ITEM #0948429A - ROOT WADS

Description: The work shall consist of furnishing, transporting and installing root wads, boulders, fill material, topsoil and footer logs as a means to provide limited bank stabilization and aquatic habitat enhancement.

Materials: An Environmental Scientist from the Connecticut Department of Transportation's Office of Environmental Planning (OEP) shall be notified a minimum of 2 weeks in advance to inspect and approve the root wads and boulder material for placement along the streambank. The root wads must be native material free of invasive plant species, decay and branches.

Root wads can be selected from clearing and grubbing operations under Section 2.01, or obtained from an offsite source if necessary.

1. Root wad. The root wad stem shall be a minimum of 12 feet in length with a root crown attached and shall have a minimum stem diameter of 12 inches. The root crown shall be a minimum of 5 feet in diameter. Bracing boulders or bracing log may be required on top of the root wad if bank height is low.

2. Footer Log. For watercourses with a low gradient, the root wad shall be anchored to a footer log. The footer log shall have a diameter equivalent to the diameter of the root wad stem. The footer log length will be determined based on the number of root wads required at one location. At minimum, the footer log length shall be equivalent to the length of a single root wad. If multiple root wads are required at one location, the root wads shall be anchored 5 feet on center. If the footer log is to be trenched excavated at or below stream invert, the footer log should have a minimum diameter of 24 inches.

3. Boulder. For watercourses with a high gradient, the root wad shall be anchored to a set of boulders. Boulders shall have a minimum diameter of 2 feet. If a back eddy is formed because of the root wad, a bracing boulder shall be placed downstream of the root wad. The bracing boulder diameter shall be 2 times larger than the root wad stem diameter.

4. Brace Log. A brace log should have a diameter equivalent to that of the root wad.

5. Fill Material. Back fill excavated area behind the footer logs, root wads or boulders with a combination of gravel and riprap material.

6. Topsoil. A minimum of 4 inches to topsoil will be required to back fill the excavated area to achieve final grade. Permanently stabilize area with ConnDOT approved seed mix. Stock piled material or material obtained from an offsite source must be free of invasive species.

7. Rebar. #6 rebar with a minimum length of 5 feet shall be used. If a bracing log is required, the minimum #6 rebar length shall be 6 feet.

Construction Methods: Installation shall be done during low flow conditions in accordance with the permit plates, environmental permit plans, construction plans and under the direction by OEP or an OEP approved representative. Use equipment and placement techniques that will minimize disturbance within water handling devices may be required to perform root wad installation in the dry.

Notify OEP at least 10 days prior to initiating the placement of root wad materials. Any and all coordination with the Department of Energy and Environmental Protection (DEEP) Inland Fisheries Division personnel must be done through the OEP.

Work should proceed from the downstream section to the upstream end of the reach or meander beginning with the excavation of the toe trench to a depth of one-half to two-thirds the diameter of the footer logs or boulders. Trenches should also be excavated for root wad placement. The center of the root crown should be set approximately 1/3 the bankfull height in order to provide toe protection.

Footer logs or boulders should be positioned in the trench below the stream invert such that each upstream log is shingled over its downstream neighbor at least 2 times the diameter of the root wad stem.

In cut sections, root wads should be positioned in trenches such that the root crown sits level with the cut end of the stump. An angle of 30 to 60 degrees upstream into the channel center line is usually adequate. Subsequent root wads should be spaced such that the bank is shielded from flows deflected by adjacent upstream root wads.

A rebar may be required to anchor the bracing log, root wad and footer log. The rebar should be inserted through a drilled hole by manual means or by an electric pneumatic jack hammer.

The root wad and associated materials should be backfilled to the specified grade and fill material should be tightly packed in joints, connections and gaps to firmly secure all components. Larger material should be used to plug holes and gaps to keep fill from falling into the channel.

Equipment: When placing and maneuvering rocks within the channel or embedding rocks into the bank, the Contractor shall use an excavator with an articulated bucket (with thumb). Any other equipment proposed to be used shall be reviewed and approved in advance by OEP or an approved representative.

Method of Measurement: This work will be measured for payment at the contract lump sum, which shall include furnishing all components of the root wads, installed and accepted.

Basis of Payment: This work will be paid for at the contract lump sum price for "Root Wads", which price shall include all root wad materials, equipment, tools, labor, excavation, fill material, erosion control measures, water handling devices, seed mix and work incidental thereto. Full payment shall not be made until the area has been accepted by the Environmental Scientists.

Pay Item	**Pay Unit**
Root Wads	LS