



# Historic Bridge Bulletin

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The *Minerva Baltica*, an oil tanker built in 2018, passes under the Rainbow Bridge, a cantilever truss bridge over the Neches River in Port Arthur, Texas. The bridge was built in 1938, is 7,752 feet long, and has a 680 foot main span. The bridge was noted for its tall 176 feet of navigational clearance when built, and its special design that allows the bridge to withstand hurricane-force winds. Photo by Nathan Holth.



# Sweeping Arches: The Tenth Street Bridge of Great Falls

By Arlyne Richert

The historic Tenth Street Bridge across the Missouri River in the heart of Great Falls, Montana, stands as a testament to the “vision” of Paris Gibson, founder of the city. Preservation Cascade, Inc., the nonprofit organization responsible for restoring the

original vehicular bridge as a pedestrian crossing is sponsoring the 100th birthday party for this architectural gem on August 20, 2020. Everyone is invited.

The River’s Edge Trail Foundation has provided extensive trails for miles along both sides of the Missouri River. It is the goal of Preservation Cascade, Inc., to integrate the historic Tenth Street Bridge into the River’s Edge system.

The Tenth Street Bridge was designed by engineer Ralph Adams of Spokane, Washington, and Great Falls architect George Shanley. It is the oldest (1920) and longest (1130 feet) known surviving reinforced concrete, open-spandrel multi-arch bridge in all the Great Plains states and was listed on the National Register of Historic Places in 1996. In its early days, this beautiful bridge served everyone going back and

forth across the Missouri River. There was even a trolley on the original bridge.

When Preservation Cascade, Inc., began efforts to save the bridge from demolition there were court challenges. The National Trust for Historic Preservation Legal Counsel Elizabeth Merritt came to the rescue, along with two local pro bono attorneys (Elizabeth Best and Lawrence Anderson). Noted historic bridge engineer Abba Lichtenstein and National Park Service bridge expert Eric DeLony were also among the individuals who lent credibility to efforts to save the bridge. The 9th Circuit Court of Appeals, with Judge Harry Pregerson acting as Mediator, ruled that the historic Tenth Street Bridge should be saved from the wrecking ball and a five member Bridge Rehabilitation Committee, comprised of two representatives from the City, two representatives of Preservation Cascade, Inc., and an architectural historian from the State Historic Preservation Office, was set up to administer the project. Although the city of Great Falls was the owner of the bridge, Preservation Cascade, Inc., was in charge of raising restoration funds, with no direct local tax dollars. Over the years, Preservation Cascade, Inc., has raised over \$1.5 million through donations, events, and grants.

In 2000, the historic Tenth Street Bridge was featured in the prestigious National Geographic book, *Saving America’s Treasures*. Preservation Cascade,



The 10th Street Bridge is depicted in *Sweeping Arches*, a lithograph by Brian Morger.





**A view beside the 10th Street Bridge in 2015. The span to the far right in the photo has been restored as a model to inspire the preservation of the remaining spans. Photo by Don Barrett, CC BY-NC-ND 2.0. ( [flickr.com/photos/donbrr/](https://www.flickr.com/photos/donbrr/) )**

Inc., received a \$250,000 grant from the National Park Service to completely restore a single span on the north end of the bridge as a demonstration model of what the restored bridge would look like. Since 2007, when the dramatic blue lighting project was completed (and was awarded a National Illumination Award), the Tenth Street Bridge has become a focal point along the Missouri River at night, being visible from the air as well as from many nearby vantage points. It is the dream of Preservation Cascade, Inc., that the restored historic Tenth Street Bridge will be as beautiful in the daytime as it is at night.

When the bridge was dedicated in 1920, the Great Falls Tribune described it as “an imposing structure of sweeping arches...a carved monument above the water.” Now, 100 years later, it is being re-purposed for pedestrian traffic and a new life as an iconic part of the Great Falls landscape.

*Arlyne Reichert was born in Buffalo, New York, on January 14, 1926 and attended the University of Buffalo in conjunction with Nurses Training. She married a Montana Airman in Great Falls and has lived there ever since. She had 5 children, 7 grandchildren and 4 great-grandchildren and was widowed in 1968. She worked at The McLaughlin Research Institute for 23 years, retiring as Assistant Director. She served in both the Montana Legislature and as an elected delegate to the Montana Constitutional Convention. Currently, Arlyne is President of Preservation Cascade, Inc., which is responsible for the Historic Tenth Street Bridge.*

## More Than Meets The Eye Design and History of the Tenth Street Bridge

***By Historic Bridge Foundation***

When Cascade County, Montana, decided to build a bridge to span the Missouri River at Great Falls, designs such as a closed spandrel with solid barrel design were considered but found to be too expensive. Ultimately, the design selected was an open spandrel ribbed arch bridge. The Tenth Street Bridge was actually one of two similar bridges designed and built at the same time, with the other bridge being on First Street. The process for selecting a design and a contractor for the bridges was somewhat unusual. Two firms, Shanley & Adams of Great Falls, Montana, and Luten Engineering Company of Indianapolis, Indiana, each designed



**Fireworks over the Tenth Street Bridge at night. Photo by Bob Harbison.**



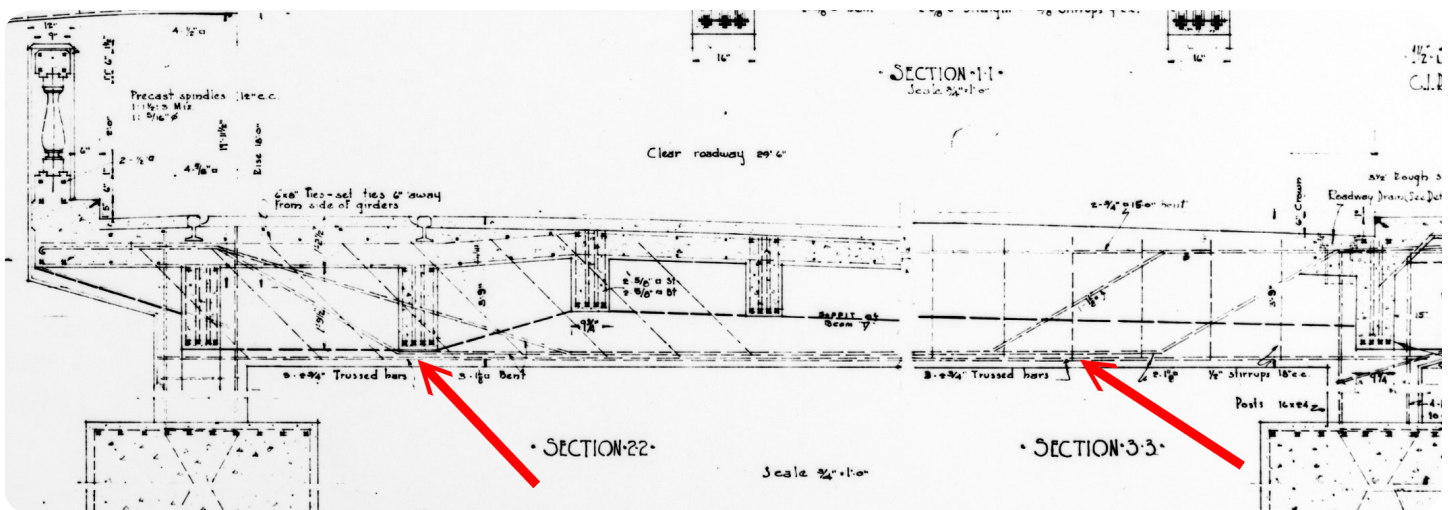
**An overview of the Tenth Street Bridge in 2015.** Photo By: Don Barrett, CC BY-NC-ND 2.0. ([flickr.com/photos/donbrr/](https://www.flickr.com/photos/donbrr/))

their own plans for bridges at these crossings. When the contract was put out to bid, contractors were invited to bid on both designs. The low bid accepted was for \$457,840.00 by Porter Brothers of Spokane, Washington, whose least expensive bid was the Shanley & Adams design.

The 1,130 foot Tenth Street Bridge, as designed by Shanley & Adams, is a reinforced concrete open spandrel deck arch bridge. The arch spans, eight in total, consist of two ribs each. The 29 foot 6 inch roadway is supported by concrete t-beams. Each arch span is 141 feet 3 inches in length.

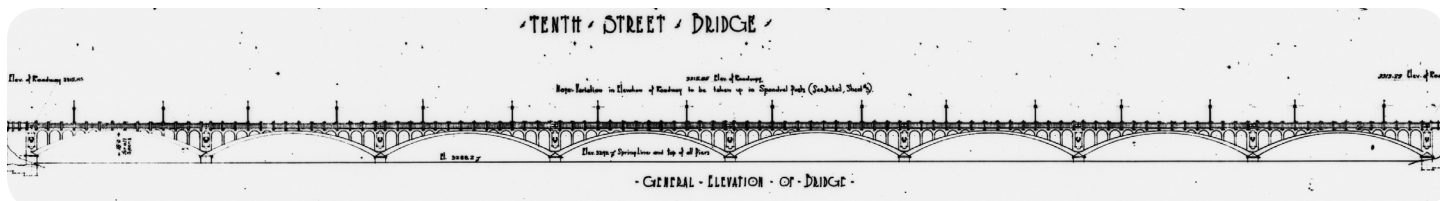
Some controversy occurred during the construction of the bridges at Tenth Street and First Street. Although located at the city of Great Falls, citizens approached Cascade County to petition for the construction of the Tenth Street Bridge since they had jurisdiction over the waterway. The county agreed to

fund and build the bridge, but the southern approach within the city limits of Great Falls would be paid for by the city. The approach systems would also have to cross railroad tracks and thus the railroad companies would contribute a portion of costs as well. A problem occurred, however, when the city learned that the southern approach they had agreed to fund would cost much more than expected (\$40,000-\$50,000) instead of the estimated \$15,000. As a result, the southern approach was not built initially, and although the arch bridge was completed in December 1920, it was a “bridge to nowhere” as it had no approach. The local newspaper noted that although the bridge looked beautiful, it required a 30-foot ladder to reach the deck! After pleading in vain to have the county assist with the cost of the southern approach, the city finally built the southern approach per the original agreement.



**A portion of the original design drawings for the Tenth Street Bridge showing the specification “Trussed bars” for reinforcement in two areas on the bridge.**

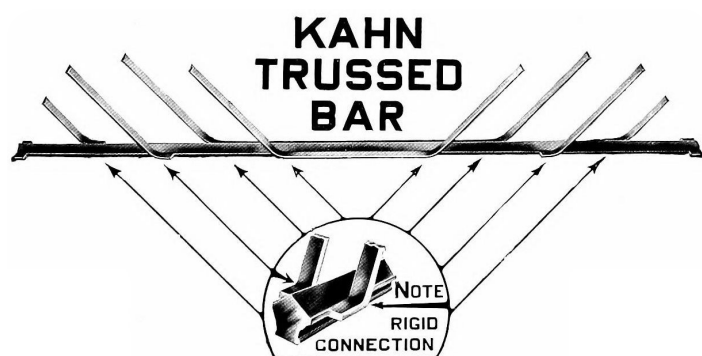




An elevation view of the bridge taken from the original design drawings for the bridge.

Little is known about the engineering firm for this bridge, Shanley & Adams. However, it is known that Ralph Adams at one time had been an agent for the Trussed Concrete Steel Company of Detroit, Michigan, a firm which in 1903 designed and patented the Kahn system of reinforcing, an unusual form of rebar for concrete that featured little bars branching out from the main rebar rod, forming a trussed rebar system. While mostly used for buildings, a small number of Kahn-reinforced bridges were built, so perhaps this is how Ralph Adams got his experience with concrete bridge design. Indeed, the design drawings for the Tenth Street Bridge reference the use of trussed reinforcing for parts of the bridge. This makes the Tenth Street Bridge one of the only known surviving arch bridges in the country with trussed reinforcing. The other engineer who worked with Adams, George Shanley, in contrast had a lot of local engineering experience in Great Falls, albeit mostly with buildings. Many notable buildings in Great Falls were designed by Shanley. The contractor for the bridge, Porter Brothers Company of Spokane, Washington, was a nationally known contractor who had experience with a variety of large construction projects ranging from military facilities to railroad construction.

Although the Tenth Street Bridge today suffers from deterioration and the loss of original railings and lighting, it remains a highly significant historic bridge.



A drawing showing Kahn trussed reinforcing. *Source:* Kahn System Standards: A Handbook on Reinforced Concrete, 1913.

Not only is it the longest known multi-span concrete open spandrel arch highway bridge in the Great Plains states, it is one of the two oldest known concrete arch highway bridges in Montana, the only other example also dating to 1920 and being a small, highly altered single-span bridge near Glacier National Park. Thus, the Tenth Street Bridge could be considered the most significant historic concrete arch bridge in Montana.

## Battleground Bridge, Deer Park, Texas

*By Historic Bridge Foundation*

The Battleground Golf Course in Deer Park, Texas, is home to a notable historic bridge with a long history. The bridge was originally located in Coryell County where it crossed the Leon River at a location that later became Mother Neff State Park. Sometime in the late 1940s or early 1950s, the bridge was relocated from this original crossing to another Leon River crossing, on CR-322, approximately six miles away. In 1994,



An elevation view of the restored Battleground Bridge as seen October 24, 2019. *Photo by Kristin E. Callahan, City of Deer Park.*

FHWA, TxDOT and the Texas Historical Commission agreed to relocate the 1891 Pratt Through Truss bridge from this location on County Road 322 to the Battleground Ground Golf Course. The Memorandum of Agreement stipulated that the bridge would be moved to the golf course as part of a transportation enhancement project and the City of Deer Park was required to sign a preservation and maintenance agreement.

Since the time of its relocation, the bridge has been used for golf cart traffic on the Battleground Golf Course. In 2012, the deck was replaced, anti-rust coating and weatherproof paint was applied to the bridge, and additional structural support was added—at an estimated cost of \$270,000 over a 10-year period. In 2018, the City of Deer Park contacted the Texas Historical Commission for advice on how to handle the deteriorating bridge. An engineering consultant for the city estimated that over 50% of the truss members showed substantial section loss and that 25% of the original truss members would need to be replaced. After much consideration and community debate, city officials made the decision in February 2019 to invest in a more comprehensive restoration project designed to give the bridge many

more years of service with less maintenance costs. More than \$471,000 was approved for restoration using hotel occupancy tax revenue, which can be allocated for historic preservation projects, but the total cost ended up being \$436,450. The project was completed as of October 2019.

The Battleground Bridge is a pin-connected Pratt through truss with five panels and a length of 90 feet and was built in 1891. It was brought to the city from Coryell County in 1995-6 as part of a \$125,000 grant for which the state spent \$100,000 and the city spent \$25,000.

The bridge is the last known remaining bridge in Texas built by the Clinton Bridge Company of Clinton, Ohio. This bridge was built at a time of change for the company. The Clinton Bridge Company was originally founded in 1875 and appears to have specialized in both iron and timber bridges. In 1892, George E. Wilson bought the company and immediately reincorporated and renamed the company as the Clinton Bridge and Iron Works. The name was again changed in 1928 to the Clinton Bridge Works and the company survived until 1984 before shutting down.



**The restored Battleground Bridge as seen October 24, 2019, with its interpretive plaque to the right. Photo by Kristin E. Callahan, City of Deer Park.**



# A Plan for Austin Bridges

By Rebekah Dobrasko

Austin's 1928 City Plan is infamously known as the document that created racial segregation in Texas's capital city. What is less known about the plan is how its recommendations on roads, bridges, and park-based boulevards opened the city for further growth and development. The road infrastructure built in the last part of the 1920s transformed the city and still serves Austin drivers today. Austin built over twenty concrete bridges and culverts as part of the recommended improvements in the new city plan. Most of these bridges had extra flourishes and enhancements reflecting the national movement to develop a City Beautiful (Figure 1).



**Figure 1: The bridge at 30th Street over Waller Creek has a concrete railing covered in stone veneer.** Photo by Rebekah Dobrasko.

Texas's capital city was one of the smaller cities in the state at the beginning of the twentieth century. Dallas, San Antonio, and Houston had over 75,000 citizens, while Austin lagged behind with just over 20,000 residents. However, the capital city was growing. The University of Texas and state government attracted professors, politicians, and bureaucrats to the city. These employees and their families needed houses, and the city grew outside of its original boundaries.

When first platted, the City of Austin was constrained by water on three sides: Waller Creek to the east, Shoal Creek to the west, and the Colorado River to the south. Businesses were located along the main streets of Austin, while residences popped up outside of the business districts. Soon after Austin's founding, people looked to leave the original city grid and began building new houses across the creeks

and river. These new residents needed bridges to get them across the waterways to and from their homes and work.

The capital city steadily grew, and by the 1920s, Austin had a traffic problem. Most of the city's roads were unpaved. Only two bridges crossed Shoal Creek on Austin's western boundary. Only one bridge crossed the Colorado River, and it often flooded. The city continued growing, building streetcar lines and new subdivisions. In 1924, Austin's city government changed its structure to a council-city manager form, and the new city manager pushed for an updated city plan to improve infrastructure and public amenities. The last city plan dated to 1839, when Mirabeau Lamar first laid out the city grid.

Following in the footsteps of the larger Texas cities, the Austin city manager hired the Dallas-based firm of Koch and Fowler to develop a city plan. The city tasked the engineering firm with recommendations for street paving, bridge construction, and sewer improvements. The plan also needed address locations for new city parks and playgrounds, cemeteries, fire stations, and a civic center. The plan laid out Austin's first zoning laws, which was a relatively new form of land planning at the time. Koch and Fowler's zoning plan created the infamous "Negro District" in east Austin, setting up a decades-long system of segregation in the capital city.

It was Koch and Fowler's recommendations for the new city amenities like bridges and parks that really caught the imagination of Austin's residents



**Figure 2: West Fifth Street Bridge at Shoal Creek opened to traffic in 1931. It is in the process of being listed in the National Register of Historic Places.** Photo by Rebekah Dobrasko.



with promises to alleviate traffic and enhance the city. The plan analyzed the traffic patterns and congestion leaving downtown Austin and headed to the growing residential neighborhoods and suburbs outside of the original city grid. Ultimately, Koch and Fowler identified major thoroughfares in the city and proposed pavement and bridges to allow growth. Most proposed bridges in the plan crossed Shoal Creek and Waller Creek, two main watersheds in the core of the city (Figure 2).

The *Austin American* newspaper trumpeted: “Austin is destined to become a city with beautiful public buildings, wide boulevards, parks, winding streams with beautiful ornamental bridges spanning Shoal and Waller Creeks, and a city whose beauty will compare with that of the national capitol at Washington...” in response to the publication of the city plan. While Koch and Fowler did not specify the design, materials, or type of the new bridges suggested, Austin’s engineering team wanted to build beautiful bridges for the city. Following a national trend in city beautification, known as the City Beautiful movement, Austin desired parkways and boulevards with classical architectural designs that enhanced the beauty of the city. Engineers and designers looked for ways to highlight Austin’s natural and scenic vistas. By implementing the city plan, the *Austin American* wrote, “Austin would truly deserve the title of the ‘City Beautiful’ if the vision of these planners is turned into a reality.”

Austin citizens voted for a city bond to pay for these new bridges and other civic works projects, and the Austin Sanitation Department, which was also responsible for bridge construction in the city, got to work. All twenty-one of the new bridges and culverts would be made of concrete. Designs varied from arch to slab to beam and slab. Austin engineers designed two rigid frame bridges over Waller Creek at 32nd Street and 34th Streets, which they believed to be the first of these bridge designs in the American Southwest.

The engineers looked for ways to “produce structures that would be pleasing to the eye as well as serve the purpose for which they were intended,” as they reported to Austin City Council. To that end, these bridges and culverts had paneling on railings, turned balustrade railing, or faux stone veneer. Bridges with high visibility, such as the one



**Figure 3: The Monroe Street bridge over Blunn Creek is a feature of Little Stacy Park in South Austin. Photo by Rebekah Dobrasko.**

constructed over Blunn Creek in Little Stacey Park where a concrete arch bridge was made to look like a historic stone bridge, enhanced the beauty of the park (Figure 3). Some bridges had pebbled finishes applied to further beautify the concrete (Figure 4).

The new bridges were in areas designed to be viewed by the public. One concrete bridge crossed Waller Creek near Austin’s golf course and country club. Three bridges were within the boundaries of The University of Texas, part of a plan to create a grand boulevard through the campus. Other bridges and culverts were located near parks and walkways along the creeks. Even if most people did not view the entirety of the bridge structure, with its design flourishes and finishes, the distinct concrete railings along the sidewalks and roads of the bridges were attractive as well as utilitarian.

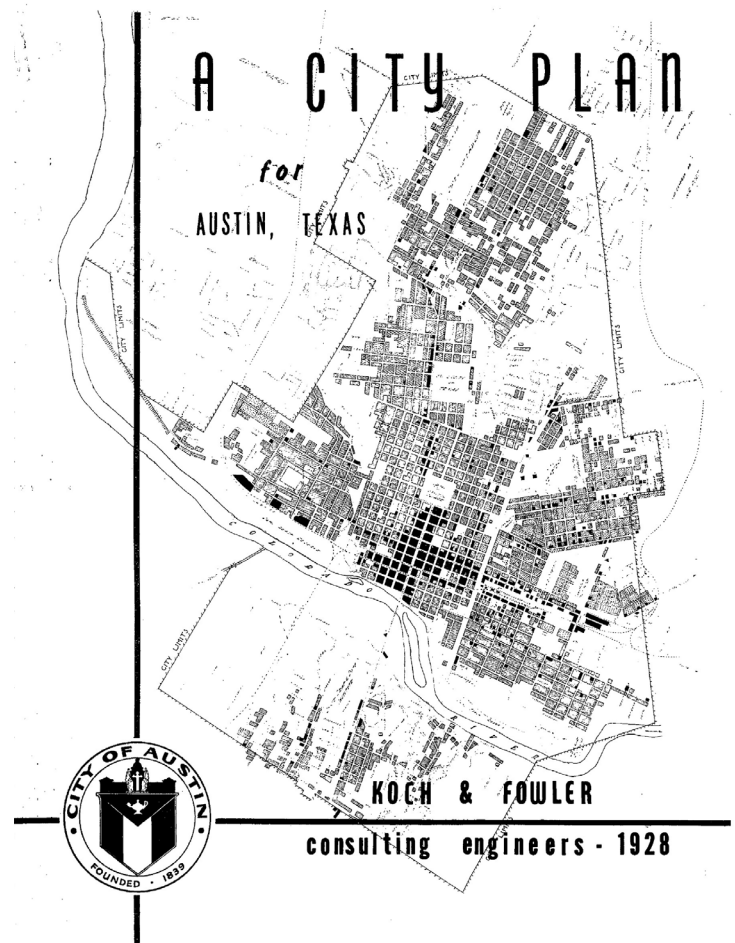


**Figure 4: A detail photo showing the railing on the 32nd Street Bridge over Waller Creek, which has a pebbled panel finish. Photo by Rebekah Dobrasko.**



While some elements of Austin's 1928 City Plan, like the "Negro District," did not survive the test of time, the twenty-one concrete bridges and culverts did. Now almost ninety years old, nineteen of the structures still serve Austin's traffic today. Most of the bridges and culverts are eligible for listing in the National Register of Historic Places, both for their engineering significance and for their connection to Austin's 1928 plan. The West Fifth Street at Shoal Creek Bridge is in the process of being listed in the National Register. While Austin has more famous historic bridges in the city, these smaller concrete City Beautiful bridges are worthy of preservation and celebration.

*Rebekah Dobrasko is an environmental program manager and lead historian at the Texas Department of Transportation in Austin. She is currently project managing the interpretation of Texas's historic post-World War II bridges and recently completed a National Register of Historic Places nomination for the West Fifth Street at Shoal Creek Bridge. Prior to coming to TxDOT in 2013, Rebekah worked for 10 years at the South Carolina State Historic Preservation Office, where she worked in the review and compliance program, the state tax credit program, and the outreach program. Rebekah has a master's degree in public history from the University of South Carolina and a B.A. in history from Tulane University in New Orleans.*



The cover page of the 1928 city plan titled, *A City Plan for Austin, Texas*.