CLOSING THE FLOODGATES // A NEED FOR SPEED // A TIGHT SQUEEZE

Manune

# precast solutions

## Ready & Reliable

Precast concrete tanks offer optimal solution for mixed-use development WINTER 2022 ISSUE



CONBLOCK IS THE FUTURE! IT IS BACKED BY SCIENCE & SPECIFIED BY ENGINEERS FOR LONGER LASTING CONCRETE.



CONBLOCK IS DOMESTICALLY & INTERNATIONALLY PROVEN & TESTED USING ASTM C1898, ASTM C1904 STANDARDS & MORE!

33

+1.937.845.8776

...

WWW.CONSEAL.COM

MICC@CONSEAL.COM



## WHAT'S INSIDE

### Saving Communities in Colorado

SEMA Precast creates the largest box culverts ever manufactured in Colorado to expedite work in helping the state recover from historic flooding. By Bridget McCrea

### Project Under Highway Necessitates Speed

12

Δ

When a Louisiana chemical plant needs to get its product to ships on the Mississippi River, Gainey's Concrete produces a custom vault to minimize the closure of a major highway. By Heather Bremer

### Filterra System Offers Solution for Development

18

24

A large-scale, mixed-use development in Southern California requires a creative stormwater solution with a minimal footprint and aesthetic appeal.

By Mason Nichols

### Sedona Updates Aging Lift Stations

Oldcastle Infrastructure answers the call to increase pump capacity while decreasing the footprint of Sedona's wastewater system. By Shari Held

#### precast Solutions WINTER 2022 VOLUME 20 | NUMBER 1

#### ON THE COVER:

Precast concrete tanks powered by a Filterra system minimized the on-site stormwater footprint and provided aesthetic appeal for Avion Burbank, a mixed-use development in Los Angeles. Photo courtesy of Contech

> Precast Solutions (ISSN 1934-4066 print, ISSN 1934-4074 online) is published quarterly by NPCA, the association of the manufactured concrete products industry.

Material in this publication may not be reproduced without written permission from NPCA. Requests for permission should be directed to the managing editor.

© 2022 NPCA

**Publisher** Frederick H. Grubbe, MBA, CAE

> Executive Editor Joe Frollo

Managing Editor Heather Bremer

**Technical Editor** Kayla Hanson, P.E.

**Technical Advisors** Phililp Cutler. P.E. Claude Goguen, P.E., LEED AP Daryl Burns, P.E.

**Graphic Designer** Deborah Templeton

Advertising Brenda C. Ibitz (317) 571-9500 bibitz@precast.org

NPCA Precast Solutions 1320 City Center Drive, Suite 200 Carmel, IN 46032 (800) 366-7731 (317) 571-9500 (International) Email: npca@precast.org

Acceptance of advertising does not imply NPCA's endorsement of the product. NPCA reserves the right to reject advertising copy and does not accept responsibility for the accuracy of the statements made by advertisers.



This publication is designed to provide accurate and authoritative information in regard to the subject matter covered; however, National Precast Concrete Association and Precast Solutions act as mediators without approving, disapproving or guaranteeing the validity or accuracy of any data, claim or opinion appearing herein. Information is provided and disseminated with the understanding that National Precast Solutions are not engaged in rendering, legal or not engraged in rendering engineering, legal or ny other professional services. If engineering, legal or other professional assistance is required, the services of a competent professional should be obtained. National Precast Concrete Association and Precast Solutions or not assume and hereby discialim liability to any person for any loss or damage

caused by errors or omissions in the material contained herein, regardless of wahrage errors result from negligence, accident or any other cause whatsoever.



oodgates

Box culverts weighing 61,600 pounds each form the largest 4-sided, wet-cast box sections ever manufactured in Colorado.

By Bridget McCrea Photos provided by SEMA Precast

SEMA Precast box culverts were utilized in a \$7.3 million project to shore up Colorado roadways against flooding and erosion.

1.2

.5

100%, 5101. 19. 19. 19.

339504

Over a seven-day period during the summer of 2013, record rainfall in northern Colorado affected 14 counties, killed 10 people, damaged 26,000 houses and destroyed 2,000 homes. When the flooding finally subsided, it left behind an estimated \$2 billion in housing, road and infrastructure damage across multiple communities.

Many mountain roads were damaged and deemed impassable. Among them was Buckhorn Road (LCR 44H) in Larimar County, which couldn't stand up to the force of a 100year flood event. There, the flood damaged one bridge, destroyed seven large culvert installations and inflicted a range of damage to the adjacent roads.

"The massive flooding washed out a lot of roadways and underpasses, including CR 44H's multiple crossings," said Tyler Brookhart, president at SEMA Precast in Brighton, Colo.

To prevent this from happening again in the future, Larimar County's Road and Bridge Department initiated the County Road 44H (Buckhorn Road) Flood Repair Project. With a construction budget of \$7.3 million, the project included raising more than 10 miles of road to pre-2013 flood elevations and replacing six culvert crossings with precast box culverts ranging in size from 15 feet by 7 feet to 25 feet by 8 feet. The county reported that final approval for the project was given by FEMA in September 2020 and that Flatiron Constructors Inc. of Denver started work in January 2021.

#### ANSWERING THE CALL WITH PRECAST

When the CR 44H Flood Repair Project was put out to bid, SEMA Precast answered the call. The county engineer specified precast for the project, which would require a four-sided precast box culvert made from 8,000 psi concrete. The overall length of the box was 88 feet, and it was made up of 4-foot sections (for a total of 22 pieces), each weighing 61,600 pounds. The precast top and floor slabs were 18 inches thick, and the walls were 14 inches thick. Brookhart said precast was selected for several reasons, including the need to expedite construction, work within the tight confines of the installation site and minimize the amount of time that the road was closed to traffic.

"It's a winding road with homes on both sides; cast-in-place would have taken weeks to install," he said.

The job site also was heavily wooded with tall trees and situated in a canyon, which made communications difficult. Because of unreliable cell phone connectivity, employees had to use walkie-talkies to communicate with one another.

> "Once the boxes were set at a pace of one every 15 minutes, they were able to start constructing the roadway on top of them right away."

"The goal was the get in and out quickly and to keep the traffic flowing," Brookhart said. "Once the boxes were set at a pace of one every 15 minutes, they were able to start constructing the roadway on top of them right away."

#### SPECIAL MOLDING EQUIPMENT

To make the huge culvert, SEMA Precast obtained special molding equipment and modified its existing molds to accommodate the culvert's huge size and heavy weight.



"The span was bigger than anything we've made before," Brookhart said, "and we had to modify our molds to accommodate the 14-inch wall thicknesses."

Using its Mi-Jack® Travelift® crane and two hooks to support the product's heavy weight and load its transports, SEMA Precast delivered the culvert to the job site in February 2021. The culvert was in place and functional within a day thanks to the contractor being able to set one piece (of a total of 22) every 15 minutes.

The project also required intricate logistics on the installation side. Trucks were driven in a straight line right to the job site and then unloaded by crane. Then, the trailer had to be detached, raised in the air by the crane, spun 180 degrees (while the truck itself turned around), reattached and driven away.

"That's the only way we could exit the job site," said Bookhart.

#### ATTENTION TO DETAIL

Because of the span's length and heavy weight, SEMA Precast used more reinforcing steel in the products and also braced them in the center for extra support during storage, handling and shipping.

To speed up the installation process, SEMA Precast preinstalled rubber profile gaskets on the culvert sections at its plant. That way, when the pieces arrived on-site, the contractor could put them together and ensure that they were watertight without the need to spend time installing mastic or joint sealant.

Matt Tolsma, project manager for Flatiron Constructors, said his company was the lowest bidder on the County Road 44H Flood Repair Project. The contractor has completed multiple bridge, drainage improvement and roadway rehab projects in the region, and this one was a typical run-of-the-mill county roadway project, according to Tolsma.

"It was in a remote area with little room to get trucks in and out of the job site," Tolsma said, "but nothing that we're not used to handling. The logistics of getting trucks and cranes in and out of there was really the most difficult aspect of the job."

#### PRECAST: THE MATERIAL OF CHOICE

As bridge builders who "pour their own concrete whenever it's feasible," Flatiron Constructors saw the value in using precast for this particular project.

"In my mind, precast made the most sense," Tolsma said. "We were up against the weather and runoff coming down the creek, so being able to get in there, dig it out, set precast boxes, get it backfilled and get the roadway fully opened quickly was huge. I think precast was definitely the right option there."

The contractor considered cast-in-place for the larger 8-footby-25-foot culvert but later abandoned that idea because of the time it would require for cast-in-place construction versus precast concrete.



#### Contact your local supplier to learn more about RETAIN-IT?

Arrow Concrete Products Granby, CT | 860.653.5063 Columbia Precast Products Woodland, WA | 360.335.8400 Concrete Pipe & Precast Ashland, VA | 804.798.6068



## **Grifcote & Cast-O-Magic**

The Most Trusted Names In Concrete Release Agents



The Hill and Griffith Company's Grifcote and Cast-O-Magic release agents are: readily and inherently biodegradable fluids; VOC compliant; DOT exempt; non-staining; non-carcinogenic; low oder; and cover up to 3000 sqft/gallon. Additional products include: grease replacements, concrete dissolvers, cleaners, hydraulic fluids.





1-800-543-0425 · www.hillandgriffith.com





CALL FOR A QUOTE! 603.758.1900 www.watertreatmentonline.com



"SEMA Precast was able to figure out how to cast that box locally, so we went that route instead," said Tolsma, who was pleased with the results. "Everything went well and looks good. The joints on the boxes were good."

Brookhart said Larimar County provided positive feedback the day after the installation was complete.

"They just couldn't believe how fast the box was installed," he said. "I'm sure it also saved them money on installation, which I believe they were anticipating would take three to four days, versus just one." **PS** 

Bridget McCrea is a freelance writer who covers manufacturing, industry and technology. She is a winner of the Florida Magazine Association's Gold Award for best trade-technical feature statewide.



# A Need for Speed

Gainey's custom precast concrete solution offers quick installation, minimizing shutdown of major Louisiana highway.

By Heather Bremer Photos provided by Gainey's Concrete

South of Baton Rouge, La., the Mississippi River snakes its way through a collection of industrial areas that utilize the river for transporting a wide range of products.

Louisiana Highway 30 shadows the Mississippi as it winds its way toward the Gulf of Mexico, acting as a major route for heavy industrial traffic through the southeastern part of the state.

While essential to commerce in the area, the thoroughfare presented a significant challenge for the Willow Glen chemical facility in getting shipments to the river for transport.

How could the facility bury pipes needed to carry its chemicals beneath Highway 30 to waiting ships on the river without shutting down this major roadway for an extended period?

Gainey's Concrete, with a reputation for custom-made precast concrete solutions, had the answer.

Willow Glen's engineer, Tim Bacon of Sigma Engineering, worked with Gainey's and Senior Design Manager Cyndi Glascock on a project several years ago, and he was familiar with the company's capabilities. While some may have considered cast-in-place concrete, Bacon knew they didn't have time for that.

"He contacted us because he needed to move fast," Glascock said. "Some people aren't always familiar with using precast over cast-in-place, but for him it was a no-brainer."

Precast concrete also addressed another of Willow Glen's major concerns: protecting the pipes.

According to the Louisiana Department of Transportation and Development, more than 12,000 vehicles traverse that stretch of Highway 30 in a single day.

"It was going to go under not just a regular major road but a major route with very heavy industrial traffic over it," Glascock said. "Big tankers and such up and down the road, so they wanted to also protect the pipes."

#### A CHALLENGING DESIGN

The project went through several design stages. Originally, Bacon envisioned utilizing a box culvert but switched to installing one large vault. He felt they could speed up the project if they avoided laying individual sections of box culvert.

"It was originally 71/2-feet-by-36-feet-by-3-foot-3 tall, and it was a single vault," Glascock said. "Then they came back to us about a week later, and they're like "There actually will be more pipes, so we need to make it larger."





Gainey's crews cast the 115,000-pound, 6-foot-by-36-foot-by-5-foot-8-inch vaults using 6,000 psi concrete.

Gainey's team headed back to the drawing board. Willow Glen's team proposed a 10-foot-by-36-foot vault, but Glascock felt a vault at those dimensions would be too heavy and difficult to cast. A pitch was made to split the project into four boxes.

Willow Glen countered with a request for two.

"We ended up with two very long vaults, 6-foot-by-36-footby-5-foot-8 tall," Glascock said. "And we moved forward from there."

#### A NEED FOR CREATIVE SOLUTIONS

The challenges did not end once a design was selected. The structures in Gainey's four-box proposal would have weighed nearly 60,000 pounds, allowing the company to utilize its own equipment to lift the boxes once they'd been cast and cured. But the long vaults that were settled on weighed 115,000 pounds.

"This meant we would need to bring a crane with more lifting capacity to Gainey's to perform the lift," said Tim Sander, operations manager at Gainey's. "We decided to hire a professional crane and rigging company to perform the lift and transport the large, heavy structures on their specialty trailers."

Since the Gainey's plant would not be able to move the structures until shipping day, it was imperative to select the right location for casting. Other projects going on at the same time had to be considered as well as the placement of the transport equipment. Not a drop of concrete was cast before the plan was in place.

"Before the first piece was formed up, we planned the location of the crane, the placement of the trailers that would be carrying the structures and compared that data to the load charts for the crane that would be performing the lifts to make sure they had enough reach and everything would work out," Sander said.

Because the two vaults would be set side by side, Gainey's needed to ensure the walls wouldn't bow. That caused some adjustments to the typical formwork. Two 4-inch-by-6-inch walers per wall were secured to the formwork. Wooden cross braces also were installed at 5-foot intervals on the inside formwork to keep the walls from pulling in on themselves when the structures were lifted.

The walls remained straight, and the field installation went smoothly.

"We'll never know if it was necessary, but just as another precaution because they were so long, we put wood bracing in between but just temporarily," Glascock said. "We just left it there until they got it in place, then they just popped the wood out."

#### FINDING GREAT PARTNERS

Another big challenge was connecting Deep South Cranes' rigging with the anchors that Gainey's planned to cast into the structures. Each of the massive vaults was supposed to have eight ALP Supply utility anchors cast into the walls. But the crane company's rigging would not fit into the recess pockets designed for those anchors.

Gainey's experimented with several alternatives, then reached out to ALP's technical team. ALP suggested using clutches designed for their ring-lift system on the utility anchors.

"The clutches fit well and successfully bridged the gap between the anchors and rigging," Sander said.

Gainey's found another partner in Delta Specialty Precast Concrete Engineers when concerns arose about the possibility of the lids cracking. The weight of the traffic wasn't a worry. The lids, at 8 inches thick, could handle that. Glascock's concerns centered around when the lids would be lifted. Delta helped find a solution.

"They helped us design an eight-point pick for the lid versus a standard four-point, so that way the weight of the lid balanced out against itself," Glascock said. "And when we went to lift that, it didn't crack, and we didn't have to engage the steel. The concrete on its own was sufficient."

The structure's bathtub base unit was very heavy. Because of this, the base unit also was designed to be lifted with an eightpoint pick.

#### SIZE AND SPEED

Vault production, using a 6,000 psi mix design, took about a week and half. When finished, they were the second largest pieces ever produced by Gainey's. Coincidentally, the largest, at 125,000 pounds, was for another chemical facility on the same highway as Willow Glen.

The structures remained at Gainey's just long enough that anyone who took a plant tour during The Precast Show in May 2021 got to see the pieces before they shipped out.

Once the pieces did leave the yard, the turnaround time at the job site was fast.

"Within two days' time, the road was back up and running," Glascock said. "So, they were able to excavate, we dropped the boxes, they backfilled and kept going."





#### PRECAST IS THE PROVEN CHOICE

Time is money in the industrial market, and, for this project, precast concrete proved its time- and money-saving capabilities once again. Gainey's has analyzed statistics on rainfall in Louisiana, which showed 2021 was the third-wettest spring in the state's history. When working with project owners, Glascock often cites these stats and how precast can help avoid issues cast-in-place projects may encounter.

"What happens when it starts pouring down rain and your whole project gets ground to a stop?" Glascock said. "With precast, as soon as the sky is dry, we come in and bring the product in, and we're out."

Safety is another advantage of precast concrete. Easy, fast installations mean less time that a crew is working in the middle of a highway system, trying to place rebar or working atop scaffolding.

"It really eliminates a lot of the safety hazards in a situation like that," Glascock said.

And when it comes to quality, there's a certainty and reassurance you often won't find with cast-in-place.

At Gainey's, quality-certified technicians batch the structures in quality-controlled plants that are NPCA-certified. Batch tickets are generated by computers so Gainey's can provide documentation





about the mix used and what batch it came out of. The company also performs its own cylinder breaks.

"So, before it gets to you, you already know the strength of your concrete," Glascock said. "You're not placing it in a hole and then finding out later, 'Oh, this wasn't strong enough."

The Willow Glen project is yet another chapter in precast concrete's powerful story, one that can be a lesson for Gainey's as it continues to offer solutions to industrial markets.

"Projects like this really excite me because they challenge everyone here at Gainey's who plays a role in them," Sander said. "Those challenges force us to learn, grow and ultimately we become better precasters." **PS** 

*Heather Bremer is a communications manager at NPCA.* 

The massive vaults to protect Willow Glen's pipes were installed under Highway 30 in just two days.



# Low-Impact De High-Performi

# evelopment, ng Results

Precast concrete tanks powered by Contech's Filterra system provide optimal solution for large-scale, mixed-use development in Southern California.

By Mason Nichols

Photos provided by Precon Products and Contech

California is massive. Encompassing more than 160,000 square miles, the state boasts a healthy assortment of terrains and ecosystems, including everything from lush forests and towering redwoods to expansive mountain ranges and arid deserts. With a generally temperate climate, ample job opportunities and so much to do and see, it's no wonder that real estate values across the state are significantly higher when compared to the rest of the United States.



Workers set a precast concrete vault at the Avion Burbank mixed-use development.

This has forced many developers to get creative in their plans for construction. In Burbank, Calif., Overton Moore Properties (OMP) of Los Angeles planned Avion Burbank, a 60-acre mixeduse development combining creative office, retail, industrial and hotel space via a sustainable campus environment. With 17 buildings and more than 1.25 million square feet to cover, OMP sought an on-site stormwater solution that would minimize the footprint – and costs – while also providing aesthetic appeal and meeting Los Angeles County's stringent stormwater requirements.

The answer was Filterra, an innovative solution powered by precast concrete and optimized for high-volume treatment and high pollutant removal that requires a minimal footprint.

#### **PUTTING A LID ON IT**

With sustainable practices becoming an increasing area of focus across the United States, many entities are turning to low-impact developments (LIDs) for stormwater management. Traditional stormwater management systems collect and convey stormwater runoff via storm drains and pipes to a centralized stormwater facility. LIDs, however, leverage site design and special stormwater techniques to mimic the natural processes that "result in the infiltration, evapotranspiration or use of stormwater in order to protect water quality and associated aquatic habitat," according to the EPA.

Because LIDs boast a slew of economic and environmental benefits and have been so successful in an array of applications in many states, they are "seen in California as an alternative to conventional storm water management," according to California Water Boards. For these reasons, the LID approach made perfect sense for Avion Burbank. However, to select the optimal system for the development, the engineer of record and all parties involved had to review the LID hierarchy established for the area. According to Tamara Mamon, stormwater consultant for Contech Engineered Solutions, this was a multi-faceted process.

Mamon explained that the first rule in the hierarchy is that if soils are favorable for infiltration, you must infiltrate on-site. This was not the case for Avion Burbank, so the capture and use tier was considered. But requirements for capture and use mandate that any water collected must be discharged within four days following a rain event. This makes capture and use inefficient within most of Los Angeles County because water collected and stored is typically needed in the drier months – not directly after an event.

The next tier to consider was bioretention, and the engineer of record pursued this to treat the 85th percentile storm event

# Biodegradable Form Releases

- Water Free
- Solvent Free
- Zero Vegetable Oils
- Exceptionally Clean Forms
- Exceptionally Smooth Surfaces



- Designed for All Mixes and Forms
- Environmentally and Worker Friendly
- Low Odor
- Low VOC Compliant
- Contains No Waxes or Silicones



877-868-5650 • www.strongproductsllc.com



described in Los Angeles County's Multiple Separate Storm Sewer System (MS4) permit. Ultimately, a LID plan leveraging bioretention was selected, which would allow for the control of pollutant loads and runoff volumes to the maximum feasible extent while meeting all the requirements of the MS4 permit.

#### **ENTER FILTERRA**

With a plan in place, the project developer and engineer of record next needed a proven system that would maximize treatment and minimize costs. They turned to Filterra, an advanced bioretention solution designed by Contech for high efficiency that requires just a small amount of space.

Filterra system consists of a plant, 3 inches of mulch, 21 inches of engineered media and an underdrain pipe that's encased in about 6 inches of stone. Stormwater runoff enters the system through a curb inlet or pipe and flows through a specially designed filter media mixture contained in a landscaped precast concrete vault. The filter media captures and immobilizes pollutants, and, ultimately, the runoff flows into an underdrain system at the bottom of the vault, where it is discharged. One specific feature was of considerable importance for the Avion Burbank project.

"The media infiltration rate of Filterra systems is 140 inches per hour, which is significantly higher than traditional biofiltration media," Mamon said. "Attachment H of Los Angeles County's MS4 permit specifies that the range should fall between 5-12 inches per hour. This higher rate results in the footprint being reduced significantly when compared to a more traditional system.

"With the cost of land in Los Angeles being so steep, Filterra is a favorable alternative."

On most projects where Filterra precast concrete vaults have been specified in the past, only two to four units have been needed. But with more than 1.25 million square feet to consider for Avion Burbank, a sizable increase in the number of vaults was needed. To manufacture the nearly 50 units required for the job, Contech turned to longtime partner and NPCA Certified Producer Member Precon Products of Simi Valley, Calif.

#### **GETTING IT DONE**

Precon Products and Contech have a long history together, stretching all the way back to when Precon worked with Australian-based CDS in the late 1990s. After Contech purchased CDS in 2006, the two companies continued partnering on a variety of projects, and Precon now serves as the primary precast manufacturer for Contech in California.

This long-standing relationship was critical to success for Avion Burbank, which required close collaboration among all parties to produce the large number of Filterra units needed in the time frame specified. According to Dan Zarraonandia, vice president at Precon Products, an ample array of vaults in varying sizes were manufactured. All vaults were 4 feet deep but ranged in size from 4 feet wide by 6 feet long to 8 feet wide by 22 feet long. The largest vault weighed more than 50,000 pounds and had to be shipped in three separate pieces.

Zarraonandia explained that the tight working relationship between Precon and Contech, along with assistance from the other project partners, was key to Avion Burbank's success.

"On a project like this, with the vaults being so large, there's a lot of coordination required between us, Contech and the contractor to ensure that everything shows up on time," he said. "But with all three of the main parties working in unison, everything went very smoothly."

This was especially important given the project's tight timeline, which called for the Filterra vaults to be manufactured and delivered to the Burbank site in just 10 weeks. Once the vaults were manufactured and delivered to the site, the installation process was simple. Workers from GJ Gentry, the contractor for Avion Burbank, excavated the area for the units to be set, made proper piping connections for the inlets and outlets, then backfilled. After installation was completed, large trucks arrived on-site and distributed Filterra's filtration media via conveyor belt. The final step included planting trees and shrubs and installing tree grates across the precast vaults.

Mamon agreed with Zarraonandia's assessment of the work, citing the power of collaboration as critical to bringing everything together.

"Working closely with all the parties involved was imperative on this project," she said. "Up front, I sought out the city of Burbank multiple times during the design phase to ensure that Filterra would be approved in the plan checking process. Our sales engineers were also very communicative with the contractors and distributors to make sure our spec was held and to prevent any delays."

Going with the Filterra precast solution offered many advantages beyond price savings. Zarraonandia said that if a cast-in-place system had been selected, the project likely wouldn't have been possible. Additionally, precast allowed the bioretention system to meet both the high level of quality and tight tolerances needed.

"With precast, you're up to strength before you ship, and you know the quality before the product goes out there," Zarraonandia said. "With cast-in-place, if there's a bad batch of concrete that doesn't come up to strength and it's already in the ground, you could have a real disaster."

#### MEETING THE NEED

As developers in California and across the North America continue considering alternative stormwater management solutions on projects at scale, precast concrete solutions – including Filterra – stand ready to reduce costs, foster innovation and provide long-term stability. Thanks to tight collaboration between project partners and the benefits of a



Crews fill a precast tank with mulch and engineered media at the Avion Burbank development.

proven system, the Filterra precast concrete vaults at Avion Burbank will provide reliable and aesthetically pleasing stormwater management at the mixed-use development for years to come. **PS** 

Mason Nichols is a Grand Rapids, Mich.-based writer and editor who has covered the precast concrete industry since 2013.





# **Tight Squeeze**

Single-structure precast lift stations make for a small footprint and a super quick installation for the city of Sedona.

By Shari Held

Photos provided by Oldcastle Infrastructure

Sedona, Ariz., is without a doubt one of the most beautiful cities in the United States. Three million visitors flock to the Verde Valley in the heart of the Sonoran Desert each year to enjoy the incredible scenic views, nearly 2 million acres of Red Rock Country, national forests and spiritual vortex meditation sites.

Sedona is situated at the bottom of the Verde Valley, while the Sedona Wastewater Treatment Facility and Wetlands Preserve is at a much higher elevation. That means the majority of Sedona's wastewater must run through a series of pump stations before it reaches the wastewater treatment plant, five miles outside the city limits.

"We have major hills that we have to overcome to get wastewater from one side of town to the next and then eventually out to our treatment plant," said Roxanne Holland, P.E., director of wastewater for Sedona.

When Sedona's 2017 Wastewater Master Plan Update indicated two of the city's 17 lift stations – Mystic Hills and Chapel – were aging and inadequate, it was cause for concern. The existing lift stations were two-structure stations with precast wet wells and a T-Lock lining system.

"Both of them needed to be upsized," Holland said. "We didn't have adequate capacity. And any time you don't have adequate capacity, you want to increase that in a fairly quick timeframe."

The city's goal for the replacement project was two-fold: increasing pump capacity while decreasing the lift stations' footprints to ensure quick and efficient installation.

#### THE PERFECT SOLUTION

The biggest challenge with the project was lack of space. Both lift stations were in areas of hard bedrock. This had the potential to make the excavation process more difficult and timeconsuming. At one point, the city even considered acquiring additional land to accommodate the building of new lift stations, but that wasn't an ideal solution.

Precast was the preferred building material to expedite the project. A cast-in-place pump station would require onsite forming, concrete placement and and curing time, which could increase the overall job costs. Another benefit that precast's fast installation provided was that it helped avoid excessive bypass pumping costs and lift station downtime during the installation process.

Ultimately, Sedona determined the best method moving forward would be to install two OneLift<sup>™</sup> pump stations, manufactured in Chandler, Ariz., by Atlanta, Ga.-based Oldcastle Infrastructure, formerly Oldcastle Precast. Oldcastle Infrastructure houses all the company's precast, stormwater, enclosure and building accessory products.

OneLift's integral pump station is a single-structure lift station with a monolithic valve vault built into the often unused top portion of the wet well. This design reduces conventional pump station footprints up to 50% compared to conventional two-structure pump stations. The maximum footprint (with collar) is 8 feet by 13 feet, 10 inches.

"We needed something that would allow us to take the old lift station out and put the new one in, in one day, so we would urnkey Solutic 

Single-structure Stability

Variable Capacity

Smaller Footprint

## **ONELIFT**<sup>™</sup> **PUMP STATION**

With an innovative design and a significantly reduced footprint, the OneLift pump station provides an optimal solution for a variety of waste water and storm water applications. Pre-assembled in our manufacturing facility, OneLift saves on open trench time, excavation, dewatering, and installation costs – **units can be installed in a single day.** It's unique, single-structure design also solves the differential settlement issues that occur with traditional two-structure stations.

Learn more about our OneLift Pump Station at onelift.com

minimize bypass time," Holland said. "We considered several ideas, but this just seemed like the most efficient way to get the project done."

#### DESIGN AND MANUFACTURING

The design for each pump station was different. The Mystic Hill pump station required a smaller footprint that would allow it to accommodate the construction of an adjoining masonry wall.

The specifications required the wet wells to be manufactured using self-consolidating concrete and to have a 28-day compressive strength of 5,000 psi.

The integral RC 611 pump station is 6 feet long and 11 feet wide, with a capacity of 468

gallons per vertical foot. The Mystic Hill pump station measures 15 feet, 10 inches in depth. The Chapel pump station is two feet deeper. The base, the heaviest pick weight, weighs 17 tons.

"This lift station came as a package," Holland said. "Everything was all set. We didn't have to spec out each item independently."

Pumps, piping (from 2 to 6 inches in diameter), valving, wiring and controls – all the interior equipment – were tested at the plant. The pump station was pre-assembled at the plant and then partially disassembled prior to shipping.

The pump stations were loaded on flatbed trucks for the 140mile trip from Oldcastle's Chandler plant to the city.

#### **EXCAVATION AND INSTALLATION**

In 2018, excavation and construction began at the Mystic Hills lift station. Both stations required excavation into rock to reach the required depth for installation. OneLift's largervolume wet well helped reduce the depth needed. Reducing the time for an open excavation made the job site safer.

Unfortunately, unforeseen site conditions necessitated the Mystic Hills lift station to be kept online while a new hole was excavated to house the replacement precast wet well. The crew encountered a significant amount of bedrock, increasing the installation timeline. It took approximately 160 days from the beginning of excavation to the setting of the precast wet well.

The installation of the precast wet well took only one day thanks to the straightforward installation process. First, a crane placed the base section into the excavated area, then the additional sections were set, grouted and sealed. Next, the crane set the long discharge pipes and pump guide rails into place in the station. Finally, any loose piping, valves and specialized components that were disassembled at the factory were assembled. Within hours, the pump station was installed and ready to be backfilled.



At the Chapel lift station, the new precast wet well was installed in the existing location. Demolition of the old wet well and installation of the new wet well took only approximately 70 days at this site. Again, the setting of the precast wet well took only one day.

"OneLift's prepackaged and pre-plumbed features made my job as project manager much easier," said Michael Thomas with Flagstaff, Ariz.-based Kinney Construction Services, the general contractor for the project. "We were able to install the product in one day, and it required only minimal pipe and electrical work on-site, making it easily compatible with project specifications."

Since each lift station was installed in one day, everyone involved in the installation (electricians, civil engineering crew, etc.) had to be on-site and ready to perform.

"One of the biggest challenges was coordinating all the different construction specialties," Holland said.

#### **A WINNING SOLUTION**

OneLift pump stations integrated seamlessly into Sedona's existing infrastructure with minimal disruption to neighboring properties. Less on-site excavation was necessary, reducing overall project costs and the project timeframe, which was 14 months from start to finish. And even though the new pump stations were smaller than the two-structure lift stations they replaced, they provided increased capacity.

"This project was unique because we did have minimal bypass time and we were able to take out an old lift station and put a new one online fairly quickly," Holland said. "We now have adequate capacity at both of those lift stations. With new equipment, everything runs better and there's less maintenance." **PS** 

Shari Held is an Indianapolis-based freelance writer who has covered the construction industry for more than 10 years.

## Polylok wastewater products... a septic tanks best friend!



THE PRECAST SHOW

BOOTH 1323

Polylok, Inc. has been at the forefront of effluent filter and onsite wastewater technology for over 35 years. With an extensive line of effluent filters, septic tank risers and covers, filter and tank alarms, safety devices, distribution boxes, and an array of onsite wastewater accessories, we are your one stop shop for all your septic tank needs. Trust the company that experts and professionals have trusted for over 35 years!



Visit our web site for our complete line of more than 200 onsite wastewater & drainage products. www.polylok.com / 1-877-765-9565

## NPCA's 2022 Webinar Series Now Available



NPCA's webinars are an excellent way to provide precast-specific training to your employees. The registration fee is per location, which means you can train all of your employees for one low price. Registration gives you access to the live webinar and NPCA's entire online library of one-hour webinars for a full year. This provides you with access to the webinars at any time for additional employee training.

#### All live one-hour webinars are presented from noon to 1:00 p.m. Eastern time. The 2022 Webinar Series topics include:

Jan. 20	What You Need to Know When Creating an Employee Handbook	July 14	Making That Big Purchase: What You Need to Know About Large Capital Expenditures
Feb. 3	Applied Ethics in the Precast Industry	Aug. 11	Lean 101
March 17	Onboarding: Go from Employee Seeker to Employee Keeper	Sept. 8	Get Packing! We Are on a Quest to Better Concrete with Combined Aggregate Gradation
April 14	What You Need to Know About Precast Mixers	Oct. 13	AutoCAD Tips and Tricks
May 12 June 9	Identifying Mix Design Efficiencies Testing Fresh Concrete	Nov. 10	Best Practices for Steel Reinforcement Fabrication, Placement and Inspection
		Dec. 8	Increase Sales by Building and Enhancing Relationships

Access to all 12 live webinars and the online library is: \$785 for members • \$985 for non-members. Webinars also can be purchased individually.

### Register at: precast.org/webinars