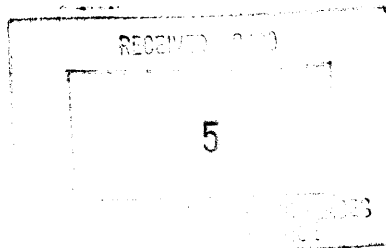


United States Department of the Interior
National Park Service



4534

**NATIONAL REGISTER OF HISTORIC PLACES
REGISTRATION FORM**

=====

1. Name of Property

historic name: WASHINGTON AVENUE BRIDGE

other name/site number: (Bridge No. 4534)

=====

2. Location

street & number: Washington Avenue over Mad River

city/town: Waterbury not for publication: N/A
vicinity: N/A

state: CT county: New Haven code: 009 zip code: 06702

=====

3. Classification

Ownership of Property: public-local

Category of Property: structure

Number of Resources within Property:

Contributing	Noncontributing	
_____	_____	buildings
_____	_____	sites
<u>1</u>	_____	structures
_____	_____	objects
<u>1</u>	<u>0</u>	Total

Number of contributing resources previously listed in the National Register: 0

Name of related multiple property listing: N/A

4. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this X nomination request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property X meets does not meet the National Register Criteria. See cont. sheet.

Signature of certifying official: John W. Shannahan, Director, Connecticut Historical Commission; Date: 02/27/01

State or Federal agency and bureau

In my opinion, the property meets does not meet the National Register criteria. See continuation sheet.

Signature of commenting or other official; Date

State or Federal agency and bureau

5. National Park Service Certification

I, hereby certify that this property is:

- entered in the National Register See continuation sheet.
determined eligible for the National Register See continuation sheet.
determined not eligible for the National Register
removed from the National Register

Signature of Keeper: Elson A. Beall; Date: 4.12.01

other (explain):

Signature of Keeper; Date of Action

6. Function or Use

Historic: TRANSPORTATION Sub: road-related

Current: TRANSPORTATION Sub: road-related

7. Description

Architectural Classification:

Other: lenticular pony truss

Other Description: N/A

Materials:	foundation _____	roof _____
	walls _____	other <u>METAL; iron</u>
		<u>STONE</u>

Describe present and historic physical appearance. See continuation sheet.

8. Statement of Significance

Certifying official has considered the significance of this property in relation to other properties: state

Applicable National Register Criteria: A,C

Criteria Considerations (Exceptions) : N/A

Areas of Significance: ENGINEERING
INDUSTRY

Period(s) of Significance: 1878-1900

Significant Dates: 1881

Significant Person(s): N/A

Cultural Affiliation: N/A

Architect/Builder: Corrugated Metal Company (fabricator)

State significance of property, and justify criteria, criteria considerations, and areas and periods of significance noted above. See continuation sheet.

=====
9. Major Bibliographical References
=====

X See continuation sheet.

Previous documentation on file (NPS):

- preliminary determination of individual listing (36 CFR 67) has been requested.
- previously listed in the National Register
- previously determined eligible by the National Register
- designated a National Historic Landmark
- recorded by Historic American Buildings Survey # _____
- recorded by Historic American Engineering Record # _____

Primary Location of Additional Data:

- X State historic preservation office Connecticut Historical Commission
- X Other state agency 59 South Prospect Street
- Federal agency Hartford, Connecticut 06106
- Local government
- University Connecticut Dept. of Transportation
- Other -- Specify Repository: _____ Newington, Connecticut 06111

=====
10. Geographical Data
=====

Acreage of Property: less than one acre

UTM References: Zone Easting Northing Zone Easting Northing

A	<u>18</u>	<u>663620</u>	<u>4600790</u>	B	<u> </u>	<u> </u>	<u> </u>
C	<u> </u>	<u> </u>	<u> </u>	D	<u> </u>	<u> </u>	<u> </u>

 See continuation sheet.

Verbal Boundary Description: See continuation sheet.
The nominated property includes the bridge, abutments, and roadway.

Boundary Justification: See continuation sheet.
The boundary includes only the components of the bidge itself.

=====
11. Form Prepared By
=====

Name/Title: Bruce Clouette and Hoang Tinh, reviewed by John Herzan,
Conn. Hist. Commission

Organization: Historic Resource Consultants/ Date: February 20, 2001
Public Archaeology Survey Team, Inc.

Street & Number: P. O. Box 209 Telephone: 860-429-1723

City or Town: Storrs State: CT Zip: 06268

United States Department of the Interior
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**NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET**

Description	Washington Avenue Bridge Waterbury, New Haven County, CT	7-1
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Washington Avenue Bridge is a single-span wrought-iron lenticular pony truss built in 1881 by the Corrugated Metal Company (later called the Berlin Iron Bridge Company). It crosses the Mad River in a densely built industrial area of the City of Waterbury, Connecticut (Photographs 1-4). The bridge measures 70 feet long and is 24 feet wide; the truss is about 10 feet in depth at the center. The Mad River flows some eight feet below the bridge in a stone and concrete-walled channel running between factories and tenements. Because the river turns toward its confluence with the Naugatuck River at this point, the bridge is extremely skewed, close to 45 degrees, resulting in an offset of almost an entire panel between the two sides of the bridge.

The five-panel truss has pinned connections (Photographs 5-7). The end posts and curved upper chord consist of an 8" by 16" box girder formed from plates, angles, and, on the open underside, stay plates spaced about 30 inches apart. The lower chord slants up to meet the upper chord at the tops of the end posts, imparting the distinctive lens-shaped profile to the bridge. It consists of four parallel chains of 3" eyebars. The three middle panels are cross-braced by tension rods with turnbuckles. Verticals are all lattice girders. The sidewalk railings, however, are original. Rosettes decorate the intersections of the lattice railings, and at the ends are cast-iron posts surmounted by orb-shaped finials (Photograph 8).

The original trusses no longer function to carry load, but instead serve in effect as guardrail supports mounted on a steel and concrete beam structure inserted underneath; separate beams carry outside sidewalks on each side of the bridge. As a consequence of this rehabilitation (1982), nothing remains of the original floor system; even the hangers for the floor beams have been removed. The roadway guardrails are of modern galvanized W-rail.

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**NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET**

Significance **Washington Avenue Bridge** **8-1**
Waterbury, New Haven County, CT

Summary

The Washington Avenue Bridge is significant as the earliest known surviving example of the Berlin Iron Bridge Company's distinctive lenticular truss (Criterion A and C). Although the Berlin Iron Bridge Company, first known as the Corrugated Metal Company, built hundreds of bridges throughout the Northeast, relatively few have survived to the present. The Washington Avenue Bridge is the oldest of only 17 lenticular trusses remaining in the company's home state of Connecticut. It is particularly notable for its wide roadway, sidewalks, and decorative railings, features omitted in many other surviving Berlin bridges, which are more likely to be found in rural areas. Waterbury at the time was a growing industrial city, and this bridge (and a companion structure across the Naugatuck River that is no longer extant) set some precedents for the city's extensive late 19th-century bridge replacement program.

The Washington Avenue Bridge is also significance as a general representative of late 19th-century bridgebuilding. It embodies many distinctive characteristics of the early years of metal-truss design, such as the use of wrought iron as the principal material, pinned connections, and an unusual truss pattern. By 1900, all of these features had virtually disappeared from American bridge building. In their place, a standardized design emerged for highway bridges based on the use of steel members, rivetted connections, and only two major truss patterns, the Warren and the Pratt trusses. The Washington Avenue Bridge represents a rare survivor of the era before standardized design prevailed.

Engineering Significance

The Washington Avenue Bridge's lenticular truss was one of a myriad of patented designs that characterized the American bridge industry in its formative stage. In part, such designs were an attempt to improve the technology of bridge building, but they also served to distinguish one fabricator's products from another. The Berlin Iron Bridge Company's design offered some savings of material over a comparably sized Pratt truss (even though the savings must have been largely offset by the greater complexity in fabricating the curved top chord's multiple angles). Equally important, however, the design's unique profile provided something distinctive that Berlin agents could exploit when trying to convince local highway officials of their product's superiority.

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CONTINUATION SHEET**

Significance

**Washington Avenue Bridge
Waterbury, New Haven County, CT**

8-2

In most other respects, the truss is similar to the vast majority of its contemporaries. In the early 1880s, steel had not yet replaced wrought-iron for structural forms, so most bridges of the 1880s were built with wrought-iron members. Similarly, pinned connections were only beginning to give way to rivetted joints. Pinned connections were popular because they simplified the erection of the bridge, requiring only large wrenches to join prefabricated members instead of the more demanding technique of field rivetting. Many engineers also claimed that pinned joints allowed forces to be transferred less ambiguously, though all agreed that riveted bridges were more rigid. Iron bridges, particularly those in urban areas, typically were embellished with ornamental railings, cresting, and urns, and in this regard, the rosettes and urn finials on the Waterbury Avenue Bridge are representative of the decorative detail of the period. It should not be assumed, however, that the bridge itself was perceived as aesthetically lacking. Instead, iron bridges such as this were regarded as particularly beautiful. To the Victorians, the lightness of an iron bridge's structural members (in contrast to wooden trusswork) created an appealing gracefulness that symbolized the spirit of progress.

Berlin Iron Bridge Company

Unlike most American bridge firms, which were closely tied to iron and steel makers, Connecticut's leading manufacturer of bridges began as an offshoot of the tinware industry. Roys and Wilcox, an East Berlin maker of tinnery tools and other metal-forming machines, set up a company in 1868 to market sheet-iron products made with its rolling machines. The Corrugated Metal Company, as it was named, produced roofing material and metal-clad fire doors and shutters; the company soon found itself involved in structural iron work when it began to provide roof trusses as well as the exterior material. The company was not particularly successful until a new investor in 1877, S. C. Wilcox, realized that the plant had the capacity to manufacture highway bridges. The following year, the Corrugated Metal Company purchased rights to William Douglas's patented "parabolic" truss and produced the first of the lenticular bridges that would soon dot the landscape of the Northeast. Douglas, educated at West Point, joined the company as treasurer and executive manager and continued to refine his design; he was awarded a second patent in 1885, two years after the company had changed its name to the Berlin Iron Bridge Company.

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**NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET**

Significance

**Washington Avenue Bridge
Waterbury, New Haven County, CT**

8-3

The late 19th century was a good time to be in the bridge business. As the industry developed, the price of iron trusses steadily dropped until they were competitive with wooden spans, especially when their superior durability and flood resistance were figured in (wooden bridges had an average lifetime of about 25 years). The only other alternative, for shorter spans only, was building a stone arch, which remained very expensive. Throughout America, local highway officials opted to replace their wooden bridges with iron, and firms such as the Berlin Iron Bridge Company were happy to oblige.

At its height, the Berlin Iron Bridge Company was probably the largest structural fabricator in New England. Some 400 workers were employed at its East Berlin plant (no longer extant), with many others at work in the field during the construction season as erection workers. There is no definitive count of the company's bridges; at least 600 are known to have been completed during its first ten years. Most were in the Northeast, though even today Berlin trusses survive as far away as Texas. In its 1889 catalog, the company claimed to have built more than 1,000 bridges, including 90 percent of the iron bridges in New England and New York. In Waterbury alone, the company built some 40 spans of varying sizes, including some provided for local railroad lines. In addition to lenticular trusses, the company made girder bridges, other types of trusses, suspension bridges, specialized industrial structures such as cargo handlers, and ironwork for buildings and roofs.

The Berlin Iron Bridge Company was absorbed in 1900 by the American Bridge Company, a largely successful attempt by J. P. Morgan to monopolize the country's structural fabricating industry. A competing firm was started almost immediately, however, by former Berlin Iron Bridge employees, and it quickly regained much of its predecessor's influence in the New England bridge market; it remains in business today under the name Berlin Steel.

Of the hundreds of bridges known to have been built in Connecticut by the Berlin Iron Bridge Company, no more than 17 lenticular trusses survive, and two of these face imminent replacement, joining six others that have been lost since 1981. Although similar, no two are alike. Washington Avenue Bridge, for example, shares with another Waterbury bridge a rather unusual detail: its box girders have widely spaced stay plates on the underside rather than the more usual lacing bars, and its four-fold chain of eyebars in the lower chord is, in most pony trusses, a single or double chain. As the earliest of a dwindling number of Berlin bridges, the Washington Avenue Bridge helps to

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**NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET**

Significance

**Washington Avenue Bridge
Waterbury, New Haven County, CT**

8-4

illustrate the variation in detail practiced by this important Connecticut company.

Historical Background

Waterbury was a rapidly expanding industrial city in the late 19th century. Its brass mills had achieved dominant positions in both the primary brass market (sheet, tube, and wire) and in secondary products such as brass buttons, buckles, lamps, and architectural specialties. In addition to its thriving factory districts, Waterbury's commercial core was expanding as well, and new residential neighborhoods, many in what formerly were the outskirts of the city, were developed to house the industrial workforce. One result was that many of the bridges that crossed the Mad River, Naugatuck River, Great Brook, and the other watercourses within the city limits soon proved inadequate. Because Waterbury's brass companies frequently acted as suppliers for each other and even shared production contracts, there was constant movement of both raw materials and products throughout the city, and consequently, a need for strong, wide, and reliable bridges.

Waterbury's city government, which had jurisdiction over a small central built-up area within the larger Town of Waterbury, had begun purchasing bridges from the Corrugated Metal Company as early as 1878, the first year of the company's bridge business. Over the next 20 years, both city and town governments¹ bought dozens of Berlin bridges of all sizes, giving the company business on an almost exclusive basis.

In April 1881, the Waterbury town meeting authorized \$25,000 for bridges across the Naugatuck and Mad Rivers as part of a new street² between South Main Street, where there were a number of important brass factories, and the city's west side. The resolution specified sidewalks and a roadway width of 24 feet, clearly anticipating a high level of both vehicular and pedestrian traffic. The part across the Naugatuck River (no longer extant) consisted of two end-to-end Berlin

¹According to its charter, as amended in 1861, the city was responsible only for the smaller bridges; larger spans such as those across the Naugatuck and Mad Rivers were the responsibility of the town government.

²This part of Washington Avenue was known as Burnham Street for its first ten years.

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**NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET**

Significance

**Washington Avenue Bridge
Waterbury, New Haven County, CT**

8-5

lenticular through trusses, while this pony truss was erected across the smaller Mad River. Completed the same year, the two-bridge project, called the Washington Bridge, cost a total of \$22,681.72. The Washington Bridge served as a model for later Waterbury bridges, most of which also were built to a 24-foot width and had sidewalks. Large through trusses were purchased from the Berlin Iron Bridge Company for subsequent Naugatuck River crossings at Bank Street, West Main Street, and Huntington Avenue, and smaller pony lenticular trusses appeared everywhere along Waterbury's smaller watercourses, particularly at sites near factories. Today, only this bridge and one other in the Waterville section remain as evidence of Waterbury's late 19th-century infrastructure renewal.

Integrity

The extent of alterations on this bridge raise questions of its retention of integrity. Remaining Berlin bridges mostly fall into two categories: near-original bridges that have become so deteriorated that they are out of service, or bridges (like this one) that have some sort of supplementary structural system and remain in use. In comparative terms, the vast majority of construction details in this bridge have been preserved in place, and the original proportions have been maintained. Losses have been confined to the floor beams, deck, and lower bracing beneath the roadway. None of the added components can be mistaken for original parts of the bridge, and they do not intrude upon its overall appearance. Visually, the bridge reads as a well-maintained lenticular truss, and thus preserves all the historical associations, as well as most of the original engineering features, associated with the Berlin Iron Bridge Company. Moreover, its early date of construction adds to its importance as a surviving example; as of 1981 (Roth, p. 188), there were only four remaining bridges known to have been built by the Corrugated Metal Company, the company's name prior to 1883, in the entire nation.

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**NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET**

Bibliography	Washington Avenue Bridge (Bridge No. 4534) Waterbury, New Haven County, CT	9-1
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"The Plant of the Berlin Iron Bridge Company," *Engineering News* 3(October 3, 1891): 87-91.

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**NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET**

Photographs

**Washington Avenue Bridge
(Bridge No. 4534)
Waterbury, New Haven County, CT**

Photos-1

All photographs:

1. Washington Avenue Bridge (Bridge No. 4534)
2. Waterbury, New Haven County, CT
4. April, 1998
5. Negative filed with Connecticut Historical Commission
Hartford, CT

Captions:

West end of bridge, camera facing east
Photograph 1 of 8

East end of bridge, camera facing west
Photograph 2 of 8

North elevation, camera facing southwest
Photograph 3 of 8

South elevation, camera facing northeast
Photograph 4 of 8

Detail of portal joint, northeast end post, camera facing northeast
Photograph 5 of 8

Detail of typical upper joint, north side, camera facing northeast
Photograph 6 of 8

Detail of typical lower joint, south side, showing attachment of truss
to modern beam bridge; floor beam and hanger have been removed; camera
facing east
Photograph 7 of 8

Detail of railing, east end, north side, camera facing northeast
Photograph 8 of 8