DRAINAGE CALCULATIONS

for a

PROPOSED
RESIDENTIAL DEVELOPMENT

located at

22 Pleasant Street
Wellesley, Massachusetts

Prepared for:

Capital Group Properties
259 Turnpike Road
Southborough, Massachusetts 01772

Prepared By:

Engineering Design Consultants, Inc.
32 Turnpike Road
Southborough, Massachusetts 01772

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PROJECT NARRATIVE

This project at 22 Pleasant Street, encompasses the razing of an existing dwelling and the construction of six (6) new dwelling units in its place including appurtenant utilities and grading. The existing walls and driveway will also be reconstructed along with additional parking spaces.

All of the stormwater runoff flows toward the northeast to Pleasant Street. An erosion control barrier will be placed prior to construction as shown on the plans. The erosion control barrier will consist of staked "Silt Stop" at locations indicated on the plans.

DRAINAGE NARRATIVE

A storm water analysis was performed for the property at 22 Pleasant Street. The method of analysis is the SCS method for hydrologic conditions. The SCS method utilized TR-55 and HydroCAD stormwater modeling system to analysis the 2-year, 10-year, 25-year, and 100-year 24 hour storm events. Runoff areas are designated on the detail sheet of the plans.

Hydrologic Existing Conditions:

The existing site runoff flows toward the northeast toward Pleasant Street. The hydrologic soils group for the property is "Charlton-Hollis-Urban," a hydrologic value of "C" was used.

Subcatchment Area 1S contains 48,510 sf of total land and drains to the northeast and contains the existing house, drive and lawn area. (The Entire Lot)

The overall pre-developed flow to the northeast is represented by Subcatchment 1S.

Hydrologic Proposed Conditions:

Under proposed conditions the same design point location was analyzed for peak flow discharge for the 2-year, 10-year, 25-year and 100-year 24 hour storm events.

There are seven Subcatchments 10S through 16S, included in the proposed condition.

Subcatchment 10S through 15S represent the roof areas of each dwelling unit, 1,392 sf. The roof downspouts will tie into underground "Cultec" chambers to infiltrate into the ground. Pond 10P through 15P, represent each of the six (6) infiltration areas behind the dwellings. The chambers will have overflow scuppers for more intense storms. Each infiltration will consist of six (6) "Cultec" chambers (2 rows of 3 chambers) surrounded by one foot of stone and can be seen on the detail sheet of the plans.

Subcatchment 16S, 40,160 sf, is the remaining area of the proposed yard, including the paved, lawn, and wooded surfaces.

The overall developed flow to the north is summarized by the link 1L, "Total Proposed"

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The peak runoff discharge results are in the following table:

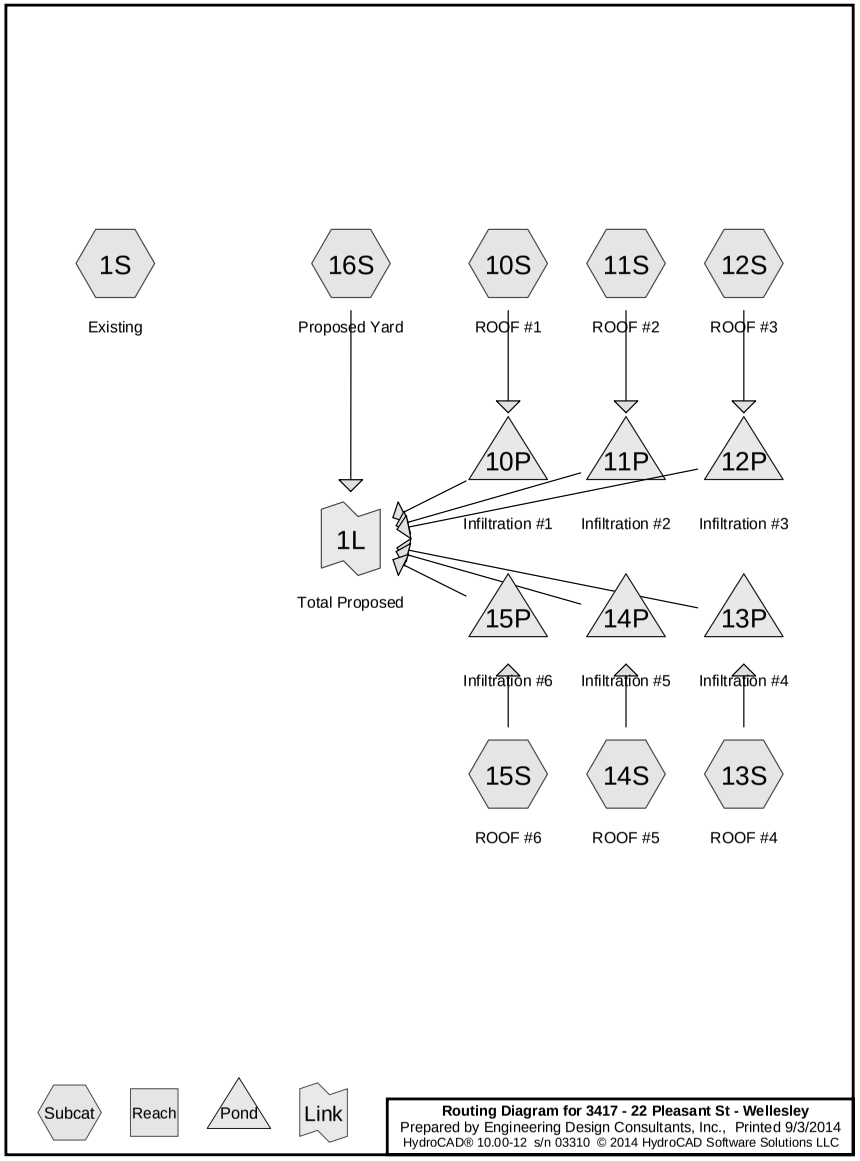
	2-Year	**10-Year**	**25-Year**	**100-year**
Pre-Developed (1S)	1.26 cfs	2.69 cfs	3.36 cfs	4.84 cfs
Post-Developed (1L)	1.07 cfs	2.23 cfs	2.77 cfs	4.18 cfs

In conclusion, the 2-year, 10-year, 25-year and 100-year peak rates of runoff are predominately maintained under proposed conditions to the design point.

The runoff volume results are in the following table:

	2-Year	**10-Year**	**25-Year**	**100-year**
Pre-Developed (1S)	4,657 cf	9,588 cf	11,937 cf	17,210 cf
Post-Developed (1L)	4,056 cf	8,221 cf	10,303 cf	15,229 cf

In conclusion, the 2-year, 10-year, 25-year and 100-year runoff volumes are predominately maintained under proposed conditions to the design point.



Summary for Subcatchment 1S: Existing

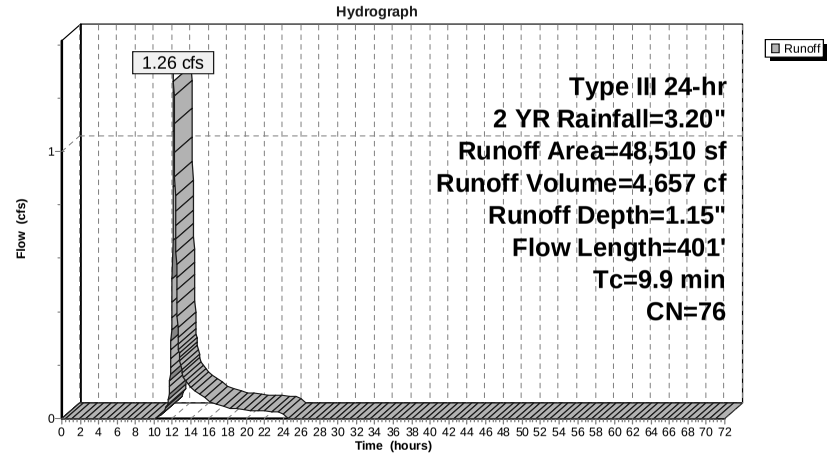
Runoff = 1.26 cfs @ 12.15 hrs, Volume= 4,657 cf, Depth= 1.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 2 YR Rainfall=3.20"

Area (sf)	CN	Description
2,606	98	Roofs, HSG C
4,039	98	Paved parking, HSG C
25,201	74	>75% Grass cover, Good, HSG C
16,664	70	Woods, Good, HSG C
48,510	76	Weighted Average
41,865		86.30% Pervious Area
6,645		13.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	35	0.0570	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.4	58	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.1	172	0.0170	0.91		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	136	0.1200	7.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.9	401	Total			

Subcatchment 1S: Existing



Summary for Subcatchment 10S: ROOF #1

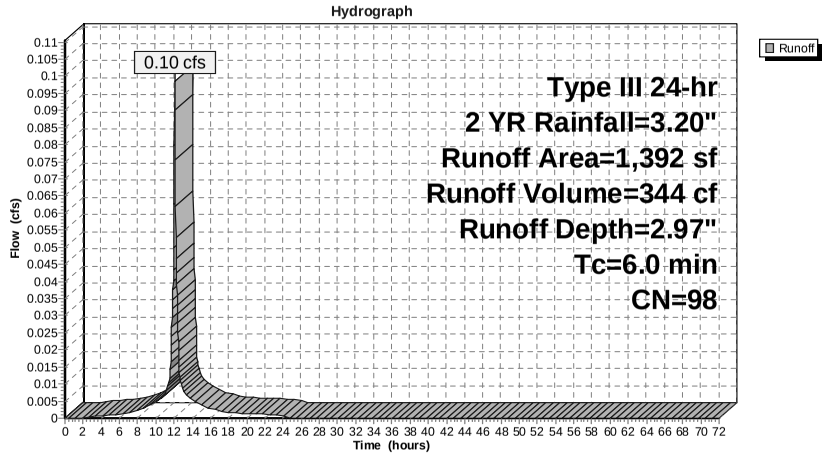
Runoff = 0.10 cfs @ 12.08 hrs, Volume= 344 cf, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 2 YR Rainfall=3.20"

Area (sf)	CN	Description
1,392	98	Roofs, HSG C
1,392		100.00% Impervious Area

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

Subcatchment 10S: ROOF #1



Summary for Subcatchment 11S: ROOF #2

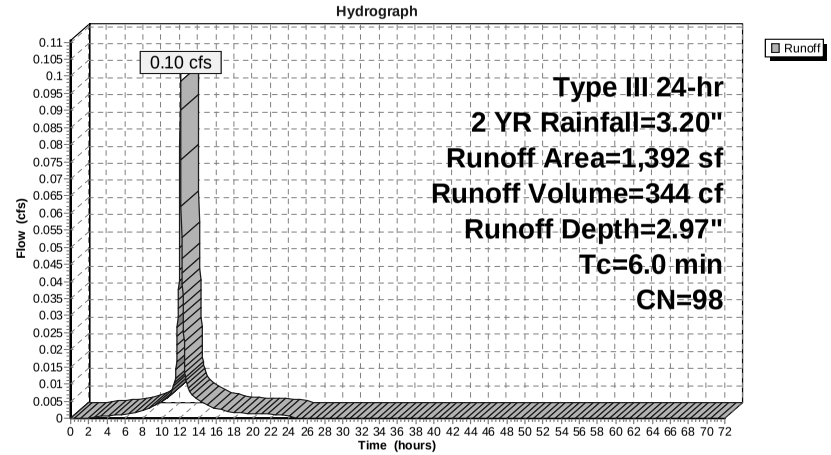
Runoff = 0.10 cfs @ 12.08 hrs, Volume= 344 cf, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 2 YR Rainfall=3.20"

Area (sf)	CN	Description
1,392	98	Roofs, HSG C
1,392		100.00% Impervious Area

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

Subcatchment 11S: ROOF #2



Summary for Subcatchment 12S: ROOF #3

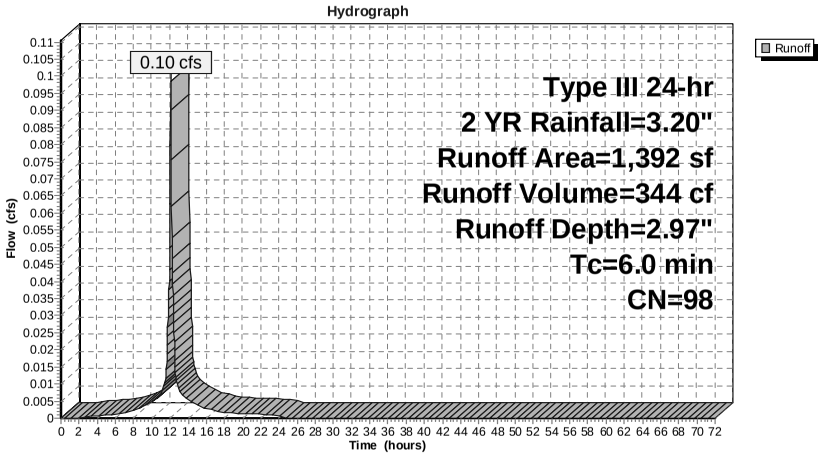
Runoff = 0.10 cfs @ 12.08 hrs, Volume= 344 cf, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 2 YR Rainfall=3.20"

Area (sf)	CN	Description
1,392	98	Roofs, HSG C
1,392		100.00% Impervious Area

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

Subcatchment 12S: ROOF #3



Summary for Subcatchment 13S: ROOF #4

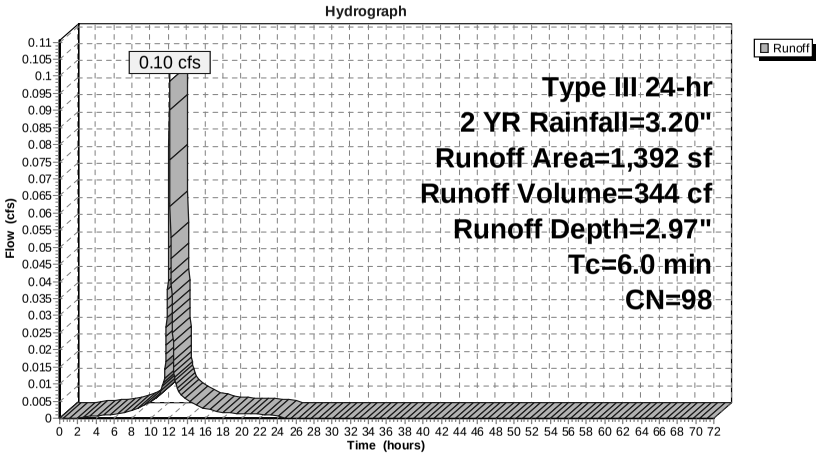
Runoff = 0.10 cfs @ 12.08 hrs, Volume= 344 cf, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 2 YR Rainfall=3.20"

Area (sf)	CN	Description
1,392	98	Roofs, HSG C
1,392		100.00% Impervious Area

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

Subcatchment 13S: ROOF #4



Summary for Subcatchment 14S: ROOF #5

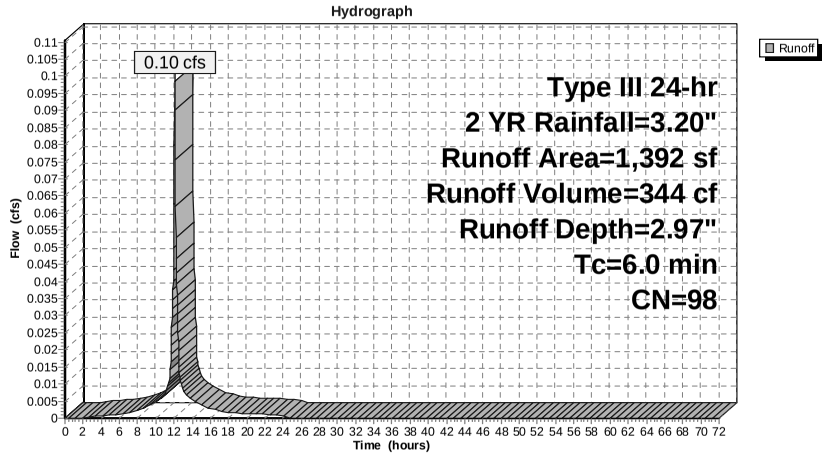
Runoff = 0.10 cfs @ 12.08 hrs, Volume= 344 cf, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 2 YR Rainfall=3.20"

Area (sf)	CN	Description
1,392	98	Roofs, HSG C
1,392		100.00% Impervious Area

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

Subcatchment 14S: ROOF #5



Summary for Subcatchment 15S: ROOF #6

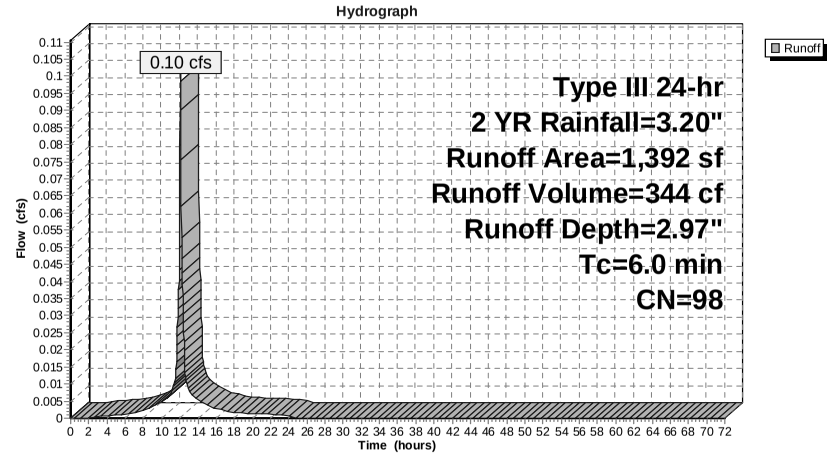
Runoff = 0.10 cfs @ 12.08 hrs, Volume= 344 cf, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 2 YR Rainfall=3.20"

Area (sf)	CN	Description
1,392	98	Roofs, HSG C
1,392		100.00% Impervious Area

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

Subcatchment 15S: ROOF #6



Summary for Subcatchment 16S: Proposed Yard

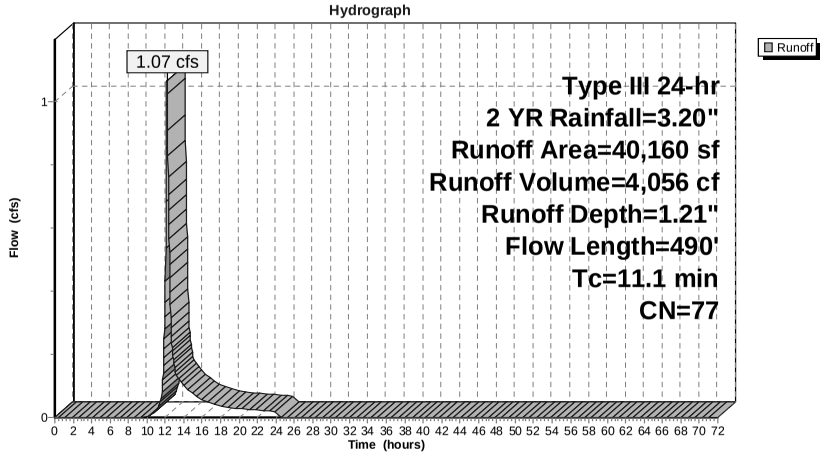
Runoff = 1.07 cfs @ 12.16 hrs, Volume= 4,056 cf, Depth= 1.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 2 YR Rainfall=3.20"

Area (sf)	CN	Description
6,765	98	Paved parking, HSG C
23,837	74	>75% Grass cover, Good, HSG C
9,558	70	Woods, Good, HSG C
40,160	77	Weighted Average
33,395		83.15% Pervious Area
6,765		16.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	35	0.0570	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.4	58	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.8	204	0.0160	0.89		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	94	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	99	0.1000	6.42		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
11.1	490	Total			

Subcatchment 16S: Proposed Yard



Summary for Pond 10P: Infiltration #1

Inflow Area = 1,392 sf,100.00% Impervious, Inflow Depth = 2.97" for 2 YR event
Inflow = 0.10 cfs @ 12.08 hrs, Volume= 344 cf
Outflow = 0.00 cfs @ 16.62 hrs, Volume= 344 cf, Atten= 98%, Lag= 272.3 min
Discarded = 0.00 cfs @ 16.62 hrs, Volume= 344 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 1.39' @ 16.62 hrs Surf.Area= 268 sf Storage= 224 cf

Plug-Flow detention time= 903.8 min calculated for 344 cf (100% of inflow)
Center-of-Mass det. time= 904.1 min (1,660.5 - 756.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	206 cf	**8.00'W x 33.50'L x 2.54'H Field A** 681 cf Overall - 167 cf Embedded = 514 cf x 40.0% Voids
#2A	0.50'	167 cf	**Cultec R-150XLHD** x 6 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		373 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	3.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 16.62 hrs HW=1.39' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

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

Pond 10P: Infiltration #1 - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 2 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

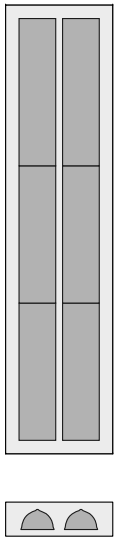
3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +12.0" End Stone x 2 = 33.50' Base Length
2 Rows x 33.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.00' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

6 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 2 Rows = 166.9 cf Chamber Storage

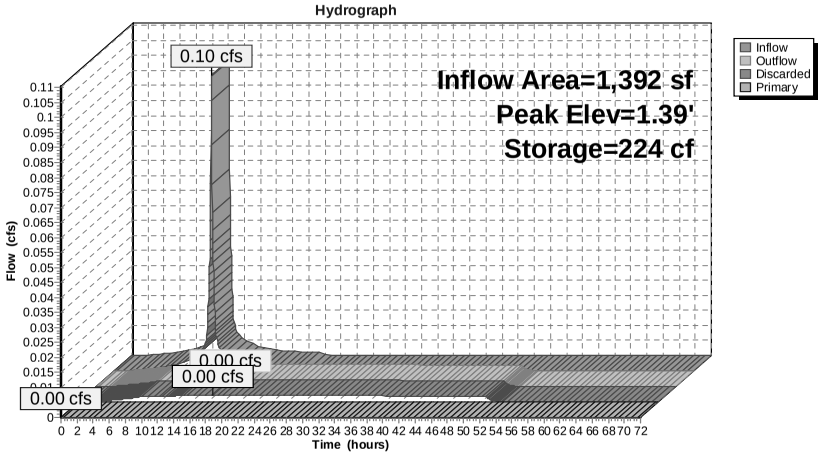
681.2 cf Field - 166.9 cf Chambers = 514.3 cf Stone x 40.0% Voids = 205.7 cf Stone Storage

Chamber Storage + Stone Storage = 372.6 cf = 0.009 af
Overall Storage Efficiency = 54.7%

6 Chambers
25.2 cy Field
19.0 cy Stone



Pond 10P: Infiltration #1



Summary for Pond 11P: Infiltration #2

Inflow Area = 1,392 sf,100.00% Impervious, Inflow Depth = 2.97" for 2 YR event
Inflow = 0.10 cfs @ 12.08 hrs, Volume= 344 cf
Outflow = 0.00 cfs @ 16.62 hrs, Volume= 344 cf, Atten= 98%, Lag= 272.3 min
Discarded = 0.00 cfs @ 16.62 hrs, Volume= 344 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 1.39' @ 16.62 hrs Surf.Area= 268 sf Storage= 224 cf

Plug-Flow detention time= 903.8 min calculated for 344 cf (100% of inflow)
Center-of-Mass det. time= 904.1 min (1,660.5 - 756.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	206 cf	**8.00'W x 33.50'L x 2.54'H Field A** 681 cf Overall - 167 cf Embedded = 514 cf x 40.0% Voids
#2A	0.50'	167 cf	**Cultec R-150XLHD** x 6 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		373 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	3.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 16.62 hrs HW=1.39' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

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

Pond 11P: Infiltration #2 - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 2 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

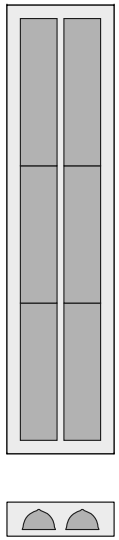
3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +12.0" End Stone x 2 = 33.50' Base Length
2 Rows x 33.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.00' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

6 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 2 Rows = 166.9 cf Chamber Storage

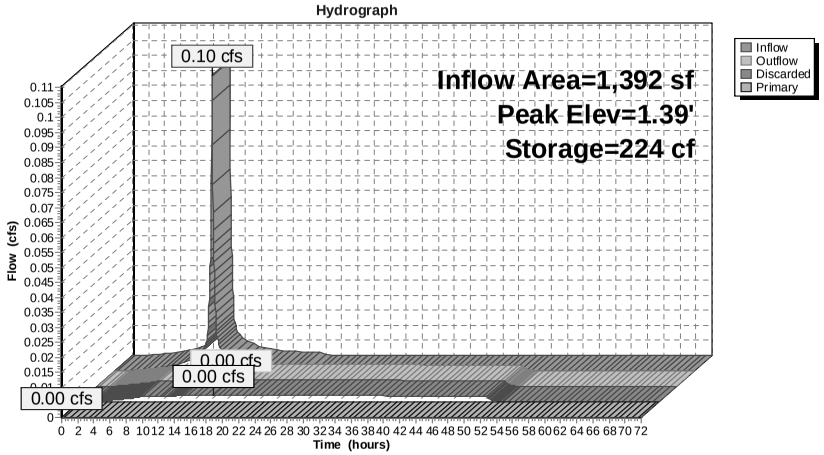
681.2 cf Field - 166.9 cf Chambers = 514.3 cf Stone x 40.0% Voids = 205.7 cf Stone Storage

Chamber Storage + Stone Storage = 372.6 cf = 0.009 af
Overall Storage Efficiency = 54.7%

6 Chambers
25.2 cy Field
19.0 cy Stone



Pond 11P: Infiltration #2



Summary for Pond 12P: Infiltration #3

Inflow Area = 1,392 sf,100.00% Impervious, Inflow Depth = 2.97" for 2 YR event
Inflow = 0.10 cfs @ 12.08 hrs, Volume= 344 cf
Outflow = 0.00 cfs @ 16.62 hrs, Volume= 344 cf, Atten= 98%, Lag= 272.3 min
Discarded = 0.00 cfs @ 16.62 hrs, Volume= 344 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 1.39' @ 16.62 hrs Surf.Area= 268 sf Storage= 224 cf

Plug-Flow detention time= 903.8 min calculated for 344 cf (100% of inflow)
Center-of-Mass det. time= 904.1 min (1,660.5 - 756.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	206 cf	**8.00'W x 33.50'L x 2.54'H Field A** 681 cf Overall - 167 cf Embedded = 514 cf x 40.0% Voids
#2A	0.50'	167 cf	**Cultec R-150XLHD** x 6 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		373 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	3.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 16.62 hrs HW=1.39' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

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

Pond 12P: Infiltration #3 - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 2 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

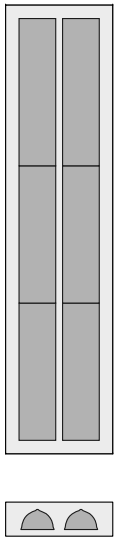
3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +12.0" End Stone x 2 = 33.50' Base Length
2 Rows x 33.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.00' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

6 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 2 Rows = 166.9 cf Chamber Storage

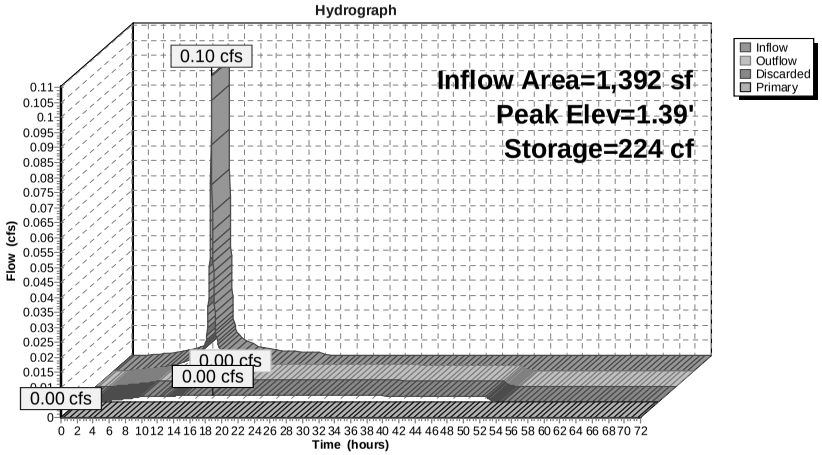
681.2 cf Field - 166.9 cf Chambers = 514.3 cf Stone x 40.0% Voids = 205.7 cf Stone Storage

Chamber Storage + Stone Storage = 372.6 cf = 0.009 af
Overall Storage Efficiency = 54.7%

6 Chambers
25.2 cy Field
19.0 cy Stone



Pond 12P: Infiltration #3



Summary for Pond 13P: Infiltration #4

Inflow Area = 1,392 sf,100.00% Impervious, Inflow Depth = 2.97" for 2 YR event
Inflow = 0.10 cfs @ 12.08 hrs, Volume= 344 cf
Outflow = 0.00 cfs @ 16.62 hrs, Volume= 344 cf, Atten= 98%, Lag= 272.3 min
Discarded = 0.00 cfs @ 16.62 hrs, Volume= 344 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 1.39' @ 16.62 hrs Surf.Area= 268 sf Storage= 224 cf

Plug-Flow detention time= 903.8 min calculated for 344 cf (100% of inflow)
Center-of-Mass det. time= 904.1 min (1,660.5 - 756.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	206 cf	**8.00'W x 33.50'L x 2.54'H Field A** 681 cf Overall - 167 cf Embedded = 514 cf x 40.0% Voids
#2A	0.50'	167 cf	**Cultec R-150XLHD** x 6 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		373 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	3.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 16.62 hrs HW=1.39' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

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

Pond 13P: Infiltration #4 - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 2 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

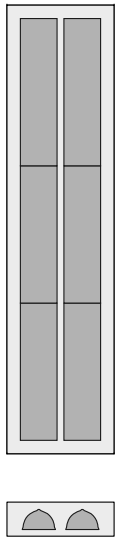
3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +12.0" End Stone x 2 = 33.50' Base Length
2 Rows x 33.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.00' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

6 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 2 Rows = 166.9 cf Chamber Storage

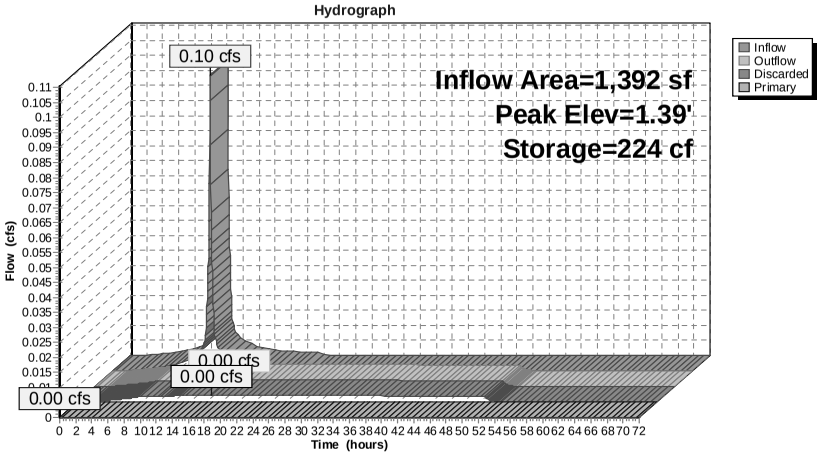
681.2 cf Field - 166.9 cf Chambers = 514.3 cf Stone x 40.0% Voids = 205.7 cf Stone Storage

Chamber Storage + Stone Storage = 372.6 cf = 0.009 af
Overall Storage Efficiency = 54.7%

6 Chambers
25.2 cy Field
19.0 cy Stone



Pond 13P: Infiltration #4



Summary for Pond 14P: Infiltration #5

Inflow Area = 1,392 sf,100.00% Impervious, Inflow Depth = 2.97" for 2 YR event
Inflow = 0.10 cfs @ 12.08 hrs, Volume= 344 cf
Outflow = 0.00 cfs @ 16.62 hrs, Volume= 344 cf, Atten= 98%, Lag= 272.3 min
Discarded = 0.00 cfs @ 16.62 hrs, Volume= 344 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 1.39' @ 16.62 hrs Surf.Area= 268 sf Storage= 224 cf

Plug-Flow detention time= 903.8 min calculated for 344 cf (100% of inflow)
Center-of-Mass det. time= 904.1 min (1,660.5 - 756.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	206 cf	**8.00'W x 33.50'L x 2.54'H Field A** 681 cf Overall - 167 cf Embedded = 514 cf x 40.0% Voids
#2A	0.50'	167 cf	**Cultec R-150XLHD** x 6 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		373 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	3.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 16.62 hrs HW=1.39' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

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

Pond 14P: Infiltration #5 - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 2 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

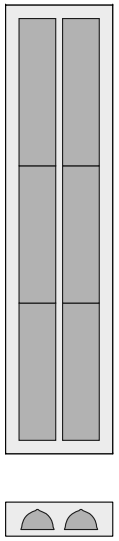
3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +12.0" End Stone x 2 = 33.50' Base Length
2 Rows x 33.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.00' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

6 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 2 Rows = 166.9 cf Chamber Storage

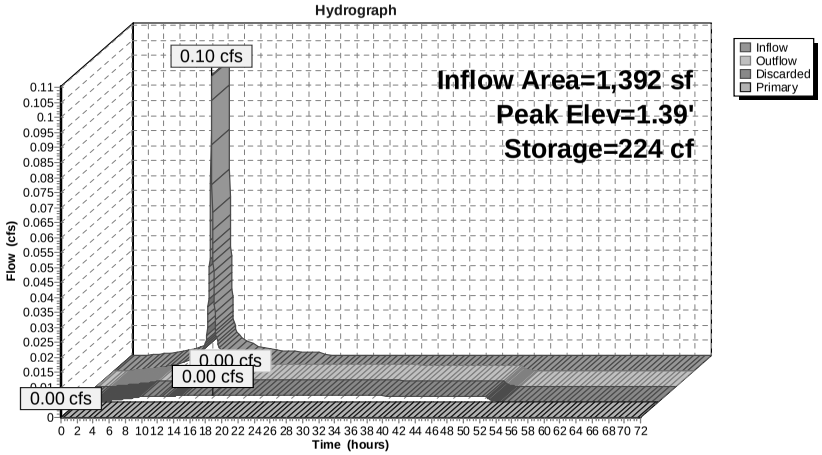
681.2 cf Field - 166.9 cf Chambers = 514.3 cf Stone x 40.0% Voids = 205.7 cf Stone Storage

Chamber Storage + Stone Storage = 372.6 cf = 0.009 af
Overall Storage Efficiency = 54.7%

6 Chambers
25.2 cy Field
19.0 cy Stone



Pond 14P: Infiltration #5



Summary for Pond 15P: Infiltration #6

Inflow Area = 1,392 sf,100.00% Impervious, Inflow Depth = 2.97" for 2 YR event
Inflow = 0.10 cfs @ 12.08 hrs, Volume= 344 cf
Outflow = 0.00 cfs @ 16.62 hrs, Volume= 344 cf, Atten= 98%, Lag= 272.3 min
Discarded = 0.00 cfs @ 16.62 hrs, Volume= 344 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 1.39' @ 16.62 hrs Surf.Area= 268 sf Storage= 224 cf

Plug-Flow detention time= 903.8 min calculated for 344 cf (100% of inflow)
Center-of-Mass det. time= 904.1 min (1,660.5 - 756.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	206 cf	**8.00'W x 33.50'L x 2.54'H Field A** 681 cf Overall - 167 cf Embedded = 514 cf x 40.0% Voids
#2A	0.50'	167 cf	**Cultec R-150XLHD** x 6 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		373 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	3.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 16.62 hrs HW=1.39' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

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

Pond 15P: Infiltration #6 - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 2 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

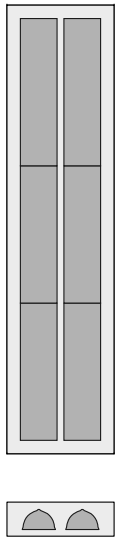
3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +12.0" End Stone x 2 = 33.50' Base Length
2 Rows x 33.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.00' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

6 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 2 Rows = 166.9 cf Chamber Storage

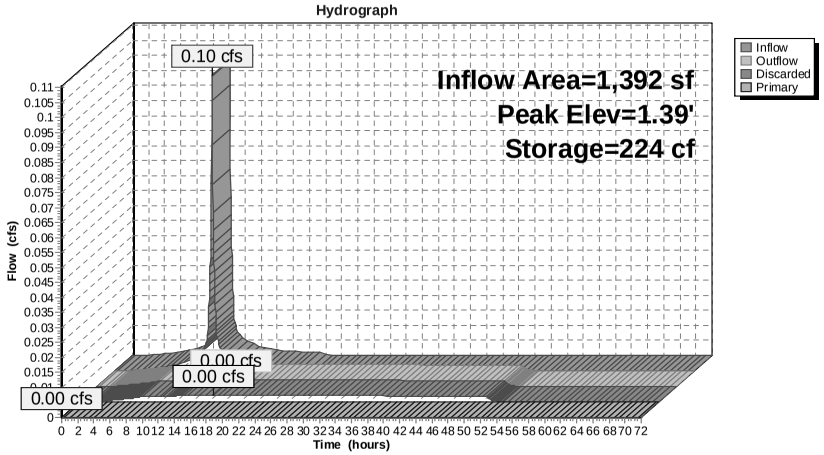
681.2 cf Field - 166.9 cf Chambers = 514.3 cf Stone x 40.0% Voids = 205.7 cf Stone Storage

Chamber Storage + Stone Storage = 372.6 cf = 0.009 af
Overall Storage Efficiency = 54.7%

6 Chambers
25.2 cy Field
19.0 cy Stone



Pond 15P: Infiltration #6

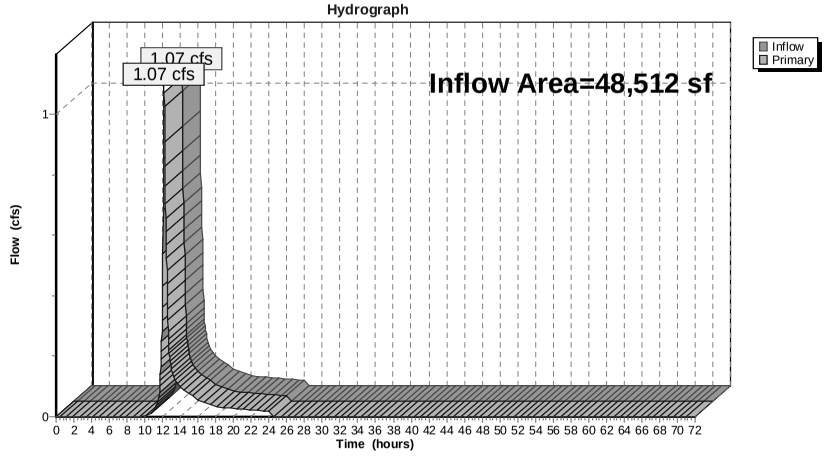


Summary for Link 1L: Total Proposed

Inflow Area = 48,512 sf, 31.16% Impervious, Inflow Depth = 1.00" for 2 YR event
Inflow = 1.07 cfs @ 12.16 hrs, Volume= 4,056 cf
Primary = 1.07 cfs @ 12.16 hrs, Volume= 4,056 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs

Link 1L: Total Proposed



Summary for Subcatchment 1S: Existing

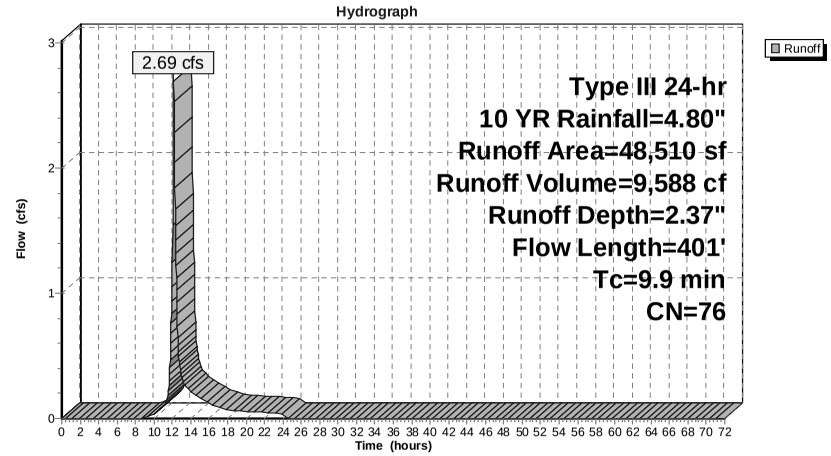
Runoff = 2.69 cfs @ 12.14 hrs, Volume= 9,588 cf, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 YR Rainfall=4.80"

Area (sf)	CN	Description
2,606	98	Roofs, HSG C
4,039	98	Paved parking, HSG C
25,201	74	>75% Grass cover, Good, HSG C
16,664	70	Woods, Good, HSG C
48,510	76	Weighted Average
41,865		86.30% Pervious Area
6,645		13.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	35	0.0570	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.4	58	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.1	172	0.0170	0.91		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	136	0.1200	7.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.9	401	Total			

Subcatchment 1S: Existing



Summary for Subcatchment 10S: ROOF #1

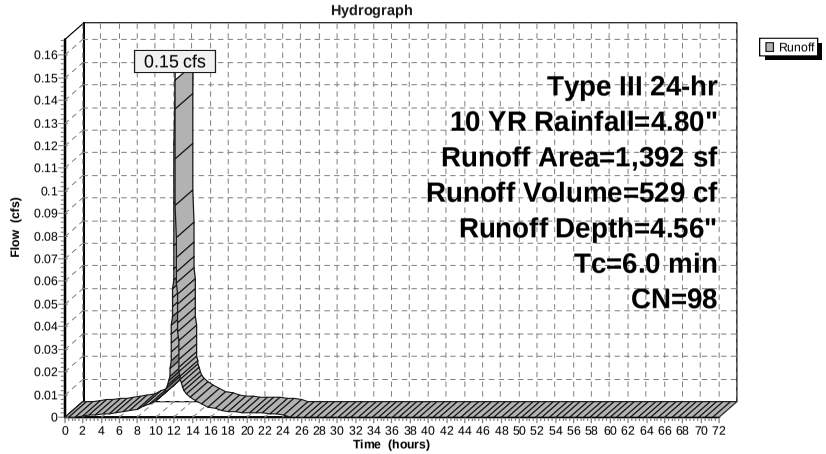
Runoff = 0.15 cfs @ 12.08 hrs, Volume= 529 cf, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 YR Rainfall=4.80"

Area (sf)	CN	Description
1,392	98	Roofs, HSG C
1,392		100.00% Impervious Area

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

Subcatchment 10S: ROOF #1



Summary for Subcatchment 11S: ROOF #2

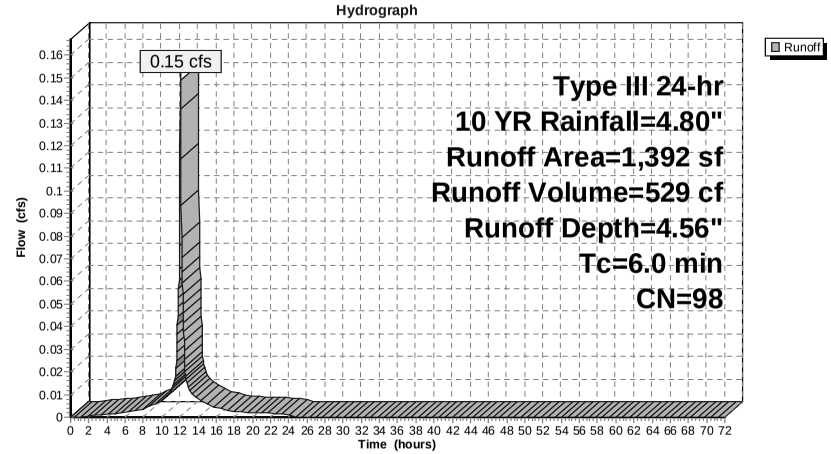
Runoff = 0.15 cfs @ 12.08 hrs, Volume= 529 cf, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 YR Rainfall=4.80"

Area (sf)	CN	Description
1,392	98	Roofs, HSG C
1,392		100.00% Impervious Area

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

Subcatchment 11S: ROOF #2



Summary for Subcatchment 12S: ROOF #3

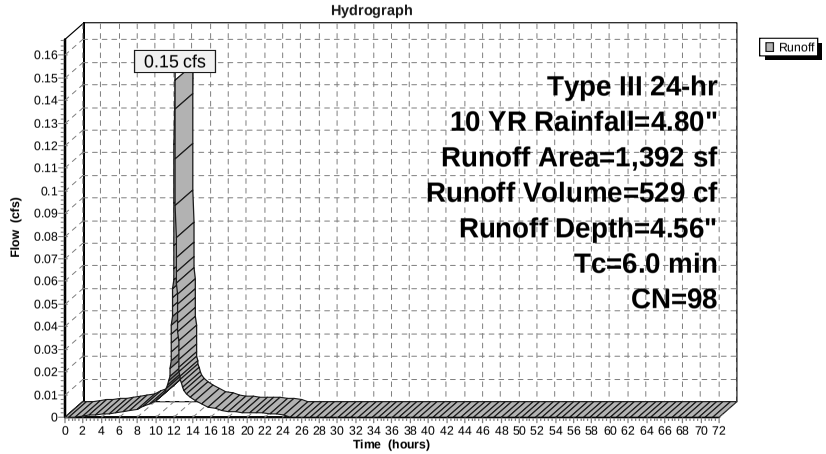
Runoff = 0.15 cfs @ 12.08 hrs, Volume= 529 cf, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 YR Rainfall=4.80"

Area (sf)	CN	Description
1,392	98	Roofs, HSG C
1,392		100.00% Impervious Area

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

Subcatchment 12S: ROOF #3



Summary for Subcatchment 13S: ROOF #4

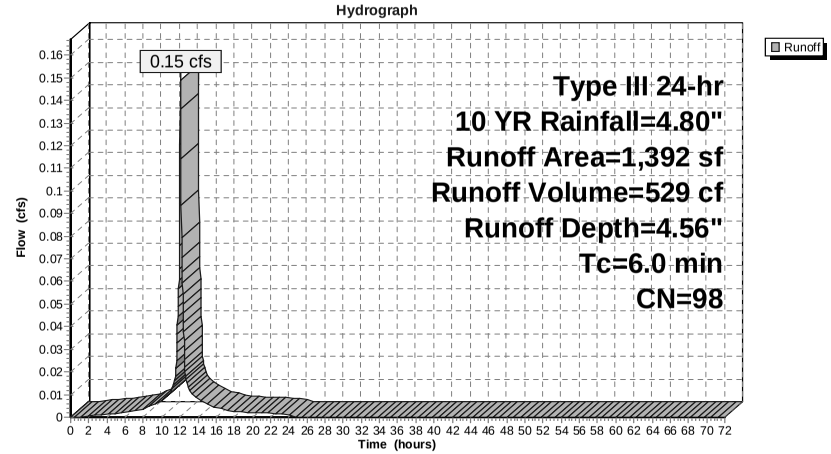
Runoff = 0.15 cfs @ 12.08 hrs, Volume= 529 cf, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 YR Rainfall=4.80"

Area (sf)	CN	Description
1,392	98	Roofs, HSG C
1,392		100.00% Impervious Area

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

Subcatchment 13S: ROOF #4



Summary for Subcatchment 14S: ROOF #5

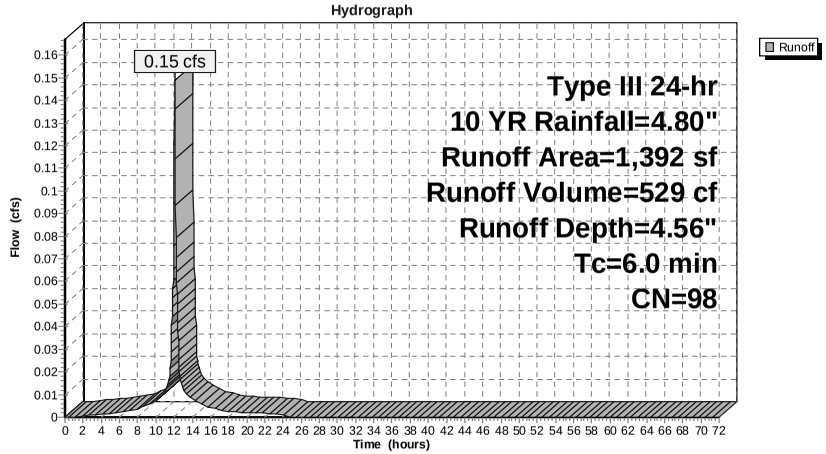
Runoff = 0.15 cfs @ 12.08 hrs, Volume= 529 cf, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 YR Rainfall=4.80"

Area (sf)	CN	Description
1,392	98	Roofs, HSG C
1,392		100.00% Impervious Area

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

Subcatchment 14S: ROOF #5



Summary for Subcatchment 15S: ROOF #6

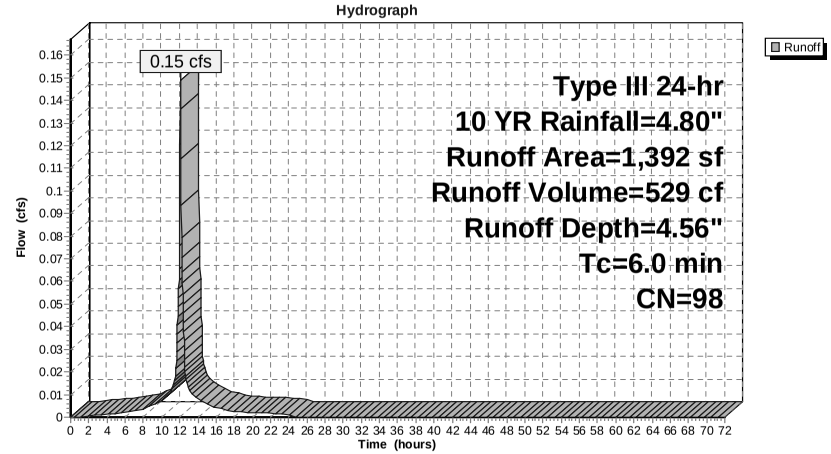
Runoff = 0.15 cfs @ 12.08 hrs, Volume= 529 cf, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 YR Rainfall=4.80"

Area (sf)	CN	Description
1,392	98	Roofs, HSG C
1,392		100.00% Impervious Area

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

Subcatchment 15S: ROOF #6



Summary for Subcatchment 16S: Proposed Yard

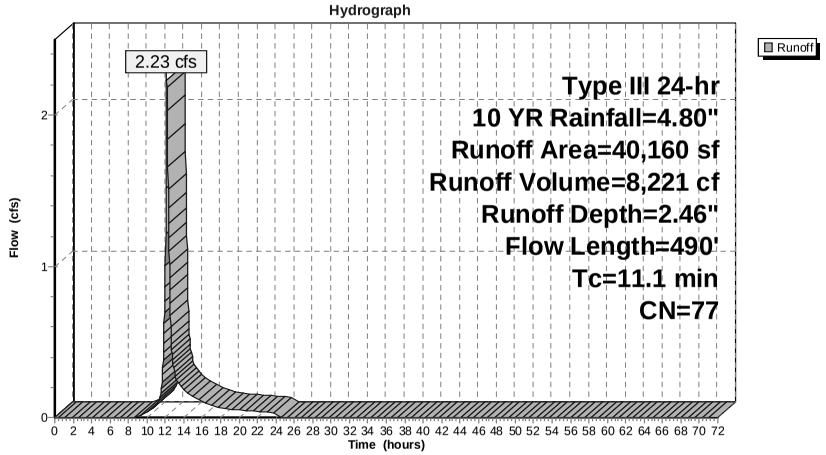
Runoff = 2.23 cfs @ 12.16 hrs, Volume= 8,221 cf, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 10 YR Rainfall=4.80"

Area (sf)	CN	Description
6,765	98	Paved parking, HSG C
23,837	74	>75% Grass cover, Good, HSG C
9,558	70	Woods, Good, HSG C
40,160	77	Weighted Average
33,395		83.15% Pervious Area
6,765		16.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	35	0.0570	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.4	58	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.8	204	0.0160	0.89		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	94	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	99	0.1000	6.42		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
11.1	490	Total			

Subcatchment 16S: Proposed Yard



Summary for Pond 10P: Infiltration #1

Inflow Area = 1,392 sf,100.00% Impervious, Inflow Depth = 4.56" for 10 YR event
Inflow = 0.15 cfs @ 12.08 hrs, Volume= 529 cf
Outflow = 0.00 cfs @ 17.42 hrs, Volume= 529 cf, Atten= 98%, Lag= 320.4 min
Discarded = 0.00 cfs @ 17.42 hrs, Volume= 529 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 2.53' @ 17.42 hrs Surf.Area= 268 sf Storage= 371 cf

Plug-Flow detention time= 1,291.5 min calculated for 529 cf (100% of inflow)
Center-of-Mass det. time= 1,292.1 min (2,040.8 - 748.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	206 cf	**8.00'W x 33.50'L x 2.54'H Field A** 681 cf Overall - 167 cf Embedded = 514 cf x 40.0% Voids
#2A	0.50'	167 cf	**Cultec R-150XLHD** x 6 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		373 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	3.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 17.42 hrs HW=2.53' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

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

Pond 10P: Infiltration #1 - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 2 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

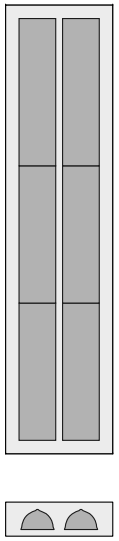
3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +12.0" End Stone x 2 = 33.50' Base Length
2 Rows x 33.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.00' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

6 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 2 Rows = 166.9 cf Chamber Storage

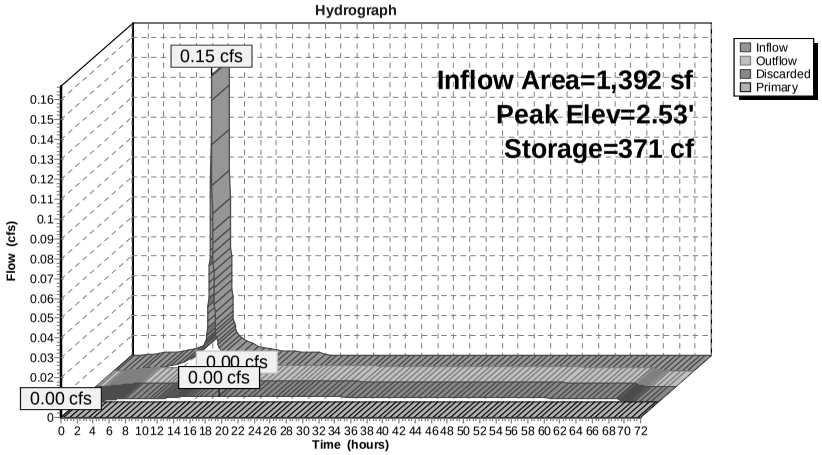
681.2 cf Field - 166.9 cf Chambers = 514.3 cf Stone x 40.0% Voids = 205.7 cf Stone Storage

Chamber Storage + Stone Storage = 372.6 cf = 0.009 af
Overall Storage Efficiency = 54.7%

6 Chambers
25.2 cy Field
19.0 cy Stone



Pond 10P: Infiltration #1



Summary for Pond 11P: Infiltration #2

Inflow Area = 1,392 sf,100.00% Impervious, Inflow Depth = 4.56" for 10 YR event
Inflow = 0.15 cfs @ 12.08 hrs, Volume= 529 cf
Outflow = 0.00 cfs @ 17.42 hrs, Volume= 529 cf, Atten= 98%, Lag= 320.4 min
Discarded = 0.00 cfs @ 17.42 hrs, Volume= 529 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 2.53' @ 17.42 hrs Surf.Area= 268 sf Storage= 371 cf

Plug-Flow detention time= 1,291.5 min calculated for 529 cf (100% of inflow)
Center-of-Mass det. time= 1,292.1 min (2,040.8 - 748.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	206 cf	**8.00'W x 33.50'L x 2.54'H Field A** 681 cf Overall - 167 cf Embedded = 514 cf x 40.0% Voids
#2A	0.50'	167 cf	**Cultec R-150XLHD** x 6 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		373 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	3.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 17.42 hrs HW=2.53' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

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

Pond 11P: Infiltration #2 - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 2 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

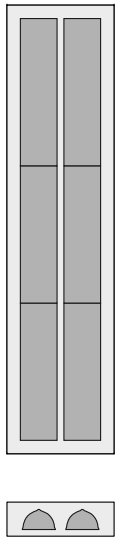
3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +12.0" End Stone x 2 = 33.50' Base Length
2 Rows x 33.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.00' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

6 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 2 Rows = 166.9 cf Chamber Storage

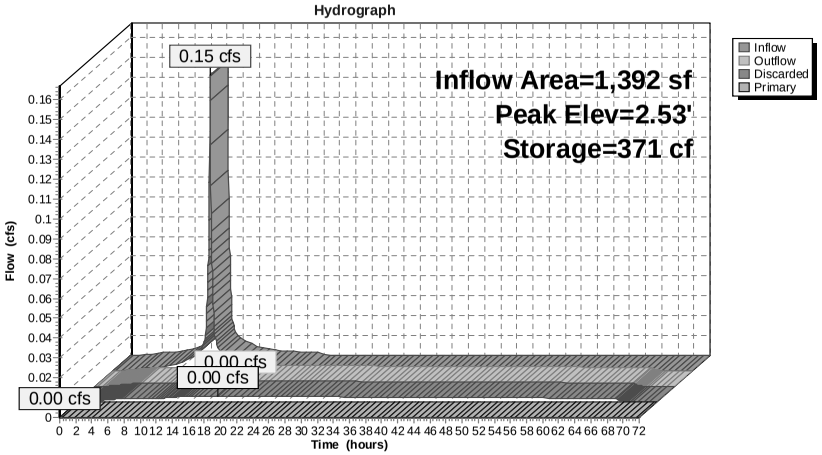
681.2 cf Field - 166.9 cf Chambers = 514.3 cf Stone x 40.0% Voids = 205.7 cf Stone Storage

Chamber Storage + Stone Storage = 372.6 cf = 0.009 af
Overall Storage Efficiency = 54.7%

6 Chambers
25.2 cy Field
19.0 cy Stone



Pond 11P: Infiltration #2



Summary for Pond 12P: Infiltration #3

Inflow Area = 1,392 sf,100.00% Impervious, Inflow Depth = 4.56" for 10 YR event
Inflow = 0.15 cfs @ 12.08 hrs, Volume= 529 cf
Outflow = 0.00 cfs @ 17.42 hrs, Volume= 529 cf, Atten= 98%, Lag= 320.4 min
Discarded = 0.00 cfs @ 17.42 hrs, Volume= 529 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 2.53' @ 17.42 hrs Surf.Area= 268 sf Storage= 371 cf

Plug-Flow detention time= 1,291.5 min calculated for 529 cf (100% of inflow)
Center-of-Mass det. time= 1,292.1 min (2,040.8 - 748.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	206 cf	**8.00'W x 33.50'L x 2.54'H Field A** 681 cf Overall - 167 cf Embedded = 514 cf x 40.0% Voids
#2A	0.50'	167 cf	**Cultec R-150XLHD** x 6 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		373 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	3.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 17.42 hrs HW=2.53' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

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

Pond 12P: Infiltration #3 - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 2 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

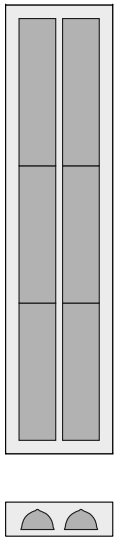
3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +12.0" End Stone x 2 = 33.50' Base Length
2 Rows x 33.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.00' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

6 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 2 Rows = 166.9 cf Chamber Storage

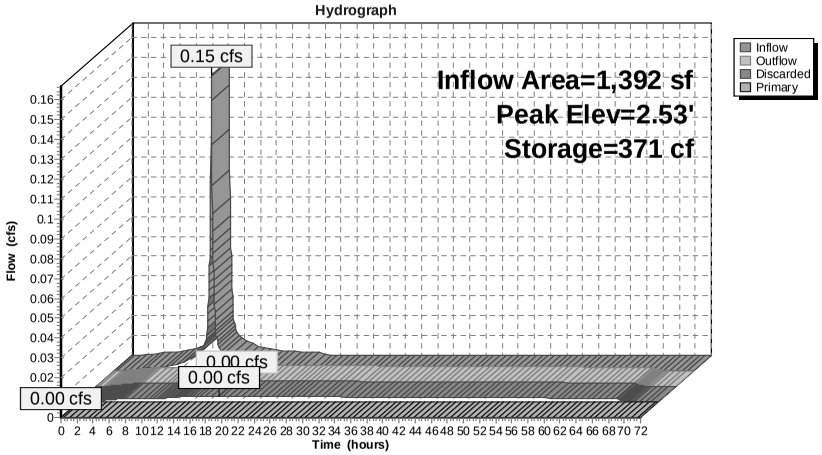
681.2 cf Field - 166.9 cf Chambers = 514.3 cf Stone x 40.0% Voids = 205.7 cf Stone Storage

Chamber Storage + Stone Storage = 372.6 cf = 0.009 af
Overall Storage Efficiency = 54.7%

6 Chambers
25.2 cy Field
19.0 cy Stone



Pond 12P: Infiltration #3



Summary for Pond 13P: Infiltration #4

Inflow Area = 1,392 sf,100.00% Impervious, Inflow Depth = 4.56" for 10 YR event
Inflow = 0.15 cfs @ 12.08 hrs, Volume= 529 cf
Outflow = 0.00 cfs @ 17.42 hrs, Volume= 529 cf, Atten= 98%, Lag= 320.4 min
Discarded = 0.00 cfs @ 17.42 hrs, Volume= 529 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 2.53' @ 17.42 hrs Surf.Area= 268 sf Storage= 371 cf

Plug-Flow detention time= 1,291.5 min calculated for 529 cf (100% of inflow)
Center-of-Mass det. time= 1,292.1 min (2,040.8 - 748.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	206 cf	**8.00'W x 33.50'L x 2.54'H Field A** 681 cf Overall - 167 cf Embedded = 514 cf x 40.0% Voids
#2A	0.50'	167 cf	**Cultec R-150XLHD** x 6 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		373 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	3.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 17.42 hrs HW=2.53' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

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

Pond 13P: Infiltration #4 - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 2 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

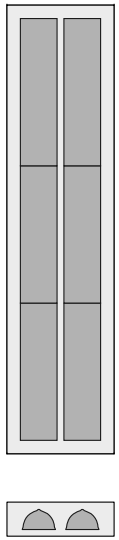
3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +12.0" End Stone x 2 = 33.50' Base Length
2 Rows x 33.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.00' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

6 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 2 Rows = 166.9 cf Chamber Storage

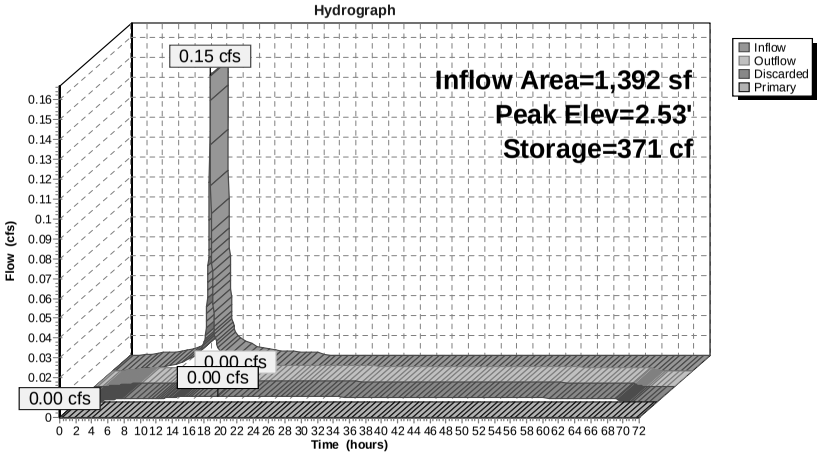
681.2 cf Field - 166.9 cf Chambers = 514.3 cf Stone x 40.0% Voids = 205.7 cf Stone Storage

Chamber Storage + Stone Storage = 372.6 cf = 0.009 af
Overall Storage Efficiency = 54.7%

6 Chambers
25.2 cy Field
19.0 cy Stone



Pond 13P: Infiltration #4



Summary for Pond 14P: Infiltration #5

Inflow Area = 1,392 sf,100.00% Impervious, Inflow Depth = 4.56" for 10 YR event
Inflow = 0.15 cfs @ 12.08 hrs, Volume= 529 cf
Outflow = 0.00 cfs @ 17.42 hrs, Volume= 529 cf, Atten= 98%, Lag= 320.4 min
Discarded = 0.00 cfs @ 17.42 hrs, Volume= 529 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 2.53' @ 17.42 hrs Surf.Area= 268 sf Storage= 371 cf

Plug-Flow detention time= 1,291.5 min calculated for 529 cf (100% of inflow)
Center-of-Mass det. time= 1,292.1 min (2,040.8 - 748.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	206 cf	**8.00'W x 33.50'L x 2.54'H Field A** 681 cf Overall - 167 cf Embedded = 514 cf x 40.0% Voids
#2A	0.50'	167 cf	**Cultec R-150XLHD** x 6 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		373 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	3.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 17.42 hrs HW=2.53' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

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

Pond 14P: Infiltration #5 - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 2 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

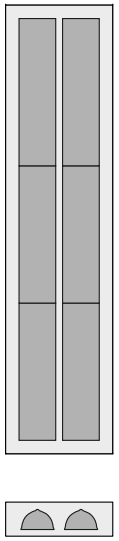
3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +12.0" End Stone x 2 = 33.50' Base Length
2 Rows x 33.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.00' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

6 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 2 Rows = 166.9 cf Chamber Storage

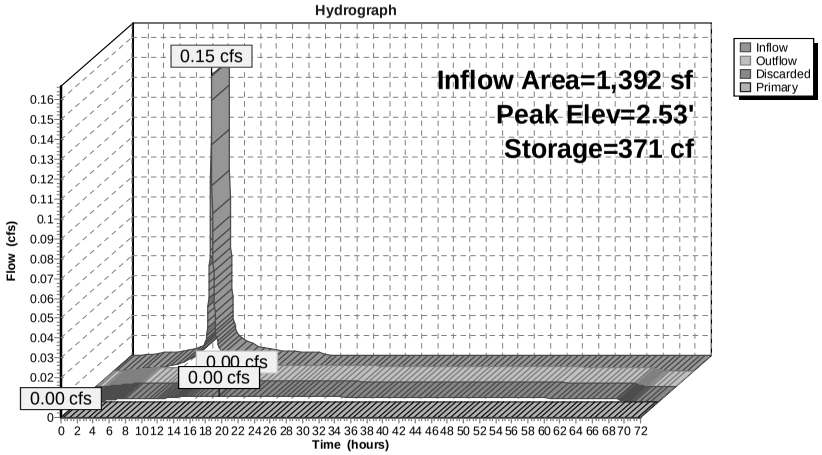
681.2 cf Field - 166.9 cf Chambers = 514.3 cf Stone x 40.0% Voids = 205.7 cf Stone Storage

Chamber Storage + Stone Storage = 372.6 cf = 0.009 af
Overall Storage Efficiency = 54.7%

6 Chambers
25.2 cy Field
19.0 cy Stone



Pond 14P: Infiltration #5



Summary for Pond 15P: Infiltration #6

Inflow Area = 1,392 sf,100.00% Impervious, Inflow Depth = 4.56" for 10 YR event
Inflow = 0.15 cfs @ 12.08 hrs, Volume= 529 cf
Outflow = 0.00 cfs @ 17.42 hrs, Volume= 529 cf, Atten= 98%, Lag= 320.4 min
Discarded = 0.00 cfs @ 17.42 hrs, Volume= 529 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 2.53' @ 17.42 hrs Surf.Area= 268 sf Storage= 371 cf

Plug-Flow detention time= 1,291.5 min calculated for 529 cf (100% of inflow)
Center-of-Mass det. time= 1,292.1 min (2,040.8 - 748.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	206 cf	**8.00'W x 33.50'L x 2.54'H Field A** 681 cf Overall - 167 cf Embedded = 514 cf x 40.0% Voids
#2A	0.50'	167 cf	**Cultec R-150XLHD** x 6 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		373 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	3.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 17.42 hrs HW=2.53' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

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

Pond 15P: Infiltration #6 - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 2 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

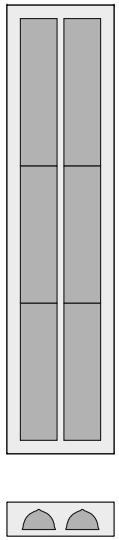
3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +12.0" End Stone x 2 = 33.50' Base Length
2 Rows x 33.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.00' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

6 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 2 Rows = 166.9 cf Chamber Storage

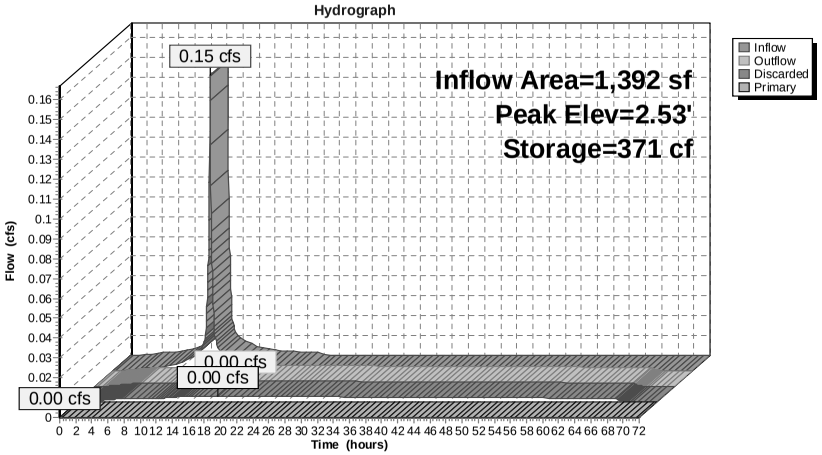
681.2 cf Field - 166.9 cf Chambers = 514.3 cf Stone x 40.0% Voids = 205.7 cf Stone Storage

Chamber Storage + Stone Storage = 372.6 cf = 0.009 af
Overall Storage Efficiency = 54.7%

6 Chambers
25.2 cy Field
19.0 cy Stone



Pond 15P: Infiltration #6

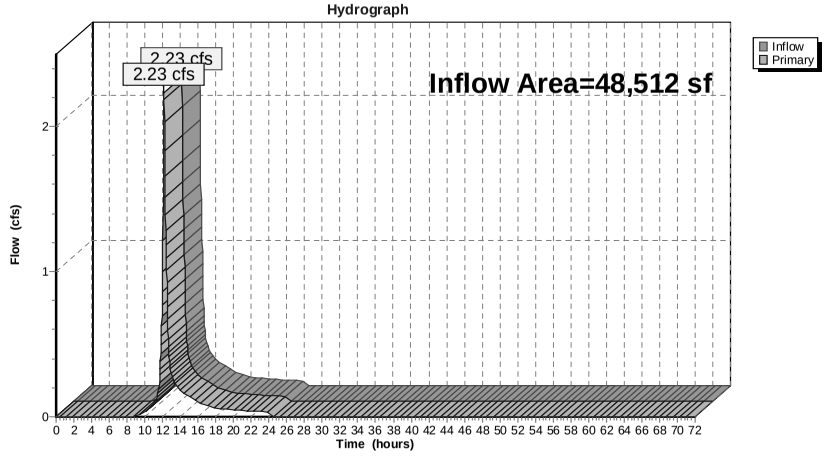


Summary for Link 1L: Total Proposed

Inflow Area = 48,512 sf, 31.16% Impervious, Inflow Depth = 2.03" for 10 YR event
Inflow = 2.23 cfs @ 12.16 hrs, Volume= 8,221 cf
Primary = 2.23 cfs @ 12.16 hrs, Volume= 8,221 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs

Link 1L: Total Proposed



Summary for Subcatchment 1S: Existing

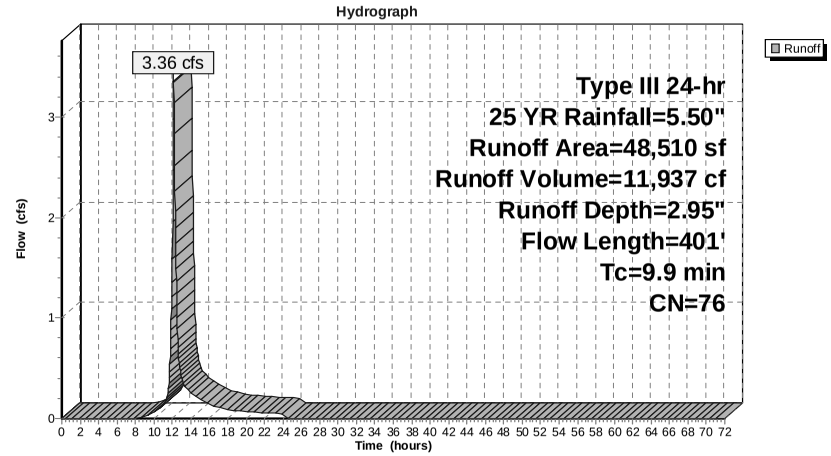
Runoff = 3.36 cfs @ 12.14 hrs, Volume= 11,937 cf, Depth= 2.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 25 YR Rainfall=5.50"

Area (sf)	CN	Description
2,606	98	Roofs, HSG C
4,039	98	Paved parking, HSG C
25,201	74	>75% Grass cover, Good, HSG C
16,664	70	Woods, Good, HSG C
48,510	76	Weighted Average
41,865		86.30% Pervious Area
6,645		13.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	35	0.0570	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.4	58	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.1	172	0.0170	0.91		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	136	0.1200	7.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.9	401	Total			

Subcatchment 1S: Existing



Summary for Subcatchment 10S: ROOF #1

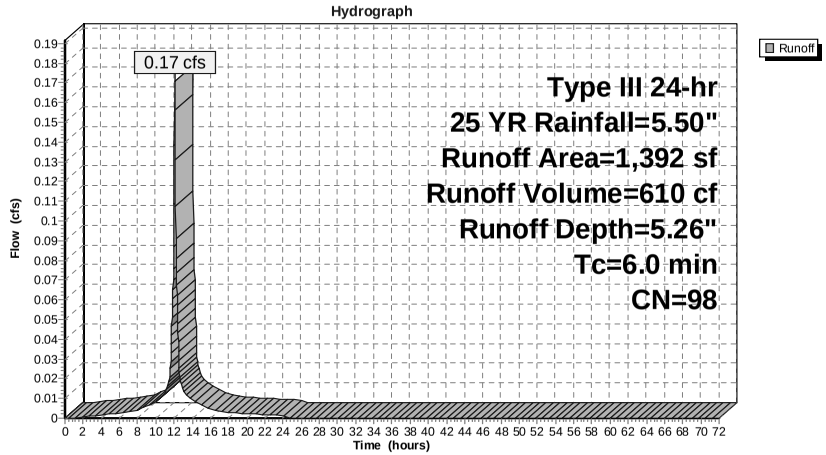
Runoff = 0.17 cfs @ 12.08 hrs, Volume= 610 cf, Depth= 5.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 25 YR Rainfall=5.50"

Area (sf)	CN	Description
1,392	98	Roofs, HSG C
1,392		100.00% Impervious Area

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

Subcatchment 10S: ROOF #1



Summary for Subcatchment 11S: ROOF #2

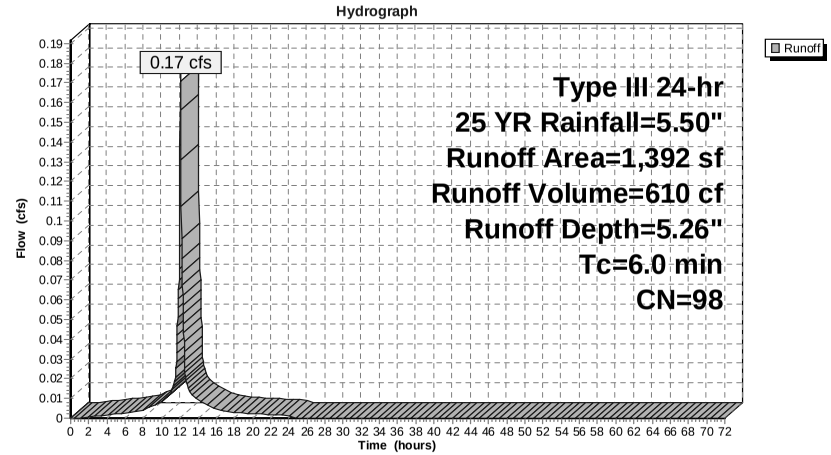
Runoff = 0.17 cfs @ 12.08 hrs, Volume= 610 cf, Depth= 5.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 25 YR Rainfall=5.50"

Area (sf)	CN	Description
1,392	98	Roofs, HSG C
1,392		100.00% Impervious Area

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

Subcatchment 11S: ROOF #2



Summary for Subcatchment 12S: ROOF #3

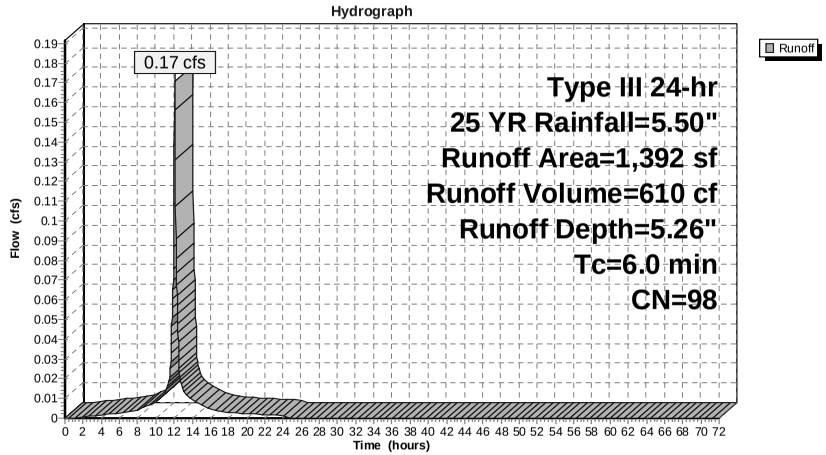
Runoff = 0.17 cfs @ 12.08 hrs, Volume= 610 cf, Depth= 5.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 25 YR Rainfall=5.50"

Area (sf)	CN	Description
1,392	98	Roofs, HSG C
1,392		100.00% Impervious Area

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

Subcatchment 12S: ROOF #3



Summary for Subcatchment 13S: ROOF #4

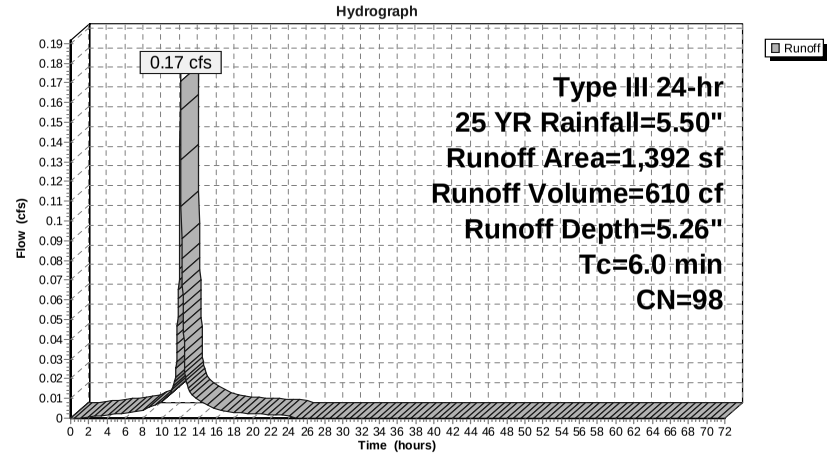
Runoff = 0.17 cfs @ 12.08 hrs, Volume= 610 cf, Depth= 5.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 25 YR Rainfall=5.50"

Area (sf)	CN	Description
1,392	98	Roofs, HSG C
1,392		100.00% Impervious Area

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

Subcatchment 13S: ROOF #4



Summary for Subcatchment 14S: ROOF #5

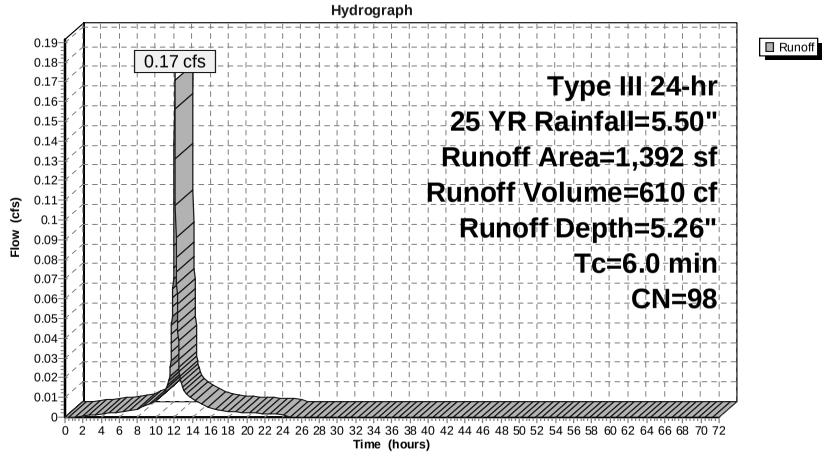
Runoff = 0.17 cfs @ 12.08 hrs, Volume= 610 cf, Depth= 5.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 25 YR Rainfall=5.50"

Area (sf)	CN	Description
1,392	98	Roofs, HSG C
1,392		100.00% Impervious Area

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

Subcatchment 14S: ROOF #5



Summary for Subcatchment 15S: ROOF #6

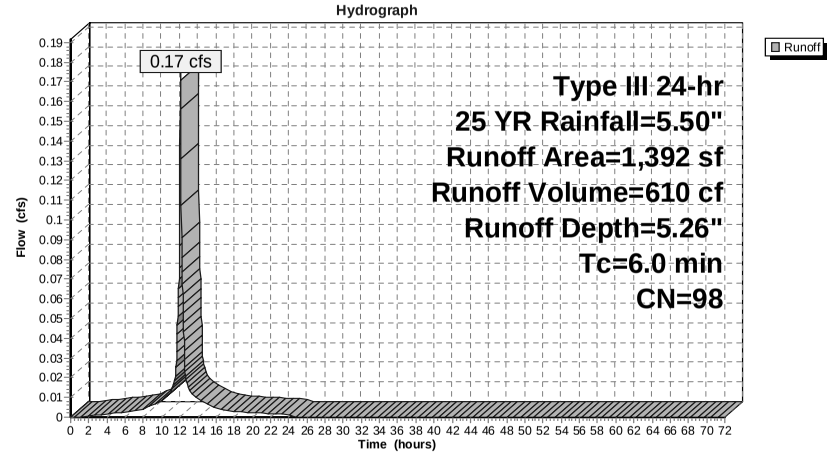
Runoff = 0.17 cfs @ 12.08 hrs, Volume= 610 cf, Depth= 5.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 25 YR Rainfall=5.50"

Area (sf)	CN	Description
1,392	98	Roofs, HSG C
1,392		100.00% Impervious Area

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

Subcatchment 15S: ROOF #6



Summary for Subcatchment 16S: Proposed Yard

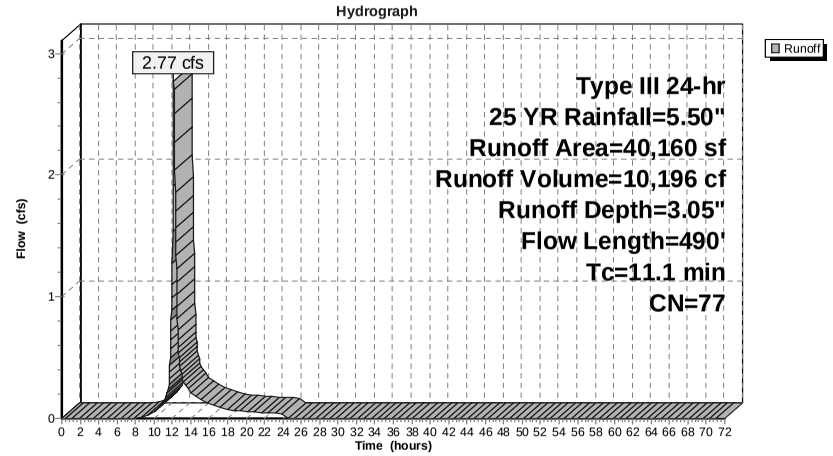
Runoff = 2.77 cfs @ 12.16 hrs, Volume= 10,196 cf, Depth= 3.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 25 YR Rainfall=5.50"

Area (sf)	CN	Description
6,765	98	Paved parking, HSG C
23,837	74	>75% Grass cover, Good, HSG C
9,558	70	Woods, Good, HSG C
40,160	77	Weighted Average
33,395		83.15% Pervious Area
6,765		16.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	35	0.0570	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.4	58	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.8	204	0.0160	0.89		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	94	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	99	0.1000	6.42		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
11.1	490	Total			

Subcatchment 16S: Proposed Yard



Summary for Pond 10P: Infiltration #1

Inflow Area = 1,392 sf,100.00% Impervious, Inflow Depth = 5.26" for 25 YR event
Inflow = 0.17 cfs @ 12.08 hrs, Volume= 610 cf
Outflow = 0.01 cfs @ 12.94 hrs, Volume= 561 cf, Atten= 93%, Lag= 51.5 min
Discarded = 0.00 cfs @ 12.93 hrs, Volume= 543 cf
Primary = 0.01 cfs @ 12.94 hrs, Volume= 18 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 3.01' @ 12.93 hrs Surf.Area= 268 sf Storage= 373 cf

Plug-Flow detention time= 1,299.6 min calculated for 561 cf (92% of inflow)
Center-of-Mass det. time= 1,257.4 min (2,003.8 - 746.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	206 cf	**8.00'W x 33.50'L x 2.54'H Field A** 681 cf Overall - 167 cf Embedded = 514 cf x 40.0% Voids
#2A	0.50'	167 cf	**Cultec R-150XLHD** x 6 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		373 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	3.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 12.93 hrs HW=3.01' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 12.94 hrs HW=3.01' (Free Discharge)
└**2=Orifice/Grate** (Weir Controls 0.00 cfs @ 0.24 fps)

Pond 10P: Infiltration #1 - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 2 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

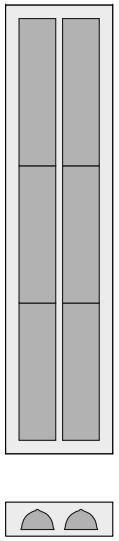
3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +12.0" End Stone x 2 = 33.50' Base Length
2 Rows x 33.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.00' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

6 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 2 Rows = 166.9 cf Chamber Storage

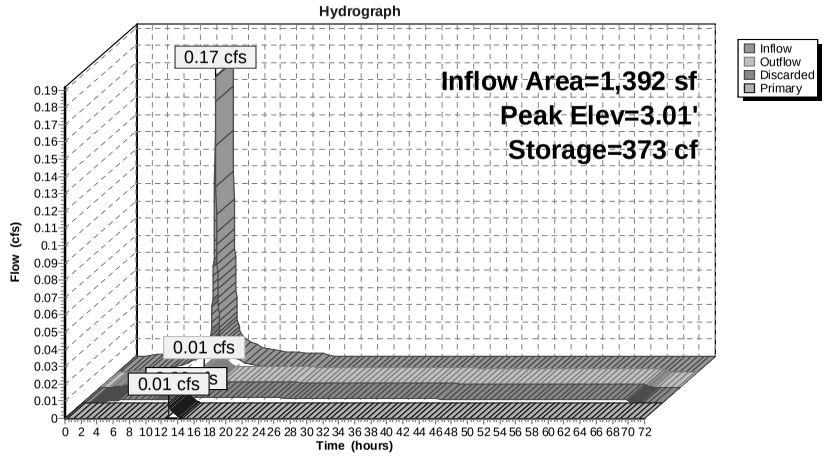
681.2 cf Field - 166.9 cf Chambers = 514.3 cf Stone x 40.0% Voids = 205.7 cf Stone Storage

Chamber Storage + Stone Storage = 372.6 cf = 0.009 af
Overall Storage Efficiency = 54.7%

6 Chambers
25.2 cy Field
19.0 cy Stone



Pond 10P: Infiltration #1



Summary for Pond 11P: Infiltration #2

Inflow Area = 1,392 sf,100.00% Impervious, Inflow Depth = 5.26" for 25 YR event
Inflow = 0.17 cfs @ 12.08 hrs, Volume= 610 cf
Outflow = 0.01 cfs @ 12.94 hrs, Volume= 561 cf, Atten= 93%, Lag= 51.5 min
Discarded = 0.00 cfs @ 12.93 hrs, Volume= 543 cf
Primary = 0.01 cfs @ 12.94 hrs, Volume= 18 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 3.01' @ 12.93 hrs Surf.Area= 268 sf Storage= 373 cf

Plug-Flow detention time= 1,299.6 min calculated for 561 cf (92% of inflow)
Center-of-Mass det. time= 1,257.4 min (2,003.8 - 746.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	206 cf	**8.00'W x 33.50'L x 2.54'H Field A** 681 cf Overall - 167 cf Embedded = 514 cf x 40.0% Voids
#2A	0.50'	167 cf	**Cultec R-150XLHD** x 6 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		373 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	3.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 12.93 hrs HW=3.01' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 12.94 hrs HW=3.01' (Free Discharge)
└**2=Orifice/Grate** (Weir Controls 0.00 cfs @ 0.24 fps)

Pond 11P: Infiltration #2 - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 2 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

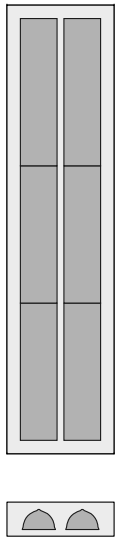
3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +12.0" End Stone x 2 = 33.50' Base Length
2 Rows x 33.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.00' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

6 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 2 Rows = 166.9 cf Chamber Storage

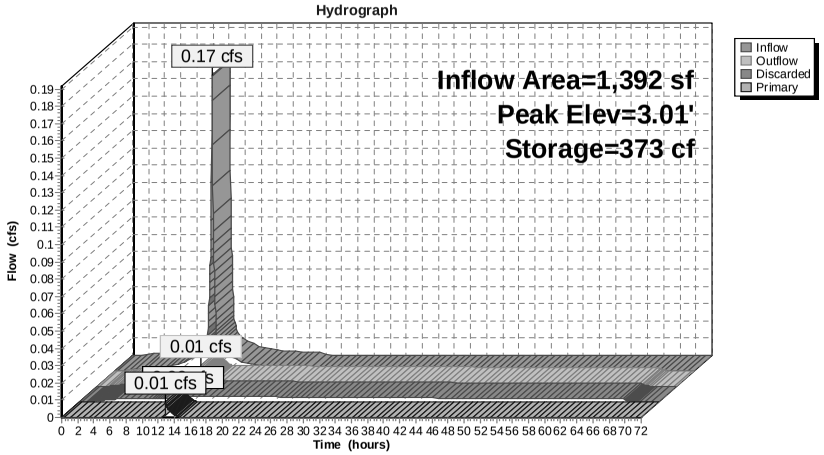
681.2 cf Field - 166.9 cf Chambers = 514.3 cf Stone x 40.0% Voids = 205.7 cf Stone Storage

Chamber Storage + Stone Storage = 372.6 cf = 0.009 af
Overall Storage Efficiency = 54.7%

6 Chambers
25.2 cy Field
19.0 cy Stone



Pond 11P: Infiltration #2



Summary for Pond 12P: Infiltration #3

Inflow Area = 1,392 sf,100.00% Impervious, Inflow Depth = 5.26" for 25 YR event
Inflow = 0.17 cfs @ 12.08 hrs, Volume= 610 cf
Outflow = 0.01 cfs @ 12.94 hrs, Volume= 561 cf, Atten= 93%, Lag= 51.5 min
Discarded = 0.00 cfs @ 12.93 hrs, Volume= 543 cf
Primary = 0.01 cfs @ 12.94 hrs, Volume= 18 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 3.01' @ 12.93 hrs Surf.Area= 268 sf Storage= 373 cf

Plug-Flow detention time= 1,299.6 min calculated for 561 cf (92% of inflow)
Center-of-Mass det. time= 1,257.4 min (2,003.8 - 746.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	206 cf	**8.00'W x 33.50'L x 2.54'H Field A** 681 cf Overall - 167 cf Embedded = 514 cf x 40.0% Voids
#2A	0.50'	167 cf	**Cultec R-150XLHD** x 6 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		373 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	3.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 12.93 hrs HW=3.01' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 12.94 hrs HW=3.01' (Free Discharge)
└**2=Orifice/Grate** (Weir Controls 0.00 cfs @ 0.24 fps)

Pond 12P: Infiltration #3 - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 2 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

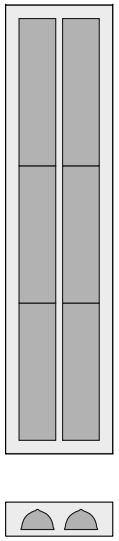
3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +12.0" End Stone x 2 = 33.50' Base Length
2 Rows x 33.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.00' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

6 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 2 Rows = 166.9 cf Chamber Storage

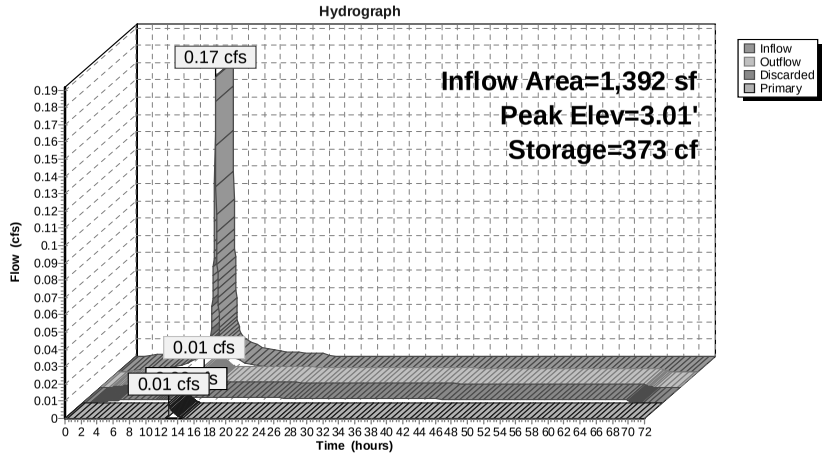
681.2 cf Field - 166.9 cf Chambers = 514.3 cf Stone x 40.0% Voids = 205.7 cf Stone Storage

Chamber Storage + Stone Storage = 372.6 cf = 0.009 af
Overall Storage Efficiency = 54.7%

6 Chambers
25.2 cy Field
19.0 cy Stone



Pond 12P: Infiltration #3



Summary for Pond 13P: Infiltration #4

Inflow Area = 1,392 sf,100.00% Impervious, Inflow Depth = 5.26" for 25 YR event
Inflow = 0.17 cfs @ 12.08 hrs, Volume= 610 cf
Outflow = 0.01 cfs @ 12.94 hrs, Volume= 561 cf, Atten= 93%, Lag= 51.5 min
Discarded = 0.00 cfs @ 12.93 hrs, Volume= 543 cf
Primary = 0.01 cfs @ 12.94 hrs, Volume= 18 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 3.01' @ 12.93 hrs Surf.Area= 268 sf Storage= 373 cf

Plug-Flow detention time= 1,299.6 min calculated for 561 cf (92% of inflow)
Center-of-Mass det. time= 1,257.4 min (2,003.8 - 746.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	206 cf	**8.00'W x 33.50'L x 2.54'H Field A** 681 cf Overall - 167 cf Embedded = 514 cf x 40.0% Voids
#2A	0.50'	167 cf	**Cultec R-150XLHD** x 6 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		373 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	3.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 12.93 hrs HW=3.01' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 12.94 hrs HW=3.01' (Free Discharge)
└**2=Orifice/Grate** (Weir Controls 0.00 cfs @ 0.24 fps)

Pond 13P: Infiltration #4 - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 2 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

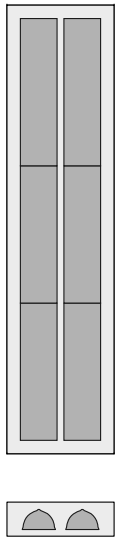
3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +12.0" End Stone x 2 = 33.50' Base Length
2 Rows x 33.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.00' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

6 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 2 Rows = 166.9 cf Chamber Storage

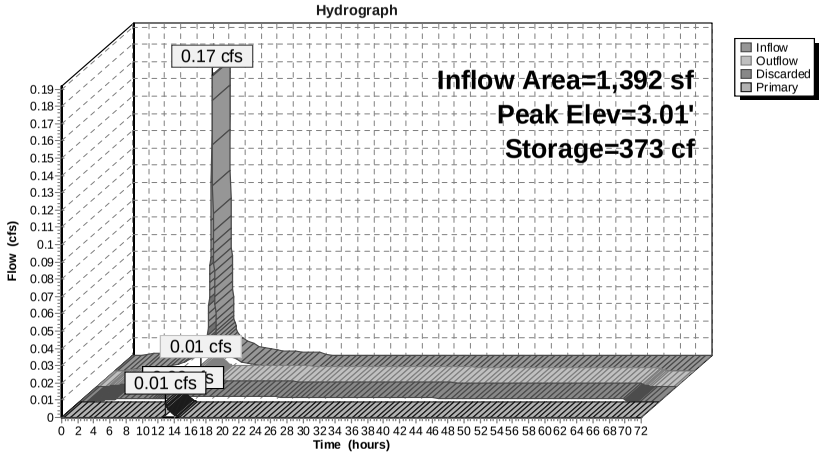
681.2 cf Field - 166.9 cf Chambers = 514.3 cf Stone x 40.0% Voids = 205.7 cf Stone Storage

Chamber Storage + Stone Storage = 372.6 cf = 0.009 af
Overall Storage Efficiency = 54.7%

6 Chambers
25.2 cy Field
19.0 cy Stone



Pond 13P: Infiltration #4



Summary for Pond 14P: Infiltration #5

Inflow Area = 1,392 sf,100.00% Impervious, Inflow Depth = 5.26" for 25 YR event
Inflow = 0.17 cfs @ 12.08 hrs, Volume= 610 cf
Outflow = 0.01 cfs @ 12.94 hrs, Volume= 561 cf, Atten= 93%, Lag= 51.5 min
Discarded = 0.00 cfs @ 12.93 hrs, Volume= 543 cf
Primary = 0.01 cfs @ 12.94 hrs, Volume= 18 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 3.01' @ 12.93 hrs Surf.Area= 268 sf Storage= 373 cf

Plug-Flow detention time= 1,299.6 min calculated for 561 cf (92% of inflow)
Center-of-Mass det. time= 1,257.4 min (2,003.8 - 746.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	206 cf	**8.00'W x 33.50'L x 2.54'H Field A** 681 cf Overall - 167 cf Embedded = 514 cf x 40.0% Voids
#2A	0.50'	167 cf	**Cultec R-150XLHD** x 6 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		373 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	3.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 12.93 hrs HW=3.01' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 12.94 hrs HW=3.01' (Free Discharge)
└**2=Orifice/Grate** (Weir Controls 0.00 cfs @ 0.24 fps)

Pond 14P: Infiltration #5 - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 2 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

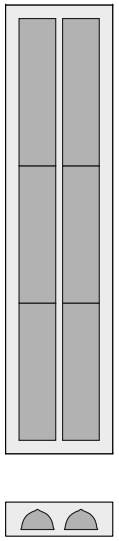
3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +12.0" End Stone x 2 = 33.50' Base Length
2 Rows x 33.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.00' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

6 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 2 Rows = 166.9 cf Chamber Storage

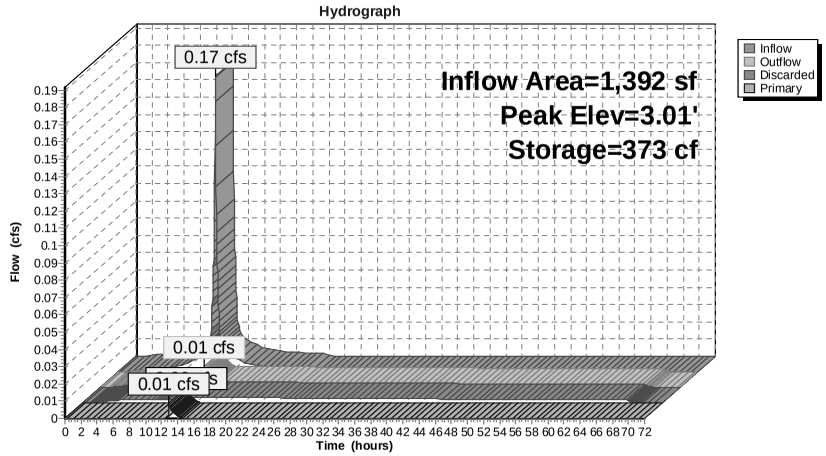
681.2 cf Field - 166.9 cf Chambers = 514.3 cf Stone x 40.0% Voids = 205.7 cf Stone Storage

Chamber Storage + Stone Storage = 372.6 cf = 0.009 af
Overall Storage Efficiency = 54.7%

6 Chambers
25.2 cy Field
19.0 cy Stone



Pond 14P: Infiltration #5



Summary for Pond 15P: Infiltration #6

Inflow Area = 1,392 sf,100.00% Impervious, Inflow Depth = 5.26" for 25 YR event
Inflow = 0.17 cfs @ 12.08 hrs, Volume= 610 cf
Outflow = 0.01 cfs @ 12.94 hrs, Volume= 561 cf, Atten= 93%, Lag= 51.5 min
Discarded = 0.00 cfs @ 12.93 hrs, Volume= 543 cf
Primary = 0.01 cfs @ 12.94 hrs, Volume= 18 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 3.01' @ 12.93 hrs Surf.Area= 268 sf Storage= 373 cf

Plug-Flow detention time= 1,299.6 min calculated for 561 cf (92% of inflow)
Center-of-Mass det. time= 1,257.4 min (2,003.8 - 746.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	206 cf	**8.00'W x 33.50'L x 2.54'H Field A** 681 cf Overall - 167 cf Embedded = 514 cf x 40.0% Voids
#2A	0.50'	167 cf	**Cultec R-150XLHD** x 6 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		373 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	3.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 12.93 hrs HW=3.01' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 12.94 hrs HW=3.01' (Free Discharge)
└**2=Orifice/Grate** (Weir Controls 0.00 cfs @ 0.24 fps)

Pond 15P: Infiltration #6 - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 2 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

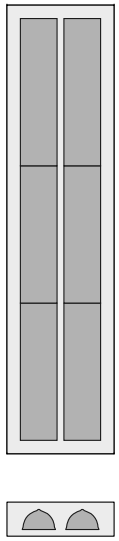
3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +12.0" End Stone x 2 = 33.50' Base Length
2 Rows x 33.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.00' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

6 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 2 Rows = 166.9 cf Chamber Storage

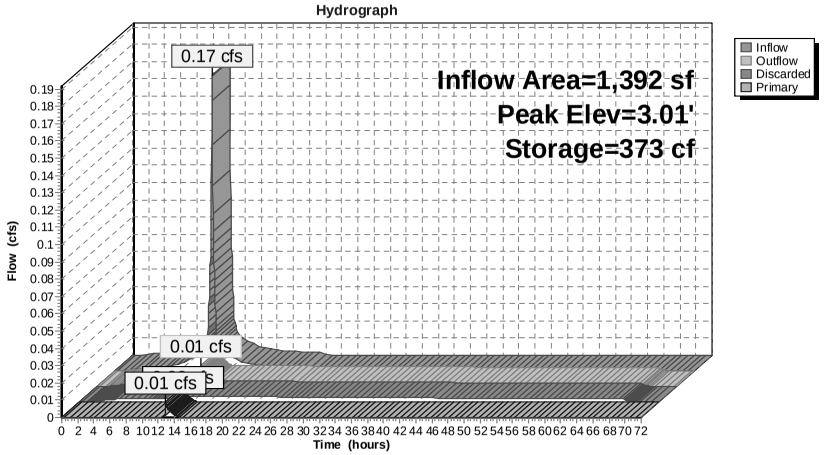
681.2 cf Field - 166.9 cf Chambers = 514.3 cf Stone x 40.0% Voids = 205.7 cf Stone Storage

Chamber Storage + Stone Storage = 372.6 cf = 0.009 af
Overall Storage Efficiency = 54.7%

6 Chambers
25.2 cy Field
19.0 cy Stone



Pond 15P: Infiltration #6

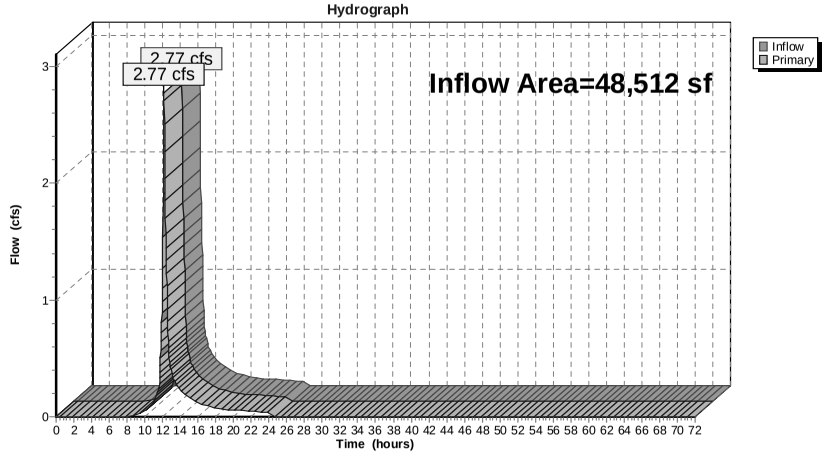


Summary for Link 1L: Total Proposed

Inflow Area = 48,512 sf, 31.16% Impervious, Inflow Depth = 2.55" for 25 YR event
Inflow = 2.77 cfs @ 12.16 hrs, Volume= 10,303 cf
Primary = 2.77 cfs @ 12.16 hrs, Volume= 10,303 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs

Link 1L: Total Proposed



Summary for Subcatchment 1S: Existing

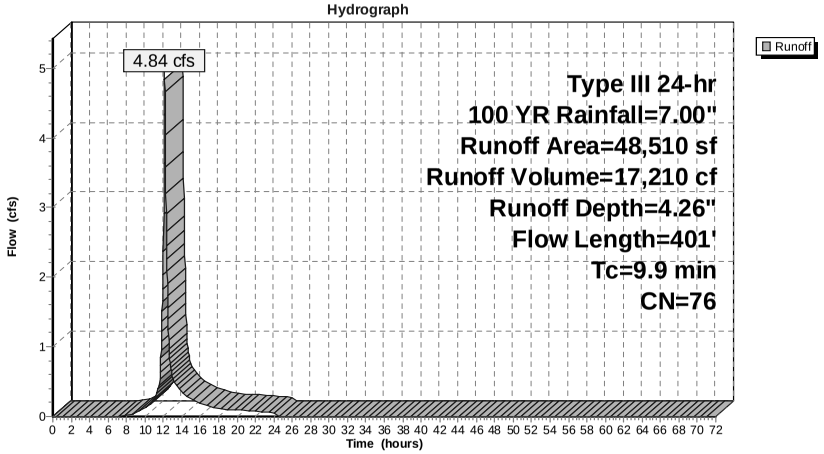
Runoff = 4.84 cfs @ 12.14 hrs, Volume= 17,210 cf, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 100 YR Rainfall=7.00"

Area (sf)	CN	Description
2,606	98	Roofs, HSG C
4,039	98	Paved parking, HSG C
25,201	74	>75% Grass cover, Good, HSG C
16,664	70	Woods, Good, HSG C
48,510	76	Weighted Average
41,865		86.30% Pervious Area
6,645		13.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	35	0.0570	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.4	58	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.1	172	0.0170	0.91		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	136	0.1200	7.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
9.9	401	Total			

Subcatchment 1S: Existing



Summary for Subcatchment 10S: ROOF #1

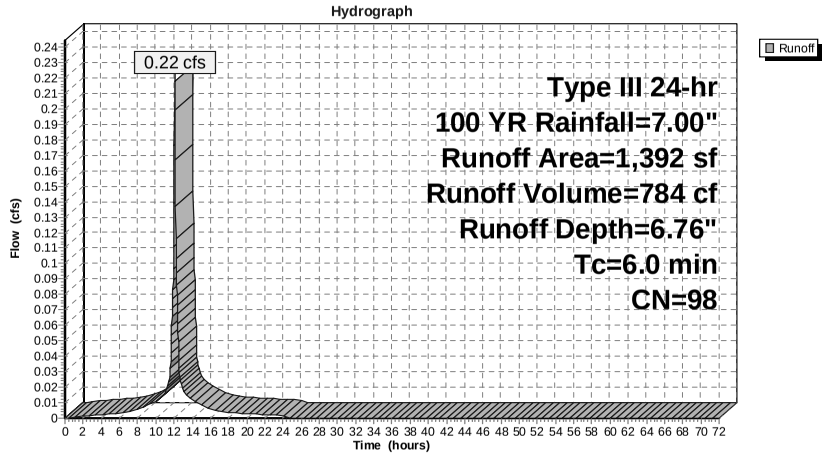
Runoff = 0.22 cfs @ 12.08 hrs, Volume= 784 cf, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 100 YR Rainfall=7.00"

Area (sf)	CN	Description
1,392	98	Roofs, HSG C
1,392		100.00% Impervious Area

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

Subcatchment 10S: ROOF #1



Summary for Subcatchment 11S: ROOF #2

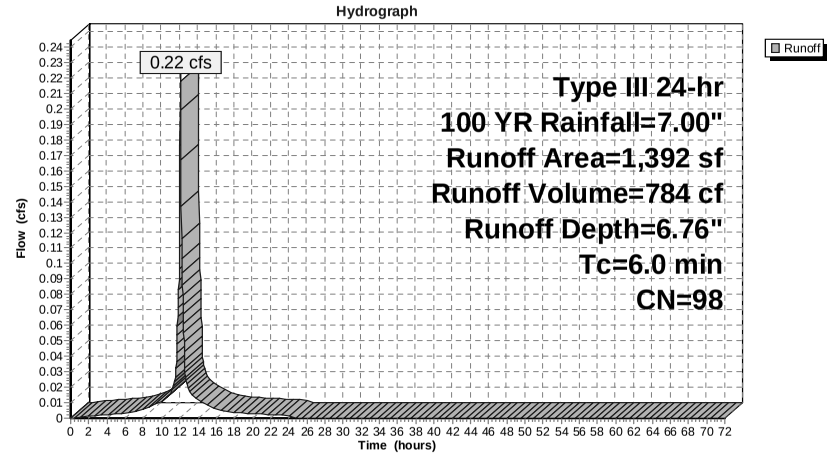
Runoff = 0.22 cfs @ 12.08 hrs, Volume= 784 cf, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 100 YR Rainfall=7.00"

Area (sf)	CN	Description
1,392	98	Roofs, HSG C
1,392		100.00% Impervious Area

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

Subcatchment 11S: ROOF #2



Summary for Subcatchment 12S: ROOF #3

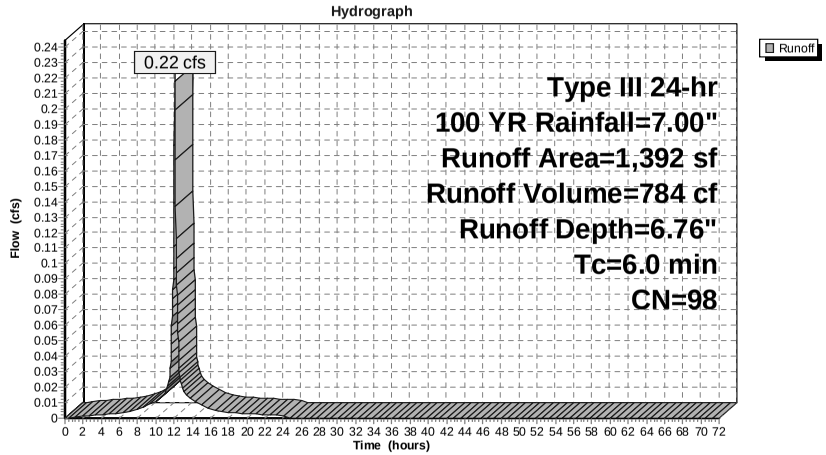
Runoff = 0.22 cfs @ 12.08 hrs, Volume= 784 cf, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 100 YR Rainfall=7.00"

Area (sf)	CN	Description
1,392	98	Roofs, HSG C
1,392		100.00% Impervious Area

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

Subcatchment 12S: ROOF #3



Summary for Subcatchment 13S: ROOF #4

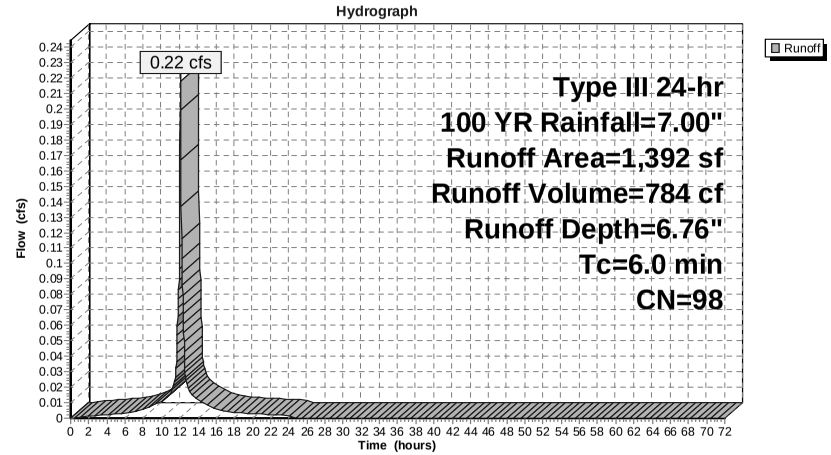
Runoff = 0.22 cfs @ 12.08 hrs, Volume= 784 cf, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 100 YR Rainfall=7.00"

Area (sf)	CN	Description
1,392	98	Roofs, HSG C
1,392		100.00% Impervious Area

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

Subcatchment 13S: ROOF #4



Summary for Subcatchment 14S: ROOF #5

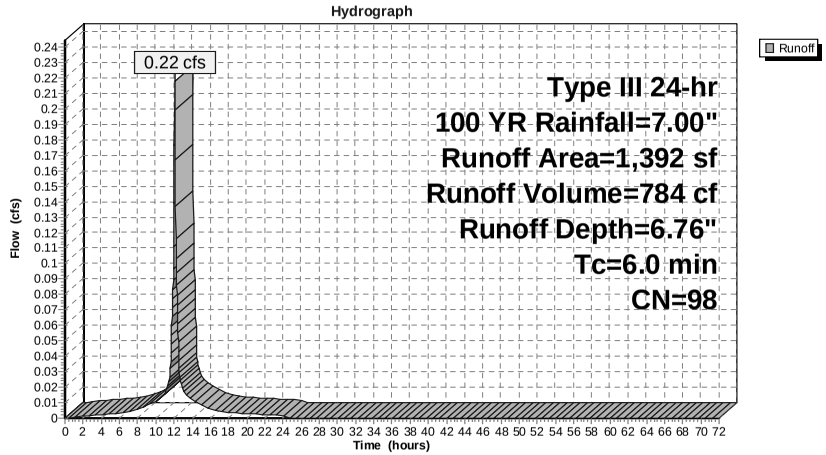
Runoff = 0.22 cfs @ 12.08 hrs, Volume= 784 cf, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 100 YR Rainfall=7.00"

Area (sf)	CN	Description
1,392	98	Roofs, HSG C
1,392		100.00% Impervious Area

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

Subcatchment 14S: ROOF #5



Summary for Subcatchment 15S: ROOF #6

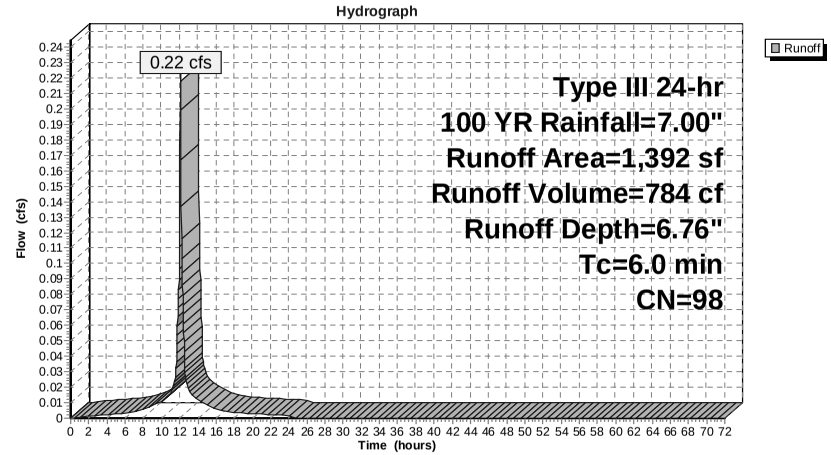
Runoff = 0.22 cfs @ 12.08 hrs, Volume= 784 cf, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 100 YR Rainfall=7.00"

Area (sf)	CN	Description
1,392	98	Roofs, HSG C
1,392		100.00% Impervious Area

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

Subcatchment 15S: ROOF #6



Summary for Subcatchment 16S: Proposed Yard

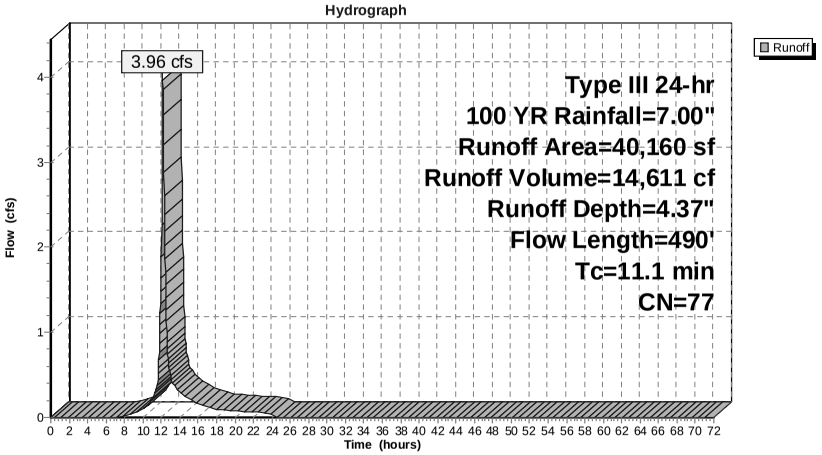
Runoff = 3.96 cfs @ 12.15 hrs, Volume= 14,611 cf, Depth= 4.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs
Type III 24-hr 100 YR Rainfall=7.00"

Area (sf)	CN	Description
6,765	98	Paved parking, HSG C
23,837	74	>75% Grass cover, Good, HSG C
9,558	70	Woods, Good, HSG C
40,160	77	Weighted Average
33,395		83.15% Pervious Area
6,765		16.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	35	0.0570	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.4	58	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.8	204	0.0160	0.89		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.5	94	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	99	0.1000	6.42		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
11.1	490	Total			

Subcatchment 16S: Proposed Yard



Summary for Pond 10P: Infiltration #1

Inflow Area = 1,392 sf,100.00% Impervious, Inflow Depth = 6.76" for 100 YR event
Inflow = 0.22 cfs @ 12.08 hrs, Volume= 784 cf
Outflow = 0.12 cfs @ 12.22 hrs, Volume= 664 cf, Atten= 47%, Lag= 8.2 min
Discarded = 0.00 cfs @ 12.21 hrs, Volume= 560 cf
Primary = 0.11 cfs @ 12.22 hrs, Volume= 103 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 3.05' @ 12.21 hrs Surf.Area= 268 sf Storage= 373 cf

Plug-Flow detention time= 1,168.9 min calculated for 663 cf (85% of inflow)
Center-of-Mass det. time= 1,103.1 min (1,846.1 - 743.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	206 cf	**8.00'W x 33.50'L x 2.54'H Field A** 681 cf Overall - 167 cf Embedded = 514 cf x 40.0% Voids
#2A	0.50'	167 cf	**Cultec R-150XLHD** x 6 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		373 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	3.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 12.21 hrs HW=3.05' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.10 cfs @ 12.22 hrs HW=3.05' (Free Discharge)
└**2=Orifice/Grate** (Weir Controls 0.10 cfs @ 0.73 fps)

Pond 10P: Infiltration #1 - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 2 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

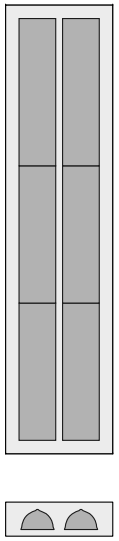
3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +12.0" End Stone x 2 = 33.50' Base Length
2 Rows x 33.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.00' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

6 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 2 Rows = 166.9 cf Chamber Storage

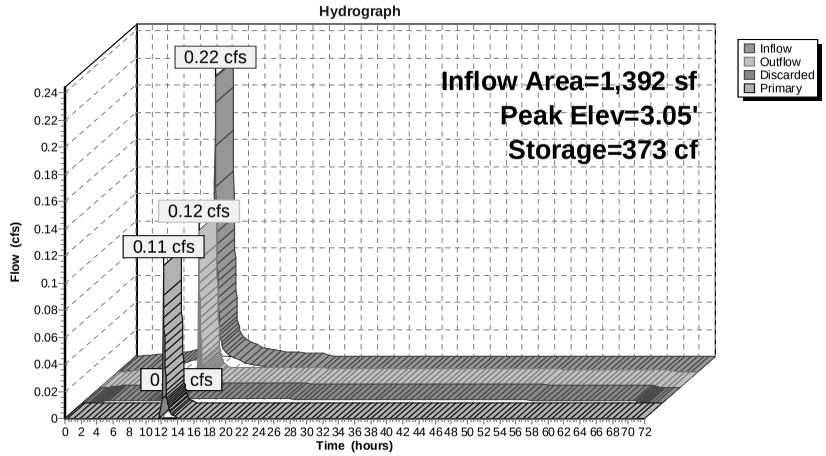
681.2 cf Field - 166.9 cf Chambers = 514.3 cf Stone x 40.0% Voids = 205.7 cf Stone Storage

Chamber Storage + Stone Storage = 372.6 cf = 0.009 af
Overall Storage Efficiency = 54.7%

6 Chambers
25.2 cy Field
19.0 cy Stone



Pond 10P: Infiltration #1



Summary for Pond 11P: Infiltration #2

Inflow Area = 1,392 sf,100.00% Impervious, Inflow Depth = 6.76" for 100 YR event
Inflow = 0.22 cfs @ 12.08 hrs, Volume= 784 cf
Outflow = 0.12 cfs @ 12.22 hrs, Volume= 664 cf, Atten= 47%, Lag= 8.2 min
Discarded = 0.00 cfs @ 12.21 hrs, Volume= 560 cf
Primary = 0.11 cfs @ 12.22 hrs, Volume= 103 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 3.05' @ 12.21 hrs Surf.Area= 268 sf Storage= 373 cf

Plug-Flow detention time= 1,168.9 min calculated for 663 cf (85% of inflow)
Center-of-Mass det. time= 1,103.1 min (1,846.1 - 743.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	206 cf	**8.00'W x 33.50'L x 2.54'H Field A** 681 cf Overall - 167 cf Embedded = 514 cf x 40.0% Voids
#2A	0.50'	167 cf	**Cultec R-150XLHD** x 6 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		373 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	3.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 12.21 hrs HW=3.05' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.10 cfs @ 12.22 hrs HW=3.05' (Free Discharge)
└**2=Orifice/Grate** (Weir Controls 0.10 cfs @ 0.73 fps)

Pond 11P: Infiltration #2 - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 2 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

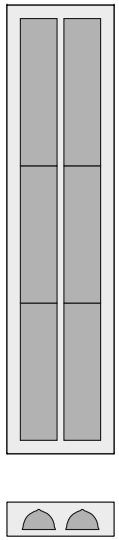
3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +12.0" End Stone x 2 = 33.50' Base Length
2 Rows x 33.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.00' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

6 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 2 Rows = 166.9 cf Chamber Storage

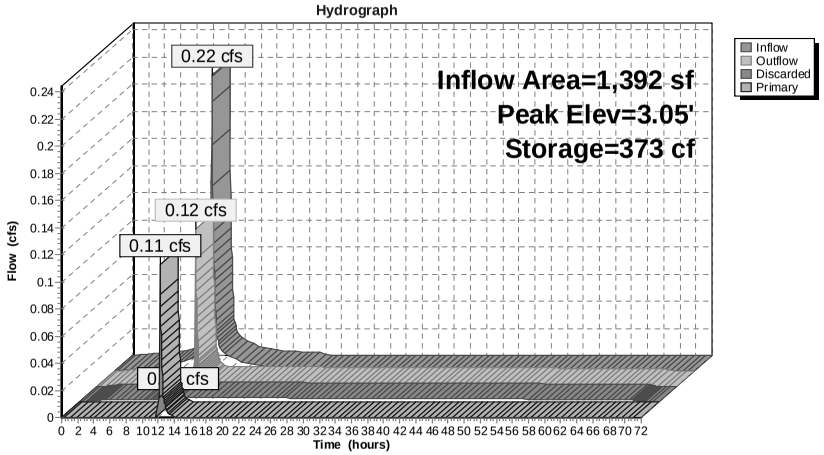
681.2 cf Field - 166.9 cf Chambers = 514.3 cf Stone x 40.0% Voids = 205.7 cf Stone Storage

Chamber Storage + Stone Storage = 372.6 cf = 0.009 af
Overall Storage Efficiency = 54.7%

6 Chambers
25.2 cy Field
19.0 cy Stone



Pond 11P: Infiltration #2



Summary for Pond 12P: Infiltration #3

Inflow Area = 1,392 sf,100.00% Impervious, Inflow Depth = 6.76" for 100 YR event
Inflow = 0.22 cfs @ 12.08 hrs, Volume= 784 cf
Outflow = 0.12 cfs @ 12.22 hrs, Volume= 664 cf, Atten= 47%, Lag= 8.2 min
Discarded = 0.00 cfs @ 12.21 hrs, Volume= 560 cf
Primary = 0.11 cfs @ 12.22 hrs, Volume= 103 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 3.05' @ 12.21 hrs Surf.Area= 268 sf Storage= 373 cf

Plug-Flow detention time= 1,168.9 min calculated for 663 cf (85% of inflow)
Center-of-Mass det. time= 1,103.1 min (1,846.1 - 743.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	206 cf	**8.00'W x 33.50'L x 2.54'H Field A** 681 cf Overall - 167 cf Embedded = 514 cf x 40.0% Voids
#2A	0.50'	167 cf	**Cultec R-150XLHD** x 6 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		373 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	3.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 12.21 hrs HW=3.05' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.10 cfs @ 12.22 hrs HW=3.05' (Free Discharge)
└**2=Orifice/Grate** (Weir Controls 0.10 cfs @ 0.73 fps)

Pond 12P: Infiltration #3 - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 2 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

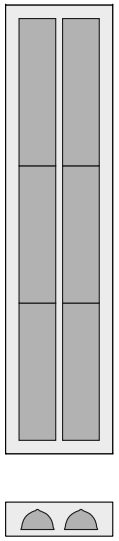
3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +12.0" End Stone x 2 = 33.50' Base Length
2 Rows x 33.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.00' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

6 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 2 Rows = 166.9 cf Chamber Storage

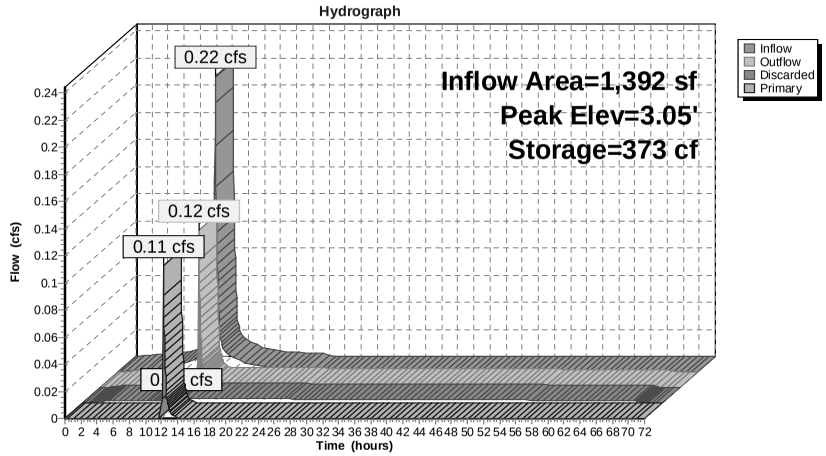
681.2 cf Field - 166.9 cf Chambers = 514.3 cf Stone x 40.0% Voids = 205.7 cf Stone Storage

Chamber Storage + Stone Storage = 372.6 cf = 0.009 af
Overall Storage Efficiency = 54.7%

6 Chambers
25.2 cy Field
19.0 cy Stone



Pond 12P: Infiltration #3



Summary for Pond 13P: Infiltration #4

Inflow Area = 1,392 sf,100.00% Impervious, Inflow Depth = 6.76" for 100 YR event
Inflow = 0.22 cfs @ 12.08 hrs, Volume= 784 cf
Outflow = 0.12 cfs @ 12.22 hrs, Volume= 664 cf, Atten= 47%, Lag= 8.2 min
Discarded = 0.00 cfs @ 12.21 hrs, Volume= 560 cf
Primary = 0.11 cfs @ 12.22 hrs, Volume= 103 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 3.05' @ 12.21 hrs Surf.Area= 268 sf Storage= 373 cf

Plug-Flow detention time= 1,168.9 min calculated for 663 cf (85% of inflow)
Center-of-Mass det. time= 1,103.1 min (1,846.1 - 743.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	206 cf	**8.00'W x 33.50'L x 2.54'H Field A** 681 cf Overall - 167 cf Embedded = 514 cf x 40.0% Voids
#2A	0.50'	167 cf	**Cultec R-150XLHD** x 6 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		373 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	3.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 12.21 hrs HW=3.05' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.10 cfs @ 12.22 hrs HW=3.05' (Free Discharge)
└**2=Orifice/Grate** (Weir Controls 0.10 cfs @ 0.73 fps)

Pond 13P: Infiltration #4 - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 2 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

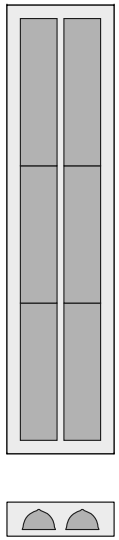
3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +12.0" End Stone x 2 = 33.50' Base Length
2 Rows x 33.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.00' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

6 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 2 Rows = 166.9 cf Chamber Storage

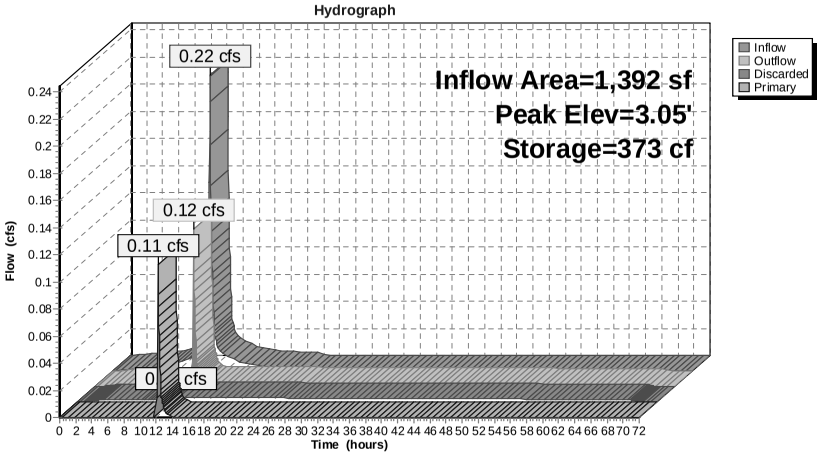
681.2 cf Field - 166.9 cf Chambers = 514.3 cf Stone x 40.0% Voids = 205.7 cf Stone Storage

Chamber Storage + Stone Storage = 372.6 cf = 0.009 af
Overall Storage Efficiency = 54.7%

6 Chambers
25.2 cy Field
19.0 cy Stone



Pond 13P: Infiltration #4



Summary for Pond 14P: Infiltration #5

Inflow Area = 1,392 sf,100.00% Impervious, Inflow Depth = 6.76" for 100 YR event
Inflow = 0.22 cfs @ 12.08 hrs, Volume= 784 cf
Outflow = 0.12 cfs @ 12.22 hrs, Volume= 664 cf, Atten= 47%, Lag= 8.2 min
Discarded = 0.00 cfs @ 12.21 hrs, Volume= 560 cf
Primary = 0.11 cfs @ 12.22 hrs, Volume= 103 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 3.05' @ 12.21 hrs Surf.Area= 268 sf Storage= 373 cf

Plug-Flow detention time= 1,168.9 min calculated for 663 cf (85% of inflow)
Center-of-Mass det. time= 1,103.1 min (1,846.1 - 743.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	206 cf	**8.00'W x 33.50'L x 2.54'H Field A** 681 cf Overall - 167 cf Embedded = 514 cf x 40.0% Voids
#2A	0.50'	167 cf	**Cultec R-150XLHD** x 6 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		373 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	3.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 12.21 hrs HW=3.05' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.10 cfs @ 12.22 hrs HW=3.05' (Free Discharge)
└**2=Orifice/Grate** (Weir Controls 0.10 cfs @ 0.73 fps)

Pond 14P: Infiltration #5 - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 2 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

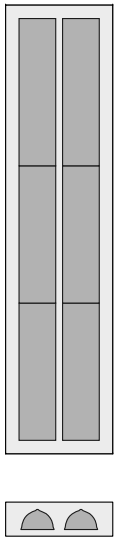
3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +12.0" End Stone x 2 = 33.50' Base Length
2 Rows x 33.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.00' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

6 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 2 Rows = 166.9 cf Chamber Storage

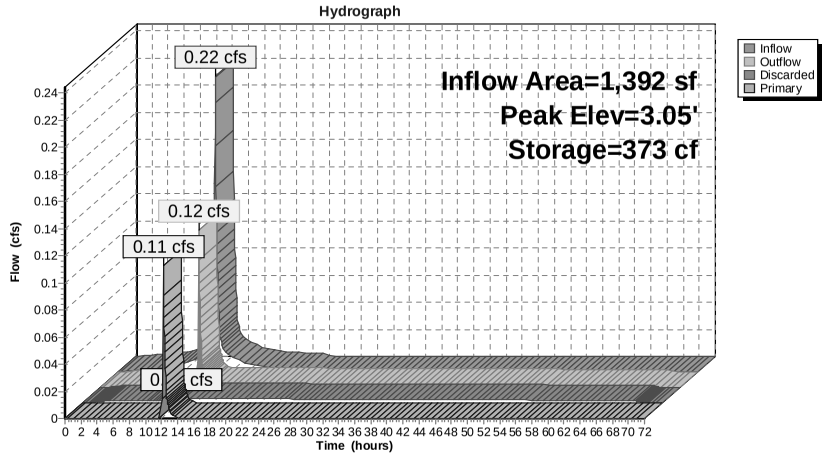
681.2 cf Field - 166.9 cf Chambers = 514.3 cf Stone x 40.0% Voids = 205.7 cf Stone Storage

Chamber Storage + Stone Storage = 372.6 cf = 0.009 af
Overall Storage Efficiency = 54.7%

6 Chambers
25.2 cy Field
19.0 cy Stone



Pond 14P: Infiltration #5



Summary for Pond 15P: Infiltration #6

Inflow Area = 1,392 sf,100.00% Impervious, Inflow Depth = 6.76" for 100 YR event
Inflow = 0.22 cfs @ 12.08 hrs, Volume= 784 cf
Outflow = 0.12 cfs @ 12.22 hrs, Volume= 664 cf, Atten= 47%, Lag= 8.2 min
Discarded = 0.00 cfs @ 12.21 hrs, Volume= 560 cf
Primary = 0.11 cfs @ 12.22 hrs, Volume= 103 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 3.05' @ 12.21 hrs Surf.Area= 268 sf Storage= 373 cf

Plug-Flow detention time= 1,168.9 min calculated for 663 cf (85% of inflow)
Center-of-Mass det. time= 1,103.1 min (1,846.1 - 743.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	206 cf	**8.00'W x 33.50'L x 2.54'H Field A** 681 cf Overall - 167 cf Embedded = 514 cf x 40.0% Voids
#2A	0.50'	167 cf	**Cultec R-150XLHD** x 6 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 2 rows
		373 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**0.270 in/hr Exfiltration over Wetted area**
#2	Primary	3.00'	**10.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 12.21 hrs HW=3.05' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.10 cfs @ 12.22 hrs HW=3.05' (Free Discharge)
└**2=Orifice/Grate** (Weir Controls 0.10 cfs @ 0.73 fps)

Pond 15P: Infiltration #6 - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 2 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

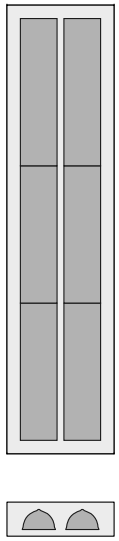
3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +12.0" End Stone x 2 = 33.50' Base Length
2 Rows x 33.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 8.00' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

6 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 2 Rows = 166.9 cf Chamber Storage

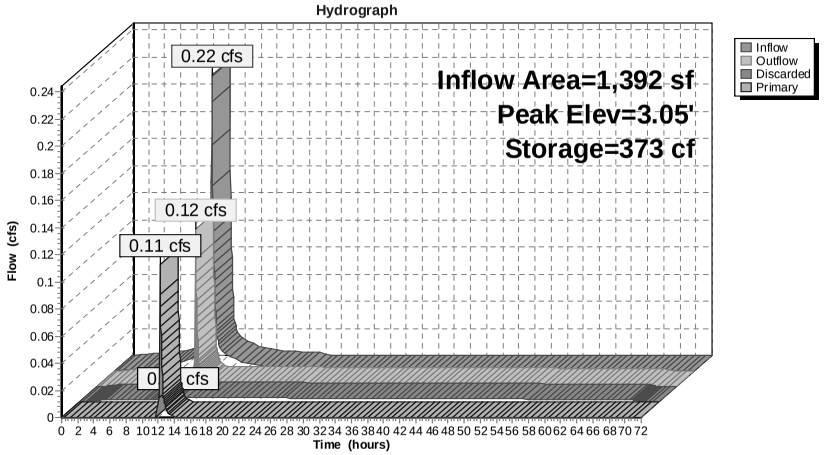
681.2 cf Field - 166.9 cf Chambers = 514.3 cf Stone x 40.0% Voids = 205.7 cf Stone Storage

Chamber Storage + Stone Storage = 372.6 cf = 0.009 af
Overall Storage Efficiency = 54.7%

6 Chambers
25.2 cy Field
19.0 cy Stone



Pond 15P: Infiltration #6

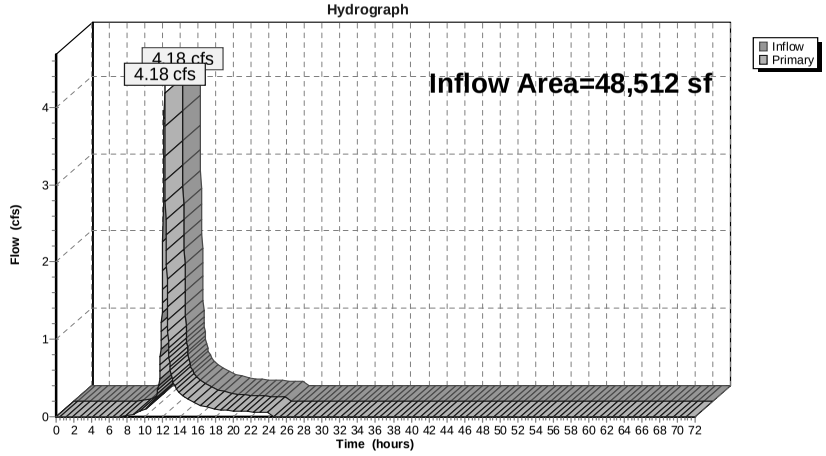


Summary for Link 1L: Total Proposed

Inflow Area = 48,512 sf, 31.16% Impervious, Inflow Depth = 3.77" for 100 YR event
Inflow = 4.18 cfs @ 12.21 hrs, Volume= 15,229 cf
Primary = 4.18 cfs @ 12.21 hrs, Volume= 15,229 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.03 hrs

Link 1L: Total Proposed



Map Scale: 1:1,250 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

Streams and Canals

Transportation

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

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 9, Dec 17, 2013

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

Date(s) aerial images were photographed: Mar 30, 2011—May 1, 2011

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 — Norfolk and Suffolk Counties, Massachusetts (MA616)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	A	0.0	0.0%
630C	Charlton-Hollis-Urban land complex, 3 to 15 percent slopes		6.2	100.0%
Totals for Area of Interest			**6.2**	**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