LAKE WISE "do the numbers"
Simple Math for Landscaping Practices that Reduce Erosion and Runoff

Impervious Surface Area

Decks, stairs, patios, house, and other impervious structures should be <u>less than 20%</u> of the entire property.

Measuring Distance, Area, and Slope

<u>Distance</u>
Learn to use your pace to measure distance. Count the number of steps it takes you to walk a known distance to determine the length of your pace. If it takes 120 steps to walk the 300 foot length of a football field, your pace is 2.5 feet for every step you take. Everyone's pace varies.

<u>Area</u> = Length x Width. A 10ft by 20ft deck has an area of 200 square feet.

<u>Percent slope</u> = Percent slope is calculated by this formula: Rise/Run x 100. A 40 foot long ditch that drops 2 feet has a 5% slope because 2 divided 40 equals 0.05, and then multiplied by 100 equals 5.

Ditches

The steeper the ditch, the greater increase in the water's velocity. Fast moving water has a greater capacity to erode the sides or bottoms of ditches. Ditches that are steeper than a 5% slope are more prone to erosion and should be lined with crushed stone.

Ditches should be U-shaped in cross-section. Sides should have 2:1 slope (a 2 foot run for every foot of rise, so a 2:1 horizontal to vertical sloped ratio).

Grassed or vegetated swales should have slopes of 1% to 4%. If steeper, check dams are recommended. On steep slopes run the swale parallel to the contour. Surface area of swale should be 1% of area drained (500 sq feet/acre drained).

TABLE 1: DITCH LININGS		
Channel Slope	**Lining**	**Thickness**
0-5%	grass	
5-10%	R#3 (2 - 6 inch) diameter rock	7.5"
> 10%	R#4 (3-12 inch) diameter rock	12"

Driveways

Crown driveways ½ inch for every foot of width in order to get stormwater off the driving surfaces. Encourage sheet flow rather than concentrated flow. Use turnouts (or culverts) to divert water into vegetated buffers before it reaches a lake or stream. Define and minimize parking areas and other impermeable surfaces in order to avoid runoff-producing areas.

Infiltration Steps

Rise, run, and tread width.

Steps or stairs work well with steep slopes, such as a 1:1 rise to run or a 100% slope. For infiltration steps, tread depth should be at least 15 inches and a 4 foot width for stairs is comfortable for one person to walk up or down.

For stairs on stringers, the rise is usually 7" and the run 8-10"

Re-grading Lake Banks

No steeper than 2:1 (2 foot horizontal for every 1 foot height). Use 6-8 inch diameter stone at toe- angular rock is best.
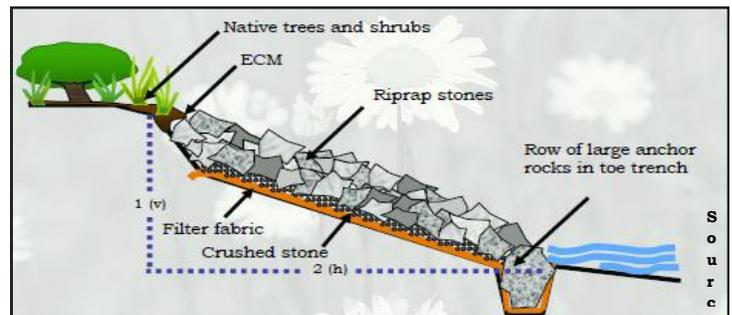
Riprap installation.

Rain Garden Sizes

1. Calculate the impervious surface area that doesn't allow infiltration of water, but instead contributes to storm water runoff. In general the area of the rain garden will be 8%of the total imperviouos surface area.
2. The chart below explains how to calculate the depth of the raingarden.

Calculate the slope to determine the rain garden's depth:

1. Place one stake at the uphill end of the rain garden and another at the downhill end as illustrated in Figure 1.
2. Level the string between the two stakes.
3. Measure the total length of the string and the height of the string at the downhill stake in inches.
4. Divide the height by the length and multiply the result by 100. This is the slope.
5. Use Table 1 to determine the recommended rain garden depth.

Table 1	
Slope	Depth
< 4%	3-5 in
5-7%	6-7 in
8-12%	8 in +
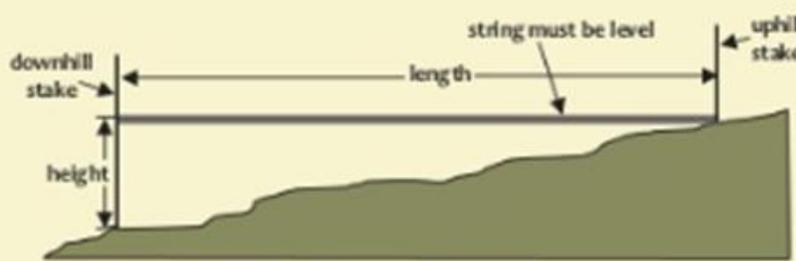
Figure 1: Determine the slope of the landscape.