

DIGGING DEEP for compliance

UNDERSTANDING THE ROLE OF STORAGE SYSTEMS IN
TODAY'S STORM WATER LEGISLATION AND MARKETPLACE

By Tori Durliat



Storm water regulations, as established in most communities, limit a developed site's pollutant loads and runoff volume or rate. Property owners are required to manage runoff actively so as to minimize the effect it may have on the environment and existing sewers. Rarely is a commercial or industrial site exempt from these regulations.

There are a variety of new products—and new applications of existing products—that have been introduced to

help engineers meet storm water regulations. Surface storage systems such as ponds and basins are commonly used to hold runoff; an overflow pipe is used to control the runoff discharged to a sewer or alternative outlet.

While ponds can be made relatively attractive, they sometimes pose safety concerns and consume expensive real estate that could be used for building or other applications. Subsurface storage systems, typically comprised of underground pipe networks, eliminate many

of the negative issues associated with surface systems.

Engineers generally do not depend on storage systems, whether of surface or subsurface design, to remove pollutants. That function is accomplished with other products, including storm water quality units (SWQUs), which have been introduced over the last several years as regulations become more restrictive. SWQUs operate by capturing a portion of the initial runoff, which generally contains the most

concentrated pollutants. Pollutants are settled or floated out of the runoff, and the relatively clean portion flows to a storage system or other discharge point.

KEEPING COMPLIANT IN JEFFERSONVILLE, IND.

Park Place Towers, a Sprigler Development project located in Jeffersonville, Ind., included a two-story office building and a few retail stores on a parcel of

land that was once an open farm field.

Jeffersonville law requires that runoff from new development does not exceed predevelopment runoff levels for two-, 10- and 100-year storm events. In addition, it requires the use of a SWQU to improve the quality of runoff.

The Park Place Towers development covered about one acre. A parking lot took up about half the site, the building covered another quarter and the

remaining area was open space. The addition of impervious surfaces to what was originally an open area meant a runoff increase.

The engineering firm on the Park Place Towers project, Heritage Engineering, Jeffersonville, Ind., determined that 0.08 acre/ft of runoff would need to be stored to meet postdevelopment regulations.

UTILIZING NEW COMPLIANCE SOLUTIONS

Heritage engineers wanted to make the most of Park Place Towers' small site. One of the best ways of doing that was placing a subsurface storm water storage system beneath the development's parking lot. A LandMax detention system was designed for the site using Hancor Inc. Sure-Lok ST high-density polyethylene (HDPE) pipe.

The LandMax system for the Park Place Tower project required about 740 ft of 30-in. pipe and fit beneath 13 parking spaces. In order to satisfy city requirements, crews installed a Hancor SWQU; the system captures pollutants before the runoff enters the LandMax system. Additional Hancor HDPE pipe in 12-, 15- and 18-in. diameters was used for storm sewers on other parts of the site.

The LandMax system at Park Place Towers was installed in December 2005 under the guidance of project manager Leo Messmer of Dan Cristiani Excavating, Clarksville, Ind. An excavator was used to remove the native soil and position the new system's components.

Specifications required a No. 57 stone for the backfill. The project contractor used the excavator bucket to pour the backfill on the pipe crown so that it flowed uniformly on either side of the HDPE pipe laterals. A laborer shoveled the backfill into the pipe haunch area to minimize any voids that might have been created. One pass was made with a plate compactor when the backfill was about at the springline. The pipe did not misalign during the backfilling or compaction processes. Backfilling continued until there was about 1 ft of gravel over the pipe crown, and the contractor then used a bulldozer to level it.

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Subsurface storage systems can save valuable real estate.

The total cover over the system varied between 2 and 3 ft. The No. 57 stone backfill extended 1 to 2 ft over the pipe crown, and the asphalt base, binder and surface layers added nearly 1 ft more.

A Hancor SWQU 42 in. in diameter and 20 ft in length was installed near the LandMax system to capture the first-flush from a storm event.

GETTING BENEATH SUBSURFACE SYSTEMS

Subsurface systems, regardless of pipe material, may require a geotextile to separate the backfill from the native soil to prevent soil migration. Conditions at the Park Place Towers site did not require use of a geotextile since the native soils and stone backfill were unlikely to lead to migration concerns.

The subsurface system utilized in this project contains nonperforated pipe and serves a detention function, meaning it is meant to hold runoff temporarily and then discharge it at a controlled rate. Perforated or nonperforated pipe can act as a detention system, but controlled discharge is always a necessary component. Depending on project specifications, pipe is used in detention applications with either soil-tight or water-tight joints.

Like detention systems, retention systems temporarily store runoff. But retention systems allow the stored storm water to recharge to the surrounding soil. Perforated pipes with soil-tight joints are used in retention applications. Whether a system should serve as a detention or retention type is usually determined by local regulations.

The LandMax detention system installed at Park Place Towers has been performing well for about a year and a half. As real estate costs continue to rise, demand for subsurface systems will increase. The reasons for this rising need are clear; subsurface storage systems allow for the efficient management of storm water without creating an eyesore or safety issues. **SWS**

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