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Biopolymers for Wetlands

Settling and filtering red clay on a Tennessee highway project

Storm water management professionals will find that there are many simple and effective treatment options for controlling sediment on major highway construction sites. Reaching high-end water quality, even in various clay and colloidal soils, is no longer a difficult task, as the following case study explains.

The Tennessee Department of Transportation currently is extending State Route 385—"the 385 Loop"—from State Route 86 (U.S. 72) to Interstate 40. The project is divided into four segments. Once completed, the 385 Loop will improve transportation around the city of Memphis, Tenn., and in surrounding counties.

Parts of the expansion run through wetland areas. Tennessee wetlands provide a home for many native vegetation species as well as avian, frog and mammalian species. Their protection is important to the local ecosystem, so the water quality in these areas needs to be as good coming off the construction site as in the background receiving waters. This goal presents quite a challenge, especially when considering the large amount of red clay that the sites typically expose during the various phases of the project.

To reduce erosion, multiple layers of best management practices (BMPs) initially were installed, including rolled erosion control blankets (RECBs), straw and blankets of other compositions. Rock and wattle check dams for sediment control were implemented as well. Vegetated buffer areas were kept to provide a natural filter for water migrating into the wetlands. A polyacrylamide addition was applied to the check dams to aid in the settling of the fine particulate. Nevertheless, water in the sediment basins was still measuring about 1,200 NTUs.

Hanes Geo Components, an erosion and sediment distributor that supplied materials to the project, suggested a new technology that uses natural biopolymers to aid in the settling and filtration of the red clay. StormKlear DBP-2100 and GelFloc socks were used in conjunction with the Hanes TerraBag to dewater the ponds.

A standard trash pump at a flow rate of approximately 200 gal per minute was pumped across two socks of DBP-2100 positioned in a polyvinyl chloride pipe configuration that allowed mixing. Then it was sent to a second chamber filled with two socks and into the bag, which was positioned on No. 57 stone to allow it to dewater properly.

In order to drop the initial turbidity, the water was recirculated from the pond through the dual polymer sock chambers and then discharged into the rip-rap, which provided agitation to prevent further erosion. Residence time followed to allow settling to occur. The sock chambers were connected to the geotextile dewatering bag, and the filtrate from the bag was discharged through several transition areas before leaving the site and entering the wetlands.

The additional treatment system yielded highly impressive results. The water quality measurements went from approximately 1,200 NTUs to less then 30 NTUs, resulting in water quality suitable for maintaining the integrity of the wetlands. SWS

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