



CHALLENGE

A BRIDGE IN SOUTHWESTERN PENNSYLVANIA REQUIRED AN OUTSIDE-OF-THE BOX REPLACEMENT SOLUTION.

SERVICES

- Bridge Design
- Highway Design
- Traffic Engineering and Planning
- Structural Analysis
- Environmental Planning and Permitting
- Public Involvement
- Right-of-Way Plans
- Utility Relocation Design
- Drainage Design
- Stream and Wetland Delineation
- Sidewalk and Curb Ramp Design

AWARDS



2017 OUTSTANDING HIGHWAY
ENGINEERING AWARD

American Society of Highway Engineers (ASHE)
Pittsburgh Section

STATE ROUTE 4031 BRIDGE REPLACEMENT

The Pennsylvania Department of Transportation (PennDOT) District 9-0 and the engineers at ms consultants, inc. knew the state Route 4031 bridge replacement in southwestern Pennsylvania required outside-of-the-box thinking.

The bridge carries state Route 4031 (West High Street)

over the Ghost Town Trail (formerly R.J. Corman Railroad) in Cambria County.

The most important considerations and constraints of the project would be: safe and efficient maintenance of pedestrian and vehicular traffic, limited right-of-way, and constructability in tight quarters.

MAINTAINING NORMAL OPERATIONS

With average daily traffic of more than 12,000 vehicles and numerous driveways and side roads in close proximity, determining the appropriate vehicular and pedestrian traffic control solution was key to the project's success.

A traffic control alternatives analysis compared full detours, partial detours, half-width construction, and pedestrian access routes. After analyzing the alternatives, it was clear that maintaining two lanes of traffic, one in each direction, would maintain access

and mobility in this densely-mixed commercial and residential corridor.

A separate temporary pedestrian bridge was installed to maintain pedestrian use on state Route 4031 during construction, while the recreational and emergency use of the Ghost Town Trail below was maintained at all times (except for removal and placement of bridge beams overhead). In addition, a temporary 'pedestrian tunnel' was provided for overhead protection for trail use during construction activities.

DESIGNING FOR COMPLEX CONDITIONS

The combination of tight quarters and staged construction can make any engineer nervous. During the design process and internal constructability reviews, ms recognized the need for temporary shoring. ms went one step further by determining that something beyond the typical solution would be needed for construction.

Because temporary shoring, which is up to 20 feet high, would need to be installed between the old and new abutments in a gap less than two feet wide, a pilaster was introduced on the back side of the stage one abutment. The pilaster served as an important

piece to construction of the state Route 4031 bridge replacement.

Without the pilaster, the required temporary shoring would have nothing to bear on but as designed, the shoring was able to rest against the newly constructed abutment. This made construction of the stage two abutment much simpler.

SAFETY IMPROVEMENTS

In addition to replacing a structurally-deficient bridge, the project resulted in several improvements to safety of vehicles, pedestrians and trail traffic.

Safety improvements for the state Route 4031 bridge replacement included:

- Addition of a left turn lane for westbound state Route 4031 vehicles turning onto state Route 0160, reducing the likelihood of rear-end collisions
- The additional turn lane also reduced through-moving vehicles from driving around stopped vehicles and onto the shoulder
- Construction of sidewalks on both sides of state Route 4031 to provide safe access for pedestrians throughout the project
- Temporary pedestrian tunnel to safely maintain trail traffic during construction

PROJECT SUCCESS

The bridge replacement met the needs of PennDOT District 9-0, vehicular traffic, and the local community. The project was completed on schedule and under budget. Traffic was efficiently maintained through the work zone during construction, including recreational traffic along the Ghost Town Trail. Disruption to local businesses was minimized due to the staged construction and detour avoidance.