GRANT APPLICATION

Austin Convention and Visitors Bureau
Attn: Steve Genovesi, Senior Vice President, Sales
111 Congress Avenue, Suite 700
Austin, Texas 78701
Phone: 512-583-7259 Email: sgenovesi@austintexas.org

DATE: July 31, 2017

HISTORIC PROPERTY AND ADDRESS: 1887 West 6th Street Bridge Over Shoal Creek, located on 6th Street between West Avenue and Wood Street.

APPLICANT'S NAME: Shoal Creek Conservancy

APPLICANT'S ADDRESS: P.O. Box 11520, Austin, TX 78711

NAME AND ADDRESS OF OWNER, IF DIFFERENT FROM APPLICANT: City of Austin Public Works Department, 505 Barton Springs Road, Floor 8, Suite 800, Austin, TX 78704

TAX I.D. NUMBER/TAX STATUS: 46-2705100/Tax exempt due to nonprofit status

PERSON PRESENTING REQUEST/CONTACT PERSON: Nina Rinaldi

ADDRESS: P.O. Box 11520, Austin, TX 78711 TELEPHONE NO. 512-474-2412

E-MAIL: nina@shoalcreekconservancy.org FAX NUMBER: N/A

PROJECT NAME: 1887 West 6th Street Bridge Over Shoal Creek Restoration Project

DESCRIPTION OF PROJECT – PLEASE SUMMARIZE THE PROPOSED PROJECT. (IF DESIRED, APPLICANT MAY ALSO ATTACH AN ADDITIONAL SHEET MORE FULLY EXPLAINING THE PROJECT AND THE REASON FOR THE GRANT REQUEST.)

Shoal Creek Conservancy is rehabilitating the historic 1887 West 6th Street Bridge over Shoal Creek. Through structural rehabilitation, architectural and placemaking enhancements, and interpretive features, the bridge will be transformed into an educational and cultural destination along Shoal Creek.
Presently, Shoal Creek Conservancy requests funding to support construction and rehabilitation of the bridge's parapets, and to support the addition of bridge lighting at the street level, trail level, and underneath the bridge vault.

Please view the attached "Description of Project" document for more information.

PLEASE LIST HISTORIC DESIGNATIONS OF THE PROPERTY, AND IF LOCATED WITHIN A NATIONAL REGISTER OR LOCAL HISTORIC DISTRICT (PLEASE SPECIFY WHICH DISTRICT), AND IF THE PROPERTY IS CONTRIBUTING:

The West 6th Street Bridge is listed on the National Register of Historic Places.

AMOUNT OF FUNDING REQUESTED: $58,000

AMOUNT OF MATCH OR VALUE OF IN-KIND MATCH: None presently secured, however, the Conservancy is working with the Public Works Department to apply for a Neighborhood Partnering Program grant to help fund the parapet and lighting construction.

DO LIENS EXIST AGAINST THE HISTORIC PROPERTY? ( ) YES (X) NO

IF *YES*, DESCRIBE THE LIENS AND AMOUNTS: _____

Joanna Wolaver
Shoal Creek Conservancy
Executive Director

(OWNER OR AUTHORIZED AGENT, AND TENANT IF APPLICABLE)

REQUIRED ATTACHMENTS:

1) TOURISM JUSTIFICATION: Include substantiation of contribution to the tourism industry in Austin (i.e., annual summary of out of town visitation, copies of promotional material, list of promotional activities, hours of operations, tours provided, etc.).

2) HISTORIC DOCUMENTATION: Historic photograph(s) or other documentation (especially those showing the elevation(s) of the historic property where restoration, alterations, changes, and/or improvements are planned).

3) CERTIFICATE OF APPROPRIATENESS FOR CITY DESIGNATED LANDMARKS AND LETTER OF APPROVAL FOR STATE DESIGNATED LANDMARKS: Proof of approval for historic property alterations, if required. *NOTE: If an approval is required, the Preservation Agreement with ACVB will not be executed until such documentation has been issued and provided to ACVB.*

4) PROJECT BUDGET: Applicant must include a budget, specifying the major components of the restoration/preservation project with associated costs. Also include evidence of other sources of funding, i.e. your own or others' match, and the corresponding work to be performed with these funds.

5) THREE COMPETITIVE BIDS for the proposed work (in excess of $5,000) must accompany the application.

6) PROJECT SCHEDULE: Phasing schedule and amount of funding required for each phase, if applicable.

7) PROOF OF OWNERSHIP/LEASE/AUTHORIZATION: Copy of the Deed or Will (if applicant is the owner) or documentation showing authorization from owner and any existing lease between owner and applicant.

8) INSURANCE: Proof of casualty, fire and federal flood insurance, if applicable.

9) PLANS AND SPECIFICATIONS OF PROPOSED WORK.

10) INCOMPLETE APPLICATIONS WILL NOT BE ACCEPTED.

DESCRIPTION OF PROJECT

Overview

Shoal Creek Conservancy respectfully requests funding from the Visit Austin to support the revitalization of the 1887 West 6th Street Bridge over Shoal Creek. Specifically, the Conservancy seeks $58,000 to support reconstruction of the Bridge's north parapet; retrofitting of the Bridge's south parapet; and installation of lighting at the trail level, street level, and under the bridge vault.

The parapet reconstruction and the addition of lighting would serve as immediate and impactful steps to improve the look, feel, and safety level of the bridge for trail users and pedestrians. When complete, the proposed improvements would highlight the bridge's uniqueness and make it a more inviting location to spend time. Lighting and parapet construction represent a central step in the four-phase restoration plan for the historic downtown Austin bridge.

The West 6th Street Bridge over Shoal Creek is located in the heart of Austin, just steps east of the intersection of Lamar Boulevard and West 6th Street. Built by hand in 1887, the striking triple-arched limestone bridge is listed on the National Register of Historic Places. Its history is rich, yet its story remains largely untold. Older than the State Capitol Building, the West 6th Street Bridge boasts an 80-foot-wide deck uniquely designed in that era for two-way wagon traffic, and later mule-drawn trolley traffic. The bridge was integral in accessing west Austin for expansion, allowing for the development of the Old West, Clarksville and Old Enfield neighborhoods.

Surviving 130 years of wear and tear and neglect, the West 6th Street Bridge today remains erect and in use, but in desperate need of rehabilitation and tribute to its distinct history. Though listed on the National Register of Historic Places, the bridge remains a little-known treasure. The bridge sits in disrepair amidst a popular and bustling complex of offices, iconic Austin restaurants and retail, and the flagship Whole Foods Market. As Austin rapidly grows, car, truck, bike and foot traffic have increased over the bridge deck, giving rise to concerns about the structural integrity of the bridge. In its current state, flood risk further threatens the longevity of the bridge.

Shoal Creek Conservancy recognizes the importance of structurally reinforcing and highlighting the historic grandeur of the West 6th Street Bridge that spans over Shoal Creek, a major Austin waterway. To accomplish this goal, Shoal Creek Conservancy obtained funding in 2015 from the Texas Historical Commission's Texas Preservation Trust Fund (TPTF) and the Burdine Johnson Foundation to commission the *1887 West Sixth Street Bridge at Shoal Creek Restoration Study*, a roadmap for rehabilitation of the bridge. The study revealed critical structural issues, and resulted in emergency repair work by the City of Austin. The repairs addressed immediate safety concerns, but certain repairs are still needed to support increased traffic on the bridge deck, ensure the long-term integrity of the bridge, and highlight the bridge as a historic treasure.

The Conservancy is ready to proceed with reconstruction of the bridge's parapets and the addition of lighting to highlight the bridge's architectural features and enhance safety for trail

users and pedestrians. Construction for these repairs and enhancements represent Phase 3 of a three-phase restoration project. Phase 1 was the commissioned rehabilitation study and plan, and is now complete. Phase 2 represents the design phase, which is complete for the parapets and lighting and in progress for other elements of the site. Also included in Phase 3 are additional placemaking and maintenance activities, including the installation of landscaping to visually enhance and draw community to the space.

Shoal Creek Conservancy, with endorsement from the City of Austin Public Works Department, seeks complete structural restoration of the 1887 West 6th Street Bridge over Shoal Creek, along with light and landscape enhancements to transform the space into a cultural and educational destination that honors the rich history of the bridge and the natural beauty of Shoal Creek and its trail.

Restoring Long-Term Structural Integrity

The *1887 West Sixth Street Bridge at Shoal Creek Restoration Study*, conducted in 2015, revealed a serious public safety concern. Severe loss of mortar had significantly reduced the carrying capacity of the bridge to only 20% of its original capacity. Shoal Creek Conservancy shared these findings with the City of Austin, which resulted in emergency re-grouting of the bridge by the City of Austin Public Works Department. The Conservancy facilitated conversations between the City, Sparks Engineering, and Bat Conservation International to ensure that the repairs both preserved the historic integrity of the bridge and ensured the safe and humane evacuation of the bridge's resident bats.

Restoration Plan

In 2015, Shoal Creek Conservancy consulted with one of Texas' premier bridge restoration professionals, Sparks Engineering, Inc. (Sparks) on rehabilitation of the West 6th Street Bridge. Working with subcontractors Limbacher & Godfrey Architects, Sparks recommended the restoration project be tackled in four phases:

- Phase 1: Evaluation
- Phase 2: Restoration Design
    - Design Schematics
    - Construction Documents
- Phase 3: Construction & Maintenance Protocol

Funding from TPTF and the Burdine Johnson Foundation allowed the completion of Phase 1, resulting in the *1887 West Sixth Street Bridge Over Shoal Creek Restoration Study.* The study summarized existing structural conditions and recommended a path forward for future restoration work.

<u>The present request for funds in the amount of $58,000 covers a portion of Phase 3, namely, to support reconstruction of the destroyed north parapet; retrofitting of the south parapet; and addition of lighting at the parapet level, trail level, and inside the bridge vault.</u>

Destroyed after many years of buffeting by flood waters, the bridge's north parapet has been replaced by a metal guardrail. The lack of lighting presents a serious safety issue and when remedied, will help draw community to the bridge. The Conservancy, Sparks

Engineering, and Limbacher & Godfrey Architects recognize the importance of a lighting design that is compatible with the bridge's historic features as well as with the surrounding streetscape and creekway. The lighting system must also withstand a number of challenges including flooding and vandalism. The lighting design takes into account all these considerations to produce a visually pleasing and inspiring lighting scheme (attached as Appendix E).

Shoal Creek Conservancy would be honored to partner with Visit Austin in the rehabilitation of the 1887 West 6th Street Bridge over Shoal Creek. A heritage grant award of $58,000 to support parapet construction and the addition of lighting would contribute significantly to the complete restoration of this overlooked Austin treasure.

Attachment 1: Tourism Justification

Introduction

Shoal Creek Conservancy envisions a restored and rejuvenated 1887 West 6th Street Bridge over Shoal Creek as a destination for locals and tourists to enjoy. A key feature of the bridge is its prime location. Just steps from the iconic Lamar Boulevard and West 6th Street intersection of Austin, locals and tourists already flock to this established and popular part of downtown. In an otherwise paved and concrete corridor, showcasing the beautiful historic stone West 6th Street Bridge as it spans over natural elements of creek water and trail will only heighten the draw to the area.

The West 6th Street Bridge rests over the Shoal Creek Greenbelt in a bustling and highly-frequented section of West 6th Street in downtown Austin. Tech companies, law offices, and GSD&M advertising agency populate the square, bringing local employees and business travelers to the area. The flagship Whole Foods Market is a hot spot for groceries and dining among Austin residents and out-of-towners, who often congregate on the outdoor patios and rooftop for live music and ice skating in the winter. Popular retailers include REI, Anthropologie, and By George, as well as homegrown favorites such as Waterloo Records, Amy's Ice Cream and Book People. Waterloo Records continually attracts locals and tourists for its free in-store shows. Book People draws in crowds for its unique collection of independent books, as well as its author events, book releases and children's story times. Crowded destination restaurants along West 6th Street include Hut's Hamburgers, Frank & Angie's Pizzeria, Irene's, The Grove Wine Bar & Kitchen, and 24 Diner.

Nestled amidst this hotbed of activity, the West 6th Street Bridge over Shoal Creek currently stands in despair. But given new life, the bridge and its surrounding space have the potential to transform into a picturesque and historically-rich reprieve, paying proper tribute to the story of our city's first bridge and Shoal Creek, a major and beloved waterway in Austin. The end result will be a landmark destination for locals to build community around and tourists to seek out as part of a uniquely Austin experience. The refurbished bridge will also become an important destination in the fabric of the Shoal Creek Trail, which links the New Central Library, the University of Texas, Austin Community College, and Pease Park, among other destinations.

The West 6th Street Bridge Area Is Frequented by Tourists

Shoal Creek Conservancy provides evidence to support the high number of tourists who currently visit the West 6th Street Bridge area. Specifically, the Conservancy gathered information from hotels and restaurants in the area, as well as the City of Austin website for trail usage, to demonstrate high tourist activity at and around the bridge. This data demonstrates the strong potential to make the bridge itself a historic tourist destination.

<u>Nearby Hotels Frequently Recommend the West 6th Street Bridge Area to Guests</u>

The Austin hotel industry is burgeoning as the city continues to attract a growing number of conference, festival and vacation tourists. With nearly 8,000 hotels rooms already available in

downtown Austin, and roughly 2,000 slated for addition,[1] hotels provide a valuable source of information on common tourist destinations within the city. To understand the number of tourists who head to the West 6th Street Bridge area based on hotel concierge recommendations, Shoal Creek Conservancy interviewed several hotel staff members within one mile of the historic bridge.

Based on the response, it is evident that the intersection of Lamar Boulevard and West 6th Street is an iconic tourist destination, well-known for its uniquely-Austin restaurants and shops:

> I often recommend Hut's Hamburgers, Whole Foods, Book People, Wildflower, Billy Reid, Walton's Fancy & Staple, Ranch 616, By George, and Anthropologie. [F]arther down West 6th Street, our guests like to go to Jean-Marc Fray French Antiques and Clark's Oyster Bar.
>
> – Staff, The Driskill Hotel

> I direct quite a few guests on foot to take Lavaca Street to 6th Street and then head towards Irene's**,** Book People**,** RIO Nightclub and 24 Diner. The flagship Whole Foods is also a popular destination.
>
> – Channe Whitright, Concierge, W Austin Hotel

> I send about 10-15 guests per week to Whole Foods or Hut's Hamburgers. Hut's is the first place I recommend to guests who ask about burgers.
>
> – Staff, Hyatt Place Austin Downtown

> I often recommend Hut's Hamburgers, Whole Foods, Waterloo Records, and Amy's Ice Cream to clients.
>
> – Staff, Omni Austin Hotel Downtown

The testimony of the nearby hotel concierge staff also provides estimates of the number of out-of-towners directed by staff to the West 6th Street Bridge area. Based upon information received from the hotels, Shoal Creek Conservancy estimates that downtown hotels alone direct between 27,563 and 29,695 out-of-town guests per year to the West 6th Street Bridge. This does not include the countless other tourists who make their way to the West 6th Street Bridge area based on information from other sources, including travel websites and publications, restaurant reviews, Austin must-do and -see lists, and word-of-mouth.

[1] Source: http://www.downtownaustin.com/business/tourism, *citing* Downtown Austin Alliance, September 2016 (visited 03-08-17)

Hotel	Distance from West 6th Street Bridge[2]	Estimated Number of Out-of-Town Guests Hotel Staff Directs to the West 6th Street Bridge Area		Estimated Annual Number of Out-of-Town Guests Hotel Staff Directs to the West 6th Street Bridge Area[3]
		Per day	Per week	
Extended Stay America – Austin Downtown 6th Street	0.3 mile		4-10	208-520
The Driskill Hotel	0.6 mile		30-60[4]	1,560-3,120
Omni Austin Hotel Downtown	0.8 mile		100	5,200
W Hotel Austin	0.6 mile	50		18,250
Hyatt Place Austin Downtown	0.6 mile		10-15	520-780
Intercontinental Stephen F. Austin	0.6 mile	5		1,825
			TOTAL:	**27,563-29,695**

This estimate of how many tourists are directed to the West 6th Street by hotel staff, while significant, is not exhaustive. It is limited to select hotels within one mile of the West 6th Street Bridge. It is highly likely that hotels outside of a one-mile radius also send guests to the popular restaurants and retail along the West 6th Street corridor.

Also worth noting, not included in the numbers is the Westin Austin Downtown. The concierge clearly recommends West 6th Street attractions to clients, but did not quantify the guests directed to the area. Staff at the Westin Austin Downtown confirm the draw of Waterloo Records for music-lovers visiting Austin, and notes family-friendly places around the West 6th Street Bridge.

> Any time I have a guest interested in music or there is a free in-store show, I direct him or her to Waterloo Records. The shows are always on my list of recommended events I create for the week, and guests often ask about Waterloo Records on their own. For families, I at times recommend Frank & Angie's and Hut's Hamburgers for dining. I also suggest Book People story-time events for guests with children. Also, since the CVS closed near our hotel, a lot of our guests now head to the Lamar and 6th Street area for drug store needs.

[2] The source for the distance from the West 6th Street Bridge to each hotel is Google Maps. The distances are approximates based on the distance between the hotel and Hut's Hamburgers, which is adjacent to the bridge.

[3] The Estimated Annual Number of Out-of-Town Guests Hotel Staff Directs to the West 6th Street Bridge is calculated by Shoal Creek Conservancy based on the 'per day' and 'per week' estimates provided by Downtown Austin hotel staff.

[4] The Driskill Hotel staff members, estimate that they direct 10-20 guests daily to the West 6th Street Bridge area on Thursdays, Fridays, and Saturdays. Shoal Creek Conservancy, thus, equates this estimate to 30-60 weekly (10-20 daily over 3 days each week).

The Restaurants Around the West 6th Street Bridge Draw in Tourists

The restaurants in downtown Austin range from established iconic favorites to those featuring new and trendy spaces and innovative menus. Many are already on the radars of tourists based upon personal recommendations, social media, researching online restaurant reviews, or reading "best of" articles in various publications. The restaurants in the immediate vicinity of the West 6th Street Bridge are no exception, and include Hut's Hamburgers, Frank & Angie's Pizzeria, Irene's and The Grove Wine Bar & Kitchen.

Situated just steps east of the footpath above the West Sixth Street Bridge, Hut's Hamburgers is an iconic burger joint in downtown Austin. The restaurant opened its doors in 1981 and has a long-standing and loyal customer base. Testimony from its General Manager and nearby hotel concierge staff support the draw this establishment has for tourists visiting Austin.

> While a lot of our weekday business is from area law firms, GSD&M, and Cirrus Logic, we see many tourists at Hut's and Frankie and Angie's on the weekends. Both restaurants seem to be well-known among tourists. In fact, if the University of Texas at Austin is hosting UIL events with out-of-town competitors, we often get large crowds at the restaurants. We recently hosted a swim team from Harvard University at Hut's.
>
> Hut's has a long history in Austin, and loyal customers who used to live in Austin return when they are in town. I recently had a UT graduate who now lives in New York call me and ask if I could open Hut's early so that he could get a burger before leaving town.

Similarly, Frank & Angie's Pizzeria, an indoor-outdoor pizza place, often gets requests for large groups of tourists visiting Austin.

> We also see many out-of-town customers when Austin is hosting races or marathons. Large parties will often call ahead to reserve our patio space at Frank & Angie's for after the race.

Other nearby West 6th Street restaurants that routinely receive recommendation by hotel concierges include 24 Diner, Z'Tejas, and Clark's Oyster Bar.

Hikers, Runners and Bikers Routinely Use the Shoal Creek Trail

The Shoal Creek Trail, a portion of which runs below the West 6th Street Bridge, gets significant daily use. Between December 29, 2014 and March 10, 2017, the trail logged 116,256 users, or an average of 145 daily.[5] While we do not know the exact number of individuals that use the trail at the West 6th Street Bridge location, the portion of the Shoal Creek Trail that runs through downtown Austin is popular. Restoration of the West 6th Street Bridge and its surroundings will likely attract additional runners, bikers and hikers, some of whom will likely be tourists drawn to the trail because of the history and setting of the bridge.

[5] City of Austin trail counter website, http://www.eco-public.com/ParcPublic/?id=89# (visited 03-10-17)

Establishing and Advertising the West 6th Street Bridge as a Destination

Once the West 6th Street Bridge is restored, Shoal Creek Conservancy envisions a prominent display of its National Register of Historic Places designation on a plaque or other signage at the bridge. Additionally, as part of the restoration project, interpretive totems will be installed at both the sidewalk and trail levels to display a narrative history of the bridge. Elegant lighting and native landscape enhancements to the bridge and its surroundings will further highlight and draw attention to the remarkable history and beauty of the space.

Through these efforts, Shoal Creek Conservancy wishes ultimately to build community around the West 6th Street Bridge, establishing it as an Austin landmark destination with cultural, educational and historical significance. Adding this treasure to the downtown Austin landscape will serve to enrich an already flourishing tourism industry. The Conservancy anticipates the space may be listed on a City of Austin website, advertising it as an important destination in the heart of the city. The bridge may also appear on city maps, hotel concierge lists of recommended Austin attractions, and travel publications and blogs featuring Austin. Association with local, state and national historic preservation societies will also help to advertise the West 6th Street Bridge destination to tourists.

Conclusion

Uniquely situated in an otherwise busy complex of trendy restaurants, shops, and the flagship Whole Foods Market, the revitalization of the 1887 West 6th Street Bridge over Shoal Creek marks an opportunity to highlight and draw community to the beauty of a National Register of Historic Places treasure. Surrounded by concrete and development, the striking 1887 limestone bridge and its water, green space, and hike and bike trail, once restored, will provide a cultural and natural haven for locals and tourists to enjoy, today and for years to come.

Attachment 2: Historic Documentation

The earliest existing photos of the West 6th Street Bridge façade date to 1981. However, photos of the bridge deck and environs are available from earlier years. Photos included here are from 1915, 1945, and 1981. Further historic photos and maps can be found on pages 26-30 of the Sparks Engineering *Restoration Study,* included as **Appendix C**.

The West 6th Street Bridge appears on the right hand side of this photo. This image shows the aftermath of the 1981 Shoal Creek Memorial Day Flood.

1915 Shoal Creek Flood; West 6th Street & Wood Street, facing west.

6th Street and Bowie Street, facing east, ca. 1945.

Attachment 4: Project Budget

West 6th Street Bridge Construction: Bridge Lighting and Parapets

Item	Cost
Parapet Construction	$62,000
Lighting Construction & Electrical	$190,000
Supporting Work (Traffic Control, Sidewalk Removal, Tree Protection, etc.)	$71,000
Fees & Contingency	$92,000
TOTAL	$415,000

The estimated cost for construction work on the bridge lighting and parapets is $415,000. The Sparks Engineering Opinion of Cost is attached as part of **Appendix E**.

Attachment 5: Three Competitive Bids

Shoal Creek Conservancy wishes to hire Sparks Engineering, Inc. (Sparks). Sparks is the preeminent historical bridge specialist in the United States. The firm "specializes in design for rehabilitation and restoration of historic structures, with special attention given to sensitive strengthening methods that do not detract from the structure's historic character." *See* **Appendix B**, *Statement of Qualification, Bridge Consulting Services*, prepared by Sparks Engineering, Inc. for Shoal Creek Conservancy, Page 3. Importantly, Sparks has an impressive resume of historic bridge experience:

1881/1910 Hays Street Bridge Rehabilitation
1887 Faust Street Bridge Restoration*
1887 West Sixth Street Bridge Evaluation, Austin
1910 RG&E Dam Bridge, Rochester, NY, Fracture Analysis
1912 West 7th Street Bridge, Fort Worth, Evaluation
1929 San Antonio Street Bridge Railing
1935 Camp Mabry Arch Bridge and Dam Evaluation
1936 Inks Bridge Evaluation, Llano
1939 Amelia Earhart Bridge, Preservation Consulting
1940 Vida-Shaw Swing Bridge, Louisiana, Evaluation
1890 Spring Creek Truss Bridge, Evaluation
1891 Bluff Dale Suspension Bridge, Evaluation
1896 Mata de Platano Bridge, Ciales, PR, Rehabilitation
1896 Sugarloaf Bridge Rehabilitation

*Individual experience of the firm principal

See **Appendix B**, Page 5.

Given that Sparks prepared the rehabilitation plan for the 1887 West 6th Street Bridge over Shoal Creek and is intimately familiar with the bridge structure and its restorative needs, the Conservancy believes it is the most efficient and appropriate use of resources to hire Sparks to complete the design for the rehabilitation of the retaining walls. Based on Sparks' history with the project and the firm's unique qualifications, Shoal Creek Conservancy has not obtained additional bids.

Attachment 6: Phasing Schedule

West 6th Street Bridge Over Shoal Creek: Restoration Project

Phase	Schedule	Total Amount
Phase 1: Evaluation	Completed March 2016	$43,500
Phase 2: Restoration Design Design Schematics Construction Documents	Partially complete; in progress	$209,700
Phase 3: Construction & Maintenance Protocol	Upcoming	$1,705,000
TOTAL		$1,958,200

More detailed phasing recommendations can be found in **Appendix C: Restoration Study.**

Attachment 7: Letter of Endorsement from the City of Austin

Letter attached as Appendix D.

Attachment 9: Plans and Specifications of Proposed Work

Construction documents and an opinion of cost are attached as **Appendix E**. A lighting concept package by Limbacher & Godfrey Architects is attached as **Appendix F**. This document displays the inspiration for the bridge's holistically compatible lighting scheme and illustrates what the bridge lighting will look like when complete.

Appendix A: Current Photos of the West 6th Street Bridge

West 6th Street Bridge, north face.

West 6th Street Bridge, north face. The metal guardrail installed in place of the destroyed parapet is visible here. The northwest retaining wall made of large stone blocks is visible on the right side of the photo.

Another view of the bridge's north side and metal guardrail. The northwest retaining wall is visible here on the right side of the photo.

Regrouting of the bridge in 2016. The little tubes inserted in between the stones are escape chutes for the bridge's resident bats.

Statement of Qualifications

Bridge Consulting Services

Faust Street Bridge - Restored 1998
New Braunfels, Texas

Prepared for Shoal Creek Conservancy,
Austin, Texas

SPARKS ENGINEERING, INC.

Photo Credit: Albert Moyer, Jr. Photography

Table of Contents

Mata de Platano Bridge during assessment.

Introduction to SEI

> "SEI is one of the few structural engineering firms specializing in the evaluation, restoration, and rehabilitation of historic bridges."

Sparks Engineering, Inc. specializes in preservation and adaptive use of existing and historic structures. We provide consulting engineering services in support of architects, owners, and facility managers, and we offer an unparalleled knowledge of building systems, adaptation, and design. Our services include both diagnostics and structural design. The company was founded in January 2001 and has become nationally recognized in our areas of expertise.

SEI has a well-developed philosophy of preservation engineering based on minimal intervention and respect for historic fabric. We have evaluated and designed appropriate structural conservation measures for many landmark engineering works. We have been chosen to provide consulting services for historic bridges across Texas and the nation, as well as for National Historic Landmarks and the now inscribed Missions of San Antonio World Heritage Site. At Sparks Engineering, Inc., we have developed a systematic approach to the restoration and rehabilitation of existing structures. Our approach is based on the fundamentals of sound engineering practice and a philosophy of long-term value.

Services

Structural Evaluation

SEI performs on-site investigations of existing structural systems to predict future structural performance and recommends strengthening measures to improve performance.

Nondestructive Testing

SEI has successfully developed special testing protocols for all types of structures. NDT can offer a rapid and thorough evaluation without the adverse impact of destructive testing. We also have the ability to provide material evaluation services. Our material evaluation services include concise, experienced-based interpretation of test results to develop the most rational approach for repair.

Design for Restoration and Rehabilitation

SEI specializes in design for rehabilitation and restoration of historic structures, with special attention given to sensitive strengthening methods that do not detract from the structure's historic character. We understand how historic structures were built, and we know how to restore them.

Installation of a railing section for the San Antonio Street Bridge, New Braunfels, Texas.

Consulting Services for the Rehabilitation of the Historic Brazos River Truss Bridge, Waco Texas

Familiarity with Standards

All of our work on historic structures meets the Secretary of the Interior's Standards for Rehabilitation. We routinely work with government authorities on permitting and compliance, and have led Section 106 and 4(f) reviews. Further, we incorporate the ISCARSAH principals for structural conservation in our philosophy. We are also familiar with Federal Highway Administration, Texas DOT, and AASHTO standards for bridge design and rehabilitation. In addition, based on prior bridge assessments and our knowledge of historic truss bridges, we developed a report for the Texas Department of Transportation entitled "Guide to Evaluating Historic Iron & Steel Bridges".

As well, we are familiar with the following codes and standards:

- Bridge Inspector's Reference Manual, FHWA
- TxDOT- Historic Bridge Manual
- Guide Specifications for Fracture Critical Non-Redundant Bridge Members, American Association of State Highway and Transportation Officials, AASHTO
- Manual for Condition Assessment of Bridges, AASHTO
- ASCE Guidelines for Assessment of Existing Structures
- Repair and Strengthening of Old Steel Truss Bridges, American Society of Civil Engineers
- LRFD Bridge Design Specifications, AASHTO
- LRFD Guide Specifications for Design of Pedestrian Bridges, AASHTO

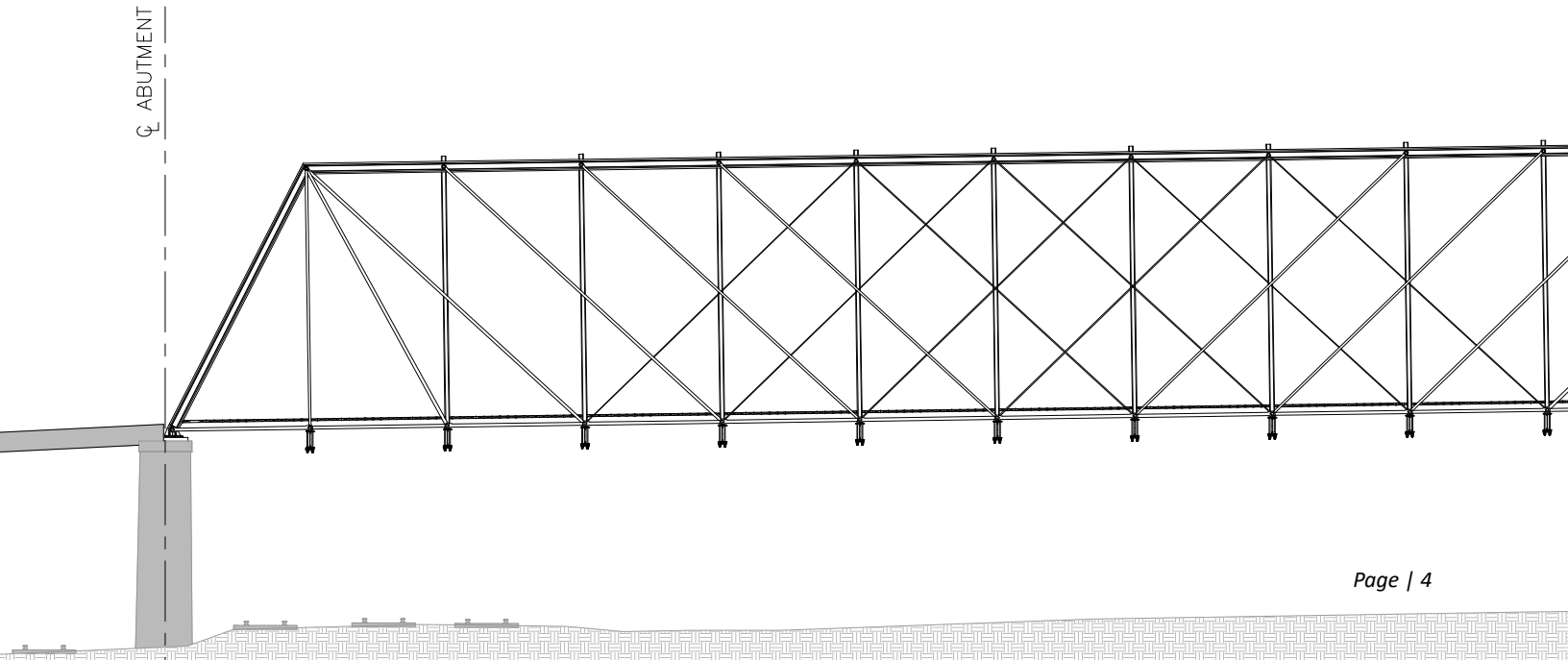
Ease of Coordination

In our work on historic bridges, we have to maintain a high degree of coordination with various authorities and stakeholders, such as NPS, State DoT, FHWA, SHPO, and contractors, and with environmental compliance.

Hays Street Bridge Beam Rehabilitation, San Antonio, Texas.

Selected Client List

National Park Service
Republic of Palau
City of San Antonio
Shoal Creek Conservancy
Texas Tech University
Department of Defense
United States Navy
US Veterans Administration
Texas A&M University
Texas General Land Office
Texas Historical Commission



Historic Bridge Experience

1881/1910	Hays Street Bridge Rehabilitation
1887	Faust Street Bridge Restoration*
1887	West Sixth Street Bridge Evaluation, Austin
1910	RG&E Dam Bridge, Rochester, NY, Fracture Analysis
1912	West 7th Street Bridge, Fort Worth, Evaluation
1929	San Antonio Street Bridge Railing
1935	Camp Mabry Arch Bridge and Dam Evaluation
1936	Inks Bridge Evaluation, Llano
1939	Amelia Earhart Bridge, Preservation Consulting
1940	Vida-Shaw Swing Bridge, Louisiana, Evaluation
1890	Spring Creek Truss Bridge, Evaluation
1891	Bluff Dale Suspension Bridge, Evaluation
1896	Mata de Platano Bridge, Ciales, PR, Rehabilitation
1896	Sugarloaf Bridge Rehabilitation

**Individual experience of the firm principal.*

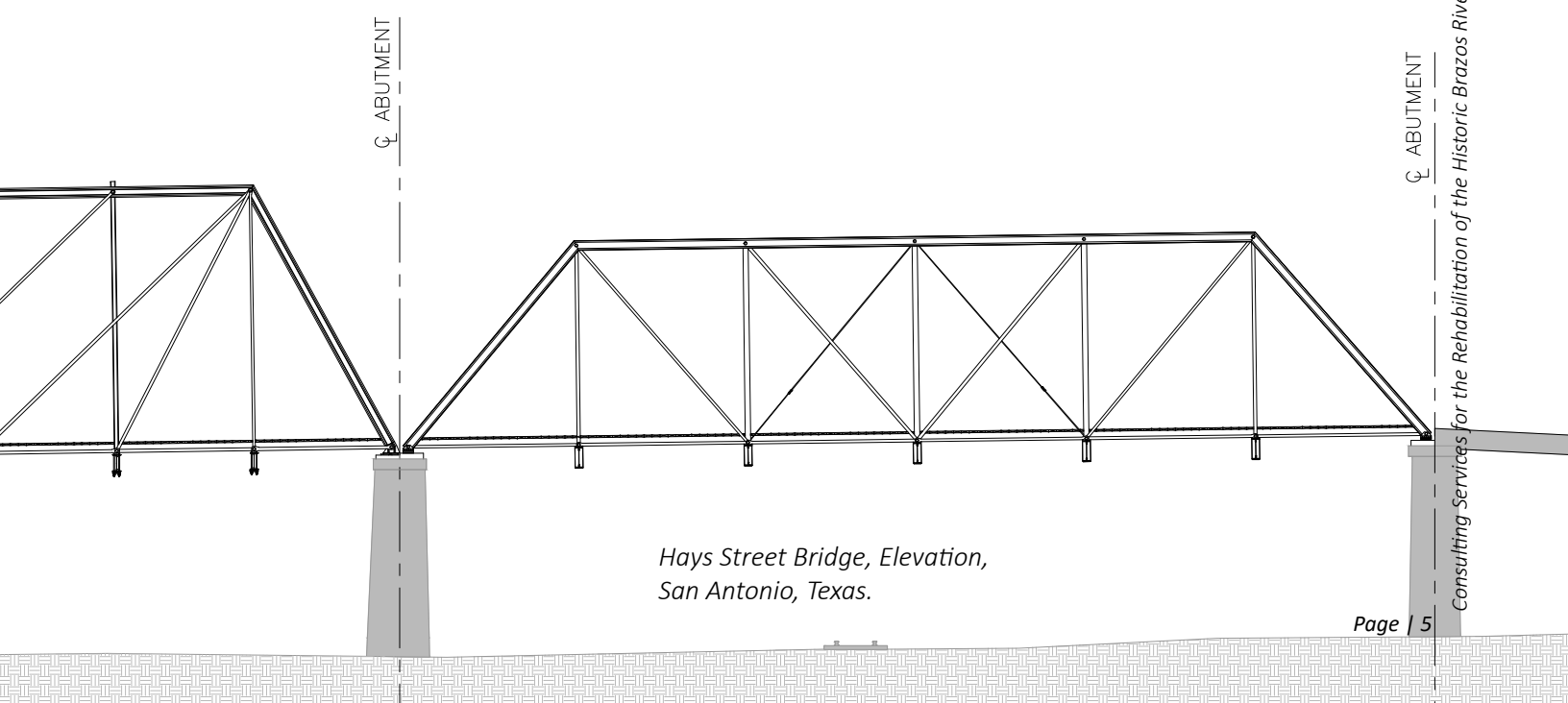
Sparks Engineering, Inc specializes in structural design, repair and strengthening of existing structures, including bridges.

Most recently, Sparks Engineering, Inc. was the prime consultant for the restoration design of the West Sixth Street Bridge at Shoal Creek in Austin, Texas. The bridge stands in the location of the presumed first bridge in the state. The project involved evaluating the 1887 unreinforced masonry arch bridge and designing a proposed master plan for the bridge and surrounding creekway. The bridge is still currently in use, and changes to the city around it are demanding a rehabilitated icon.

Additionally, SEI was the prime consultant for the restoration of the Hays Street Bridge in San Antonio. This project involved rehabilitating two 1881 iron thru-truss spans over the Union Pacific Railroad and rebuilding the approaches to be used as a pedestrian and bicycle bridge. The finished product revived a neighborhood icon and connected the Dignowity Hill historic district with downtown San Antonio. Additionally, the project has been recognized by the Bridge Aesthetics Subcommittee of the Transportation Research Board.

Mr. Sparks is routinely called upon to consult on the repair and strengthening of historic bridges. Some examples include the Amelia Earhart Memorial Bridge over the Missouri River in Atchison Kansas, the Roy B. Inks Bridge over the Llano River, and the West 7th Street Bridge over the Trinity River in Fort Worth.

Mr. Sparks was also the engineer of record for the rehabilitation of the Faust Street Bridge* in Comal County over the Guadalupe River, one of the most significant historic bridges in the state. The 640-foot, four-span wrought-iron truss bridge was originally built in 1887 and had been closed for 16 years. Prior to its rehabilitation and re-opening to pedestrian traffic the bridge had been damaged by corrosion and decay, and it had fire damage on one span.



Hays Street Bridge, Elevation,
San Antonio, Texas.

Historic Bridge Experience

The Faust Street Bridge rehabilitation included a detailed structural evaluation and inspection of the bridge's fracture-critical members. Use of selective materials testing avoided removal of historic fabric. Additionally, new procedures were developed and utilized that allowed ultrasonic inspection of a total of 128 pins and 64 eyebars. Completion of the project also included Section 106 review with the TxDOT and the Texas Historical Commission, and issued an environmental document for EPA clearance. The project was completed under budget and is one of the most successful ISTEA-funded projects in the state.

Company Information

The company was founded in January 2001 in and has become nationally recognized for our expertise with landmark structures and design in coastal environments. Since inception, we have successfully completed projects that include evaluation, retrofit, and expansions of commercial, industrial, and institutional buildings, restoration and rehabilitation of hundreds of national register properties.

Legal Name: Sparks Engineering, Inc.

Type of Entity: Corporation

Number of Years in Business: 15 Years (since 2001)

Address:
933 North Flores Street
San Antonio, Texas 78212
210-229-0669
www.sparksengineering.com

Number of Employees:

Principal, P.E.	1
Senior Engineer, P.E.	2 (part-time)
Project Engineer	1
Production	1
Accounting	1 (part-time)

Contact:
Patrick Sparks, P.E.
President
933 North Flores Street
San Antonio, Texas 78212
210-229-0669
psparks@sparksengineering.com

Firm Registration:
F-0515 Texas Registered Engineering Firm
Federal Small Business Enterprise

Current Engagements: Sparks Engineering, Inc. is currently engaged in the following major contracts:

Owner's Name	*Scope of Services*	*Contract Dates*
General Land Office	Alamo Historic Structures Report, GPR Survey, Borescope	August 2016
Missions Maintenance Program	Structural Maintenance Planning and Approaches	On-Going
Department of Defense	Legacy Study, Implementing Rehabilitation Recommendations for Pre WWII Masonry Buildings	August 2016
Beinn Breagh, Cape Breton, NS, CA	Subconsultant on restoration of Alexander Graham Bell Home	Spring 2016

S. Patrick Sparks, P.E.

President

EDUCATION

Texas A&M University
- Master of Engineering, Civil Engineering, 1989
- Bachelor of Science, Aerospace Engineering, 1982

Georgia Institute of Technology
- Master of Science, Aerospace Engineering, 1983

PROFESSIONAL REGISTRATION

Professional Engineer
- Texas, Mississippi, Louisiana

CAREER SUMMARY

Patrick Sparks is principal of Sparks Engineering, Inc. He has over 30 years' experience in a variety of engineering disciplines, including research, construction, and design.

Sparks has specialized experience in historic bridge evaluation and rehabilitation, including the Texas Civil Engineering Landmarks 1881/1910 Hays Street Bridge in San Antonio and 1887 Faust Street Bridge in New Braunfels. He is currently a subconsultant to CMA Architects & Engineers for the rehabilitation of the 1896 Mata de Platano Bridge in Ciales, PR.

He is a co-founder of the Preservation Engineering Technical Committee of the Association for Preservation Technology, a Professional Fellow of the Center for Heritage Conservation at Texas A&M University, and is an expert member of ISCARSAH, an international scientific committee for structural conservation.

PRACTICE AREAS

Structural Evaluation
Repair and Rehabilitation Design
Hurricane and Flood Damage
Structural Analysis/Finite Element Analysis
Concrete Deterioration and Repair
Bridge Rehabilitation
Foundation Underpinning
Nondestructive Testing

PROFESSIONAL ACTIVITIES

Center for Heritage Conservation, Texas A&M
- Professional Fellow since 1999
- Advisory Council, 1999-2002

Association for Preservation Technology
- Board of Directors, 1999-2003, 2008
- Preservation Engineering Committee, Founding member

US National Committee of the International Council on Monuments and Sites (US/ICOMOS)

International Scientific Committee for Analysis and Restoration of Structures of Architectural Heritage, Expert Member, 2007

Historic Bridge Foundation, President 2003-2007

Texas Dance Hall Preservation, Inc., President 2008-present

Concrete Preservation Institute, director 2014-present

AWARDS & HONORS

Charles E. Peterson Prize1990, Historic American Buildings Survey, Grimes County Courthouse

Professional Fellow, Texas A&M University, Center for Heritage Conservation

Naval Facilities Engineering Command Commander's Certificate of Commendation, NAS Pensacola

National Preservation Honor Award, 2010

REPRESENTATIVE PROJECTS

Bridge Rehabilitation

Chevy Chase Bridge, Austin
- Failure Investigation and Repair Design

1887 Faust Street Bridge Restoration
- Evaluation and Restoration Design

1936 Inks Bridge
- Evaluation

1910 RG&E Dam Bridge, Rochester, NY
- Fracture Critical Analysis

1896 Sugarloaf Bridge Rehabilitation
- Evaluation and Restoration Design

1881/1910 Hays Street Bridge Rehabilitation
- Evaluation and Rehabilitation Design

1939 Amelia Earhart Memorial Bridge, Atchison, KS
- Preservation Consulting

1935 Camp Mabry Arch Bridge and Dam
- Evaluation and Conservation Recommendations

1890 Spring Creek Truss Bridge
- Evaluation and Opinion of Cost for Rehabilitation

1891 Bluff Dale Suspension Bridge
- Evaluation and Opinion of Cost for Rehabilitation

1896 Mata de Platano Bridge, Ciales, PR
- Subconsultant for Evaluation and Rehabilitation

National Historic Landmarks & Sites

Ordoñez Seacoast Gun, San Juan National Historic Site
Beauvoir NHL, Biloxi
Fort Concho NHL, San Angelo, Texas
Pensacola Naval Air Station NHL
Treviño-Uribe Complex NHL, San Ygnacio Texas
The Missions of San Antonio, WHS
Texas Governor's Mansion, Austin
1800 African House, Melrose Plantation NHL
Fort Sam Houston NHL
Fort Christiansvaern NHS, St. Croix
Cape Hatteras Lighthouse Relocation
Old Fort Brown NHL, Brownsville, Texas

Historic Preservation

1780 Casa Fuerte, Zapata County, Texas
1846 St. Mary's Cathedral Basilica, Galveston
1848 Jefferson Davis House, Beauvoir, Biloxi
1850 Immaculate Conception Cathedral, Brownsville
1850 Pease Mansion, Austin
1856 Texas Governor's Mansion
1874 Union Mercantile Adobe, Fort Davis
1875 Coggin Academy, Brownwood
1882 Eaton Chapel, Galveston
1896 Ordoñez Seacoast Gun, San Juan
1900 Swetman Residence, Biloxi
1900 St. Edward's Old Main, Austin
1920 Waveland Civic Center, Waveland, MS
1927 Villa De Matel Convent, Houston

SELECTED PRESENTATIONS AND PUBLICATIONS

"Ironclad", Civil Engineering, American Society of Civil Engineers, August 2010, pp 70-75

"Rehabilitation of the Historic Hays Street Viaduct in San Antonio, Texas," proceedings of the ASCE/SEI Structures Congress, Austin, Texas April 2009

"Historic Bridges: Rehab or Replace?" presented at the 2009 Kansas Department of Transportation Annual Conference,

"Evaluation of Iron & Steel in Historic Bridges," proceedings of the Sixth International Conference on Structural Analysis of Historical Constructions, Bath, UK July 2008

"Evaluation of Historic Iron & Steel Structures," presented at the APT-DVC Symposium on Iron & Steel, Philadelphia, PA, April 30, 2005

"Stabilization and Structural Engineering Issues in Historic Preservation" presented at the Preservation Texas Building Industry Council Seminar From Eyesore to Icon, February 17, 2005

"Classification of Diagnostic Methods," presented at the APT Workshop in Preservation Engineering: Diagnostics - Nondestructive Testing for the Evaluation of Historic Structures, Galveston, Texas November 3-4, 2004

"Corrosion Testing of Concrete," presented at the APT Workshop in Preservation Engineering: Diagnostics - Nondestructive Testing for the Evaluation of Historic Structures, Galveston, Texas November 3-4, 2004

Guide to Evaluating Historic Iron & Steel Bridges, developed for the Texas Department of Transportation, 2004.

"Innovation in Conservation: Characterization of Historic Materials," presented at the Historic Preservation Symposium, Texas A&M University, February 2004.

"Historic Bridges: A Conservation Engineering Approach," Building Industry Council Symposium, Austin, Texas, February 2003.

"Historic Iron & Steel Structures: Properties, Evaluation, and Reliability," lecture to the ARCH 646- Preservation Technology graduate class, October 29, 2002, Texas A&M University.

"Wrought Iron: Properties, Evaluation, and Reliability," presented at the Association for Preservation Technology Annual Conference, Banff, Alberta, Canada, October 1999.

"Restoration of Wrought-Iron Bridges", presented at the Historic Bridge Symposium, Indianapolis, Indiana, June 1998.

"Non-Destructive Evaluation of a Historic Wrought-Iron Truss Bridge in New Braunfels, Texas", APT Bulletin: Journal of the Association for Preservation Technology, Vol. XXIX, No. 1, 1998.

Quentin Collette, PhD

Project Engineer

EDUCATION

Vrije Universiteit Brussel (Brussels, Belgium)
PhD in Civil Engineering, Architecture, 2014
Solvay Brussels School E-M (Brussels, Belgium)
MS in Business Management, Marketing, 2011
Université Libre de Bruxelles (Brussels, Belgium)
MS in Civil Engineering, Architecture, 2009
BS in Civil Engineering, Architecture, 2007

CAREER SUMMARY

Quentin Collette is a project engineer at Sparks Engineering, Inc., and a voluntary post-doctoral researcher at the Faculty of Engineering of the Vrije Universiteit Brussel (Brussels, Belgium). He was a PhD researcher and lecturer assistant at the Vrije Universiteit Brussel between 2009 and 2014. His research focused on the riveted connections of historical metal structures (1840-1940). He wrote and reviewed papers on metal and reinforced concrete structures, historic preservation, and construction history. During his PhD, he co-organized a European summer school on construction history and collaborated with engineers, researchers and ironworkers on an international scale (EU, US). He developed personal and professional skills through international work experience (Belgium, France, UK, USA, China). He has a full verbal and written proficiency in French, Dutch and English. He promotes the history of civil engineering through lectures, guided tours and workshops.

PRACTICE AREAS

History of Materials and Techniques
Riveted Connections
Historic Preservation
Reinforced Concrete Structures
Reverse Engineering Approach
Archival Information Research
Construction History
Structural Evaluation
Surveying Techniques
Nondestructive Testing
Iron and Steel Structures

MEMBERSHIPS

Association for Preservation Technology, APT, 2015-16
International Council on Monuments and Sites
ICOMOS Wallonia-Brussels, 2012-16
Construction History Society of America, CHSA, 2015-16
French Association of Construction History, AFHC, 2014, 2016
Royal Federation of Belgian Associations of Civil Engineers, FABI, 2009-16
American Society of Civil Engineers, ASCE, 2011-12, 2015

AWARDS & SCHOLARSHIPS

Research Foundation Flanders, FWO (Belgium), 2010 and 2012 PhD Fellowships, 2014 Travel Grant
Lansing Community College Foundation (MI, USA), 2013
Scholarship, Iron and Steel Preservation Conference
Student Award (Belgium), 2009 laureate, Architectural Award
Organized by Françoise Dupuis, President of the Brussels Parliament

SELECTED LIST OF PUBLICATIONS

Collette, Q, S Sire and I Wouters. 2015. "Lap shear tests on repaired wrought-iron riveted connections", Engineering Structures, Gould P.L. (ed), vol. 85, published by Elsevier, pp. 170-181.

Collette, Q. 2014. "Riveted connections in historical metal structures (1840-1940). Hot-driven rivets: technology, design and experiments." PhD thesis. Brussels: Vrije Universiteit Brussel (unpublished).

Collette, Q, S Sire, WJ Vermes, VJ Mesler and I Wouters. 2014. "Experimental investigations on hot-driven structural rivets in historical French and Belgian wrought-iron structures (1880s–1890s)", Construction and Building Materials, Forde M.C. (ed), vol. 54, published by Elsevier, pp. 258-269.

Collette, Q, A Péters and I Wouters. 2014. "Les machines à fabriquer les rivets en construction métallique : une analyse des brevets belges (1830–1940)", Matériaux et Techniques, Gras R., Fuga A. (eds), issue 702, vol. 101, published by EDP Sciences, pp. 1-10.

Collette, Q, I Wouters, L Lauriks and K Verswijver. 2012. "Brussels Cinquantenaire Park halls: a structural revolution or evolution ?", Engineering History and Heritage, Cox R. (ed), issue 3, vol. 165, published by ICE Publishing, pp. 145-155.

SELECTED LIST OF PRESENTATIONS

"Unraveling the design of end-of-the-19th-century riveted connections in Belgium", 5th Int. Congress on Construction History, Chicago, IL, USA, June 3-7, 2015.

"Mécanisation de la technologie du rivetage en construction métallique (1830-1940) : fabrication et installation des rivets", 2e Congrès Francophone d'Histoire de la Construction, Lyon, France, January 29-31, 2014.

"Genesis of structural riveted connections: from practice to theory (1840-1940)", Iron and Steel Preservation Conference, Lansing, MI, USA, March 4-5, 2013.

"Morphogenesis of the theory and design principles of riveted connections in historical iron and steel structures", Int. Conf. on Structural Analysis of Historical Constructions, Wroclaw, Poland, October 15-17, 2012.

"Structural analysis of historical reinforced concrete structure: case study of the Dotremont house (1932)", Int. Conf. on Structural Analysis of Historical Constructions, Wroclaw, Poland, October 15-17, 2012.

"Evolution of historical riveted connections: joining typologies, installation techniques and calculation methods", 12th Int. Conf. on Structural Studies, Repairs and Maintenance of Heritage Architecture, Chianciano Terme, Italy, September 5-7, 2011.

Zachary Webb, P.E.

Senior Engineer

EDUCATION

The University of Texas at Austin
- Master of Science, Civil Engineering, 2011
- Bachelor of Science, Civil Engineering, 2007

CAREER SUMMARY

Mr. Webb began working at SEI in September 2011 after completing his graduate degree work in structural engineering. His graduate research involved large-scale laboratory testing of concrete structures affected by premature deterioration mechanisms.

Before returning to graduate school Mr. Webb worked as a design engineer and project manager at Coreslab Structures where he gained experience in precast/ prestressed concrete parking garages. He also has experience with architectural concrete cladding.

Mr. Webb's areas of interest include the evaluation and rehabilitation of existing structures, structural diagnostics, and structural health monitoring. He has experience working with concrete, wood, steel, and masonry.

PRACTICE AREAS

Structural Evaluation
Repair and Rehabilitation Design
Strengthening of Existing Structures
Structural Analysis
Design using Concrete, Wood and Steel
Concrete Deterioration and Repair
Nondestructive Testing
Structural Health Monitoring

PROFESSIONAL REGISTRATION / MEMBERSHIPS

Professional Engineer- Texas
International Concrete Repair Institute (ICRI)

REPRESENTATIVE PROJECTS

Renovation and Rehabilitation

Hays Street Bridge, San Antonio, Texas
- Evaluation and rehabilitation design including concrete approaches and thru-truss frame.

San Antonio Street Bridge Railing, New Braunfels, Texas
- Concrete analysis to match replacements with in-kind material and strengthening of internal capacity of new concrete railing members.

Brazoria County Museum, Angleton, Texas
- Repair and strengthening of historic built-up timber trusses and roof framing.

Immaculate Conception Church, Brownsville, Texas
- Historic scissor truss repair and strengthening.

Marvin United Methodist Church, Tyler, Texas
- Composite steel balcony in existing auditorium.

Reinbolt Hall, St. Mary's University, San Antonio
- Underpinning and rehabilitation of existing masonry building.

New Construction & Expansion

Domain II Parking Garages, Austin, Texas
- Three-story and five-story precast concrete parking garage for upscale retail center.

MD Anderson Hospital, Houston, Texas
- Precast cladding for 25-story medical administrative building.

Compton Lofts, Tyler, Texas
- Mixed-use, 30000-sf multi-story steel framed building with roof terrace.

FBC Pittsburg, Pittsburg, Texas
- Foundation and retaining wall design for a two-story, steel-framed expansion.

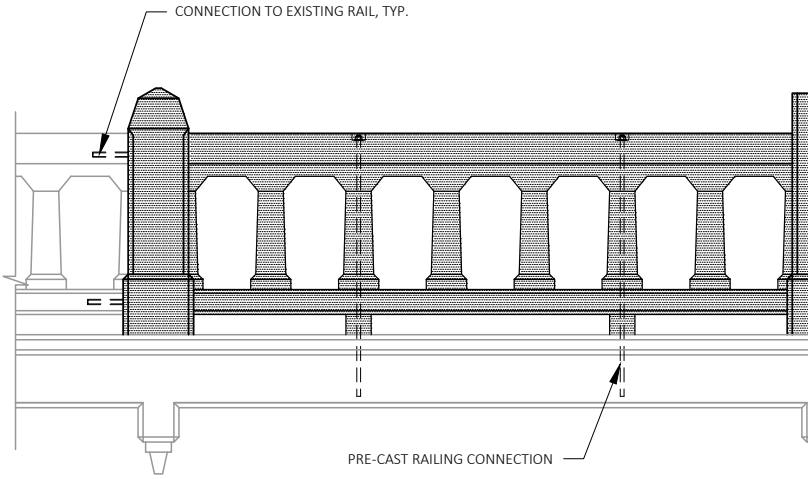
TTUHSC International Pain Center Connector and Expansion, Lubbock, Texas
- One, story steel framed jewel-box connector and 1500-sf wing expansion.

Structural Evaluation

TTU School of Pharmacy Garage, Dallas, Texas
Reinbolt Hall, St. Mary's University, San Antonio
Garni Hall, St. Mary's University, San Antonio
GJ Sutton Building Complex, San Antonio
Black Bear Restaurant, Fort Davis, Texas
Shoal Creek Bridge

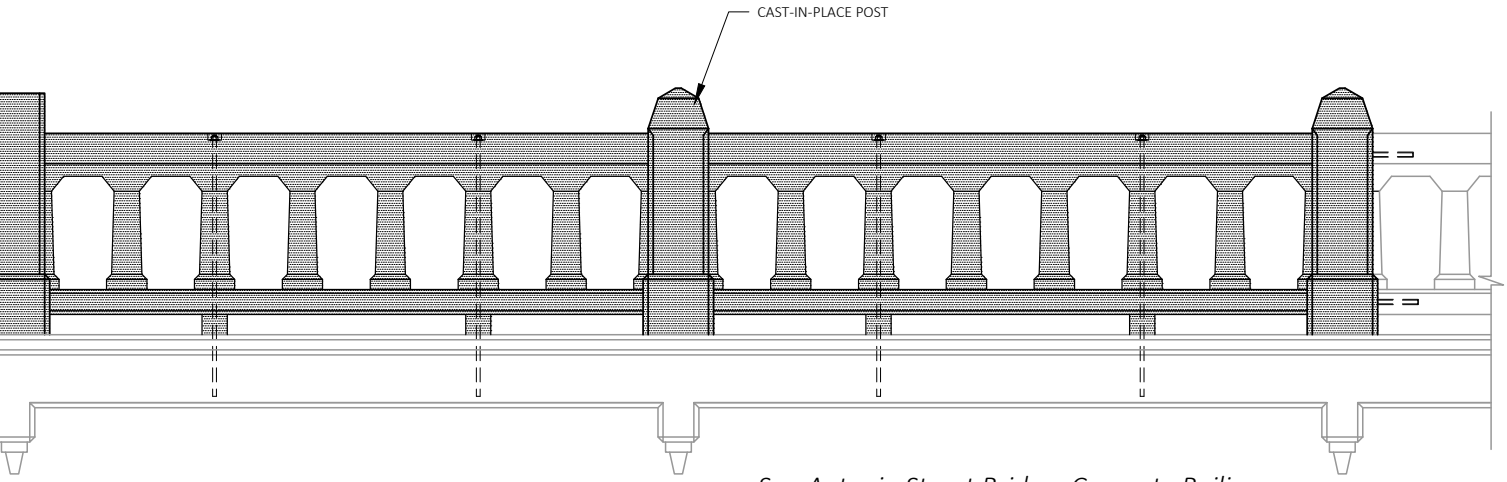
SELECTED CLIENT LIST

Texas Tech University, Health Science Center
St. Mary's University
Volz & Associates Architects



SEI
SPARKS ENGINEERING, INC.

Project Profiles



San Antonio Street Bridge, Concrete Railing Elevation, New Braunfels, Texas.

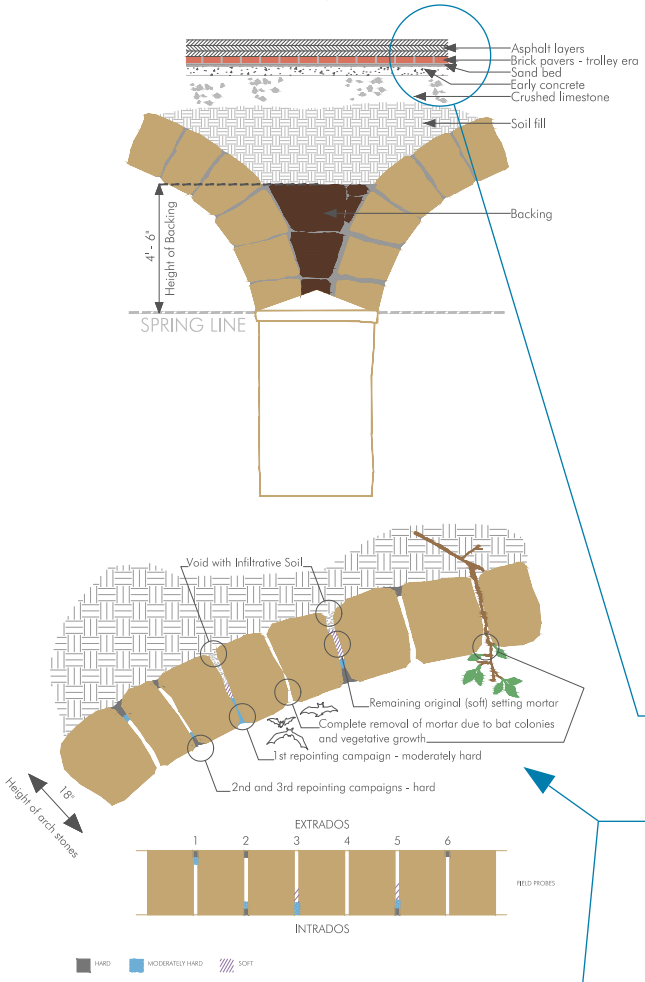
West Sixth Street Bridge at Shoal Creek

Austin, Texas - Evaluation, Restoration Study, and Opinion of Cost

SEI
SPARKS ENGINEERING, INC.

Owner / Client
Shoal Creek Conservancy
Joanna Wolaver- joanna@shoalcreekconservancy.org

The c. 1887 West Sixth Street Bridge is a three-span limestone arch bridge over Shoal Creek. Originally including ten foot sidewalks on either side of the roadway, the bridge served an important role in expanding Austin. The earliest bridge at this site was probably one of wood, replaced in 1869 by an iron bowstring. Although planned as a new iron bridge to replace the 1869 iron bowstring span, the design was redefined during procurement to be built of stone masonry. This divergent change is the main reason the bridge has continued to be in service today.



The purpose of this study was to develop an appropriate restoration approach for the 1887 Wet Sixth Street Bridge at Shoal Creek, taking into account its actual structural condition as well as outlining a compatible holistic treatment of the streetscape and creekway

We focused on providing the Shoal Creek Conservancy with planning guidance for restoration, which included a review of available documents, limited historical research, 3D laser scanning, investigation and analysis of the structural condition, an architectural assessment of accessibility, interpretation, landscaping, lighting and pedestrian enhancements.

During the course of the study our design team found that:

- At least two building campaigns produced the bridge we see today.
- The south parapet is likely original, and several of the original cap stones remain. Early aerial photography suggests there was originally a north parapet to match.
- The early concrete pavement and brick pavers from the trolley era remain beneath the asphalt.
- The arch construction is based on the three-centered arch.
- The current state of mortar loss was by far the most significant structural deficiency. Adding to this state, minimal backing and missing voussoirs is contributing to the 2015 loss of 80% of the original capacity.

Below: 3D Laser Scan of the Bridge and Creekway

Hays Street Bridge Rehabilitation

San Antonio, Texas - Feasibility Study, NDT, Concrete Approach Design, CA
Construction Cost: $3.2 Million

SEI
SPARKS ENGINEERING, INC.

Owner / Client
City of San Antonio
Dean Bayer, P.E.- dean.bayer@sanantonio.gov

The Hays Street Bridge is a viaduct built in 1910, consisting of 1000-linear feet of concrete approach span and two 1881 railroad trusses that formerly crossed the Nueces River. One of the spans is a 225-feet Whipple truss that is one of only six remaining in Texas. The bridge was closed in 1980, but through the efforts of civic groups and dedicated citizens, funding and grants were secured to rehabilitate the structure as a pedestrian and bicycle bridge, connecting the historic Dignowity Hill neighborhood with downtown San Antonio.

Sparks Engineering served as the prime consultant and performed the non-destructive testing, analysis, and structural design for the project. The design team assured the compatibility of the rehabilitation with the historic character of the iron truss spans.

During the evaluation of the bridge, the concrete approaches were deemed irreparable and required full replacement. The new design was an aesthetically pleasing approach that provides ADA compliant access to the bridge deck and increases the transparency of the approach while interpretively matching the historic profile.

The design required flexibility to meet code requirements, ensure compatibility with the bridge's historic character, and stay within budget. In addition, the project included architectural and pedestrian lighting, interpretive signs, and a landscaped entry plaza. As a pedestrian bridge that will serve as a link between the east side of San Antonio and its downtown, the newly restored bridge is inviting to all, providing not only a sense of community as an area of recreation but also as an attraction for visitors.

Above: Upper chord pin and eyebar connection, during assessment.

Right: Hays Street Bridge after rehabilitation.

Photo Credit: Yankee Blue

Consulting Services for the Rehabilitation of the Historic Brazos River Truss Bridge, Waco Texas

The Alamo, World Heritage Site

San Antonio, Texas - HSR, GPR, IRT Survey, Mortar/Stone/Salts Analysis, LB Stabilization

SEI
SPARKS ENGINEERING, INC.

Owner / Client
Daughters of the Republic of Texas, now General Land Office
Pam Rosser , Conservator- prosser@thealamo.org

Sparks Engineering, Inc. is currently engaged in the creation of an Historic Structures Report on a multidisciplinary team contracted with the General Land Office. We are analyzing and assessing the structure in its current state, as well as looking at the evolution of interventions that have been made to this iconic landmark over the centuries. We will be conducting a GPR survey and extended borescope probing in an effort to clarify some questions Texans have had since he days of the republic.

In 2013 we worked closely with the Alamo Conservator to complete an extensive infrared thermography (IRT) survey of The Alamo using high sensitivity thermal imaging. Through the use of both passive and active heating approaches we were able to identify moisture issues throughout the chapel, hidden features- including a hidden arch over the north transept, delaminations of stone and plaster elements, and a significant stone delamination at one location in the Monk's Burial Room. Based on our IRT findings, we made recommendations to improve the site drainage and other areas of water infiltration, repair areas of separating or delaminated masonry, and improve the HVAC system for protecting the building and its artifacts.

We also provided mortar, stone, and salts analysis at The Alamo. Results from the analysis will be incorporated into a materials database as part of the on-going historical documentation and conservation projects at The Alamo and Long Barracks. This database contributed to the undertaking of consolidating the southwest corner of the Long Barracks where SEI designed the masonry stitching and specifications for the repair.

The Alamo during our IRT Survey

Franciscan Missions, World Heritage Site

San Antonio, Texas - Foundation/Wall Stabilization, Monitoring / Evaluation

SEI
SPARKS ENGINEERING, INC.

Owner / Client
General Land Office, Ford, Powell and Carson
Carolyn Peterson- Ford, Powell and Carson, cpeterson@fpcarch.com

Sparks Engineering, Inc. is currently engaged in developing a maintenance manual for all the franciscan missions of San Antonio. It is the culmination of comprehensive structural assessments we undertook in 2015 to design recommendations for long-term stewardship and structural conservation of all the associated resources after being inscribed to UNESCO's World Heritage List.

A major structural stabilization was completed in 2012 at Mission San Juan, after several years of study and monitoring of expansive soil movement. Several solutions were provided to the owner and the chosen design involved stabilization of the foundation using reinforced concrete underpinning piers. In addition, we designed stabilization for the walls by stitching the walls with stainless steel rods and grout injecting in areas of cracking. The grout used is an innovative grout mix not previously used in the United States.

SEI completed several years of structural monitoring at Mission Espada in early 2012 and we provided a structural monitoring report which identified that an accumulation of decades of small soil-related movements as well as isolated water intrusion into the walls were the causes of the building distress. We recommended that the masonry walls be stitched and grouted, additional tie rods be installed, and soil moisture control measures be taken to help the building withstand future soils-related movement. Our structural stabilization recommendations have been included in the restoration at Espada.

Right: Mission San Juan during assessment.

Sugarloaf Bridge Rehabilitation

Milam County, Texas - Feasibility Study, NDT, Field Metallography, Materials ID

SEI
SPARKS ENGINEERING, INC.

Owner / Client
Texas Department of Transportation / Carter & Burgess
Mr. Scott Wallace, Carter & Burgess - p. 512-314-3100

This 1896 through-truss bridge spans 234-feet over the Little River in Milam County, Texas. The bridge was scheduled for replacement, and a feasibility study was needed to determine the bridge's suitability for use as a pedestrian facility.

In any structural evaluation, it is necessary to characterize the materials and their strength. The conventional approach has relied on tensile-testing of coupons removed from a structure to determine strength values. That approach is unsatisfactory because it may not be indicative of the structure as a whole, and the removal of coupons from critical bridge members is rarely feasible.

SEI was retained to provide a non-destructive evaluation of the historic bridge materials. These services included identifying the material type (wrought iron or steel), visual assessment, field hardness surveys, field metallography, and non-destructive chemical analysis.

Our services on this project were based on our approach to historic metals, which we have developed over the past decade. This approach includes our knowledge of the characteristics of historical materials, visual condition assessment, engineering judgment and nondestructive testing.

SEI prepared a project report summarizing our approach and the findings. From these findings, and from our previous experience with other historic truss bridges, we developed a publication titled "***Guide to Evaluating Historic Iron & Steel Bridges***".

Above: Sugarloaf Bridge after rehabilitation.

Left: Sugarloaf Bridge during assessment.

Bluff Dale Bridge Evaluation

Erath County, Texas - Structural Evaluation, Opinion of Cost for Rehabilitation

SEI
SPARKS ENGINEERING, INC.

Owner / Client
Friends of Erath County Historical Commission
Cathey Hartman - p. 254-728-3286

This cable-stayed bridge is an exceedingly rare example of a bridge type developed by the collaboration between Edwin E. Runyon and William Flinn. *The Bluff Dale Bridge, the most complete example of the collaboration of these designers, was originally constructed in 1890 based on a bridge system patented by Runyon. Although renovated and relocated, Bluff Dale is the second oldest surviving cable-stayed bridge in Texas and possibly in the United States as well*[1].

The 225 foot span bridge utilizes locally available materials in a unique engineering solution only found in north-central Texas. The bridge was moved to its current location in 1934, and was open to traffic until 1989 at which time maintenance ceased. The condition of the bridge came to the attention of Preservation Texas and was listed as one of the most endangered historical sites in 2009. The Erath County Historical Commission contacted SEI to perform a preliminary structural evaluation, and develop an opinion of cost for rehabilitation.

Our approach to the evaluation and analysis of the bridge was based on the historic nature of the metals, their unique assembly, and arriving at rehabilitation solutions that would keep intervention to a minimum without compromising the safety or beauty of a new pedestrian through-way.

We prepared a report outlining our findings on condition, missing character-defining features, pedestrian structural capacity, constructibility of the rehabilitation plan, and an opinion of cost covering the proposed scope of work.

1 See "History and Engineering Analysis of the 1890 Cable-Stayed Bluff Dale Bridge" by Stephen G. Buonopane and Mark M. Brown.

Above: Bluff Dale Bridge HAER Historic Photo.

Right: Bluff Dale Bridge during assessment.

Consulting Services for the Rehabilitation of the Historic Brazos River Truss Bridge, Waco Texas

RONALD W. ANTHONY

President and Wood Scientist
Anthony & Associates, Inc.
P.O. Box 271400
Fort Collins, CO 80527 U.S.A.
Phone: 1-970-377-2453
Fax: 1-970-377-2469
woodguy@anthony-associates.com

Ron Anthony received an M.S. in Wood Science and Technology from Colorado State University. He earned his B.S. in Forest Management and Wood Science and Technology, also from Colorado State University. Prior to forming Anthony & Associates in 1999, he conducted research and consulted on wood properties and the use of wood in construction applications. Anthony & Associates, Inc. focuses on evaluating the performance of wood in historic structures and conducting forensic investigations. Mr. Anthony's research activities have focused on nondestructive evaluation and materials testing to better understand how wood interacts with other materials and performs over time. His efforts have led to applications of resistance drilling and digital radioscopy for quantifying decay in structural timbers and investigating hidden conditions.

His consulting activities have focused on the application of these innovative inspection technologies for assessment of wood in historic structures, such as Gustav Stickley's Craftsman Farms in Morris Plains, New Jersey; James Madison's Montpelier in Virginia; Benjamin Latrobe's Basilica of the Assumption in Baltimore; Mission San Miguel Arcangel in California (named to the National Trust for Historic Preservation's 11 Most Endangered Historic Places List, 2006), and the Hanging Flume in Colorado (named to the World Monuments Fund 2006 Watch List). He also conducts forensic investigations on wood-related failures, such as the collapse of Pavilion I at the University of Virginia. Mr. Anthony is the 2002 recipient of the James Marston Fitch Foundation Grant for his approach to evaluating wood in historic buildings.

His activities extend to organizing and participating in workshops and lecturing on wood properties and the use of wood in construction applications. He has lectured at MIT, Columbia University, Princeton, the University of Pennsylvania, Oregon State University, the University of Colorado and Colorado State University on investigating wood in historic buildings and given presentations at the Association for Preservation Technology International, Colorado Preservation, Inc., American Society of Civil Engineers conferences, and ICOMOS and RILEM symposia. He has authored over 100 publications; participated in conferences and seminars; and consulted throughout North America, Europe, Asia, Africa, Australia and the South Pacific. He is a member of the Association for Preservation Technology International, Colorado Preservation, Inc., the Society of Wood Science and Technology, the Forest Products Society, the Timber Framers Guild, the American Wood Protection Association, and is on the Executive Committee of the American Society of Civil Engineers' Technical Council on Forensic Engineering.

Restoration Study | 1887 West Sixth Street Bridge at Shoal Creek

West Sixth Street Bridge at Shoal Creek , laser scan image courtesy of the Center for Heritage Conservation - Texas A&M.

STATE OF TEXAS
S. PATRICK SPARKS
70196
REGISTERED PROFESSIONAL ENGINEER

03-08-2016

SHOAL CREEK CONSERVANCY

SPARKS ENGINEERING, INC.
www.sparksengineering.com

LIMBACHER & GODFREY
ARCHITECTS

Table of Contents

Restoration Study funded by grants from the Burdine Johnson Foundation and the Texas Preservation Trust Fund.

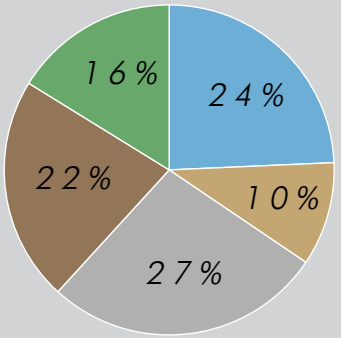
Executive Summary

The purpose of this study was to develop an appropriate restoration approach for the 1887 West Sixth Street Bridge at Shoal Creek, taking into account its actual structural condition as well as outlining a compatible holistic treatment of the streetscape and creekway. In addition, we are providing Shoal Creek Conservancy with prioritized conceptual costs for the restoration.

Our design team found that the bridge in its original condition would have had ample capacity for modern truck loading. However, as of December 2015 *the bridge had only about 20% of its original capacity remaining*. Of the several factors affecting the capacity, *mortar loss* was by far the most significant deficiency. We understand that a grouting effort is now underway (March 2016) by the City of Austin which will improve the load carrying capacity of the bridge. This is a first step in the restoration process outlined here to ensure that the robust masonry arch bridge will serve for many more generations.

Restoration work will include repointing and grouting of the limestone arches, reconstruction of the wing walls, strengthening of the existing south parapet and addition of a matching parapet on the north side, new concrete pavement, wider sidewalks, lighting, accessibility, wayfinding and interpretation.

Based on the scope of work identified in our study, we recommended the following prioritized budget[1] allocations:



Immediate Structural	$	414,300
Remaining Structural	$	173,300
Pavement	$	465,800
Creekway and Lighting	$	375,400
Interpretive Signs, Wayfinding, and Landscape	$	276,200
Construction Cost	$	1,705,000
Fees & Contingency	$	490,000
Total Project Cost	$	2,195,000

1 See page 22 for detailed Restoration Scope and Opinion of Cost.

**This report was revised on March 7, 2016 to reflect the grouting that was underway.*

Study Scope and Limitations

Scope of the Study

This study was focused on providing the Shoal Creek Conservancy with planning guidance for restoration of the bridge and improvements to the streetscape and creekway in the immediate vicinity of the bridge. We included review of available documents, limited historical research, investigation and analysis of the structural condition, an architectural assessment of accessibility, interpretation, landscaping, lighting and pedestrian enhancements.

Limitations

This study report is based on our review of available documents, assessment of the condition of the existing structure, limited testing and preliminary analysis. Conditions may exist or develop over time that were not identified in the study. The design elements, recommendations, and scope of construction outlined herein are necessarily general. They are not intended for construction.

Available Documents

Historic American Engineering Record (HAER) TX51 Notes prepared by Robert W. Jackson in August of 1996.

HAER TX51 Archival Drawings
- South Elevation
- Axonometric Section
- Plan

National Register of Historic Places Registration SBR Draft, February 2014, Submission by Jimena Cruz Pifano and Gregory Smith.

Texas Department of Transportation Bridge Inspection Summary Reports: *May 1984, May 1986, February 1988, December 1989, November 1991, August 1993, August 1995, August 1997, May 1998, July 2000, June 2002, April 2012.*

Texas Department of Transportation Channel Cross-Section Measurements Record: *March 2008, April 2010, April 2012.*

Various Historical Photographs from the HAER survey, NRHP SBR Draft, and Flood Events.

Lower Shoal Creek Bank Stabilization Design Standards, Prepared by Morgan Byars (Watershed Protection Department) 1/15/2011.

Site Plan - GSD&M Property

Shoal Creek Walk Site Plan - Schlosser Property

City of Austin Topography and Impervious Cover Shape Files, West Sixth Street.

Precinct Plan - 6th and Lamar Existing Conditions

Over the course of the restoration study, certain documents were provided to Sparks Engineering, Inc. to aid in the evaluation of the West Sixth Street Bridge at Shoal Creek. These documents include historical items as well as contemporary laser scans and field surveys procured and conducted by SEI. In addition to the available documents, SEI compiled reference material to aid in the structural analysis (see references section), as well as historical photographs and information (see appendix one).

Bridge History

The c. 1887 West Sixth Street Bridge is a three-span limestone arch bridge over Shoal Creek. Originally including ten foot sidewalks on either side of the roadway, the bridge served an important role in expanding Austin. The earliest bridge at this site was probably one of wood, replaced in 1869 by an iron bowstring. Although planned as a new iron bridge to replace the 1869 iron bowstring span, the design was redefined during procurement to be built of stone masonry. This divergent change is the main reason the bridge has continued to be in service today.

Of interest, our study found that:

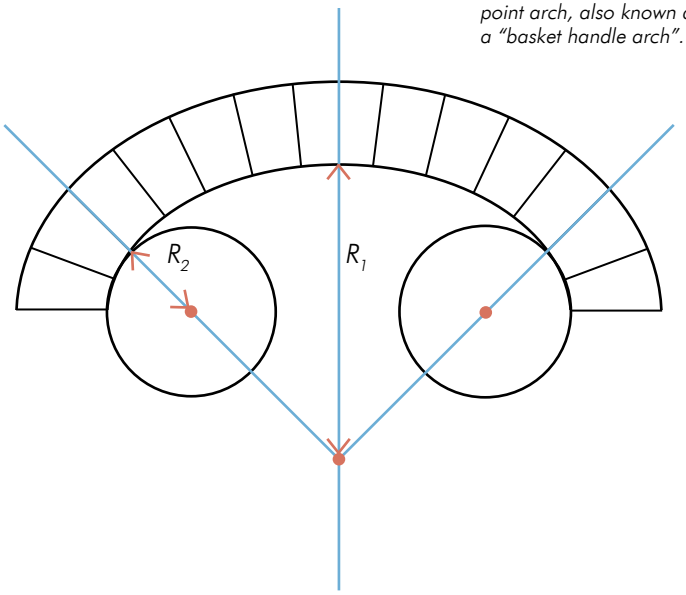
- At least two building campaigns produced the bridge we see today: construction joints piecing the length of the arch vaults in thirds, as shown in the nearby image. The two end sections differ from the central section in stone selection, size, tooling, and coursing.
- The south parapet is likely original, and several of the original cap stones remain. Early aerial photography suggests there was originally a north parapet to match.
- The early concrete pavement and brick pavers from the trolley era remain beneath the asphalt.

Character Defining Features:

- Three-centered arches
- Native limestone construction
- Stone parapets

West Sixth Street Bridge, middle vault longitudinal section showing construction joints within the length.

Construction of a three-point arch, also known as a "basket handle arch".



"The first bridges men built were in wood, which were suited to their requirements at the time. But then they began to think about the immortality of their names. And because their richness gave them heart and made better things available to them, they began to build bridges in stone, which lasted longer, cost more, and brought glory to those that built them."

A. Palladio 1570

Study Philosophy and Methodology

Philosophical Approach

Because of the important historic significance of the bridge, we have based our approach to the restoration study on the following principles of structural conservation[1]:

- Keep intervention to the minimum.
- Use compatible materials.
- Preserve the distinguishing qualities of the structure.
- Imperfections can be maintained if they do not compromise the safety requirements.

Study Goals

As a vehicular bridge in a vibrant urban setting, the design must be inviting to all by providing not only a reliable and safe structure, but also creating a sense of place that anchors the historic West Sixth Street Bridge into its surrounding context.

To meet these goals, the constraints of the project must be addressed in a thoughtful and deliberate manner. The recommended restoration scope will also assure compatibility with the bridge's historic character, in accordance with The Secretary of the Interior's Standards for Rehabilitation (36 CFR §67.7).

Our design team identified the following key goals for the project:

- Safety ——— Improvements for safe access and use
- Utility ——— Continued multifunctional use
- Beauty ——— Simple enhancements that do not distract
- Permanence – Expected remaining life in excess of 100 years
- Economy —— Efficient, constructible design

[1] *Principles for the Analysis, Conservation and Structural Restoration of Architectural Heritage*, ISCARSAH Scientific Committee, International Council on Monuments and Sites, 2003. www.iscarsah.icomos.org

Study Methodology

Our study methodology is based on the principal goal of retaining the historic arch bridge structure, keeping it in vehicular service, and enhancing awareness and enjoyment of the bridge and the creekway by the public. To these ends, we developed the study around the following components:

- Review of available documents, including current and planned site development plans adjacent to the bridge, creek and trail studies, and historical records and photographs. See the appendix for some of the historical information that was gathered.
- Laser Scanning of the bridge and surroundings to obtain highly accurate three-dimensional measurements of the arch structure for our structural analysis. The laser scan data constitutes an exact record of the bridge in time, and can also be used for developing construction drawings, interpretative rendering, stream modeling, etc.
- Condition assessment, including a detailed visual survey, selective probing and borescope inspection of the mortar joints, non-destructive testing for reinforcement in the concrete pier encasements, and test for carbonation of the encasement concrete.
- Structural analysis for understanding the current load capacity of the bridge, taking into account the observed conditions and actual geometry of the barrel vaults.
- Architectural assessment to identify enhancements for safety, accessibility, and public enjoyment.
- Opinion of probable cost based on our recommended scope of restoration.

Condition Assessment
Texas A&M Point Cloud Laser Scanning

Laser Scanning was provided by the Center for Heritage Conservation at Texas A&M University. The scans provided a detailed and highly accurate model of the existing bridge geometry for use in determining the original geometry and the amount of past distortion in the arch rings. The scans also extended to cover an area around the bridge for future use in site design.

Laser Scanner Point Cloud Composition with precise mapping of all elements for analysis and future maintenance.

Bat colonies at dark spots

Construction joint
- change in stone -

Broken stone / Missing mortar

Stone slippage at joint

Utilities cut into arch stones

Pinched arch stones

Root intrusion

Water infiltration

Tunnel collapse, vault A

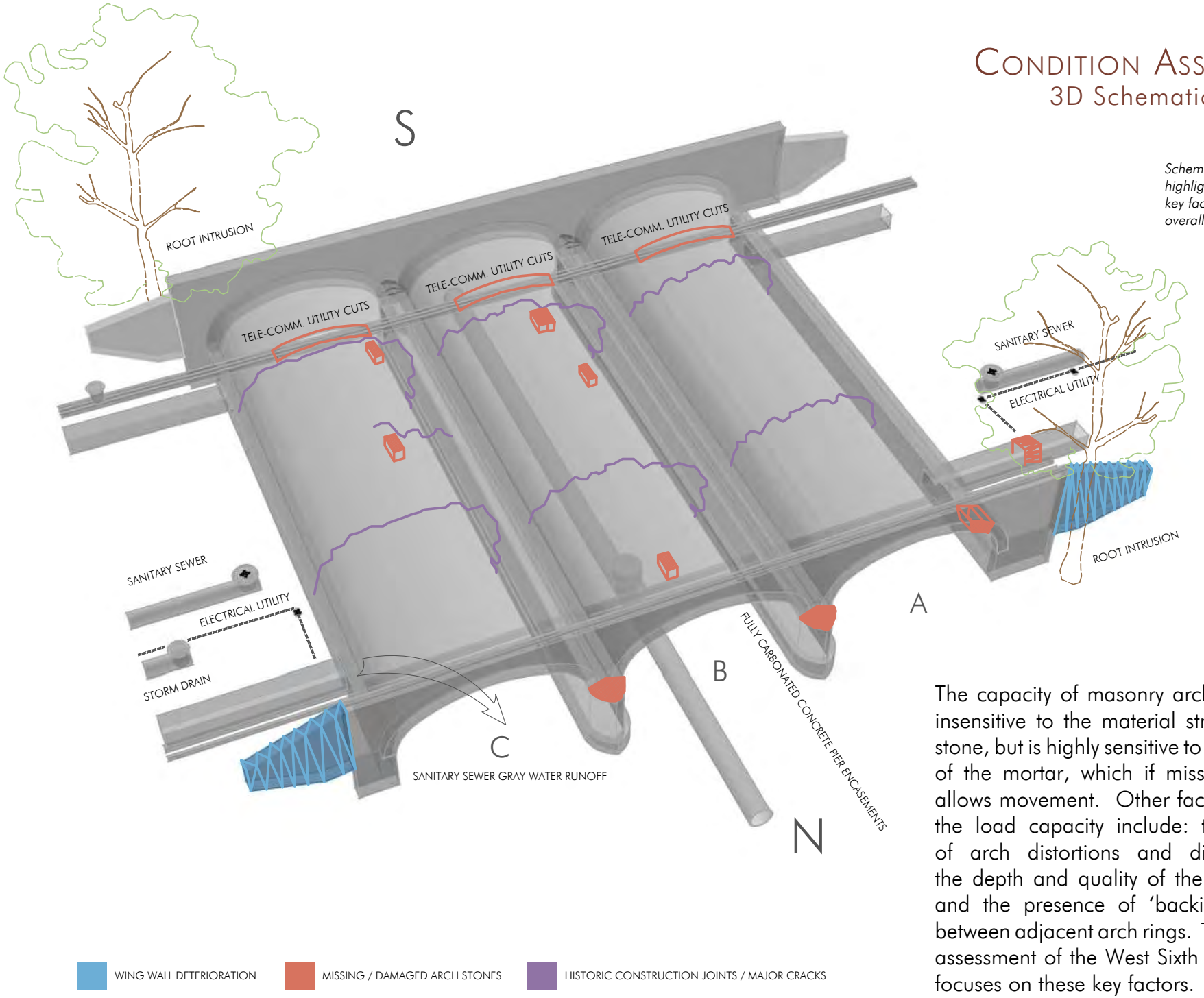
Condition Assessment

Our condition assessment included a detailed visual survey and selective use of non-destructive testing and probes. We identified the following main deficiencies and condition findings:

- Severe loss of mortar from the barrel vaults.
- Several crushed or cracked arch stones.
- Slippage of arch stones.
- One missing arch stone in vault C.
- Collapsed drainage tunnel, vault A.
- Telecom utility line cut into tops of vaults.
- Extensive root intrusion into the mortar joints of the bridge.
- Two historic construction joints in each vault.
- Instability of the north wing walls.
- Water infiltration.
- Concrete encasement around piers in good condition, although fully carbonated.
- Good condition of the spandrel walls.

The photos at left illustrate the aforementioned findings. A 3d schematic diagram and detailed analysis of the deficiencies follow on the subsequent pages.

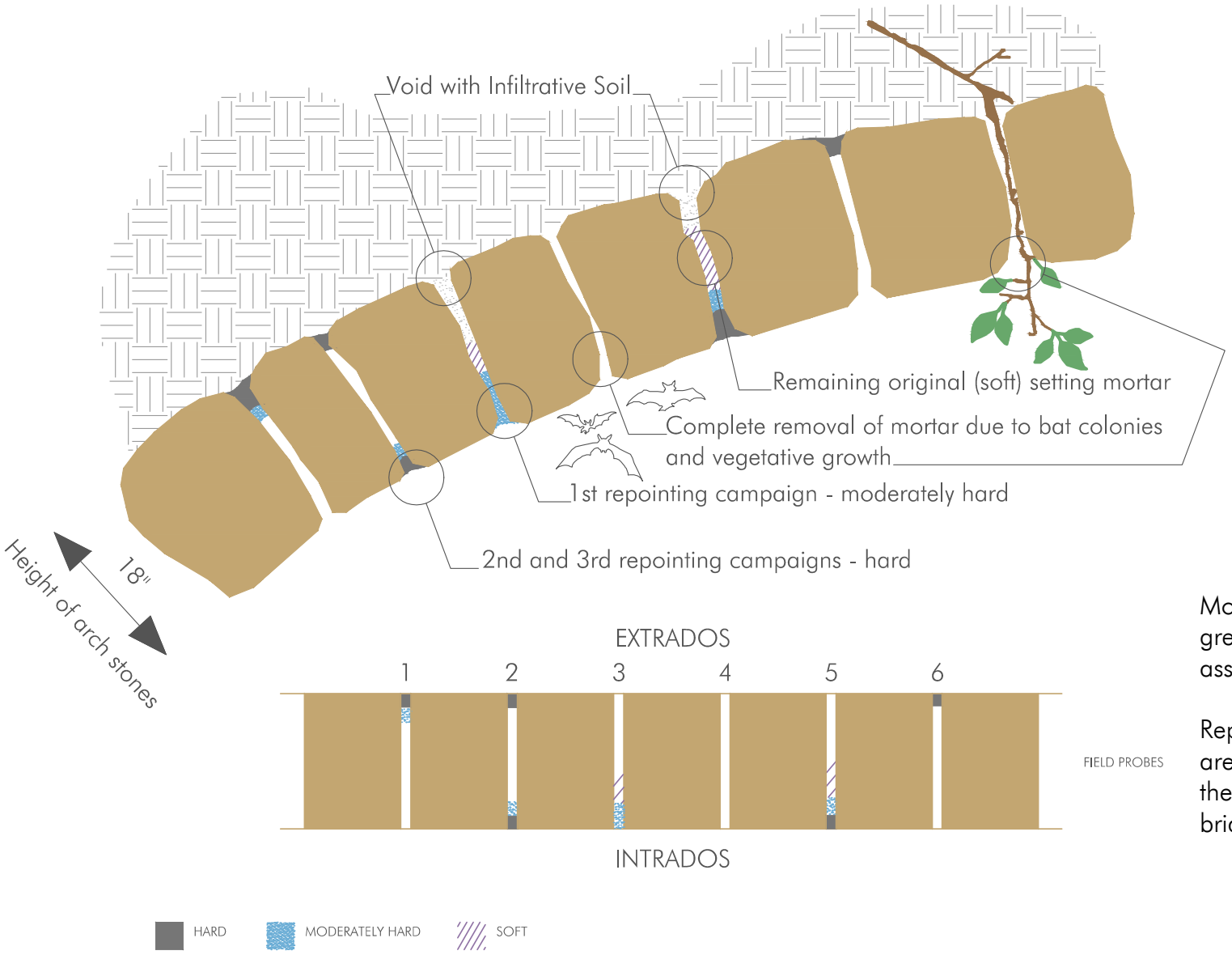
Condition Assessment
3D Schematic Diagram



Schematic Diagram highlighting some of the key factors of the bridges' overall condition.

The capacity of masonry arches is largely insensitive to the material strength of the stone, but is highly sensitive to the condition of the mortar, which if missing or loose allows movement. Other factors affecting the load capacity include: the presence of arch distortions and discontinuities, the depth and quality of the fill material, and the presence of 'backing' masonry between adjacent arch rings. The condition assessment of the West Sixth Street Bridge focuses on these key factors.

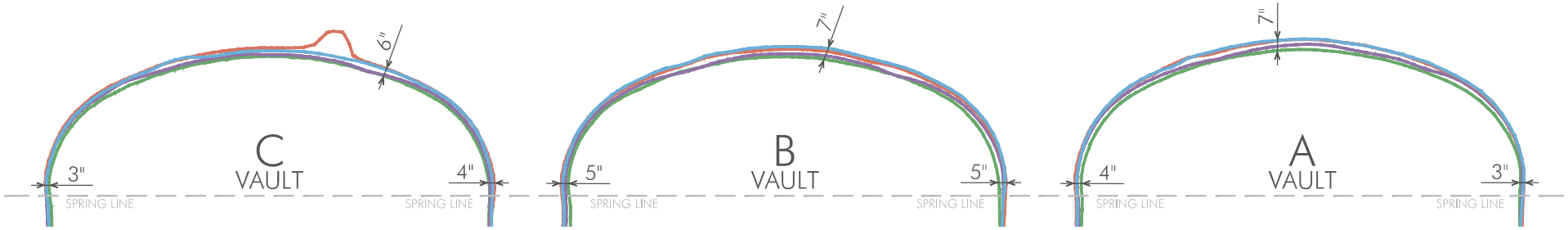
Condition Assessment
Mortar Loss Typical Conditions



Mortar loss is significantly greater than previously assumed.

Repointing and grouting are required to recover the load capacity of the bridge.

Condition Assessment
Barrel Vault Ring Distortion



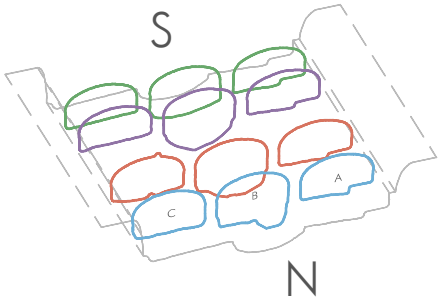
The shape of the barrel vaults varies as much as 7" in rise and 10" in span. The highest arch distortion occurs at the utility cuts in the top of the vaults to the south.

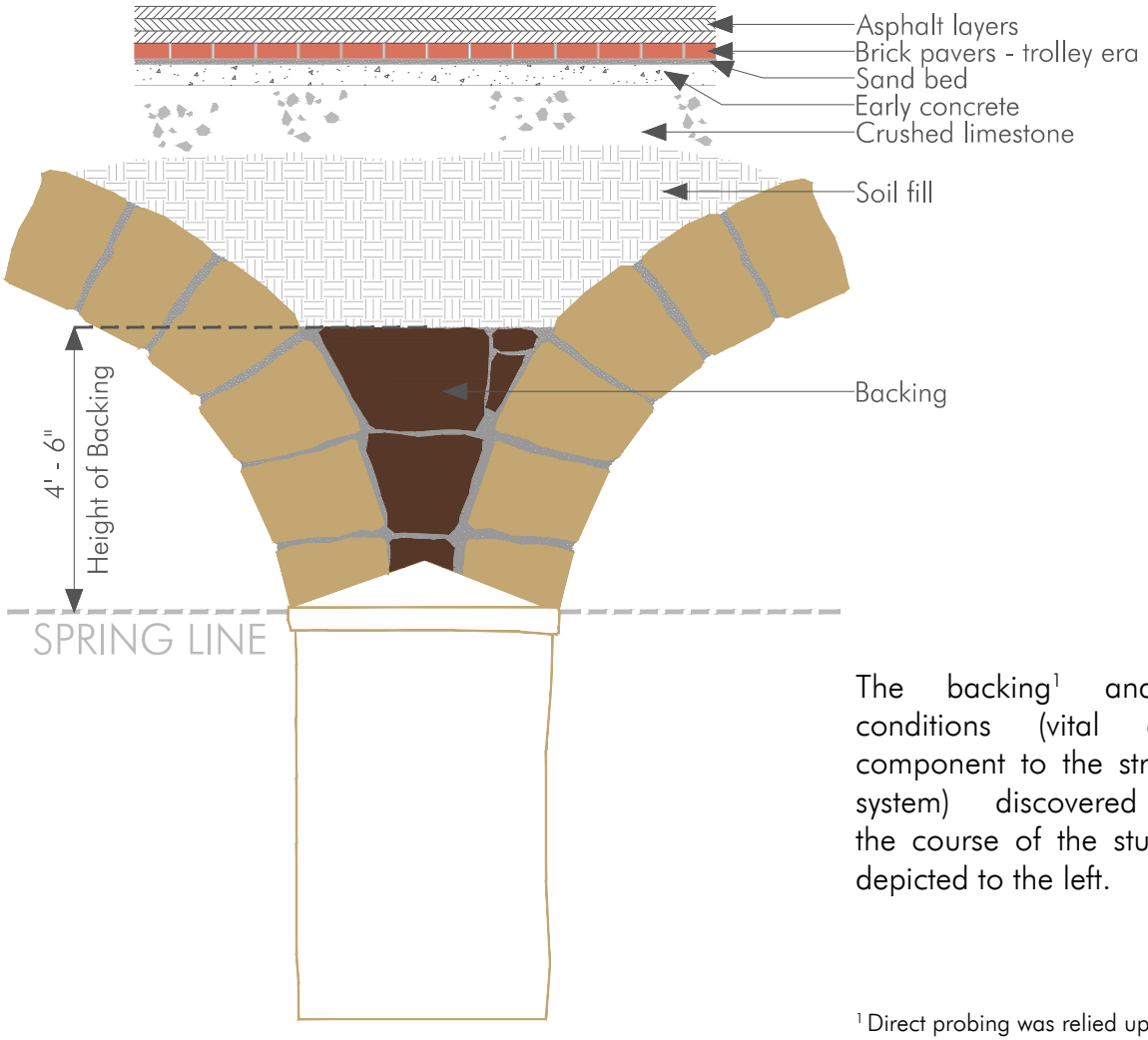
SECTION 4B - 14'-9" IN FROM NORTH

SECTION 10B - 34'-6" IN FROM NORTH

SECTION 19B - 64' IN FROM NORTH
**Location of Telecom Cuts*

SECTION 23B - 77' IN FROM NORTH





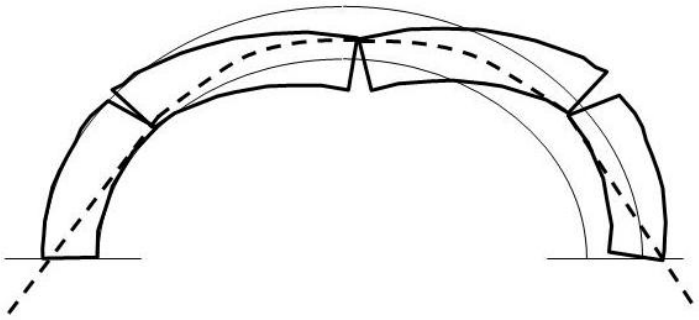
The backing[1] and fill[2] conditions (vital as a component to the structural system) discovered over the course of the study are depicted to the left.

[1] Direct probing was relied upon rather than ground penetrating radar.
[2] Fill section data from City of Austin street excavation.

SEI drilling through an arch stone mortar joint to determine the amount of backing present within the bridge.

Structural Capacity Analysis

Masonry arches are intrinsically strong. The stresses are always low compared to the natural strength of the stone, and localized weaknesses in the material do not have a large effect on the structural capacity. It is the stability of the arch ring, either locally or globally, under concentrated load that determines capacity. The stability of a masonry arch bridge is governed entirely by its geometric proportions, principally the rise-to-span ratio, the depth of the arch ring, and the amount of overburden or fill (see backing and fill conditions diagram) above the arch crown.



Typical arch collapse mechanism - formation of hinges.

As part of our study, we performed an initial structural analysis of the masonry arch bridge. Despite the apparent simplicity of arch structures, the direct calculation of exact load capacity is quite difficult and made ambiguous by the high level of indeterminacy within the arch. Moreover, U.S. bridge design standards do not address masonry arches. As such, we combined several methods to develop a rational understanding of the bridge's performance. We began with historical design methods to roughly define the allowable axle load to be supported by a single vault at mid-span, followed by other methods as described below.

Semi-Empirical Method – MEXE

The modified MEXE assessment of the arch barrel is an adaptation of the British method set out in "Military Load Classification (of Civil Bridges) by the Reconnaissance and Correlation Methods", Military Engineering Experiment Establishment, 1963[1]. This method is based on the results of past experience, and it has been found to give satisfactory results for a range of highway vehicles on spans less than 18m. It allows the application of empirical modifying factors. Taking their shortcomings into account[2], we implemented the Pippard's method and its derivative, the Military Engineering Experimental Establishment method (MEXE)[3]. Both methods primarily depend on the arch stone thickness, the vault span, and the total depth of material above the crown. Adjustment factors allow for the influence of defects such as vault discontinuities and mortar joint deterioration on the allowable axle load. We also varied the arch rise-to-span ratio to compare the idealized geometry with the as-measured shape of the barrel vaults.

Mechanism Analysis - RING 3.1

The RING software (LimitState Ltd.) relies on a rigid-plastic analysis that identifies the live load that transforms the structure into a mechanism. It also provides a visual representation of the failure mode. We used RING to explore the effect of mortar loss. From this analysis we determined that the loss of mortar was the dominant factor in loss of capacity.

Elastic Model – RISA

We prepared a 3D computer model using RISA-3D V9.1 software (RISA Technologies) which allowed us assess the stress state and

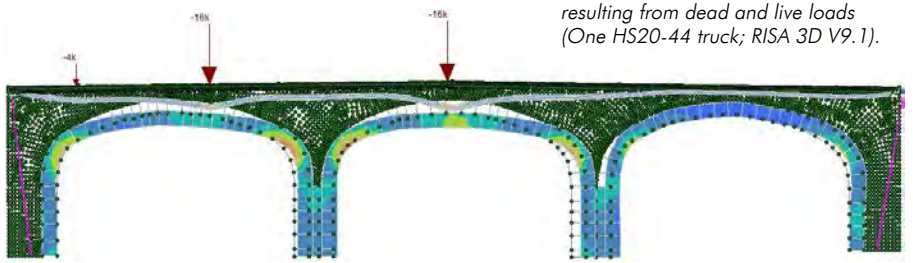
deformation of the bridge, while performing a parametric study to identify the sensitivity to fill modulus, embankment pressure and pavement stiffness. This model produced an accurate simulation of wheel-load distribution not available in the other methods. As a result, we found that the bridge performance would be substantially enhanced by the addition of reinforced concrete pavement to distribute loads and to span defects in the arch ring.

THRUST-LINE METHOD – ARCHIE-M

We retained Bill Harvey Associates Limited, an expert masonry arch bridge consultancy in the UK, to review our findings and to provide a basic calculation using their proprietary software Archie-M (thrust-line model). The Archie-M results confirmed that the bridge, once rehabilitated, will meet the design loads for truck traffic, as shown in the MEXE analysis.

ASSUMPTIONS

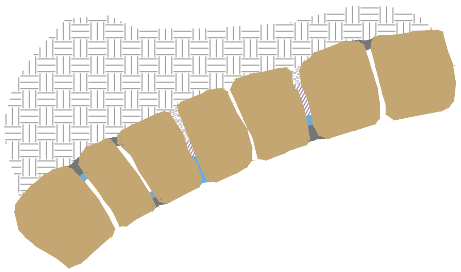
We referred to literature[4] to define the mechanical properties of the pier stones, arch stones, and backfill material[5]. One HS20-44 truck[6] was applied on the bridge at the location leading to the lowest ultimate load-carrying capacity. The following main modelling assumptions were used: effective bridge width of 10 feet (i.e., one lane), 27 arch stones per vault, arch stone thickness of 18 inches, 15 inches of backfill above key arch stone, neglected stiffening effect of spandrel walls.



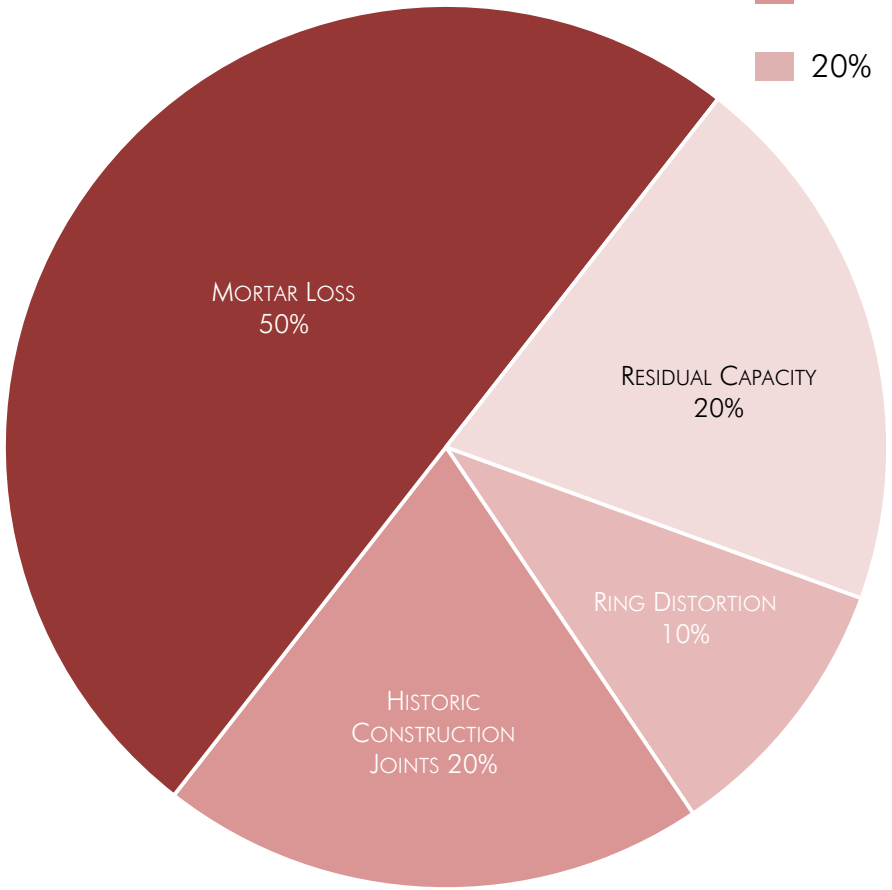
Deformation and Von Mises contour stresses of the barrel vault arches resulting from dead and live loads (One HS20-44 truck; RISA 3D V9.1).

[1]The MEXE method is related to that of Pippard, which is an analytical solution based on simplifying assumptions. In the case of the Shoal Creek bridge, the Pippard equation gave results compatible with the MEXE calculation.
[2]Wang J., Haynes J. & Melbourne C. (2013).
[3] Those simple methods are based on an elastic analysis of a two-hinged arch, and can be considered as (semi-)empirical.
[4]See for instance: Baker IO. (1892), Kessler DW. & Sligh WH. (1927), Youn H. (2008).
[5]We assumed the following material properties with RISA-3D: pier stones (Young's modulus 6,000 ksi, poisson's ratio 0.25, selfweight 165 pcf), arch stones (Young's modulus 4,000 ksi, poisson's ratio 0.25, selfweight 145 pcf), backfill (Young's modulus 15 ksi, poisson's ratio 0.25, selfweight 110 pcf). Identical materials' selfweights were used with RING.
[6] Axle load of a HS20-44 truck is as follows: 8,000 lbs (1st axle), 32,000 lbs (2nd axle) and 32,000 lbs (3rd axle). 14' is the fixed spacing between the first and second axles. 24' is the spacing between the second and third axles producing the lowest ultimate load-carrying capacity (AASHTO 1973).

Comparative Strength Loss Factors



Mortar Loss



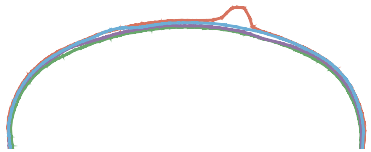
Initial Structural Findings:

- 50% Reduction due to loss of mortar.
- 10% Reduction due to distorted ring geometry.
- 20% Reduction due to point-loading over the historic construction joints.

Repointing and grouting all mortar joints is critical to recovering the structural integrity of the bridge.

Adding reinforced concrete pavement would greatly improve structural performance beyond the original capacity.

Historic Construction Joints



Barrel Vault Ring Distortion

THE REASON TO INCLUDE ARCHITECTURAL ENHANCEMENTS

The primary purpose of this project is to restore the structural integrity of the bridge, and to replace lost or missing elements. But experience tells us that simply restoring structural integrity can easily go unnoticed and, therefore unappreciated by the public, leaving an untapped opportunity to bring positive attention to an important element of architectural history as well as to the work and the public stewardship involved in the restoration. For this reason, an architectural component was included in the scope. In particular, the idea is to surround the bridge's landscape context with architectural and interpretive elements to celebrate the history of the bridge and to make these restoration efforts visible and enjoyable for the public.

CONCEPTUAL DESIGN SCOPE

The scope concentrates on a few key strategies to bring the bridge more fully into the public realm. It recognizes that architectural enhancements can have a meaningful, positive experience.

THE SIXTH STREET EXPERIENCE

Sadly, the experience of crossing at street level today is unremarkable to the extent that the bridge passage is barely noticeable. The sidewalks are cracked and narrow. Parallel parking runs across the bridge on both sides as if it were just more undifferentiated city street. Lighting is by standard utilitarian pole-mounted street lighting. With the exception of one stone parapet wall, nothing about the Sixth Street experience conveys the historical significance of the bridge. This design seeks to rectify that and to clearly differentiate the bridge experience from that of its more ordinary surroundings. In this way, it invites the public to better understand the importance of the bridge and its history. The design uses new lighting; new, distinctive and appropriate sidewalk paving, wood street furniture, plantings and new iconic totem elements that bring definition to the bridge location while providing a focus for interpretive storytelling.

To further enhance the Sixth Street experience, this design also eliminates parking on the bridge and gives that space over to more generous sidewalks. The idea stems from Austin's Great Streets initiative, and is appropriately adapted to fit this unique circumstance. Creating a more generous sidewalk sets the stage for installing sturdy, handsome wood benches and new iconic totems.

Because historical documentation did not suggest it, the discovery of covered-by-asphalt brick paving during the subsurface investigation was a surprise. To capitalize on that discovery, this design salvages and reuses them as sidewalk paving. In this way, this newly-discovered brick paving is not only given new life, but it is also given new purpose—to differentiate the bridge precinct from the rest of the city and its more-ordinary concrete sidewalks.

THE TRAIL EXPERIENCE

The trail experience in and around this important bridge is undifferentiated from the rest of the Shoal Creek trail, and offers little clue that the user has arrived at a uniquely important place. This design seeks to burnish a particular character through the use of lighting and new, simple but attractive walking surfaces. It also focuses on the northwest trail bank for special consideration including new, more naturalistic retaining walls and landscape attention to include ecological restoration. The new walking surfaces should be simple and durable and should contrast with the more-ordinary exposed-pebble walks that characterize much of the rest of the trail. The new paving may be as simple as tined-finished concrete, and should extend from the new accessible connection of this project south to the new accessible connection that is part of the in-progress Schlosser project along the southwest bank. As part of an effort to give the landscape a looser, more naturalistic appearance, new retaining walls should replace the existing vertical wall of cut stone. These new walls should be positioned to step back at the approach to the bridge to make that northern approach more spatially generous while also revealing more of the stone wall of the

bridge itself. The stonework at the recently-completed Waller Creek outfall provides a useful model for this more naturalistic stonework idea.

New Accessible Connection

This idea is to transform an existing footpath on the northwest creek bank into an accessible route from Sixth Street down to the trail. From the sidewalk at Sixth Street, it should generally follow the track of the existing path, but proceeding at a steeper pace, seeking a slope that proceeds downward in a purposeful way. Along the way, an interpretive station should be included—an overlook with an intentional view back to the bridge to include an interpretive panel for telling the stories of the bridge.

This new connection will require adjustments to the existing topography. Recognizing the proximity of nearby trees and the hydrological challenge of altering the shape of the creek channel, retaining walls should be either rusty steel plate or steel sheet pilings, because either will be minimally intrusive by virtue of their very thin section.

Keeping the slopes at or below a 5% grade will bypass the architecturally-cumbersome requirements specific to a ramp (which is any path steeper than 5%) as defined by the Texas Accessibility Standards. Conceptually, this would seem to be possible from Sixth Street to the landing (depicted as a large oval). From the landing, a ramp will probably be required down to the trail.

Lighting

A thoughtful lighting design is crucial to both enhance a sense of safety and security around the bridge, and also to punctuate its presence on the urban scene. This concept includes a collection of complementary lighting strategies:

Lighting the facades. Using a shrouded linear fixture, light washes down the north and the south facades so that the bridge is clearly visible to approaching nighttime trail users.

Architectural Enhancements

Lighting the bridge vaults. Carefully locating shrouded fixtures at the apex of the arches, light washes the vaulted shapes so that the structural logic and arched geometry is expressed and highlighted.

Lighting the parapets. Using a shrouded linear fixture, light washes down the sidewalk side of the parapets to both call attention to the stonework and to provide lighting for pedestrian safety.

Uplighting in walking surfaces. Using low-wattage in-ground fixtures, the walking surfaces can be animated by points of light. These should be used in the sidewalk at street level as well on the trail as it passes through the bridge precinct.

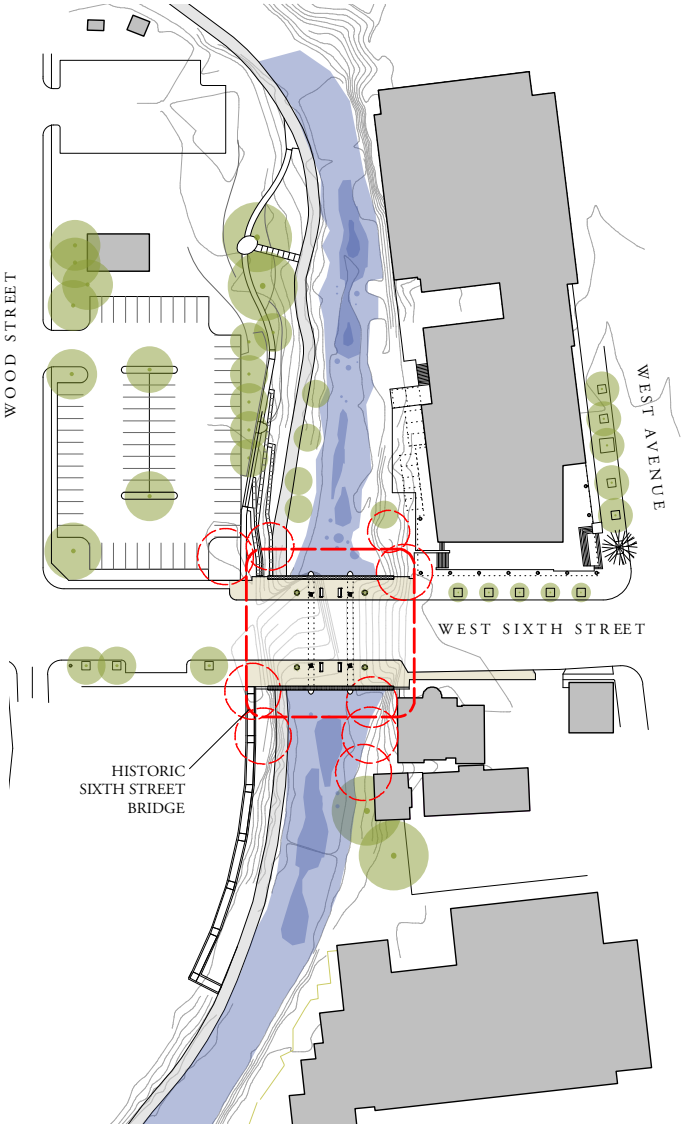
Totem lighting. Totems - vertical, celebratory elements - are included to intentionally mark the space and location of the bridge for users at street level. Their surfaces will carry interpretive graphics where the story of the bridge can be told. They will also be lit at night as a visible reminder of the bridge importance.

Front porch lighting. This design shines a welcoming pool of light onto the walking surface at the trail approach from both the north and the south. The discreet fixture is pole-mounted.

Landscape

One of the chief causes of structural degradation of historic structures is root invasion from nearby trees and woody vegetation. So from a conservation standpoint alone, a no-tree zone in proximity to the bridge should be declared. Where that removal creates voids, new native plantings should be installed.

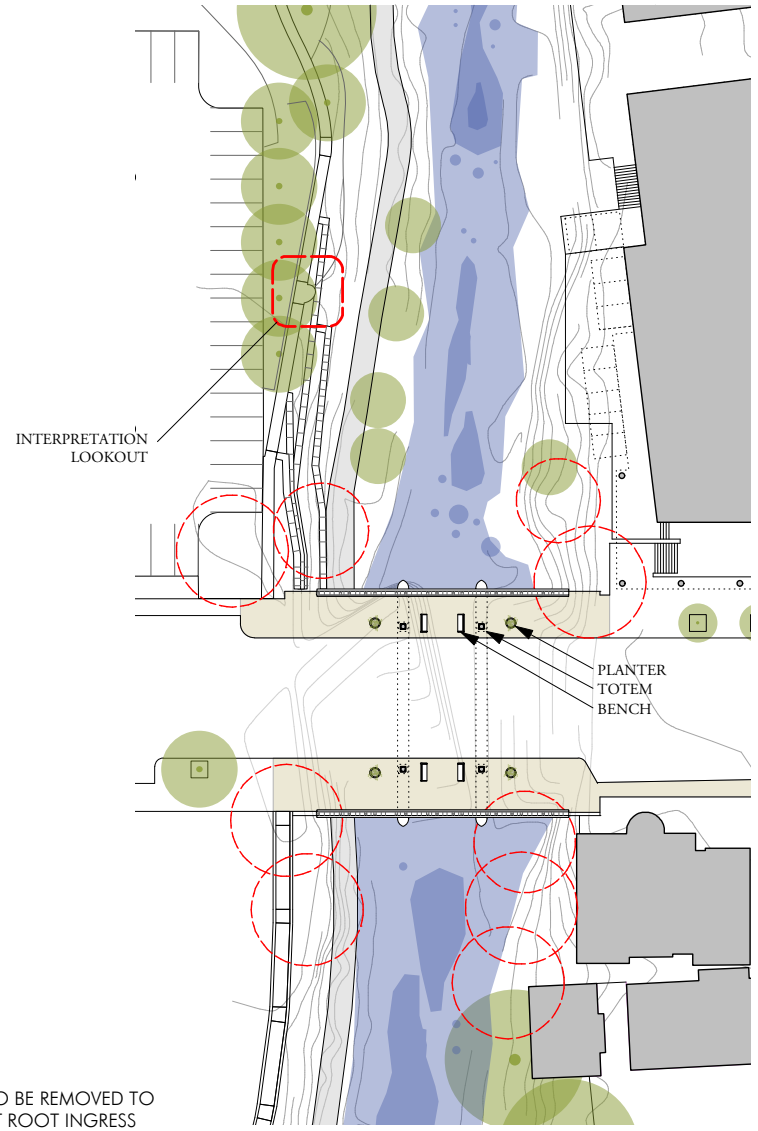
Taken together, these design interventions should create a palpable sense of urban importance at the bridge.



PRECINCT PLAN

NORTH

TREES TO BE REMOVED TO
PREVENT ROOT INGRESS



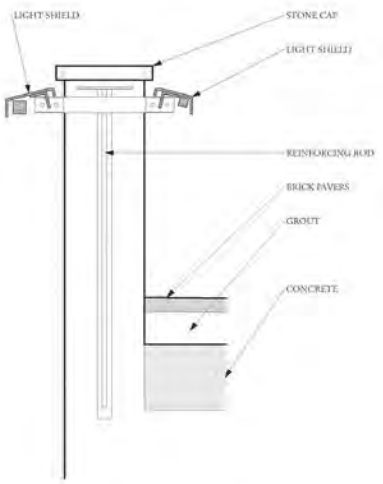
SITE PLAN

NORTH

Stonework at Waller Creek intended to recall the layering found in local limestone bluffs. Note that the integration of native plants further reinforces the sense of naturalism.

SITE SECTION
LOOKING NORTH

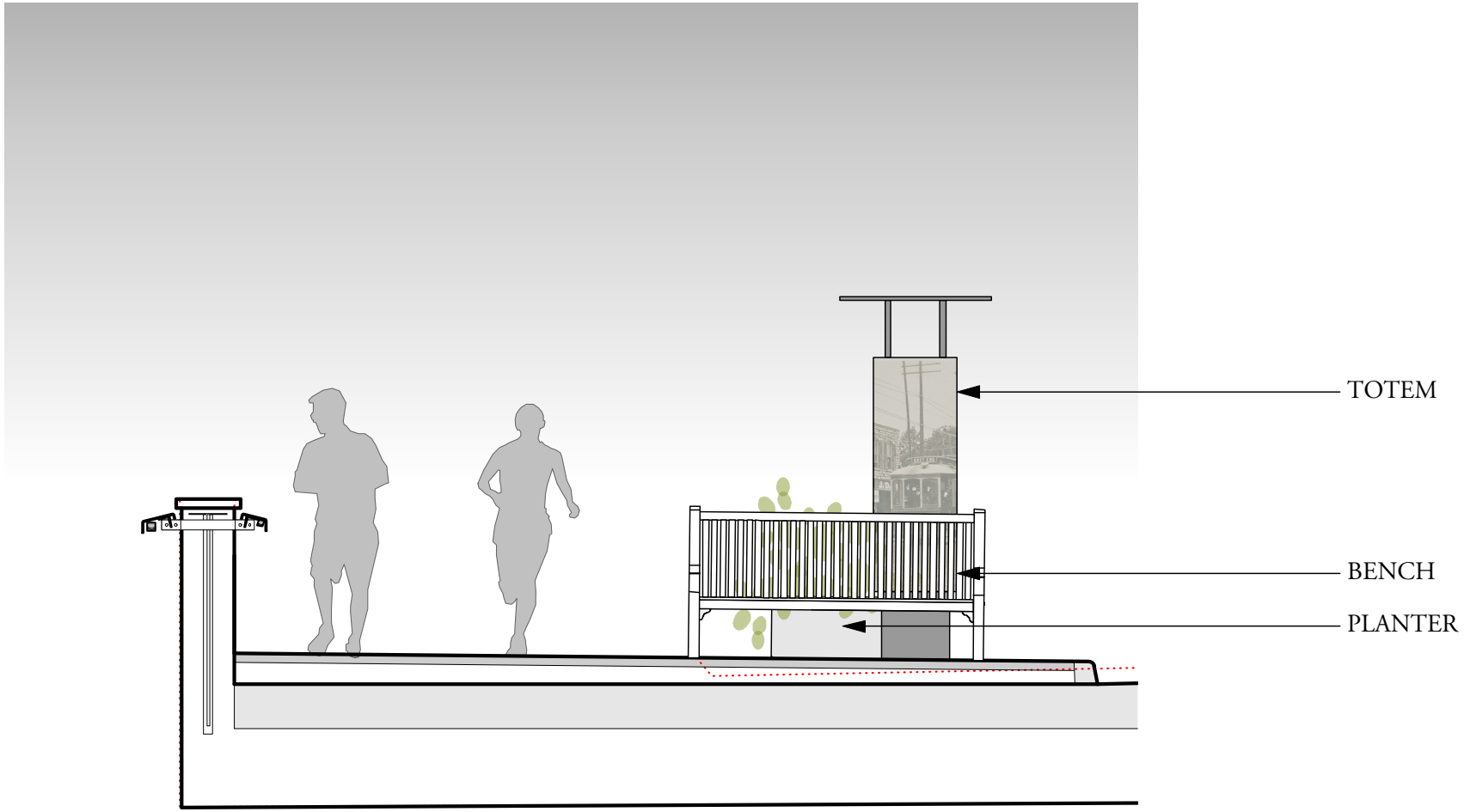
Architectural Totem Marker



Parapet Section

Looking West

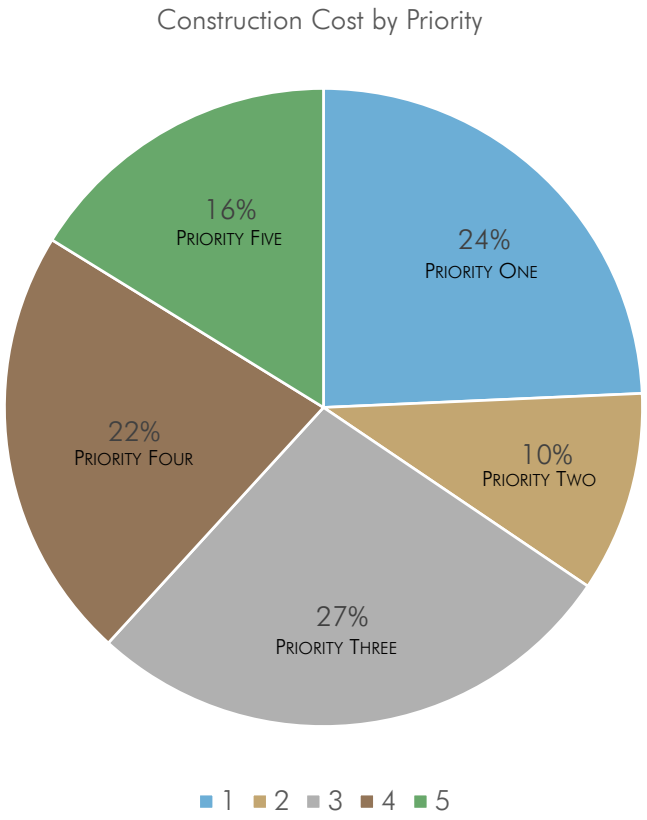
Interpretive Lookout Upstream of Bridge
Looking East



LONGITUDINAL SECTION THROUGH SIDEWALK

LOOKING WEST

Immediate Structural	$	414,300
Remaining Structural	$	173,300
Pavement	$	465,800
Creekway and Lighting	$	375,400
Interpretive Signs, Wayfinding, and Landscape	$	276,200
Construction Cost	$	1,705,000
Fees & Contingency	$	490,000
Total Project Cost	$	2,195,000



Restoration Project Scope

The scope of the project encompasses structural conservation to keep the historic bridge in vehicular service for modern loads, along with safety and pedestrian enhancements. The envisioned work will involve stone repair, grouting and pointing of the mortar joints, rebuilding of the wing walls and north parapet, lighting on and under the bridge, landscaping, improved accessible route, roadway signage and interpretive wayfinding. We have prioritized the work based on safety of the bridge first, followed by arresting sources of damage, stabilizing and restoring the bridge, and finally bringing the beauty and permanence back to the bridge and creekway.

Priority One - Immediate Structural

- The joints of the arch rings are currently being grouted as recommended.
- Repair sanitary sewer leak.
- Remove trees within 50 ft. of the bridge to stop root growth inside the structure.
- Kill all vegetation growing on, or immediately adjacent to the bridge.

Priority Two - Remaining Structural

- Rebuild wing walls.
- Repoint remaining mortar joints.
- Rehabilitate south parapet and reconstruct north parapet.

Priority Three - Pavement

- Remove asphalt pavement, sidewalks, guard fence, and signs.
- New concrete pavement, sidewalks, curb and gutter, and street signs.

Priority Four - Creekway and Lighting

- Regrade creekway channel.
- New accessible trail and rebuild creekway trail.
- Bridge and creekway trail lighting.

Priority Five - Interpretive Signs, Landscape, Wayfinding, and Plantings

- Remove paint from stone.
- Street furniture and totems.
- Interpretive and wayfinding signs.
- Landscape stonework and plantings.

West 6th Street Bridge at Shoal Creek

Engineer's Opinion of Probable Cost

https://www.municode.com/library/tx/austin/codes/standard_specifications_manual

		Item	Quantity	Unit	Unit Price	Amount	Comments
Allocated		Prep ROW	1	AC	$ 10,000.00	$ 10,000.00	
		Mobilization & Contractor's General Requirements	1	LS	$ 335,000.00	$ 335,000.00	
		Project Signs	1	LS	$ 2,000.00	$ 2,000.00	
Priority One	Immediate Structural	Remove bats	1	Allowance	$ 10,000.00	$ 10,000.00	*Removal of Bats is underway (March 2016) by Bat Conservation International
		Grout & Repoint masonry joints barrel vaults	5,600	SF	$ 55.00	$ 308,000.00	*Grouting is underway (March 2016) by City of Austin Public Works
		Remove trees & kill vegetation	1	LS	$ 12,000.00	$ 12,000.00	
Priority Two	Remaining Structural	Apply root barrier at wing walls	700	SF	$ 10.00	$ 7,000.00	By City of Austin
		Stone - Repair stone-lined storm drainage tunnels	1	LS	$ 12,000.00	$ 12,000.00	NW tunnel has localized collapse ~20ft in. SW tunnel has 18-inch clay tile beginning at ~20ft in. NE tunnel conveying sewage. SE tunnel abandoned.
		Bridge parapet - new north railing	315	SF	$ 55.00	$ 17,000.00	Match stone work of south parapet
		Bridge parapet - restore south parapet	90	LF	$ 300.00	$ 27,000.00	Includes internal reinforcement
		Reconstruct two wing walls	300	SF	$ 100.00	$ 30,000.00	100% of joints
		Repoint spandrel walls & piers	3,000	SF	$ 12.00	$ 36,000.00	100% of joints
		Guardrails at parapet ends	60	LF	$ 150.00	$ 9,000.00	30% of joints, 5x90x2ea x30%
Priority Three	Pavement	Remove existing sidewalks	400	SY	$ 25.00	$ 10,000.00	
		Remove existing curb & gutter	400	LF	$ 10.00	$ 4,000.00	
		Temporary Traffic Control & Barricades	10	MOS	$ 5,000.00	$ 50,000.00	
		Vehicular signage, markings & controls	1	LS	$ 10,000.00	$ 10,000.00	
		Remove exisiting metal beam guard fence	90	LF	$ 20.00	$ 2,000.00	
		Remove signs, parking appurtenances	1	Allowance	$ 5,000.00	$ 5,000.00	
		Remove exisiting HMAC pavement	2,000	SY	$ 5.00	$ 10,000.00	300'x4'
		TY C HMAC Pavement	130	TON	$ 110.00	$ 14,000.00	300x60
		Concrete Pavement (Continuously Reinforced)	150	CY	$ 1,000.00	$ 150,000.00	210x44 - approaches
		Concrete Curb & Gutter	400	LF	$ 30.00	$ 12,000.00	90x60x6" plus 10x60x8"x2 EA Sleeper slab, full width
		Brick Paver Sidewalks	400	SY	$ 75.00	$ 30,000.00	
		Concrete Sidewalk - extension beyond bridge	200	SY	$ 75.00	$ 15,000.00	200'x9'x2EA at street level
		Colored Stamped Concrete	350	SY	$ 125.00	$ 44,000.00	Bridge deck proper
		Adjust existing telecom duct on bridge	1	LS	$ 15,000.00	$ 15,000.00	200x9x2EA
Priority Four	Creekway and Lighting	Lighting - bridge rail	1	LS	$ 20,000.00	$ 20,000.00	
		Lighting - arch spandrel	1	LS	$ 20,000.00	$ 20,000.00	300'x80' street level, 400'x30' creek level
		Lighting - vaults	1	LS	$ 20,000.00	$ 20,000.00	
		Lighting - pathway	1	LS	$ 10,000.00	$ 10,000.00	400'x5' beneath bridge, 200'x4'x2EA
		Landscape - Channel Grading	1,000	SY	$ 30.00	$ 30,000.00	200' x 2 EA
		Creekway Trail - concrete walkway	140	SY	$ 20.00	$ 3,000.00	
		Access Trail - concrete walkway	130	SY	$ 20.00	$ 3,000.00	
		Repair scoured pedestrian walkway	1	LS	$ 5,000.00	$ 5,000.00	
		ADA compliant grate (special fabrication)	2	EA	$ 1,000.00	$ 2,000.00	This appears to SW Bell lines. The arches were cut when it was installed originally.
		Trail Guardrail	440	LF	$ 150.00	$ 66,000.00	
		Metal light covers	600	LF	$ 200.00	$ 120,000.00	
		Landscape - Temporary Irrigation	1	LS	$ 10,000.00	$ 10,000.00	90 LF Rock Berm, 1,000 LF Silt Fence, 1,000 LF Mulch Sock, 10 EA Tree Protection, 1 EA Stab Const Entrances
Priority Five	Interpretive Signs, Ladscape, Wayfinding, and Plantings	Monument sign or totems	4	EA	$ 5,000.00	$ 20,000.00	3 rows at 300 LF
		Wayfinding signs	4	EA	$ 400.00	$ 2,000.00	20% of Direct Costs
		Interpretive signs or panels	1	LS	$ 1,000.00	$ 1,000.00	
		Paint removal from stone	300	SF	$ 40.00	$ 12,000.00	Special fabrications
		Landscape - Plants (5 gal)	100	EA	$ 100.00	$ 10,000.00	
		SWPPP, Erosion Controls, Tree Protection	1	LS	$ 45,000.00	$ 45,000.00	
		Landscape - Terraced Stonework	300	LF	$ 400.00	$ 120,000.00	
		Total Construction Cost				**$ 1,705,000.00**	
		Design Fees	14%			$ 240,000.00	
		Testing & Inspection	3%			$ 50,000.00	
		Contingency	10%			$ 200,000.00	
		Total Project Cost				**$ 2,195,000.00**	

** Excludes escalation, City of Austin project management and administrative fees, land surveying, and fees for hydraulics analysis*

This opinion of cost is for planning purposes and is intended only to provide information on the general magnitude of costs. Costs are based on our engineering judgment and experience with similar projects. The opinion of cost is not a quotation or guarantee of actual costs. We have no control over the actual cost or availability of labor, equipment or materials, market conditions or a contractor's method of pricing. Further, no detailed design documents have been developed on which to base the cost of a specific project. As with any restoration work, an appropriate contingency should be maintained in the project budget.

References

AASHTO 1973. Standard Specifications for Highway Bridges, 11th ed., Washington D.C.: American Association of State Highway Officials.

AASHTO 1996. Standard Specifications for Highway Bridges, 16th ed., Washington D.C.: American Association of State Highway and Transportation Officials, Inc.

AASHTO 2012. ASSHTO LRFD Bridge – Design Specifications – Customary U.S. Units, Washington D.C.: American Association of State Highway and Transportation Officials, Inc.

BA-16/97 The Assessment of Highway Bridges and Structures, "Assessment of Masonry Arch Bridges by the Modified MEXE Method".

Baker IO. 1892. A treatise on masonry construction. New York: John Wiley & Sons.

Heyman, Jacques. The Stone Skeleton: Structural Engineering of Masonry Architecture Cambridge University Press; Reprint edition (July 28, 1997).

Kessler DW. & Sligh WH. 1927. Physical properties of the principal commercial limestones used for building construction in the United States, Technologic Papers of the Bureau of Standards, No. 349, Washington: US Dept. of Commerce.

Nobile L. & Bartolomeo V. 2014. Methods for the Assessment of Historical Masonry Arches, in: *Recent Advances in Civil Engineering and Mechanics, Proceedings of the 5th European Conf. of Civil Engineering (ECCIE '14)*, Florence, Italy.

Wang J., Haynes J. & Melbourne C. 2013. A comparison between the MEXE and Pippard's methods of assessing the load carrying capacity of masonry arch bridges, in: Proc. of Int. Conf. on Arch Bridges (ARCH'13), Trogir- Split, Croatia.

Youn H. 2008. Effect of verification core hole on the point bearing capacity of drilled shafts, PhD Thesis, Austin: the University of Texas (unpublished).

Additional Historical Documents

The available documents did not illustrate or describe the original conditions of the bridge side rails, nor any subsequent modifications that have apparently been made to the rails, or the paving materials at the bridge. The study team conducted independent research at the Austin History Center and with the Texas Department of Transportation communications and photogrammetry divisions, to locate images or other information related to the original side rail conditions and paving materials, with limited success.

The bridge is depicted in fire insurance maps of Austin, prepared by the Sanborn Map Company in 1894, 1900, 1935 and 1961. The bridge is depicted without parapets in the earlier maps, and simply as "stone bridge" with parapets on each side, in the later maps. It is important to note that the purpose of the fire insurance maps was to document buildings and construction data and the maps were used to estimate the potential risk to urban structures in the event of fire. As such, the bridge construction may not have been recorded in great detail on the fire insurance maps.

A series of photographs taken near the bridge, after a monumental flood on Shoal Creek on April 22, 1915, show conditions on West Sixth Street to the west of the bridge. The flood waters rose so high that the blocks on either side of the bridge were inundated, and the street cars couldn't cross the bridge. Witness accounts describe houses being washed down the creek and piling up around Sixth Street, so any existing bridge parapets may well have been damaged in the flood. However, none of the photographs of this event in the collection of the Austin History Center show the bridge itself; only views to the west of the bridge were found.

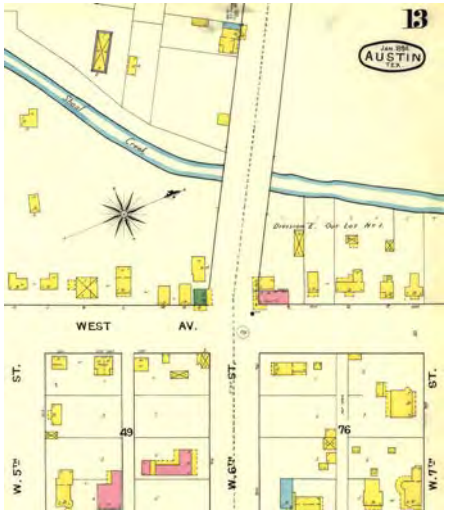
Regarding the original paving materials at the bridge, the documentation located to date is also limited. Street paving in Austin began in 1905, with the first increment of brick paving installed on Congress Avenue. The paving spread from there, and a reference in the February 28, 1911 City Council minutes approved paving a portion of West Sixth Street, from San Antonio Street to West Avenue, with bitulithic (asphalt) pavement. It is not clear when the bridge, itself, was paved, but Plate 2 of *A City Plan for Austin*, completed in 1928, shows Sixth Street paved out to West Lynn Street.

Later photographs show the installation of new street lighting along West Sixth Street near the bridge in 1939. In 1940, the street car tracks were removed from West Sixth Street, and the ruts infilled and paved over with new asphalt.

Two later photographs showing the bridge itself were located, but do not provide much useful detail about the parapets. An image taken at Sixth and Bowie around 1945, looking east towards the bridge, is obscured by vehicles where the parapets would show, but does offer information about sidewalk and street lighting at that time. An image taken from the east bank of Shoal Creek after the Memorial Day flood in 1981, looking north toward the bridge, shows the parapet on the south side of the bridge.

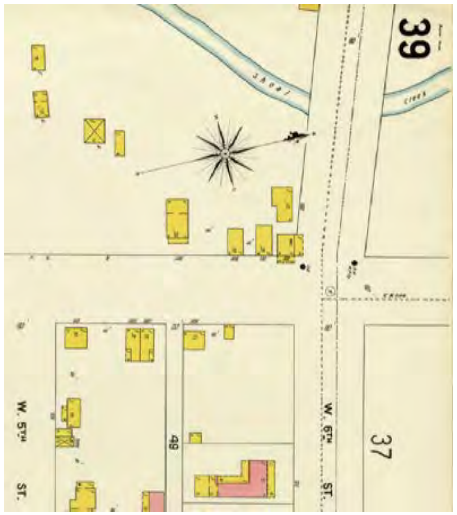
Finally, the Texas Department of Transportation had few images of the bridge in their collection, since it is not located on a state highway. The earliest aerial view of the bridge, taken in 1964, appears to show stone parapets on both the north and south sides of the bridge.

Sanborn Maps

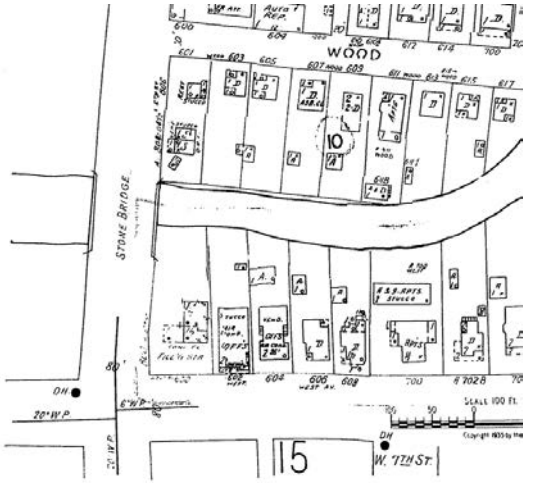


Copyright 1894 The Sanborn Company, The Sanborn Library, LLC. All rights reserved.

Copyright 1935 The Sanborn Company, The Sanborn Library, LLC. All rights reserved.



Copyright 1900 The Sanborn Company, The Sanborn Library, LLC. All rights reserved.



Copyright 1961 The Sanborn Company, The Sanborn Library, LLC. All rights reserved.

Photo 1: West Sixth Street at Wood Street, looking west, 1915. CO 8563, Austin History Center, Austin Public Library.

Photo 2: West Sixth Street at Wood Street, looking west, 1915. CO 8527, Austin History Center, Austin Public Library.

Photo 3: West Sixth Street at Wood Street, looking west, 1915. CO 8529, Austin History Center, Austin Public Library.

Photo 4: West Sixth Street at Wood Street, looking west, 1915. CO 8541, Austin History Center, Austin Public Library.

Photo 5: West Sixth Street at Wood Street, looking west, 1915. CO 8535, Austin History Center, Austin Public Library.

Photo 6: West Sixth Street, looking east, new street lighting, 1939. PICA 05082, Austin History Center, Austin Public Library.

Photo 7: West Sixth Street at Bowie Street, looking east, ca. 1945. PICA 26808, Austin History Center, Austin Public Library.

Photo 8: Shoal Creek, looking north, after Memorial Day flood, 1981. CO 8541, Austin History Center, Austin Public Library.

Historic Photographs

Aerial view, West Sixth Street bridge, 1964. North is at the bottom of the image. Texas Department of Transportation.

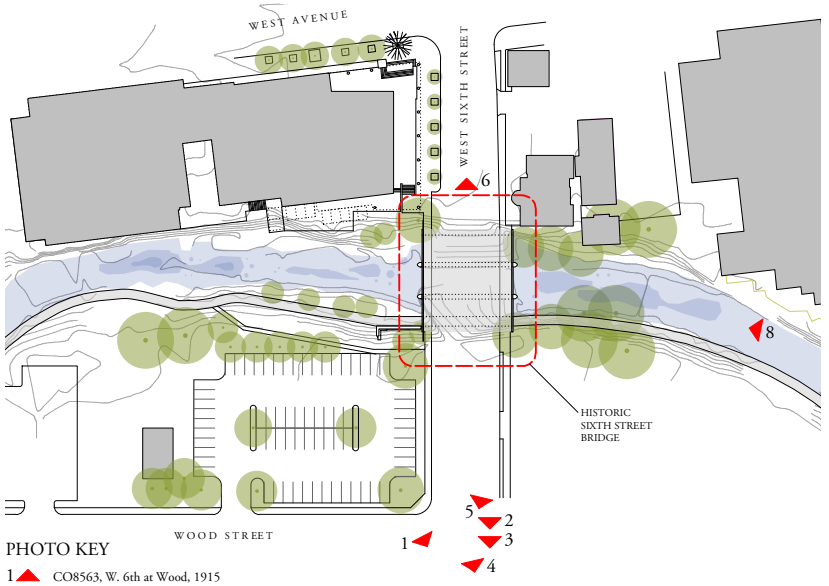


PHOTO KEY

1 CO8563, W. 6th at Wood, 1915
2 CO8527, W. 6th at Wood, 1915
3 CO8529, W. 6th at Wood, 1915
4 CO8541, W. 6th at Wood, 1915
5 CO8535, W. 6th at Wood, 1915
6 PICA 05082, New street lighting, W. 6th Street, 1939
7 PICA 26808, W. 6th Street at Bowie, ca. 1945
8 PICA 29471, Shoal Creek, Memorial Day Flood, 1981

Appendix Two: Attachments

This page intentionally left blank.

City of Austin
Public Works Department
P.O. Box 1088, Austin, Texas 78767-1088 - Administrative Offices:
One Texas Center, 505 Barton Springs Road, Suite 800, 78704
Telephone (512) 974-7065; Fax (512) 974-7084

July 14, 2016

Joanna Wolaver
Executive Director
Shoal Creek Conservancy

RE: Historic West 6th Street Bridge Over Shoal Creek

Dear Ms. Wolaver:

The City of Austin Public Works Department (PWD) is pleased to express support for Shoal Creek Conservancy's West 6th Street Bridge Restoration Project. This bridge is owned and maintained by the City of Austin.

The goal of this project is to protect and restore the West 6th Street Bridge over Shoal Creek. Through this project, the Shoal Creek Conservancy (SCC) will commission engineering and architectural plans for structural improvements that are sensitive to the bridge's historical design, add bridge lighting, make landscaping improvements, and create an ongoing maintenance protocol for removing graffiti. The goal is to restore this nationally-listed historic structure and transform the bridge into a special destination along the Shoal Creek Trail, which travels under the bridge. PWD is particularly supportive of the placemaking components of this project as it relates to improving the Shoal Creek Trail, one of the City's priority urban trails.

SCC has shared the project goals and vision with PWD, which supports SCC's efforts to raise funds to accomplish the project. PWD will coordinate with SCC to identify public and private funding sources to sustain the project.

Thank you in advance for your consideration and for supporting the West 6th Street Bridge project.

Sincerely,

Robert Hinojosa, P.E., Interim Director
City of Austin
Public Works Department