

Precast Concrete Stormwater Detention System Shows Great Value in “Show Me” State

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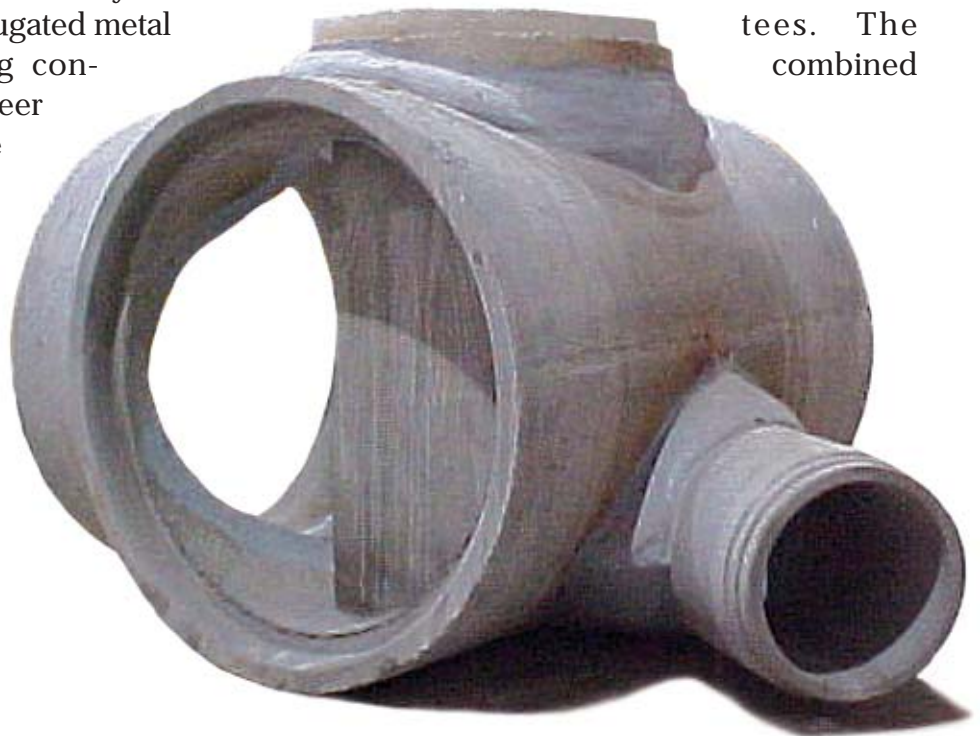
Underground detention systems are becoming an integral part of stormwater management programs. They offer unique benefits to the owner, and in some cases, significant challenges to the producer of the containment system. In most cases, the owners and producers of detention systems share a common goal – to obtain the best system and long-term value.

On a recent project in the Greater St. Louis-area, Independent Concrete Pipe Company worked closely with the owner and consulting engineer to point out the inherent benefits of a precast concrete detention system: greater durability, lower maintenance costs and installation cost-savings. Although the bid documents for an underground stormwater detention system were originally issued for corrugated metal products, value engineering convinced the consulting engineer that precast concrete was the best choice. Known locally as the Midland Manor Detention and Overflow Structure, it is located in the Metro Sewer District jurisdiction of St. Louis. Construction began on the

detention system in July 2002.

This project is an important achievement in the application of precast concrete products in Missouri. Until recently, almost all underground detention overflow structures were specified corrugated metal pipe because of their inherent low flow orifice and emergency standpipe. These structures can now be supplied as precast concrete products.

St. Charles Engineering and Surveying, Inc designed the detention system. The structure included 66-inch diameter RCP at one end and a manifold at the other end. The manifold end consisted of two 66-inch x 66-inch ninety-degree elbows and two 66-inch x 66-inch diameter tees. The combined



A special 66-inch x 66-inch diameter precast concrete manifold structure with a 90° elbow was fabricated for the Midland Manor Detention and Overflow System.

structure accommodated four 72-foot long runs of 66-inch diameter RCP. Bulkheads were used to close the system for underground storage. On the last pipe in the 72-foot runs, a 48-inch diameter manhole tee was produced for access to the 66-inch diameter pipe. Independent Concrete Pipe Company, St. Louis, Missouri supplied the standard and special precast concrete products for the structure.

A 66-inch x 66-inch cross with a 48-inch riser was designed at the manifold so an interior wall could be constructed to hold back the stored water. This weir wall has a low flow orifice and does not extend to the top of the 66-inch pipe. In the event that the low flow orifice is clogged, the weir is used for emergency overflow into a 24-inch diameter RCP. The weir and low flow orifice control the outfall so that no flooding is caused downstream.

There are numerous advantages of using precast concrete underground stormwater detention systems:

- A design life of 100 years
- No disruption to business due to failed pipe
- No special fill requirements
- Minimal risk of flotation
- Significantly reduced maintenance costs
- Easier to install
- Cost competitive
- Special designs, such as low head boxes and elliptical pipe, available.

Underground stormwater detention systems have the



The system included 66-inch x 66-inch diameter 90° elbows and tees with four 72-foot runs of 66-inch diameter reinforced concrete pipe.

ability to meet strict stormwater runoff regulations. With the increased design flexibility of systems, such as the Midland Manor system, owners can expect greater value. For example, the surface area above the detention system may be used for parking.



Installation of the 72-foot runs of 66-inch diameter RCP went smoothly and provided the owners with the ability to add a parking surface above the structure.



48-inch manhole tees with bulkheads were installed at the end of each 72-foot run to provide access to the Midland Manor Detention and Overflow System.

Ponds are not always the answer to stormwater management challenges, since they require a great deal of land. Some designs may include modern-day health and

safety issues considering diseases transmitted by mosquitoes and other pests, as well as new design problems associated with homeland security.

The American Concrete Pipe Association has released a new software program called DASH (Detention And Sewer Hydraulics) to facilitate the design of underground stormwater detention systems, storm sewers and sanitary sewers. The program calculates stormwater detention volumes using a variety of methods. The software helps design entire systems. It produces drawings to scale, uses

multiple sizes and types of pipes and boxes, and provides a listing of all materials required for cost estimating and quotations. Designing and constructing underground stormwater detention systems is made easy using precast reinforced concrete products.

The Midland Manor detention and overflow structure demonstrates the versatility of precast concrete pipe used for stormwater management. With the help of ACPA design software, such structures can be specified and easily constructed to last a lifetime. ☺

Project:	Midland Manor Detention and Overflow Structure St. Louis County, Missouri
Owner:	Metropolitan St. Louis Sewer District
Consulting	St. Charles Engineering & Surveying, Inc.
Engineer:	St. Charles, Missouri
Contractor:	Purler, Cannon & Schulte St. Charles, Missouri
Quantities:	72 feet (four runs) of 66-inch diameter RCP 6 (48-inch diameter) manhole tees 2 (66-inch x 66-inch ninety degree elbows) 2 (66-inch x 66-inch) diameter tees
Producer:	Independent Concrete Pipe Company St. Louis, Missouri

Independent Concrete Pipe Company has seven plants located in Kentucky, Indiana, Missouri and Ohio. Established in 1912, the St. Louis, Missouri Plant supplies reinforced concrete pipe and manholes, precast concrete box units and Hy-Span™ bridges to the growing metropolitan area of St. Louis. Independent Concrete Pipe Company is a long-time member of the American Concrete Pipe Association.