PC-30 ROCK ARMOR/ROCK MULCH/TURF REINFORCEMENT MATS

For assistance, contact the Geotechnical Engineer in ITD Headquarters

BMP Objectives

- ☒ **Perimeter Control**
- ☒ **Slope Protection**
- ☐ **Borrow and Stockpiles**
- ☒ **Drainage Areas**
- ☒ **Sediment Trapping**
- ☒ **Stream Protection**
- ☒ **Temporary Stabilizing**
- ☒ **Permanent Stabilizing**

Definition and Purpose

Protection of a slope by using angular shot rock, or Turf Reinforcement Mats (TRM).

- Rock Armoring: Angular shot rock placed on a slope surface to prevent or reduce erosion.
- Rock Mulch: When topsoil and soil amendments are included to facilitate vegetative growth, the material is referred to as rock mulch. Rock mulch is considered topsoil material with angular rock included to inhibit erosion.
- TRM: A long-term, non-degradable rolled erosion control product composed of UV-stabilized synthetic fibers, nettings, and/or filaments processed into three-dimensional reinforcement matrices designed for permanent applications where discharges exert velocities and shear stresses that exceed the limits of mature, natural vegetation. The TRM provides sufficient thickness, strength, and void space to permit soil filling and/or retention and the development of vegetation within the matrix.

Appropriate Applications

- Rock armoring and/or rock mulch is normally used to protect fine-grained soil slopes and steep soil slopes from erosion due to high surface runoff, strong wind, and surface sloughing.
- TRM is used for surface erosion control on bare slopes to be revegetated.

Limitations

- Rock armoring should not be used on slopes 1.25H:1V or steeper. Extra measures are required to place rock armor on slopes 2H:1V or steeper. Rock mulch is not generally recommended on slopes 2H:1V or steeper.

- A minimum application of 12 inches thickness is the most effective, and for rock armoring, revegetation efforts may be of limited effectiveness.
- The TRM should not be used where the presence or appearance is aesthetically unacceptable. Aesthetics may be less of a limitation for rock armoring.
- The effectiveness of TRM may be reduced if not properly selected, designed, or installed.

Design Parameters

- Rock armoring/rock mulch should be placed on a roughened slope to help key and stabilize the material on the slope.
- Material for rock armoring should meet the requirements of the Standard Specifications and should consist of 6-inch-minus rippable or shot rock with 20 to 40 percent passing the 4.75 mm (No. 4) sieve.
- Rounded rock is not acceptable for use as rock armoring on steep slopes. Rounded rock for rock mulch is of limited value.
- A lined ditch at the toe is appropriate to inhibit erosion (undercutting) under the rock-armored slope.
- For 3H:1V or flatter slopes, rock mulch may consist of 60 percent coarse rock armoring material and 40 percent minus 4.75 mm (No. 4) rock armoring fines, topsoil, and soil amendments. Soil amendments should include organic material such as compost, log yard waste, bark, or wood chips if available.
- For steeper slopes, added topsoil and soil amendments should be limited to no more than 10 percent.
- If the TRM is used, additional erosion control methods are generally recommended. Fiber wattles may be appropriate at regular intervals under the TRM to further reduce surface runoff velocity. Appropriate seeding measures should be included.
- TRM products intended for surface stabilization of slopes as steep as 1H:1V are available.

Construction Guidelines

- Rock armoring/rock mulch should be keyed into a roughened surface to prevent slippage, and the rock armoring/rock mulch should also be keyed into the toe of the slope to enhance long-term stability.
- A lined ditch at the toe is appropriate to inhibit erosion (undercutting) under the rock-armored slope.
- The TRM should be installed in accordance with the plans, specifications, and manufacturer's recommendations. The TRM requires a smooth surface for installation to avoid tenting or gaps under the mat.

Maintenance and Inspection

- Conduct inspections as required by the NPDES permit or contract specifications during construction.

- Periodic inspection and maintenance will be required based on post-construction site conditions.
- Make any repairs necessary to ensure the measure is operating properly.