

# New Nashville Area Commercial Development Turns to Downstream Defender® to Protect Retention Ponds

## Project Profile

### Objective

Provide erosion control, stormwater treatment and control of the 100-yr storm event for a steeply sloped site on the north side of Nashville, TN.

### Solution

Two Downstream Defender® devices were installed upstream of retention ponds to provide effective, reliable pretreatment.

## Downstream Defender® Product Profile

- High pollutant removal performance minimizes dredging maintenance required for downstream retention ponds
- Effective treatment performance met stormwater treatment requirements
- Smaller footprint was easier, quicker and less expensive to install than other devices

Find more about the Downstream Defender® at [www.hydro-int.com](http://www.hydro-int.com)

NASHVILLE, TENNESSEE – Nashville, Tennessee is a fast-growing major metropolitan area with a population over 1.5 million people and spanning 13 counties. Although Nashville is most well-known for its country music scene, it is also the capital of Tennessee, a hub for colleges and universities and a major center for banking, publishing and health care. The city has a growing permanent population, which has increased over 10% in the last decade. To meet the needs of residents, a local businessman decided to develop a mixed use commercial property known as Brick Church Pike Realty located just north of the Cumberland River near Exit 87 of I-24/I-65. Consisting of 5.5 acres, 4 acres of the site will include an 8,000 square foot funeral home/chapel, a crematory, and 115 parking spaces in the center of the site, with space set aside at the front and the back of the site for two future strip mall style retail spaces, all of which are desired in the area. The western-most 1.5 acres of the site will be left undeveloped (Fig.1). The site is situated above the city and offers a gorgeous view of the iconic Nashville skyline.

Although the site's elevation offers skyline views, final grades included steep slopes that vary between 10% and 20%. The primary challenge for the developer was to control and treat the stormwater runoff from the parking spaces and the roofs of both the funeral home and the crematory. The city required 80% removal of total suspended solids (TSS) from stormwater runoff, plus capture the large amount of oil and grease that would be produced from the two parking lots.

Local regulations and ordinances also required management of post-development runoff for the 100-year storm event plus erosion control measures for more frequent storm events. The Brick Church Realty site would tie into an existing drainage system that takes in runoff from the property up-gradient of the proposed development. The engineer determined that during the 100-year storm event, runoff from the Brick Church site had to be limited to 13.8 cfs to prevent surcharging the system. Erosion control measures were also an important factor of the design,

considering the site's steep slopes, large paved parking area and proximity to other locales.

Chet Rhodes PE, REPA of Rhodes Engineering was hired to design the storm water management plan for the development. To control the runoff, Rhodes broke the site into several terraces that stepped down from west to east. Two retention ponds in series were placed in the southeast corner of the lot. An outlet structure from the lower pond

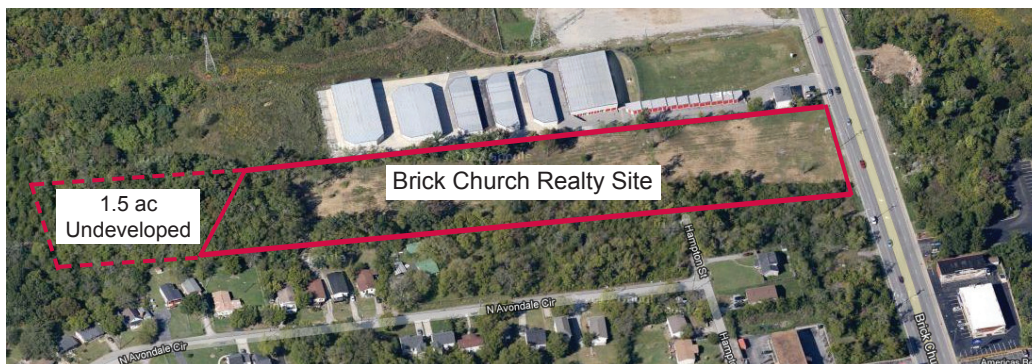


Fig. 2 The Brick Church Realty project developed 4 acres of a 5.5 acre site on the north side of Nashville, TN.

controlled discharge from the ponds into the existing storm drain.

Rhodes followed the advice of the City's water utility, and specified the use of two stormwater quality controls for pretreatment and selected the Downstream Defender®, which is on the approved BMP list for Metro Nashville Water and Sewerage.



Fig. 2 The Downstream Defender® effectively captures and retains the bulk of solid pollutants from stormwater runoff, extending the maintenance life and performance of downstream retention ponds.

The Downstream Defender® by Hydro International is an advanced vortex separator designed to remove sediments, trash and oils from stormwater runoff in the small footprint of a standard manhole. The Downstream Defender® uses specially designed flow-modifying components to increase pollutant capture and to prevent captured pollutants from being washed out of the device during peak storm flows.

Prior to the upper retention pond, Rhodes specified a six-foot Downstream Defender® for installation on the westerly edge of the pond. The vortex separator pre-treats stormwater from the parking area and the roofs of the proposed structures. Stormwater then flows into the retention pond system.

A four-foot Downstream Defender® was installed prior to the lower retention pond to capture the bulk of the pollutants from stormwater washed from the lower section of the site. Runoff is conveyed to the Downstream Defender® where the bulk of solids, trash and hydrocarbons are captured before the water flows into the pond. Additional treatment and control is provided by the lower retention pond before stormwater is slowly released into the Brick Church Pike Ditch, a conveyance channel running parallel to Brick Church Pike from north to south towards the Cumberland River (Fig.3).

Unlike many other stormwater quality devices, the Downstream Defender® does not have an internal bypass that discharges higher flows without treatment. "That's what makes the Downstream Defender® ideal for these types of pretreatment applications," explains Will Hall of Hydro International, who provided technical support on the project. "If your device internally bypasses, you are creating a situation where even a short surge in intensity could exceed the treatment capacity of the device and your internal bypass is going to convey pollutants directly into your downstream retention system."

Furthermore, extensive testing on the Downstream Defender® has shown that previously captured pollutants will not wash out during intense storm flows.

"On a site designed like this one, you could be looking at a downstream retention system clogged with sediment if your pretreatment device either internally bypasses or is prone to washing out its captured pollutants during intense storm events," says Hall. "Neither scenario makes for a happy site owner, who then has to pay for an expensive retention pond clean-out."

"The lightweight nature of the Downstream Defender® made for ease of installation on this project," said Rhodes. "The staff's technical support and commitment to proper installation was very much appreciated on this project."

The Downstream Defender® advanced vortex separators play an important role in maintaining the long term health and performance of the retention ponds, whose slow-release design helps make the sloped lot usable for development. This small parcel, now a functional development, has already been designed to support two additional future buildings, ensuring that it will continue to support population growth in the area well into the future.

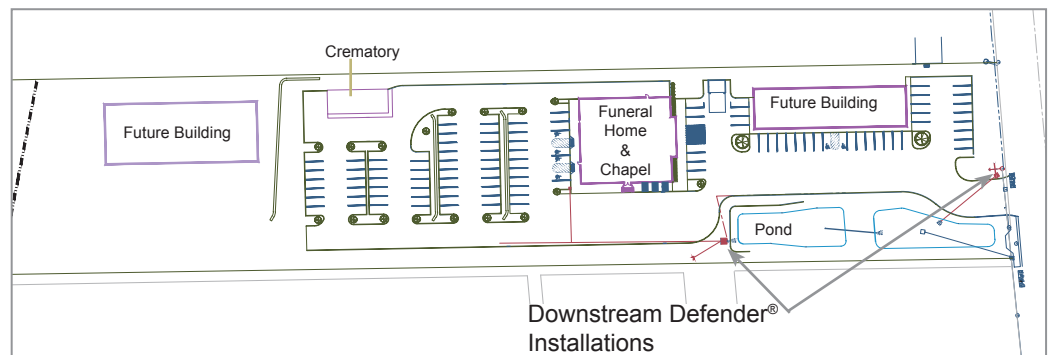


Fig. 3 The Downstream Defenders® pretreats runoff upstream of two retention ponds to enhance their performance and extend their maintenance life.