



Transforming a Pedestrian Underpass into a Welcoming Attraction

Aaron McVicker (McClure) and Todd Black (Contech)

Presentation Outline

- Overview of the Project and Partners
- Background Information
- Collaborative Design Effort
- Pre-Cast Structure Integration
- Impact on Campus Connectivity
- Key Takeaways
- Conclusion

Overview of the Project and Partners



- Project

- Developing a new pedestrian access under Hwy 63
- Initial Study Phase
- Importance of Pedestrian Infrastructure on Campus



- Partners

- Missouri S&T
- MoDOT
- City of Rolla
- Contech
- Antella and SWT Design



Overview of Project



Overview of Project – Plan View



Overview of Project – Looking West



Overview of Project – Looking East



Background Information

- Context of Campus Environment
 - Student Housing West of Hwy 63
- Need for Improved Pedestrian Connectivity
 - Safe access for students
- Initial Challenges and Considerations
 - Closure Windows
 - Pedestrian Access during construction

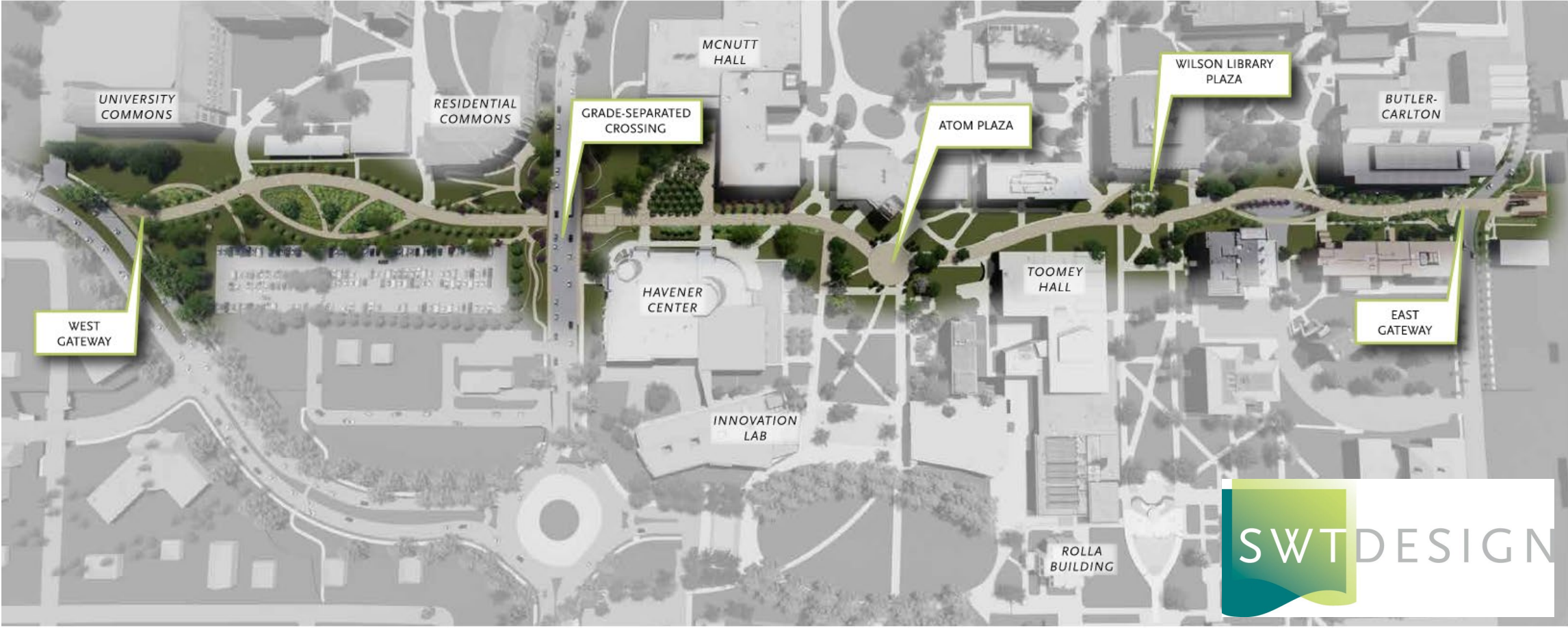


Collaborative Design Effort

- Multidisciplinary Team Involvement
 - Study Phase
 - MoDOT Collaboration
 - Contech
 - Multiple McClure Teams
- Integration of Campus Planning Principles
 - Utilized SWT to integrate Promenade Vision overall
- Precast Customization
 - Multiple Options Considered



Promenade Concept by SWT - 2021

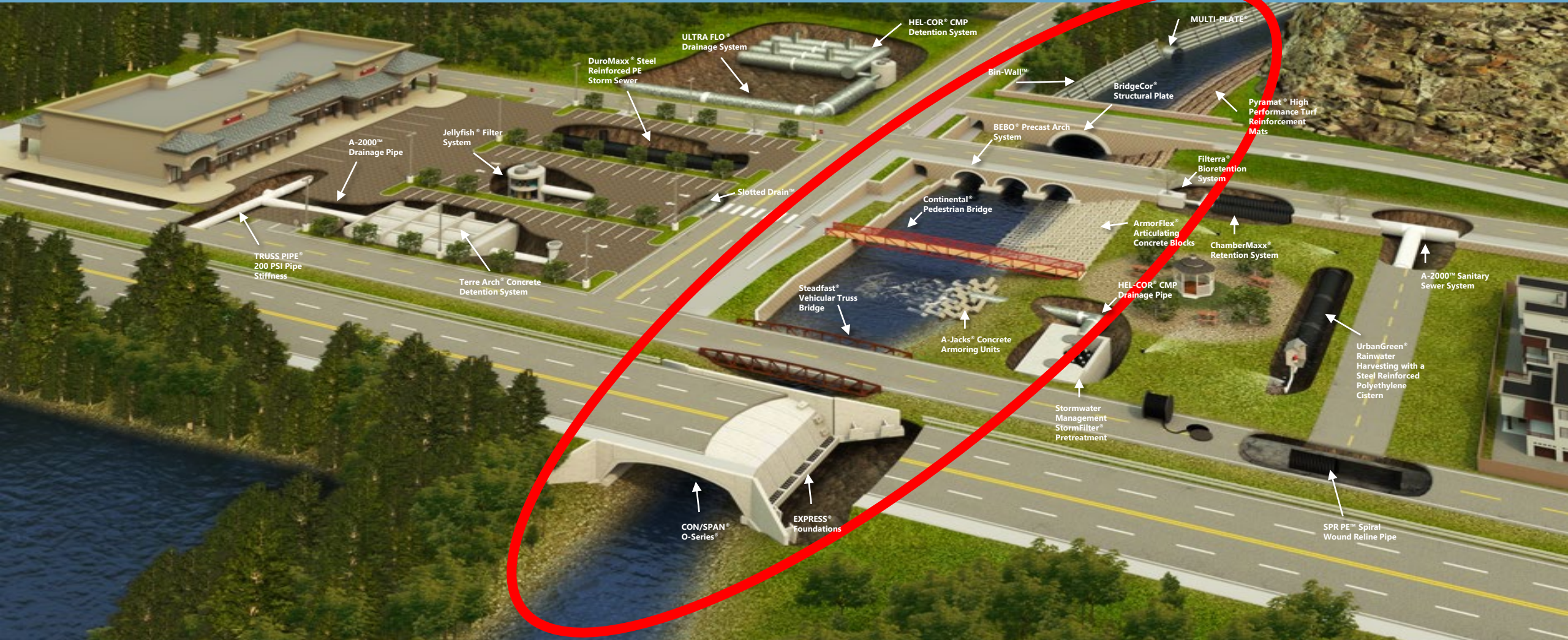


Aesthetic Features



Contech Engineered Solutions

Bridges & Structures, Stormwater Management, Pipe, Erosion Control and Retaining Walls





Working with Contech – What's the Process

Highway 63 Project Timeline

Contech's Involvement

- First contact with McClure was at TEAM 2022!!
- Started in earnest April 2022
- Bid & order July 2023
 - Roughly 160 emails between first contact and bid
- Submittals approved December 2023
- Installation schedule for March 2024
 - Will have full-time on-site representation during installation

Highway 63 Project Timeline

What comes with 160+ emails?

- Structure selection
- Foundation discussion
- Plans & specification development
 - Contech Design Center
- Estimates
 - Including installed cost
- Meet with precaster
- Work with contractors during bid
 - Scope, installation guide
- Order coordination
 - Submittals, logistic, on-site help

CONTECH ENGINEERED SOLUTIONS
Contech Engineered Solutions
13032 Flint
Overland Park, KS 66213
(913) 216-3818
todd.black@ContechES.com

July 17, 2023

CONTECH ENGINEERED SOLUTIONS – SCOPE OF WORK

Project: Highway 63 Pedestrian Underpass
Location: Rolla, MO
Bid Date: July 25, 2023 / 11:00 am

The following information is for your use in preparation of your bid for the above project.

DESCRIPTION OF MATERIALS

ConSpan B-series precast concrete arch system / 32' span x 11' rise x 54' long, including:

- (9) precast concrete arch units, with 6' lay length
- (2) precast concrete headwalls, ~4' tall at center of arch, sloping with formliner finish on outside face
- 108' of Express precast foundation units (40 cy of CIP concrete to be supplied by others)
- Delivery to the job site (unloading by others)
- Masonite setting shims
- Headwall mounting hardware
- Standard joint sealing material
- On-site technical support for pre-construction and installation
- Signed & sealed Installation & Fabrication Drawings and design calcs

Approximate pick weights:

- Arch units = 25 tons

Typical lead time:

- Submittal and fabrication drawings from acceptance of order 4 – 8 weeks
- Delivery from receipt of approved drawings & order paperwork 10 – 12 weeks

T	QUANTITY	PRICE	AMOUNT
20			
21			
22			
23			
24			
25			

Respectfully,
C. Todd Black
C. Todd Black, PE (KS)
Senior Bridge Consultant
todd.black@ContechES.com / 913-216-3818

CONSPAN B-SERIES BEBO Arch System BridgeCor CONTINENTAL MIX

Overland Park KS 66213
913-216-3818
www.ContechES.com
7/8/2022

Span X 11 FT Rise X 48 FT Long

Help My Projects

Export/Submit
Select the output you would like to receive below

PDFs 3D Model Image

Save

CONTECH ENGINEERED SOLUTIONS



Benefits of Using a Precast Buried Bridge for this Project

Clear Span Bridges

Pipe Solutions

i-Series™ Culvert

MULTI-PLATE®

Aluminum Structural Plate

Aluminum Box Culvert

SUPER-SPAN™

SUPER-PLATE®

BridgeCor®

CON/SPAN® O-Series®

CON/SPAN®

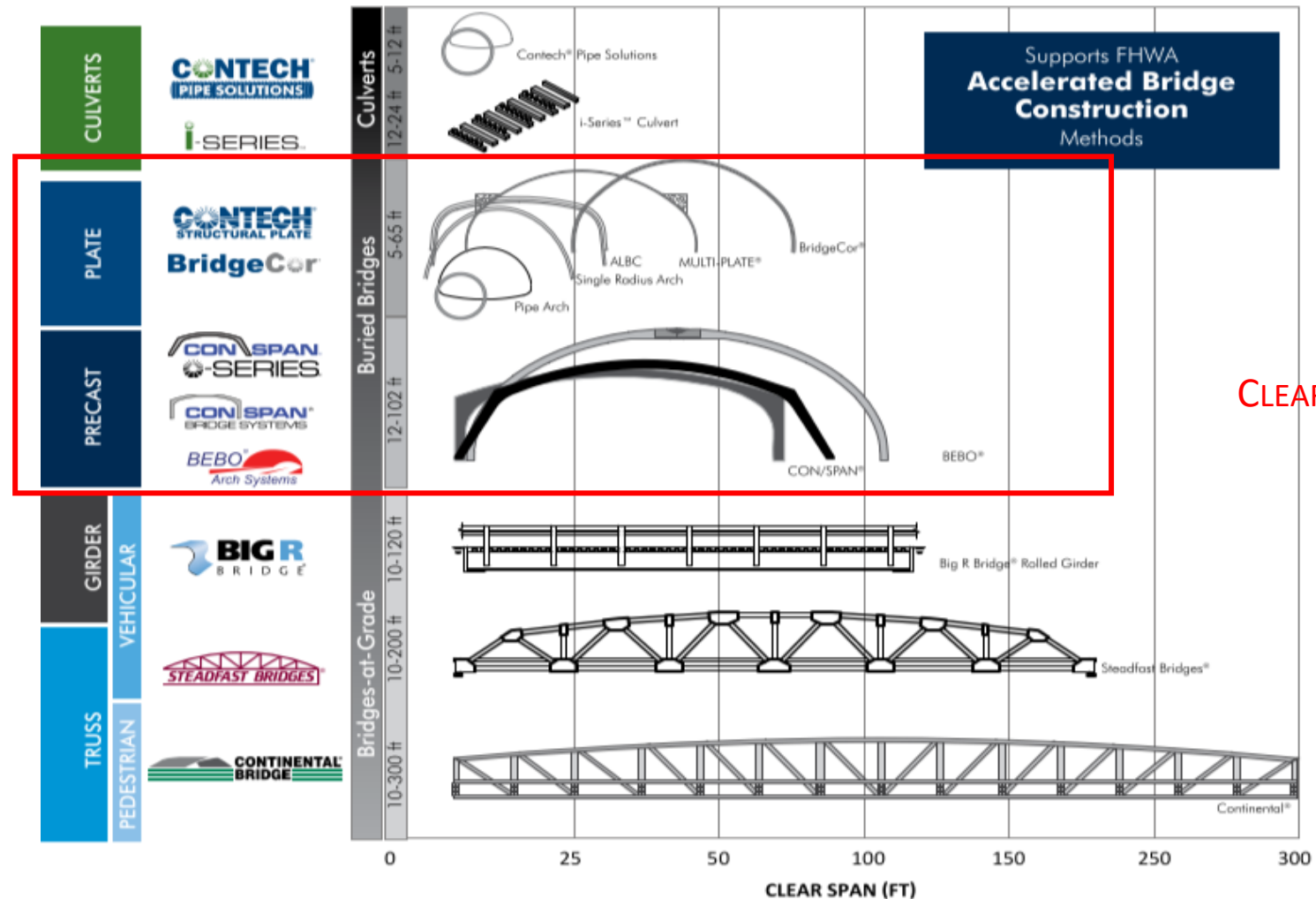
BEBO®

Big R Bridges®

(Rolled Girder)

Steadfast Bridges® (Vehicular)

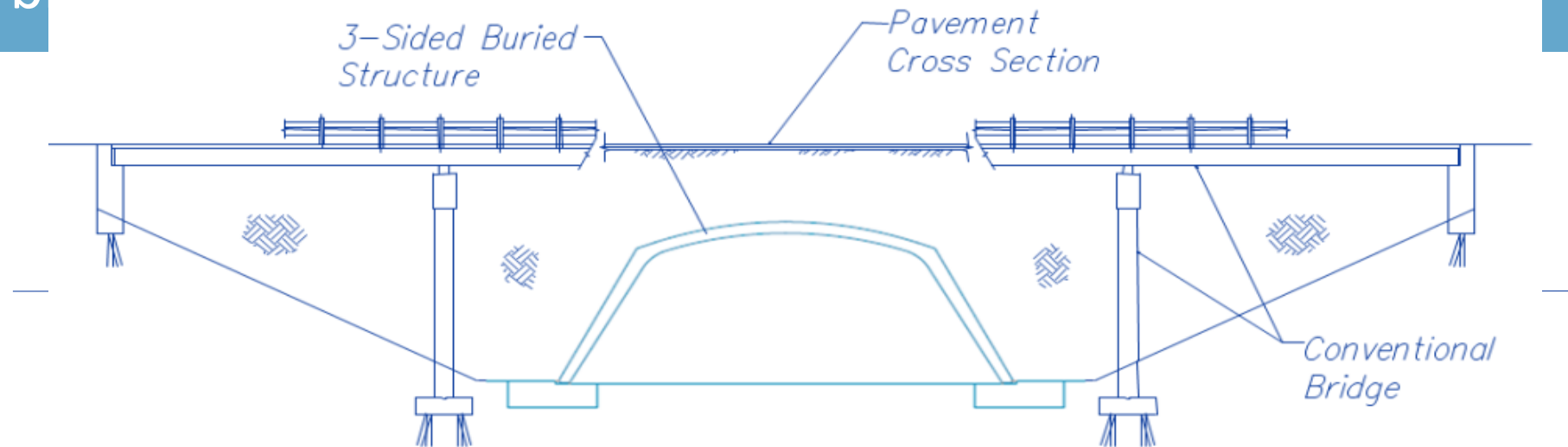
Continental® Bridges (Pedestrian)



CLEAR SPANS 5' TO 102'

Buried Bridge Applications

Buried b



ADVANTAGES OF A BURIED BRIDGE OVER A BRIDGE AT GRADE

- SHORTER CONSTRUCTION TIME / PHASING MEANS LOWER INITIAL COST
- MINIMAL / NO LONG-TERM MAINTENANCE LOWERS OVERALL LIFE CYCLE COST
 - COMPARED TO CONTINUAL BRIDGE DECK MAINTENANCE
- SHORTER CONSTRUCTION TIME MINIMIZES TRAFFIC DISRUPTION
- BURY UTILITIES IN BACKFILL OVER STRUCTURE
- INCREASED SAFETY WITH LIMITED / NO FREEZE CONCERNS & DECK MAINTENANCE

Conventional Bridge



Highway 63 Product Selection

What are the project requirements?

- Speed of installation
 - Reduced construction time
 - Reduced disruption to traffic
- Aesthetics
 - Formliner on walls
- Special features
 - Lighting
 - Architectural panels
- Proven product
 - Used by MoDOT



Highway 63 Product Selection

Precast Arches



Highway 63 Product Selection

Speed of Installation





CONSPAN
BRIDGE SYSTEMS

Howell St / Cape Girardeau, MO

06/06/2008

Highway 63 Product Selection

Aesthetics



MSE large block head



Headwall w/ rock face



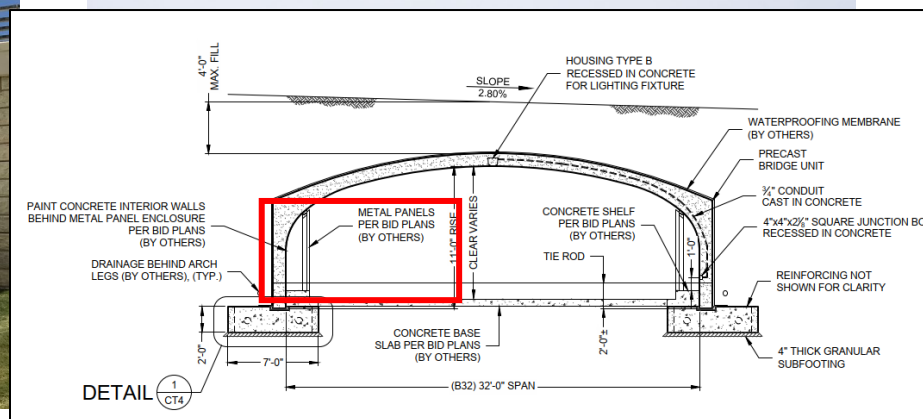
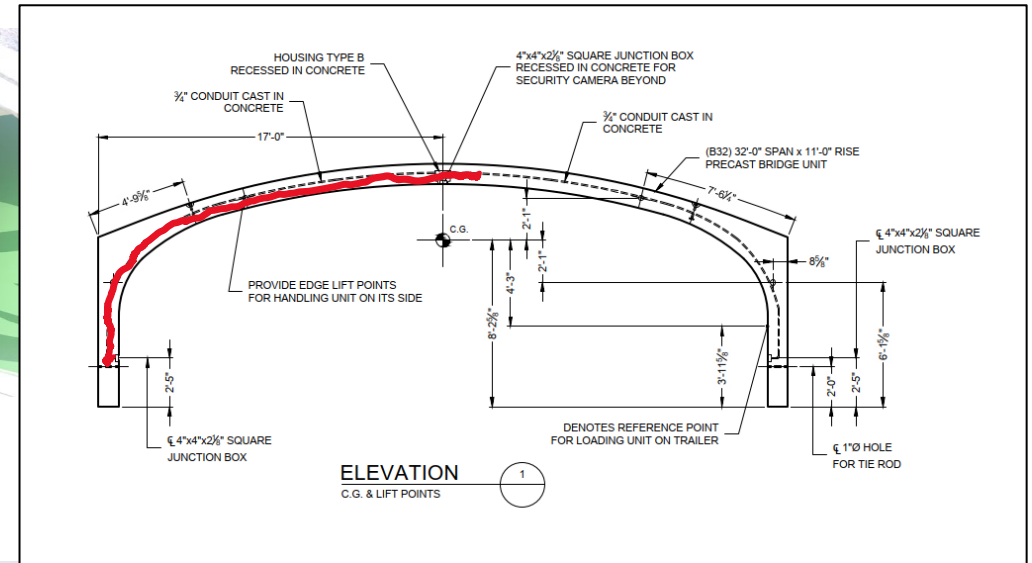
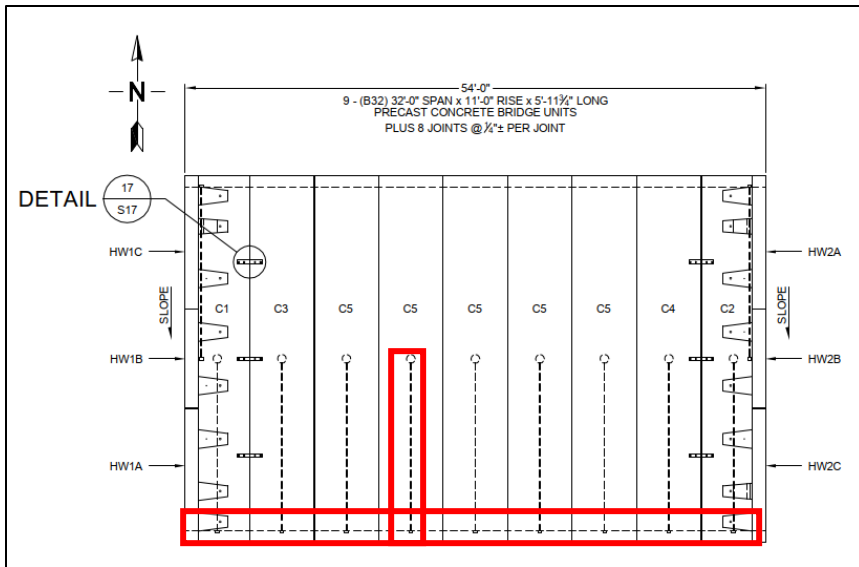
Precast headw



Headwall w/ formliner

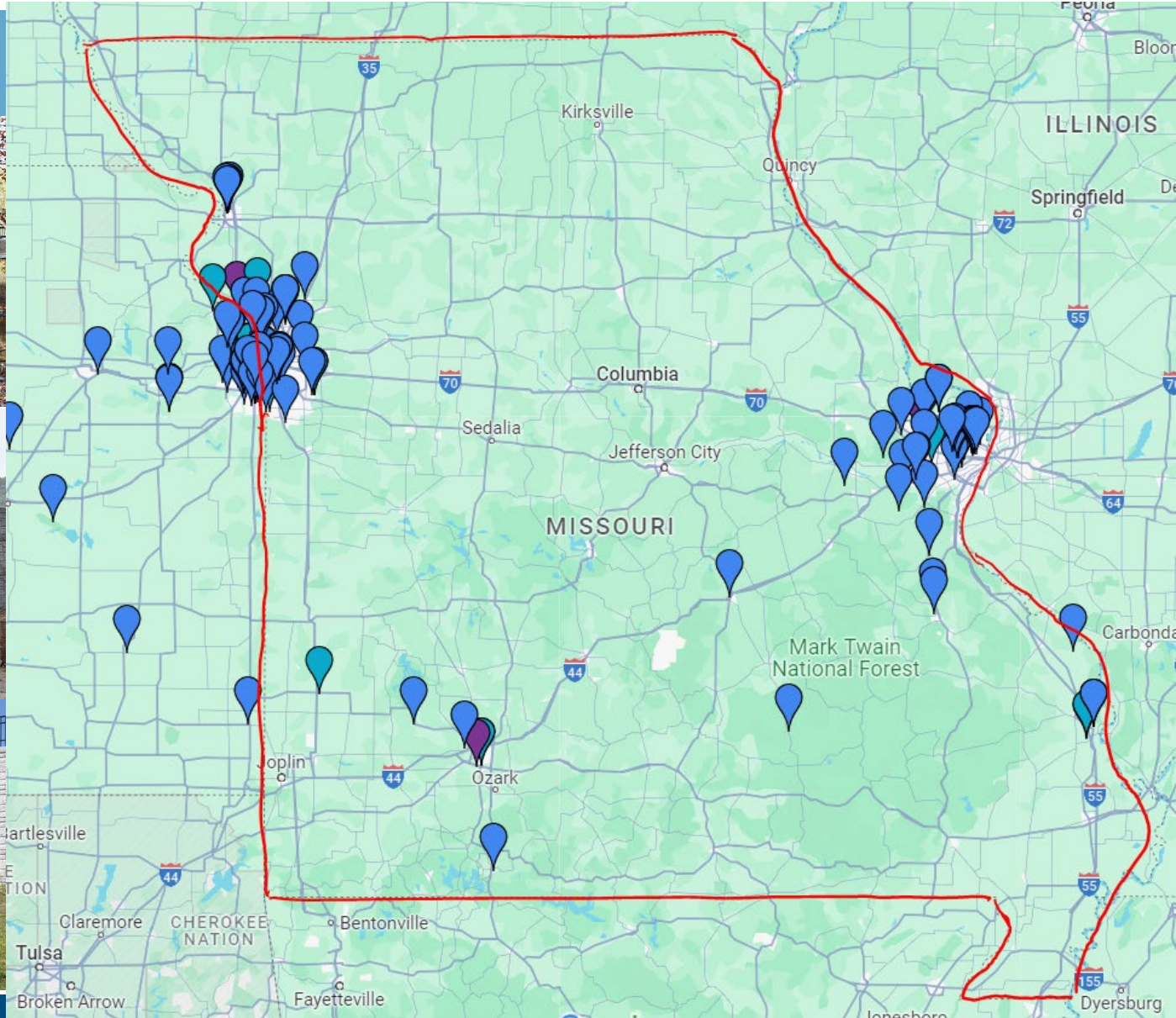
Highway 63 Product Selection

Special Features



Highway 63 Product Selection

Proven Usage



Highway 63 Pedestrian Underpass

Summary

- ✓ ■ Speed of installation
- ✓ ■ Aesthetics
- ✓ ■ Special features
- ✓ ■ Proven product
- ? ■ Successful install

NOTES

GENERAL NOTES:

- THIS BRIDGE HAS BEEN DESIGNED FOR GENERAL SITE CONDITIONS. THE PROJECT ENGINEER SHALL BE RESPONSIBLE FOR THE STRUCTURE'S SUITABILITY TO THE EXISTING SITE CONDITIONS AND CONFIRMATION OF SOIL CONDITIONS.
- PRIOR TO CONSTRUCTION, CONTRACTOR MUST VERIFY ALL ELEVATIONS SHOWN THROUGH THE ENGINEER.
- ONLY CONTECH ENGINEERED SOLUTIONS LLC, THE CONSPAN® APPROVED PRECASTER IN MISSOURI MAY PROVIDE THE STRUCTURE DESIGNED IN ACCORDANCE WITH THESE PLANS.
- THE USE OF ANOTHER PRECAST STRUCTURE WITH THE DESIGN ASSUMPTIONS USED FOR THE CONSPAN® STRUCTURE MAY LEAD TO SERIOUS DESIGN ERRORS. USE OF ANY OTHER PRECAST STRUCTURE WITH THIS DESIGN AND DRAWINGS VOIDS ANY CERTIFICATION OF THIS DESIGN AND WARRANTY. CONTECH ENGINEERED SOLUTIONS LLC ASSUMES NO LIABILITY FOR DESIGN OF ANY ALTERNATE OR SIMILAR TYPE STRUCTURES.

DESIGN DATA

DESIGN LOADINGS:
 BRIDGE UNITS: HL-93
 HEADWALLS: EARTH PRESSURE + LIVE LOAD SURCHARGE
 DESIGN FILL HEIGHT: 2'-0" MIN. TO 4'-0" MAX AT CROWN W/ 2.5% SLOPE FROM TOP OF CROWN TO TOP OF PAVEMENT.
 DESIGN METHOD (ARCHES & HEADWALLS): LOAD AND RESISTANCE FACTOR DESIGN PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION, 2002.
 DESIGN METHOD (FOUNDATION): LOAD FACTOR DESIGN PER AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 17TH EDITION, 2002.
 NET ALLOWABLE SOIL BEARING PRESSURE: 2000 PSF
 GROSS ALLOWABLE SOIL BEARING PRESSURE: 4360 PSF

*FOUNDATION EXCAVATION AND SUBGRADE PREPARATION SHALL BE IN ACCORDANCE WITH THE GEOTECHNICAL REPORT FOR THIS PROJECT PREPARED BY JACOBI GEOTECHNICAL ENGINEERING DATED 5/13/2023.

MATERIALS

PRECAST UNITS SHALL BE CONSTRUCTED AND INSTALLED IN ACCORDANCE WITH CONSPAN® SPECIFICATIONS. CONCRETE FOR FOOTINGS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI. REINFORCING STEEL FOR FOOTINGS SHALL CONFORM TO ASTM A615 OR A895-GRADE 60.

MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY HIGHWAY 63 PEDESTRIAN UNDERPASS S&T PROJECT #RC000217 PHELPS COUNTY, MISSOURI

LOCATION PLAN
NOT TO SCALE

MARK	DATE	REVISION DESCRIPTION	BY
1	12/12/2023	APPROVED FOR CONSTRUCTION	DM

CONTECH
ENGINEERED SOLUTIONS LLC

www.ContechES.com

8100 Centre Pointe Dr., Suite 400, West Chester, OH 45399
800-338-1122 513-645-7000 513-645-7993 FAX

CONSPAN
SPRINGS SYSTEMS

CONTRACT DRAWING

MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY
HIGHWAY 63 PEDESTRIAN UNDERPASS
S&T PROJECT #RC000217
PHELPS COUNTY, MISSOURI

APPROVED

CONTECH ENGINEERED SOLUTIONS LLC
PROFESSIONAL ENGINEERING SERVICES
LICENSE NUMBER E-2012032402

PROJECT NO.	S&T NO.	DATE
707833	020025	12/7/2023

DESIGNED	DRAWN
DM	TEK

CHECKED	APPROVED
SAL	PAC

SHEET NO. CT1 OF CT9

© 2021 Contech Engineered Solutions LLC

CONTECH
ENGINEERED SOLUTIONS

Impact on Campus Connectivity



- Enhanced Pedestrian Safety
 - Almost eliminates at-grade crossings on Hwy 63
- Improved Mobility
- Welcoming Atmosphere
 - Landscape Architecture

Key Takeaways



- Pre-cast allowed for shorter construction timeline/closure window
- Ability to Customize Pre-cast was not apparent
- Missouri S&T responsible for maintenance – Played a big role in structure type selection

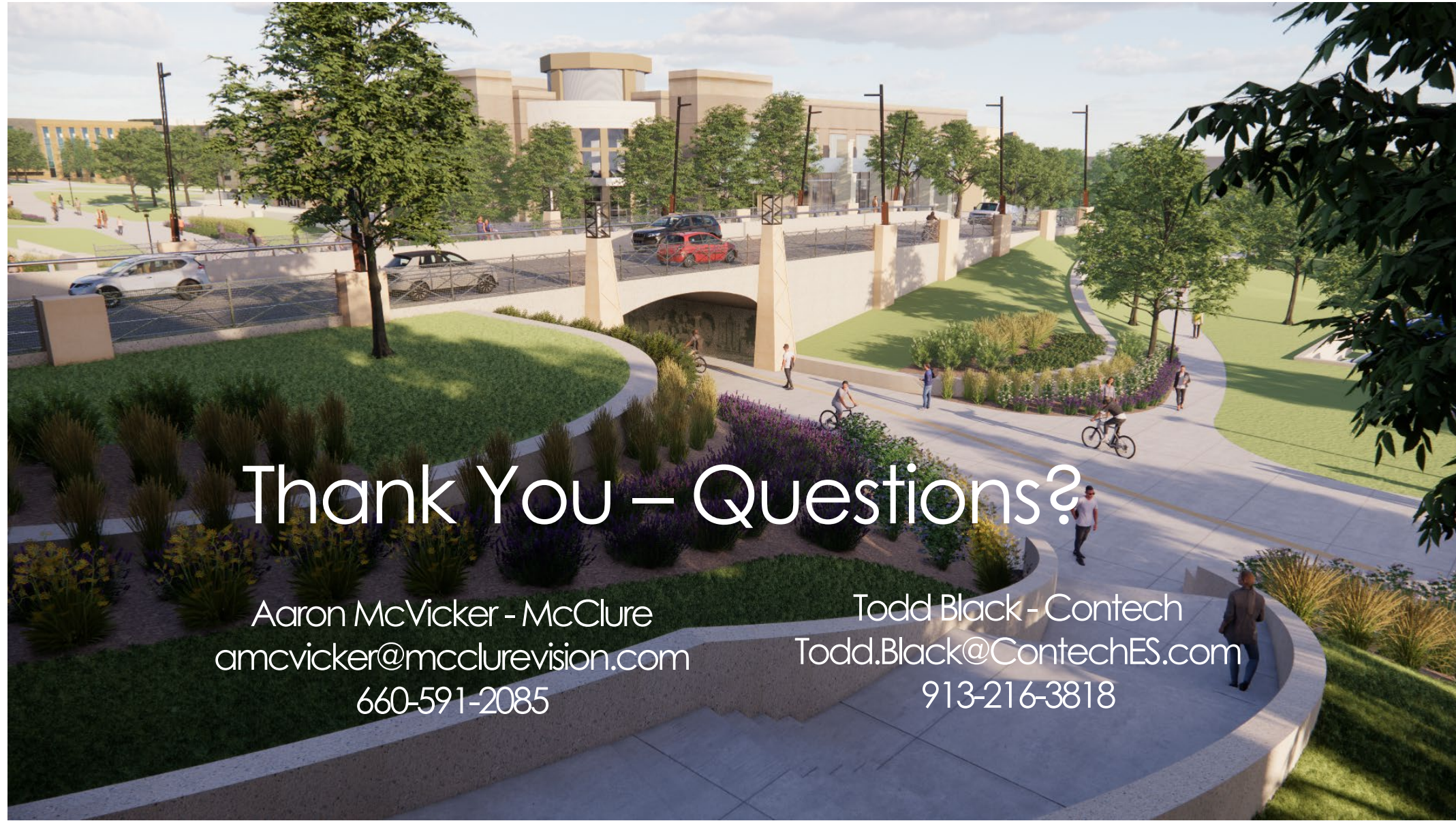
Conclusion

- Recap of Project Journey
- Construction Progress



Construction Progress





Thank You – Questions?

Aaron McVicker - McClure
amcvicker@mcclurevision.com
660-591-2085

Todd Black - Contech
Todd.Black@ContechES.com
913-216-3818