

IV. RESULTS

RESOURCE DESCRIPTION

Bridge 447 was constructed in 1924 – 25 over Blackwater Creek in Sussex County, Delaware. Construction of the bridge was carried out under contract CS-36, as part of a 3.73-mile road improvement project for the county road from Omar to Clarksville, later designated State Road 54. The project, which straightened, graded, paved, and widened the roadbed, was conducted by the Delaware State Highway Department (DSHD) under Federal Aid Project Number 26. The bridge was designed by the DSHD and was approved by the State Bridge Engineer, Arthur G. Livingston, in September 1924.

The bridge was constructed to carry vehicular traffic over Blackwater Creek, which runs south to north to join the Indian River. When the bridge was built, engineers realigned the stream channel to cross at a 90-degree angle to the new road, thereby decreasing the span necessary for a diagonal crossing (Figure 4.1). The new bridge was a slab design constructed of reinforced concrete, including parapet walls and abutments in the style of engineer Daniel Luten (Figures 4.2 and 4.3). Concrete walls extended to the south of the bridge to retain the stream in its new alignment. The bridge was designed with guardrails along the road, extending in both directions for approximately sixty feet. Bridge 447 had a calculated live load carrying capacity of 200 pounds per square foot.

Bridge 447 is similar to many small span concrete slab bridges built in Delaware and across the country in the first half of the twentieth century. It was built of Class A concrete with round deformed reinforcing bars. The bridge spans 12 feet with an overall length of 14 feet, 6 inches and a width of 28 feet, 8 inches. Abutments with sloped tops extended an additional 2 feet, 10 inches off each corner at an approximate angle of 45 degrees. After the concrete was poured in place and cured, it was finished with white cement. A single long rectangle was incised into the surface on all four sides of the parapets. The tops of the parapets were adorned with thin cornices, and the corner sections were slightly larger and more emphasized than the rest of the span.

In 1948, the bridge was partially replaced during a widening project on State Road 54 from Frankford to Clarksville. The work was carried out under Federal Aid Project Number 173(3), Contract 998. At this time, both sides of Bridge 447 were built out, expanding the bridge to an overall width of 42 feet for the roadbed and gravel shoulders (Figures 4.4 and 4.5). New abutments and parapets were created in essentially the same configuration as the original bridge (Figure 4.6 and Plate 4.1). The number “447” was painted in red on the road side of the northeast and southwest parapet corners (Plate 4.2). The new parapets were simpler than the original ones. Although two rectangles were incised for the new bridge, there is less overall articulation of the surface, with chamfered edges as the only form of ornamentation. The deck of the bridge is believed to be the original 1924 deck, but the remainder of Bridge 447 dates to this 1948 reconstruction.

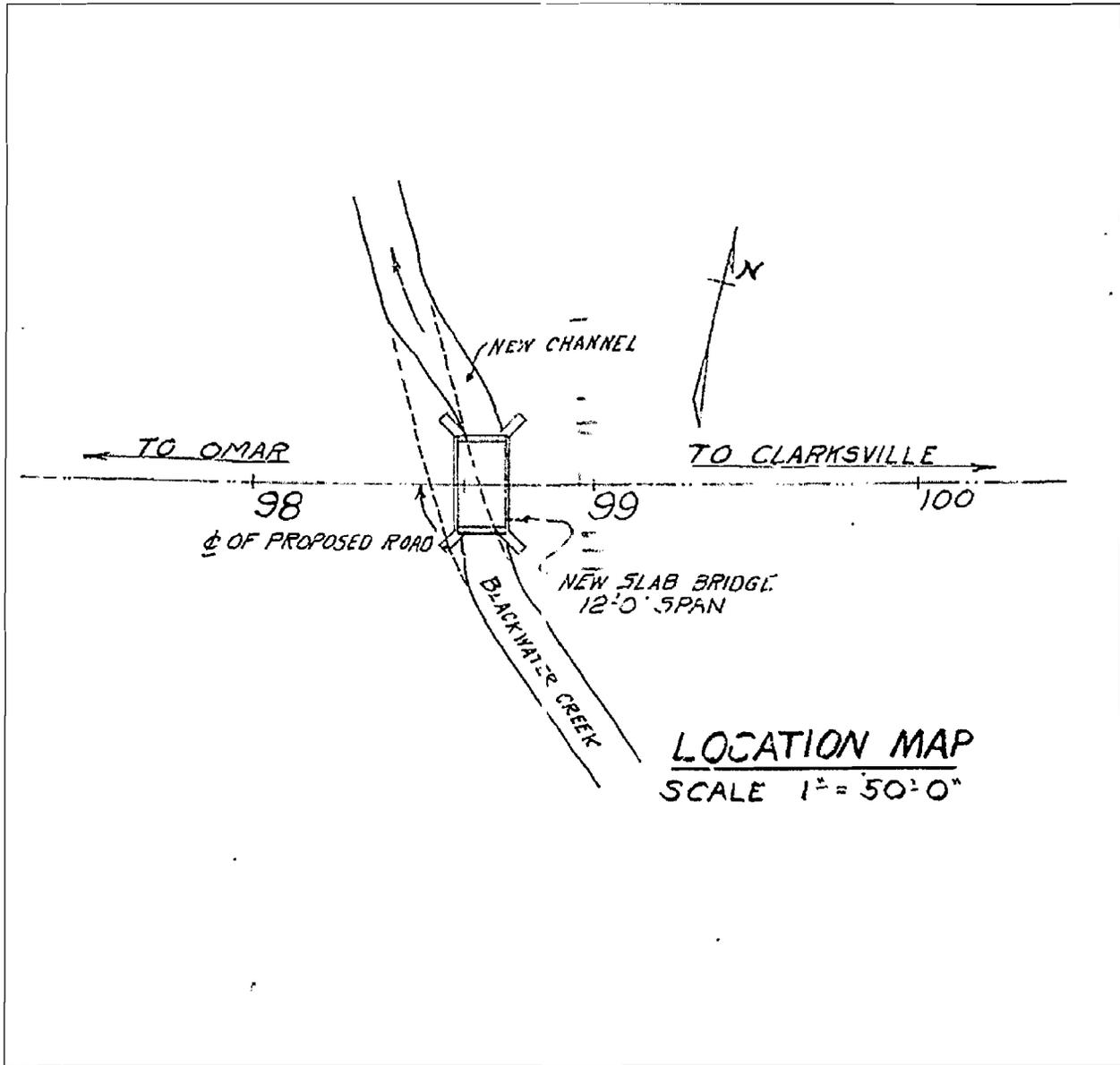


Figure 4.1 Blackwater Creek Rechanneling Plan for Construction of Bridge 447
 (Delaware State Highway Department 1924)

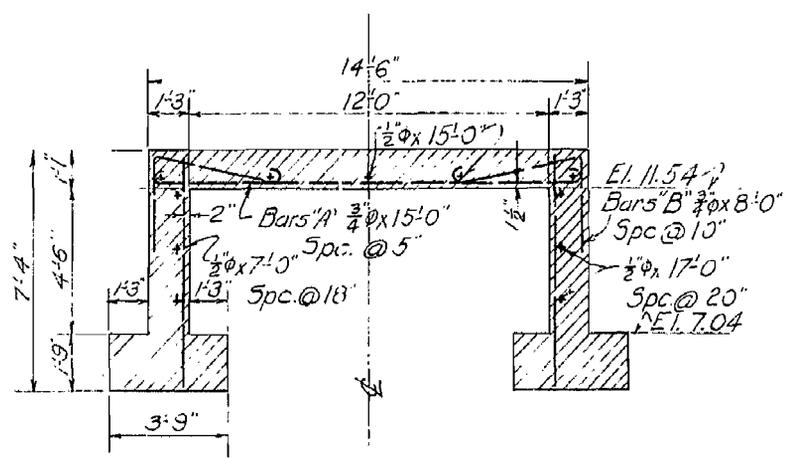
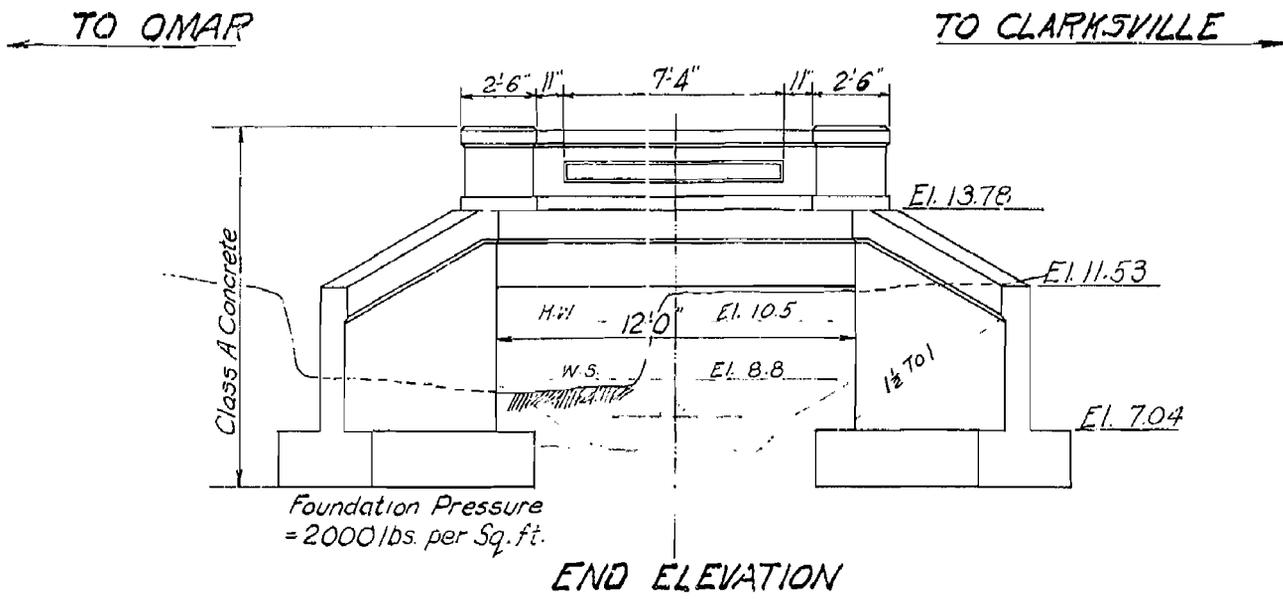


Figure 4.2 Bridge 447, Elevation and Typical Section (Delaware State Highway Department 1924)

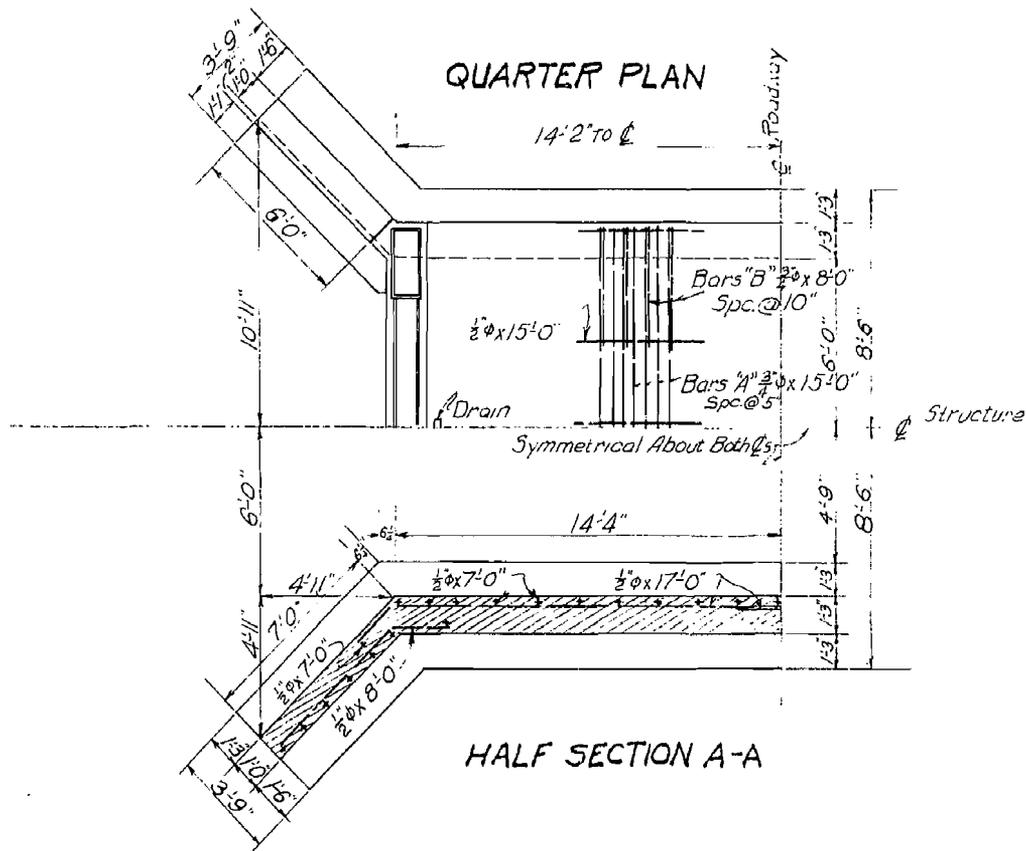
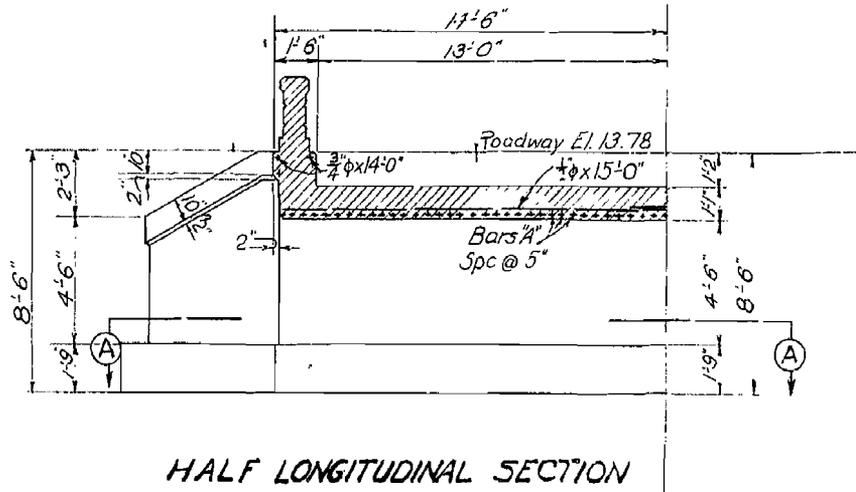


Figure 4.3 Bridge 447, Section Views
 (Delaware State Highway Department 1924)

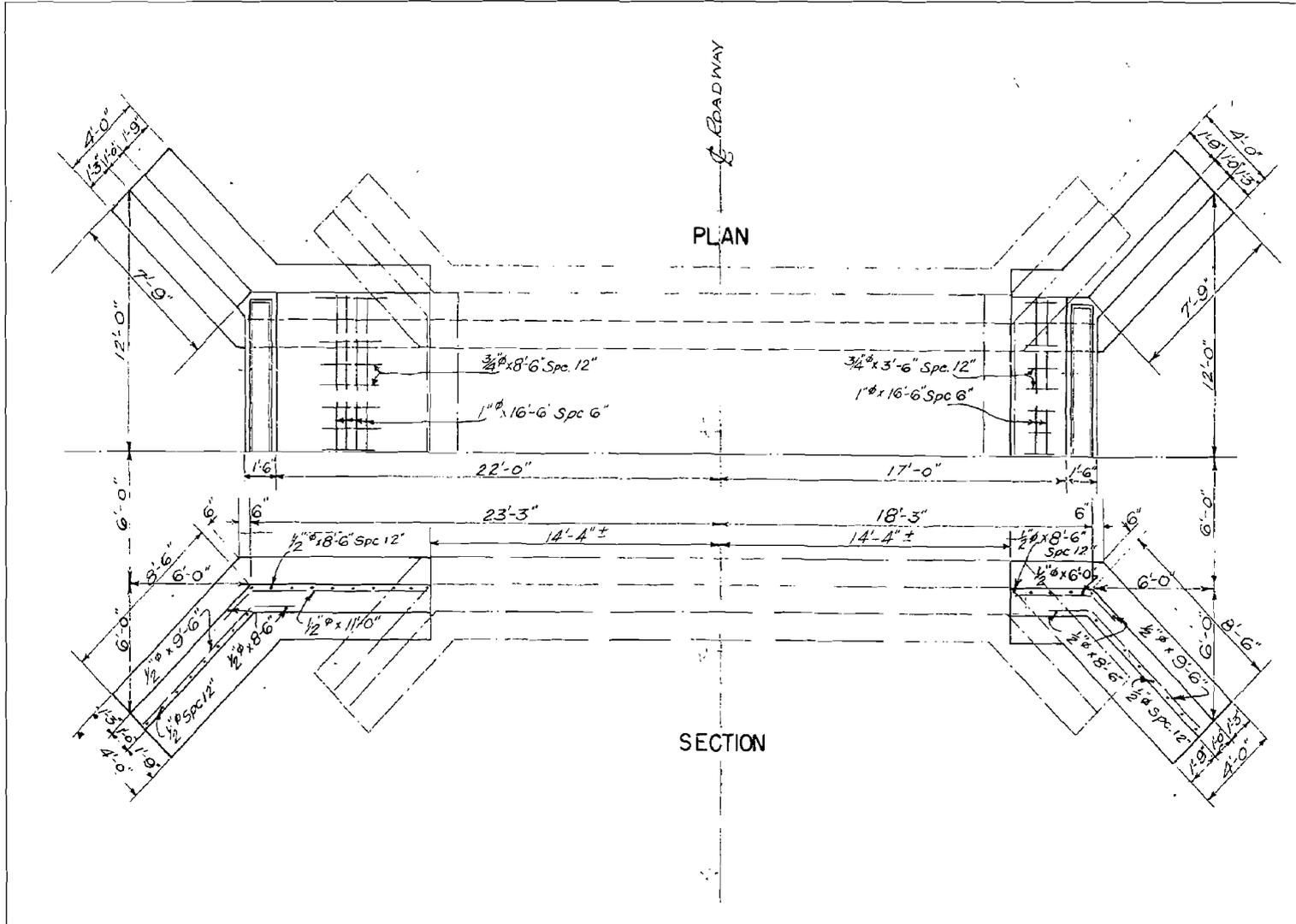


Figure 4.4 1948 Bridge Reconstruction Plans Superimposed on 1924 Plans
(Delaware State Highway Department 1948)

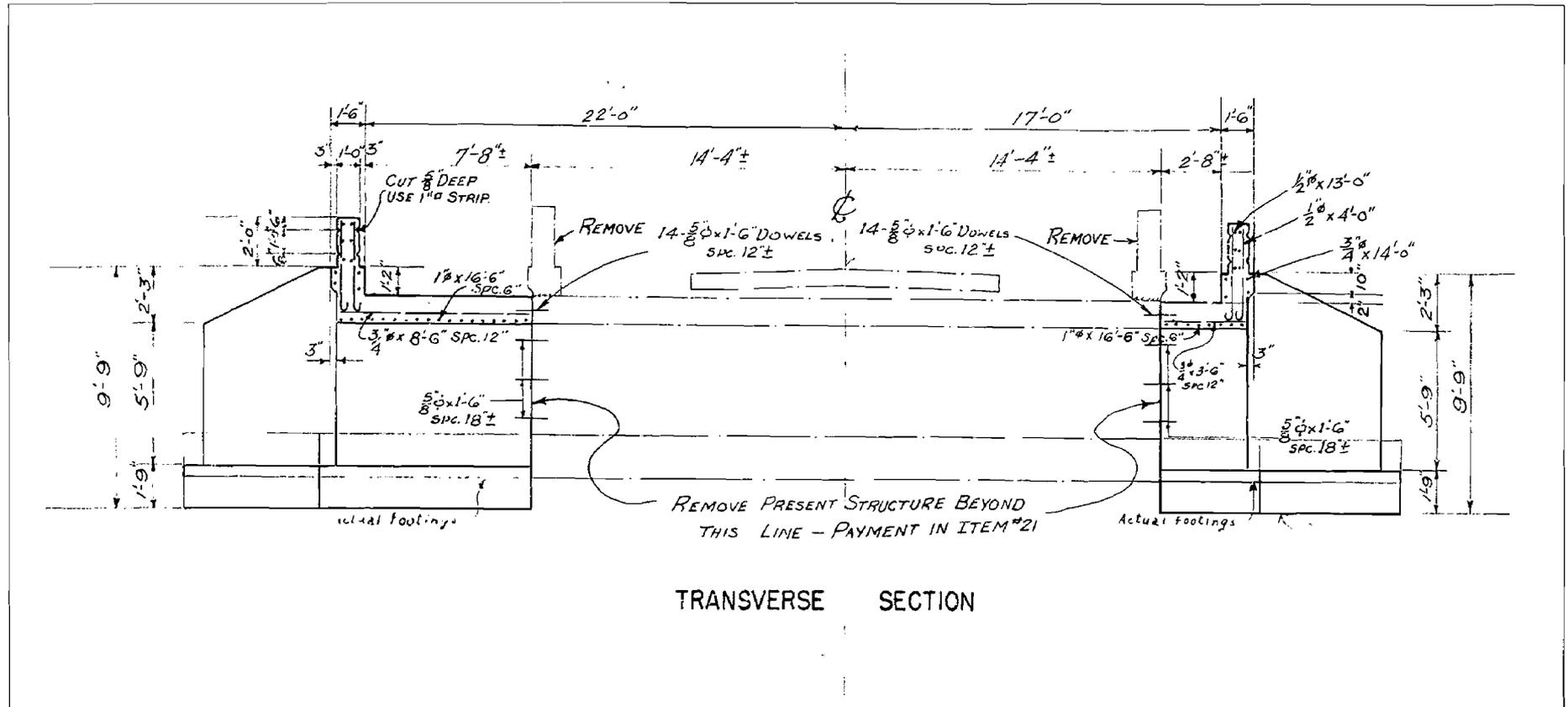


Figure 4.5 Bridge 447 Reconstruction, Transverse Section View
 (Delaware State Highway Department 1948)

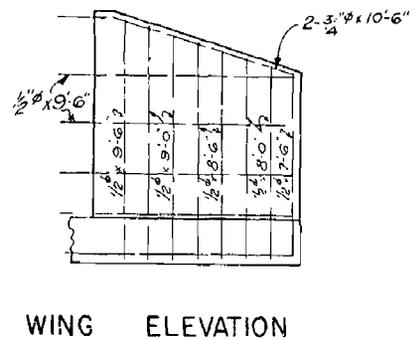
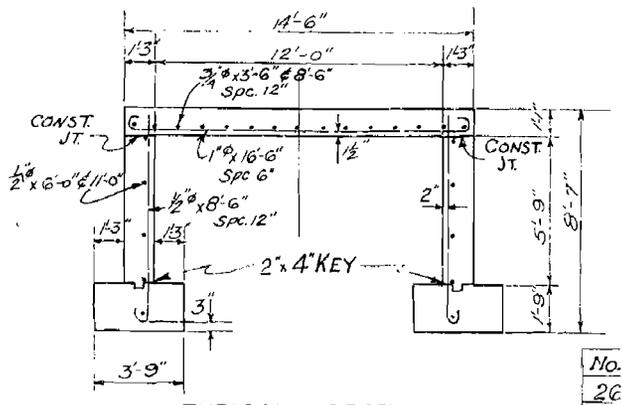
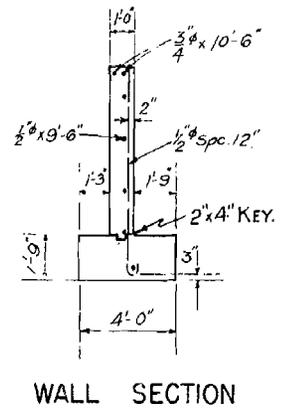
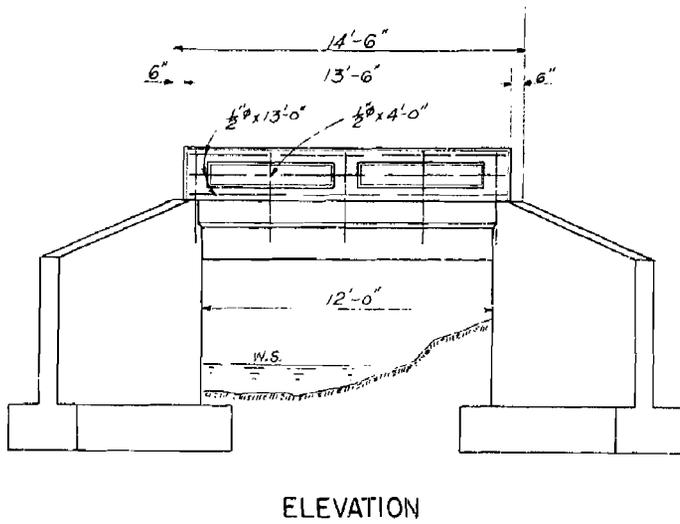


Figure 4.6 Bridge 447 Additions, Construction Details (Delaware State Highway Department 1948)



Plate 4.1 Bridge 447, South Parapet and Abutments, Looking North



Plate 4.2 Bridge 447, North Parapet, Southeast Corner Showing Bridge Number Painted in Red

Currently, the bridge appears to be in good condition (Plates 4.3, 4.4, and 4.5). Much of the original white color has faded and the cement coat has flaked off in some places, notably the corners, exposing the concrete aggregate. No exposed rebar was apparent. Spray paint graffiti covers portions of the south wing wall and abutments (Plate 4.6).

SIGNIFICANCE AND EVALUATION

Bridge 447 was not among those identified in a statewide bridge survey completed by P.A.C. Spero & Company in 1991 or in the revised edition, completed by Lichtenstein Consulting Engineers, Inc. in 2000. These surveys examined Delaware bridges built before 1957 that were over 20 feet in length, as listed in Delaware's bridge management database. As Bridge 447 spans only 12 feet, it was not included in the inventory and has not previously been evaluated for its historic significance.

In reviewing the bridges that were inventoried and evaluated in the two surveys, it becomes apparent that only a small percentage of Delaware's bridges were determined eligible for listing in the National Register of Historic Places. According to the 1991 survey, to be considered eligible for the National Register bridges must be "excellent examples of their type" (P.A.C. Spero 1991:6). While Bridge 447 is representative of its type and period; it does not present an exceptional example of a reinforced concrete slab bridge.

In fact, the form and construction of Bridge 447 was of a type "immediately adopted" as the standard for bridge design in Delaware from the 1920s through the 1950s (Lichtenstein 2000:153). Reinforced concrete slab bridges appeared en masse in the first quarter of twentieth century in Delaware and throughout the United States. The bridges were "an economical and expedient engineering solution" to the growing needs for convenient automobile routes (Spero 123). Generally, these bridges were undecorated with the exception of standardized incised geometric patterns, as seen on Bridge 447.

Many of the bridges constructed during this time by the Delaware State Highway Department Bridge Division were influenced by the design of engineer Daniel Luten, who patented over thirty bridge designs using reinforced concrete. Bridge 447 is typical of the Luten-inspired bridges built throughout the state, primarily over small crossings.

There are a number of examples of identical or nearly identical bridges in the immediate area (one just west on State Highway 20 and two just north on U.S. 113) and throughout the rest of Sussex County and the state. Other bridges of this type, similar in their sizes and dates of construction, have been listed or were determined eligible for listing as representative or exceptional examples of reinforced concrete slab bridges.

The Spero bridge survey also recommends that bridges be "in excellent condition with all decorative features intact" in order to be considered eligible for National Register listing (P.A.C. Spero 1991:6). Bridge 447, originally constructed in 1924 – 25 was significantly altered during its reconstruction in 1948. While these alterations are historic, they did not raise the level of



Plate 4.3 Bridge 447, View to East



Plate 4.4 Bridge 447, South Side of North Parapet



Plate 4.5 Bridge 447, North Side of South Parapet



Plate 4.6 Bridge 447, South Parapet, South Side Showing Graffiti

distinction of the bridge's design and ornamentation. Nor was a new technology or engineering design implemented with the reconstruction.

Bridge 447 presents a common bridge type—a reinforced concrete slab—widely used throughout Delaware in the first half of the twentieth century. The bridge is not distinguished in its form or decorative details, its innovation of design, or its material use. Other contemporary reinforced concrete bridges of similar size and decorative detail have already been selected as representative of this type. The individual architect or engineer associated with Bridge 477's design is unknown.

As no significant association with historical, cultural, engineering, or design developments could be established, Bridge 447 is not recommended as being eligible for listing in the National Register under Criterion A, B, or C. The bridge was not evaluated under Criterion D for its potential to yield significant information.

Furthermore, due to distance and vegetative obstructions, the replacement of Bridge 447 will have no effect on the surrounding historic properties. The nearest inventoried property to the bridge was the Floyd Turner House (S-2407), which has been demolished within the past two decades. Other inventoried properties in the vicinity are not within the immediate viewshed of the project area.