CONTECH ENGINEERED SOLUTIONS

CONTECH® ENGINEERED SOLUTIONS
A QUIKRETE® COMPANY

Structures Technical Seminar

Josh Loera – Bridge Consultant, Houston/Gulf Coast

CONTECH ENGINEERED SOLUTIONS

Agenda

- Contech Introduction
- Solution Overview
  - Applications
  - Foundation and Scour Discussion
- Industry Trends
- Partnering With Contech

Josh Loera - Bridge Consultant

Kevin Gassaway – Area Director

CONTECH ENGINEERED SOLUTIONS

Contech Engineered Site Solutions

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

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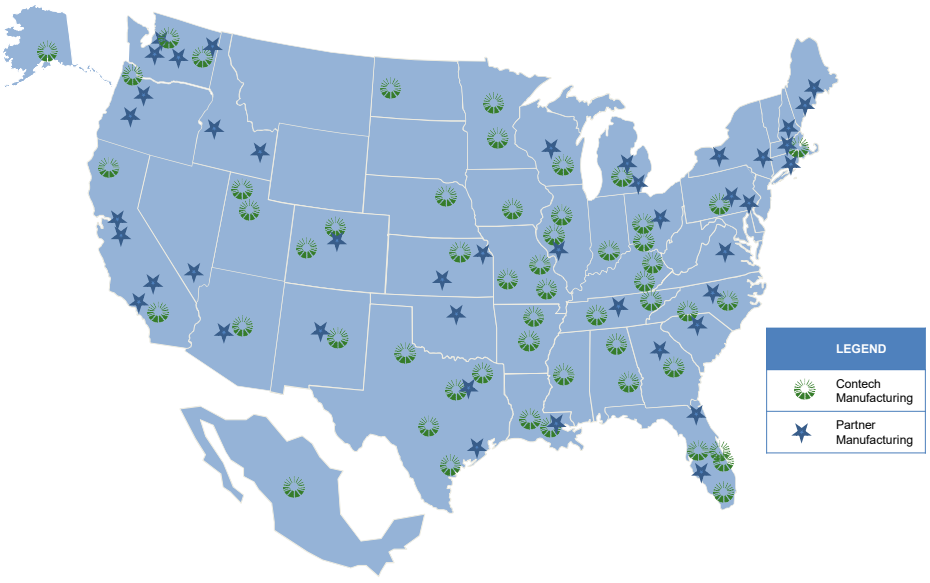
Manufacturing Capabilities

CONTECH ENGINEERED SOLUTIONS



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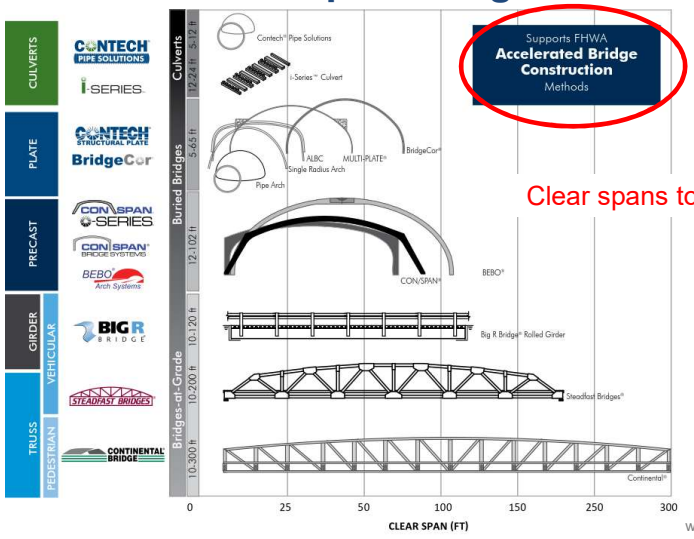
Clear Span Bridges



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BIG R BRIDGE Rolled Girders

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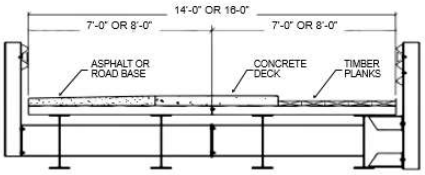
Big R Bridge® Modular Bridges

STANDARD FEATURES

- Single lane, modular bridge with a longitudinal splice
- Heavy duty loading (AASHTO HL-93 highway and U-80 off-highway trucks and greater)
- 14' or 16' wide
- Low-maintenance weathering steel structural members
- Galvanized steel structural decking
- Bearing plates and pads
- Curb or railing systems
- Precast sills available



1/2 Bridge Weights (lbs.)*		
Length (ft.)	14' Wide	16' Wide
30	7,900	8,400
40	11,200	11,700
50	14,100	16,200
60	21,800	22,600
70	27,900	28,800
80	35,700	36,800

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CONTECH ENGINEERED SOLUTIONS

CUSTOMIZABLE TO MEET ANY SITE NEEDS

ANY SPAN & WIDTH

- AASHTO LRFD Designs
- Designed to meet HL-93 vehicular loading
- Design can accommodate customer-specified vehicle loads

ASSEMBLY

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GUARDRAIL OPTIONS


W-Beam


Thrie-Beam


Custom Rail

DECK TYPES


Cast-in-Place Concrete on S.I.P. Forms


Concrete/Asphalt on Bridge Plank


Gravel on Bridge Plank

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Truss Bridges – Pedestrian and Vehicular

CONTINENTAL BRIDGE

EXPRESS TRUSS CONTINENTAL® BRIDGE

STEADFAST BRIDGES

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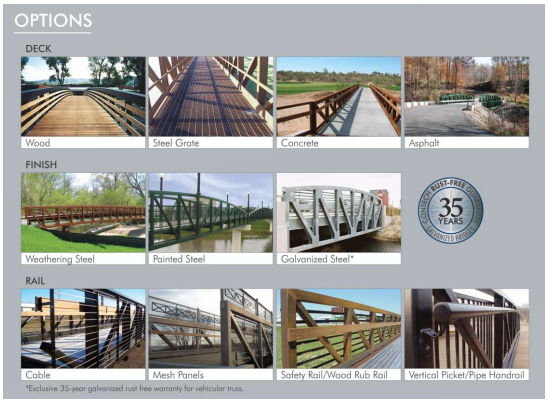
Custom Designs & Options



CONTINENTAL BRIDGE

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CONTECH ENGINEERED SOLUTIONS

Pedestrian Truss Bridge Styles

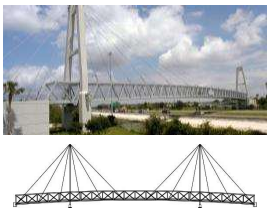
Connector®

Capstone®

Keystone®

Gateway®

Link®



Cable Stayed

CONTINENTAL BRIDGE

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Freight Economy / Simple Installation

CONTECH ENGINEERED SOLUTIONS

Greens Bayou Greenway – 187’ Span

CONTECH ENGINEERED SOLUTIONS

Green Tee Terrace – 200’ Span – Pearland, TX

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CONTECH ENGINEERED SOLUTIONS

Green Tee Terrace – 200’ Span – Pearland, TX

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Grade Separation / Clearance Box

CONTINENTAL BRIDGE

Colorado Center over I-25– Denver, CO
Owner – City of Denver
Engineer – HNTB

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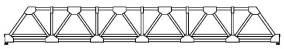
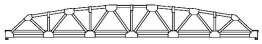
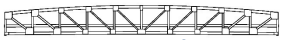
Vehicular Truss Bridge Designs



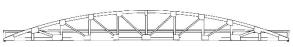
Colonial Flat



Colonial



Capstone®



Keystone®

Horizon

Archway

STEADFAST BRIDGES

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Port 10 – SJRA Crossing

STEADFAST BRIDGES

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Port 10 – SJRA Crossing

STEADFAST BRIDGES

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Have You Ever Heard Of The Term "Prefabricated Buried Bridge"?

- ❑ Yes
- ❑ No

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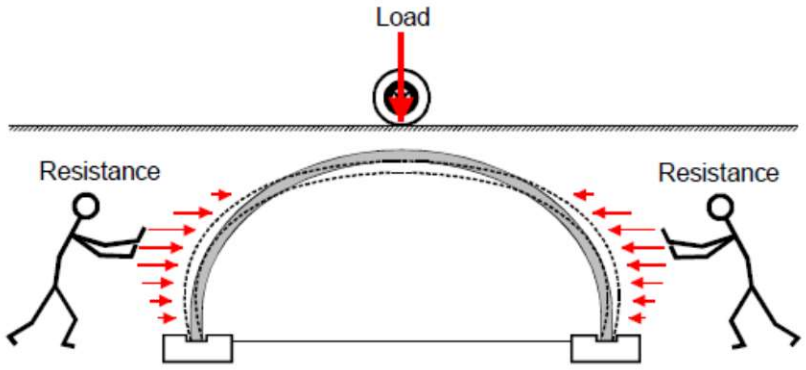

Soil-Structure-Interaction

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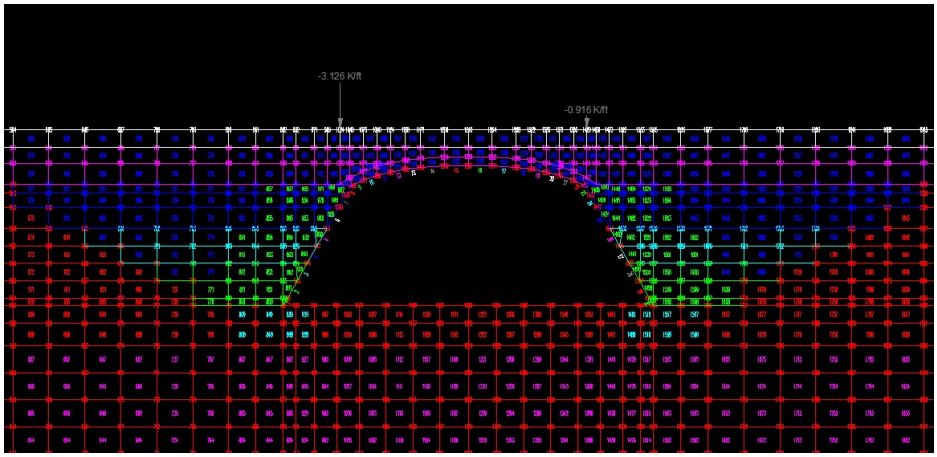
CANDE (Culvert ANalysis and DEsign)



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Contech Structural Plate



CONTECH STRUCTURAL PLATE

BridgeCor

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Contech Structural Plate

STEEL

BRIDGECOR / MULTI-PLATE / SUPERSPAN

Railroad Rehabilitation

Alaska DOT

ALUMINUM

ALUMINUM STRUCTURAL PLATE
ALUMINUM BOX CULVERT

Residential Development

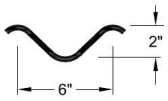
Golf Course Community

CONTECH ENGINEERED SOLUTIONS

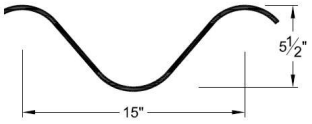
Plate Corrugations

STEEL

6" X 2" CORRUGATION



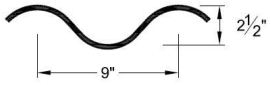
15" X 5 ½" CORRUGATION



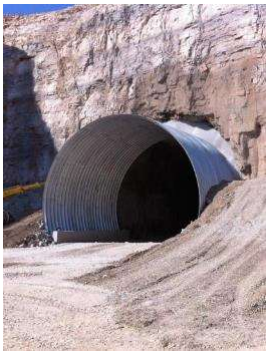
Gage	12	10	8	7	5	3	1	5/16	3/8
Thickness	.111	.140	.170	.188	.218	.249	.280	.318	.380

ALUMINUM

9" X 2 ½" CORRUGATION



Thickness	.125	.150	.175	.200	.225	.250



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Lightweight, Bolted Plate Construction

Freight economy

Efficient assembly

Lift and set in place

Handles highway loading

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Structural Plate Versatility

SHAPES			STRUCTURE SIZE RANGES - INSIDE SPAN X RISE MULTI-PLATE® 6" x 2" Steel	BridgeCor® 15" x 5.5" Steel	ALSP 9" x 2.5" Aluminum
Round		min.	5'-0"	19'-11"	6'-0"
		max.	26'-0"	50'-6"	21'-0"
Vertical Ellipse		min.	4'-8" x 5'-2"		4'-8" x 5'-2"
		max.	25'-0" x 27'-8"		20'-1" x 22'-3"
Underpass		min.	12'-2" x 11'-0"		12'-1" x 11'-0"
		max.	20'-4" x 17'-9"		20'-5" x 17'-9"
Single Radius Arch		min.	6'-0" x 1'-10"	19'-7" x 9'-9"	5'-0" x 1'-9"
		max.	260° x 131"	54'-4" x 27'-2"	23'-0" x 11'-11"
Two Radius Arch		min.		18'-5" x 8'-4"	
		max.		50'-7" x 19'-11"	
Horizontal Ellipse		min.	7'-4" x 5'-6"		9'-2" x 6'-8"
		max.	14'-11" x 11'-2"		14'-11" x 11'-2"
Pipe Arch		min.	6'-1" x 4'-7"		6'-7" x 5'-8"
		max.	20'-7" x 13'-2"		21'-11" x 14'-11"
Low-Profile Arch SUPER-SPAN™ / SUPER-PLATE®		min.	19'-5" x 6'-9"		19'-5" x 6'-9"
		max.	45'-0" x 18'-8"		38'-8" x 15'-9"
High Profile Arch SUPER-SPAN™ / SUPER-PLATE®		min.	20'-1" x 9'-1"		20'-1" x 9'-1"
		max.	35'-4" x 20'-0"		35'-5" x 20'-0"
Horizontal Ellipse SUPER-SPAN™ / SUPER-PLATE®		min.	19'-4" x 12'-9"		19'-4" x 12'-9"
		max.	37'-2" x 22'-2"		37'-3" x 22'-2"
Pear-Arch SUPER-SPAN™		min.	23'-11" x 23'-4"		
		max.	304' x 2510"		
Pear SUPER-SPAN™		min.	23'-8" x 25'-5"		
		max.	29'-11" x 31'-3"		
Box Culvert		min.		17'-6" x 6'-10"	8'-9" x 2'-6"
		max.		35'-4" x 13'-11"	35'-3" x 13'-7"

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What Is The Expected Design Life (Yrs.) Of A Structural Plate Buried Bridge?

- ❑ 0 to 25
- ❑ 26 to 50
- ❑ 51 to 75
- ❑ > 75

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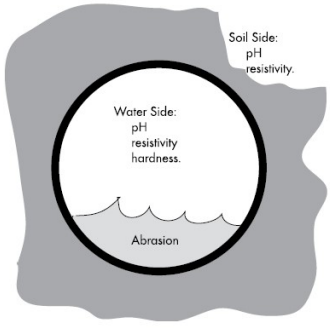
Structural Plate Durability



Controlling Factors
- pH
- Resistivity
- Hardness

When to Use Steel or Aluminum?

STEEL:
6.0 ≤ pH ≤ 10.0
Resistivity > 2,500 ohm-cm
Hardness > 300 mg/L

ALUMINUM:
4.0 ≤ pH ≤ 9.0
Resistivity > 500 ohm-cm
Hardness < 300 mg/L

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Structural Plate Durability – Galvanized Steel

NCSPA STEEL: PROVEN 100-YEARS STRONG

SERVICE LIFE CALCULATOR

Service Life Calculator (Plate) – Beta Version

Gage: 12	N/A
Gage: 10	N/A
Gage: 8	N/A
Gage: 7	**89 Years**
Gage: 5	99 Years
Gage: 3	100 Years
Gage: 1	100 Years
Gage: 5/16	100 Years
Gage: 3/8	100 Years

Desired Service Life (Years): 75

Resistivity (Ohm-cm): 2000

pH: 6

Abrasion Level: Level 3: Moderate Abrasion

Plate and CSP estimator on website

Based on CALTRANS/AISI studies of CSP

Buried bridges designed without inverts
- Improves overall durability
- Eliminates potential invert corrosion
- Quality backfill aids in durability

Steel structural plate – 50% more galvanized coating

Post applied coatings aid in extending service life
- Polymers, Asphalt, Concrete Paving, etc.

Impermeable membranes over structure
- Minimize water migration
- Shed de-icing chemicals

NCSPA.org for Service Life Calculator

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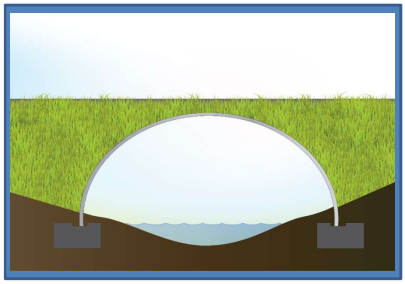
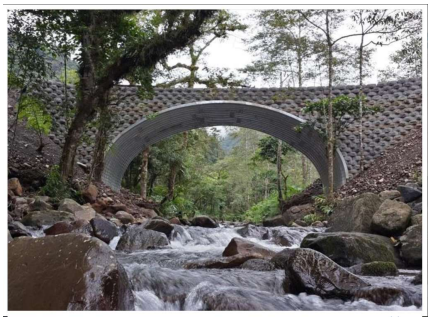
Durability Benefits of Clear Span



Improves Long Term Durability
- No Invert - Keep normal flows away from structure
- Exposure to high flows for short duration
- Free draining backfill
- Clear span sensitive wetlands

BridgeCor

- Deep corrugated metal structures
  - Spans up to 80'
  - AASHTO approved
  - 9X stiffer than MULTI-PLATE
  - Accelerated construction methods



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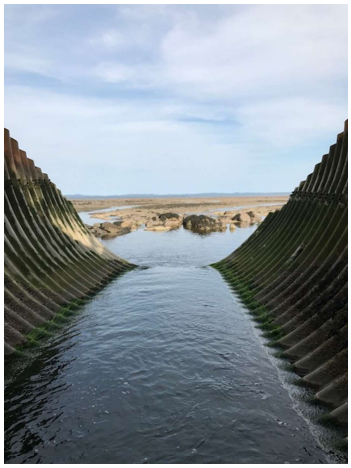
Structural Plate Durability – Aluminum



- **Metal oxide film**
  - Pit rate can be estimated at 1 mil/yr.
  - Ex.: 0.100” thick plate/ 0.001”/yr = 100 year design life
- **Excellent abrasion resistance**
  - Metal oxide film is not a coating
- **Excellent saltwater performance**

Bay of Fundy US Rte 1 Robbinston, ME

- 1966 install
- Saltwater environment
- No metal loss

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ITEM 461
STRUCTURAL PLATE STRUCTURES

461.1. Description. Furnish and install structural plate pipes, pipe arches, arches, underpasses, box culverts, and special shapes.

461.2. Materials.

A. General. Furnish materials in accordance with the following:

- Item 420, “Concrete Structures”
- Item 421, “Hydraulic Cement Concrete”
- Item 440, “Reinforcing Steel”
- Item 442, “Metal for Structures”
- Item 445, “Galvanizing”
- Item 447, “Structural Bolting.”

Provide galvanized steel plates conforming to AASHTO M 167. Provide aluminum plates conforming to AASHTO M 219.

Use Class C concrete for footings unless otherwise shown on the plans.

B. Fabrication. Use structural units of corrugated galvanized metal for steel plates. Furnish single plates in standard sizes to permit structure length increments of 2 ft. Provide plates with an approximately 2-in. lip beyond each end crest. Design and construct footings for arches to accommodate this additional length. When required, fabricate galvanized steel inverts, toe walls, footings, and closure plates in accordance with the requirements for the galvanized steel structural plate structure.

Use structural units of corrugated aluminum alloy for aluminum plates. For aluminum alloy structures, furnish cut plates on structure ends to permit structure length increments of 1 ft. Provide plates with an approximately 2-in. lip beyond each end crest. Design and construct footings for arches to accommodate this additional length. When required, fabricate aluminum alloy inverts, toe walls, footings, and closure plates in accordance with the requirements for the aluminum structural plate structure.

Form plates to provide bolted lap joints. Punch bolt holes so that all plates having like dimensions, curvature, and number of bolts per foot of seam will be interchangeable. Curve each plate to the proper radius to provide cross-sectional dimensions of the finished structure as shown on the plans. Stagger joints so that not more than 3 plates are joined at any one point.

Unless otherwise specified, provide bolt holes along the edges of the plates that will form longitudinal seams in the finished structure as follows:

- For galvanized steel structures, stagger holes in rows 2 in. apart, with one row in the valley and one on the crest of the corrugations and at least 4 bolts per foot.
- For aluminum alloy structures, provide holes in rows 1-3/4 in. apart with two 2 bolts in each valley and on each crest and at least 16 bolts per 3 ft.

Provide bolt holes at a maximum spacing of 12 in. along the edges of the plates that will form circumferential seams in the finished structure. Ensure a minimum distance from center of hole to edge of plate of not less than 1-3/4 times the diameter of the

Texas Department of Transportation

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Texas & Aluminum Structural Plate

- TxDOT Brownwood District
  - CR 41 Lampasas County
- 2 Barrel #67C ALBC
- Cast in place concrete headwalls and spread footings

Providing Engineered Solutions for Every Site

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- TxDOT Amarillo District
- Single Barrel Multi Plate Arch on a Skew
- Cast in place concrete headwall with form liner finish

Providing Engineered Solutions for Every Site

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CONTECH ENGINEERED SOLUTIONS

CR44, Corpus Christi, TX

3 Span - 19' Span Single Radius Arch Aluminum Structural Plate
Value Engineered triple span TxDOT beam

CONTECH STRUCTURAL PLATE

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Deer Park HEB
Engineer: Pape-Dawson, Houston

CONTECH STRUCTURAL PLATE

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CONTECH STRUCTURAL PLATE

Deer Park HEB
Engineer: Pape-Dawson, Houston

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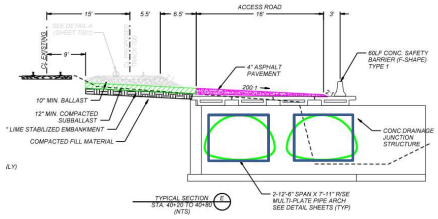
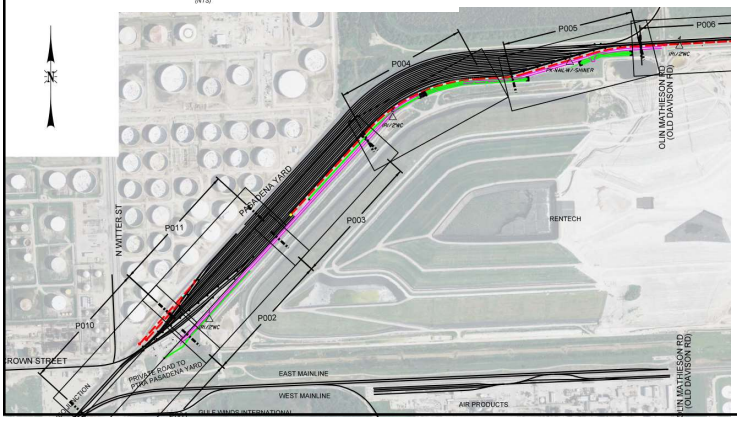
PTRA – Pasadena Yard Drainage Project



- **Alternative Design**
- **Original Design: 2EA Concrete Box Culvert**



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- **1267 LF (Structure Length) – Pipe Arch Structure**
- **Open Area: 78 SF/EA - > 156 SF total**

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CONTECH ENGINEERED SOLUTIONS

PASADENA RAIL YARD

- Pipe Arch: $922.5/LF
- 8x10 Box Culvert: $1,100/LF
- **~$224,000 Total Savings**

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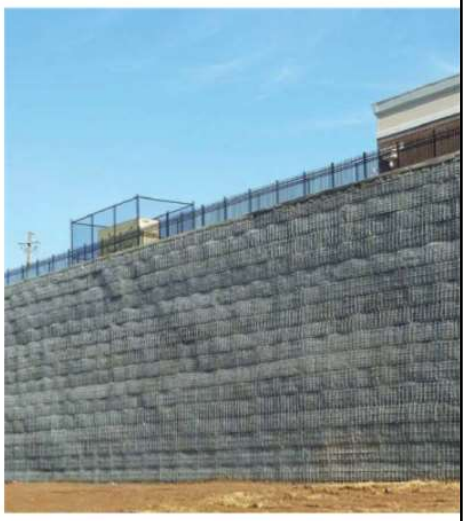
VISTA WALL

Vist-A-Wall® Wire Walls.



Vist-A-Wall Wire Walls are available as temporary or permanent solutions.

CONTECH ENGINEERED SOLUTIONS

Vist-A-Wall® Wire Walls.

VISTA WALL

CONTECH ENGINEERED SOLUTIONS

VISTA WALL

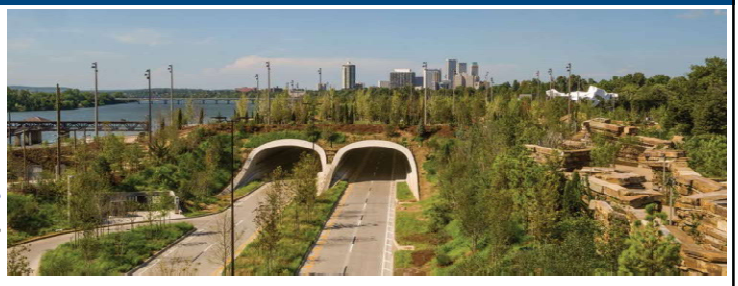
Vist-A-Wall® Precast Panel MSE Wall System

www.ContechES.com

CONTECH ENGINEERED SOLUTIONS

Precast – CON/SPAN and BEBO Concrete Arches

CON SPAN ⌀-SERIES



BEBO® Arch Systems

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CONTECH ENGINEERED SOLUTIONS

Precast Bridge Shapes

CON/SPAN® O-Series

BEBO® E-Series

BEBO® C-Series

BEBO® T-Series

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CON SPAN ARCH SERIES

CON/SPAN

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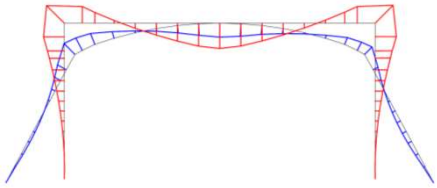
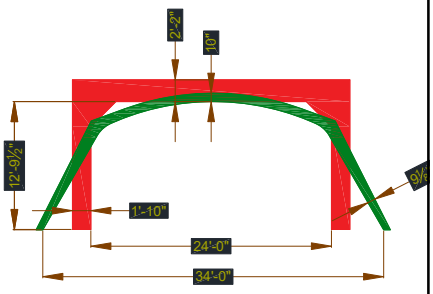
O-Series Moment Reduction over Flat Top





- Moment Diagram for HS25 Live Load, 2'-0" Cover
- O-Series results in:
  - Maximum positive and negative moment reduced
  - Required A1 and A3 steel areas *reduced*
  - Reduction in Concrete and Steel (up to 40%)
  - Longer Lay Lengths (less picks, less installation time) due to reduced weights

CONTECH ENGINEERED SOLUTIONS

West Lake Houston Parkway – Northbound

Engineer: CobbFendley, Houston

CON SPAN O-SERIES

CONTECH ENGINEERED SOLUTIONS

Bridgeland Tuckerton Crossing, Cypress, TX

BGE Inc.

CON SPAN O-SERIES

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Bridgeland Tuckerton Crossing, Cypress, TX

BGE Inc.

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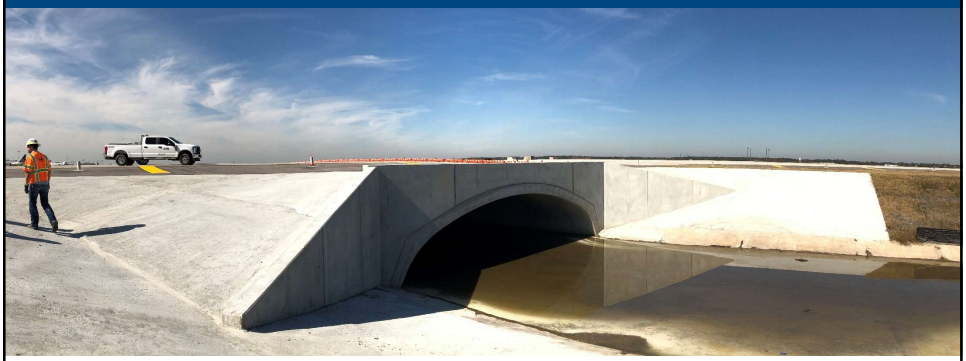

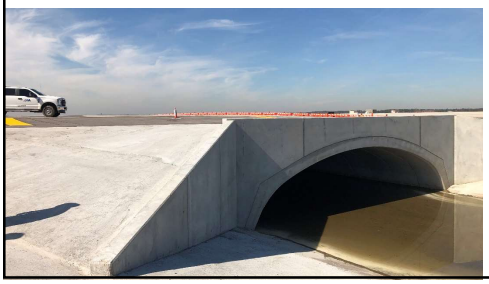

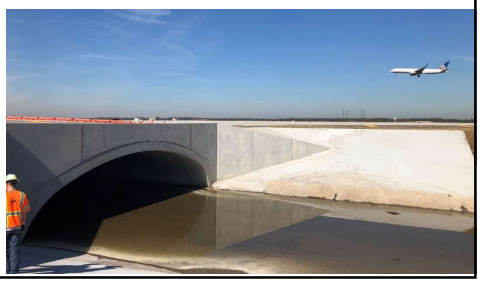

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GREENHOUSE RD. – HOUSTON, TX

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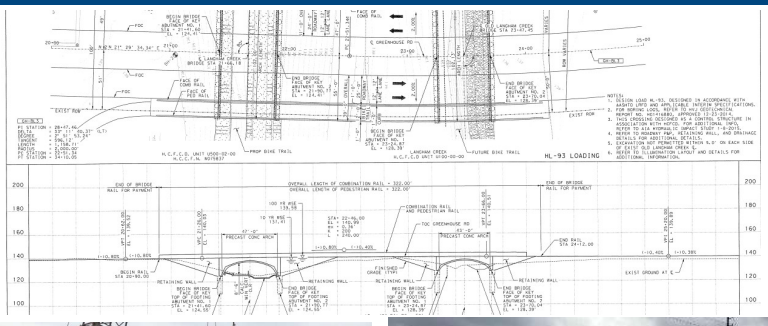
GREENHOUSE RD. – HOUSTON, TX



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Greenhouse Road, Bridge 1
Engineer: AIA Engineers, Houston

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CON SPAN S-SERIES

Greenhouse Road, Bridge 1
Engineer: AIA Engineers, Houston

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CON SPAN S-SERIES

Greenhouse Road, Bridge 1
Engineer: AIA Engineers, Houston

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SPECIAL SPECIFICATION

4330

Precast Long Span Culvert Structures

1. **Description.** Construct precast long span culvert structure of precast nonstressed/prestressed reinforced concrete culvert sections in accordance with these specifications and in reasonably close conformity with the lines, grades, design, and dimensions shown on the plans or as established by the Engineer. Submit an actual design of the sections to the Engineer for approval before submission of shop drawings. Provide design submissions and shop drawings bearing the seal of a registered professional engineer licensed to practice in the State of Texas.

   Refer to the plans for the size of the required structure.

2. **Designation.** The type and size of structure will be indicated on the plans using the following convention:

   Precast Culvert Structure (XX ft span)(XX ft rise)(XX ft length)

   A. The dimension shown for the span of the structure will describe the horizontal dimension between the inside faces of the walls of the structure.

   B. The dimension shown for the rise of the structure will describe the vertical dimension between the top of the foundation and the inside face of the top slab of the structure.

   C. The dimension shown for the length of the structure will describe the combined length of the culvert sections to provide the clear roadway width as shown on the plans.

3. **Design.** Refer to the plans and shop drawings for the section dimensions and the reinforcement details. Design the precast long span culvert sections for earth dead loading, structure dead loading, HS20 live loading, and rail impact loading, when applicable.

   Provide a 1-in. minimum of concrete cover over all reinforcement. Design the reinforcement to insure that the clear distance of the end circumferential wire is not less than 1 in. or more than 2 in. from the end of the culvert. Assemble reinforcement utilizing single or multiple layers of welded wire fabric or utilizing a single layer of deformed billet-steel bars.

   Manufacture precast long span culvert sections with flat butt ends such that when the sections are laid together they will make a continuous line of sections with a smooth interior that is free of appreciable irregularities. Accomplish this all in conformance with the permissible variations of this Specification.

4. **Materials.**

   A. Use Class "H" concrete meeting the requirements of Item 421, "Hydraulic Cement Concrete," except where otherwise specified herein or otherwise shown on the plans.

   B. Fabricate and place reinforcing steel in accordance with the detailed shop drawings submitted by the manufacturer and the requirements of Item 440, "Reinforcing Steel."

Texas Department of Transportation

- TxDOT Approved (Special Specification 4330)
- Several local and state wide case histories

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- **TxDOT Dewey Avenue @ West Amarillo Creek, Potter County**
- **1 cell 28’ long CONSPAN “O” Series O1161 – 61’-0” span x 10’ – 0 7/8” rise**
- **Timber bridge replacement**

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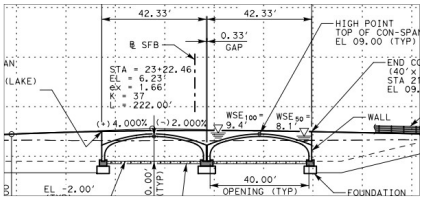
US 181 – Harbor Bridge – Lake St. Crossing



Engineer: Figg Bridge/Stantec

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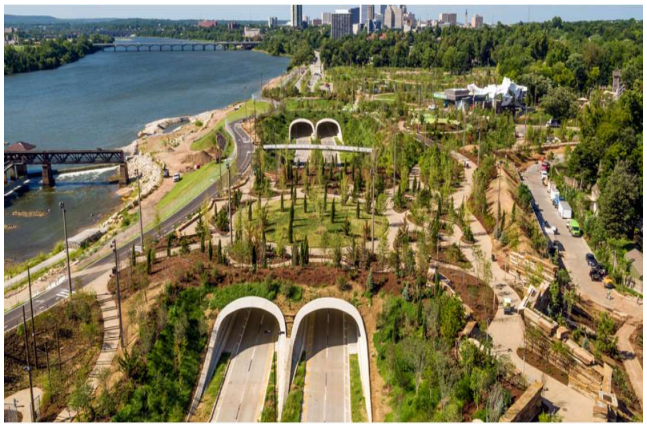

CON SPAN SERIES

The Gathering Place
Engineer: HNTB, Tulsa, OK

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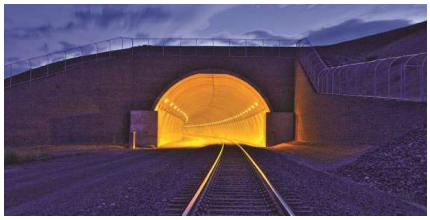
BEBO Arch Systems

BEBO Arch Systems

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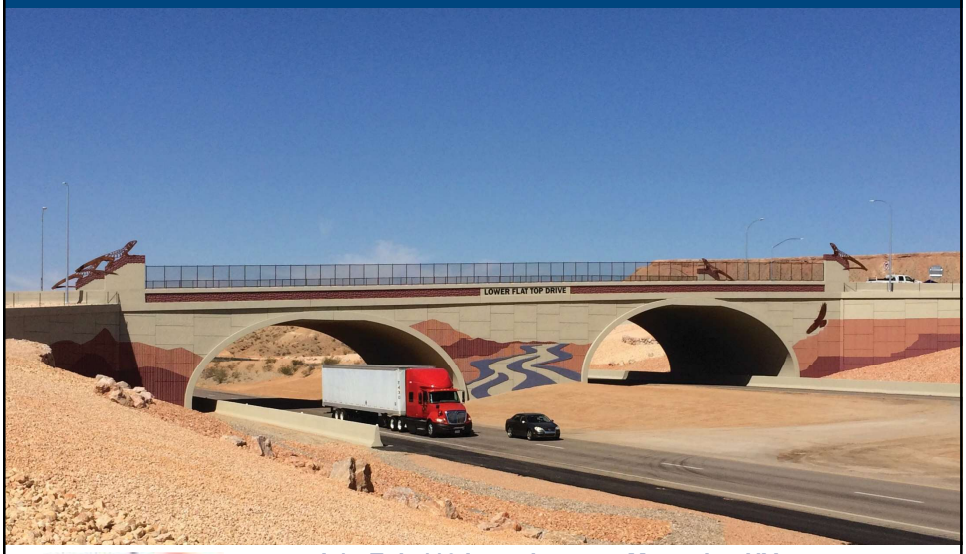
Grade Separation / Clearance Box



BEBO Arch Systems

I-15 Exit 118 Interchange – Mesquite, NV
Owner – Nevada DOT
Engineer – Atkins North America

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BEBO Arch Systems

BEBO Arch Systems




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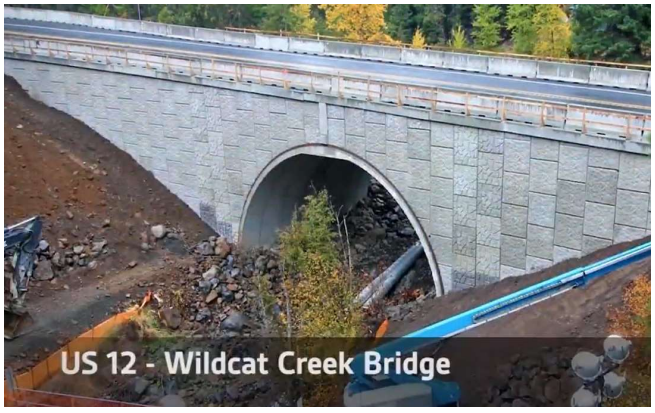
BEBO Arch Systems

BEBO Arch Systems



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Foundation and Scour

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Geotechnical Information Required

- Early Information = Most Efficient Design
- Include Boring Elevation
- Recommended soil bearing capacity
  - Factored Bearing Resistance (LRFD)
  - Allowable Bearing Capacity (LFD)
  - Must Specify if Bearing is Net or Gross
- Bearing Strata/Water Table Elevation
- Recommendation of Foundation Type
- Pile Type and Capacity (if applicable)

- Bearing Capacity - 1” max settlement or 1/2” differential settlement

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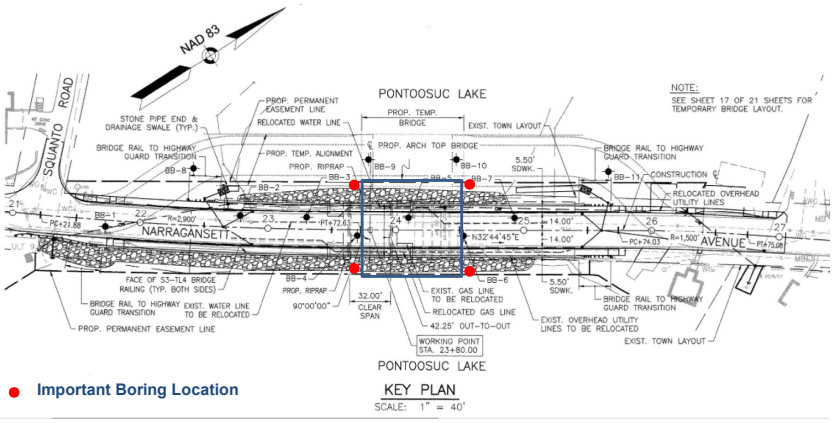

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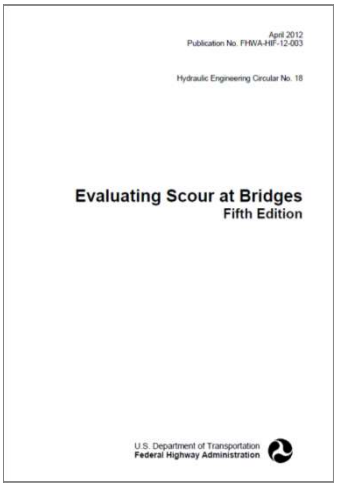
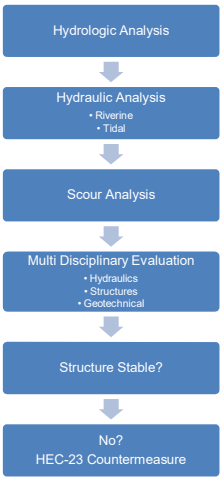
Scour





HEC No. 18

- Evaluate Scour Potential

HEC No.23

- Design Guideline 8: Articulating Concrete Block Systems
- Design Guideline 19: Concrete Armor Units

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Buried Bridge vs Conventional Bridges

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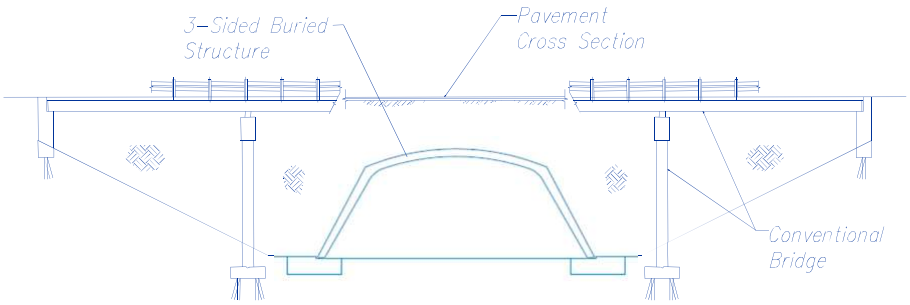
Buried Bridge vs. Conventional Bridge



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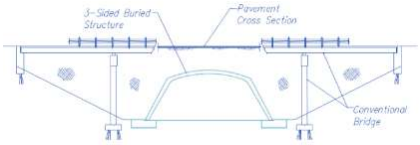
Buried Bridge vs. Conventional Bridge



CONVENTIONAL BRIDGES CONVERT TO BURIED BRIDGES:

- Shorter construction time/phasing means lower initial cost
- Minimal/no long term maintenance lowers overall life cycle cost
- Shorter construction time minimizes traffic disruption
- Bury utilities in backfill over structure
- Increased safety with limited/no freeze concerns & deck maintenance

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US 90A at COUNTRY CLUB BAYOU

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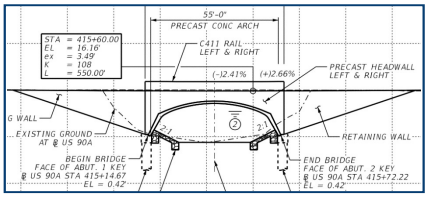
US 90A at COUNTRY CLUB BAYOU



Engineer: Consor Engineering, Houston

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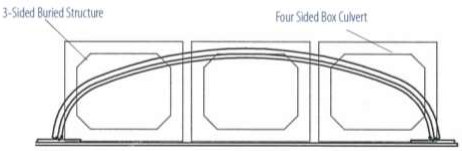
Buried Bridge vs Culverts

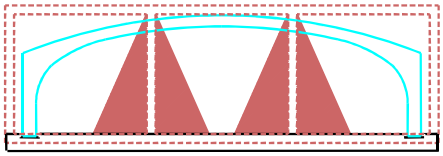
CONTECH ENGINEERED SOLUTIONS

Buried Bridge vs. Culverts



CULVERTS CONVERT TO BURIED BRIDGES

- Complete system with headwalls, wingwalls and foundations
- Bottomless structure promotes natural aquatic habitat and fish/wildlife passage
- Maintenance-free structure lowers overall life cycle cost
- Project specific design to handle all loading requirements
- Long clear spans promote improved hydraulics while minimizing pier blockage



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East Valley Water District
Highland, California

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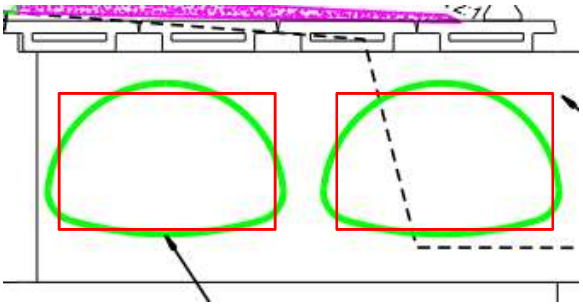
Buried Bridge vs. Culverts



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Accelerated Bridge Program

U.S. Department of Transportation
Federal Highway Administration

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Accelerated Bridge Program

U.S. Department of Transportation
Federal Highway Administration

***Accelerated Bridge Construction (ABC)*:**

- ABC is bridge construction that uses innovative planning, design, materials, and construction methods in a safe and cost-effective manner to reduce the onsite construction time that occurs when building new bridges or replacing and rehabilitating existing bridges

Prefabricated Bridge Elements and Systems

- PBES are structural components of a bridge that are built offsite, or near-site of a bridge and include features that reduce the onsite construction time and the mobility impact time that occurs when building new bridges or rehabilitating or replacing existing bridges relative to conventional construction methods.

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Connection Details for Prefabricated Bridge Elements and Systems

March 30, 2009

Publication No. FHWA-IF-09-010

U.S.Department of Transportation Federal Highway Administration

Priority, Market Ready Technologies and Innovations

HIGHWAYS FOR LIFE

Figure 2.4.3-1 depicts a proprietary arch system call the Con/Span® Bridge System. This system, including the arch elements, the spandrel walls, the wingwalls and the footings, can be completely made with precast concrete elements. The connections shown in Figure 2.4.3-1 are described in the following sections.

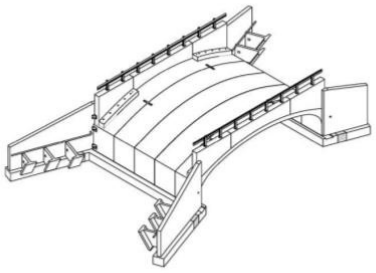

Figure 2.4.3-1 Con/Span® Bridge System

Page 2-181

"Prefabricated elements of a bridge produced off-site can be assembled quickly, and can reduce design time and cost, minimize forming, minimize lane closure time and/or possibly eliminate the need for a temporary bridge."

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Accelerated Bridge Process

It All Starts with Collaborative Solution Development

Quality Controlled Manufacturing While Site is Being Prepared

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Accelerated Bridge Process

Efficient Logistics and Assembly

Backfill and Completion

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FHWA & Proprietary Products

- Previous regulation allowed FHWA participation only when competitively bid, essential to match up with existing facilities or no suitable alternatives
- Repealed Rule 23 CFR 635.11 in October 2019
  - Gives states more ***flexibility to use patented and proprietary products*** in federal-aid highway projects
- For federal-aid projects that state/local public agencies may
  - ***Specify proprietary products***
  - ***Reference single trade name materials***
  - ***List proprietary products on approved product list***
  - Use AASHTO or ASTM specs where only one manufacturer can meet requirements
- State DOTs will follow their procurement policies
  - No allowance for in-state preferences

Source: ABC-UTC Monthly Webinar / March 2020

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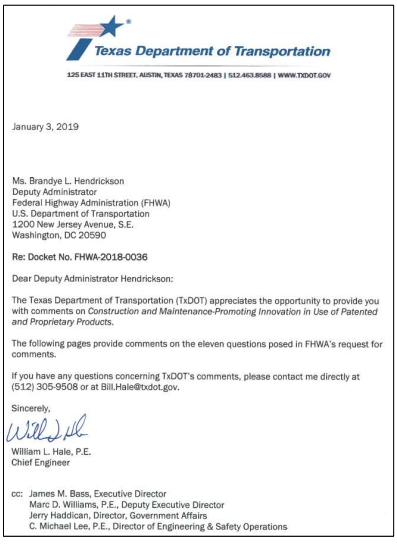
TxDOT Comments



Texas Department of Transportation

125 EAST 11TH STREET, AUSTIN, TEXAS 78701-2483 | 512.463.8588 | WWW.TXDOT.GOV

January 3, 2019

Ms. Brandye L. Hendrickson
Deputy Administrator
Federal Highway Administration (FHWA)
U.S. Department of Transportation
1200 New Jersey Avenue, S.E.
Washington, DC 20590

Re: Docket No. FHWA-2018-0036

Dear Deputy Administrator Hendrickson:

The Texas Department of Transportation (TxDOT) appreciates the opportunity to provide you with comments on *Construction and Maintenance-Promoting Innovation in Use of Patented and Proprietary Products.*

The following pages provide comments on the eleven questions posed in FHWA's request for comments.

If you have any questions concerning TxDOT's comments, please contact me directly at (512) 305-9508 or at Bill.Hale@txdot.gov.

Sincerely,

William L. Hale, P.E.
Chief Engineer

cc: James M. Bass, Executive Director
Marc D. Williams, P.E., Deputy Executive Director
Jerry Haddican, Director, Government Affairs
C. Michael Lee, P.E., Director of Engineering & Safety Operations

- "TxDOT concurs with Option 2 to rescind the requirements"
- "Encouraging further innovation"
- "Potentially reducing costs"
- "Developing performance-based specs"
- "Deploy innovative and cost-effective products"
- "Easier to get innovative projects used on projects"
- "Result in better products"
- "Improving overall public safety and the resultant cost benefit"

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Solution Development | Design Support | Installation

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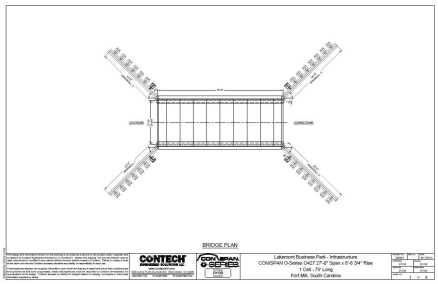

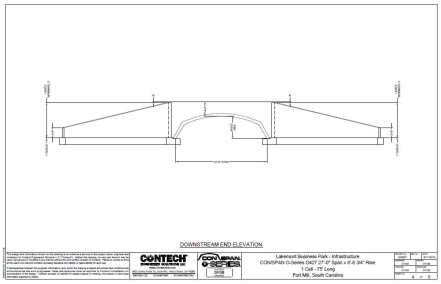

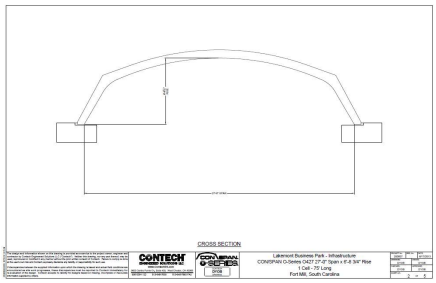

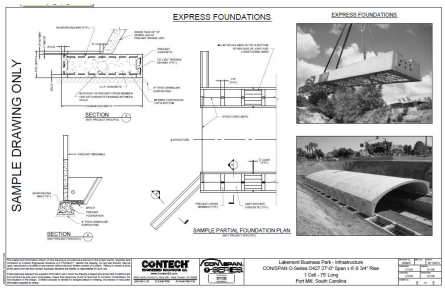

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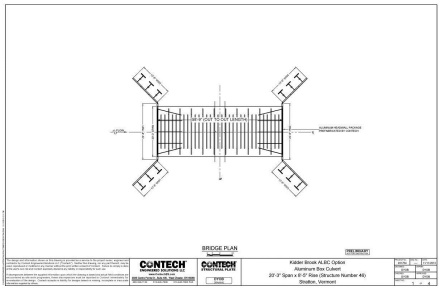

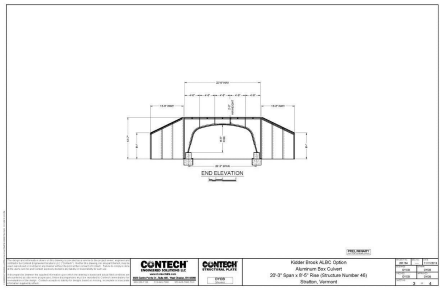

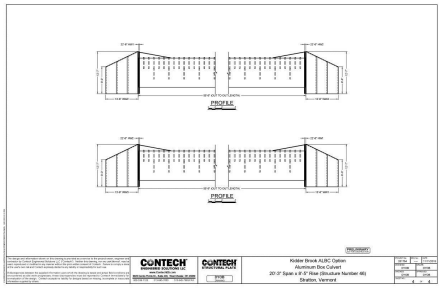

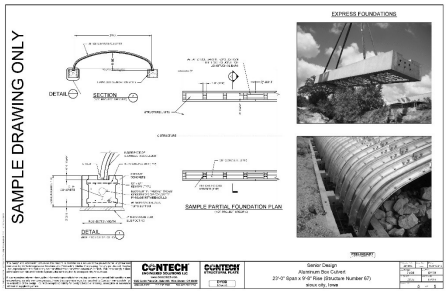

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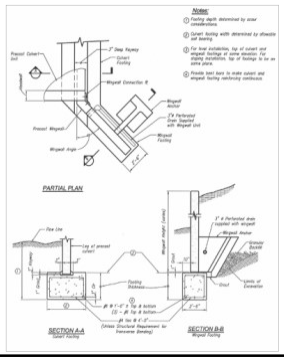
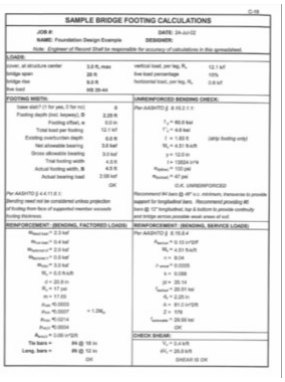
Building Blocks to a Successful Project

Solution Development | **Design Support** | Installation

- Horizontal and vertical reactions
- Foundation sizing
- Foundation design calculations
- Foundation drawings





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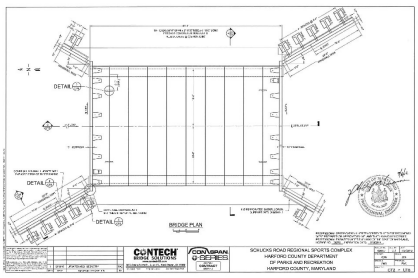
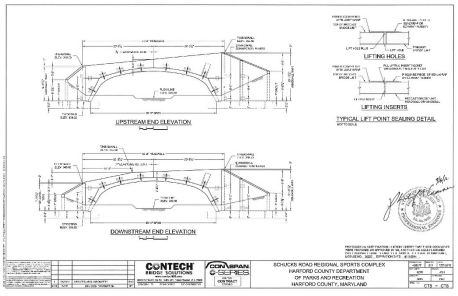
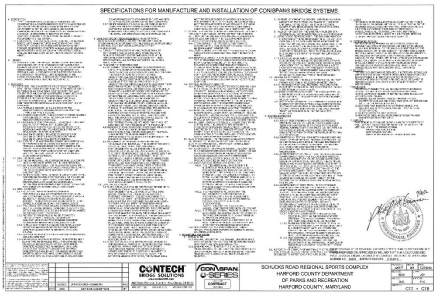
Contract Drawings







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Building Blocks to a Successful Project

Solution Development | *Design Support* | **Installation**

- Attending Pre-Bid Meetings
- Holding Preconstruction Meeting
- Field Consultants Attend all Installations

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Contech. Your project partner.

- Comprehensive Site Solutions
- Over 60 Engineers and CAD Specialists
- 200 Contech Specialists covering all 50 States
- Over 100 years of experience

Options & Support Specific to Your Project Needs

Solution Development	Design Support	Installation Support
• Project Design Worksheet • Structure Selection • Siting & Layout • DYOB • Engineer Estimate • Site Simulation • Proposal Preparation • Design Build Support	• Specifications • Contract Drawings • Permitting • Structural/Fabrication Drawings • Approval Assistance • Custom Shape Development • Horizontal/Vertical Alignment • Hydraulics & Scour Support • Foundations	• Preconstruction Meeting • On-Site Installation Assistance • Logistics Coordination

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Questions?

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