



RESILIENT HOMES, PARKS AND PEOPLE

HOW TO CREATE A RAIN GARDEN: A GUIDE FOR RESIDENTS





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The Resilient Homes, Parks and People Project

The climate is changing on PEI. Increasing sea levels and large storm events mean that Charlottetown can expect more flooding in the future. In response to these changes the City of Charlottetown, supported through the Government of Prince Edward Island's Climate Challenge Fund, is undertaking efforts to equip residents with practical solutions to reduce flooding risk on their property.

All our actions matter - managing water on your own property contributes to the collective flood resilience of the community, reducing flooding risk to neighbours and all across Charlottetown. There are many options to reduce flooding risk as a resident. As you begin to think about which might be the best for your property, consider the following key points:

- 1. Know your Risk.** Anywhere it can rain, it can flood – talk to your neighbors or contact the Charlottetown planning and zoning office to find out about any past flooding events in your area (planning@charlottetown.ca / 902-629-4158).
- 2. Insure your property.** Flood damage may not be covered by standard homeowners or tenant insurance policies, check your policy and purchase a flood insurance policy if appropriate.
- 3. Reduce your risk.** Decide how to prepare and protect your home from flooding. See the City of Charlottetown website for information sheets, expert presentations, and links to further resources on how to reduce flooding risk on your property.

What is a rain garden?

A rain garden is **a shallow planted depression designed to capture stormwater** (rain and melted snow). Rain gardens are one way to manage stormwater on your property by absorbing water from disconnected roof downspouts and sump pump outlets.

Why rain gardens matter:

As Charlottetown continues to grow, new development will replace green space with impervious surfaces (rooftops, paved streets and parking lots). More impervious surfaces result in an increased amount of stormwater runoff to municipal systems. This, in addition to larger and more frequent storm events can overwhelm the capacity of municipal stormwater infrastructure. Rain gardens provide the opportunity for infiltration before it reaches those systems, reducing flooding risk and protecting our waterways. When compared to a conventional patch of lawn, rain gardens can soak up about 30% more water in the same space!

While an individual rain garden may seem like a small thing, collectively they produce substantial neighborhood and community environmental benefits.



Rain gardens:

- Re-charge and re-store groundwater.
- Reduce the amount of water entering municipal storm water systems, prevent flooding and sewer backups.
- Filter storm water and reduce pollution in waterways.
- Provide pollinator habitat, attracting birds, butterflies, and beneficial insects, like mosquito-consuming dragon flies!

Is a rain garden the right fit for your property?

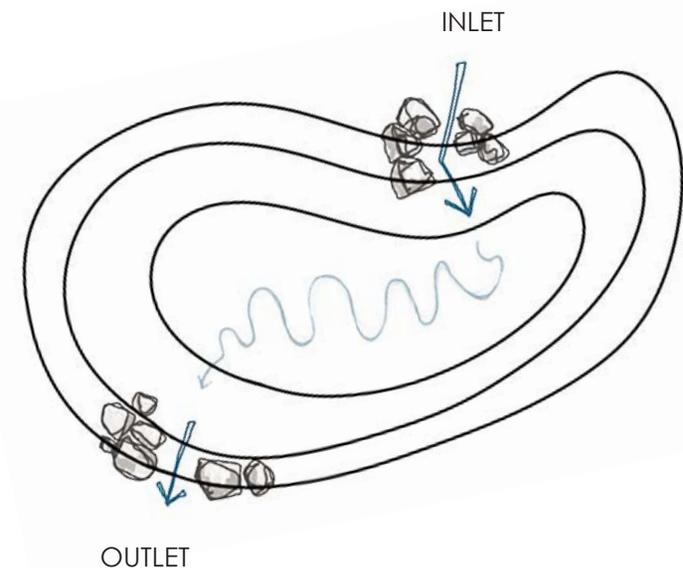
1. Is there a source of water to feed your rain garden, such as a downspout or sump pump?
2. Do you have space at least 3 metres away from any building foundation?
3. Is your potential garden space relatively flat (between 1% and 5% slope) AND can it be connected to your water source?

There are a few things to consider for rain garden success:

Soil Testing: Soil type plays an important factor in the function of a rain garden. The soil in your site will determine if the location is appropriate and how the soil will have to be amended.

- **Soil Type:** In general, soil can be clay, sand, or loam, each with a different infiltration rate. Garden sites with an abundance of clay may not be suited for a rain garden and will require both size and soil amendments for it to function. To check the infiltration capacity, dig a hole 30 cm wide and 50 cm deep. Fill the hole with water and watch carefully. If the water is fully drained within 24 hours your site is appropriate for a rain garden.
- **Soil Amendment:** Rain gardens need light, well draining soil to function. Once you have dug out your rain garden, it will be time to fill it back up again. In general, a mix of 30% sand, 30–40% native soils (free of clay) and 30% compost will work for most rain gardens. Consider using excess soil to fill in gaps around your foundation, maintain a 5% slope and direct water away from your home.

Rain Garden Water Path: Water needs to move to and from your rain garden either through an extended downspout or through a dug trench. For large rain events it is important for rain gardens to have an outlet. Locate your outlet on the downhill side of the rain garden, placing some small stones around the area to slow water and protect the soil from erosion.





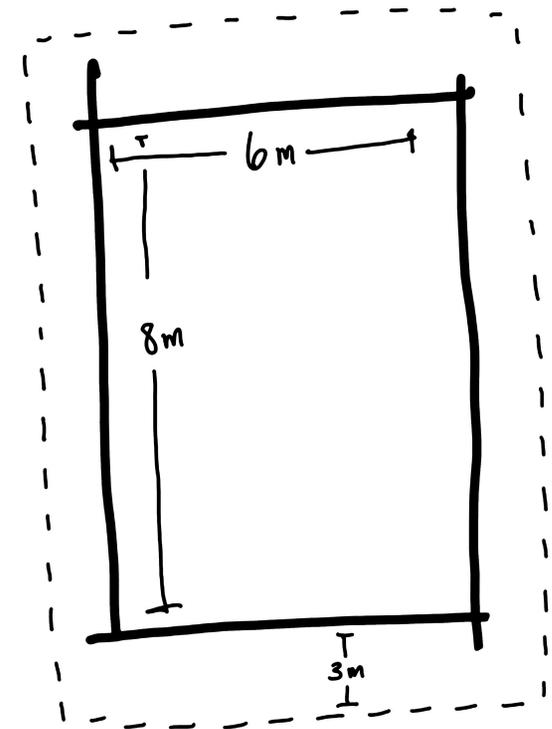
Estimating the size of your garden:

Determine the size of your rain garden by the roof area that will drain to it and your soil type.

- 1. Observe!** Check the weather and watch how water currently moves on your property. How much water is flowing from your downspouts? Is there pooling anywhere on your property? How long does it take for your garden to dry out? How many hours of sunlight does your garden get? All these questions provide a good foundation for making decisions about your future rain garden.
- 2. Identify.** How much area of roof or impervious surface will be draining to your rain garden? This can be determined by estimating the total area of your home (length x width) and dividing it by the total number of downspouts. For irregularly shaped roofs the area draining to your rain garden can also be found using the measure tool on Google Earth.
- 3. Size.** A general rule of thumb is that rain gardens should be roughly 10% of the size of the impervious surface generating the runoff. To determine the size of your rain garden, divide the area of your drainage area by 10.

$(\text{Length} \times \text{Width}) / \# \text{ of Downspouts} = \text{Drainage Area}$

$\text{Drainage Area (m}^2\text{)} / 10 = \text{Rain Garden Area}$

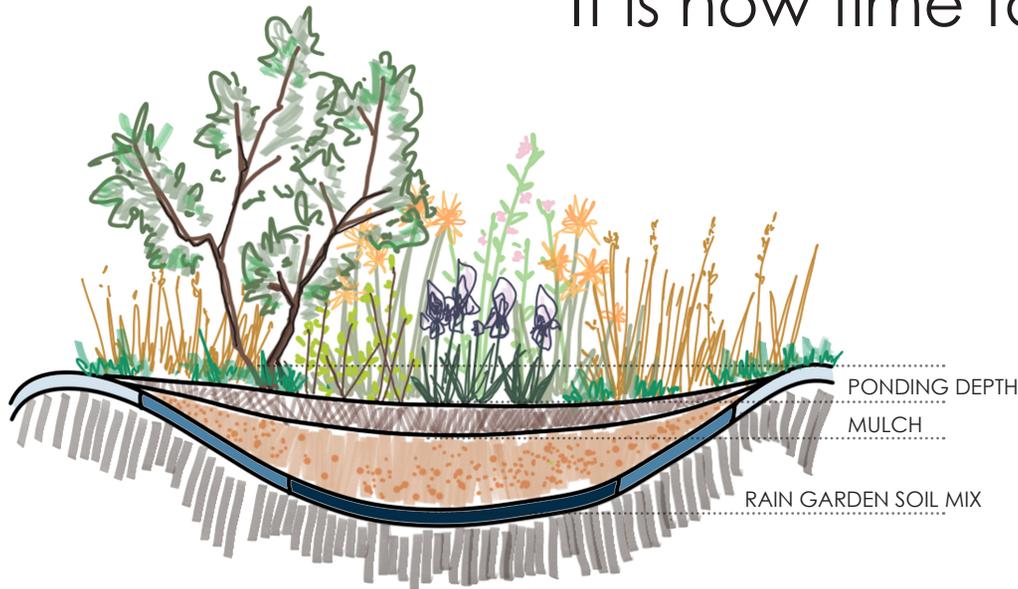


Ex: $(8\text{m} \times 6\text{m}) / 2 = 24\text{m}$

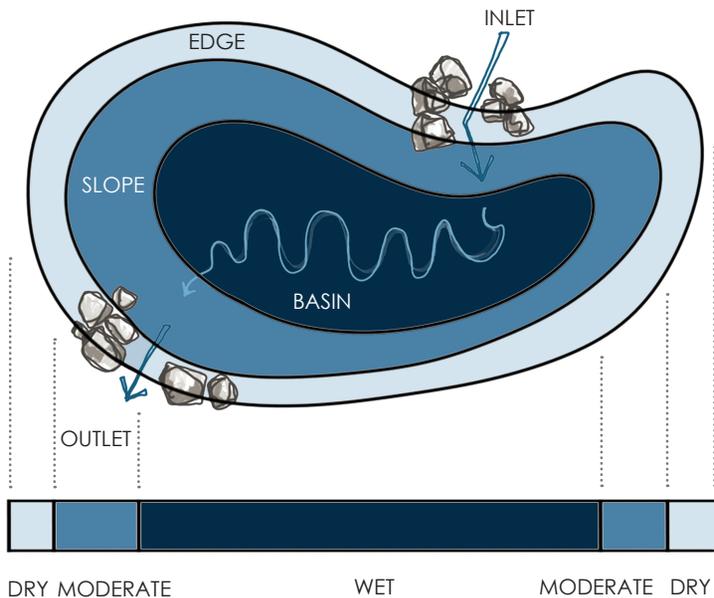
$24 / 10 = 2.4 \text{ m}^2$

It is now time to construct your rain garden!

This involves 3 steps:



1. Dig your garden. Carefully mark out your rain garden to the appropriate size and desired shape. Once you are happy with the shape, determine the location of your basin – or deepest part of the rain garden. Dig down to approximately 85cm deep into the subsoil to create your basin with sloped sides of roughly 30%. Construct the inflow and outflow to your garden, placing rocks to slow water and prevent erosion.



2. Fill your garden. Amend the soil as described on page 2 and return soil to your rain garden at a depth of approximately 60cm (leaving 25cm for plants, mulch, and pooling). Once your garden is filled keep your boots out! Work from the edge to avoid compacting your garden.

3. Plant your garden. Prioritize the use of native plants and avoid invasive species. Visit local nurseries that sell native plants and check out the planting resources on pg 5-7. Once your plants are in, cover your garden with 5-10cm of natural mulch and water regularly until established.

MATCH COLORS AND LOCATION WITH THE PLANT CHART ON PAGES 7-9 TO BUILD YOUR GARDEN!

Selecting Plants:

Group plants with similar needs together. Use the chart on pages 7-9 to match plant needs such as sunlight and location in the rain garden to the conditions of your yard. Consider things like height, colour and form when choosing plants for your garden. These elements will work together to make your rain garden both beautiful and functional.

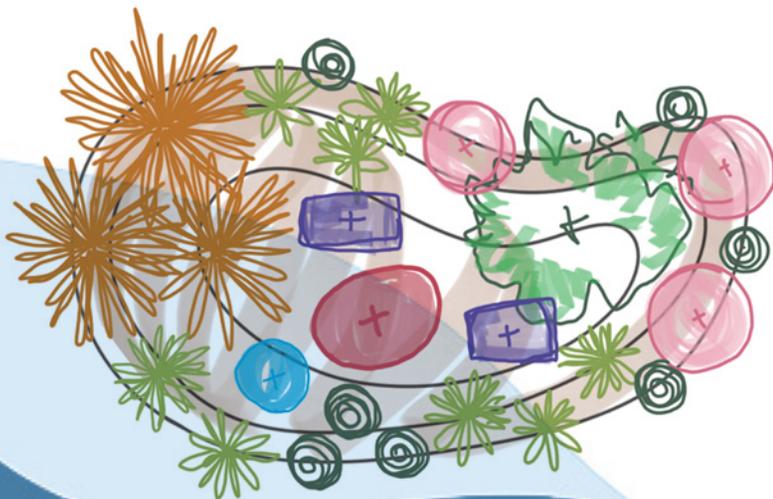
When to Plant:

In general, it is best to plant in early spring or fall. This allows root systems to develop before summer drought or winter frost, helping your garden to thrive. After planting, your rain garden will need support to become established. Check the most current City watering restrictions and act accordingly. To see updated restrictions visit www.charlottetown.ca and click on "Water Use and Restrictions" which can be found under the "Residents Services" tab on the home page. Water daily, either in the early morning or after the sun has set, for 1-2 weeks to help the garden establish.

These are guidelines, not rules! Gardening is an art form that takes on your own creativity. Each rain garden is unique and can be adapted to fit the specific conditions of your yard and budget. If you cannot accommodate a rain garden suited to your total drainage area, consider limiting the amount of rooftop directed to your garden, installing multiple smaller gardens or integrating other rainwater capture options (rain barrel, infiltration trench or soak away pit). No matter what size of garden you create, it will provide some storm water management and important habitat in the city!

Rain Garden examples to get you started:

Full Sun: Plant this garden in a spot that receives more than 6 hours of direct sunlight.



Sedge



Wood Violet



Little Bluestem



Native Rose



Swamp
Milkweed



Joe Pye Weed



Serviceberry

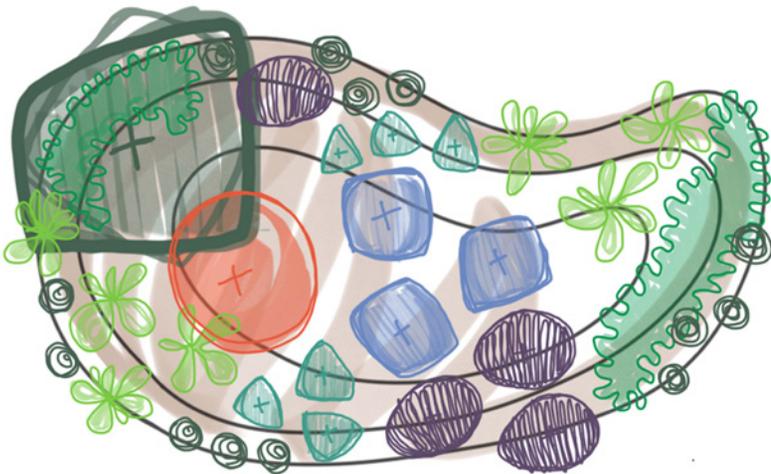
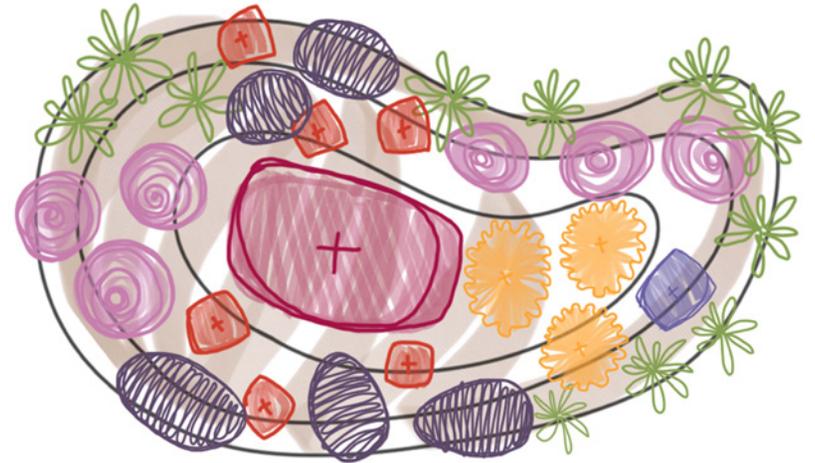


Fireweed

Part Sun | Part Shade:

Plant this garden in a spot that receives between 4-6 hours of direct sunlight.

- | | | | | | |
|---|-------------------|---|--------------------|---|-------|
|  | Common Elderberry |  | Herb Robert |  | Sedge |
|  | Ostrich Fern |  | Cutleaf Coneflower |  | Iris |
|  | Turtlehead | | | | |



Shade: Plant this garden in a spot that receives less than 4 hours of direct sunlight.

- | | | | | | |
|--|-------------------|---|--------------------------|---|--------------------|
|  | Spotted Jewelweed |  | Sedge |  | Jack in the Pulpit |
|  | Witch Hazel |  | Iris |  | Turtlehead |
|  | Wood Violet |  | Wild Lilly of the Valley | | |

TREES				
SPECIES	COMMON	NATIVE TO	SUNLIGHT	EDGE SLOPE BASIN
<i>Acer pensylvanicum</i>	Striped Maple	PEI	● ●	
<i>Acer saccharum</i>	Silver Maple	CAN	●	
<i>Amelanchier sp.</i>	Serviceberry	PEI	●	
<i>Amelanchier alnifolia</i>	Saskatoon Berry	CAN	●	
<i>Betula alleghaniensis</i>	Yellow Birch	PEI	● ●	
<i>Betula nigra</i>	River Birch	CAN	● ●	
<i>Cornus alternifolia</i>	Alternate Leafed Dogwood	PEI	● ●	
<i>Larix laricina</i>	Eastern Tamarack	PEI	●	
<i>Tilia americana</i>	Basswood/American Linden	PEI	●	
<i>Thuja occidentalis</i>	Cedar	PEI	● ●	
SHRUBS				
SPECIES	COMMON	NATIVE TO	SUNLIGHT	EDGE SLOPE BASIN
<i>Alnus crispa</i>	Downy Alder	PEI	● ●	
<i>Alnus rugosa</i>	Speckled Alder	PEI	● ●	
<i>Aronia melanocarpa</i>	Black Chokeberry	PEI	● ●	
<i>Aronia prunifolia</i>	Purple Chokeberry	PEI	● ●	
<i>Betulus pumila</i>	Bog Birch	PEI	●	
<i>Cornus rugosa</i>	Round-leaf dogwood	PEI	● ●	
<i>Cornus stolonifera</i>	Red Osier Dogwood	PEI	●	
<i>Hamamelis virginiana</i>	Witch Hazel	PEI	● ● ●	
<i>Ilex verticillata</i>	Winterberry Holly	PEI	●	
<i>Myrica pensylvanica</i>	Bayberry	PEI	●	
<i>Lonicera canadensis</i>	American Fly Honeysuckle	PEI	● ● ●	
<i>Physocarpus opulifolius</i>	Ninebark	CAN	● ●	
<i>Rubus idaeus subsp. strigosus</i>	Red Raspberry	PEI	● ● ●	
<i>Rhus typhina</i>	Staghorn Sumac	PEI	●	

● FULL SUN ● PART SUN ● SHADE

SHRUBS				
SPECIES	COMMON	NATIVE TO	SUNLIGHT	EDGE SLOPE BASIN
Sambucus Canadensis	Common Elderberry	PEI	● ●	■ ■
Sambucus nigra	Black Elderberry	PEI	● ●	■ ■
Salix sp.	Willow	PEI	● ●	■ ■ ■
Viburnum cassinoides	Wild Raisin	PEI	● ●	■ ■
Viburnum dentatum	Arrowwood	CAN	●	■
Viburnum lentago	Nannyberry	CAN	●	■ ■
Viburnum opulus var americanum	High Bush Cranberry	PEI	● ●	■
GRASSES				
SPECIES	COMMON	NATIVE TO	SUNLIGHT	EDGE SLOPE BASIN
Agrostis scabra	Rough Hair Grass	PEI	●	■ ■
Andropogon gerardii	Big Blue Stem	CAN	●	■ ■
Bouteloua curtipendula	Side-oats grama	CAN	●	■ ■
Carex aurea	Golden Fruit Sedge	PEI	● ●	■ ■
Carex sp.	Sedge	CAN	● ● ●	■ ■ ■
Elymus Canadensis	Canada Wild Rye	PEI	●	■ ■
Deschampsia cespitosa	Tufted Hairgrass	CAN	●	■ ■
Schizachyrium scoparium	Little Blue Stem	CAN	●	■ ■
FERNS				
SPECIES	COMMON	NATIVE TO	SUNLIGHT	EDGE SLOPE BASIN
Dryopteris cristata	Crested Wood Fern	PEI	● ●	■ ■
Matteuccia struthiopteris	Ostrich Fern	PEI	● ●	■ ■ ■
Osmunda cinnamomea	Cinnamon Fern	PEI	● ●	■ ■
Osmunda regalis	Royal Fern	PEI	● ●	■ ■
Onoclea sensibilis	Sensitive Fern	PEI	● ●	■ ■ ■
VINES				
SPECIES	COMMON	NATIVE TO	SUNLIGHT	EDGE SLOPE BASIN
Clematis virginiana	Virgin's Bower	PEI	●	■ ■

PERENNIALS				
SPECIES	COMMON	NATIVE TO	SUNLIGHT	EDGE SLOPE BASIN
<i>Arisaema triphyllum</i>	Jack in the Pulpit	PEI	● ●	
<i>Asclepias tuberosa</i>	Butterfly Milkweed	CAN	●	
<i>Asclepias incarnata</i>	Swamp Milkweed	PEI	●	
<i>Chamaenerion angustifolium</i>	Fireweed	PEI	●	
<i>Cornus canadensis</i>	Bunchberry	PEI	● ●	
<i>Chelone glabra</i>	Turtlehead	PEI	● ● ●	
<i>Clintonia borealis</i>	Blue Bead Lily	PEI	● ●	
<i>Euthamia graminifolia</i>	Flat Top Fragrant Goldenrod	PEI	●	
<i>Eutrochium maculatum</i>	Joe-Pye Weed	PEI	● ●	
<i>Eupatorium perfoliatum</i>	Boneset	PEI	● ●	
<i>Geranium robertianum</i>	Herb Robert	PEI	● ●	
<i>Impatiens capensis</i>	Spotted Jewelweed	PEI	● ● ●	
<i>Iris versicolor</i>	Blue Flag Iris	PEI	● ●	
<i>Maianthemum canadense</i>	Wild Lily-of-the-Valley	PEI	● ●	
<i>Monarda fistulosa</i>	Wild Bergamont	CAN	●	
<i>Rosa blanda</i>	Wild Rose	PEI	●	
<i>Rosa palustris</i>	Swamp Rose	PEI	●	
<i>Rudbeckia laciniata</i>	Cutleaf Coneflower	PEI	● ● ●	
<i>Rudbeckia hirta</i>	Black-eyed Susan	CAN	● ●	
<i>Symphotrichum novae-angliae</i>	New England American-aster	CAN	●	
<i>Solidago flexicaulis</i>	Zig Zag Goldenrod	PEI	● ●	
<i>Solidago sempervirens</i>	Seaside Goldenrod	PEI	● ●	
<i>Viola sororia</i>	Wood Violet	PEI	● ● ●	

● FULL SUN ● PART SUN ● SHADE



CHARLOTTETOWN

Great things happen here.



This guide was prepared by Quinn Howard

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