



Leyden Ranch Stormwater Culvert Erosion Protection



ShoreMax and Turf Reinforcement Mats deliver permanent protection from soil erosion.

LOCATION:

Arvada, Colorado

PRODUCT:

*ShoreMax
Turf Reinforcement Mats*

PROJECT PARTNERS:

*Owner
Taylor Morrison*

*Contractor
Pase*

*Completion Date
October 2014*

In the Leyden Ranch neighborhood of Arvada, Colorado a stormwater discharge system required a redesign to handle increased runoff caused by the influx of new housing. The stormwater culvert needed resizing to handle the increased flows and prevent scour of the outfall and pollution of area waterways.

Challenge

Resizing stormwater culverts, like those at Leyden Ranch, typically leaves soils disturbed and vulnerable to erosion. While scour protection has traditionally been addressed using rock riprap, new vegetative technologies have emerged to lessen cost and improve aesthetics, performance and safety. The proper solution would allow for vegetation establishment while safeguarding against soil erosion.

The Leyden Ranch neighborhood is a new housing development built on former grasslands in the rolling hills of Arvada. The increased runoff caused by the new housing has pushed the current stormwater system to capacity.

Solution

To address the site requirements, Nilex considered the culvert size, peak discharge and the culvert's down-slope gradient. Using North American Green's ECMDS design software, Nilex was able to properly size the area the scour-protection mat would need to cover. Peak discharge from the resized 36 inch culvert pipe was determined to be 168 cubic feet per second at a 3% gradient. These values suggested the scour protection mat needed to be at least 15 ft by 15 ft.



Unearthing better results.

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ShoreMax scour protection mats were chosen because they are very flexible, permit vegetation establishment and protect the culvert outfall from scour. Since the scour protection mats have a higher specific gravity than normal erosion control blankets or turf reinforcement mats, they act as a ballast, preventing uplifting in turbulent stormwater and improving the performance of the underlying mat. In addition, the flexible scour mat allows vegetation to establish, which creates a soft-armored system, as opposed to traditional hard-armored designs.



Installation

ShoreMax was applied to a 225 sq/ft area using 18 inch rebar staples and installed over the C350 turf reinforcement mat (TRM). The TRM was extended 20 to 30 ft beyond the culvert outfall to further armor the outfall area. To help protect the upper slopes surrounding the culvert outfall, a temporary Bionet erosion control blanket (ECB) was installed which would also help re-establish vegetation in an environmentally and wildlife-friendly manner.

Results

Six months after installation, vegetation on the site was almost completely established, and the system remained stable through record rainfall in April and May 2015. The fiber matrix of the TRM helped prevent soil erosion from occurring prior to vegetation establishment. Once vegetation is fully established, the combination of the scour protection mat and the TRM will deliver permanent protection from soil erosion by reinforcing both the stems and roots of the vegetation.



The Nilex Advantage

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With over 35 years of experience, a long-standing commitment to the environment and highly qualified staff, Nilex delivers the products and technologies that give clients an economic advantage with environmental benefit.