



# DRIP HANDBOOK



## Learn how to:

- ▶ Disconnect your downspout
- ▶ Install a rain barrel
- ▶ Plant a rain garden

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## **What is DRIP?**

When rain falls on hard surfaces like rooftops, patios and driveways, it runs off the land, carrying pollutants and excess water to local creeks and rivers causing serious issues like flooding and erosion. The Disconnection Redirection Infiltration Program (DRIP) is a storm water management program that teaches homeowners methods to reduce storm water pollution. This handbook is your guide to improving water quality and reducing the amount of storm water runoff on your property.

# DOWNSPOUT DISCONNECTION



Downspouts are pipes that carry and channel rain water and snow melt from your roof and gutters. In many areas, downspouts are piped into the ground and connect to the sewer system. In other areas, downspouts are discharging directly onto the ground. Downspout disconnection is the removal of the lower portion of your home's downspout and adding an extension that allows you to control where the water is discharged on your property.

## Why should you disconnect your downspout?

### A disconnected downspout:

- Redirects water from the sewer system, reducing the burden on sewer pipes, leading to less sewer overflows, flooding, erosion and water pollution.
- Can save you money on your water bill if you direct the water into a garden or a rain barrel for later use.



## Reflect Before You Disconnect

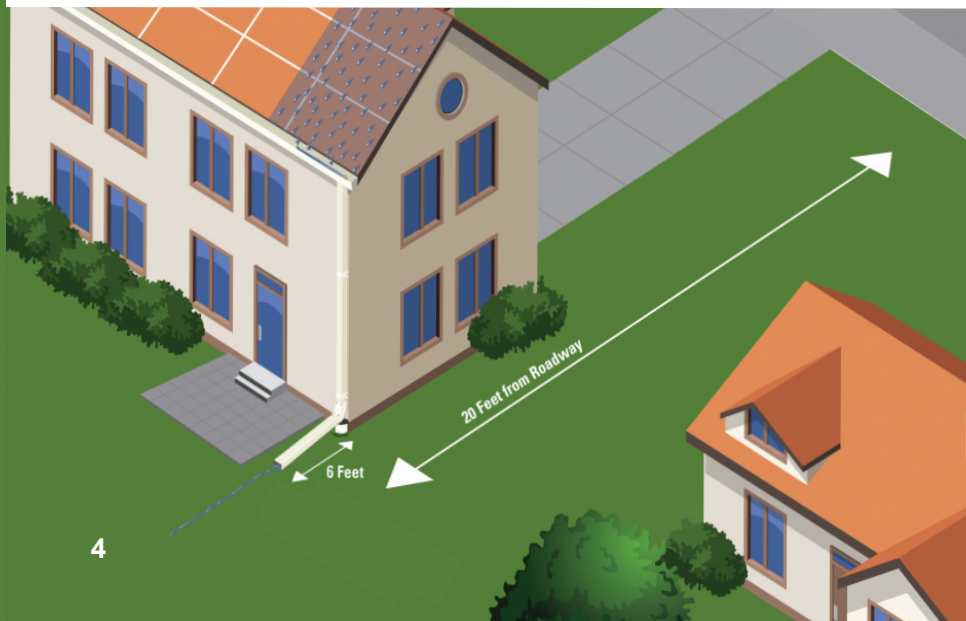
### Is a disconnection right for you?

You should not disconnect your downspout if:

- You do not have enough green space or an area in your yard that can handle excess water.
- It will cause water problems for you or your neighbor.
- It will create unsafe sidewalk or road conditions.

### Where will the excess water go?

Installing storm water best management practices like a rain barrel or rain garden to collect excess water is highly recommended. However, you can also direct water to your lawn, but be sure to use the following guidelines.





## Downspout Disconnection Guidelines

- ☐ Check with your city and county to ensure your disconnection method meets local requirements.
- ☐ Call Kentucky811, the “Call Before You Dig Center” at 1-800-752-6007 and all local utility companies to ensure you do not drain water over utility lines. For septic systems, call the Northern Kentucky Health Department at 859-341-4264.
- ☐ Verify the excess water will slope away from your house and drain at least:
  - 6 feet from your foundation
  - 5 feet from a public sidewalk
  - 20 feet from a roadway
- ☐ Be sure the drainage area is about 10 percent of the roof area that drains to the downspout. See page 6 for directions and sample calculation.
- ☐ To prevent erosion, use a splash block or rocks beneath your downspout. Note the example pictured on page 10.

## Calculate the drainage area

1. Multiple the house length by house width to determine how many square feet of rooftop you have.
2. Divide the square feet of rooftop by the number of downspouts to determine the area of rooftop that drains to each downspout.
3. Multiply that number by 0.10 to get the area of yard or landscaping you need.

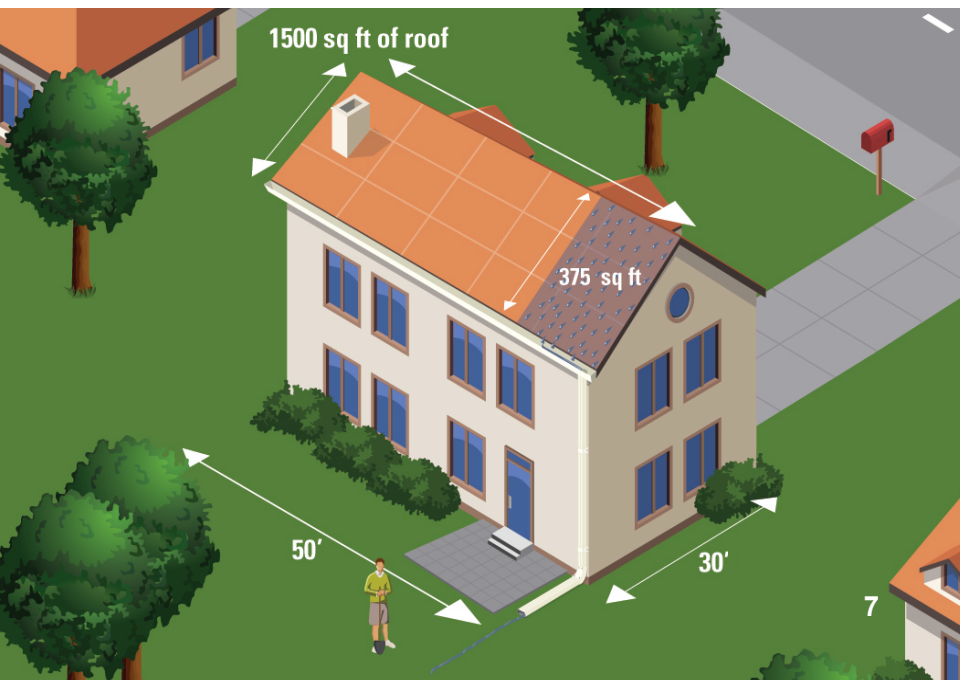
### ***Sample calculation for determining the area of yard or landscaping you need to disconnect your downspout:***

- *50 ft. (length of home) x 30 ft. (width of home) = 1,500 sq. ft. of rooftop*
- *1,500 sq. ft. of rooftop / 4 downspouts = 375 sq. ft. draining to each downspout*
- *375 sq. ft. x .10 = 37.5 sq. ft. of yard or landscaping needed*

# How to Disconnect Your Downspout

## Tools and materials needed:

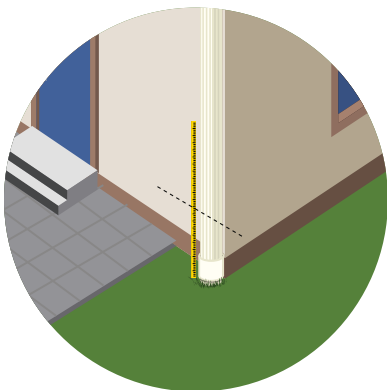
- Tape measure
- Hacksaw
- Metal file
- Pliers
- Drill
- Sheet metal screws
- Protective equipment (eye, hand, foot)
- Downspout elbow or flexible hose
- Downspout extension piece
- Standpipe expansion plug with a hose clamp or a cap with a wing nut (measure the diameter of the standpipe to size)
- Brackets to secure the downspout to your house (optional)
- Splash block and/or rocks (optional)



## 1. Measure

Measure the length of the elbow or flexible hose that will be used for the extension and mark the spot on your downspout. Measure up from the standpipe where the downspout enters the ground to ensure your elbow or flexible hose will fit.

The cut is usually eight or nine inches above where the downspout enters the ground.



**Note:** If you plan to install a rain barrel, be sure to measure and cut your downspout so that your rain barrel and connector pieces will fit.

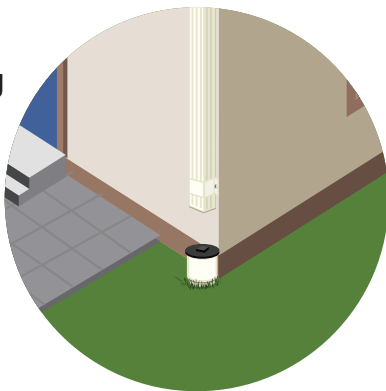
## 2. Cut

Cut the downspout where you marked it with a hacksaw and use a metal file to smooth the rough edges of the downspout.



### 3. Close the standpipe

Use a cap with a hose clamp or a plug with a wing nut to close the sewer standpipe coming out of the ground. Measure the diameter of the standpipe to find the appropriate size plug or cap. Do not cover the pipe with concrete or loosely-fitted objects.

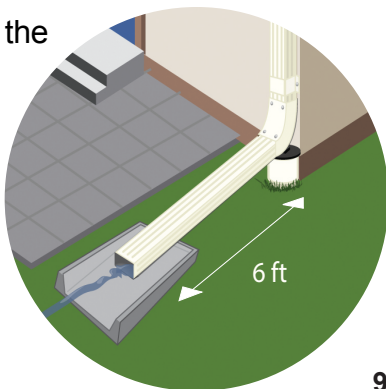


### 4. Attach the extension piece

Insert the elbow or flexible hose into the cut downspout. You may need to crimp the end of the downspout with pliers to ensure a tight fit. Make sure the extension piece is long enough so that water discharges at least six feet from your home's foundation.

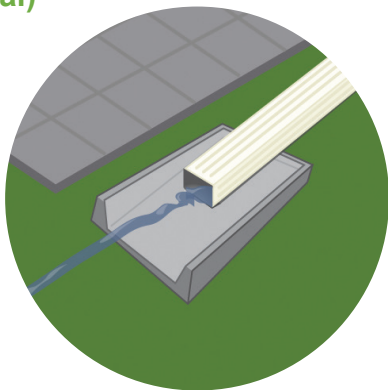
### 5. Secure the connections

Drill holes on both sides of the downspout, elbow/flexible hose and extension piece and secure all pieces together with metal screws. You may also need to secure your downspout to your house using brackets to keep it from moving too much.



## 6. Prevent erosion (optional)

Place a splash block or rocks beneath your downspout extension to prevent erosion or direct the flow of storm water from your downspout into a rain barrel or rain garden.



## 7. After it rains

Check the discharge area to ensure it handles the excess storm water. If water isn't soaking into the ground or it is causing problems, you may need to redirect the downspout to a more suitable area.

**Remember to ensure the flow is discharging at least 6 feet from your home's foundation, 5 feet from a public sidewalk and 20 feet from a roadway. Make sure flow is not affecting your neighbor's property.**

## Maintain Your Downspout

Periodically check pipes and connection pieces for debris and remove if necessary to prevent clogs.

Check that all connections are secure and not leaking. Especially note if pipes are successfully discharging water away from your foundation.

# RAIN BARRELS

A rain barrel is a container that collects and stores storm water runoff from your roof. Typically this runoff would either enter the sewer system or discharge out onto your yard. Instead, rain barrels store this water for later use.

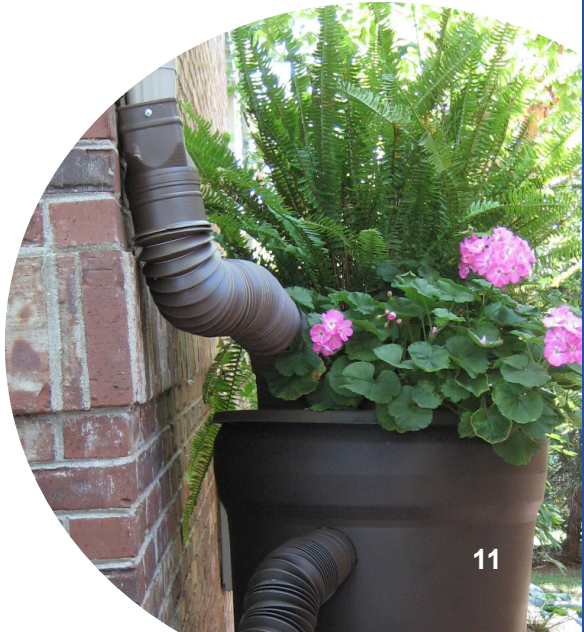


## Why should you install a rain barrel?

A rain barrel helps prevent the sewer system from becoming overwhelmed with excess storm water which reduces:

- Storm water pollution
- Flooding
- Erosion
- Sewer overflows

A rain barrel can also reduce your water bill by using the rain water to water your yard or landscaping.



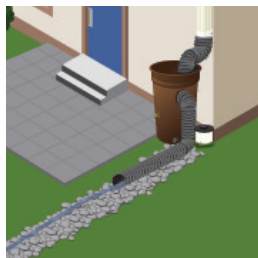


## Choose a Rain Barrel

Rain barrels come in all shapes and sizes, so be sure to choose a functional barrel that is right for your property.

### Functional rain barrels have:

- Quality plastic or brass spigots.
- An overflow output that is at least the same diameter as your downspout to allow excess water to exit the barrel freely.
- A removable lid so you can easily remove any dirt or debris that collects in your barrel.



### Consider your property

When positioning your rain barrel, ensure that the areas where you will be connecting your downspout and attaching hoses will be easily accessible. Lastly, be sure the design complements your home and property.



## Feeling Creative? Paint Your Rain Barrel!

Whether you are feeling artistic or want to educate your family through a fun project, a simple design on your rain barrel can go a long way.

# Paint Your Rain Barrel

## Materials needed:

- Plastic rain barrel
- Lint-free rags
- Ultra-fine sandpaper (800-1000 grit)/palm sander
- Warm water/hose
- White distilled vinegar
- Spray acrylic plastic primer
- Spray acrylic plastic paint (basecoat)
- Outdoor spray acrylic or polyurethane sealer
- Scrub brush
- Assorted decorative synthetic paint brushes, artist acrylic paints and stencils (optional)

## Directions:

1. Clean inside/outside of barrel using an equal mix of warm water and white distilled vinegar. Allow barrel to air dry.
2. Sand the outside of the barrel until dull.
3. Remove sanding dust with a clean scrub brush and water. Rinse and dry barrel.
4. Apply primer.
5. Apply basecoat paint color, apply additional coat(s) as necessary.
6. Decorate barrel with hand-painted designs or stencils. Have fun and be creative!
7. Protect your art with one to three top coats of sealer.

*\* Always follow paint manufacturer's instructions for application and dry time.*

# How to Install a Rain Barrel

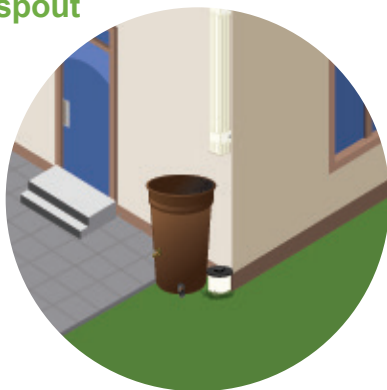
## Tools and materials needed:

- A rain barrel and any tools and materials needed for assembly listed in the rain barrel manual
- Tools and materials listed in the Downspout Disconnection section of this guide for disconnecting your downspout
- Extension hoses or connector pieces to divert the water from your downspout into the rain barrel and to discharge excess water in your barrel from the overflow output

**Note:** Before you purchase or install a rain barrel, check city and county ordinances to ensure your rain barrel and plans meet local requirements. Also check with your homeowners association (HOA) to see if there are any restrictions on rain barrels.

## 1. Disconnect your downspout

Follow the steps in the Downspout Disconnection section of this guide to disconnect your downspout. Be sure to measure and cut your downspout so that your rain barrel and any connector pieces will fit.



## 2. Assemble the rain barrel

Assemble your rain barrel following the instructions in your rain barrel manual.

## 3. Connect your downspout to your rain barrel

Cover the end of your cut downspout with an elbow or flexible hose as instructed in the Downspout Disconnection section of this guide and direct the flow of storm water from your downspout into the opening of your rain barrel.

## 4. Direct the overflow from your rain barrel

The overflow from your full rain barrel can be discharged onto your yard or landscaping, a rain garden or back into the sewer system from which you disconnected your downspout. The overflow pipe should be at least the same diameter as the downspout.



**Note:** If you discharge the overflow onto your yard, remember to ensure the water exits the hose/pipe at least 6 feet from your foundation, 5 feet from a public sidewalk and 20 feet from a roadway. **Also, be sure the water is not affecting your neighbor's property.**

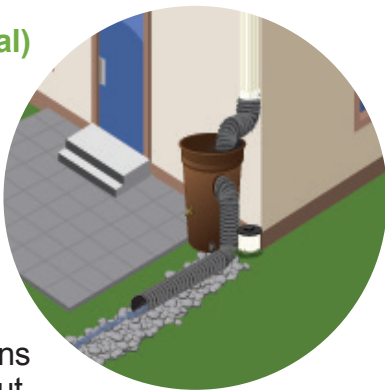
## 5. Prevent erosion (optional)

Place a splash block or rocks beneath the overflow pipe to slow the flow of water.

### After it rains

Inspect your rain barrel to make sure that all connections are good and your downspout is emptying water properly. When your barrel is full, check the overflow output to be sure the excess water is exiting the rain barrel freely.

Don't forget to check the overflow area to ensure the land is handling the excess water. Water should not pool in your yard. If it isn't soaking into the ground, redirect the output to a more suitable area.



## Maintain Your Rain Barrel

**Clean:** Use mild soap and water to clean your barrel. Water pressure from a garden hose is usually helpful in cutting away grime.

**Winterize:** When temperatures dip below 40 degrees, drain, clean, disconnect and store your rain barrel inside. Be sure to redirect your downspout connection piece to a suitable area on your property.

### CAUTION:

Never drink water stored in your rain barrel.

# RAIN GARDENS

A rain garden is a shallow, vegetated area that beautifies your property as well as helps to control storm water runoff and improve water quality.



## Why should you plant a rain garden?

### A rain garden:

- Captures and stores storm water runoff.
- Filters and cleans runoff before it reaches storm drains.
- Attracts birds and butterflies.
- Reduces flooding and erosion.



# Plan Your Rain Garden

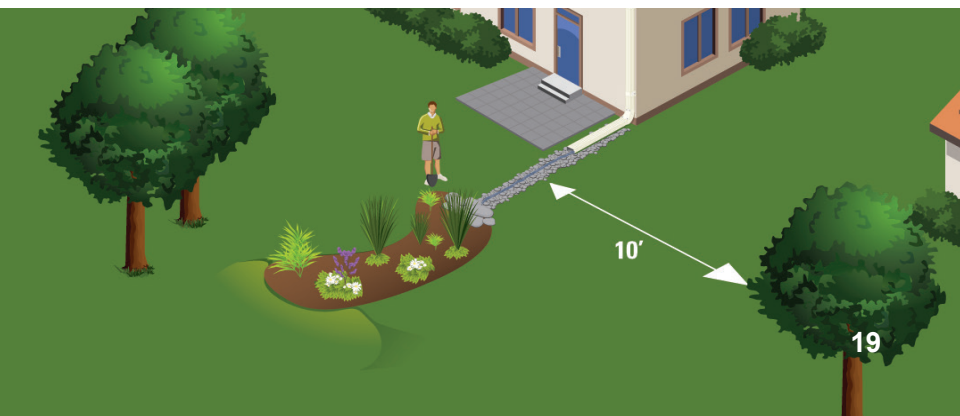
## Determine the location

Consider the natural landscape of your yard and the way storm water flows on your property when determining whether a rain garden is right for you. Keep the following in mind:

- ☐ Check with your city and county to ensure your plans meet local requirements.
- ☐ Contact Kentucky811, the “Call Before You Dig Center” at 1-800-752-6007 and all local utility companies to ensure you don’t drain water over utility lines. For septic systems, call the Northern Kentucky Health Department at 859-341-4264.
- ☐ If you are disconnecting your downspout and redirecting the flow to a rain garden, make sure the downspout discharges water at least:
  - 6 feet from your foundation
  - 5 feet from a public sidewalk
  - 20 feet from a roadway
- ☐ Consider how you plan to direct the flow of storm water to your rain garden. If you plant your rain garden a good distance away from your downspout, rain barrel or other storm water source you may need to utilize an extension hose, a grass swale or shallow trench or another method to channel the water to your garden.



- ☐ Consider how excess storm water will flow out of the garden if it fills during a heavy storm. Excess storm water should be routed to existing swales or storm drains.
- ☐ Certain areas of your yard may not represent a good location for a rain garden. Don't plant your rain garden:
  - Over or near buried utility lines, septic systems or water supply sources
  - Directly under a large tree
  - In the grass strip between a sidewalk and roadway
  - Where water pools or where the ground becomes soggy
- ☐ It is easier to plant a rain garden in a flat area or a naturally low-lying spot with good drainage. Do not plant on a steep slope.
- ☐ Your rain garden should be at least 10 feet away from your home and any neighboring houses.



## Find the right size

Your rain garden should be large enough to capture storm water runoff from draining surfaces on your property. To estimate the size of your garden, follow the directions below (see sample calculation on page 22):

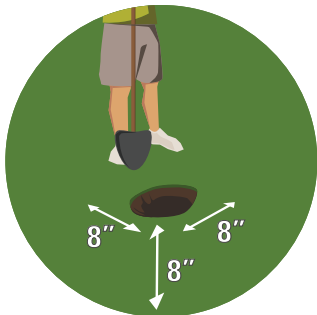
1. Multiply the length of your home by the width to determine the square footage of your rooftop.
2. If you will direct storm water from a downspout, divide the square feet of rooftop by the number of downspouts to get the area of rooftop that drains to each downspout.
3. If you plan to direct storm water from a patio, driveway or other paved area in addition to the water from your downspout, add the square footage of these surfaces to the area of rooftop that drains to each downspout to get the total amount of impervious surface that will drain to your garden.
4. Conduct an infiltration test in the planting area to see how well your soil drains and determine the depth of your garden (see page 21).
5. Divide the amount of impervious area that will drain to your garden by the depth of your garden.

Note: Residential rain gardens should be at least eight inches deep but no deeper than 12 inches.

## Conduct an infiltration test

- Dig a hole that is eight inches deep and eight inches wide.
- Fill it with water and wait at least one hour for it to soak.
- Fill the hole with water again.
- Come back four hours later and measure the water level.
- Multiply how many inches the water level dropped by six to estimate the soil infiltration rate in a 24-hour period, which will give you your suggested rain garden depth. Your rain garden should drain of all water within a 24-hour period.

If your soil infiltration test shows little change in water level, evaluate your soil and consider amending it to improve drainage.



**Tip:** Sandy soil drains well, is crumbly and will break apart easily. Clay soil drains poorly and sticks together in heavy clumps.

***Sample calculation for determining the dimensions of your rain garden:***

50 ft. (home length) x 30 ft. (home width) = 1,500  
sq. ft. of rooftop

1,500 sq. ft. of rooftop / 4 downspouts = 375 sq. ft.  
draining to each downspout

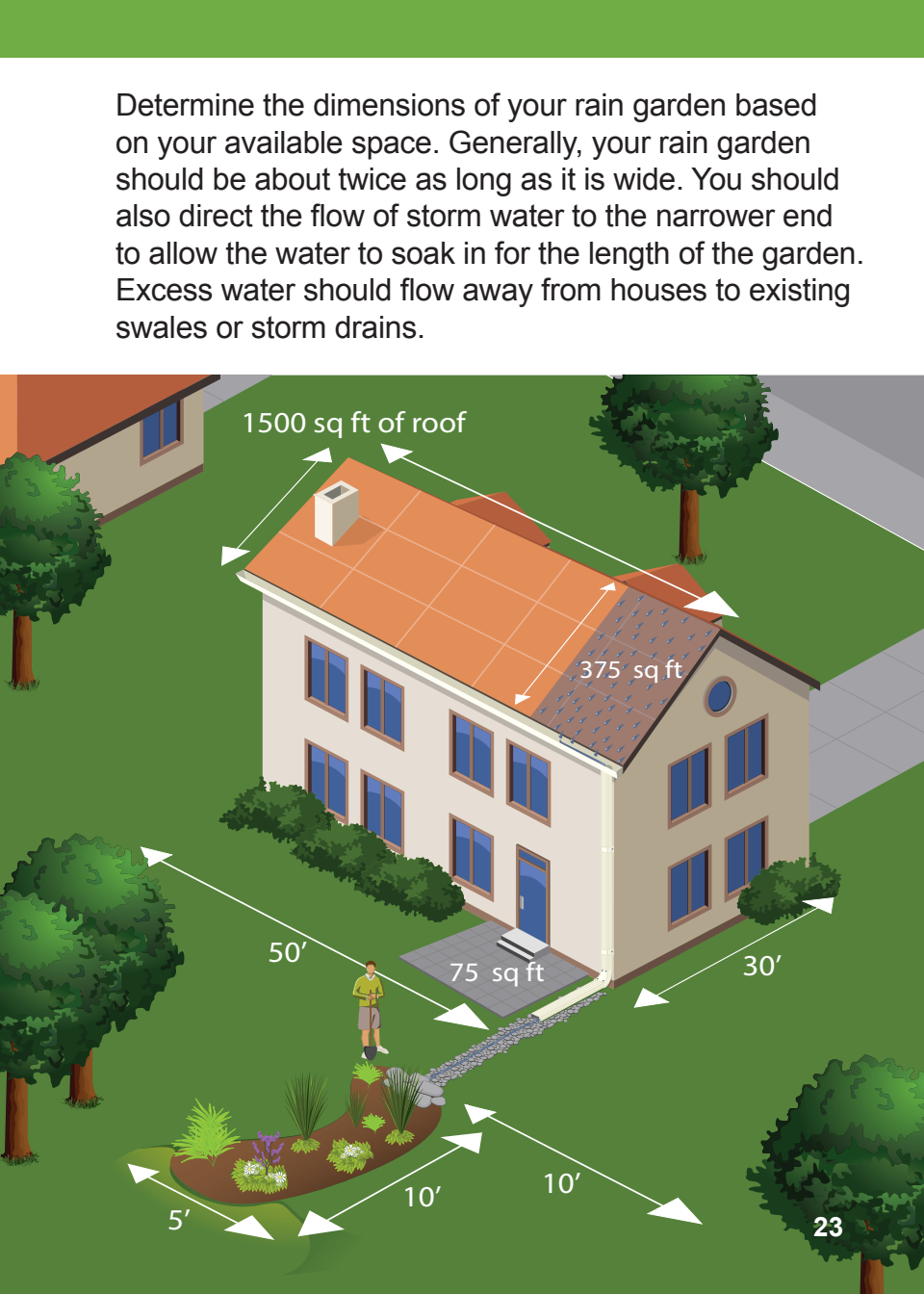
75 sq. ft. of patio or driveway + 375 sq. ft. of rooftop  
= 450 sq. ft. of impervious surface

Water level drops 1.5 inches in four hours x 6 = 9  
inch rate of infiltration in 24 hours

9 inch rate of infiltration = 9 inch garden depth

450 sq. ft. of impervious area / 9 inch garden depth  
= 50 sq. ft. of rain garden

50 sq. ft. of rain garden / 10 ft. in length = 5 ft. in  
width



## Design Your Rain Garden

Design your garden based on budget and space available. Remember, these are guidelines, not rules. Each property is different, and if your yard or budget cannot accommodate the recommended rain garden size, consider limiting the amount of rooftop or impervious area directed to the garden or planting multiple, smaller gardens.

### Choose the right plants

Look for native, drought tolerant, non-invasive plants. Shrubs, sedges and grasses are all good choices because of their long, water-absorbing roots. Choose complementary plants that vary in height, color and blooming periods.



## How many plants do you need?

Most plants should be placed about 12-18 inches apart, as measured from the center of the plant. Based on this recommendation, determine the approximate number of plants you will need.

If you're planting large shrubs or trees, be sure to plant according to the expected mature height. These larger plants should be placed anywhere from 2-20 feet away from other plants in your garden. For a detailed list of plants that are suitable for rain gardens, see pages 31-33.

### ***Sample calculation for determining the number of plants needed for your rain garden:***

Assuming 12 inches from plant center (one plant for every 1 sq. ft.):  $50 \text{ sq. ft.} / 1 \text{ plant per sq. ft.} = 50 \text{ plants}$

Assuming 18 inches from plant center (one plant for every 1.5 sq. ft.):  $50 \text{ sq. ft.} / 1.5 \text{ plants per sq. ft.} = \sim 33 \text{ plants}$



# How to Plant a Rain Garden

## Tools and materials needed:

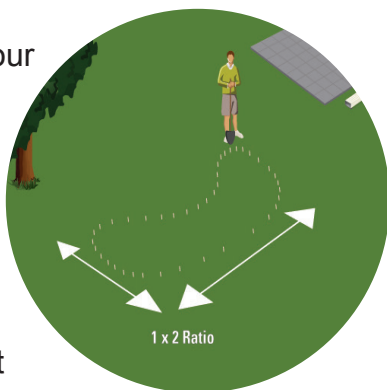
- Protective equipment
- Tape measure
- Shovel
- Trowel
- Level
- Yarn / stakes / hose
- Rototiller
- Topsoil
- Mulch
- Plants
- Wheelbarrow



## 1. Prepare the soil

Outline the perimeter of your rain garden with yarn, stakes or a hose.

Dig a depression that is the depth you calculated in your infiltration test, making one side slightly lower than the other to help with drainage. Try not to compress the soil.



## 2. Ensure infiltration

Add a small amount of water to the depression and ensure it drains within 24 hours. If it doesn't, amend or partially amend the existing soil with a rototiller.

**Tip:** Planting on a slope? Create a berm with excavated soil and build a small spillway for overflow to exit the garden. Be sure that the overflow drains to an area in your yard that can handle the extra water and not towards a house or street unless there's adequate distance between them.

### 3. Amend the soil

To amend the soil, remove 4-6 inches of soil from the bed and replace it with a good soil mixture (50-60% sand, 30-40% loamy topsoil and 5-10% organic matter). To partially amend the soil, till some of the good soil mixture into the garden.

### 4. Plant the garden

Fill the depression with excavated soil and break apart large clumps by hand or with a rototiller.

To help with the success of the plant growth, incorporate topsoil and organic matter into the existing garden soil. Lay your plants approximately 12-18 inches apart and decide how you want the garden to look. Plant your vegetation according to the instructions on the container.



**Tip:** For visual appeal, place taller plants in the middle or back of the rain garden and medium and short plants in the front or along the sides.

## 5. Direct water to your rain garden

### ***Direct water from your downspout or rain barrel:***

Angle a downspout extension piece toward the front of the garden. Follow the steps in the Downspout Disconnection section of this guide to disconnect your downspout.

### ***Direct water from your patio, driveway or other paved area:***

Build a rock channel or a shallow grass swale or trench from the hard surface to the front of the garden.

***Tip:*** Place a large rock at the front of your garden where the storm water enters to slow the flow of water and distribute it more evenly in your garden.





## Maintain Your Rain Garden

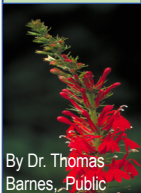




After your rain garden is installed, you should monitor your garden 12 to 24 hours after a rainstorm to ensure the water is soaking into the soil. After this initial observation, monitor your garden periodically. If the water is not soaking into the ground, consider changing the direction of the flow or amending the soil.

Like any garden, your rain garden will need basic maintenance to keep it functioning properly. Prune, replace plants, weed and water as needed. Replace mulch every couple of years.

# Rain Garden Plant Selection

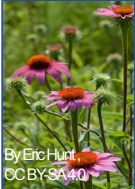




	Common Name	Moisture	Max. Height	Sunlight	Bloom Time	Bloom Color
 <p>Photo by H. Zell, CC BY-SA 3.0</p>	Sweet Flag	Wet-Mesic	24 in.	Full	May - July	Green
 <p>Photo by cultivar413, CC BY 2.0</p>	Big Bluestem Grass	Wet-Mesic, Mesic, Dry-Mesic, Dry	84 in.	Full Partial	August - November	Red, Blue, Brown
 <p>Public Domain</p>	Swamp Milkweed	Wet-Mesic / Mesic	48 in.	Full	June - October	Pink, Purple
 <p>Public Domain</p>	Smooth Blue Aster	Wet-Mesic, Mesic, Dry-Mesic	48 in.	Full Partial	August - October	Blue
 <p>By D. Thomas Barnes, Public Domain</p>	New England Aster	Wet-Mesic, Mesic, Dry-Mesic	48 in.	Full Partial	August - October	Pink, Purple

## Rain Garden Plant Selection

	Common Name	Moisture	Max. Height	Sunlight	Bloom Time	Bloom Color
 By Dr. Thomas Barnes, Public	Cardinal Flower	Wet-Mesic	48 in.	Full Partial	May - October	Red
 By Andrew C., CC BY 2.0	Great Blue Lobelia	Wet-Mesic / Mesic	36 in.	Full Partial	July - October	Blue
 By Robert Mohlenbrock, Public Domain	Water Horehound	Wet-Mesic	24 in.	Full	July - September	White
 By Matt Levin, CC BY-SA 2.0	Great Bulrush	Wet-Mesic	72 in.	Full	June - August	Orange-brown
 By Robert H. Mohlenbrock, Public Domain	Cup Plant	Wet-Mesic / Mesic	96 in.	Full Partial	July - September	Yellow



# Rain Garden Plant Selection

	Common Name	Moisture	Max. Height	Sunlight	Bloom Time	Bloom Color
 By Eric Hunt, CC BY-SA 4.0	Purple Coneflower	Wet-Mesic, Mesic, Dry-Mesic	48 in.	Full Partial	June - August	Purple
 By Sasamehoneyart, CC BY-SA 3.0	Rattlesnake Master	Wet-Mesic, Mesic, Dry-Mesic	48 in.	Full	June - September	Green-white
 By KEN PEI, CC BY-SA 3.0	Joe-Pye Weed	Wet-Mesic	60 in.	Full Partial	July - September	Pink , Purple
 By Sri/resh, CC BY-SA 3.0	Prairie Blazing Star	Wet-Mesic / Mesic	48 in.	Full Partial	July - September	Purple
 By Photo by David Li Siang , CC BY-SA 4.0	Marsh Blazing Star	Wet-Mesic / Mesic	60 in.	Full Partial	July - September	Purple



## Learn More

Help SD1 protect the streams and rivers we rely on for drinking water and recreation by learning more about storm water pollution and SD1's DRIP program.



[www.SD1.org](http://www.SD1.org)

 [@SanitationDistrictNo.1](https://www.facebook.com/SanitationDistrictNo.1)