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ON THE COVER:

Precast concrete urn crypts were chosen for the Omaha National Cemetery expansion.

Photo courtesy of Wieser Concrete Products

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Specifier Q&A:

Carol Ruiz, P.E., MSCE

This issue, *Precast Solutions* hears from Carol Ruiz, P.E., MSCE, Principal and Project Manager at Gibbs & Olson.

What's your background and area of expertise?

I am a professional engineer specializing in transportation, site design and stormwater management. I graduated from Washington State University with a Bachelor of Science in Civil Engineering, followed two years later by a Master of Science in Civil Engineering. I began my career with a small firm in South Carolina that focused on transportation and site design, which became my area of design focus.

What types of projects do you typically oversee?

My work includes projects for both private sector clients and public agencies. These projects typically involve site grading, utility service and stormwater design. Stormwater design elements include watershed analysis, closed system design and stormwater management. As a project manager, I regularly assist our clients with public involvement, utility design, franchise utility coordination and permitting, as well as provide state and federal funding assistance for local agencies.

I work on projects as small as a half-acre to larger watershed analysis projects involving hundreds of square miles. Many of the site development and transportation projects in Washington State must address stormwater requirements for treatment and detention. Washington State has some of the most stringent stormwater requirements in the country, and many municipalities have specific stormwater management codes



Carol Ruiz, P.E., MSCE

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Photo courtesy of MWA Architects

Gibbs & Olson chose a modular precast concrete stormwater detention system for a project in Vancouver, Wash. Precast overcame the site's challenges and stringent stormwater requirements.

for their communities to meet the state's requirements. This requires a unique approach for every project to address both water quality and flow control requirements, often with little available area on site to provide infrastructure to comply with these regulations.

What are some unique or noteworthy projects on which you specified precast concrete?

The ability to meet the requirements for flow control can be very challenging, particularly on site development projects in urban areas. Not only are we competing with available onsite area for treatment and detention, but often high groundwater and little elevation change for connecting to downstream discharge locations are additional challenges. For a recent housing project in the City of Vancouver, we were tasked with providing stormwater management for a 1.8-acre site that converted two-thirds of the site from undeveloped land into

impervious surface. The remainder of the site was converted to landscaping, but the change in land use created a significant increase in runoff that required onsite stormwater storage.

The project included a three-story, 40-unit apartment complex with a significant area identified for parking and an entrance road, but also promised an area designated for residential gardening. These design elements left no room to provide treatment and detention in above-ground facilities, such as swales and detention ponds. Additionally, the site was identified as sensitive to ground movement, and therefore, infiltration of the runoff was not recommended for this site.

To address the stormwater treatment requirements for the site, runoff was directed to catch basins with specially designed filter media, before being conveyed to the underground detention facility. A concrete modular system was selected to provide the underground detention of the stormwater to meet the flow control requirements for the site. The facility is comprised of 92 modules (each module is 7-feet-wide-by-15-feet-long-by-3-feet-high) providing 31,000 cubic feet of storage.

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How did precast concrete make that project a success?

The concrete modular block system provided an adaptable method to detain stormwater onsite given the multiple site constraints. These constraints included:

- 1) Providing a shallow detention system to accommodate discharge to the existing outlet elevation. The depth between the asphalt surface elevation and the top of detention facility is approximately 12-inches.
- 2) The area identified for underground detention was irregular in shape. The detention facility configuration needed to be variable to fit within the area available, wrapping around the proposed building foundation.
- 3) The installed system needed to withstand HS-20 traffic loading as a portion of the facility was located under the designated fire department turnaround area.

The installed precast concrete modular block system met all the above site constraints while still meeting stormwater detention requirements. Because the detention system was comprised of precast concrete units, the system was installed within two days. Additionally, the system allowed for connection

to the treatment structures and the roof downspout drainpipe at any location along the perimeter of the structure.

How do you see precast concrete advancing as a building material?

Redevelopment continues to occur in urban settings, with little room for addressing the ever-increasing stormwater management requirements. Implementing underground detention facilities with precast structures provides a strong, accommodating and efficient method to meet local agency requirements for stormwater management. **PS**



Philadelphia Achieving Goals with One P

Precast concrete is playing a central role in the City of Philadelphia's sus

By Matt Werner

Photos courtesy of RES



StormTrap

ieves Two Project

tainability goals.



A precast concrete stormwater detention system helps manage runoff near the home of the Philadelphia Eagles and Phillies. Designers chose precast concrete for its durability and an easy installation.

Philly sports fans are notorious for their passion, enthusiasm and relentlessness. Snow, sleet or rain, fans pack the Eagles' and Phillies' stadiums to cheer on their teams, and tailgating is a big part of the fan culture.

As city and team officials sought to maximize the available space for parking and tailgating, they targeted an old warehouse near the teams' neighboring stadiums.

Officials razed the building after years of sitting dilapidated to create the environment fans wanted, and simultaneously implemented plans to protect the city's aging stormwater infrastructure.

With sustainability goals in mind, officials chose precast concrete to provide a long-term solution.

GREEN CITY, CLEAN WATERS

Philadelphia holds prominence in American history textbooks for many reasons, but few know the city was also at the forefront of treating and supplying water. In 1801, it became the first American city to provide drinking water to its citizens. Its sewer system is one of the oldest in the country, and some of the original infrastructure is still operational today.

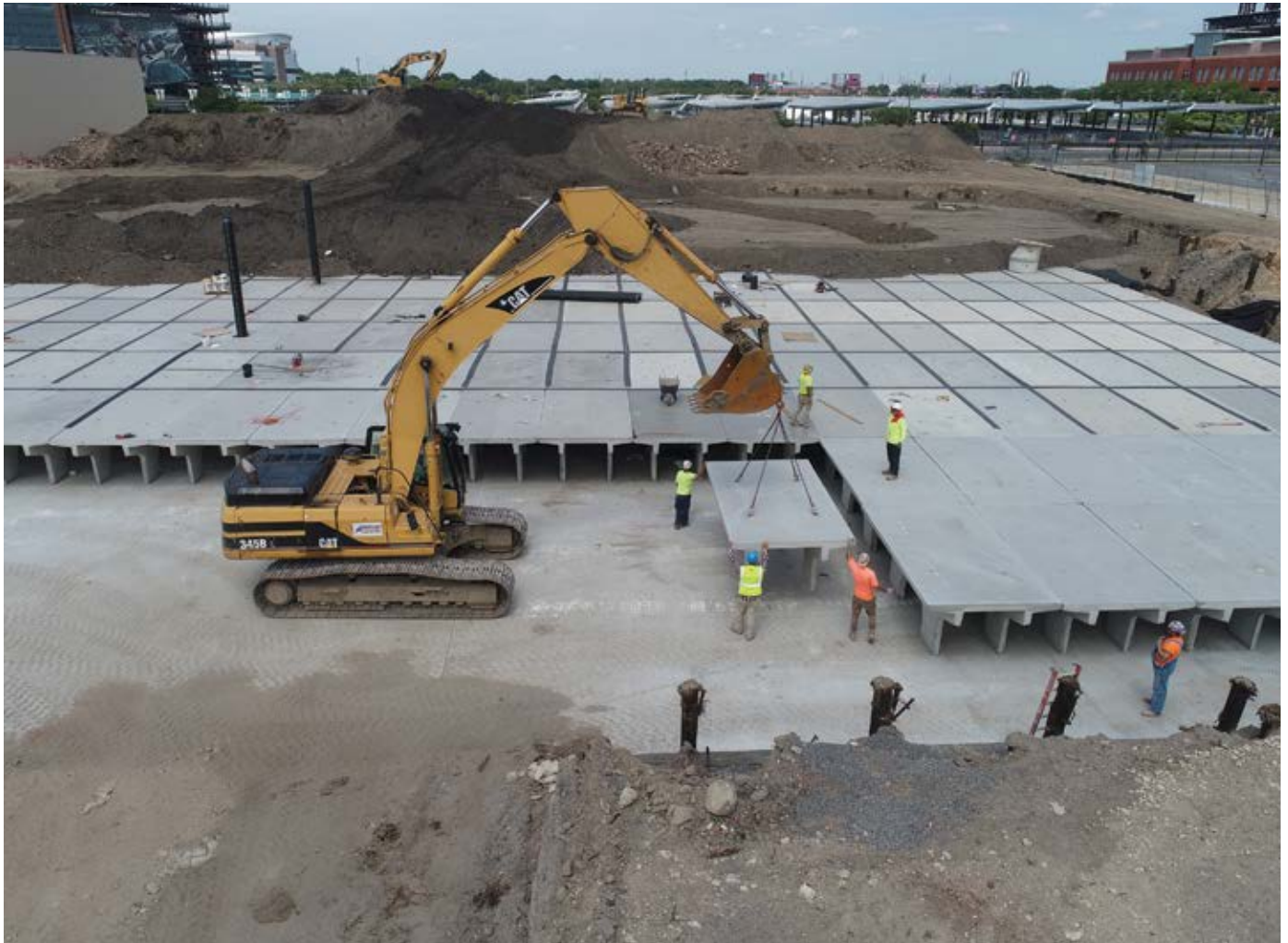
As the city grew and environmental requirements changed, it became evident that the aging combined sewers that serviced the city were no longer viable.

In 2011, the Philadelphia Water Department unveiled its Green City, Clean Waters plan – a 25-year commitment to manage runoff and inject more sustainable infrastructure projects into the city's watersheds.

The city's program is multi-faceted and ranges from preserving open space and planting trees to restoring streams and stormwater infrastructure. It features "Greened Acres" that filter or store the first inch of rainwater runoff every time it rains. The city is seeking to convert many vacant and abandoned lands to reduce the stress on its stormwater infrastructure.

DARIEN CROSSING

RES, a water resource management firm specializing in ecological solutions, received a Green City, Clean Waters program grant to complete a stadium parking project known as Darien Crossing. The resulting parking lot features large green space areas that serve as a filtration system for rainwater that is then stored and slowly released into the city's stormwater infrastructure.



Ed Linkewich, P.G., served as the project manager for RES. He said that as RES was designing the stormwater system, it became evident it would use precast concrete due to the site's constraints, including unusual soil conditions.

"Our forefathers basically utilized historic fill like demolition debris and incinerator waste to fill whatever wetlands were near the Delaware River to build them up to a height so they could make buildings," Linkewich said. "By utilizing precast structures, it gave us a large amount of structural stability that we wouldn't have been able to gain by using a plastic product."

While the soil presented a major challenge, it was far from the only one.

"We installed the foundation at negative 1 foot above sea level," Linkewich explained. "Even after we put the foundation and precast units in, we were still about four feet below grade."

This means there is nearly eight feet of soil on top of the stormwater system.

"These units had to withstand a large volume of weight on top of them while also holding a bunch of water," Linkewich noted. "Weight really was the key factor in determining what material we needed to use."

RES engaged StormTrap early to come up with a solution for the project, and the two worked hand-in-hand throughout the entire process.

Justin Nace, StormTrap's Pennsylvania territory manager, said they worked through several design iterations with RES to get everything just right.

"This was a very specific, not a cookie-cutter type of project," Nace explained. "We went through at least four or five conceptual options, fine-tuning things with the department and the project owner."

SMOOTH SAILING

A.C. Miller Concrete Products in Spring City, Pa., manufactured a total of 455 StormTrap units for the project. The company has been working with StormTrap for several years, and this project was one of the bigger ones they've done.

"Once we get above 250 pieces, we consider that a pretty large job," said Owner and General Manager Dave Miller. "So this one was certainly on that scale."

A.C. Miller was able to relocate some forms from its plant in Blairsville, Pa., to Spring City so it could produce more pieces



Challenging soil conditions and load-bearing capacity led designers to choose precast concrete.

at one time. It also started pouring on Saturdays to ensure deadlines were being hit.

Having done several StormTrap projects in the past, Miller was very familiar with what the project owners needed for the stormwater detention system.

“It’s pretty consistent, very modular, very adaptable,” Miller said. “It was a lot of pieces, but it went very smooth.”

A.C. Miller completed production in just a couple of months and shipped the pieces down to Philadelphia without delay. Linkewich paid a visit to the precaster during production and came away impressed with the process.

“They were putting the rebar and forms together, which was really cool to see,” he said. “They are very well built, and the tolerance was great in that it saved a lot of headaches on the back end.”

As soon as units arrived at the job site on a truck, they were unloaded and set into position.

“The precision was such that we were able to seal the entire system utilizing joint wrap,” Linkewich said. “They were formed so well, and the tolerances were extremely close. That made life very easy for us.

“It was surprising how fast we got those boxes installed, wrapped, sealed and buried – it was crazy it was just the course of months.”

Linkewich also touted the benefits of how easily the installation could be done with a smaller crew.

“You just need a couple guys and a truck driver,” he said. “As soon as these were getting in, another crew was coming.”



The precast system was installed without delay, saving the project owner time and money.

TEAMWORK FROM START TO FINISH

With all precast pieces installed and work on converting the space to a parking lot underway, everyone raved about the collaboration from design to installation.

“It was a beautiful example of a number of different parties coming together for a common goal,” Nace said. “It was great to really partner with one another and work homogeneously together.”

Linkewich said he didn’t have much experience in using precast in the past, but plans to use more after this project based on how things went.

“We’re always looking to replicate work we’ve completed,” he said. “Working with StormTrap and the precaster, they allowed us to work unimpeded without any delays that held up our schedule so that was great.”

Philadelphia now has a place for fans to enjoy themselves while also furthering its sustainability goals with another Greened Acre.

“The site was unused for a long time and was a problem,” Linkewich said. “By doing this, we made a positive impact on the city, and we’re providing them a great value as they meet their future goals in sustainability.” **PS**

Matt Werner is the managing editor of Precast Solutions magazine and is NPCA’s communication manager.



The Forever Solution

Precast concrete manufacturers provide veterans cemeteries with quality, durable and effective solutions.

By Kirk Stelsel, CAE

Photos courtesy of Wieser Concrete Products



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Wieser Concrete Products manufactured six pieces per day for the project.

There's no mistaking a veterans cemetery. The perfectly aligned rows of headstones, the expertly manicured grass and a crisp American flag flowing in the wind are telltale signs of the reverence and respect the government places on the hallowed grounds. The precise and pristine upkeep are a final "Thank You" to those who served in the armed forces.

Although the above-ground aesthetics have remained relatively consistent for many decades, below grade, the United States Department of Veterans Affairs (VA) has evolved the way it buries both caskets and urns. The changes ensure the burial process meets high expectations and that the 135 cemeteries are run efficiently.

PLOTTING THE COURSE

For many decades, the VA and the National Cemetery Administration (NCA) would dig an 8-foot-deep hole as needed to place a vault. In some cases, it places a second vault on top for a spouse or dependent, which is known as a double-lawn crypt.

This method occasionally ran into issues depending on the soil type, water table depth, nearby vaults' condition and other factors. It also was not a terribly efficient method. These concerns led to a shift in approach. The NCA now uses pre-placed precast concrete crypts it installs in large quantities, so the interment process only requires a small excavation.

Well before installation, the planning stage begins by crunching data and modelling expected future needs in various regions around the country. The VA places the precast vaults and crypts to meet a projected 10-15-year demand. It adds space either by expanding an existing cemetery or establishing a new one.

This analysis identified a demonstrated need for a new cemetery in Nebraska, which led to the dedication of the Omaha

National Cemetery in 2016. The initial buildout included installing thousands of double-lawn precast vaults. The process was going so well, it soon led to a new approach for urns as well.

"During this project, we were so happy and had such great success with the double-lawn crypts – they actually pay for themselves over time and reduce labor and maintenance – that we decided to use the approach for the urns we had to bury," said Andrew Walters, PE, with the NCA. "A lot of times, ashes are put into columbarium. But you can also put urns into the ground in a 4-foot-by-4-foot plot."

Walters was tasked with the approach to bury urns. The result is a structure with a multi-component box base and a hatch where the urn is placed, as well as a riser feature that acts as a headstone support.

INCREASING DEMAND IN OMAHA

When the VA determines the need during an expansion, reality does not always match expectations. In Omaha, urn crypt demand has been particularly high, which led to a major expansion in 2019 into 2020. The urn crypts are only in use at six veterans cemeteries, which makes the work in Omaha fairly unique.

Although this particular product and approach are new, work at veterans cemeteries is anything but new for Wieser Concrete Products, headquartered in Maiden Rock, Wis. Company president Andy Wieser said the company has manufactured hundreds of thousands of vaults and crypts for veterans cemeteries since its first project with the VA in 2003.

With three of its plants nearly equidistant from Omaha, it came down to workload and floor space once it won the bid. Wieser Concrete started the project at its Roxana, Ill., plant and finished it up in Portage, Wis., to accommodate the timeline and each plant's workload.



Each structure has multiple cavities for urns. The Roxana plant set up two forms that manufacture an 8-cavity design and one form for a 4-cavity design. Wieser Concrete partners with Lindsay Precast on VA projects. The forms were shipped to Wieser Concrete by Lindsay Precast and, with a few modifications, production was off and running. With double pours – Wieser Concrete poured forms in the morning, stripped around noon and then poured again – the plant was able to manufacture six pieces per day for a total of 40 cavities.

Wieser Concrete poured the boxes monolithically and added the previously cured risers – which will later hold the headstones in place – to the pour. The risers eliminate countless hours of future work straightening and realigning headstones.

The design also includes a 14-inch lid in the top of the box, which is later removed to place the urn. Finally, a plywood cover is added to the riser to ensure soil does not enter the crypt during backfilling operations.

PRECISE PRODUCTION

Although it was Weiser Concrete's first time manufacturing the urn crypts, Andy Wieser and his son Drew Wieser, general manager of the Roxana location, said the project went well. The plant used a 6,000 psi SCC mix design and had strict protocol from start to finish.

"There was a little bit of a learning curve because there is very little taper, and the bases are a big structure so it's critical you strip them right – especially with double pouring them because we are stripping them fairly green," Andy said.

"In addition to the hot water, we used an accelerator to double pour them," Drew added. "We covered them with tarps, and we used cylinders to make sure we had the strength and that the timing was correct."

With an 8-cavity unit weighing approximately 16,000 pounds, Wieser Concrete could haul 24 cavities per truck. In total, it delivered 3,264 cavities. Because the products have a thin wall, Wieser Concrete cushioned the lids to make sure they were not damaged in shipment and ensured straps were correctly placed to prevent damage.

In the field, the installers must handle them from the base section down through the lid. Wieser Concrete used sleeved, 2-foot-long coil bolts with swivel blocks that went into the bottom base. The first round was installed during the winter of 2019 and the second in the spring of 2020.

RESTING IN PEACE

Today, the scene at Omaha Veterans Cemetery is exactly what you would expect. Perfectly spaced and aligned headstones pay tribute to the nation's heroes, which makes Andy Wieser proud.

"It's an honor to work at a VA cemetery," he said. "These are prestigious cemeteries, and it's a privilege to work for our fallen heroes. These never come out of the ground, so it's not just 100 years, it's forever."

"People from the Federal government are out there and there's a lot of respect there. They inspect your product and come to the plant – you're working with some very respectable people."

Walters said the NCA tried an alternative material, but that the precast concrete crypts provide the longevity it is looking for with a few other benefits based on the design of the structures.

"With concrete, you get the permanence of it, and we are in the forever business, so the preference is for precast concrete," he said. "Plus, with the creation of a good SCC concrete to do these thin-wall concrete crypts, the quality of the crypts is just excellent, and the crypts keep the headstones in place, which



The precast concrete urn crypts feature a 6,000 psi SCC mix design and a riser to hold the headstones in place.

is our brand. When you put an urn into the crypt and put the headstone in, it should never move so you have everything in line.”

For veterans, service in the armed forces is a source of great pride and for some it required the ultimate sacrifice. This fact is not lost on the employees of the VA, the NCA or those who work



on these projects. From the permanence of the vaults and crypts below ground to the picturesque space above, their remains are paid the respect they deserve. **PS**

Kirk Stelsel, CAE, is NPCA's vice president of communications and public affairs.

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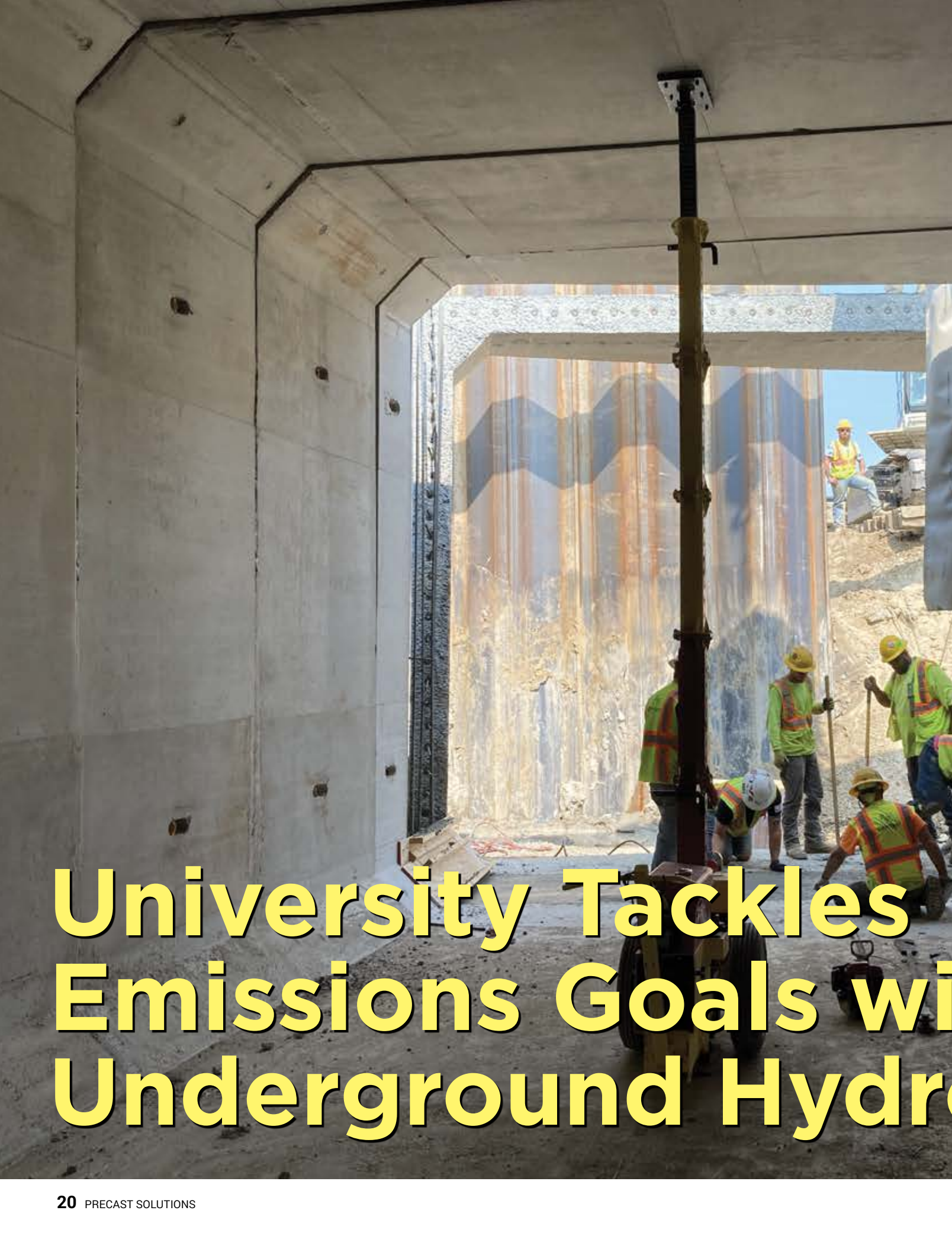


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University Tackles Emissions Goals with Underground Hydro



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South Bend and University of Notre Dame join forces to build an underground hydroelectric plant that will supply 7% of the electricity on campus.

By Bridget McCrea

Photos courtesy of Paul Kempf

South Bend, Ind., may be most widely known because of the presence of the University of Notre Dame, but a recent renewable energy project directly under a popular city park will put it on the map with a different crowd. Working with the university, South Bend Venues Parks & Arts recently broke ground on a 2.5-megawatt hydroelectric generation facility along the St. Joseph River.

The facility, which will primarily be underground, is expected to generate about 7% of the university's electrical needs and offset about 9,700 tons of carbon dioxide annually. Falling water will generate the electricity, after which underground lines transmit the electricity to the campus. The hydro facility project is expected to be completed by 2021, and precast concrete plays a vital role in its success.

REDUCING CARBON EMISSIONS

Paul Kempf, Notre Dame's assistant vice president for utilities and maintenance, said the facility is one facet of the school's wide-ranging sustainability plan, which eliminates coal use in its power plant by the end of 2020 and cuts its carbon footprint in half by 2030. So far, the university has reduced its carbon emissions by 49%. The plan targets six key areas: energy and emissions; water; building and construction; waste; procurement, licensing and sourcing; and education, research and community outreach.

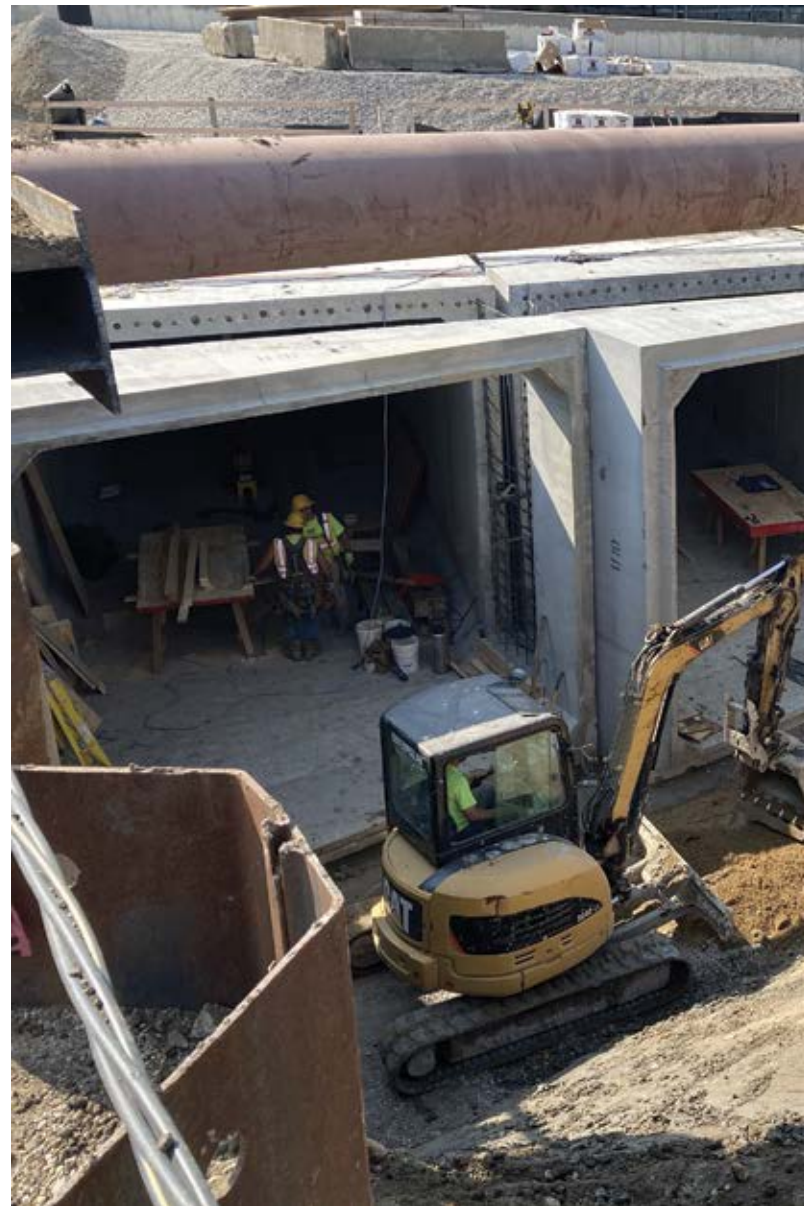
As part of its diversified approach to whittling down its footprint, the school looked at a dam built in 1844 during South Bend's industrialization movement. In the early 1900s, a large farm equipment manufacturer purchased the adjoining land and built a hydroelectric facility there. The land was eventually rehabbed for recreational watersports and, later, a fish ladder was installed to support an upstream hatchery.

Fast-forward to 2019, and the Federal Energy Regulatory Commission (FERC) – which had granted an exemption for the proposed plant – told South Bend that it had to either “use it or lose it.” Notre Dame, situated only two miles away, took an interest in the project.

“We pursued it and came to an agreement on the 50-year lease,” Kempf said. “In the end, it's a carbon play. It's also a great opportunity for us to partner with the city, which is something we've done on a number of other occasions, and build a stronger relationship between the university and South Bend.”

PRECAST PROVIDES SHORTER SCHEDULES, LOWER RISK

During the project design phase, its owners wanted to minimize the impact on Seitz Park, under which the project is being installed. Precast concrete products



Due to the job site's location beneath a city park, officials turned to precast concrete.

are helping to minimize the closure while also providing quality, long-lasting materials.

Once finished, the park itself will be situated on top of the precast water channels and feature vending kiosks, a band shell, planting beds and various other amenities. For this reason, the city wanted to make sure its underpinnings were sturdy and strong. Working with engineers from KFI and Lawson Fisher, the project's owners decided precast concrete was the best material for the application.

"Water will literally be racing beneath the feet of people who are using the park," said Aaron Perri, executive director of South Bend Venues Parks & Arts. "For this reason, it was important that the precast be fabricated in a fashion that would allow all of these activities to happen on top of it, once the park was completed. The right combination of engineering expertise and building materials is making that happen."

Marathon, Wis.-based County Materials Corp., manufactured box culvert sections for the channels. Steve Smart, technical resource engineer with County Materials, noted the installation speed on a plant that's going to be positioned 25 feet below the St. Joe's River made precast an essential element of the project. This culvert sections' simple installation was a major selling point for precast in the space-constrained project.

"(The owner) wanted to be able to get the structure in the ground and backfilled without worrying about river-related issues," he said.

Kempf agreed using precast was key for the project.

"We were looking for a means of shortening our schedule," said Kempf. "Precast came into play both from a scheduling and from a risk [minimization] perspective."

The project includes three primary components: the entrance where the water comes in, the turbines located on the downside



of the dam and a center section where precast concrete box culverts are used. The sections are being installed around the existing fish ladder, where pieces measuring 16-feet-wide-by-14-feet-tall form the plant's long channels. There are 137 total sections weighing 25 tons each.

"With precast, the only thing you have to do onsite is put the pieces together," said Kempf. "It's a little easier than the cast-in-place concrete."

BIGGER AND BETTER THAN EVER

Once several permitting, property rights, and FERC exemption issues were addressed, which took about 12 months, the underground hydroelectric project broke ground and has since been running smoothly. Kempf sees it as a significant development not only for Notre Dame and South Bend, but for the nation as a whole.

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More than 130 precast concrete sections, weighing 25 tons each, were used for the project.

"There aren't many people doing hydro projects in the U.S., or anywhere in the world, right now, quite frankly," said Kempf, who recently did a campus presentation on the third coming of hydropower to South Bend. "We're not just building a hydro plant in the middle of nowhere; this dam has a major connection to South Bend."

Perri concurred and said the city's residents are looking forward to the reopening of their beloved park.

"It's a small park, but pound for pound it's one of the most popular parks in our city," said Perri. "People certainly miss it, but it's going to return bigger and better than ever." **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.

Thinking Inside the Box: MSG Sphere

Precast concrete box culverts provide large-scale underground air duct system for upcoming cutting-edge entertainment venue in Las Vegas.

By Mason Nichols

Photos courtesy of Jensen Precast

Las Vegas is anything but ordinary and boasts eclectic architecture that is a visual treat. The MSG Sphere, a \$1.66 billion entertainment venue under construction at the Venetian Resort, will be no different when it is completed in 2023. The structure will include approximately 875,000 sq. ft. of interior space, a seating capacity of up to 20,000 and a fully programmable LED exterior. When completed, it will be a one-of-a-kind design, which will offer an immersive sensory experience unlike any other in the world.

While MSG Sphere's exterior will certainly leave an impression, the work taking place underground is just as technologically advanced. To power the HVAC system for the world's largest spherical building, they needed a specialized air duct system, and precast was the building material for the job.

DESIGNING WITH SPEED

Initial plans specified a fiberglass solution. But according to Keith Stewart, senior project manager for Harris Company, the plumbing, piping and HVAC subcontractor on the job, that approach had issues.

"To get the fiberglass ductwork in the timeframe originally specified wasn't going to work," Stewart said. "Additionally, workers were also going to be driving cranes over the ground where this ductwork was going in to keep the project moving and on schedule. The fiberglass couldn't support this."

The Harris team quickly pivoted, and the answer was precast concrete. Harris shifted gears and reached out to long-time partner Jensen Precast to begin crafting an entirely new design.

Joshua Myers, vice president of operations and engineering for Jensen, explained the design, production and installation timeline was extremely compressed. Matters were further complicated by the complex engineering required for the new precast system.

In the span of just a couple days, Jensen and Harris went from having an initial conversation to needing a layout design.

Myers added that laying out a project like this in 3D would typically take about 2 or 3 weeks. With only a few days to spare, he connected with his engineering manager and got straight to work on the air duct, which was designed to be the arena's return air system – similar to what you'd see in a home, but on a massive scale.

MANAGING COMPLEXITIES

Jensen Precast benefitted from an experienced team and multiple locations near the installation site when taking on the complex project. Collaboration between the Jensen teams involved with the work was key to delivering both a successful design and product.

"A big part of this operation was coordination," said Tyler Haack, P.E., vice president of operations for Jensen. "We had



More than 100 precast concrete box culvert sections provide the air duct system for a new building in Las Vegas.

the Las Vegas plant, where the project was located, but we also had the Fontana plant in California involved. There was a great coordination and project management effort employed throughout the entire process.”

The air duct system was engineered using the design-build process, so the collaboration between Jensen and Harris was just as important. The two sides worked together diligently while sharing iterative designs.

“We’d draw a layout, ship it out to Harris, and then Harris would take our structure and insert it into the overall BIM model,” Myers said. “Then, we’d look at it to determine if we had enough clearance and what might need to move. Really, it was a lot of back and forth between us to get this done.”

Ultimately, the two sides chose a precast box culvert solution that employs two different styles to help achieve the airtightness and curvature the air duct system required. Jensen manufactured more than 100 box culvert pieces for the arena, each measuring about 10-feet-high-by-10-feet-wide and

weighing approximately 40,000 pounds. Pieces included mono-gasketed, dry-cast culvert structures that were manufactured out of the Fontana plant and match-cast culvert structures, which were primarily produced in Las Vegas. The custom match-cast pieces allowed for the atypical skews and complex joint transitions in the design.

The Jensen team also had to contend with the designed openings to ensure proper airflow.

“Putting large openings in a box completely affects that box’s structural integrity,” Myers said. “We had certain length requirements that we could do. For the gasketed boxes, our lay length was about 8 feet, limiting the type of hole we could put in that piece to about 3-by-3 (feet) or 4-by-4 (feet) without having to completely change the structural walls and massively increase the rebar.

“We had to transition from that type of lay length to a cantilevered wall structure box culvert, which has the capability – because of the design of the structure – to go with bigger openings.”



Thanks to precast concrete's inherent strength, additional construction work could continue while the units were being installed.

ACHIEVING MAJOR SUCCESS

Thanks to the precast concrete structures and the open lines of communication among all parties involved, the MSG Sphere's air duct project was a major success.

"In the case of this project, it was really timeline, timeline, timeline," Myers said. "The initial need arose out of a supply chain issue relating to the fiberglass, and the contractor simply couldn't cease operations for several months while they waited for that material to show up."

Haack referenced not just the manufacturing and installation speed as positives, but the Jensen team's engineering process as well.

"We were turning around our custom engineering extremely quick for us to meet the ship dates that they needed," Haack said. "Our ability to change the location and radiuses of what needed to be done to avoid their existing footings and the footings that were going to be installed during the next stage was a big reason that precast ended up being a great success."

Haack added that they were able to achieve rapid design strengths, which allowed them to ship pieces quickly from both plant locations. This was paramount to staying on schedule. The project also benefitted from the pre-existing relationship between Jensen and Harris. Because the two firms are so familiar with each other, they were able to quickly power

through the design-build process, overcoming obstacles and challenges with efficiency. As Stewart explained, Jensen's assistance solving the difficulties of converting the air duct design to precast was flawless.

The end result was a precast concrete air duct solution for the MSG Sphere that wasn't only installed on time, but also capable of supporting the tremendous amount of weight of construction operations both on and surrounding the installation site.

ALL IN ON PRECAST

In Las Vegas, everything is about raising the stakes. Pushing the limits of what's expected isn't a rare occurrence, it's the norm. It's no surprise, then, that the MSG Sphere will revolutionize entertainment when it opens to the public in 2023. And Harris Company and Jensen Precast can stand proud of their efforts, which collectively helped redefine how engineers and designers view box culverts moving forward.

"When we put our minds and talents together – both internally and externally with our partners – we can do some pretty amazing things," Myers said. **PS**

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

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