BLACK BRIDGE
(Bridge No. 4434)
Black Bridge Road, spanning
Farmington River
New Hartford
Litchfield County
Connecticut

HAER No. CT-156

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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
Northeast Region
Philadelphia Support Office
U.S. Custom House
200 Chestnut Street
Philadelphia, P.A. 19106

HAER CONN 3-NEHA, 1-

HISTORIC AMERICAN ENGINEERING RECORD
BLACK BRIDGE
(Bridge No. 4434) **HAER No. CT-156**

Location: Black Bridge Road, spanning Farmington River
New Hartford
Litchfield County, Connecticut

USGS New Hartford Quadrangle
UTM Coordinates: 18.668870.4638030

Date of Construction: 1936

Fabricator: Berlin Construction Company

Present Owner: Town of New Hartford
530 Main Street
New Hartford, Connecticut 06057

Present Use: Not in use

Significance: Black Bridge is significant as a representative 20th-century steel-truss highway bridge. Its Warren-truss design, the relatively heavy proportions of its members, and its concrete-slab deck reflect the standardization of bridge engineering in that period, as well as the demands of ever-increasing motor-vehicle usage. Black Bridge also has historical interest as part of the reconstruction that followed the disastrous flood of March 1936, an event that damaged or destroyed hundreds of bridges throughout New England.

Project Information: This documentation was undertaken in accordance with a Memorandum of Agreement between the Federal Highway Administration and the Connecticut State Historic Preservation Office. The bridge is scheduled for replacement.

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Description

Black Bridge is a two-span steel pony-truss bridge built in 1936 across the Farmington River in the Pine Meadow section of New Hartford, Connecticut. The surrounding area is a densely settled residential neighborhood with numerous mid-19th-century houses, a public school, and the Pine Grove Cemetery. The immediate vicinity of the bridge, however, is heavily wooded, and from the river banks, it appears almost uninhabited. The Farmington River generally flows in a west-to-east direction through New Hartford, but it turns southward at this specific point, with Black Bridge Road crossing it on an east-by-northeast heading. For the purpose of this documentation, the upstream side of the bridge will be referred to as the north elevation and the downstream side as the south elevation, with the ends of the bridge referred to as the east and west ends accordingly.

The two spans of the bridge are each 84 feet long. The bridge's trusses are set 19' 6" on center, yielding a two-lane roadway width of about 18 feet; however, the roadway is further constricted to 17 feet by the pedestals and caps of the 10-foot-long sections of reinforced-concrete railings that extend from either end of the bridge. There is an almost imperceptible camber to each truss, about 6" over its entire length. The bridge typically is about 15 to 18 feet above the level of the water in the Farmington River.

The two five-panel Warren-type trusses are identical. They are 9' 9" in depth and are composed of relatively heavy components, as follows:

Top chord and end posts:	10" x 18" box girders made up of side channels and top plates, with the underside double-laced.
Lower chord:	paired 10" channels with stay plates 4 feet on center.
Diagonals:	paired angles graduated from 4" x 3" in the center panel to 6" x 3 1/2" in the end panels. Compression diagonals are joined by single lacing, with tension diagonals joined by stay plates 2 1/2 feet on center.

There are no vertical members. The structural members are connected by large gusset plates, with field connections made using bolts and nuts.

The paved concrete-slab roadway is carried by a floor system consisting of 18" x 10" I-section floor beams, on top of which run six 12" x 6" I-beam stringers. The bridge is cross-braced between the floor beams with 3 x 3 1/2" angles. From the form marks on the underside, which indicate the forms were built of boards rather than plywood sheets, it appears that the concrete deck is original; corrosion of the reinforcing rod has caused extensive spalling along the outside edges.

There are no sidewalks or curbs along the roadway. Bolted to the trusses 3 feet above the roadway are simple railings consisting of three 4-inch channels spaced one foot apart. The railings continue past the ends of the trusses where they abut the concrete approach railings. At each end of the bridge, on the right end post, is a plaque giving the bridge's date and the name of the fabricator; it reads "THE / BERLIN CONST. CO. / BERLIN, CONN. / 1936." There formerly was another set of commemorative markers mounted just below the fabricator's plaques that read "BLACK BRIDGE / ERECTED 1871 / REPLACED 1936," referring to the wooden covered bridge which the present structure replaced and from which it takes its name.[1]

The bridge's granite abutments are built of large roughly squared-up pieces of stone laid in very uneven courses. The center pier is built in a coursed ashlar of quarry-faced granite, with the upstream end stepped and pointed to serve as a cutwater. The pier measures about 8 feet wide at the base and 4 feet at the top. The pier and abutments are capped with concrete to accommodate the bridge's bearings, which are all pinned pedestals.

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[1]It was common in Connecticut for traditional names to be applied to successive structures, as was apparently intended in this case, to judge by the now-missing commemorative plaques. In the town reports of the period, the bridge was simply referred to as the Pine Meadow bridge.

Technological Significance

Black Bridge is typical in many ways of the highway bridges of the 1920s and 1930s, a period in which truss engineering was reached the height of its development. With its two-lane width, concrete-slab deck, and relatively heavy proportions, the bridge reflects the demands of the ever-increasing motor-vehicle usage in the period. Although many people were forced to give up their cars in the early years of the Depression, automobile usage in Connecticut soon returned to pre-Depression levels and by the end of the decade had increased substantially over 1929.[2] What this meant for bridge design can be seen by comparing Black Bridge's trusses with the Mount Hope Road Bridge in Mansfield, a 1901 truss built by the same company; both are steel, rivet-connected five-panel Warren trusses of similar length. Not only is the older bridge only a single lane wide, but also it was originally decked with wooden planks. The biggest difference, however, is in the dimensions of the structural components, with the older bridge using similar but much smaller members. The box girder forming its upper chord, for example, is only 5 1/2" x 12" in section, and in place of Black Bridge's lower chord of 10-inch channels, it has only a pair of 2 1/2" angles.

There are virtually no elements of Black Bridge which do not appear on hundreds of other highway trusses built throughout the country in the 1920s and 1930s. The large gusset plates, pinned bearings, construction of the floor with a concrete slab laid on top of the stringers resting in turn on the top flanges of the floor beams--all are standard period features repeated over and over again.

There are several reasons for the growing similarity of highway trusses. The number of firms competing for the business of state and local highway officials had greatly diminished from the late 19th century. The formation of the American Bridge Company in 1900 and its subsequent domination of the industry had left only a few regional fabricators such as the Berlin Construction Company as strong competitors, and the Depression had brought on a further winnowing. With fewer

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[2]For example, In Bristol, a typical Connecticut industrial town, there were 5,500 cars in 1929 and 7,700 ten years later; Bruce Clouette and Matthew Roth, Bristol, Connecticut: A Bicentennial History (Bristol, 1985), 224. Figures for New Hartford are not available.

fabricators, there consequently were fewer variations in the bridges that were produced. Secondly, the promulgation of design standards tended to make bridges more alike. Connecticut's State Highway Department issued its first official book of specifications in 1927; although it did not require particular designs, it did cover such things as rivet spacing, methods of truss analysis, and basic load parameters for state bridges. Even though town-funded bridges were not bound by the state standards, fabricators such as the Berlin Construction Company also provided trusses to the state and so were accustomed to designing to state standards. Other states published similar specifications about the same time, with the American Association of State Highway Official's standards further propelling fabricators toward essentially similar bridges. Some states took the issuance of specifications another step by giving complete standard plans for trusses of varying lengths. Finally, engineering textbooks in the 1920s and 1930s played a role in defining standard highway truss engineering (see examples in Bibliography). Unlike earlier editions, they concentrated on a limited repertoire of trusses, almost all of which were based upon the Warren and Pratt patterns, and they all showed the same details for connections, floor systems, and bearings.[3]

Historical Background

Black Bridge was built as a replacement for a two-span wooden covered bridge destroyed in the flood of March 18-19, 1936. Heavy snow falls, a sudden thaw, and torrential rains combined that year to produce unprecedented river conditions throughout New England. Hartford was inundated when the Connecticut River rose 37 feet above normal, and other rivers such as the Farmington also experienced high water. In New Hartford, tremendous damage occurred when overflowing flood waters

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[3]The only way Black Bridge deviates from the common practice of the 1930s is in the graduated sizes and built-up construction of its diagonals. The American Association of State Highway Officials' 1929 recommendations called for the use of rolled channels or I-beams for such members, which saved design and fabrication time, especially if they were all of the same size. The engineers of the Berlin Construction Company apparently preferred the more traditional approach, which saved a little weight because it used only as much steel as each diagonal actually required.

weakened the dam of the Greenwoods Manufacturing Company, a cotton mill near the town center. After two days, the dam gave way, releasing all the water impounded behind it. The bridge across Cottage Street downstream of the dam was destroyed, debris from which was added to the rushing currents, which then hit Black Bridge, washing it away as well.

Black Bridge was a useful crossing for the people of Pine Meadow. Pine Meadow had developed in the 19th-century as a small industrial village of workers employed in nearby tool and textile factories powered by the fast-moving Farmington River. Although the village itself was located on the south side of the river, there were also a few houses on the north side, as well as the village cemetery and a major road leading to neighboring towns to the north. The next bridge across the Farmington was the Cottage Street bridge, which (until the flood destroyed it) had crossed the Farmington River about three-quarters of a mile upstream in the New Hartford town center.

Faced with replacing two major bridges, as well as cleaning up miles of debris-strewn river bank, the Town of New Hartford turned to the Works Progress Administration, a federally funded work-relief agency. There already were a number of W.P.A. projects underway in New Hartford and so the town had an established relationship with state and federal relief administrators. The W.P.A. immediately set crews to work cleaning up and agreed to replace both bridges. As it turned out, delays in procuring the replacement for Black Bridge forced the town to drop it from the W.P.A.-funded project and pay for it using local funds. The W.P.A. did replace the Cottage Street bridge, at a cost of over $30,000, and went on to build four smaller structures in New Hartford, thereby eliminating the last of its timber bridges. Black Bridge cost $11,926.059, which the town funded from bridge construction bonds.

Black Bridge also has historical interest as a product of the Berlin Construction Company, an enterprise founded when the American Bridge Company absorbed the Berlin Iron Bridge Company of East Berlin, Connecticut, in its attempt to monopolize the country's steel-fabrication industry. Faced with an uncertain future, several of Berlin Iron Bridge's managers struck out together on their own, building a new structural-steel fabricating plant near the railroad in the Kensington section of Berlin. The new company brought

together much of its predecessor's key expertise in marketing, production management, and bridge design. Daniel E. Bradley, the first president of the Berlin Construction Company, was a Dartmouth-educated engineer who had managed the contracting department for Berlin Iron Bridge. The vice-president of the new firm was George H. Sage, who had formerly been superintendent of the fabricating shop. The position of chief engineer was assumed by Charles F. Chase, one of Berlin Iron Bridge's best bridge designers. The new firm quickly renewed its contacts with local highway officials and within a few years had built numerous bridges as far away as Maryland.

During the next four decades, the Berlin Construction Company enjoyed a brisk business providing steel bridges for local roads and state highways throughout the Northeast. With several hundred workers at its plant in Berlin, it ranked as one of the region's largest fabricators and the only major bridge builder of the period in Connecticut. Region-wide floods in 1928 and again in 1936 further enlarged the market for its bridges.[4]

At the time of the 1936 flood, Charles F. Chase had succeeded Sage and Bradley as president of the company. The last of the company's leaders from the Berlin Iron Bridge days, Chase (1864-1945) followed a path that closely paralleled that of Daniel Bradley, who was three years older. Both men had been born in the Monadnock region of New Hampshire, had graduated from Dartmouth and the Thayer School of Engineering, and had worked for a short time with the Vermont Construction Company. Chase came to Berlin in 1890 to work as a bridge engineer. He designed the 1896 Middletown-Portland bridge whose 447-foot-long draw span was at the time one of the country's largest. In addition to his technical capabilities, Chase was an early and enthusiastic motorist who "knew intimately New England's highways and byways," a familiarity that undoubtedly added to the company's rapport with local highway officials.

Despite the upsurge occasioned by the Flood of 1936, the demand for steel-truss highway bridges soon entered a precipitous decline. Few steel bridges were built during

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[4]The company's strength as a regionally important supplier can be seen in Vermont, where Berlin Construction was second only to the American Bridge Company as a provider of trusses for the state's massive rebuilding effort following the Flood of 1927.

World War II, and after the war, the ascendancy of various methods of concrete bridge construction, along with the greater availability of large I-beams, brought about an end to the common use of trusses for small highway bridges. However, like many bridge fabricators, the Berlin Construction Company had also carried on a large business supplying structural steel for commercial buildings, power plants, and specialized industrial structures, a diversity that helped the company endure economic downturns. The company is still in business today under the name of the Berlin Steel Construction Company.

BIBLIOGRAPHY

Berlin Construction Company, Berlin, Connecticut: Some of Its Work Illustrated. Springfield, Mass.: F. A. Bassette, 1903.

"Bradley. Hon. Daniel E." Commemorative Biographical Record of Hartford County, Connecticut. Chicago: J. H. Beers, 1900.

Chase, Charles F. Memoir. Proceedings of the Connecticut Society of Civil Engineers, 1946, pp. 271-72.

Clouette, Bruce, and Matthew Roth. Connecticut Historic Bridge Inventory. Connecticut Department of Transportation, 1990.

Connecticut Department of Transportation. Bridge Inspection files. Newington, Connecticut.

DeVito, Michael C. Connecticut's Old Timbered Crossings. Warehouse Point, Conn.: DeVito Enterprises, 1976.

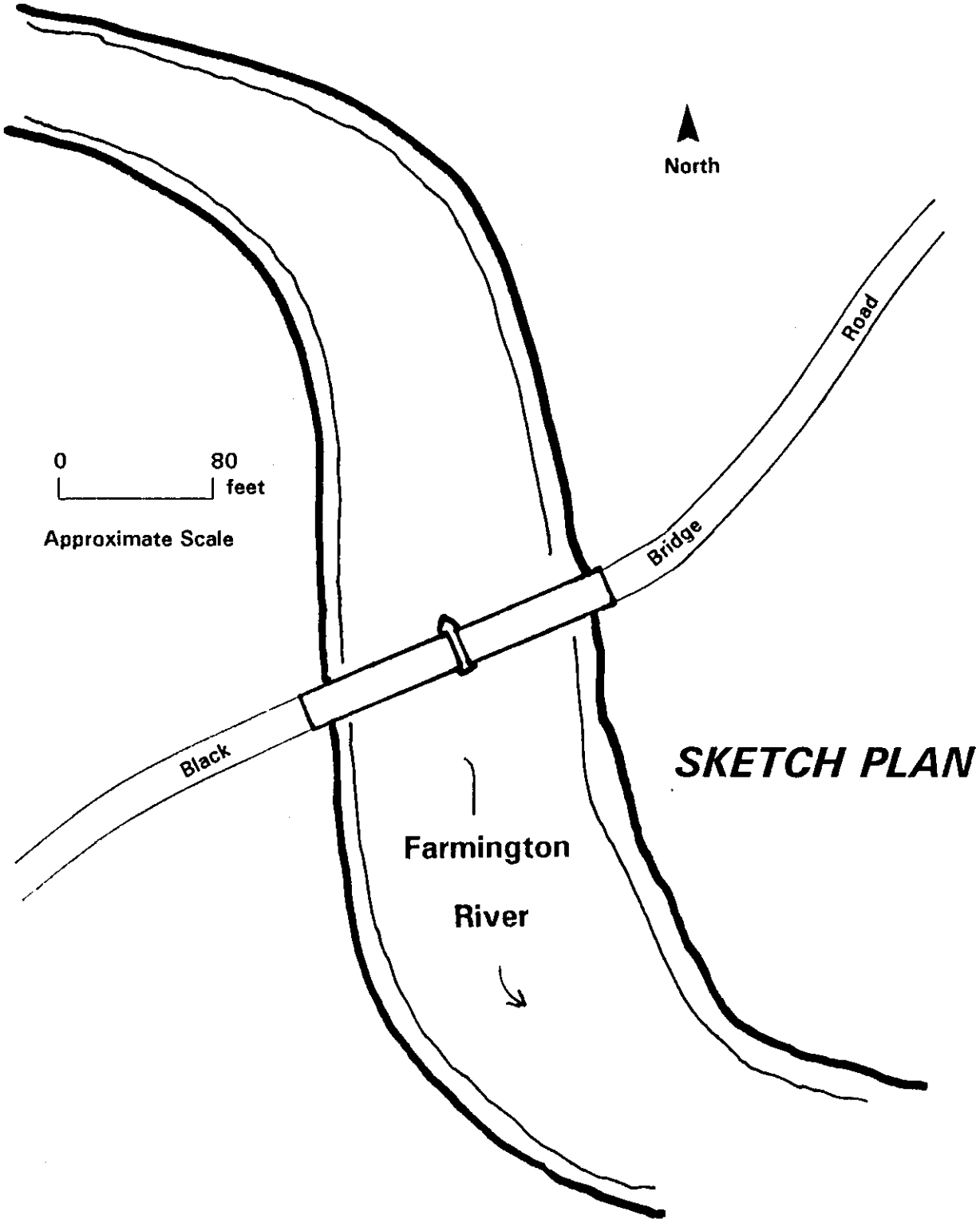
Dufour, Frank O. and C. Paul Schantz. Bridge Engineering. Chicago: American Technical Society, 1933.

Kirkham, John E. Highway Bridges: Design and Cost. New York: McGraw-Hill Book Company, 1932.

New Hartford, Town of. Annual Report, 1936-1938.

Sage, George H. Memoir. Proceedings of the Connecticut Society of Civil Engineers, 1926, p. 99.

Urquhart, Leonard C. and Charles E. O'Rourke. Design of Steel Structures. New York: McGraw-Hill Book Company, 1930.


North
Road
Bridge
Black
0
80
feet
Approximate Scale
Farmington
River

SKETCH PLAN