



**SPECIAL PROVISIONS  
FOR  
LIVE STAKES**

**Polk County  
TAP-T-1945(837)--8V-77**

**Effective Date  
March 19, 2019**

**THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.**

**157112.01 DESCRIPTION.**

- A.** The purpose of this specification is to describe soil bio-engineering techniques that shall be incorporated into the project. Soil bio-engineering is specialized use of plant materials to stabilize soil by combining engineering principles with plant science.
- B.** Live Stakes are standard bio-engineering techniques which involve planting dormant plant cuttings which are of a species known to produce rooting from cuttings. Cuttings are live plant material without a previously developed root system. Work under this specification includes the harvesting, storing, preparation, and installation of Live Stakes on areas shown in the contract documents.

**157112.02 MATERIAL.**

**A. Live Stake Cuttings.**

Live Stake cuttings shall be healthy, well branched, disease free stock between 1 inch and 2 inch DBH (diameter at breast height, prior to harvesting). Cuttings shall be at least 6 feet in length and straight. Cuttings shall have a minimum of two undamaged bud tips while the side branches shall be removed and the bark left intact prior to installation. Split or otherwise damaged plants shall be discarded.

**B. Authorized Plant Species.**

The following plant species are authorized for use as Live Stake or Live Post cuttings:  
*Salix interior* (Sandbar Willow)

**157112.03 CONSTRUCTION.**

**A. Harvesting and Storing.**

1. Harvest dormant plant materials of the species indicated between November 15 and January 1. Use refrigeration as necessary to maintain the temperature of harvested dormant plant materials below 41°F and humidity greater than 90% while in storage. A thermometer and hygrometer shall be affixed in the refrigeration unit.
2. Equipment such as chainsaws, bush axes, loppers, and pruners may be used for harvesting provided that they leave clean cuts. Cuts typically should be made 0.5 feet to 1.0 foot from the ground and should be flat or at a slight angle to ensure that the source sites will regenerate rapidly.

**B. Live Material Preparation.**

Dormant plant material harvested shall have smooth 30 to 45 degree cuts. Once ready to place dormant plant materials, protect plant materials from drying and overheating until installed. Store dormant plant materials in water or moist soil (healed in) for a maximum of 2 days. Outside storage locations shall be continually shaded and protected from the wind. If the temperature is 50°F or greater, the dormant plant material shall not be stored on site but installed the day removed from refrigeration. Do not use dormant plant materials that do not meet these requirements.

**C. Live Stake Placement.**

1. Immediately prior to installation, treat live stake with rooting hormone (Rhizopon 3) as directed by manufacturer's recommendations.
2. Install the Live Stakes upright so that no less than 1 foot of the stake and at least two undamaged bud tips are exposed above riprap/ground.
3. Plant the Live Stakes such that the stake is tamped in and has full contact between the soil and cutting to a depth of no less than 24 inches. Make pilot holes through revetment by hammering a piece of rebar or using a steel stringer between rip rap. Carefully extrude the rebar or steel stringer and tamp in the live stake. Insert the basal end of the live stake first, then fill hole around cutting with a water and soil slurry mixture or backfill the holes with loose soil after the Stake is installed and pour water in each hole as backfilling progresses, to ensure that the cutting is in firm contact with the wetted soil. If approved by Engineer, Contractor may select alternate method of installing live stakes, such as the use of an extended rod on a jack hammer to create a pilot hole through installed rip rap, then insert the prepared live stake as specified.
4. Water plants during planting operations. Apply sufficient water to moisten backfill around each plant so that moisture will extend into surrounding soil.
5. Total Live Stake density shall be approximately three stakes per square yard. Provide at least 1 foot spacing between all plantings. See plan documents for locations of Live Stakes.
6. Remove and replace Live Stakes which are split, or if the split is less than 1/6 of the cutting length, re-trim the top after installation to remove the damaged portion as long as two undamaged buds remain above the riprap/ground.

**D. Site Inspection.**

Upon completion of the planting, Engineer shall review plantings for density and plant viability. If planting density and numbers are less than 50% survival per planting area or if plant viability is not acceptable, replant as required at the Contractor's own expense, in order to achieve required planting density/viability.

**157112.04 METHOD OF MEASUREMENT**

Live stakes will be measured by each live stake installed in accordance with the drawings and specifications. Harvesting or other procurement, live stake preparation, live stake materials, root hormones, installation, and watering shall be incidental to live stake bid item.

**157112.05 BASIS OF PAYMENT**

Live stakes will be paid at the contract unit price per each live stake installed. The unit price shall include all harvesting or other procurement, live stake preparation, live stake materials, installation and watering, and all other related work required to place live stakes in accordance with the drawings and specifications.