

- **Owner:**
Peters Township
- **Services:**
 - Bridge Replacement Design
 - Construction Inspection
- **Size:**
145'-6" Single-Span Structure
- **Year Completed:**
Design: 2011
Construction: 2013



SR 1004 Sugar Camp Road Bridge Design

Peters Township, Washington County, PA

Stahl Sheaffer provided engineering services for the replacement of a single-span cast-in-place reinforced concrete arch carrying Arrowhead Trail over SR 1004, Sugar Camp Road. Three structure alternatives were investigated during preliminary design. The options included a precast reinforced concrete arch under fill, a single-span composite prestressed concrete I-beam bridge on pile supported integral abutments, and a single-span prestressed concrete adjacent box beam bridge on cantilever abutments. The selected replacement is a 145'-6" single span structure consisting of three 33/71.5 PA Bulb-Tee Beams on integral abutments. To complete the design process, coordination was required with PennDOT District 12-0 to obtain Structural Adequacy and Foundation Approval.

The three structure alternatives considered included: Alternate No. 1, a precast reinforced concrete arch; Alternate No. 2, a single-span composite prestressed concrete I-beam bridge with a reinforced concrete deck on integral abutments; and Alternate No. 3, a single-span composite prestressed concrete adjacent box beam bridge with a reinforced concrete deck. The three alternatives were evaluated to determine the most appropriate replacement structure.

Upon evaluation of the criteria, Stahl Sheaffer concluded that Alternate No. 2 was the most feasible alternative. This alternate selection was significantly less expensive than Alternate No. 1 and Alternate No. 3. Additionally, this structure type easily accommodated SR 1004 if the horizontal alignment is improved to eliminate the S-curve within the existing structure. Therefore, Stahl Sheaffer recommended replacing the existing structure with Alternate No. 2, a single-span composite prestressed concrete I-beam bridge on integral abutments using two 33/85.5 PA Bulb-Tee beams spaced at 8'-8 1/4" o.c. with an 8.0" reinforced concrete deck and a 14'-0" curb-to-curb.

The horizontal and vertical geometry of SR 1004 was based on a 35-mph design speed. There is an approximate grade separation of 37 feet between Arrowhead Trail and SR 1004. With a minimum under clearance of 16'-6", there is trivial effect on vertical profile based on the existing geometry constraints. The trail and SR 1004 will be replaced on similar vertical profiles. Stahl Sheaffer attended regular meetings with the client and the contractor prior to, and during, construction. These meetings involved coordination with public utilities that were within the construction area, making sure that the contractor was on schedule, and resolving any issues that came up during the construction process. Construction inspection personnel were onsite throughout all phases of construction from the demolition of the old concrete arch, the delivery of the beams, the deck pour, and final completion of the structure. Construction inspectors also facilitated communication between the contractor and the design engineers if any items needed clarification in order to keep the project running smoothly.