



Kiewit Corporation
3555 Farnam St.
Omaha, NE 68131

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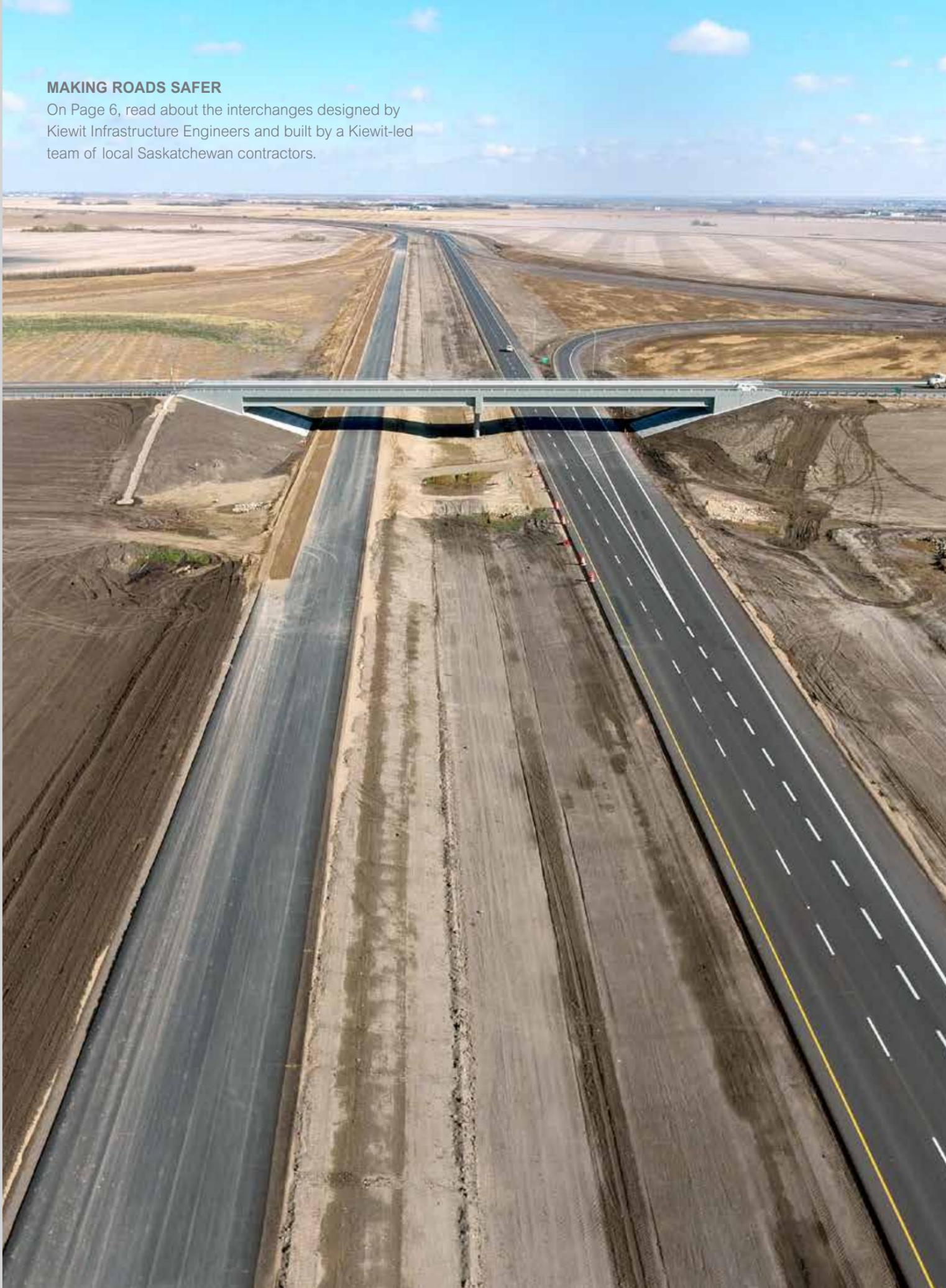
KIEWAYS





MAKING ROADS SAFER

On Page 6, read about the interchanges designed by Kiewit Infrastructure Engineers and built by a Kiewit-led team of local Saskatchewan contractors.



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 organization operates through a network of subsidiaries in the United States, Canada, and Mexico. Kiewit offers construction and engineering services in a variety of markets including transportation; oil, gas and chemical; power; building; water/wastewater; industrial; and mining. Kiewit had 2017 revenues of \$8.7 billion and employs 22,000 staff and craft employees.

MANAGING EDITOR

Sharon Armstrong

CREATIVE EDITOR

Ashley Wedeking

CONTRIBUTING WRITERS

Dave Jackson, Jessica Jensen, Susan Houston Klaus, Kristen Stieg

CONTRIBUTING DESIGNERS

Krista Aiello, Emma Farrell, Ashley Wedeking

EDITORIAL TEAM

Sharon Armstrong, Matt Baird, Carrie Chambers, Tom Janssen, Jessica Jensen, Tammy Korgie, Bob Kula, Amy Nussmeier, Toni Oestmann, Craig Olson, Gary Pietrok, Teresa Shada, Shawn Vaughan, Ashley Wedeking

CONTRIBUTORS

Sharon Armstrong, Carrie Chambers, Eric Grundke, Rand Magee, Tricia Todd

KIEWAYS

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DELIVERING ON A CAN DO ATTITUDE

You know the old saying, “You can do anything you set your mind to?” Call it optimism, self-fulfilling prophecy or good old fashioned stubbornness, but at Kiewit we know one thing for sure — it works.

“Of course we can.” That was our team’s response when asked to design a more earthquake-resistant football stadium that also had to meet federal guidelines beneath LAX’s flight path. See what it took to accomplish those unique gridiron goals on Page 18.

Sometimes determination is born out of inspiration, other times it comes from necessity. Such is the case in the Canadian province of Saskatchewan, where a population boom created an urgent need for safer and more efficient interchanges. You might be surprised by the obstacle Kiewit had to navigate on that job — flat terrain (Page 6).

Our diverse capabilities allow us to build some pretty iconic projects, but our newest market touches a lot of the items you use every day. We take you inside our industrial market on Page 12 to see how Kiewit serves the consumer goods space, including everything from the paper on your desk to what you feed your pets.

My favorite thing about Kiewit’s can do attitude is that it’s contagious and ultimately impacts our people. Be sure to read Page 5 where we applaud the award-winning work of our employees, and congratulate the winners of this year’s Kiewit Legacy Minority Scholarship. Their successes are proof enough for me.

BRUCE GREWCOCK

Chairman and CEO

INNOVATION AT ITS BEST

The Kiewit team used post-tensioned, precast segments to construct 38 columns that will provide the flexibility required for the L.A. Stadium to withstand up to a 9.0 magnitude earthquake. Read more about it on Page 18.

ON THE COVER

18 GRIDIRON GOALS
In Southern California, a Kiewit team racks up an impressive record on a notable stadium project.

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New interchanges will improve safety for a growing number of drivers in the Saskatchewan communities of Warman and Martensville.

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Kiewit expands its focus on winning and building new types of work in a growing industrial market.



KIEWIT NEWS

What began in 1884 with two hard-working brothers has grown into a construction and engineering industry leader. As a multi-billion dollar organization, Kiewit can tackle projects of all sizes, in any market. Here's a brief collection of recent news and information from around the company.

OUR MARKETS

-  BUILDING
-  INDUSTRIAL
-  MINING
-  OIL, GAS & CHEMICAL
-  POWER
-  TRANSPORTATION
-  WATER/WASTEWATER

OUR VALUES:

-  PEOPLE
-  INTEGRITY
-  EXCELLENCE
-  STEWARDSHIP

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PAYING IT FORWARD

The Oroville Spillways Repair project team in California donated \$40,000 for upgrades to the Oroville Union High School District's baseball facilities. Craft employees chipped in \$15,000, subcontractors and vendors added \$10,000, and Kiewit contributed another \$15,000. "We've been lucky to have a community encouraging our team," said Kiewit Project Director Todd Orbus. "This is our way to pay it forward."



BRINGING HOME THE GOLD

The Powell Spillgate Rehabilitation Installation project in British Columbia received gold recognition in the Vancouver Regional Construction Association's (VRCA) Awards of Excellence in the up to \$15 million category. Peter Kiewit Sons ULC completed the seismic upgrades on the 108-year-old dam. Work included the in-place removal and replacement of 19 radial gates while the facility was still in service. The team logged 30,000 man-hours without a single lost time or recordable incident.

AWARD-WINNING TIMES SIX

The new Goethals Bridge opened to traffic earlier this year. Since then, the Goethals Bridge Replacement Project team has received numerous awards and accolades for their achievements.

Three Engineering News Record (ENR) Awards – New York Region

- 2018 Best Project in Highways/Bridges
- 2018 Best Project for Excellence in Safety
- 2018 Project of the Year

55th Annual American Concrete Institute New Jersey Concrete Awards

- 2018 Grand Award

Concrete Industry Board Annual Awards

- 57th Annual Roger H. Corbetta Award for Quality Concrete

American Council of Engineering Companies of New Jersey Awards

- 2018 Award for Engineering Excellence

KIEWIT AND BLACK & VEATCH SIGN ON FOR ANNOVA LNG

In October, Kiewit Energy Group Inc. and Black & Veatch Corporation announced an equity investment in the Annova LNG export project in Brownsville, Texas. The two companies will also complete an engineering, procurement and construction contract for the Annova LNG 6.0 million tonnes per annum (MTPA) project.

"The Annova LNG Brownsville Project will have a positive, lasting impact on the local community and further strengthens the Port of Brownsville's position as a global energy hub," said Tom Shelby, president of Kiewit Energy Group, Inc.



AND THE WINNERS ARE...

Thanks to a new Kiewit scholarship, three college students — Dia Cuntapay, Juan de la Garza, Jr., and Doug McLenithan— will pay \$5,000 less this semester. And if they continue to meet the criteria, they'll receive \$5,000 per semester per year for up to four years. The Kiewit Legacy Minority Scholarship encourages diversity in the engineering and construction management field by offering scholarships to highly motivated, minority high school students who plan to pursue a degree in engineering or construction management.



DIA CUNTAPAY



JUAN DE LA GARZA, JR.



DOUG MCLENITHAN



HONORING VETERANS

Across the Kiewit organization, projects and offices spent Veterans Day recognizing those who served. Kiewit presented a \$10,000 donation to Helmets to Hardhats at the Hickory Run Energy Station (HRES) project site in Pennsylvania. Helmets to Hardhats connects National Guard, Reserve, retired and transitioning active-duty military service members with career opportunities in the construction industry. Helmets to Hardhats Regional Manager Daniel Breslin accepted Kiewit's donation and gave remarks. "The funds will be used for getting our message out to veterans," shared Breslin. "With 250,000 veterans transitioning out annually, keeping them informed of the opportunities in the construction industry is Helmets to Hardhats' number one priority."

—CONNECTING PRAIRIE COMMUNITIES—

Just outside Saskatchewan's largest city of Saskatoon lie the communities of Warman and Martensville, two of the fastest growing cities in Canada.

In only 10 years, these cities have more than doubled in size, according to the Canadian census. With that increased population came more traffic and an opportunity for Kiewit and the local communities.

Peter Kiewit Sons ULC, working with the Ministry of Highways and Infrastructure in Saskatchewan, built new interchanges to serve both cities, along Highways 11 (in Warman) and 12 (in Martensville). And Kiewit Infrastructure Engineers (KIE) was also the engineer of record (EOR) for the \$60.6 million project, the first time KIE has held this distinction.

GROWTH DRIVES SAFETY CONCERNS

Saskatoon itself has grown to more than 246,000 (a jump of nearly 22 percent between 2006 and 2016), and that has turned Warman and Martensville from rural farming towns into suburbs for people working in Saskatoon. Both were incorporated as cities in just the past 10 years.

Highway 11 between Warman and Saskatoon has more than 17,000 vehicles per day, while Highway 12 between Martensville and Saskatoon has more than 14,000 vehicles per day. And as those highways approach the edge of their cities, the increased traffic led to left turns onto and across the highways, becoming more dangerous — resulting in vehicle accidents and a number of fatalities.

Kiewit constructed two new interchanges. The Warman interchange routed the intersection of Highways 11

and 305 to the west and added an overpass, on-ramps and off-ramps for easier traverse. The Martensville interchange dispersed traffic onto Main Street, which runs perpendicular to Highway 12, and Centennial Drive, which runs parallel to it. In addition, a new overpass allows travelers on Main Street to cross over or enter Highway 12 without having to cross traffic from either side.

“Traffic safety will also be improved for motorists driving through the area or commuting to Saskatoon,” said Penny Popp, assistant deputy minister of design and construction for the Ministry of Highways and Infrastructure. “Beyond



1. The Warman and Martensville Interchanges Project won awards for Safety and Best Overall Large Project from the Saskatchewan Heavy Construction Association (SHCA). Members of the Kiewit-led team accepted the awards at the SHCA convention in November. 2. Kiewit used communication tools like this 3D rendering of the Warman interchange at open houses for the local communities prior to construction.

Reshaping the land

Kiewit had a number of technical challenges in building the new interchanges. Saskatoon’s terrain is flat prairie, which forced the team to reshape the land to build the interchanges. Also, the Ministry had acquired all of the land before the design-build team was awarded the contract and before the design was finalized.

The KIE design team was up for the challenge, and designed the road profile, ditches and on-site borrow/landscape areas to balance the excavation and embankment on both the Warman and Martensville sites without having to acquire “borrowed” dirt from outside the project right-of-way or between project sites.

The resulting interchange designs have both cloverleaf-style looping ramps on one side, and more traditional straight ramps. Due to contract requirements to accommodate future bridge widenings and ramp adjustments, the bridge designs initially had

unbalanced span lengths. After KIE consulted the construction team and discussed various options, the center columns were realigned on both sites. This resulted in equal spans on individual bridges and both bridges being largely symmetrical, increasing construction efficiency.

In addition, the snow common in Saskatchewan’s long winters not only meant construction had to be seasonal, engineers also needed to shape the interchange geometry so the blowing snow would not collect on roadways during the winters. The winter, however, served a key purpose for the team.

During the first winter, 90 percent of the design was completed and issued to the construction team to break ground in March 2017. During the second winter, some elements of the project were behind schedule. The team, led by Kiewit’s newly appointed construction manager, Aileen Roberts, completely rebuilt and resequenced the 2018 construction operations as if it was a newly awarded job.



“We kept people on through the winter and used that time to build relationships with subcontractors,” said Roberts. “So when we were ready to hit the ground, we could go faster.”

In 2018, the Kiewit-led team of local Saskatchewan contractors attacked the new accelerated schedule and on Nov. 1 celebrated completion of the last day of production paving. Both new interchanges are open, nearly a year ahead of the client’s proposed schedule.

the local area, these overpasses provide additional benefits such as improving the efficiency of moving goods on our provincial highway network. Highway 11, in particular, is part of the national highway system and serves as the gateway to northern Saskatchewan.”

A TEAM EFFORT

Kiewit has done a number of construction projects in the province before, but two elements make this project unique: 1) It was the first large scale infrastructure design-build

project for the Ministry; and 2) KIE served as EOR for an infrastructure project for the first time.

Those two factors are related. The Ministry took the step of requiring bidders to submit a technical proposal first, which was evaluated independent of cost, before submitting the full bid that included financials. This allowed Kiewit’s experience in design-build projects to shine through. Popp said a design-build approach would give the Ministry greater scheduling and cost certainty.

KIE was part of the project team from the outset. Taking on the EOR role meant that Kiewit engineers would put their professional seals on all public renderings and take on a client-facing role in the execution of the project. In addition, the high-profile role helped reinforce the company's commitment to construction-driven engineering.

"Being a partner with the construction team, we're all about making it efficient to build," said Jim Bauman, senior design sponsor for KIE. "As a designer, we've got several choices to design anything that's required. Those choices should be answered by the construction team, and we'll determine what meets code and standards."

MANAGING THE CURVE

While both the construction and engineering aspects are handled by Kiewit, the fact that KIE is in a new role created a learning curve — but also a significant opportunity.

"We're all Kiewit so if there are challenges, you know exactly where to go and how to quickly mitigate them," said Andrew Schumacher, project manager. "You have more control of your own destiny when there is better overall integration between construction and design. There are challenges, too, because we learned lessons on the fly with KIE. But, if we can improve on our design systems and processes on small-to-medium-sized infrastructure jobs, with KIE as EOR, they can build the capacity to take on an EOR role on larger projects."

In addition, the Warman and Martensville interchanges have been constructed using subcontractors from the local Saskatchewan community, a factor Schumacher cites as being instrumental to Kiewit winning the bid, but one that required flexibility on Kiewit's part to manage a team comprised entirely of contractors with no Kiewit craft workers.

"If you can produce good results, it makes a difference," Schumacher said. "We've been relentless in our principles: safety, quality and schedule management."

Popp cites the Martensville overpass as an example of Kiewit's innovation and execution. The plan allowed Kiewit to close the busy Main Street intersection with Highway 12 for 30 days, temporarily inconveniencing residents but completing the new bridge crossing ahead of schedule.

"This eliminated long periods of detours and allowed construction crews to complete the tie-in work safely and more efficiently," Popp said. "The design-build allows for this type of schedule change." 

Ahead of schedule

Kiewit Project Manager Andrew Schumacher spoke to the community and elected officials in October as they marked the opening of the Warman and Martensville interchanges a year ahead of schedule.

"We wanted to complete it in 2018, and we wanted to complete it without any injuries," he said. "The opening of these interchanges is about the safety of the traveling public, but it's also about the safety of our workforce."



Building with a purpose

In addition to providing the Warman and Martensville communities with newer, safer roads, Kiewit also supported one of the area's leading children's organizations with donations to KidSport.

KidSport provides funding for local underprivileged children to play sports such as hockey, soccer and baseball. One of their key fundraisers is a raffle for a playhouse built by Grade 12 students at Martensville. Kiewit donated \$5,000 for the materials to build the playhouse and has committed an additional \$10,000 for the project to continue through the next two years.

Kiewit also participated in the unveiling of the playhouse in May. Not only is Kiewit's donation another example of partnering with communities everywhere it constructs projects, the nature of the fundraiser ties well with Kiewit's own business.

"By having the high school students build playhouses, they learn trade skills and get to participate in the community," said Aileen Roberts, construction manager for the Warman and Martensville project.



1. Kiewit donated the building materials for this KidsSport Playhouse that was auctioned for charity.
2. Photo looking east toward the city of Martensville shows the final deck pour on the Martensville Bridge.
3. Day 4 of the 30-day closure to replace an existing at-grade highway crossing, connecting the highway to the west and the city of Martensville to the east.



INDUSTRIAL

A MARKET LIKE NO OTHER

Think about some of the things you need and use every day.

Sidewalks and driveways are poured with concrete.

Cars and trucks are built with steel.

People — and pets — eat food, drink beverages and take prescriptions.

Businesses use paper for writing, printing and mailing.

At first glance, none seem to have much in common.

Upon closer look, there's a connection — at least at Kiewit.

All of these products fall into Kiewit's new industrial market, a recent addition to the company's six existing markets: building; mining; oil, gas and chemical; power; transportation; and water/wastewater.

While Kiewit and several of its subsidiary companies — namely TIC - The Industrial Company (TIC) and T.E. Ibberson, Co. (Ibberson) — have been designing and constructing industrial projects since their inception, today, the Kiewit organization is placing a more strategic focus on the industrial market with the goal of expanding its footprint in this growing area.

A MARKET LIKE NO OTHER

Industrial is Kiewit's most diverse market, covering: mineral processing; cement; bulk manufacturing; industrial water; metals; pulp and paper; specialty chemicals; food and beverage; pharmaceuticals and advanced manufacturing. Although construction varies significantly, the end result is the same: consumer goods.

While there are ties between these different types of industrial projects, there are also elements that set them apart. Clients and competitors typically specialize in one area rather than operating in several.

"For example, in oil, gas and chemical, there are a lot of clients that cover multiple sub-markets: upstream, midstream and downstream," explained Brian Deason,

southeast area manager for TIC. "You don't see that in industrial. You don't see cement makers crossing over into pulp and paper, and you don't see pulp and paper clients in food and beverage."

Industrial opportunities are heavily impacted by different economic and political factors. Due to a recent push in the United States to increase domestic manufacturing in the country, industrial work is growing rapidly. According to Industrial Info Resources, industrial plant spending increased nearly 7 percent from 2017 to 2018; in southern states alone, industrial spending is forecasted to reach more than \$164 billion, a 4.8 percent increase year over year.

Social factors also play a significant role in the market's growth. Food and beverage continues to evolve to satisfy consumers' ever-changing demands spanning from healthier, easy-to-prepare foods for families on the go, to no-grain, organic pet food. As craft brewers continue to gain popularity, the need for malt production has also increased.

Other parts of the industrial world have seen similar increases. For pulp and paper manufacturers, cardboard production has increased the last several years due to the popularity of online shopping. For aircraft and automobiles to meet fuel efficiency targets, the demand for high strength, lighter aluminum alloys and carbon fiber has grown.

SOMETHING OLD, SOMETHING NEW

Kiewit has renewed its push for industrial work, tapping its recent and historic experience in industrial engineering and construction.

Peter Kiewit Sons ULC is designing and constructing the new high-capacity grain export terminal for client G3 Terminal Vancouver. Located in the Port of Vancouver, British Columbia, the project will optimize receiving, cleaning, storing and shipping of grain, which is coming primarily from Canada's western Prairie provinces. When complete in 2020, the facility will handle 8 million tonnes of wheat, canola and other specialty crops.

Historically, TIC has participated in industrial projects that fall into the mineral processing, cement, bio-fuel, pulp and paper, and bulk manufacturing sub-markets. In June, TIC completed the Chesapeake Fire Rebuild project for Enviva, the world's largest producer of utility grade wood pellets. Crews demolished and rebuilt portions of a wood pellet export facility, which caught fire in February 2018.

Ibberson is a long-time player in the food and beverage and cement sub-markets. Most recently, Ibberson completed the Convent Phase III project for Zen-Noh Grain in Convent, Louisiana. Ibberson also finished construction on a series of pet food projects, including a dry food dog plant in Hereford, Texas; a wet can food plant in Hereford, Texas; and an upgrade to a dry dog food plant in Dunkirk, New York.

"Putting a more overarching, strategic focus and the right resources on industrial work allows us to identify the key clients and know what's going on in the marketplace, just like we do for our other markets," said Deason. "It's the right move to coordinate and maximize our collective experience and resources."

The shift also allows Kiewit to align more closely with standard industry conventions. For example, Engineering News Record (ENR) recognizes Industrial Process — which includes pulp and paper mills, steel mills, non-ferrous metal refineries, pharmaceutical plants, chemical plants, food plants and other processing plants — as its own market.

SETTING UP FOR SUCCESS

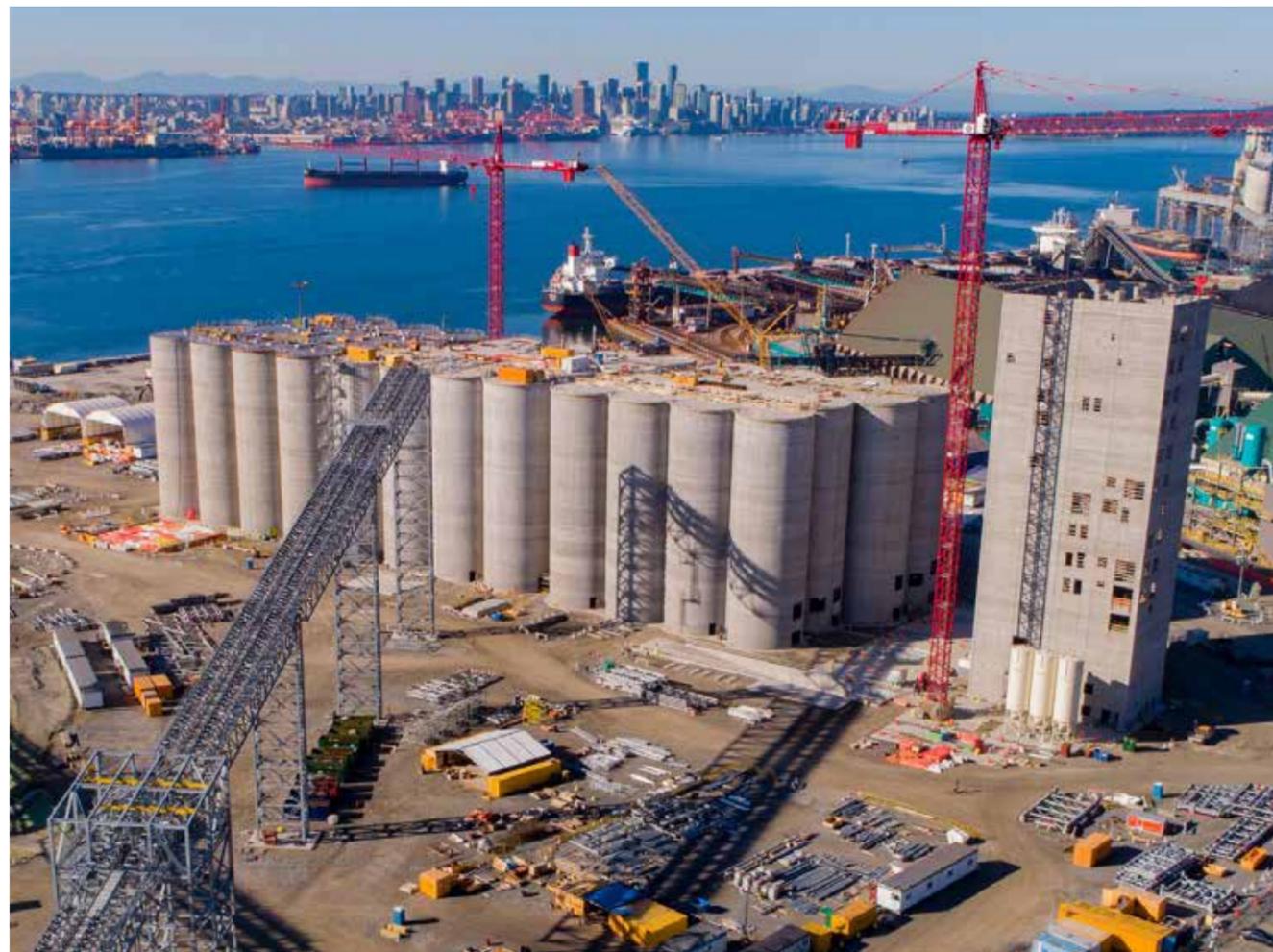
Earlier this year, Kiewit set up a new office in Atlanta to focus heavily on pursuing and building industrial work. The location is both strategic and practical: 80 percent of

industrial clients and their facilities are located within a four-to five-hour drive or one-hour flight from the city.

To increase Kiewit's depth of knowledge in the market, Deason and his team have added business development managers and operations personnel with extensive industrial backgrounds to complement the organization's existing expertise, especially in food and beverage work.

Beyond expanding its construction team, Kiewit is ramping up its industrial engineering services to perform detailed design and third-party engineering coordination for industrial projects.

"It's really been an evolution of engineering execution," said Megan Armstrong, industrial engineering director at Kiewit Engineering Group Inc. "For the G3 Terminal Vancouver project and several others, we've been continuously



The G3 Terminal Vancouver facility includes 48 concrete storage silos, scale and cleaning structures, high-capacity conveyors and a new dock and ship loaders. The facility will handle wheat, canola and other specialty crops.

Industrial market segments

The industrial market is broken into nine diverse segments, each with its own types of construction.



MINERAL PROCESSING

Ore processing, beneficiation, process refinement, gold, copper, silver, nickel, cobalt, lithium and other industrial materials

CEMENT

Material processing, powder production, and product handling and storage

BULK MANUFACTURING

Bulk material handling, processing, packaging and final product transfer

INDUSTRIAL WATER

Raw water filtration and desalination systems, water reuse and effluent treatment, and produced water treatment and reinjection

METALS

Steel manufacturing, rebar production and aluminum milling

PULP & PAPER

Bulk material handling, paper production, wood alcohol processing, final product process and packaging

SPECIALTY CHEMICALS

Construction chemicals processing, final product packaging and distribution, and bulk chemical storage

FOOD & BEVERAGE

Agricultural products; baked, prepared and frozen food; beverages; dairy; meat, beef and poultry; and warehouse and distribution

PHARMACEUTICALS AND ADVANCED MANUFACTURING

Pharmaceuticals, automotive, textile production, data centers, tires, microchips and high technology, and other advanced manufacturing



improving and developing how we execute projects with multi-faceted Kiewit engineering teams. We're really excited about the future."

With strong past experience and a new strategic focus, the industrial market presents a positive future opportunity for Kiewit.

With more than \$4 billion in industrial design and construction on Kiewit's radar, that piece of business could be much bigger, indeed.

"One thing many of our employees love about working for Kiewit is the ability to move around the country and do different types of work," said Deason. "This market will present additional opportunities for those who want to try something entirely different in their careers."

With so much growth and many different sub-markets — each with different construction, clients and competitors — the adventures for Kiewit employees may be endless. 🚧

In the works

Kiewit and its subsidiary companies have designed and constructed many types of industrial projects over the years. Below are three of many industrial projects currently under construction.



Enviva Hamlet
Hamlet, NC

Following TIC's work on the Chesapeake Fire Rebuild project, Enviva selected TIC to build the Hamlet wood pellet manufacturing plant. When complete in June 2019, the plant will produce utility grade wood pellets for Enviva's clients around the world. TIC is responsible for the mechanical, structural, pipe and electrical work on the plant.



Naheola
Pennington, AL

TIC is designing and building a biomass-fueled boiler, steam turbine engine and bark yard conveyor system at the Naheola pulp and paper mill for Georgia Pacific, a subsidiary of Koch Industries. The project will provide a foundation for Naheola's competitive position in the paper towel, toilet paper and dixie cup market. It will also improve the mill's environmental footprint and create a platform for future growth.



G3 Terminal Vancouver
Vancouver, BC

Peter Kiewit Sons ULC is designing and constructing the new grain export terminal for client, G3 Terminal Vancouver. Located in the Port of Vancouver, it is the first new grain terminal to be constructed there since the 1960s. The terminal will receive, clean, store and ship grain, which is arriving by rail primarily from Canada's western Prairie provinces. When complete, the facility will handle 8 million tonnes of grain annually.



GRIDIRON GOALS

As Kiewit's role in constructing Inglewood Stadium nears completion, it's clear that this team has got game.

Before the Rams and Chargers take the field in L.A. Stadium in 2020, Kiewit's own team will already have racked up an impressive record. The team's wide-reaching experience, coupled with excellent performance, led the client to award additional complex scope, more than tripling the contract value. It's a job that will stand out for years to come among seasoned project players and rookies alike.

Who do you sign when you need a roster of proven players with stellar stats and the ability to get the ball across the goal every time?

For the project owner and Turner AECOM Hunt, construction manager of the new NFL stadium in Inglewood, Calif., Kiewit was at the top of the list.

A phone call between Andy Peplow, Kiewit project executive, and Bob Aylesworth, principal in charge for Turner AECOM Hunt, began with a question.

Aylesworth had worked with Kiewit previously on Safeco Field in Seattle and Cardinals Stadium in Glendale, Arizona.

“Bob and his team were being asked to meet an aggressive schedule,” Peplow said. “He asked if Kiewit would be willing to look at a different solution for the project’s expansive retaining wall” that could accelerate the work.

Peplow knew the answer to this challenge, as well as anything else that would come their way, was as close as a call to a member of the Kiewit team.

From the start, 1Kiewit would set the tone for this project.

Rising to the challenge through collaboration is the hallmark of 1Kiewit — a company mindset that describes how, on any project, Kiewit people with the right experience and expertise for the job come together from across the country to ensure the project is a success.

A LESS EXPENSIVE, FASTER OPTION

Finding a solution to the project owner’s request would require the Kiewit players to think outside the box.

Because the stadium is in the flight path of Los Angeles International Airport, its field level would have to be constructed 100 feet below existing grade to satisfy FAA restrictions.

The initial design provided by the engineer included a slurry wall that required construction of the wall at the same time of foundation excavation, which would take considerable time.

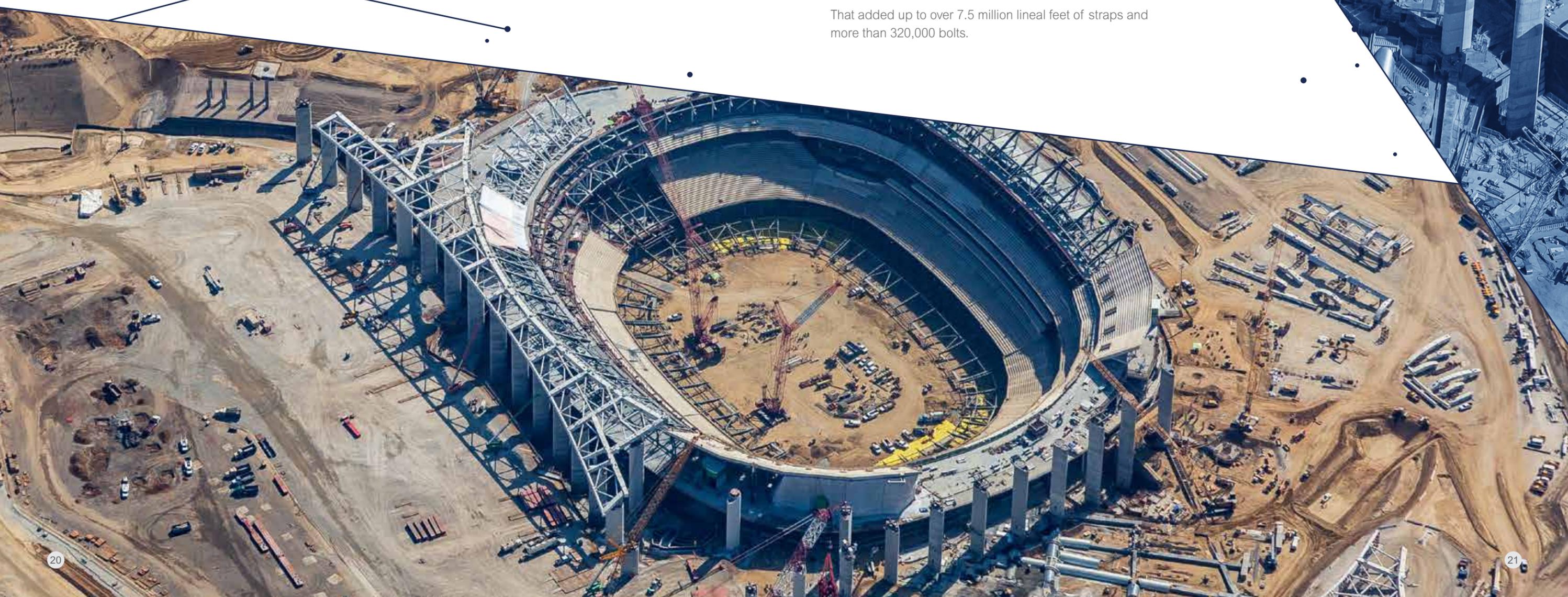
Kiewit proposed a different idea: a mechanically stabilized earth (MSE) wall made of precast concrete panels that would be substantially less expensive and could be built faster than the original design.

It was the solution Turner AECOM Hunt was looking for. Soon, Kiewit had a contract for the excavation of the site and building the wall.

But this wouldn’t be just any MSE wall, said MSE Wall Manager Justin Daniel. “At nearly 100 feet tall, this is one of the tallest ever built.”

That meant thinking big for both craft and materials. The usual MSE wall has a steel strap, 40-50 feet long, which goes back into the fill. For Inglewood Stadium, this strap reached 120 feet with up to 12 straps per panel.

That added up to over 7.5 million lineal feet of straps and more than 320,000 bolts.



Play by play

5.5 MILLION CUBIC YARDS OF MASS EXCAVATION FOR STADIUM BOWL

7.55 MILLION TOTAL LINEAL FEET OF MSE STRAP

252,000 SQUARE FEET OF MSE PANELS

Nearly **2 MILLION** CUBIC YARDS OF MSE BACKFILL

107,000 CUBIC YARDS OF CONCRETE

7.5 MILLION CUBIC YARDS OF DIRT HANDLED

36 MILLION POUNDS OF REBAR

Lineup

90 KIEWIT STAFF & **400 KIEWIT CRAFT** at peak

Estimated to use **1.7 MILLION** MAN-HOURS (including staff and craft)

\$46 MILLION worth of equipment, including:

- 30** CAT 657 SCRAPERS
- 6** CAT 773 HAUL TRUCKS
- 10** CAT 740 HAUL TRUCKS
- 2** CAT D10S
- 2** CAT D9S
- 1** CAT D8
- 1** PC 1250 EXCAVATOR
- 3** CAT 980 LOADERS
- 1** TOWER CRANE
- 14** VEHICLES
- 15** CRANES RANGING FROM 65-TON HYDROS TO 600 MG CRAWLERS
- 1** 95-TON SHUTTLE LIFT

"A typical MSE operation has one crew that does the panels, straps and the backfill," Daniel said. "But because of the size of this job and all the parts and pieces that we needed, we broke it up into smaller bites. We had separate crews that all they did was the straps, or the panels or the backfill."

The wall is one of three design-build jobs Kiewit has on the project. The others are a 10-foot cast-in-place wall on top of the MSE wall and a tunnel that will be used to deliver players and concessions to the stadium.

'OF COURSE, WE CAN DO THAT'

Not long after being awarded the first contract, Kiewit was asked to provide some alternate ideas for the roof columns that support the 20,000-ton, 1.1-million-square-foot stadium canopy.

The original design was a structural steel design with concrete cast around it. However, the density of the reinforcing steel made it an unrealistic option, given the location of the project on an active seismic area.

Talking with one of the Turner AECOM Hunt managers, Project Director Thom Baulisch suggested using post-tensioned, precast segments to construct the 38 blade columns.

"I ran it by Area Manager Ralph Salamie who said, 'Oh, yeah, of course, we can do that.' It really was a great solution for the owner, saving both time and money. And it was possible just because we have such diverse experience and so many resources available in our company."

Combined with a post-tensioning system that Kiewit uses on bridges, the columns will provide the flexibility required for the facility to withstand up to a 9.0 magnitude earthquake.

BUCKET LIST PROJECT

Tensioning each of the columns is a system of 1,450 miles of strand, says Post-Tensioning Superintendent Meghan Stotts.

Every piece of post-tensioning is made of individual strands that make up a tendon. This job has 7.7 million linear feet of strand, creating 1,700 tendons.

The PT system travels from the base each column sits on — called a butterfly cap — to an anchor block, or deadman. Every butterfly has 48 post-tensioned tendons going

Training camp

Because of the scope of Kiewit's work, Inglewood Stadium has offered many younger team members opportunities to gain valuable experience on the job.

Sippy Aria has been with Kiewit for six years, which may make her a rookie to some. But during her time on this project, she's served as general superintendent over rebar and concrete, structures project engineer, and most recently, project engineer for the entire job.

"The different disciplines that I've worked with made it an amazing experience for me, definitely," she said.

"I've had a really good support system from managers. They understand what I'm good at, what I need to be trained on and what my end-all goal is. They have really helped and mentored me throughout my career."

Her takeaway once the project is complete: "How proud I am to work for a company that has so many different types of resources," Aria said.

"I don't know of many other general contracting companies that have a branch of engineering that they can bring in and have the ability to mobilize the fleet of equipment from across North America in such a short amount of time."

What question does she hear most often from friends and family about the project? "Everyone wants to know how many tickets I can get." Her reply when they ask: "I'm going to work on my ticket first," she laughed.



through it: the blade column tendons, loop tendons and strut tendons.

Loop tendons go down from the butterfly caps a hundred feet into the spread footing, across 40 feet and back up 100 feet.

For Stotts, who grew up playing sports in Minnesota, being on a project like this has always been on her bucket list.

"I don't know if the word 'unique' really does it justice," she said. "I never thought in my wildest dreams I'd ever build a stadium. Every time I come to the job I feel like a little kid because it's kind of a dream come true."

ONE-STOP SHOPPING

While it will be another year and a half before the teams take the field, the project players will look forward to doing a figurative end-zone dance of their own.

"This has been the best Kiewit experience I've been part of," said Peplow. "I've never been on a project for Kiewit where we've utilized so many of the resources that we have to offer."

"That includes mobilizing a massive fleet of equipment very quickly and bringing the expertise to set up a precast yard on site to the expertise of the post-tensioning, to our structural and geotechnical expertise and being able to get resources from all over the place."

Aylesworth says the cost and time savings Kiewit has delivered are substantial.

"I think it's safe to say that the savings are well in excess of \$100 million. From a schedule perspective, I believe the solutions — in particular, the MSE wall — probably saved the project a year. If you're a National Football League team, that's a lot."

"I don't believe there's a contractor that has Kiewit's range of capability, especially as it relates to this project," Aylesworth added. "For us, it was one-stop shopping." 

