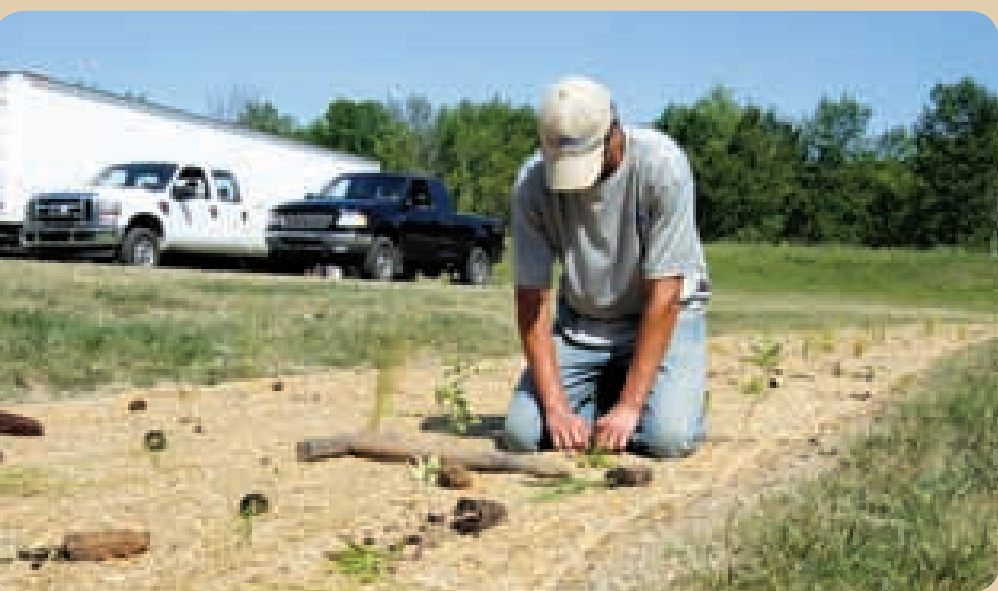


Swale Upgrade



BMP assortment addresses infiltration and water quality issues on an Indiana commercial transport site

By Mike Hayes & Mark Pranckus



Save the Dunes Conservation Fund (SDCF), located in northwest Indiana, was established in 1994 to protect the environment of the Indiana Dunes and Lake Michigan watershed. In 2006, SDCF received funding from the Indiana Department of Environmental Management through the U.S. Environmental Protection Agency to implement water quality improvement projects to address priorities identified in the Dunes Creek Watershed Management Plan.

SDCF enlisted JFNew, an environmental consulting firm headquartered in Walkerton, Ind., because of its extensive design and installation experience. One of the projects funded involved improving storm water treatment at Trailer Transit's newly constructed office building complex in Chesterton, Ind.

Storm Water Situation

Trailer Transit's new site included a 14,000-sq-ft primary facility, a 1,500-sq-ft maintenance building and a 1.6-acre parking lot on a 6.4-acre parcel. Due to the nature of its business—commercial transport—Trailer Transit needed a large area of impermeable

Top: Erosion problems were developing at Trailer Transit's point of discharge. Bottom: Plugs and seeds of 27 native species were planted in the bioswales and detention basin.

surface to accommodate semi-trucks and trailers: 30 percent of the site.

Within the site's existing storm water management features, there was little opportunity for storm water treatment. Precipitation falling on these impermeable surfaces was collected and directed into a series of turf-grassed swales leading to an adjacent 0.9-acre detention basin. Because very little storm water runoff infiltrates into the native clay soil along the swales, the velocity and volume of the runoff was beginning to form small gullies where the swales emptied into the detention basin.

BMP Solutions

In an effort to resolve the emerging erosion problems and enhance the infiltration and filtration of storm water runoff, SDCF and its consulting firm incorporated a variety of best management practices (BMPs) into the design plan. The approach included the use of native plants from



Workers installed stone around the Trailer Transit site's underdrain.

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Soil and geotextile cloth topped the drain to complete the upgrade.

JFNew's Native Plant Nursery, which was attractive to Trailer Transit and addressed the conservation interests of SDCF.

The approach developed by JFNew's project manager utilized existing property drainage patterns, decreased velocity by widening the swales and increased infiltration by replacing native soils with amended soils. Increasing infiltration along the flow path by upgrading the swale allowed for a reduction in the volume of discharge.

The project manager proposed three bioswale treatment plans that varied based on whether an underdrain was installed, amended soils were added or simple grading was used to enlarge the existing swale. All three treatments incorporated the use of native plants to decrease storm water runoff volume and velocity into the detention basin and improve infiltration. Cost, site conditions and existing property infrastructure were

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used to determine where each practice was used on the property.

The development of 610 ft of bioswale treatment with an underdrain and amended soil mixture was created through the implementation of multiple techniques. First, an 8-ft-wide by 1.5-ft-deep trench and a 2-ft-wide by 1-ft-deep trench were excavated. The smaller trench contained a 4-in. perforated underdrain that emptied into the detention basin.

Clean stone fill was then placed on top of the underdrain to the level of the larger trench. A nonwoven, nonheat-bonded geotextile fabric was placed directly on the stone. The larger trench was backfilled with an amended soil mix of 80 percent sand, 10 percent compost and 10 percent native soil. After final grading was complete, a native seed mix was installed and a North American Green S150BN erosion control blanket applied. Native plant plugs were also installed to provide more immediate storm water quality benefits and enhanced landscape appeal.

Additionally, 350 ft of stone diaphragm was installed along 10 percent of the parking perimeter to reduce the velocity and volume of runoff not captured by the swales. This was accomplished by excavating a 2-ft-wide by 3-ft-deep trench along the edge of the parking area, which was then filled with clean limestone to the existing grade. Finally, 47 cu yd of stone border surrounding the detention basin was removed and replaced with a variety of native plants and 4 in. of hardwood mulch, creating a buffer zone between the surrounding turf and the basin.

Put to the Test

In September 2008, just two months after completion, the site received more than 12 in. of rain within a 48-hour period, with only minor damage to the newly constructed areas. This project is an example of how storm water BMPs can provide instant water quality benefits and reduce site maintenance over traditional storm water management. [SWS](#)

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