

# Concrete Pipe **News**



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**On the Cover:**

Precast delivered to the site included 12,000 feet (approx. 2.3 miles) of 12, 15, 18, 24, 30, 36, 48, 60 and 72-inch diameter RCP

Photo: National Precast Concrete Association



American Concrete Pipe Association

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# Editorial

## First Concrete Pipe Week celebrations leading to Pipe School 2016



**Matt Childs, P.E., President**  
American Concrete Pipe Association

and way of life.

The wave of support from the offices of state governors washed over the industry quickly and deeply. Proclamations of Concrete Pipe Week were marked with public endorsements, news releases, social media posts, and local events that included plant tours for public officials. Concrete Pipe Week was proclaimed by 28% of U.S. states. These included Alabama, Arkansas, Colorado, Delaware, Georgia, Illinois, Iowa, Maryland, Minnesota, Missouri, Oklahoma, Pennsylvania, Virginia, and Wisconsin. These states represent approximately 25 % of the U.S.A's population.

Concrete Pipe Week celebrations were designed to educate communities and their leaders on the importance of buried infrastructure, concrete pipe, and precast manufacturers. Events included:

- An open house at the Sherman Dixie (Kentucky) facility on August 20. Invited were KY legislators, local government leaders and tech staff, and Kentucky Transportation Cabinet personalities.
- Colorado held a Legislative Review Committee Plant Tour on August 27.
- There was a Proclamation signing in Iowa with Governor Terry Branstad on July 29.
- Governor Asa Hutchinson signed a proclamation on June 25 declaring August 16 through August 20 National Concrete Pipe Week in Arkansas.
- Concrete Pipe & Precast held employee appreciation luncheons, and
- Senator Klobuchar of Minnesota toured the Hancock pipe plant on August 18.

For more than a century, concrete pipe has been the product of choice used in North America's vast network of sewers and culverts, and yet most Americans don't give these vital, 'unseen' structures a second thought. It's understandable given that concrete pipe has a 100-year service life. They're easy to forget. So it's gratifying that our industry and the professionals that have dedicated their careers to it are finally getting some much-deserved recognition.

Planning is well underway for ACPA's Pipe School 2016 being held January 4-7 at the University of Texas at Arlington. The program has been finalized and promotion of the event began in August. Pipe School is a grand opportunity to learn more about precast concrete pipe and box products, participate in training sessions, and work with peers to improve the products and services that the concrete pipe industry provides. The last Pipe School had 22 Department of Transportation representatives from 14 different states.

Concrete Pipe Week is a new initiative of the ACPA designed to highlight contributions of the concrete pipe industry to the public, and enhance participation in Pipe School by clients and strategic partners. Interest in Concrete Pipe Week and the success of past Pipe Schools suggest that 2016 will be a very busy year for ACPA staff and member company representatives.



## Accelerated Precast Construction - INDOT U.S. 31 Keystone Avenue

By Trygve W. Hoff, P.E., Northeast Region Engineer  
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Accelerated precast construction (APC) is the use of innovative scheduling, delivery, design, manufacturing and construction methods to reduce onsite construction time and costs, while improving safety and reducing road user impacts. The Keystone Avenue section of the Indiana Department of Transportation (INDOT) U.S. 31 project is a case-in-point where reconstruction was completed ahead of schedule using a wide range of precast concrete products, including concrete pipe and precast boxes. When INDOT required a project with cost savings and rapid construction through a narrow right-of-way of U.S. 31, the APC method was the only choice.

APC reduces project delivery and shortens traffic delays and community disruption. In addition, APC can reduce right-of-way acquisition needs, eliminate temporary alignments and minimize utility relocations. Shortened installation time reduces environmental impacts and eliminates the possibility of weather-related delays. By specifying concrete pipe and box sections, construction activity can be accelerated and schedules shortened.

Concrete pipe and precast boxes were supplied to the contractor, Walsh Construction, by [Rinker Materials, Concrete Pipe Division – Cretex<sup>1</sup>](#). Rinker was able to fast-track the delivery of products and accommodate just-in-time delivery, and at the same time meet the contractor's tight schedule. Rinker reported that the underground work was challenging because of existing utility obstacles and site constraints that included mounds of earth and surface structures.

Reinforced concrete pipe delivered to the site included 12,000 feet (approx. 2.3 miles) of 12, 15, 18, 24, 30, 36, 48, 60 and 72-inch diameter standard, specialized and modified product. Precast boxes included 1,500 feet in a range of sizes 6 ft. x 3 ft.; 9 ft. x 5 ft.; 10 ft. x 4 ft.; 10 ft. x 5 ft.; 10 ft. x 6 ft.; and 12 ft. x 4 ft. Some sizes were installed at depths as great as 46 feet. The boxes had to accommodate mechanically stabilized earth wall loads and were designed with heavy steel and stirrup reinforcement. The boxes were produced with greater wall thickness and top and bottom slabs with thickness in excess of standard designs.

Construction with precast products appears to be growing in acceptance throughout the USA, perhaps due to a definite increase in federal and state attention to the resiliency of America's transportation infrastructure and the obvious impacts of changing weather extremes on roadway pavements. On this particular project, time, cost and space required for cast-in-place (CIP) concrete construction (rebar placement and on-site pours) would not be possible. CIP requires more surface area for construction than the narrow Keystone right-of-way could offer, and form-work construction and curing time would not meet INDOT's deadlines. In addition, precast concrete pipe is the only pipe material approved by INDOT that does not require time-consuming mandrel testing.

The Keystone Avenue project was an ideal application of APC with concrete pipe and box sections because it complimented the overall decision to use as much precast as possible throughout the right-of-way corridor. APC contributed to completing the project with as little disruption as possible to local businesses, Interstate commerce and local traffic.

### LINKS

1. [precast.org/2013/04/indot-u-s-31-project-snaking-through-the-high-country](http://precast.org/2013/04/indot-u-s-31-project-snaking-through-the-high-country)

### Learn More About Buried Infrastructure

- **Keyword Search on American Concrete Pipe Association Website**  
(Interstate, highway, culvert, drainage, APC, accelerated, pipeline) [concretepipe.org](http://concretepipe.org)
- **Concrete Pipe Design Manual** [concretepipe.org/pipe-box-resources/design/design-manual](http://concretepipe.org/pipe-box-resources/design/design-manual)
- **Concrete Pipe News** [concretepipe.org/category/concrete-pipe-news](http://concretepipe.org/category/concrete-pipe-news)

Precast boxes included 1,500 feet in a range of sizes 6 ft. x 3 ft.; 9 ft. x 5 ft.; 10 ft. x 4 ft.; 10 ft. x 5 ft.; 10 ft. x 6 ft.; and 12 ft. x 4 ft.



RCP and box sections specified because it complimented the decision to use as much precast as possible.



By specifying concrete pipe and box sections, construction activity can be accelerated and schedules shortened.



Photos: National Precast Concrete Association

## TxDOT Delivers North Tarrant Express Under Budget Concrete Pipe and Precast Boxes Included in Award-winning Project

By Kyle Dickerson

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For its cost-saving and project efficiency during the funding and construction of the [North Tarrant Express \(NTE\) project](#)<sup>1</sup>, the Texas Department of Transportation (TxDOT) earned an award in 2015 in the “Under Budget” category from [America's Transportation Awards \(ATA\)](#)<sup>2</sup> for the Western Region States. Large quantities of concrete pipe and precast boxes supplied by Hanson Pipe & Precast and Rinker Materials, Concrete Pipe Division – Cemex were used throughout the project. Precast boxes were supplied for storm sewers and jacking pipe was used in several locations. The ATA competition recognizes the greatest transportation projects accomplished each year by state DOTs. Construction on the North Tarrant Express began in October 2010. The project opened on Oct. 4, 2014, approximately nine months ahead of schedule.

The project required miles of precast boxes and reinforced concrete pipe to construct the drainage infrastructure. Large tonnages of precast boxes and RCP were supplied from Hanson's Grand Prairie and Cedar Hill production facilities for culvert structures. Hanson supplied RCP ranging in size from 18 to 66-inch diameter in classes 3, 4 and 5, and box sections ranging in size from 4 x 2-foot to 9 x 9-foot. In addition, Hanson supplied 84-inch diameter class 4 jacking pipe and 48-inch diameter class 4 and 5 jacking pipe.

The stimulus for this story was the project's America's Transportation Award in the “Under Budget” category from the Western Association of State Highway and Transportation Officials (WASHTO). TxDOT won this award for its cost-saving and project efficiency efforts during the funding and construction of the NTE project. These efforts included TxDOT's ability to leverage a \$575 million investment into a \$2.1 billion construction project by procuring the NTE as a concession. Alternative Technical Concepts (ATCs), the design-build delivery method, and a post construction maintenance contract, were some of the efforts that lead to the award.

TxDOT's \$2.1 billion North Tarrant Express project rebuilt and expanded 13.3 miles of the Dallas-Fort Worth Metroplex's most congested highways, improving conditions for motorists and freight traffic. The project was completed nine months ahead of schedule and provides additional lanes for motorists while including additional toll lanes. The project team shaved as many as six years from the construction schedule with their design-build method, saving time on construction and reducing inconveniences to motorists. A public-private partnership between TxDOT and the North Central Texas Council of Governments, the developer (North Tarrant Express Mobility Partners), and Bluebonnet Contractors was formed to deliver the project. AECOM was awarded a contract by Bluebonnet Contractors for the first-phase engineering services. Renaissance Contractors, Inc. was the precast concrete installation contractor.

### LINKS

1. [txdot.gov/government/partnerships/current-cda/north-tarrant-express.html](http://txdot.gov/government/partnerships/current-cda/north-tarrant-express.html)
2. [americatransportationawards.org/2015-entries/tx-north-tarrant-express](http://americatransportationawards.org/2015-entries/tx-north-tarrant-express)


### Learn More About Buried Infrastructure

- Keyword Search on American Concrete Pipe Association Website (highway, expressway, storm, interstate, culvert, sewer) [concretepipe.org](http://concretepipe.org)
- Concrete Pipe Design Manual [concretepipe.org/pipe-box-resources/design/design-manual](http://concretepipe.org/pipe-box-resources/design/design-manual)
- Concrete Pipe News [concretepipe.org/category/concrete-pipe-news](http://concretepipe.org/category/concrete-pipe-news)

Photos: Renaissance Contractors, Inc.



A wide variety of precast concrete structures were used for the drainage infrastructure of the NTE project.



Box sections used for culverts ranged in size from 4 x 2-foot to 9 x 9-foot.



## Precast Concrete Box Sections Specified for Storm Water Detention Structure

By Jason Spencer  
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Alex Nichols, P.Eng.  
R.V. Anderson Associates Limited

Precast concrete box sections were specified for an underground [storm water detention](#)<sup>1</sup> tank to enable the construction of the Humber Mews Townhomes project on Evans Avenue in Toronto, Ontario. The system was selected because it could reduce the total peak runoff being discharged from the site during all storm events. Using precast units would reduce construction costs and time. Other pre-manufactured solutions were considered, nevertheless, a precast system was selected as the preferred option. The structure met the service life requirements through the proven durability of precast concrete.

The precast system was customized to fit site-specific conditions, layout and structural requirements. While a detention tank would normally be placed on the P1 level of an underground parking structure, the design team decided that the storage system could be placed below the P1 level to accommodate the large volume of storm water.

Shallow municipal storm sewers on Evans Avenue, along with a level grade, suggested a tank design on P1 with a reduced internal height. This design limitation required a tank footprint covering greater area, thereby reducing required parking spaces. The consulting engineering company, [R.V. Anderson Associates Limited](#)<sup>2</sup> provided the volume and discharge parameters. If the tank were to be installed below the P1 level and the connecting storm sewer, a pumping system was required to discharge storm water from the tank. The storage system had to be structurally designed to withstand loads from the parking structure.

[Con Cast Pipe](#)<sup>3</sup> was contracted by [CDC Contracting](#)<sup>4</sup> to supply the precast concrete boxes and other precast products to construct the system. Con Cast Pipe retained the services of [GM Blueplan Engineering Consultants Limited](#)<sup>5</sup> to provide the structural design of the box sections. The system was composed of a combination of horizontal box sections and a vertical precast concrete structure with plugs and caps to contain the storm water on site. The horizontal portion of the system was composed of seven 4.8m (span) x 3.8m (rise) box sections with a 4.8m x 3.8m precast cap and plug at each end of the box system. The vertical portion was comprised of two 4.8m long x 4.8m wide box sections, with a 4.8m x 4.8m precast base slab and transition slab. On top of the transition slab, a standard 1,200mm manhole taper top was provided to allow maintenance access from P1. The heaviest section of the 4.8m x 3.8m box unit weighed 41,587 kg. The horizontal box sections (combined) measured 12.1 meters. The heaviest element of the 4.8m x 4.8m vertical chamber was 38,755 kg with a height of 6.8 meters.

Structural water-tightness was achieved with a water-tight system utilizing a rubber jointing material, an external wrap, and a geotextile filter cloth.

The installation, from the initial ground breaking, excavation for the placement of the units to backfilling took two days. Ease of product installation reduced the possibility of performance issues resulting from improper installation.

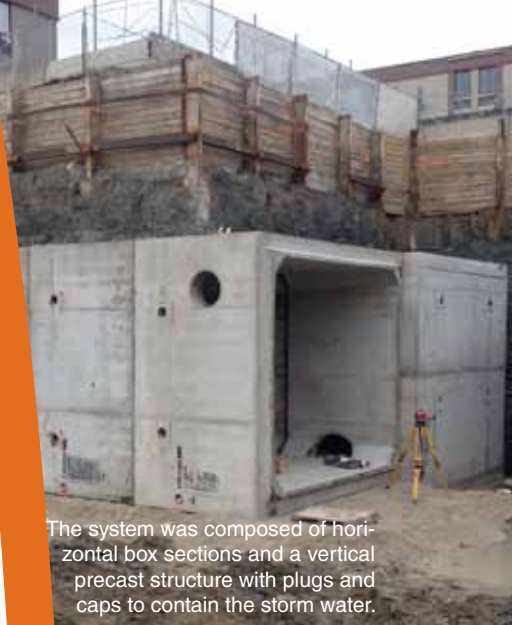
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1. [concretepipe.org/wp-content/uploads/UndergroundStormWaterSystems.pdf](http://concretepipe.org/wp-content/uploads/UndergroundStormWaterSystems.pdf)
2. [rvanderson.com](http://rvanderson.com)
3. [concastpipe.com](http://concastpipe.com)
4. [cdccontracting.com](http://cdccontracting.com)
5. [gmbblueplan.ca](http://gmbblueplan.ca)

Photos: Larry Wunder, Con Cast Pipe

### Learn More About Buried Infrastructure

- **Keyword Search on American Concrete Pipe Association Website**  
(storm, detention, retention, joint, box) [concretepipe.org](http://concretepipe.org)
- **Concrete Pipe Design Manual** [concretepipe.org/pipe-box-resources/design/design-manual](http://concretepipe.org/pipe-box-resources/design/design-manual)
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The system was composed of horizontal box sections and a vertical precast structure with plugs and caps to contain the storm water.



Custom-made precast concrete stormwater detention system.



The horizontal portion was composed of seven 4.8m (span) x 3.8m (rise) box sections.

## RCP Replaces Aged Steel Irrigation Siphons

By: Richard J. Langguth, Sales Manager

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Reinforced concrete pipe (RCP) was specified to replace two 96-inch diameter steel pipes known as the Indian Creek and Horse Creek siphons within the Belle Fourche Irrigation District of South Dakota. The pipes, installed in the 1930s, were aligned above ground. One siphon ran for 1,256 feet and the other 626 feet. The new RCP siphons were installed below ground to prevent thermal expansion leaks, costly maintenance, and damaging high water flows. The steel siphons had reached the end of their service life.

A siphon (pipe or tube) refers to a device which causes a liquid to flow above the surface of a source with no pump, but powered by gravity as it discharges at a level lower than the surface of the source from whence it came. The two concrete siphons are used to convey the flows from the Belle Fourche Reservoir under Indian and Horse Creeks. The project is needed to continue delivering water to nearly 500 irrigators for growing wheat, corn, alfalfa, barley and other crops over approximately 57,000 acres.

The Belle Fourche Irrigation District and the U.S. Bureau of Reclamation contracted with [RESPEC Water and Natural Resources](#)<sup>1</sup> to replace both siphons beginning late fall of 2013. RCP produced to [ASTM C-361](#)<sup>2</sup> (Standard Specification for Reinforced Concrete Low-Head Pressure Pipe) with a progressive specification, was their material of choice. In addition to the stringent requirement of C-361 R4, pipe required proof of design at the production location, hydrostatic and vacuum testing, joint tolerance, gasket compression calculations, ASTM C-1103 (Standard Practice for Joint Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines), and a final Hydrostatic Test post installation

[Heavy Constructors Inc.](#)<sup>4</sup> of Rapid City, SD was the successful bidder. The Indian Creek siphon consisted of 1,250 feet of A50 and B75 96-inch diameter RCP, with several 7.5 and 15 degree bends, a blowoff manhole with fabricated fittings, and precast beveled end sections, for special tie in connections to the existing inlet and outlet structures. The Horse Creek siphon consisted of 550 feet of A50 and C50 84-inch diameter RCP with several 7.5 and 15 degree bends, a blowoff manhole with fabricated fittings, precast beveled end sections for existing structure connections, and two 84 to 96-inch diameter fabricated increaser/reducers to help with the connections. The successful C-1103 joint testing followed pipe installation with full-time [Cretex](#)<sup>5</sup> representation.

Especially challenging phases of the work involved winter construction conditions and diversion of the streams during particularly high runoff periods. There could be no interruption to the vital flow of 450 cfs of water from the Belle Fourche Reservoir via the old siphons during the growing season.

The western states are experiencing increasing water supply challenges due to chronic water shortages, explosive population growth, over-allocated watersheds, environmental needs and aging water facilities. The Belle Fourche Irrigation District siphons are expected to contribute to the saving of 1,233 acre-feet of water per year to the district's water bank and improve the efficient use of existing water supplies.

### LINKS

1. [respec.com](http://respec.com)
2. [astm.org/Standards/C361.htm](http://astm.org/Standards/C361.htm)
3. [astm.org/DATABASE.CART/HISTORICAL/C1103-03.htm](http://astm.org/DATABASE.CART/HISTORICAL/C1103-03.htm)
4. [heavyconstructorsinc.com](http://heavyconstructorsinc.com)
5. [cretexconcreteproducts.com](http://cretexconcreteproducts.com)

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- **Keyword Search on American Concrete Pipe Association Website** (irrigation, canal, siphon, conservation, pressure) [concretepipe.org](http://concretepipe.org)
- **Concrete Pipe Design Manual** [concretepipe.org/pipe-box-resources/design/design-manual](http://concretepipe.org/pipe-box-resources/design/design-manual)
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Photos Credit: Richard J Langguth, Cretex



C-1103 joint testing followed pipe installation.




The Indian Creek siphon consisted of 1,250 feet of A50 and B75 96-inch dia. RCP. The Horse Creek siphon consisted of 550 feet of A50 and C50 84-inch dia. RCP.




RCP required proof of design at the production location, hydrostatic and vacuum testing, joint tolerance, gasket compression calculations, ASTM C-1103 Standard Practice, and a final hydrostatic test post installation.






9,150 ft<sup>3</sup> reinforced concrete pipe detention system consisting of a series of pipes with headers and an outlet.



Precast concrete for stormwater treatment systems under parking areas where there is heavy truck traffic.



RCP stormwater detention system can increase surface area for development.

## RCP Stormwater Detention Systems Raising the Standard for Land Use and Water Quality - The Crossings Distribution Center - 6050 Dana Way warehouse

By Michael D. Kusch, Director of Technical Marketing  
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Stormwater management is an expected element of any plan for new development or expansion. Developers and property managers work closely with consulting engineers and contractors to meet legislative and local policies for managing and treating storm water. A warehouse site improvement at 6050 Dana Way in Nashville, TN demonstrates the continued preference of precast concrete for stormwater treatment systems under parking areas where there is heavy truck traffic. It also demonstrates the versatility of easily accessible standard reinforced concrete pipe (RCP) for uses other than sewers and culverts.

A 9,150 ft<sup>3</sup> reinforced concrete pipe detention system consisting of a series of pipes with headers and an outlet comprise the structure that meets the Metro Nashville Stormwater requirements designed to handle runoff generated by a 10-year storm event. The structure consists of six, 100-foot chambers of 48-inch diameter RCP for a total storage length of 600 feet. Included in the design are entry manholes at each of the two headers and two inlet catch basins.

The site for the structure was excavated and gravel placed prior to delivery of the pipe and other precast elements. The contractor was able to grade the bedding with a GPS-guided dozer to save time and increases productivity when setting the system in place. The contractor was able to backfill between pipes as they were set.

The many attributes of RCP and precast concrete box sections become clear when these products are considered for [underground detention and retention systems](#)<sup>1</sup>. Benefits include: ease of design for any site condition; familiarity with concrete; a wide range of shapes and sizes; large volumes of water handled in a small footprint; cost-effective water storage; quick installations and immediate backfilling so overall site work can progress on or ahead of schedule; use of RCP in conjunction with structural storm water quality units; treatment of storm water within the structure; a system that will outlast all other products at a competitive cost; and inspection and maintenance access alternatives.

In addition, buried storm water detention and retention systems may enable smaller sizes of mainline pipe; can connect with existing drainage; can increase surface area for development; have reduced liability and less maintenance compared to ponds; and can store water until times of need.

The Nashville office of [Cushman & Wakefield](#)<sup>2</sup> managed the construction project. The site contractor was [Sunrise Contracting](#)<sup>3</sup> and the consulting engineer [Barge Cauthen & Associates](#)<sup>4</sup>. The 6050 Dana Way project is another example of how RCP continues to add value to industrial land development and expansion with precast storm water detention and retention structures.

### LINKS

1. [concretepipe.org/wp-content/uploads/UndergroundStormWaterSystems.pdf](http://concretepipe.org/wp-content/uploads/UndergroundStormWaterSystems.pdf)
2. [cushmanwakefield.com](http://cushmanwakefield.com)
3. [sunrisecontracting.net](http://sunrisecontracting.net)
4. [bargecauthen.com](http://bargecauthen.com)

Photos: Courtesy of Sunrise Contracting

### Learn More About Buried Infrastructure

- **Keyword Search on American Concrete Pipe Association Website** (stormwater, storm, detention, retention, management, brochure) [concretepipe.org](http://concretepipe.org)
- **Concrete Pipe Design Manual** [concretepipe.org/pipe-box-resources/design/design-manual](http://concretepipe.org/pipe-box-resources/design/design-manual)
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## Pipeline Installation 2.0 available from Amster Howard, Pipeline Installation Expert

The 2015 Pipeline Installation 2.0 edition includes new chapters, more illustrations, updated content, additional topics, and links to online resources.

Pipeline Installation 2.0 is a 640 page, hard-cover book that emphasizes the geotechnical aspects of water, wastewater, stormwater, and irrigation pipe installations. The book covers the fundamentals of pipe-soil interaction as related to the construction of a buried pipeline. All types of pipe are discussed. From unloading the pipe at the construction site to final testing for acceptance, each step in the installation sequence is reviewed in detail.

