

BMP 18.00. Rolled Erosion Control Products for Slopes

DESIGN CONSIDERATIONS

Objectives

Roller erosion control products (RECPs) are installed on slopes to provide erosion control and soil stabilization.

Description

RECPs are manufactured mats or coverings that are unrolled and anchored to unvegetated soil.

The Erosion Control Technology Council (ECTC) (www.ectc.org) defines subcategories depending on the materials used in the manufacturing and the intended purpose of the product. The following describes the various types of RECPs:

- Temporary Degradable RECPs – These products can be expected to last from between three months and three years depending on their composite materials and site climate conditions. Commonly called blankets, the materials typically used in the manufacture of temporary degradable RECPs consist of various fibers, straw, flax, coconut (coir), and wood shavings (excelsior) sewn to or between netting made of photodegradable plastics or biodegradable netting. Alternatively, the product may consist of natural fibers (such as jute or coir) woven into mats that have varied weights per square yard. Typically the greater the weight per unit of area the stronger the product and the longer it will last.
- Turf Reinforcement Mats (TRMs) – Permanent, non-degradable, UV-resistant materials designed to resist erosion in areas exposed to high shear stresses. TRMs can be used to convey concentrated flows while supporting the establishment of vegetation. Applications include the replacement of conventional riprap for down-drains and at culvert outlets.

Other Names

- Erosion control geotextile, erosion control blankets (ECB), erosion control mat.

Applicability

RECPs are used where seeding and mulching alone are inadequate to stabilize soil. RECPs offer greater assurance where mulch must be anchored and other methods, such as crimping or tackifiers, are unfeasible. Applications range from coverings for temporarily inactive construction sites to long term permanent protection of steep slopes.

Selection Considerations

The designer must select the type of RECP based on site conditions, climate conditions, timing of installation, and field conditions in the areas of installation for access and anchor placement.

- All RECPs must be selected based on the expected functional longevity required to protect the seedbed and prevent erosion during the vegetation establishment period and for the expected shear stress the product will be exposed to. Evaluate the following:
 - *Duration of need, temporary (e.g. 3 months up to 2 years) vs. permanent (2-10 years)*
 - *Slope length*
 - *Slope gradient (e.g. flatter than 3:1, 2:1, or 1:1 or steeper)*
 - *Soil type and erodibility*
 - *Seasonal temperature and weather patterns; regional precipitation distribution*
 - *Vegetation needs, especially where germination conditions are not optimal*
- In general, the longer the product must last the greater the shear stress resistance is needed. The time required for vegetation establishment should be exceeded by the product's functional longevity. Selecting RECP strength is a function of the expected duration and velocity of any surface flows over the blanket and is decided by considering the shear stress resistance in the RECP specification.
- Details regarding product longevity and applications for slopes with consideration for expected shear stresses and slope steepness are available from the ECTC specifications at www.ectc.org. Use the design selection tables to select the product type based on the required longevity to ensure vegetation establishment and

the necessary strength to resist the expected shear stress to which the RECP will be exposed. ECTC has four charts for degradable RECPs: Ultra Short-Term; Short-Term; Extended-Term; and Long-Term. To use these charts, you will need to know the maximum slope gradient and the C-Factor. The C-Factor is the cover management factor in the Revised Universal Soil Loss Equation (RUSLE). C-Factors can be determined from tables and are a function of the mulch application rate and type of the seeding. From the ECTC charts for degradable RECPs, determine the maximum shear stress and minimum tensile strength to require for the RECP and add these to the specification. Also add the RECP to the Materials Certification List.

- Coordinate with the regional environmental section to determine if there are wildlife or fish concerns that would influence the selection of the type of RECP netting. Natural fiber netting may be preferable to synthetic based on installation location and wildlife entanglement concerns.
- Anchors: The designer must consider the type and number of anchors needed for each site. Manufacturer's specifications are a minimum standard to be used for guidance. Designers may increase the length and numbers of anchors based on site conditions. Specification 754-2.02 calls for anchors that are applicable in typical situations. Designers must consider soil cohesion with regard to anchor length. Sandy soils will require longer anchors as the soil is less cohesive. Designers should also call for more anchors or longer anchors if the location is windy. Designers should consider whether the site will be mowed and if so, may not want to specify metal anchors. Site topography may require more anchors than indicated in standard drawings to ensure complete contact with the soil surface.
- Installations that may be exposed to lateral flow, wave action, or free-board water movement and forces require trenching of the exposed edges to ensure product effectiveness.
- Proper installation is critical to the effectiveness of RECPs. Runoff must be prevented from concentrating under the RECP and causing erosion under the product. Note that typical

details are for illustration only and all RECPs must be installed per manufacturer's guidelines as a minimum and in conformance with the project specifications.

- If there is a situation in which the RECP would be removed, it should be specified on the drawing. Otherwise, it is assumed that both temporary and permanent RECPs will remain and not be removed at the end of construction.

Relationship to Other ESC Measures

RECPs can complement seeding and revegetation. Byproducts of RECP decomposition add mulch benefits and soil enhancement. RECPs can be used in conjunction with benching or other runoff velocity slowing or redirecting measures. RECPs aid in dust control.

Common Failures or Misuses

- Improper installation is the most common problem with RECPs. Many installations do not trench-in the RECP at the top of the slope, allowing surface flows to get under the RECP and resulting in seed and soil washing away.
- Improper anchoring is also found to be a common cause of RECP failure. Inspectors must verify that the RECP has been properly anchored according to the specifications for the particular slope steepness, soil cohesion, and expected shear stress. Anchoring must ensure that the product is in complete contact with the soil surface.

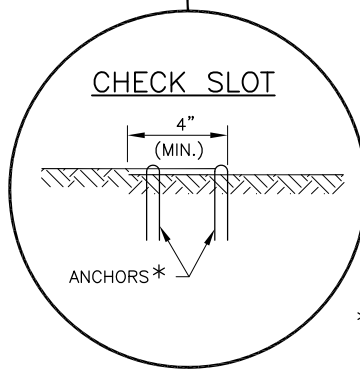
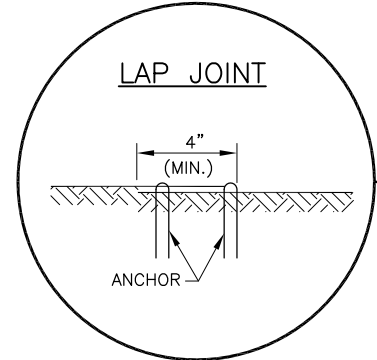
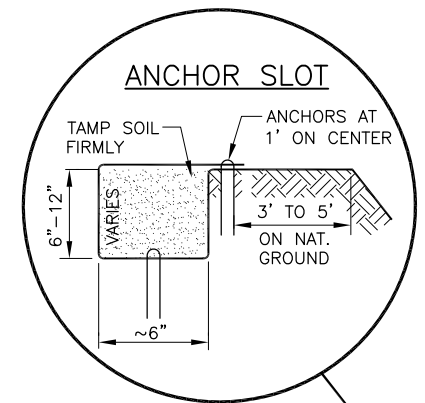
SPECIFICATIONS

Standard Specifications

- 654 – Rolled Erosion Control Product for Slopes
- 754 – Rolled Erosion Control Products

Drawing

- BMP-18.00 – Rolled Erosion Control for Slopes



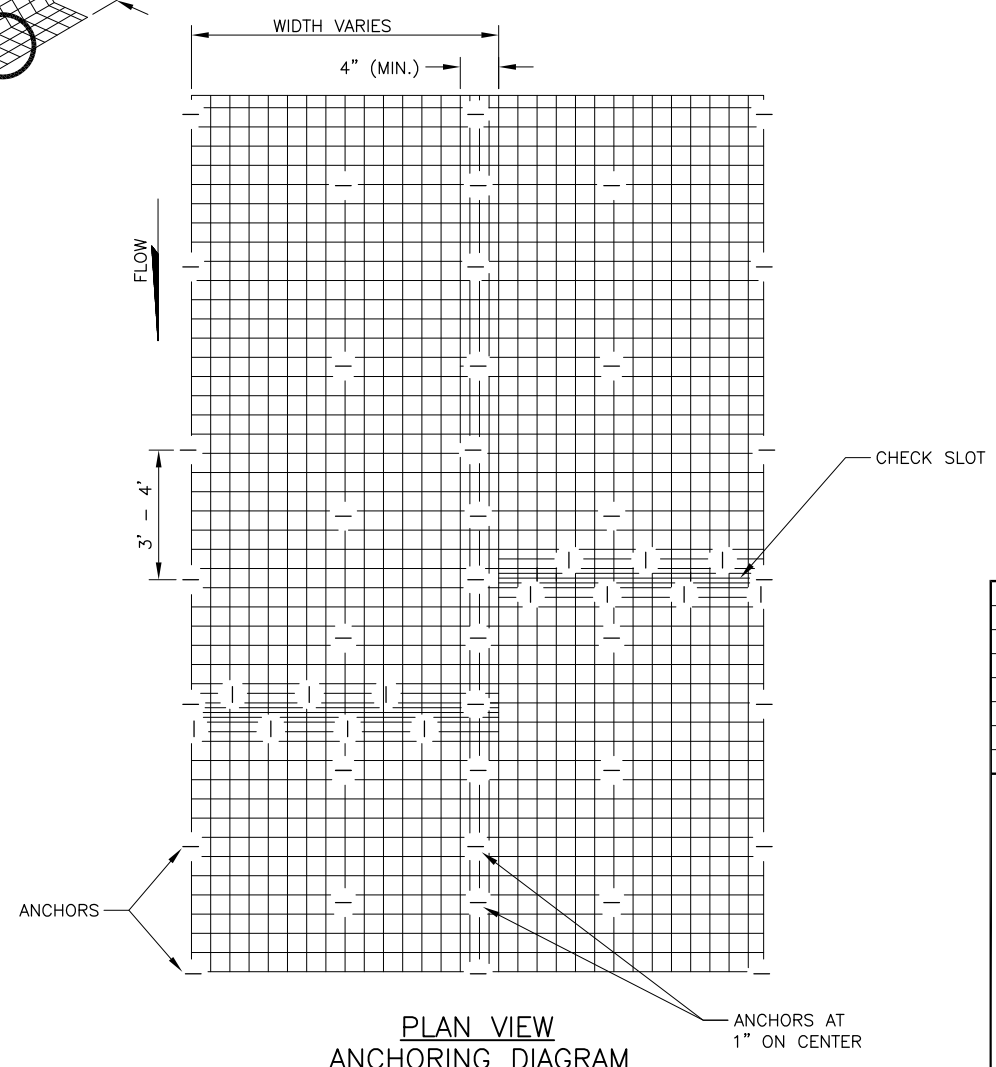
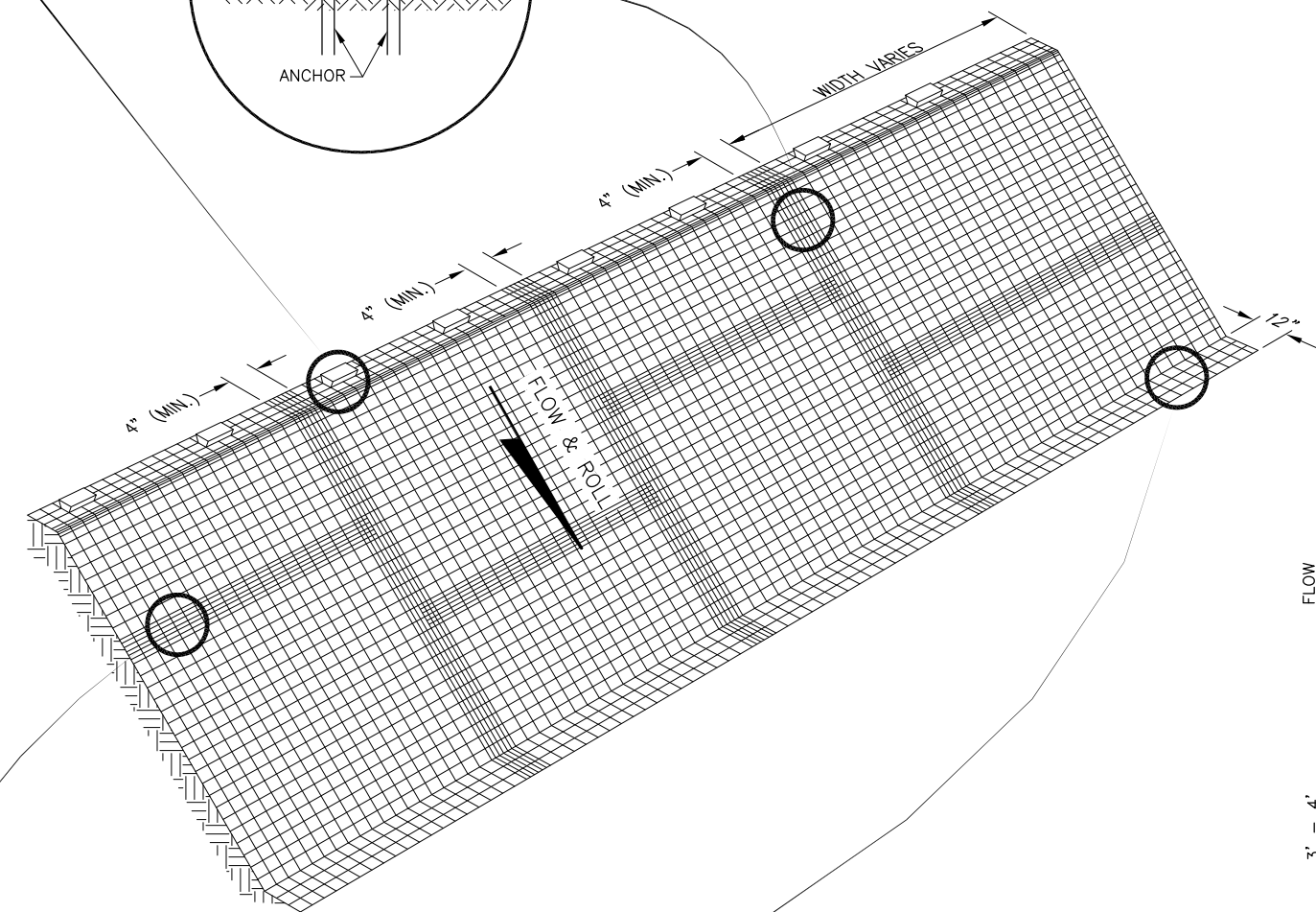
MATERIALS USED IN CHECK SLOT SHALL OVERLAP 4"

*INSTALL WITH TWO ROWS OF STAGGERED ANCHORS 4" APART AND 4" ON CENTER.

NOTES

1. INSTALL AND ANCHOR IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS OR AS APPROVED BY THE ENGINEER.
2. SMOOTH SOIL UNDER RECP AS MUCH AS POSSIBLE TO ENSURE INTIMATE CONTACT BETWEEN THE RECP AND THE SOIL.
3. INSTALL TO ENSURE THE RECP MAKES INTIMATE, CONTINUOUS CONTACT WITH THE GROUND SURFACE.

CHECK SLOT SPACINGS	
SLOPE	SPACING
LESS THAN 4%	75'
4% OR MORE	50'



PLAN VIEW ANCHORING DIAGRAM

REVISIONS		
Date	Description	By

State of Alaska
Department of Transportation
& Public Facilities

ROLLED EROSION CONTROL FOR SLOPES

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P
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O
V
E
D

NOT TO SCALE

Date 12/2015 X/XX/XX