Retail Center Benefits From Underground Chamber System

When Tanger Factory Outlet Centers Inc. embarked on the redevelopment of its center in Bluffton, S.C., the company employed Ward Edwards Inc. to oversee the engineering aspects of the project. Redesigning the existing storm water management system was at the top of a to-do list for the Ward Edwards engineers, who had to find a modern solution to replace a network of detention ponds constructed 20 to 30 years ago.

"There were no records to show the design of the existing storm water system, so we designed the replacement detention and water quality system to make the post-redevelopment discharge rate less than a pre-development rate," said Willy Powell, P.E. with Ward Edwards.

The 177,000-sq-ft center, which consists of four buildings, is located on a 20-acre site. The redesigned center also features about 1,000 parking spaces, so taking up land with an aboveground storm water solution was an issue. According to Powell, had the engineers used an aboveground storm water system, they would have lost about 10% to 15%—or two to three acres—of the development area. To maximize the development area, the engineers chose an underground chamber system provided by Cultec Inc. As the groundwater level was high—4 to 5 ft deep—the company's lower-profile Recharger 150 HD was considered the best fit for the site. The chamber is 33 in. wide, 18.5 in. tall and works well for installations with depth restrictions.

"The new storm water system had to accommodate a large volume of runoff because we are located in a hurricane-prone county. We also needed to avoid increasing discharge into the adjacent wetland," said Carl Close, project manager with Tanger Outlet Centers. "Cultec's system gave us the needed storage capacity, and at the same time fit in the tight space allowed by the high water table."

Designed to handle a 25-year storm event as required by local regulations, the system offers 168,958 cu ft of storage and operates in conjunction with two bioretention swales that drain the runoff into the chambers. The chamber system then discharges runoff to a wetland located west of the site. The high groundwater did not allow for infiltration, so the open-bottom chamber system functions as a detention solution.

The system included 4,402 units of the Recharger 150 HD installed in eight beds under the parking area, which featured both impervious and pervious surfaces in a ratio of 2:1. The inlets were equipped with Trash Guard screens to ensure that debris-free runoff enters the detention system.

According to the engineer, this system was the solution due to ease of installation. Cultec employed its own in-line side portal manifold, eliminating the need for a costly external pipe header. Such a system was easier to install than a conventional manifold system and also was more cost effective. Additionally, the system used less stone than other comparable systems on the market and required no heavy installation equipment.

"The system went together easily and without the need of any specialty tools," Close said.

The redesigned center is the first LEED-certified retail location in the state, and the storm water system contributed points to earn this recognition based on the following credits: SS Credit 6.1: Stormwater Design: Quantity Control and SS Credit 6.2: Stormwater Design: Quality Control. SWS

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