# Green Infrastructure Project
# Swales and Berms

## Want to water less?

A vegetated swale is a grass-lined depression that slows down runoff water velocity and infiltrates the water into the soil.

Berms are low earthen walls adjacent to ditches that can be used to help retain runoff in a designated area along the downhill side of the location.

www.uvm.edu

www.lincoln.ne.gov

**Fairbanks Green Infrastructure Group**

Berms and swales are one type of earthworks used in permaculture design to conserve soil and water. Vegetated swales and berms can direct water to where you wish it to drain, whether it is a rain garden or a dry well or any other area where excess water can be filtered before it reaches a waterway. Swales can be dug by hand and cost you next to nothing to construct.

## Cold Climate Considerations:
See "Steps to create a berm" for examples of plants that will survive on a Fairbanks area berm.

### Cost Estimate:
- Self installed
  $3 - $7 per sq ft
- Professionally installed
  $10 - $15 per sq ft

### Time Estimate:
- This project will take one to three days to complete.

### Pros:
- Aesthetically pleasing.
- Reduces water runoff.
- Increases groundwater infiltration.
- Increases property value.
- Creates habitat for birds and butterflies.

### Cons:
- Surface freezing in the fall reduces the water retention potential during that season.
- A restricted list of suitable plants.

### Materials:
- ☐ Appropriate plants
- ☐ Extra soil if needed
- ☐ Non-toxic paint, stakes or string
- ☐ Native plant seeds or grass seeds

### Tools:
- ☐ Shovel
- ☐ Spade
- ☐ Measuring tape

## Steps to create a vegetated swale:
Steps to create a vegetated swale:
1. Choose the right location for your swale:
   a. Note the direction of runoff and low spots where water collects.
   b. Swales can be used to convey roof runoff to rain gardens, dry wells, or other areas of your lawn. Swales should not be used to direct runoff into the street or other nonporous surfaces.
   c. Make sure that the chosen location runs downhill and ends at least ten feet away from buildings with basements.
   d. Location should not be on or near septic tanks or wellheads.
   e. Before you dig, be aware of underground service lines or utilities on your property. Call 1-800-478-3121 or go online at www.akonecall.com to have the underground lines marked for you.
2. Once you have chosen a location, define the borders using non-toxic paint, stakes and string, etc.
   a. The swale can be as wide or narrow as you want it.
   b. The depth of the swale can be as deep as you like. For residential purposes six inches or less is adequate.
   c. The slope of the swale should be not more than 3:1, horizontal to vertical.
3. Remove the sod and dig a trench with the dimensions you wish your swale to be.
4. Once you have finished your trench, either replace the sod or reseed the swale. You will need to water the sod or seeds well until they are established.
5. Attach a universal downspout adapter to the downspout and redirect it into the swale.

# Vegetated Swale

RAIN GUTTER

DOWNSPOUT

UPHILL

VEGETATED SWALE

# Vegetated Berm

RAIN GUTTER

DOWNSPOUT

UPHILL
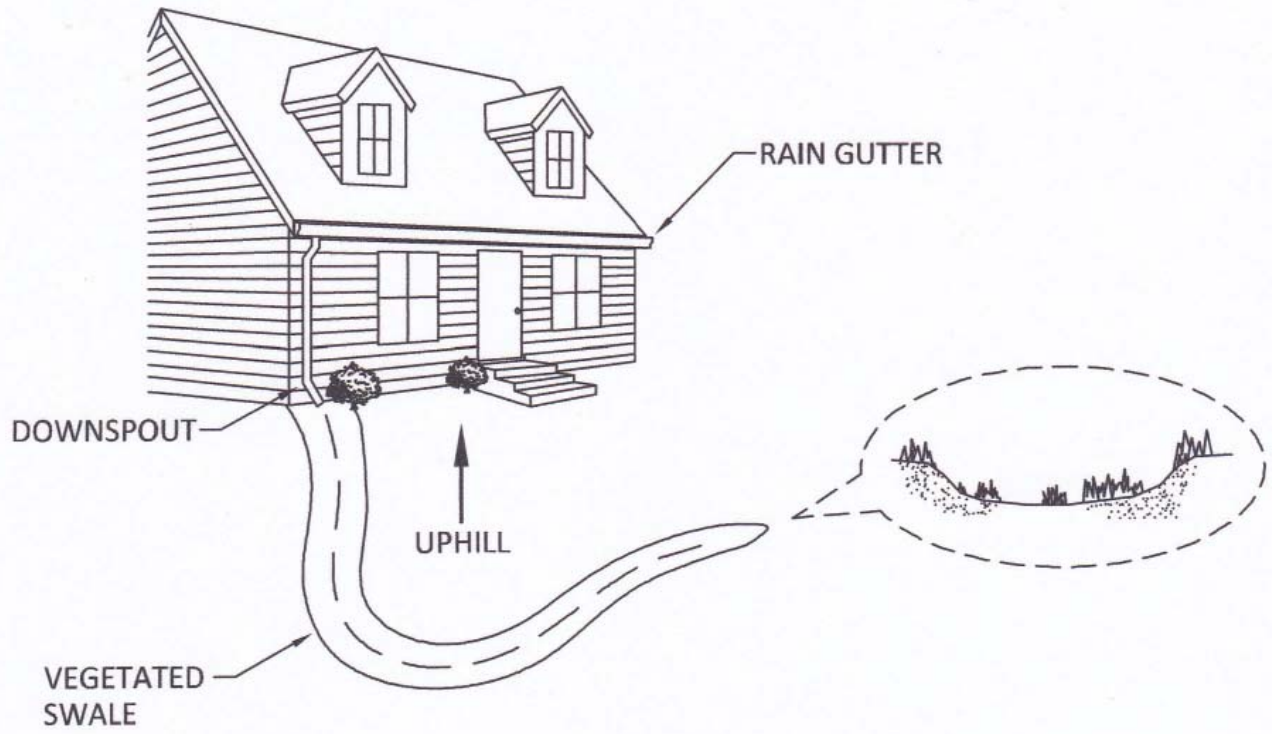
VEGETATED BERM
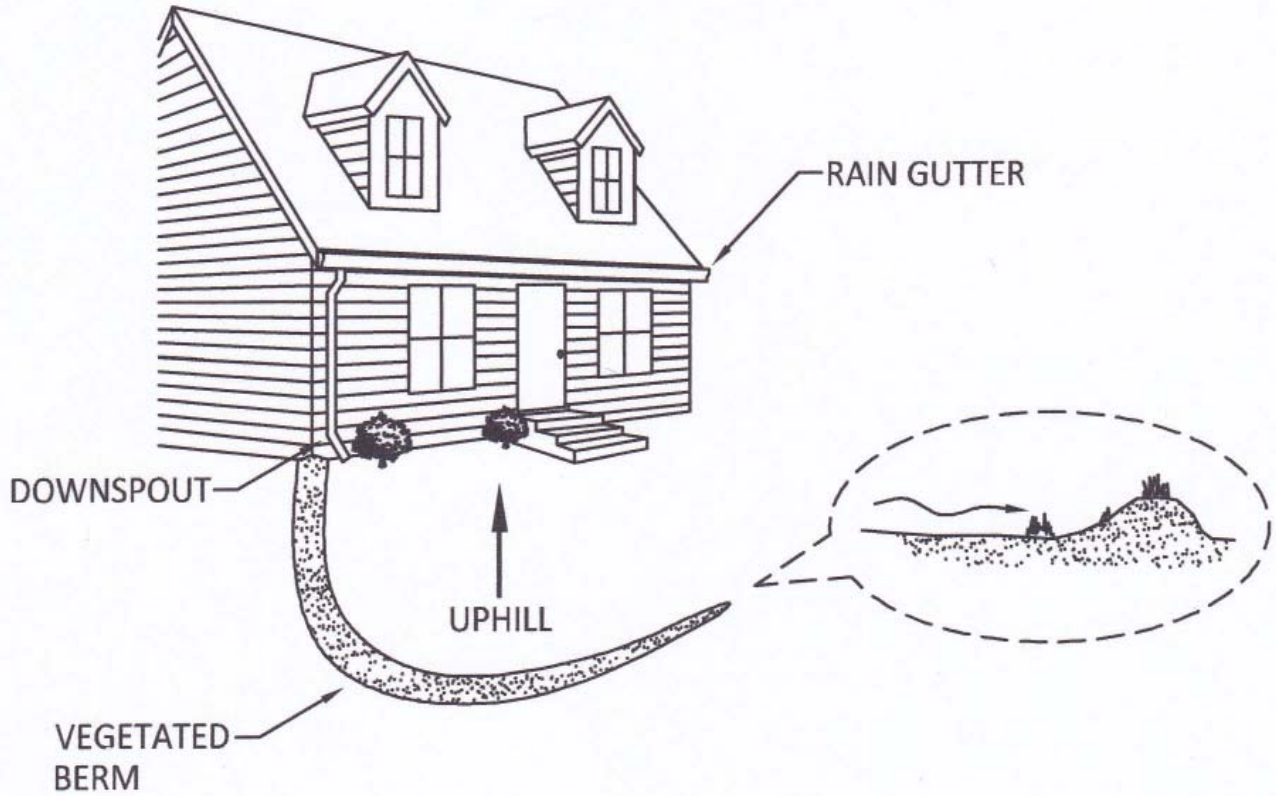
## Steps to create a berm:

1. Pile up an appropriate amount of soil. Usually five inches tall is sufficient to retain water but not drown plants.
2. Compact the soil by walking on it and tamping it down well.
3. To help minimize erosion of the berms, either put a two-inch layer of mulch on the berm or plant drought resistant plants for ground cover. Rock Cress (Arabis arendsii), Gold Creeping Jenny (Lysimachia mummularia 'Aurea'), and Field Pussytoes (Antennaria neglecta 'Greene') are some good choices.

## Maintenance:

- Weeding
- Fertilizing
- Watering, frequently until the vegetation is established, then occasionally.

For more information about this and other Green Infrastructure Projects please visit:

## www.fairbanksgig.com

## Sources:

Alaska Department of Fish and Game, Native Alaskan and Exotic Plants Used by Wildlife
  www.wildlife.alaska.gov/index.cfm?adfg=birds.plants
Tree People website, Build Berms
  www.treepeople.org/build-berms
United States Environmental Protection Agency website, National Pollutant Discharge Elimination System, Grassed Swales
  http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=factsheet_
  results&view=specific&bmp=75



kerrmaculture.files.wordpress.com/