

**Accelerated Design-Build
Replacement of SEPTA's Crum Creek Viaduct**

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Key Presentation Take-Aways

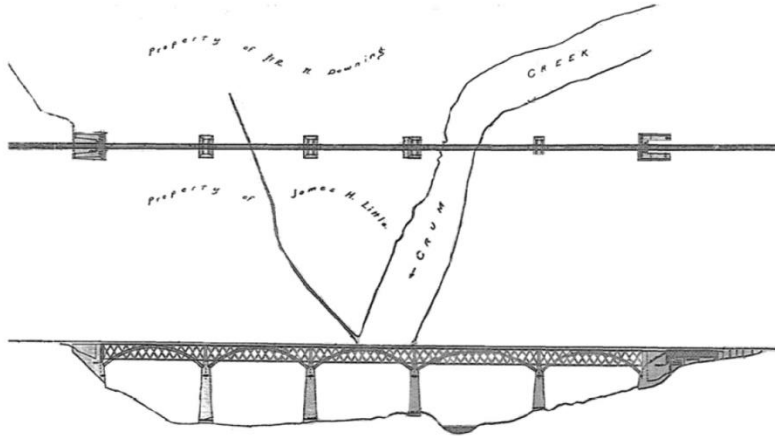
NEED TO QUICKLY REPLACE BRIDGE TO ENSURE RAIL SERVICE WILL REMAIN SAFE AND RELIABLE INTO THE FUTURE.

- Accelerated Project Delivery
- Balance Customer Needs versus Construction Efficiencies
- Obtain Long Service Life
- Maintain Safe Operations and Work Force Activities

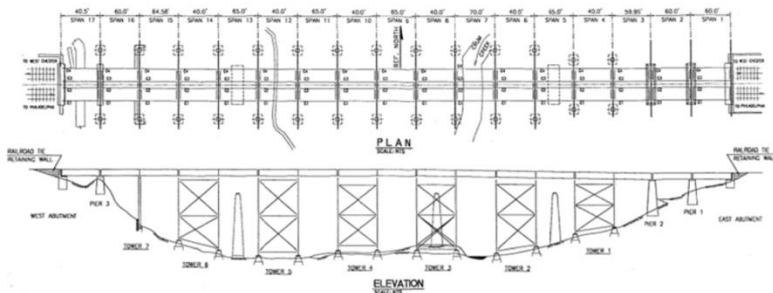


Crum Creek

Viaduct Replacement Project



1854 Structure



1895 Structure



Completed Crum Creek Viaduct

Accelerated Project Delivery Method

- Design-Build Procurement
- Design to 30% Level
- Use of Stipends for Bidding
- Public Outreach
- Advance Permitting

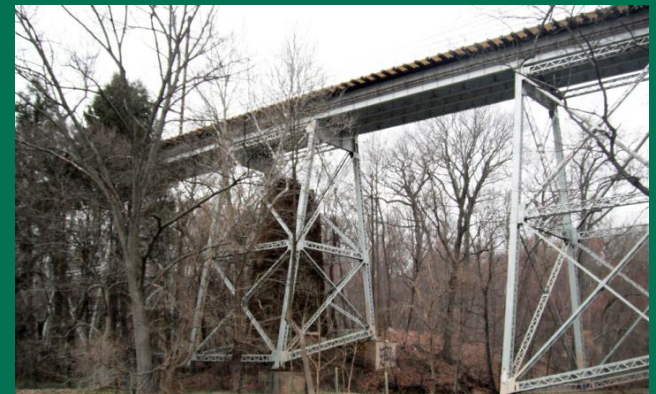


History

- Original viaduct constructed in 1854
- Steel viaduct constructed in 1895, 17 spans, 915 feet long and 100 feet high.
- SEPTA acquired ownership from Conrail in 1982.
- 25 year life extension project performed in 1983.
- Serves the Media/Elwyn Regional Rail Line.
- Carries more than 320 passenger trains a week.



Wood and stone viaduct - constructed 1854



Steel Viaduct - constructed 1895

Project Schedule

- PA Act 89 passed – November 2013 (Funding for Project)
- Issued Step 1 of Procurement December 2013
- Five teams pre-qualified by SEPTA in August 2014.
- Three design-build bids were received on October 2014.
- Design/Build Contract Awarded December 2014
 - Walsh Construction Company with Figg Engineering
- Construction Began March 2015
- Shutdown Summer Outage: (11 weeks) June 17, 2016 – September 4, 2016.
- Viaduct went into Revenue Service September 5, 2016.
- All Work and Site Restoration Completed November 2016.



Permitting – By SEPTA

NEPA/Historic Review

- SHPO – Pennsylvania Historical and Museum Commission
- Mitigation Efforts – Survey and Document Historic Bridges on Line

Waterway Permits

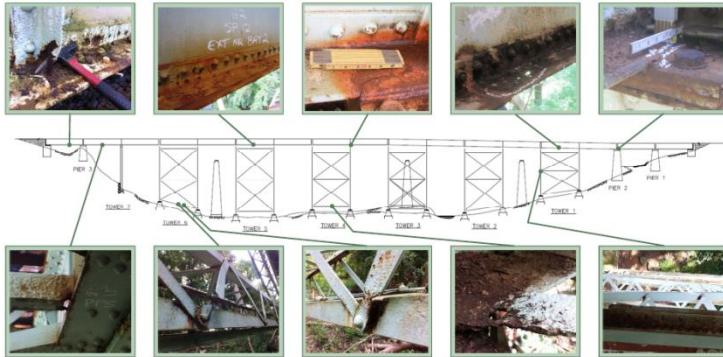
- Joint Permit Application (JPA) – from USACOE and PADEP
- Assess impacts to water (streams and wetlands) due to project.
- Pennsylvania Natural Diversity Inventory (PNDI)

Earth Disturbance Permit (NPDES)

- Erosion and Sediment Control Plan (ESC) for all construction sequence
- Stormwater analysis (pre vs. post) for rate and volume
 - Land cover type effects run-off and DEP has requirements for retaining 2- year run-off on site
- Erosion and Sediment Control Plan (ESC) for all construction sequence

Public Outreach

CRUM CREEK VIADUCT : BRIDGE 11.87, MEDIA/ELWYN LINE REGIONAL RAILROAD, DELAWARE COUNTY, PENNSYLVANIA



CONDITIONS OBSERVED SEPTEMBER 2013



CRUM CREEK VIADUCT STATISTICS

Location: Media/ Elwyn Line, Regional Railroad
 Construction Date: 1895
 Bridge Length: 925 feet, 17 spans
 Bridge Height: 95 feet above Crum Creek
 Construction Cost: \$60 Million
 Impaired Ridership: 5,900 Trips per Day



PROJECT IMPACT AREA

- Community Meetings
- Stakeholder Meetings
- Web Site
- Live Web Cams
- Information Posters

REBUILDING for the Future CRUM CREEK VIADUCT REPLACEMENT PROJECT

HOME PROJECT PURPOSE/BACKGROUND HISTORICAL OVERVIEW CONSTRUCTION NEWS & INFORMATION CONTACT US

View of the existing Crum Creek Viaduct in Delaware County

LATEST NEWS

- Updates [Drilling](#)
- Service Advisories [Coming soon](#)
- Other Projects [Media/Elwyn Viaducts](#) [Detour Plans](#)

WELCOME!

The Southeastern Pennsylvania Transportation Authority (SEPTA) welcomes your interest in the Crum Creek Viaduct Replacement Project. Built in 1895, the Crum Creek Viaduct rises more than 100 feet above Crum Creek and spans a length of more than 915 feet.

Despite a series of repairs made to the structure over recent years, the Viaduct has reached the end of its useful life. As a result, SEPTA will replace the Crum Creek Viaduct with a new structure to help ensure safe and efficient rail service will continue well into the future. Please check back to this website for regular updates to project news and information.

WEBCAM **NOW LIVE!!**

Follow the construction progress!
 Webcam footage is now available of the Crum Creek Viaduct construction. Photos are taken every 15 minutes. View the time lapse video showing progress from August 2, 2015 through today.

Contact Webmaster
McCORMICK TAYLOR

SEPTA
 www.septa.org

Requirements

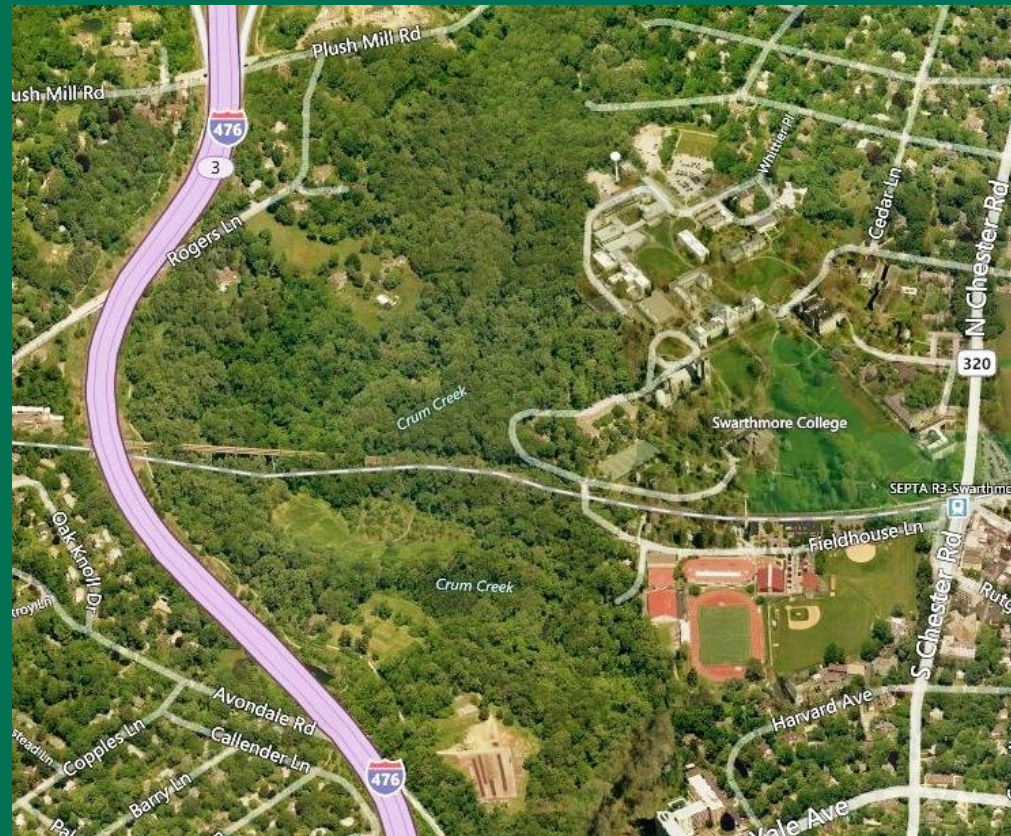
- Specified Acceptable Structure Type
 - Steel Framing with Concrete Deck
 - 100 Year Design Life
- Must Match Existing Track Alignment
- Designed to minimize effects on the existing structure while it remained in service. (Real-Time Monitoring)
- Must be in service by Labor Day 2016 (September 5, 2016).
- Designed to accommodate a TOTAL track outage time of 11 weeks
 - Summer of 2016
 - 9 weeks “owned: by Contractor for construction (*\$75k/day penalty*)
 - 2 weeks “owned” by SEPTA for Catenary, Signal Work and Testing



ABC Accelerated Bridge Construction

Real Estate Issues and Site Constraints

- Site on Swarthmore College Grounds and Within Arboretum.
- Limited Access - Site is landlocked by College and I-476.
- Access Road for Construction was integral to design process.
- Nearest public road is Rodgers Lane
- College maintains nature trails and research projects throughout the area.
- Shallow Depth Sewer Line and Petroleum Pipe Lines along Access Route.
- Stream Crossing.



Real Time Structural Monitoring for Existing Bridge During Construction

- Structural Motion and Vibration Sensors were attached at key points to detect excessive structural motion or movement of elements.
- Inclinometers installed in critical slopes.
- Real time reporting to Contractor, Construction Manager and SEPTA Engineering.
- Remotely accessible cameras in addition to web cams.



Final Design

- 5-span continuous, composite, weathering steel girder bridge with four straddle piers each with a post-tensioned concrete pier cap.
- 735 Foot Long Bridge with 157 foot maximum span length.
- Foundations are 42” diameter drilled shafts, four per column.
- Bridge length was reduced by constructing high abutments and placing fill behind post and plank wingwalls at both ends.
- A precast concrete “tunnel” over the Leiper-Smedley trail paralleling I-476.
- Contractor chose straddle piers to allow for larger machinery outside of limits of existing bridge.
- Bearings are fixed “pot” bearings on the piers and seismic isolation bearings at the abutments.

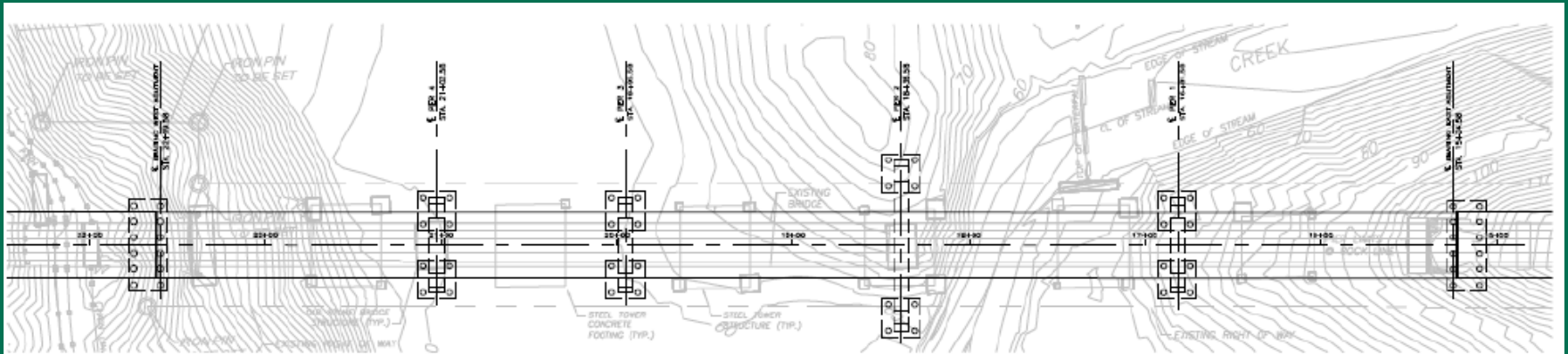
ABC Concept

To accomplish construction in 9 weeks:

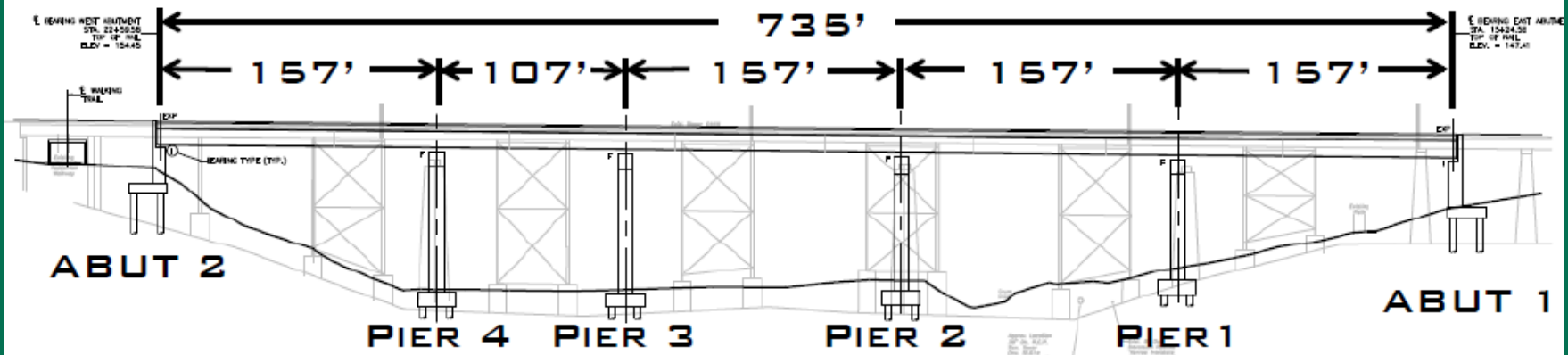
- Build Substructure on each side of existing structure.
- Use Straddle Beams between columns, under existing structure.
- Erect Temporary Brackets.
- Precast Deck Sections.
- Erect new girders and deck ahead of outage on temp Brackets.
- During 9 week outage, perform lateral slide.



New Bridge Plan Sections



PLAN
SCALE 1" = 30'-0"



ELEVATION
SCALE 1" = 30'-0"

LEGEND:
 I - ISOLATION BEARINGS WITH EQUAL STIFFNESS
 F - FIBER BEARING
 C - CONCRETE

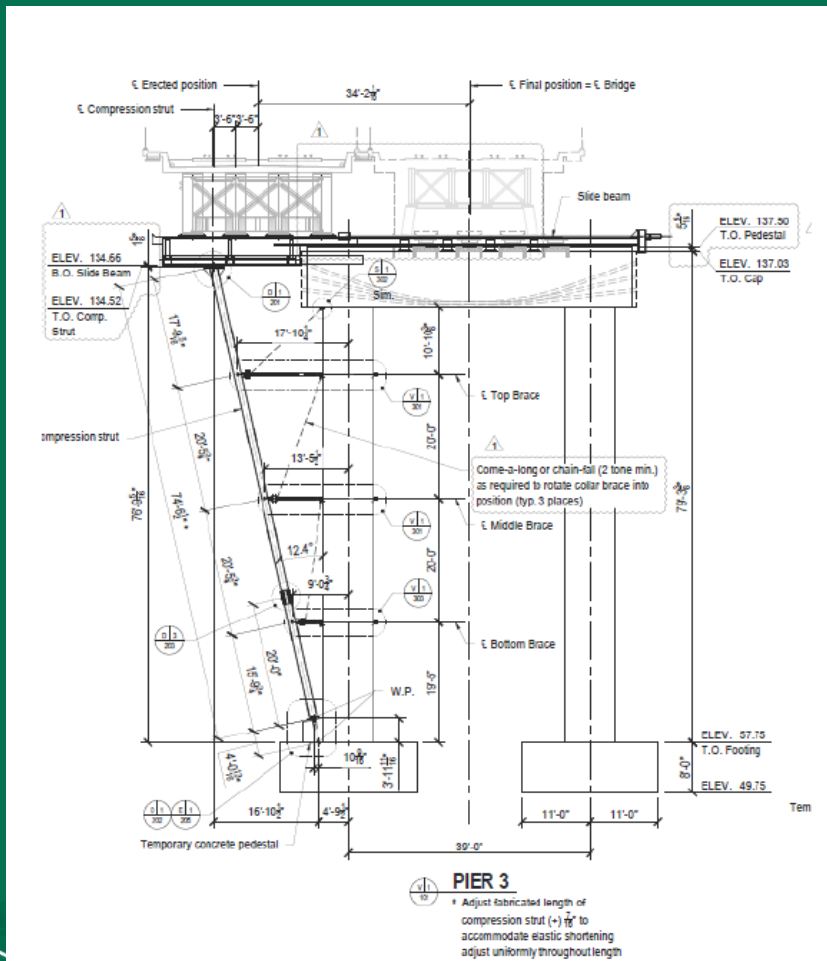
ABC Concept



Construction-Straddle Bents

Crum Creek Viaduct

ABC Concept



Lateral Slide Support System

Crum Creek Viaduct

ABC Concept



Construction – Steel Girders | Crum Creek Viaduct

ABC Concept



Pre-Cast Deck Installation | Crum Creek Viaduct

ABC Concept



Construction – Bridge Slide | Crum Creek Viaduct

Questions and Comments

