



# DIY

# RAIN GARDEN GUIDEBOOK

Written and Designed by Paige Hugart, 2024



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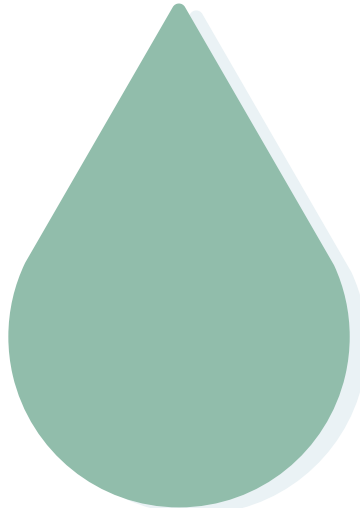
# ALL ABOUT RAIN GARDENS

## Learn More!

[About Rain Gardens](#)

[Testimonial](#)

[Master Rain Gardener](#)



## Rain Gardens...

- Filter pollutants from stormwater such as heavy metals, nitrogen, and phosphorous<sup>1</sup>
- Recharge groundwater aquifers<sup>1</sup>
- Protect rivers, lakes, and streams, and everything living in them<sup>1</sup>
- Support pollinators such as bees and Monarch butterflies<sup>2</sup>
- Feed songbirds during all four seasons<sup>3</sup>
- Support biodiversity and strong ecosystems by restoring native plant populations<sup>2</sup>
- Reduce basement flooding by diverting stormwater away from your home
- Reduce water pooling in yards and sidewalks
- Provide a beautiful garden for you and neighbors to enjoy

Rain gardens are shallow depressions, refilled with appropriate soil, planted with native plants, and covered with mulch. They allow stormwater from **impervious surfaces** (buildings, pavements, etc.) to be filtered, and **infiltrated** into the groundwater rather than quickly running into basements, sewer systems, or waterways. Infiltration is the process of moving water down into the soil where it becomes part of the **groundwater**.

The Birmingham Rain Garden Rebate Program is an integral part of the Birmingham Healthy Climate Plan, while installing a rain garden to manage stormwater runoff on your property aligns with the [MI Healthy Climate Plan](#) and the [Southeast Michigan Priority Climate Action Plan 2024!](#) When you install a rain garden, you're helping bring these plans to life!

Rain Garden Diagram: Paige Hughart; 1. <https://wires.onlinelibrary.wiley.com/doi/10.1002/wat2.1507>; 2. <https://doi.org/10.3390/land12071289>; 3. <https://doi.org/10.1007/s11355-017-0331-0>

# EXAMPLES



Photo: Paige Hughart



Photo: Clinton River Watershed Council



Photo: Carolyn M Crane



Photo: Michael Baker



Photo: Meridian Township



Photo: Emily Ferstle

Rain gardens have essential parts, but can look really different! You can add materials like stones or fences in the beginning or add them later.

# DIY PLANNING GUIDEBOOK





# GATHER PLANNING TOOLS

## Planning Tools:

1

- Tape Measure
- Paper + pencil for notes
- Graph paper (provided in guidebook)
- Hand trowel
- Hose or bucket of water
- Timer
- Marking/Garden spray paint  
OR hose to mark garden bed

2

## CALL MISS DIG

Call Miss Dig at 811 or submit an online request at [missdig811.org](https://www.missdig811.org) before digging.

Miss Dig will send folks to mark the location of your gas, electric, and water utilities. This can take around a week. Be aware that Miss Dig may not always mark private cable, propane, electric, and similar lines, so some additional site work may be necessary to locate these.



## 3 SELECT LOCATION

### Review Requirements and Considerations:

- Locate the rain garden at least 10 feet away and downhill from the foundations of any building and at least 2 feet from property lines.
- Do not place rain gardens over utility lines, septic systems, etc.
- Choose a flat or gently sloped place and ensure any overflow from the garden will go to a safe location away from any structures. If you have a hilly yard, place your rain garden near the bottom of the slope.
- Do not place a rain garden under existing trees to avoid large tree roots when digging so that trees are not damaged.
- The best location is where you have seen water pooling on your property downhill from any buildings.
- Not all sites are suitable for rain gardens! Rain gardens shouldn't be placed on steep slopes or where there is permanent standing water.



Photo: Fatimah Bolhassan

# DETERMINE GARDEN SIZE

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## Drainage Area:

Measure the area of the **impervious surfaces** that will flow to the rain garden. Typically, this is the area of the roof drainage being collected by a gutter downspout, but may include driveways and sidewalks that are immediately uphill from your rain garden.

You can use the measure tool in Google Earth or start from the known square footage of your home.

## Soil Type and Infiltration Rate:

Why is this important? Infiltration rate helps us understand your soil type and how quickly water might be able to be moved from the ground surface down into the soil. This helps determine the overall size and depth of your rain garden. Soil type is an important factor in infiltration. Clay soils tend to drain water more slowly while sandy soils drain more quickly.

If your soil has high levels of clay, we recommend shallow rain gardens (3-5 inches) with a large surface area to avoid long standing water and regular overflow. However, if you have sandy or silty soils, you have more freedom in your garden depth. Read more about installing rain gardens in clay soils [here!](#) When it comes to determining plants, know that clay soil holds moisture longer, so you'll want to use plants that can handle a higher level of moisture. If your soil is sandier, you'll choose plants that can handle drier conditions.

This [video](#) can help guide you through your infiltration test.



## Infiltration Test:

**1. Dig a hole that is about 6 inches in diameter and 18 inches deep.**

**2. Fill with water, wait until it is completely drained.**

The hole should drain within 24 hours or this site may not be suitable for a rain garden without the complete removal of soil and/or a sub-drain installation. If this happens, you can choose another location. Feel free to call for assistance.

**3. Fill the hole again with 12 inches of water.** and time the rate of infiltration.

**4. Use Table 1 to determine your infiltration rate.**

**5. Determine the basic soil type.**

Take the infiltration rate from Table 1 to determine the basic soil type. Use that to determine the sizing multiplier using Table 2. Use the sizing multiplier that aligns with your desired garden depth. Remember that a deeper garden will be smaller in square footage.

**5. Calculate Rain Garden Size.**

Take the drainage area previously measured and multiply it by the sizing multiplier. This will be the approximate size of the garden.

**Table 1: Infiltration Rate**

| Drains Within | Infiltration Rate    |
|---------------|----------------------|
| 6 hours       | 2.00 inches per hour |
| 12 hours      | 1.00 inches per hour |
| 18 hours      | 0.75 inches per hour |
| 24 hours      | 0.50 inches per hour |

**Table 2: Sizing Multiplier based on garden depth**

| Infiltration Rate           | Soil   | 3"-5" | 6"-7" | 8"   |
|-----------------------------|--------|-------|-------|------|
| >1.25 inches per hour       | Sandy  | 0.19  | 0.15  | 0.08 |
| 0.75 - 1.00 inches per hour | Silty  | 0.34  | 0.25  | 0.16 |
| <0.50 inches per hour       | Clayey | 0.43  | 0.32  | 0.20 |

**If your infiltration test results are less than 0.25 inches per hour, you may have to excavate your soil or choose another location.**



(Drainage area in sq ft) x (sizing multiplier)  
= **approximate rain garden size**

**If properly installed, rain gardens will not hold water for more than 24 hours so they are not a risk for mosquitos.**



# PLAN FOR EXCESS SOIL

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**When you dig your rain garden, you will have to move your excess soil to a different location. Make sure you have the tools to move soil and a place to store it long term.**

Here are some recommendations:

- Use your clay soil to build a berm around your garden -
- Move it to another garden bed -
- Fill outdoor pots, planters, and raised beds -
- Fix grading issues throughout your yard -
- Offer some to neighbors -

Photo: Fatimah Bolhassan

# DESIGN YOUR GARDEN

## 6

### Site Plan:

A site plan is an aerial view of a given area with key details drawn out. Once you've determined a general location for your rain garden, you can draw it on your site plan. Site plans help you determine what your project will look like in context and make sure it meets all the spacing recommendations.

You don't have to cover your entire property in the site plan, but it should cover the immediate context to the rain garden, such as the portion of the roof and other impervious surfaces draining into the garden, adjacent porches, trees, and garden beds, etc.

- Mark the downspout and/or impervious surfaces you would like to drain into your rain garden.
- Measure the impervious surfaces that will flow into your garden and draw them to scale on the graph paper.
- Locate objects in the yard, such as trees, fences, existing garden beds, and draw them as close to scale as possible on the site plan.
- Lightly sketch the approximate size and location of your future rain garden. Rework until you have the shape you want. Remember to include the berm around your rain garden in the sketch. Your berm will likely be about 1-1.5 feet wide.
- Draw the inlets. Inlets move water from impervious surfaces to the rain garden. They can be an overland swale or an underground drain. This guidebook will take you through how to build both.
- Label the overflow outlet and location. Make sure overflow isn't going into any buildings and try to avoid overflow directly onto impervious surfaces like sidewalks and driveways.
- Optional: include personalized details like a rock or brick border outside the berm. Neat borders can help make a native plant rain garden match the rest of your yard. These can be drawn in now or added later.

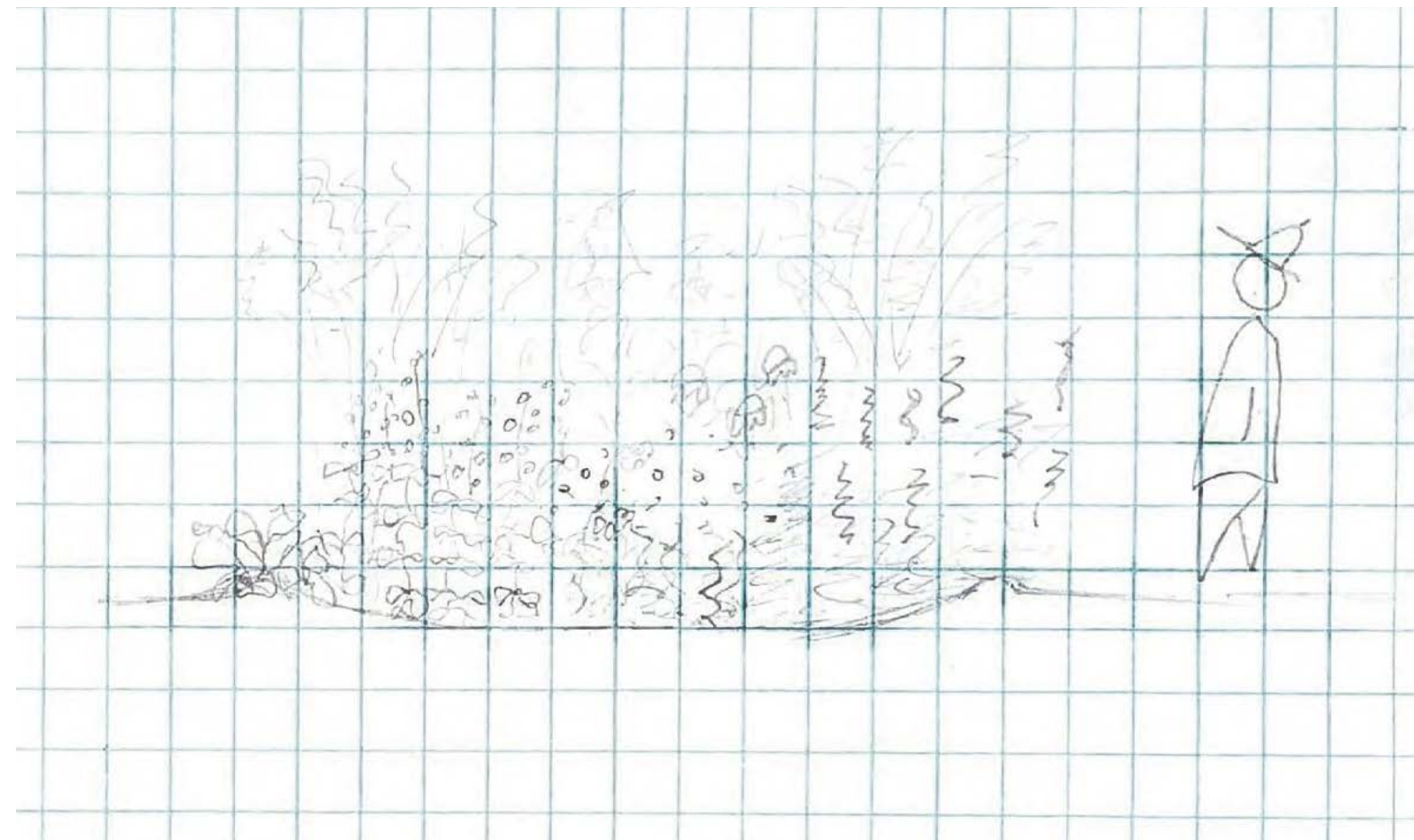
### Section:

A section is a view of your garden if you cut right down the middle. The main purpose of a section is to show height variation between objects.

Including a section helps ensure that your rain garden depth is correct and that berms are planned for. The section will also help you decide which plants should go where since height variation creates visual interest. Your section doesn't need to include context.

**Graph paper that you can print is included with this guidebook.**

**Generally, use**  
*each square = one square foot*



### Optional:

Draw your garden design onto your lawn using marking spray paint. To do this, determine the exact distance between the planned garden and existing points, spray those known points and then connect them into approximately the desired shape. Remember to include the berm!

- Rework until the shape feels right.
- Let the grass grow a little taller in that area to get a sense of what your rain garden will look like.
- You will have to mark the garden shape before digging anyway, but this can help make sure you'll be satisfied with the final product.

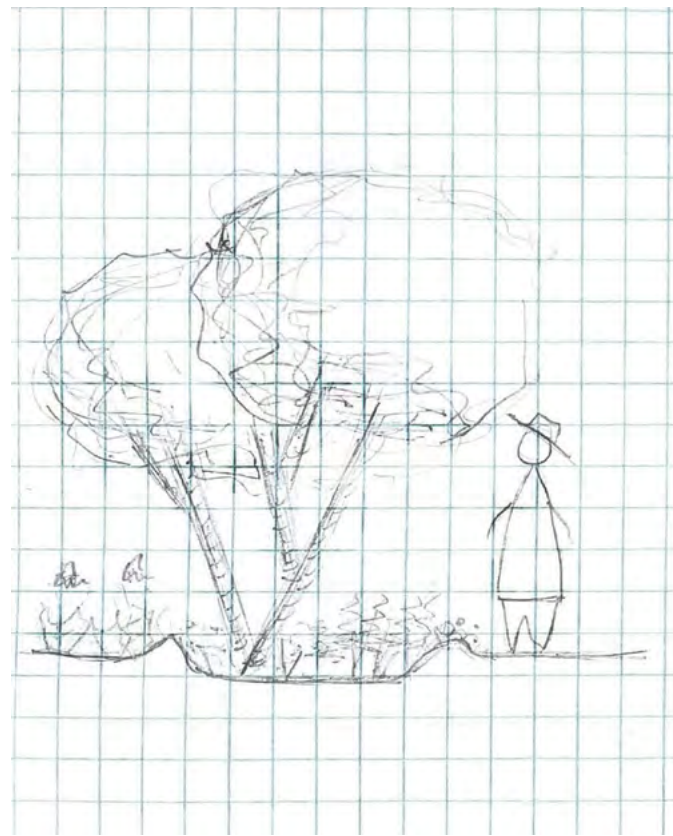
### Check your work!

Count the number of squares your drawn rain garden includes and make sure it equals close to the calculated rain garden size in square feet.

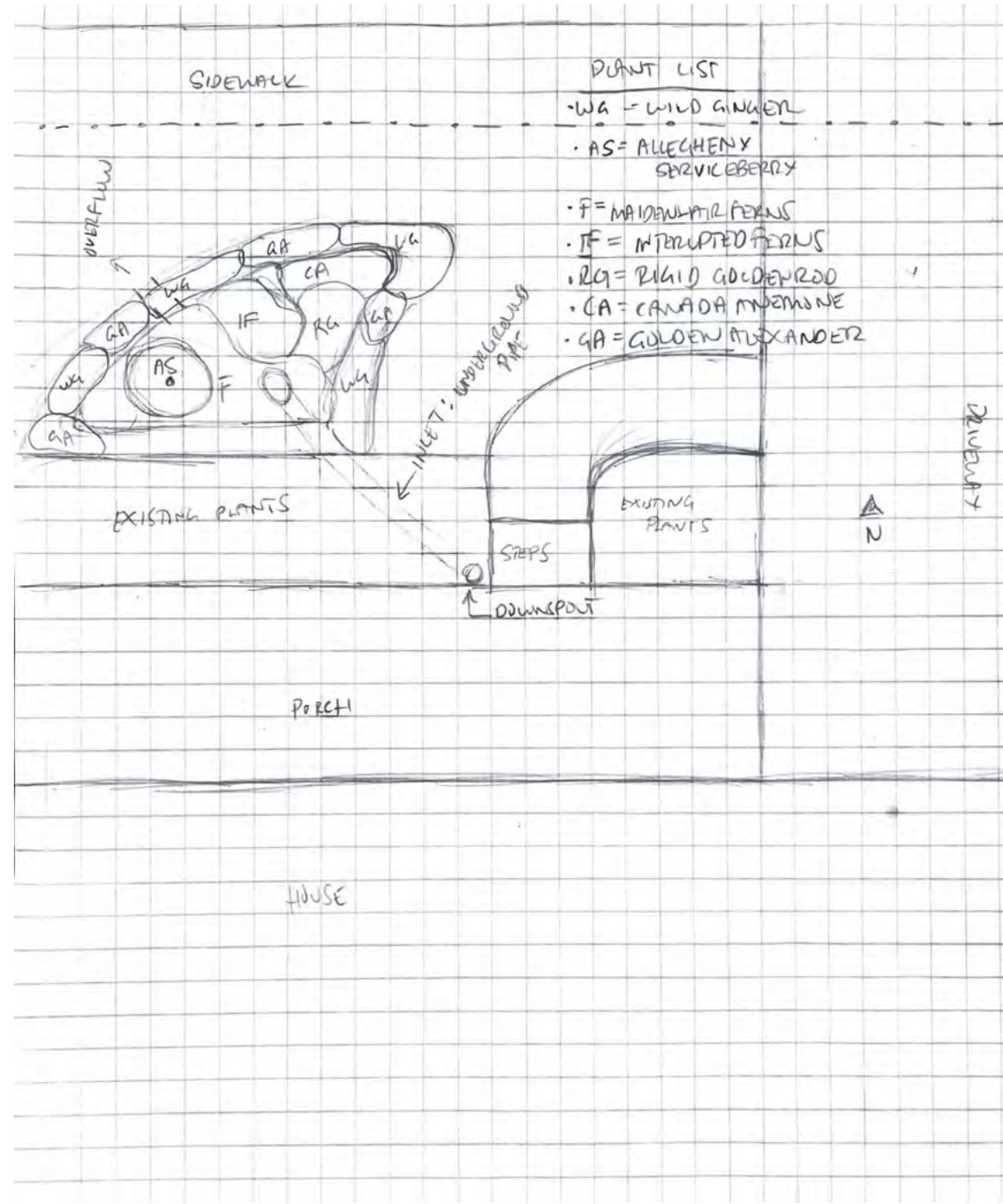
# EXAMPLE DESIGNS



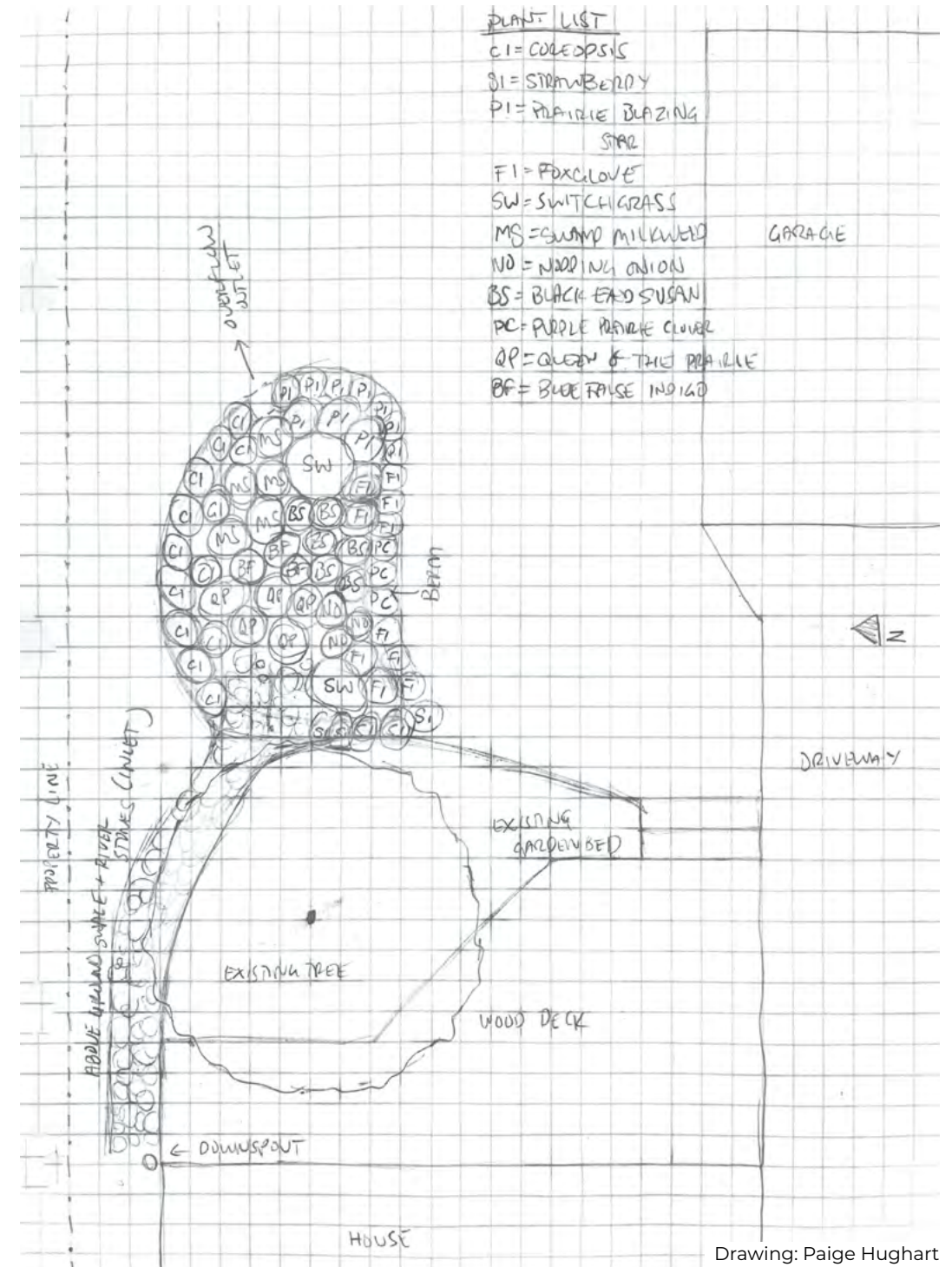
You can find more example designs in the [resources](#) shared by Friends of the Rouge!



Drawing: Paige Hugart



Drawing: Paige Hugart



Drawing: Paige Hugart

# DETERMINE PLANTS

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**Native plants** are used in rain gardens because they are well suited to both standing water and extremely dry conditions. Their roots are long enough to infiltrate water deeply into the soil and filter out pollutants before they end up in our waterways. Only transplants or potted plants can be used in rain gardens. Seeds will likely be washed away. If you have any of the listed plant species in your yard, you can transplant them to the rain garden!

Make sure you're not planting [invasive species](#).

## How many plants do I choose?

Use the garden size you previously calculated on and the equation below to determine the number of plants you need for your rain garden.

$$(\text{Garden size in sq ft}) / 2.25 = \# \text{ of plants}$$

## What kinds of plants do I choose?

The most important things to consider when choosing plants are the type of soil, sun requirements, and water requirements. Water loving plants should be planted at the center of the rain garden where water is likely to stand the longest. Dry loving plants should be planted near the edges of the rain garden and on berm slopes when needed. Most plants will do well in a range of soil types.

It's nice to consider things like bloom time and color so there is something beautiful to look at in your garden all season long and so that you're providing food for pollinators as often as possible! Height is a helpful consideration for aesthetics and logistics. Latin names are included so you can verify that the plant you're purchasing or reading about is definitely the one listed.

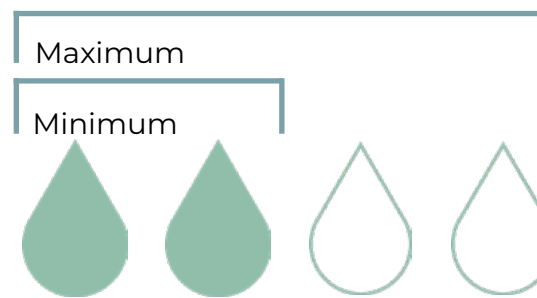
It's more visually appealing to plant herbaceous plants in groups of 3 or 5. On the other hand, if you want a truly natural, meadow feel to your garden, you can plan "on a matrix-" meaning you plant all your plants randomly and do not intentionally group the same species together.

[Check out the nursery recommendation list](#) from Friends of the Rouge!

## Plant List Symbols

These symbols are used in the plant list on the following pages. They will help you determine which plants will thrive in each section of your rain garden.

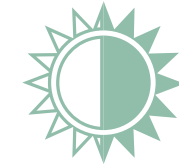
### Moisture Requirements



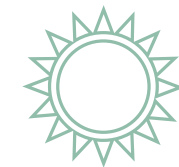
### Sun Requirements



**Full Sun:** 6+ hours per day

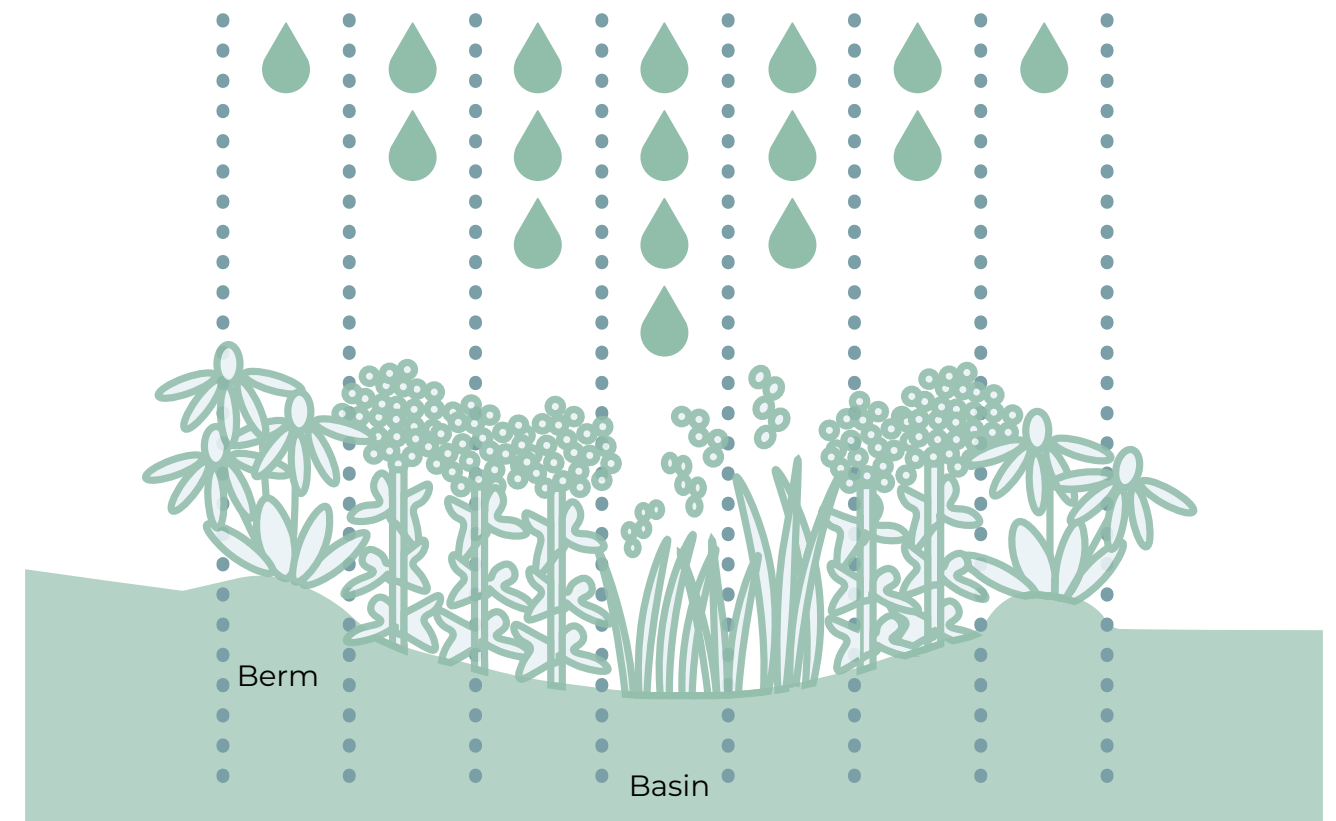


**Partial:** 3-6 hours per day



**Shade:** Less than 3 hours per day

### Rain Garden Moisture Map



Rain Garden Diagram: Paige Hughart

# PLANT LIST

Your infiltration test will help you determine your soil type. You can also use a filterable plant list like the ones provided [here](#) by Friends of the Rouge. Looking up plants by their latin name will ensure you're getting accurate photos!












































| Plant Name                  | Latin Name                | Light  | Moisture  | Flower Color  | Bloom Time | Height  |
|-----------------------------|---------------------------|--|---|---------------|------------|---------|
| Canada Anemone              | Anemone canadensis        |    |      | White         | May-July   | 1'-1.5' |
| Swamp Milkweed              | Asclepias incarnata       |     |             | Pink/Purple   | July       | 3'-4'   |
| Baptisia<br>OR False Indigo | Baptisia australis        |   |      | Blue          | June       | 3'-4'   |
| Hot Lips Turtlehead         | Chelone lyonii 'Hot Lips' |     |     | Pink          | Aug-Sept   | 2'-3'   |
| Purple Coneflower           | Echinacea purpurea        |     |      | Pink/Lavender | July-Aug   | 3'-3.5' |
| Joe-Pye Weed                | Eupatorium purpureum      |   |     | Pink          | July-Sept  | 3'-5'   |
| Queen of the Prairie        | Filipendula rubra         |     |     | Pink          | June-July  | 4'-5'   |
| Prairie Blazing Star        | Liatris pycnostachya      |   |     | Purple        | July-Oct   | 2'-3'   |
| Marsh Blazing Star          | Liatris spicata           |     |      | Pink          | June-July  | 4'-5'   |













































Photo: [Mt. Cuba Center](#)



Photos: [Michigan Flora](#) by species, unless otherwise marked

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| Plant Name            | Latin Name                | Light  | Moisture  | Flower Color | Bloom Time | Height |
|-----------------------|---------------------------|--|---|--------------|------------|--------|
| Wild Bergamot         | Monarda fistulosa         |         |     | Lavender     | July-Sept  | 2'-5'  |
| Interrupted Fern      | Osmunda claytoniana       |       |             | n/a          | n/a        | 1'-2'  |
| Foxglove Beard-tongue | Penstemon digitalis       |         |      | White        | June       | 3'-4'  |
| Compass Plant         | Silphium laciniatum       |   |             | Yellow       | July-Aug   | 4'-7'  |
| Prairie Dock          | Silphium terebinthinaceum |   |      | Yellow       | Aug        | 8'     |
| Ohio Goldenrod        | Solidago ohioensis        |   |     | Yellow       | Aug-Sept   | 3'-4'  |
| Riddell's Goldenrod   | Solidago riddellii        |   |     | Yellow       | Aug-Oct    | 2'-4'  |
| Rigid Goldenrod       | Solidago rigida           |   |     | Yellow       | Jul        | 3'-4'  |
| Yellow Coneflower     | Ratibida pinnata          |     |     | Yellow       | July-Sept  | 4'-5'  |



Photos: [Michigan Flora](#) by species, unless otherwise marked

# PLANT LIST


























Your infiltration test will help you determine your soil type. You can also use a filterable plant list like the ones provided [here](#) by Friends of the Rouge. Looking up plants by their latin name will ensure you're getting accurate photos!

| Plant Name        | Latin Name                          | Light  | Moisture  | Flower Color   | Bloom Time | Height | Photo  |
|-------------------|-------------------------------------|--|---|----------------|------------|--------|--|
| Rosin Weed        | <i>Silphium integrifolium</i>       |     |    | Yellow         | July-Sept  | 3'-5'  |   |
| Cup Plant         | <i>Silphium perfoliatum</i>         |    |    | Yellow         | July-Sept  | 5'-10' |   |
| Smooth Aster      | <i>Symphyotrichum laeve</i>         |     |    | Lavender, Blue | Aug-Oct    | 2'-4'  |   |
| New England Aster | <i>Symphyotrichum novae-angliae</i> |    |    | Purple         | Aug-Oct    | 3'-6'  |    |
| Ironweed          | <i>Vernonia missurica</i>           |   |  | Purple         | July-Oct   | 4'-5'  |   |
| Golden Alexander  | <i>Zizia aurea</i>                  |  |  | Yellow         | May-June   | 1'-3'  |   |
| Big Bluestem      | <i>Andropogon gerardii</i>          |   |  | Green, Red     | Aug-Oct    | 5'-8'  |  Photo: <a href="#">UMass Amherst Extension</a> |
| Canada Wild Rye   | <i>Elymus canadensis</i>            |   |  | Cream          | Jul-Aug    | 4'-5'  |   |
| Switch Grass      | <i>Panicum virgatum</i>             |   |  | Green, Cream   | Aug-Sept   | 3'-6'  |   |

Photos: [Michigan Flora](#) by species, unless otherwise marked

# PLANT LIST

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



























| Plant Name            | Latin Name                          | Light  | Moisture  | Flower Color | Bloom Time | Height | Photo   |
|-----------------------|-------------------------------------|--|---|--------------|------------|--------|---|
| Maidenhair Fern       | <i>Adiantum pedatum</i>             |   |    | n/a          | n/a        | 1'-2'  |    |
| Nodding Pink Onion    | <i>Allium cernuum</i>               |   |    | White, Pink  | July-Aug   | 1'-2'  |    |
| Common Bluestar       | <i>Amsonia tabernaemontana</i>      |         |    | Blue         | May-June   | 2'-3'  |  <small>Photo: <a href="#">North Carolina Extension Gardener</a></small> |
| Wild Ginger           | <i>Asarum canadense</i>             |     |    | Burgundy     | May-June   | <1'    |   |
| Purple Prairie Clover | <i>Dalea purpurea</i>               |   |  | Purple       | July-Aug   | 1'-2'  |    |
| *Sedges               | *Most species of <i>Carex</i> genus |   |  | n/a          | n/a        | Varies |    |
| Bee Balm              | <i>Monarda didyma</i>               |   |  | Red          | June-Aug   | 2'-5'  |    |
| Indian Grass          | <i>Sorghastrum nutans</i>           |   |  | Green, Gold  | Aug-Sept   | 5'-7'  |    |
| Black-eyed Susan      | <i>Rudbeckia hirta</i>              |     |  | Yellow       | June-Sept  | 1'-3'  |    |

Photos: [Michigan Flora](#) by species , unless otherwise marked


















































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| Plant Name         | Latin Name               | Light  | Moisture  | Flower Color | Bloom Time | Height | Photo   |
|--------------------|--------------------------|--|---|--------------|------------|--------|---|
| Wild Strawberry    | Fragaria virginiana      |          |      | White        | May-June   | 6"-1'  |    |
| Wild Geranium      | Geranium maculatum       |          |      | Pink/Purple  | May-June   | 1'-2'  |    |
| Columbine          | Aquilegia canadensis     |     |      | Red          | May-June   | 2'-3'  |    |
| Rattlesnake Master | Eryngium yuccifolium     |   |     | White        | July-Sept  | 2'-3'  |   |
| Blue flag iris     | Iris virginica           |    |     | Purple       | May-June   | 2'-3'  |    |
| Blue Lobelia       | Lobelia siphilitica      |    |      | Blue         | July-Sept  | 1'-3'  |    |
| Culver's Root      | Veronicastrum virginicum |    |      | White        | July-Aug   | 4'-6'  | <br>Photo: <a href="#">North Carolina Extension Gardener</a> |
| Butterfly Weed     | Asclepias tuberosa       |   |      | Orange       | May-Sep    | 1'-2'  |    |
| Wood Poppy         | Stylophorum diphyllum    |     |     | Yellow       | April-June | 1'-2'  |    |

# TREES & SHRUBS LIST






















































If you're planting large shrubs or trees, choose other plants based on the current light conditions and plan to make changes to your rain garden as the shrubs and trees grow larger, crowding and shading other plants.

| Plant Name             | Latin Name               | Light  | Moisture  | Flower Color | Bloom Time | Height  |
|------------------------|--------------------------|--|---|--------------|------------|---------|
| River Birch            | Betula nigra             |     |             | n/a          | n/a        | 70'     |
| Northern White Cedar   | Thuja occidentalis       |     |      | n/a          | n/a        | 30'-50' |
| Allegheny Serviceberry | Amelanchier laevis       |     |      | White        | April-May  | 6'-15'  |
| American Hazelnut      | Corylus americana        |     |     | Red          | April-May  | 3'-6'   |
| Ninebark               | Physocarpus opulifolius  |     |      | White        | May-June   | 5'-8'   |
| Black Chokeberry       | Aronia melanocarpa       |     |      | White        | May-June   | 4'-6'   |
| Red Osier Dogwood      | Cornus sericea           |     |     | White        | May-June   | 6'-9'   |
| Low Gro Fragrant Sumac | Rhus aromatica 'Gro Low' |     |     | Red Berries  | n/a        | 2'-3'   |
| Eastern Redbud         | Cercis canadensis        |    |      | Pink         | May        | 20'-25' |



# TREES & SHRUBS LIST

If you're planting large shrubs or trees, choose other plants based on the current light conditions and plan to make changes to your rain garden as the shrubs and trees grow larger, crowding and shading other plants.

| Plant Name          | Latin Name                  | Light  | Moisture  | Flower Color | Bloom Time  | Height  |
|---------------------|-----------------------------|--|---|--------------|-------------|---------|
| Paw Paw             | <i>Asimina triloba</i>      |    |             | n/a          | n/a         | 15'-30' |
| Musclewood          | <i>Carpinus caroliniana</i> |    |             | White        | April-May   | 12'-30' |
| Silky Dogwood       | <i>Cornus amomum</i>        |    |             | White        | June-July   | 3'-9'   |
| Kalm's St John Wort | <i>Hypericum kalmianum</i>  |     |         | Yellow       | June-August | 1'-4'   |
| Pussy Willow        | <i>Salix discolor</i>       |   |     | White        | March-April | 6'-20'  |
| Bur Oak             | <i>Quercus macrocarpa</i>   |   |     | n/a          | n/a         | 60'-85' |
| Swamp White Oak     | <i>Quercus bicolor</i>      |   |     | n/a          | n/a         | 60'-80' |
| Winterberry         | <i>Ilex verticillata</i>    |   |     | Red Berries  | August-May  | 4'-6'   |
| Spicebush           | <i>Lindera benzoin</i>      |     |     | Yellow       | April-May   | 5'-10'  |



# SOURCE MATERIALS

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## Compost & Mulch

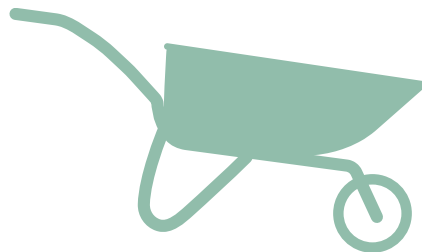
Use the formulas below to calculate the amount of compost and mulch you will need to lay it 2 inches deep in the garden.

Adding compost to rain gardens increases the amount of pollutants the garden can filter from stormwater.

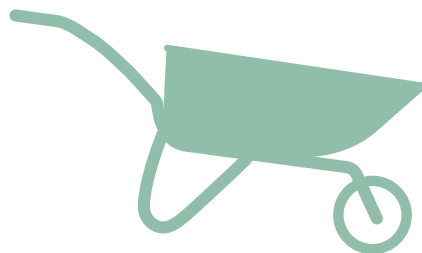
**Plan to store mulch and compost between when it arrives and when it is added to the rain garden!**

In your driveway or on a tarp somewhere in your yard. Just consider how far you will be moving it with a wheelbarrow.

(Garden area in sq ft) x .00617 =  
**Compost in Cubic Yards**



(Garden area in sq ft) x .00617 =  
**Mulch in Cubic Yards**



## Inlet Materials

Measure and note the distance from the downspout or other impervious surface that will supply water to the rain garden. This will tell you how much material is needed for the inlet.



Photo: Fatimah Bolhassan

## Tools & Materials:

- Tape Measure
- Shovels
- Rakes
- Trowels
- Level
- Wheelbarrow
- Marking/Garden spray chalk
- Compost: fully finished/broken down
- Mulch: double or triple shredded and aged minimum 6 months

### For Dry Swale Installation:

- Optional: stones
- Optional: native plants
- Optional: downspout extender

### For Pipe Installation:

- Black non-perforated pipe or PVC
- Grate or Pop Up Emitter to fit chosen pipe
- Two small screws
- Electric Drill
- Rocks for end of pipe
- Optional: Sawzall with metal appropriate blade

# DIY INSTALLATION GUIDEBOOK



# STEP BY STEP INSTALLATION

## 1. Transfer site plan to the ground

Make the general shape and size of your rain garden using either spray chalk or a garden hose. Start by measuring known distances from set points included in your site plan such as the corner of a porch, a fence, or the trunk of a tree.

This [video](#) can help with the hose method!



Photo: Paige Hughart

## 2. Remove grass

Remove grass from your garden site + 12-18" to make space for the berm and prevent grass growth into the rain garden. You can remove grass using a shovel, sod cutter, or by laying cardboard over the defined area for about two weeks.

Remember to have a plan for where to take the sod and soil removed during the rain garden installation! Load a wheelbarrow while you're digging and move it periodically.



Photo: Paige Hughart

## 3. Dig!

Dig your desired garden depth PLUS 2 inches to be back filled with compost. Build the berm about two inches tall as you're digging out the garden basin using mostly clay soil that comes from your basin. Make sure the bottom is level and the slope up the berm is gradual. The berm is most important at the downhill side of your rain garden. Add a notch in the downhill side berm to lead water to your overflow location.

**Do not dig while soil is wet!**



Photo: Paige Hughart

## 4. Build your inlet

You can choose a buried pipe or an overland swale to move water into your rain garden.

### Underground pipe:

The pipe should run downhill to the rain garden and the inlet should be above the elevation of the emergency overflow notch. Use a non-perforated pipe made of either black plastic or PVC. The end of the pipe can end with a grate or a pop-up emitter.

1. Dig trench from directly underneath downspout into the rain garden. Using a level, make sure the trench is downsloping the entire way.
2. Lay the pipe in the trench and double check that it is still continuously sloping toward the rain garden.
3. Cut downspout about 12" from ground and attach pipe to downspout using small screws.
4. Add either a grate or pop-up emitter at the end of the pipe in the garden and surround it with stones to decrease soil erosion when water comes out of the pipe.
5. Make sure to rebuild and level any part of the rain garden changed by installing the inlet.



Photo: Paige Hughart

### Overland Swale:

If your garden is downhill from your downspout, rain water will flow over land and will often infiltrate into the ground while moving through the channel. Your swale can be made of stones, native plants, or simply be a lowered grassy pathway. If you're using this method, make sure your downspout is extended at least four feet from the building before entering the overland swale in order to avoid water damage to your foundation.

1. Dig very shallow overland swale from end of downspout to the rain garden. Make sure the swale is down sloped toward the garden the entire length using a level.
2. Fill with stones or plant with native plants, or let grass grow.



Photo: Clinton River Watershed Council

# STEP BY STEP INSTALLATION

## 5. Add compost

Lay two inches of compost along the basin and make sure it is still level.

Adding compost to your rain garden increases the amount of pollutants your rain garden can filter from stormwater. This keeps those pollutants out of waterways!



Photo: Paige Hughart

## 6. Add plants

Place plants where you want them. Bury them about level with the top of the compost. Burying them too deep or shallow could cause them to die. You can add mulch before planting if needed!



Photo: Clinton River Watershed Council

## 7. Add mulch

Lay two inches of mulch almost touching the plants. Do not pile mulch too close to the base of the plant or it may cause disease.



Photo: Clinton River Watershed Council

**Expect better infiltration once plants are more established. Their roots will push through clay particles over time!**

## 8. Restore the disturbed area

Level out all disturbed areas and lay grass, clover seed, or a garden bed as desired.



Photo: Paige Hughart

## 9. Monitor your rain garden!

Check on your rain garden during and between the next couple of storms! Is water flowing into the garden? Are the plants doing well? Has mulch moved? How are your plants doing?



Photo: Clinton River Watershed Council

**If you lose young plants to standing water, open up the berm and allow plants to establish. Once they are larger, close the berm and allow the rain garden to function as planned.**

# DIY

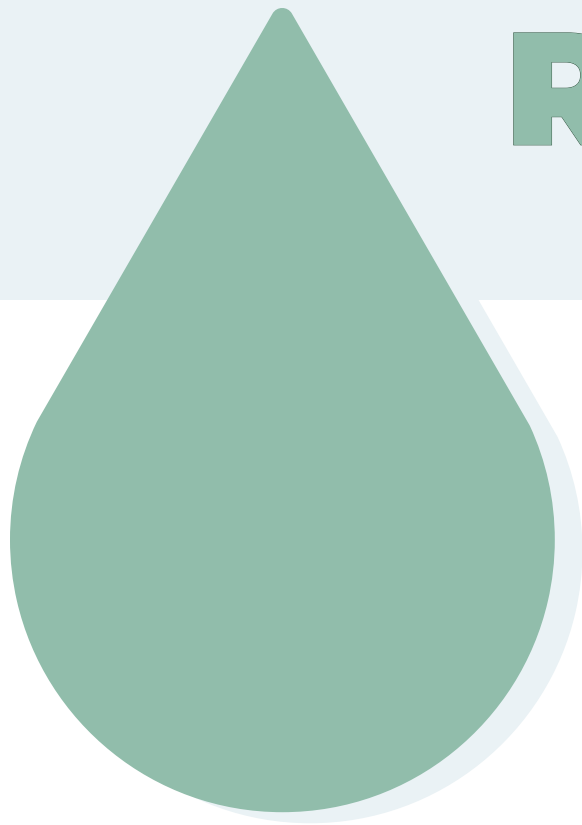
# MAINTENANCE

# GUIDEBOOK





# RAIN GARDEN MAINTENANCE



- Check inlets for debris and make sure the water is flowing smoothly into your rain garden. Remove accumulated sediment at the inlet annually.
- Water your newly planted rain garden during periods of drought until plants are established. This is more of a concern for rain gardens built in the spring. Your rain garden will require less watering than other garden beds, so water just enough to keep them from perishing in the first growing season. Your garden won't need to be watered after the first year.
- If you have trees or shrubs in your rain garden, these will need to be watered more regularly during the first season. Follow the planting instructions from the nursery to make sure these establish themselves.



## DO NOT USE PESTICIDES, HERBICIDES, OR FERTILIZERS IN YOUR RAIN GARDEN.

**Part of rain garden's purpose is to filter pollutants from the water. Using chemical management negates this. Do not apply fertilizers to your lawn too close to your rain garden and especially not in your above-ground swale leading to the rain garden if that is your inlet style.**

- Maintain the rain garden border by clipping and weeding. Lining the berm with natural stone or bricks is helpful.
- After the first year, you should cover bare spaces in your rain garden with additional native plants. If plantings become too dense, you can split plants and move them to other locations or swap them with friends.
- If your rain garden holds water for more than 48 hours after it is planted, you may need to replace the soil or choose another location.
- Remove dead plant material in the spring following the first three consecutive days of 50 degree + weather. Leave dead plant materials standing during the fall and winter for visual interest, birds, and insects.
- Remove weeds by hand regularly.



Photo: Fatimah Bolhassan

# WHAT TO EXPECT



## Weeding

Weeding your rain garden is extremely important in the first and second growing season. There are two methods we recommend. You can stick to one or use both when it works best!

### String stage weeding

This is where you identify a plant as young as possible, often in the cotyledon phase (when the seed has germinated and only one or two leaves have grown), then remove the entire plant. This method ultimately saves time because plants are easily removed at this stage and do not crowd your native plants. It is important to be able to recognize weed cotyledons over native plant cotyledons.

### Chop and Drop weeding

This is where you identify a large weed and chop the top off, leaving the roots in the ground. This weakens the plant without removing the organic material from the soil. The organic matter continues to build the soil health, while the unwanted plant is weakened and your native plants can eventually smother it. Leaving the roots and soil undisturbed builds healthier soil over time without potentially activating the seedbank and causing more weeds to germinate. Note - we do not recommend this for creeping grasses or invasive species. Those should be pulled as soon as possible.



Photo: Meridian Township



Photo: Paige Hughart

## Year 1



## Year 2



Photo: Paige Hughart

## Year 3

Rain gardens, like any native plant garden, look different from year 1 to year 3. There is variation depending on the age and type of plants you choose, but these photos give a general idea of what to expect your rain garden to look like from year to year and from spring to fall. By year three, your plants will likely be well established.



Photo: Paige Hughart

**Use this [common weed list](#) as a guide!**

# ACKNOWLEDGEMENTS

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## Following the lead of...

The following rain garden programs have established leading practices in Southeastern Michigan residential rain garden installation and rebate programs. Much of this content pulls from their expertise.



- [Rain Catchers Collective](#)
- [Clinton River Watershed Council](#)
- [Friends of the Rouge](#)
- [Huron River Watershed Council](#)

[RainSmart Rebates](#)  
(coordinated by Oakland County in partnership with the Clinton River Watershed Council)

[Rain Gardens to the Rescue](#)  
(coordinated by Friends of the Rouge and Sierra Club of Michigan)

[Ann Arbor Rain Garden Program](#)

[Master Rain Gardener Program](#)  
(coordinated by Washtenaw County Water Resources)

[Dearborn Rain Garden 50/50 Cost Share Program for Sustainable Lawns](#)

[Royal Oak Rain Garden Program](#)

