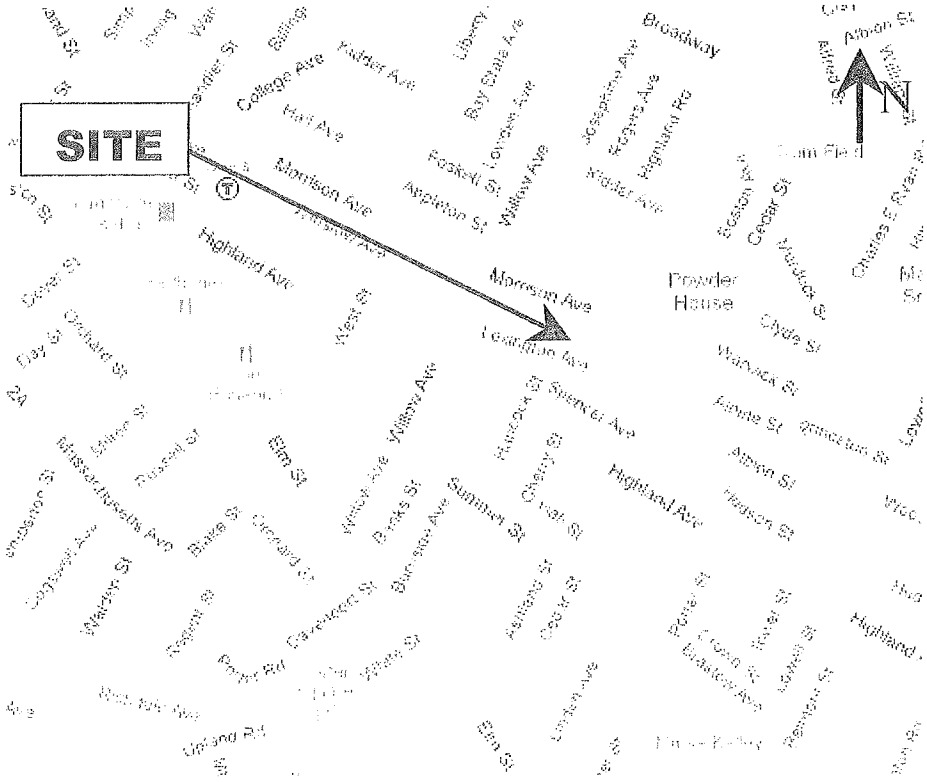
Drainage Report
For
35R Lexington Street
Somerville, MA

January 2010



Prepared for:
Christos Poutahidis
DCI Project #2009-025

Design Consultants, Inc.
Consulting Engineers
Transportation, Civil Engineering, Land Surveying
265 Medford Street, Somerville, Massachusetts 02143 ~ Telephone (617) 776-3350 ~ FAX (617) 776-7710

TABLE OF CONTENTS

Project Narrative

Christos Poutahidis is proposing to a new single family home and convert an existing industrial building to a residence at 35R Lexington Street. The site is located on the north side of Spring Street between Hancock Street and Cedar Street.

The site is located in the RA zoning district, which requires 10,000 square feet and 50 feet of frontage. The lot contains 12,985 square feet and 21 feet of frontage.

There is currently an existing building on the site, consisting of a two-story brick building with a one-story concrete block addition. The USDA Natural Resource Conservation Service (NRCS) has mapped the soils on site as Scio/Urban, which has a hydrologic soil type classification of type B for the purpose of analysis. The Permeability of Type B sandy loam is identified by The Mass DEP Stormwater Handbook (Rawls) as 1.02 inches per hour.

Proposed Site Development

Each proposed building will contain a housing unit and seven exterior parking spaces are proposed. The driveway accesses from Lexington Street via an existing right-of-way. Public water will be provided to the site via the public water main in Lexington Street and sewer disposal will be via public sewer. All other utilities will be provided to the project from service connections to the mains in Lexington Street.

Stormwater Management

Currently, stormwater flows off the site towards abutting bike trail property to the north with no visible controls. The proposed homes will be provided with drywells to collect runoff from the roof, while paved surfaces are to be constructed of pavers, to further reduce runoff. The proposed drywells ensure that there will not be an increase in runoff from the site.

LOCUS MAP

SCALE 1:25 000

1 CENTIMETER ON THE MAP REPRESENTS 250 METERS ON THE GROUND

CONTOUR INTERVAL 3 METERS

500 0 1000

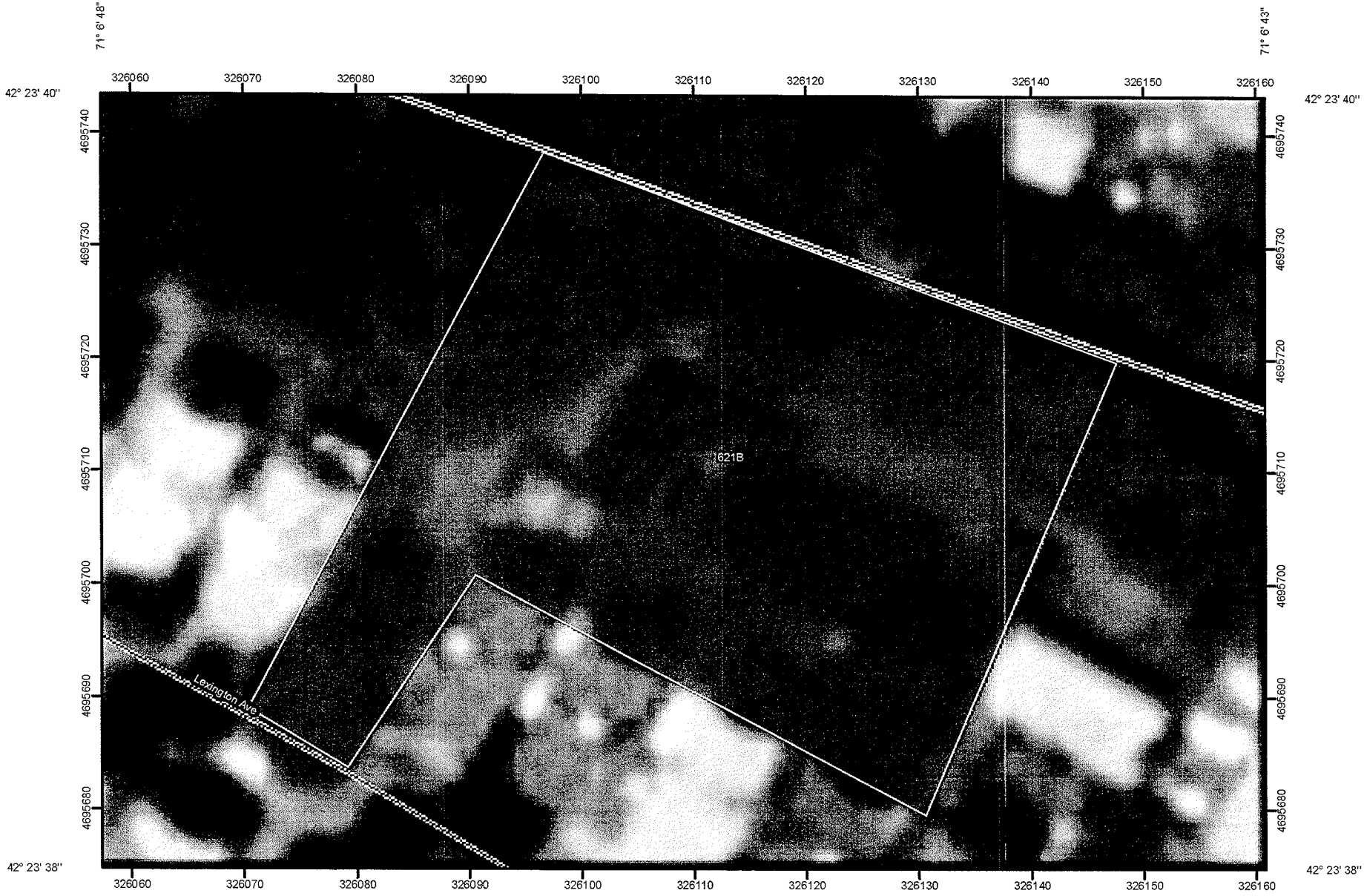
1000 0 2000 4000 6000

Name: BOSTON NORTH
Date: 1/14/110
Scale: 1 inch equals 2004 feet

Location: 042° 23' 49.7" N 071° 06' 46.4" W
Caption: 35R Lexington
Locus Map

SUBSURFACE SOIL DATA

Hydrologic Soil Group—Middlesex County, Massachusetts
(35R Lexington Ave.)



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Units

Soil Ratings

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Political Features

Cities

Water Features

Oceans

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

MAP INFORMATION

Map Scale: 1:491 if printed on A size (8.5" × 11") sheet.

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 19N NAD83

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 9, Apr 15, 2009

Date(s) aerial images were photographed: 7/10/2003

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

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Middlesex County, Massachusetts				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
621B	Scio-Urban land complex, 0 to 8 percent slopes	B	0.6	100.0%
Totals for Area of Interest			0.6	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

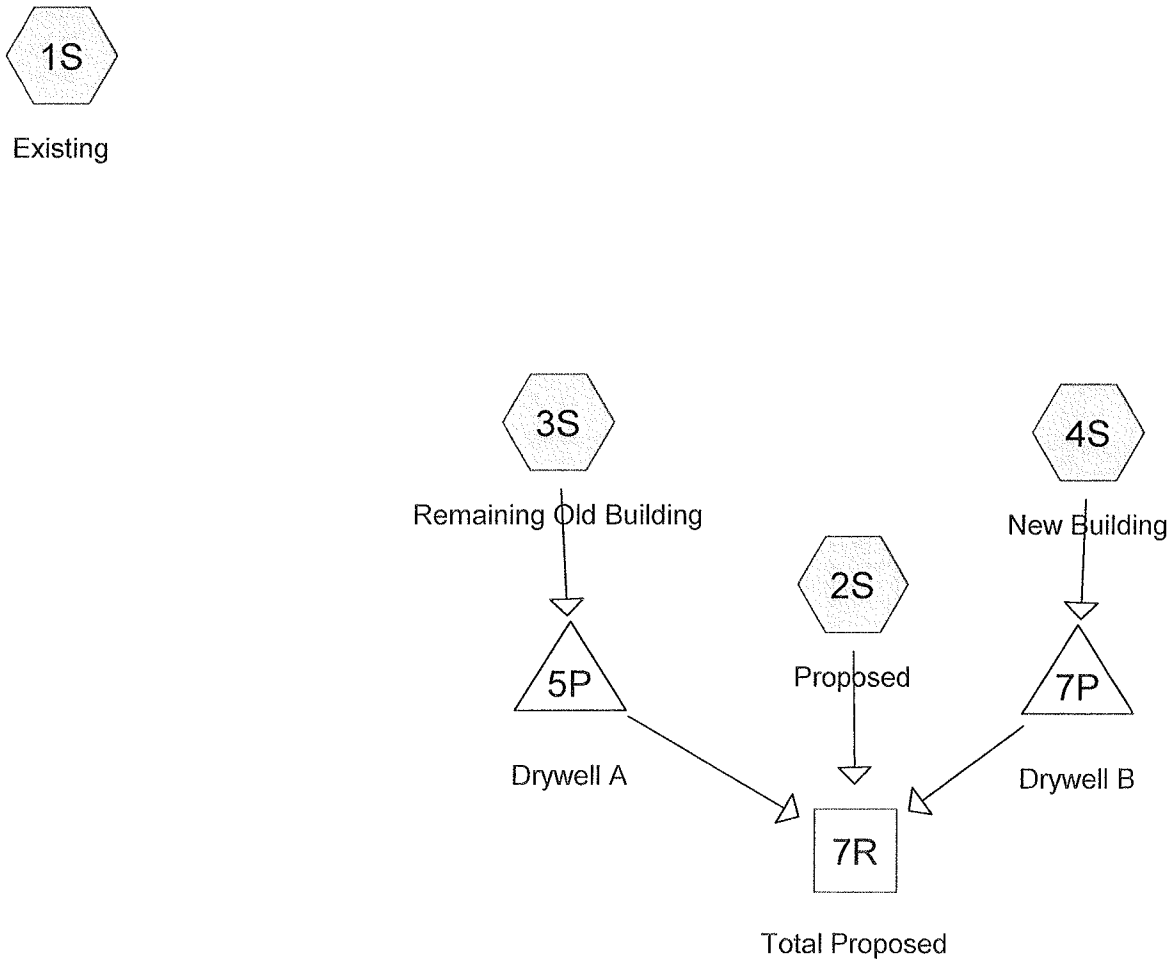
Component Percent Cutoff: *None Specified*

Tie-break Rule: Lower

HYDROLOGIC SUMMARY
Of
35R LEXINGTON STREET
In
SOMERVILLE, MASSACHUSETTS

The analysis was performed for the 2, 10, 25, & 100-year storms; existing conditions were compared to proposed conditions to ensure that the proposed design will not substantially change the rate of runoff from the site. A summary of the results is as follows.

			2 year	10 year	25 year	100 year
Pre-Construction	Flow	(cfs)	1.08	1.65	1.90	2.25
Post-Construction	Flow	(cfs)	0.82	1.43	1.68	2.04



Subcat Reach Pond Link

Drainage Diagram for EX-Pr
Prepared by Design Consultants Inc. 1/14/2010

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

Subcatchment 1S: Existing Runoff Area=14,887 sf Runoff Depth=2.86"
Tc=5.0 min CN=97 Runoff=1.08 cfs 0.081 af

Subcatchment 2S: Proposed Runoff Area=12,334 sf Runoff Depth=1.91"
Tc=5.0 min CN=87 Runoff=0.66 cfs 0.045 af

Subcatchment 3S: Remaining Old Building Runoff Area=1,242 sf Runoff Depth=2.97"
Tc=5.0 min CN=98 Runoff=0.09 cfs 0.007 af

Subcatchment 4S: New Building Runoff Area=1,311 sf Runoff Depth=2.97"
Tc=5.0 min CN=98 Runoff=0.10 cfs 0.007 af

Reach 7R: Total Proposed Inflow=0.82 cfs 0.052 af
Outflow=0.82 cfs 0.052 af

Pond 5P: Drywell A Peak Elev=49.71' Storage=0.002 af Inflow=0.09 cfs 0.007 af
Discarded=0.00 cfs 0.003 af Primary=0.09 cfs 0.004 af Outflow=0.09 cfs 0.007 af

Pond 7P: Drywell B Peak Elev=50.21' Storage=0.003 af Inflow=0.10 cfs 0.007 af
Discarded=0.00 cfs 0.005 af Primary=0.09 cfs 0.003 af Outflow=0.09 cfs 0.007 af

Total Runoff Area = 0.684 ac Runoff Volume = 0.141 af Average Runoff Depth = 2.48"

Subcatchment 1S: Existing

Runoff = 1.08 cfs @ 12.07 hrs, Volume= 0.081 af, Depth= 2.86"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2yr Rainfall=3.20"

Area (sf)	CN	Description
262	61	>75% Grass cover, Good, HSG B
14,625	98	Paved parking & roofs
14,887	97	Weighted Average

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

Subcatchment 2S: Proposed

Runoff = 0.66 cfs @ 12.07 hrs, Volume= 0.045 af, Depth= 1.91"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2yr Rainfall=3.20"

Area (sf)	CN	Description
3,630	61	>75% Grass cover, Good, HSG B
8,704	98	Paved parking & roofs
12,334	87	Weighted Average

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

Subcatchment 3S: Remaining Old Building

Runoff = 0.09 cfs @ 12.07 hrs, Volume= 0.007 af, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2yr Rainfall=3.20"

Area (sf)	CN	Description
1,242	98	Paved parking & roofs

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

Subcatchment 4S: New Building

Runoff = 0.10 cfs @ 12.07 hrs, Volume= 0.007 af, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2yr Rainfall=3.20"

Area (sf)	CN	Description
1,311	98	Paved parking & roofs

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

Reach 7R: Total Proposed

Inflow Area = 0.342 ac, Inflow Depth = 1.81" for 2yr event
Inflow = 0.82 cfs @ 12.09 hrs, Volume= 0.052 af
Outflow = 0.82 cfs @ 12.09 hrs, Volume= 0.052 af, Atten= 0%, Lag= 0.0 min

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

Pond 5P: Drywell A

Inflow Area = 0.029 ac, Inflow Depth = 2.97" for 2yr event
Inflow = 0.09 cfs @ 12.07 hrs, Volume= 0.007 af
Outflow = 0.09 cfs @ 12.06 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 11.80 hrs, Volume= 0.003 af
Primary = 0.09 cfs @ 12.06 hrs, Volume= 0.004 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 49.71' @ 12.06 hrs Surf.Area= 0.001 ac Storage= 0.002 af
Plug-Flow detention time= 274.6 min calculated for 0.007 af (100% of inflow)
Center-of-Mass det. time= 274.7 min (1,030.2 - 755.5)

Volume	Invert	Avail.Storage	Storage Description
#1	43.50'	0.001 af	**33.6"W x 20.0"H x 6.33'L Cultec R-180** x 2 Inside #2
#2	43.00'	0.001 af	**6.00'W x 8.00'L x 2.25'H Prismatoid**
			0.002 af Overall - 0.001 af Embedded = 0.001 af x 35.0% Voids
#3	45.00'	0.000 af	**0.33'D x 8.00'H Vertical Cone/Cylinder**
		0.002 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	49.50'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.00 cfs @ 11.80 hrs HW=45.03' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.09 cfs @ 12.06 hrs HW=49.71' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.09 cfs @ 1.6 fps)

Pond 7P: Drywell B

Inflow Area =	0.030 ac,	Inflow Depth =	2.97"	for 2yr event	
Inflow =	0.10 cfs @	12.07 hrs,	Volume=	0.007 af	
Outflow =	0.09 cfs @	12.10 hrs,	Volume=	0.007 af,	Atten= 5%, Lag= 1.6 min
Discarded =	0.00 cfs @	11.68 hrs,	Volume=	0.005 af	
Primary =	0.09 cfs @	12.10 hrs,	Volume=	0.003 af	

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 50.21' @ 12.10 hrs Surf.Area= 0.001 ac Storage= 0.003 af
Plug-Flow detention time= 506.8 min calculated for 0.007 af (100% of inflow)
Center-of-Mass det. time= 504.6 min (1,260.0 - 755.5)

Volume	Invert	Avail.Storage	Storage Description
#1	43.50'	0.000 af	**6.00'W x 8.00'L x 2.25'H Prismatoid** 0.002 af Overall - 0.001 af Embedded = 0.001 af x 25.0% Voids
#2	44.00'	0.001 af	**33.6"W x 20.0"H x 6.33'L Cultec R-180** x 2 Inside #1
#3	45.50'	0.002 af	**4.00'D x 8.00'H Vertical Cone/Cylinder**
		0.004 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	50.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.00 cfs @ 11.68 hrs HW=45.50' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.09 cfs @ 12.10 hrs HW=50.21' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.09 cfs @ 1.6 fps)

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

Subcatchment 1S: Existing Runoff Area=14,887 sf Runoff Depth=4.45"
Tc=5.0 min CN=97 Runoff=1.65 cfs 0.127 af

Subcatchment 2S: Proposed Runoff Area=12,334 sf Runoff Depth=3.38"
Tc=5.0 min CN=87 Runoff=1.14 cfs 0.080 af

Subcatchment 3S: Remaining Old Building Runoff Area=1,242 sf Runoff Depth=4.56"
Tc=5.0 min CN=98 Runoff=0.14 cfs 0.011 af

Subcatchment 4S: New Building Runoff Area=1,311 sf Runoff Depth=4.56"
Tc=5.0 min CN=98 Runoff=0.15 cfs 0.011 af

Reach 7R: Total Proposed Inflow=1.43 cfs 0.093 af
Outflow=1.43 cfs 0.093 af

Pond 5P: Drywell A Peak Elev=49.78' Storage=0.002 af Inflow=0.14 cfs 0.011 af
Discarded=0.00 cfs 0.004 af Primary=0.14 cfs 0.007 af Outflow=0.14 cfs 0.011 af

Pond 7P: Drywell B Peak Elev=50.29' Storage=0.003 af Inflow=0.15 cfs 0.011 af
Discarded=0.00 cfs 0.005 af Primary=0.14 cfs 0.006 af Outflow=0.15 cfs 0.011 af

Total Runoff Area = 0.684 ac Runoff Volume = 0.229 af Average Runoff Depth = 4.02"

Subcatchment 1S: Existing

Runoff = 1.65 cfs @ 12.07 hrs, Volume= 0.127 af, Depth= 4.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

Area (sf)	CN	Description
262	61	>75% Grass cover, Good, HSG B
14,625	98	Paved parking & roofs
14,887	97	Weighted Average

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

Subcatchment 2S: Proposed

Runoff = 1.14 cfs @ 12.07 hrs, Volume= 0.080 af, Depth= 3.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

Area (sf)	CN	Description
3,630	61	>75% Grass cover, Good, HSG B
8,704	98	Paved parking & roofs
12,334	87	Weighted Average

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

Subcatchment 3S: Remaining Old Building

Runoff = 0.14 cfs @ 12.07 hrs, Volume= 0.011 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

Area (sf)	CN	Description
1,242	98	Paved parking & roofs

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

Subcatchment 4S: New Building

Runoff = 0.15 cfs @ 12.07 hrs, Volume= 0.011 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

Area (sf)	CN	Description
1,311	98	Paved parking & roofs

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

Reach 7R: Total Proposed

Inflow Area = 0.342 ac, Inflow Depth = 3.28" for 10-yr event
Inflow = 1.43 cfs @ 12.07 hrs, Volume= 0.093 af
Outflow = 1.43 cfs @ 12.07 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

Pond 5P: Drywell A

Inflow Area = 0.029 ac, Inflow Depth = 4.56" for 10-yr event
Inflow = 0.14 cfs @ 12.07 hrs, Volume= 0.011 af
Outflow = 0.14 cfs @ 12.07 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 10.87 hrs, Volume= 0.004 af
Primary = 0.14 cfs @ 12.07 hrs, Volume= 0.007 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 49.78' @ 12.07 hrs Surf.Area= 0.001 ac Storage= 0.002 af
Plug-Flow detention time= 195.6 min calculated for 0.011 af (100% of inflow)
Center-of-Mass det. time= 195.6 min (943.3 - 747.8)

Volume	Invert	Avail.Storage	Storage Description
#1	43.50'	0.001 af	**33.6"W x 20.0"H x 6.33'L Cultec R-180** x 2 Inside #2
#2	43.00'	0.001 af	**6.00'W x 8.00'L x 2.25'H Prismatoid** 0.002 af Overall - 0.001 af Embedded = 0.001 af x 35.0% Voids
#3	45.00'	0.000 af	**0.33'D x 8.00'H Vertical Cone/Cylinder**
		0.002 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	49.50'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.00 cfs @ 10.87 hrs HW=45.00' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.14 cfs @ 12.07 hrs HW=49.78' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.14 cfs @ 1.8 fps)

Pond 7P: Drywell B

Inflow Area =	0.030 ac,	Inflow Depth =	4.56"	for 10-yr event	
Inflow =	0.15 cfs @	12.07 hrs,	Volume=	0.011 af	
Outflow =	0.15 cfs @	12.07 hrs,	Volume=	0.011 af,	Atten= 0%, Lag= 0.3 min
Discarded =	0.00 cfs @	10.53 hrs,	Volume=	0.005 af	
Primary =	0.14 cfs @	12.07 hrs,	Volume=	0.006 af	

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 50.29' @ 12.07 hrs Surf.Area= 0.001 ac Storage= 0.003 af
Plug-Flow detention time= 350.0 min calculated for 0.011 af (99% of inflow)
Center-of-Mass det. time= 342.6 min (1,090.4 - 747.8)

Volume	Invert	Avail.Storage	Storage Description
#1	43.50'	0.000 af	**6.00'W x 8.00'L x 2.25'H Prismatoid**
			0.002 af Overall - 0.001 af Embedded = 0.001 af x 25.0% Voids
#2	44.00'	0.001 af	**33.6"W x 20.0"H x 6.33'L Cultec R-180** x 2 Inside #1
#3	45.50'	0.002 af	**4.00'D x 8.00'H Vertical Cone/Cylinder**
		0.004 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	50.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.00 cfs @ 10.53 hrs HW=45.51' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.15 cfs @ 12.07 hrs HW=50.29' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.15 cfs @ 1.8 fps)

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

Subcatchment 1S: Existing Runoff Area=14,887 sf Runoff Depth=5.15"
Tc=5.0 min CN=97 Runoff=1.90 cfs 0.147 af

Subcatchment 2S: Proposed Runoff Area=12,334 sf Runoff Depth=4.04"
Tc=5.0 min CN=87 Runoff=1.36 cfs 0.095 af

Subcatchment 3S: Remaining Old Building Runoff Area=1,242 sf Runoff Depth=5.26"
Tc=5.0 min CN=98 Runoff=0.16 cfs 0.013 af

Subcatchment 4S: New Building Runoff Area=1,311 sf Runoff Depth=5.26"
Tc=5.0 min CN=98 Runoff=0.17 cfs 0.013 af

Reach 7R: Total Proposed Inflow=1.68 cfs 0.112 af
Outflow=1.68 cfs 0.112 af

Pond 5P: Drywell A Peak Elev=49.81' Storage=0.002 af Inflow=0.16 cfs 0.013 af
Discarded=0.00 cfs 0.004 af Primary=0.16 cfs 0.009 af Outflow=0.16 cfs 0.013 af

Pond 7P: Drywell B Peak Elev=50.32' Storage=0.003 af Inflow=0.17 cfs 0.013 af
Discarded=0.00 cfs 0.005 af Primary=0.17 cfs 0.008 af Outflow=0.17 cfs 0.013 af

Total Runoff Area = 0.684 ac Runoff Volume = 0.268 af Average Runoff Depth = 4.70"

Subcatchment 1S: Existing

Runoff = 1.90 cfs @ 12.07 hrs, Volume= 0.147 af, Depth= 5.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25yr Rainfall=5.50"

Area (sf)	CN	Description
262	61	>75% Grass cover, Good, HSG B
14,625	98	Paved parking & roofs
14,887	97	Weighted Average

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

Subcatchment 2S: Proposed

Runoff = 1.36 cfs @ 12.07 hrs, Volume= 0.095 af, Depth= 4.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25yr Rainfall=5.50"

Area (sf)	CN	Description
3,630	61	>75% Grass cover, Good, HSG B
8,704	98	Paved parking & roofs
12,334	87	Weighted Average

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

Subcatchment 3S: Remaining Old Building

Runoff = 0.16 cfs @ 12.07 hrs, Volume= 0.013 af, Depth= 5.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25yr Rainfall=5.50"

Area (sf)	CN	Description
1,242	98	Paved parking & roofs

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

Subcatchment 4S: New Building

Runoff = 0.17 cfs @ 12.07 hrs, Volume= 0.013 af, Depth= 5.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25yr Rainfall=5.50"

Area (sf)	CN	Description
1,311	98	Paved parking & roofs

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

Reach 7R: Total Proposed

Inflow Area = 0.342 ac, Inflow Depth = 3.95" for 25yr event
Inflow = 1.68 cfs @ 12.07 hrs, Volume= 0.112 af
Outflow = 1.68 cfs @ 12.07 hrs, Volume= 0.112 af, Atten= 0%, Lag= 0.0 min

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

Pond 5P: Drywell A

Inflow Area = 0.029 ac, Inflow Depth = 5.26" for 25yr event
Inflow = 0.16 cfs @ 12.07 hrs, Volume= 0.013 af
Outflow = 0.16 cfs @ 12.07 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 10.38 hrs, Volume= 0.004 af
Primary = 0.16 cfs @ 12.07 hrs, Volume= 0.009 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 49.81' @ 12.07 hrs Surf.Area= 0.001 ac Storage= 0.002 af
Plug-Flow detention time= 173.8 min calculated for 0.013 af (100% of inflow)
Center-of-Mass det. time= 174.0 min (919.5 - 745.5)

Volume	Invert	Avail.Storage	Storage Description
#1	43.50'	0.001 af	**33.6"W x 20.0"H x 6.33'L Cultec R-180** x 2 Inside #2
#2	43.00'	0.001 af	**6.00'W x 8.00'L x 2.25'H Prismatoid** 0.002 af Overall - 0.001 af Embedded = 0.001 af x 35.0% Voids
#3	45.00'	0.000 af	**0.33'D x 8.00'H Vertical Cone/Cylinder**
		0.002 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	49.50'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.00 cfs @ 10.38 hrs HW=45.01' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.16 cfs @ 12.07 hrs HW=49.81' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.16 cfs @ 1.9 fps)

Pond 7P: Drywell B

Inflow Area =	0.030 ac,	Inflow Depth =	5.26"	for 25yr event	
Inflow =	0.17 cfs @	12.07 hrs,	Volume=	0.013 af	
Outflow =	0.17 cfs @	12.08 hrs,	Volume=	0.013 af,	Atten= 0%, Lag= 0.4 min
Discarded =	0.00 cfs @	10.00 hrs,	Volume=	0.005 af	
Primary =	0.17 cfs @	12.08 hrs,	Volume=	0.008 af	

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 50.32' @ 12.08 hrs Surf.Area= 0.001 ac Storage= 0.003 af
Plug-Flow detention time= 309.3 min calculated for 0.013 af (99% of inflow)
Center-of-Mass det. time= 302.7 min (1,048.3 - 745.5)

Volume	Invert	Avail.Storage	Storage Description
#1	43.50'	0.000 af	**6.00'W x 8.00'L x 2.25'H Prismatoid**
			0.002 af Overall - 0.001 af Embedded = 0.001 af x 25.0% Voids
#2	44.00'	0.001 af	**33.6"W x 20.0"H x 6.33'L Cultec R-180** x 2 Inside #1
#3	45.50'	0.002 af	**4.00'D x 8.00'H Vertical Cone/Cylinder**
		0.004 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	50.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.00 cfs @ 10.00 hrs HW=45.50' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.17 cfs @ 12.08 hrs HW=50.32' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.17 cfs @ 1.9 fps)

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

Subcatchment 1S: Existing Runoff Area=14,887 sf Runoff Depth=6.14"
Tc=5.0 min CN=97 Runoff=2.25 cfs 0.175 af

Subcatchment 2S: Proposed Runoff Area=12,334 sf Runoff Depth=5.00"
Tc=5.0 min CN=87 Runoff=1.66 cfs 0.118 af

Subcatchment 3S: Remaining Old Building Runoff Area=1,242 sf Runoff Depth=6.26"
Tc=5.0 min CN=98 Runoff=0.19 cfs 0.015 af

Subcatchment 4S: New Building Runoff Area=1,311 sf Runoff Depth=6.26"
Tc=5.0 min CN=98 Runoff=0.20 cfs 0.016 af

Reach 7R: Total Proposed Inflow=2.04 cfs 0.140 af
Outflow=2.04 cfs 0.140 af

Pond 5P: Drywell A Peak Elev=49.87' Storage=0.002 af Inflow=0.19 cfs 0.015 af
Discarded=0.00 cfs 0.004 af Primary=0.19 cfs 0.011 af Outflow=0.19 cfs 0.015 af

Pond 7P: Drywell B Peak Elev=50.39' Storage=0.003 af Inflow=0.20 cfs 0.016 af
Discarded=0.00 cfs 0.005 af Primary=0.20 cfs 0.011 af Outflow=0.20 cfs 0.016 af

Total Runoff Area = 0.684 ac Runoff Volume = 0.323 af Average Runoff Depth = 5.68"

Subcatchment 1S: Existing

Runoff = 2.25 cfs @ 12.07 hrs, Volume= 0.175 af, Depth= 6.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100yr Rainfall=6.50"

Area (sf)	CN	Description
262	61	>75% Grass cover, Good, HSG B
14,625	98	Paved parking & roofs
14,887	97	Weighted Average

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

Subcatchment 2S: Proposed

Runoff = 1.66 cfs @ 12.07 hrs, Volume= 0.118 af, Depth= 5.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100yr Rainfall=6.50"

Area (sf)	CN	Description
3,630	61	>75% Grass cover, Good, HSG B
8,704	98	Paved parking & roofs
12,334	87	Weighted Average

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

Subcatchment 3S: Remaining Old Building

Runoff = 0.19 cfs @ 12.07 hrs, Volume= 0.015 af, Depth= 6.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100yr Rainfall=6.50"

Area (sf)	CN	Description
1,242	98	Paved parking & roofs

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

Subcatchment 4S: New Building

Runoff = 0.20 cfs @ 12.07 hrs, Volume= 0.016 af, Depth= 6.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100yr Rainfall=6.50"

Area (sf)	CN	Description
1,311	98	Paved parking & roofs

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

Reach 7R: Total Proposed

Inflow Area = 0.342 ac, Inflow Depth = 4.91" for 100yr event
Inflow = 2.04 cfs @ 12.07 hrs, Volume= 0.140 af
Outflow = 2.04 cfs @ 12.07 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

Pond 5P: Drywell A

Inflow Area = 0.029 ac, Inflow Depth = 6.26" for 100yr event
Inflow = 0.19 cfs @ 12.07 hrs, Volume= 0.015 af
Outflow = 0.19 cfs @ 12.07 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 9.71 hrs, Volume= 0.004 af
Primary = 0.19 cfs @ 12.07 hrs, Volume= 0.011 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 49.87' @ 12.07 hrs Surf.Area= 0.001 ac Storage= 0.002 af
Plug-Flow detention time= 151.0 min calculated for 0.015 af (100% of inflow)
Center-of-Mass det. time= 151.0 min (894.0 - 743.1)

Volume	Invert	Avail.Storage	Storage Description
#1	43.50'	0.001 af	**33.6"W x 20.0"H x 6.33'L Cultec R-180** x 2 Inside #2
#2	43.00'	0.001 af	**6.00'W x 8.00'L x 2.25'H Prismatoid** 0.002 af Overall - 0.001 af Embedded = 0.001 af x 35.0% Voids
#3	45.00'	0.000 af	**0.33'D x 8.00'H Vertical Cone/Cylinder**
		0.002 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	49.50'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.00 cfs @ 9.71 hrs HW=45.01' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.19 cfs @ 12.07 hrs HW=49.87' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.19 cfs @ 2.2 fps)

Pond 7P: Drywell B

Inflow Area =	0.030 ac,	Inflow Depth =	6.26"	for	100yr event
Inflow =	0.20 cfs @	12.07 hrs,	Volume=	0.016 af	
Outflow =	0.20 cfs @	12.08 hrs,	Volume=	0.016 af,	Atten= 0%, Lag= 0.4 min
Discarded =	0.00 cfs @	9.32 hrs,	Volume=	0.005 af	
Primary =	0.20 cfs @	12.08 hrs,	Volume=	0.011 af	

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 50.39' @ 12.08 hrs Surf.Area= 0.001 ac Storage= 0.003 af
Plug-Flow detention time= 267.0 min calculated for 0.016 af (99% of inflow)
Center-of-Mass det. time= 261.2 min (1,004.3 - 743.1)

Volume	Invert	Avail.Storage	Storage Description
#1	43.50'	0.000 af	**6.00'W x 8.00'L x 2.25'H Prismatoid** 0.002 af Overall - 0.001 af Embedded = 0.001 af x 25.0% Voids
#2	44.00'	0.001 af	**33.6"W x 20.0"H x 6.33'L Cultec R-180** x 2 Inside #1
#3	45.50'	0.002 af	**4.00'D x 8.00'H Vertical Cone/Cylinder**
		0.004 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	50.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.00 cfs @ 9.32 hrs HW=45.51' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.20 cfs @ 12.08 hrs HW=50.39' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.20 cfs @ 2.3 fps)