

1. Description

Live stakes & Live Posts are standard bio-engineering techniques which involves planting of dormant plant cuttings which are of a species know to produce rooting from cuttings. Work under this specification includes the harvesting, transporting and installation of Live Stakes and live posts on streambanks and other areas as applicable to each site plan.

2. Definition

For the purpose of this specifications, Live Stakes and Live Posts are defined as follows;

Live Stakes - smaller, .5-2" stock of 2'-3' in length

Live Posts - larger, 2" - 4" stock of 4' to 8' in length

3. Harvest & Construction Schedule

- 2.1** The success of Live Stakes/Posts is dependent upon completing the harvesting and planting operations during the plant material's dormant period. Contractors shall conduct harvesting of the plant material and preparation/planting of the Live Stakes/Posts during the time periods set forth in the Special Conditions section of this specification.
- 2.2** Prior to execution of a contract, the Contractor shall submit a harvesting and planting plan for the Contracting Officers approval. The plan shall include identification of the plant material source, the method of harvesting, storage and transportation plans, and installation methods. Harvesting and Planting Plans must address all requirements set forth in this specification. No work shall commence until the Contracting Officer has reviewed and approved the plan.

4. Materials:

4.1 Live Stake Cuttings

Live Stake cuttings shall be approximately one half inch to one and one half inches (.5" to 1.5") in diameter. Cuttings will not exceed two inches (2") in diameter. Cuttings shall be two feet (2') to three feet (3') in length and reasonably straight. Live Stake cuttings shall consist of a mix of two (2) or more of the approved plant species as set forth in Section 6 Special Conditions Each will consist of no more than 60%, and no less than 40%, of the mix.

4.2 Live Post Cuttings

Live Post cuttings shall be two inch (2") to four inches (4") in diameter and will not exceed six inches (6") in diameter. Cuttings shall be between four feet (4') and eight feet (8') in length. Side branches shall be removed and the bark left intact prior to installation. Live pegs shall consist of the same species listed above for Live Stake cuttings

4.3 Mulch Materials

Prior to placement of the Live Stakes/Posts, the Contractor shall place a suitable erosion control fabric on the prepared surface. The erosion control materials must be approved by the Contracting Officer prior to their use. The Contractor shall install all commercial erosion control materials in accordance with the manufacturers specifications.

5. Construction Methods

Placement of the Live Fascines shall be completed as set forth in the following section.

5.1 General

All proposed construction techniques must be approved by the Contracting Officer prior to implementation by the Contractor. Construction techniques shall be presented in the Harvesting Plan prepared by the Contractor.

5.2 Harvesting

The Contractor shall locate and secure dormant plant materials of the species indicated in 3.1 above or as set forth in the Section 6: Special Conditions. Live materials shall be obtained from a source that is located within thirty five (35) miles of the project site, and all cuttings will be installed on the same day during which they have been harvested. The Contractor shall locate and flag the proposed harvest sites and will conduct a joint inspection of the plant material with the Contracting Officer and/or Project Engineer. Alternate sites may be used if approved by the Contracting Officer. The Contractor is responsible for obtaining the necessary approvals for harvesting and for obtaining the permission of all landowners of the harvest sites, and is responsible for all other requirements as set forth in their approved Harvesting and Planting Plan.

5.3 Live Material Preparation

Plant material shall be harvested such that maximum survival is obtained. All cuts shall be smooth and the cut surface shall be kept small. Harvesting may be done using hand tools (pruning shears) or power tools (chainsaws, power trimmers

w/blades). Plant material with excessive damage or oblique cuts, or with excessive damage to the bark, will not be acceptable. All live materials shall be properly stored to insure viability. Plant material must be moved from the harvest site and planted within eight (8) hours of cutting. Contractors shall protect plant materials from drying and overheating at the time of harvest, during transport and during the construction process. Contractors shall be responsible to follow the procedures set forth in their approved Harvest and Planting Plan.

Live plant material shall receive continuous shade and well as protection from the wind. Shade fabric, heeling, mulches, plastic and watering are all techniques that may be used. Misting and watering shall not be done with water that exceeds 15° C. Live materials shall be planted the same day as harvested, or stored for a period of no longer than two (2) days. Storage of fascine materials shall be approved by the Contracting Officer.

Shrubs and young trees used in preparation of live pegs shall be cut directly above the ground. Buds on the Live Posts shall be orientated in an upward position. The basal (bottom) ends shall be tapered to a point to facilitate insertion into the soil. The top shall be cut smooth and square.

5.4 Live Stake/Post Placement

Live Stakes/Posts shall be installed according to the Harvesting and Planting Plan and in accordance with the plans, details and following specifications.

The Live Stakes/Posts shall be placed so that 2/4-4/5 of their length is buried. And the Stake/Post shall be tamped or otherwise backfilled, to insure continuous soil to -cutting contact, with no excessive voids in the surrounding soil materials.

Live Stake/Posts shall be installed at the spacing and density as shown in the project drawings or as directed by the Contracting officer and/or Project Engineer. Typical spacing for Live Stakes will be 2'-3' apart using a triangular spacing. Total Live Stake density will be 2-4 stakes per square yard. Spacing on Live Posts is typically 4'-6' apart.

Neither Live Stakes or Live Posts shall be split during installation. Live Stakes/Posts which are split shall be removed and replaced, or if the split is less than 1/6 of the cutting length, the top may be re-trimmed after installation to remove the damaged portion.

5.5 Backfilling

All Live Stakes/Posts shall be planted such that the stake/post is tamped, and has full contact between the soil and cutting. In the event that an auger is used to pre-drill holes for Live Posts, or a bar is used to initiate a pilot hole for Live Stakes, the holes will be filled with loose soil after the Stake/Post is installed. The Contractor shall use water, poured in each hole, to insure that the cutting is in firm contact with

the backfill.

5.6 Clean-up

During installation, reasonable efforts will be taken to protect surrounding sod and vegetation. The work area shall be kept clean and free of debris such as unusable plant materials. Final cleanup shall be the responsibility of the Contractor. Upon completion of the project, and prior to the issue of the final payment, the Contractor shall remove all debris and trash from the site and dispose of such materials off site.

5.7 Site Inspection

Upon completion of the planting, the Contractor and Contracting Officer/Project Engineer will inspect all plantings. Inspections will be completed prior to placement of the Jute Mesh. The Contractors shall correct all deficiencies within ten (10) calendar days of the inspection.

6. Warranty

The Contractors shall maintain a one (1) year repair and replacement warranty for the Live Fascines. Plant mortality of 80% must be achieved.

7. Method of Payment

Method #1 Unit Bid Cost - The Contractor shall be paid at the Unit Bid Cost as set forth in this contract. The Contractor and Contracting Officer shall jointly measure total Live Stakes/Post quantities for payment certification.

Method #2 Lump Sum - Live Stakes/Posts shall be paid id at the bid lump sum price.

Under each method, payment shall be considered full compensation for the item of work, and shall include the cost for harvesting, storage, preparation and planting. The price shall include the erosion control fabric as well as equipment, labor and incidental costs associated with meeting the design specifications, plans and drawings.

8. Special Conditions

8.1 The following plant species are authorized for use in this project;

Cornus amomum (Silky Dogwood)
Salix bonplandiana (Pussy Willow)
Cornus sericea stolonifera (Red Osier Dogwood)
Salix purpurea (Streamco Willow)
Salix nigra (Black Willow)

8.2 All construction of Live Fascines shall be completed in the presence of the Contracting Officer, Project Engineer or their designated representatives. The GCSWCD shall designate the final number and locations of the Live Posts. No live Stakes shall be used on this project.

8.3 Payment will be made using Method #1. Contractors shall provide Bid Unit Costs for Live Stakes and for Live Posts.