ACEC Missouri

2025 Engineering Excellence Awards

Grand Conceptor Award

Parsons, St. Louis

PROJECT TITLE:

I-270 North Design-Build Project

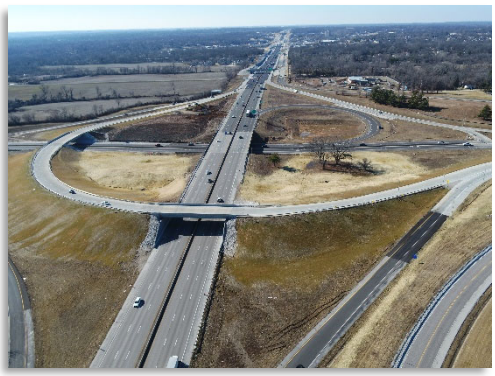
CLIENT/OWNER:

Missouri Department of Transportation

Parsons is the lead designer for the I-270 North Design-Build Project. This is the largest project undertaken by the Missouri Department of Transportation in recent years, and it entails a major modernization of the critical transportation system linking urban interstate between I-270 and the Missouri-Illinois state line at the Mississippi River. The improvements relieve growing traffic congestion, enhance safety and resiliency, and expand mobility for freight and passengers. This marquis project in the Gateway to the West also creates an economic boost for nearby communities. Parsons' team provides multifaceted cost and design solutions for rehabilitating and widening nine miles of interstate and reconstructing ten interchanges using one-way roads and roundabouts. The design eliminates unsafe, unsignalized crossover ramps, includes 18 new bridges, and maximizes the scope within the client's fixed-price budget of $252M.

The I-270 North Design-Build Project in Missouri addresses several critical issues. The corridor, built in the 1960s, suffers from aging infrastructure, including deteriorated pavement, bridges, interchanges, and outer roads. Additionally, the route experiences significant traffic congestion, carrying over 140,000 vehicles per day, and has safety concerns due to outdated freeway systems and unsafe, unsignalized cross-over ramps. There is also minimal accessibility for local pedestrians and bicyclists.

To solve these problems, the project involves the reconstruction and rehabilitation of the deteriorated infrastructure, including pavement and bridges. It aims to improve traffic operations, geometrics, and safety by adding an extra driving lane in both directions and constructing new interchanges. The design eliminates unsafe, unsignalized cross-over ramps and includes 18 new bridges. The project also enhances pedestrian and bicycle facilities by constructing a new 10-mile multi-use path along Dunn Road and Pershall Road. These improvements are expected to relieve traffic congestion, enhance safety and resiliency, and expand mobility for freight and passengers, creating an economic boost for nearby communities.



The I-270 North Design-Build Project is a comprehensive effort to modernize a critical transportation route in Missouri. By addressing the aging infrastructure, traffic congestion, and safety concerns, the project enhances the overall functionality and safety of the corridor. The reconstruction and rehabilitation of deteriorated pavement, bridges, and interchanges, along with the addition of new driving lanes and interchanges, significantly improves traffic operations and mobility for both freight and passengers. The project includes important safety improvements, such as the elimination of unsafe, unsignalized cross-over ramps and the construction of 18 new bridges. The addition of a 10-mile multi-use path enhances accessibility for pedestrians and bicyclists and promoted a more inclusive transportation system. Overall, the project is expected to provide an economic boost to nearby communities, demonstrating the commitment to creating a safer, more efficient, and resilient transportation corridor.

Bartlett & West, Inc., Jefferson City

PROJECT TITLE:
MoDOT Guardrail

CLIENT/OWNER:
Missouri Department of Transportation

In January 2023, MoDOT contracted with Bartlett & West to locate a specific type of guardrail end terminal on the MoDOT highway system. This expansive network encompasses 38,000 centerline miles, including interstates, state routes, ramps and auxiliary roads.

MoDOT furnished the digital files for all these routes to Bartlett & West. Bartlett & West used GIS files to build an online GIS real-time map for data collection and to perform QA/QC functions. This online map was linked to each Bartlett & West field crew's IPAD and Trimble TDC 6 data collector. Field crews would collect pictures of each end terminal and GPS location. The data would then be uploaded automatically to the map allowing the end users real-time access to the data. As field crews finish a specific route, they can update its status to reflect its completion.

To verify each measurement of the width of the guardrail end caps stem were uniform, we innovated a color coded jig for each two-person field team to use. When placing the jig on the end cap stem, if green was on shown on top that would indicate that it is a 5-inch wide stem, if red was on top that would indicate that it was a 4-inch wide stem. This allowed for efficient and equal measurement between each field team.

Photos of each terminal were taken, accompanied by their corresponding GPS locations. The Bartlett & West field crews would collect pictures with a Trimble TDC 6 data collector connected to a Trimble DA2 GNSS system utilizing the Trimble subscription-based Catalyst 10 system, which would allow field crews to get accuracies of 10cm or less on end terminal locations.

Bartlett & West also developed an online dashboard which allowed both their team and the client to monitor the field teams' progress in real time during deployments. As the project progressed, the dashboard grew to allow end users to query various data sets tailored to their specific needs, becoming a key component of the deliverable packaged to MoDOT.

Hg Consult, Inc., Kansas City

PROJECT TITLE:
I-70 SIU4 EIS NEPA Re-Evaluation

CLIENT/OWNER:
Missouri Department of Transportation

The I-70 SIU 4 Environmental Impact Statement National Environmental Policy Act Re-Evaluation (SIU 4 EIS Re-Evaluation) is related to proposed improvements along an 18-mile stretch of I-70 through Boone County, MO from just east of Route BB to just east of Route Z (see Figure 1). This section of I-70 includes 10 interchanges and passes through the heart of Columbia. The estimated cost of the proposed improvements is $1.034B.

Because the original I-70 SIU 4 EIS was prepared in 2006, FHWA and MoDOT required a Re-Evaluation of the original study. Hg Consult served as the Prime Consultant and led all aspects of the SIU 4 EIS Re-Evaluation study

including Project Management, Environmental Analysis & Re-Evaluation Document Preparation, Alternatives Development and Refinement, Preliminary Design, and Public Involvement. Key teammates include CMT, BMcD, ARC, and ES&S.

In 2023, Governor Parson signed a bill allocating $2.8B to improve I-70 across the state. This new funding for I-70 provided MoDOT with a revenue stream to begin improvements along the corridor and required quick implementation.

In anticipation of this additional funding for I-70 improvements, and to encourage the speed and innovation benefits of a Design Build (D-B) delivery process, MoDOT challenged the Hg Consult team to develop, in addition to the Preferred Alternative, a full range of NEPA alternatives that analyzed the impacts of a composite NEPA footprint that incorporates all of the project's Reasonable Alternatives. By doing so, the D-B teams were free to select any of the Reasonable Alternatives identified at each interchange location, or new alternatives within the composite footprint, to improve I-70 without the added time and expense of preparing another Re-Evaluation or Supplemental EIS.

Approved in 2023, the SIU 4 EIS Re-Evaluation was the first MoDOT NEPA study prepared in this manner and set the "bar" in terms of process and format for the six subsequent NEPA Re-Evaluations along I-70. The SIU 4 EIS Re-Evaluation was completed ahead of schedule and almost $1M under the Consultant's contracted budget.

The FHWA approved the SIU 4 EIS Re-Evaluation December 11, 2023, allowing MoDOT to award the first D-B Improve I-70 project in early 2024. This project will add one additional lane in each direction of I-70 for approximately 20 miles between the I-70/US 63 interchange in Columbia and the I-70/US 54 interchange in Kingdom City. As a result, MoDOT was able to quickly advance into construction, demonstrating innovation and responsiveness to legislators and the traveling public for current and future funding opportunities.

IMEG, Chicago, IL

PROJECT TITLE:
21c Museum Hotel

CLIENT/OWNER:
Nuovo RE, LLC

The 21c Museum Hotel, a full-service boutique hotel, art museum, bar and restaurant, was a YMCA from 1926-2016. Built in the Renaissance Revival style, it is listed on the National Register of Historic Places.

As the adaptive reuse was planned, the owner wanted to highlight the building's historic character. IMEG collaborated closely with the architect and historic preservation officials to create code-compliant, design-efficient mechanical and fire protection systems that could be installed while maintaining historic features. This work was like solving a puzzle — how could the team best respect the historic nature of the property while creating a modern, comfortable, upscale hotel and museum?

As is common with adaptive reuse of century-old buildings, actual conditions differed from the design documentation. The team reworked MEP designs to make the program work with the as-built structure. Some of the surprises included:

- The YMCA was built on top of a block of demolished row homes, and some of those walls and foundations were intact. All below-grade MEP and utility work had to be designed to work through or around these obstructions.
- The floor-to-floor clear height did not match existing design documentation. The difference of two inches meant the systems had to be redesigned.
- The building's pan joist construction did not line up as documentation indicated. It was as if they had been randomly laid out by the installers 100 years ago. This meant the ducts and pipes had to snake their way through the walls, rather than run straight up and down.

Other key components of this adaptive reuse include:

- In areas with vaulted ceilings, IMEG coordinated underfloor HVAC distribution, so it did not disrupt furniture and architectural elements.
- Overhead ductwork distribution would not be appropriate for the swimming pool of this historic property. Instead, IMEG repurposed radiator enclosures on the perimeter and routed ductwork under the floor to those enclosures to serve the space via HVAC in another way.
- One of the focal points of the hotel is the ballroom/gallery, formerly the YMCA's gymnasium and overhead track. The team spent months designing the ductwork and lighting behind its beautiful ceiling only to have historic preservation officials reject the plan. The team reworked the plan to accommodate the preservation team's concerns.
- To best protect the artwork throughout the building from potential fire and water damage, each of the common area floors uses a double interlock pre-action fire protection system.

Lochmueller Group, Inc., St. Louis

PROJECT TITLE:

Rex Whitton Expressway & Lafayette Interchange Mitigation

CLIENT/OWNER:

Missouri Department of Transportation

The Rex Whitton Expressway & Lafayette Interchange Mitigation project for the Missouri Department of Transportation (MoDOT) was located in Jefferson City, Missouri, with the purpose of providing cultural mitigation for the construction of the Lafayette Street interchange connecting to the Rex Whitton Expressway (US 50). The new interchange construction resulted in an Adverse Effect under Section 106 of the National Historic Preservation Act due to the demolition of the last remnants of the historic Foot neighborhood, an African-American community that thrived from 1900 until its demise in the 1960s resulting from the construction of US 50 and local urban renewal efforts.

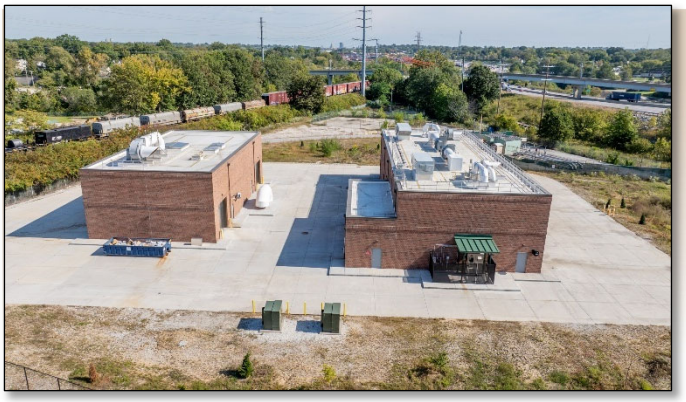
To honor the legacy of The Foot, Lochmueller Group, Inc. (Lochmueller) produced a 40-minute documentary titled The Foot: A Community Remembered. This film utilizes oral histories, archival photographs, and narrative storytelling to preserve the memories of a community that has largely been erased from the landscape. The documentary serves not only to illuminate the past but also to address the complex feelings surrounding the community's loss. The Foot is Jefferson City's first Legacy Historic District, with no extant buildings.

The project faced significant challenges, particularly in establishing trust with community members who had direct negative experiences with the urban renewal efforts. Building these relationships was critical to gaining access to authentic narratives. The Lochmueller team prioritized community outreach, fostering connections with individuals who had previously been hesitant to share their stories.

This initiative is viewed as an important step towards healing longstanding grievances. By directly confronting issues of race and the impact of highway construction and urban renewal on minority neighborhoods, the documentary aims to raise awareness of these historical narratives and their relevance to current social and environmental justice conversations. The project also aligns with Executive Order 12898, which seeks to address disproportionate impacts on underserved communities.

Notably, MoDOT recognized the value of this creative approach to mitigation, with statements from its Historic Preservation Manager and Senior Historic Preservation Specialist expressing gratitude for exceeding expectations and the emotional impact of the documentary. Lincoln University, which has a complicated history with the Foot community, also supported the project, acknowledging its significance in community engagement.

Overall, the documentary not only serves as a valuable educational resource but also as a foundation for ongoing dialogue and improved relationships between transportation engineering entities and historically underserved communities. This project exemplifies how creative media can be leveraged to mitigate adverse effects on historic resources while fostering social healing and understanding.



Parsons, St. Louis

PROJECT TITLE:
Deer Creek Sanitary Tunnel and Pump Station

CLIENT/OWNER:
Metropolitan St. Louis Sewer District

The Deer Creek Sanitary Tunnel and Pump Station project exemplifies Parsons' commitment to delivering transformative engineering solutions that address contemporary challenges and promote a sustainable future. Parsons serves as the Deer Creek Watershed Consultant for the Metropolitan St. Louis Sewer District (MSD). The program was expected to extend over a 10-year period and was one of the first major projects of MSD's Capital Improvement Program. The watershed, located in St. Louis County, consists of approximately 24,000 acres served by sanitary systems, including over 100 miles of sanitary and combined sewer. This extensive project involves preliminary and final design, as well as construction-phase services for a tunnel, pump station, eight shafts, five diversion structures, and five hydraulic drop structures. The project included the design of a wet weather sanitary storage facility to attenuate peak wet weather flows and mitigate overloading of the Deer Creek Trunk sewer. It also manages the release of stored wastewater back into the sanitary collection system to prevent overloading downstream sewers and the Lemay Wastewater Treatment Plant. The tunnel, which is approximately 4 miles long and 19 feet in diameter, is located 175 feet below the surface in solid rock and has the capacity to store over 38 million gallons during wet-weather events.

Historically, heavy rains would overcharge the existing sewer system in the Deer Creek watershed, leading to basement backups and sewer overflows. The Deer Creek Tunnel provides relief to several communities including Clayton, Richmond Heights, Brentwood, Maplewood, Webster Groves, and Shrewsbury. Several construction options were considered, including pumping excess flow to above-ground storage tanks or building a network of open-cut sanitary sewers. With the heavily developed urbanized area and the number of roadways involved, it was determined that a deep storage tunnel with a pump station provided the least disruptive and most cost-effective solution. Using an enormous Tunnel Boring Machine (TBM), contractors bored thru deep rock 150-250 feet below the ground surface. The inside of the tunnel is finished with a concrete liner leaving an inside diameter of 19 feet and approximately 4 miles long, capable of storing 38 million gallons. At the downstream end of the tunnel, a pump station was designed and constructed to drain the tunnel in less than 48 hours when there is capacity at the wastewater treatment plant. The hydraulic modeling performed by Parsons was crucial in determining the tunnel's alignment, diameter, and components to prevent surges and transient pressures, ensuring the system's efficiency and reliability.

The Deer Creek Sanitary Tunnel and Pump Station project exemplifies a successful response to significant urban infrastructure challenges. By leveraging advanced engineering solutions and engaging with the community, Parsons delivered a project that not only addresses the immediate issues of flooding and sewer overflows but also provides a sustainable long-term solution. This project serves as a model for future initiatives in our industry and stands as a testament to our firm's dedication to innovation, sustainability, and community-focused engineering. We look forward to contributing to the ongoing dialogue about the industry's role in creating a better world.

SCI Engineering, Inc., St. Charles

PROJECT TITLE:
Dierbergs Crestwood Crossing

CLIENT/OWNER:
Dierbergs Markets

The redevelopment of the former Crestwood Mall site into a mixed-use community featuring a Dierbergs Market grocery

store, residential subdivision, and public amenities stands as a model of innovation and urban renewal. SCI Engineering, Inc (SCI) played a pivotal role in providing environmental services, geotechnical services, and construction materials testing and inspections, for this project. SCI provided comprehensive services for the demolition of outbuildings, along with the construction of vital infrastructure including retaining walls, a pedestrian bridge, the Dierbergs Market, and extensive grading for the subdivision.

The project's complexity required advanced geotechnical techniques to investigate subsurface conditions. The site required careful planning to manage risks including significant elevation changes, undocumented fill materials, and seismic risks. SCI Engineering addressed variable fill materials, including clay, rubble, and foundation remnants, and used innovative remediation methods such as lime stabilization to mitigate expansive soils and seismic hazard risks. These solutions not only ensured long-term site stability and sustainability but also provided cost-effective design and development recommendations. SCI provided customized solutions for each challenge, minimizing potential delays, keeping the project within budget and ensuring long-term success.

This urban redevelopment project addressed many social and economic challenges. The development provided much-needed housing and retail services, including a full-service grocery store with a pharmacy, restaurants, and public spaces, enhancing both the social and economic fabric of the area. This development added 81-single family homes to accommodate the growing community and improved access to essential resources. Additionally, SCI Engineering minimized environmental impact by reducing material haul-off and repurposing building debris, maximizing sustainability.

The Dierbergs Markets Crestwood project showcases SCI ’s ability to deliver innovative solutions for complex challenges, maximizing sustainability and safety, and successfully collaborate with multiple stakeholders to deliver added benefits to the community. SCI not only adhered to the project’s budget and timeline but also exceeded client expectations by maximizing the reuse of onsite materials. Successful coordination and collaboration with the City of Crestwood, Dierbergs Markets, and other key participants exemplifies how teamwork within the engineering profession drives innovation and enhances public awareness of the critical role engineers play in shaping our communities. This project stands as a testament to the power of collaboration and innovation in delivering solutions that benefit both the client and the community.

TREKK Design Group, LLC, Kansas City

PROJECT TITLE:

I-49 and Route 7 Interchange Improvement

CLIENT/OWNER:

MoDOT Kansas City District

The I-49 and Route-7 Interchange Improvement Project provides Missouri residents with an enhanced connection between two primary routes in the region. The Missouri Department of Transportation’s (MoDOT) primary project goal was to replace the outdated Route 7 bridge with one that met current standards. However, with minimal additional cost, significant value was provided to Missouri residents by also enhancing safety and improving traffic flow. This heavily traveled interchange connects Kansas City to recreational areas in central and southwest Missouri, handling an average daily traffic of 36,000 vehicles on I-49 and 16,000 vehicles on Route 7. As growth between the regions continue, an interchange that better serves the increasing traffic volumes became a priority for MoDOT.

TREKK’s innovative solution of a unique ‘separated’ Diverging Diamond Interchange (DDI) provided some additional benefits to the typical DDI. of As with most DDIs, the number of vehicle conflict points were reduced and the flow of turning traffic was optimized. The I-49 and Route 7 DDI is special due to the through movements being separated from each other between the ramp intersections. This configuration allowed for the construction of the new bridges without impacting the existing traffic patterns. Because of the heavy traffic volumes using this interchange, the expected savings in road user costs during construction was significant.

The project resulted in better traffic flow and enhanced safety not only during construction, but also in the final configuration. The DDI configuration is proven to be safer and more efficient than traditional diamond interchanges due to the reduced number of conflict points, improved sight distance, and increased left-turn capacity. Research

shows that DDIs reduce rear-end, left-turn, and right-angle crashes, offering long-term benefits. The bridge configuration also allows for future lanes of I-49, planning for traffic demands for the next 75 years.

TREKK's engineering creativity on the I-49 and Route 7 Interchange Improvement project demonstrated innovation of the proven DDI configuration. The project's success shows TREKK's commitment to innovative solutions that enhance safety and support infrastructure resilience. Through collaboration with MoDOT and local stakeholders, TREKK delivered a sustainable, community-focused solution that demonstrates a new interchange configuration to be considered in other locations across the country. Because of TREKK's thoughtful engineering approach, the contractor was able to complete the project ahead of schedule and under budget.

Walter P Moore, Kansas City

PROJECT TITLE:
F&M Bank Arena

CLIENT/OWNER:
Convergence Design / Montgomery County Tennessee

In September 2023, F&M Bank Arena opened in downtown Clarksville, Tennessee. The arena, with a seating capacity of 5,500, hosts large concerts and features two ice sheets for youth hockey and public skating events. It also serves as the home venue for the men's and women's basketball teams of Austin Peay University, enhancing their facilities and recruitment efforts.

The project was built on an underdeveloped, steeply sloping downtown site underlain by highly variable Karst geology prone to fissures and irregular rock profiles. The unique geological characteristics of the site presented a myriad of engineering challenges.

In addition to creating a state-of-the-art arena, the structural engineer demonstrated engineering excellence in two primary ways. The structural engineer first created an innovative digital workflow that integrated mapping, design, and documentation techniques to develop an economical, seismically safe micropile foundation system, efficiently conforming to the variable bearing levels.

Second, the engineer utilized four different lateral soil resisting systems as well as a protective moat strategy to nestle the arena into the hillside without allowing soil loads to push on the building in an earthquake, cost-effectively shielding the building from negative seismic impacts.

Two top-down retention systems—tied-back concrete soldier pile walls and soil nail walls—provide lateral resistance along the taller sections of the perimeter, with retention heights up to 55 feet. Two additional conventional retention systems—mechanically stabilized earth (MSE) and cast-in-place concrete cantilever retaining walls—provide lateral soil resistance at shorter heights. Together, the four systems isolate the structure from the surrounding and potentially active soil mass, allowing the soil to shift in a seismic event without impacting the arena. The systems also eliminated the need for the structure to withstand the substantial static, unbalanced lateral soil loads, reducing construction costs and improving seismic safety. Precast planking on slide bearings bridges the gap created by this moat at street level around the building's perimeter, allowing the soil and structure to move independently.

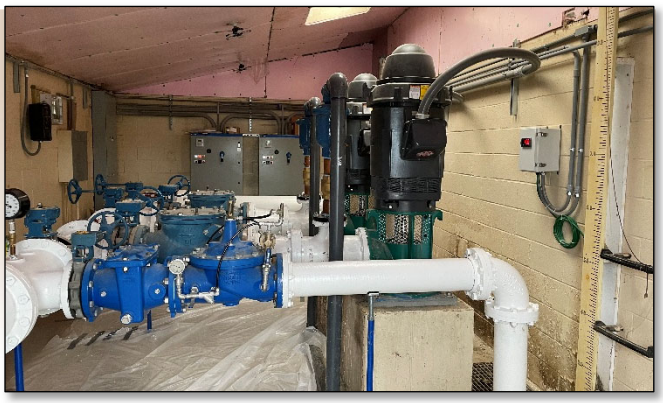
The cost and operational benefits of nestling the arena into the hillside were numerous. One was that every level of the arena—even the rigging grid level—was accessible from grade. This level of accessibility for patrons, operating staff, and riggers is almost unprecedented for a modern arena.

The project has significantly benefited Clarksville, allowing the city to attract top entertainment acts. F&M Bank Arena met all client goals and has been a great success for Clarksville and Montgomery County. Despite the challenges posed by the Covid-19 pandemic, the arena was completed on time and within budget. In its first year of operation it has received praise from performers, media, and the community for its functionality and engagement.

Bartlett & West, Inc., Jefferson City

PROJECT TITLE:
Centralia, MO Wastewater Treatment Expansion

CLIENT/OWNER:
City of Centralia, Missouri



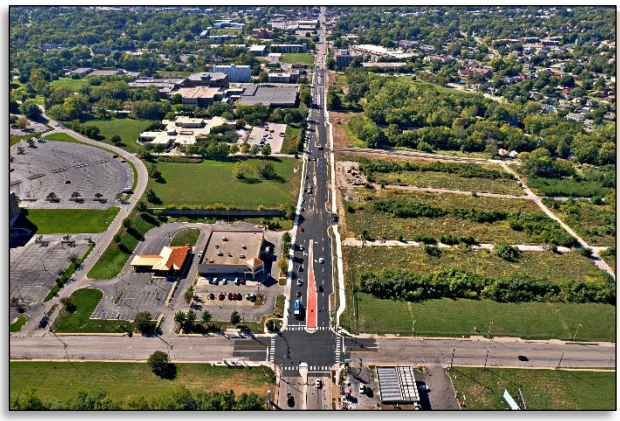
This project provided extensive upgrades to Centralia's wastewater storage and treatment systems. Bartlett & West helped the City procure a low-interest, government loan to coverthe costs, used innovative drone surveying and coordinated stakeholders and vendors in addition to the infrastructure changes noted below. After completion, the City was provided with sufficient storage capacity and no longer discharges wastewater into local streams. Other project elements include:

The City's treatment system is unique in that it is not entirely owned by the City. Much of the land used for treatment is owned by private farms, and the City is allowed to utilize that land for irrigation of wastewater through long-term lease agreements with the property owners. The City's existing system consisted of two City-owned lagoons for primary treatment along with three farmer-owned basins and 12 farmer-owned wastewater irrigation fields. The project added four new wastewater storage basins - two city-owned and two farmer-owned. In addition, seven new wastewater irrigation fields were added to the system - one city-owned and six farmer-owned. Controls upgrades were also completed on seven of the farmer-owned irrigation pivots. Several upgrades were also made to the existing City-owned and farmer-owned pumping systems for increased flow capacity.

With the new infrastructure added to the system, the City's distribution system was analyzed to be sure the increased flows would not damage the existing assets. The analysis investigated the hydraulics for proposed distribution infrastructure and the overall system with more than 20 pumping scenarios. The analysis determined the pump selections proposed for both the City- and farmer-owned pump replacements and additions.

New pumps and irrigation field equipment required electrical upgrades. This consisted of new electrical services, reworking of existing electrical configurations and power supplies, updating existing controls equipment, and selecting new controls equipment. Since new center pivot irrigation systems were added to the system, analyses and selection of proper center pivots, corner arms, and irrigation pipelines was required. This involved extensive coordination with equipment vendors and the farmers for equipment selection and cost proposals.

After several years of planning, both financially and technically, the wastewater expansion was fully complete and operational in the Fall of 2023. The City's treatment system is now permitted as a no-discharge facility with zero permitted point discharges to local streams, which supports the Missouri Department of Natural Resources mission to reduce the level of pollutants that enter waterways of the State.



Bartlett & West, Inc., Jefferson City

PROJECT TITLE:
63rd Street Reconstruction

CLIENT/OWNER:
Kansas City, Missouri

The 63rd Street Reconstruction in Kansas City, Missouri (KCMO) was a design-build project, a complete reconstruction of 63rd Street from Woodland Avenue to Prospect Avenue and

included installing a 16-inch transmission water main. The road project was limited to a not to exceed guaranteed maximum price (excluding a water main replacement) for $6 million.

The project improvements incorporate a complete street design and includes 4-lane roadway with curb & gutter and divided median, 5-foot sidewalk on the south side and 10-foot multi-use path on the north side of 63rd Street, new LED Street Lighting, new storm sewer to separate approximately two acres of stormwater runoff from combined sanitary/storm sewer system, new traffic signals at Woodland Avenue and Euclid Avenue, realigning the intersection of Brooklyn Avenue, tree planting, improved transit/bus stop facilities, 2,500-foot of 16-inch transmission water main and improvement to transit facilities. This roadway corridor was littered with underground utilities.

This project also incorporated strategies from an intersection safety study that aligns with KCMO's Vision Zero plan for bike and pedestrian safety. The two acres of stormwater runoff was designed and routed to an existing dedicated storm sewer with the option to disconnect and outlet the storm runoff to a future water quality/green infrastructure project as Danial Boon's Park.

This roadway corridor was littered with underground utilities. From the proposal stage, we decided to implement Subsurface Utility Engineering (SUE). Rademacher Brothers Excavating (RBE) did extensive potholing to identify exact locations of critical utilities. Bartlett & West incorporated this information into our plans and were able to design around all except a couple of handholds. Implementing SUE benefited all the utilities and RBE by saving them time and money. This was critical with the shortage of labor, issues in the supply chain, and the increasing cost of materials.

The citizens of KCMO will benefit from the project by the much-needed safety and ADA improvements that improve the mobility to connect people to schools, parks, and health care facilities along the 63rd Street corridor.

Brown and Caldwell, St. Louis

PROJECT TITLE:

Little Blue Valley Primary Heat Exchanger Replacement

CLIENT/OWNER:

Little Blue Valley Sewer District

The Little Blue Valley Sewer District (District) operates a regional system providing wholesale wastewater services to approximately 360,000 people residing in surrounding customer jurisdictions in and around Independence, MO.

Wastewater treatment generates solids and the District utilizes an incineration system to reduce the mass by over 95 percent yielding a sterile ash. Without the incineration process the District would be subject to daily hauling and landfilling fees to dispose of the solids.

The incineration process includes a primary heat exchanger (PHX). This piece of equipment is critical to avoid unnecessary use of fossil fuels. The PHX transfers heat from the furnace flue gas to the combustion air used to feed the furnace. The preheating of the combustion air offsets the need for fossil fuels to achieve furnace temperatures (more than 1,400 deg F) required to process the wastewater solids.

The existing PHX was installed in 2014 in the process train associated with the District's sanitary sludge fluid bed incinerator, and was found to need significant repair upon an inspection in 2019. Upon completion of this repair, the PHX was returned to service. It was recommended by the original equipment manufacturer (OEM) that a significant rehabilitation or replacement be planned for completion by 2024. The equipment has an estimated lead time of approximately 1 year and is believed to require an extended outage to replace. An incinerator outage was planned for October 2020 to assess previous repairs and unfortunately the inspection found continued deterioration of the unit, confirming the need for an extensive rehabilitation or replacement.

The first phase of work included a site visit by BC during the October 2020 outage, an evaluation of the equipment and recent repair, and recommendation to replace the existing PHX. The nature of the failures observed appeared to be exacerbated by the frequency of short-term temperature changes during overnight periods of warm stand-by

(bottle ups) resulting in a daily thermal cycle. BC, therefore, also recommended alternative materials of construction and an alternative operation scheduling to prolong the life of the new PHX.

During the follow-up phases, BC provided design of the new PHX and appurtenances as well as construction management services through start-up of the new unit. During bidding, BC and the District were faced with a global stop-sell on nickel ore, and collaborated to avoid major schedule delays while remaining on budget.

Despite the global market conditions, proprietary PHX fabrication, and fit-up challenges prior to start-up, the new PHX was installed and successfully placed into operation with only a one month schedule delay. The new PHX is performing better than the original unit and continues to provide the District with marketable solids that are land applied locally, thus saving their customers from service outages and avoiding increased usage fees related to downtimes.

Crawford, Murphy & Tilly, Inc., St. Louis

PROJECT TITLE:

Reconstruction of Runway 12R-30L at STL

CLIENT/OWNER:

City of St. Louis, St. Louis Lambert International Airport

CMT led the design of a two-year reconstruction project at St. Louis Lambert International Airport (STL) to rebuild the Runway 12R-30L corridor – encompassing the center third of the airfield. At just over 11,000 feet, Runway 12R-30L is the Airport's longest runway. The project involved narrowing the 200' runway by 50 feet to meet current FAA standards for runway width for the airport's design aircraft.

This project was originally programmed in 2010, during a time when a good deal of the pavements throughout the airfield were due for reconstruction. In order to avoid having a majority of the Airport's budget taken up by one massive project, CMT developed a program that involved strategic repairs to 12R-30L. This approach allowed funds to be directed to other pavement projects. By the end of the decade, STL was in a much stronger position to take on this $87.6 million project.

While the runway narrowing and reconstruction were the primary drivers of the project, the team took advantage of the opportunity to make other needed improvements. Two 900' crossing taxiways and two exit taxiways were removed and realigned to mitigate ramp direct access, high energy crossings and complex geometry. Three other taxiways were reconstructed within the runway safety area, and the remaining nine taxiway connectors were modified within the fillets to accommodate tying into the shifted runway edge.

Due the extent of the proposed work and its impact on the Airport and airfield facilities, a great deal of collaboration was required with a number of invested stakeholders. CMT worked closely with multiple departments at the Airport and the FAA to implement a Construction Safety and Phasing Plan and to incorporate the Airport's needs into the design. Working with Operations and the Air Traffic Control Tower staff, a phasing plan was developed that allowed at least two means of access to the north side of the airfield at all times, while also providing the contractor a large working area to complete the work safely and efficiently.

This project included the replacement of a BAK-14M arresting gear system near the Runway 30L end. CMT worked with the Department of Defense and Boeing on the replacement of this system, which was completed as part of the runway reconstruction.

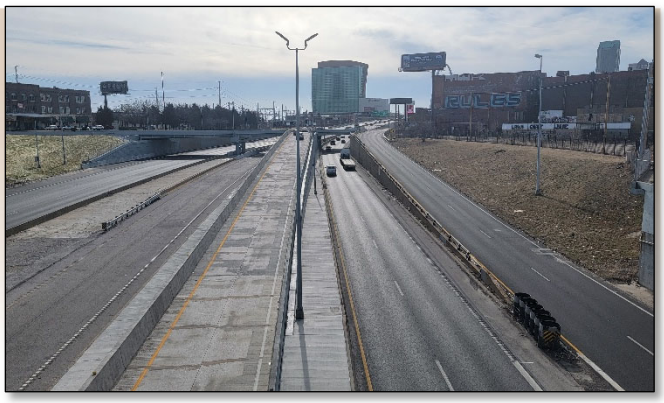
The presence of asbestos in the old pavement that was being removed, rare on an airfield project, required the development of a mitigation plan to help ensure that it was handled and transported off-site safely.

In total, this project included almost 200,000 SY of new PCC pavement, over 100,000 CY of earthwork, 1100 new LED runway and taxiway lights, 100 new LED airfield signs, and nearly 400,000 LF of airfield cable. Existing concrete pavements were recycled for use as the base under all new airfield pavements.

Horner & Shifrin, Inc., St. Louis

PROJECT TITLE:
Broadway Over I-44

CLIENT/OWNER:
MoDOT, St. Louis District



Horner & Shifrin, Inc. led a team of subconsultants to develop concepts and final PSE for replacing the T-shaped, highly skewed bridge carrying Broadway over I-44 in downtown St. Louis. This bridge is located at the end of the express lanes, where one lane exits to Broadway and one lane continues through the bridge.

PROJECT CHALLENGES: Design work commenced at the onset of the COVID-19 pandemic. The project required support of a signal structure on MSE wall fill, dealt with soft soils, complex curve geometry with varying cross slopes, highly skewed bridges, and construction in high traffic volumes.

DESIGN SOLUTIONS: The existing ramp was on a bridge and it was determined that a more economical solution was to construct the ramp on MSE walls. Soil improvements, including the replacement of 5 feet of fill under the walls and the installation of rock columns, were necessary to safely support the wall. Two bridges were designed with an MSE wall island between them where the ramp intersected the bridge. The geometry was constrained by skews around 50° and the need to tie into approaches and the new ramp. A 2-span NU girder bridge spanned the EB lanes of I-44 and the express lane ramps, while a steel plate girder bridge with flared ends spanned the WB lanes of I-44. The flares accommodated ramp geometry. Custom details were developed for the interfaces between the bridges and walls, in consultation with MoDOT, to ensure bridge maintenance staff supported the proposed details.

Details assured that the bridges could move independently due to changes in temperature to assure no premature deterioration. Stormwater was collected and connected to existing underground systems. Vertical clearance was improved to 16’2”, exceeding the standard 16’6” minimum for much of the crossing.

CONSTRUCTION: A transparent stay-in-place deck forming system was used, allowing the bridge deck to be observed from below. This new construction practice is the result of years of research and development, resulting in an innovative method of deck forming that improves safety, while complying with bridge inspection criteria. Anomalies with deck pour or reinforcement can be easily spotted and rectified during construction, and the clear panels allow for the deck to be inspected by the naked eye.

During construction, the design team participated in weekly meetings with the contractor and MoDOT construction inspection staff, facilitating the identification and resolution of construction challenges. The project was completed without major changes to the construction plans, demonstrating the effectiveness of the communication, coordination, and quality control practices of the design team.

Lamp Rynearson, Kansas City

PROJECT TITLE:
Lake Lotawana, MO Wastewater Treatment Plant

CLIENT/OWNER:
City of Lake Lotawana, Missouri

Lake Lotawana’s Wastewater Treatment Plant No. 1 was in dire need of repair prior to the completion of this project. Although less than 20 years old, the original plant was at

the end of its useful life. The original plant was not capable of operating at its design flow due to the clarifiers being undersized and a lack of ability to control flow into and out of the peak flow lagoon.

A short-term study of repairs that were needed to keep the wastewater treatment plant operational for a 2-5 year period was completed in July 2016. The short-term study was followed by completion of a Wastewater Treatment Plant Facility Plan, which analyzed multiple long-term options, in October 2018. The City Board of Alderman approved long term improvements to the facility, which led to a design project with a budget of $4.15M. The improvements include a new screen structure/influent pump station, a new anaerobic basin, modifications to the existing anoxic and aerobic basins, new clarifiers, a new UV disinfection system, cascade aeration, and related improvements.

Our wastewater engineers looked for cost-effective and creative solutions. For this project, the existing metal aeration/clarifier basins had the center clarifiers removed, and the exterior metal used as forms for concrete activated sludge basins. Similarly, the upstream basins were refurbished as anoxic basins.

The improvements included a new screen structure/influent pump station, a new anaerobic basin, modifications to the existing anoxic and aerobic basins, new clarifiers, a new UV disinfection system, cascade aeration, and related improvements. These improvements were crucial to maintain system viability for the growing community throughout the 20-year design period.

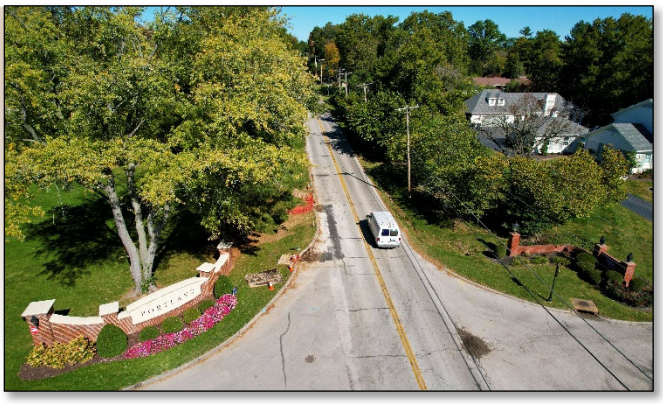
Lochmueller Group, Inc., St. Louis

PROJECT TITLE:

Land Acquisition Services for North Geyer Road Improvements Project – Phase I

CLIENT/OWNER:

The City of Frontenac, Missouri



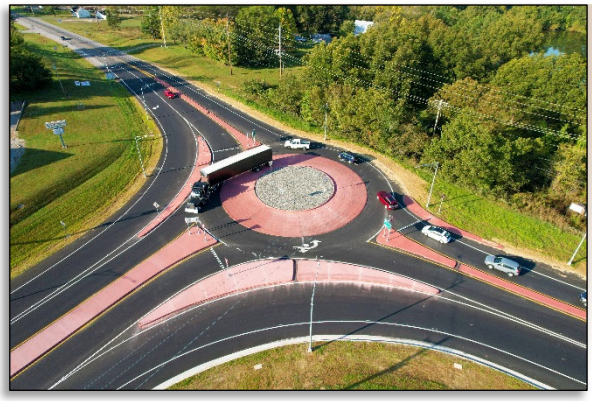
Land Acquisition Services for North Geyer Road Phase I was an integral part of the broader roadway improvements project that aimed to enhance Geyer Road from Hermitage Hill Road to Clayton Road and to Clayton Road from Geyer Road to Clayton Downs Lane. The intent of this project was to address existing safety issues, make repairs to the pavement structure, and provide enhanced access for pedestrians. Included in the improvements was the installation of a stormwater drainage system and curb and gutter, pavement resurfacing, and an addition of sidewalks along Geyer Road and Clayton Road.

Lochmueller Group, Inc. (Lochmueller) teamed with the City of Frontenac for the acquisition of right of way, permanent easements, and temporary easements from thirty-two (32) property owners along the length of the project. Lochmueller provided appraisal valuations of the acquisitions and personnel from the City and Lochmueller met as a team with each owner to present offers and discuss the project and acquisition. A significant amount of effort was made to ensure that the goals of the City and the concerns of the property owners were balanced, and that all acquisition procedures were conducted in accordance with state and federal regulations. The Negotiation Team worked diligently with the property owners to answer questions and resolve the owners' concerns about the impact of the project on their property. This additional effort during negotiations resulted in greater buy-in from the public and smooth final transactions with the owners.

Beyond just negotiating on behalf of the City, Lochmueller's land acquisition experts coordinated with the design team to incorporate property owners' feedback to minimize impact as much as possible to their properties. This helped Lochmueller's design retain more of the cultural and historic features of the neighborhood while still implementing the needed infrastructure improvements. The result was greater land owner satisfaction due to Lochmueller's transparency and good-faith efforts to address their concerns prior to construction, as well as successful representation by Lochmueller of the City towards its residents.

In reference to a recent public meeting on June 14th, 2024, between the Public Works Committee and a public audience, Director of Public Works Jeff Wappelhorst praised both Lochmueller's input in the meeting and their consulting services, saying, "In addition to addressing the right-of-way acquisition and engineering design challenges of the project, Lochmueller Group answered questions from our finance representatives as well as attendees in the audience."

In the end, all 32 parcels were successfully negotiated, and construction is set to begin by November 2024. Each property owner's concern was respectfully heard, and the Negotiation Team successfully ensured that all parties walked away benefiting from the proceedings and the project improvements. The project's timeline was not significantly impacted, and negotiations with property owners for phase two will begin in November 2024. Lochmueller is honored to have partnered with the City of Frontenac on this project.



Lochmueller Group, Inc., St. Louis

PROJECT TITLE:

Route 25/K Intersection Safety Improvements - Roundabout

CLIENT/OWNER:

Missouri Department of Transportation

The Route 25 and Route K intersection in Gordonville, Missouri is a three-leg intersection with stop control on the westbound Route K approach. The intersection experiences high peak hour volumes from traffic heading to and from Cape Girardeau, Missouri. This resulted in long queues and significant delays for the west bound approach during both the morning and afternoon rush hours, and a crash rate 15 times the expected rate for the intersection. To address these problems, the Missouri Department of Transportation (MoDOT) hired Lochmueller Group, Inc. (Lochmueller) to conduct a traffic study and recommend intersection improvements.

The results of the traffic study revealed that both the traffic signal and roundabout would improve traffic operations at the intersection, but the roundabout would perform significantly better for the westbound movements. In addition, a roundabout provides important safety benefits and lowers long term maintenance costs over a signalized intersection, making it the desired solution. The final configuration of the intersection includes a single lane roundabout with bypass lanes for the northbound to eastbound and westbound to northbound movements and the addition of a two-way left turn lane to serve adjacent commercial entrances along Route K.

Upon completion of the traffic study, MoDOT selected Lochmueller to complete the design. Lochmueller designed a detailed 3D model of the roadway improvements and developed final construction plans utilizing Open Roads Designer. The improvements involved pavement widening with a mill and overlay of the existing pavement, new roadway lighting, and minor drainage work. The widening and overlay were chosen over reconstruction to reduce construction costs and mitigate traffic impacts. The geometry of the roundabout was designed to accommodate large semi-trucks and farm equipment that utilize this intersection regularly. To improve their visibility, the concrete raised medians and truck aprons were designed with integral colors.

The high traffic volumes and lack of a suitable detour nearby made the maintenance of traffic plan (MOT) a critical component to the design. The initial construction stages included roadway widening to provide space for traffic shifts in subsequent stages. To maintain safe operating conditions and keep traffic flowing during construction, temporary traffic signals were utilized. This allowed construction of the center island and truck apron while traffic was shifted to the east. Once this was completed, the driving surface was installed, and finally the raised medians were constructed on top of the finished surface.

The traffic study began in October 2021 and was completed in May 2022. The final design began in June 2022 and completed in October 2023. The project was put out to bid in December 2023 and construction was completed ahead of schedule in September 2024. The total construction cost was $2.4 million.

Lochmueller is proud to have had the opportunity to collaborate with MoDOT on this project. Enhancing the safety of traffic and intersections for drivers has been and always will be a top priority for Lochmueller. The Route 25 and Route K Roundabout significantly improves traffic flow and safety, reduces accidents, and provides a better driving experience for all.

Olsson, Inc., Springfield

PROJECT TITLE:
ConnectSGF Transit Optimization Study

CLIENT/OWNER:
City Utilities of Springfield, Missouri

In January 2024, Olsson finalized a transit optimization study for City Utilities Transit in Springfield, Missouri. Branded as ConnectSGF, the project seeks to improve “The Bus” service operated by City Utilities in both the near-term and long-term. ConnectSGF evaluates existing transit services and recommends improvements to better connect the Springfield community.

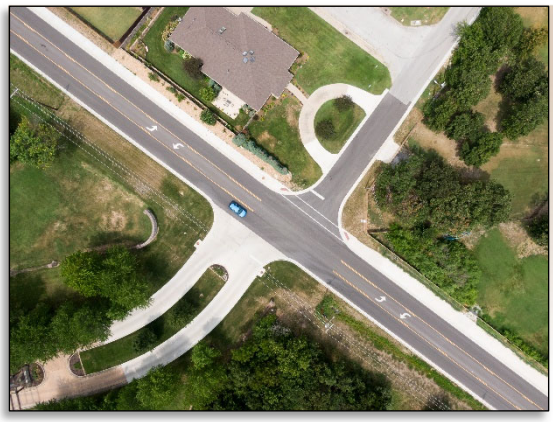
Our work included the following:

- An in-depth review of transportation needs and the existing transit system.
- A public visioning process to define what the community wants the transit system to be.
- Creation of guidelines and alternatives for improvements to explore multiple options for growth.
- Development of Short, Medium, and Long-Term Plans to meet the needs and opportunities discovered during the planning process.
- Documentation of how plan recommendations impact the Springfield economy and residents.

Each phase of the process included public engagement opportunities to support the development of the plan. Public input was used to determine project goals and objectives for Springfield’s transit system. Olsson created and analyzed a survey that received over 400 responses, conducted indepth interviews with more than 20 stakeholders, and facilitated two all-day open house events.

Olsson created a vision for improving transit service by bringing together large and diverse datasets and connecting these with public input. These efforts helped create a range of alternatives that were rigorously evaluated based on criteria established by project stakeholders, industry standards, and the community’s vision.

Each step was utilized to create implementable recommendations that transit agencies can pursue to better meet their community’s needs. The ConnectSGF plan and associated economic and human impact analyses were completed in January 2024. City Utilities immediately put the plan into action by preparing a series of route changes, based on the short-term recommendations of ConnectSGF, that were enacted in September 2024.



Olsson, Inc., Joplin

PROJECT TITLE:
32nd Street Improvements

CLIENT/OWNER:
City of Joplin, Missouri

PROBLEM: The 32nd Street Widening Project in Joplin, Missouri, aimed to address both safety and capacity issues in a growing part of the city. With the City of Joplin bound on the north, south, and east sides, the west side remained the most logical direction for expansion. The original 32nd Street was a two-lane, more rural road with no sidewalks or bike paths, leading to increased traffic and numerous safety concerns as expansion and population shifted westward. The two-mile stretch from Schifferdecker Avenue to Central City Road posed visibility concerns due to steep hills and valleys, contributing to unsafe conditions. Additionally, the lack of bike lanes or sidewalks resulted in numerous close calls and accidents.

The project faced unique challenges, particularly involving public involvement, utility coordination, and right-of-way negotiation. Multiple affluent neighborhoods with significant landscaping and ingress/egress issues were impacted, alongside significant utility relocations. The presence of a large-scale power transmission line along the southern half of the project presented further complications, with certain aspects immovable due to budgetary constraints. Over 60 property owners were affected, requiring extensive easement and right-of-way negotiations.

SOLUTION: The roadway was expanded to three lanes, adding a center turn lane and a shared-use path for pedestrians and cyclists. This enhanced traffic flow and safety. The reconstruction, which cost about $12.5 million, included right-of-way acquisitions and utility relocations for potential future expansion to five lanes. The roadway also connects to a recently relocated Fire Station, improving response times to emergencies. Funded through a sales tax initiative, it has become a vital corridor supporting economic and residential growth in southwest Joplin.

Olsson conducted several public meetings to inform community stakeholders about planned improvements and construction schedules, addressing their concerns and input. Coordination with utility companies was vital. The Missouri American Water (MAW) water line relocation was incorporated into the roadway contractor's work, setting a benchmark for future projects. This integration enabled condensed phasing, a shorter delivery time frame, and continuous water service throughout. Olsson's designs accommodated existing constraints, keeping the project within budget. Additionally, Olsson managed right-of-way negotiations and acquisitions, delivering a comprehensive project for Joplin's stakeholders.

Wilson & Company, Inc., Engineers & Architects, Kansas City

PROJECT TITLE:
FARM Bridge Program

CLIENT/OWNER:
Missouri Department of Transportation

The Missouri Department of Transportation's (MoDOT) Fixing Access to Rural Missouri (FARM) Bridge Program Design-Build project was a $21.5 million initiative to replace 31 deteriorating, weight-restricted bridges in the Northwest and Northeast Districts. These aging one-lane bridges posed safety risks and traffic limitations on rural two-lane roads, making their replacement critical. Completed one month ahead of schedule in September 2023, the project was delivered in under two and a half years by implementing cost-effective methods such as eliminating field splices, using lighter girders, and optimizing construction sequences to stay within budget.

A key innovation was the use of the Simple for Dead Load-Continuous for Live Load (SDCL) Steel Girder Design Methodology, which minimized the need for grade raises and allowed for more bridge replacements. The use of friction H-Pile further extended the project's reach by mitigating price volatility. To ensure longevity, the new bridges were designed with an estimated 100-year service life, incorporating galvanized girders and continuous concrete decks to reduce future maintenance costs.

Public convenience was prioritized through an accelerated construction strategy that employed full road closures, well-planned detours, and effective community engagement to minimize disruption. The project also adopted several innovations, including a modified Nebraska Department of Transportation (NDOT) detail that allowed for quicker placement of approach slabs, resulting in smoother driving surfaces. Reinforced concrete box culverts were used in place of some bridges, reducing future maintenance burdens for MoDOT. Additional innovations, such as single-stage abutment caps, reusable traffic signage, and hydronic heat technology for winter concrete work, helped expedite construction and overcome seasonal challenges.

The MoDOT FARM Bridge Program Design-Build project is a testament to the effective application of innovative design, construction methods, and project management strategies in public infrastructure development. By leveraging industry standards and introducing novel techniques, the project team delivered high-quality, long-lasting infrastructure improvements that significantly enhance rural mobility and safety in northern Missouri. The project not only met but exceeded MoDOT's expectations, providing the state with durable, low-maintenance bridges that will serve its rural communities for generations to come.