



Stormwater Management for Homeowners Fact Sheet 1: Rooftop Redirection (Disconnection)

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This fact sheet is part of a series. Please refer to definitions in the glossary at the end of this fact sheet. Glossary terms are italicized on first mention in the text.

Introduction

When rain falls on *pervious surfaces*, like soil, mulch, and vegetative groundcovers, it soaks in through a process called *infiltration*. The water can be used by plants, or it can recharge underground water storage areas called *aquifers*.

When rain falls on *impervious surfaces*, like roads, driveways, and rooftops, it does not infiltrate. Instead, water quickly collects and flows off these surfaces to the nearest stream, river, pond, lake, reservoir, bay, sound, or ocean. Water that moves in this way is called *runoff* or *stormwater*. It carries *pollutants* with it, including fertilizer, pesticides, fluids from cars, *sediment* from bare soil areas, bacteria from animal waste, plant debris like leaves and grass clippings, and trash like plastic bottles and cigarette butts. The more area covered in impervious surfaces, the greater the amount of pollution and volume of runoff, which increases the likelihood of flooding, stream *erosion*, harm to wildlife and the environment, and degradation of water quality.

Stormwater best management practices, or *BMPs*, are tools for managing runoff. They reduce the speed and volume of runoff and clean up the pollutants in it. Homeowners can use different practices, like *rooftop redirection*, *rain barrels*, *permeable pavement*, *grass swales*, *rain gardens*, and *buffers* in their landscapes, to manage runoff at the source. This prevents large volumes of polluted runoff from going into storm drains that flow directly into nearby water bodies. Some additional benefits of BMPs include improved drainage, a healthier and more attractive landscape, increased property value, wildlife food and habitat, improved water quality, and a cleaner environment.

What Is Rooftop Redirection?

Rooftop redirection is the simplest stormwater management practice for homeowners, and it addresses the largest impervious surface on most residential properties — the roof. Traditional home drainage systems use gutters and downspouts to collect stormwater and move it to the driveway and/or the curb. This process does not allow water to infiltrate into the ground. Flooding and water pollution are more likely where there are many homes with roof downspouts and piped drainage systems.

Rooftop redirection moves the collected stormwater into the landscape where it can spread out, slow down, and infiltrate (see figure 1). Make sure the landscape area the runoff will be flowing into does not have existing drainage issues and is healthy enough to handle the inflows of water. If you have questions about this, contact your local [Virginia Cooperative Extension office](https://ext.vt.edu/) for assistance (<https://ext.vt.edu/>).

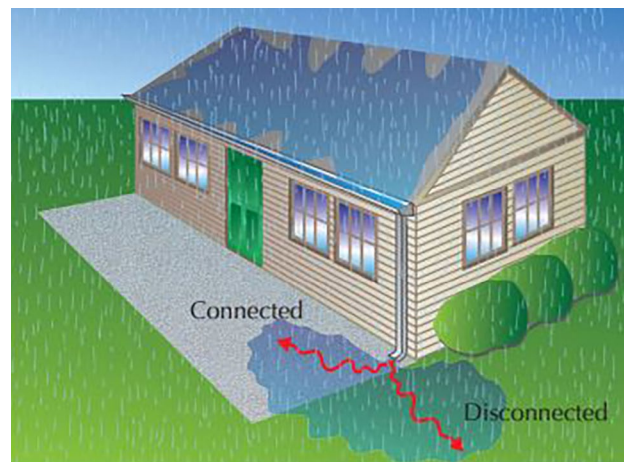


Figure 1. Diagram of water flow with rooftop redirection. Source: Center for Watershed Protection, "The Runoff Reduction Method." Technical Memorandum, 2011.

How Does It Work?

Flexible fittings and extension pipes are attached to the end of a downspout and direct the runoff away from the house and impervious areas to pervious areas in the landscape, like flowerbeds, vegetable gardens, and lawns (see figure 2). Stormwater can also be directed into other practices, like grass swales, rain gardens, and buffers (see other VCE publications in this series). Redirecting the runoff allows the water to infiltrate or be used by landscape plants (reducing irrigation costs) and reduces the amount of polluted runoff leaving the property and going into nearby waterways.

Rooftop redirection usually does not require a professional to install. Measure the end of the downspout and the distance you want to direct the runoff so you can purchase the correct size fittings and amount of extension pipe. The extension pipe can have holes in it to allow the stormwater to seep out along the length as well as the end of the pipe, or it can be solid so the water exits only at the end. If the stormwater is being directed into a lawn area, consider a hinged or flexible extension pipe that can easily be moved out of the way if necessary when mowing.



Figure 2. Example of a downspout with a flexible extension pipe. Direct the runoff 10 feet away from the foundation and into the landscape. Photo by Mary Ann Kincaid, Virginia Beach Master Gardener Water Steward.

Preventing Erosion

Erosion occurs when flowing water washes soil from a landscape. Erosion can be prevented in several ways.

- A spreader kit can be attached to the end of the extension pipe to create many small streams of water instead of one large one.

- An extension pipe with holes in it will reduce the volume and speed of water coming out of the end of the pipe.
- A splitter can divide the extension pipe and make the water go in two different directions or parts of the landscape.
- The end of the extension pipe should release water onto a reasonably flat part of the landscape — not a steep slope. Medium-sized stones can be placed at the end of the extension pipe to slow down the water as it comes out of the downspout.
- Dense healthy lawn or planted beds will also slow down and use much of the runoff coming out of the extension pipe. If the extension pipe redirects runoff into a lawn area, consider *aerating* the lawn every three years to keep the runoff infiltrating successfully.

Cost

Rooftop redirection is the least expensive stormwater management practice to install. The cost is generally \$25 to \$100 per downspout, depending on the type of fitting and the length of the extension pipe used. All items mentioned in this publication can be found in local hardware or home improvement stores or online.

Some cities and counties offer incentive programs that encourage residential stormwater management practices. The incentives could include rebates, utility bill credits, or cost sharing for installation. Homeowners should contact their local stormwater, public works, or soil and water conservation office to find out about these programs.

Maintenance

Downspout redirection system maintenance is basic.

- Use screens or regularly clean out gutters to prevent leaves and debris from clogging them and restricting water flow.
- Inspect the fittings and extension pipe connections periodically to make sure they are secure.
- Inspect the extension pipe periodically to make sure it is not crushed or clogged, that it is still moving water to the desired location, and that there is no erosion.

Resources

Chesapeake Bay Program, “How-To’s and Tips” – www.chesapeakebay.net/action/howtotips

Chesapeake Conservation Landscaping Council, “The Eight Essential Elements of Conservation Landscaping” – www.ChesapeakeLandscape.org

Chesapeake Stormwater Network, “Homeowner BMP Guide” – <https://chesapeakestormwater.net/homeowner-bmp-guide/>

Low Impact Development Center – <https://lowimpactdevelopment.org/>

Virginia Cooperative Extension, “Best Management Practice” fact sheet series on urban stormwater management practices, 426-119-134, by D. Sample – <http://pubs.ext.vt.edu/>

Virginia Cooperative Extension, “Stormwater Management for Homeowners” fact sheet series, HORT-293P–298P, by L. Fox – <http://pubs.ext.vt.edu/>

Virginia Department of Forestry, “Rain Gardens Technical Guide” – <https://dof.virginia.gov/wp-content/uploads/Rain-Gardens-Technical-Guide.pub.pdf>

Glossary

Aeration – The act of manually or mechanically poking holes into the ground; reduces soil compaction and creates channels through which oxygen, water, and nutrients can penetrate into the soil.

Aquifer – A natural underground storage area for water.

BMP (best management practice) – An action or device meant to manage runoff.

Buffer – An area of vegetation next to the water’s edge that protects water quality by slowing runoff, filtering pollutants and sediment, providing infiltration, and stabilizing shorelines. Buffers also add plant diversity to the landscape and provide wildlife with food, habitat, and movement corridors.

Erosion – The loss of soil on property, often due to water flow.

Grass swale – A graded, linear, shallow, open channel covered with plants, usually grass; used to slow down, spread out, and filter stormwater.

Impervious surface – A surface that does not allow water to flow through it.

Infiltration – The process by which water enters the soil or other materials.

Permeable pavement – Pavement with a top layer that allows water to infiltrate due to spaces in the paving material or spaces between the pavers.

Pervious surface – A surface that allows water to flow through it.

Pollutants – Materials that have a negative impact on human or environmental health.

Rain barrel – A small collection tank installed at the end of a downspout to collect and temporarily store rainwater runoff from a roof for later use.

Rain garden – A planted shallow depression that temporarily holds runoff from impervious areas until it evaporates, is absorbed by plants, or infiltrates into the ground.

Rooftop redirection (disconnection) – A stormwater management practice that moves the runoff collected from rooftops through gutters and downspouts into the landscape where it can spread out, slow down, and infiltrate; instead of moving the runoff directly into a storm drain system.

Runoff – Water that runs off impervious surfaces during rain events, often associated with urban areas. Runoff can also occur from pervious surfaces if the precipitation rate is greater than the infiltration rate. Also called “stormwater.”

Sediment – Soil, rock, or biological material particles formed by weathering, decomposition, and erosion.

Stormwater – Water that runs off impervious surfaces during rain events, often associated with urban areas. Also called “runoff.”

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