Dear Hampton Homeowner,

Thank you for taking the next step to becoming a more environmentally friendly household in a city that is addressing water quality and flooding head-on. In this guide, you will learn about ways to reduce polluted stormwater runoff from your property, such as planting trees and storing rainwater as part of the City of Hampton’s new Resilient and Innovative Neighbor (RAIN) pilot program. You’ll also be provided with links to additional resources. Once again, the Chesapeake Bay Foundation and the City of Hampton thank you for contributing to help Save the Bay!

Hampton Homeowner Guide
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TREE PLANTING
A Solution to Pollution and Flooding!

Planting trees is one of the simplest and least expensive ways to reduce flooding and pollution in a neighborhood. A typical street tree can intercept anywhere from 760 gallons to 3,000 gallons of stormwater per year, depending on the species. That means less pooling water and reduced flooding! Plus, more trees on a property can also reduce air conditioning costs, increase real estate value, and create more attractive neighborhoods. So why not protect your property—and your neighbors’—from flooding, while also sprucing up your outdoor space?

Step 1: Choosing the right tree, at the right time, for the right place

Just like any plant, trees take a little TLC and dedication when growing. Not every tree can grow in every environment, and the wrong conditions can lead to a dead tree. That’s why it’s important to keep the following factors in mind when you’re planting a tree:

- **Sunlight exposure**: how much sunlight does the area get during the day?
- **Soil conditions**: what type of tree would do best in your area? Is the soil sandy, rich (hummus), or mostly clay?
- **Water**: does the location stay damp or does it drain well? Will it be easy to water a newly planted tree here?
- **Time of year**: spring or early fall is generally the best time to plant trees in southeast Virginia. The warmer it is, the more watering trees will need in their first few months.

The best trees to plant are those native to southeastern Virginia. Here are some examples, as well as the best places to buy them:

Native Virginia trees include:

- Red Maple
- Eastern Redbud
- Many Oaks (live, swamp white, red, scarlet, pin, willow, etc.)
- Mockernut Hickory
- Common Persimmon
- And many more! Please use the “Native Plants for Southeast Virginia” booklet (see Additional Resources on page 3) for more trees suited to southeastern Virginia.
Places to purchase trees:

- Hardware stores: Lowe’s, Home Depot, Walmart
- Local gardening retailers:
  - Countryside Gardens (https://countrysidegardens.biz/)
  - Anderson’s Garden Center (https://loveandersons.com/)
  - McDonald Garden Center (https://www.mcdonaldgardencenter.com/)

Step 2: Dig a hole large enough for your tree

For the depth, the general rule is that trees should be transplanted into soil that is no deeper than the container the tree was grown in. If the hole is too deep, the roots won’t have enough oxygen to grow well. The tree’s trunk flare is also a guide that can be used. This part of the tree is right above the roots and needs to be above the soil.

For the width, the hole should be two to three times wider than the root ball.

Step 3: Remove any excess material

Before you plant your tree, remove any excess material, such as wires, burlap, or other obstructions that could prevent the roots from growing. If the tree was potted, you may notice the roots growing around the outside of the root ball or in the shape of the container, meaning it is “root bound.” In this case, break up the root ball with your hands or gardening tool (don’t worry about hurting the roots - better they start healing now than continue growing in that fashion). Watch out for “girdling roots” that are growing in a circle and up around the flare as these will eventually strangle the tree from receiving nutrients. Cut girdling roots off with pruning shears.

You don’t need to add any new soil to the hole, just add the soil from the container the tree was grown in. Break up the dirt from your hole, remove any rock or sticks, and refill. Finally, remove any air pockets by tamping down around the base of the tree with your feet.

Step 4: Water as needed

A newly planted tree needs to be watered regularly. Slow, deep watering is better than frequent, shallow watering. Using a hose instead of using an overhead sprinkler and giving the root zone a thorough soaking gets your tree off to a good start. Trees need at least one inch of water a week. If you haven’t received adequate rainfall, water the tree at the intervals listed in the table on the right.

<table>
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<th>Weeks after Planting</th>
<th>Watering Intervals</th>
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<td>1-2 Weeks</td>
<td>Daily</td>
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<tr>
<td>3-12 Weeks</td>
<td>Every 2 to 3 Days</td>
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<tr>
<td>12+ Weeks</td>
<td>Water Weekly</td>
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Gator Bags are an effective method of watering any newly planted or established trees by slowly releasing water into the soil. Gator bags are generally used during the first two growing seasons (i.e. spring through fall) after planting and only need to be refilled every five to seven days. Once a tree is established, gator bags can be used as a supplemental watering device.

- Gator Bags can be purchased at any local hardware store or online through Amazon, Home Depot, or Lowe’s
- For more information on this product, visit this website: [http://www.treegator.com/index.html](http://www.treegator.com/index.html)

Step 5: Don’t miss out on the mulch

After planting your tree, adding one to two inches of mulch around the root zone will help your tree retain water, reduce competition from weeds, and protect it from hazards like mowing. However, avoid the common mistake of improper mulching: Keep mulch from directly touching the base of the tree to help the in-soil oxygen exchange between roots and the tree.

Additional resources:

- “Plant the Right Tree in the Right Place” ([https://greenvistava.com/right-tree-right-place/](https://greenvistava.com/right-tree-right-place/))
- “Native Plants for Southeast Virginia” ([https://www.deq.virginia.gov/Portals/0/DEQ/CoastalZoneManagement/Native-Plants-for-Southeast-Virginia-Guide.pdf](https://www.deq.virginia.gov/Portals/0/DEQ/CoastalZoneManagement/Native-Plants-for-Southeast-Virginia-Guide.pdf))
- “Proper Mulching Techniques” ([https://www.treesaregood.org/portals/0/docs/treecare/ProperMulching.pdf](https://www.treesaregood.org/portals/0/docs/treecare/ProperMulching.pdf))
Humans have been harvesting rainwater for thousands of years for survival. Now, rainwater harvesting can be used to reduce the amount of runoff and associated flooding during a rainfall by storing it for future use. You can save money by storing and using rainwater for common household chores including:

- Watering gardens
- Bathing pets
- Washing cars
- Watering plants
- Filling ponds and fountains

Rain barrels are a great way to capture the rainwater that normally flows out of rooftop downspouts. The water is captured inside of a barrel or tank and reused for outdoor or indoor watering uses. The rainwater can also be emptied later into the lawn or landscape for slower infiltration. While rain barrels can be easily installed by a homeowner, there are some important things to keep in mind. In addition, there are local volunteers dedicated to helping you install your rain barrel. Please contact David Singletary with Colonial Virginia Council, BSA at David.Singletary@gmail.com.

Safety Considerations:

- A rain barrel must be secured on a firm, level surface. A full 55-gallon rain barrel weighs over 400 pounds. Tipping is a risk.
- Your barrel must be structurally sound and capable of withstanding the pressure of holding water. Trash cans are not designed for the pressure of water.
- A lid and sturdy mesh covering are important to keep debris and mosquitos from getting inside.
- Mosquitos breed in standing water. You may want to use a “mosquito dunk,” a slow-releasing formula that naturally prevents mosquito breeding. Typical dunks will kill mosquitos with mosquito larvae-eating bacteria for 30 days. They are completely biodegradable and will not harm fish or other animals.
- Water from rain barrels should NEVER be used for drinking, cooking, or other potable uses.
- Cisterns are larger and more complex rainwater collection systems that have larger storage areas and use pumps. Consult a professional to review design, construction, and safety considerations.
Installing your rain barrel:

1. The barrel must be located at the base of a downspout. Choose the downspout nearest to where you will use the water in your yard, factoring in the length of the hose that you will attach to the barrel.

2. Your barrel must have an overflow valve that allows overflow to discharge to a safe location (at least six feet from basement walls and at least two feet from crawl spaces and concrete slabs). In general, rain barrels have a device near the top of the barrel that allows extra water to be discharged. Attach an appropriately sized extension (e.g. a simple rubber hose will work) to the overflow valve and run the extension to an area where you can safely discharge your overflow.

3. Elevate the rain barrel about 12 inches off the ground to provide water pressure. Cinder blocks work great to secure your rain barrel and prevent tipping.

### Rain Barrel Maintenance

<table>
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<th>Don’ts</th>
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<td>Remove leaves and other debris from the overflow pipe and roof gutters.</td>
<td>Leave the water in rain barrel for long periods of time.</td>
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<td>Disconnect your barrel during the winter if it isn’t made from weather adequate material.</td>
<td>Allow children to play in or around the barrel.</td>
</tr>
<tr>
<td>Place gutter guards on top of roof downspouts.</td>
<td>Let the foundation become unleveled or unstable.</td>
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### Additional resources:

- “How to Install a Rain Barrel YouTube video”  
  [https://www.youtube.com/watch?v=J2XTFwA3iPc&feature=youtu.be](https://www.youtube.com/watch?v=J2XTFwA3iPc&feature=youtu.be)

- “How to Maintain Your Rain Barrel”  

- “Your Rain Barrel: How to Clean and Maintain It”  
  [https://fullserviceaquatics.com/your-rain-barrel-how-to-clean-and-maintain-it/](https://fullserviceaquatics.com/your-rain-barrel-how-to-clean-and-maintain-it/)
RAIN GARDENS
The “Cool Kids” of Gardens

Rain gardens collect runoff from a roof, driveway, or parking lot that would otherwise go directly to the street or storm drain. The garden has a shallow depression underneath that collects rainwater. Natural soils may be replaced with sandier ones to allow the water to absorb faster. The garden is planted with a mix of native plants that filter out pollutants, attract wildlife, and beautify the property.

NOTE: There is no “cookie-cutter” rain garden. These are general suggestions to give you an idea of the work required. Please consult the below resources and others before you start digging! We highly recommend you watch this video first: How to Build a Rain Garden, https://www.youtube.com/watch?v=h88RB0J_EqQ.

Step 1: Choose the right location
Rain gardens are ideal for catching rain from a downspout or multiple downspouts coming off a roof. They may also be positioned somewhere else you may notice pooling water after rain, such as the edge of a parking lot, driveway or other impermeable surface to catch that excess water. Most importantly, your rain garden should be at least 10 feet away and downslope from the foundation of any building. You will also want to consider how much sun your location receives, as that will influence your plant selection.

Step 2: Call Miss Utility
Once you have a general idea of where you would like to install your rain garden, you must call Miss Utility (dial 811 on any phone). The call is very easy and usually does NOT require a site visit! This is to ensure you are not building your rain garden over any utility lines. Once you have requested information, they typically look at your site online and send you an email with anything you should be aware of within a couple days.

Step 3: Determine your soil infiltration
Ultimately, you will be digging a large hole 24 inches deep for your garden and the water must drain from the bottom of your garden or you’ll end up with a pond. To test your soil for its infiltration ability, dig a 24-inch hole in the area you want to install the garden (a post hole digger helps). Fill with eight inches to one foot of water. Divide the number of inches drained by the number of hours drained. For example, if it takes eight hours for one foot of water to drain, your drainage rate is one-and-a-half inches per hour. You will want to repeat this test two or three times if you do this in a dry month.

If the water drains faster than one inch per hour and the soil has a sandy or sandy-loam texture, the existing soil may be used. If it drains slower than one inch per hour but faster than half an inch per hour, you will want to purchase a rain garden soil mix to replace the filler for the garden. If the soil drains any slower, you may need to consider replacing the soil with rain garden soil mix AND an underdrain system, which can be quite costly. If there are tree roots, clay or bedrock in the way, a rain garden may not be appropriate for that location.
Step 4: Design your rain garden

The size of your rain garden is determined by the surface area that drains to it. This drainage area can be rooftop area draining into a downspout as well as driveways or patios that slope towards the garden. Once you determine this area, you can then determine the minimum area needed for an effective rain garden.

- Determine the surface area draining into your garden, including the part of the roof leading to the downspout and any other hard surface (like a sidewalk or driveway) that may be sending water into the garden area.

  - Surface Area = Length x width (10 feet long by 2 feet wide would be 200 square feet). For the example below, we are capturing rain from half of a 1000-square foot roof, so 1000/2 = 500 square feet. You may be able to use the Google Area Calculator tool to estimate the surface area of your roof and other surfaces draining to your rain garden: https://www.daftlogic.com/projects-google-maps-area-calculator-tool.htm
  - In southeast Virginia, you should prepare for a one-inch rainstorm. Converted to feet equates to .083 feet for the below formula.
  - For our example, we have underlying soils that drain well, so we’ll plan for a 24-inch rain garden depth, converted to feet, so 2 feet.
  - The final equation for determining the minimum area for a rain garden is: Surface Drainage Area (in square feet) x 0.083 feet (a one-inch storm) divided by the projected depth of your garden in feet = minimum surface area for a rain garden. Ex: 500 square feet x 0.083 feet/2 = 20.75 square feet = the minimum size of your rain garden to capture a 1-inch rain event!

Step 5: Construct your rain garden

Once you have determined that you have enough space for a rain garden, construction can begin. This will include digging the hole for the garden, installing an overflow channel and backfilling with topsoil.

- A 24-inch hole takes longer to dig than you might think! Consider using a small backhoe or getting a group of friends to help. Many hands make light work!
- Because you will be removing soil, think about disposal methods (i.e., use to fill holes or depressions elsewhere in your yard) or have it hauled away.
- Save the best soil. The top six inches of soil you remove for a rain garden may be dark, loamy, and rich in organic matter. You may want to save that for the top of the garden!
- Save some dirt for the berm; a raised area on the opposite side from which the water flows which will help keep water in the garden.
- The hole should be level all along the bottom. However, you may choose to have some beveled sides for planting certain flowers/shrubs that are less tolerant of water.
Overflow: at the end of the project, you will want to install a small pipe toward the top of the berm that will act as an overflow for your garden in case of big storms with excessive amounts of water.

**Step 6: Planting your rain garden**

A rain garden can have plants in three zones:

- **Center Zone:** plants that tolerate sitting in water for an extended period of time.
- **Mid Zone:** plants that tolerate water for a shorter period of time.
- **Outer Zone:** plants that do not tolerate sitting in water.

Other considerations when planting a rain garden include:

- Amount of sunlight the area receives
- Native plants to your area
- The bloom time of the plants
- The visual appeal of the plants
- Height of the plants. Think about the “structural” components of the garden first: What will it look like in the winter when all of the perennials have died back?
  - Do you have any evergreen plants?
  - Are there any grasses, rushes, or sedges that have winter interest, or look good in winter? This will help you locate plants with winter interest first. As a note, sometimes people place accent stones and/or river rock through the middle of the rain garden so that there is more visual interest in the winter. A focal element such as a sculpture or garden ornament is also an option.
- If planting near a building, locate the taller plants along the back or the edges, such as shrubs, hibiscus, or ironweed.
- Place sturdy plants near where the water flows into the rain garden. Blue flag iris, soft rush, and white turtlehead are good candidates as they will withstand some velocity of water.

**Additional resources:**

- YouTube video “How to Build a Rain Garden” - [https://www.youtube.com/watch?v=h88RB0J_EqQ](https://www.youtube.com/watch?v=h88RB0J_EqQ)
- University of Maryland’s “Rain Gardens Across Maryland” - [https://extension.umd.edu/sites/extension.umd.edu/files/_docs/articles/Rain_Gardens_Across_MD.pdf](https://extension.umd.edu/sites/extension.umd.edu/files/_docs/articles/Rain_Gardens_Across_MD.pdf)
- Low Impact Development Center’s Rain Garden Design Templates - [https://lowimpactdevelopment.org/](https://lowimpactdevelopment.org/)
- The Chesapeake Ecology Center’s Rainscaping Campaign - [http://www.rainscaping.org/](http://www.rainscaping.org/)
PERMEABLE SURFACES
Between a Rock and a Hardscape

One of the main causes of flooding is right under your car. Driveways, sidewalks, roads, and other similar hard surfaces are all typically impervious surfaces, or areas where water cannot be absorbed. These are most often built out of materials, such as asphalt, that make it nearly impossible for rain to seep into the ground. Instead, the rain will run off these surfaces and pick up pollutants before flowing into sewers and ultimately streams, rivers, and the Chesapeake Bay.

As more and more areas become urbanized, more impervious surfaces will cover the land. This leads to increased levels of stormwater runoff and sometimes localized flooding. But there is a solution: permeable hardscapes!

These materials simulate the process of rainwater seeping into the ground by allowing rainfall to rapidly pass through the paver, into a shallow stone reservoir, and then soak into the ground. You can see this displayed in the diagram above.

Permeable hardscapes are a great option when replacing deteriorating pavement. Most permeable pavers require the assistance of an experienced designer and pavement installation contractor. Here are a few contacts that offer permeable paver services:

- Virginia Beach Patios [https://www.virginiabeachpatios.com/driveways](https://www.virginiabeachpatios.com/driveways)

Additional resources: