

Wishbone Bridge Connects Austin Through Precast Concrete Innovation

by Lee Frieberg, HDR

When the new Wishbone pedestrian bridge in Austin, Tex., officially opened on February 7, 2026, the automated counter on the structure indicated that more than 21,000 people showed up to mark the occasion. This impressive turnout reflected pent-up demand for a safe and inviting crossing on one of the most heavily used urban trail corridors in Texas.

A fitting addition to Austin's many pedestrian crossings, the bridge provides a long-missing link to complete the city's 10-mile loop trail system. It spans Lady Bird Lake at the eastern end of the Ann and Roy Butler Hike-and-Bike Trail, connecting Longhorn Shores on the south bank, Holly Shores to the north, and a narrow peninsula created decades ago for power plant cooling operations.

The Y-shaped structure features three gently curving legs that converge at a wide central plaza, creating a civic gathering space as well as a bridge. Although the form is unique, the structural system relies in large part on standard precast and prestressed concrete elements.

During design and construction, the project team addressed issues involving complex geometry, environmental constraints, constructability, and cost.

Ultimately, the team delivered a high-quality user experience.

Community Origins and Project Need

The distinctive wishbone shape of the bridge emerged from ideas offered during early public engagement. During the first round of community meetings,

several participants independently drew a Y-shaped bridge that would connect all three shorelines at once. That concept became the community's favorite, receiving roughly twice the support of the next most popular alternative.

By the third public meeting, when the refined wishbone concept was

The Y-shaped Wishbone Bridge in Austin, Tex., spans Lady Bird Lake at the eastern end of the Ann and Roy Butler Hike-and-Bike Trail. The pedestrian bridge connects Longhorn Shores on the south bank, Holly Shores to the north, and a narrow peninsula. The three legs converge at a central plaza. All Photos: HDR.



profile

WISHBONE PEDESTRIAN BRIDGE / AUSTIN, TEXAS

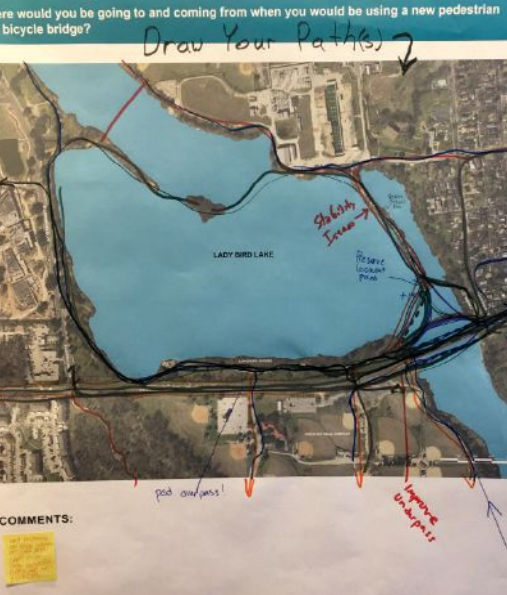
BRIDGE DESIGN ENGINEER: HDR Inc., Austin, Tex.

PRIME CONTRACTOR: Jay-Reese Contractors, Dripping Springs, Tex.

CONCRETE SUPPLIER: Alpha Ready Mix, Hutto, Tex.

PRECASTER: Heldenfels Enterprises, San Marcos, Tex.—a PCI-certified producer

OTHER MATERIAL SUPPLIERS: Formwork: EFCO, Dallas, Tex.; Reinforcement: CMC, Seguin, Tex.



In drawings of their preferred alignment for the new bridge, participants at a community meeting show a clear preference for a Y-shaped structure.

presented, 96% of participants reported being supportive or very supportive of the design. That level of consensus is rare for a major piece of urban infrastructure, and it helped carry the project forward through funding and final design.

Splayed precast concrete girders accommodate the irregular geometry of the unique bridge.



The crane used to erect the precast concrete girders for the Wishbone Bridge, which includes nine in-water piers, is mounted on barges to minimize the project's environmental impact. The plaza cap beams have unequal cantilevers. Due to geometrical constraints, the cap beams carry equal moments during the in-service dead-load condition.

The project also garnered community support because it addressed an evident public need. Before the bridge was built, trail users were funneled onto a narrow sidewalk along the Pleasant Valley Road Bridge and Longhorn Dam. In places, the path was running alongside fast-

moving traffic and maintenance gates and was just 3 to 4 ft wide. With more than 5 million annual users on the trail system, the crossing had become both a safety hazard and a bottleneck.

In 2021, while the Wishbone Bridge was being designed and constructed, an interim improvement was implemented on the Pleasant Valley Road Bridge. That improvement, which widened portions of the sidewalk, was never intended as a long-term solution. Wishbone Bridge provides a fully separated pedestrian and bicycle alternative to using the widened sidewalk on the Pleasant Valley Road Bridge. Together with the new Unity Underpass beneath Pleasant Valley Road, which is 30 ft wide and 16 ft tall, Wishbone Bridge creates a continuous, traffic-free route while improving accessibility and user comfort.

Defining the Scope and Structural Approach

Once the overall form of Wishbone Bridge was established, the next challenge was determining the structural and material specifications. Early in the process, the project team presented the public with a choice: invest in a signature

CITY OF AUSTIN, OWNER

BRIDGE DESCRIPTION: A Y-shaped, three-legged pedestrian bridge approximately 1121 ft in total length

STRUCTURAL COMPONENTS: Twenty-nine TX-62 I-girders; four 15-in.-deep slab beams; 48-in.-deep cast-in-place concrete diaphragms; 8½-in.-thick cast-in-place concrete deck; cast-in-place inverted tee pier caps, columns, and drilled shafts

BRIDGE CONSTRUCTION COST: \$325/ft²



During construction, the precast concrete girders serve as stable work platforms for cast-in-place operations.

structure with high visual impact, or use a conventional, efficient substructure and focus project resources on the elements that the public would use and experience most directly. The community favored the latter approach, prioritizing shade, seating, landscaping, generous widths, and gathering areas.

That decision set the direction for the structural solution. Below the 8½-in.-thick cast-in-place concrete deck, the bridge uses efficient, proven components. Above the deck, the project invested primarily in features that shape the user experience, resulting in a bridge that functions as both a crossing and a destination.

In plan, the bridge consists of three legs framing a central triangular opening. The

superstructure is supported by drilled shafts, which vary in diameter from 2 ft to 5 ft and are founded a minimum of 15 ft into competent rock, and round concrete columns, capped with inverted-tee cast-in-place pier caps and Texas Department of Transportation (TxDOT) standard TX-62 prestressed concrete I-girders. While the pier caps are typical of TxDOT construction, they were custom designed for this application. The pier caps near the plaza have an offset column that, due to the eccentric loading, balances the column dead loads under final dead-load configuration. A slanted earwall hides the “T” shape. The ends of the beams are slightly skewed at the caps near the plaza.

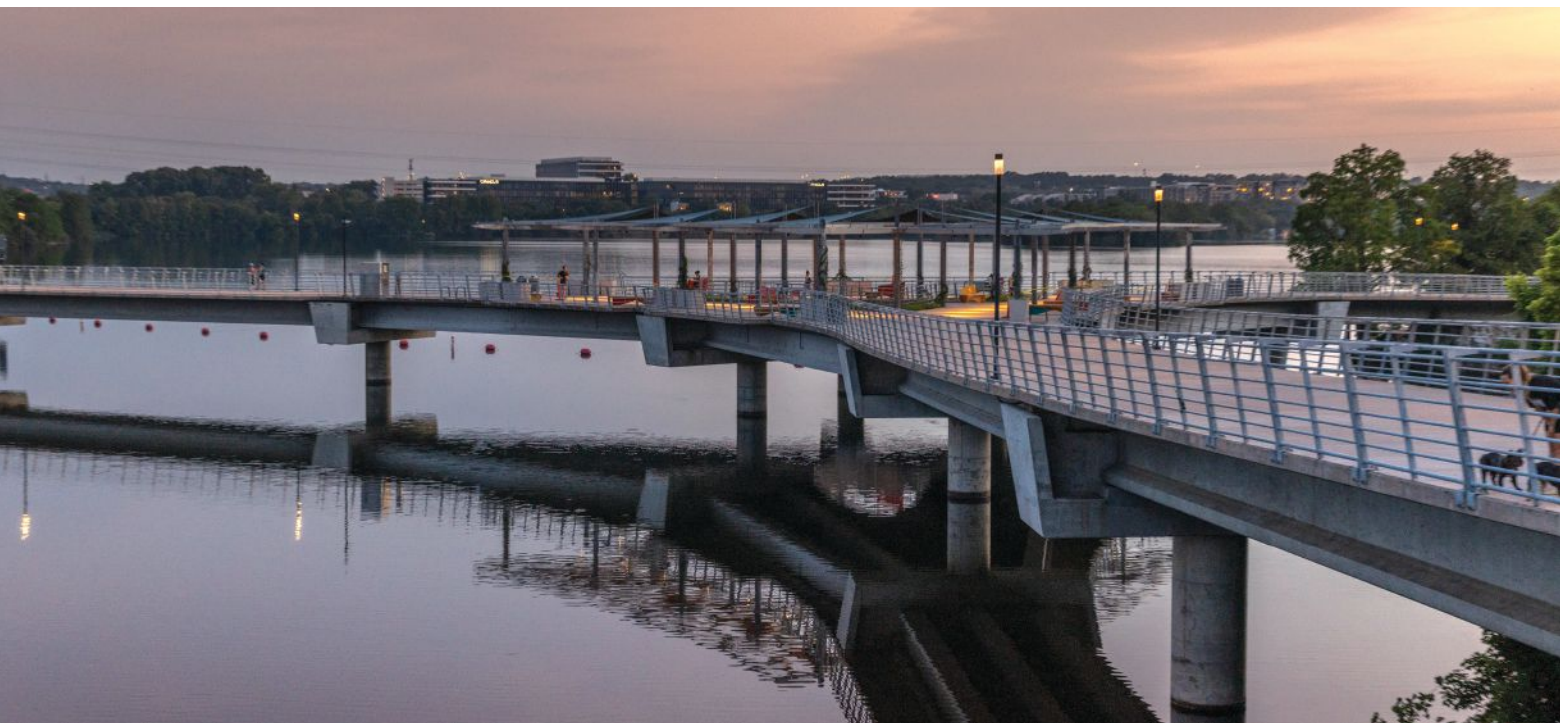
Spans generally range from about 86 to 112 ft; designers chose these lengths

to minimize the number of piers in the water and reduce hydraulic impacts. A constant-depth superstructure was desired, resulting in underuse of girders near the plaza. A range of twelve to thirty-two 0.6-in.-diameter strands was required for the various girders. In total, the bridge includes nine in-water piers.

The use of long-span precast concrete girders offers multiple design benefits. The limited number of piers minimizes the obstruction to flow in the tightly regulated, no-rise lake environment. The use of long spans also reduced environmental disturbance during construction and simplified permitting in the environmentally sensitive corridor. Inverted tee pier caps were selected to maximize vertical clearance beneath the bridge while reducing visual obstruction. 15-in.-deep slab beams located on the two peninsula spans create a shallow superstructure as the bridge profile descends to match the existing grade. These shallow girders were needed to avoid interference with the critical root zones of several protected trees in this area.

The deck width varies significantly, from roughly 16 ft on the approach legs to more than 70 ft at the central plaza; with even greater width measured across the void created by the triangular opening. To support those varying widths, the project team used a creative framing system, including splayed girders and substantial cast-in-place diaphragms

The new Wishbone pedestrian bridge has become a popular amenity for pedestrians and bike riders in downtown Austin, Tex.





The central plaza stands 30 ft above the water, offering shade and scenic views.

that tie the precast concrete elements together.

Working in a Managed Floodplain

One of the most significant constraints on the project was its location within a highly managed floodplain. Lady Bird Lake operates under a strict no-rise requirement. Any measurable increase in water surface elevation, even fractions of an inch, would have required additional approvals. Therefore, the design team worked to minimize the number of in-water supports and carefully modeled hydraulic effects. While early one-dimensional models suggested that the new bridge design might displace water and cause levels to rise upstream, a refined two-dimensional analysis demonstrated that any changes would be localized around pier locations and did not produce backwater effects. This analysis reinforced the decision to use long-span precast concrete girders to limit obstructions.

Structural Complexity of a Three-Legged Bridge

From an engineering perspective, the wishbone geometry introduced challenges well beyond those of a straight crossing. In a conventional bridge, thermal movement can be predicted along a single axis, with expansion and contraction occurring symmetrically. In a three-legged configuration, movement is constrained in multiple directions, creating complex stress paths that must be carefully managed.

To assess these stresses, the design team developed a global structural model and repeated the following steps until

the deck stresses were within specified tolerances: fixities were assigned based on the location of joints, a temperature deformation load was applied, and the resulting deck stresses were evaluated.

Splaying the prestressed concrete girders to follow the geometry required careful detailing. In some areas, girder spacing reached approximately 22 ft, which is far wider than typical practice for girder bridges. Those wide spacings would also need to support significant additional loads from below-deck planters that would measure roughly 4 ft x 4 ft x 18 ft and be filled with soil and vegetation.

The solution was a hybrid system. Precast concrete girders provide the primary load-carrying capacity and long-span capability, and cast-in-place diaphragms and beams distribute loads and accommodate the irregular geometry. This combination preserves the efficiency of precast concrete construction while providing the flexibility needed for architectural features. The precast concrete girders also serve as important building blocks to support the cast-in-place portions of this bridge erected in relatively deep water.

Accessibility issues and slope requirements across the bridge added layers of complexity to the design. One approach connects to Canterbury Street, on the north, which is roughly 15 ft above Longhorn Shores on the south. The central plaza must be nearly level to function as a gathering space. The roadway and bridge designers coordinated vertical profiles and cross slopes to meet accessibility requirements of the Americans with Disability Act (ADA) without creating uncomfortable

transitions or drainage issues. To find a preferred solution, the team went through multiple design iterations, including raising, lowering, or tilting the plaza by 1%, and evaluated the resulting structure for ADA compliance and floodplain impacts. The three-dimensional model was refined repeatedly until all criteria were met.

Constructability and the Value of Precast Concrete

One of the clearest demonstrations of the value of precast concrete came during construction. The site, which is surrounded by parkland, dense development, and water, provided limited options for equipment access. The nearby Longhorn Dam has load restrictions that prevent the use of heavy cranes, and portions of the peninsula are underlain by uncompacted fill unsuitable for large machinery.

Given these restrictions, the project team decided to use modular barges as temporary work platforms. These barges first held drilling equipment that pushed through the sediment and limestone at the lake bottom to create space for substructure columns. Columns and inverted tee caps were cast in place, with the work supported by barges. However, the environmental conditions would have made cast-in-place construction for long spans impractical. Therefore, precast, prestressed concrete girders were fabricated off site under controlled conditions and then delivered and erected using cranes mounted on barges. This approach reduced the need for extensive falsework and temporary supports in the lake. The prestressed concrete girders were fabricated at a nearby plant that was accustomed to producing TxDOT

standard sections, underscoring another advantage of precast concrete: availability. Using familiar, widely produced elements reduced risk and helped keep the project within budget, even as bids initially came in higher than anticipated.

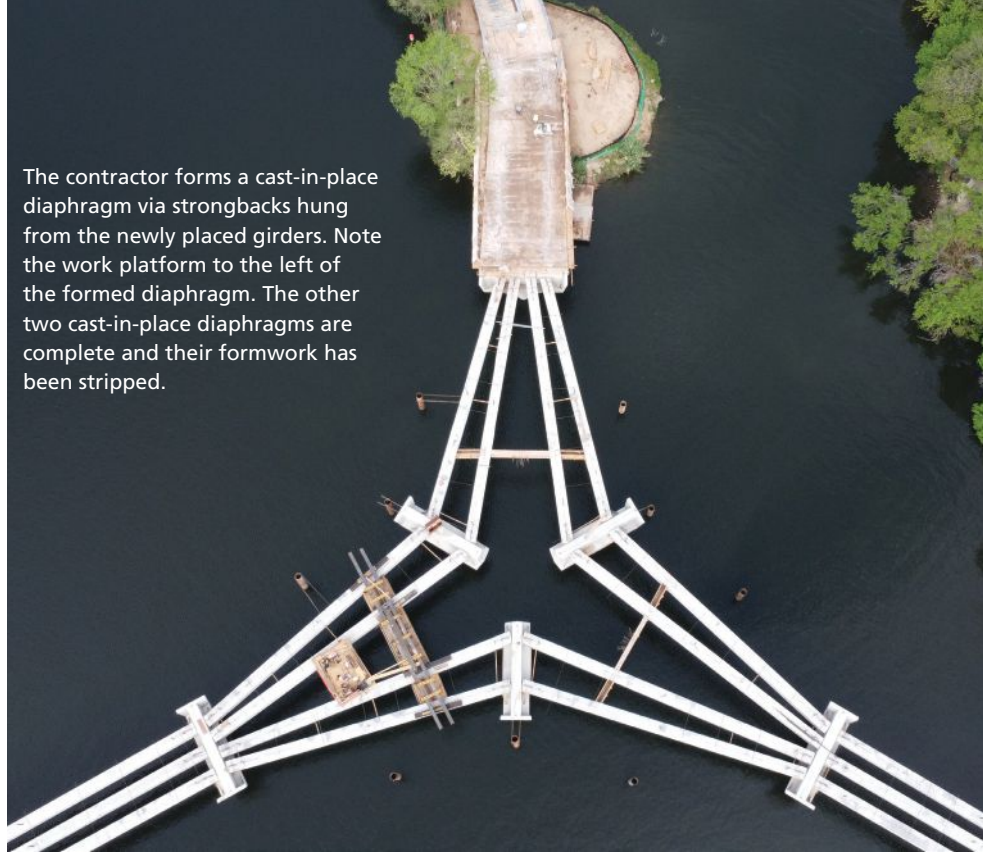
Once the girders were in place, they served as a base for stable work platforms for subsequent cast-in-place operations. Strongbacks were installed to support formwork for large diaphragms and planters, allowing crews to safely place significant volumes of concrete over open water.

Concrete placement itself required innovation. At times, concrete was pumped distances of more than 600 ft from land-based pump trucks. By keeping pump trucks on shore and routing hoses across the deck, the contractor avoided the need for additional barges and minimized disruption in the lake.

Conclusion

Wishbone Bridge demonstrates how standard precast and prestressed concrete elements can be adapted to support ambitious architectural and community-driven goals. By pairing practical, efficient structural components

The contractor forms a cast-in-place diaphragm via strongbacks hung from the newly placed girders. Note the work platform to the left of the formed diaphragm. The other two cast-in-place diaphragms are complete and their formwork has been stripped.



below deck with finishes and amenities that center on the user experience above, the project team delivered a bridge that is technically sophisticated and responsive to its setting.

In this project, standard girders, inverted tee caps and cast-in-place connections were assembled in new ways to

solve complex problems of geometry, hydraulics, and constructability. The result is a bridge that already functions as a landmark and a gathering place for the city. 

Lee Frieberg is a bridge engineer and bridge business class leader for HDR Inc. in Austin, Tex.



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