



Live stakes (left) and live fascines (right) can be used to stabilize slopes. Note that the live fascine photo was taken directly after installation and additional soil stabilization was also completed.

## 5.6 Live Staking

### Description

Living, but dormant, vegetative cuttings, usually one to two inches in diameter and one to three feet tall, capable of quickly rooting in moist soils to provide slope stabilization.

### Purpose

To create a living root mat to stabilize soil by reinforcing and binding soil particles together.

### Conditions Where Practice Applies

Live staking works well on eroding, steep, rocky slopes where disturbing the soil is difficult and not recommended lest it led to further erosion. However, most plants that can be propagated from a vegetative cutting, like willows and

dogwoods, prefer wet soils and will do best with moisture. Often live staking is used to supplement other plantings in conjunction with other bioengineering techniques including slope regrading, stone toes, encapsulated soil lifts, fiber coir rolls, and timber cribs.

Live stakes are harvested and planted during the dormant months (late fall and early spring). They cost approximately one to two dollars each if purchased and have a 70 percent chance of survival. While a spacing of one to three feet is recommended for planting, over planting live stakes works well to ensure good survival and will reap the full benefit of these fast-rooting plants. Live stakes do best when watered while establishing and during dry periods (up to three years).

Live stakes can also be used as bundles called waddles or live fascines. They are laid horizontally along a steep slope or used to reinforce a live staked project in certain spots. The live branches are bunched together and tied with a biodegradable twine and placed horizontally into a shallow, dug out trench or cradle. They are staked in place with either a live stake branch or wooden stake. These fast-rooting vegetative cuttings will root and sprout branches all along their length.

Sometimes “dead” fascines or brush layers are used. These dead branches, grouped in bundles, are laid horizontally along the ground to slow stormwater. As these bundles are not living branches, they are not used to revegetate an area.

### Tips and Considerations

Live stakes can do well in rip-rapped areas, which otherwise would be very difficult to plant. Live stakes should not be planted within 10 feet of a leach field. They should not be used where structural integrity is required to resist large areas of slumping or lateral earth pressures. A rock can be placed on top of the stake and a hammer used to drive the stake into the ground by striking the rock. The rock helps to cushion the stake to ensure it is not damaged during installation. Alternatively, a blunted mallet can be used directly on the stake to drive it in.

It is essential to know which shrubs can propagate from vegetative cuttings because most plants cannot reproduce from cuttings. See [Section 4](#) for more information on specific species to use for live stakes, waddles, or live fascines.



## Plans and Specifications

Live stakes should be one-half to two inches in diameter and one to three feet in length. No leaf buds shall have initiated growth beyond one-quarter inch and the cambium layer shall be moist, green, and healthy. Materials shall be maintained in a continuously cool, covered, and moist state prior to use and be in good condition when installed.

To determine planting count and layout, a 30 percent mortality rate should be assumed. Live stakes shall be cut to a 45-degree angle on the basal end for insertion in the ground. Before planting, the basal end can be dipped in a root hormone powder to help stimulate fast root growth. Root hormones are inexpensive and sold in small four-to-six-ounce jars; one jar of powder can be used for about 250 stakes. A dibble, iron bar, or simply a sharp tipped grade stake can be used to make a pilot hole for the stake. The pilot holes make installations go faster and with less potential damage to the stake. Live stakes

shall be inserted by hand into pilot holes. The stakes are driven into the ground with a hammer or blunted mallet. At least one-half of the stake length shall be buried and one-quarter exposed with a minimum of two live buds. When possible, soil should be tamped around live stakes. Care shall be taken not to damage the live stakes during installation. If needed, trim off damaged tops.

## Maintenance Considerations

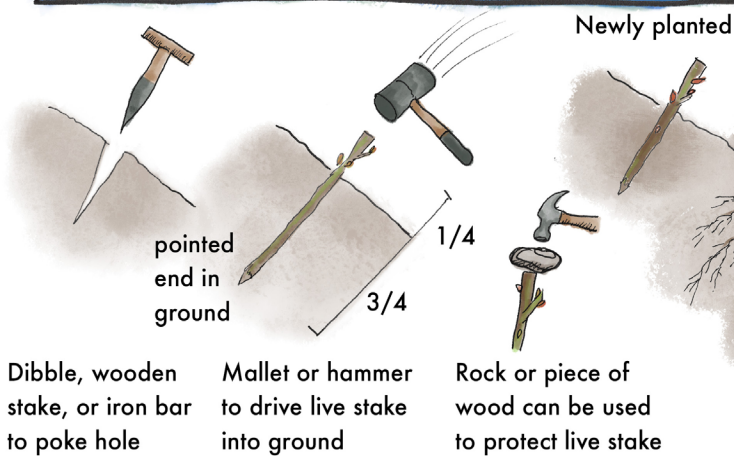
Once leaf out occurs, inspect the site for live stake survival rate. Depending on this assessment, plan for replacement plantings. Assess if the slope is stable, erosion control blankets (if used) are secure, and plants are receiving enough water. Make repairs as needed during or directly following these inspections. Temporary fencing and signage are important when live stakes are used where people and/or animals could trample them. Fencing can be removed once the plants are well established, typically in three years.

## Design Criteria

Dimension	Name	Typical Unit	Guidelines	Description
A	Regraded Slope Pitch	Foot:Foot, Percent (%)	>3:1 (33%) slopes and shallower slopes sensitive areas require erosion control blankets. Slopes >2:1 (>50%) should not be created for vegetation establishment.	Ratio of horizontal run to elevation rise of buffer as measured from the top of bank adjacent to the lakeshore to developed lands (managed turf or impervious area).
B	Stake Length	Foot	Typically 1 foot – 3 feet.	Length of the live stake, including a 45-degree angle at the bottom, square cut at the top, and buds facing upwards.
C	Stake Width	Inch	Typically ½ inch to 2 inches diameter.	Diameter of the live stake.
D	Spacing	Foot	1 foot to 3 feet spacing.	Live stakes shall be installed perpendicular to the slope with spacing as measured on the slope.

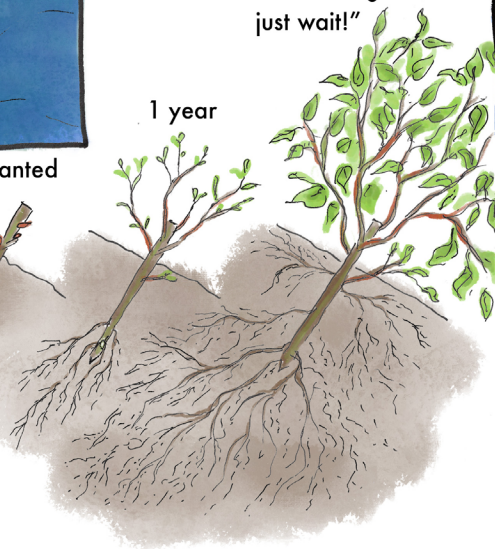


## LIVE STAKING

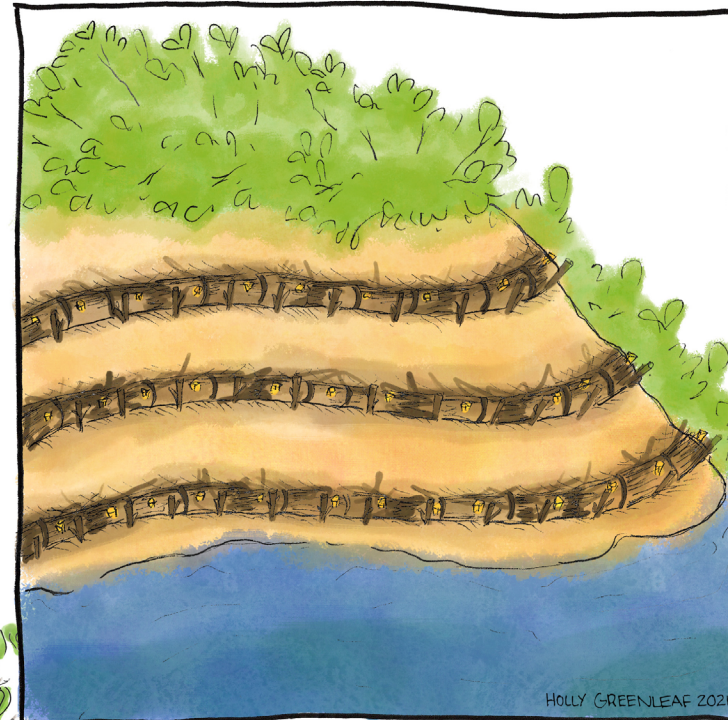


3 years  
"It will be great,  
just wait!"

1 year

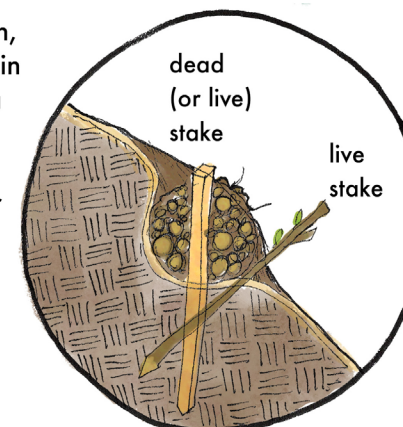


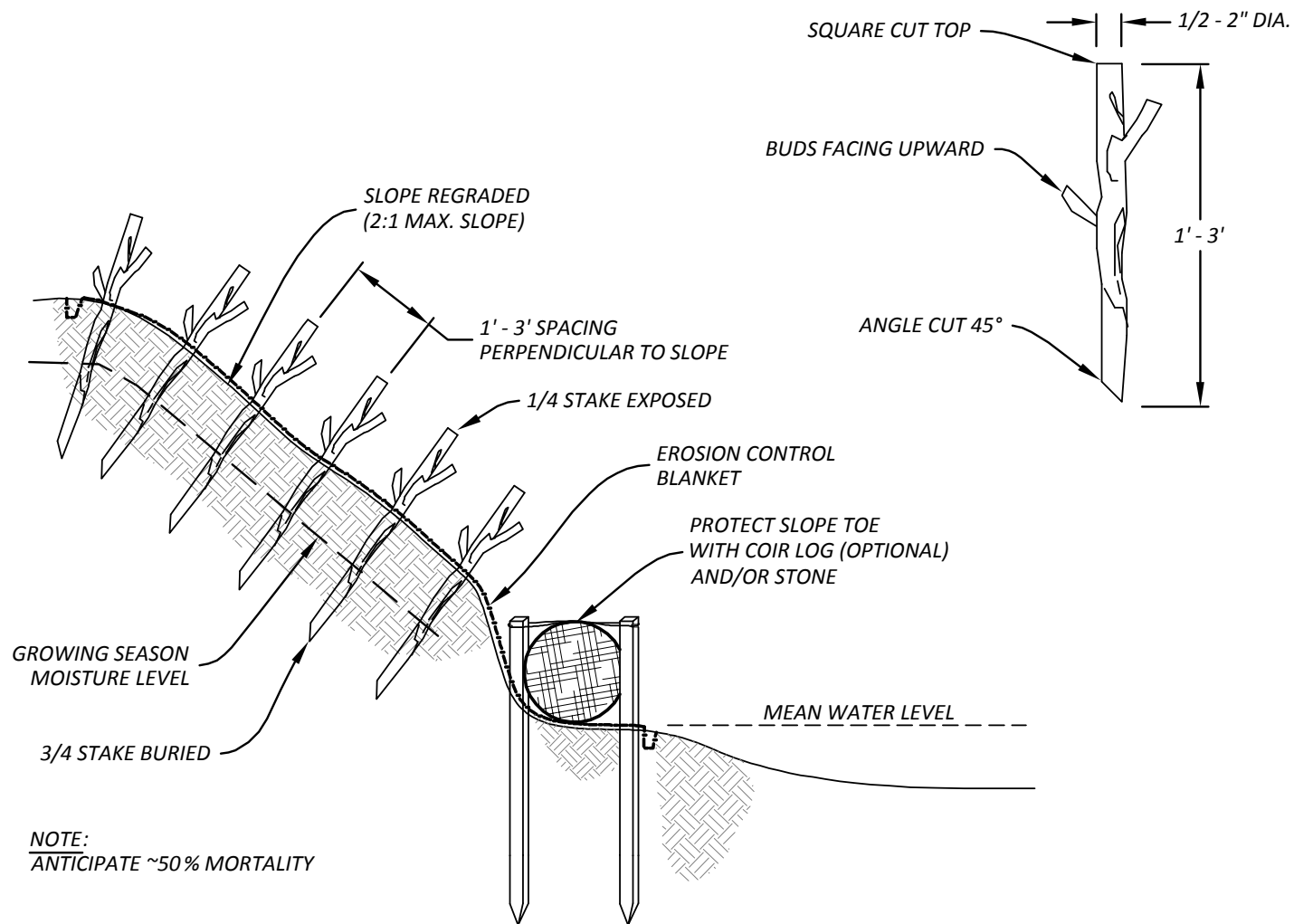
## WATTLES & LIVE FASCINES



HOLLY GREENLEAF 2021

Dig 6" on-contour trench, place wattles and stake in every couple feet with a dead stake through the middle and live stake at the base. Partially cover with soil.





LIVE STAKING  
SLOPE PROTECTION

LAKELIKE BIOENGINEERING  
CONSTRUCTION DETAILS