

Construction Specification

580. STREAMBANK AND SHORELINE PROTECTION

1. SCOPE

The work shall consist of furnishing materials and installing all components of the streambank and/or shoreline protection, as outlined in this specification and the drawings.

2. MATERIALS

Unless otherwise set forth in Section 7, the following materials are to be used:

a. **ROCK** shall be durable and obtained from sources listed in PennDOT Bulletin 14 or as otherwise approved by the designer. Size and gradation, where required, shall be as specified in Section 7 or as shown on the drawings. The nominal size of a rock is that dimension (middle) which passes through a square opening with the same size dimension; i.e. it is not the greatest dimension. The rock shall be free from soil and trash. Rocks shall be angular or subangular in shape. However, the least dimension of any individual rock shall be not less than one-third the greatest dimension.

b. **GEOSYNTHETICS** shall meet the requirements set forth in Section 7 and/or on the drawings. In addition, geotextiles shall meet the requirements of PennDOT Specifications, Section 735, for the appropriate class defined in Section 212. Certification from the manufacturer shall be provided by the Contractor that the geosynthetics meets these requirements.

c. **BIOTEXTILES, BIOMATS** and other manufactured natural materials shall conform to the requirements in Section 7, and be installed according to the manufacturer's recommendations for flowing water applications.

d. **AGGREGATE** for bedding, drainfill, and concrete shall be durable and obtained from sources listed in PennDOT Bulletin 14. The gradation shall be as set forth in Section 7 or on the drawings.

e. **PORTLAND CEMENT** shall be Type I, with air-entrainment agent, or Type IA, unless otherwise required in Section 7. All cement shall conform to ASTM-C150.

f. **MASONRY** shall meet the requirements of ASTM-C90 & C270.

g. **PRECAST** concrete units shall meet the requirements of ACI-525 & 533, unless otherwise specified in Section 7.

h. **LUMBER** shall be the dimensions and species specified in Section 7 or shown on the drawings. Wood shall be graded and stamped by an agency accredited by the American Lumber Standards Committee as meeting the required species, grade, and moisture content. Pressure treated wood products shall be Douglas Fir, Southern Yellow Pine, or as otherwise specified on the drawings or in Section 7. They shall be treated with preservatives in accordance with the American Wood Preservers Association (AWPA) Standard C16, "Wood Used on Farms, Pressure Treatment", except that only non-CCA preservatives, suitable for use in aquatic habitats, can be used. Each piece shall bear the AWPA stamp of quality. In the absence of grade and treatment stamps, the Contractor or material supplier shall provide written certification that the wood meets the designated quality criteria.

i. **PLANT MATERIALS**, including seed, shall be true to the type, name and size

required on the drawings or in Section 7. Plants and seeds shall be viable and free from disease, injurious insects, mechanical injury, decay, or other defect that will decrease survivability. All bare rootstock shall have a root:stem ratio of at least 1:1 by volume. Bulbs and tubers shall be firm and rhizomes resilient. Balled and burlapped, multi-stem stock shall be pruned to one-half height prior to planting. Transport and storage of all stock shall be done in a manner that prevents windburn and drying. All local, state, and Federal regulations regarding plant shipments shall be complied with.

3. SITE ACCESS AND CLEARING

Only those areas, shown on the drawings, to be protected or actually required for access shall be cleared. Tree and brush removal shall be done in such a manner to prevent damage to other trees and property. Unless otherwise specified in Section 7, all cleared materials, including trash, shall be burned or removed from the site. Burning shall comply with all state and local applicable regulations.

4. GRADING

Soil surfaces shall be graded to the lines or sections shown on the drawings and/or staked in the field. Surfaces which have been over-excavated shall be brought to the planned grade by replacement with soils similar to, and at a density equal to, that of the adjacent soils. Unless otherwise set forth in Section 7, fill that is required to be imported to the site shall be similar to, and placed at a density equal to, that of the adjacent soils, except that areas to be vegetated shall receive topsoil approved by the Engineer. Excess soil material shall be

disposed of as set forth in Section 7 or shown on the drawings.

5. STRUCTURAL INSTALLATION

Structures shall be installed as set forth in Section 7, as shown on the drawings, and in such a manner as to minimize erosion and sedimentation.

Rock shall be placed by equipment on the surface and to the depths specified, and in such a manner as to avoid displacement or damage to the underlying materials or adjacent structures. Graded rock shall be delivered and placed in such a manner that will ensure that the in-place material is homogeneous with no one size dominating an area. Some hand placing may be necessary to provide a neat and uniform surface on grade.

Commercially manufactured structures, including but not limited to gabions, precast units, etc., shall be installed as required by the manufacturer for flowing water applications.

6. VEGETATION

Vegetation shall be established at the locations shown on the drawings and/or staked in the field, and as set forth herein, in Section 7, and/or as shown on the drawings. Unless otherwise set forth in Section 7, all woody vegetation shall be planted between October 1 and April 15. Bare rootstock and cuttings shall be discarded, and replaced, if leaf sprouting has begun.

Plant stock shall be planted within two days of harvesting or removal from commercial storage. Plants that can not be planted the

day of arrival onsite, shall be stored under a tarp to protect them from wind, direct sunlight, drying, or other damage. Cuttings or bare root stock that are not planted within two days of arrival onsite shall be discarded unless refrigerated below 50⁰ F. Rooted stock that is not planted within five days of arrival onsite shall be discarded unless refrigerated at 40⁰ to 50⁰ F. Discarded materials shall be replaced at the Contractor's expense.

Plant stock shall be planted in holes of sufficient size to prevent bending of the roots. Manually compact topsoil around the stock and add enough water to remove trapped air. Unless otherwise shown on the drawings, container and balled shrubs shall be planted so that the root ball is at or just above the final ground surface. Plant tubers and bulbs deep enough to prevent them from floating, but not less than two inches. Rhizomes shall be angled upward in shallow slits, with the upper end of the rhizome at the soil surface.

Live stakes, with a diagonal-cut stem end, may be driven into the soil to the depth required; however this shall be done in such a manner to prevent damage to the cutting. If the top of the cutting is damaged, it shall be discarded or the damaged length pruned off.

Rootwads and logs shall be from fresh hardwood trees that are free of decay and disease. Other bioengineering plant material shall be installed as shown in the drawings. Damaged materials shall be discarded and replaced at the Contractor's expense.

Unless otherwise approved by the Engineer, the application of seed, soil supplements, and mulch shall be done by mechanical methods that ensure uniform coverage.

**7. ADDITIONAL CONDITIONS
WHICH APPLY TO THIS PROJECT
ARE:**