

# Conservation Landscapes



(Source: Chesapeake Horticultural Services LLC)

## Purpose & Benefits

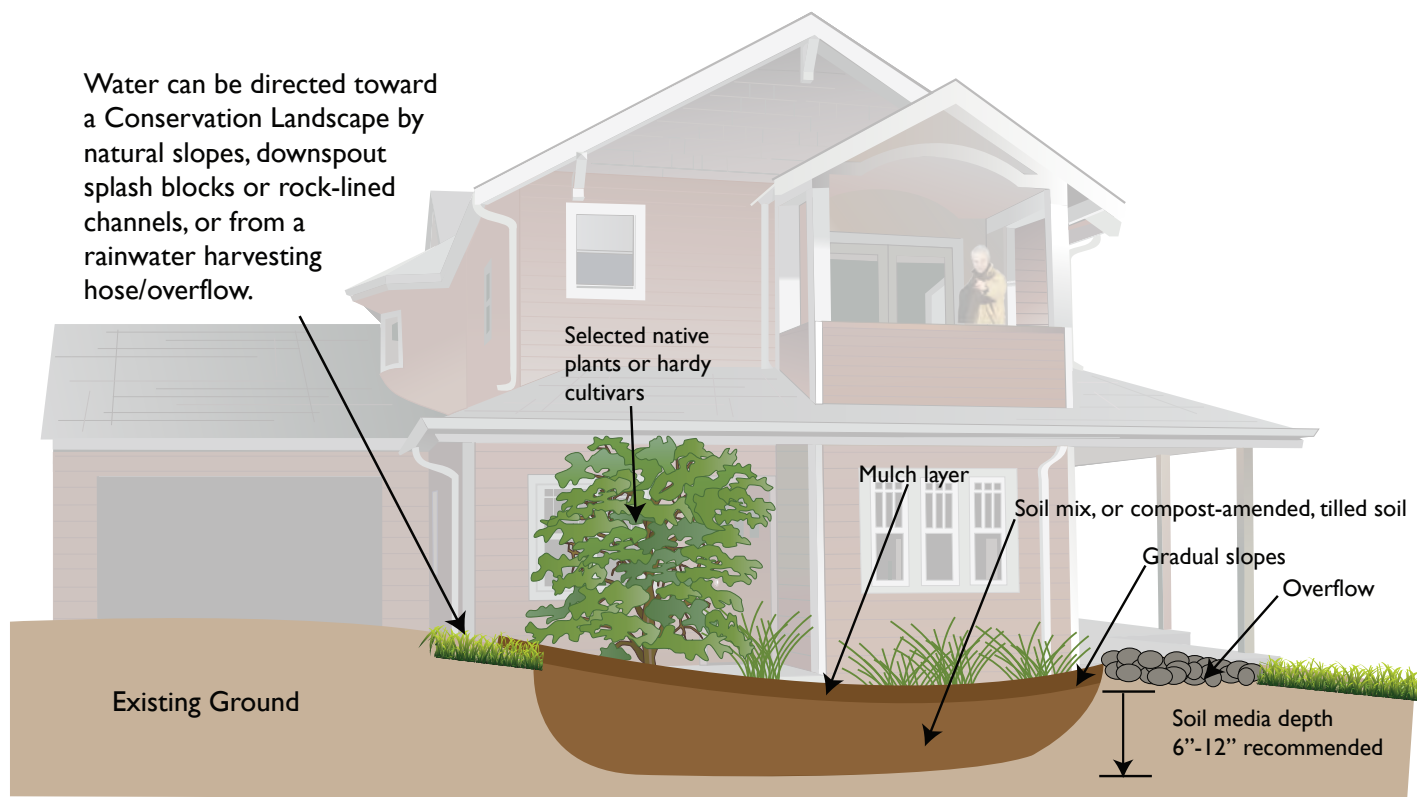
- Pollinator & wildlife habitat
- Attractive landscaping feature, with native flowering plants
- Stormwater runoff and pollution reduction
- Reduce water, pesticide and fertilizer use; less time and money spent on these inputs
- Promotes healthy soils & air quality
- Control of invasive plants
- Less maintenance on the long-term

## Description

Conservation Landscapes can range from the relatively simple practice of replacing existing turf, invasive plants, or impervious surface with landscaped areas of native plants and trees to the more comprehensive and integrated sustainable design and management approach. Conservation Landscapes feature native plants and trees, many of which flower at different times during the growing season. Unlike many traditional landscaped areas, Conservation Landscapes are situated slightly below the existing ground level so runoff from rooftops, driveways, and surrounding yard areas can spread out and soak into the landscaped area. Native plants provide habitat for beneficial pollinators and songbirds, and, once established, do not require chemical fertilizers, pesticides or excess watering. The deep roots of most native plants, and associated healthy soils, allow runoff to soak into the ground at a much higher rate than traditional lawns. In yards with poor soil, compost amendments can enhance stormwater infiltration capabilities of Conservation Landscapes. *Consider pairing a Conservation Landscape with a Rain Barrel or cistern to increase the stormwater captured.* Conservation Landscapes are also referred to as *BayScapes*, *RainScapes*, and *Bay-Friendly Landscapes*.

## What to Expect

Native plants used in Conservation Landscapes come in a variety of shapes, colors, and sizes. The design of the landscape can match the aesthetic preferences and maintenance skills of the property owner. Designs can range from natural-looking meadows or wooded strips to more traditional mulched landscape beds. Generally, Conservation Landscapes require a similar level of maintenance as what is needed for conventional landscape beds, and often less.



**Figure I.1.** *Overview of a Conservation Landscape*

## I.1. Complexity

A Conservation Landscape is one of the simplest practices presented in this manual. It can be used on any residential property with some amount of outdoor green space. Many Conservation Landscape methods are simple enough for the “do-it-yourselfers”. However, some designs can be more complicated if the property owner desires specific coordination of bloom times and colors, plant heights, and other aesthetic elements. Based on these factors, the contractor should consider whether or not the project needs to be designed by a professional landscape designer and/or installed by a landscape contractor. **Table I.1** provides some guidance.



**Figure I.2.** *Example of Conservation Landscape*

A Steward or homeowner with experience in landscaping can undertake a simple Conservation Landscape project. Consult a landscape contractor or design professional for moderate to complex projects, or when the project requirements are uncertain.



**Table I.1. Design Complexity for Conservation Landscapes**

Design Complexity	Description	Guidance
Simple	<ul style="list-style-type: none"> <li>Plant selection based on locally available natives and site conditions</li> <li>Plant layout is relatively simple (see online <b>WSA Conservation Landscape Design Tool</b> (Design Tool) for templates)</li> </ul>	<ul style="list-style-type: none"> <li>Design can be done by anyone with some knowledge of native plants and experience with landscaping</li> <li>The design should consist of a sketch plan, with material types and quantities (see <b>Design Tool</b> for assistance)</li> <li>Installation can be accomplished by a landscape contractor or homeowner</li> <li>Digging up and removing the existing turf and associated root mat will likely be the most labor-intensive part</li> </ul>
Moderate to High	<ul style="list-style-type: none"> <li>Plants chosen based on elements such as specific bloom colors and timing or maximum height of plants</li> <li>Other advanced aesthetic or habitat goals</li> <li>Applications involving most or all of a property; integration with hardscapes, structural elements, or other advanced design/engineering features</li> </ul>	<ul style="list-style-type: none"> <li>Make list of goals and desires for the Conservation Landscape</li> <li>Enlist a licensed landscape architect or professional landscape designer if questions arise regarding site and soil conditions, or if site slopes are steeper than 5%</li> <li>Consult with a professional engineer if there are sensitive surroundings, such as nearby wetlands or floodplains, or if the soil and groundwater conditions raise concerns</li> </ul>

## I.2. Location & Feasibility

Complete an assessment of the entire site based on guidance in **Appendix A** prior to designing any stormwater management practices on a client's property. Once the assessment is complete, consider the following specific factors when choosing the location(s) for a Conservation Landscape:

### **Downhill from Impervious & Yard Areas**

If possible, Conservation Landscapes should be placed to receive some runoff from uphill impervious surfaces, such as a rooftop or driveway, and surrounding yard areas. However, this is not an absolute necessity, and very successful

### Do:

- Test soil to determine need for soil amendments
- Locate Conservation Landscapes in a low spot that will collect stormwater runoff from the site
- Consider including a Rain Barrel at downspouts that can drain to the Conservation Landscape

### Don't:

- Direct runoff toward a building foundation
- Locate Conservation Landscapes above underground utility lines
- Locate Conservation Landscapes where the excavation will damage tree roots



## Where NOT to Locate a Conservation Landscape



- ① Within 10 feet of a building foundation
- ② Over utilities
- ③ Near an existing or reserve septic drainfield or tank
- ④ Near Wells- Stay back 50 feet from confined wells, or 100 feet from unconfined wells

Conservation Landscapes can be installed simply to replace existing turf or other land covers. In addition, smaller Conservation Landscapes (e.g., 60 or 90 square feet) should not be designed to accept runoff from large roofs, driveways, and other impervious surfaces because the landscape area will become overwhelmed with runoff water. If installing a Conservation Landscape near a downspout, consider also installing a Rain Barrel or cistern on the downspout to slow water before it enters the Conservation Landscape. The Rain Barrel or cistern can be calibrated to allow water to drain out slowly over approximately two days. Doing so will increase infiltration of the roof runoff.

**Size** Conservation Landscapes can be any size that fits into an existing property. Yards with large open spaces may be more suitable for uniform meadow plantings that can be mowed annually, while small sections of yard may be more appropriate for plantings in mulch beds that can be maintained by hand. The [WSA Conservation Landscape Design Tool](#) contains plant layout templates for various landscape sizes (60, 90, 120, and 180 square feet) in different configurations. If large areas are to be cleared and graded, check with the local government to see if an erosion and sediment control permit is required.



**Replace Turf** Conservation Landscapes are often installed to replace turf grass areas, such as in the example shown in **Figure 1.3**. Turf can be removed with various methods, some of which are described in **Section 1.6**.

**Figure 1.3:** Residential yard in Montgomery County, MD converted from turf grass to Conservation Landscape (Source: Montgomery Co. Department of Environmental Protection, RainScapes)



**Proximity to Utilities** Always call Miss Utility before choosing where to locate the Conservation Landscape, to avoid damaging underground utilities. Most Conservation Landscapes will disturb the uppermost 6 to 12 inches of the soil, and may interfere with shallow utilities. Also, be aware that Miss Utility may not always mark private cable, propane, and similar lines, so some additional site work may be necessary to locate these.

**Proximity to Buildings** Conservation Landscapes can be installed adjacent to house foundations or other structures. However, the surface of the Conservation Landscape should slope away from the structure to ensure that stormwater will not get into the foundation. If the building's downspouts discharge roof runoff onto the ground (i.e., they are "disconnected" rather than piped directly to an underground storm water drain), it is recommended that downspouts extend 5 feet from foundations and 10 feet if a basement is present (see **Figure I.4**). See **Table I.2** for more ideas on how to manage runoff from downspouts.



**Figure I.4:** *Downspout piped directly to underground storm drain*  
(Source: City of Savannah, GA).

*Disconnected downspout with extension pipe away from foundation*  
(Source: Ted Millich)





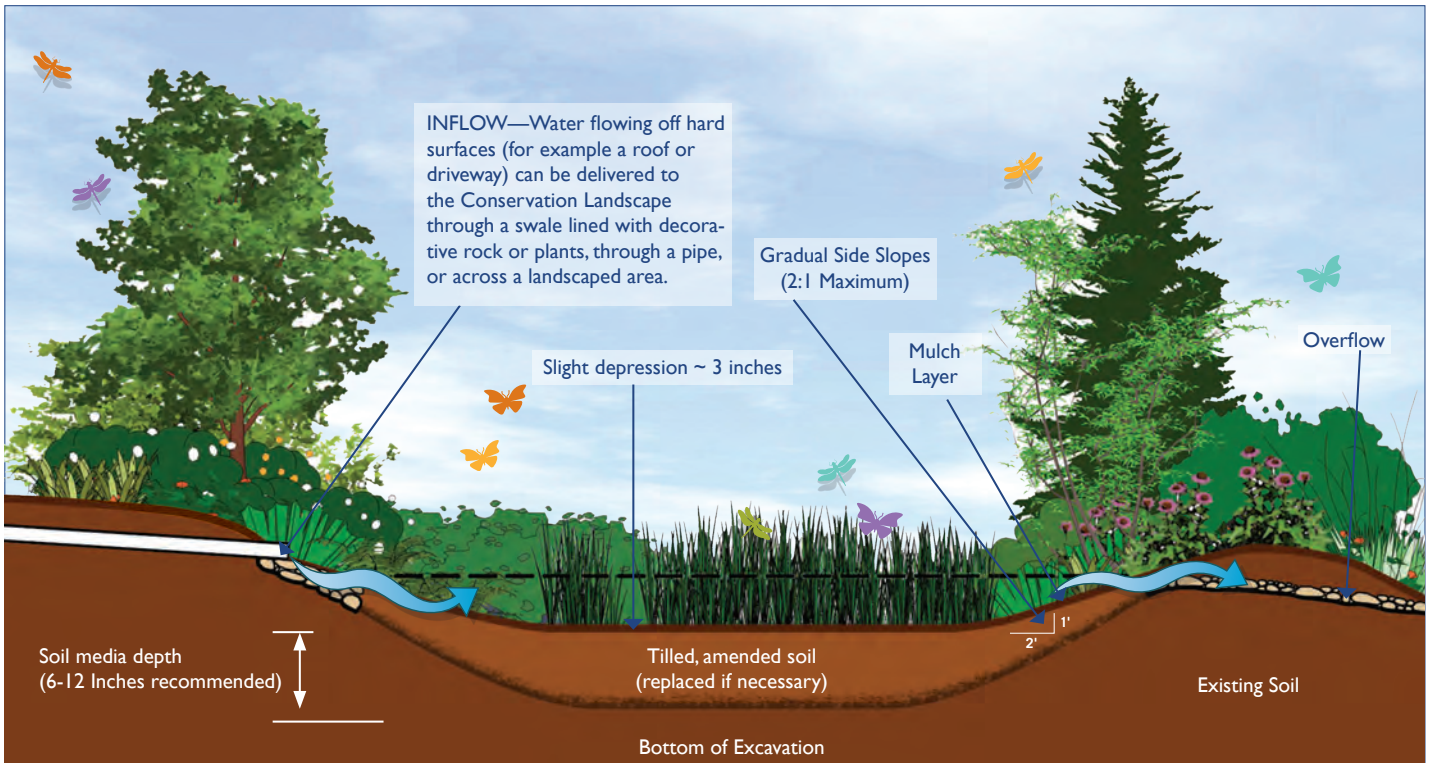
## Table I.2. Dealing with Roof Runoff: Downspout Disconnection

Downspout disconnection refers to directing roof gutter downspouts to well vegetated areas (such as Conservation Landscapes) instead of to the storm drain pipe network so that stormwater has a chance to soak into the ground and be filtered by vegetation. This manual often highlights the same theme: downspouts **can be directed to many different types of landscapes and stormwater features**, as illustrated below.





## Design Elements of a Conservation Landscape



### 1.3. Design

As you prepare a Conservation Landscape design for your client to create an area that also functions as a stormwater management practice, consider the following factors:

**Runoff & Sizing** A **Conservation Landscape Worksheet** accompanies this manual to help calculate the optimal size of the landscape for absorbing stormwater runoff from its respective drainage area. Of course, sizing the landscape according to the drainage area size is optional. If space or cost constraints ultimately determine the size of the practice, this worksheet can be used simply to determine material quantities needed for a landscape of a given size, estimate costs for those materials, and estimate the amount of material (i.e., soil and turf) that may need to be removed from or recycled on the site due to excavation and soil replacement. Finally, the worksheet estimates how much nutrient and sediment pollution the Conservation Landscape can reduce by absorbing stormwater runoff from the drainage area that flows to it. The **Conservation Landscape Worksheet** can be found at [www.aawsa.org](http://www.aawsa.org).

**Plant Species and Layout** It is important to take into account conditions at the site, such as exposure to sun, soil type, how wet or dry the area is, aesthetics, and wildlife objectives when selecting the appropriate plant species for a Conservation Landscape. Native plant species with high habitat value, suited to site conditions, and planted in layers and zones of similar native plant communities are preferred over non-native species, but some ornamental species may be used for landscaping effect if they are not aggressive or invasive. See **Section 1.5** and the [Design Tool](#) for more guidance and the references at the end of this chapter for more plant resources.

**Plant Heights** When choosing where to install Conservation Landscapes and which plants to use, consider the typical maximum height for each type of plant. Certain tree species, for example, may grow quite tall and shade out other plants, block views, and get in the way of aerial electric and cable wires. Only use tall tree species where appropriate. Landscaped areas next to driveways or parking areas should not block ingress and egress or sightlines.

#### WSA Conservation Landscape Design Tool

See the online [Design Tool](#) for help in choosing plant species and layout based on sun exposure, soil permeability, space available, and drainage area to the site. A total of 22 templates are available.



**Soils** Conservation Landscapes can be tailored to any soil type and soil infiltration rates. A soil test can help determine plants suitable to the site and what types of amendments (e.g., compost, lime) may be needed to improve the fertility of the soil for plant growth and infiltration of water into the soil. The first rule of thumb is to use existing soil and reestablish soil health with soil amendments if there is little or no topsoil, the organic content is low, or the pH is less than 4.5 or greater than 8.0. Many clay soils can be amended with organic content to improve infiltration; however compacted soils will not successfully sustain plant life or allow infiltration of water into the ground. Compacted soils should be amended with organic compost and aerated, tilled, plowed or hand turned with a shovel or fork to re-introduce space between the soil particles and improve infiltration. In some cases, where topsoil is missing, new high quality, sandy loam topsoil should be brought in. Many university extension agencies provide soil testing services to the public at a low cost. Along with test results, they also usually provide recommendations for how to improve the soil structure and quality. Also, see **Appendix B** for information on testing soil texture and infiltration rates.

**Excess Material** As mentioned above, the [Conservation Landscape Worksheet](#) accounts for the quantity of soil and turf that may need to be removed from the landscape to make room for adding compost, mulch, plants, and possibly new soil while keeping the surface level at least 1-2 inches below surrounding grade. The plan for construction should address the excess material. Several options may be available: (1) keep it on site for future use, such as for raised garden beds or fill (cover with tarp to avoid erosion); (2) offer it for free through local or online classifieds; or (3) haul it to an appropriate local landfill, which will likely charge a fee. Speak with the homeowner to decide which option works best.

**Erosion Control** If the Conservation Landscape receives stormwater directly from gutter downspouts, the design will need to incorporate a pad of cobble stone (sometimes called river rock, or river jack) or some other means at the mouth of the downspout to reduce flow velocity and prevent erosion. See **Figure 1.5** for an example and **Section 1.6 (Step 5)** for installation instructions. Where a Conservation Landscape is located next to a sidewalk, patio or driveway, consider including a similar treatment to prevent erosion at the edge where the bed meets the hardscape until the plant material is established and mature.

In addition -- depending on the size of the installation, anticipated weather, and number of days needed for installation -- it may be advisable to place silt fence downhill from the Conservation Landscape excavation and/or stockpiles of excavated material. Take all precautions necessary to not contribute sediment to downhill storm drainage systems and waterways.



**Figure 1.5:**

*River cobble at downspout to slow down roof runoff before it enters a Conservation Landscape. Ideally, this downspout would extend to route water further away from the building foundation before it reaches the stone.*





## I.4. Materials

The following is a list of materials needed for constructing a Conservation Landscape. Note that some of these materials are optional, based on site conditions. The [Conservation Landscape Worksheet](#) will help determine specific quantities for each item, based on the size of the landscape area.

**Table I.3. Material Specifications for Conservation Landscapes**

Material	Specifications	Size	Depth	Notes
<i>Soil mix (optional)</i>	Rain Garden soil mix from vendor or sandy loam topsoil	N/A	Replace existing soil to a depth of approximately 12 inches	Recommended strongly if topsoil is missing, is full of rock, shale or construction debris, or otherwise has poor infiltration rates
<i>Compost (optional)</i>	The material should be well composted and free of viable weed seeds Fresh manure should not be used for compost because of high bacteria and nutrient levels	N/A	Add 2 inches of compost across landscape surface area and incorporate into top 6 inches of soil	Follow recommendations from the soil test if compost amendments are suggested
<i>Plants</i>	See <b>Section 1.5</b> below	Variable	N/A	Potted plants, plugs, or seeds
<i>Ground cover</i>	<i>Options:</i> double-shredded hardwood mulch, leaf mulch, or seed mix	N/A	2 – 3 inches	Mulch should be aged a minimum of 6 months
<i>Cobble/Stone (optional)</i>	Washed river rock, large gravel, or small rip-rap	3 – 5 inch diameter stone	1 or 2 layers deep	Use at downspouts, inlets, and where landscaping meets hardscape areas as needed to dissipate flow and prevent soil erosion Install filter fabric secured with landscape staples below the stones to keep them in place and to prevent weed growth



## I.5. Plants



**Figure I.6.** A variety of plant types used in a residential Conservation Landscape  
(Source: Montgomery Co. Department of Environmental Protection, RainScapes)

Some common Conservation Landscape planting strategies:



**Tree, shrub and herbaceous plants/grasses (referred to in the Design Tool as “Typical”)** These have a balanced mix of plant types for variety and cooperative function. They can produce a natural effect, simulating the structure and function of a native forest plant community. Requires regular maintenance in the form of weeding, thinning, pruning, mulching, and other activities that are routine for other landscaped areas.



**Simple meadow** This is a lower maintenance approach that focuses on the herbaceous layer and may resemble a wildflower meadow. The goal is to establish a more natural look, and, once the grasses are established, maintenance can largely consist of mowing the area annually in the early spring.



**Flowering tree focal point garden** A small or medium tree is accented with perennials/ herbaceous plants. This garden may have more mulched areas than other options, so weeding and re-mulching would be expected.



**Butterfly garden** Largely a modification of the tree, shrub, herbaceous option, but with plants selected for pollinators and wildlife.



**Woody screen** Some Conservation Landscapes can be naturalized screens, consisting largely of trees with understory shrubs and ground covers. The idea is to create a property screen or, more appropriately, a natural buffer area along streams, swales, wetlands, or other natural areas. Once established, maintenance would consist of periodic thinning and control of invasive plants.



**Hybrid** There are many options for Conservation Landscape concepts. The designer may mix and match the concepts above or design something suited to the particular property.

### Match The Conservation Landscape Design with the Owner's Maintenance Capabilities

Conservation Landscapes often require much less maintenance than traditional landscaped beds, but until established, they do require some watering, weeding, mulching, and occasional thinning of plants, depending on the aesthetic goals of the garden. Often, people do not consider the long-term maintenance responsibilities when these practices are first installed. Conservation Landscapes designed with tightly-spaced herbaceous plants (e.g., a meadow) require less maintenance than those with more complicated designs. Investigate the planting templates in the [Design Tool](#), and make sure the selection is a good match for the owner.

## 1.6. Construction

Local jurisdictions may require a permit or permission before a practice can be installed. Once site suitability and appropriate location have been confirmed:

### Step 1 - Outline the Conservation Landscape area

Clearly mark both the boundaries of the Conservation Landscape and any nearby underground utilities (call Miss Utility at least two business days before digging). Also try to identify private propane, cable, electric, and other small lines. Make sure to have a plan and phone numbers of who to call in case there is any damage to utilities. Also mark areas that should not be disturbed during installation (e.g. environmentally sensitive areas, soil around root zones of mature trees, and existing vegetation).

### Step 2 - Remove the Turf

If turf grass needs to be removed, several methods can be used, as outlined below. These “physical” methods are preferable to using herbicides, since the intention of the practice in the first place is to protect water quality.

(1) Sheet mulching- uses cardboard or sheets of newspaper to smother and kill the grass (see **Figure 1.7**).

- First, cut the grass as short as possible and water down the area well.
- Lay down the cardboard or newspaper (about 10 sheets thick) like shingles, with some overlap. If there is a breeze, water down the paper to keep it from blowing away.
- Add a layer of 3 – 5 inches of mulch on top of the paper to keep it in place.



**Figure 1.7.** Killing turf grass with newspaper and mulch cover, (a.k.a., “sheet mulching”).

(Source: Eve's Garden Design)



- Wait 2 – 4 months to allow the grass to die off. When ready to install the Conservation Landscape, remove the sheet mulch or install potted plants (or plugs) directly by cutting holes into the newspaper or cardboard.

(2) Solarizing - Using stapled down sheets of black or clear plastic over the grass (see **Figure I.8**). Over time, heat from the sun will kill the grass. Remove the plastic before planting. As with sheet mulching, be sure to start the process at least two months in advance of installing the Conservation Landscape to allow time for the grass to die off.

(3) Mechanical methods - Using a sod cutter to remove turf (see **Figure I.9**.) or using shovels to cut out grass roots by hand. This method is needed if grass is not killed in advance.



**Figure I.8.** “Solarizing” turf grass with plastic to kill it.  
(Source: Ted Millich)

**Step 3 - Loosen the Soil** If the site is heavily compacted, deep-till the bed to a depth of approximately 8 to 12 inches, using a rotary tiller (or, for small areas, by hand using shovels and forks). If needed, add 2 inches of a suitable compost mix evenly across the Conservation Landscape while tilling.

**Step 4 - Remove Excess Soil** Most Conservation Landscapes will match the existing shape of the land. If possible, the surface of the Conservation Landscapes should be a few inches lower than the surrounding area, so that water flows into the landscaping area. As mentioned earlier, the design should account for removal and disposal or reuse/composting of any soil and/or turf grass. When grading the area to achieve the desired final elevations and slopes, avoid compacting the soil with heavy equipment.



**Figure I.9.** Using a sod cutter to remove turf prior to planting a Conservation Landscape.

## Do:

- Call Miss Utility before digging
- Remove all turf grass in landscape area
- Water plants during first month

## Don't:

- Compact the soil with heavy equipment during construction
- Add fertilizer if using compost.

**Step 5 - Install Stone, if applicable** If the volume and speed of water flowing into the landscape appears to have the potential to cause erosion, add river cobble stone at downspouts and any other inlets or edges where water is concentrated.

To install:

1. Dig a concave channel 1 – 2 feet wide with the outer edges of the channel approximately 6 inches deep and the center approximately 8 inches deep. Fan out the width of the channel as it enters the landscape, to encourage the incoming water to spread out.
2. Lay landscape fabric down onto the surface of the excavated area and secure it with landscape staples. This fabric will prevent the stones from sinking into the ground over time.



3. Add approximately 3 – 5 inches of stone (1 or 2 layers) on top of the fabric and tamp it down.
4. After installing the stone, check to make sure the stone is low enough in the ground to not block flow from getting into the Conservation Landscape. **Figure 1.5** shows an example of cobble stone stabilization.

**Step 6 - Install Plants and Mulch** Install native plants per grower’s instructions and add 2 – 3 inches of hardwood, composted leaf mulch, and/or other recommended organic mulch around them to retain soil moisture and reduce weed growth. Alternatively, plant an appropriate seed mix using grower’s instructions (e.g., native meadow seed mix) and cover with straw or biodegradable erosion control matting.

**Step 7 - Water** Water plants immediately, then approximately once every three days for the first month (depending on rainfall).

## 1.7. Maintenance

Maintenance of Conservation Landscapes is very similar to the maintenance of traditional landscape beds. Those performing maintenance on Conservation Landscapes need to be able to differentiate between native plants and non-native plants to know which are desirable and undesirable.

**Table 1.4. Recommended Maintenance for Conservation Landscapes**

Maintenance Tasks	Frequency
<ul style="list-style-type: none"> <li>• Water once every three days for the first month and then weekly during the first growing season (April-October), depending on rainfall</li> <li>• Expect up to 10% of the plant stock to fail in the first year, and plan accordingly for replacement plants</li> </ul>	Upon establishment
<ul style="list-style-type: none"> <li>• Check inlets and overflow areas for debris or leaves that are blocking flow</li> <li>• Check and repair erosion areas</li> </ul>	After heavy rains in first month; periodically in subsequent years
<ul style="list-style-type: none"> <li>• Remove weeds by hand</li> </ul>	Monthly for first growing season; every 3 months or as needed in subsequent years
<ul style="list-style-type: none"> <li>• For “meadow” type Conservation Landscapes consisting of grasses, mow in early spring</li> <li>• For other types of landscapes, check for winter damage and add mulch to bare spots as desired (2–3 inches)</li> <li>• Cut back perennials and remove dead growth</li> </ul>	March or April
<ul style="list-style-type: none"> <li>• Add reinforcement planting to maintain the desired vegetation density</li> <li>• Prune trees and shrubs; thin herbaceous plants as desired</li> </ul>	Fall
<ul style="list-style-type: none"> <li>• Remove invasive and non-native plants using recommended control methods</li> <li>• Remove any dead or diseased plants</li> <li>• Dead-head flowers</li> <li>• Stabilize any eroded or bare areas</li> <li>• Remove trash</li> </ul>	As needed



## I.8. Resources & References

Albemarle County,VA, *Piedmont Native Plant Data Base*

<http://www.albemarle.org/nativeplants/>

Alliance for Chesapeake Bay, *BayScapes Homeowners' Guide to Designing Your Property*

<http://allianceforthebay.org>

Chesapeake Conservation Landscaping Council, *Conservation Landscaping Guidelines: The Eight Essential Elements of Conservation Landscaping*

<http://www.chesapeakelandscape.org>

Association of Professional Landscape Designers (APLD) – sustainability resources and guides developed for APLD certified landscape designers

<http://apl.org/?p=sustainability>

Ladybird Johnson Plant Database

<http://www.wildflower.org/plants/>

North American Native Plant Society

<http://www.nanps.org/>

USDA, *Plants Database*,

<http://plants.usda.gov/java/>

U.S. Fish and Wildlife Service, *Native Plants for Wildlife Habitat and Conservation Landscaping*

<http://www.fws.gov/chesapeakebay/bayscapes/bsresources/bs-nativeguides.html>