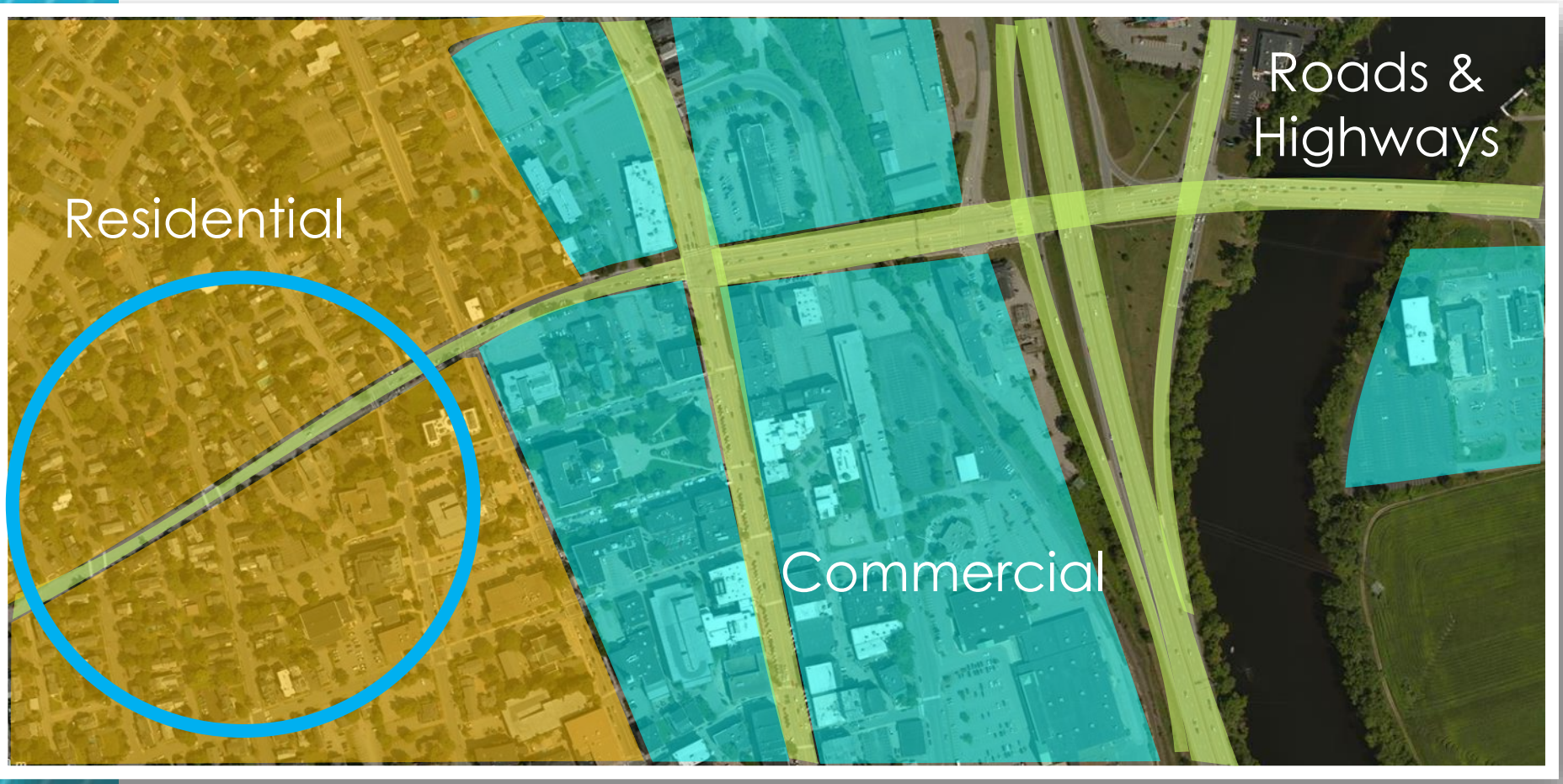
Site Scale Stormwater Management Problems & Practices

Sources



Soak up the rain NH

Opportunities



- Site Assessment
- Site Level Practices
- Selecting a Practice
- Sizing exercise

Inventory the Site

1. Impervious Surfaces: Roofs, Driveways, Walkways, Decks & Patios
2. Lawn & Landscaped Areas
3. Undisturbed Areas: Natural buffers, Wooded Areas



Follow the Flow

How and where does water flow on the property?

1. Where does it come from?
2. Where does it end up?
3. Does it cause any problems along the way?

Follow the Flow



Photo: Kevin Micalizzi, Flicker

Follow the Flow

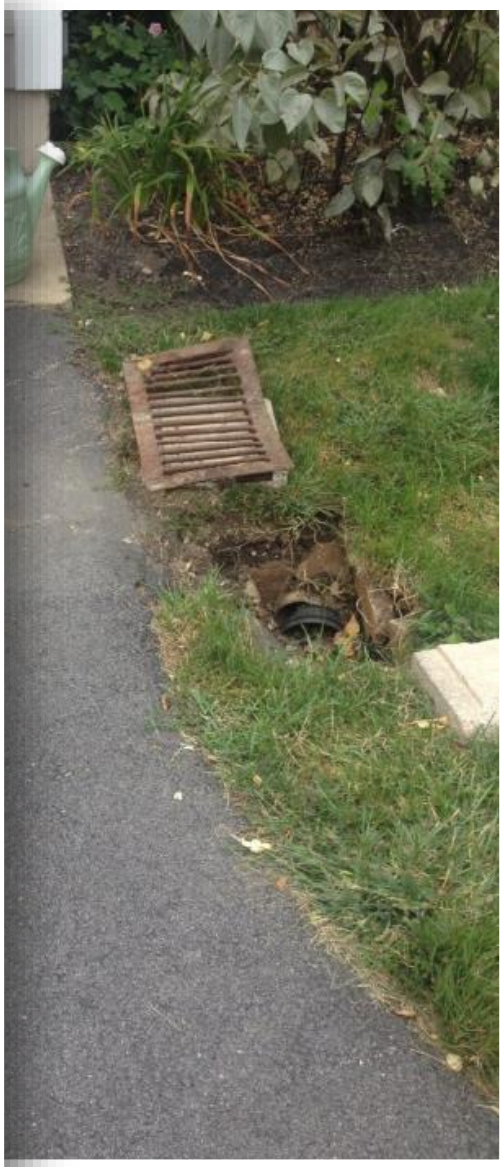


Soak up the rain NH

Follow the Flow







Soak up the rain NH

Follow the Flow



Identifying Problems & Opportunities



Understand the Soils

Soil Perc Test

a) Will water drain through the soil?



Soil Ribbon Test

b) What is the soil type?



Soil Perc Test

1. Dig a hole ~12" deep.



2. Fill it with water. Let drain. Fill again.



3. Note water level & time. After 15 minutes note new water level.



Ideally want the hole to drain in 24 hours (or at least 0.5 in/hr)

Soil Ribbon Test

Soil Ribbon Test To Estimate Soil Type

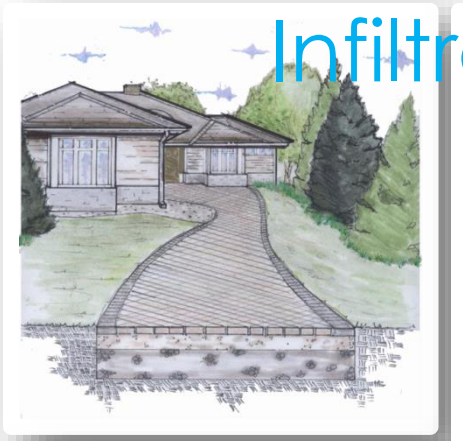


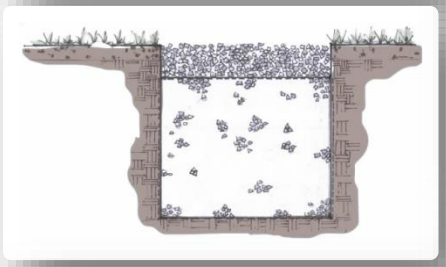
Soil Type	Ribbon Length (inches)
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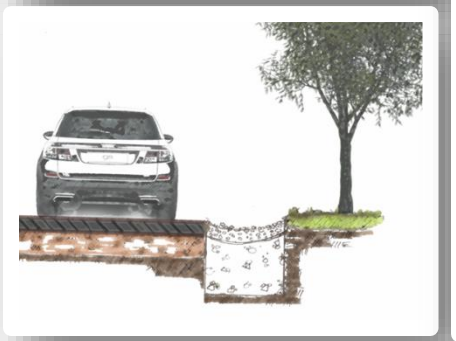
Site-Scale Stormwater Solutions

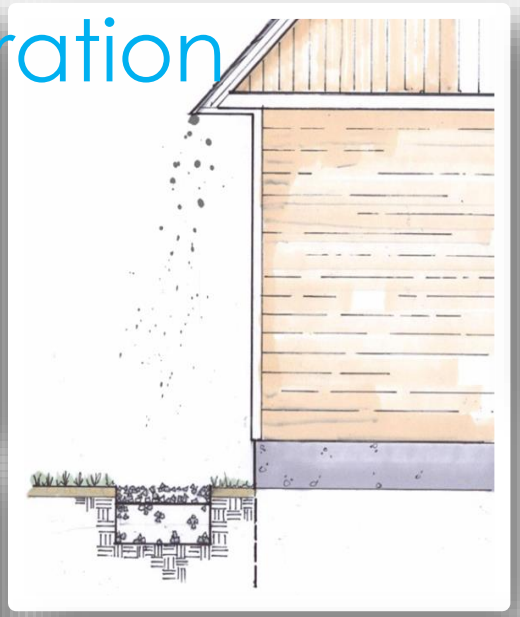
Two Types of Stormwater Practices

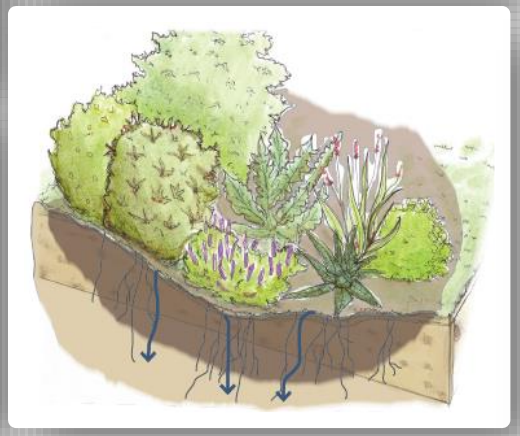
Infiltration



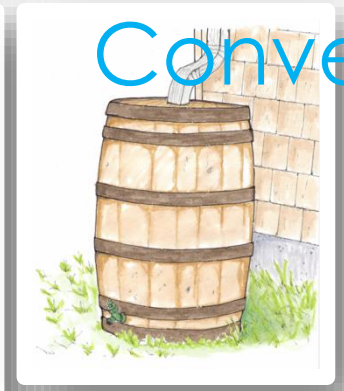




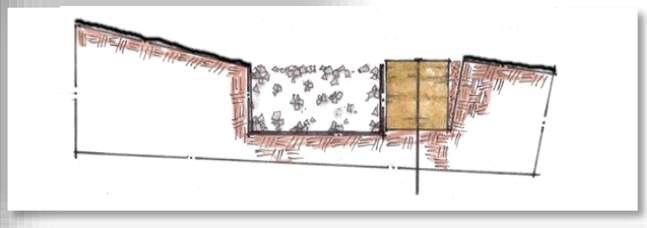




Storage/ Conveyance



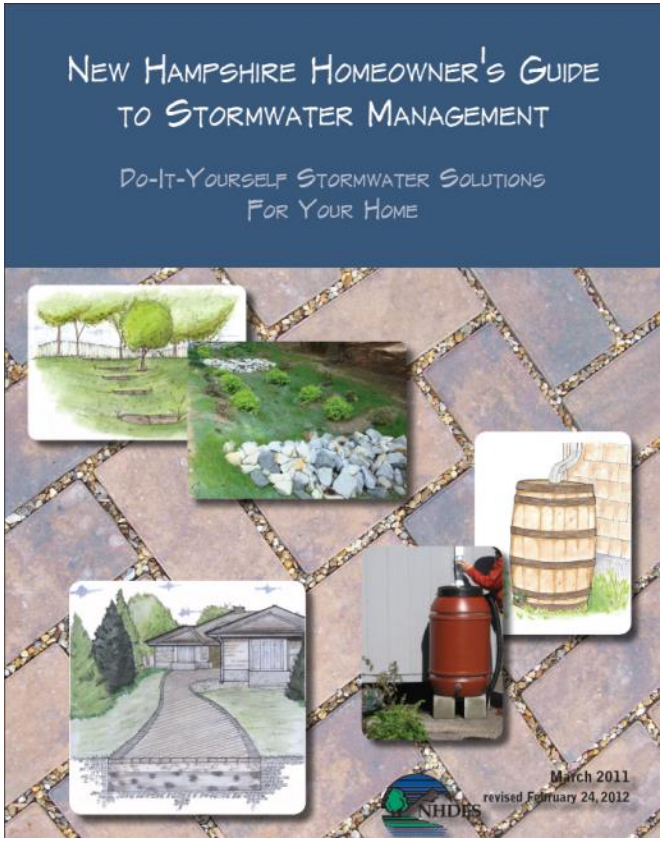






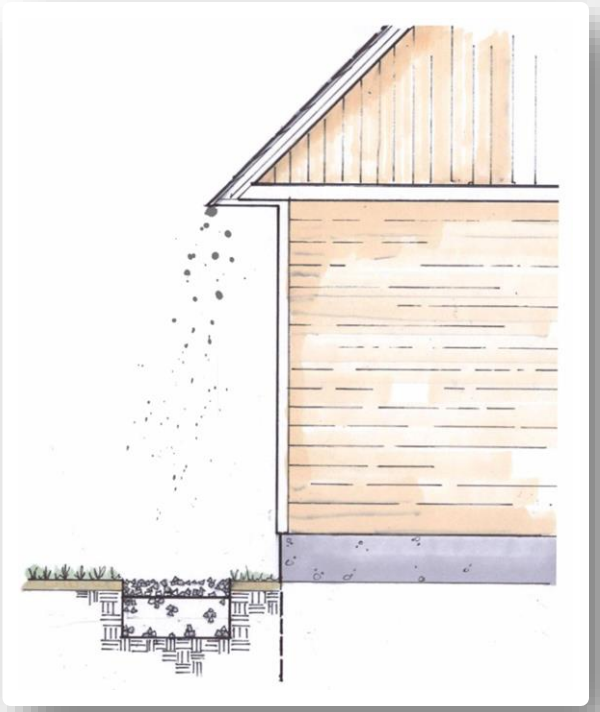
Stormwater Management Practices

1. Dripline infiltration trench
2. Driveway infiltration trench
3. Dry well
4. Infiltration steps
5. Pervious walkway & patio
6. Rain barrel
7. Rain garden
8. Vegetated swale
9. Water bar



Dripline Infiltration Trench

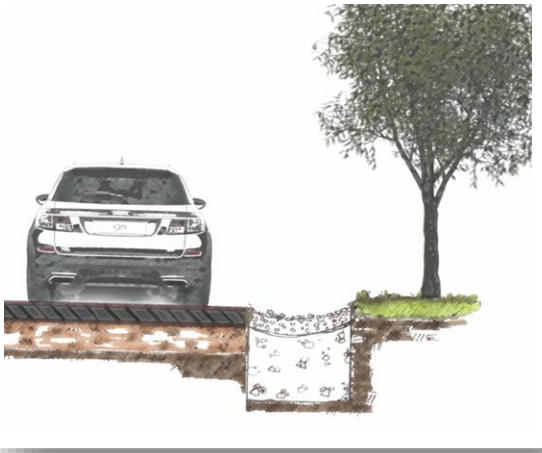




A stone-filled trench around the perimeter of a building. Catches and stores runoff from roof edges before soaking into the ground.

Driveway Infiltration Trench





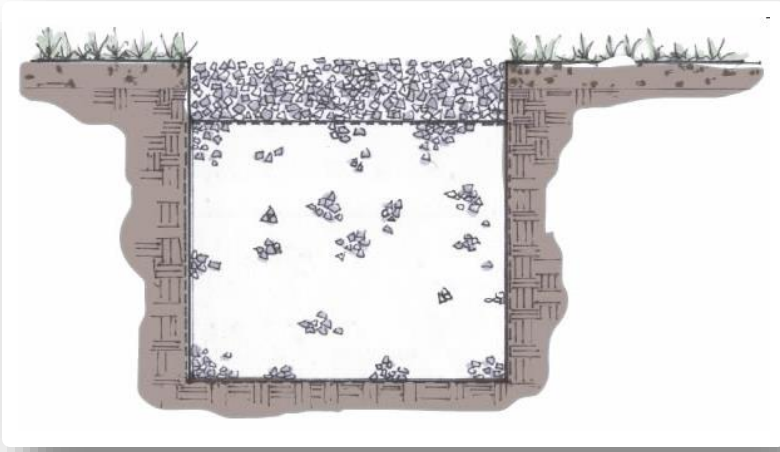


A stone-filled trench along the perimeter of your driveway. Catches and stores runoff before soaking into the ground.

Dry Well

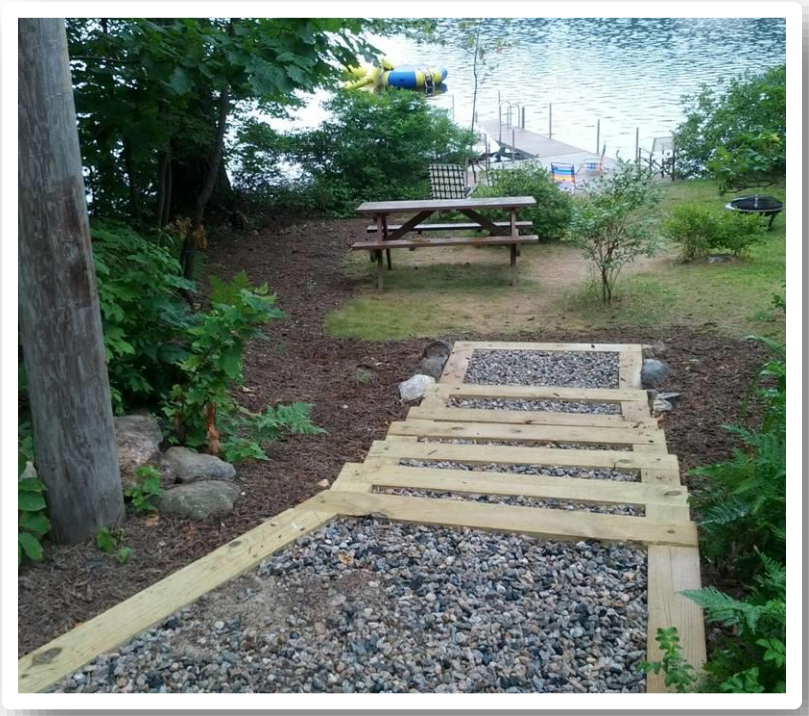






A hole in the ground filled with stone. Catches and stores runoff before soaking into the ground.

Infiltration Steps





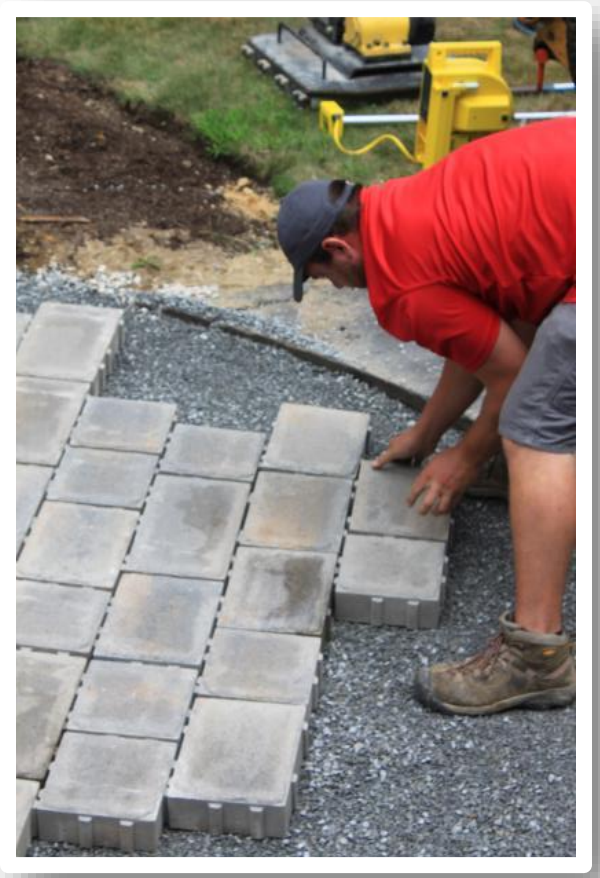
Stabilize paths and help water infiltrate instead of causing slope erosion.

Pervious Pavers





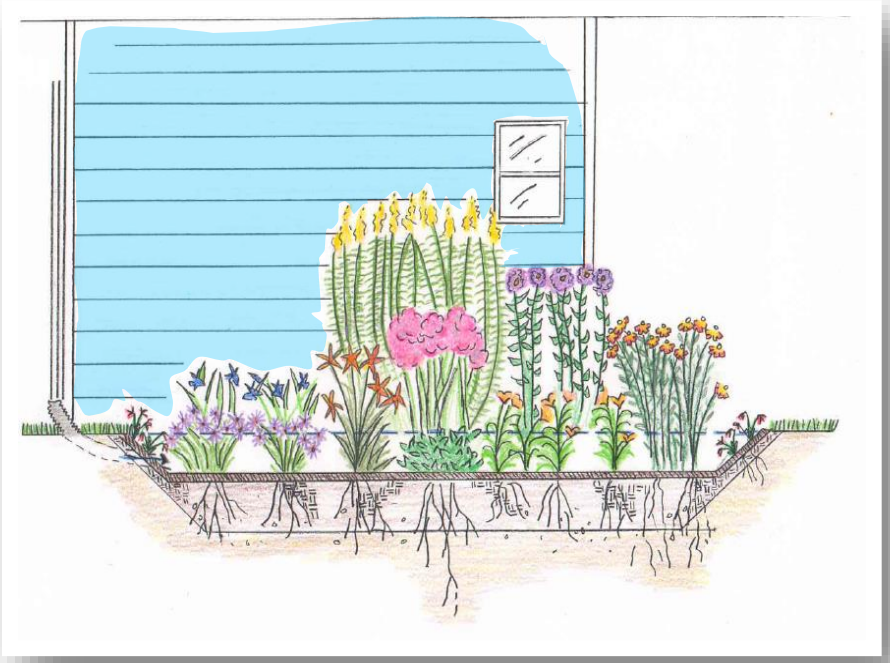
Stone reservoirs under the walkway collect and infiltrate rain and snow.



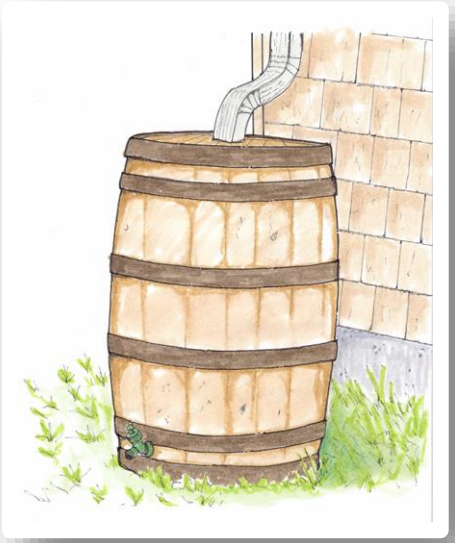
Rain Garden



A sunken, flat-bottomed garden that uses vegetation and soils to capture absorb and treat stormwater.



Rain Barrel



A container that captures and stores rainwater from a roof for later use to water gardens and indoor plants.





Vegetated Swale

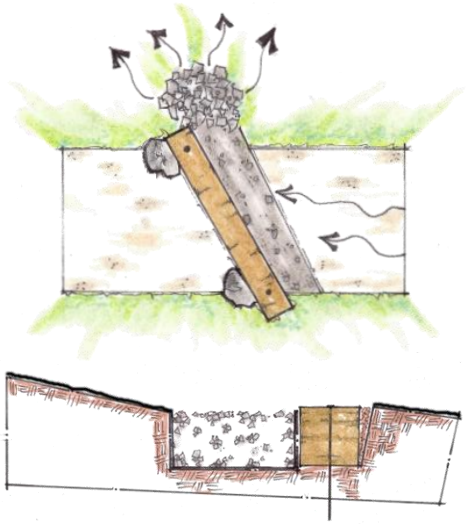






A vegetated channel that collects and directs stormwater to an area where it can soak into the ground.

Water Bar

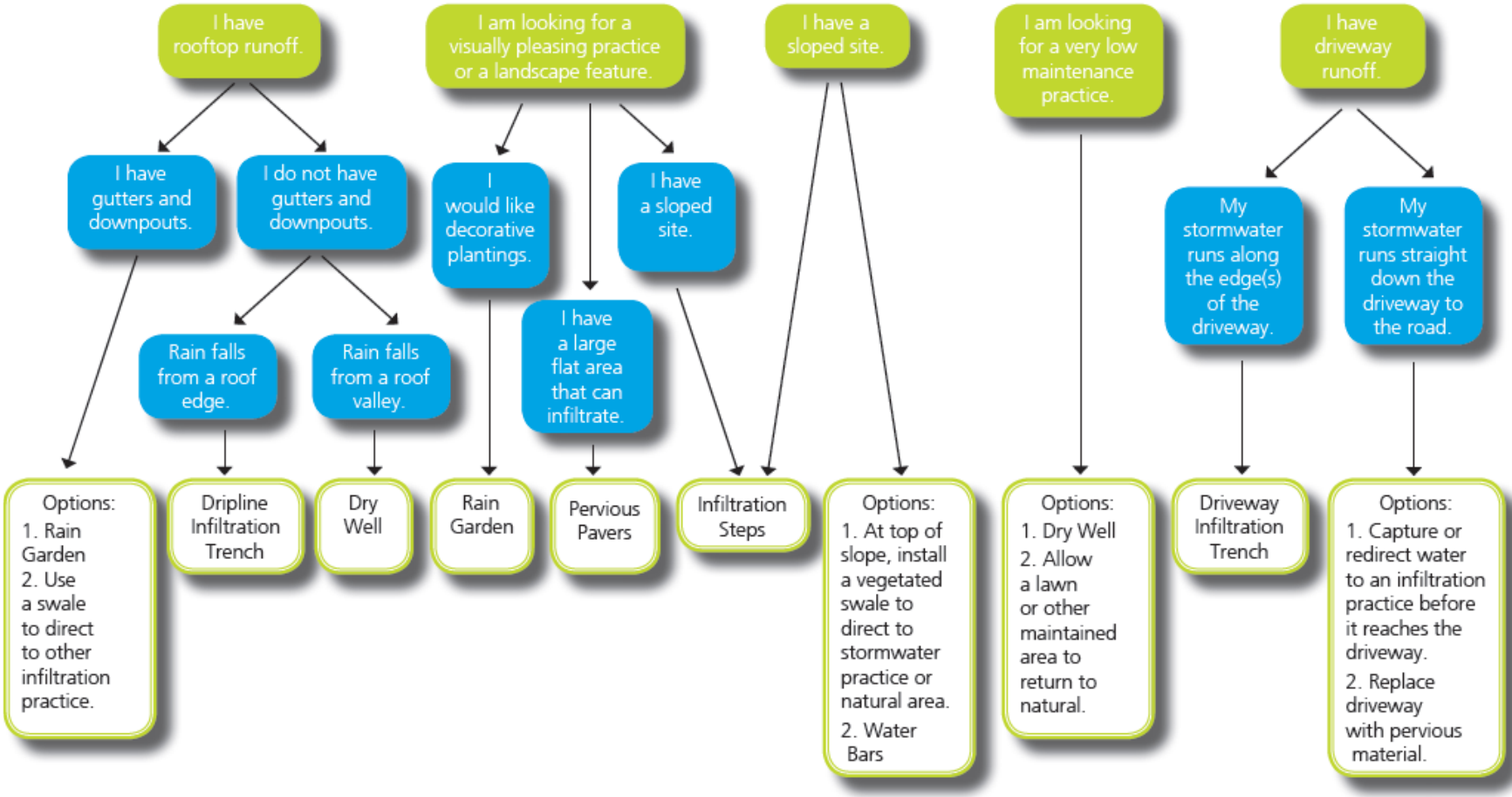


Intercepts water traveling down paths and diverts it to a stable area to prevent erosion.





Selecting a Practice



Four Questions

1. Will the soils soak up the rain?
2. Are there special site considerations?
3. Will the practice "fit" the location? Does it make sense?
4. What does the property owner want?

Site Considerations

1. Property setbacks.
2. Underground utilities.
3. Identify:
   a) Areas with standing water after it rains
   b) Water well
   c) Tree roots
   d) Septic tank or leach field
   e) Steep slopes (<12%)
   f) Water table
   g) Bedrock – outcroppings
   h) Sun/shade









Soak up the rain NH

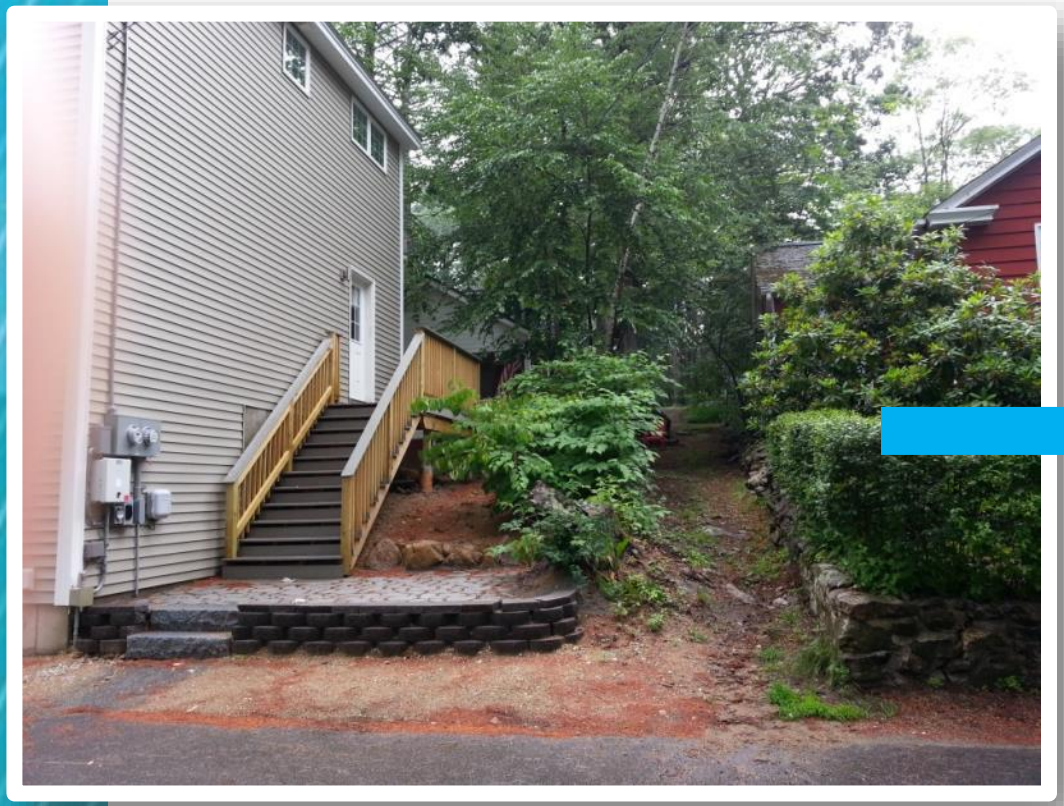
Will the practice "fit"?



Does it makes sense?



Soak up the rain NH

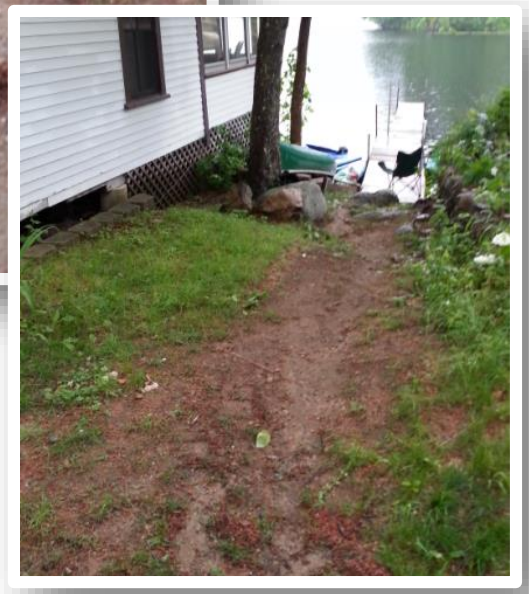




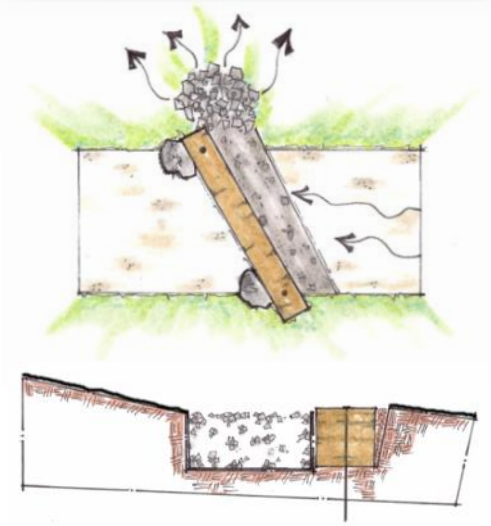


Soak up the rain NH









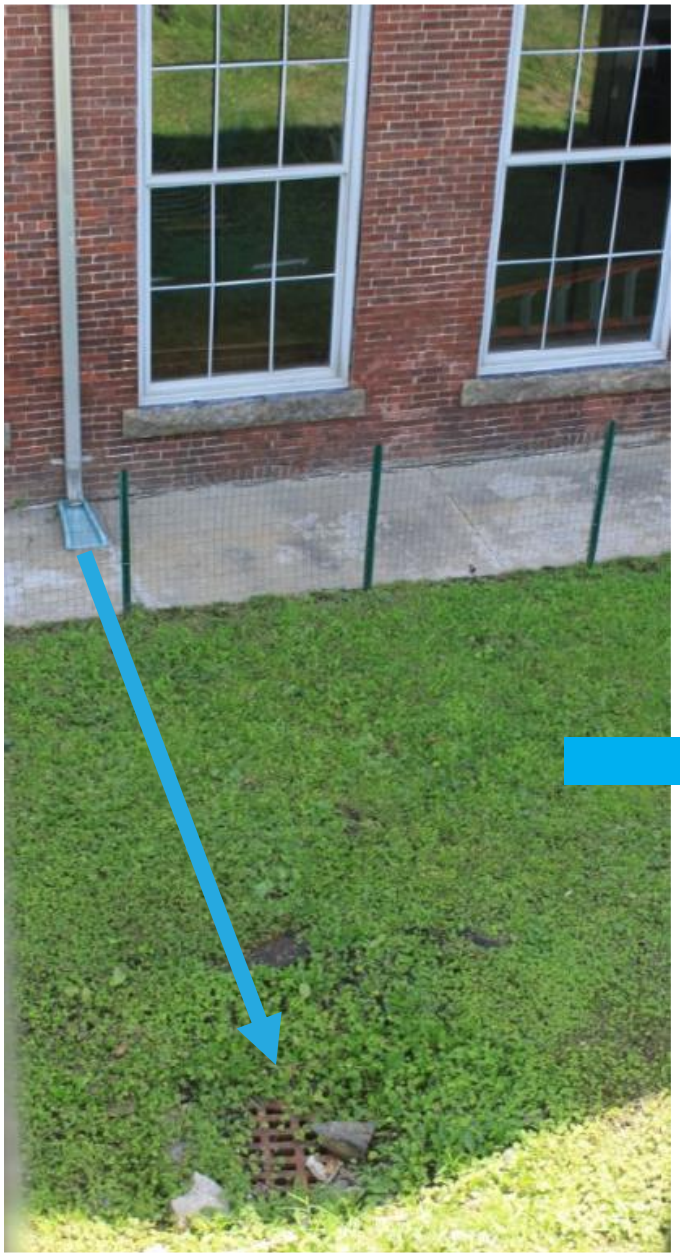
Soak up the rain NH







Soak up the rain NH



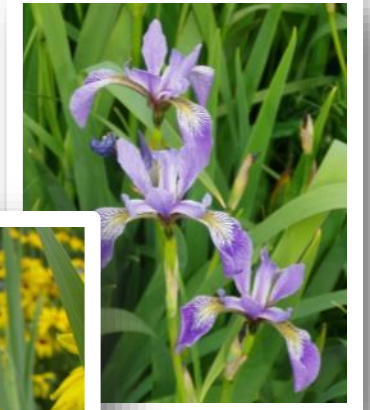




What does the homeowner want?

Preferences & Concerns















Sizing Best Management Practices

Example Rain Garden



1. Slope

Slope should be <12%





Slope (degrees)	% Grade
3	5.24
4	6.99
5	8.75
6	10.5
7	12.3

rise / run x 100 = % slope

2. Soil Type



Grab a handful of soil. Add a few drops of water. Roll it into a ball and squeeze it between for thumb and forefinger to see how long of a ribbon you can make.

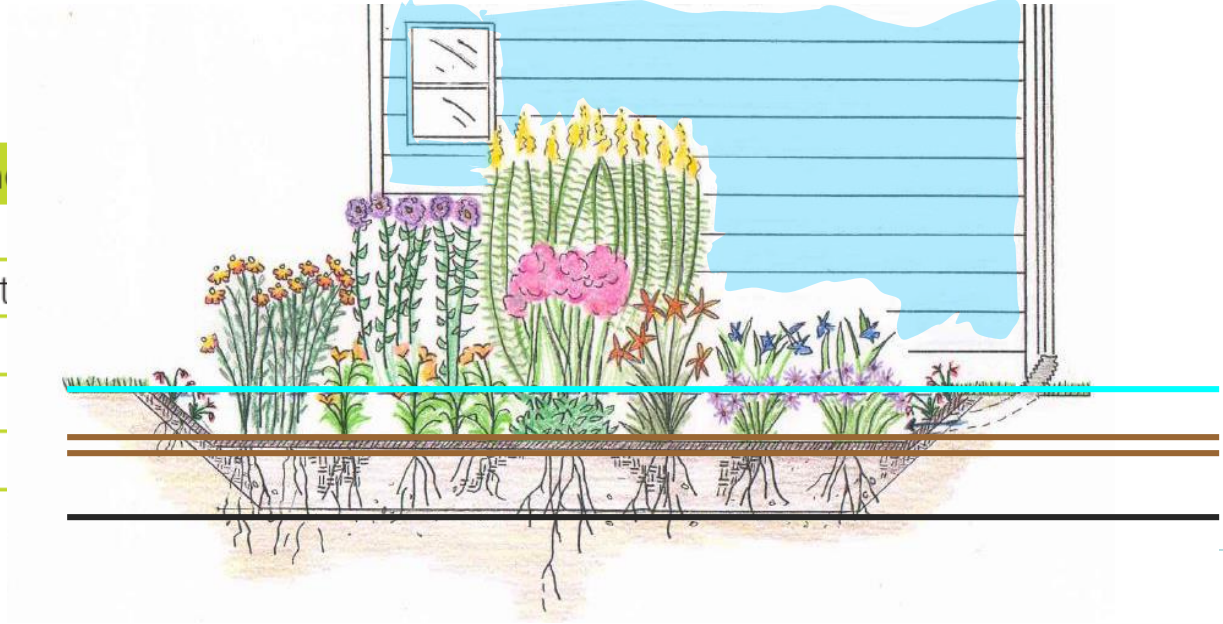
Soil Type	**Ribbon Length (inches)**
sand	soil does not form a ribbon at all
silt	a weak ribbon <1.5" is formed before breaking
clay	a ribbon >1.5" is formed

3. Drainage Area



Finished Size

Table 2. Pon	
Slope	
Ponding Dept	
Soil Type	Sand
	Silt
	Clay



7" ponding
2" mulch
8" planting bed

17" total

Table 3. Rain Garden Sizing Information	
1. Slope: (rise/run) x 100	6.25 %
2. Ponding Depth (from Table 1)	7 inches
3. Soil Type	SILT
4. Rain Garden Size Factor (from Table 2)	0.25
5. Total Drainage Area directed to rain garden	288 ft^2
6. Rain Garden Area (line 4 x line 5)	72 ft^2
7. Total Depth to Dig: Ponding Depth + Planting Bed Depth (6 - 12") + 2"Mulch	15 - 21 inches

Shape









Inlet & Outlet Planning





Selecting Plants

Right Plant

Right Place

Right Function

…tomorrow!



Field Trip this afternoon

