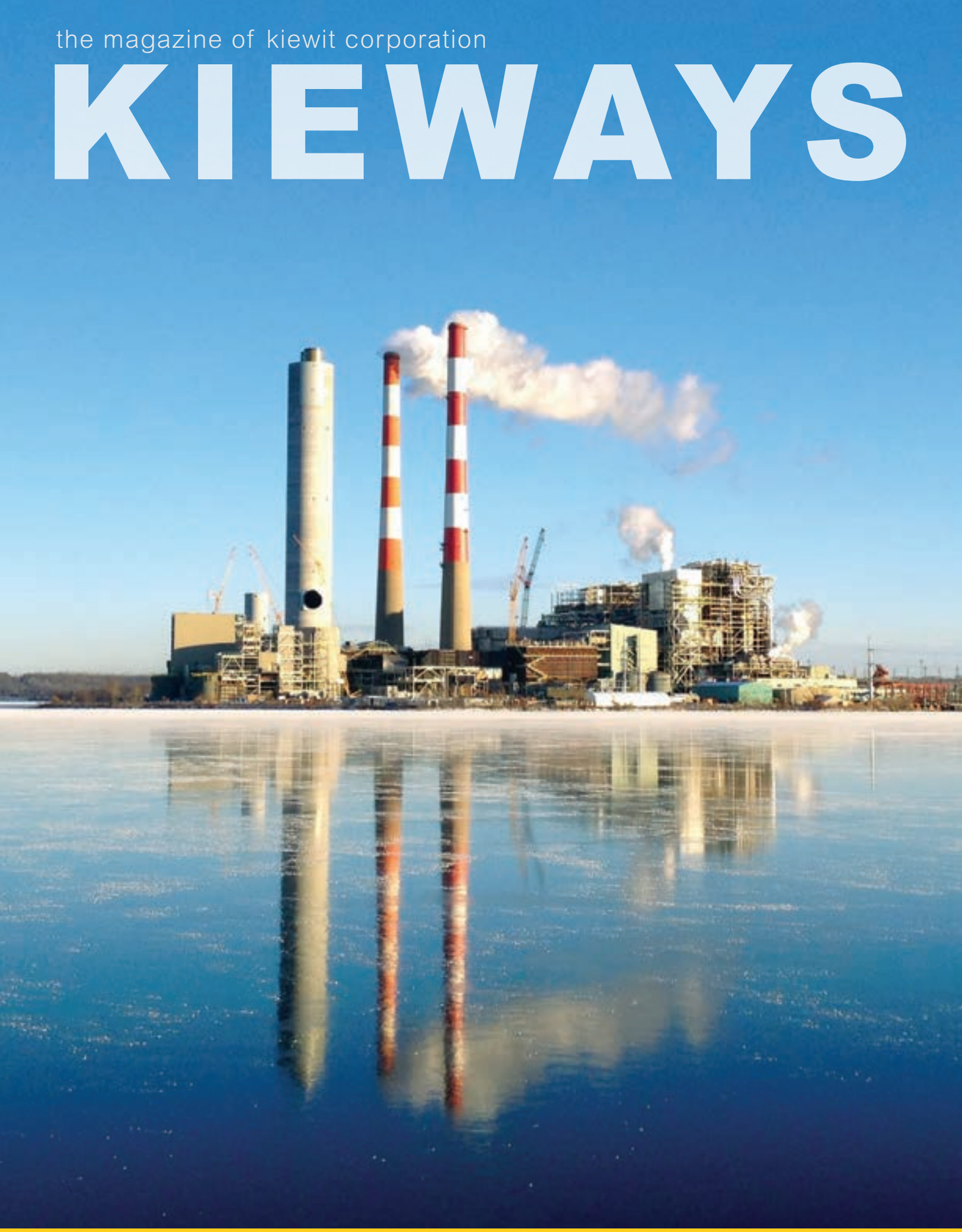
the magazine of kiewit corporation

KIEWAYS



2014 / Quarter 1

Kiewit

Kiewit is one of North America's largest and most respected construction and engineering organizations. With its roots dating back to 1884, the employee-owned company operates through a network of offices and projects in the United States, Canada and Australia. Kiewit offers construction and engineering services in a variety of markets including transportation, water/wastewater, power, oil, gas and chemical, building and mining. Kiewit had 2013 revenues of $11.8 billion and employs more than 33,000 staff and craft employees.

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KIEWAYS
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TYING IT ALL TOGETHER
Get an inside look at the 33-foot-diameter McCook Tunnel that will tie into a live sewer system and future reservoir in Chicago on Page 22.

USING OUR RESOURCES TO LEND A HAND

It's no surprise to anyone that I'm proud of the quality of the work we build, the safe manner in which we build it and our diverse capabilities and expertise. I'm especially proud of our ability to undertake emergency work, which requires quick mobilization and the expertise to deal with environmental and other factors that accompany natural disasters.

The most recent example of our emergency work capabilities occurred late last year. In September 2013, flooding caused damage in several parts of Colorado. Kiewit was awarded a contract to repair an 18-mile stretch of Highway 34 destroyed by flooding of the Big Thompson River (full story begins on Page 14). The work we performed helped restore some normalcy to the people affected by these floods in and near the towns of Estes Park, Drake and Loveland.

This isn't the first time we've performed emergency reconstruction work. On Page 20, you'll see a handful of emergency repair projects we've completed in the past decade. Each had its own special set of circumstances but also had the same need for a fast start-up, quick turnaround and safe completion. To know Kiewit can lend a hand and make a difference in peoples' live makes our jobs even more meaningful and gratifying.

This issue of Kieways also covers our work on the La Cygne generating station near Kansas City, Mo. (Page 4), our vertical building work in Nebraska's capital city (Page 8) and our tunneling work at the McCook Reservoir in Chicago (Page 22).

BRUCE GREWCOCK
Chairman and CEO

RESTORING HOPE
More than 150 workers put in 80 hours, seven days a week, to restore 18 miles of roadway in several Colorado mountain towns. Flooding from torrential rain caused massive damage across the state. Find out more on Page 14.

ON THE COVER

ALSO IN THIS ISSUE

CONSTRUCTING A GENTLE GIANT

The La Cygne Environmental Retrofit project is an enormous undertaking in the most literal sense, starting with a total project budget in excess of $1 billion. Add a slew of other important, fluid aspects — from extensive subcontractor and supplier relationships and a dynamic craft workforce, to crucial environmental regulations and precise specifications — and this project demanded the best any contractor could offer.

Operated by Kansas City Power & Light (KCP&L), the La Cygne generating station is located one hour south of Kansas City, Mo. KCP&L decided to retrofit the La Cygne coal-fired units in order to comply with a host of federal Environmental Protection Agency (EPA) emission requirements and related contractual commitments.

KCP&L initiated a competitive bid process for a fixed-price engineer, procure and construct contract in 2010. After a thorough technical and commercial review of bidder responses, KCP&L awarded the work to the La Cygne Environmental Partners (LEP), a joint venture between Kiewit and Sargent & Lundy.

MAKING THE OLD NEW

The La Cygne Environmental Retrofit project is making sure EPA bases are covered.

LEP was given full notice to proceed in September 2011. Air quality control system (AQCS) work is being performed on both existing units. Major items of work include installation of fabric filters, induced draft fans, wet flue gas desulfurization (WFGD) systems and a selective catalytic reduction system.

The sequence of construction on each unit is done in unison. The WFGD systems for each unit are fed by a common limestone preparation system. The system is designed to mix and crush limestone with water, creating a slurry that's sprayed into the WFGD system absorber vessel. These vessels house the reaction between flue gas and lime slurry, a process that removes sulfur dioxide.

Besides the major AQCS equipment installations, a dual flue chimney measuring 80 feet in diameter by 589 feet tall was also erected. The entire chimney slip was completed in just seven weeks.

"We have one mega-job, but really, it's more like several small jobs," said Michael O'Neill, assistant project manager.

How did they do it?

In just 56 days, La Cygne Environmental Partners (LEP) successfully completed an interim outage in which 56 existing coal burners were replaced with new low NOx burners. Also, LEP installed new over-fire air ductwork and replaced the entire "brain" of Unit 2 — the digital control system (DCS). The DCS enables plant operators to monitor and control plant operations from a centralized control room.

56 DAYS

56 BURNERS

La Cygne by the numbers

100 thousand	Linear feet of pipe
3 thousand	Tons of ductwork
9 thousand	Tons of structural steel
1.56 million	Linear feet of cable
6	Induced draft fans with 18,000 horsepower
40 thousand	Cubic yards of concrete

"Each portion has its own resources, schedule, cost accounts and its own challenges. We've found this is the most efficient way to get the work completed, while allowing employees the opportunity to grow."

SILVER, GOLD AND COAL

Remember the saying, "Make new friends, but keep the old, one is silver and the other is gold"? LEP recognizes the importance of strong business relationships.

"We've learned from the past that our relationships, whether with our project stakeholders, labor partners or our client, are absolutely crucial to our success," said Brett Smith, project manager.

LEP understands how important it is to create and maintain relationships at every level. The foundation of these relationships is a focus on steady communication and constant coordination — mandatory to the ultimate success on a project of this magnitude.

Building a "one team" attitude requires everyone to stay on the same page, and this has been a priority since contract inception, Smith said. There's a KCP&L representative present at each weekly meeting, working hand-in-hand with LEP to ensure construction is on track.

"At KCP&L, we have a very good working relationship with LEP. They have just been great to work with, very transparent and reliable," said Bob Bell, KCP&L senior director of construction. "LEP and KCP&L are very involved in day-to-day activities and this has resulted in very few issues during the first two years of the project."

It's not only client relationships that have the eye of LEP project team members. It's also the relationships they have with each other.

"From the craft getting along, to the staff getting along, to the craft and staff getting along — it's been something we've focused on relentlessly," said Smith.

Kiewit employees from near and far have come together on this project. Because more than three million man-hours are projected at La Cygne, it's been especially important to partner with trades and involve every discipline, from safety to production.

"Of course the number one success factor you can have at any project is craft and staff engagement," said Billy Ours, construction manager. "An engaged workforce is a safe workforce, and that helps us every day to reach our goal of constructible, on-time engineering."

Being part of a project this big also means sharing the work with a lot of subcontractors.

"Power is a very specialized niche, and that sometimes comes with the perception there is little room for supplier diversity," said O'Neill. "But at LEP that's not the case. Supplier diversity is very prevalent here."

Prevalent, indeed. LEP has worked with minority and women-owned business enterprises, as well as small businesses, veteran and hub zones. This commitment to cultivating many kinds of partnerships is evident, as the project has exceeded the diverse supplier goal set forth in LEP's contract with KCP&L.

WALKING THE WIRE

A significant challenge in retrofitting the La Cygne generating station is making sure new construction activities don't interfere with existing plant operations. La Cygne is a fully functioning power plant, capable of generating approximately 1,500 megawatts of electricity.

"Like any project, you're going to have obstacles, but we've got a unique situation here," said Ours. "We can't afford to make the mistake of not ensuring everyone is aware of the next step. We strategically plan our construction around the existing power operations. One wrong move could mean the loss of power to thousands of people."

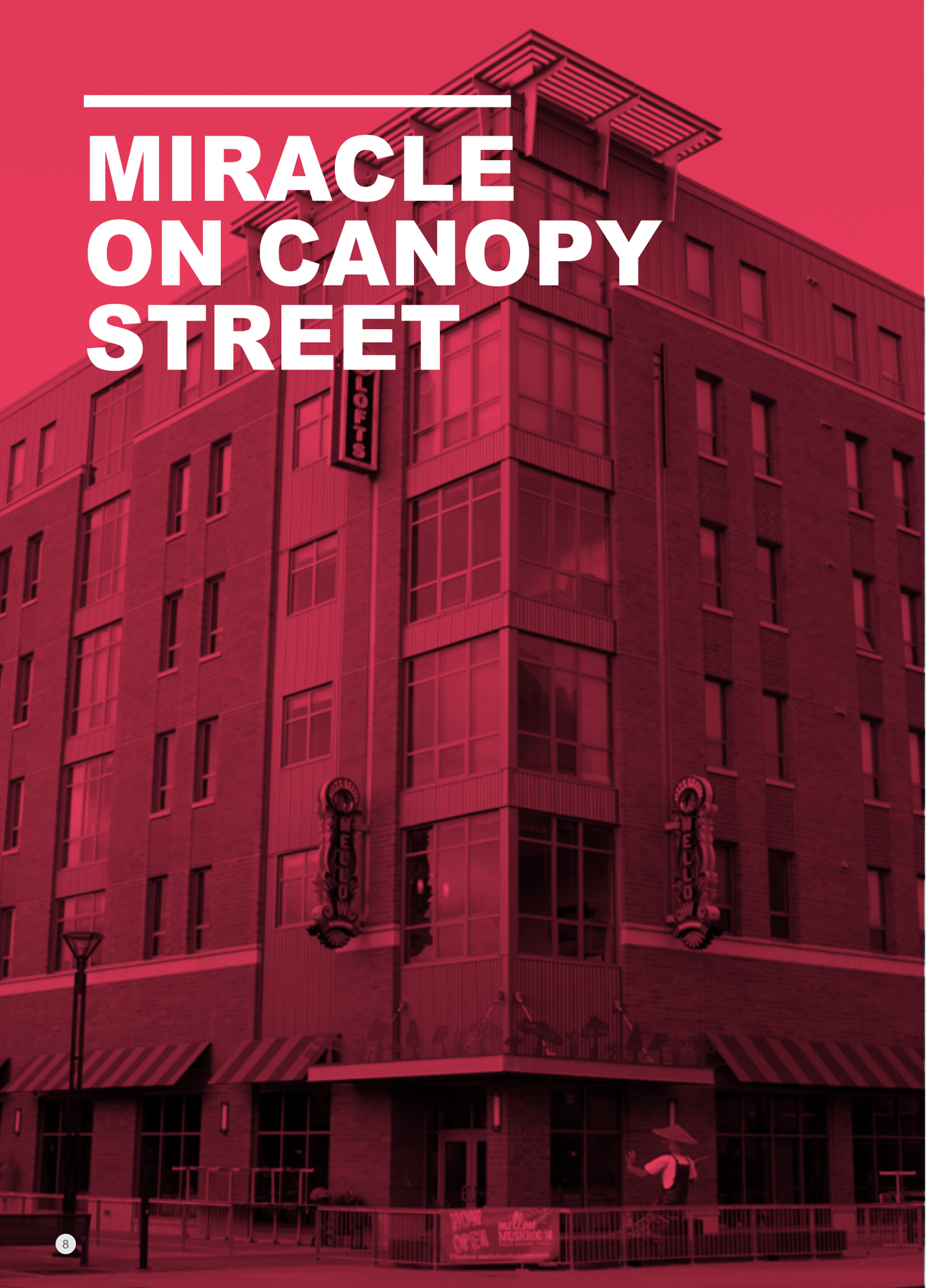
LEP pays careful consideration to every detail, at every stage, because even the smallest action could have a major impact.

THE BIG WIN

With two years of hard work behind them and two years remaining to complete the project, the finish line is in sight for the project team. Through continued due diligence by LEP, its vendors and subcontractors, the new AQCS will tie into the existing boiler — resulting in a cleaner, more environmentally-friendly source of power.

1. The La Cygne generating station is home to this Flue Gas Desulphurization building and its massive maintenance alley, which measures 300 feet long. 2. As part of the limestone slurry preparation area, millwrights erected and aligned two ball mills (pictured). Once in operation, each is capable of producing up to 66 tons of slurry per hour.

MIRACLE ON CANOPY STREET



A construction project more than seven years in the making is transforming the landscape of Nebraska's capital city. Owned in part by WRK and Chief Industries, the $498 million West Haymarket Redevelopment project is an eight-block expansion of Lincoln's Historic Haymarket District.

Made up of nearly 30 individual projects, including apartments, restaurants, bars and a large courtyard for events, the development is expected to help the city's talent retention and expansion efforts.

KIEWIT'S INVOLVEMENT

In June 2012, Kiewit was awarded the Canopy Street Lofts and Railyard projects — with a combined contract value of $21 million. Four months later, they were awarded the $19 million Hyatt Place hotel and Hobson Place contracts. Additional tenant improvement projects were awarded in May 2013.

"With all of the different projects and other contractors in the area, we are fortunate to have such a substantial role in the construction activity," said Bart Thomsen, project sponsor.

Innovations on Canopy Street

With so much construction going on in and around Kiewit's projects in the area, the project team used innovative applications to simulate the virtual construction of a project, which helped in phasing, sequencing and scheduling work.

"We decided early on that we wanted to try something new and innovative," said Matt Ramm, craft superintendent.

PLANGRID

The team incorporated a construction app called PlanGrid for iPhones and iPads to help manage documents and drawings and track quality issues in the field.

"The app's document control function provides one go-to location to find the most up-to-date drawing information to ensure everyone is building off the right set," said Brent Clausen, project manager. "The quality control functions allow us to track issues in the field, communicate them to members of the team to ensure they are resolved, and document them for future use. It allows us to have one location for all progress photos that are integrated into the record documents."

"With eight projects going on at one time, in the middle of so many others, the app helped keep everything straight," said Ramm. "It really added another level of clarity and accountability."

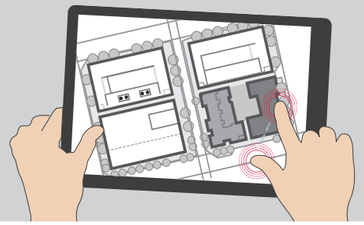
BIM

Building Information Modeling (BIM) tools were used in two separate phases during construction.

During the RFP stage, the project team used BIM to model the project for the client, allowing the client to see how the projects would be completed, while allowing their adjacent projects to stay on schedule.

During the planning phase, BIM also helped coordinate mechanical, electrical and plumbing.

"BIM really helped us to visualize how we would build the project," said Clausen.



"It's fantastic to have a project of this magnitude to showcase what we can do for the city of Lincoln," said Dan Hayes, superintendent.

CLOSE QUARTERS

Throughout the construction process, Kiewit's two-square-block jobsite has been home to as many as 150 subcontractors. This has provided a unique challenge, as this number is considerably higher than the average number of subcontractors on a project — 30 to 40, according to Brent Clausen, project manager. The entire expansion, about six city blocks, has also seen nine general contractors responsible for various parts of the expansion — each with their own subcontractors.

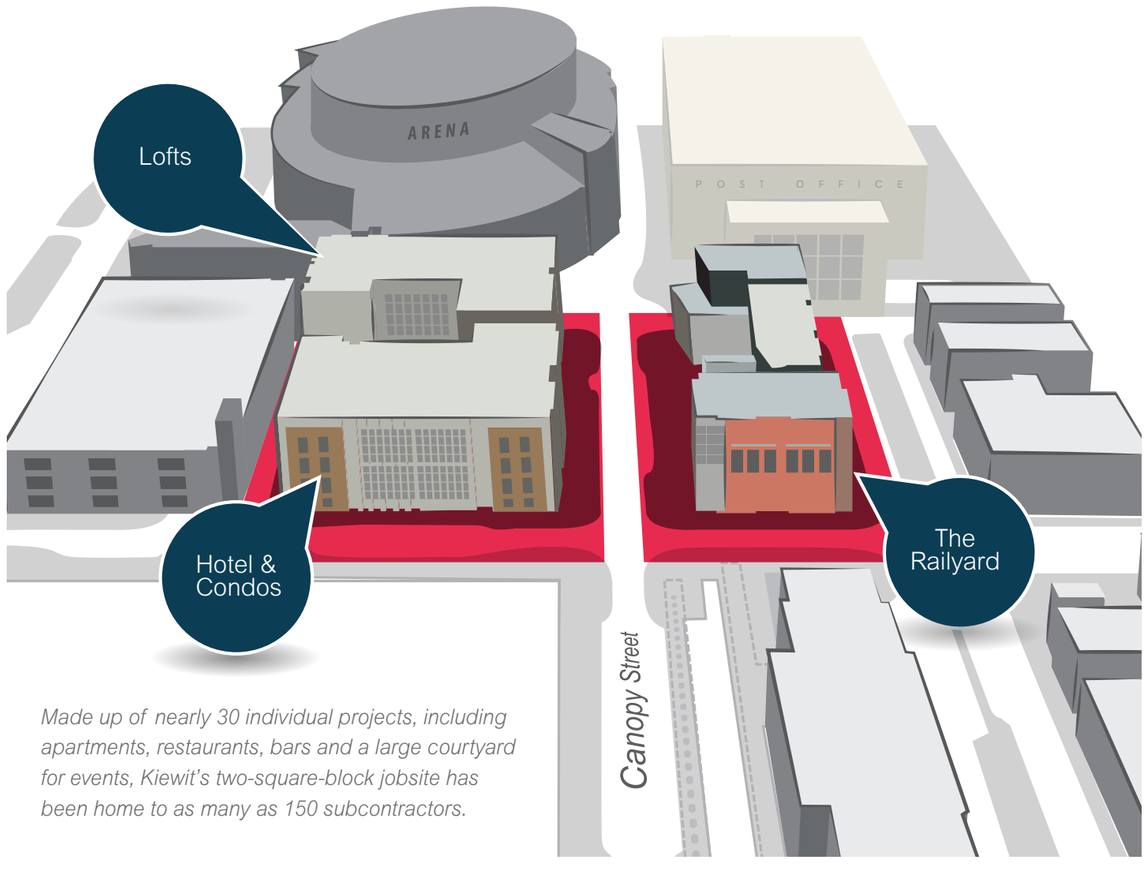
"We were essentially surrounded," said Thomsen. "We had an arena being built to the north, a parking garage to the west, and underground piping and roads on all sides. Our team did a great job of working with the other project teams to coordinate the work."

"Being able to build this many projects in such a condensed space is a source of pride," said Clausen. "The community was very interested in the project so there was a lot of attention on us. It was as if we were building in a fishbowl."

COORDINATION AND PRE-PLANNING

From the beginning of the project, monthly coordination meetings were set up by the city's construction manager

Kiewit on Canopy Street



Made up of nearly 30 individual projects, including apartments, restaurants, bars and a large courtyard for events, Kiewit's two-square-block jobsite has been home to as many as 150 subcontractors.

between contractors and designers involved in the project. Topics included safety, street shutdowns, general logistics and upcoming events, to name a few.

Weekly hot-button meetings were also held among the clients, architects and contractors, allowing each party the opportunity to communicate and plan ahead.

"In the middle of the many construction projects in the area, just trying to get truck drivers to our project proved twice as difficult as it should be," said Ramm. "We had to maintain our schedule despite being unable to control the other contractors on all sides of us."

FOCUS ON SAFETY

For safety reasons, the coordination of fencing, proper access and signage continues to be very important to all contractors involved in all expansion projects.

Mass safety meetings are held each month where Kiewit employees and subcontractors communicate and emphasize our Nobody Gets Hurt philosophy.

"Safety is the No. 1 topic at every meeting and they are on top of it, from start to finish," said Brett West of WRK of the Kiewit project team. "We want a project that's on schedule, but more importantly we really want everyone to make it home safe every night."

"Coordination is key," said Brent Kool, project engineer. "With the public surrounding us, it is important for everyone to be in the loop. Public safety is a fundamental priority."

After a recent safety meeting, Kiewit celebrated the safe and successful completion of five of its eight total projects by serving 3,000 chicken wings from one of the restaurants built as part of the expansion. Jobsite t-shirts, adorned with the project logo, were given to workers.

"The entire team has done an excellent job of training, communicating and leading by example," said Clausen.

AGGRESSIVE SCHEDULE

An aggressive schedule with multiple turnover dates added another degree of difficulty for the project team.

"We couldn't get the gates open fast enough," said Matt Ramm, five-year Kiewit veteran and craft superintendent of the Canopy Street Lofts project. The team turned the project over to the client on Aug. 30, in time to host a University of Nebraska-Lincoln (UNL) alumni event that

> "Safety is the No. 1 topic at every meeting and they [Kiewit project team] are on top of it, from start to finish. We want a project that's on schedule, but more importantly we really want everyone to make it home safe every night."
>
> **BRETT WEST,**
> WRK

coincided with the start of the Nebraska Cornhusker football season.

“From the opening of the Lofts for students to move in for the UNL fall semester, to the opening of the Railyard in time for the first Husker game, to the multiple tenant improvement projects to get the new businesses open, the team had to methodically work through each space,” said Thomsen.

“We normally don’t have to plan for 20,000 residents on the job,” said Hayes. “Everyone knew that every Friday at noon, work would stop in preparation for Husker football Saturdays.”

COMPLETION

The project is currently under budget and on track for completion in April 2014.

Upon completion, the new Canopy Street will vastly change the landscape of the capital city, offering its 300,000 residents and more than two million annual visitors new ways to live, work and play.

Hayes, whose wife was born and raised in Lincoln, said his friends and family are already enjoying the new district. “We’re hearing nothing but praise. People love to have more to do.”

“As a recent UNL grad, it means a lot to me to be a part of a project that is a landmark for the city,” said Ramm.

“It’s definitely a pride factor,” Clausen added.

“This project is truly a game changer for the city of Lincoln,” said West. “I have developed great respect for all of your staff and have developed good friends through the ‘Miracle on Canopy Street,’ as it has been aptly named. It’s a project we can all be proud of for a long time.”

Canopy Street at a glance

COMPLETED CONSTRUCTION

CANOPY STREET LOFTS

- Completed: August 2013
- Project involved the construction of a new 120,000-square-foot, six-story mixed-use building. The first floor consists of mechanical and electrical rooms, elevator lobby, and the core and shell for future tenants. Floors 2 through 6 are residential apartment suites.

THE RAILYARD:

- Completed: August 2013
- Project included the construction of a one-story building and a three-story building — totaling 53,000 square feet. The scope included the core and shell of both buildings and created 11 spaces for future tenants (10 bar/restaurant and one office space).

TENANT IMPROVEMENT PROJECTS

- Buffalo Wings and Rings - Bar/restaurant located in the Railyard
- Jack and June’s Bar & Diner - Bar/restaurant located in the Railyard
- Vega - Bar/live concert venue in the Railyard
- Public Market - Open market with multiple small vendors (farmers market style) in the Railyard
- Chief Industries Office - Office space

UNDER CONSTRUCTION

HYATT PLACE HOTEL AND HOBSON PLACE

- Expected completion: April 2014
- Project includes the construction of a 140,000-square-foot, seven-story mixed-use building. Floors 1 through 4 are for a 111-room Hyatt Place hotel. Floors 5 through 7 are designated for 32 high-end residential units.
- Fun fact: Ndamukong Suh, former Nebraska Cornhusker and current Detroit Lions football defensive lineman, was among the first to buy a high-end residential unit in the Hobson Place development.

1. Kiewit employees and subcontractors gather for a mass safety meeting. 2. Canopy Street hotel and condos view from corner of ‘Q’ & Canopy Streets. 3. Developers, city officials and Suh break ground on the Hyatt Place hotel and Hobson Place in April 2013.

A TRUE TEAM EFFORT

RESTORING LIFE ALONG THE BIG THOMPSON

In late September 2013, flooding caused by torrential rain ravaged communities throughout Colorado — from small mountain towns to Denver suburbs. Nine Colorado residents lost their lives, and thousands of survivors lost their homes, cars and personal belongings. One town in particular, Drake, suffered devastating damage.

The Colorado Department of Transportation (CDOT) set out to remedy the destruction along Highway 34, the main route between Interstate 25 and Estes Park. Within three days of responding to CDOT's RFP, Kiewit was awarded the $20 million, cost-reimbursable contract to head into the small communities of Estes Park, Drake and Loveland and begin repair work.

Kiewit restored 18 miles of roadway. Approximately five miles were completely blown out by overflow from the Big Thompson River. Two miles of road work included repairing the backfill behind structural walls. Other tasks included building back the embankment from the river and removing debris in the right-of-way.

A STEP BACK IN TIME

This 18-mile stretch is familiar to Kiewit. On July 31, 1976, after more than a foot of rain fell in only four hours, the Big Thompson River gave way to flash flooding. That summer, as in 2013, Kiewit was contracted to fix the damage to Highway 34.

"The damage to Big Thompson Canyon was similar to the 1976 flood," said Project Sponsor Will White. "It took nearly four years to fully reopen the road, whereas this time around, it only took us 59 days."

White credits the availability of resources for the quick turnaround. Five Kiewit districts pulled together 150 workers and 70 major pieces of equipment to get the job done.

"We were scheduled to open the highway on December 1, but we always had the goal to open before Thanksgiving. We accomplished the goal and opened 11 days early on November 21," he said.

Although the walls Kiewit built more than 35 years ago had held up, unfortunately the backfill behind the walls had not — primarily because of scour from under the grade beams. Other damage was likely caused by county and private bridges across the Big Thompson. Debris had built up under the structures, forcing the river to flow around the bridges. The detour wiped out long stretches of highway.

HOW DID THEY DO IT?

Walking on to something that looked like a post-apocalyptic movie scene might make many ask, "Where do you even start?"

Fortunately for Kiewit, they had Superintendent Max Chesnik. The long-time Kiewit employee helped rebuild the highway in 1976. Now, he was ready to pioneer a path and start moving debris.

“Max and Construction Manager Mike Supenski were integral in managing field operations for the project,” said White. “They knew what to do. I credit them for their amazing foresight in getting the job rolling and getting residents back in their homes.”

In addition to managers in the field, leaders at all levels put hierarchical roles aside, executing all types of activities to help get the project done as quickly and safely as possible.

“Everyone on the job had a lunch-pail mentality,” said Superintendent Tim Louie. “We had senior project people working side-by-side with craft and younger staff, doing work that fell well out of their typical scope of responsibility. It was exciting that no one thought twice about it. There was one prevailing sentiment throughout the project for all employees: ‘what can I do right now to help?’”

Many individuals, led by Senior Engineer Paul Jacobson, worked long hours in the office to make sure the project had what was needed in the field to stay on schedule. Equipment managers and maintenance staff made sure the equipment arrived on time and kept running, even under challenging circumstances.

On the ground, Kiewit began work in areas where the river was running in place of the road. Workers used excavators and bulldozers to remove boulders that had washed downstream, rebuild a solid foundation and armor the toe of the slope.

Teams also filled in sinkholes behind the structural walls — some up to 30 feet deep — with 25,000 yards of flowfill. The flowable, impermeable concrete mix will help protect against a washout in the future. Crews, led by Superintendent Shane Winberg, worked around the clock, seven days a week, to make sure the project finished on time.

“This was the quickest and most economical solution,” said White. “We had to get in there and get it done fast.”

Big Thompson Canyon Emergency Repair by the numbers

A breakdown of the effort it took to repair the highway and finish ahead of schedule

- More than **700,000 cubic yards** of excavation and embankment
- **51,000 tons** of road base
- **650 truckloads** of hauled debris
- **90,000 cubic yards** of rip-rap (approximately 30 percent complete to date)
- **150 team members**, working seven days a week
- **70 pieces** of heavy construction equipment
- **59 days** nonstop project operations
- **25,000 yards** of flowfill concrete
- **22,000 tons** of asphalt
- **50,000 man-hours** (not including subcontractors) with no injuries

When disaster strikes

The flooding in Big Thompson Canyon is just one example of how Kiewit has rebuilt and helped return life back to normal for those affected by disasters. Kiewit has been involved in a number of emergency repair projects around the country:

BEARTOOTH HIGHWAY EMERGENCY REPAIR
RED LODGE, MONT.
In March 2005, a rain-on-snow event severely damaged more than 12 miles of U.S. Highway 212 outside Red Lodge, Mont. Due to instability in failed areas on the mountain, safety was the first priority for Kiewit in reconstructing the $15.2 million highway project. Kiewit's fast-track, design-build approach allowed the team to reopen the roadway in just 16 weeks (14 days ahead of schedule).

SALT DRAW CREEK I-20 EMERGENCY BRIDGE REPAIR
PECOS, TEXAS
Emergency repairs were needed on the Interstate 20 east- and westbound bridges outside of Pecos, Texas, after a levee broke upstream during a 100-year flood. The $3.6 million project was completed in June 2004 by Kiewit Texas Construction LP (formerly Gilbert Texas Construction LP), a subsidiary of Kiewit, in 56 days (10 days ahead of schedule).

I-10 EMERGENCY BRIDGE REPAIR
PENSACOLA, FLA.
The wrath of Hurricane Ivan on Sept. 16, 2004, destroyed nearly a quarter mile of the I-10 concrete bridge across Escambia Bay and halted daily bridge traffic of nearly 42,000 vehicles. A joint venture led by Kiewit Infrastructure South Co. (formerly Gilbert Southern Corp.) quickly responded to the $33.7 million design-build reconstruction effort. Traffic over the westbound span reopened in just 17 days (seven days ahead of schedule) and the eastbound span reopened 26 days ahead of the original 90-day completion schedule.

SR-14 EMERGENCY LANDSLIDE REPAIR
CEDAR CANYON, UTAH
A landslide in October 2011 dumped nearly 1.5 million cubic yards of dirt and debris across 2,000 feet of the roadway on State Highway 14 in Cedar Canyon, Utah. The $15 million project was awarded to Kiewit. The road was rebuilt by excavating and embanking 700,000 cubic yards of rock and dirt, surfacing and striping the roadway, building a concrete barrier and guardrail, improving drainage and creating a mechanically stabilized earth wall.

A TRUE TEAM EFFORT
In all, 150 workers (including CDOT employees) consistently put in 80 hours, seven days a week, to get the job done — without a single injury.

"The hardest part was getting so many people together in such a short amount of time," said White. "We had to maintain the urgency of getting the road open without jeopardizing our safety culture. We stopped work on the project several times just to make sure everyone understood that no matter how urgent this project was, we couldn't put ourselves in harm's way. Safety always comes first."

Maintaining that safety culture proved tricky for most of the project, as the work and location changed hourly. Crews would stop at least twice per day to re-evaluate the conditions and address potential hazards.

"Our biggest safety concern was the variance from one portion to the next," said Superintendent Jim Smith. "Each situation was totally different. We had to get out ahead of the crews, make a plan, get craft input and execute that plan accordingly."

The client is more than impressed with Kiewit's ability to complete this job, and to do it ahead of schedule.

"I have nothing but good things to say about Kiewit," said CDOT representative Gray Currier. "They are a professional organization. Kiewit came in here, even before we had CDOT boots on the ground, and established a presence. We were very fortunate to have a contractor with the experience, capability, personnel and spirit to make this a successful project."

Most importantly, the residents of Drake can now access their properties and begin rebuilding their lives.

"Finishing this job is one of the most rewarding experiences of my career," White said, describing the first few days of the highway reopening.

"Traffic stood a mile long. Residents would come up and give us hugs and handshakes. People from Estes Park, Drake and Loveland welcomed us and did everything they could to help."

> "Finishing this job is one of the most rewarding experiences of my career. ... Residents would come up and give us hugs and handshakes. People from Estes Park, Drake and Loveland welcomed us and did everything they could to help."
>
> **WILL WHITE,**
> PROJECT SPONSOR

DRILLING.
BLASTING.
EXCAVATING.

KIEWIT TUNNELS TO SUCCESS

THE MCCOOK RESERVOIR MAIN TUNNEL SYSTEM ADDRESSES CHICAGO'S FLOODING ISSUES

Have you ever been in a situation that makes you feel like a tiny speck in this vast universe?

Try this. Imagine taking a slow three-minute ride in a tiny, caged, cable-pulled elevator — down a 90-foot-diameter by 300-foot-deep main gate shaft to an underground tunnel.

That elevator ride into the depths of underground Chicago is something more than 60 Kiewit employees do every day, and it will quickly make you feel small.

Kiewit was awarded the McCook Reservoir Main Tunnel System project as the best-value contractor by the U.S. Army Corps of Engineers (USACE). Today, the company is drilling, blasting, excavating and concrete-and-steel finishing a 33-foot-diameter tunnel that will tie into a live sewer system and a future reservoir.

The tunnel runs 800 feet east and 800 feet west of the main gate shaft. The west side of the tunnel will tie into the future reservoir, which is currently a quarry, and the east side will tie into a live, combined sewer and storm water system.

"The McCook Tunnel was excavated using the drill-and-blast method," explained Project Manager Bhaskar Bhavsar. "We used two Sandvik DT820 two-boom drill jumbos to drill holes in the rock face. Then the holes were loaded and blasted with a total of 242,000 pounds of explosives."

Once Kiewit employees completed the excavation, they lined the tunnel with 8,000-psi concrete, reinforced with a single mat of rebar: #6 bar runs parallel and #8 bar runs perpendicular to the tunnel.

"We selected two 40-foot EFCO tunnel forms for the concrete lining operation," he said. "The concrete was pumped from the surface to the underground form with a Putzmeister 2110 concrete pump through a five-inch steel slick line."

Interestingly, this project actually dates back further than Kiewit's January 2012 notice to proceed suggests. The Tunnel and Reservoir Plan (TARP) was originally commissioned in the mid-1970s to address the issues the area faced after major rain events. TARP is designed to protect the area's source for drinking water; improve the area's water quality in rivers and streams; and provide an outlet for floodwaters. The project was split into two phases, one to address the pollution and one to address flood control.

Phase I included a series of tunnels and pumping stations. After heavy rains, the tunnels store the sewage until the treatment plants have the capacity to process the water. The pumping stations dewater the tunnels when the treatment plants are available.

In 1980, Kiewit was awarded the Mainstream Pumping Station project located about one mile from the main gate shaft. Bhavsar remembers that project well, as he was a newly hired, eager, young field engineer who helped build that project.

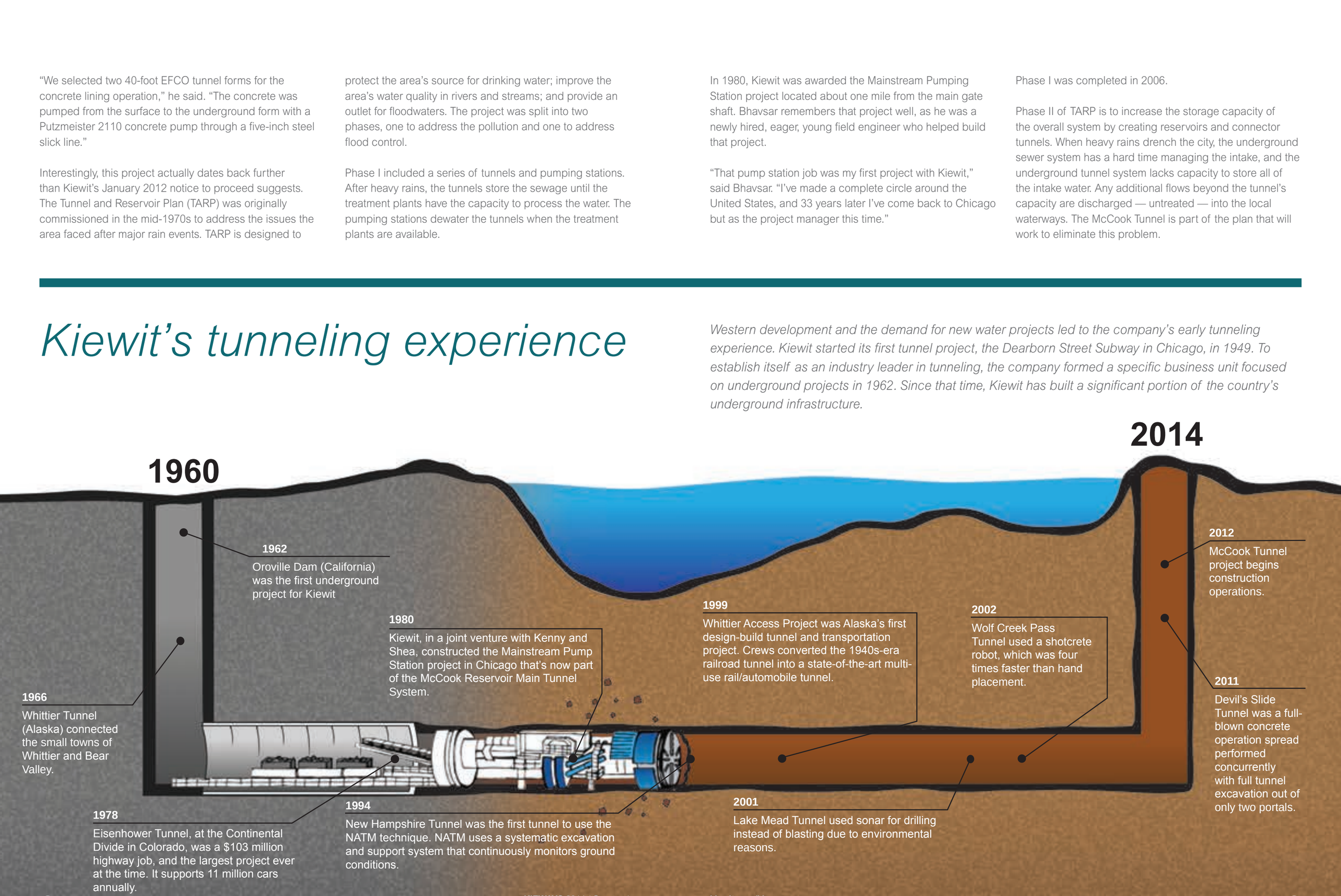
"That pump station job was my first project with Kiewit," said Bhavsar. "I've made a complete circle around the United States, and 33 years later I've come back to Chicago but as the project manager this time."

Phase I was completed in 2006.

Phase II of TARP is to increase the storage capacity of the overall system by creating reservoirs and connector tunnels. When heavy rains drench the city, the underground sewer system has a hard time managing the intake, and the underground tunnel system lacks capacity to store all of the intake water. Any additional flows beyond the tunnel's capacity are discharged — untreated — into the local waterways. The McCook Tunnel is part of the plan that will work to eliminate this problem.

Kiewit's tunneling experience

Western development and the demand for new water projects led to the company's early tunneling experience. Kiewit started its first tunnel project, the Dearborn Street Subway in Chicago, in 1949. To establish itself as an industry leader in tunneling, the company formed a specific business unit focused on underground projects in 1962. Since that time, Kiewit has built a significant portion of the country's underground infrastructure.



The excess storm water will take a detour through Kiewit's tunnel and then be stored in the reservoir until the flows subside.

But Bhavsar's personal tie to this project isn't the only unique aspect.

In itself, a 33-foot-diameter tunnel is unusual. Add in finishing the tunnel with concrete walls, installing 260 feet of steel lining where the tunnel isn't finished with concrete and tying into a live sewer, and you have a recipe for a unique project.

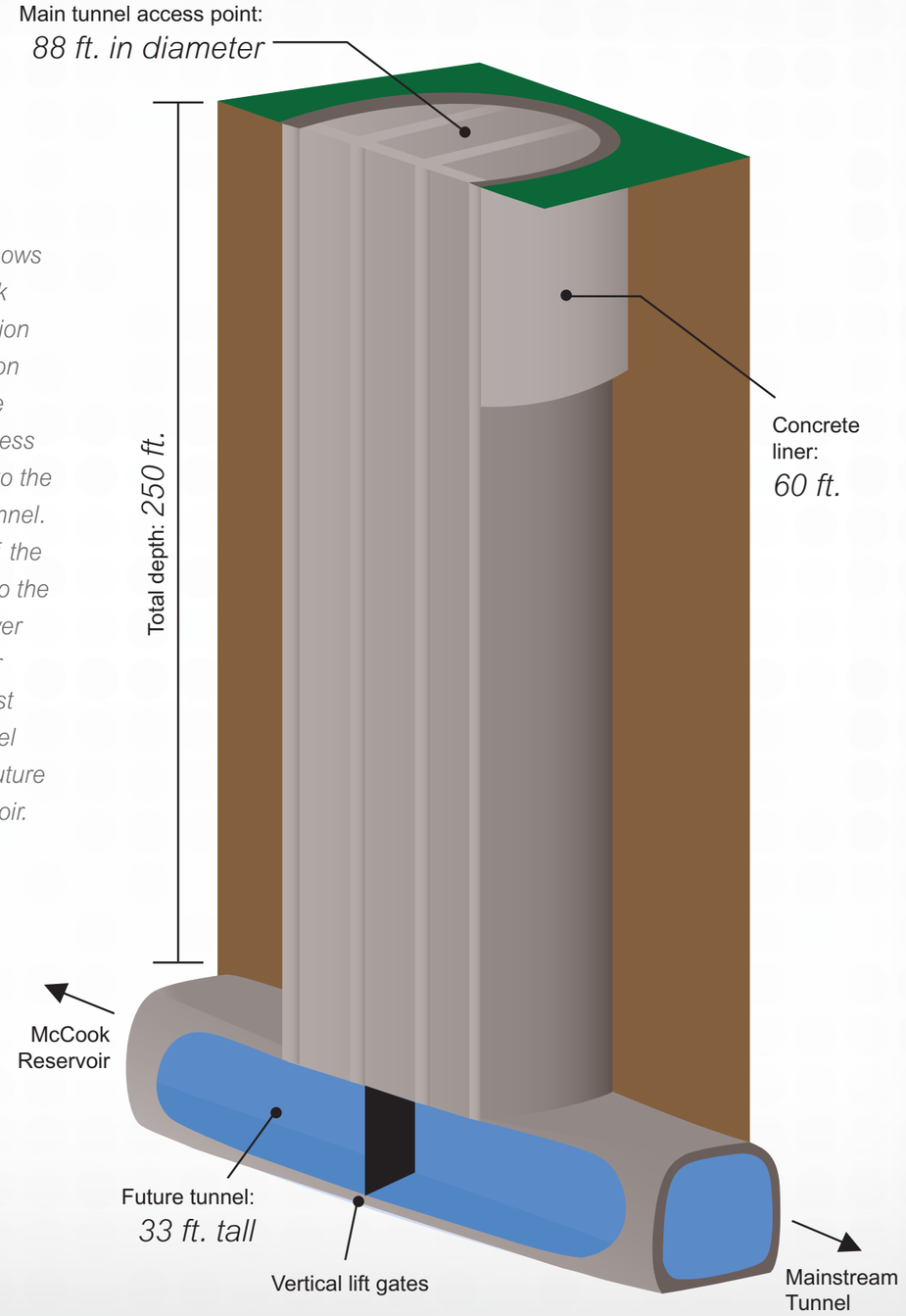
"This is definitely a challenging project," he said. "I've never worked in a 33-foot-diameter tunnel in all my years with Kiewit. We have employees working at heights equal to a three-story building inside the tunnel. Plus, our steel lining is arriving to the site in four pieces."

The four pieces are welded together on the surface, then

1. Kiewit employees lower and raise tools to each other while working on the concrete tunnel finisher. 2. Maria Garcia prepares to radio workers on the surface to lower the heavy equipment 300 feet down into the tunnel. 3. A wide-angle shot of the concrete finisher from the inside of the McCook Tunnel.

Accessing McCook Reservoir

This diagram shows how the McCook Tunnel will function once construction is complete. The main tunnel access point connects to the underground tunnel. The east side of the tunnel will tie into the existing live sewer and storm water system. The west side of the tunnel will tie into the future McCook Reservoir.



> High engagement leads to good safety practices. We are focused on hazard recognition, Kiewit's 'Speak Up, Listen Up' initiative and getting workers involved in our safety walks.

BHASKAR BHAVSAR,
PROJECT MANAGER

lowered into the tunnel. The largest piece weighs 65 tons (130,000 pounds) and requires eight straight working days to weld to the adjoining piece.

As for tying into a live sewer, the team had to carefully plan the schedule.

"Right now we have a 150-foot gap in the lining of the tunnel that will connect with the sewer," explained Area Superintendent Josh Armstrong. "We will complete the tunnel to the tie-in point, plug the 150-foot area, finish that gap in the tunnel, blast the sewer entrance and then blast the plug we installed. But we have to do this all during the low-flow season, which runs from October to April."

In order to maintain the schedule during the tie-in phase, crews are working around the clock, seven days a week.

"We have a very compressed schedule," said Bhavsar. "We have to get this work finished before the low-flow season is over. Working three shifts, 24/7, is the only option."

With this continuous, challenging work, employee engagement is imperative.

"High engagement leads to good safety practices," he said. "We are focused on hazard recognition, Kiewit's 'Speak Up, Listen Up' initiative and getting workers involved in our safety walks. The staff and craft employees here are good people."

To wrap up the project, Kiewit will remove the unreinforced concrete lining from the existing live sewer and tunnel 75 feet each way from the tie-in location. The team will then place new, reinforced concrete at the tie-in area of the existing tunnel; it will serve as the final lining. During this operation, the main gate shaft will be filled with 43,000 cubic yards of concrete.

Six rectangular-shaped vertical shafts will remain on the face of the gate shaft and will serve as steel gates. Kiewit will install these 30-foot-tall by 15-foot-wide owner-furnished gates that will allow or restrict water flows from the live sewer and the quarry.

When Kiewit completes the McCook Main Tunnel System project in August 2016, the Metropolitan Water Reclamation District of Greater Chicago will assume operation.

Kiewit

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