

NATURAL RESOURCES CONSERVATION SERVICE

EWP CONSTRUCTION SPECIFICATION

BIO-ENGINEERING

1. SCOPE

This work shall consist of supplying, and planting dormant live cuttings at the locations and spacing shown on the drawings. Work includes procuring or harvesting, storage, and delivery to the construction site for plantings.

2. MATERIALS

A. Live Branches (Whips)

1. Cuttings will come from shrubs and young trees and will have basal branch diameters of 0.25 to 1 inch. Each stem shall contain at least two healthy side branches; side branches shall not be trimmed off. Minimum length is 3.5 feet.

B. Live Stakes

1. Cuttings will come from willow shrubs and young trees and have basal ends 1 to 2 inches in diameter. Minimum length is 2 feet.

C. Cut and use bioengineering materials within 48 hours. Cuttings stored more than two weeks must be harvested during the dormant season (approximately two weeks after leaf-off) and then properly stored.

D. Plant material showing desiccation, abrasion, sun-scalded injury, disfigurement, or unauthorized substitution shall be rejected.

3. PRODUCT HANDLING

A. General: Carefully pack dormant live cuttings (with all growing tips in one direction) to prevent desiccation, breaking, damage to bark and branches. Provide adequate ventilation. Protect from sun, drying wind and freezing. Do not drop cuttings from vehicles. Legibly label cuttings with common name, and date collected.

B. Transport: Transport cuttings in covered, unheated vehicles, moistened and covered with moisture retaining medium.

C. Storage:

1. If cuttings cannot be delivered to the construction site within 24 hours, store off-site in specially prepared facilities specifically constructed to store dormant live plant material. Maintain facilities at a constantly cool temperature (34 deg F to 50 deg F) and with adequate humidity levels.
2. Keep cuttings moist and covered with moisture-retaining medium throughout the time in storage. Periodically water to maintain moisture levels. While at construction site, ensure plants are not left in sun to dry out; keep in shaded area and keep moist.
3. Store on pallets above ground surface. Provide adequate ventilation.

4. SOURCE OF SUPPLY

If stored cuttings are used harvest cuttings during the dormant season from within the project watershed, or as designated or approved by the Contracting Officer. Any necessary harvesting permits are the responsibility of the contractor. Harvesting during the growing season will be permitted for cuttings used within 48 hours or as approved by the Contracting Officer.

5. LIVE CUTTINGS

Notify the Contracting Officer 72 hours prior to harvesting at the approved sites.

The Contractor shall schedule his cutting and delivery to the planting site so that the materials can be installed within 48 hours after they arrive.

1. Collect only specimens deemed suitable for harvesting.
2. Harvest fresh cuttings to be used within 48 hours. Permitted harvest outside the growing season, as authorized, will require special handling including but not limited to keeping cuttings cool and moist from the time of harvest to the time of planting, soaking of cuttings, immediate watering of newly planted cuttings.
3. Substitutions will not be permitted without written request and approval from the Contracting Officer.

6. INSTALLATION

A. Installing Live Branches (Whips)

1. Live Branches are installed at the toe of sloped riprap as indicated on the drawings. Live branches shall be placed with their basal end pointed inward and no less than 8 inches or more than 12 inches of the tips extending beyond the face of the slope. Live Branches shall have a minimum embedment depth of 3 feet

spaced as shown on the drawings. Branches shall have a basal end of 0.25 to 1 inch in diameter.

B. Installing Live Stakes

1. Live stakes shall be installed at a spacing as shown on the drawings. No more than 25% of live stake shall be left exposed to the air after installation. If bark is split away from cambium layer at terminal end during installation, the top of the live stake shall be freshly cut again with lopping or pruning shears leaving a smooth cut without bark separating from cambium. Live stakes will be inserted into soil in such a manner so that no air pockets will occur between the stake and the surrounding soil.

7. MAINTENANCE DURING STORAGE

- A. If immediate delivery to the construction site is not possible, maintain cuttings throughout the storage period as specified in Section 3.
- B. Materials in storage may be viewed periodically by the Contracting Officer.

8. DELIVERY

- A. Coordinate with the Contracting Officer to ensure that materials are delivered to the job site in a timely manner. Report any practices planned during construction that may prevent establishment of the cuttings.
- B. Deliver as specified in Section 3. Maintain conditions of cuttings throughout transport and delivery.

9. PLANTING

- A. Spacing and limits of plantings are shown on the drawings.

10. MEASUREMENT AND PAYMENT

A. *Method 1*

a. Live Branches

Payment will be made at the contract unit price for linear feet of Live Branches measured along the rows. Payment for this item includes all of the work necessary to install the practice. No additional payment will be made for harvesting, transporting, storing or installing Live Branches.

b. Live Stakes

Payment will be made at the contract unit price for the linear feet of Live Stakes measured along the rows. Payment for this item includes all of the work necessary to install the practice. No additional payment will be made for harvesting, transporting, storing or installing Live Stakes.

B. *Method 2*

For items of work for which specific lump sum prices are established in the contract, the quantity of cuttings installed will not be measured. Payment for this item will be made at the contract lump sum price. Such payment shall constitute full compensation for all labor, materials, equipment, tools, and other appurtenances necessary and incidental to the completion of the work. Payment for this item includes all of the work necessary to install the practice. No additional payment will be made for harvesting, transporting, storing or installing cuttings.

12. ITEMS OF WORK AND CONSTRUCTION DETAILS

The items of work to be performed in conformance with this specification and the construction details are:

A. Bio-Engineering

- (1) This item consists of the labor necessary to install the materials as shown on drawings.
- (2) The contractor shall be responsible for identifying and supplying of the necessary plant materials.
- (3) Measurement and Payment. The measurement and payment for the necessary labor will be by method 2, lump sum at the contract price.