

Drainage Calculations

For

15 Larchmont Ave

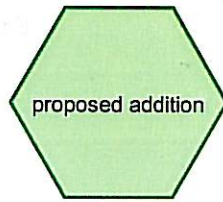
Located in

Newton, MA

Prepared by:

Cyprus Design, Inc.
978-640-1019

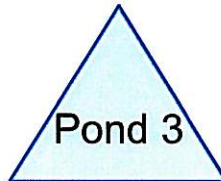
December 3, 2014



proposed addition runoff



4" pvc



Infiltrator sys Q4 low
profile Infiltrators



rooftop runoff 15 larchmont

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15 Larchmont Ave Newton Ma

Type III 24-hr Rainfall=7.00"

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Summary for Subcatchment proposed addition: proposed addition runoff

Runoff = 0.08 cfs @ 12.14 hrs, Volume= 312 cf, Depth> 6.24"

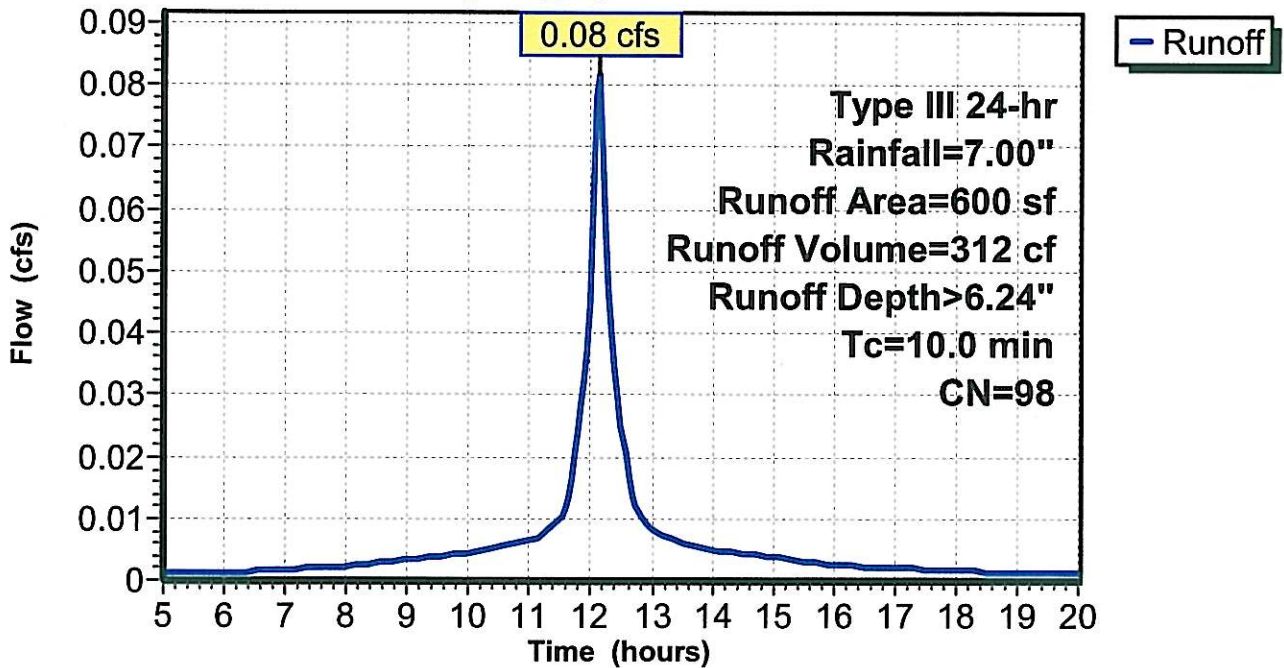
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Rainfall=7.00"

Area (sf)	CN	Description
* 600	98	proposed addition runoff
600		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry, 10 min

Subcatchment proposed addition: proposed addition runoff

Hydrograph



rooftop runoff 15 larchmont

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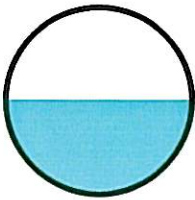
Summary for Reach pipe1: 4"pvc

Inflow Area = 600 sf, 100.00% Impervious, Inflow Depth > 6.24"
 Inflow = 0.08 cfs @ 12.14 hrs, Volume= 312 cf
 Outflow = 0.08 cfs @ 12.14 hrs, Volume= 312 cf, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 1.83 fps, Min. Travel Time= 0.2 min
 Avg. Velocity = 0.76 fps, Avg. Travel Time= 0.4 min

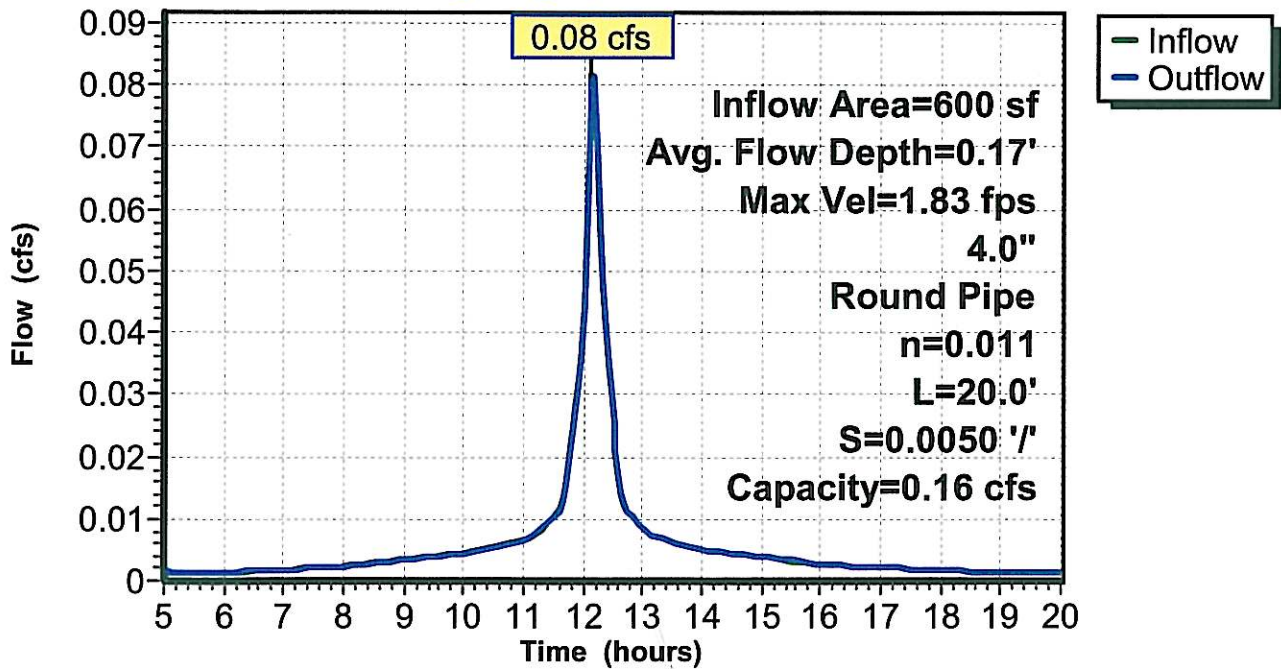
Peak Storage= 1 cf @ 12.14 hrs
 Average Depth at Peak Storage= 0.17'
 Bank-Full Depth= 0.33' Flow Area= 0.1 sf, Capacity= 0.16 cfs

4.0" Round Pipe
 n= 0.011 Concrete pipe, straight & clean
 Length= 20.0' Slope= 0.0050 '/'
 Inlet Invert= 0.00', Outlet Invert= -0.10'



Reach pipe1: 4"pvc

Hydrograph



rooftop runoff 15 larchmont

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Summary for Pond Pond 3: Infiltrator sys Q4 low profile Infiltrators

Inflow Area = 600 sf, 100.00% Impervious, Inflow Depth > 6.23"
 Inflow = 0.08 cfs @ 12.14 hrs, Volume= 312 cf
 Outflow = 0.04 cfs @ 12.00 hrs, Volume= 312 cf, Atten= 51%, Lag= 0.0 min
 Discarded = 0.04 cfs @ 12.00 hrs, Volume= 312 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 100.38' @ 12.36 hrs Surf.Area= 59 sf Storage= 29 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 2.8 min (739.8 - 737.0)

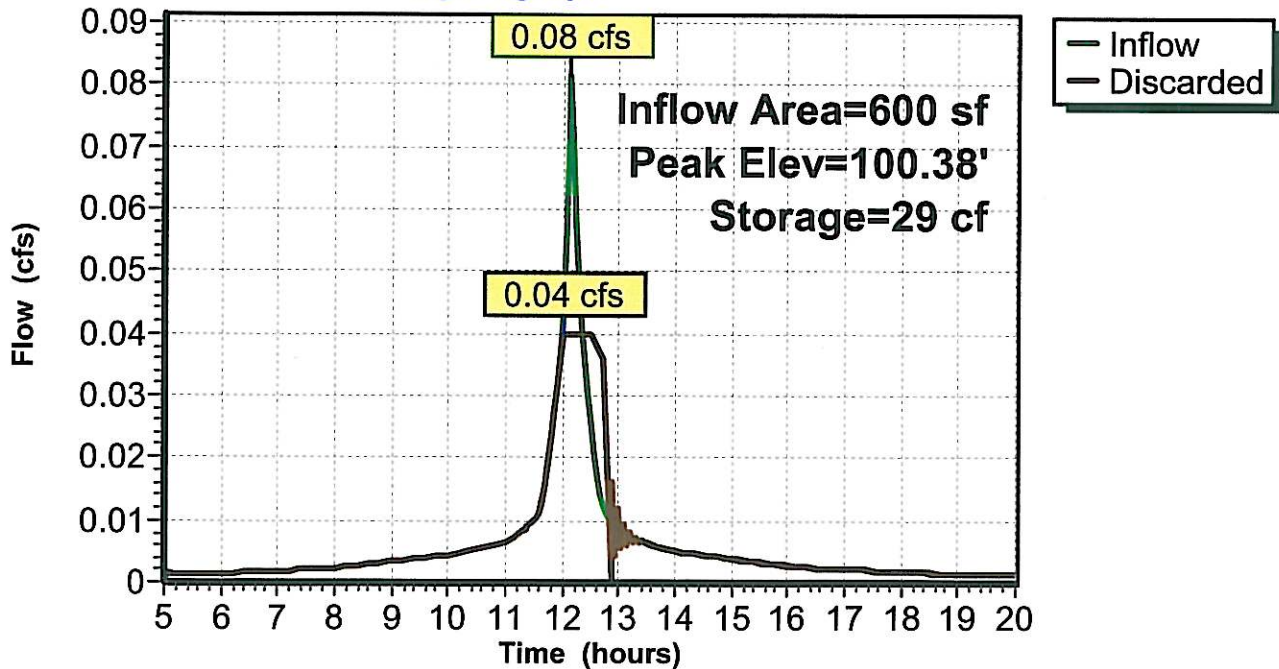
Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	40 cf	34.0"W x 8.0"H x 4.00"L Parabolic Arch x 8

Device	Routing	Invert	Outlet Devices
#1	Discarded	100.00'	0.01 cfs Exfiltration X 8.00 when above 100.00'

Discarded OutFlow Max=0.04 cfs @ 12.00 hrs HW=100.01' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.04 cfs)

Pond Pond 3: Infiltrator sys Q4 low profile Infiltrators

Hydrograph



**Stormwater BMP
Operation/Maintenance Manual
& Erosion Control**

For

15 Larchmont Ave

Located in

Newton, MA

Prepared by:

Cyprus Design, Inc.
978-640-1019

December 3, 2014

PROJECT DESCRIPTION:

The project will include the removal of existing paved driveway and wood deck and the construction of a new 570 s.f. addition with all associated grading and drainage improvements.

Prior to construction, erosion and sedimentation control measures will be implemented at the site. Specifically, silt fence will be installed encompassing the limit of construction as detailed on the proposed site plan. The siltation barrier will be installed prior to the commencement of any site work and in accordance with the design plans. An additional supply of silt fence shall be on-site to replace and/or repair silt fencing that is has been disturbed.

Temporary storm inlet protection filter fabric will be placed around all catch basin inlets. The filter fabric will prevent the intrusion of sediments into the drainage system and shall remain in-place until permanent vegetative cover is established or paving and/or construction are complete and the transport of silt/sediment is no longer visibly apparent.

If applicable, the surface of all disturbed areas that will not be paved shall be stabilized during and after construction. Temporary measures shall be taken during construction to prevent erosion and siltation. All disturbed slopes will be stabilized with a permanent vegetative cover. Some or all of the following measures will be utilized on this project as conditions may warrant.

- a. Temporary Seeding
- b. Temporary Mulching
- c. Permanent Seeding
- d. Placement of Sod
- e. Hydroseeding
- f. Placement of Hay
- g. Placement of Jute Netting

Operation and Maintenance

This Operation and Maintenance Manual has been prepared to conform to the Department of Environmental Protection's Stormwater Management guidelines and more specifically follows the format of Stormwater Management Standards Operation and Maintenance Plans (Standard 9).

1. Stormwater Management System(s) Owner(s) & Parties Responsible for Operation and Maintenance:

The stormwater management plan includes 6 underground infiltration chambers to capture and infiltrate rooftop runoff from proposed addition. Ownership and maintenance responsibilities of drainage chambers will be the owner of subject parcel.

Schedule for Maintenance and Inspection

During Construction

During construction, erosion control measures shall be implemented in accordance with the design plan approved by the City of Newton to eliminate silt intrusion to drainage systems, and to stabilization of vegetated cover in landscaped areas. During this period of time, it shall be the responsibility of the owner's representatives (contractor) to maintain erosion control measures. These measures include ensuring silt sock is in-place, filter fabric is present on catch basin inlets and that these are effectively preventing silt and/or sediment from entering the catch basins (if applicable). The owner or owner's representative shall be responsible for inspecting the silt sock on a weekly basis and if it needs to be replaced, the owner or owner's representative shall replace applicable section of silt sock as soon as is practical or no later than the next work day.

Upon Completion of Development and City of Newton Approval

Once the construction is complete to the satisfaction of the City of Newton, inspection and maintenance of all of the subject parcel structures (i.e. roof leaders, infiltration chambers) will be the responsibility of the landowner and will be clearly identified in the deed for the property. During the first two years of operation, the property owner shall inspect infiltration units after the first 20 storm events and after each heavy rainfall event thereafter. In addition, the infiltrators shall be inspected at least once a year outside of the storm events during the first two years. After the first two years, the owner shall inspect the infiltrators after an unusually heavy storm and once each year. The property owner shall be responsible for inspection of the drainage system every spring and maintenance as needed to ensure proper operation and to prevent a significant accumulation of sand, silt and/or debris from entering the drainage system.

4. Routine & Nonroutine Maintenance Tasks

Routine Maintenance Tasks

The landowner shall be responsible by deed notation for maintenance of the infiltration units through the observation well and shall be responsible for removal of unwanted tree seedlings from the infiltration chamber area (if applicable). Maintenance of structures shall coincide with the previously identified inspection schedule at a minimum. Driveway to be swept at a minimum of one time per year in the spring. Trash may collect in the drainage structures, potentially causing clogging of the facilities. All debris and litter shall be removed when necessary, and after each storm event. Structure cleanings, and Debris collected from units is considered solid waste by DEP, and must be handled and disposed in accordance with all DEP regulations, policies, and guidance. In the absence of written approval from the DEP, the cleanings and debris removal must be taken to a facility permitted by the DEP to accept solid waste.

Non-Routine Maintenance Tasks

Screens must be placed on all building gutters that are connected to the units to eliminate debris and leaves from entering the roof leaders and infiltration chambers. If accumulated water inside the infiltration chambers is observed through observation well several days after a storm event it may indicate that the bottom of the trench has been fouled. In this case, stormwater entering the system may discharge through the overflow leader at the building. If this occurs, a Professional Civil Engineering Consultant shall be contracted by the owner to determine if maintenance and/or replacement of some or all of the units will be required.

Water accumulations at the surface of the infiltration chambers may indicate that only the surface is clogged and may be attributed to grass clippings, leaves, and accumulated sediment at the surface. If this occurs, the owner or their representative shall immediately remove these items. If water accumulates in the units as observed through the observation well, the contracted Professional Civil Engineering consulting firm will determine the extent of system repair and/or replacement. Once approved, the owner will be responsible for implementation of the remedy.