

Caton Ford Bridge  
Spanning the Marmaton River at County Road 301  
Nevada vicinity  
Vernon County  
Missouri

HAER No. MO-76

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PHOTOGRAPHS  
HISTORICAL AND DESCRIPTIVE DATA

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Historic American Engineering Record  
National Park Service  
Rocky Mountain Regional Office  
Department of the Interior  
P.O. Box 25287  
Denver, Colorado 80225

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# Historic American Engineering Record

HAER No. MO-76

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## Caton Ford Bridge

HAER No. MO-76

**Location:** Spanning the Marmaton River at County Road 301; 4.2 miles north of Nevada; Northwest  $\frac{1}{4}$  of Section 17, Township 36 North, Range 31 West; Vernon County, Missouri.  
UTM: 15.379290.4196420.

**USGS Quadrangle:** Horton, Missouri (7 $\frac{1}{2}$  Minute Series, 1991)

**Construction Date:** 1894

**Designer:** Missouri Valley Bridge and Iron Company, Leavenworth KS

**Fabricator:** Missouri Valley Bridge and Iron Company, Leavenworth KS

**Builder:** Missouri Valley Bridge and Iron Company, Leavenworth KS

**Present Owner:** Vernon County, Missouri

**Present Use:** One-lane roadway bridge (to be replaced in 1994)

**Significance:** Built almost one hundred years ago by one of the Midwest's most prolific bridge erectors, the Caton Ford Bridge features a pin-connected Pratt truss superstructure. From the 1870s through the 1910s, thousands of pinned Pratt trusses were erected on Missouri's roadways. Although several hundred of these structures remain in use today, relatively few date from before the turn of the century. And fewer yet of the 19th century survivors remain structurally intact. The Caton Ford Bridge stands out among Missouri's pin-connected trusses as an early, well-documented and well-preserved example of what was once a mainstay structural type.

**Assembled by:** Clayton B. Fraser  
Fraserdesign  
Loveland Colorado

October 1993

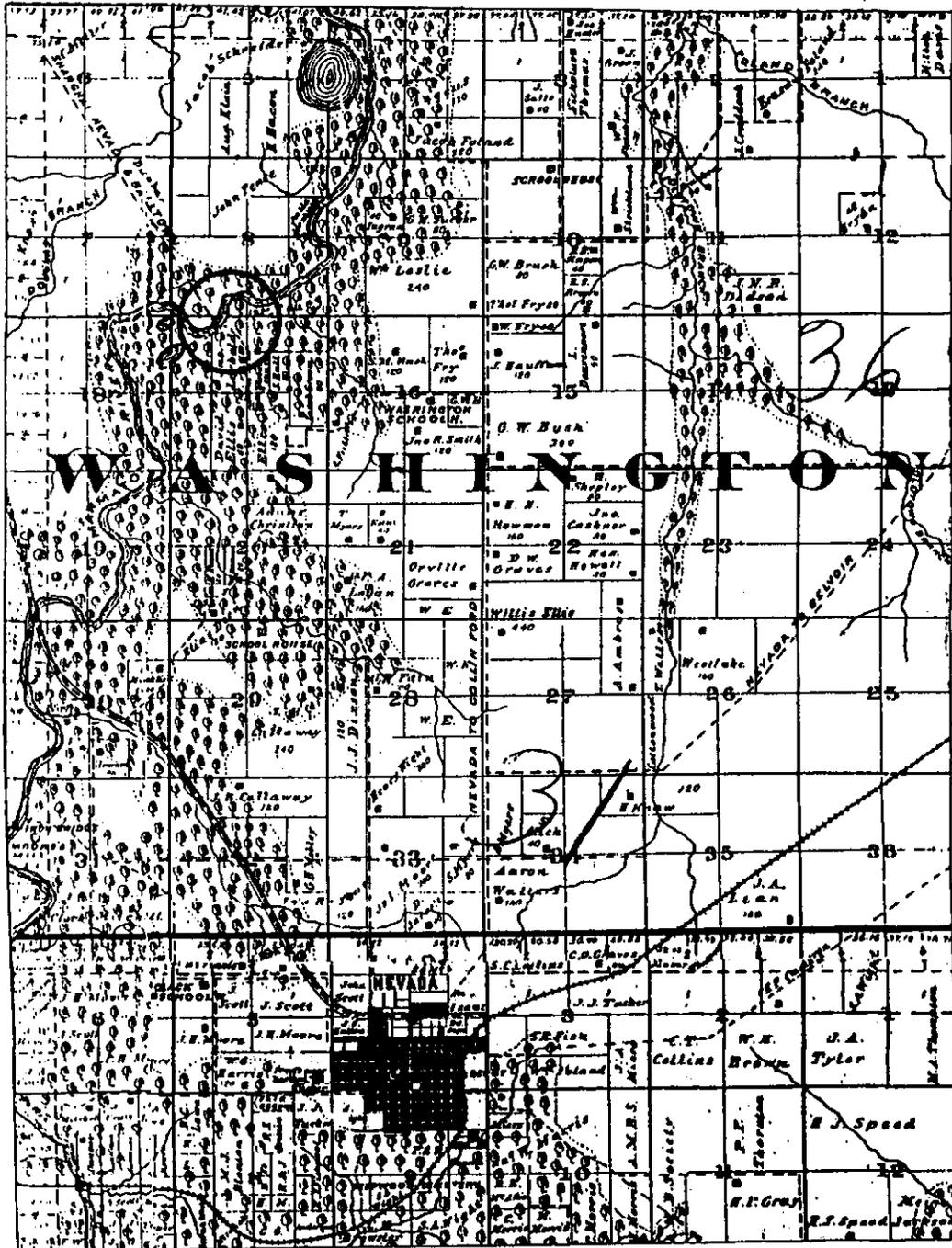
The Historic American Engineering Record [HAER] documentation for the Caton Ford Bridge was conducted by Fraserdesign of Loveland, Colorado, under contract with Allgeler, Martin and Associates, Inc., of Joplin, Missouri. Vernon County, Missouri, has proposed replacement of the structure in 1994. The documentation is intended to mitigate, in part, the impact on the bridge by this action. Photographic recordation, research and preparation of this report were undertaken in October 1993. The research for this project has involved six primary archival sources: the Vernon County Clerk's Office at the Vernon County Courthouse, the Nevada Public Library and the Blanche Skiff Ross Memorial Library at Cottey College, all located in Vernon, Missouri; the Missouri State Library and Missouri Highway and Transportation Department, both located in Jefferson City, Missouri; and the Missouri State Historical Society Library at Columbia, Missouri.<sup>1</sup>

**W**hen Noah Caton moved to the region of Missouri that would later become Vernon County, he was among the area's first settlers. A native of North Carolina, Caton had first relocated his family to Kentucky, then Warren County, Missouri, before establishing a farm here in 1839.<sup>2</sup> Sixteen years later, Vernon County was partitioned from Bates County. Nevada, a town platted four miles south of Caton's farm, was designated the county seat in October 1855.<sup>3</sup> Without a courthouse or even a town in which to meet, the county court in July 1855 held its first session in Noah Caton's house. "Mr. Caton had been in the country for about 16 years," a later history recounted, "was considered an old settler, and moreover his large log house was rather roomy and its location was very near the geographical center of the county and was well-known."<sup>4</sup>

Caton's farm was located immediately south of the Marmaton River, the major watercourse through Vernon County [see *Figure 1*]. The Marmaton entered the county about midway on its western boundary and meandered northward to drain into the Osage River at the county's northern border. The derivation of the river's name is obscure, as explained by one chronicler:

The word "Marmaton" is absolutely meaningless. It has a French sound, however, and is doubtless a corruption of the French word *Marmite*, signifying a pot or cooking kettle. From the circumstances of finding a kettle or losing a kettle, or some incident connected with a kettle in some way, it is quite probable that the first French voyagers called the stream "Marmite," pronounced *Marmita*, or *Marmeta*, and by the old settlers "Marmetaw," or "Mometaw," accent on the first syllable always... Doubtless the true English name for the stream is Kettle Creek.<sup>5</sup>

When Noah Caton died in 1862, the crossing of the river near his farm had long been known as the Caton Ford.



☒ Figure 1. Location Map of Bridge Site, from Kimball's New Sectional Map of Vernon County, Missouri, 1876.

The Marmaton posed too great an obstacle for the county to bridge in its formative years. The court instead sanctioned fords and ferries on the river, while concentrating instead on bridging the smaller crossings. To span the myriad of

streams, runs, gullies, ravines and washes that crisscrossed the region, the judges ordered small-scale timber stringer structures built in the 1850s and 1860s. Though inexpensive to erect, most of these spans tended to be structurally suspect and required frequent maintenance to prevent their collapse. Moreover, they were limited to short-span applications. Timber/iron combination trusses, covered with wood walls and roofs, were used for crossings that required longer spans. During the 1860s and early 1870s, Vernon County built only timber or timber/iron hybrid bridges. In the mid-1870s, however, the county court began contracting for all-iron structures as a more durable alternative to wood construction. Among these earliest metal structures were spans over Clear Creek at Young's Ford and over the Marmaton River at Moore's Mill and near Deerfield.<sup>6</sup> By the end of the decade, the county had built substantial iron trusses at many of the area's major crossings.

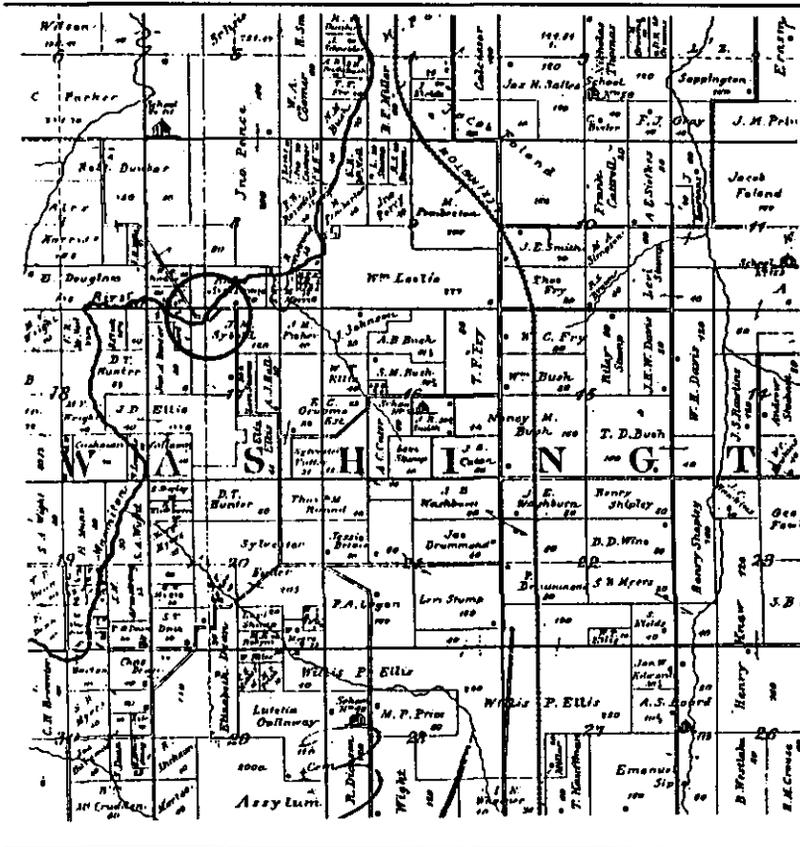


Figure 2. Location Map of Bridge Site. Standard Atlas of Vernon County, Missouri, 1886.

A notable exception to this was the Caton Ford of the Marmaton River in Washington Township [see Figure 2]. Strategically located in the center of the county, over the largest watercourse through the county, on the main road north from the county seat, Caton Ford seemed a pivotal location for a bridge. Jacob Schneider and some 1,600 other Vernon County citizens certainly thought so when they signed a petition for a bridge at Caton Ford, presented to the county court in January 1889.<sup>7</sup> For some reason, however, the three judges that comprised the court opposed a bridge here. In the face of overwhelming popular support, they could hardly reject the petition outright, but neither did they intend to build the structure at that time. Diplomatically, the court continued Schneider's

petition. Over the succeeding five years, the judges ordered construction of several iron bridges - at the Johnson crossing on Hightower Branch, the Schell City crossing and the Benefield Ford on the Osage River, bridges over the Kelly Ford, the Palton Ford, the King Ford and the Colley Ford - while repeatedly deferring petitions for a permanent span at Caton Ford.<sup>8</sup>

Eventually, in April 1893 the court directed county road and bridge commissioner W.H. Wood to view the Caton Ford site with seven others and estimate the cost to construct bridges at these locations.<sup>9</sup> In July the judges directed Wood to solicit proposals to build the other seven spans, and even two additional structures. But they postponed work at Caton Ford until the following January, ostensibly to give Wood time to survey a "good road to said ford."<sup>10</sup> January passed without action on the bridge. On March 12th, the county finally awarded a contract to fabricate and erect the Caton Ford Bridge to the Missouri Valley Bridge and Iron Company of Leavenworth, Kansas, for \$4,900.00.<sup>11</sup>

**A**s one of the Midwest's most prolific bridge fabricators, Missouri Valley B&I maintained an extensive catalogue of truss types, ranging from the exotic to the commonplace. MVB&I, like most of the region's bridge builders of the time, relied heavily on pin-connected Pratt truss variants for its standard truss types. Patented in 1844 by Thomas and Caleb Pratt, the Pratt design was characterized by upper chords and vertical members acting in compression and lower chords and diagonals that acted in tension. Its parallel chords and equal panel lengths resulted in standardized sizes for the verticals, diagonals and chord members, making fabrication and assembly relatively easy. In the highly competitive bridge manufacturing industry, in which efficiency equated with profit, Pratt trusses received almost universal use. "The Pratt truss is the type most commonly used in America for spans under two hundred and fifty feet in length," noted bridge engineer J.A.L. Waddell wrote in 1916. "Its advantages are simplicity, economy of metal, and suitability for connecting to the floor and lateral systems."<sup>12</sup> Virtually all of the major regional fabricators manufactured Pratt trusses and marketed them extensively to Missouri's counties in the late 19th and early 20th centuries.

The long-span bridge that MVB&I fabricated for the Caton Ford crossing in 1894 featured a standard Pratt configuration, straight from MVB&I's current roster of designs. With a nominal roadway width of 14 feet and a span length of 150 feet, the truss over the river's channel was divided into eight equal panels.<sup>13</sup> It was comprised of steel members built up and machine-riveted in the Missouri Valley B&I shops. The inclined endposts and upper chords consisted of two back-to-back channels, covered by a continuous plate on top and joined by strap lacing beneath. The verticals were similarly configured, with two

channels laced together by metal straps. (Two square eyebars formed the verticals at the hips.) The lower chords and diagonals were each made up of two rectangular bars with punched eyes; the counters consisted of round eyerods with turnbuckles. I-beam floor beams were field-bolted to pin plates on the verticals; these carried the timber stringers, which in turn supported the timber deck. The struts were comprised of four angles joined by adjustable rods, with knee-braced lattice struts at the portals. Both upper and lower lateral braces were round bars with threaded ends.

The truss was supported on all four corners by cast bearing shoes, which were anchor-bolted to concrete-filled iron cylinder piers founded on driven piles. The channel span was approached on both sides by wooden trestles, with pile bent piers and stone masonry abutments. Cast iron plates mounted on the bridge's endposts (since removed) identified the builder and listed the members of the county court.<sup>14</sup>

Soon after receiving the contract for the bridge, a MVB&I crew began work on the substructural excavation. Meanwhile, the truss was fabricated in the firm's Leavenworth shops, using members rolled in Pittsburgh by the Carnegie Steel Company. Construction progressed quickly through the spring. On June 11th, the bridge was completed and accepted by the county. It has functioned in place since.<sup>15</sup> Since its erection, the Caton Ford Bridge has undergone a number of alterations of varying degrees. The approach spans have been replaced on both sides, with two steel stringer spans installed on the north side and a rigid-connected Pratt pony truss on the south. This required alterations in the stone abutments at each end: stones from the north abutment have been removed to provide support for the deeper stringers, and the south abutment has been replaced altogether with concrete. In addition, the original timber deck has more recently been replaced with asphalt over corrugated steel. The most recent alteration, perpetrated sometime within the past year, is a minor one, involving the removal of all commemorative plates from the truss's endposts. Despite these changes, the truss itself remains in essentially unaltered condition.

Like virtually all of Missouri's counties, Vernon County followed a definite progression in its bridge construction in the 19th century, in response to evolving transportation needs and technological development in the bridge industry. The first simple spans, built as the county was undergoing its initial settlement, were rudimentary timber structures. These were cheap and easy to build but lacking in durability and limited in span length. With greater revenues from increased settlement, the county could undertake more ambitious timber/iron combination trusses in the 1860s and 1870s. These, in turn, were superseded in the late 1870s by all-iron spans, made readily available by mass production. Although

the county court barely noticed the transition from iron to steel in the 1890s, this evolution marked a watershed that would continue into the 20th century for bridge fabricators and the rolling mills that supplied them.

From the 1870s through the 1910s, thousands of pinned Pratt trusses were erected on Missouri's roadways. Although several hundred of these structures remain in use today, relatively few predate the turn of the century. And fewer yet of the 19th century survivors remain structurally intact. The Caton Ford Bridge stands out among Missouri's pin-connected trusses as an early, well-documented and well-preserved example of what was once a mainstay structural type.

## Endnotes

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<sup>1</sup>This HAER documentation draws upon a previous unpublished study of the Caton Ford Bridge for background information: Fraserdesign, "Caton Ford Bridge: Preliminary Determination of NRHP Eligibility for the Missouri Historic Bridge Inventory," 29 December 1992, on file at the Missouri Department of Natural Resources, Jefferson City, Missouri.

<sup>2</sup>J.B. Johnson, *History of Vernon County, Missouri* (Chicago: C.F. Cooper & Company, 1911), page 717; *History of Vernon County, Missouri* (St. Louis: Brown & Company, 1887), page 485.

<sup>3</sup>According to the 1887 county history:

The origin of the City of Nevada and its founding were public and official acts, growing out of the municipal organization of Vernon county, and not the work of individual or corporate enterprise. The selection of the site was according to the forms of law, and not for purposes of commercial advantage merely. It was not contemplated in the beginning that the business interests of the town would be more than incidental to its character as the capital of the new county. It was not imagined that in time the county seat feature would become practically incidental, while the business and commercial features would be chief.

From its natural peculiarities the county court desired to name the new town Fairview, and indeed the locality had been so called by certain persons; but the county and circuit clerk, Col. D.C. Hunter, objected, and reminded the judges that there was already a village and post-office of that name in Cass county, and that the similarity in names would inevitably lead to embarrassment and confusion. Presiding Justice Still then said: "Well, Hunter, you give it a name." Hunter had been a California gold seeker, and recalled some very pleasant remembrances of the town of Nevada City, then, as now, the

county seat of Nevada county, in the Golden State. He proposed to call the new capital of the county of Vernon in honor of the delightful little burg on the Pacific slope. The court, after some discussion as to the propriety and relevancy of the name, finally acquiesced and the town was ordered named Nevada City.

Ibid., pages 595-96.

<sup>4</sup>Ibid., page 197; *The Vernon County Centennial, 1855-1955*, n.p., 1955, pages 5-6.

<sup>5</sup>J.B. Johnson, *History of Vernon County, Missouri*, page 484.

<sup>6</sup>Vernon County Court Record, Book E, page 15 (1 August 1884) and pages 19-22 (28 August 1884), located at the Vernon County Clerk's Office, Vernon County Courthouse, Nevada, Missouri. During the 1880s, Vernon County contracted for its iron trusses with several of the region's most active bridge builders, including the St. Louis Bridge and Iron Works, the Kansas City Bridge and Iron Works, the Chicago Bridge and Iron Works and the Missouri Valley Bridge and Iron Works.

<sup>7</sup>Vernon County Record Book F, page 112 (23 January 1889).

<sup>8</sup>Vernon County Court Record, Book F, page 208 (19 July 1889); page 231 (15 August 1889); page 233 (16 August 1889); page 238 (22 October 1889); page 250 (4 November 1889); page 311 (22 April 1890); page 385 (12 August 1890); page 394 (27 August 1890); page 400 (20 October 1890); page 497 (1 June 1891); page 500 (3 June 1891); page 516 (14 August 1891); page 526 (10 September 1891); page 550 (22 October 1891); Book G, page 10 (20 January 1892); page 51 (19 April 1892); page 62 (25 April 1892); page 65 (18 May 1892).

<sup>9</sup>Vernon County Court Record, Book G, page 191 (1 April 1893). The bridge sites that Wood was to view were as follows: across Clear Creek east of Sheldon, across Lady Branch northwest of Conley Springs, across Drywood Creek in Harrison and Moundville Townships, across Old Town Branch at Cephas Ford, across Wilson Creek at Butler's Ford, across Kaufman Branch near Stotesbury, and across the Marmaton River at Caton Ford. With a required span length of 150 feet, the Caton Ford Bridge was by far the longest of these proposed spans, some of which were to be built of wood.

<sup>10</sup>Vernon County Court Record, Book G, page 234 (19 July 1893).

<sup>11</sup>Vernon County Court Record, Book G, page 302 (12 March 1894); "A Bridge at Caton Ford," *Nevada Daily Mail*, 12 March 1894.

<sup>12</sup>J.A.L. Waddell, *Bridge Engineering* (London: John Wiley and Sons, 1916), page 468.

<sup>13</sup>The description that follows is based upon a field inspection of the bridge made by Clayton Fraser on 11 October 1993.

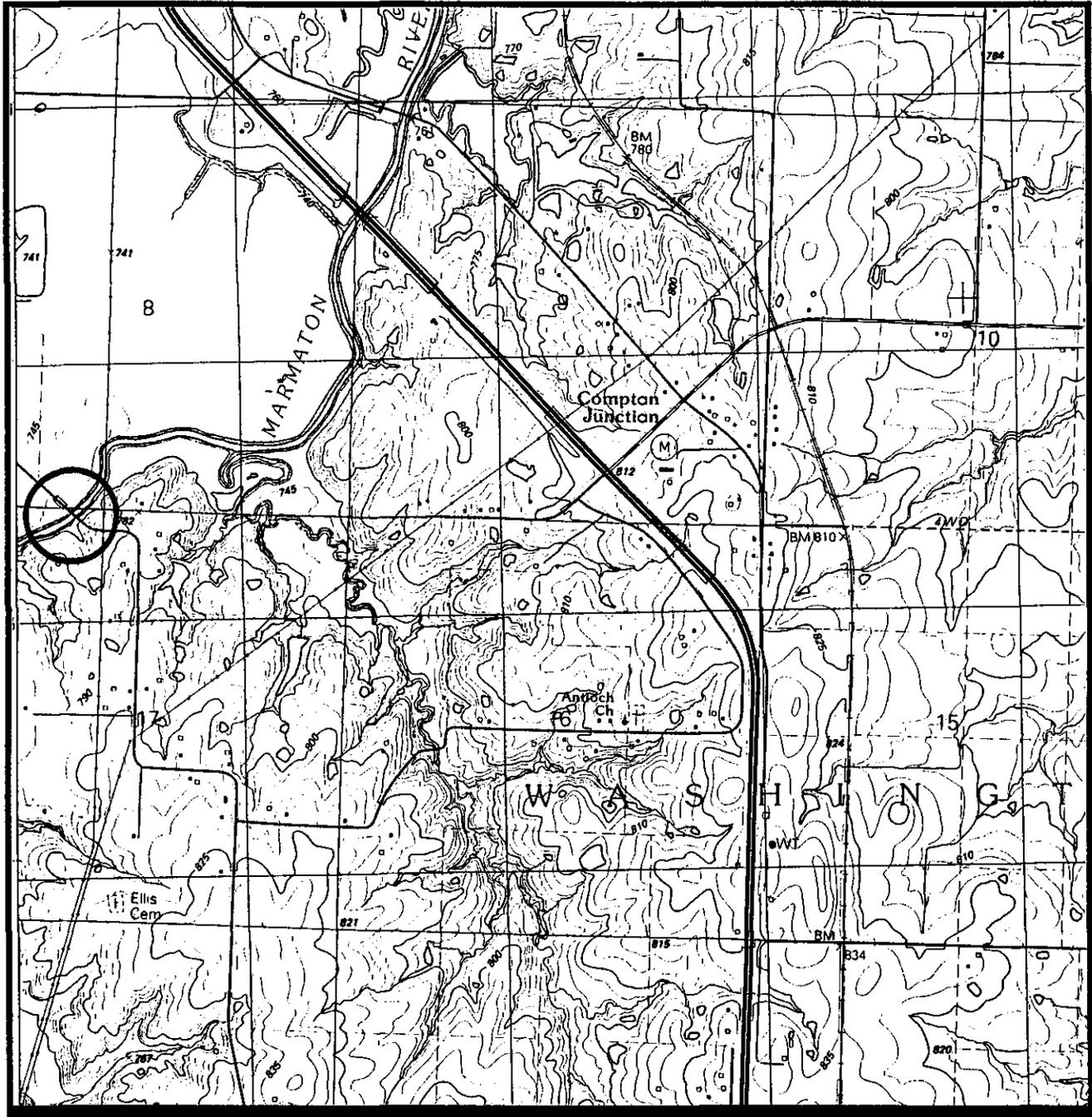
<sup>14</sup>The text of the plates, determined from an earlier field inspection of the bridge, was as follows: "BUILT / 1894 / MO. VALLEY BRIDGE & IRON WORKS / LEAVENWORTH KANS.," and "VERNON COUNTY COURT / 1894 / J.T. MATES PREST. / J.F. BROOKS 1ST DIST. / WESLEY JONES 2ND DIST. / W.H. WOOD, BRIDGE COMM'R."

<sup>15</sup>Vernon County Court Record, Book G, page 335 (11 June 1894); "County Court Proceedings," *Nevada Daily Mail*, 12 June 1894.

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■ Figure 3. Location Map of Bridge (Horton, Missouri, USGS Quadrangle Map: 7½ Minute Series, 1991).