Installing a Rain Garden: What Homeowners Need to Know

August 13, 2015
North Scituate Library
Scituate, RI

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Tonight's Agenda

- How do rain gardens work?
- The installation process
- Considerations before installation
- Resources to help
- Neighborhood tour

How Do Rain Gardens Work?

- By Helping Water Absorb Into The Ground

Rain Gardens Control Stormwater

Stormwater picks up pollution as it moves downhill

- Fertilizer
- Animal waste
- Trash
- Oil and gasoline
- Sediment
- Road salt
- Yard waste

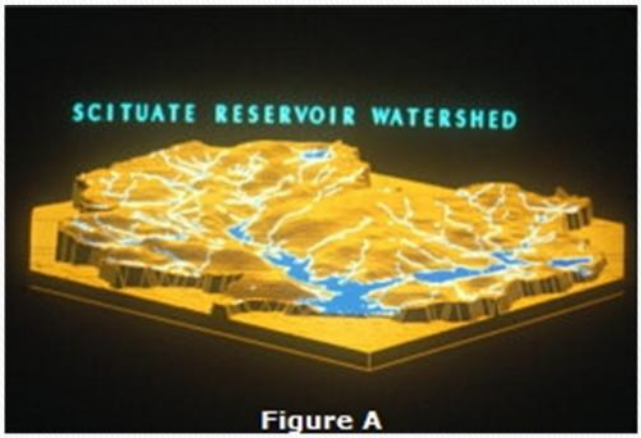


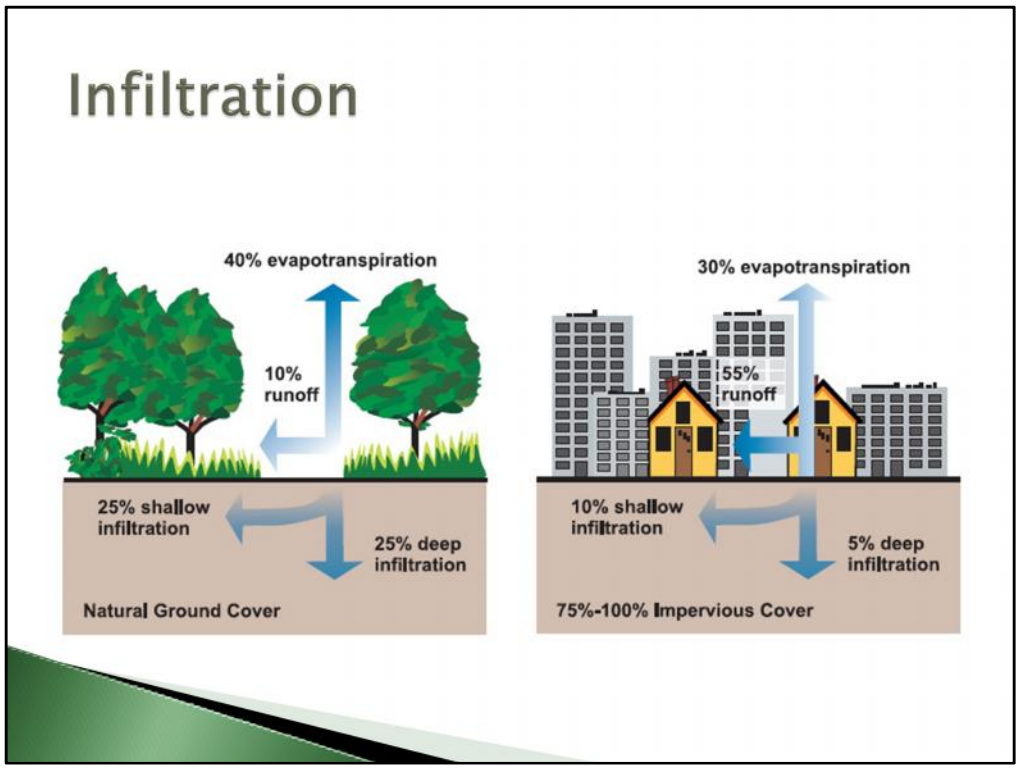
Figure A

The Scituate Reservoir Watershed

Over 60% of Rhode Islanders drink water from this watershed

Rhode Island's Watersheds

- Wherever you live, you are in a watershed
- Most RI watersheds lead to Narragansett Bay
- Some lead to Long Island Sound

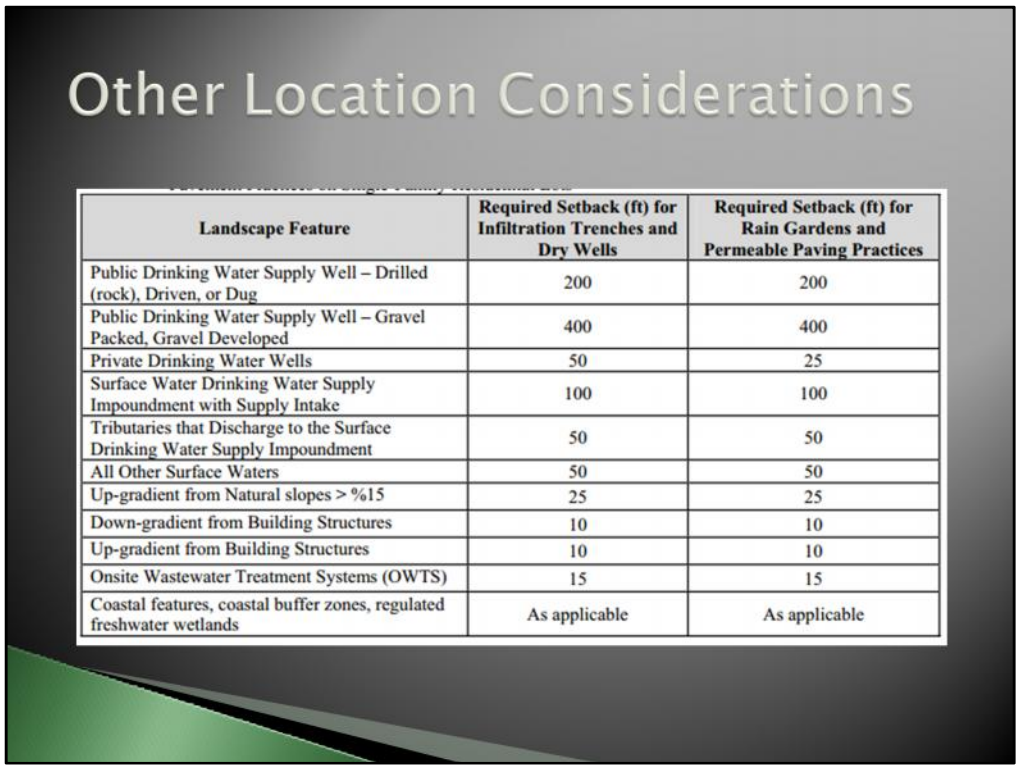


The goal of modern stormwater management techniques is to increase infiltration, or the amount of water that soaks into the ground. In natural areas like you see on the left, about half of water absorbs into the ground, recharging groundwater supplies and preventing the problems caused by runoff. A significant additional percentage is used by plants. On the right, in a densely built city, over half of runoff runs over the landscape where it can collection pollution. Our aim when installing rain gardens is to get the percentage of water absorbed into the ground closer to the image on the left than on the right, even in densely built areas like we have here in North Scituate Village.

What I will share now is a broad overview of the rain garden installation process. Rain gardens can be installed by a typical homeowner who is in good health and likes a good project! However, it is important to do research ahead of time to make sure that your garden is properly sited and installed. Today I'll give you a basic idea, but other resources I have provided will help point you in the right direction if you decide to move forward with putting a garden on your property. Of course, hiring a landscape architecture firm to install a garden for you is also a very sound option, and I will talk about some considerations to make when hiring one later in this presentation.

The first step to choosing a good spot for your rain garden is to take a walk around your home during a rain storm and see where your storm water is going. See if you can add a rain garden somewhere where it can stop stormwater from leaving your property. At the site we are looking at here, water from this downspout was running right into the road. Even though some of the water was being absorbed into the grass, the ground was relatively hard packed so the majority was not infiltrating. We sited the garden near the downspout, and then buried the downspout underground to bring water to the garden so it no longer leaves the property.

It may seem counterintuitive, but you should NOT place a rain garden at a site that tends to develop a big puddle after a rainstorm. Drainage at a site like that is probably insufficient to allow water to absorb quickly.



Landscape Feature	Required Setback (ft) for Infiltration Trenches and Dry Wells	Required Setback (ft) for Rain Gardens and Permeable Paving Practices
Public Drinking Water Supply Well – Drilled (rock), Driven, or Dug	200	200
Public Drinking Water Supply Well – Gravel Packed, Gravel Developed	400	400
Private Drinking Water Wells	50	25
Surface Water Drinking Water Supply Impoundment with Supply Intake	100	100
Tributaries that Discharge to the Surface Drinking Water Supply Impoundment	50	50
All Other Surface Waters	50	50
Up-gradient from Natural slopes > %15	25	25
Down-gradient from Building Structures	10	10
Up-gradient from Building Structures	10	10
Onsite Wastewater Treatment Systems (OWTS)	15	15
Coastal features, coastal buffer zones, regulated freshwater wetlands	As applicable	As applicable

When you are deciding where to put the garden, you will also need to consult the single family homeowner guidance document (**PAGE 3**) to make sure that you are far enough away from your well, septic sytem, and foundation. The garden can be planted on a mild slope, but DEM requirements do not recommend planting on a slope of greater than 10%. You'll also want to think about aesthetics, and the practical aspects of having this garden at your home. Can you mow and weed whack around it? Is it near a hose connection so you can water it when the plants are new? Will you be happy with its location from an aesthetic perspective?

Next, we will need to determine the size of the drainage area that will feed into the garden. I'm using an aerial photo of my own house, taken from Google Maps, as an example here. If I was going to put a rain garden in my front yard, and feed it using the downspout by my front door, I would need to take a look at my roof and figure out what portion of the roof is feeding into that particular downspout. I'd then figure out the area of that portion of the roof, erring on the side of larger if there is any question, and use that to determine my drainage area. If my drainage area included a walkway or driveway, I would add that area onto my total drainage area. Be sure to take a close look at where your gutters actually lead-they may bring water to the other side of the house from where they are located. It can be helpful to watch them during a rainstorm to be sure.

Tables 7. and 8. Rain Garden Sizing Guidance

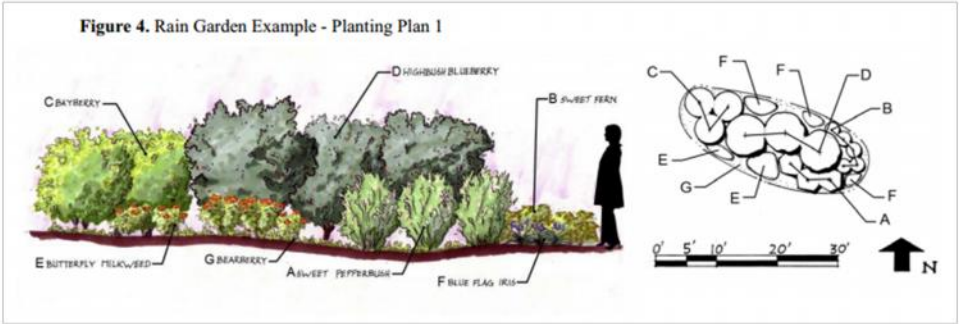
Rain Garden Surface Area in Sandy Soils (Sands, Loamy Sands and Sandy Loams) (square feet)			
Drainage Area (Square feet)	**for 4 inch deep garden**	**for 6 inch deep garden**	**for 8 inch deep garden**
100	19	15	8
200	38	30	16
300	57	45	24
400	76	60	32
500	95	75	40
600	114	90	48
700	133	105	56
800	152	120	64
900	171	135	72
1000	190	150	80

Rain Garden Surface Area in Silty Soils (Loams and Silt Loams) (square feet)			
Drainage Area (Square feet)	**for 4 inch deep garden**	**for 6 inch deep garden**	**for 8 inch deep garden**
100	34	25	16
200	68	50	32
300	102	75	48
400	136	100	64
500	170	125	80
600	204	150	96
700	238	175	112
800	272	200	128
900	306	225	144
1000	340	250	160

*In lieu of a soil texture determination, use the calculated surface areas for silty soils

I would then take my total drainage area to this chart from the DEM guidelines. It specifies how large a garden needs to be for various drainage areas and soil types. If you are not sure whether your soil is sandy or silty, you should use the silty chart since it will give a larger margin of error. You can also decide how deep you would like your garden to be. A shallower garden will allow more room for plants, but a deeper 8” garden may be a good choice if your space is limited.

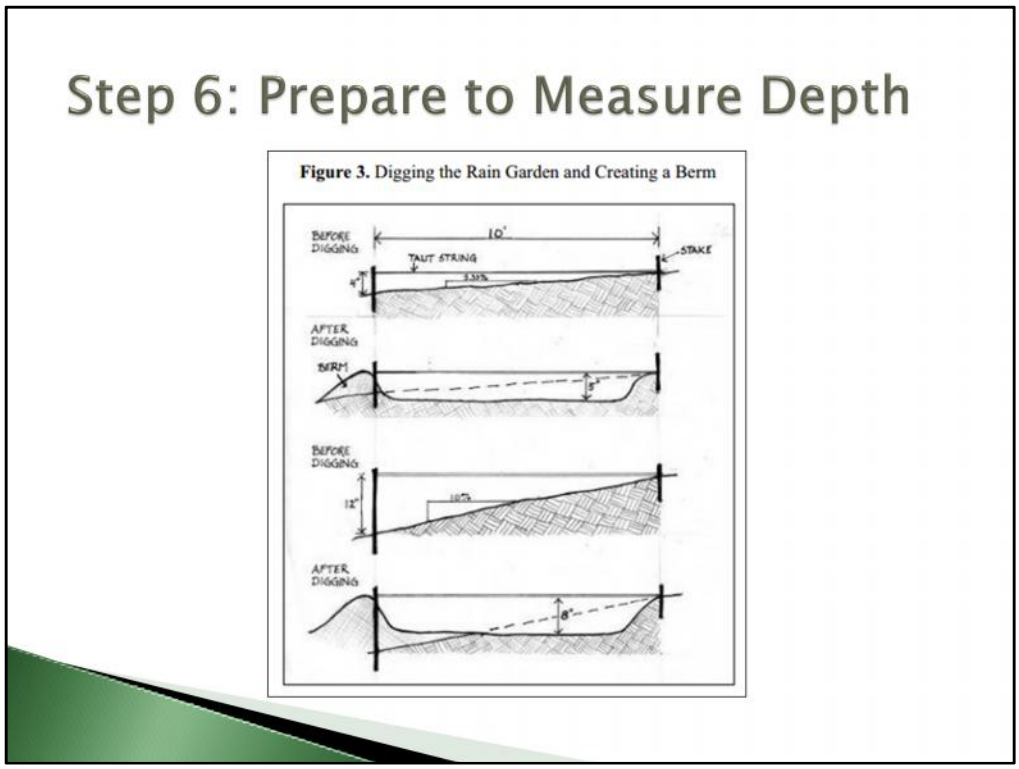
Step 3: Design Your Garden



Your guidelines from RIDEM also give guidance to help with the rain garden plant design process. In general, the garden should be about twice as long as it is wide, and should be angled perpendicular to the flow of water that you are trying to accept. At this point you can also start to think about plants you might like to add, using resources like URI's RI Native Plant Guide.

Rain gardens should not hold water for any more than 12 to 48 hours to ensure proper functioning and prevent mosquito breeding. To ensure that your soil drains well enough to allow infiltration in this time period, there is a quick soil test you can do before breaking ground. All you need to do is dig a 6-8" hole, fill it with water, and make sure that all of the water is absorbed within 12 hours. Here in our North Scituate gardens, water was generally absorbed within 20 minutes!

Before breaking ground on your rain garden, it is important to verify that there are no underground utility lines in the area where you would like to dig. Calling digsafe at 811 will allow all utilities operating in your area to be notified about your potential excavation. They will then have three business days to mark any utilities in the area so that you can avoid digging through them. Keep in mind that any underground utilities may be relatively close to the surface-if utilities are marked in your garden area, you should chose a new spot for the garden. This step is important for everyone, but takes on an EXTREMELY high level of importance if you live in a town with natural gas lines. If you hire a contractor to excavate your garden, be sure that they call dig safe as well. Most contractors will be familiar with this process.



As you begin to dig the garden, you will need a system to ensure you dig to the proper depth. If your garden is on a slope, you will need to add a "berm" on the downslope side of the garden to allow water to pool evenly. You can build this berm using sod and soil as you dig, but remember that if you use any sod, the berm will lose height as the sod decays. We used a system, like that seen here, of poles, a string, a level, and a ruler to ensure we dug our gardens to the prescribed depth. It is very difficult to "eyeball" these depths, so frequently checking our measurements was essential.

Excavating and removing soil is the most challenging step in rain garden installation. You have a choice-you can excavate by hand, or hire someone with a digger to excavate for you. Most of the rain gardens in our project were excavated by hand, and took two people 2-3 work days of digging. We also had to remove the soil to a location off-site; if you have someplace on site to keep your soil, this step will go more quickly. The Village Drum and Charmed and Dangerous gardens were excavated by machine, and this took only a couple of hours per garden, but cost over $1000. Local septic system contractors may be able to complete this work for you if you chose to go this route.

The volume of soil that needs to be removed from a typical rain garden is quite large. All of our gardens needed at least three yards removed, which is at least 5 trips in a typical small pickup truck if it needs to be taken offsite. It is hard, tiring work, which is one of the many reasons that rain gardens are best installed in the spring or fall, when temperatures are lower.

One step you can take to make digging easier is to kill any sod by putting a tarp in the shape of your rain garden over the excavation area for three or more days.

Before adding plants to the new garden basin, you may need to make some changes to the soil to ensure either proper drainage or proper plant growth. All we had to do in NSV was to put aside the good top soil, take out a bit more of the rocky under soil, then mix the top soil back in with 50% finished compost, which we purchased from Resource Recovery or Macera's.

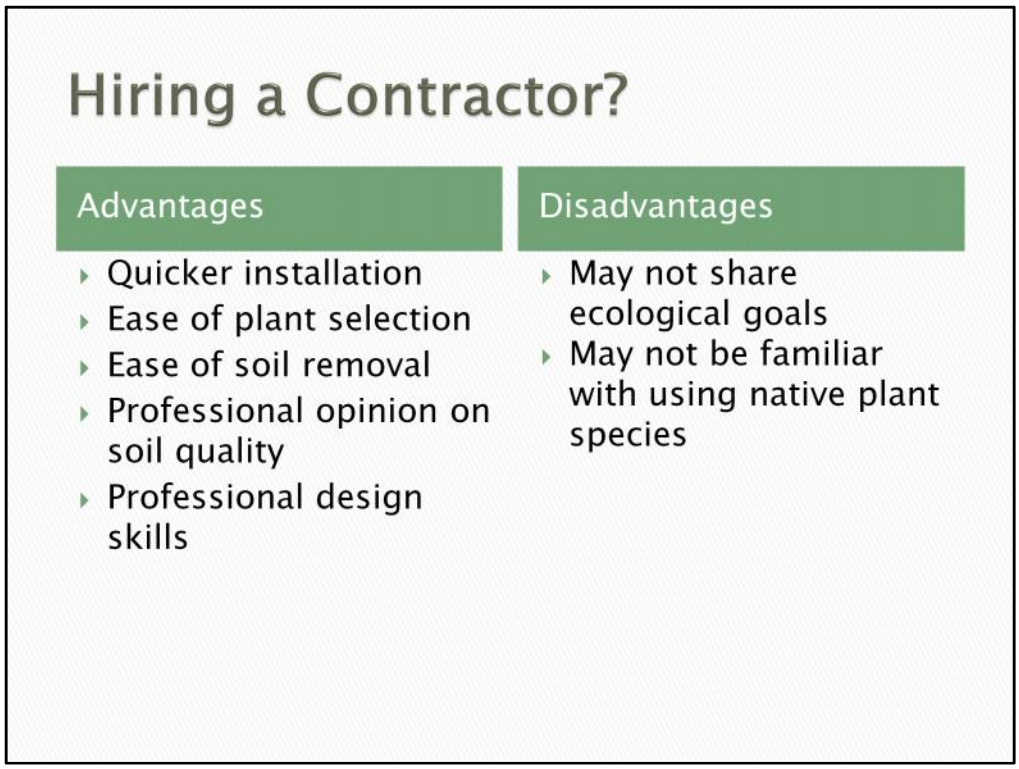
At this point we planted the gardens. When possible, we purchased plants in 1-gallon containers since smaller plants have an easier time becoming established. You could purchase plants in 3-gallon containers if you prefer that your garden have a very “full” look right off the bat. Take care to leave enough space between plants to allow for future growth.

Next, add 4 inches of shredded bark mulch, avoiding heavily died mulches when possible. At this point, your garden's depth should be the initially planned depth, which means you need to dig as far as 8 additional inches down in the excavation stage to account for mulch and compost additions.

Finally, it is important to make sure that water has a simple method of accessing your garden. This may mean burying a connection from the nearest downspout, creating a channel of stones to guide water from the downspout, or even simply steering a downspout extender towards the garden if it will not create a mowing hazard for you. For this project we had all of our downspouts done by a gutter professional to ensure seamless connections. The cost of this was relatively low ($200ish per garden) for the piece of mind it brought.

Smooth river stone near the point of downspout entry to the garden, especially if it is a steep slope, will prevent erosion and stabilize the garden basin.

Your garden will need to be watered daily for the first couple of weeks, and then periodically throughout the rest of the first growing season, until plants are established. You should also check your garden after the first few major storms to make sure that it is functioning as designed and is not ponding water for too long.

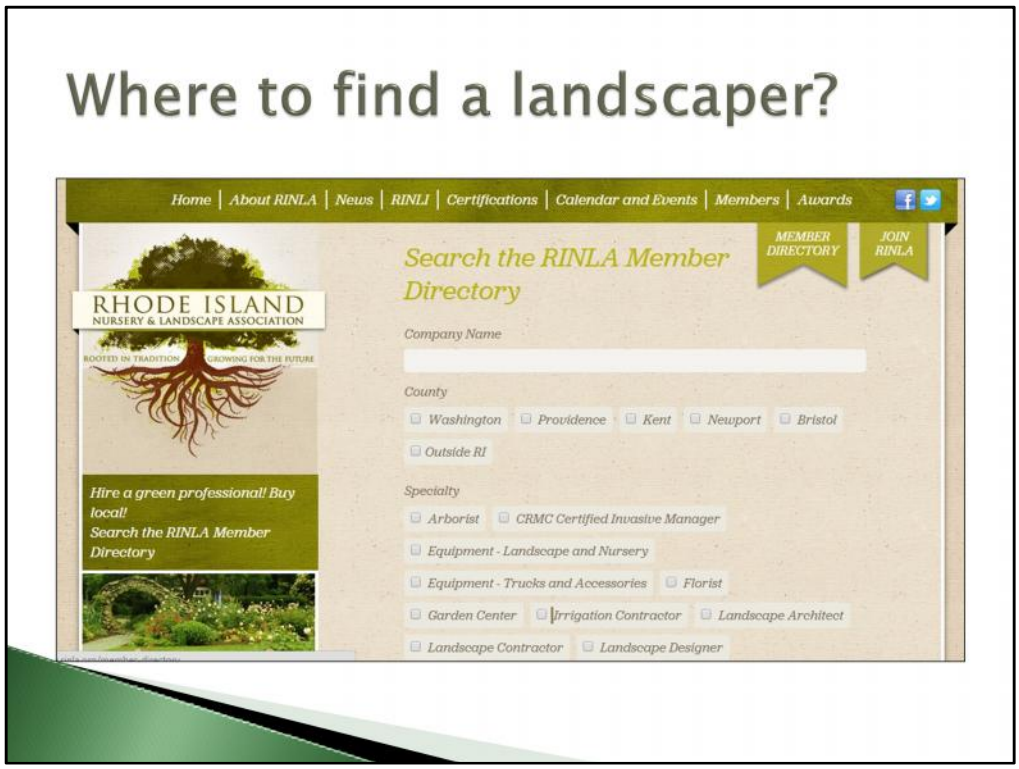


If you do not have 2-4 days to devote to rain garden installation, you may chose to hire a contractor to help with all or part of your project. Landscape designers and architects can do you design work and recommend plantings, and may be able to subcontract the actual installation to landscape crews. There are pros and cons to working with a contractor, and it is important to find a designer or architect who shares your goals for the project, as we did with our project.

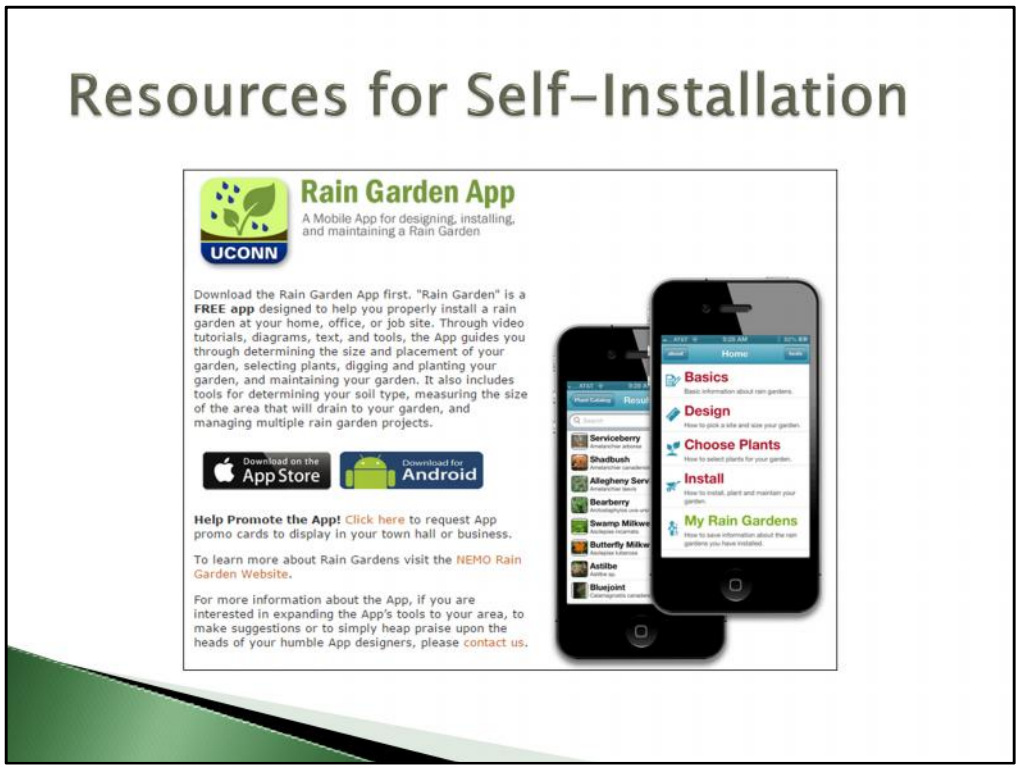
Another option, as previously mentioned, is to simply contract out excavation. With excavation done by machine, installation can be done in as little as a day. Renting or borrowing a small excavator may also be an option if someone in your family is qualified to operate one.

Questions to Ask

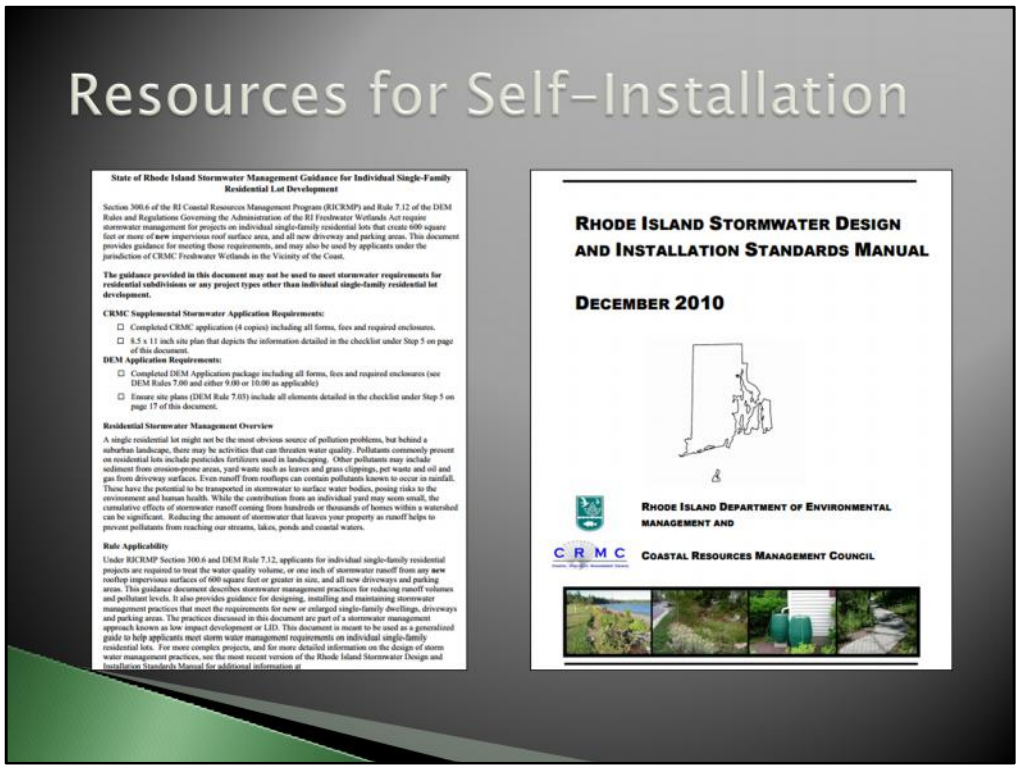
- Have you created rain gardens before?
- Are you familiar with "Single Family Guidance…"
- Are you familiar with native plants?
- Will you provide post-installation support?



If you are looking for a landscaper, a good place to start is by checking out the RI Nursery and Landscape Association's member directory. You can filter your search by county and specialty. Look for a landscape designer or architect, and then check out their website for examples of their work.



The University of Connecticut's rain garden app for iphone or android is honestly one of the best resources out there to help you self-install a rain garden. The app will walk you though the planning steps that I described here, show you a map of average soil types in your area, and help you to select plants based on your preferences and site conditions. Please note, however, that a few of the plants recommended by the app are non-native, so if using only natives is a priority to you you'll want to research each plant thoroughly.



You should also familiarize yourself with the RI state standards for stormwater project installation. I did not include a copy of the Single Family Residential Lot Development guidance in tonight's folder since most of you have already received it, but I do suggest that you pick up a copy from our back table if you have not. This document will be extremely helpful as you plan out your rain garden. The full stormwater manual is less relevant to small rain garden projects, but the list of plants in the back may come in handy. Both documents are also available for free online.

In most cases, RIDEM does not require a permit for the private installation of a residential rain garden. We want to encourage homeowners to adopt these practices and make it as simple as possible for you. If you are concerned that your garden may be in a wetland, or may be diverting water from a wetland, however, you can always consult with an environmental professional to be sure. In Scituate, no town permits are required either. However, you should familiarize yourself with any zoning or HOA requirements that may be specific to your town.


Questions?
Neighborhood Tour