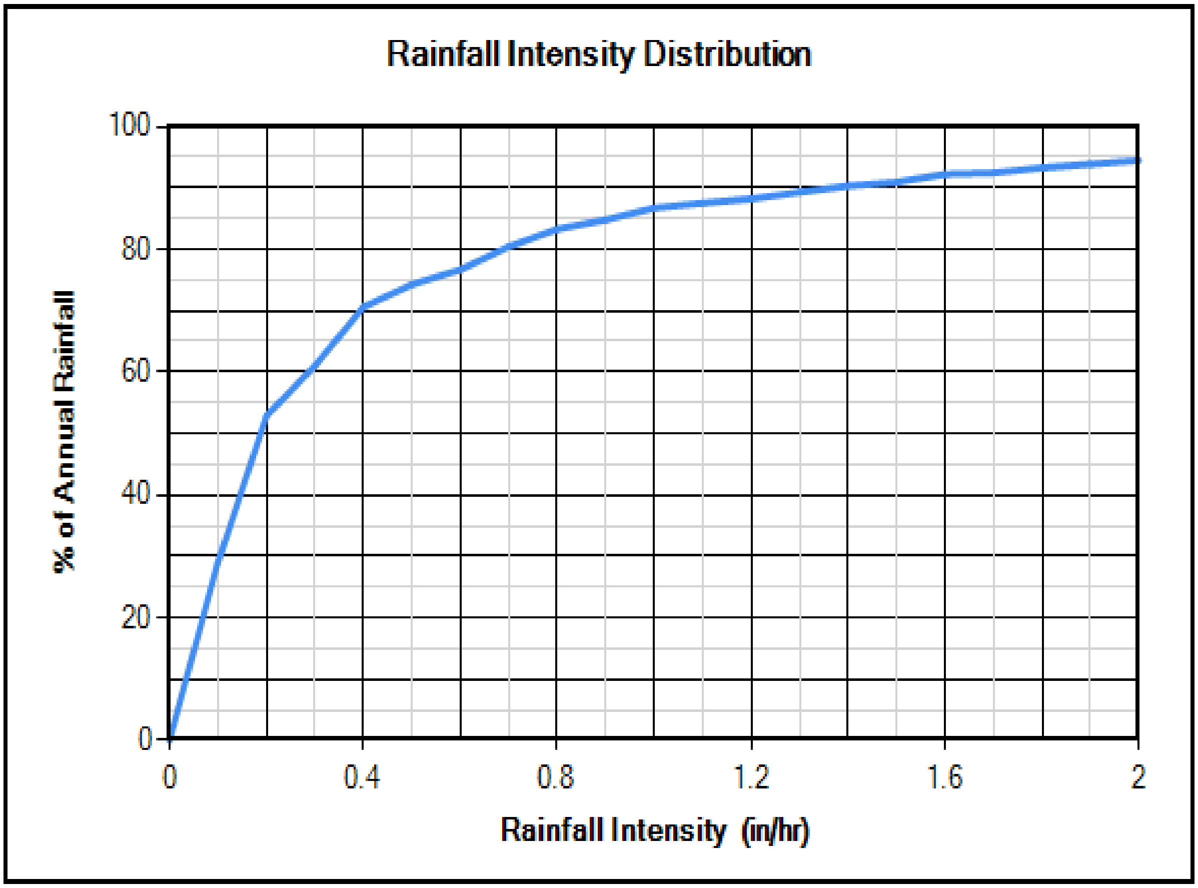
- ◉ NJDEP
- ○ Standard HDS Design
- ○ Alden Laboratory
- ○ OK110
- ○ Toronto
- ○ Ontario Fine
- ○ NJDEP (Calgary)
- ○ Calgary Forebay
- ○ Kitchener
- ○ User Defined

Clear

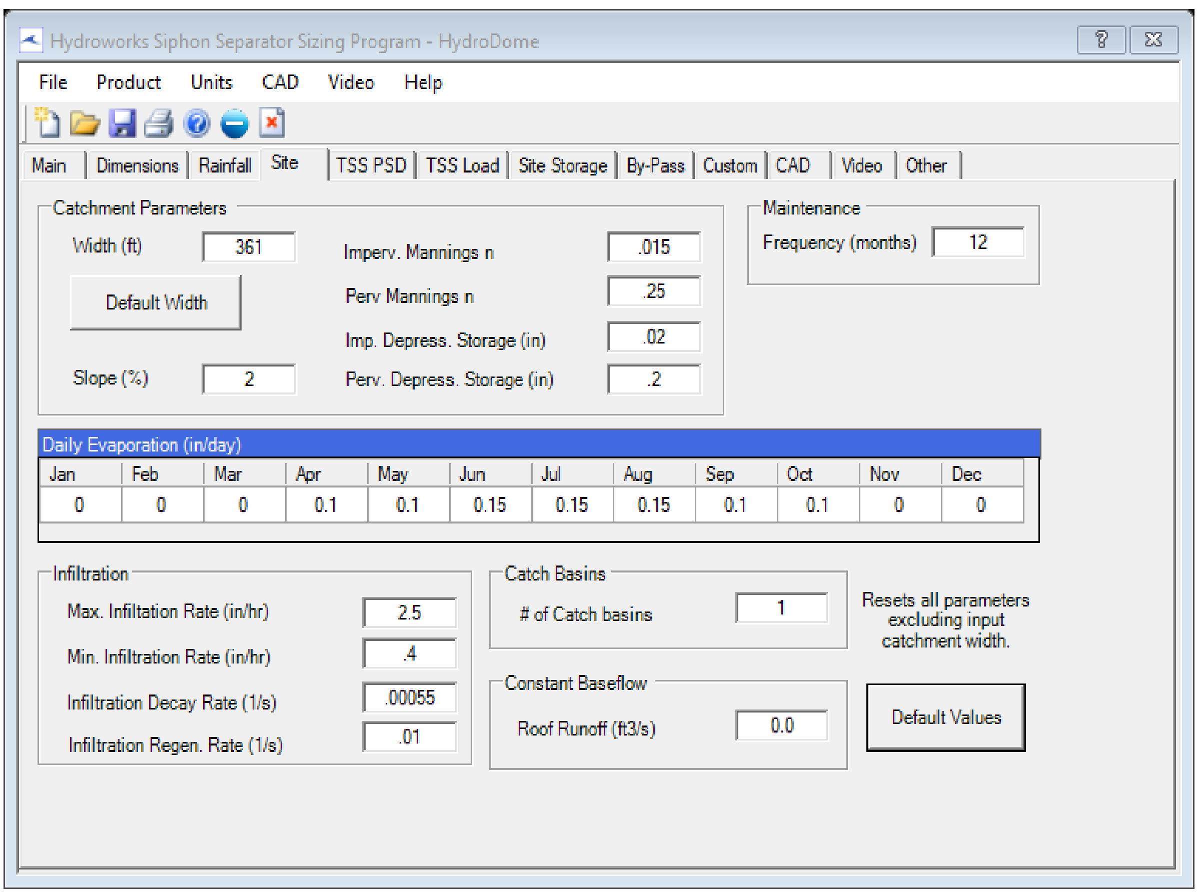
You must select a particle size distribution for TSS to simulate TSS removal

Water Temp (F) 68

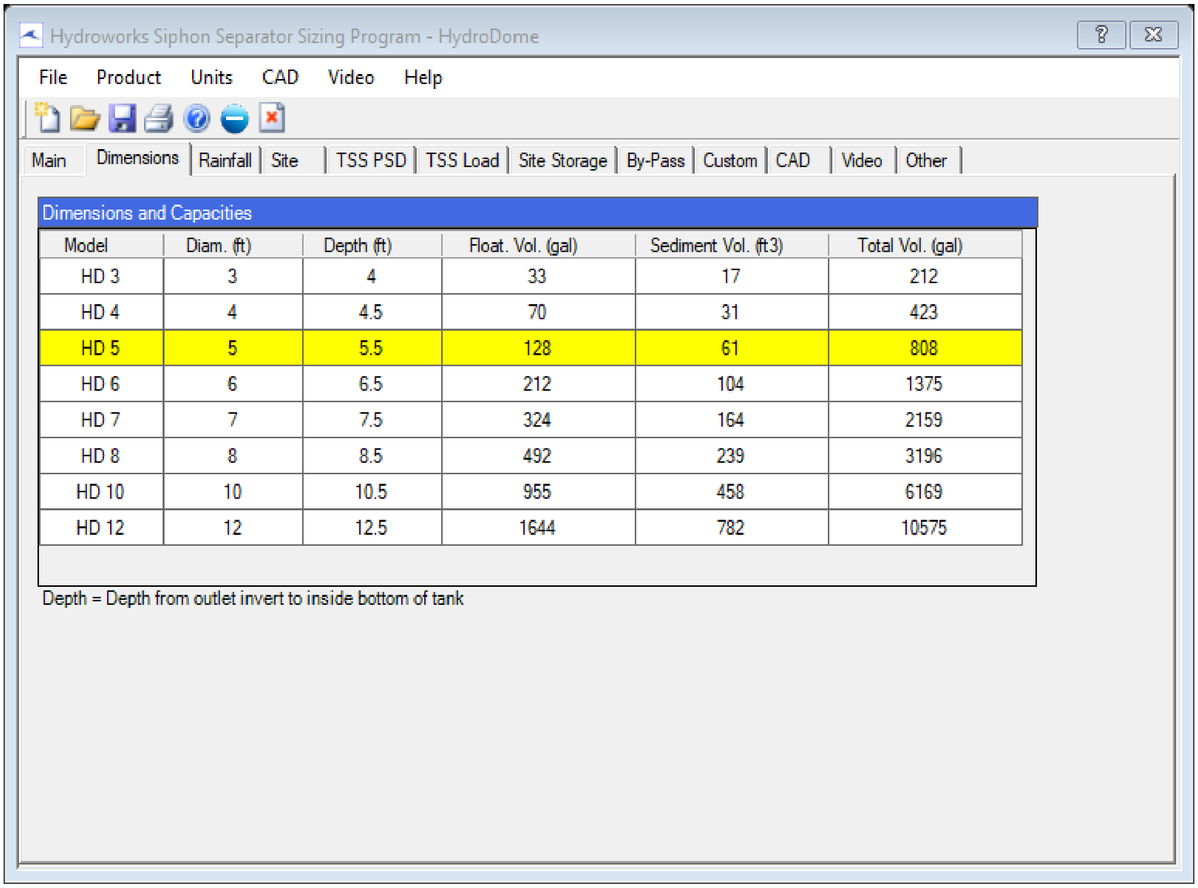
Rainfall Station - Sterling 2 Nnw, Massachusetts(1948 To 1972)



Site Physical Characteristics



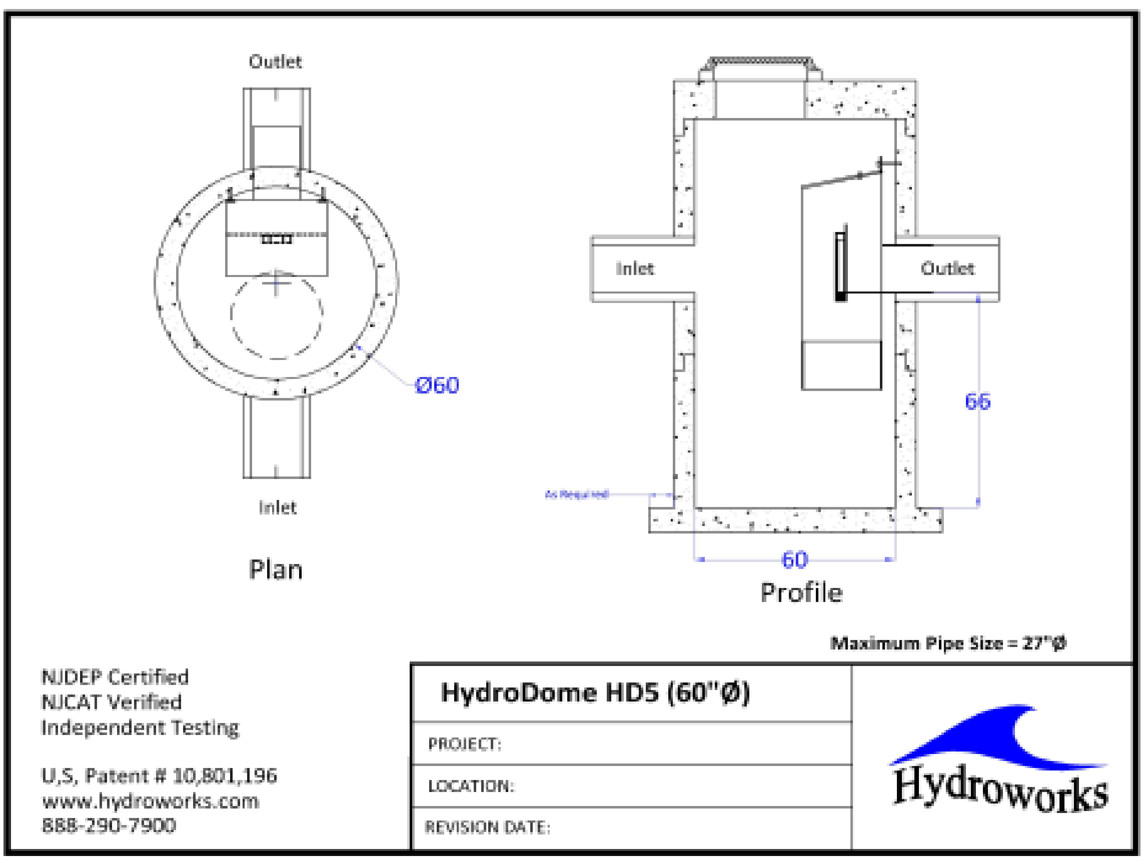
Dimensions And Capacities



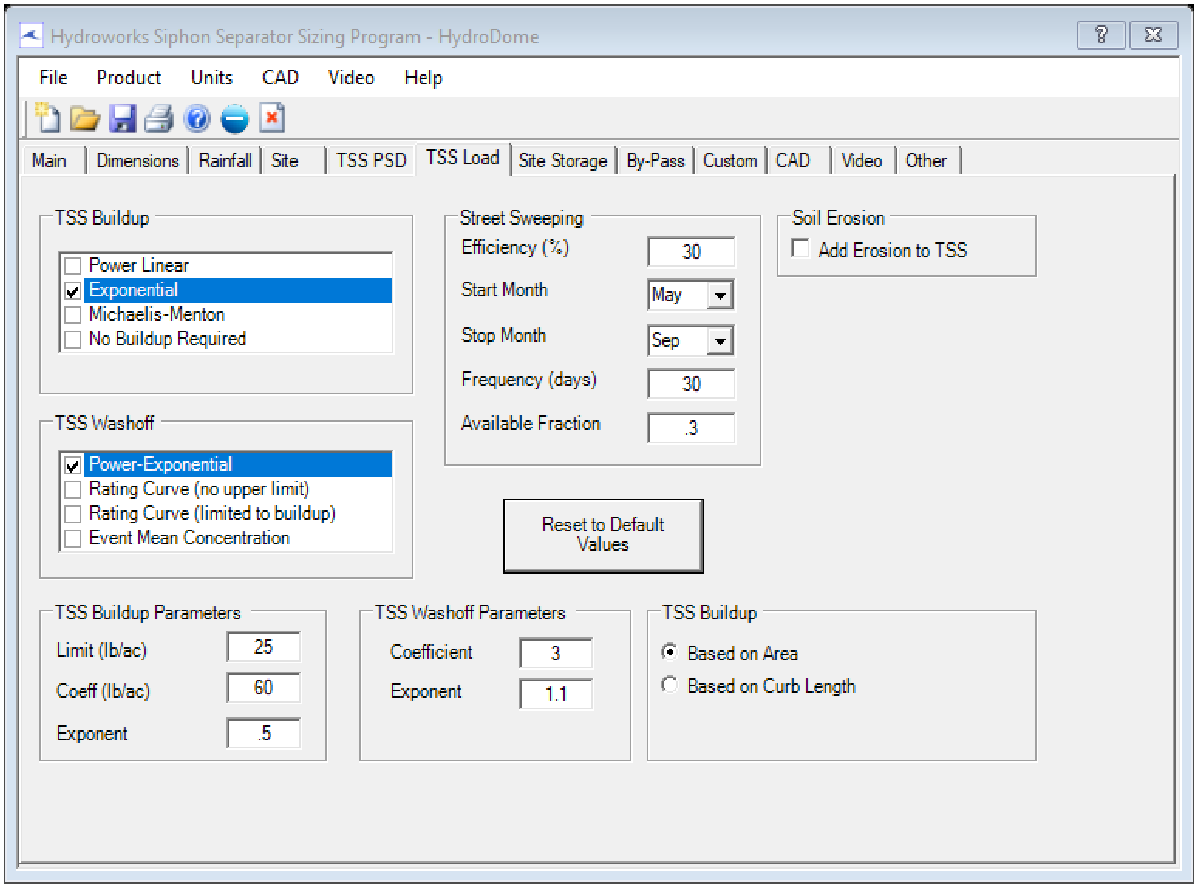
Model	Diam. (ft)	Depth (ft)	Float. Vol. (gal)	Sediment Vol. (ft3)	Total Vol. (gal)
HD 3	3	4	33	17	212
HD 4	4	4.5	70	31	423
HD 5	5	5.5	128	61	808
HD 6	6	6.5	212	104	1375
HD 7	7	7.5	324	164	2159
HD 8	8	8.5	492	239	3196
HD 10	10	10.5	955	458	6169
HD 12	12	12.5	1644	782	10575

Depth = Depth from outlet invert to inside bottom of tank

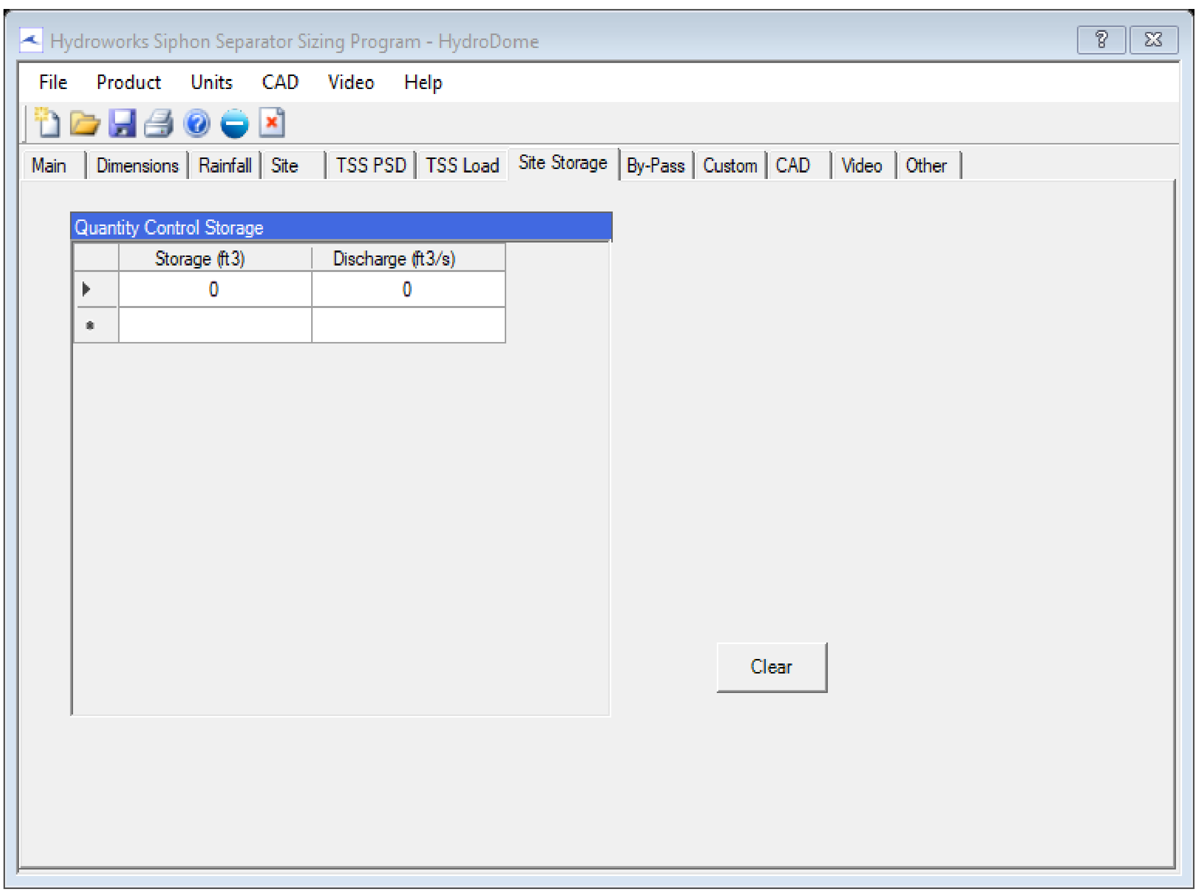
Generic HD 5 CAD Drawing



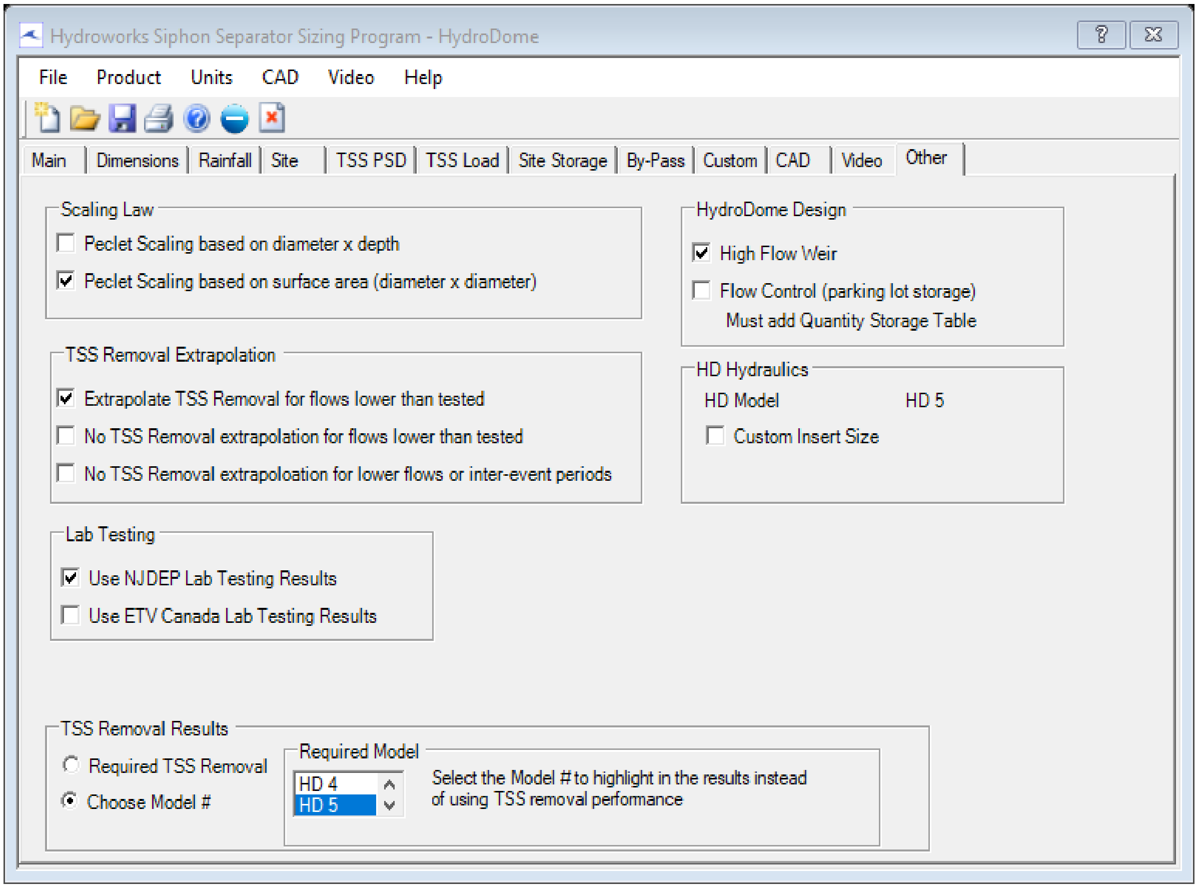
TSS Buildup And Washoff



Upstream Quantity Storage



Other Parameters



Flagged Issues

If there is underground detention storage upstream of the HydroDome please contact Hydroworks to ensure it has been modeled correctly.

Hydroworks Sizing Program - Version 5.8.5

1-800-290-7900
www.hydroworks.com

Operation and Maintenance Plan

Proposed Addition
18 Independence Drive
Devens, Massachusetts
Operation and Maintenance Plan

The site contractor will be responsible for the operation and maintenance of the stormwater collection system including deep sump catch basins, water quality unit, underground infiltration basin, , including emergency repairs. After construction, the Property Owner, Mack Devens Development, LLC., is responsible for the operation and maintenance of the proposed stormwater collection system, including emergency repairs. The following long-term Operation and Maintenance Plan for the project is proposed in accordance with DEP Stormwater Management Standard No. 9 to ensure that the stormwater collection and treatment system operates in accordance with the MADEP Stormwater Management Policy.

Signed by:____(Alan Fluet, representative)

Schedule for Inspection and Maintenance after Construction:

Stormwater Management System Owner/Operator

- The property owner will be the owner and operator of the proposed stormwater collection system on site.
- If the property is sold, a copy of this Operation and Maintenance Plan will be transferred to the new property owners.

Deep Sump Catch Basins

- Inlets should be cleaned a minimum of four times per year and inspected monthly.
- All sediments and hydrocarbons should be properly handled and disposed, in accordance with local, state, and federal guidelines and regulations.
- Structures should be inspected and maintained according to the manufacturer's recommendation.

Water Quality Units

- Structure cover should be inspected monthly for evidence of repair. Verify that inverts are secure and free flowing. Measure depth of sediment below water line.
- Unit shall be cleaned a minimum of twice per year. One of these cleanings to occur before April 15th of each year and one shall occur before September 15th of each year. Unite must be cleaned with a vacuum pump.
- All liquid and sediment shall be pumped from the sump at least twice per year at intervals corresponding with the unit cleaning.
- All sediment, water and hydrocarbons should be properly handled and disposed of in accordance with local, state and federal guidelines and regulations.

- Refer to water quality unit manufacturers specifications for additional maintenance recommendations.

Pea Stone Diaphragm

- The pea stone filter layer shall be inspected every 6 months and after every major storm event to verify no erosion has occurred and the system is functioning as desired. A major storm event is any storm greater than the 2-year storm which is 3.03 inches of rainfall in a 24-hour period.

- If it is found that the pea stone filter layer is clogged with sediment, the pea stone and filter fabric should be replaced on an as needed basis.

- All sediments and hydrocarbons will be properly handled and disposed of off-site, in accordance with local, state, and federal guidelines and regulations.

Sediment Forebay

- The forebay will be cleaned four times per year and inspected monthly.

- All sediments will be properly handled and disposed of off-site, in accordance with local, state, and federal guidelines and regulations.

At Grade Infiltration Basin

- Once constructed, the basin will be inspected after every major storm event during the first three months of operation and twice per year thereafter. A major storm event is any storm greater than the 2-year storm which is 3.03 inches of rainfall in a 24-hour period.

- The outlet structure will be inspected and repaired where sediment appears to have clogged the invert.

- A stake shall be placed at the bottom of the pond with marks at 1” increments to measure the sediment accumulation. Sediment will be removed from ponds at a minimum when accumulation is at 4”, but as often as necessary, and at least once every 10 years.

- At least twice during the growing season, the side slopes will be mowed, and accumulated trash and debris removed. Accumulated sediment in forebay will also be removed at this time.

Porous Pavement

- Once constructed, the porous pavement shall be inspected after every rainfall event to ensure water does not pond on the surface for more than 30 minutes. If ponding remains, vacuum sweeping must be performed.

- Vacuuming shall be conducted during spring cleanup following the last snowfall event to remove sediment deposited from winter conditions.

- Vacuuming shall be conducted during fall cleanup to remove accumulated leafy debris.

- Power washing shall be implemented if vacuuming is not adequate to restore the infiltration capacity of the pavement surface.

- Damaged areas may be repaired by use of infrared heating and rerolling of pavement on an as needed basis.

Underground Infiltration Basin

- Once constructed, the basin will be inspected at a minimum after several storm events for the first year and annually thereafter to confirm drainage system functions as designed. Problems will be addressed immediately.

- System shall be cleaned as required per the manufacturer's recommendations.

The routine and non-routine maintenance tasks to be undertaken after construction and a schedule for implementing those tasks

- A site maintenance log will be kept. This log will record the dates when maintenance tasks were completed, the person who completed the task, and any observations of malfunctions in components of the stormwater management system. A sample maintenance log form is attached.

Estimated Operations and Maintenance Budget

- Operation and maintenance costs for the project are expected to be approximately $10,000/year

Proposed Addition
18 Independence Drive
Devens, Massachusetts
Operation and Maintenance Plan

Operation and Maintenance Schedule

BMP	Frequency	Date Performed	Comments	Cleaning/ Repair Needed? Yes/No	Date of Cleaning/ Repair	Performed By
Catch Basins	Monthly Inspections Quarterly cleaning					
Water Quality Unit	Monthly Inspections Biannual Cleaning					
Sediment Forebay	Monthly Inspections Quarterly Cleaning					
Pea Stone Diaphragm	*Inspection after each major storm event for the first year *Cleaning as needed					
Above Grade Infiltration Basin	Annual Inspections and after each major storm event. Banks mowed twice a year. Cleaning as needed (Min once every 10 years)					
Underground Infiltration Basin	Inspection after each major storm event for the first year Cleaning as needed					
Porous Pavement	Inspection after each major storm event Spring and Fall Cleanup Power wash as needed Infrared heating and rerolling as needed					

Site Maintenance Supervisor:__________________________ Date:_______________

UNHSC Design Specifications for Porous Asphalt Pavement and Infiltration Beds

February 2014

Revision September 2016

University of New Hampshire Stormwater Center (UNHSC)
Gregg Hall ● 35 Colovos Road ● Durham, New Hampshire 03824-3534 ● http://unh.edu/unhsc/

UNHSC DESIGN SPECIFICATIONS FOR POROUS ASPHALT PAVEMENT AND INFILTRATION BEDS

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UNHSC DESIGN SPECIFICATIONS FOR POROUS ASPHALT PAVEMENT AND INFILTRATION BEDS

NOTICE

The specifications listed herein were developed by the UNHSC for UNHSC related projects and represent the author's best professional judgment. No assurances are given for projects other than the intended application. These design specifications are not a substitute for licensed, qualified engineering oversight and should be reviewed, and adapted as necessary.

ACKNOWLEDGEMENTS

The original 2007 specifications were completed by collaboration between the University of New Hampshire, of Durham, New Hampshire, and Pike Industries Inc., of Belmont, New Hampshire. The principal UNH authors were Joshua F. Briggs, Robert M. Roseen, PE, PhD, and Thomas P. Ballestero, PE, PhD, PH, CGWP, PG. The principal author from Pike Industries was the Corporate Quality Control Manager, Jeff Pochily. Other contributions to the project were made by Grant Swenson, also of Pike Industries. Revised specifications (2009) were prepared by the UNHSC after a round table discussion with New Hampshire Asphalt Manufacturers (Rick Charbonneau Mark Charbonneau, and Keith Dane of Continental Paving, Jeff Lewis of Brox Industries, and Mary Wescott, Dave Duncan, and Jeff Pochily of Pike Industries) and a round table discussion with design engineers. The 2009 specifications were also reviewed and revised by Antonio P. Ballestero, Jr., PE.

These latest modifications (2014) were authored by Thomas P. Ballestero, James J. Houle, and Timothy A. Puls of the UNHSC. The latest modifications were based upon UNHSC experiences as well as personal interviews with Mary Wescott and Dave Duncan of Pike Industries and Rick Charbonneau and Mark Charbonneau of Continental Paving. In addition, we are grateful to Jill Thomas, Executive Director of the Minnesota Asphalt Pavement Association for edits and comments.

The UNH Stormwater Center is housed within the Department of Civil and Environmental Engineering at the University of New Hampshire (UNH) in Durham, New Hampshire. Formerly, funding for the program was provided by the Cooperative Institute for Coastal and Estuarine Environmental Technology (CICEET) and the National Oceanic and Atmospheric Administration (NOAA).

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PART 1 GENERAL

1.1 DESCRIPTION

A. This specification is intended to be used for porous asphalt pavement in parking lot, sidewalk, and light duty road applications, although heavy duty applications are possible and have been documented. Stormwater management functions of porous asphalt installations include water quality treatment, peak flow reduction, storm volume reduction via groundwater recharge, and increased hydrograph time lag. This specification is intended for a cold climate application based upon the field experiences of porous asphalt systems designed, installed, and monitored by the UNHSC since 2005. The specification can be adapted to projects elsewhere provided that selection of materials and system design reflects local conditions, constraints, and objectives.

B. The work of this Section includes subgrade preparation, installation of the underlying porous media beds, and porous asphalt mix (mix) design, production, and installation. Porous media beds refer to the material layers underlying the porous asphalt pavement. Porous asphalt pavement refers to the compacted mix of modified asphalt, aggregate, and additives.

C. The porous asphalt pavement specified herein is modified after the National Asphalt Pavement Association (NAPA) specification outlined in *Design, Construction, and Maintenance Guide for Porous Asphalt Pavements, Information Series 131* (2003) and *Design, Construction, and Maintenance of Open-Graded Friction Courses, Information Series 115* (2002).

D. Alternative specifications for mix, such as Open Graded Friction Courses (OGFC) from Federal Agencies or state Departments of Transportation (DOT), may be used if approved by the Engineer. The primary requirements for the specifications of the mix are performance grade (PG) asphalt binder, binder content, binder draindown, aggregate gradation, air void content, retained tensile strength (TSR).

1.2 SUBMITTALS

A. Submit a list of materials proposed for work under this Section including the name and address of the materials producers and the locations from which the materials are to be obtained.

B. Submit certificates, signed by the materials producers and the relevant subcontractors, stating that materials meet or exceed the specified requirements, for review and approval by the Engineer.

C. Submit samples of materials for review and approval by the Engineer. For mix materials, samples may be submitted only to the QA inspector with the Engineer's approval.

D. Submittal requirements for samples and certificates are summarized in

E. Table 1 and discussed in further detail in the Materials section.

Table 1. Submittal requirements.

Material or Pavement Course*	Properties to be reported on Certificate**
choker course, reservoir course	gradation, max. wash loss, min. durability index, max. abrasion loss, air voids (reservoir course)
filter course	gradation, permeability/ sat. hydraulic conductivity
filter blanket (graded filter)	gradation
geotextile filter fabric	manufacturer's certification, AOS/EOS, tensile strength
striping paint	certificate
binder	PGAB certification
coarse aggregate	gradation, wear, fracture faces (fractured and elongated)
fine aggregate	gradation
silicone	manufacturer's certification
Fibers (optional)	manufacturer's certification
mineral filler (optional)	manufacturer's certification
fatty amines (optional anti-strip)	manufacturer's certification
hydrated lime (optional anti-strip)	manufacturer's certification

* Samples of each material shall be submitted to the Engineer (or QA inspector for mix). These samples must be in sufficient volume to perform the standardized tests for each material.
** These are the minimum properties to be reported, additional material properties may be required (refer to Materials Section).

1.3 Quality Control and Quality Assurance (QC/QA)

A. Use appropriate equipment and adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work in this section.

B. Codes and Standards - All materials, methods of construction, and workmanship shall conform to applicable requirements of AASHTO, ASTM Standards, NHDOT Standard Specifications for Road and Bridge Construction (or similar state DOT) specifications, latest revised (including supplements and updates), or other standards as specified.

C. QC/QA requirements for mix production are discussed in the Materials Section, and for construction of the porous media beds and paving, in the Execution Section.

1.4 PROJECT CONDITIONS

A. Site Assessment should be performed per the steps outlined in IS 131 (NAPA, 2003).

B. Construction Phasing should be performed as outlined in IS 131 (NAPA, 2003).

C. Protection of Existing Infrastructure

1. Protect adjacent work from the unintended dispersal/splashing of pavement materials. Remove all stains from exposed surfaces of pavement, structures, and grounds. Remove all waste and spillage. If necessary, limit access to adjacent work/structures with appropriate signage and/or barriers.
2. Protection of pavement work area from run-on during construction and post-construction periods minimize maintenance and prolong pavement lifespan.

3. Proper erosion and sediment control practices shall be provided in accordance with existing codes and regulations. Do not damage or disturb existing improvements or vegetation. Provide suitable protection where required before starting work and maintain protection throughout the course of the work. This includes the regular, appropriate inspection and maintenance of the erosion and sediment control measures.
4. Restore damaged areas, including existing pavement on or adjacent to the site that was damaged as a result of construction work, to their original condition or repair as directed to the satisfaction of the Engineer at no additional cost.

D. Safety and Traffic Control

1. Notify and cooperate with local authorities and other organizations having jurisdiction when construction work will interfere with existing roads and traffic.
2. Provide temporary barriers, signs, warning lights, flaggers, and other protections as required to assure the safety of persons and vehicles around and within the construction area and to organize the smooth flow of traffic.

E. Weather Limitations

1. In cold climates, porous asphalt, open graded friction course, or dense-mixed asphalt is generally not placed between November 15 and March 15. More specifically when the ambient air temperature at the pavement site in the shade away from artificial heat is below 16 °C (60 °F) or when the actual ground temperature is below 10 °C (50 °F) any placement of porous asphalt materials should proceed with extreme caution, and is generally not recommended. Only the Engineer may adjust this air temperature requirement, soil temperature requirement, or extend the dates of the pavement season.

2. The Contractor shall not pave on days when it is raining or when rain is forecast for the day, unless a change in the weather results in favorable conditions as determined by the Engineer.

1.5 REFERENCES

1. *General Porous Asphalt Bituminous Paving and Groundwater Infiltration Beds,* specification by UNH Stormwater Center, October, 2009.
2. *Design, Construction, and Maintenance Guide for Porous Asphalt Pavements, Information Series 131*, National Asphalt Pavement Association (NAPA), November, 2008. http://www.asphaltpavement.org/
3. *Design, Construction, and Maintenance of Open-Graded Friction Courses, Information Series 115*, NAPA, May, 2002. http://www.asphaltpavement.org/
4. *Annual Book of ASTM Standards*, American Society for Testing and Materials, Philadelphia, PA, 2014 or latest edition. http://www.astm.org/Standard/
5. *Standards of the American Association of State Highway and Transportation Officials* (AASHTO), 2014 or latest edition. http://www.ihs.com/products/industry-standards/organizations/aashto/index.aspx
6. *Section 401- Plant Mix Pavements – General*, in *Standard Specifications for Road and Bridge Construction – State of New Hampshire Department of Transportation*, 2010. http://www.nh.gov/dot/org/projectdevelopment/highwaydesign/specifications/documents/2010_Spec_Book.pdf

7. *Section 02725 - General Porous Pavement and Groundwater Infiltration Beds*, specification from NAPA Porous Asphalt Seminar handout, Cahill Associates, Inc., 2004.
8. *Correlations of Permeability and Grain Size*, Russell G. Shepherd, Groundwater 27 (5), 1989.
9. *Groundwater*, R. Allan Freeze and John A. Cherry, 1979.

PART 2 PRODUCTS

2.1 MATERIALS

A. Porous Media Infiltration Beds

1. Below the porous asphalt itself are located various layers intended for structure, hydrologic control, and water quality improvement (Figure 1). From top to bottom: a 4" – 8 " (10 - 20 cm) minimum thickness layer of choker course of crushed stone; an 8" to 12" (20 cm to 30 cm) minimum thickness layer of filter course of poorly graded sand (a.k.a. bank run gravel or modified 304.1); 3" (8 cm) minimum thickness filter blanket (pea gravel) that is an intermediate setting bed between the filter course and the reservoir course below; and a reservoir course of crushed stone, thickness dependent on required storage, desired infiltration, and underlying native materials. Alternatively, the pea gravel layer could be thickened and used as the reservoir course depending upon subsoil suitability. This alternative simplifies subbase construction. The fine gradation of the filter course is for enhanced filtration (water quality improvement) and delaying infiltration (this layer throttles the downward movement of water). The high air void content of the uniformly graded crushed stone reservoir course maximizes storage of filtered water thereby allowing more time for water to infiltrate the native soil below between storms; and creates a capillary barrier that arrests any upwards vertical water movement and in doing so prevents winter freeze-thaw and heaving. The filter blanket is placed to prevent downward migration of filter course material into the reservoir course. An optional perforated or slotted drain pipe installed in the reservoir course is for hydraulic relief (typically raised off of the bottom of the reservoir stone layer for enhanced groundwater recharge, if no groundwater recharge is desired, pipe is at base of stone or even in a lower section (trench) of stone). Nonwoven geotextile filter fabric (geotextile) is used only for stabilizing the sloping sides of the porous asphalt system excavation and is not to be used on the bottom of the system unless needed for structural reasons. Filter fabrics are not recommended as a horizontal layer between any of the above mentioned layers.

   For high permeability soils (saturated infiltration rate of > 2 inches per hour {5 cm/hr}) where infiltration to groundwater is acceptable, the reservoir course and filter blanket may be unnecessary. In cold regions, the filter blanket should be included to create a capillary barrier in lieu of more detailed study of frost heave susceptibility.

2. Material for the choker course and reservoir course shall meet the following:

   Maximum Wash Loss of 0.5%
   Minimum Durability Index of 35
   Maximum Abrasion Loss of 10% for 100 revolutions, and maximum of 50% for 500 revolutions.

Figure 1: Typical Cross-Section for Pervious Pavement System

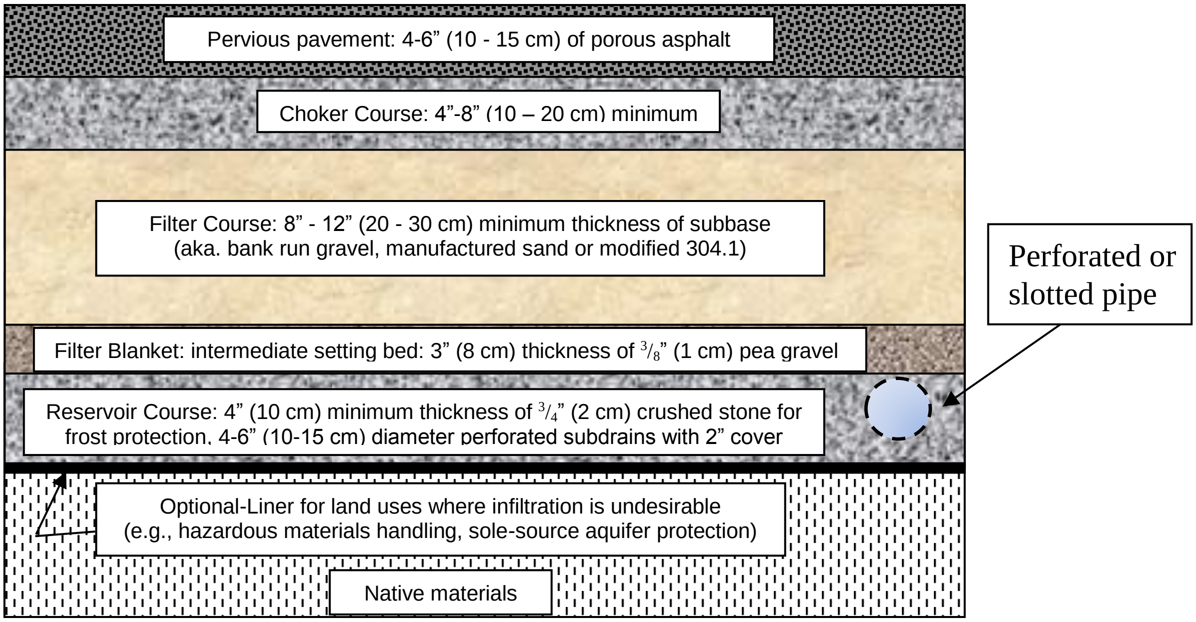

Table 2: Gradations of choker, filter, and reservoir course materials.

US Standard Sieve Size Inches/mm	Per Cent Passing (%)			
	Choker Course (AASHTO No. 57/ No. 67*)	Filter Course (Manufactured Sand/Modified NHDOT 304.1)	Reservoir Course (AASHTO No. 3)	Reservoir Course Alternative** (AASHTO No. 5)
6/150	-	100	-	
2½/63	-	-	100	-
2 /50	-	-	90 – 100	-
1½/37.5	100	-	35 – 70	100
1/25	95 - 100	-	0 – 15	90 – 100
¾/19	-	-	-	20 - 55
½/12.5	25 - 60	-	0 - 5	0 - 10
3/8/9.5	-	-	-	0 - 5
#4/4.75	0 - 10	70-100	-	
#8/2.36	0 - 5	-	-	-
#200/0.075	-	0 – 6***	-	-

* Alternate gradations (e.g. AASHTO No. 67) may be accepted upon Engineer’s approval.
** Alternate gradations (e.g. AASHTO No. 5) may be accepted upon Engineer’s approval.
*** Preferably less than 4% fines

Material for the choker course and reservoir course shall have the AASHTO No. 57 and AASHTO No. 3 gradations, respectively, as specified in Table 2. If the AASHTO No. 3 gradation cannot be met, AASHTO No. 5 is acceptable with approval of the Engineer. AASHTO no. 3 is also suitable for the choker course.

3. Reservoir course thickness is dependent upon the following criteria (that vary from site to site). The reservoir course is located at the interface between native materials and the filter blanket.

   a. A 4-in (10 cm) minimum thickness of reservoir course to act as a capillary barrier for frost heave protection.

   b. 4-in. (10 cm) minimum thickness if the underlying native materials are well drained (Hydrologic Group A soils).

   c. 8-in. (20 cm) minimum thickness if subdrains are installed. Subdrains insure that the subbase is well drained

   d. Subdrains, if included, are elevated a minimum of 4" (10 cm) from the reservoir course bottom to provide storage and infiltration for the water quality volume. For lower permeability native soils, perforated or slotted drain pipe is located in the stone reservoir course for drainage. This drain pipe can be day lighted to receiving waters or wetlands or connected into other stormwater management infrastructure (catch basin, storm sewer, etc.). If the system is lined and infiltration is undesirable, subdrains are at the bottom of the reservoir course.

   e. Subbase thickness is determined from subbase materials having sufficient void space to store the design storm.

      Example: If the design storm is 5.1" (13 cm) of rainfall depth, and the reservoir void space is 30%, then the minimum subbase thickness = 5.1"/0.3 = 17" (43.2 cm). This example reflects infiltration from solely the porous asphalt surface and no additional runon.

   f. The total porous pavement system thickness (porous pavement layer down to the base of the stone reservoir course) thickness is $\geq$ 0.65 * local design depth of frost.

      Example: Durham, New Hampshire design depth of frost = 48" (122 cm) = $D_{\text{maximum frost}}$, therefore the *minimum* depth to the base of the stone reservoir course = 0.65(48") = 32" (81 cm).

4. Optional Bottom Liner is only recommended for aquifer protection or infiltration prevention. If a liner is employed, stone reservoir course and subdrains must be included above the liner. This liner is to be located at the interface between subbase and native materials and is dependent upon the following:

   a. As with any infiltration system, care must be taken when siting porous asphalt systems close to locations where hazardous materials are handled/trafficked, or where high contaminant loading may threaten groundwater, or where infiltration is undesirable (nearby foundations, buried utilities, slope stability, etc.). In such cases, the porous asphalt system can be lined to prevent infiltration yet still improve stormwater quality, lag hydrograph peak, and dramatically reduce hydrograph peak flow.

   b. Refer to state or USEPA guidelines regarding the use of infiltration systems (USEPA, 1999, CalTrans, 2003, WI DNR, 2004, USEPA, 2004).

   c. Suitable liners may include Hydrologic Group D soils, HDPE liners, or equivalent. Refer to state or USEPA guidelines regarding selection of impermeable liners (USEPA, 2004). Liner permeability should be no greater than 0.4 in/day = 1 cm/day.

d. Filter fabrics or geotextile liners are not recommended for use as a separation layer (filter blanket) on the bottom of the porous asphalt system (at the base of the stone reservoir subbase) if designing for infiltration. Filter fabric usage in stormwater filtration has been known to clog prematurely. Graded stone filter blankets are recommended instead. Additionally, geotextile filter fabrics should not be used as any horizontal layer within the porous asphalt system.

e. Geogrids may be used if designing on poor structural or low hydraulic conductivity soils. Geogrid usage is limited to the bottom and possibly sides of the excavation.

5. Filter course material shall have a hydraulic conductivity (also referred to as coefficient of permeability) of 10 to 60 ft/day (0.0036 to 0.022 cm/sec) at 95% compaction unless otherwise approved by the Engineer. Great care needs to be used to not over-compact materials. Over-compaction results with loss of infiltration capacity. The filter coarse material is commonly referred to as a bankrun gravel (modified NHDOT 304.1). In order to select an appropriate gradation, coefficient of permeability may be estimated through an equation that relates gradation to permeability, such as described in *Correlations of Permeability and Grain Size* (Shepherd, 1989) or in *Section 8.7 Estimation of Saturated Hydraulic Conductivity* (Freeze and Cherry, 1979). Preferably, the coefficient of permeability (saturated hydraulic conductivity) for the selected filter course material shall be measured by ASTM D5084 and reported to the Engineer.
6. Filter blanket material between the filter course and the reservoir course shall be an intermediate size between the finer filter course above, and the coarser reservoir course below, for the purpose of preventing the migration of a fine setting bed into the coarser reservoir material. An acceptable gradation shall be calculated based on selected gradations of the filter course and reservoir course using criteria outlined in the *HEC 11* (Brown and Clyde, 1989). A pea-gravel with a median particle diameter of 3/8" (9.5 mm) is commonplace.
7. Non-woven geotextile filter fabric (*only recommended* for the sloping sides of the porous asphalt system excavation) shall be Mirafi 160N, or approved equivalent and shall conform to the specifications in Table 3. Mirafi ® 160N is a non-woven geotextile composed of polypropylene fibers, which are formed into a stable network such that the fibers retain their relative position. 160N is inert to biological degradation and resists naturally encountered chemicals, alkalis, and acids.

Table 3: Non-woven geotextile filter fabric properties.

Mechanical Properties	Test Method	Unit	Minimum Average Roll Values	
			MD*	CD**
Grab Tensile Strength	ASTM D 4632	kN (lbs)	0.71 (160)	0.71 (160)
Grab Tensile Elongation	ASTM D 4632	%	50	50
Trapezoid Shear Strength	ASTM D 4533	kN (lbs)	0.27 (60)	0.27 (60)
Mullen Burst Strength	ASTM D 3786	kPa (psi)	2100 (305)	2100 (305)
Puncture Strength	ASTM D 4833	kN (lbs)	0.42 (95)	0.42 (95)
Apparent Opening Size (AOS)	ASTM D 4751	mm (US Sieve)	0.212 (70)	0.212 (70)
Permittivity	ASTM D 4491	sec^{-1}	1.4	1.4
Permeability	ASTM D 4491	cm/sec	0.22	0.22
Flow Rate	ASTM D 4491	lpm/m^2 (gpm/ft^2)	4,477 (110)	4,477 (110)
UV Resistance (at 500 hours)	ASTM D 4355	% strength retained	70	70

Physical Properties	Test Method	Unit	Typical Value
Weight	ASTM D 5261	g/m^2 (oz/yd^2)	217 (6.4)
Thickness	ASTM D 5199	mm (mils)	1.9 (75)
Roll dimension (width x length)		m (ft)	4.5 x 91 (15 x 300)
Roll area		m^2 (yd^2)	410 (500)
Estimated roll weight		kg (lb)	99 (217)

*MD - Machine Direction; **CD - Cross-machine Direction

8. Alternative materials for the porous media beds filter blanket, and geotextile may be substituted at the discretion of the Engineer.

B. Porous Asphalt Mix

1. Mix materials consist of performance grade asphalt binder (PGAB), coarse and fine aggregates, and optional additives such as polymer modified asphalt (PMA), fibers, or other select additives. Materials shall meet the requirements of the NAPA's Design, Construction, and Maintenance of Open-Graded Friction Courses, Information Series 115 (2002) and Design, Construction, and Maintenance Guide for Porous Asphalt Pavements, Information Series 131, except where noted otherwise below or approved in writing by the Engineer.

Polymer Modified PGAB The asphalt binder shall be a polymer and/or fiber modified performance grade asphalt binder (PGAB) used in the production of Superpave Hot Mix Asphalt (HMA) mixtures. Ideally for maximum durability, the PGAB shall be two grades stiffer than that required for dense mix asphalt (DMA) parking lot installations, which is often achieved by adding a polymer and/or fiber. In New Hampshire the standard DMA asphalt binder is PG 64 -28, meaning that the preferred asphalt binder for porous asphalt applications is PG 76 -22. The PGAB polymer modifiers are to be either styrene butadiene rubber (SBR) or styrene butadiene styrene (SBS). SBS is generally reserved for large projects as pre-blending is required. SBR is feasible for smaller projects as it can be blended at the plant. The dosage of fiber additives shall be added at 1.5% by total mixture volume. Fibers are a simple addition either manually for a batch plant or automated for larger plants. The binder shall meet the requirements of AASHTO M320.

The PGAB may be pre-blended or post-blended. The pre-blended binder can be blended at the source or at a terminal. For post-blended addition, the modifier can either be in-line blended or injected into the pugmill at the Plant.

The following asphalt mix designs are recommended (listed in order of increasing strength):

1. PG 64-28 with 5 pounds of fibers per ton of asphalt mix. This mix is no longer considered suitable for PA wearing course applications in any development. It may be used as a base course where approved by the engineer for smaller projects with lower traffic counts or loading potential.

2. Post-Blended PG 64-28 SBR (to effectively obtain PG 76 -22*) at 1.5% by volume with 5 pounds of fibers per ton of asphalt mix. This mix is recommended for large projects > 1acre where high durability pavements are needed. The SBR will be supplied by an approved PGAB supplier holding a Quality Control Plan approved by the state DOT. A Bill of Lading (BOL) will be delivered with each transport of PG 64-28 SBR. A copy of the BOL will be furnished to the QA inspector at the Plant. A Post-Blended SBR Binder Quality Control Plan (Table 4) will be submitted to the Engineer for approval at least 10 working days prior to production.

**It is noted that with post-blended SBR blends performance grade is assumed as it is impossible to be determined.*

3. Pre-Blended PG 76-28 modified with SBS (this mix has been used with great success since 2011 in New England). This mix is recommended for large sites anticipating high wheel load (H-20) and traffic counts for maximum durability. The SBS will be supplied by an approved PGAB supplier holding a Quality Control Plan approved by the state DOT. A Bill of Lading (BOL) will be delivered with each transport of PG 76-28 SBS. A copy of the BOL will be furnished to the QA inspector at the Plant.

Quality control plans may always be altered at the discretion of the Engineer and based on feasible testing as suggested by the asphalt producer. Certain QC testing requirements during production may not be feasible for small projects in which limited asphalt is generated. Some testing methods cannot be completed during the time needed during small batch (less than approximately 50 tons of porous asphalt mix) production. The feasibility should be assessed with the Engineer and producer.

Table 4: Post-Blended SBS/SBR Binder QC Plan requirements.

The QC Plan will Contain
1. Company name and address
2. Plant location and address
3. Type of facility
4. Contact information for the Quality Control Plan Administrator
5. QC test to be performed on each PGAB
6. Name(s) of QC testing lab to perform PC and process control testing
7. Actions to be taken for PGAB and Polymer Modifier in non-compliance
8. List of mechanical controls (requirements below)
9. List of process controls and documentation (requirements below)
List of Mechanical Controls
1. Liquid Polymer Modifier no-flow alert system with an "alert" located in the control room and automatic documentation of a no flow situation on the printout
2. Provide means of calibrating the liquid Polymer Modifier metering system to a delivery tolerance of 1%
3. A batching tolerance at the end of each day's production must be within 0.5%
4. Mag-flow meter (other metering system may be considered)
5. Method of sampling liquid Polymer Modifier
List of Process Controls and Documentation
1. Printouts of liquid Polymer Modifier and PGAB quantities must be synchronized within 1 minute of each other
2. Polymer Modifier supplier certification showing the percent of Polymer Modifier solids in liquid Polymer Modifier
3. Test results of a lab sample blended with the specified dosage of Polymer Modifier. At a minimum, provide the name of the PGAB and liquid Polymer Modifier suppliers and PGAB information such as grade and lot number and Polymer Modifier product name used for the sample
4. MSDS sheet for liquid Polymer Modifier
5. Handling, storage and usage requirements will be followed as required by the liquid Polymer Modifier manufacturer
6. At a minimum, provide a table showing proposed rate of Polymer Modifier liquid (L/min) in relation to HMA production rate (tons per hour) for the percent solids in liquid Polymer Modifier, quantity of Polymer Modifier specified for HMA production and the specific gravity of the Polymer Modifier
7. QCT or QC plan administrator must be responsible for documenting quantities and ensuring actual use is within tolerances. All printouts, calculations, supplier certifications, etc., must be filed and retained as part of the QCTs daily reports
8. Method and frequency of testing at the HMA plant including initial testing and specification testing

* This plan shall be submitted to the engineer 10 days before production

2. Anti-Stripping Mix Additives.

   The mix shall be tested for moisture susceptibility and asphalt stripping from the aggregate by AASHTO T283, or improved updated method. If the retained tensile strength (TSR) < 80% upon testing, a heat stable additive shall be furnished to improve the anti-stripping properties of the asphalt binder. Test with one freeze-thaw cycle (rather than five recommended in *NAPA IS 115*). The amount and type of additive (e.g. fatty amines or hydrated lime) to be used shall be based on the manufacturer's recommendations, the mix design test results, and shall be approved by the Engineer.

   Silicone shall be added to the binder at the rate of 1.5 mL/m^3 (1 oz. per 5000 gal).

   Fibers may be added per manufacturer and *NAPA IS 115* recommendation if the draindown requirement cannot be met (<0.3% via ASTM D6390) provided that the air void content requirement is met (>18%, or >16% as tested with CoreLok device).
   Additives should be added per the relevant DOT specification and *NAPA IS 115*.

3. Coarse Aggregate.

   Coarse aggregate shall be that part of the aggregate retained on the No. 8 sieve; it shall consist of clean, tough, durable fragments of crushed stone, or crushed gravel of uniform quality throughout.

   Coarse aggregate shall be crushed stone or crushed gravel and shall have a percentage of wear as determined by AASHTO T96 of not more than 40 percent. In the mixture, at least 75 percent, by mass (weight), of the material coarser than the 4.75 mm (No. 4) sieve shall have at least two fractured faces, and 90 percent shall have one or more fractured faces (ASTM D5821). Coarse aggregate shall be free from clay balls, organic matter, deleterious substances, and not more than 8.0% of flat or elongated pieces (>3:1) as specified in ASTM D4791.

4. Fine Aggregate.

   The fine aggregate shall be that part of the aggregate mixture passing the No. 8 sieve and shall consist of sand, screenings, or combination thereof with uniform quality throughout. Fine aggregate shall consist of durable particles, free from injurious foreign matter. Screenings shall be of the same or similar materials as specified for coarse aggregate. The plasticity index of that part of the fine aggregate passing the No. 40 sieve shall be not more than 6 when tested in accordance with AASHTO T90. Fine aggregate from the total mixture shall meet plasticity requirements.

5. Recycled Asphalt (RAP).

   Recycled asphalt can be used to supplement, or in place of, fine aggregate. RAP should be a ½" minus or properly managed product with known asphalt content in quantities not to exceed more that 10% by weight.

6. Porous Asphalt Mix Design.

   The Contractor shall submit a mix design at least 10 working days prior to the beginning of production. The Contractor shall make available samples of coarse aggregate, fine aggregate, RAP, fibers and a sample of the PGAB that will be used in the design of the mixture. A certificate of analysis (COA) of the PGAB will be submitted with the mix design. The COA will be certified by a laboratory meeting the requirements of AASHTO R18. The Laboratory will be certified by the state DOT, regional equivalent (e.g. NETTCP), and/or qualified under ASTM D3666. Technicians will be certified by the regional certification agency (e.g. NETTCP) in the discipline of HMA Plant Technician.

The mixture will be designed according to the NAPA IS 131, with the exception of testing for air void content. Bulk specific gravity (SG) used in air void content calculations shall not be determined and results will not be accepted using AASHTO T166 (saturated surface dry), since it is not intended for open graded specimens (>10% AV). Bulk SG shall be calculated using AASHTO T275 (paraffin wax) or ASTM D6752 (automatic vacuum sealing, e.g. CoreLok). Air void content shall be calculated from the bulk SG and maximum theoretical SG (AASHTO T209) using ASTM D3203.

The materials shall be combined and graded to meet the composition limits by mass (weight) as shown in Table 5.

7. Porous Asphalt Mix Production

   a. Mixing Plants. Mixing plants shall meet the requirements of hot mix asphalt plants as specified in the state DOT or regional equivalent unless otherwise approved by the Engineer (e.g. *Section 401- Plant Mix Pavements – General for Quality Assurance specifications* in the *Standard Specifications for Road and Bridge Construction* – State of New Hampshire DOT, 2010, or latest revised edition and including supplemental specifications and updates).

Table 5: Porous Asphalt Mix Design Criteria

Sieve Size (inch/mm)	Percent Passing (%)
0.75/19	100
0.50/12.5	85-100
0.375/9.5	55-75
No.4/4.75	10-25
No.8/2.36	5-12
No.200/0.075 (#200)	2-4
Binder Content (AASHTO T164)	5.8 - 6.5%
Air Void Content (ASTM D6752)	16.0-22.0%
Draindown (ASTM D6390)*	≤ 0.3 %
Retained Tensile Strength (AASHTO 283)**	≥ 80 %
Cantabro abrasion test on unaged samples	≤ 20%
Cantabro abrasion test on 7 day aged samples	≤ 30%

* Either method is acceptable
**Cellulose, mineral, or polyester fibers may be used to reduce draindown.
***If the TSR (retained tensile strength) values fall below 80% when tested per NAPA IS 131 (with a single freeze thaw cycle rather than 5), then in Step 4, the contractor shall employ an antistrip additive, such as hydrated lime (ASTM C977) or a fatty amine, to raise the TSR value

above 80%.

b. Preparation of Asphalt Binder. The asphalt material shall be heated to the temperature specified in the state DOT specification (if using a DOT spec for the mix) in a manner that will avoid local overheating. A continuous supply of asphalt material shall be furnished to the mixer at a uniform temperature.

c. Preparation of Aggregates. The aggregate for the mixture shall be dried and heated at the mixing plant before being placed in the mixer. Flames used for drying and heating shall be properly adjusted to avoid damaging the aggregate and depositing soot or unburned fuel on the aggregate.

   Mineral filler, if required to meet the grading requirements, shall be added in a manner approved by the Engineer after the aggregates have passed through the dryer.

   The above preparation of aggregates does not apply for drum-mix plants.

d. Mixing. The dried aggregate shall be combined in the mixer in the amount of each fraction of aggregate required to meet the job-mix formula and thoroughly mixed prior to adding the asphalt material.

   The dried aggregates shall be combined with the asphalt material in such a manner as to produce a mixture that when discharged from the pugmill is at a target temperature in the range that corresponds to a recommended range supplied by the PGAB supplier.

   The asphalt material shall be measured or gauged and introduced into the mixer in the quantity determined by the Engineer for the particular material being used and at the temperature specified in the relevant specification.

   After the required quantity of aggregate and asphalt material has been introduced into the mixer, the materials shall be mixed until a complete and uniform coating of the particles and a thorough distribution of the asphalt material throughout the aggregate is secured and there is no residual moisture in the coated aggregate.

   All plants shall have a positive means of eliminating oversized and foreign material from being incorporated into the mixer.

e. QC During Production
   The Contractor shall provide process control and/or QC test results to the Engineer or the Engineer's designee. The QC plan may be altered at the discretion of the Engineer and based on feasible testing as suggested by the asphalt producer. Certain QC testing requirements during production may not be feasible for small projects in which limited asphalt is generated. Some testing methods cannot be completed during the time needed during small batch production. The feasibility should be assessed with the Engineer and producer.

   The mixing plant shall employ a Quality Control Technician (QCT). The QCT will perform QC testing and will be certified in the discipline of HMA Plant Technician by the relevant certifying agency (e.g. NETTCP in New England). The Contractor shall sample, test and evaluate the mix in accordance with the methods and minimum frequencies in Table 6 and the Post-Blended SBR Binder Quality Control Plan (if applicable).

Table 6: QC/QA testing requirements during production.

Test	Min. Frequency	Test Method
Temperature in truck at plant	6 times per day	
Gradation	Greater of either (a) 1 per 500 tons, (b) 2 per day, or (c) 3 per job	AASHTO T30
Binder Content	Greater of either (a) 1 per 500 tons, (b) 2 per day, or (c) 3 per job	AASHTO T164
Air Void Content	Greater of either (a) 1 per 500 tons, (b) 2 per day, or (c) 3 per job	ASTM D6752
Binder Draindown	Greater of either (a) 1 per 500 tons, (b) 1 per day, or (c) 1 per job	ASTM D6390

If an analyzed sample is outside the testing tolerances immediate corrective action will be taken by the contractor. After the corrective action has been taken the resulting mix will be sampled and tested. If the re-sampled mix test values are outside the tolerances the Engineer will be immediately informed. The Engineer may determine that it is in the best interest of the project that production is ceased. The Contractor will be responsible for all mix produced for the project.

f. Testing Tolerances During Production. Testing of the QC requirements shall be within the limits set in Table 6. The paving mixture produced should not vary from the design criteria for aggregate gradation and binder content by more than the tolerances in Table 7.

Table 7: QC/QA testing tolerances during production.

Sieve Size (inch/mm)	Percent Passing
0.75/19	-
0.5/12.5	± 6.0
0.375/9.5	± 6.0
0.187/4.75	± 5.0
0.093/2.36	± 4.0
0.0029/0.075	± 2.0
% PGAB	± 0.3

g. Plant Shutdown and Rejection of Mix. Should the porous asphalt mix not meet the tolerances specified in this section upon repeat testing, the Engineer may reject further loads of mix. Mix that is loaded into trucks during the time that the plant is changing operations to comply with a failed test shall not be accepted, and should be recycled at the plant.

8. Striping Paint shall be latex, water-base emulsion, ready-mixed, and complying with pavement marking specifications PS TT-P-1952.

PART 3 EXECUTION

3.1 INSTALLATION

A. Porous Media Beds

1. Grade Control

   a. Establish and maintain required lines and elevations. The Engineer shall be notified for review and approval of final stake lines for the work before construction work is to begin. Finished surfaces shall be true to grade and even, free of roller marks, and free of puddle-forming low spots. All areas must drain freely. Excavation elevations should be within +/- 0.1 ft (+/- 3 cm).

   b. If, in the opinion of the Engineer, based upon reports of the testing service and inspection, the quality of the work is below the standards which have been specified, additional work and testing will be required until satisfactory results are obtained.

   c. General criteria for watershed area to treatment area ratios for permeable pavements are defined by the state. Hybrid designs (dense-mix drive-lanes with permeable pavement parking stalls) have been used to address diminished strength of permeable asphalt materials in high traffic volume/load locations. A 1:1 watershed area to permeable pavement area is preferred (implying no runon). Improvements to materials and designs have addressed many of the strength deficiencies associated with older designs and materials specifications.

2. Notification.

   The Engineer shall be notified at least 24 hours prior to all porous media bed and porous pavement work.

3. Subgrade preparation

   a. The existing native subgrade material under all bed areas shall NOT be compacted or subject to excessive construction equipment traffic prior to stone bed placement. Compaction is acceptable if an impermeable liner is used at the base of the porous asphalt system and infiltration is not desired.

   b. Where erosion of the native material subgrade has caused accumulation of fine materials and/or surface ponding at the base of the excavation, this material shall be removed with light equipment and the underlying soils scarified to a minimum depth of 6 inches (15 cm) with a York rake or equivalent and light tractor.

   c. Bring subgrade of stone porous media bed to line, grade, and elevations indicated. Fill and lightly regrade any areas damaged by erosion, ponding, or traffic compaction before the placing of the stone. For parking lots all bed bottoms are level grade to promote uniform infiltration. For road applications, typically the slope of the bottom of excavation parallels that of the road surface. Interior berms in the stone layer are then necessary to prevent infiltrated water from flowing in the reservoir stone parallel to the road. Interior berms should be almost as tall as the reservoir course thickness and made of relatively impermeable material (this may be accomplished with geofabric or geotextile). On the upstream side of the berm, water may infiltrate. If soil infiltration capacity is low, then a drainage pipe should be located on the upstream side of the berm to remove water from the reservoir course and drain (daylight) to natural receiving waters, wetlands, or plumbed into existing stormwater drainage infrastructure (swales, catch basins, storm sewers).

4. <u>Porous Media Bed Installation</u>

a. Upon completion of subgrade work, the Engineer shall be notified and shall inspect at his/her discretion before proceeding with the porous media bed installation.

b. Side slope geotextile (when used) and porous media bed aggregate shall be placed immediately after approval of subgrade preparation. Any accumulation of debris or sediment which has taken place after approval of subgrade shall be removed prior to installation of geotextile or porous media at no extra cost to the Owner.

c. Place side slope geotextile in accordance with manufacturer's standards and recommendations. Adjacent strips of geotextile shall overlap a minimum of sixteen inches (16" or 41 cm). Secure geotextile at least four feet (1.2 m) outside of the bed excavation and take any steps necessary to prevent any runoff or sediment from entering the storage bed.

d. Install coarse aggregate in lifts no greater than 8-inches (20 cm). Lightly compact each lift with equipment, keeping equipment movement over storage bed subgrades to a minimum. Install aggregate to grades indicated on the drawings.

e. Install choker base course (see Materials section) aggregate evenly over surface of filter course bed, sufficient to allow placement of pavement, and notify Engineer for approval. Choker base course thickness shall be sufficient to allow for even placement of the porous asphalt but no less than 4-inches (10 cm) in depth.

f. The infiltration rate of the compacted filter course shall be determined by ASTM D3385 or an approved alternate at the discretion of the supervising engineer. The infiltration rate shall be no less 5-30 ft/day or 50% of the hydraulic conductivity (D2434) at 95% standard proctor compaction (refer to section 2.1.A.5).

g. Following placement of bed aggregate, the sideslope geotextile shall be folded back along all bed edges to protect from sediment washout along bed edges. At least a four-foot (1.2 m) edge strip shall be used to protect beds from adjacent bare soil. This edge strip shall remain in place until all bare soils contiguous to beds are stabilized and vegetated. In addition, take any other necessary steps to prevent sediment from washing into beds during site construction. When the site is fully stabilized, temporary sediment control devices shall be removed.

5. QC/QA requirements for Porous Media Bed Construction.

QC/QA activities are summarized in Table 8.

Table 8: QC/QA requirements for porous media bed construction.

Activity	Schedule
Contractor to notify engineer for approval	24 hours in advance of start of work
Contractor to employ soil inspector acceptable to engineer	NA
Contractor to employ staking and layout control inspector acceptable to engineer	NA
Contractor to employ site grading inspector acceptable to engineer	NA
Contractor to employ pavement work inspector acceptable to the engineer	NA
Contractor to notify engineer for approval	after subgrade preparation, before construction of porous media bed
Contractor to notify engineer for approval	after filter course placement, before placement of choker course and pavement to verify proper compaction of filter course by ASTM D3385

6. Resurfacing

In cases where a porous asphalt system was constructed and the asphalt needs to be replaced, it is recommended to mill the older asphalt and to resurface on the choker course rather than to use a tackifier and pave over the older asphalt. While there is little documented experience with partial milling and resurfacing it has been done with success for porous asphalt pavements. Attention to cleaning milled surface is critical.

1. Mill older asphalt down to specified depth or to choker course

2. Restore the infiltration capacity with low angle pressure washing or air to a vacuum (for example the 15” vacuum attachment hose of a Tymco regenerative air vac)

3. Level and compact choker course

7. Porous Asphalt Pavement Installation

1. The mixing plant, hauling and placing equipment, and construction methods shall be in conformance with NAPA IS 131 and applicable sections of the state DOT's specification for asphalt mixes.

2. The use of surge bins shall not be permitted.

3. Hauling Equipment. The open graded mix shall be transported in clean vehicles with tight, smooth dump beds that have been sprayed with a non-petroleum release agent or soap solution to prevent the mixture from adhering to the dump bodies. Mineral filler, fine aggregate, slag dust, etc. shall not be used to dust truck beds. The open graded mix shall be covered during transportation with a suitable material of such size sufficient to protect the mix from the weather and also minimize mix cooling and the prevention of lumps. When necessary, to ensure the delivery of material at the specified temperature, truck bodies shall be insulated, and covers shall be securely fastened. Long hauls, particularly those in excess of 25 miles (40 km), may result in separation of the mix and its rejection.

4. Placing Equipment. The paver shall be a self-propelled unit with an activated screed or strike-off assembly, capable of being heated if necessary and capable of spreading and finishing the mixture without segregation for the widths and thicknesses required. In general, track pavers have proved superior for Porous Asphalt placement. The screed shall be adjustable to provide the desired cross-sectional shape. The finished surface shall be of uniform texture and evenness and shall not show any indication of tearing, shoving, or pulling of the mixture. The machine shall, at all times, be in good mechanical condition and shall be operated by competent personnel.

   Pavers shall be equipped with the necessary attachments, designed to operate electronically, for controlling the grade of the finished surface.

   The adjustments and attachments of the paver will be checked and approved by the Engineer before placement of asphalt material.

5. Rollers. Rollers shall be in good mechanical condition, operated by competent personnel, capable of reversing without backlash, and operated at speeds slow enough to avoid displacement of the asphalt mixture. The mass (weight) of the rollers shall be sufficient to compact the mixture to the required density without crushing of the aggregate. Rollers shall be equipped with tanks and sprinkling bars for wetting the rolls.

   Rollers shall be two-axle tandem rollers with a gross mass (weight) of not less than 7 metric tons (8 tons) and not more than 10 metric tons (12 tons) and shall be capable of providing a minimum compactive effort of 44 kN/m (250 pounds per inch) of width of the drive roll. All rolls shall be at least 1.1 m (42 inches) in diameter.

   A rubber tired roller is not required on the open graded asphalt friction course surface.

6. Conditioning of Existing Surface. Contact surfaces such as curbing, gutters, and manholes shall be painted with a thin, uniform coat of Type RS-1, or equivalent emulsified asphalt immediately before the asphalt mixture is placed against them.

7. Temperature Requirements. The temperature of the asphalt mixture, at the time of discharge from the haul vehicle and at the paver, shall be between 135-163°C (275 to 325°F), within 6 °C (10 °F) of the compaction temperature for the approved mix design.

8. Spreading and Finishing._The Porous Asphalt should be placed in two lifts at 1.5 to 2 inches (4 - 6 cm). One lift is not recommended because uniform compaction is difficult to achieve. Great care must be taken to insure that the porous asphalt layers join completely. This means: keeping the time between layer placements minimal; keeping the first layer clear from dust and moisture, and minimizing traffic on the first layer. However care should be taken to allow sufficient time for the asphalt placement to set, generally the following day or when the surface temperature of the first lift cools to 38°C (100 °F). Two lifts affords better compaction of the entire lift, especially in colder weather and for large sites. It also provides access to the site for finish work such as curbing. Care must be taken to not damage or impair permeability of the base course if a multiple lift scenario is chosen. If significant site work will take place between placement of base and wearing courses higher durability mixes should be used for both layers.

The Contractor shall protect all exposed surfaces that are not to be treated from damage during all phases of the pavement operation.

The asphalt mixture shall be spread and finished with the specified equipment. The mixture shall be struck off in a uniform layer to the full width required and of such depth that each course, when compacted, has the required thickness and conforms to the grade and elevation specified. Pavers shall be used to distribute the mixture over the entire width or over such partial width as practical. On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the mixture shall be spread and raked by hand tools.

No material shall be produced so late in the day as to prohibit the completion of spreading and compaction of the mixture during daylight hours, unless night paving has been approved and established for the project.

No traffic will be permitted on material placed until the material has been thoroughly compacted and has been permitted to cool to below 38 °C (100 °F). The use of water to cool the pavement is not permitted. The Engineer reserves the right to require that all work adjacent to the pavement, such as guardrail, cleanup, and turf establishment, is completed prior to placing the wearing course when this work could cause damage to the pavement. On projects where traffic is to be maintained, the Contractor shall schedule daily pavement operations so that at the end of each working day all travel lanes of the roadway on which work is being performed are paved to the same limits.

9. Compaction. Immediately after the asphalt mixture has been spread, struck off, and surface irregularities adjusted, it shall be thoroughly and uniformly compacted by rolling. The compaction objective is 16% - 19% in place void content (Corelock).

Breakdown rolling shall occur when the mix temperature is between 135-163°C (275 to 325°F). This is typically achieved with 1-2 passes with a 7.5 – 10 ton vibratory roller.

Finish rolling shall occur when the mix temperature is between 66-93°C (150 to 200°F). This is typically achieved with a 1-ton roller with no vibratory compaction. Finish rolling is largely aesthetic and done for a smooth finished surface. Care should be taken so as to not continually roll the same location for instance back and forth to a water source.

The cessation temperature occurs at approximately 79°C (175°F), at which point the mix becomes resistant to compaction. If compaction has not been performed at temperatures greater than the cessation temperature, the pavement will not achieve adequate durability. The temperatures referenced here are guidelines and have been used in the field to oversee successful porous asphalt installations.

The surface shall be rolled when the mixture is in the proper condition and when the rolling does not cause undue displacement, cracking, or shoving.

Rollers or oscillating vibratory rollers, ranging from 7.5 – 10 tons, shall be used for breakdown compaction. The number, mass (weight), and type of rollers furnished shall be sufficient to obtain the required compaction while the mixture is in a workable condition. Generally, one breakdown roller will be needed for each paver used in the spreading operation.

To prevent adhesion of the mixture to the rollers, rollers shall be kept moist with water or water mixed with very small quantities of detergent or other approved material. Excess liquid will not be permitted.

Along forms, curbs, headers, walls, and other places not accessible to the rollers, the mixture shall be thoroughly compacted with hot or lightly oiled hand tampers, smoothing irons or with mechanical tampers. On depressed areas, either a trench roller or cleated compression strips may be used under the roller to transmit compression to the depressed area.

Other combinations of rollers and/or methods of compacting may be used if approved in writing by the Engineer, provided the compaction requirements are met.

The speed of the roller shall be slow and uniform to avoid displacement of the mixture, and the roller should be kept in as continuous operation as practical. Finish rolling shall continue below the threshold temperature until all roller marks and ridges have been eliminated.

Rollers will not be stopped or parked on the freshly placed porous asphalt.

It shall be the responsibility of the Contractor to conduct whatever process control the Contractor deems necessary. Acceptance testing will be conducted by the Engineer using cores provided by the Contractor.

Any mixture that becomes loose and broken, mixed with dirt, or is in any way defective shall be removed and replaced with fresh hot mixture. The mixture shall be compacted to conform to the surrounding area. Any area showing an excess or deficiency of binder shall be removed and replaced. These replacements shall be at the Contractor's expense.

If the Engineer determines that unsatisfactory compaction or surface distortion is being obtained or damage to highway components and/or adjacent property is occurring using vibratory compaction equipment, the Contractor shall immediately cease using this equipment and proceed with the work in accordance with the sixth paragraph of this subsection.

10. Joints. Joints between old and new pavements or between successive day's work shall be made to ensure a thorough and continuous bond between the old and new mixtures. Whenever the spreading process is interrupted long enough for the mixture to attain its initial stability, the paver shall be removed from the mat and a joint constructed.

Butt joints shall be formed by cutting the pavement in a vertical plane at right angles to the centerline, at locations approved by the Engineer. The Engineer will determine locations by using a straightedge at least 3 m (10 feet) long. The butt joint shall be thoroughly coated with Type RS-1 or equivalent emulsified asphalt just prior to depositing the pavement mixture when pavement resumes.

Longitudinal joints that have become cold shall be coated with Type RS-1 or equivalent emulsified asphalt before the adjacent mat is placed. If directed by the Engineer, joints shall be cut back to a clean vertical edge prior to applying the emulsion.

11. Surface Tolerances. The surface will be tested by the Engineer using a straightedge at least 3 m (10 feet) in length at selected locations parallel with the centerline. Any variations exceeding 9.5 mm (3/8 inch) between any two contact points shall be satisfactorily eliminated. A straightedge at least 3 m (10 feet) in length may be used on a vertical curve. The straightedges shall be provided by the Contractor.

12. Work shall be done expertly throughout, without staining or injury to other work. Transition to adjacent impervious asphalt pavement shall be merged neatly with flush, clean line. Finished pavement shall be even, without pockets, and graded to elevations shown on drawing.

13. Repair of Damaged Pavement. Any existing pavement on or adjacent to the site that has been damaged as a result of construction work shall be repaired to the satisfaction of the Engineer without additional cost to the Owner.

14. Striping Paint

    a. Vacuum and clean surface to eliminate loose material and dust.
    b. Paint 4-inch wide (10 cm) parking striping and traffic lane striping in accordance with plan layouts. Apply paint with mechanical equipment to produce uniform straight edges. Apply in two coats at manufacturer's recommended rates. Provide clear, sharp lines using white traffic paint. Paint should conform with Federal Specification TT-P-85.
    c. Color for Handicapped Markings: Blue

8. <u>QC/QA for Paving Operations (optional as part of an installation contract).</u>

    1. The full permeability of the pavement surface shall be tested by application of clean water at the rate of at least 5 gpm (23 lpm) over the surface, using a hose or other distribution devise. Water used for the test shall be clean, free of suspended solids and deleterious liquids and will be provided at no extra cost to the Owner. All applied water shall infiltrate directly without large puddle formation or surface runoff, and shall be observed by the Engineer.

    2. Testing and Inspection: Employ at Contractor's expense an inspection firm acceptable to the Engineer to perform soil inspection services, staking and layout control, and testing and inspection of site grading and pavement work. Inspection and list of tests shall be reviewed and approved in writing by the Engineer prior to starting construction. All test reports must be signed by a licensed Engineer.

    3. Test in-place base and surface course for compliance with requirements for thickness and surface smoothness. Repair or remove and replace unacceptable work as directed by the Engineer.

4. Surface Smoothness: Test finished surface for smoothness using a 3 m (10 foot) straightedge applied parallel with and at right angles to the centerline of the paved area. Surface will not be accepted if gaps or ridges exceed 9.5mm (3/8 inch).
5. Porous pavement beds shall not be used for equipment or materials storage during construction, and under no circumstances shall vehicles be allowed to deposit soil on paved porous surfaces.
6. QC/QA requirements during paving are summarized in Table 9**Error! Reference source not found.**.

Table 9: QC/QA requirements during paving.

Activity	Schedule/Frequency	Tolerance
Inspect truck beds for pooling (draindown)	every truck	NA
Take temp of asphalt in truck	every truck	> 135°C (275°F)
Take temp of PA mix in the paver	each pull	within 6°C (10°F) of the recommended compaction temp
Consult with engineer to determine locations of butt joints	As needed	NA
Test surface smoothness and positive drainage with a 10' straightedge	after compaction	9.5 mm (3/8")
Consult with engineer to mark core locations	after compaction	NA
House test with at least 5 gpm water	after compaction	immediate infiltration, no puddling

PART 4. REFERENCES

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Note on Multiple Stress Creep Recovery Grading

Multiple Stress Creep Recovery (MSCR) Implementation

North East Asphalt User Producer Group (NEAUPG) States have agreed to launch MSCR grading for modified binders for the 2013 season. This only affects polymer modified products for now. NHDOT will be accepting either grade designation from suppliers this year.

MSCR grading measures binder properties at the local environment temperature. Stiffness properties above those of the standard grade are determined by applying traffic parameters, as follows.

S Standard
H Heavy
V Very Heavy
E Extremely Heavy

Environmental Grade	Old Modified Grade	New Modified Grade
NH 58°	PG 76-28	PG 64V-28, or PG 64E-28
Maine 58°	PG 70-28	
Mass 64°	PG 64-28 (w/latex or tire rubber)	
RI 64°	PG 76-28	

Binder suppliers can currently supply NH with PG 76-28 with > 3% SBS

PG 64E-28 can be produced with about 2.2% SBS

The PG 64E-28 being shipped to RI meets the MSCR testing and has 60% elastic recovery at 10° C. ER test is normally run at 20° C.

Hydroworks

Hydroworks® HydroDome

Operations & Maintenance Manual

Version 1.0

Please call Hydroworks at 888-290-7900 or email us at support@hydroworks.com if you have any questions regarding the Inspection Checklist. Please email a copy of the completed checklist to Hydroworks at support@hydroworks.com for our records.

Introduction

The HydroDome (Figure 1) is a state-of-the-art hydrodynamic separator. HydroDome can be used for water quality and quantity flow control if desired.

Hydrodynamic separators remove solids, debris and lighter than water (oil, trash, floating debris) pollutants from stormwater. Hydrodynamic separators and other water quality measures are mandated by regulatory agencies (Town/City, State, Federal Government) to protect storm water quality from pollution generated by urban development (traffic, people) as part of new development permitting requirements.

As storm water treatment structures fill up with pollutants they become less and less effective in removing new pollution. Therefore, it is important that storm water treatment structures be maintained on a regular basis to ensure that they are operating at optimum performance. The HydroDome is no different in this regard and this manual has been assembled to provide the owner/operator with the necessary information to inspect and coordinate maintenance of their HydroDome.

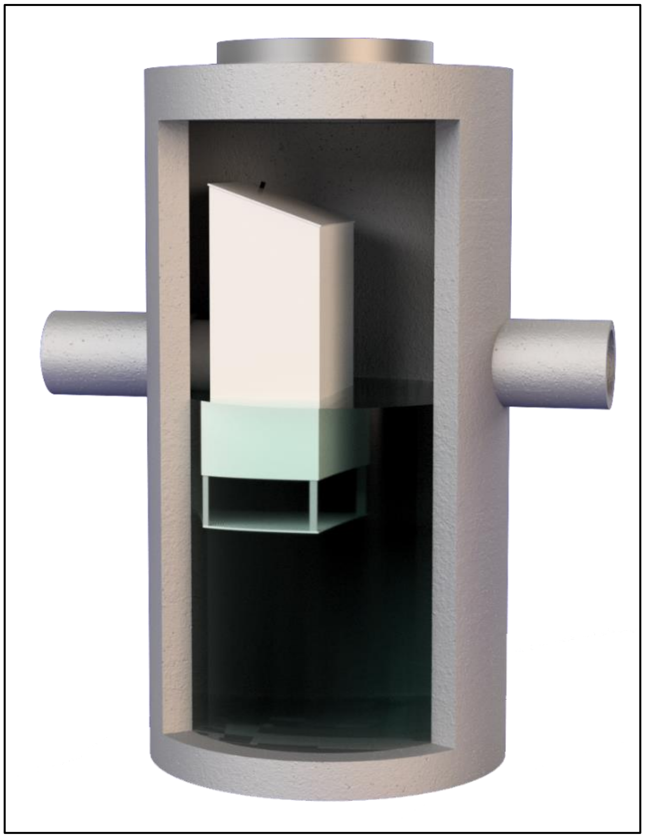


Figure 1. Hydroworks HydroDome

Hydroworks

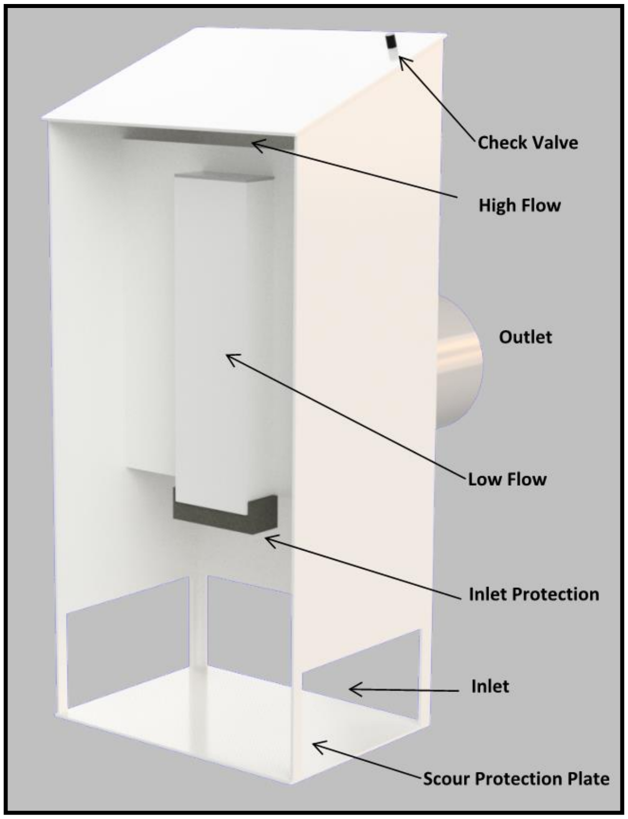


Figure 2 HydroDome Internal Components

Inspection

Procedure

Floatables

A visual inspection can be conducted for floatables by removing the cover/grate and looking down into the separator.

TSS/Sediment

Inspection for TSS build-up can be conducted using a Sludge Judge®, Core Pro®, AccuSludge® or equivalent sampling device that allows the measurement of the depth of TSS/sediment in the unit. These devices typically have a ball valve at the bottom of the tube that allows water and TSS to flow into the tube when lowering the tube into the unit. Once the unit touches the bottom of the device, it is quickly pulled upward such that the water and TSS in the tube forces the ball valve closed allowing the user to see a full core of water/TSS in the unit. Several readings (2 or 3) should be made at different locations of the structure to ensure that an accurate TSS depth measurement is recorded.

Operation

The water level during periods without rain should be near the outlet invert of the structure. If the water level remains near the top of the HydroDome this may suggest that there is an obstruction downstream of the HydroDome or that the inlet protection at the HydroDome may need to be cleaned.

Frequency

Construction Period

The HydroDome separator should be inspected every four weeks and after every large storm (over 0.5” (12.5 mm) of rain) during the construction period.

Post-Construction Period

The Hydroworks HydroDome separator should be inspected during the first year of operation for normal stabilized sites (grassed or paved areas). If the unit is subject to oil spills or runoff from unstabilized areas (storage piles, exposed soils), the HydroDome separator should be inspected more frequently (4 times per year). The initial annual inspection will indicate the required frequency of inspection and maintenance if the unit was maintained after the construction period.

Reporting

Reports should be prepared as part of each inspection and include the following information:

1. Date of inspection
2. GPS coordinates of Hydroworks unit
3. Time since last rainfall
4. Date of last inspection
5. Installation deficiencies (missing parts, incorrect installation of parts)
6. Structural deficiencies (concrete cracks, broken parts)
7. Operational deficiencies (leaks, elevated water level)
8. Presence of oil sheen or depth of oil layer
9. Estimate of depth/volume of floatables (trash, leaves) captured
10. Sediment depth measured
11. Recommendations for any repairs and/or maintenance for the unit
12. Estimation of time before maintenance is required if not required at time of inspection

A sample inspection checklist is provided at the end of this manual.

Maintenance

Procedure

The Hydroworks HydroDome unit is typically maintained using a vacuum truck. There are numerous companies that can maintain the HydroDome separator. Maintenance with a vacuum truck involves removing all of the water and sediment together. The water is then separated from the sediment on the truck or at the disposal facility.

The area around the HydroDome provides clear access to the bottom of the structure (Figure 3). This is the area where a vacuum hose would be lowered to clean the unit.

In instances where a vacuum truck is not available other maintenance methods (i.e. clamshell bucket) can be used, but they will be less effective. If a clamshell bucket is used the water must be decanted prior to cleaning since the sediment is under water and typically fine in nature.

The local municipality should be consulted for the allowable disposal options for both water and sediments prior to any maintenance operation. Once the water is decanted the sediment can be removed with the clamshell bucket.

Maintenance of a Hydroworks HydroDome unit will typically take 1 to 2 hours depending on size of unit and using a vacuum truck. Cleaning may take longer for other cleaning methods (i.e. clamshell bucket).

Inlet protection (Figure 2) is located at the inlet to the low flow opening in the HydroDome to ensure the opening does not become clogged. Although it is not anticipated that the inlet protection will have to be replaced on a regular (i.e. annual) basis since the inlet protection is protected by the submerged entrance to the HydroDome , the inlet protection should be checked each time the HydroDome is inspected or maintained. The inlet protection is removable and should be rinsed with water to ensure any debris caught on the protection is discarded. Unless damaged, the inlet protection can be reinstalled. A replacement piece can be bought through Hydroworks and/or retail stores. Hydroworks can provide information on the inlet protection and where it can be bought. A sign that the inlet protection needs cleaning/replacement would be a water level near the crown of the outlet pipe in the structure during periods with no flow (i.e. unit does not drain down to the pipe invert).

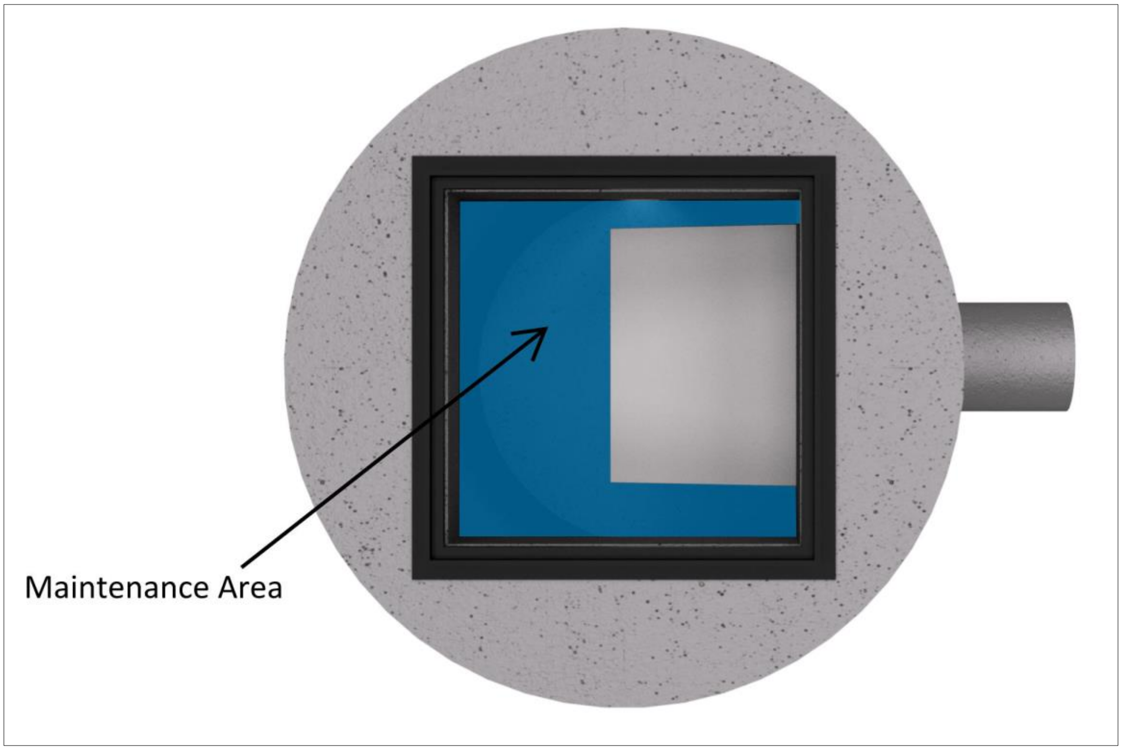


Figure 3. HydroDome Maintenance Access

Frequency

Construction Period

A HydroDome separator can fill with construction sediment quickly during the construction period. The HydroDome must be maintained during the construction period when the depth of TSS/sediment reaches 24” (600 mm). It must also be maintained during the construction period if there is an appreciable depth of oil in the unit (more than a sheen) or if floatables other than oil cover over 50% of the area of the separator

The HydroDome separator should be maintained at the end of the construction period, prior to operation for the post-construction period.

Post-Construction Period

The maintenance for sediment accumulation is required if the depth of sediment is 1 ft or greater in separators with standard water (sump) depths (Table 1).

There will be designs with increased sediment storage based on specifications or site-specific criteria. Please contact Hydroworks at 888-290-7900 to inquire whether your HydroDome was designed with extra sump depth to extend the frequency of maintenance.

The HydroDome separator must also be maintained if there is an appreciable depth of oil in the unit (more than a sheen) or if floatables other than oil cover over 75% of the water surface of the separator.

Table 1 Standard Dimensions for Hydroworks HydroDome Models

Model	Diameter ft (mm)	Maintenance Sediment Depth in (mm)
HD 3	3 (900)	12 (300)
HD 4	4 (1200)	12 (300)
HD 5	5 (1500)	12 (300)
HD 6	6 (1800)	12 (300)
HD 7	7 (2100)	12 (300)
HD 8	8 (2400)	12 (300)
HD 10	10 (3000)	12 (300)
HD 12	12 (3600)	12 (300)

HYDRODOME INSPECTION SHEET

Date	____________________
Date of Last Inspection	____________________
Site	____________________
City	____________________
State	____________________
Owner	____________________
GPS Coordinates	____________________
Date of last rainfall	____________________

Site Characteristics	**Yes**	**No**
Soil erosion evident	☐	☐
Exposed material storage on site	☐	☐
Large exposure to leaf litter (lots of trees)	☐	☐
High traffic (vehicle) area	☐	☐

HydroDome	**Yes**	**No**
Obstructions in the inlet	☐ *	☐
Damage to HydroDome (cracked, broken, loose pieces)	☐ **	☐
Improperly installed outlet pipe	☐ ***	☐
Internal component damage (cracked, broken, loose pieces)	☐ **	☐
Floating debris in the separator (oil, leaves, trash)	☐	☐
Large debris visible in the separator	☐ *	☐
Concrete cracks/deficiencies	☐ ***	☐
Exposed rebar	☐ **	☐
Raised water level (water level close to top of HydroDome)	☐ ***	☐
Water seepage (water level not at outlet pipe invert)	☐ ***	☐
Water level depth below outlet pipe invert ________ "		

Routine Measurements				
Floating debris depth	**< 0.5" (13mm)**	☐	**>0.5" 13mm)**	☐ *
Floating debris coverage	**< 75% of surface area**	☐	**> 75% surface area**	☐ *
Sludge depth	**< 12" (300mm)**	☐	**> 12" (300mm)**	☐ *

* Maintenance required
** Repairs required
*** Further investigation is required

Note: Inspections should not be made within 24 hours of a storm to allow the water to drain from the structure to assess a raised water level or water level seepage

Hydroworks

Other Comments:

Hydroworks

Hydroworks® HydroDome

One Year Limited Warranty

Hydroworks, LLC warrants, to the purchaser and subsequent owner(s) during the warranty period subject to the terms and conditions hereof, the Hydroworks HydroDome to be free from defects in material and workmanship under normal use and service, when properly installed, used, inspected and maintained in accordance with Hydroworks written instructions, for the period of the warranty. The standard warranty period is 1 year.

The warranty period begins once the separator has been manufactured and is available for delivery. Any components determined to be defective, either by failure or by inspection, in material and workmanship will be repaired, replaced or remanufactured at Hydroworks' option provided, however, that by doing so Hydroworks, LLC will not be obligated to replace an entire insert or concrete section, or the complete unit. This warranty does not cover shipping charges, damages, labor, any costs incurred to obtain access to the unit, any costs to repair/replace any surface treatment/cover after repair/replacement, or other charges that may occur due to product failure, repair or replacement.

This warranty does not apply to any material that has been disassembled or modified without prior approval of Hydroworks, LLC, that has been subjected to misuse, misapplication, neglect, alteration, accident or act of God, or that has not been installed, inspected, operated or maintained in accordance with Hydroworks, LLC instructions and is in lieu of all other warranties expressed or implied. Hydroworks, LLC does not authorize any representative or other person to expand or otherwise modify this limited warranty.

The owner shall provide Hydroworks, LLC with written notice of any alleged defect in material or workmanship including a detailed description of the alleged defect upon discovery of the defect. Hydroworks, LLC should be contacted at 136 Central Ave., Clark, NJ 07066 or any other address as supplied by Hydroworks, LLC. (888-290-7900).

This limited warranty is exclusive. There are no other warranties, express or implied, or merchantability or fitness for a particular purpose and none shall be created whether under the uniform commercial code, custom or usage in the industry or the course of dealings between the parties. Hydroworks, LLC will replace any goods that are defective under this warranty as the sole and exclusive remedy for breach of this warranty.

Subject to the foregoing, all conditions, warranties, terms, undertakings or liabilities (including liability as to negligence), expressed or implied, and howsoever arising, as to the condition, suitability, fitness, safety, or title to the Hydroworks HydroDome are hereby negated and excluded and Hydroworks, LLC gives and makes no such representation, warranty or undertaking except as expressly set forth herein. Under no circumstances shall Hydroworks, LLC be liable to the Purchaser or to any third party for product liability claims; claims arising from the design, shipment, or installation of the HydroDome, or the cost of other goods or services related to the purchase and installation of the HydroDome. For this Limited Warranty to apply, the HydroDome must be installed in accordance with all site conditions required by state and local codes; all other applicable laws; and Hydroworks' written installation instructions.

Hydroworks, LLC expressly disclaims liability for special, consequential or incidental damages (even if it has been advised of the possibility of the same) or breach of expressed or implied warranty. Hydroworks, LLC shall not be liable for penalties or liquidated damages, including loss of production and profits; labor and materials; overhead costs; or other loss or expense incurred by the purchaser or any third party. Specifically excluded from limited warranty coverage are damages to the HydroDome arising from ordinary wear and tear; alteration, accident, misuse, abuse or neglect; improper maintenance, failure of the product due to improper installation of the concrete sections or improper sizing; or any other event not caused by Hydroworks, LLC. This limited warranty represents Hydroworks' sole liability to the purchaser for claims related to the HydroDome, whether the claim is based upon contract, tort, or other legal basis.

Long Term Pollution Prevention Plan

Proposed Addition
18 Independence Drive
Devens, Massachusetts
Long Term Pollution Prevention Plan

A long-term pollution prevention plan is an important element of the routine operation and maintenance of an industrial facility that is designed to reduce or eliminate the creation of pollutants at the source. In addition to the obvious environmental benefits of protecting the natural resources downstream of the facility, maintaining a long-term pollution prevention plan will provide for a healthier and safer work environment. The following long term pollution prevention practices will be employed at the facility.

- Good housekeeping practices:
  Maintaining a clean property will prevent or reduce the amount of pollutants in the stormwater runoff discharging from the site. This will be achieved through periodic parking lot sweeping, at the owners discretion, and through catch basin and infiltration basin cleaning as detailed within the sites Stormwater Operation and Maintenance Plan.

- Provisions for storing materials and waste products inside or under cover:
  Materials will be stored in their appropriate containers and shall be stored under cover or in a secure enclosure to reduce the risk of spills. Waste products will be placed in proper bins until emptied by a licensed solid waste management company.

- Vehicle washing controls:
  Vehicle washing is not anticipated to occur at this site, however if washing is needed it shall be conducted in pavement areas where the was water will be collected and conveyed through catch basins and water quality units prior to discharging to the onsite infiltration basins.

- Requirements for routine inspections and maintenance of stormwater BMPs:
  Refer to the maintenance schedule provided in the Stormwater Operation and Maintenance Plan.

- Spill prevention and response plans:
  Materials shall be stored in their proper original container in a secure location. No mixing of materials shall occur unless recommended by manufacturer. The manufacturer's recommendations for proper use and disposal should be strictly adhered to. In the case of a spill the manufacturer's method for cleanup shall be followed. The area shall be kept ventilated and personnel handling the cleanup shall wear proper protective clothing. Spills of toxic or hazardous material shall be reported to the appropriate State and/or local authority in accordance with local and/or State regulations.

- Provisions for maintenance of lawns, gardens, and other landscaped areas:
  Owner will maintain surrounding landscaped area as needed. These services shall be provided by a third-party landscape professional.

- Requirements for storage and use of fertilizers, herbicides, and pesticides:
  Fertilizers, herbicides and pesticides shall be stored in their appropriate containers in a secure location as described above. Protective clothing shall be used when handled, and quantities shall be applied according to manufacturer's recommendations.

- Pet waste management provisions:
  Pet waste management is not applicable at this site.

- Provisions for operation and management of septic systems:
  Septic Systems are not applicable at this site.

- Provisions for solid waste management:
  Solid waste material shall be placed in outdoor secure containers until emptied by licensed waste management company.

- Snow disposal and plowing plans relative to Wetland Resource Areas:
  There are no known wetland resource areas on the property.

- Winter Road Salt/or Sand Use and Storage restriction:
  The use of environmentally friendly alternatives to road salt will be considered.

- Street sweeping schedules
  Street sweeping will occur as needed at the discretion of the owner. Street sweeping of porous pavement to be done in conformance of the O&M Plan.

- Provisions for prevention of illicit discharges to the stormwater management system:
  The Stormwater Management System associated with the development of 18 Independence Drive has been designed such that prior to storm water runoff discharging from the site, it is treated through a series of best management practices. To the Engineer's knowledge, there are no known or designed non-storm water discharges that are or will be connected to the storm water collection system that would convey pollutants directly to groundwater or surface waters.

- 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, adjacent wetlands or from a LUHPPL:
  Hydroworks water quality unit is designed to capture and store oils and floatable debris. All catch basins shall be equipped with hoods to prevent oils and floatables from discharging.

- Training for staff or personnel involved with the implementing Long Term Pollution Prevention Plan:
  Facilities staff will be responsible for implementing the Long Term Pollution Prevention Plan and staff will be trained in accordance with company policy.

- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan:
  Alan Fluet
  SMC Ltd
  18 Independence Drive
  Devens, MA 01434
  Phone:978-502-9649

Sediment Forebay Sizing Calculations

AT GRADE INFILTRATION BASIN- SEDIMENT FOREBAY SIZING CALCULATION

Summary for Pond 1F: Sediment Forebay

[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1	254.00'	245 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	
254.00	151	0	0	
255.00	339	245	245	Provided Volume

Tributary Impervious Area to Forebay = 13,015 SF
Forebay 1 Required Volume = 13,015 SF X 0.1 in X (1 ft/12 in) = 108.47 cf

MADEP Stormwater Checklist

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

Checklist for Stormwater Report

A. Introduction

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

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

The Stormwater Report must include:

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

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

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

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

[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.

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

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

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

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

Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature

COMMONWEALTH OF MASSACHUSETTS
WESLEY R.
FLIS
CIVIL
No. 45866
PROFESSIONAL ENGINEER

7/3/2025

Signature and Date

Checklist

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

☐ New development

☐ Redevelopment

☒ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

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

☒ No disturbance to any Wetland Resource Areas

☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)

☐ Reduced Impervious Area (Redevelopment Only)

☐ Minimizing disturbance to existing trees and shrubs

☐ LID Site Design Credit Requested:

- ☐ Credit 1
- ☐ Credit 2
- ☐ Credit 3

☐ Use of “country drainage” versus curb and gutter conveyance and pipe

☒ Bioretention Cells (includes Rain Gardens)

☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)

☐ Treebox Filter

☐ Water Quality Swale

☐ Grass Channel

☐ Green Roof

☐ Other (describe): ______________________

Standard 1: No New Untreated Discharges

☒ No new untreated discharges

☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth

☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist (continued)

Standard 2: Peak Rate Attenuation

- ☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.
- ☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.
- ☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

- ☐ Soil Analysis provided.
- ☒ Required Recharge Volume calculation provided.
- ☐ Required Recharge volume reduced through use of the LID site Design Credits.
- ☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

  ☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

- ☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.
- ☒ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
- ☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
- ☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:
  - ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
  - ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
  - ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
  - ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- ☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.
- ☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

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

Checklist (continued)

Standard 3: Recharge (continued)

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

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

Standard 4: Water Quality

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

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

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

☐ is within the Zone II or Interim Wellhead Protection Area

☐ is near or to other critical areas

☒ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)

☐ involves runoff from land uses with higher potential pollutant loads.

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

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

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

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

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

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

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

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

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

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

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

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

☐ All exposure has been eliminated.

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

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

Standard 6: Critical Areas

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

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

Checklist 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.

Illicit Discharge Compliance Statement

Proposed Addition
18 Independence Drive
Devens, Massachusetts

Illicit Discharge Compliance Statement

The Stormwater Management System associated with the proposed development of 18 Independence Drive has been designed such that prior to storm water runoff discharging from the site, it is treated through a series of best management practices. To the Engineer's knowledge, there are no known or designed non-storm water discharges that are or will be connected to the storm water collection system that would convey pollutants directly to groundwater or surface waters.

Name: Wesley R. Flis, P.E. Title: Engineering Project Manager

Signature: Wesley R Flis Date: 7/3/2025

NRCC Precipitation Table

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Metadata for Point	
Smoothing	Yes
State	
Location	
Latitude	42.546 degrees North
Longitude	71.599 degrees West
Elevation	70 feet
Date/Time	Thu Jun 12 2025 10:58:30 GMT-0400 (Eastern Daylight Time)

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.53	0.70	0.87	1.10	**1yr**	0.75	1.03	1.27	1.60	2.01	2.54	2.81	**1yr**	2.25	2.70	3.14	3.83	4.45	**1yr**
2yr	0.34	0.52	0.65	0.86	1.08	1.36	**2yr**	0.93	1.25	1.57	1.96	2.44	3.03	3.37	**2yr**	2.68	3.24	3.74	4.47	5.08	**2yr**
5yr	0.40	0.63	0.78	1.05	1.34	1.70	**5yr**	1.16	1.56	1.97	2.46	3.06	3.79	4.26	**5yr**	3.36	4.09	4.72	5.61	6.31	**5yr**
10yr	0.45	0.71	0.90	1.22	1.58	2.02	**10yr**	1.37	1.85	2.35	2.94	3.64	4.50	5.08	**10yr**	3.98	4.89	5.63	6.67	7.44	**10yr**
25yr	0.53	0.85	1.08	1.48	1.97	2.54	**25yr**	1.70	2.30	2.95	3.70	4.59	5.63	6.44	**25yr**	4.98	6.19	7.12	8.40	9.24	**25yr**
50yr	0.59	0.96	1.23	1.72	2.32	3.03	**50yr**	2.01	2.72	3.54	4.43	5.47	6.68	7.70	**50yr**	5.91	7.41	8.50	9.99	10.90	**50yr**
100yr	0.68	1.11	1.43	2.02	2.75	3.60	**100yr**	2.37	3.22	4.21	5.28	6.51	7.93	9.22	**100yr**	7.02	8.86	10.16	11.89	12.86	**100yr**
200yr	0.78	1.27	1.64	2.35	3.25	4.28	**200yr**	2.81	3.81	5.02	6.29	7.75	9.42	11.04	**200yr**	8.34	10.61	12.14	14.16	15.18	**200yr**
500yr	0.93	1.53	1.99	2.90	4.06	5.39	**500yr**	3.51	4.76	6.34	7.95	9.77	11.83	14.02	**500yr**	10.47	13.48	15.38	17.84	18.91	**500yr**

Lower Confidence Limits

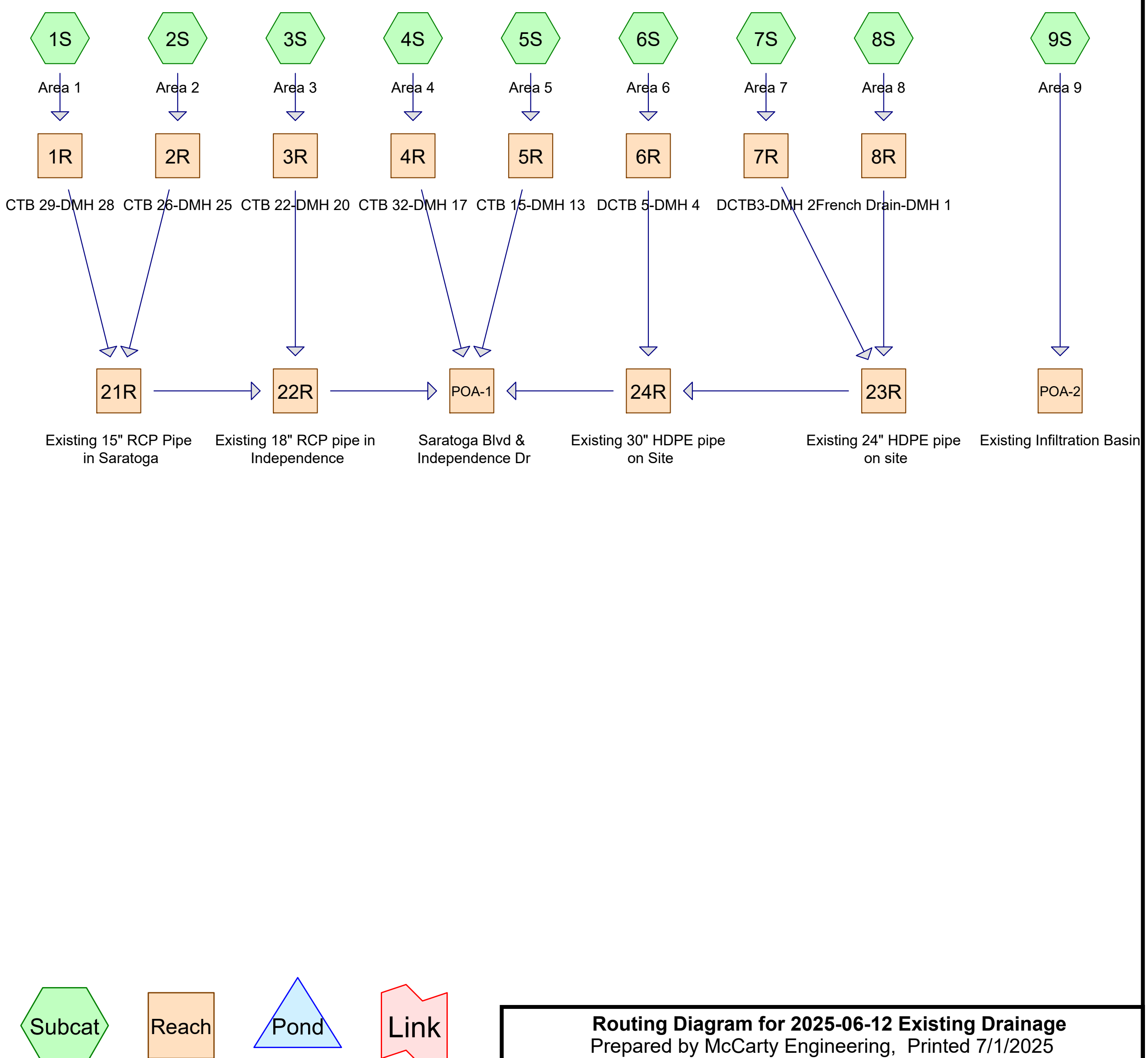
	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.21	0.33	0.40	0.54	0.66	0.77	**1yr**	0.57	0.76	1.00	1.40	1.71	2.24	2.46	**1yr**	1.98	2.37	2.82	3.28	3.95	**1yr**
2yr	0.32	0.50	0.62	0.83	1.03	1.23	**2yr**	0.89	1.21	1.40	1.81	2.31	2.96	3.26	**2yr**	2.62	3.14	3.67	4.38	4.99	**2yr**
5yr	0.37	0.57	0.71	0.97	1.23	1.44	**5yr**	1.06	1.41	1.68	2.18	2.78	3.54	3.98	**5yr**	3.13	3.82	4.44	5.31	5.96	**5yr**
10yr	0.41	0.63	0.78	1.08	1.40	1.61	**10yr**	1.21	1.58	1.79	2.47	3.16	4.05	4.56	**10yr**	3.59	4.38	5.13	6.09	6.80	**10yr**
25yr	0.46	0.70	0.87	1.25	1.64	1.87	**25yr**	1.42	1.83	2.06	2.93	3.75	4.83	5.45	**25yr**	4.28	5.24	6.21	7.35	8.08	**25yr**
50yr	0.50	0.76	0.94	1.36	1.83	2.10	**50yr**	1.58	2.06	2.28	3.34	4.27	5.51	6.26	**50yr**	4.88	6.02	7.18	8.45	9.22	**50yr**
100yr	0.54	0.81	1.01	1.46	2.01	2.36	**100yr**	1.73	2.31	2.54	3.13	4.88	6.31	7.17	**100yr**	5.58	6.89	8.31	9.73	10.51	**100yr**
200yr	0.58	0.87	1.10	1.60	2.23	2.64	**200yr**	1.92	2.58	2.81	3.43	5.60	7.22	8.20	**200yr**	6.39	7.89	9.62	11.19	11.98	**200yr**
500yr	0.64	0.96	1.23	1.79	2.55	3.08	**500yr**	2.20	3.01	3.23	3.88	6.74	8.63	9.83	**500yr**	7.64	9.45	11.69	13.44	14.22	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.32	0.49	0.60	0.81	0.99	1.19	**1yr**	0.86	1.16	1.34	1.74	2.18	2.74	3.03	**1yr**	2.43	2.92	3.40	4.23	4.80	**1yr**
2yr	0.37	0.57	0.70	0.94	1.16	1.36	**2yr**	1.00	1.33	1.54	2.01	2.56	3.11	3.51	**2yr**	2.76	3.38	3.83	4.59	5.20	**2yr**
5yr	0.44	0.67	0.84	1.15	1.46	1.77	**5yr**	1.26	1.73	1.96	2.50	3.15	4.03	4.51	**5yr**	3.57	4.34	4.98	5.92	6.70	**5yr**
10yr	0.51	0.79	0.98	1.37	1.77	2.18	**10yr**	1.52	2.13	2.50	3.01	3.76	4.93	5.52	**10yr**	4.37	5.31	6.09	7.22	8.14	**10yr**
25yr	0.65	0.99	1.23	1.76	2.31	2.87	**25yr**	2.00	2.80	3.31	3.83	4.76	6.43	7.21	**25yr**	5.69	6.94	7.97	9.39	10.55	**25yr**
50yr	0.77	1.18	1.47	2.11	2.84	3.53	**50yr**	2.45	3.46	4.09	4.60	5.69	7.86	8.86	**50yr**	6.96	8.52	9.77	11.47	12.85	**50yr**
100yr	0.93	1.40	1.75	2.53	3.47	4.36	**100yr**	3.00	4.26	5.07	6.56	6.80	9.63	10.85	**100yr**	8.52	10.43	11.97	14.01	15.68	**100yr**
200yr	1.11	1.66	2.11	3.05	4.26	5.37	**200yr**	3.68	5.25	6.27	8.11	8.13	11.79	13.28	**200yr**	10.43	12.77	14.69	17.08	19.15	**200yr**
500yr	1.41	2.10	2.70	3.92	5.58	7.04	**500yr**	4.82	6.88	8.32	10.76	10.28	15.40	17.45	**500yr**	13.63	16.78	19.25	22.26	24.97	**500yr**

Appendix B

Existing Conditions HydroCAD Model



Routing Diagram for 2025-06-12 Existing Drainage
Prepared by McCarty Engineering, Printed 7/1/2025
HydroCAD® 10.00-26 s/n 02034 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
4.014	39	>75% Grass cover, Good, HSG A (1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S)
0.213	61	>75% Grass cover, Good, HSG B (1S, 2S, 9S)
0.363	98	Concrete, HSG A (1S, 2S, 3S, 4S, 5S, 7S, 8S)
0.018	98	Concrete, HSG B (1S, 2S)
2.669	98	Paved parking, HSG A (1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S)
0.062	98	Paved parking, HSG B (1S, 2S)
0.233	30	Woods, Good, HSG A (4S, 8S, 9S)
7.572	**64**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
7.279	HSG A	1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S
0.293	HSG B	1S, 2S, 9S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
7.572		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
4.014	0.213	0.000	0.000	0.000	4.227	>75% Grass cover, Good	1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S
0.363	0.018	0.000	0.000	0.000	0.381	Concrete	1S, 2S, 3S, 4S, 5S, 7S, 8S
2.669	0.062	0.000	0.000	0.000	2.731	Paved parking	1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S
0.233	0.000	0.000	0.000	0.000	0.233	Woods, Good	4S, 8S, 9S
7.279	**0.293**	**0.000**	**0.000**	**0.000**	**7.572**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1R	254.20	254.10	13.3	0.0075	0.012	12.0	0.0	0.0
2	2R	255.75	255.61	13.7	0.0102	0.012	12.0	0.0	0.0
3	3R	254.66	253.80	13.8	0.0623	0.012	12.0	0.0	0.0
4	4R	254.20	254.06	14.3	0.0098	0.012	12.0	0.0	0.0
5	5R	254.80	254.60	13.8	0.0145	0.012	12.0	0.0	0.0
6	6R	251.58	251.36	15.8	0.0139	0.012	12.0	0.0	0.0
7	7R	251.74	251.36	8.2	0.0463	0.012	12.0	0.0	0.0

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Area 1 Runoff Area=10,028 sf 40.98% Impervious Runoff Depth=0.78"
Flow Length=231' Slope=0.0100 '/' Tc=8.3 min CN=71 Runoff=0.17 cfs 0.015 af

Subcatchment 2S: Area 2 Runoff Area=40,284 sf 17.40% Impervious Runoff Depth=0.10"
Flow Length=106' Slope=0.0100 '/' Tc=8.1 min CN=50 Runoff=0.01 cfs 0.007 af

Subcatchment 3S: Area 3 Runoff Area=27,470 sf 19.07% Impervious Runoff Depth=0.10"
Flow Length=154' Tc=9.5 min CN=50 Runoff=0.01 cfs 0.005 af

Subcatchment 4S: Area 4 Runoff Area=25,154 sf 33.93% Impervious Runoff Depth=0.28"
Flow Length=174' Tc=8.5 min CN=58 Runoff=0.07 cfs 0.014 af

Subcatchment 5S: Area 5 Runoff Area=11,801 sf 47.22% Impervious Runoff Depth=0.60"
Flow Length=62' Slope=0.0130 '/' Tc=6.0 min CN=67 Runoff=0.15 cfs 0.014 af

Subcatchment 6S: Area 6 Runoff Area=42,592 sf 57.48% Impervious Runoff Depth=0.88"
Flow Length=164' Tc=6.0 min CN=73 Runoff=0.93 cfs 0.071 af

Subcatchment 7S: Area 7 Runoff Area=43,690 sf 80.08% Impervious Runoff Depth=1.69"
Tc=6.0 min CN=86 Runoff=1.99 cfs 0.141 af

Subcatchment 8S: Area 8 Runoff Area=73,104 sf 62.41% Impervious Runoff Depth=0.98"
Flow Length=282' Tc=7.9 min CN=75 Runoff=1.71 cfs 0.137 af

Subcatchment 9S: Area 9 Runoff Area=55,716 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=346' Tc=11.8 min CN=41 Runoff=0.00 cfs 0.000 af

Reach 1R: CTB 29-DMH 28 Avg. Flow Depth=0.15' Max Vel=2.24 fps Inflow=0.17 cfs 0.015 af
12.0" Round Pipe n=0.012 L=13.3' S=0.0075 '/' Capacity=3.35 cfs Outflow=0.17 cfs 0.015 af

Reach 2R: CTB 26-DMH 25 Avg. Flow Depth=0.04' Max Vel=1.12 fps Inflow=0.01 cfs 0.007 af
12.0" Round Pipe n=0.012 L=13.7' S=0.0102 '/' Capacity=3.90 cfs Outflow=0.01 cfs 0.007 af

Reach 3R: CTB 22-DMH 20 Avg. Flow Depth=0.02' Max Vel=1.90 fps Inflow=0.01 cfs 0.005 af
12.0" Round Pipe n=0.012 L=13.8' S=0.0623 '/' Capacity=9.64 cfs Outflow=0.01 cfs 0.005 af

Reach 4R: CTB 32-DMH 17 Avg. Flow Depth=0.10' Max Vel=1.92 fps Inflow=0.07 cfs 0.014 af
12.0" Round Pipe n=0.012 L=14.3' S=0.0098 '/' Capacity=3.82 cfs Outflow=0.07 cfs 0.014 af

Reach 5R: CTB 15-DMH 13 Avg. Flow Depth=0.12' Max Vel=2.72 fps Inflow=0.15 cfs 0.014 af
12.0" Round Pipe n=0.012 L=13.8' S=0.0145 '/' Capacity=4.65 cfs Outflow=0.15 cfs 0.014 af

Reach 6R: DCTB 5-DMH 4 Avg. Flow Depth=0.31' Max Vel=4.55 fps Inflow=0.93 cfs 0.071 af
12.0" Round Pipe n=0.012 L=15.8' S=0.0139 '/' Capacity=4.55 cfs Outflow=0.93 cfs 0.071 af

Reach 7R: DCTB3-DMH 2 Avg. Flow Depth=0.33' Max Vel=8.69 fps Inflow=1.99 cfs 0.141 af
12.0" Round Pipe n=0.012 L=8.2' S=0.0463 '/' Capacity=8.31 cfs Outflow=1.99 cfs 0.141 af

Reach 8R: French Drain-DMH 1 Inflow=1.71 cfs 0.137 af
Outflow=1.71 cfs 0.137 af

Reach 21R: Existing 15" RCP Pipe in Saratoga Inflow=0.17 cfs 0.022 af
Outflow=0.17 cfs 0.022 af

Reach 22R: Existing 18" RCP pipe in Independence Inflow=0.17 cfs 0.027 af
Outflow=0.17 cfs 0.027 af

Reach 23R: Existing 24" HDPE pipe on site Inflow=3.63 cfs 0.278 af
Outflow=3.63 cfs 0.278 af

Reach 24R: Existing 30" HDPE pipe on Site Inflow=4.55 cfs 0.350 af
Outflow=4.55 cfs 0.350 af

Reach POA-1: Saratoga Blvd & Independence Dr Inflow=4.89 cfs 0.404 af
Outflow=4.89 cfs 0.404 af

Reach POA-2: Existing Infiltration Basin Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 7.572 ac Runoff Volume = 0.404 af Average Runoff Depth = 0.64"
58.90% Pervious = 4.460 ac 41.10% Impervious = 3.112 ac

Summary for Subcatchment 1S: Area 1

Runoff = 0.17 cfs @ 12.13 hrs, Volume= 0.015 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.03"

	Area (sf)	CN	Description
	1,449	98	Paved parking, HSG A
	1,705	98	Paved parking, HSG B
*	420	98	Concrete, HSG A
*	535	98	Concrete, HSG B
	2,295	39	>75% Grass cover, Good, HSG A
	3,624	61	>75% Grass cover, Good, HSG B
	10,028	71	Weighted Average
	5,919		59.02% Pervious Area
	4,109		40.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	43	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.5	188	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.3	231	Total			

Summary for Subcatchment 2S: Area 2

Runoff = 0.01 cfs @ 13.76 hrs, Volume= 0.007 af, Depth= 0.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.03"

	Area (sf)	CN	Description
	4,591	98	Paved parking, HSG A
	991	98	Paved parking, HSG B
*	1,188	98	Concrete, HSG A
*	238	98	Concrete, HSG B
	32,021	39	>75% Grass cover, Good, HSG A
	1,255	61	>75% Grass cover, Good, HSG B
	40,284	50	Weighted Average
	33,276		82.60% Pervious Area
	7,008		17.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.5	56	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.1	106	Total			

Summary for Subcatchment 3S: Area 3

Runoff = 0.01 cfs @ 13.80 hrs, Volume= 0.005 af, Depth= 0.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.03"

	Area (sf)	CN	Description
	4,201	98	Paved parking, HSG A
*	1,038	98	Concrete, HSG A
	22,231	39	>75% Grass cover, Good, HSG A
	27,470	50	Weighted Average
	22,231		80.93% Pervious Area
	5,239		19.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.8	76	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	28	0.0800	5.74		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.5	154	Total			

Summary for Subcatchment 4S: Area 4

Runoff = 0.07 cfs @ 12.33 hrs, Volume= 0.014 af, Depth= 0.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.03"

	Area (sf)	CN	Description
	7,321	98	Paved parking, HSG A
*	1,213	98	Concrete, HSG A
	12,656	39	>75% Grass cover, Good, HSG A
	3,964	30	Woods, Good, HSG A
	25,154	58	Weighted Average
	16,620		66.07% Pervious Area
	8,534		33.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.1	10	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.8	114	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.5	174	Total			

Summary for Subcatchment 5S: Area 5

Runoff = 0.15 cfs @ 12.11 hrs, Volume= 0.014 af, Depth= 0.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.03"

	Area (sf)	CN	Description
	4,465	98	Paved parking, HSG A
*	1,108	98	Concrete, HSG A
	6,228	39	>75% Grass cover, Good, HSG A
	11,801	67	Weighted Average
	6,228		52.78% Pervious Area
	5,573		47.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	40	0.0130	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.2	22	0.0130	2.31		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.9	62	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 6S: Area 6

Runoff = 0.93 cfs @ 12.10 hrs, Volume= 0.071 af, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.03"

Area (sf)	CN	Description
24,483	98	Paved parking, HSG A
18,109	39	>75% Grass cover, Good, HSG A
42,592	73	Weighted Average
18,109		42.52% Pervious Area
24,483		57.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	50	0.0500	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.4	36	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	78	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.8	164	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 7S: Area 7

Runoff = 1.99 cfs @ 12.09 hrs, Volume= 0.141 af, Depth= 1.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.03"

	Area (sf)	CN	Description
	33,300	98	Paved parking, HSG A
*	1,685	98	Concrete, HSG A
	8,705	39	>75% Grass cover, Good, HSG A
	43,690	86	Weighted Average
	8,705		19.92% Pervious Area
	34,985		80.08% Impervious Area

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

Summary for Subcatchment 8S: Area 8

Runoff = 1.71 cfs @ 12.12 hrs, Volume= 0.137 af, Depth= 0.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.03"

	Area (sf)	CN	Description
	36,451	98	Paved parking, HSG A
*	9,174	98	Concrete, HSG A
	21,677	39	>75% Grass cover, Good, HSG A
	5,802	30	Woods, Good, HSG A
	73,104	75	Weighted Average
	27,479		37.59% Pervious Area
	45,625		62.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0200	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.4	84	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.7	148	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.9	282	Total			

Summary for Subcatchment 9S: Area 9

Runoff = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.03"

Area (sf)	CN	Description
50,919	39	>75% Grass cover, Good, HSG A
388	30	Woods, Good, HSG A
4,409	61	>75% Grass cover, Good, HSG B
55,716	41	Weighted Average
55,716		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0150	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.0	54	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.7	59	0.0420	1.43		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.6	183	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
11.8	346	Total			

Summary for Reach 1R: CTB 29-DMH 28

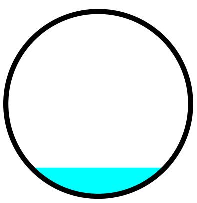
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.230 ac, 40.98% Impervious, Inflow Depth = 0.78" for 2-Year event
Inflow = 0.17 cfs @ 12.13 hrs, Volume= 0.015 af
Outflow = 0.17 cfs @ 12.13 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.24 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.93 fps, Avg. Travel Time= 0.2 min

Peak Storage= 1 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.35 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.3' Slope= 0.0075 '/'
Inlet Invert= 254.20', Outlet Invert= 254.10'



Summary for Reach 2R: CTB 26-DMH 25

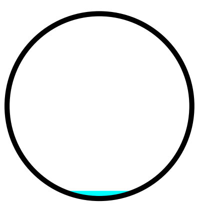
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.925 ac, 17.40% Impervious, Inflow Depth = 0.10" for 2-Year event
Inflow = 0.01 cfs @ 13.76 hrs, Volume= 0.007 af
Outflow = 0.01 cfs @ 13.76 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.12 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.95 fps, Avg. Travel Time= 0.2 min

Peak Storage= 0 cf @ 13.76 hrs
Average Depth at Peak Storage= 0.04'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.90 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.7' Slope= 0.0102 '/'
Inlet Invert= 255.75', Outlet Invert= 255.61'



Summary for Reach 3R: CTB 22-DMH 20

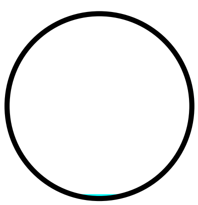
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.631 ac, 19.07% Impervious, Inflow Depth = 0.10" for 2-Year event
Inflow = 0.01 cfs @ 13.80 hrs, Volume= 0.005 af
Outflow = 0.01 cfs @ 13.78 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.90 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.64 fps, Avg. Travel Time= 0.1 min

Peak Storage= 0 cf @ 13.78 hrs
Average Depth at Peak Storage= 0.02'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 9.64 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.8' Slope= 0.0623 '/'
Inlet Invert= 254.66', Outlet Invert= 253.80'



Summary for Reach 4R: CTB 32-DMH 17

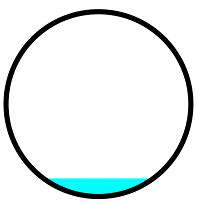
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.577 ac, 33.93% Impervious, Inflow Depth = 0.28" for 2-Year event
Inflow = 0.07 cfs @ 12.33 hrs, Volume= 0.014 af
Outflow = 0.07 cfs @ 12.33 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.92 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.07 fps, Avg. Travel Time= 0.2 min

Peak Storage= 1 cf @ 12.33 hrs
Average Depth at Peak Storage= 0.10'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.82 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 14.3' Slope= 0.0098 '/'
Inlet Invert= 254.20', Outlet Invert= 254.06'



Summary for Reach 5R: CTB 15-DMH 13

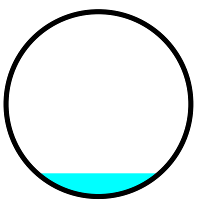
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.271 ac, 47.22% Impervious, Inflow Depth = 0.60" for 2-Year event
Inflow = 0.15 cfs @ 12.11 hrs, Volume= 0.014 af
Outflow = 0.15 cfs @ 12.11 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.72 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.17 fps, Avg. Travel Time= 0.2 min

Peak Storage= 1 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.12'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.65 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.8' Slope= 0.0145 '/'
Inlet Invert= 254.80', Outlet Invert= 254.60'



Summary for Reach 6R: DCTB 5-DMH 4

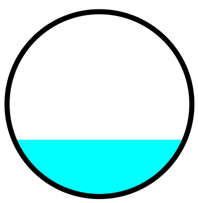
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.978 ac, 57.48% Impervious, Inflow Depth = 0.88" for 2-Year event
Inflow = 0.93 cfs @ 12.10 hrs, Volume= 0.071 af
Outflow = 0.93 cfs @ 12.10 hrs, Volume= 0.071 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.55 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.82 fps, Avg. Travel Time= 0.1 min

Peak Storage= 3 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.31'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.55 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 15.8' Slope= 0.0139 '/'
Inlet Invert= 251.58', Outlet Invert= 251.36'



Summary for Reach 7R: DCTB3-DMH 2

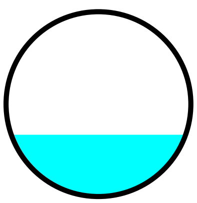
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 1.003 ac, 80.08% Impervious, Inflow Depth = 1.69" for 2-Year event
Inflow = 1.99 cfs @ 12.09 hrs, Volume= 0.141 af
Outflow = 1.99 cfs @ 12.09 hrs, Volume= 0.141 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.69 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 3.06 fps, Avg. Travel Time= 0.0 min

Peak Storage= 2 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.33'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 8.31 cfs

12.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 8.2' Slope= 0.0463 '/'
Inlet Invert= 251.74', Outlet Invert= 251.36'



Summary for Reach 8R: French Drain-DMH 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.678 ac, 62.41% Impervious, Inflow Depth = 0.98" for 2-Year event
Inflow = 1.71 cfs @ 12.12 hrs, Volume= 0.137 af
Outflow = 1.71 cfs @ 12.12 hrs, Volume= 0.137 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 21R: Existing 15" RCP Pipe in Saratoga

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.155 ac, 22.10% Impervious, Inflow Depth = 0.23" for 2-Year event
Inflow = 0.17 cfs @ 12.13 hrs, Volume= 0.022 af
Outflow = 0.17 cfs @ 12.13 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 22R: Existing 18" RCP pipe in Independence

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.786 ac, 21.03% Impervious, Inflow Depth = 0.18" for 2-Year event
Inflow = 0.17 cfs @ 12.13 hrs, Volume= 0.027 af
Outflow = 0.17 cfs @ 12.13 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 23R: Existing 24" HDPE pipe on site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.681 ac, 69.02% Impervious, Inflow Depth = 1.25" for 2-Year event
Inflow = 3.63 cfs @ 12.10 hrs, Volume= 0.278 af
Outflow = 3.63 cfs @ 12.10 hrs, Volume= 0.278 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 24R: Existing 30" HDPE pipe on Site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	3.659 ac,	65.94% Impervious,	Inflow Depth = 1.15"	for 2-Year event
Inflow =	4.55 cfs @	12.10 hrs, Volume=	0.350 af	
Outflow =	4.55 cfs @	12.10 hrs, Volume=	0.350 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach POA-1: Saratoga Blvd & Independence Dr

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.293 ac, 49.45% Impervious, Inflow Depth = 0.77" for 2-Year event
Inflow = 4.89 cfs @ 12.10 hrs, Volume= 0.404 af
Outflow = 4.89 cfs @ 12.10 hrs, Volume= 0.404 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach POA-2: Existing Infiltration Basin

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.279 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Area 1 Runoff Area=10,028 sf 40.98% Impervious Runoff Depth=1.75"
Flow Length=231' Slope=0.0100 '/' Tc=8.3 min CN=71 Runoff=0.42 cfs 0.034 af

Subcatchment 2S: Area 2 Runoff Area=40,284 sf 17.40% Impervious Runoff Depth=0.50"
Flow Length=106' Slope=0.0100 '/' Tc=8.1 min CN=50 Runoff=0.24 cfs 0.039 af

Subcatchment 3S: Area 3 Runoff Area=27,470 sf 19.07% Impervious Runoff Depth=0.50"
Flow Length=154' Tc=9.5 min CN=50 Runoff=0.16 cfs 0.026 af

Subcatchment 4S: Area 4 Runoff Area=25,154 sf 33.93% Impervious Runoff Depth=0.90"
Flow Length=174' Tc=8.5 min CN=58 Runoff=0.45 cfs 0.044 af

Subcatchment 5S: Area 5 Runoff Area=11,801 sf 47.22% Impervious Runoff Depth=1.46"
Flow Length=62' Slope=0.0130 '/' Tc=6.0 min CN=67 Runoff=0.44 cfs 0.033 af

Subcatchment 6S: Area 6 Runoff Area=42,592 sf 57.48% Impervious Runoff Depth=1.90"
Flow Length=164' Tc=6.0 min CN=73 Runoff=2.14 cfs 0.154 af

Subcatchment 7S: Area 7 Runoff Area=43,690 sf 80.08% Impervious Runoff Depth=3.00"
Tc=6.0 min CN=86 Runoff=3.50 cfs 0.251 af

Subcatchment 8S: Area 8 Runoff Area=73,104 sf 62.41% Impervious Runoff Depth=2.05"
Flow Length=282' Tc=7.9 min CN=75 Runoff=3.75 cfs 0.287 af

Subcatchment 9S: Area 9 Runoff Area=55,716 sf 0.00% Impervious Runoff Depth=0.16"
Flow Length=346' Tc=11.8 min CN=41 Runoff=0.03 cfs 0.018 af

Reach 1R: CTB 29-DMH 28 Avg. Flow Depth=0.24' Max Vel=2.92 fps Inflow=0.42 cfs 0.034 af
12.0" Round Pipe n=0.012 L=13.3' S=0.0075 '/' Capacity=3.35 cfs Outflow=0.42 cfs 0.034 af

Reach 2R: CTB 26-DMH 25 Avg. Flow Depth=0.17' Max Vel=2.77 fps Inflow=0.24 cfs 0.039 af
12.0" Round Pipe n=0.012 L=13.7' S=0.0102 '/' Capacity=3.90 cfs Outflow=0.24 cfs 0.039 af

Reach 3R: CTB 22-DMH 20 Avg. Flow Depth=0.09' Max Vel=4.60 fps Inflow=0.16 cfs 0.026 af
12.0" Round Pipe n=0.012 L=13.8' S=0.0623 '/' Capacity=9.64 cfs Outflow=0.16 cfs 0.026 af

Reach 4R: CTB 32-DMH 17 Avg. Flow Depth=0.23' Max Vel=3.26 fps Inflow=0.45 cfs 0.044 af
12.0" Round Pipe n=0.012 L=14.3' S=0.0098 '/' Capacity=3.82 cfs Outflow=0.45 cfs 0.044 af

Reach 5R: CTB 15-DMH 13 Avg. Flow Depth=0.21' Max Vel=3.73 fps Inflow=0.44 cfs 0.033 af
12.0" Round Pipe n=0.012 L=13.8' S=0.0145 '/' Capacity=4.65 cfs Outflow=0.44 cfs 0.033 af

Reach 6R: DCTB 5-DMH 4 Avg. Flow Depth=0.48' Max Vel=5.71 fps Inflow=2.14 cfs 0.154 af
12.0" Round Pipe n=0.012 L=15.8' S=0.0139 '/' Capacity=4.55 cfs Outflow=2.14 cfs 0.154 af

Reach 7R: DCTB3-DMH 2 Avg. Flow Depth=0.45' Max Vel=10.12 fps Inflow=3.50 cfs 0.251 af
12.0" Round Pipe n=0.012 L=8.2' S=0.0463 '/' Capacity=8.31 cfs Outflow=3.50 cfs 0.251 af

Reach 8R: French Drain-DMH 1	Inflow=3.75 cfs 0.287 af Outflow=3.75 cfs 0.287 af
Reach 21R: Existing 15" RCP Pipe in Saratoga	Inflow=0.64 cfs 0.072 af Outflow=0.64 cfs 0.072 af
Reach 22R: Existing 18" RCP pipe in Independence	Inflow=0.78 cfs 0.098 af Outflow=0.78 cfs 0.098 af
Reach 23R: Existing 24" HDPE pipe on site	Inflow=7.14 cfs 0.538 af Outflow=7.14 cfs 0.538 af
Reach 24R: Existing 30" HDPE pipe on Site	Inflow=9.28 cfs 0.692 af Outflow=9.28 cfs 0.692 af
Reach POA-1: Saratoga Blvd & Independence Dr	Inflow=10.76 cfs 0.867 af Outflow=10.76 cfs 0.867 af
Reach POA-2: Existing Infiltration Basin	Inflow=0.03 cfs 0.018 af Outflow=0.03 cfs 0.018 af

Total Runoff Area = 7.572 ac Runoff Volume = 0.885 af Average Runoff Depth = 1.40"
58.90% Pervious = 4.460 ac 41.10% Impervious = 3.112 ac

Summary for Subcatchment 1S: Area 1

Runoff = 0.42 cfs @ 12.12 hrs, Volume= 0.034 af, Depth= 1.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
	1,449	98	Paved parking, HSG A
	1,705	98	Paved parking, HSG B
*	420	98	Concrete, HSG A
*	535	98	Concrete, HSG B
	2,295	39	>75% Grass cover, Good, HSG A
	3,624	61	>75% Grass cover, Good, HSG B
	10,028	71	Weighted Average
	5,919		59.02% Pervious Area
	4,109		40.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	43	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.5	188	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.3	231	Total			

Summary for Subcatchment 2S: Area 2

Runoff = 0.24 cfs @ 12.18 hrs, Volume= 0.039 af, Depth= 0.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
	4,591	98	Paved parking, HSG A
	991	98	Paved parking, HSG B
*	1,188	98	Concrete, HSG A
*	238	98	Concrete, HSG B
	32,021	39	>75% Grass cover, Good, HSG A
	1,255	61	>75% Grass cover, Good, HSG B
	40,284	50	Weighted Average
	33,276		82.60% Pervious Area
	7,008		17.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.5	56	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.1	106	Total			

Summary for Subcatchment 3S: Area 3

Runoff = 0.16 cfs @ 12.23 hrs, Volume= 0.026 af, Depth= 0.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
	4,201	98	Paved parking, HSG A
*	1,038	98	Concrete, HSG A
	22,231	39	>75% Grass cover, Good, HSG A
	27,470	50	Weighted Average
	22,231		80.93% Pervious Area
	5,239		19.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.8	76	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	28	0.0800	5.74		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.5	154	Total			

Summary for Subcatchment 4S: Area 4

Runoff = 0.45 cfs @ 12.14 hrs, Volume= 0.044 af, Depth= 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
	7,321	98	Paved parking, HSG A
*	1,213	98	Concrete, HSG A
	12,656	39	>75% Grass cover, Good, HSG A
	3,964	30	Woods, Good, HSG A
	25,154	58	Weighted Average
	16,620		66.07% Pervious Area
	8,534		33.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.1	10	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.8	114	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.5	174	Total			

Summary for Subcatchment 5S: Area 5

Runoff = 0.44 cfs @ 12.10 hrs, Volume= 0.033 af, Depth= 1.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
	4,465	98	Paved parking, HSG A
*	1,108	98	Concrete, HSG A
	6,228	39	>75% Grass cover, Good, HSG A
	11,801	67	Weighted Average
	6,228		52.78% Pervious Area
	5,573		47.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	40	0.0130	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.2	22	0.0130	2.31		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.9	62	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 6S: Area 6

Runoff = 2.14 cfs @ 12.09 hrs, Volume= 0.154 af, Depth= 1.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
24,483	98	Paved parking, HSG A
18,109	39	>75% Grass cover, Good, HSG A
42,592	73	Weighted Average
18,109		42.52% Pervious Area
24,483		57.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	50	0.0500	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.4	36	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	78	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.8	164	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 7S: Area 7

Runoff = 3.50 cfs @ 12.09 hrs, Volume= 0.251 af, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
	33,300	98	Paved parking, HSG A
*	1,685	98	Concrete, HSG A
	8,705	39	>75% Grass cover, Good, HSG A
	43,690	86	Weighted Average
	8,705		19.92% Pervious Area
	34,985		80.08% Impervious Area

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

Summary for Subcatchment 8S: Area 8

Runoff = 3.75 cfs @ 12.12 hrs, Volume= 0.287 af, Depth= 2.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
	36,451	98	Paved parking, HSG A
*	9,174	98	Concrete, HSG A
	21,677	39	>75% Grass cover, Good, HSG A
	5,802	30	Woods, Good, HSG A
	73,104	75	Weighted Average
	27,479		37.59% Pervious Area
	45,625		62.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0200	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.4	84	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.7	148	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.9	282	Total			

Summary for Subcatchment 9S: Area 9

Runoff = 0.03 cfs @ 13.70 hrs, Volume= 0.018 af, Depth= 0.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
50,919	39	>75% Grass cover, Good, HSG A
388	30	Woods, Good, HSG A
4,409	61	>75% Grass cover, Good, HSG B
55,716	41	Weighted Average
55,716		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0150	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.0	54	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.7	59	0.0420	1.43		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.6	183	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
11.8	346	Total			

Summary for Reach 1R: CTB 29-DMH 28

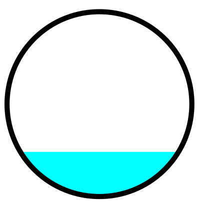
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.230 ac, 40.98% Impervious, Inflow Depth = 1.75" for 10-Year event
Inflow = 0.42 cfs @ 12.12 hrs, Volume= 0.034 af
Outflow = 0.42 cfs @ 12.13 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.92 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.12 fps, Avg. Travel Time= 0.2 min

Peak Storage= 2 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.35 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.3' Slope= 0.0075 '/'
Inlet Invert= 254.20', Outlet Invert= 254.10'



Summary for Reach 2R: CTB 26-DMH 25

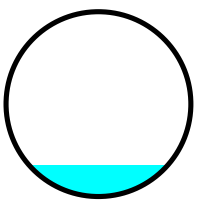
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.925 ac, 17.40% Impervious, Inflow Depth = 0.50" for 10-Year event
Inflow = 0.24 cfs @ 12.18 hrs, Volume= 0.039 af
Outflow = 0.24 cfs @ 12.19 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.77 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.47 fps, Avg. Travel Time= 0.2 min

Peak Storage= 1 cf @ 12.19 hrs
Average Depth at Peak Storage= 0.17'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.90 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.7' Slope= 0.0102 '/'
Inlet Invert= 255.75', Outlet Invert= 255.61'



Summary for Reach 3R: CTB 22-DMH 20

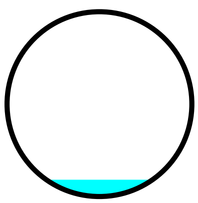
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.631 ac, 19.07% Impervious, Inflow Depth = 0.50" for 10-Year event
Inflow = 0.16 cfs @ 12.23 hrs, Volume= 0.026 af
Outflow = 0.16 cfs @ 12.23 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.60 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.47 fps, Avg. Travel Time= 0.1 min

Peak Storage= 0 cf @ 12.23 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 9.64 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.8' Slope= 0.0623 '/'
Inlet Invert= 254.66', Outlet Invert= 253.80'



Summary for Reach 4R: CTB 32-DMH 17

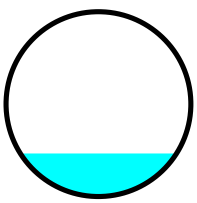
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.577 ac, 33.93% Impervious, Inflow Depth = 0.90" for 10-Year event
Inflow = 0.45 cfs @ 12.14 hrs, Volume= 0.044 af
Outflow = 0.45 cfs @ 12.14 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.26 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.44 fps, Avg. Travel Time= 0.2 min

Peak Storage= 2 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.82 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 14.3' Slope= 0.0098 '/'
Inlet Invert= 254.20', Outlet Invert= 254.06'



Summary for Reach 5R: CTB 15-DMH 13

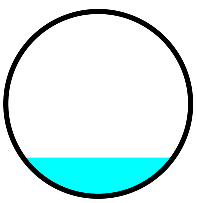
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.271 ac, 47.22% Impervious, Inflow Depth = 1.46" for 10-Year event
Inflow = 0.44 cfs @ 12.10 hrs, Volume= 0.033 af
Outflow = 0.44 cfs @ 12.10 hrs, Volume= 0.033 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.73 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.44 fps, Avg. Travel Time= 0.2 min

Peak Storage= 2 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.65 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.8' Slope= 0.0145 '/'
Inlet Invert= 254.80', Outlet Invert= 254.60'



Summary for Reach 6R: DCTB 5-DMH 4

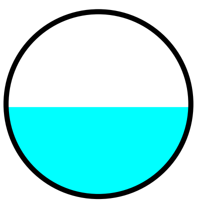
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.978 ac, 57.48% Impervious, Inflow Depth = 1.90" for 10-Year event
Inflow = 2.14 cfs @ 12.09 hrs, Volume= 0.154 af
Outflow = 2.14 cfs @ 12.09 hrs, Volume= 0.154 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.71 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.16 fps, Avg. Travel Time= 0.1 min

Peak Storage= 6 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.48'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.55 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 15.8' Slope= 0.0139 '/'
Inlet Invert= 251.58', Outlet Invert= 251.36'



Summary for Reach 7R: DCTB3-DMH 2

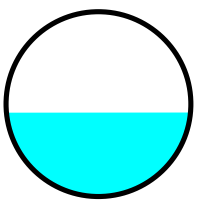
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 1.003 ac, 80.08% Impervious, Inflow Depth = 3.00" for 10-Year event
Inflow = 3.50 cfs @ 12.09 hrs, Volume= 0.251 af
Outflow = 3.50 cfs @ 12.09 hrs, Volume= 0.251 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 10.12 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 3.48 fps, Avg. Travel Time= 0.0 min

Peak Storage= 3 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.45'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 8.31 cfs

12.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 8.2' Slope= 0.0463 '/'
Inlet Invert= 251.74', Outlet Invert= 251.36'



Summary for Reach 8R: French Drain-DMH 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.678 ac, 62.41% Impervious, Inflow Depth = 2.05" for 10-Year event
Inflow = 3.75 cfs @ 12.12 hrs, Volume= 0.287 af
Outflow = 3.75 cfs @ 12.12 hrs, Volume= 0.287 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 21R: Existing 15" RCP Pipe in Saratoga

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.155 ac, 22.10% Impervious, Inflow Depth = 0.75" for 10-Year event
Inflow = 0.64 cfs @ 12.15 hrs, Volume= 0.072 af
Outflow = 0.64 cfs @ 12.15 hrs, Volume= 0.072 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 22R: Existing 18" RCP pipe in Independence

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.786 ac, 21.03% Impervious, Inflow Depth = 0.66" for 10-Year event
Inflow = 0.78 cfs @ 12.16 hrs, Volume= 0.098 af
Outflow = 0.78 cfs @ 12.16 hrs, Volume= 0.098 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 23R: Existing 24" HDPE pipe on site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.681 ac, 69.02% Impervious, Inflow Depth = 2.41" for 10-Year event
Inflow = 7.14 cfs @ 12.10 hrs, Volume= 0.538 af
Outflow = 7.14 cfs @ 12.10 hrs, Volume= 0.538 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 24R: Existing 30" HDPE pipe on Site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	3.659 ac, 65.94% Impervious, Inflow Depth = 2.27"	for 10-Year event	
Inflow =	9.28 cfs @ 12.10 hrs, Volume=	0.692 af	
Outflow =	9.28 cfs @ 12.10 hrs, Volume=	0.692 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach POA-1: Saratoga Blvd & Independence Dr

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.293 ac, 49.45% Impervious, Inflow Depth = 1.65" for 10-Year event
Inflow = 10.76 cfs @ 12.10 hrs, Volume= 0.867 af
Outflow = 10.76 cfs @ 12.10 hrs, Volume= 0.867 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach POA-2: Existing Infiltration Basin

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.279 ac, 0.00% Impervious, Inflow Depth = 0.16" for 10-Year event
Inflow = 0.03 cfs @ 13.70 hrs, Volume= 0.018 af
Outflow = 0.03 cfs @ 13.70 hrs, Volume= 0.018 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Area 1 Runoff Area=10,028 sf 40.98% Impervious Runoff Depth=2.60"
Flow Length=231' Slope=0.0100 '/' Tc=8.3 min CN=71 Runoff=0.64 cfs 0.050 af

Subcatchment 2S: Area 2 Runoff Area=40,284 sf 17.40% Impervious Runoff Depth=0.97"
Flow Length=106' Slope=0.0100 '/' Tc=8.1 min CN=50 Runoff=0.72 cfs 0.075 af

Subcatchment 3S: Area 3 Runoff Area=27,470 sf 19.07% Impervious Runoff Depth=0.97"
Flow Length=154' Tc=9.5 min CN=50 Runoff=0.46 cfs 0.051 af

Subcatchment 4S: Area 4 Runoff Area=25,154 sf 33.93% Impervious Runoff Depth=1.53"
Flow Length=174' Tc=8.5 min CN=58 Runoff=0.86 cfs 0.074 af

Subcatchment 5S: Area 5 Runoff Area=11,801 sf 47.22% Impervious Runoff Depth=2.25"
Flow Length=62' Slope=0.0130 '/' Tc=6.0 min CN=67 Runoff=0.70 cfs 0.051 af

Subcatchment 6S: Area 6 Runoff Area=42,592 sf 57.48% Impervious Runoff Depth=2.78"
Flow Length=164' Tc=6.0 min CN=73 Runoff=3.19 cfs 0.227 af

Subcatchment 7S: Area 7 Runoff Area=43,690 sf 80.08% Impervious Runoff Depth=4.06"
Tc=6.0 min CN=86 Runoff=4.68 cfs 0.339 af

Subcatchment 8S: Area 8 Runoff Area=73,104 sf 62.41% Impervious Runoff Depth=2.97"
Flow Length=282' Tc=7.9 min CN=75 Runoff=5.47 cfs 0.415 af

Subcatchment 9S: Area 9 Runoff Area=55,716 sf 0.00% Impervious Runoff Depth=0.44"
Flow Length=346' Tc=11.8 min CN=41 Runoff=0.22 cfs 0.047 af

Reach 1R: CTB 29-DMH 28 Avg. Flow Depth=0.30' Max Vel=3.29 fps Inflow=0.64 cfs 0.050 af
12.0" Round Pipe n=0.012 L=13.3' S=0.0075 '/' Capacity=3.35 cfs Outflow=0.64 cfs 0.050 af

Reach 2R: CTB 26-DMH 25 Avg. Flow Depth=0.29' Max Vel=3.78 fps Inflow=0.72 cfs 0.075 af
12.0" Round Pipe n=0.012 L=13.7' S=0.0102 '/' Capacity=3.90 cfs Outflow=0.71 cfs 0.075 af

Reach 3R: CTB 22-DMH 20 Avg. Flow Depth=0.15' Max Vel=6.32 fps Inflow=0.46 cfs 0.051 af
12.0" Round Pipe n=0.012 L=13.8' S=0.0623 '/' Capacity=9.64 cfs Outflow=0.46 cfs 0.051 af

Reach 4R: CTB 32-DMH 17 Avg. Flow Depth=0.32' Max Vel=3.92 fps Inflow=0.86 cfs 0.074 af
12.0" Round Pipe n=0.012 L=14.3' S=0.0098 '/' Capacity=3.82 cfs Outflow=0.86 cfs 0.074 af

Reach 5R: CTB 15-DMH 13 Avg. Flow Depth=0.26' Max Vel=4.26 fps Inflow=0.70 cfs 0.051 af
12.0" Round Pipe n=0.012 L=13.8' S=0.0145 '/' Capacity=4.65 cfs Outflow=0.70 cfs 0.051 af

Reach 6R: DCTB 5-DMH 4 Avg. Flow Depth=0.62' Max Vel=6.27 fps Inflow=3.19 cfs 0.227 af
12.0" Round Pipe n=0.012 L=15.8' S=0.0139 '/' Capacity=4.55 cfs Outflow=3.18 cfs 0.227 af

Reach 7R: DCTB3-DMH 2 Avg. Flow Depth=0.54' Max Vel=10.89 fps Inflow=4.68 cfs 0.339 af
12.0" Round Pipe n=0.012 L=8.2' S=0.0463 '/' Capacity=8.31 cfs Outflow=4.68 cfs 0.339 af

Reach 8R: French Drain-DMH 1	Inflow=5.47 cfs 0.415 af Outflow=5.47 cfs 0.415 af
Reach 21R: Existing 15" RCP Pipe in Saratoga	Inflow=1.35 cfs 0.124 af Outflow=1.35 cfs 0.124 af
Reach 22R: Existing 18" RCP pipe in Independence	Inflow=1.80 cfs 0.175 af Outflow=1.80 cfs 0.175 af
Reach 23R: Existing 24" HDPE pipe on site	Inflow=10.01 cfs 0.754 af Outflow=10.01 cfs 0.754 af
Reach 24R: Existing 30" HDPE pipe on Site	Inflow=13.18 cfs 0.981 af Outflow=13.18 cfs 0.981 af
Reach POA-1: Saratoga Blvd & Independence Dr	Inflow=16.30 cfs 1.281 af Outflow=16.30 cfs 1.281 af
Reach POA-2: Existing Infiltration Basin	Inflow=0.22 cfs 0.047 af Outflow=0.22 cfs 0.047 af

Total Runoff Area = 7.572 ac Runoff Volume = 1.328 af Average Runoff Depth = 2.11"
58.90% Pervious = 4.460 ac 41.10% Impervious = 3.112 ac

Summary for Subcatchment 1S: Area 1

Runoff = 0.64 cfs @ 12.12 hrs, Volume= 0.050 af, Depth= 2.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.63"

	Area (sf)	CN	Description
	1,449	98	Paved parking, HSG A
	1,705	98	Paved parking, HSG B
*	420	98	Concrete, HSG A
*	535	98	Concrete, HSG B
	2,295	39	>75% Grass cover, Good, HSG A
	3,624	61	>75% Grass cover, Good, HSG B
	10,028	71	Weighted Average
	5,919		59.02% Pervious Area
	4,109		40.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	43	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.5	188	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.3	231	Total			

Summary for Subcatchment 2S: Area 2

Runoff = 0.72 cfs @ 12.14 hrs, Volume= 0.075 af, Depth= 0.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.63"

	Area (sf)	CN	Description
	4,591	98	Paved parking, HSG A
	991	98	Paved parking, HSG B
*	1,188	98	Concrete, HSG A
*	238	98	Concrete, HSG B
	32,021	39	>75% Grass cover, Good, HSG A
	1,255	61	>75% Grass cover, Good, HSG B
	40,284	50	Weighted Average
	33,276		82.60% Pervious Area
	7,008		17.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.5	56	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.1	106	Total			

Summary for Subcatchment 3S: Area 3

Runoff = 0.46 cfs @ 12.17 hrs, Volume= 0.051 af, Depth= 0.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.63"

	Area (sf)	CN	Description
	4,201	98	Paved parking, HSG A
*	1,038	98	Concrete, HSG A
	22,231	39	>75% Grass cover, Good, HSG A
	27,470	50	Weighted Average
	22,231		80.93% Pervious Area
	5,239		19.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.8	76	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	28	0.0800	5.74		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.5	154	Total			

Summary for Subcatchment 4S: Area 4

Runoff = 0.86 cfs @ 12.13 hrs, Volume= 0.074 af, Depth= 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.63"

	Area (sf)	CN	Description
	7,321	98	Paved parking, HSG A
*	1,213	98	Concrete, HSG A
	12,656	39	>75% Grass cover, Good, HSG A
	3,964	30	Woods, Good, HSG A
	25,154	58	Weighted Average
	16,620		66.07% Pervious Area
	8,534		33.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.1	10	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.8	114	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.5	174	Total			

Summary for Subcatchment 5S: Area 5

Runoff = 0.70 cfs @ 12.09 hrs, Volume= 0.051 af, Depth= 2.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.63"

	Area (sf)	CN	Description
	4,465	98	Paved parking, HSG A
*	1,108	98	Concrete, HSG A
	6,228	39	>75% Grass cover, Good, HSG A
	11,801	67	Weighted Average
	6,228		52.78% Pervious Area
	5,573		47.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	40	0.0130	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.2	22	0.0130	2.31		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.9	62	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 6S: Area 6

Runoff = 3.19 cfs @ 12.09 hrs, Volume= 0.227 af, Depth= 2.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.63"

Area (sf)	CN	Description
24,483	98	Paved parking, HSG A
18,109	39	>75% Grass cover, Good, HSG A
42,592	73	Weighted Average
18,109		42.52% Pervious Area
24,483		57.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	50	0.0500	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.4	36	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	78	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.8	164	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 7S: Area 7

Runoff = 4.68 cfs @ 12.09 hrs, Volume= 0.339 af, Depth= 4.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.63"

	Area (sf)	CN	Description
	33,300	98	Paved parking, HSG A
*	1,685	98	Concrete, HSG A
	8,705	39	>75% Grass cover, Good, HSG A
	43,690	86	Weighted Average
	8,705		19.92% Pervious Area
	34,985		80.08% Impervious Area

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

Summary for Subcatchment 8S: Area 8

Runoff = 5.47 cfs @ 12.11 hrs, Volume= 0.415 af, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.63"

	Area (sf)	CN	Description
	36,451	98	Paved parking, HSG A
*	9,174	98	Concrete, HSG A
	21,677	39	>75% Grass cover, Good, HSG A
	5,802	30	Woods, Good, HSG A
	73,104	75	Weighted Average
	27,479		37.59% Pervious Area
	45,625		62.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0200	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.4	84	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.7	148	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.9	282	Total			

Summary for Subcatchment 9S: Area 9

Runoff = 0.22 cfs @ 12.42 hrs, Volume= 0.047 af, Depth= 0.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.63"

Area (sf)	CN	Description
50,919	39	>75% Grass cover, Good, HSG A
388	30	Woods, Good, HSG A
4,409	61	>75% Grass cover, Good, HSG B
55,716	41	Weighted Average
55,716		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0150	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.0	54	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.7	59	0.0420	1.43		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.6	183	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
11.8	346	Total			

Summary for Reach 1R: CTB 29-DMH 28

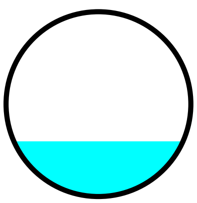
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.230 ac, 40.98% Impervious, Inflow Depth = 2.60" for 25-Year event
Inflow = 0.64 cfs @ 12.12 hrs, Volume= 0.050 af
Outflow = 0.64 cfs @ 12.12 hrs, Volume= 0.050 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.29 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.23 fps, Avg. Travel Time= 0.2 min

Peak Storage= 3 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.35 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.3' Slope= 0.0075 '/'
Inlet Invert= 254.20', Outlet Invert= 254.10'



Summary for Reach 2R: CTB 26-DMH 25

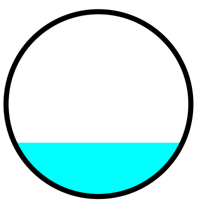
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.925 ac, 17.40% Impervious, Inflow Depth = 0.97" for 25-Year event
Inflow = 0.72 cfs @ 12.14 hrs, Volume= 0.075 af
Outflow = 0.71 cfs @ 12.14 hrs, Volume= 0.075 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.78 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.73 fps, Avg. Travel Time= 0.1 min

Peak Storage= 3 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.90 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.7' Slope= 0.0102 '/'
Inlet Invert= 255.75', Outlet Invert= 255.61'



Summary for Reach 3R: CTB 22-DMH 20

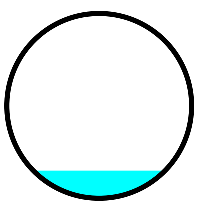
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.631 ac, 19.07% Impervious, Inflow Depth = 0.97" for 25-Year event
Inflow = 0.46 cfs @ 12.17 hrs, Volume= 0.051 af
Outflow = 0.46 cfs @ 12.17 hrs, Volume= 0.051 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.32 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.91 fps, Avg. Travel Time= 0.1 min

Peak Storage= 1 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 9.64 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.8' Slope= 0.0623 '/'
Inlet Invert= 254.66', Outlet Invert= 253.80'



Summary for Reach 4R: CTB 32-DMH 17

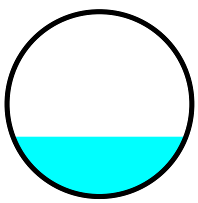
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.577 ac, 33.93% Impervious, Inflow Depth = 1.53" for 25-Year event
Inflow = 0.86 cfs @ 12.13 hrs, Volume= 0.074 af
Outflow = 0.86 cfs @ 12.13 hrs, Volume= 0.074 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.92 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.63 fps, Avg. Travel Time= 0.1 min

Peak Storage= 3 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.32'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.82 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 14.3' Slope= 0.0098 '/'
Inlet Invert= 254.20', Outlet Invert= 254.06'



Summary for Reach 5R: CTB 15-DMH 13

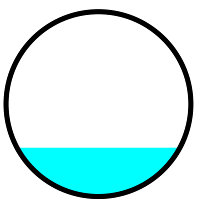
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.271 ac, 47.22% Impervious, Inflow Depth = 2.25" for 25-Year event
Inflow = 0.70 cfs @ 12.09 hrs, Volume= 0.051 af
Outflow = 0.70 cfs @ 12.09 hrs, Volume= 0.051 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.26 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.59 fps, Avg. Travel Time= 0.1 min

Peak Storage= 2 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.65 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.8' Slope= 0.0145 '/'
Inlet Invert= 254.80', Outlet Invert= 254.60'



Summary for Reach 6R: DCTB 5-DMH 4

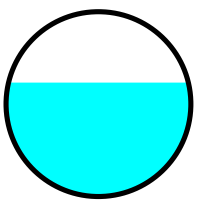
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.978 ac, 57.48% Impervious, Inflow Depth = 2.78" for 25-Year event
Inflow = 3.19 cfs @ 12.09 hrs, Volume= 0.227 af
Outflow = 3.18 cfs @ 12.09 hrs, Volume= 0.227 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.27 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.36 fps, Avg. Travel Time= 0.1 min

Peak Storage= 8 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.62'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.55 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 15.8' Slope= 0.0139 '/'
Inlet Invert= 251.58', Outlet Invert= 251.36'



Summary for Reach 7R: DCTB3-DMH 2

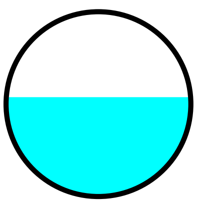
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 1.003 ac, 80.08% Impervious, Inflow Depth = 4.06" for 25-Year event
Inflow = 4.68 cfs @ 12.09 hrs, Volume= 0.339 af
Outflow = 4.68 cfs @ 12.09 hrs, Volume= 0.339 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 10.89 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 3.73 fps, Avg. Travel Time= 0.0 min

Peak Storage= 4 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.54'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 8.31 cfs

12.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 8.2' Slope= 0.0463 '/'
Inlet Invert= 251.74', Outlet Invert= 251.36'



Summary for Reach 8R: French Drain-DMH 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.678 ac, 62.41% Impervious, Inflow Depth = 2.97" for 25-Year event
Inflow = 5.47 cfs @ 12.11 hrs, Volume= 0.415 af
Outflow = 5.47 cfs @ 12.11 hrs, Volume= 0.415 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 21R: Existing 15" RCP Pipe in Saratoga

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.155 ac, 22.10% Impervious, Inflow Depth = 1.29" for 25-Year event
Inflow = 1.35 cfs @ 12.13 hrs, Volume= 0.124 af
Outflow = 1.35 cfs @ 12.13 hrs, Volume= 0.124 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 22R: Existing 18" RCP pipe in Independence

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.786 ac, 21.03% Impervious, Inflow Depth = 1.18" for 25-Year event
Inflow = 1.80 cfs @ 12.14 hrs, Volume= 0.175 af
Outflow = 1.80 cfs @ 12.14 hrs, Volume= 0.175 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 23R: Existing 24" HDPE pipe on site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.681 ac, 69.02% Impervious, Inflow Depth = 3.38" for 25-Year event
Inflow = 10.01 cfs @ 12.10 hrs, Volume= 0.754 af
Outflow = 10.01 cfs @ 12.10 hrs, Volume= 0.754 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 24R: Existing 30" HDPE pipe on Site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.659 ac, 65.94% Impervious, Inflow Depth = 3.22" for 25-Year event
Inflow = 13.18 cfs @ 12.10 hrs, Volume= 0.981 af
Outflow = 13.18 cfs @ 12.10 hrs, Volume= 0.981 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach POA-1: Saratoga Blvd & Independence Dr

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.293 ac, 49.45% Impervious, Inflow Depth = 2.44" for 25-Year event
Inflow = 16.30 cfs @ 12.10 hrs, Volume= 1.281 af
Outflow = 16.30 cfs @ 12.10 hrs, Volume= 1.281 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach POA-2: Existing Infiltration Basin

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.279 ac, 0.00% Impervious, Inflow Depth = 0.44" for 25-Year event
Inflow = 0.22 cfs @ 12.42 hrs, Volume= 0.047 af
Outflow = 0.22 cfs @ 12.42 hrs, Volume= 0.047 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Area 1 Runoff Area=10,028 sf 40.98% Impervious Runoff Depth=3.46"
Flow Length=231' Slope=0.0100 '/' Tc=8.3 min CN=71 Runoff=0.86 cfs 0.066 af

Subcatchment 2S: Area 2 Runoff Area=40,284 sf 17.40% Impervious Runoff Depth=1.49"
Flow Length=106' Slope=0.0100 '/' Tc=8.1 min CN=50 Runoff=1.27 cfs 0.115 af

Subcatchment 3S: Area 3 Runoff Area=27,470 sf 19.07% Impervious Runoff Depth=1.49"
Flow Length=154' Tc=9.5 min CN=50 Runoff=0.82 cfs 0.078 af

Subcatchment 4S: Area 4 Runoff Area=25,154 sf 33.93% Impervious Runoff Depth=2.19"
Flow Length=174' Tc=8.5 min CN=58 Runoff=1.29 cfs 0.106 af

Subcatchment 5S: Area 5 Runoff Area=11,801 sf 47.22% Impervious Runoff Depth=3.05"
Flow Length=62' Slope=0.0130 '/' Tc=6.0 min CN=67 Runoff=0.96 cfs 0.069 af

Subcatchment 6S: Area 6 Runoff Area=42,592 sf 57.48% Impervious Runoff Depth=3.66"
Flow Length=164' Tc=6.0 min CN=73 Runoff=4.20 cfs 0.298 af

Subcatchment 7S: Area 7 Runoff Area=43,690 sf 80.08% Impervious Runoff Depth=5.06"
Tc=6.0 min CN=86 Runoff=5.77 cfs 0.423 af

Subcatchment 8S: Area 8 Runoff Area=73,104 sf 62.41% Impervious Runoff Depth=3.87"
Flow Length=282' Tc=7.9 min CN=75 Runoff=7.13 cfs 0.541 af

Subcatchment 9S: Area 9 Runoff Area=55,716 sf 0.00% Impervious Runoff Depth=0.79"
Flow Length=346' Tc=11.8 min CN=41 Runoff=0.53 cfs 0.085 af

Reach 1R: CTB 29-DMH 28 Avg. Flow Depth=0.35' Max Vel=3.57 fps Inflow=0.86 cfs 0.066 af
12.0" Round Pipe n=0.012 L=13.3' S=0.0075 '/' Capacity=3.35 cfs Outflow=0.86 cfs 0.066 af

Reach 2R: CTB 26-DMH 25 Avg. Flow Depth=0.39' Max Vel=4.44 fps Inflow=1.27 cfs 0.115 af
12.0" Round Pipe n=0.012 L=13.7' S=0.0102 '/' Capacity=3.90 cfs Outflow=1.27 cfs 0.115 af

Reach 3R: CTB 22-DMH 20 Avg. Flow Depth=0.20' Max Vel=7.49 fps Inflow=0.82 cfs 0.078 af
12.0" Round Pipe n=0.012 L=13.8' S=0.0623 '/' Capacity=9.64 cfs Outflow=0.82 cfs 0.078 af

Reach 4R: CTB 32-DMH 17 Avg. Flow Depth=0.40' Max Vel=4.39 fps Inflow=1.29 cfs 0.106 af
12.0" Round Pipe n=0.012 L=14.3' S=0.0098 '/' Capacity=3.82 cfs Outflow=1.29 cfs 0.106 af

Reach 5R: CTB 15-DMH 13 Avg. Flow Depth=0.31' Max Vel=4.67 fps Inflow=0.96 cfs 0.069 af
12.0" Round Pipe n=0.012 L=13.8' S=0.0145 '/' Capacity=4.65 cfs Outflow=0.96 cfs 0.069 af

Reach 6R: DCTB 5-DMH 4 Avg. Flow Depth=0.76' Max Vel=6.58 fps Inflow=4.20 cfs 0.298 af
12.0" Round Pipe n=0.012 L=15.8' S=0.0139 '/' Capacity=4.55 cfs Outflow=4.20 cfs 0.298 af

Reach 7R: DCTB3-DMH 2 Avg. Flow Depth=0.61' Max Vel=11.42 fps Inflow=5.77 cfs 0.423 af
12.0" Round Pipe n=0.012 L=8.2' S=0.0463 '/' Capacity=8.31 cfs Outflow=5.77 cfs 0.423 af

Reach 8R: French Drain-DMH 1	Inflow=7.13 cfs 0.541 af Outflow=7.13 cfs 0.541 af
Reach 21R: Existing 15" RCP Pipe in Saratoga	Inflow=2.12 cfs 0.181 af Outflow=2.12 cfs 0.181 af
Reach 22R: Existing 18" RCP pipe in Independence	Inflow=2.93 cfs 0.260 af Outflow=2.93 cfs 0.260 af
Reach 23R: Existing 24" HDPE pipe on site	Inflow=12.74 cfs 0.964 af Outflow=12.74 cfs 0.964 af
Reach 24R: Existing 30" HDPE pipe on Site	Inflow=16.91 cfs 1.262 af Outflow=16.91 cfs 1.262 af
Reach POA-1: Saratoga Blvd & Independence Dr	Inflow=21.81 cfs 1.696 af Outflow=21.81 cfs 1.696 af
Reach POA-2: Existing Infiltration Basin	Inflow=0.53 cfs 0.085 af Outflow=0.53 cfs 0.085 af

Total Runoff Area = 7.572 ac Runoff Volume = 1.781 af Average Runoff Depth = 2.82"
58.90% Pervious = 4.460 ac 41.10% Impervious = 3.112 ac

Summary for Subcatchment 1S: Area 1

Runoff = 0.86 cfs @ 12.12 hrs, Volume= 0.066 af, Depth= 3.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=6.68"

	Area (sf)	CN	Description
	1,449	98	Paved parking, HSG A
	1,705	98	Paved parking, HSG B
*	420	98	Concrete, HSG A
*	535	98	Concrete, HSG B
	2,295	39	>75% Grass cover, Good, HSG A
	3,624	61	>75% Grass cover, Good, HSG B
	10,028	71	Weighted Average
	5,919		59.02% Pervious Area
	4,109		40.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	43	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.5	188	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.3	231	Total			

Summary for Subcatchment 2S: Area 2

Runoff = 1.27 cfs @ 12.13 hrs, Volume= 0.115 af, Depth= 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=6.68"

	Area (sf)	CN	Description
	4,591	98	Paved parking, HSG A
	991	98	Paved parking, HSG B
*	1,188	98	Concrete, HSG A
*	238	98	Concrete, HSG B
	32,021	39	>75% Grass cover, Good, HSG A
	1,255	61	>75% Grass cover, Good, HSG B
	40,284	50	Weighted Average
	33,276		82.60% Pervious Area
	7,008		17.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.5	56	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.1	106	Total			

Summary for Subcatchment 3S: Area 3

Runoff = 0.82 cfs @ 12.15 hrs, Volume= 0.078 af, Depth= 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=6.68"

	Area (sf)	CN	Description
	4,201	98	Paved parking, HSG A
*	1,038	98	Concrete, HSG A
	22,231	39	>75% Grass cover, Good, HSG A
	27,470	50	Weighted Average
	22,231		80.93% Pervious Area
	5,239		19.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.8	76	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	28	0.0800	5.74		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.5	154	Total			

Summary for Subcatchment 4S: Area 4

Runoff = 1.29 cfs @ 12.13 hrs, Volume= 0.106 af, Depth= 2.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=6.68"

	Area (sf)	CN	Description
	7,321	98	Paved parking, HSG A
*	1,213	98	Concrete, HSG A
	12,656	39	>75% Grass cover, Good, HSG A
	3,964	30	Woods, Good, HSG A
	25,154	58	Weighted Average
	16,620		66.07% Pervious Area
	8,534		33.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.1	10	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.8	114	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.5	174	Total			

Summary for Subcatchment 5S: Area 5

Runoff = 0.96 cfs @ 12.09 hrs, Volume= 0.069 af, Depth= 3.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=6.68"

	Area (sf)	CN	Description
	4,465	98	Paved parking, HSG A
*	1,108	98	Concrete, HSG A
	6,228	39	>75% Grass cover, Good, HSG A
	11,801	67	Weighted Average
	6,228		52.78% Pervious Area
	5,573		47.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	40	0.0130	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.2	22	0.0130	2.31		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.9	62	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 6S: Area 6

Runoff = 4.20 cfs @ 12.09 hrs, Volume= 0.298 af, Depth= 3.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=6.68"

Area (sf)	CN	Description
24,483	98	Paved parking, HSG A
18,109	39	>75% Grass cover, Good, HSG A
42,592	73	Weighted Average
18,109		42.52% Pervious Area
24,483		57.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	50	0.0500	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.4	36	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	78	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.8	164	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 7S: Area 7

Runoff = 5.77 cfs @ 12.09 hrs, Volume= 0.423 af, Depth= 5.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=6.68"

	Area (sf)	CN	Description
	33,300	98	Paved parking, HSG A
*	1,685	98	Concrete, HSG A
	8,705	39	>75% Grass cover, Good, HSG A
	43,690	86	Weighted Average
	8,705		19.92% Pervious Area
	34,985		80.08% Impervious Area

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

Summary for Subcatchment 8S: Area 8

Runoff = 7.13 cfs @ 12.11 hrs, Volume= 0.541 af, Depth= 3.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=6.68"

	Area (sf)	CN	Description
	36,451	98	Paved parking, HSG A
*	9,174	98	Concrete, HSG A
	21,677	39	>75% Grass cover, Good, HSG A
	5,802	30	Woods, Good, HSG A
	73,104	75	Weighted Average
	27,479		37.59% Pervious Area
	45,625		62.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0200	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.4	84	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.7	148	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.9	282	Total			

Summary for Subcatchment 9S: Area 9

Runoff = 0.53 cfs @ 12.26 hrs, Volume= 0.085 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=6.68"

Area (sf)	CN	Description
50,919	39	>75% Grass cover, Good, HSG A
388	30	Woods, Good, HSG A
4,409	61	>75% Grass cover, Good, HSG B
55,716	41	Weighted Average
55,716		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0150	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.0	54	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.7	59	0.0420	1.43		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.6	183	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
11.8	346	Total			

Summary for Reach 1R: CTB 29-DMH 28

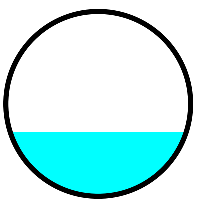
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.230 ac, 40.98% Impervious, Inflow Depth = 3.46" for 50-Year event
Inflow = 0.86 cfs @ 12.12 hrs, Volume= 0.066 af
Outflow = 0.86 cfs @ 12.12 hrs, Volume= 0.066 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.57 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.31 fps, Avg. Travel Time= 0.2 min

Peak Storage= 3 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.35'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.35 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.3' Slope= 0.0075 '/'
Inlet Invert= 254.20', Outlet Invert= 254.10'



Summary for Reach 2R: CTB 26-DMH 25

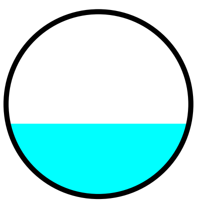
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.925 ac, 17.40% Impervious, Inflow Depth = 1.49" for 50-Year event
Inflow = 1.27 cfs @ 12.13 hrs, Volume= 0.115 af
Outflow = 1.27 cfs @ 12.13 hrs, Volume= 0.115 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.44 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.93 fps, Avg. Travel Time= 0.1 min

Peak Storage= 4 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.39'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.90 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.7' Slope= 0.0102 '/'
Inlet Invert= 255.75', Outlet Invert= 255.61'



Summary for Reach 3R: CTB 22-DMH 20

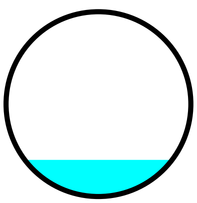
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.631 ac, 19.07% Impervious, Inflow Depth = 1.49" for 50-Year event
Inflow = 0.82 cfs @ 12.15 hrs, Volume= 0.078 af
Outflow = 0.82 cfs @ 12.15 hrs, Volume= 0.078 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.49 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 3.24 fps, Avg. Travel Time= 0.1 min

Peak Storage= 2 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 9.64 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.8' Slope= 0.0623 '/'
Inlet Invert= 254.66', Outlet Invert= 253.80'



Summary for Reach 4R: CTB 32-DMH 17

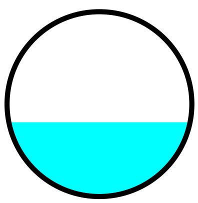
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.577 ac, 33.93% Impervious, Inflow Depth = 2.19" for 50-Year event
Inflow = 1.29 cfs @ 12.13 hrs, Volume= 0.106 af
Outflow = 1.29 cfs @ 12.13 hrs, Volume= 0.106 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.39 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.76 fps, Avg. Travel Time= 0.1 min

Peak Storage= 4 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.40'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.82 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 14.3' Slope= 0.0098 '/'
Inlet Invert= 254.20', Outlet Invert= 254.06'



Summary for Reach 5R: CTB 15-DMH 13

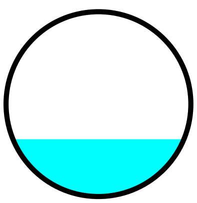
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.271 ac, 47.22% Impervious, Inflow Depth = 3.05" for 50-Year event
Inflow = 0.96 cfs @ 12.09 hrs, Volume= 0.069 af
Outflow = 0.96 cfs @ 12.09 hrs, Volume= 0.069 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.67 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.71 fps, Avg. Travel Time= 0.1 min

Peak Storage= 3 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.31'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.65 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.8' Slope= 0.0145 '/'
Inlet Invert= 254.80', Outlet Invert= 254.60'



Summary for Reach 6R: DCTB 5-DMH 4

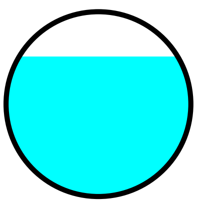
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.978 ac, 57.48% Impervious, Inflow Depth = 3.66" for 50-Year event
Inflow = 4.20 cfs @ 12.09 hrs, Volume= 0.298 af
Outflow = 4.20 cfs @ 12.09 hrs, Volume= 0.298 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.58 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.51 fps, Avg. Travel Time= 0.1 min

Peak Storage= 10 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.76'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.55 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 15.8' Slope= 0.0139 '/'
Inlet Invert= 251.58', Outlet Invert= 251.36'



Summary for Reach 7R: DCTB3-DMH 2

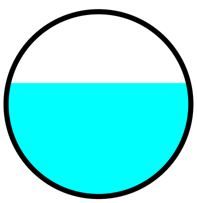
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 1.003 ac, 80.08% Impervious, Inflow Depth = 5.06" for 50-Year event
Inflow = 5.77 cfs @ 12.09 hrs, Volume= 0.423 af
Outflow = 5.77 cfs @ 12.09 hrs, Volume= 0.423 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 11.42 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 3.94 fps, Avg. Travel Time= 0.0 min

Peak Storage= 4 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.61'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 8.31 cfs

12.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 8.2' Slope= 0.0463 '/'
Inlet Invert= 251.74', Outlet Invert= 251.36'



Summary for Reach 8R: French Drain-DMH 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.678 ac, 62.41% Impervious, Inflow Depth = 3.87" for 50-Year event
Inflow = 7.13 cfs @ 12.11 hrs, Volume= 0.541 af
Outflow = 7.13 cfs @ 12.11 hrs, Volume= 0.541 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 21R: Existing 15" RCP Pipe in Saratoga

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.155 ac, 22.10% Impervious, Inflow Depth = 1.88" for 50-Year event
Inflow = 2.12 cfs @ 12.13 hrs, Volume= 0.181 af
Outflow = 2.12 cfs @ 12.13 hrs, Volume= 0.181 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 22R: Existing 18" RCP pipe in Independence

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.786 ac, 21.03% Impervious, Inflow Depth = 1.75" for 50-Year event
Inflow = 2.93 cfs @ 12.14 hrs, Volume= 0.260 af
Outflow = 2.93 cfs @ 12.14 hrs, Volume= 0.260 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 23R: Existing 24" HDPE pipe on site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.681 ac, 69.02% Impervious, Inflow Depth = 4.31" for 50-Year event
Inflow = 12.74 cfs @ 12.10 hrs, Volume= 0.964 af
Outflow = 12.74 cfs @ 12.10 hrs, Volume= 0.964 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 24R: Existing 30" HDPE pipe on Site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	3.659 ac,	65.94% Impervious,	Inflow Depth = 4.14"	for 50-Year event	
Inflow =	16.91 cfs @	12.10 hrs,	Volume=	1.262 af	
Outflow =	16.91 cfs @	12.10 hrs,	Volume=	1.262 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach POA-1: Saratoga Blvd & Independence Dr

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.293 ac, 49.45% Impervious, Inflow Depth = 3.23" for 50-Year event
Inflow = 21.81 cfs @ 12.10 hrs, Volume= 1.696 af
Outflow = 21.81 cfs @ 12.10 hrs, Volume= 1.696 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach POA-2: Existing Infiltration Basin

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.279 ac, 0.00% Impervious, Inflow Depth = 0.79" for 50-Year event
Inflow = 0.53 cfs @ 12.26 hrs, Volume= 0.085 af
Outflow = 0.53 cfs @ 12.26 hrs, Volume= 0.085 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Area 1 Runoff Area=10,028 sf 40.98% Impervious Runoff Depth=4.52"
Flow Length=231' Slope=0.0100 '/' Tc=8.3 min CN=71 Runoff=1.13 cfs 0.087 af

Subcatchment 2S: Area 2 Runoff Area=40,284 sf 17.40% Impervious Runoff Depth=2.21"
Flow Length=106' Slope=0.0100 '/' Tc=8.1 min CN=50 Runoff=2.03 cfs 0.170 af

Subcatchment 3S: Area 3 Runoff Area=27,470 sf 19.07% Impervious Runoff Depth=2.21"
Flow Length=154' Tc=9.5 min CN=50 Runoff=1.32 cfs 0.116 af

Subcatchment 4S: Area 4 Runoff Area=25,154 sf 33.93% Impervious Runoff Depth=3.06"
Flow Length=174' Tc=8.5 min CN=58 Runoff=1.85 cfs 0.147 af

Subcatchment 5S: Area 5 Runoff Area=11,801 sf 47.22% Impervious Runoff Depth=4.06"
Flow Length=62' Slope=0.0130 '/' Tc=6.0 min CN=67 Runoff=1.29 cfs 0.092 af

Subcatchment 6S: Area 6 Runoff Area=42,592 sf 57.48% Impervious Runoff Depth=4.75"
Flow Length=164' Tc=6.0 min CN=73 Runoff=5.44 cfs 0.387 af

Subcatchment 7S: Area 7 Runoff Area=43,690 sf 80.08% Impervious Runoff Depth=6.26"
Tc=6.0 min CN=86 Runoff=7.07 cfs 0.524 af

Subcatchment 8S: Area 8 Runoff Area=73,104 sf 62.41% Impervious Runoff Depth=4.98"
Flow Length=282' Tc=7.9 min CN=75 Runoff=9.14 cfs 0.696 af

Subcatchment 9S: Area 9 Runoff Area=55,716 sf 0.00% Impervious Runoff Depth=1.31"
Flow Length=346' Tc=11.8 min CN=41 Runoff=1.16 cfs 0.140 af

Reach 1R: CTB 29-DMH 28 Avg. Flow Depth=0.40' Max Vel=3.84 fps Inflow=1.13 cfs 0.087 af
12.0" Round Pipe n=0.012 L=13.3' S=0.0075 '/' Capacity=3.35 cfs Outflow=1.13 cfs 0.087 af

Reach 2R: CTB 26-DMH 25 Avg. Flow Depth=0.51' Max Vel=5.01 fps Inflow=2.03 cfs 0.170 af
12.0" Round Pipe n=0.012 L=13.7' S=0.0102 '/' Capacity=3.90 cfs Outflow=2.02 cfs 0.170 af

Reach 3R: CTB 22-DMH 20 Avg. Flow Depth=0.25' Max Vel=8.59 fps Inflow=1.32 cfs 0.116 af
12.0" Round Pipe n=0.012 L=13.8' S=0.0623 '/' Capacity=9.64 cfs Outflow=1.32 cfs 0.116 af

Reach 4R: CTB 32-DMH 17 Avg. Flow Depth=0.49' Max Vel=4.82 fps Inflow=1.85 cfs 0.147 af
12.0" Round Pipe n=0.012 L=14.3' S=0.0098 '/' Capacity=3.82 cfs Outflow=1.85 cfs 0.147 af

Reach 5R: CTB 15-DMH 13 Avg. Flow Depth=0.36' Max Vel=5.06 fps Inflow=1.29 cfs 0.092 af
12.0" Round Pipe n=0.012 L=13.8' S=0.0145 '/' Capacity=4.65 cfs Outflow=1.29 cfs 0.092 af

Reach 6R: DCTB 5-DMH 4 Avg. Flow Depth=1.00' Max Vel=6.61 fps Inflow=5.44 cfs 0.387 af
12.0" Round Pipe n=0.012 L=15.8' S=0.0139 '/' Capacity=4.55 cfs Outflow=4.80 cfs 0.387 af

Reach 7R: DCTB3-DMH 2 Avg. Flow Depth=0.71' Max Vel=11.87 fps Inflow=7.07 cfs 0.524 af
12.0" Round Pipe n=0.012 L=8.2' S=0.0463 '/' Capacity=8.31 cfs Outflow=7.07 cfs 0.524 af

Reach 8R: French Drain-DMH 1	Inflow=9.14 cfs 0.696 af Outflow=9.14 cfs 0.696 af
Reach 21R: Existing 15" RCP Pipe in Saratoga	Inflow=3.15 cfs 0.257 af Outflow=3.15 cfs 0.257 af
Reach 22R: Existing 18" RCP pipe in Independence	Inflow=4.44 cfs 0.373 af Outflow=4.44 cfs 0.373 af
Reach 23R: Existing 24" HDPE pipe on site	Inflow=16.02 cfs 1.220 af Outflow=16.02 cfs 1.220 af
Reach 24R: Existing 30" HDPE pipe on Site	Inflow=20.57 cfs 1.607 af Outflow=20.57 cfs 1.607 af
Reach POA-1: Saratoga Blvd & Independence Dr	Inflow=27.86 cfs 2.219 af Outflow=27.86 cfs 2.219 af
Reach POA-2: Existing Infiltration Basin	Inflow=1.16 cfs 0.140 af Outflow=1.16 cfs 0.140 af

Total Runoff Area = 7.572 ac Runoff Volume = 2.358 af Average Runoff Depth = 3.74"
58.90% Pervious = 4.460 ac 41.10% Impervious = 3.112 ac

Summary for Subcatchment 1S: Area 1

Runoff = 1.13 cfs @ 12.12 hrs, Volume= 0.087 af, Depth= 4.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.93"

	Area (sf)	CN	Description
	1,449	98	Paved parking, HSG A
	1,705	98	Paved parking, HSG B
*	420	98	Concrete, HSG A
*	535	98	Concrete, HSG B
	2,295	39	>75% Grass cover, Good, HSG A
	3,624	61	>75% Grass cover, Good, HSG B
	10,028	71	Weighted Average
	5,919		59.02% Pervious Area
	4,109		40.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	43	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.5	188	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.3	231	Total			

Summary for Subcatchment 2S: Area 2

Runoff = 2.03 cfs @ 12.13 hrs, Volume= 0.170 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.93"

	Area (sf)	CN	Description
	4,591	98	Paved parking, HSG A
	991	98	Paved parking, HSG B
*	1,188	98	Concrete, HSG A
*	238	98	Concrete, HSG B
	32,021	39	>75% Grass cover, Good, HSG A
	1,255	61	>75% Grass cover, Good, HSG B
	40,284	50	Weighted Average
	33,276		82.60% Pervious Area
	7,008		17.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.5	56	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.1	106	Total			

Summary for Subcatchment 3S: Area 3

Runoff = 1.32 cfs @ 12.15 hrs, Volume= 0.116 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.93"

	Area (sf)	CN	Description
	4,201	98	Paved parking, HSG A
*	1,038	98	Concrete, HSG A
	22,231	39	>75% Grass cover, Good, HSG A
	27,470	50	Weighted Average
	22,231		80.93% Pervious Area
	5,239		19.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.8	76	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	28	0.0800	5.74		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.5	154	Total			

Summary for Subcatchment 4S: Area 4

Runoff = 1.85 cfs @ 12.13 hrs, Volume= 0.147 af, Depth= 3.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.93"

	Area (sf)	CN	Description
	7,321	98	Paved parking, HSG A
*	1,213	98	Concrete, HSG A
	12,656	39	>75% Grass cover, Good, HSG A
	3,964	30	Woods, Good, HSG A
	25,154	58	Weighted Average
	16,620		66.07% Pervious Area
	8,534		33.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.1	10	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.8	114	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.5	174	Total			

Summary for Subcatchment 5S: Area 5

Runoff = 1.29 cfs @ 12.09 hrs, Volume= 0.092 af, Depth= 4.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.93"

	Area (sf)	CN	Description
	4,465	98	Paved parking, HSG A
*	1,108	98	Concrete, HSG A
	6,228	39	>75% Grass cover, Good, HSG A
	11,801	67	Weighted Average
	6,228		52.78% Pervious Area
	5,573		47.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	40	0.0130	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.2	22	0.0130	2.31		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.9	62	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 6S: Area 6

Runoff = 5.44 cfs @ 12.09 hrs, Volume= 0.387 af, Depth= 4.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.93"

Area (sf)	CN	Description
24,483	98	Paved parking, HSG A
18,109	39	>75% Grass cover, Good, HSG A
42,592	73	Weighted Average
18,109		42.52% Pervious Area
24,483		57.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	50	0.0500	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.4	36	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	78	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.8	164	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 7S: Area 7

Runoff = 7.07 cfs @ 12.08 hrs, Volume= 0.524 af, Depth= 6.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.93"

	Area (sf)	CN	Description
	33,300	98	Paved parking, HSG A
*	1,685	98	Concrete, HSG A
	8,705	39	>75% Grass cover, Good, HSG A
	43,690	86	Weighted Average
	8,705		19.92% Pervious Area
	34,985		80.08% Impervious Area

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

Summary for Subcatchment 8S: Area 8

Runoff = 9.14 cfs @ 12.11 hrs, Volume= 0.696 af, Depth= 4.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.93"

	Area (sf)	CN	Description
	36,451	98	Paved parking, HSG A
*	9,174	98	Concrete, HSG A
	21,677	39	>75% Grass cover, Good, HSG A
	5,802	30	Woods, Good, HSG A
	73,104	75	Weighted Average
	27,479		37.59% Pervious Area
	45,625		62.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0200	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.4	84	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.7	148	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.9	282	Total			

Summary for Subcatchment 9S: Area 9

Runoff = 1.16 cfs @ 12.21 hrs, Volume= 0.140 af, Depth= 1.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.93"

Area (sf)	CN	Description
50,919	39	>75% Grass cover, Good, HSG A
388	30	Woods, Good, HSG A
4,409	61	>75% Grass cover, Good, HSG B
55,716	41	Weighted Average
55,716		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0150	0.13		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.0	54	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.7	59	0.0420	1.43		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.6	183	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
11.8	346	Total			

Summary for Reach 1R: CTB 29-DMH 28

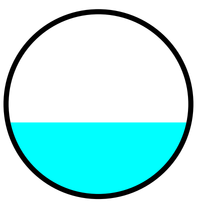
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.230 ac, 40.98% Impervious, Inflow Depth = 4.52" for 100-Year event
Inflow = 1.13 cfs @ 12.12 hrs, Volume= 0.087 af
Outflow = 1.13 cfs @ 12.12 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.84 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.39 fps, Avg. Travel Time= 0.2 min

Peak Storage= 4 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.40'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.35 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.3' Slope= 0.0075 '/'
Inlet Invert= 254.20', Outlet Invert= 254.10'



Summary for Reach 2R: CTB 26-DMH 25

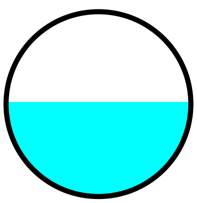
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.925 ac, 17.40% Impervious, Inflow Depth = 2.21" for 100-Year event
Inflow = 2.03 cfs @ 12.13 hrs, Volume= 0.170 af
Outflow = 2.02 cfs @ 12.13 hrs, Volume= 0.170 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.01 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.11 fps, Avg. Travel Time= 0.1 min

Peak Storage= 6 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.51'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.90 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.7' Slope= 0.0102 '/'
Inlet Invert= 255.75', Outlet Invert= 255.61'



Summary for Reach 3R: CTB 22-DMH 20

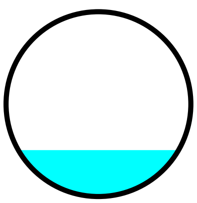
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.631 ac, 19.07% Impervious, Inflow Depth = 2.21" for 100-Year event
Inflow = 1.32 cfs @ 12.15 hrs, Volume= 0.116 af
Outflow = 1.32 cfs @ 12.15 hrs, Volume= 0.116 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.59 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 3.55 fps, Avg. Travel Time= 0.1 min

Peak Storage= 2 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 9.64 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.8' Slope= 0.0623 '/'
Inlet Invert= 254.66', Outlet Invert= 253.80'



Summary for Reach 4R: CTB 32-DMH 17

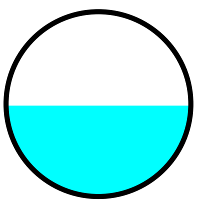
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.577 ac, 33.93% Impervious, Inflow Depth = 3.06" for 100-Year event
Inflow = 1.85 cfs @ 12.13 hrs, Volume= 0.147 af
Outflow = 1.85 cfs @ 12.13 hrs, Volume= 0.147 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.82 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.90 fps, Avg. Travel Time= 0.1 min

Peak Storage= 5 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.49'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.82 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 14.3' Slope= 0.0098 '/'
Inlet Invert= 254.20', Outlet Invert= 254.06'



Summary for Reach 5R: CTB 15-DMH 13

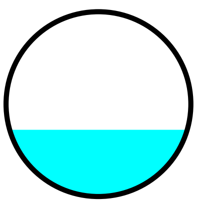
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.271 ac, 47.22% Impervious, Inflow Depth = 4.06" for 100-Year event
Inflow = 1.29 cfs @ 12.09 hrs, Volume= 0.092 af
Outflow = 1.29 cfs @ 12.09 hrs, Volume= 0.092 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.06 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.82 fps, Avg. Travel Time= 0.1 min

Peak Storage= 4 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.36'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.65 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.8' Slope= 0.0145 '/'
Inlet Invert= 254.80', Outlet Invert= 254.60'



Summary for Reach 6R: DCTB 5-DMH 4

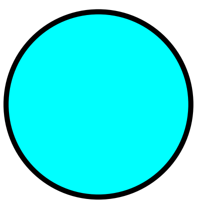
[52] Hint: Inlet/Outlet conditions not evaluated
[55] Hint: Peak inflow is 119% of Manning's capacity
[76] Warning: Detained 0.004 af (Pond w/culvert advised)
[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=1)

Inflow Area =	0.978 ac,	57.48% Impervious,	Inflow Depth =	4.75"	for 100-Year event	
Inflow =	5.44 cfs @	12.09 hrs,	Volume=	0.387 af		
Outflow =	4.80 cfs @	12.05 hrs,	Volume=	0.387 af,	Atten= 12%,	Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.61 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.65 fps, Avg. Travel Time= 0.1 min

Peak Storage= 12 cf @ 12.06 hrs
Average Depth at Peak Storage= 1.00'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.55 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 15.8' Slope= 0.0139 '/'
Inlet Invert= 251.58', Outlet Invert= 251.36'



Summary for Reach 7R: DCTB3-DMH 2

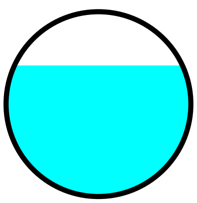
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 1.003 ac, 80.08% Impervious, Inflow Depth = 6.26" for 100-Year event
Inflow = 7.07 cfs @ 12.08 hrs, Volume= 0.524 af
Outflow = 7.07 cfs @ 12.09 hrs, Volume= 0.524 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 11.87 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 4.16 fps, Avg. Travel Time= 0.0 min

Peak Storage= 5 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.71'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 8.31 cfs

12.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 8.2' Slope= 0.0463 '/'
Inlet Invert= 251.74', Outlet Invert= 251.36'



Summary for Reach 8R: French Drain-DMH 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.678 ac, 62.41% Impervious, Inflow Depth = 4.98" for 100-Year event
Inflow = 9.14 cfs @ 12.11 hrs, Volume= 0.696 af
Outflow = 9.14 cfs @ 12.11 hrs, Volume= 0.696 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 21R: Existing 15" RCP Pipe in Saratoga

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.155 ac, 22.10% Impervious, Inflow Depth = 2.67" for 100-Year event
Inflow = 3.15 cfs @ 12.13 hrs, Volume= 0.257 af
Outflow = 3.15 cfs @ 12.13 hrs, Volume= 0.257 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 22R: Existing 18" RCP pipe in Independence

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.786 ac, 21.03% Impervious, Inflow Depth = 2.51" for 100-Year event
Inflow = 4.44 cfs @ 12.13 hrs, Volume= 0.373 af
Outflow = 4.44 cfs @ 12.13 hrs, Volume= 0.373 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 23R: Existing 24" HDPE pipe on site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.681 ac, 69.02% Impervious, Inflow Depth = 5.46" for 100-Year event
Inflow = 16.02 cfs @ 12.10 hrs, Volume= 1.220 af
Outflow = 16.02 cfs @ 12.10 hrs, Volume= 1.220 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 24R: Existing 30" HDPE pipe on Site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	3.659 ac,	65.94% Impervious,	Inflow Depth = 5.27"	for 100-Year event
Inflow =	20.57 cfs @	12.10 hrs,	Volume=	1.607 af
Outflow =	20.57 cfs @	12.10 hrs,	Volume=	1.607 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach POA-1: Saratoga Blvd & Independence Dr

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.293 ac, 49.45% Impervious, Inflow Depth = 4.23" for 100-Year event
Inflow = 27.86 cfs @ 12.11 hrs, Volume= 2.219 af
Outflow = 27.86 cfs @ 12.11 hrs, Volume= 2.219 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

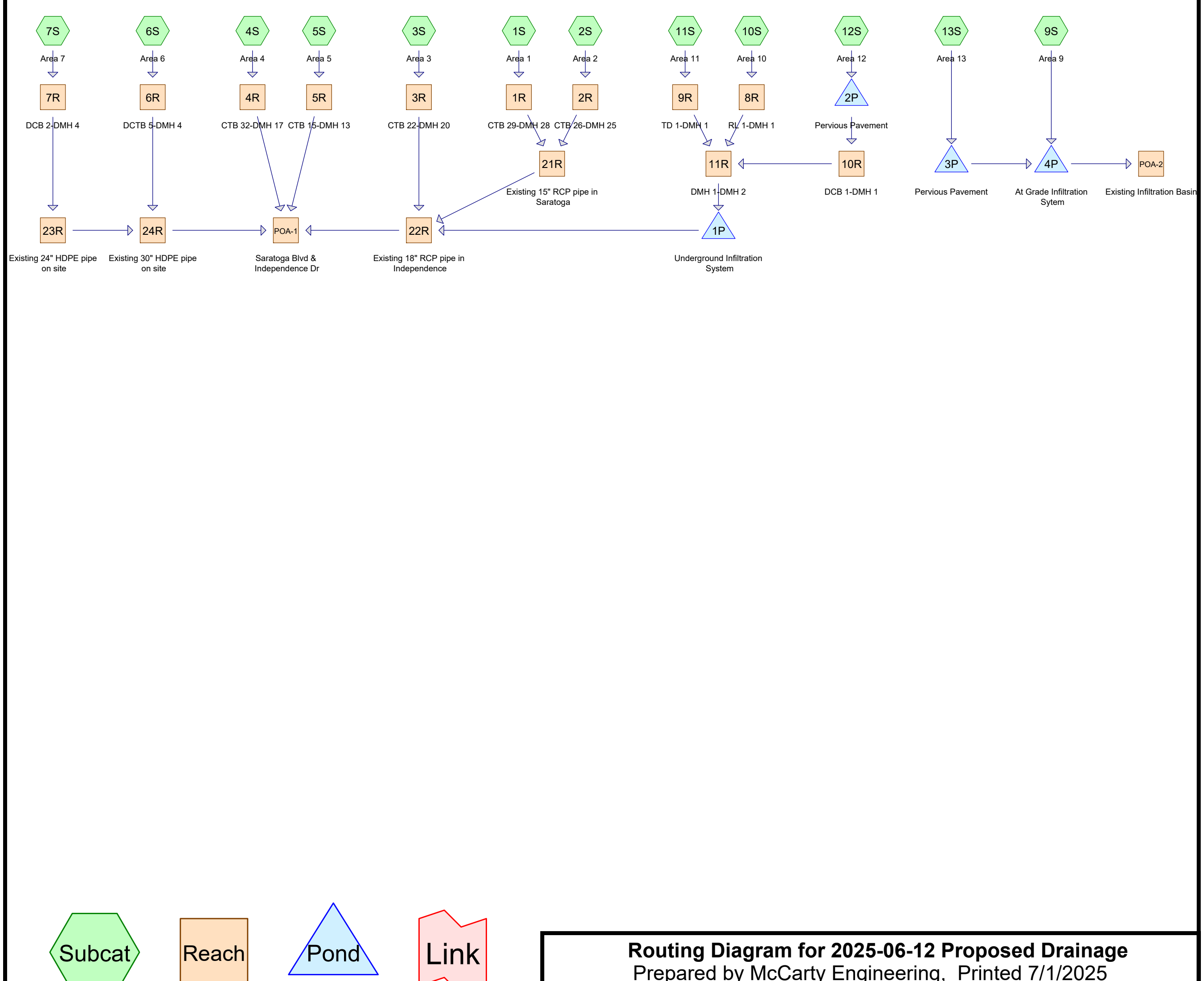
Summary for Reach POA-2: Existing Infiltration Basin

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.279 ac, 0.00% Impervious, Inflow Depth = 1.31" for 100-Year event
Inflow = 1.16 cfs @ 12.21 hrs, Volume= 0.140 af
Outflow = 1.16 cfs @ 12.21 hrs, Volume= 0.140 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Proposed Conditions HydroCAD Model



Routing Diagram for 2025-06-12 Proposed Drainage
Prepared by McCarty Engineering, Printed 7/1/2025
HydroCAD® 10.00-26 s/n 02034 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.925	39	>75% Grass cover, Good, HSG A (1S, 2S, 3S, 4S, 5S, 6S, 7S, 9S, 11S, 12S, 13S)
0.176	61	>75% Grass cover, Good, HSG B (1S, 9S, 12S, 13S)
0.309	98	Concrete, HSG A (1S, 2S, 3S, 4S, 5S, 7S, 11S, 12S, 13S)
0.018	98	Concrete, HSG B (1S)
2.662	98	Paved parking, HSG A (1S, 2S, 3S, 4S, 5S, 6S, 7S, 9S, 11S, 12S, 13S)
0.098	98	Paved parking, HSG B (1S, 9S, 13S)
1.382	98	Roofs, HSG A (10S)
7.572	**74**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
7.279	HSG A	1S, 2S, 3S, 4S, 5S, 6S, 7S, 9S, 10S, 11S, 12S, 13S
0.292	HSG B	1S, 9S, 12S, 13S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
7.572		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
2.925	0.176	0.000	0.000	0.000	3.102	>75% Grass cover, Good	1S, 2S, 3S, 4S, 5S, 6S, 7S, 9S, 11S, 12S, 13S
0.309	0.018	0.000	0.000	0.000	0.327	Concrete	1S, 2S, 3S, 4S, 5S, 7S, 11S, 12S, 13S
2.662	0.098	0.000	0.000	0.000	2.760	Paved parking	1S, 2S, 3S, 4S, 5S, 6S, 7S, 9S, 11S, 12S, 13S
1.382	0.000	0.000	0.000	0.000	1.382	Roofs	10S
7.279	**0.292**	**0.000**	**0.000**	**0.000**	**7.572**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1R	254.20	254.10	13.3	0.0075	0.012	12.0	0.0	0.0
2	2R	255.75	255.61	13.7	0.0102	0.012	12.0	0.0	0.0
3	3R	254.66	253.80	13.8	0.0623	0.012	12.0	0.0	0.0
4	4R	254.20	254.06	14.3	0.0098	0.012	12.0	0.0	0.0
5	5R	254.80	254.60	13.8	0.0145	0.012	12.0	0.0	0.0
6	6R	251.58	251.36	15.8	0.0139	0.012	12.0	0.0	0.0
7	7R	252.00	251.65	27.8	0.0126	0.012	12.0	0.0	0.0
8	8R	253.60	252.00	80.1	0.0200	0.012	18.0	0.0	0.0
9	9R	252.00	250.32	84.1	0.0200	0.012	12.0	0.0	0.0
10	10R	252.00	250.09	191.5	0.0100	0.012	12.0	0.0	0.0
11	11R	100.00	99.85	15.0	0.0100	0.012	18.0	0.0	0.0
12	1P	252.44	252.10	60.5	0.0056	0.012	12.0	0.0	0.0

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Area 1 Runoff Area=18,235 sf 39.10% Impervious Runoff Depth=0.64"
Flow Length=79' Slope=0.0100 '/' Tc=7.1 min CN=68 Runoff=0.25 cfs 0.022 af

Subcatchment 2S: Area 2 Runoff Area=12,939 sf 37.00% Impervious Runoff Depth=0.38"
Flow Length=185' Slope=0.0100 '/' Tc=8.7 min CN=61 Runoff=0.07 cfs 0.009 af

Subcatchment 3S: Area 3 Runoff Area=14,335 sf 37.64% Impervious Runoff Depth=0.38"
Flow Length=172' Slope=0.0100 '/' Tc=9.1 min CN=61 Runoff=0.07 cfs 0.010 af

Subcatchment 4S: Area 4 Runoff Area=19,390 sf 46.37% Impervious Runoff Depth=0.56"
Flow Length=110' Tc=6.3 min CN=66 Runoff=0.22 cfs 0.021 af

Subcatchment 5S: Area 5 Runoff Area=11,986 sf 45.91% Impervious Runoff Depth=0.56"
Tc=6.0 min CN=66 Runoff=0.14 cfs 0.013 af

Subcatchment 6S: Area 6 Runoff Area=51,476 sf 62.28% Impervious Runoff Depth=1.04"
Flow Length=159' Tc=6.0 min CN=76 Runoff=1.37 cfs 0.102 af

Subcatchment 7S: Area 7 Runoff Area=33,912 sf 63.48% Impervious Runoff Depth=1.04"
Flow Length=230' Tc=9.0 min CN=76 Runoff=0.81 cfs 0.067 af

Subcatchment 9S: Area 9 Runoff Area=23,171 sf 12.60% Impervious Runoff Depth=0.05"
Tc=6.0 min CN=47 Runoff=0.00 cfs 0.002 af

Subcatchment 10S: Area 10 Runoff Area=60,214 sf 100.00% Impervious Runoff Depth=2.80"
Tc=6.0 min CN=98 Runoff=4.06 cfs 0.322 af

Subcatchment 11S: Area 11 Runoff Area=41,275 sf 52.83% Impervious Runoff Depth=0.73"
Flow Length=292' Tc=9.8 min CN=70 Runoff=0.62 cfs 0.058 af

Subcatchment 12S: Area 12 Runoff Area=29,543 sf 48.32% Impervious Runoff Depth=0.64"
Flow Length=181' Tc=9.0 min CN=68 Runoff=0.38 cfs 0.036 af

Subcatchment 13S: Area 13 Runoff Area=13,342 sf 75.68% Impervious Runoff Depth=1.77"
Flow Length=32' Slope=0.0100 '/' Tc=6.0 min CN=87 Runoff=0.63 cfs 0.045 af

Reach 1R: CTB 29-DMH 28 Avg. Flow Depth=0.19' Max Vel=2.50 fps Inflow=0.25 cfs 0.022 af
12.0" Round Pipe n=0.012 L=13.3' S=0.0075 '/' Capacity=3.35 cfs Outflow=0.25 cfs 0.022 af

Reach 2R: CTB 26-DMH 25 Avg. Flow Depth=0.09' Max Vel=1.87 fps Inflow=0.07 cfs 0.009 af
12.0" Round Pipe n=0.012 L=13.7' S=0.0102 '/' Capacity=3.90 cfs Outflow=0.07 cfs 0.009 af

Reach 3R: CTB 22-DMH 20 Avg. Flow Depth=0.06' Max Vel=3.61 fps Inflow=0.07 cfs 0.010 af
12.0" Round Pipe n=0.012 L=13.8' S=0.0623 '/' Capacity=9.64 cfs Outflow=0.07 cfs 0.010 af

Reach 4R: CTB 32-DMH 17 Avg. Flow Depth=0.16' Max Vel=2.65 fps Inflow=0.22 cfs 0.021 af
12.0" Round Pipe n=0.012 L=14.3' S=0.0098 '/' Capacity=3.82 cfs Outflow=0.22 cfs 0.021 af

Reach 5R: CTB 15-DMH 13 Avg. Flow Depth=0.12' Max Vel=2.65 fps Inflow=0.14 cfs 0.013 af
12.0" Round Pipe n=0.012 L=13.8' S=0.0145 '/' Capacity=4.65 cfs Outflow=0.14 cfs 0.013 af

Reach 6R: DCTB 5-DMH 4 Avg. Flow Depth=0.38' Max Vel=5.07 fps Inflow=1.37 cfs 0.102 af
12.0" Round Pipe n=0.012 L=15.8' S=0.0139 '/' Capacity=4.55 cfs Outflow=1.37 cfs 0.102 af

Reach 7R: DCB 2-DMH 4 Avg. Flow Depth=0.29' Max Vel=4.23 fps Inflow=0.81 cfs 0.067 af
12.0" Round Pipe n=0.012 L=27.8' S=0.0126 '/' Capacity=4.33 cfs Outflow=0.81 cfs 0.067 af

Reach 8R: RL 1-DMH 1 Avg. Flow Depth=0.51' Max Vel=7.58 fps Inflow=4.06 cfs 0.322 af
18.0" Round Pipe n=0.012 L=80.1' S=0.0200 '/' Capacity=16.08 cfs Outflow=4.05 cfs 0.322 af

Reach 9R: TD 1-DMH 1 Avg. Flow Depth=0.23' Max Vel=4.61 fps Inflow=0.62 cfs 0.058 af
12.0" Round Pipe n=0.012 L=84.1' S=0.0200 '/' Capacity=5.46 cfs Outflow=0.62 cfs 0.058 af

Reach 10R: DCB 1-DMH 1 Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
12.0" Round Pipe n=0.012 L=191.5' S=0.0100 '/' Capacity=3.85 cfs Outflow=0.00 cfs 0.000 af

Reach 11R: DMH 1-DMH 2 Avg. Flow Depth=0.66' Max Vel=6.07 fps Inflow=4.52 cfs 0.380 af
18.0" Round Pipe n=0.012 L=15.0' S=0.0100 '/' Capacity=11.38 cfs Outflow=4.52 cfs 0.380 af

Reach 21R: Existing 15" RCP pipe in Saratoga Inflow=0.31 cfs 0.032 af
Outflow=0.31 cfs 0.032 af

Reach 22R: Existing 18" RCP pipe in Independence Inflow=0.37 cfs 0.042 af
Outflow=0.37 cfs 0.042 af

Reach 23R: Existing 24" HDPE pipe on site Inflow=0.81 cfs 0.067 af
Outflow=0.81 cfs 0.067 af

Reach 24R: Existing 30" HDPE pipe on site Inflow=2.13 cfs 0.169 af
Outflow=2.13 cfs 0.169 af

Reach POA-1: Saratoga Blvd & Independence Dr Inflow=2.84 cfs 0.245 af
Outflow=2.84 cfs 0.245 af

Reach POA-2: Existing Infiltration Basin Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 1P: Underground Infiltration System Peak Elev=249.96' Storage=2,859 cf Inflow=4.52 cfs 0.380 af
Discarded=1.41 cfs 0.380 af Primary=0.00 cfs 0.000 af Outflow=1.41 cfs 0.380 af

Pond 2P: Pervious Pavement Peak Elev=254.09' Storage=8 cf Inflow=0.38 cfs 0.036 af
Discarded=0.38 cfs 0.036 af Primary=0.00 cfs 0.000 af Outflow=0.38 cfs 0.036 af

Pond 3P: Pervious Pavement Peak Elev=255.09' Storage=14 cf Inflow=0.63 cfs 0.045 af
Discarded=0.62 cfs 0.045 af Primary=0.00 cfs 0.000 af Outflow=0.62 cfs 0.045 af

Pond 4P: At Grade Infiltration Sytem Peak Elev=254.00' Storage=0 cf Inflow=0.00 cfs 0.002 af
Discarded=0.00 cfs 0.002 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.002 af

Total Runoff Area = 7.572 ac Runoff Volume = 0.708 af Average Runoff Depth = 1.12"
40.97% Pervious = 3.102 ac 59.03% Impervious = 4.470 ac

Summary for Subcatchment 1S: Area 1

Runoff = 0.25 cfs @ 12.12 hrs, Volume= 0.022 af, Depth= 0.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.03"

	Area (sf)	CN	Description
	2,934	98	Paved parking, HSG A
*	726	98	Concrete, HSG A
	6,089	39	>75% Grass cover, Good, HSG A
	2,696	98	Paved parking, HSG B
*	774	98	Concrete, HSG B
	5,016	61	>75% Grass cover, Good, HSG B
	18,235	68	Weighted Average
	11,105		60.90% Pervious Area
	7,130		39.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	43	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.3	36	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.1	79	Total			

Summary for Subcatchment 2S: Area 2

Runoff = 0.07 cfs @ 12.18 hrs, Volume= 0.009 af, Depth= 0.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.03"

	Area (sf)	CN	Description
	3,911	98	Paved parking, HSG A
*	877	98	Concrete, HSG A
	8,151	39	>75% Grass cover, Good, HSG A
	12,939	61	Weighted Average
	8,151		63.00% Pervious Area
	4,788		37.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.1	135	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.7	185	Total			

Summary for Subcatchment 3S: Area 3

Runoff = 0.07 cfs @ 12.19 hrs, Volume= 0.010 af, Depth= 0.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.03"

	Area (sf)	CN	Description
	4,375	98	Paved parking, HSG A
*	1,020	98	Concrete, HSG A
	8,940	39	>75% Grass cover, Good, HSG A
	14,335	61	Weighted Average
	8,940		62.36% Pervious Area
	5,395		37.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.7	30	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.8	92	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.1	172	Total			

Summary for Subcatchment 4S: Area 4

Runoff = 0.22 cfs @ 12.11 hrs, Volume= 0.021 af, Depth= 0.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.03"

	Area (sf)	CN	Description
	7,754	98	Paved parking, HSG A
*	1,238	98	Concrete, HSG A
	10,398	39	>75% Grass cover, Good, HSG A
	19,390	66	Weighted Average
	10,398		53.63% Pervious Area
	8,992		46.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0200	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.5	60	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.3	110	Total			

Summary for Subcatchment 5S: Area 5

Runoff = 0.14 cfs @ 12.11 hrs, Volume= 0.013 af, Depth= 0.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.03"

	Area (sf)	CN	Description
	4,396	98	Paved parking, HSG A
*	1,107	98	Concrete, HSG A
	6,483	39	>75% Grass cover, Good, HSG A
	11,986	66	Weighted Average
	6,483		54.09% Pervious Area
	5,503		45.91% Impervious Area

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

Summary for Subcatchment 6S: Area 6

Runoff = 1.37 cfs @ 12.09 hrs, Volume= 0.102 af, Depth= 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.03"

Area (sf)	CN	Description
32,061	98	Paved parking, HSG A
19,415	39	>75% Grass cover, Good, HSG A
51,476	76	Weighted Average
19,415		37.72% Pervious Area
32,061		62.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	50	0.0400	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.5	35	0.0280	1.17		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	74	0.0220	3.01		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.3	159	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 7S: Area 7

Runoff = 0.81 cfs @ 12.13 hrs, Volume= 0.067 af, Depth= 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.03"

	Area (sf)	CN	Description
	20,118	98	Paved parking, HSG A
*	1,411	98	Concrete, HSG A
	12,383	39	>75% Grass cover, Good, HSG A
	33,912	76	Weighted Average
	12,383		36.52% Pervious Area
	21,529		63.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.1	18	0.3300	4.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.3	162	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.0	230	Total			

Summary for Subcatchment 9S: Area 9

Runoff = 0.00 cfs @ 15.14 hrs, Volume= 0.002 af, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.03"

Area (sf)	CN	Description
2,172	98	Paved parking, HSG A
747	98	Paved parking, HSG B
19,790	39	>75% Grass cover, Good, HSG A
462	61	>75% Grass cover, Good, HSG B
23,171	47	Weighted Average
20,252		87.40% Pervious Area
2,919		12.60% Impervious Area

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

Summary for Subcatchment 10S: Area 10

Runoff = 4.06 cfs @ 12.08 hrs, Volume= 0.322 af, Depth= 2.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.03"

Area (sf)	CN	Description
60,214	98	Roofs, HSG A
60,214		100.00% Impervious Area

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

Summary for Subcatchment 11S: Area 11

Runoff = 0.62 cfs @ 12.16 hrs, Volume= 0.058 af, Depth= 0.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.03"

	Area (sf)	CN	Description
	15,830	98	Paved parking, HSG A
*	5,975	98	Concrete, HSG A
	19,470	39	>75% Grass cover, Good, HSG A
	41,275	70	Weighted Average
	19,470		47.17% Pervious Area
	21,805		52.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.0	41	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	28	0.3300	4.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	83	0.0130	2.31		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	90	0.0250	3.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.8	292	Total			

Summary for Subcatchment 12S: Area 12

Runoff = 0.38 cfs @ 12.15 hrs, Volume= 0.036 af, Depth= 0.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.03"

	Area (sf)	CN	Description
	13,585	98	Paved parking, HSG A
*	690	98	Concrete, HSG A
	15,066	39	>75% Grass cover, Good, HSG A
	202	61	>75% Grass cover, Good, HSG B
	29,543	68	Weighted Average
	15,268		51.68% Pervious Area
	14,275		48.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.9	38	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	30	0.3300	4.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	63	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.0	181	Total			

Summary for Subcatchment 13S: Area 13

Runoff = 0.63 cfs @ 12.09 hrs, Volume= 0.045 af, Depth= 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.03"

	Area (sf)	CN	Description
	8,830	98	Paved parking, HSG A
*	430	98	Concrete, HSG A
	1,238	39	>75% Grass cover, Good, HSG A
	837	98	Paved parking, HSG B
	2,007	61	>75% Grass cover, Good, HSG B
	13,342	87	Weighted Average
	3,245		24.32% Pervious Area
	10,097		75.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	32	0.0100	0.10		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
5.3	32	Total, Increased to minimum Tc = 6.0 min			

Summary for Reach 1R: CTB 29-DMH 28

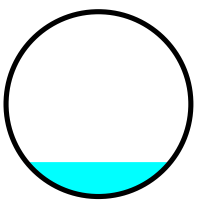
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.419 ac, 39.10% Impervious, Inflow Depth = 0.64" for 2-Year event
Inflow = 0.25 cfs @ 12.12 hrs, Volume= 0.022 af
Outflow = 0.25 cfs @ 12.12 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.50 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.07 fps, Avg. Travel Time= 0.2 min

Peak Storage= 1 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.35 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.3' Slope= 0.0075 '/'
Inlet Invert= 254.20', Outlet Invert= 254.10'



Summary for Reach 2R: CTB 26-DMH 25

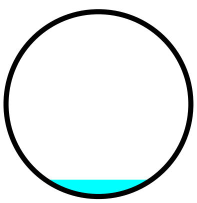
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.297 ac, 37.00% Impervious, Inflow Depth = 0.38" for 2-Year event
Inflow = 0.07 cfs @ 12.18 hrs, Volume= 0.009 af
Outflow = 0.07 cfs @ 12.18 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.87 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.96 fps, Avg. Travel Time= 0.2 min

Peak Storage= 0 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.90 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.7' Slope= 0.0102 '/'
Inlet Invert= 255.75', Outlet Invert= 255.61'



Summary for Reach 3R: CTB 22-DMH 20

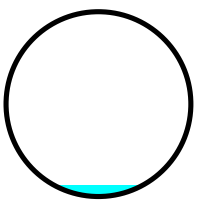
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.329 ac, 37.64% Impervious, Inflow Depth = 0.38" for 2-Year event
Inflow = 0.07 cfs @ 12.19 hrs, Volume= 0.010 af
Outflow = 0.07 cfs @ 12.19 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.61 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.88 fps, Avg. Travel Time= 0.1 min

Peak Storage= 0 cf @ 12.19 hrs
Average Depth at Peak Storage= 0.06'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 9.64 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.8' Slope= 0.0623 '/'
Inlet Invert= 254.66', Outlet Invert= 253.80'



Summary for Reach 4R: CTB 32-DMH 17

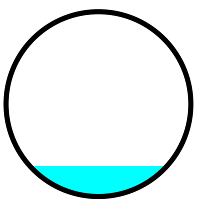
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.445 ac, 46.37% Impervious, Inflow Depth = 0.56" for 2-Year event
Inflow = 0.22 cfs @ 12.11 hrs, Volume= 0.021 af
Outflow = 0.22 cfs @ 12.12 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.65 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.16 fps, Avg. Travel Time= 0.2 min

Peak Storage= 1 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.82 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 14.3' Slope= 0.0098 '/'
Inlet Invert= 254.20', Outlet Invert= 254.06'



Summary for Reach 5R: CTB 15-DMH 13

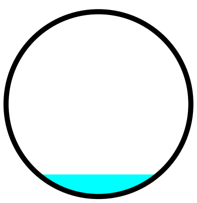
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.275 ac, 45.91% Impervious, Inflow Depth = 0.56" for 2-Year event
Inflow = 0.14 cfs @ 12.11 hrs, Volume= 0.013 af
Outflow = 0.14 cfs @ 12.11 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.65 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.16 fps, Avg. Travel Time= 0.2 min

Peak Storage= 1 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.12'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.65 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.8' Slope= 0.0145 '/'
Inlet Invert= 254.80', Outlet Invert= 254.60'



Summary for Reach 6R: DCTB 5-DMH 4

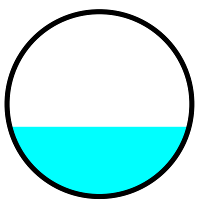
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 1.182 ac, 62.28% Impervious, Inflow Depth = 1.04" for 2-Year event
Inflow = 1.37 cfs @ 12.09 hrs, Volume= 0.102 af
Outflow = 1.37 cfs @ 12.10 hrs, Volume= 0.102 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.07 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.97 fps, Avg. Travel Time= 0.1 min

Peak Storage= 4 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.38'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.55 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 15.8' Slope= 0.0139 '/'
Inlet Invert= 251.58', Outlet Invert= 251.36'



Summary for Reach 7R: DCB 2-DMH 4

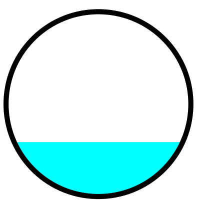
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.779 ac, 63.48% Impervious, Inflow Depth = 1.04" for 2-Year event
Inflow = 0.81 cfs @ 12.13 hrs, Volume= 0.067 af
Outflow = 0.81 cfs @ 12.14 hrs, Volume= 0.067 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.23 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.68 fps, Avg. Travel Time= 0.3 min

Peak Storage= 5 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.33 cfs

12.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 27.8' Slope= 0.0126 '/'
Inlet Invert= 252.00', Outlet Invert= 251.65'



Summary for Reach 8R: RL 1-DMH 1

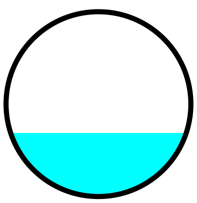
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 1.382 ac,100.00% Impervious, Inflow Depth = 2.80" for 2-Year event
Inflow = 4.06 cfs @ 12.08 hrs, Volume= 0.322 af
Outflow = 4.05 cfs @ 12.09 hrs, Volume= 0.322 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.58 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.49 fps, Avg. Travel Time= 0.5 min

Peak Storage= 43 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.51'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 16.08 cfs

18.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 80.1' Slope= 0.0200 '/'
Inlet Invert= 253.60', Outlet Invert= 252.00'



Summary for Reach 9R: TD 1-DMH 1

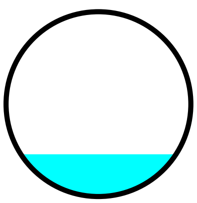
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.948 ac, 52.83% Impervious, Inflow Depth = 0.73" for 2-Year event
Inflow = 0.62 cfs @ 12.16 hrs, Volume= 0.058 af
Outflow = 0.62 cfs @ 12.16 hrs, Volume= 0.058 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.61 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.96 fps, Avg. Travel Time= 0.7 min

Peak Storage= 11 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.46 cfs

12.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 84.1' Slope= 0.0200 '/'
Inlet Invert= 252.00', Outlet Invert= 250.32'



Summary for Reach 10R: DCB 1-DMH 1

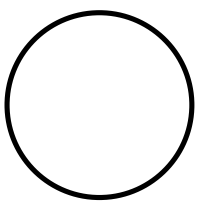
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.678 ac, 48.32% 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

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.85 cfs

12.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 191.5' Slope= 0.0100 '/'
Inlet Invert= 252.00', Outlet Invert= 250.09'



Summary for Reach 11R: DMH 1-DMH 2

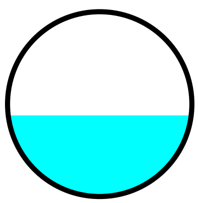
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 3.008 ac, 73.49% Impervious, Inflow Depth = 1.52" for 2-Year event
Inflow = 4.52 cfs @ 12.09 hrs, Volume= 0.380 af
Outflow = 4.52 cfs @ 12.10 hrs, Volume= 0.380 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.07 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.04 fps, Avg. Travel Time= 0.1 min

Peak Storage= 11 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.66'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 11.38 cfs

18.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 15.0' Slope= 0.0100 '/'
Inlet Invert= 100.00', Outlet Invert= 99.85'



Summary for Reach 21R: Existing 15" RCP pipe in Saratoga

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.716 ac, 38.23% Impervious, Inflow Depth = 0.53" for 2-Year event
Inflow = 0.31 cfs @ 12.13 hrs, Volume= 0.032 af
Outflow = 0.31 cfs @ 12.13 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 22R: Existing 18" RCP pipe in Independence

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.053 ac, 64.35% Impervious, Inflow Depth = 0.12" for 2-Year event
Inflow = 0.37 cfs @ 12.14 hrs, Volume= 0.042 af
Outflow = 0.37 cfs @ 12.14 hrs, Volume= 0.042 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 23R: Existing 24" HDPE pipe on site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.779 ac, 63.48% Impervious, Inflow Depth = 1.04" for 2-Year event
Inflow = 0.81 cfs @ 12.14 hrs, Volume= 0.067 af
Outflow = 0.81 cfs @ 12.14 hrs, Volume= 0.067 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 24R: Existing 30" HDPE pipe on site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.960 ac, 62.76% Impervious, Inflow Depth = 1.04" for 2-Year event
Inflow = 2.13 cfs @ 12.11 hrs, Volume= 0.169 af
Outflow = 2.13 cfs @ 12.11 hrs, Volume= 0.169 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach POA-1: Saratoga Blvd & Independence Dr

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.733 ac, 61.95% Impervious, Inflow Depth = 0.44" for 2-Year event
Inflow = 2.84 cfs @ 12.11 hrs, Volume= 0.245 af
Outflow = 2.84 cfs @ 12.11 hrs, Volume= 0.245 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach POA-2: Existing Infiltration Basin

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.838 ac, 35.65% 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

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Underground Infiltration System

[63] Warning: Exceeded Reach 11R INLET depth by 149.66' @ 12.60 hrs

Inflow Area = 3.008 ac, 73.49% Impervious, Inflow Depth = 1.52" for 2-Year event
Inflow = 4.52 cfs @ 12.10 hrs, Volume= 0.380 af
Outflow = 1.41 cfs @ 12.44 hrs, Volume= 0.380 af, Atten= 69%, Lag= 20.8 min
Discarded = 1.41 cfs @ 12.44 hrs, Volume= 0.380 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 249.96' @ 12.44 hrs Surf.Area= 5,954 sf Storage= 2,859 cf

Plug-Flow detention time= 10.6 min calculated for 0.380 af (100% of inflow)
Center-of-Mass det. time= 10.6 min (788.0 - 777.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	249.00'	8,370 cf	**94.42'W x 63.06'L x 5.50'H Field A** 32,747 cf Overall - 11,822 cf Embedded = 20,924 cf x 40.0% Voids
#2A	249.75'	11,822 cf	**ADS_StormTech MC-3500 d +Cap** x 104 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 104 Chambers in 13 Rows Cap Storage= +14.9 cf x 2 x 13 rows = 387.4 cf
		20,192 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	249.00'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 245.00'
#2	Primary	252.44'	**12.0" Round Culvert** L= 60.5' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 252.44' / 252.10' S= 0.0056 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=1.41 cfs @ 12.44 hrs HW=249.96' (Free Discharge)
└─**1=Exfiltration** (Controls 1.41 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=249.00' (Free Discharge)
└─**2=Culvert** (Controls 0.00 cfs)

Pond 1P: Underground Infiltration System - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 13 rows = 387.4 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

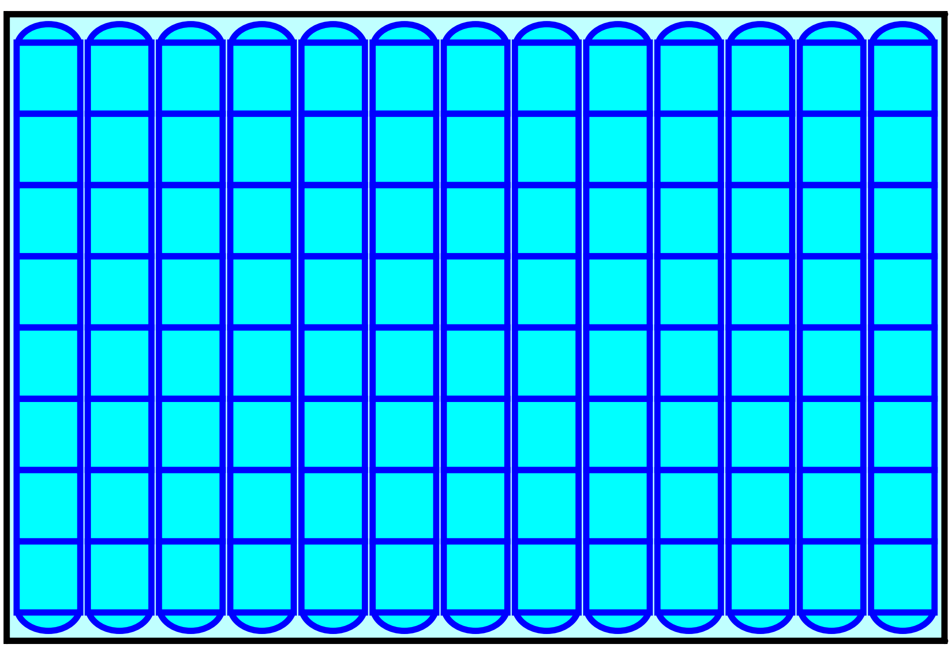
8 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 61.06' Row Length +12.0" End Stone x 2 = 63.06' Base Length
13 Rows x 77.0" Wide + 9.0" Spacing x 12 + 12.0" Side Stone x 2 = 94.42' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

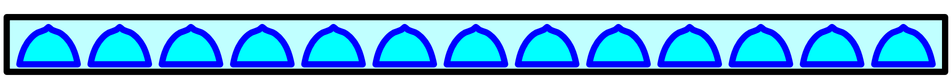
104 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 13 Rows = 11,822.4 cf Chamber Storage

32,746.5 cf Field - 11,822.4 cf Chambers = 20,924.1 cf Stone x 40.0% Voids = 8,369.7 cf Stone Storage

Chamber Storage + Stone Storage = 20,192.1 cf = 0.464 af
Overall Storage Efficiency = 61.7%
Overall System Size = 63.06' x 94.42' x 5.50'

104 Chambers
1,212.8 cy Field
775.0 cy Stone





Summary for Pond 2P: Pervious Pavement

Inflow Area = 0.678 ac, 48.32% Impervious, Inflow Depth = 0.64" for 2-Year event
Inflow = 0.38 cfs @ 12.15 hrs, Volume= 0.036 af
Outflow = 0.38 cfs @ 12.15 hrs, Volume= 0.036 af, Atten= 0%, Lag= 0.3 min
Discarded = 0.38 cfs @ 12.15 hrs, Volume= 0.036 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 254.09' @ 12.15 hrs Surf.Area= 3,248 sf Storage= 8 cf

Plug-Flow detention time= 0.3 min calculated for 0.036 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (891.0 - 890.6)

Volume	Invert	Avail.Storage	Storage Description
#1	254.08'	1,598 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
254.08	3,248	0.0	0	0
254.09	3,248	40.0	13	13
255.67	3,248	10.0	513	526
256.00	3,248	100.0	1,072	1,598

Device	Routing	Invert	Outlet Devices
#1	Discarded	254.08'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 249.00'
#2	Primary	255.90'	**90.0' long x 36.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.62 cfs @ 12.15 hrs HW=254.09' (Free Discharge)
└─**1=Exfiltration** (Controls 0.62 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=254.08' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 3P: Pervious Pavement

Inflow Area = 0.306 ac, 75.68% Impervious, Inflow Depth = 1.77" for 2-Year event
Inflow = 0.63 cfs @ 12.09 hrs, Volume= 0.045 af
Outflow = 0.62 cfs @ 12.10 hrs, Volume= 0.045 af, Atten= 2%, Lag= 0.7 min
Discarded = 0.62 cfs @ 12.10 hrs, Volume= 0.045 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 255.09' @ 12.10 hrs Surf.Area= 3,248 sf Storage= 14 cf

Plug-Flow detention time= 0.3 min calculated for 0.045 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (821.5 - 821.2)

Volume	Invert	Avail.Storage	Storage Description
#1	255.08'	3,138 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
255.08	3,248	0.0	0	0
255.09	3,248	40.0	13	13
256.67	3,248	40.0	2,053	2,066
257.00	3,248	100.0	1,072	3,138

Device	Routing	Invert	Outlet Devices
#1	Discarded	255.08'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 250.00'
#2	Primary	256.50'	**36.0' long x 90.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.62 cfs @ 12.10 hrs HW=255.09' (Free Discharge)
└─**1=Exfiltration** (Controls 0.62 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=255.08' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 4P: At Grade Infiltration Sytem

Inflow Area = 0.838 ac, 35.65% Impervious, Inflow Depth = 0.03" for 2-Year event
Inflow = 0.00 cfs @ 15.14 hrs, Volume= 0.002 af
Outflow = 0.00 cfs @ 15.19 hrs, Volume= 0.002 af, Atten= 0%, Lag= 2.8 min
Discarded = 0.00 cfs @ 15.19 hrs, Volume= 0.002 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 254.00' @ 15.19 hrs Surf.Area= 3,426 sf Storage= 0 cf

Plug-Flow detention time= 1.7 min calculated for 0.002 af (100% of inflow)
Center-of-Mass det. time= 1.7 min (1,092.4 - 1,090.7)

Volume	Invert	Avail.Storage	Storage Description
#1	254.00'	9,396 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
254.00	3,426	0	0
255.00	4,678	4,052	4,052
256.00	6,010	5,344	9,396

Device	Routing	Invert	Outlet Devices
#1	Discarded	254.00'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 249.00'
#2	Primary	255.90'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.66 cfs @ 15.19 hrs HW=254.00' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.66 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=254.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Area 1 Runoff Area=18,235 sf 39.10% Impervious Runoff Depth=1.53"
Flow Length=79' Slope=0.0100 '/' Tc=7.1 min CN=68 Runoff=0.69 cfs 0.053 af

Subcatchment 2S: Area 2 Runoff Area=12,939 sf 37.00% Impervious Runoff Depth=1.08"
Flow Length=185' Slope=0.0100 '/' Tc=8.7 min CN=61 Runoff=0.30 cfs 0.027 af

Subcatchment 3S: Area 3 Runoff Area=14,335 sf 37.64% Impervious Runoff Depth=1.08"
Flow Length=172' Slope=0.0100 '/' Tc=9.1 min CN=61 Runoff=0.32 cfs 0.030 af

Subcatchment 4S: Area 4 Runoff Area=19,390 sf 46.37% Impervious Runoff Depth=1.40"
Flow Length=110' Tc=6.3 min CN=66 Runoff=0.68 cfs 0.052 af

Subcatchment 5S: Area 5 Runoff Area=11,986 sf 45.91% Impervious Runoff Depth=1.40"
Tc=6.0 min CN=66 Runoff=0.42 cfs 0.032 af

Subcatchment 6S: Area 6 Runoff Area=51,476 sf 62.28% Impervious Runoff Depth=2.13"
Flow Length=159' Tc=6.0 min CN=76 Runoff=2.94 cfs 0.210 af

Subcatchment 7S: Area 7 Runoff Area=33,912 sf 63.48% Impervious Runoff Depth=2.13"
Flow Length=230' Tc=9.0 min CN=76 Runoff=1.74 cfs 0.138 af

Subcatchment 9S: Area 9 Runoff Area=23,171 sf 12.60% Impervious Runoff Depth=0.37"
Tc=6.0 min CN=47 Runoff=0.09 cfs 0.017 af

Subcatchment 10S: Area 10 Runoff Area=60,214 sf 100.00% Impervious Runoff Depth=4.26"
Tc=6.0 min CN=98 Runoff=6.08 cfs 0.491 af

Subcatchment 11S: Area 11 Runoff Area=41,275 sf 52.83% Impervious Runoff Depth=1.67"
Flow Length=292' Tc=9.8 min CN=70 Runoff=1.58 cfs 0.132 af

Subcatchment 12S: Area 12 Runoff Area=29,543 sf 48.32% Impervious Runoff Depth=1.53"
Flow Length=181' Tc=9.0 min CN=68 Runoff=1.05 cfs 0.087 af

Subcatchment 13S: Area 13 Runoff Area=13,342 sf 75.68% Impervious Runoff Depth=3.10"
Flow Length=32' Slope=0.0100 '/' Tc=6.0 min CN=87 Runoff=1.10 cfs 0.079 af

Reach 1R: CTB 29-DMH 28 Avg. Flow Depth=0.31' Max Vel=3.36 fps Inflow=0.69 cfs 0.053 af
12.0" Round Pipe n=0.012 L=13.3' S=0.0075 '/' Capacity=3.35 cfs Outflow=0.69 cfs 0.053 af

Reach 2R: CTB 26-DMH 25 Avg. Flow Depth=0.19' Max Vel=2.93 fps Inflow=0.30 cfs 0.027 af
12.0" Round Pipe n=0.012 L=13.7' S=0.0102 '/' Capacity=3.90 cfs Outflow=0.30 cfs 0.027 af

Reach 3R: CTB 22-DMH 20 Avg. Flow Depth=0.13' Max Vel=5.68 fps Inflow=0.32 cfs 0.030 af
12.0" Round Pipe n=0.012 L=13.8' S=0.0623 '/' Capacity=9.64 cfs Outflow=0.32 cfs 0.030 af

Reach 4R: CTB 32-DMH 17 Avg. Flow Depth=0.28' Max Vel=3.67 fps Inflow=0.68 cfs 0.052 af
12.0" Round Pipe n=0.012 L=14.3' S=0.0098 '/' Capacity=3.82 cfs Outflow=0.68 cfs 0.052 af

Reach 5R: CTB 15-DMH 13 Avg. Flow Depth=0.20' Max Vel=3.68 fps Inflow=0.42 cfs 0.032 af
12.0" Round Pipe n=0.012 L=13.8' S=0.0145 '/' Capacity=4.65 cfs Outflow=0.42 cfs 0.032 af

Reach 6R: DCTB 5-DMH 4 Avg. Flow Depth=0.58' Max Vel=6.16 fps Inflow=2.94 cfs 0.210 af
12.0" Round Pipe n=0.012 L=15.8' S=0.0139 '/' Capacity=4.55 cfs Outflow=2.94 cfs 0.210 af

Reach 7R: DCB 2-DMH 4 Avg. Flow Depth=0.44' Max Vel=5.22 fps Inflow=1.74 cfs 0.138 af
12.0" Round Pipe n=0.012 L=27.8' S=0.0126 '/' Capacity=4.33 cfs Outflow=1.74 cfs 0.138 af

Reach 8R: RL 1-DMH 1 Avg. Flow Depth=0.64' Max Vel=8.46 fps Inflow=6.08 cfs 0.491 af
18.0" Round Pipe n=0.012 L=80.1' S=0.0200 '/' Capacity=16.08 cfs Outflow=6.07 cfs 0.491 af

Reach 9R: TD 1-DMH 1 Avg. Flow Depth=0.37' Max Vel=6.01 fps Inflow=1.58 cfs 0.132 af
12.0" Round Pipe n=0.012 L=84.1' S=0.0200 '/' Capacity=5.46 cfs Outflow=1.58 cfs 0.132 af

Reach 10R: DCB 1-DMH 1 Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
12.0" Round Pipe n=0.012 L=191.5' S=0.0100 '/' Capacity=3.85 cfs Outflow=0.00 cfs 0.000 af

Reach 11R: DMH 1-DMH 2 Avg. Flow Depth=0.88' Max Vel=6.85 fps Inflow=7.38 cfs 0.623 af
18.0" Round Pipe n=0.012 L=15.0' S=0.0100 '/' Capacity=11.38 cfs Outflow=7.38 cfs 0.623 af

Reach 21R: Existing 15" RCP pipe in Saratoga Inflow=0.98 cfs 0.080 af
Outflow=0.98 cfs 0.080 af

Reach 22R: Existing 18" RCP pipe in Independence Inflow=1.29 cfs 0.110 af
Outflow=1.29 cfs 0.110 af

Reach 23R: Existing 24" HDPE pipe on site Inflow=1.74 cfs 0.138 af
Outflow=1.74 cfs 0.138 af

Reach 24R: Existing 30" HDPE pipe on site Inflow=4.57 cfs 0.348 af
Outflow=4.57 cfs 0.348 af

Reach POA-1: Saratoga Blvd & Independence Dr Inflow=6.93 cfs 0.542 af
Outflow=6.93 cfs 0.542 af

Reach POA-2: Existing Infiltration Basin Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 1P: Underground Infiltration System Peak Elev=250.73' Storage=6,662 cf Inflow=7.38 cfs 0.623 af
Discarded=1.63 cfs 0.623 af Primary=0.00 cfs 0.000 af Outflow=1.63 cfs 0.623 af

Pond 2P: Pervious Pavement Peak Elev=254.67' Storage=200 cf Inflow=1.05 cfs 0.087 af
Discarded=0.69 cfs 0.087 af Primary=0.00 cfs 0.000 af Outflow=0.69 cfs 0.087 af

Pond 3P: Pervious Pavement Peak Elev=255.24' Storage=207 cf Inflow=1.10 cfs 0.079 af
Discarded=0.64 cfs 0.079 af Primary=0.00 cfs 0.000 af Outflow=0.64 cfs 0.079 af

Pond 4P: At Grade Infiltration Sytem Peak Elev=254.00' Storage=9 cf Inflow=0.09 cfs 0.017 af
Discarded=0.08 cfs 0.017 af Primary=0.00 cfs 0.000 af Outflow=0.08 cfs 0.017 af

Total Runoff Area = 7.572 ac Runoff Volume = 1.347 af Average Runoff Depth = 2.13"
40.97% Pervious = 3.102 ac 59.03% Impervious = 4.470 ac

Summary for Subcatchment 1S: Area 1

Runoff = 0.69 cfs @ 12.11 hrs, Volume= 0.053 af, Depth= 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
	2,934	98	Paved parking, HSG A
*	726	98	Concrete, HSG A
	6,089	39	>75% Grass cover, Good, HSG A
	2,696	98	Paved parking, HSG B
*	774	98	Concrete, HSG B
	5,016	61	>75% Grass cover, Good, HSG B
	18,235	68	Weighted Average
	11,105		60.90% Pervious Area
	7,130		39.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	43	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.3	36	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.1	79	Total			

Summary for Subcatchment 2S: Area 2

Runoff = 0.30 cfs @ 12.14 hrs, Volume= 0.027 af, Depth= 1.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
	3,911	98	Paved parking, HSG A
*	877	98	Concrete, HSG A
	8,151	39	>75% Grass cover, Good, HSG A
	12,939	61	Weighted Average
	8,151		63.00% Pervious Area
	4,788		37.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.1	135	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.7	185	Total			

Summary for Subcatchment 3S: Area 3

Runoff = 0.32 cfs @ 12.14 hrs, Volume= 0.030 af, Depth= 1.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
	4,375	98	Paved parking, HSG A
*	1,020	98	Concrete, HSG A
	8,940	39	>75% Grass cover, Good, HSG A
	14,335	61	Weighted Average
	8,940		62.36% Pervious Area
	5,395		37.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.7	30	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.8	92	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.1	172	Total			

Summary for Subcatchment 4S: Area 4

Runoff = 0.68 cfs @ 12.10 hrs, Volume= 0.052 af, Depth= 1.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
	7,754	98	Paved parking, HSG A
*	1,238	98	Concrete, HSG A
	10,398	39	>75% Grass cover, Good, HSG A
	19,390	66	Weighted Average
	10,398		53.63% Pervious Area
	8,992		46.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0200	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.5	60	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.3	110	Total			

Summary for Subcatchment 5S: Area 5

Runoff = 0.42 cfs @ 12.10 hrs, Volume= 0.032 af, Depth= 1.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
	4,396	98	Paved parking, HSG A
*	1,107	98	Concrete, HSG A
	6,483	39	>75% Grass cover, Good, HSG A
	11,986	66	Weighted Average
	6,483		54.09% Pervious Area
	5,503		45.91% Impervious Area

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

Summary for Subcatchment 6S: Area 6

Runoff = 2.94 cfs @ 12.09 hrs, Volume= 0.210 af, Depth= 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
32,061	98	Paved parking, HSG A
19,415	39	>75% Grass cover, Good, HSG A
51,476	76	Weighted Average
19,415		37.72% Pervious Area
32,061		62.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	50	0.0400	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.5	35	0.0280	1.17		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	74	0.0220	3.01		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.3	159	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 7S: Area 7

Runoff = 1.74 cfs @ 12.13 hrs, Volume= 0.138 af, Depth= 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
	20,118	98	Paved parking, HSG A
*	1,411	98	Concrete, HSG A
	12,383	39	>75% Grass cover, Good, HSG A
	33,912	76	Weighted Average
	12,383		36.52% Pervious Area
	21,529		63.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.1	18	0.3300	4.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.3	162	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.0	230	Total			

Summary for Subcatchment 9S: Area 9

Runoff = 0.09 cfs @ 12.32 hrs, Volume= 0.017 af, Depth= 0.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
2,172	98	Paved parking, HSG A
747	98	Paved parking, HSG B
19,790	39	>75% Grass cover, Good, HSG A
462	61	>75% Grass cover, Good, HSG B
23,171	47	Weighted Average
20,252		87.40% Pervious Area
2,919		12.60% Impervious Area

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

Summary for Subcatchment 10S: Area 10

Runoff = 6.08 cfs @ 12.08 hrs, Volume= 0.491 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
60,214	98	Roofs, HSG A
60,214		100.00% Impervious Area

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

Summary for Subcatchment 11S: Area 11

Runoff = 1.58 cfs @ 12.14 hrs, Volume= 0.132 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
	15,830	98	Paved parking, HSG A
*	5,975	98	Concrete, HSG A
	19,470	39	>75% Grass cover, Good, HSG A
	41,275	70	Weighted Average
	19,470		47.17% Pervious Area
	21,805		52.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.0	41	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	28	0.3300	4.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	83	0.0130	2.31		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	90	0.0250	3.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.8	292	Total			

Summary for Subcatchment 12S: Area 12

Runoff = 1.05 cfs @ 12.13 hrs, Volume= 0.087 af, Depth= 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
	13,585	98	Paved parking, HSG A
*	690	98	Concrete, HSG A
	15,066	39	>75% Grass cover, Good, HSG A
	202	61	>75% Grass cover, Good, HSG B
	29,543	68	Weighted Average
	15,268		51.68% Pervious Area
	14,275		48.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.9	38	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	30	0.3300	4.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	63	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.0	181	Total			

Summary for Subcatchment 13S: Area 13

Runoff = 1.10 cfs @ 12.09 hrs, Volume= 0.079 af, Depth= 3.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
	8,830	98	Paved parking, HSG A
*	430	98	Concrete, HSG A
	1,238	39	>75% Grass cover, Good, HSG A
	837	98	Paved parking, HSG B
	2,007	61	>75% Grass cover, Good, HSG B
	13,342	87	Weighted Average
	3,245		24.32% Pervious Area
	10,097		75.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	32	0.0100	0.10		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
5.3	32	Total, Increased to minimum Tc = 6.0 min			

Summary for Reach 1R: CTB 29-DMH 28

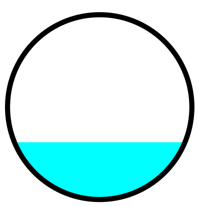
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.419 ac, 39.10% Impervious, Inflow Depth = 1.53" for 10-Year event
Inflow = 0.69 cfs @ 12.11 hrs, Volume= 0.053 af
Outflow = 0.69 cfs @ 12.11 hrs, Volume= 0.053 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.36 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.31 fps, Avg. Travel Time= 0.2 min

Peak Storage= 3 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.31'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.35 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.3' Slope= 0.0075 '/'
Inlet Invert= 254.20', Outlet Invert= 254.10'



Summary for Reach 2R: CTB 26-DMH 25

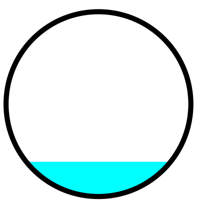
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.297 ac, 37.00% Impervious, Inflow Depth = 1.08" for 10-Year event
Inflow = 0.30 cfs @ 12.14 hrs, Volume= 0.027 af
Outflow = 0.30 cfs @ 12.14 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.93 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.24 fps, Avg. Travel Time= 0.2 min

Peak Storage= 1 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.90 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.7' Slope= 0.0102 '/'
Inlet Invert= 255.75', Outlet Invert= 255.61'



Summary for Reach 3R: CTB 22-DMH 20

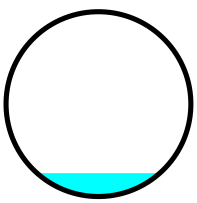
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.329 ac, 37.64% Impervious, Inflow Depth = 1.08" for 10-Year event
Inflow = 0.32 cfs @ 12.14 hrs, Volume= 0.030 af
Outflow = 0.32 cfs @ 12.15 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.68 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.42 fps, Avg. Travel Time= 0.1 min

Peak Storage= 1 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 9.64 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.8' Slope= 0.0623 '/'
Inlet Invert= 254.66', Outlet Invert= 253.80'



Summary for Reach 4R: CTB 32-DMH 17

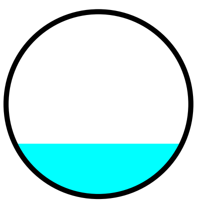
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.445 ac, 46.37% Impervious, Inflow Depth = 1.40" for 10-Year event
Inflow = 0.68 cfs @ 12.10 hrs, Volume= 0.052 af
Outflow = 0.68 cfs @ 12.10 hrs, Volume= 0.052 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.67 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.45 fps, Avg. Travel Time= 0.2 min

Peak Storage= 3 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.82 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 14.3' Slope= 0.0098 '/'
Inlet Invert= 254.20', Outlet Invert= 254.06'



Summary for Reach 5R: CTB 15-DMH 13

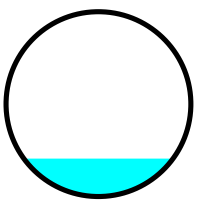
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.275 ac, 45.91% Impervious, Inflow Depth = 1.40" for 10-Year event
Inflow = 0.42 cfs @ 12.10 hrs, Volume= 0.032 af
Outflow = 0.42 cfs @ 12.10 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.68 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.44 fps, Avg. Travel Time= 0.2 min

Peak Storage= 2 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.65 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.8' Slope= 0.0145 '/'
Inlet Invert= 254.80', Outlet Invert= 254.60'



Summary for Reach 6R: DCTB 5-DMH 4

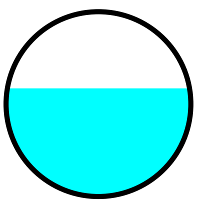
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 1.182 ac, 62.28% Impervious, Inflow Depth = 2.13" for 10-Year event
Inflow = 2.94 cfs @ 12.09 hrs, Volume= 0.210 af
Outflow = 2.94 cfs @ 12.09 hrs, Volume= 0.210 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.16 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.33 fps, Avg. Travel Time= 0.1 min

Peak Storage= 8 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.58'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.55 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 15.8' Slope= 0.0139 '/'
Inlet Invert= 251.58', Outlet Invert= 251.36'



Summary for Reach 7R: DCB 2-DMH 4

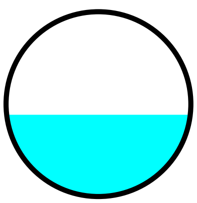
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.779 ac, 63.48% Impervious, Inflow Depth = 2.13" for 10-Year event
Inflow = 1.74 cfs @ 12.13 hrs, Volume= 0.138 af
Outflow = 1.74 cfs @ 12.13 hrs, Volume= 0.138 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.22 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.97 fps, Avg. Travel Time= 0.2 min

Peak Storage= 9 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.44'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.33 cfs

12.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 27.8' Slope= 0.0126 '/'
Inlet Invert= 252.00', Outlet Invert= 251.65'



Summary for Reach 8R: RL 1-DMH 1

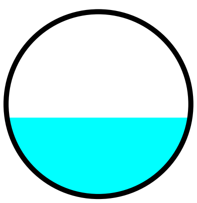
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 1.382 ac,100.00% Impervious, Inflow Depth = 4.26" for 10-Year event
Inflow = 6.08 cfs @ 12.08 hrs, Volume= 0.491 af
Outflow = 6.07 cfs @ 12.09 hrs, Volume= 0.491 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.46 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.82 fps, Avg. Travel Time= 0.5 min

Peak Storage= 57 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.64'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 16.08 cfs

18.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 80.1' Slope= 0.0200 '/'
Inlet Invert= 253.60', Outlet Invert= 252.00'



Summary for Reach 9R: TD 1-DMH 1

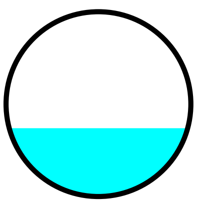
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.948 ac, 52.83% Impervious, Inflow Depth = 1.67" for 10-Year event
Inflow = 1.58 cfs @ 12.14 hrs, Volume= 0.132 af
Outflow = 1.58 cfs @ 12.15 hrs, Volume= 0.132 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.01 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.37 fps, Avg. Travel Time= 0.6 min

Peak Storage= 22 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.37'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.46 cfs

12.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 84.1' Slope= 0.0200 '/'
Inlet Invert= 252.00', Outlet Invert= 250.32'



Summary for Reach 10R: DCB 1-DMH 1

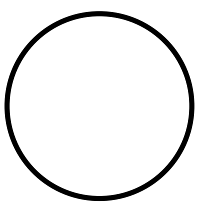
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.678 ac, 48.32% Impervious, Inflow Depth = 0.00" for 10-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

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.85 cfs

12.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 191.5' Slope= 0.0100 '/'
Inlet Invert= 252.00', Outlet Invert= 250.09'



Summary for Reach 11R: DMH 1-DMH 2

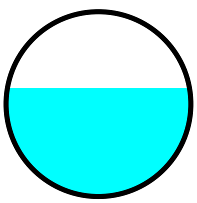
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 3.008 ac, 73.49% Impervious, Inflow Depth = 2.49" for 10-Year event
Inflow = 7.38 cfs @ 12.10 hrs, Volume= 0.623 af
Outflow = 7.38 cfs @ 12.10 hrs, Volume= 0.623 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.85 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.35 fps, Avg. Travel Time= 0.1 min

Peak Storage= 16 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.88'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 11.38 cfs

18.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 15.0' Slope= 0.0100 '/'
Inlet Invert= 100.00', Outlet Invert= 99.85'



Summary for Reach 21R: Existing 15" RCP pipe in Saratoga

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.716 ac, 38.23% Impervious, Inflow Depth = 1.34" for 10-Year event
Inflow = 0.98 cfs @ 12.12 hrs, Volume= 0.080 af
Outflow = 0.98 cfs @ 12.12 hrs, Volume= 0.080 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 22R: Existing 18" RCP pipe in Independence

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.053 ac, 64.35% Impervious, Inflow Depth = 0.33" for 10-Year event
Inflow = 1.29 cfs @ 12.13 hrs, Volume= 0.110 af
Outflow = 1.29 cfs @ 12.13 hrs, Volume= 0.110 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 23R: Existing 24" HDPE pipe on site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.779 ac, 63.48% Impervious, Inflow Depth = 2.13" for 10-Year event
Inflow = 1.74 cfs @ 12.13 hrs, Volume= 0.138 af
Outflow = 1.74 cfs @ 12.13 hrs, Volume= 0.138 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 24R: Existing 30" HDPE pipe on site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.960 ac, 62.76% Impervious, Inflow Depth = 2.13" for 10-Year event
Inflow = 4.57 cfs @ 12.10 hrs, Volume= 0.348 af
Outflow = 4.57 cfs @ 12.10 hrs, Volume= 0.348 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach POA-1: Saratoga Blvd & Independence Dr

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	6.733 ac, 61.95% Impervious,	Inflow Depth = 0.97"	for 10-Year event	
Inflow =	6.93 cfs @	12.11 hrs, Volume=	0.542 af	
Outflow =	6.93 cfs @	12.11 hrs, Volume=	0.542 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach POA-2: Existing Infiltration Basin

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.838 ac, 35.65% Impervious, Inflow Depth = 0.00" for 10-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

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Underground Infiltration System

[63] Warning: Exceeded Reach 11R INLET depth by 150.39' @ 12.64 hrs

Inflow Area = 3.008 ac, 73.49% Impervious, Inflow Depth = 2.49" for 10-Year event
Inflow = 7.38 cfs @ 12.10 hrs, Volume= 0.623 af
Outflow = 1.63 cfs @ 12.54 hrs, Volume= 0.623 af, Atten= 78%, Lag= 26.4 min
Discarded = 1.63 cfs @ 12.54 hrs, Volume= 0.623 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 250.73' @ 12.54 hrs Surf.Area= 5,954 sf Storage= 6,662 cf

Plug-Flow detention time= 24.4 min calculated for 0.623 af (100% of inflow)
Center-of-Mass det. time= 24.4 min (797.6 - 773.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	249.00'	8,370 cf	**94.42'W x 63.06'L x 5.50'H Field A** 32,747 cf Overall - 11,822 cf Embedded = 20,924 cf x 40.0% Voids
#2A	249.75'	11,822 cf	**ADS_StormTech MC-3500 d +Cap** x 104 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 104 Chambers in 13 Rows Cap Storage= +14.9 cf x 2 x 13 rows = 387.4 cf
		20,192 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	249.00'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 245.00'
#2	Primary	252.44'	**12.0" Round Culvert** L= 60.5' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 252.44' / 252.10' S= 0.0056 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=1.63 cfs @ 12.54 hrs HW=250.73' (Free Discharge)
└─**1=Exfiltration** (Controls 1.63 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=249.00' (Free Discharge)
└─**2=Culvert** (Controls 0.00 cfs)

Pond 1P: Underground Infiltration System - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 13 rows = 387.4 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

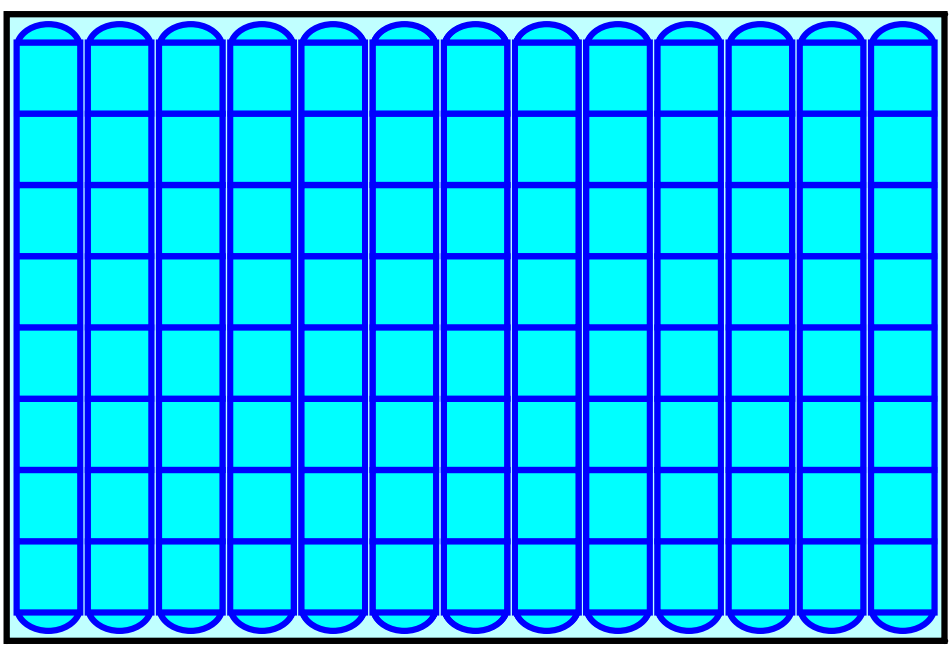
8 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 61.06' Row Length +12.0" End Stone x 2 = 63.06' Base Length
13 Rows x 77.0" Wide + 9.0" Spacing x 12 + 12.0" Side Stone x 2 = 94.42' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

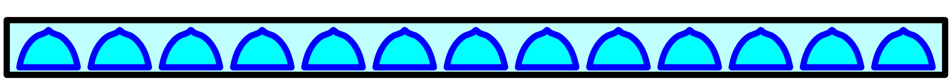
104 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 13 Rows = 11,822.4 cf Chamber Storage

32,746.5 cf Field - 11,822.4 cf Chambers = 20,924.1 cf Stone x 40.0% Voids = 8,369.7 cf Stone Storage

Chamber Storage + Stone Storage = 20,192.1 cf = 0.464 af
Overall Storage Efficiency = 61.7%
Overall System Size = 63.06' x 94.42' x 5.50'

104 Chambers
1,212.8 cy Field
775.0 cy Stone





Summary for Pond 2P: Pervious Pavement

Inflow Area = 0.678 ac, 48.32% Impervious, Inflow Depth = 1.53" for 10-Year event
Inflow = 1.05 cfs @ 12.13 hrs, Volume= 0.087 af
Outflow = 0.69 cfs @ 12.28 hrs, Volume= 0.087 af, Atten= 34%, Lag= 8.5 min
Discarded = 0.69 cfs @ 12.28 hrs, Volume= 0.087 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 254.67' @ 12.28 hrs Surf.Area= 3,248 sf Storage= 200 cf

Plug-Flow detention time= 1.3 min calculated for 0.087 af (100% of inflow)
Center-of-Mass det. time= 1.3 min (863.1 - 861.8)

Volume	Invert	Avail.Storage	Storage Description
#1	254.08'	1,598 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
254.08	3,248	0.0	0	0
254.09	3,248	40.0	13	13
255.67	3,248	10.0	513	526
256.00	3,248	100.0	1,072	1,598

Device	Routing	Invert	Outlet Devices
#1	Discarded	254.08'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 249.00'
#2	Primary	255.90'	**90.0' long x 36.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.69 cfs @ 12.28 hrs HW=254.67' (Free Discharge)
└─**1=Exfiltration** (Controls 0.69 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=254.08' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 3P: Pervious Pavement

Inflow Area = 0.306 ac, 75.68% Impervious, Inflow Depth = 3.10" for 10-Year event
Inflow = 1.10 cfs @ 12.09 hrs, Volume= 0.079 af
Outflow = 0.64 cfs @ 12.20 hrs, Volume= 0.079 af, Atten= 42%, Lag= 6.7 min
Discarded = 0.64 cfs @ 12.20 hrs, Volume= 0.079 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 255.24' @ 12.20 hrs Surf.Area= 3,248 sf Storage= 207 cf

Plug-Flow detention time= 1.3 min calculated for 0.079 af (100% of inflow)
Center-of-Mass det. time= 1.3 min (806.5 - 805.2)

Volume	Invert	Avail.Storage	Storage Description
#1	255.08'	3,138 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
255.08	3,248	0.0	0	0
255.09	3,248	40.0	13	13
256.67	3,248	40.0	2,053	2,066
257.00	3,248	100.0	1,072	3,138

Device	Routing	Invert	Outlet Devices
#1	Discarded	255.08'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 250.00'
#2	Primary	256.50'	**36.0' long x 90.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.64 cfs @ 12.20 hrs HW=255.24' (Free Discharge)
└─**1=Exfiltration** (Controls 0.64 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=255.08' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 4P: At Grade Infiltration Sytem

Inflow Area = 0.838 ac, 35.65% Impervious, Inflow Depth = 0.24" for 10-Year event
Inflow = 0.09 cfs @ 12.32 hrs, Volume= 0.017 af
Outflow = 0.08 cfs @ 12.35 hrs, Volume= 0.017 af, Atten= 1%, Lag= 1.7 min
Discarded = 0.08 cfs @ 12.35 hrs, Volume= 0.017 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 254.00' @ 12.35 hrs Surf.Area= 3,429 sf Storage= 9 cf

Plug-Flow detention time= 1.7 min calculated for 0.017 af (100% of inflow)
Center-of-Mass det. time= 1.7 min (953.0 - 951.2)

Volume	Invert	Avail.Storage	Storage Description
#1	254.00'	9,396 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
254.00	3,426	0	0
255.00	4,678	4,052	4,052
256.00	6,010	5,344	9,396

Device	Routing	Invert	Outlet Devices
#1	Discarded	254.00'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 249.00'
#2	Primary	255.90'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.66 cfs @ 12.35 hrs HW=254.00' (Free Discharge)
1=Exfiltration (Controls 0.66 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=254.00' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Area 1 Runoff Area=18,235 sf 39.10% Impervious Runoff Depth=2.34"
Flow Length=79' Slope=0.0100 '/' Tc=7.1 min CN=68 Runoff=1.09 cfs 0.082 af

Subcatchment 2S: Area 2 Runoff Area=12,939 sf 37.00% Impervious Runoff Depth=1.76"
Flow Length=185' Slope=0.0100 '/' Tc=8.7 min CN=61 Runoff=0.52 cfs 0.044 af

Subcatchment 3S: Area 3 Runoff Area=14,335 sf 37.64% Impervious Runoff Depth=1.76"
Flow Length=172' Slope=0.0100 '/' Tc=9.1 min CN=61 Runoff=0.57 cfs 0.048 af

Subcatchment 4S: Area 4 Runoff Area=19,390 sf 46.37% Impervious Runoff Depth=2.17"
Flow Length=110' Tc=6.3 min CN=66 Runoff=1.09 cfs 0.080 af

Subcatchment 5S: Area 5 Runoff Area=11,986 sf 45.91% Impervious Runoff Depth=2.17"
Tc=6.0 min CN=66 Runoff=0.68 cfs 0.050 af

Subcatchment 6S: Area 6 Runoff Area=51,476 sf 62.28% Impervious Runoff Depth=3.06"
Flow Length=159' Tc=6.0 min CN=76 Runoff=4.25 cfs 0.302 af

Subcatchment 7S: Area 7 Runoff Area=33,912 sf 63.48% Impervious Runoff Depth=3.06"
Flow Length=230' Tc=9.0 min CN=76 Runoff=2.52 cfs 0.199 af

Subcatchment 9S: Area 9 Runoff Area=23,171 sf 12.60% Impervious Runoff Depth=0.78"
Tc=6.0 min CN=47 Runoff=0.30 cfs 0.034 af

Subcatchment 10S: Area 10 Runoff Area=60,214 sf 100.00% Impervious Runoff Depth=5.39"
Tc=6.0 min CN=98 Runoff=7.62 cfs 0.621 af

Subcatchment 11S: Area 11 Runoff Area=41,275 sf 52.83% Impervious Runoff Depth=2.51"
Flow Length=292' Tc=9.8 min CN=70 Runoff=2.43 cfs 0.199 af

Subcatchment 12S: Area 12 Runoff Area=29,543 sf 48.32% Impervious Runoff Depth=2.34"
Flow Length=181' Tc=9.0 min CN=68 Runoff=1.65 cfs 0.132 af

Subcatchment 13S: Area 13 Runoff Area=13,342 sf 75.68% Impervious Runoff Depth=4.16"
Flow Length=32' Slope=0.0100 '/' Tc=6.0 min CN=87 Runoff=1.46 cfs 0.106 af

Reach 1R: CTB 29-DMH 28 Avg. Flow Depth=0.39' Max Vel=3.81 fps Inflow=1.09 cfs 0.082 af
12.0" Round Pipe n=0.012 L=13.3' S=0.0075 '/' Capacity=3.35 cfs Outflow=1.09 cfs 0.082 af

Reach 2R: CTB 26-DMH 25 Avg. Flow Depth=0.25' Max Vel=3.46 fps Inflow=0.52 cfs 0.044 af
12.0" Round Pipe n=0.012 L=13.7' S=0.0102 '/' Capacity=3.90 cfs Outflow=0.52 cfs 0.044 af

Reach 3R: CTB 22-DMH 20 Avg. Flow Depth=0.17' Max Vel=6.73 fps Inflow=0.57 cfs 0.048 af
12.0" Round Pipe n=0.012 L=13.8' S=0.0623 '/' Capacity=9.64 cfs Outflow=0.57 cfs 0.048 af

Reach 4R: CTB 32-DMH 17 Avg. Flow Depth=0.37' Max Vel=4.20 fps Inflow=1.09 cfs 0.080 af
12.0" Round Pipe n=0.012 L=14.3' S=0.0098 '/' Capacity=3.82 cfs Outflow=1.09 cfs 0.080 af

Reach 5R: CTB 15-DMH 13 Avg. Flow Depth=0.26' Max Vel=4.23 fps Inflow=0.68 cfs 0.050 af
12.0" Round Pipe n=0.012 L=13.8' S=0.0145 '/' Capacity=4.65 cfs Outflow=0.68 cfs 0.050 af

Reach 6R: DCTB 5-DMH 4 Avg. Flow Depth=0.76' Max Vel=6.59 fps Inflow=4.25 cfs 0.302 af
12.0" Round Pipe n=0.012 L=15.8' S=0.0139 '/' Capacity=4.55 cfs Outflow=4.24 cfs 0.302 af

Reach 7R: DCB 2-DMH 4 Avg. Flow Depth=0.55' Max Vel=5.72 fps Inflow=2.52 cfs 0.199 af
12.0" Round Pipe n=0.012 L=27.8' S=0.0126 '/' Capacity=4.33 cfs Outflow=2.52 cfs 0.199 af

Reach 8R: RL 1-DMH 1 Avg. Flow Depth=0.73' Max Vel=8.97 fps Inflow=7.62 cfs 0.621 af
18.0" Round Pipe n=0.012 L=80.1' S=0.0200 '/' Capacity=16.08 cfs Outflow=7.61 cfs 0.621 af

Reach 9R: TD 1-DMH 1 Avg. Flow Depth=0.47' Max Vel=6.74 fps Inflow=2.43 cfs 0.199 af
12.0" Round Pipe n=0.012 L=84.1' S=0.0200 '/' Capacity=5.46 cfs Outflow=2.43 cfs 0.199 af

Reach 10R: DCB 1-DMH 1 Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
12.0" Round Pipe n=0.012 L=191.5' S=0.0100 '/' Capacity=3.85 cfs Outflow=0.00 cfs 0.000 af

Reach 11R: DMH 1-DMH 2 Avg. Flow Depth=1.06' Max Vel=7.23 fps Inflow=9.69 cfs 0.820 af
18.0" Round Pipe n=0.012 L=15.0' S=0.0100 '/' Capacity=11.38 cfs Outflow=9.69 cfs 0.820 af

Reach 21R: Existing 15" RCP pipe in Saratoga Inflow=1.60 cfs 0.125 af
Outflow=1.60 cfs 0.125 af

Reach 22R: Existing 18" RCP pipe in Independence Inflow=2.16 cfs 0.174 af
Outflow=2.16 cfs 0.174 af

Reach 23R: Existing 24" HDPE pipe on site Inflow=2.52 cfs 0.199 af
Outflow=2.52 cfs 0.199 af

Reach 24R: Existing 30" HDPE pipe on site Inflow=6.61 cfs 0.500 af
Outflow=6.61 cfs 0.500 af

Reach POA-1: Saratoga Blvd & Independence Dr Inflow=10.50 cfs 0.804 af
Outflow=10.50 cfs 0.804 af

Reach POA-2: Existing Infiltration Basin Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 1P: Underground Infiltration System Peak Elev=251.41' Storage=9,919 cf Inflow=9.69 cfs 0.820 af
Discarded=1.83 cfs 0.820 af Primary=0.00 cfs 0.000 af Outflow=1.83 cfs 0.820 af

Pond 2P: Pervious Pavement Peak Elev=255.70' Storage=632 cf Inflow=1.65 cfs 0.132 af
Discarded=0.82 cfs 0.132 af Primary=0.00 cfs 0.000 af Outflow=0.82 cfs 0.132 af

Pond 3P: Pervious Pavement Peak Elev=255.42' Storage=447 cf Inflow=1.46 cfs 0.106 af
Discarded=0.66 cfs 0.106 af Primary=0.00 cfs 0.000 af Outflow=0.66 cfs 0.106 af

Pond 4P: At Grade Infiltration Sytem Peak Elev=254.01' Storage=30 cf Inflow=0.30 cfs 0.034 af
Discarded=0.29 cfs 0.034 af Primary=0.00 cfs 0.000 af Outflow=0.29 cfs 0.034 af

Total Runoff Area = 7.572 ac Runoff Volume = 1.897 af Average Runoff Depth = 3.01"
40.97% Pervious = 3.102 ac 59.03% Impervious = 4.470 ac

Summary for Subcatchment 1S: Area 1

Runoff = 1.09 cfs @ 12.11 hrs, Volume= 0.082 af, Depth= 2.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.63"

	Area (sf)	CN	Description
	2,934	98	Paved parking, HSG A
*	726	98	Concrete, HSG A
	6,089	39	>75% Grass cover, Good, HSG A
	2,696	98	Paved parking, HSG B
*	774	98	Concrete, HSG B
	5,016	61	>75% Grass cover, Good, HSG B
	18,235	68	Weighted Average
	11,105		60.90% Pervious Area
	7,130		39.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	43	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.3	36	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.1	79	Total			

Summary for Subcatchment 2S: Area 2

Runoff = 0.52 cfs @ 12.13 hrs, Volume= 0.044 af, Depth= 1.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.63"

	Area (sf)	CN	Description
	3,911	98	Paved parking, HSG A
*	877	98	Concrete, HSG A
	8,151	39	>75% Grass cover, Good, HSG A
	12,939	61	Weighted Average
	8,151		63.00% Pervious Area
	4,788		37.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.1	135	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.7	185	Total			

Summary for Subcatchment 3S: Area 3

Runoff = 0.57 cfs @ 12.14 hrs, Volume= 0.048 af, Depth= 1.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.63"

	Area (sf)	CN	Description
	4,375	98	Paved parking, HSG A
*	1,020	98	Concrete, HSG A
	8,940	39	>75% Grass cover, Good, HSG A
	14,335	61	Weighted Average
	8,940		62.36% Pervious Area
	5,395		37.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.7	30	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.8	92	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.1	172	Total			

Summary for Subcatchment 4S: Area 4

Runoff = 1.09 cfs @ 12.10 hrs, Volume= 0.080 af, Depth= 2.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.63"

	Area (sf)	CN	Description
	7,754	98	Paved parking, HSG A
*	1,238	98	Concrete, HSG A
	10,398	39	>75% Grass cover, Good, HSG A
	19,390	66	Weighted Average
	10,398		53.63% Pervious Area
	8,992		46.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0200	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.5	60	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.3	110	Total			

Summary for Subcatchment 5S: Area 5

Runoff = 0.68 cfs @ 12.09 hrs, Volume= 0.050 af, Depth= 2.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.63"

	Area (sf)	CN	Description
	4,396	98	Paved parking, HSG A
*	1,107	98	Concrete, HSG A
	6,483	39	>75% Grass cover, Good, HSG A
	11,986	66	Weighted Average
	6,483		54.09% Pervious Area
	5,503		45.91% Impervious Area

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

Summary for Subcatchment 6S: Area 6

Runoff = 4.25 cfs @ 12.09 hrs, Volume= 0.302 af, Depth= 3.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.63"

Area (sf)	CN	Description
32,061	98	Paved parking, HSG A
19,415	39	>75% Grass cover, Good, HSG A
51,476	76	Weighted Average
19,415		37.72% Pervious Area
32,061		62.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	50	0.0400	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.5	35	0.0280	1.17		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	74	0.0220	3.01		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.3	159	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 7S: Area 7

Runoff = 2.52 cfs @ 12.13 hrs, Volume= 0.199 af, Depth= 3.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.63"

	Area (sf)	CN	Description
	20,118	98	Paved parking, HSG A
*	1,411	98	Concrete, HSG A
	12,383	39	>75% Grass cover, Good, HSG A
	33,912	76	Weighted Average
	12,383		36.52% Pervious Area
	21,529		63.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.1	18	0.3300	4.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.3	162	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.0	230	Total			

Summary for Subcatchment 9S: Area 9

Runoff = 0.30 cfs @ 12.12 hrs, Volume= 0.034 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.63"

Area (sf)	CN	Description
2,172	98	Paved parking, HSG A
747	98	Paved parking, HSG B
19,790	39	>75% Grass cover, Good, HSG A
462	61	>75% Grass cover, Good, HSG B
23,171	47	Weighted Average
20,252		87.40% Pervious Area
2,919		12.60% Impervious Area

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

Summary for Subcatchment 10S: Area 10

Runoff = 7.62 cfs @ 12.08 hrs, Volume= 0.621 af, Depth= 5.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.63"

Area (sf)	CN	Description
60,214	98	Roofs, HSG A
60,214		100.00% Impervious Area

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

Summary for Subcatchment 11S: Area 11

Runoff = 2.43 cfs @ 12.14 hrs, Volume= 0.199 af, Depth= 2.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.63"

	Area (sf)	CN	Description
	15,830	98	Paved parking, HSG A
*	5,975	98	Concrete, HSG A
	19,470	39	>75% Grass cover, Good, HSG A
	41,275	70	Weighted Average
	19,470		47.17% Pervious Area
	21,805		52.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.0	41	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	28	0.3300	4.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	83	0.0130	2.31		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	90	0.0250	3.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.8	292	Total			

Summary for Subcatchment 12S: Area 12

Runoff = 1.65 cfs @ 12.13 hrs, Volume= 0.132 af, Depth= 2.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.63"

	Area (sf)	CN	Description
	13,585	98	Paved parking, HSG A
*	690	98	Concrete, HSG A
	15,066	39	>75% Grass cover, Good, HSG A
	202	61	>75% Grass cover, Good, HSG B
	29,543	68	Weighted Average
	15,268		51.68% Pervious Area
	14,275		48.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.9	38	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	30	0.3300	4.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	63	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.0	181	Total			

Summary for Subcatchment 13S: Area 13

Runoff = 1.46 cfs @ 12.09 hrs, Volume= 0.106 af, Depth= 4.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.63"

	Area (sf)	CN	Description
	8,830	98	Paved parking, HSG A
*	430	98	Concrete, HSG A
	1,238	39	>75% Grass cover, Good, HSG A
	837	98	Paved parking, HSG B
	2,007	61	>75% Grass cover, Good, HSG B
	13,342	87	Weighted Average
	3,245		24.32% Pervious Area
	10,097		75.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	32	0.0100	0.10		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
5.3	32	Total, Increased to minimum Tc = 6.0 min			

Summary for Reach 1R: CTB 29-DMH 28

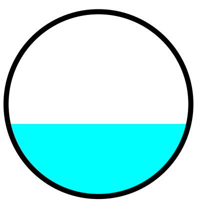
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.419 ac, 39.10% Impervious, Inflow Depth = 2.34" for 25-Year event
Inflow = 1.09 cfs @ 12.11 hrs, Volume= 0.082 af
Outflow = 1.09 cfs @ 12.11 hrs, Volume= 0.082 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.81 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.44 fps, Avg. Travel Time= 0.2 min

Peak Storage= 4 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.39'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.35 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.3' Slope= 0.0075 '/'
Inlet Invert= 254.20', Outlet Invert= 254.10'



Summary for Reach 2R: CTB 26-DMH 25

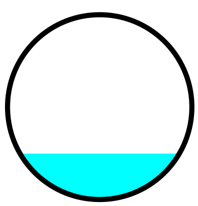
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.297 ac, 37.00% Impervious, Inflow Depth = 1.76" for 25-Year event
Inflow = 0.52 cfs @ 12.13 hrs, Volume= 0.044 af
Outflow = 0.52 cfs @ 12.13 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.46 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.39 fps, Avg. Travel Time= 0.2 min

Peak Storage= 2 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.90 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.7' Slope= 0.0102 '/'
Inlet Invert= 255.75', Outlet Invert= 255.61'



Summary for Reach 3R: CTB 22-DMH 20

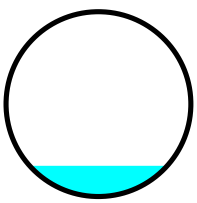
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.329 ac, 37.64% Impervious, Inflow Depth = 1.76" for 25-Year event
Inflow = 0.57 cfs @ 12.14 hrs, Volume= 0.048 af
Outflow = 0.57 cfs @ 12.14 hrs, Volume= 0.048 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.73 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.70 fps, Avg. Travel Time= 0.1 min

Peak Storage= 1 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.17'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 9.64 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.8' Slope= 0.0623 '/'
Inlet Invert= 254.66', Outlet Invert= 253.80'



Summary for Reach 4R: CTB 32-DMH 17

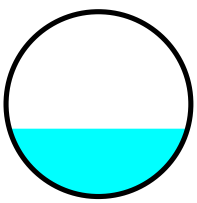
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.445 ac, 46.37% Impervious, Inflow Depth = 2.17" for 25-Year event
Inflow = 1.09 cfs @ 12.10 hrs, Volume= 0.080 af
Outflow = 1.09 cfs @ 12.10 hrs, Volume= 0.080 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.20 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.60 fps, Avg. Travel Time= 0.1 min

Peak Storage= 4 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.37'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.82 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 14.3' Slope= 0.0098 '/'
Inlet Invert= 254.20', Outlet Invert= 254.06'



Summary for Reach 5R: CTB 15-DMH 13

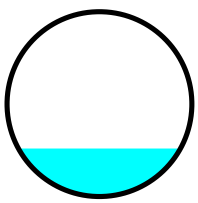
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.275 ac, 45.91% Impervious, Inflow Depth = 2.17" for 25-Year event
Inflow = 0.68 cfs @ 12.09 hrs, Volume= 0.050 af
Outflow = 0.68 cfs @ 12.09 hrs, Volume= 0.050 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.23 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.59 fps, Avg. Travel Time= 0.1 min

Peak Storage= 2 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.65 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.8' Slope= 0.0145 '/'
Inlet Invert= 254.80', Outlet Invert= 254.60'



Summary for Reach 6R: DCTB 5-DMH 4

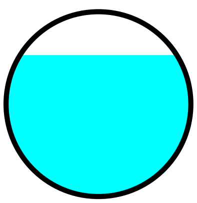
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 1.182 ac, 62.28% Impervious, Inflow Depth = 3.06" for 25-Year event
Inflow = 4.25 cfs @ 12.09 hrs, Volume= 0.302 af
Outflow = 4.24 cfs @ 12.09 hrs, Volume= 0.302 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.59 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.52 fps, Avg. Travel Time= 0.1 min

Peak Storage= 10 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.76'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.55 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 15.8' Slope= 0.0139 '/'
Inlet Invert= 251.58', Outlet Invert= 251.36'



Summary for Reach 7R: DCB 2-DMH 4

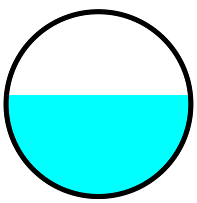
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.779 ac, 63.48% Impervious, Inflow Depth = 3.06" for 25-Year event
Inflow = 2.52 cfs @ 12.13 hrs, Volume= 0.199 af
Outflow = 2.52 cfs @ 12.13 hrs, Volume= 0.199 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.72 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.14 fps, Avg. Travel Time= 0.2 min

Peak Storage= 12 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.55'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.33 cfs

12.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 27.8' Slope= 0.0126 '/'
Inlet Invert= 252.00', Outlet Invert= 251.65'



Summary for Reach 8R: RL 1-DMH 1

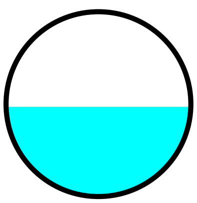
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 1.382 ac,100.00% Impervious, Inflow Depth = 5.39" for 25-Year event
Inflow = 7.62 cfs @ 12.08 hrs, Volume= 0.621 af
Outflow = 7.61 cfs @ 12.09 hrs, Volume= 0.621 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.97 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 3.03 fps, Avg. Travel Time= 0.4 min

Peak Storage= 68 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.73'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 16.08 cfs

18.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 80.1' Slope= 0.0200 '/'
Inlet Invert= 253.60', Outlet Invert= 252.00'



Summary for Reach 9R: TD 1-DMH 1

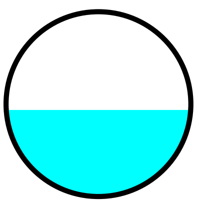
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.948 ac, 52.83% Impervious, Inflow Depth = 2.51" for 25-Year event
Inflow = 2.43 cfs @ 12.14 hrs, Volume= 0.199 af
Outflow = 2.43 cfs @ 12.15 hrs, Volume= 0.199 af, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.74 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.60 fps, Avg. Travel Time= 0.5 min

Peak Storage= 30 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.47'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.46 cfs

12.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 84.1' Slope= 0.0200 '/'
Inlet Invert= 252.00', Outlet Invert= 250.32'



Summary for Reach 10R: DCB 1-DMH 1

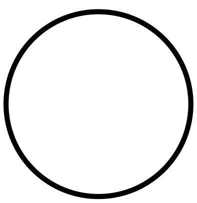
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.678 ac, 48.32% Impervious, Inflow Depth = 0.00" for 25-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

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.85 cfs

12.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 191.5' Slope= 0.0100 '/'
Inlet Invert= 252.00', Outlet Invert= 250.09'



Summary for Reach 11R: DMH 1-DMH 2

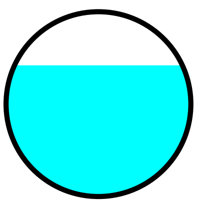
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 3.008 ac, 73.49% Impervious, Inflow Depth = 3.27" for 25-Year event
Inflow = 9.69 cfs @ 12.10 hrs, Volume= 0.820 af
Outflow = 9.69 cfs @ 12.10 hrs, Volume= 0.820 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.23 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.54 fps, Avg. Travel Time= 0.1 min

Peak Storage= 20 cf @ 12.10 hrs
Average Depth at Peak Storage= 1.06'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 11.38 cfs

18.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 15.0' Slope= 0.0100 '/'
Inlet Invert= 100.00', Outlet Invert= 99.85'



Summary for Reach 21R: Existing 15" RCP pipe in Saratoga

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.716 ac, 38.23% Impervious, Inflow Depth = 2.10" for 25-Year event
Inflow = 1.60 cfs @ 12.12 hrs, Volume= 0.125 af
Outflow = 1.60 cfs @ 12.12 hrs, Volume= 0.125 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 22R: Existing 18" RCP pipe in Independence

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	4.053 ac,	64.35% Impervious,	Inflow Depth = 0.51"	for 25-Year event
Inflow =	2.16 cfs @	12.12 hrs, Volume=	0.174 af	
Outflow =	2.16 cfs @	12.12 hrs, Volume=	0.174 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 23R: Existing 24" HDPE pipe on site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.779 ac, 63.48% Impervious, Inflow Depth = 3.06" for 25-Year event
Inflow = 2.52 cfs @ 12.13 hrs, Volume= 0.199 af
Outflow = 2.52 cfs @ 12.13 hrs, Volume= 0.199 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 24R: Existing 30" HDPE pipe on site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.960 ac, 62.76% Impervious, Inflow Depth = 3.06" for 25-Year event
Inflow = 6.61 cfs @ 12.10 hrs, Volume= 0.500 af
Outflow = 6.61 cfs @ 12.10 hrs, Volume= 0.500 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach POA-1: Saratoga Blvd & Independence Dr

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.733 ac, 61.95% Impervious, Inflow Depth = 1.43" for 25-Year event
Inflow = 10.50 cfs @ 12.11 hrs, Volume= 0.804 af
Outflow = 10.50 cfs @ 12.11 hrs, Volume= 0.804 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach POA-2: Existing Infiltration Basin

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.838 ac, 35.65% Impervious, Inflow Depth = 0.00" for 25-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

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Underground Infiltration System

[63] Warning: Exceeded Reach 11R INLET depth by 151.04' @ 12.67 hrs

Inflow Area =	3.008 ac,	73.49% Impervious,	Inflow Depth = 3.27"	for 25-Year event
Inflow =	9.69 cfs @	12.10 hrs, Volume=	0.820 af	
Outflow =	1.83 cfs @	12.57 hrs, Volume=	0.820 af,	Atten= 81%, Lag= 28.5 min
Discarded =	1.83 cfs @	12.57 hrs, Volume=	0.820 af	
Primary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 251.41' @ 12.57 hrs Surf.Area= 5,954 sf Storage= 9,919 cf

Plug-Flow detention time= 36.0 min calculated for 0.820 af (100% of inflow)
Center-of-Mass det. time= 35.9 min (806.6 - 770.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	249.00'	8,370 cf	**94.42'W x 63.06'L x 5.50'H Field A** 32,747 cf Overall - 11,822 cf Embedded = 20,924 cf x 40.0% Voids
#2A	249.75'	11,822 cf	**ADS_StormTech MC-3500 d +Cap** x 104 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 104 Chambers in 13 Rows Cap Storage= +14.9 cf x 2 x 13 rows = 387.4 cf
		20,192 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	249.00'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 245.00'
#2	Primary	252.44'	**12.0" Round Culvert** L= 60.5' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 252.44' / 252.10' S= 0.0056 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=1.83 cfs @ 12.57 hrs HW=251.41' (Free Discharge)
└─**1=Exfiltration** (Controls 1.83 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=249.00' (Free Discharge)
└─**2=Culvert** (Controls 0.00 cfs)

Pond 1P: Underground Infiltration System - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 13 rows = 387.4 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

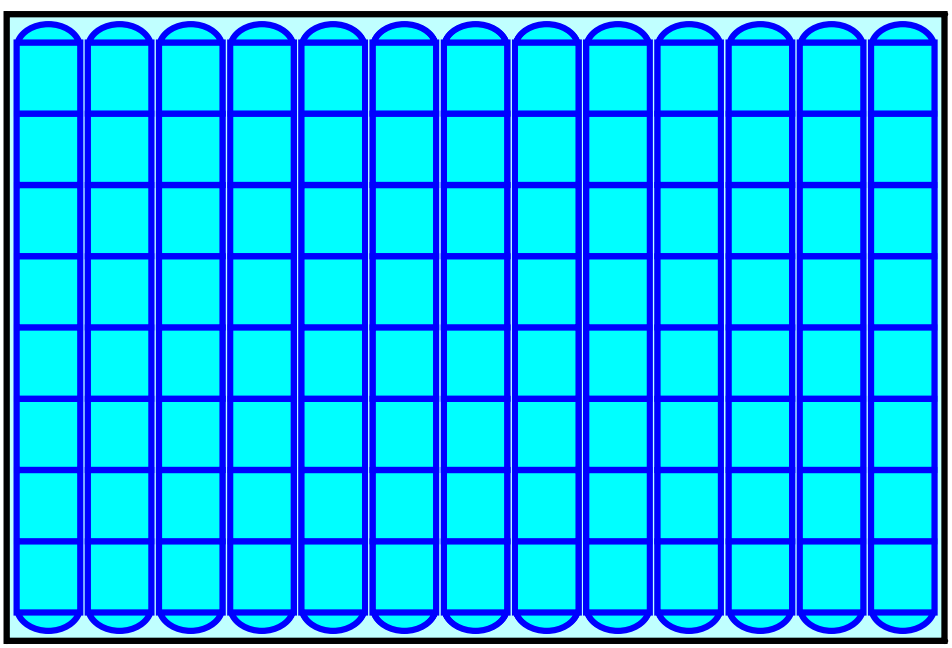
8 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 61.06' Row Length +12.0" End Stone x 2 = 63.06' Base Length
13 Rows x 77.0" Wide + 9.0" Spacing x 12 + 12.0" Side Stone x 2 = 94.42' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

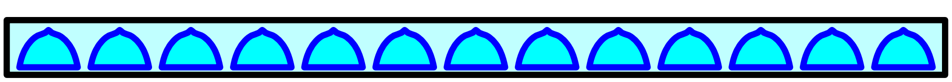
104 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 13 Rows = 11,822.4 cf Chamber Storage

32,746.5 cf Field - 11,822.4 cf Chambers = 20,924.1 cf Stone x 40.0% Voids = 8,369.7 cf Stone Storage

Chamber Storage + Stone Storage = 20,192.1 cf = 0.464 af
Overall Storage Efficiency = 61.7%
Overall System Size = 63.06' x 94.42' x 5.50'

104 Chambers
1,212.8 cy Field
775.0 cy Stone





Summary for Pond 2P: Pervious Pavement

Inflow Area = 0.678 ac, 48.32% Impervious, Inflow Depth = 2.34" for 25-Year event
Inflow = 1.65 cfs @ 12.13 hrs, Volume= 0.132 af
Outflow = 0.82 cfs @ 12.37 hrs, Volume= 0.132 af, Atten= 50%, Lag= 14.5 min
Discarded = 0.82 cfs @ 12.37 hrs, Volume= 0.132 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 255.70' @ 12.37 hrs Surf.Area= 3,248 sf Storage= 632 cf

Plug-Flow detention time= 3.8 min calculated for 0.132 af (100% of inflow)
Center-of-Mass det. time= 3.8 min (852.9 - 849.1)

Volume	Invert	Avail.Storage	Storage Description
#1	254.08'	1,598 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
254.08	3,248	0.0	0	0
254.09	3,248	40.0	13	13
255.67	3,248	10.0	513	526
256.00	3,248	100.0	1,072	1,598

Device	Routing	Invert	Outlet Devices
#1	Discarded	254.08'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 249.00'
#2	Primary	255.90'	**90.0' long x 36.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.82 cfs @ 12.37 hrs HW=255.70' (Free Discharge)
└─**1=Exfiltration** (Controls 0.82 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=254.08' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 3P: Pervious Pavement

Inflow Area =	0.306 ac, 75.68% Impervious,	Inflow Depth = 4.16"	for 25-Year event
Inflow =	1.46 cfs @ 12.09 hrs,	Volume= 0.106 af	
Outflow =	0.66 cfs @ 12.26 hrs,	Volume= 0.106 af,	Atten= 54%, Lag= 10.6 min
Discarded =	0.66 cfs @ 12.26 hrs,	Volume= 0.106 af	
Primary =	0.00 cfs @ 0.00 hrs,	Volume= 0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 255.42' @ 12.26 hrs Surf.Area= 3,248 sf Storage= 447 cf

Plug-Flow detention time= 2.8 min calculated for 0.106 af (100% of inflow)
Center-of-Mass det. time= 2.8 min (799.8 - 796.9)

Volume	Invert	Avail.Storage	Storage Description
#1	255.08'	3,138 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
255.08	3,248	0.0	0	0
255.09	3,248	40.0	13	13
256.67	3,248	40.0	2,053	2,066
257.00	3,248	100.0	1,072	3,138

Device	Routing	Invert	Outlet Devices
#1	Discarded	255.08'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 250.00'
#2	Primary	256.50'	**36.0' long x 90.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.66 cfs @ 12.26 hrs HW=255.42' (Free Discharge)
└─**1=Exfiltration** (Controls 0.66 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=255.08' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 4P: At Grade Infiltration Sytem

Inflow Area =	0.838 ac,	35.65% Impervious,	Inflow Depth = 0.49"	for 25-Year event	
Inflow =	0.30 cfs @	12.12 hrs,	Volume=	0.034 af	
Outflow =	0.29 cfs @	12.15 hrs,	Volume=	0.034 af,	Atten= 5%, Lag= 1.9 min
Discarded =	0.29 cfs @	12.15 hrs,	Volume=	0.034 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 254.01' @ 12.15 hrs Surf.Area= 3,437 sf Storage= 30 cf

Plug-Flow detention time= 1.7 min calculated for 0.034 af (100% of inflow)
Center-of-Mass det. time= 1.7 min (916.8 - 915.1)

Volume	Invert	Avail.Storage	Storage Description
#1	254.00'	9,396 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
254.00	3,426	0	0
255.00	4,678	4,052	4,052
256.00	6,010	5,344	9,396

Device	Routing	Invert	Outlet Devices
#1	Discarded	254.00'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 249.00'
#2	Primary	255.90'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.66 cfs @ 12.15 hrs HW=254.01' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.66 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=254.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Area 1 Runoff Area=18,235 sf 39.10% Impervious Runoff Depth=3.15"
Flow Length=79' Slope=0.0100 '/' Tc=7.1 min CN=68 Runoff=1.48 cfs 0.110 af

Subcatchment 2S: Area 2 Runoff Area=12,939 sf 37.00% Impervious Runoff Depth=2.47"
Flow Length=185' Slope=0.0100 '/' Tc=8.7 min CN=61 Runoff=0.76 cfs 0.061 af

Subcatchment 3S: Area 3 Runoff Area=14,335 sf 37.64% Impervious Runoff Depth=2.47"
Flow Length=172' Slope=0.0100 '/' Tc=9.1 min CN=61 Runoff=0.83 cfs 0.068 af

Subcatchment 4S: Area 4 Runoff Area=19,390 sf 46.37% Impervious Runoff Depth=2.96"
Flow Length=110' Tc=6.3 min CN=66 Runoff=1.51 cfs 0.110 af

Subcatchment 5S: Area 5 Runoff Area=11,986 sf 45.91% Impervious Runoff Depth=2.96"
Tc=6.0 min CN=66 Runoff=0.94 cfs 0.068 af

Subcatchment 6S: Area 6 Runoff Area=51,476 sf 62.28% Impervious Runoff Depth=3.97"
Flow Length=159' Tc=6.0 min CN=76 Runoff=5.50 cfs 0.391 af

Subcatchment 7S: Area 7 Runoff Area=33,912 sf 63.48% Impervious Runoff Depth=3.97"
Flow Length=230' Tc=9.0 min CN=76 Runoff=3.27 cfs 0.258 af

Subcatchment 9S: Area 9 Runoff Area=23,171 sf 12.60% Impervious Runoff Depth=1.25"
Tc=6.0 min CN=47 Runoff=0.61 cfs 0.055 af

Subcatchment 10S: Area 10 Runoff Area=60,214 sf 100.00% Impervious Runoff Depth=6.44"
Tc=6.0 min CN=98 Runoff=9.06 cfs 0.742 af

Subcatchment 11S: Area 11 Runoff Area=41,275 sf 52.83% Impervious Runoff Depth=3.35"
Flow Length=292' Tc=9.8 min CN=70 Runoff=3.27 cfs 0.265 af

Subcatchment 12S: Area 12 Runoff Area=29,543 sf 48.32% Impervious Runoff Depth=3.15"
Flow Length=181' Tc=9.0 min CN=68 Runoff=2.25 cfs 0.178 af

Subcatchment 13S: Area 13 Runoff Area=13,342 sf 75.68% Impervious Runoff Depth=5.17"
Flow Length=32' Slope=0.0100 '/' Tc=6.0 min CN=87 Runoff=1.79 cfs 0.132 af

Reach 1R: CTB 29-DMH 28 Avg. Flow Depth=0.47' Max Vel=4.13 fps Inflow=1.48 cfs 0.110 af
12.0" Round Pipe n=0.012 L=13.3' S=0.0075 '/' Capacity=3.35 cfs Outflow=1.48 cfs 0.110 af

Reach 2R: CTB 26-DMH 25 Avg. Flow Depth=0.30' Max Vel=3.85 fps Inflow=0.76 cfs 0.061 af
12.0" Round Pipe n=0.012 L=13.7' S=0.0102 '/' Capacity=3.90 cfs Outflow=0.76 cfs 0.061 af

Reach 3R: CTB 22-DMH 20 Avg. Flow Depth=0.20' Max Vel=7.51 fps Inflow=0.83 cfs 0.068 af
12.0" Round Pipe n=0.012 L=13.8' S=0.0623 '/' Capacity=9.64 cfs Outflow=0.83 cfs 0.068 af

Reach 4R: CTB 32-DMH 17 Avg. Flow Depth=0.44' Max Vel=4.58 fps Inflow=1.51 cfs 0.110 af
12.0" Round Pipe n=0.012 L=14.3' S=0.0098 '/' Capacity=3.82 cfs Outflow=1.51 cfs 0.110 af

Reach 5R: CTB 15-DMH 13 Avg. Flow Depth=0.31' Max Vel=4.64 fps Inflow=0.94 cfs 0.068 af
12.0" Round Pipe n=0.012 L=13.8' S=0.0145 '/' Capacity=4.65 cfs Outflow=0.94 cfs 0.068 af

Reach 6R: DCTB 5-DMH 4 Avg. Flow Depth=1.00' Max Vel=6.61 fps Inflow=5.50 cfs 0.391 af
12.0" Round Pipe n=0.012 L=15.8' S=0.0139 '/' Capacity=4.55 cfs Outflow=4.85 cfs 0.391 af

Reach 7R: DCB 2-DMH 4 Avg. Flow Depth=0.65' Max Vel=6.06 fps Inflow=3.27 cfs 0.258 af
12.0" Round Pipe n=0.012 L=27.8' S=0.0126 '/' Capacity=4.33 cfs Outflow=3.27 cfs 0.258 af

Reach 8R: RL 1-DMH 1 Avg. Flow Depth=0.81' Max Vel=9.37 fps Inflow=9.06 cfs 0.742 af
18.0" Round Pipe n=0.012 L=80.1' S=0.0200 '/' Capacity=16.08 cfs Outflow=9.04 cfs 0.742 af

Reach 9R: TD 1-DMH 1 Avg. Flow Depth=0.56' Max Vel=7.26 fps Inflow=3.27 cfs 0.265 af
12.0" Round Pipe n=0.012 L=84.1' S=0.0200 '/' Capacity=5.46 cfs Outflow=3.26 cfs 0.265 af

Reach 10R: DCB 1-DMH 1 Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
12.0" Round Pipe n=0.012 L=191.5' S=0.0100 '/' Capacity=3.85 cfs Outflow=0.00 cfs 0.000 af

Reach 11R: DMH 1-DMH 2 Avg. Flow Depth=1.30' Max Vel=7.34 fps Inflow=11.88 cfs 1.007 af
18.0" Round Pipe n=0.012 L=15.0' S=0.0100 '/' Capacity=11.38 cfs Outflow=11.88 cfs 1.007 af

Reach 21R: Existing 15" RCP pipe in Saratoga Inflow=2.22 cfs 0.171 af
Outflow=2.22 cfs 0.171 af

Reach 22R: Existing 18" RCP pipe in Independence Inflow=3.04 cfs 0.239 af
Outflow=3.04 cfs 0.239 af

Reach 23R: Existing 24" HDPE pipe on site Inflow=3.27 cfs 0.258 af
Outflow=3.27 cfs 0.258 af

Reach 24R: Existing 30" HDPE pipe on site Inflow=7.82 cfs 0.649 af
Outflow=7.82 cfs 0.649 af

Reach POA-1: Saratoga Blvd & Independence Dr Inflow=13.21 cfs 1.066 af
Outflow=13.21 cfs 1.066 af

Reach POA-2: Existing Infiltration Basin Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 1P: Underground Infiltration System Peak Elev=252.13' Storage=13,110 cf Inflow=11.88 cfs 1.007 af
Discarded=2.03 cfs 1.007 af Primary=0.00 cfs 0.000 af Outflow=2.03 cfs 1.007 af

Pond 2P: Pervious Pavement Peak Elev=255.90' Storage=1,263 cf Inflow=2.25 cfs 0.178 af
Discarded=0.84 cfs 0.178 af Primary=0.00 cfs 0.000 af Outflow=0.84 cfs 0.178 af

Pond 3P: Pervious Pavement Peak Elev=255.64' Storage=728 cf Inflow=1.79 cfs 0.132 af
Discarded=0.69 cfs 0.132 af Primary=0.00 cfs 0.000 af Outflow=0.69 cfs 0.132 af

Pond 4P: At Grade Infiltration Sytem Peak Elev=254.02' Storage=59 cf Inflow=0.61 cfs 0.055 af
Discarded=0.57 cfs 0.055 af Primary=0.00 cfs 0.000 af Outflow=0.57 cfs 0.055 af

Total Runoff Area = 7.572 ac Runoff Volume = 2.438 af Average Runoff Depth = 3.86"
40.97% Pervious = 3.102 ac 59.03% Impervious = 4.470 ac

Summary for Subcatchment 1S: Area 1

Runoff = 1.48 cfs @ 12.11 hrs, Volume= 0.110 af, Depth= 3.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=6.68"

	Area (sf)	CN	Description
	2,934	98	Paved parking, HSG A
*	726	98	Concrete, HSG A
	6,089	39	>75% Grass cover, Good, HSG A
	2,696	98	Paved parking, HSG B
*	774	98	Concrete, HSG B
	5,016	61	>75% Grass cover, Good, HSG B
	18,235	68	Weighted Average
	11,105		60.90% Pervious Area
	7,130		39.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	43	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.3	36	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.1	79	Total			

Summary for Subcatchment 2S: Area 2

Runoff = 0.76 cfs @ 12.13 hrs, Volume= 0.061 af, Depth= 2.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=6.68"

	Area (sf)	CN	Description
	3,911	98	Paved parking, HSG A
*	877	98	Concrete, HSG A
	8,151	39	>75% Grass cover, Good, HSG A
	12,939	61	Weighted Average
	8,151		63.00% Pervious Area
	4,788		37.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.1	135	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.7	185	Total			

Summary for Subcatchment 3S: Area 3

Runoff = 0.83 cfs @ 12.14 hrs, Volume= 0.068 af, Depth= 2.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=6.68"

	Area (sf)	CN	Description
	4,375	98	Paved parking, HSG A
*	1,020	98	Concrete, HSG A
	8,940	39	>75% Grass cover, Good, HSG A
	14,335	61	Weighted Average
	8,940		62.36% Pervious Area
	5,395		37.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.7	30	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.8	92	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.1	172	Total			

Summary for Subcatchment 4S: Area 4

Runoff = 1.51 cfs @ 12.10 hrs, Volume= 0.110 af, Depth= 2.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=6.68"

	Area (sf)	CN	Description
	7,754	98	Paved parking, HSG A
*	1,238	98	Concrete, HSG A
	10,398	39	>75% Grass cover, Good, HSG A
	19,390	66	Weighted Average
	10,398		53.63% Pervious Area
	8,992		46.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0200	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.5	60	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.3	110	Total			

Summary for Subcatchment 5S: Area 5

Runoff = 0.94 cfs @ 12.09 hrs, Volume= 0.068 af, Depth= 2.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=6.68"

	Area (sf)	CN	Description
	4,396	98	Paved parking, HSG A
*	1,107	98	Concrete, HSG A
	6,483	39	>75% Grass cover, Good, HSG A
	11,986	66	Weighted Average
	6,483		54.09% Pervious Area
	5,503		45.91% Impervious Area

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

Summary for Subcatchment 6S: Area 6

Runoff = 5.50 cfs @ 12.09 hrs, Volume= 0.391 af, Depth= 3.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=6.68"

Area (sf)	CN	Description
32,061	98	Paved parking, HSG A
19,415	39	>75% Grass cover, Good, HSG A
51,476	76	Weighted Average
19,415		37.72% Pervious Area
32,061		62.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	50	0.0400	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.5	35	0.0280	1.17		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	74	0.0220	3.01		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.3	159	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 7S: Area 7

Runoff = 3.27 cfs @ 12.13 hrs, Volume= 0.258 af, Depth= 3.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=6.68"

	Area (sf)	CN	Description
	20,118	98	Paved parking, HSG A
*	1,411	98	Concrete, HSG A
	12,383	39	>75% Grass cover, Good, HSG A
	33,912	76	Weighted Average
	12,383		36.52% Pervious Area
	21,529		63.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.1	18	0.3300	4.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.3	162	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.0	230	Total			

Summary for Subcatchment 9S: Area 9

Runoff = 0.61 cfs @ 12.11 hrs, Volume= 0.055 af, Depth= 1.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=6.68"

Area (sf)	CN	Description
2,172	98	Paved parking, HSG A
747	98	Paved parking, HSG B
19,790	39	>75% Grass cover, Good, HSG A
462	61	>75% Grass cover, Good, HSG B
23,171	47	Weighted Average
20,252		87.40% Pervious Area
2,919		12.60% Impervious Area

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

Summary for Subcatchment 10S: Area 10

Runoff = 9.06 cfs @ 12.08 hrs, Volume= 0.742 af, Depth= 6.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=6.68"

Area (sf)	CN	Description
60,214	98	Roofs, HSG A
60,214		100.00% Impervious Area

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

Summary for Subcatchment 11S: Area 11

Runoff = 3.27 cfs @ 12.14 hrs, Volume= 0.265 af, Depth= 3.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=6.68"

	Area (sf)	CN	Description
	15,830	98	Paved parking, HSG A
*	5,975	98	Concrete, HSG A
	19,470	39	>75% Grass cover, Good, HSG A
	41,275	70	Weighted Average
	19,470		47.17% Pervious Area
	21,805		52.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.0	41	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	28	0.3300	4.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	83	0.0130	2.31		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	90	0.0250	3.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.8	292	Total			

Summary for Subcatchment 12S: Area 12

Runoff = 2.25 cfs @ 12.13 hrs, Volume= 0.178 af, Depth= 3.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=6.68"

	Area (sf)	CN	Description
	13,585	98	Paved parking, HSG A
*	690	98	Concrete, HSG A
	15,066	39	>75% Grass cover, Good, HSG A
	202	61	>75% Grass cover, Good, HSG B
	29,543	68	Weighted Average
	15,268		51.68% Pervious Area
	14,275		48.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.9	38	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	30	0.3300	4.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	63	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.0	181	Total			

Summary for Subcatchment 13S: Area 13

Runoff = 1.79 cfs @ 12.09 hrs, Volume= 0.132 af, Depth= 5.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=6.68"

	Area (sf)	CN	Description
	8,830	98	Paved parking, HSG A
*	430	98	Concrete, HSG A
	1,238	39	>75% Grass cover, Good, HSG A
	837	98	Paved parking, HSG B
	2,007	61	>75% Grass cover, Good, HSG B
	13,342	87	Weighted Average
	3,245		24.32% Pervious Area
	10,097		75.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	32	0.0100	0.10		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
5.3	32	Total, Increased to minimum Tc = 6.0 min			

Summary for Reach 1R: CTB 29-DMH 28

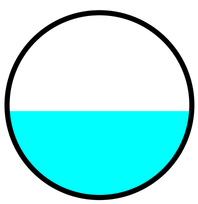
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.419 ac, 39.10% Impervious, Inflow Depth = 3.15" for 50-Year event
Inflow = 1.48 cfs @ 12.11 hrs, Volume= 0.110 af
Outflow = 1.48 cfs @ 12.11 hrs, Volume= 0.110 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.13 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.55 fps, Avg. Travel Time= 0.1 min

Peak Storage= 5 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.47'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.35 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.3' Slope= 0.0075 '/'
Inlet Invert= 254.20', Outlet Invert= 254.10'



Summary for Reach 2R: CTB 26-DMH 25

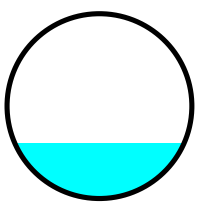
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.297 ac, 37.00% Impervious, Inflow Depth = 2.47" for 50-Year event
Inflow = 0.76 cfs @ 12.13 hrs, Volume= 0.061 af
Outflow = 0.76 cfs @ 12.13 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.85 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.50 fps, Avg. Travel Time= 0.2 min

Peak Storage= 3 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.90 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.7' Slope= 0.0102 '/'
Inlet Invert= 255.75', Outlet Invert= 255.61'



Summary for Reach 3R: CTB 22-DMH 20

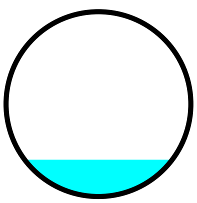
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.329 ac, 37.64% Impervious, Inflow Depth = 2.47" for 50-Year event
Inflow = 0.83 cfs @ 12.14 hrs, Volume= 0.068 af
Outflow = 0.83 cfs @ 12.14 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.51 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.92 fps, Avg. Travel Time= 0.1 min

Peak Storage= 2 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 9.64 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.8' Slope= 0.0623 '/'
Inlet Invert= 254.66', Outlet Invert= 253.80'



Summary for Reach 4R: CTB 32-DMH 17

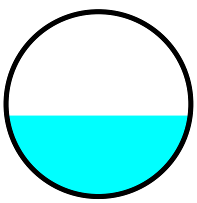
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.445 ac, 46.37% Impervious, Inflow Depth = 2.96" for 50-Year event
Inflow = 1.51 cfs @ 12.10 hrs, Volume= 0.110 af
Outflow = 1.51 cfs @ 12.10 hrs, Volume= 0.110 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.58 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.71 fps, Avg. Travel Time= 0.1 min

Peak Storage= 5 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.44'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.82 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 14.3' Slope= 0.0098 '/'
Inlet Invert= 254.20', Outlet Invert= 254.06'



Summary for Reach 5R: CTB 15-DMH 13

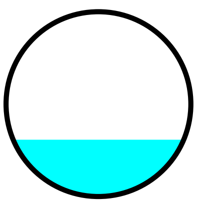
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.275 ac, 45.91% Impervious, Inflow Depth = 2.96" for 50-Year event
Inflow = 0.94 cfs @ 12.09 hrs, Volume= 0.068 af
Outflow = 0.94 cfs @ 12.09 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.64 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.71 fps, Avg. Travel Time= 0.1 min

Peak Storage= 3 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.31'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.65 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.8' Slope= 0.0145 '/'
Inlet Invert= 254.80', Outlet Invert= 254.60'



Summary for Reach 6R: DCTB 5-DMH 4

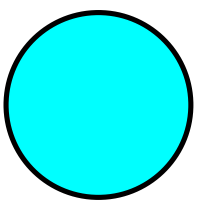
[52] Hint: Inlet/Outlet conditions not evaluated
[55] Hint: Peak inflow is 121% of Manning's capacity
[76] Warning: Detained 0.005 af (Pond w/culvert advised)

Inflow Area = 1.182 ac, 62.28% Impervious, Inflow Depth = 3.97" for 50-Year event
Inflow = 5.50 cfs @ 12.09 hrs, Volume= 0.391 af
Outflow = 4.85 cfs @ 12.05 hrs, Volume= 0.391 af, Atten= 12%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.61 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.66 fps, Avg. Travel Time= 0.1 min

Peak Storage= 12 cf @ 12.06 hrs
Average Depth at Peak Storage= 1.00'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.55 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 15.8' Slope= 0.0139 '/'
Inlet Invert= 251.58', Outlet Invert= 251.36'



Summary for Reach 7R: DCB 2-DMH 4

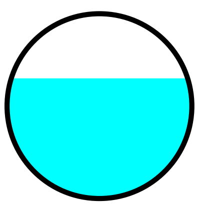
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.779 ac, 63.48% Impervious, Inflow Depth = 3.97" for 50-Year event
Inflow = 3.27 cfs @ 12.13 hrs, Volume= 0.258 af
Outflow = 3.27 cfs @ 12.13 hrs, Volume= 0.258 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.06 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.27 fps, Avg. Travel Time= 0.2 min

Peak Storage= 15 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.65'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.33 cfs

12.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 27.8' Slope= 0.0126 '/'
Inlet Invert= 252.00', Outlet Invert= 251.65'



Summary for Reach 8R: RL 1-DMH 1

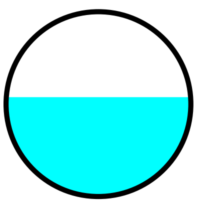
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 1.382 ac,100.00% Impervious, Inflow Depth = 6.44" for 50-Year event
Inflow = 9.06 cfs @ 12.08 hrs, Volume= 0.742 af
Outflow = 9.04 cfs @ 12.09 hrs, Volume= 0.742 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.37 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 3.20 fps, Avg. Travel Time= 0.4 min

Peak Storage= 77 cf @ 12.08 hrs
Average Depth at Peak Storage= 0.81'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 16.08 cfs

18.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 80.1' Slope= 0.0200 '/'
Inlet Invert= 253.60', Outlet Invert= 252.00'



Summary for Reach 9R: TD 1-DMH 1

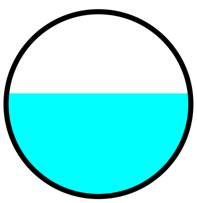
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.948 ac, 52.83% Impervious, Inflow Depth = 3.35" for 50-Year event
Inflow = 3.27 cfs @ 12.14 hrs, Volume= 0.265 af
Outflow = 3.26 cfs @ 12.15 hrs, Volume= 0.265 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.26 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.78 fps, Avg. Travel Time= 0.5 min

Peak Storage= 38 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.56'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.46 cfs

12.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 84.1' Slope= 0.0200 '/'
Inlet Invert= 252.00', Outlet Invert= 250.32'



Summary for Reach 10R: DCB 1-DMH 1

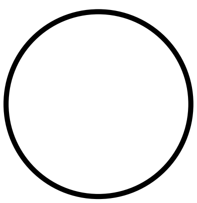
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.678 ac, 48.32% Impervious, Inflow Depth = 0.00" for 50-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

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.85 cfs

12.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 191.5' Slope= 0.0100 '/'
Inlet Invert= 252.00', Outlet Invert= 250.09'



Summary for Reach 11R: DMH 1-DMH 2

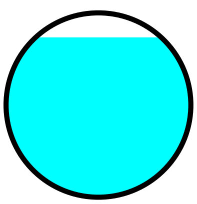
[52] Hint: Inlet/Outlet conditions not evaluated
[55] Hint: Peak inflow is 104% of Manning's capacity

Inflow Area = 3.008 ac, 73.49% Impervious, Inflow Depth = 4.02" for 50-Year event
Inflow = 11.88 cfs @ 12.10 hrs, Volume= 1.007 af
Outflow = 11.88 cfs @ 12.10 hrs, Volume= 1.007 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.34 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.69 fps, Avg. Travel Time= 0.1 min

Peak Storage= 24 cf @ 12.10 hrs
Average Depth at Peak Storage= 1.30'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 11.38 cfs

18.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 15.0' Slope= 0.0100 '/'
Inlet Invert= 100.00', Outlet Invert= 99.85'



Summary for Reach 21R: Existing 15" RCP pipe in Saratoga

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.716 ac, 38.23% Impervious, Inflow Depth = 2.87" for 50-Year event
Inflow = 2.22 cfs @ 12.11 hrs, Volume= 0.171 af
Outflow = 2.22 cfs @ 12.11 hrs, Volume= 0.171 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 22R: Existing 18" RCP pipe in Independence

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.053 ac, 64.35% Impervious, Inflow Depth = 0.71" for 50-Year event
Inflow = 3.04 cfs @ 12.12 hrs, Volume= 0.239 af
Outflow = 3.04 cfs @ 12.12 hrs, Volume= 0.239 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 23R: Existing 24" HDPE pipe on site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.779 ac, 63.48% Impervious, Inflow Depth = 3.97" for 50-Year event
Inflow = 3.27 cfs @ 12.13 hrs, Volume= 0.258 af
Outflow = 3.27 cfs @ 12.13 hrs, Volume= 0.258 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 24R: Existing 30" HDPE pipe on site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.960 ac, 62.76% Impervious, Inflow Depth = 3.97" for 50-Year event
Inflow = 7.82 cfs @ 12.13 hrs, Volume= 0.649 af
Outflow = 7.82 cfs @ 12.13 hrs, Volume= 0.649 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach POA-1: Saratoga Blvd & Independence Dr

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.733 ac, 61.95% Impervious, Inflow Depth = 1.90" for 50-Year event
Inflow = 13.21 cfs @ 12.12 hrs, Volume= 1.066 af
Outflow = 13.21 cfs @ 12.12 hrs, Volume= 1.066 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach POA-2: Existing Infiltration Basin

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.838 ac, 35.65% Impervious, Inflow Depth = 0.00" for 50-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

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Underground Infiltration System

[63] Warning: Exceeded Reach 11R INLET depth by 151.73' @ 12.68 hrs

Inflow Area = 3.008 ac, 73.49% Impervious, Inflow Depth = 4.02" for 50-Year event
Inflow = 11.88 cfs @ 12.10 hrs, Volume= 1.007 af
Outflow = 2.03 cfs @ 12.60 hrs, Volume= 1.007 af, Atten= 83%, Lag= 30.0 min
Discarded = 2.03 cfs @ 12.60 hrs, Volume= 1.007 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 252.13' @ 12.60 hrs Surf.Area= 5,954 sf Storage= 13,110 cf

Plug-Flow detention time= 46.2 min calculated for 1.007 af (100% of inflow)
Center-of-Mass det. time= 46.2 min (814.8 - 768.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	249.00'	8,370 cf	**94.42'W x 63.06'L x 5.50'H Field A** 32,747 cf Overall - 11,822 cf Embedded = 20,924 cf x 40.0% Voids
#2A	249.75'	11,822 cf	**ADS_StormTech MC-3500 d +Cap** x 104 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 104 Chambers in 13 Rows Cap Storage= +14.9 cf x 2 x 13 rows = 387.4 cf
		20,192 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	249.00'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 245.00'
#2	Primary	252.44'	**12.0" Round Culvert** L= 60.5' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 252.44' / 252.10' S= 0.0056 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=2.03 cfs @ 12.60 hrs HW=252.13' (Free Discharge)
└─**1=Exfiltration** (Controls 2.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=249.00' (Free Discharge)
└─**2=Culvert** (Controls 0.00 cfs)

Pond 1P: Underground Infiltration System - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 13 rows = 387.4 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

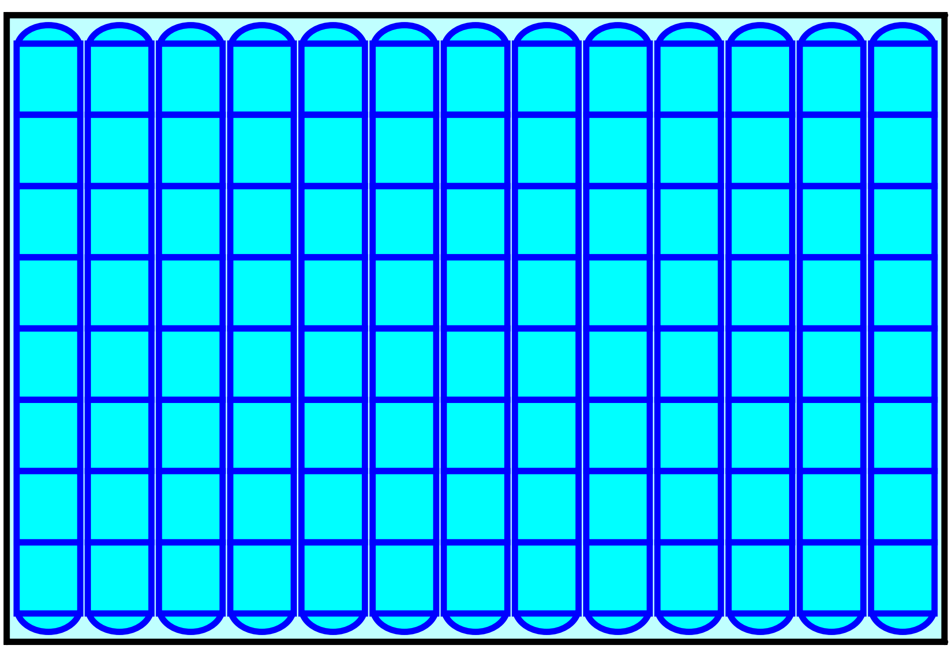
8 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 61.06' Row Length +12.0" End Stone x 2 = 63.06' Base Length
13 Rows x 77.0" Wide + 9.0" Spacing x 12 + 12.0" Side Stone x 2 = 94.42' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

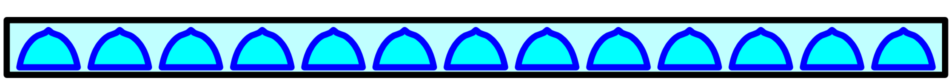
104 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 13 Rows = 11,822.4 cf Chamber Storage

32,746.5 cf Field - 11,822.4 cf Chambers = 20,924.1 cf Stone x 40.0% Voids = 8,369.7 cf Stone Storage

Chamber Storage + Stone Storage = 20,192.1 cf = 0.464 af
Overall Storage Efficiency = 61.7%
Overall System Size = 63.06' x 94.42' x 5.50'

104 Chambers
1,212.8 cy Field
775.0 cy Stone





Summary for Pond 2P: Pervious Pavement

Inflow Area = 0.678 ac, 48.32% Impervious, Inflow Depth = 3.15" for 50-Year event
Inflow = 2.25 cfs @ 12.13 hrs, Volume= 0.178 af
Outflow = 0.84 cfs @ 12.46 hrs, Volume= 0.178 af, Atten= 62%, Lag= 20.0 min
Discarded = 0.84 cfs @ 12.46 hrs, Volume= 0.178 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 255.90' @ 12.46 hrs Surf.Area= 3,248 sf Storage= 1,263 cf

Plug-Flow detention time= 7.7 min calculated for 0.178 af (100% of inflow)
Center-of-Mass det. time= 7.7 min (848.0 - 840.3)

Volume	Invert	Avail.Storage	Storage Description
#1	254.08'	1,598 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
254.08	3,248	0.0	0	0
254.09	3,248	40.0	13	13
255.67	3,248	10.0	513	526
256.00	3,248	100.0	1,072	1,598

Device	Routing	Invert	Outlet Devices
#1	Discarded	254.08'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 249.00'
#2	Primary	255.90'	**90.0' long x 36.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.84 cfs @ 12.46 hrs HW=255.90' (Free Discharge)
└─**1=Exfiltration** (Controls 0.84 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=254.08' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 3P: Pervious Pavement

Inflow Area = 0.306 ac, 75.68% Impervious, Inflow Depth = 5.17" for 50-Year event
Inflow = 1.79 cfs @ 12.09 hrs, Volume= 0.132 af
Outflow = 0.69 cfs @ 12.32 hrs, Volume= 0.132 af, Atten= 61%, Lag= 14.1 min
Discarded = 0.69 cfs @ 12.32 hrs, Volume= 0.132 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 255.64' @ 12.32 hrs Surf.Area= 3,248 sf Storage= 728 cf

Plug-Flow detention time= 4.7 min calculated for 0.132 af (100% of inflow)
Center-of-Mass det. time= 4.7 min (795.6 - 790.9)

Volume	Invert	Avail.Storage	Storage Description
#1	255.08'	3,138 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
255.08	3,248	0.0	0	0
255.09	3,248	40.0	13	13
256.67	3,248	40.0	2,053	2,066
257.00	3,248	100.0	1,072	3,138

Device	Routing	Invert	Outlet Devices
#1	Discarded	255.08'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 250.00'
#2	Primary	256.50'	**36.0' long x 90.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.69 cfs @ 12.32 hrs HW=255.64' (Free Discharge)
└─**1=Exfiltration** (Controls 0.69 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=255.08' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 4P: At Grade Infiltration Sytem

Inflow Area =	0.838 ac,	35.65% Impervious,	Inflow Depth = 0.79"	for 50-Year event	
Inflow =	0.61 cfs @	12.11 hrs,	Volume=	0.055 af	
Outflow =	0.57 cfs @	12.14 hrs,	Volume=	0.055 af,	Atten= 5%, Lag= 1.8 min
Discarded =	0.57 cfs @	12.14 hrs,	Volume=	0.055 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 254.02' @ 12.14 hrs Surf.Area= 3,448 sf Storage= 59 cf

Plug-Flow detention time= 1.7 min calculated for 0.055 af (100% of inflow)
Center-of-Mass det. time= 1.7 min (897.4 - 895.7)

Volume	Invert	Avail.Storage	Storage Description
#1	254.00'	9,396 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
254.00	3,426	0	0
255.00	4,678	4,052	4,052
256.00	6,010	5,344	9,396

Device	Routing	Invert	Outlet Devices
#1	Discarded	254.00'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 249.00'
#2	Primary	255.90'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.66 cfs @ 12.14 hrs HW=254.02' (Free Discharge)
└─**1=Exfiltration** (Controls 0.66 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=254.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Area 1 Runoff Area=18,235 sf 39.10% Impervious Runoff Depth=4.18"
Flow Length=79' Slope=0.0100 '/' Tc=7.1 min CN=68 Runoff=1.97 cfs 0.146 af

Subcatchment 2S: Area 2 Runoff Area=12,939 sf 37.00% Impervious Runoff Depth=3.39"
Flow Length=185' Slope=0.0100 '/' Tc=8.7 min CN=61 Runoff=1.06 cfs 0.084 af

Subcatchment 3S: Area 3 Runoff Area=14,335 sf 37.64% Impervious Runoff Depth=3.39"
Flow Length=172' Slope=0.0100 '/' Tc=9.1 min CN=61 Runoff=1.16 cfs 0.093 af

Subcatchment 4S: Area 4 Runoff Area=19,390 sf 46.37% Impervious Runoff Depth=3.95"
Flow Length=110' Tc=6.3 min CN=66 Runoff=2.04 cfs 0.147 af

Subcatchment 5S: Area 5 Runoff Area=11,986 sf 45.91% Impervious Runoff Depth=3.95"
Tc=6.0 min CN=66 Runoff=1.27 cfs 0.091 af

Subcatchment 6S: Area 6 Runoff Area=51,476 sf 62.28% Impervious Runoff Depth=5.09"
Flow Length=159' Tc=6.0 min CN=76 Runoff=7.02 cfs 0.502 af

Subcatchment 7S: Area 7 Runoff Area=33,912 sf 63.48% Impervious Runoff Depth=5.09"
Flow Length=230' Tc=9.0 min CN=76 Runoff=4.18 cfs 0.330 af

Subcatchment 9S: Area 9 Runoff Area=23,171 sf 12.60% Impervious Runoff Depth=1.90"
Tc=6.0 min CN=47 Runoff=1.03 cfs 0.084 af

Subcatchment 10S: Area 10 Runoff Area=60,214 sf 100.00% Impervious Runoff Depth=7.69"
Tc=6.0 min CN=98 Runoff=10.76 cfs 0.886 af

Subcatchment 11S: Area 11 Runoff Area=41,275 sf 52.83% Impervious Runoff Depth=4.40"
Flow Length=292' Tc=9.8 min CN=70 Runoff=4.30 cfs 0.348 af

Subcatchment 12S: Area 12 Runoff Area=29,543 sf 48.32% Impervious Runoff Depth=4.18"
Flow Length=181' Tc=9.0 min CN=68 Runoff=3.00 cfs 0.236 af

Subcatchment 13S: Area 13 Runoff Area=13,342 sf 75.68% Impervious Runoff Depth=6.38"
Flow Length=32' Slope=0.0100 '/' Tc=6.0 min CN=87 Runoff=2.19 cfs 0.163 af

Reach 1R: CTB 29-DMH 28 Avg. Flow Depth=0.55' Max Vel=4.43 fps Inflow=1.97 cfs 0.146 af
12.0" Round Pipe n=0.012 L=13.3' S=0.0075 '/' Capacity=3.35 cfs Outflow=1.97 cfs 0.146 af

Reach 2R: CTB 26-DMH 25 Avg. Flow Depth=0.36' Max Vel=4.23 fps Inflow=1.06 cfs 0.084 af
12.0" Round Pipe n=0.012 L=13.7' S=0.0102 '/' Capacity=3.90 cfs Outflow=1.06 cfs 0.084 af

Reach 3R: CTB 22-DMH 20 Avg. Flow Depth=0.23' Max Vel=8.28 fps Inflow=1.16 cfs 0.093 af
12.0" Round Pipe n=0.012 L=13.8' S=0.0623 '/' Capacity=9.64 cfs Outflow=1.16 cfs 0.093 af

Reach 4R: CTB 32-DMH 17 Avg. Flow Depth=0.52' Max Vel=4.94 fps Inflow=2.04 cfs 0.147 af
12.0" Round Pipe n=0.012 L=14.3' S=0.0098 '/' Capacity=3.82 cfs Outflow=2.04 cfs 0.147 af

Reach 5R: CTB 15-DMH 13 Avg. Flow Depth=0.36' Max Vel=5.04 fps Inflow=1.27 cfs 0.091 af
12.0" Round Pipe n=0.012 L=13.8' S=0.0145 '/' Capacity=4.65 cfs Outflow=1.27 cfs 0.091 af

Reach 6R: DCTB 5-DMH 4 Avg. Flow Depth=1.00' Max Vel=6.61 fps Inflow=7.02 cfs 0.502 af
12.0" Round Pipe n=0.012 L=15.8' S=0.0139 '/' Capacity=4.55 cfs Outflow=4.55 cfs 0.502 af

Reach 7R: DCB 2-DMH 4 Avg. Flow Depth=0.79' Max Vel=6.28 fps Inflow=4.18 cfs 0.330 af
12.0" Round Pipe n=0.012 L=27.8' S=0.0126 '/' Capacity=4.33 cfs Outflow=4.17 cfs 0.330 af

Reach 8R: RL 1-DMH 1 Avg. Flow Depth=0.90' Max Vel=9.75 fps Inflow=10.76 cfs 0.886 af
18.0" Round Pipe n=0.012 L=80.1' S=0.0200 '/' Capacity=16.08 cfs Outflow=10.75 cfs 0.886 af

Reach 9R: TD 1-DMH 1 Avg. Flow Depth=0.67' Max Vel=7.70 fps Inflow=4.30 cfs 0.348 af
12.0" Round Pipe n=0.012 L=84.1' S=0.0200 '/' Capacity=5.46 cfs Outflow=4.30 cfs 0.348 af

Reach 10R: DCB 1-DMH 1 Avg. Flow Depth=0.42' Max Vel=4.54 fps Inflow=1.47 cfs 0.022 af
12.0" Round Pipe n=0.012 L=191.5' S=0.0100 '/' Capacity=3.85 cfs Outflow=1.42 cfs 0.022 af

Reach 11R: DMH 1-DMH 2 Avg. Flow Depth=1.50' Max Vel=7.33 fps Inflow=14.53 cfs 1.255 af
18.0" Round Pipe n=0.012 L=15.0' S=0.0100 '/' Capacity=11.38 cfs Outflow=11.61 cfs 1.255 af

Reach 21R: Existing 15" RCP pipe in Saratoga Inflow=3.01 cfs 0.230 af
Outflow=3.01 cfs 0.230 af

Reach 22R: Existing 18" RCP pipe in Independence Inflow=4.15 cfs 0.372 af
Outflow=4.15 cfs 0.372 af

Reach 23R: Existing 24" HDPE pipe on site Inflow=4.17 cfs 0.330 af
Outflow=4.17 cfs 0.330 af

Reach 24R: Existing 30" HDPE pipe on site Inflow=8.73 cfs 0.832 af
Outflow=8.73 cfs 0.832 af

Reach POA-1: Saratoga Blvd & Independence Dr Inflow=16.04 cfs 1.442 af
Outflow=16.04 cfs 1.442 af

Reach POA-2: Existing Infiltration Basin Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 1P: Underground Infiltration System Peak Elev=253.19' Storage=17,016 cf Inflow=11.61 cfs 1.255 af
Discarded=2.33 cfs 1.206 af Primary=1.54 cfs 0.050 af Outflow=3.87 cfs 1.255 af

Pond 2P: Pervious Pavement Peak Elev=255.93' Storage=1,379 cf Inflow=3.00 cfs 0.236 af
Discarded=0.85 cfs 0.214 af Primary=1.47 cfs 0.022 af Outflow=2.32 cfs 0.236 af

Pond 3P: Pervious Pavement Peak Elev=255.94' Storage=1,120 cf Inflow=2.19 cfs 0.163 af
Discarded=0.73 cfs 0.163 af Primary=0.00 cfs 0.000 af Outflow=0.73 cfs 0.163 af

Pond 4P: At Grade Infiltration Sytem Peak Elev=254.06' Storage=197 cf Inflow=1.03 cfs 0.084 af
Discarded=0.68 cfs 0.084 af Primary=0.00 cfs 0.000 af Outflow=0.68 cfs 0.084 af

Total Runoff Area = 7.572 ac Runoff Volume = 3.109 af Average Runoff Depth = 4.93"
40.97% Pervious = 3.102 ac 59.03% Impervious = 4.470 ac

Summary for Subcatchment 1S: Area 1

Runoff = 1.97 cfs @ 12.10 hrs, Volume= 0.146 af, Depth= 4.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.93"

	Area (sf)	CN	Description
	2,934	98	Paved parking, HSG A
*	726	98	Concrete, HSG A
	6,089	39	>75% Grass cover, Good, HSG A
	2,696	98	Paved parking, HSG B
*	774	98	Concrete, HSG B
	5,016	61	>75% Grass cover, Good, HSG B
	18,235	68	Weighted Average
	11,105		60.90% Pervious Area
	7,130		39.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	43	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.3	36	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.1	79	Total			

Summary for Subcatchment 2S: Area 2

Runoff = 1.06 cfs @ 12.13 hrs, Volume= 0.084 af, Depth= 3.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.93"

	Area (sf)	CN	Description
	3,911	98	Paved parking, HSG A
*	877	98	Concrete, HSG A
	8,151	39	>75% Grass cover, Good, HSG A
	12,939	61	Weighted Average
	8,151		63.00% Pervious Area
	4,788		37.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.1	135	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.7	185	Total			

Summary for Subcatchment 3S: Area 3

Runoff = 1.16 cfs @ 12.13 hrs, Volume= 0.093 af, Depth= 3.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.93"

	Area (sf)	CN	Description
	4,375	98	Paved parking, HSG A
*	1,020	98	Concrete, HSG A
	8,940	39	>75% Grass cover, Good, HSG A
	14,335	61	Weighted Average
	8,940		62.36% Pervious Area
	5,395		37.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.7	30	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.8	92	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.1	172	Total			

Summary for Subcatchment 4S: Area 4

Runoff = 2.04 cfs @ 12.09 hrs, Volume= 0.147 af, Depth= 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.93"

	Area (sf)	CN	Description
	7,754	98	Paved parking, HSG A
*	1,238	98	Concrete, HSG A
	10,398	39	>75% Grass cover, Good, HSG A
	19,390	66	Weighted Average
	10,398		53.63% Pervious Area
	8,992		46.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0200	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.5	60	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.3	110	Total			

Summary for Subcatchment 5S: Area 5

Runoff = 1.27 cfs @ 12.09 hrs, Volume= 0.091 af, Depth= 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.93"

	Area (sf)	CN	Description
	4,396	98	Paved parking, HSG A
*	1,107	98	Concrete, HSG A
	6,483	39	>75% Grass cover, Good, HSG A
	11,986	66	Weighted Average
	6,483		54.09% Pervious Area
	5,503		45.91% Impervious Area

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

Summary for Subcatchment 6S: Area 6

Runoff = 7.02 cfs @ 12.09 hrs, Volume= 0.502 af, Depth= 5.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.93"

Area (sf)	CN	Description
32,061	98	Paved parking, HSG A
19,415	39	>75% Grass cover, Good, HSG A
51,476	76	Weighted Average
19,415		37.72% Pervious Area
32,061		62.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	50	0.0400	0.19		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.5	35	0.0280	1.17		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	74	0.0220	3.01		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.3	159	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 7S: Area 7

Runoff = 4.18 cfs @ 12.13 hrs, Volume= 0.330 af, Depth= 5.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.93"

	Area (sf)	CN	Description
	20,118	98	Paved parking, HSG A
*	1,411	98	Concrete, HSG A
	12,383	39	>75% Grass cover, Good, HSG A
	33,912	76	Weighted Average
	12,383		36.52% Pervious Area
	21,529		63.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.1	18	0.3300	4.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.3	162	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.0	230	Total			

Summary for Subcatchment 9S: Area 9

Runoff = 1.03 cfs @ 12.10 hrs, Volume= 0.084 af, Depth= 1.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.93"

Area (sf)	CN	Description
2,172	98	Paved parking, HSG A
747	98	Paved parking, HSG B
19,790	39	>75% Grass cover, Good, HSG A
462	61	>75% Grass cover, Good, HSG B
23,171	47	Weighted Average
20,252		87.40% Pervious Area
2,919		12.60% Impervious Area

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

Summary for Subcatchment 10S: Area 10

Runoff = 10.76 cfs @ 12.08 hrs, Volume= 0.886 af, Depth= 7.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.93"

Area (sf)	CN	Description
60,214	98	Roofs, HSG A
60,214		100.00% Impervious Area

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

Summary for Subcatchment 11S: Area 11

Runoff = 4.30 cfs @ 12.14 hrs, Volume= 0.348 af, Depth= 4.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.93"

	Area (sf)	CN	Description
	15,830	98	Paved parking, HSG A
*	5,975	98	Concrete, HSG A
	19,470	39	>75% Grass cover, Good, HSG A
	41,275	70	Weighted Average
	19,470		47.17% Pervious Area
	21,805		52.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
1.0	41	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	28	0.3300	4.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	83	0.0130	2.31		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.5	90	0.0250	3.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.8	292	Total			

Summary for Subcatchment 12S: Area 12

Runoff = 3.00 cfs @ 12.13 hrs, Volume= 0.236 af, Depth= 4.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.93"

	Area (sf)	CN	Description
	13,585	98	Paved parking, HSG A
*	690	98	Concrete, HSG A
	15,066	39	>75% Grass cover, Good, HSG A
	202	61	>75% Grass cover, Good, HSG B
	29,543	68	Weighted Average
	15,268		51.68% Pervious Area
	14,275		48.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
0.9	38	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	30	0.3300	4.02		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	63	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.0	181	Total			

Summary for Subcatchment 13S: Area 13

Runoff = 2.19 cfs @ 12.08 hrs, Volume= 0.163 af, Depth= 6.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=7.93"

	Area (sf)	CN	Description
	8,830	98	Paved parking, HSG A
*	430	98	Concrete, HSG A
	1,238	39	>75% Grass cover, Good, HSG A
	837	98	Paved parking, HSG B
	2,007	61	>75% Grass cover, Good, HSG B
	13,342	87	Weighted Average
	3,245		24.32% Pervious Area
	10,097		75.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	32	0.0100	0.10		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.03"
5.3	32	Total, Increased to minimum Tc = 6.0 min			

Summary for Reach 1R: CTB 29-DMH 28

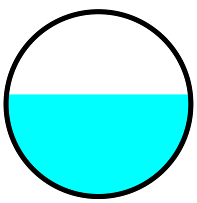
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.419 ac, 39.10% Impervious, Inflow Depth = 4.18" for 100-Year event
Inflow = 1.97 cfs @ 12.10 hrs, Volume= 0.146 af
Outflow = 1.97 cfs @ 12.11 hrs, Volume= 0.146 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.43 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.65 fps, Avg. Travel Time= 0.1 min

Peak Storage= 6 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.55'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.35 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.3' Slope= 0.0075 '/'
Inlet Invert= 254.20', Outlet Invert= 254.10'



Summary for Reach 2R: CTB 26-DMH 25

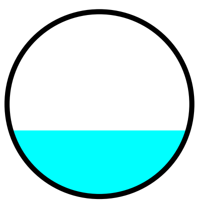
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.297 ac, 37.00% Impervious, Inflow Depth = 3.39" for 100-Year event
Inflow = 1.06 cfs @ 12.13 hrs, Volume= 0.084 af
Outflow = 1.06 cfs @ 12.13 hrs, Volume= 0.084 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.23 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.61 fps, Avg. Travel Time= 0.1 min

Peak Storage= 3 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.36'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.90 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.7' Slope= 0.0102 '/'
Inlet Invert= 255.75', Outlet Invert= 255.61'



Summary for Reach 3R: CTB 22-DMH 20

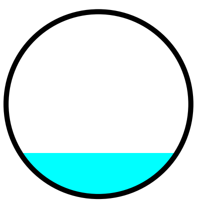
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.329 ac, 37.64% Impervious, Inflow Depth = 3.39" for 100-Year event
Inflow = 1.16 cfs @ 12.13 hrs, Volume= 0.093 af
Outflow = 1.16 cfs @ 12.13 hrs, Volume= 0.093 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.28 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 3.14 fps, Avg. Travel Time= 0.1 min

Peak Storage= 2 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 9.64 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.8' Slope= 0.0623 '/'
Inlet Invert= 254.66', Outlet Invert= 253.80'



Summary for Reach 4R: CTB 32-DMH 17

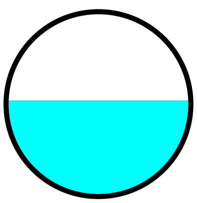
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.445 ac, 46.37% Impervious, Inflow Depth = 3.95" for 100-Year event
Inflow = 2.04 cfs @ 12.09 hrs, Volume= 0.147 af
Outflow = 2.04 cfs @ 12.10 hrs, Volume= 0.147 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.94 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.83 fps, Avg. Travel Time= 0.1 min

Peak Storage= 6 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.52'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.82 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 14.3' Slope= 0.0098 '/'
Inlet Invert= 254.20', Outlet Invert= 254.06'



Summary for Reach 5R: CTB 15-DMH 13

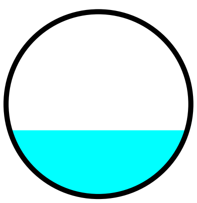
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.275 ac, 45.91% Impervious, Inflow Depth = 3.95" for 100-Year event
Inflow = 1.27 cfs @ 12.09 hrs, Volume= 0.091 af
Outflow = 1.27 cfs @ 12.09 hrs, Volume= 0.091 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.04 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.82 fps, Avg. Travel Time= 0.1 min

Peak Storage= 3 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.36'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.65 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 13.8' Slope= 0.0145 '/'
Inlet Invert= 254.80', Outlet Invert= 254.60'



Summary for Reach 6R: DCTB 5-DMH 4

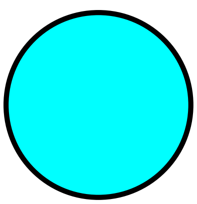
[52] Hint: Inlet/Outlet conditions not evaluated
[55] Hint: Peak inflow is 154% of Manning's capacity
[76] Warning: Detained 0.021 af (Pond w/culvert advised)

Inflow Area = 1.182 ac, 62.28% Impervious, Inflow Depth = 5.09" for 100-Year event
Inflow = 7.02 cfs @ 12.09 hrs, Volume= 0.502 af
Outflow = 4.55 cfs @ 12.03 hrs, Volume= 0.502 af, Atten= 35%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.61 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.80 fps, Avg. Travel Time= 0.1 min

Peak Storage= 12 cf @ 12.02 hrs
Average Depth at Peak Storage= 1.00'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.55 cfs

12.0" Round Pipe
n= 0.012 Concrete pipe, finished
Length= 15.8' Slope= 0.0139 '/'
Inlet Invert= 251.58', Outlet Invert= 251.36'



Summary for Reach 7R: DCB 2-DMH 4

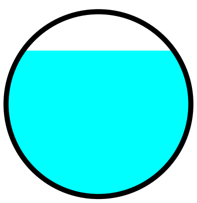
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.779 ac, 63.48% Impervious, Inflow Depth = 5.09" for 100-Year event
Inflow = 4.18 cfs @ 12.13 hrs, Volume= 0.330 af
Outflow = 4.17 cfs @ 12.13 hrs, Volume= 0.330 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.28 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.40 fps, Avg. Travel Time= 0.2 min

Peak Storage= 18 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.79'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 4.33 cfs

12.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 27.8' Slope= 0.0126 '/'
Inlet Invert= 252.00', Outlet Invert= 251.65'



Summary for Reach 8R: RL 1-DMH 1

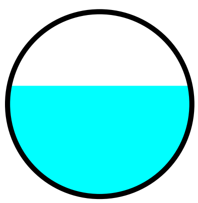
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 1.382 ac,100.00% Impervious, Inflow Depth = 7.69" for 100-Year event
Inflow = 10.76 cfs @ 12.08 hrs, Volume= 0.886 af
Outflow = 10.75 cfs @ 12.09 hrs, Volume= 0.886 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.75 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 3.37 fps, Avg. Travel Time= 0.4 min

Peak Storage= 88 cf @ 12.08 hrs
Average Depth at Peak Storage= 0.90'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 16.08 cfs

18.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 80.1' Slope= 0.0200 '/'
Inlet Invert= 253.60', Outlet Invert= 252.00'



Summary for Reach 9R: TD 1-DMH 1

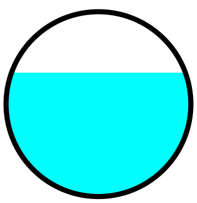
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.948 ac, 52.83% Impervious, Inflow Depth = 4.40" for 100-Year event
Inflow = 4.30 cfs @ 12.14 hrs, Volume= 0.348 af
Outflow = 4.30 cfs @ 12.14 hrs, Volume= 0.348 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.70 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.95 fps, Avg. Travel Time= 0.5 min

Peak Storage= 47 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.67'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.46 cfs

12.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 84.1' Slope= 0.0200 '/'
Inlet Invert= 252.00', Outlet Invert= 250.32'



Summary for Reach 10R: DCB 1-DMH 1

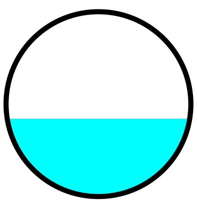
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 0.678 ac, 48.32% Impervious, Inflow Depth = 0.38" for 100-Year event
Inflow = 1.47 cfs @ 12.21 hrs, Volume= 0.022 af
Outflow = 1.42 cfs @ 12.24 hrs, Volume= 0.022 af, Atten= 4%, Lag= 1.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.54 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.83 fps, Avg. Travel Time= 1.7 min

Peak Storage= 60 cf @ 12.23 hrs
Average Depth at Peak Storage= 0.42'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 3.85 cfs

12.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 191.5' Slope= 0.0100 '/'
Inlet Invert= 252.00', Outlet Invert= 250.09'



Summary for Reach 11R: DMH 1-DMH 2

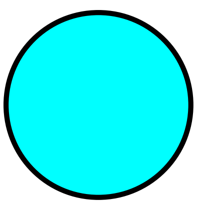
[52] Hint: Inlet/Outlet conditions not evaluated
[55] Hint: Peak inflow is 128% of Manning's capacity
[76] Warning: Detained 0.022 af (Pond w/culvert advised)

Inflow Area = 3.008 ac, 73.49% Impervious, Inflow Depth = 5.01" for 100-Year event
Inflow = 14.53 cfs @ 12.10 hrs, Volume= 1.255 af
Outflow = 11.61 cfs @ 12.04 hrs, Volume= 1.255 af, Atten= 20%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.33 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.85 fps, Avg. Travel Time= 0.1 min

Peak Storage= 27 cf @ 12.05 hrs
Average Depth at Peak Storage= 1.50'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 11.38 cfs

18.0" Round Pipe
n= 0.012 Corrugated PP, smooth interior
Length= 15.0' Slope= 0.0100 '/'
Inlet Invert= 100.00', Outlet Invert= 99.85'



Summary for Reach 21R: Existing 15" RCP pipe in Saratoga

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.716 ac, 38.23% Impervious, Inflow Depth = 3.85" for 100-Year event
Inflow = 3.01 cfs @ 12.11 hrs, Volume= 0.230 af
Outflow = 3.01 cfs @ 12.11 hrs, Volume= 0.230 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 22R: Existing 18" RCP pipe in Independence

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.053 ac, 64.35% Impervious, Inflow Depth = 1.10" for 100-Year event
Inflow = 4.15 cfs @ 12.12 hrs, Volume= 0.372 af
Outflow = 4.15 cfs @ 12.12 hrs, Volume= 0.372 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 23R: Existing 24" HDPE pipe on site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.779 ac, 63.48% Impervious, Inflow Depth = 5.09" for 100-Year event
Inflow = 4.17 cfs @ 12.13 hrs, Volume= 0.330 af
Outflow = 4.17 cfs @ 12.13 hrs, Volume= 0.330 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach 24R: Existing 30" HDPE pipe on site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	1.960 ac,	62.76% Impervious,	Inflow Depth = 5.09"	for 100-Year event	
Inflow =	8.73 cfs @	12.13 hrs,	Volume=	0.832 af	
Outflow =	8.73 cfs @	12.13 hrs,	Volume=	0.832 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach POA-1: Saratoga Blvd & Independence Dr

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.733 ac, 61.95% Impervious, Inflow Depth = 2.57" for 100-Year event
Inflow = 16.04 cfs @ 12.11 hrs, Volume= 1.442 af
Outflow = 16.04 cfs @ 12.11 hrs, Volume= 1.442 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Reach POA-2: Existing Infiltration Basin

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.838 ac, 35.65% Impervious, Inflow Depth = 0.00" for 100-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

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Underground Infiltration System

[63] Warning: Exceeded Reach 11R INLET depth by 152.64' @ 12.58 hrs

Inflow Area =	3.008 ac, 73.49% Impervious, Inflow Depth = 5.01" for 100-Year event			
Inflow =	11.61 cfs @	12.04 hrs, Volume=	1.255 af	
Outflow =	3.87 cfs @	12.51 hrs, Volume=	1.255 af,	Atten= 67%, Lag= 28.0 min
Discarded =	2.33 cfs @	12.51 hrs, Volume=	1.206 af	
Primary =	1.54 cfs @	12.51 hrs, Volume=	0.050 af	

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 253.19' @ 12.51 hrs Surf.Area= 5,954 sf Storage= 17,016 cf

Plug-Flow detention time= 52.5 min calculated for 1.255 af (100% of inflow)
Center-of-Mass det. time= 52.5 min (818.7 - 766.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	249.00'	8,370 cf	**94.42'W x 63.06'L x 5.50'H Field A** 32,747 cf Overall - 11,822 cf Embedded = 20,924 cf x 40.0% Voids
#2A	249.75'	11,822 cf	**ADS_StormTech MC-3500 d +Cap** x 104 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 104 Chambers in 13 Rows Cap Storage= +14.9 cf x 2 x 13 rows = 387.4 cf
		20,192 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	249.00'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 245.00'
#2	Primary	252.44'	**12.0" Round Culvert** L= 60.5' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 252.44' / 252.10' S= 0.0056 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=2.33 cfs @ 12.51 hrs HW=253.19' (Free Discharge)
1=Exfiltration (Controls 2.33 cfs)

Primary OutFlow Max=1.54 cfs @ 12.51 hrs HW=253.19' (Free Discharge)
2=Culvert (Barrel Controls 1.54 cfs @ 3.38 fps)

Pond 1P: Underground Infiltration System - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 13 rows = 387.4 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

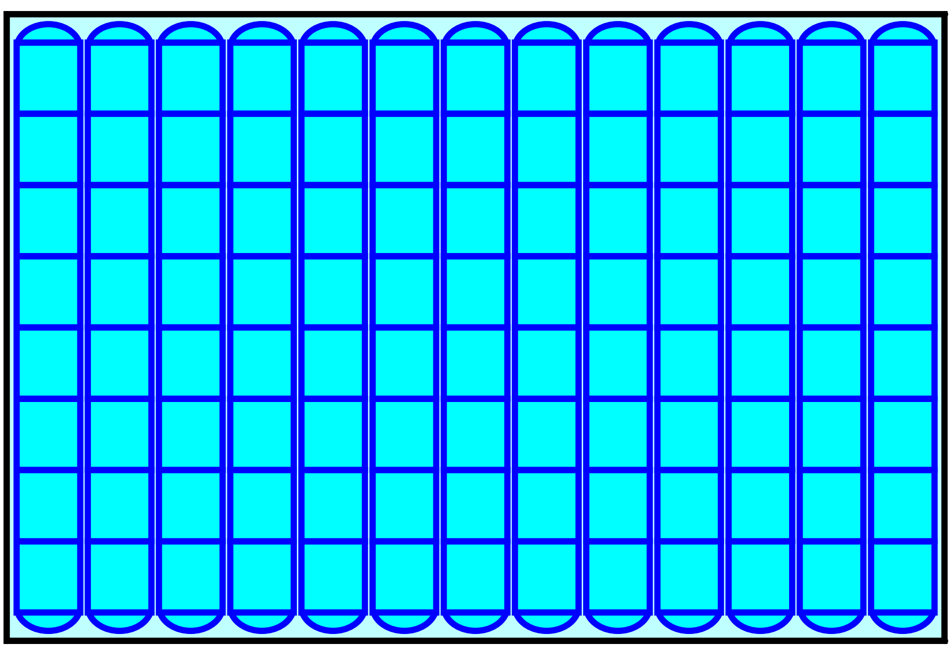
8 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 61.06' Row Length +12.0" End Stone x 2 = 63.06' Base Length
13 Rows x 77.0" Wide + 9.0" Spacing x 12 + 12.0" Side Stone x 2 = 94.42' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

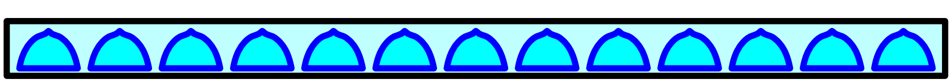
104 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 13 Rows = 11,822.4 cf Chamber Storage

32,746.5 cf Field - 11,822.4 cf Chambers = 20,924.1 cf Stone x 40.0% Voids = 8,369.7 cf Stone Storage

Chamber Storage + Stone Storage = 20,192.1 cf = 0.464 af
Overall Storage Efficiency = 61.7%
Overall System Size = 63.06' x 94.42' x 5.50'

104 Chambers
1,212.8 cy Field
775.0 cy Stone





Summary for Pond 2P: Pervious Pavement

Inflow Area = 0.678 ac, 48.32% Impervious, Inflow Depth = 4.18" for 100-Year event
Inflow = 3.00 cfs @ 12.13 hrs, Volume= 0.236 af
Outflow = 2.32 cfs @ 12.21 hrs, Volume= 0.236 af, Atten= 23%, Lag= 5.1 min
Discarded = 0.85 cfs @ 12.21 hrs, Volume= 0.214 af
Primary = 1.47 cfs @ 12.21 hrs, Volume= 0.022 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 255.93' @ 12.21 hrs Surf.Area= 3,248 sf Storage= 1,379 cf

Plug-Flow detention time= 7.5 min calculated for 0.236 af (100% of inflow)
Center-of-Mass det. time= 7.5 min (839.7 - 832.2)

Volume	Invert	Avail.Storage	Storage Description
#1	254.08'	1,598 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
254.08	3,248	0.0	0	0
254.09	3,248	40.0	13	13
255.67	3,248	10.0	513	526
256.00	3,248	100.0	1,072	1,598

Device	Routing	Invert	Outlet Devices
#1	Discarded	254.08'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 249.00'
#2	Primary	255.90'	**90.0' long x 36.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.85 cfs @ 12.21 hrs HW=255.93' (Free Discharge)
└─**1=Exfiltration** (Controls 0.85 cfs)

Primary OutFlow Max=1.41 cfs @ 12.21 hrs HW=255.93' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 1.41 cfs @ 0.48 fps)

Summary for Pond 3P: Pervious Pavement

Inflow Area =	0.306 ac, 75.68% Impervious, Inflow Depth = 6.38" for 100-Year event			
Inflow =	2.19 cfs @	12.08 hrs, Volume=	0.163 af	
Outflow =	0.73 cfs @	12.37 hrs, Volume=	0.163 af,	Atten= 67%, Lag= 17.2 min
Discarded =	0.73 cfs @	12.37 hrs, Volume=	0.163 af	
Primary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 255.94' @ 12.37 hrs Surf.Area= 3,248 sf Storage= 1,120 cf

Plug-Flow detention time= 7.3 min calculated for 0.163 af (100% of inflow)
Center-of-Mass det. time= 7.3 min (792.5 - 785.3)

Volume	Invert	Avail.Storage	Storage Description
#1	255.08'	3,138 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
255.08	3,248	0.0	0	0
255.09	3,248	40.0	13	13
256.67	3,248	40.0	2,053	2,066
257.00	3,248	100.0	1,072	3,138

Device	Routing	Invert	Outlet Devices
#1	Discarded	255.08'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 250.00'
#2	Primary	256.50'	**36.0' long x 90.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.73 cfs @ 12.37 hrs HW=255.94' (Free Discharge)
└─**1=Exfiltration** (Controls 0.73 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=255.08' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 4P: At Grade Infiltration Sytem

Inflow Area =	0.838 ac,	35.65% Impervious,	Inflow Depth = 1.21"	for 100-Year event
Inflow =	1.03 cfs @	12.10 hrs, Volume=	0.084 af	
Outflow =	0.68 cfs @	12.22 hrs, Volume=	0.084 af,	Atten= 34%, Lag= 6.9 min
Discarded =	0.68 cfs @	12.22 hrs, Volume=	0.084 af	
Primary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 254.06' @ 12.22 hrs Surf.Area= 3,497 sf Storage= 197 cf

Plug-Flow detention time= 2.3 min calculated for 0.084 af (100% of inflow)
Center-of-Mass det. time= 2.3 min (882.7 - 880.4)

Volume	Invert	Avail.Storage	Storage Description
#1	254.00'	9,396 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
254.00	3,426	0	0
255.00	4,678	4,052	4,052
256.00	6,010	5,344	9,396

Device	Routing	Invert	Outlet Devices
#1	Discarded	254.00'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 249.00'
#2	Primary	255.90'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.68 cfs @ 12.22 hrs HW=254.06' (Free Discharge)
└─**1=Exfiltration** (Controls 0.68 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=254.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)