

UNITED STATES DEPARTMENT OF THE INTERIOR  
NATIONAL PARK SERVICE

**NATIONAL REGISTER OF HISTORIC PLACES  
INVENTORY -- NOMINATION FORM**

FOR NPS USE ONLY
RECEIVED
DATE ENTERED

SEE INSTRUCTIONS IN HOW TO COMPLETE NATIONAL REGISTER FORMS  
TYPE ALL ENTRIES -- COMPLETE APPLICABLE SECTIONS

**1 NAME**

HISTORIC Riverside Avenue Bridge

AND/OR COMMON

**2 LOCATION**

STREET & NUMBER

Riverside Avenue & Railroad Tracks

NOT FOR PUBLICATION

CITY, TOWN

Greenwich

VICINITY OF

CONGRESSIONAL DISTRICT

4th - Stewart B. McKinney

STATE

Connecticut

CODE

09

COUNTY

Fairfield

CODE

001

**3 CLASSIFICATION**

CATEGORY	OWNERSHIP	STATUS	PRESENT USE	
<input type="checkbox"/> DISTRICT	<input type="checkbox"/> PUBLIC	<input type="checkbox"/> OCCUPIED	<input type="checkbox"/> AGRICULTURE	<input type="checkbox"/> MUSEUM
<input type="checkbox"/> BUILDING(S)	<input checked="" type="checkbox"/> PRIVATE	<input type="checkbox"/> UNOCCUPIED	<input type="checkbox"/> COMMERCIAL	<input type="checkbox"/> PARK
<input checked="" type="checkbox"/> STRUCTURE	<input type="checkbox"/> BOTH	<input type="checkbox"/> WORK IN PROGRESS	<input type="checkbox"/> EDUCATIONAL	<input type="checkbox"/> PRIVATE RESIDENCE
<input type="checkbox"/> SITE	<input type="checkbox"/> PUBLIC ACQUISITION	<input type="checkbox"/> ACCESSIBLE	<input type="checkbox"/> ENTERTAINMENT	<input type="checkbox"/> RELIGIOUS
<input type="checkbox"/> OBJECT	<input type="checkbox"/> IN PROCESS	<input type="checkbox"/> YES: RESTRICTED	<input type="checkbox"/> GOVERNMENT	<input type="checkbox"/> SCIENTIFIC
	<input type="checkbox"/> BEING CONSIDERED	<input checked="" type="checkbox"/> YES: UNRESTRICTED	<input type="checkbox"/> INDUSTRIAL	<input checked="" type="checkbox"/> TRANSPORTATION
		<input type="checkbox"/> NO	<input type="checkbox"/> MILITARY	<input type="checkbox"/> OTHER:

**4 OWNER OF PROPERTY**

NAME Trustees of Penn Central

STREET & NUMBER

Penn Central Properties, 466 Lexington Ave.

CITY, TOWN

New York

VICINITY OF

STATE

NY 10017

**5 LOCATION OF LEGAL DESCRIPTION**

COURTHOUSE,  
REGISTRY OF DEEDS, ETC.

Greenwich Town Clerk/ Highway Department

STREET & NUMBER

Greenwich Avenue

CITY, TOWN

Greenwich

STATE

CT

**6 REPRESENTATION IN EXISTING SURVEYS**

TITLE

New England: An Inventory of Historic Engineering and Industrial  
Historic American Engineering Record Sites

DATE

1974

FEDERAL  STATE  COUNTY  LOCAL

DEPOSITORY FOR  
SURVEY RECORDS

Library of Congress

CITY, TOWN

Washington

STATE

DC

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CONTINUATION SHEET	ITEM NUMBER	PAGE
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Riverside Avenue Bridge	6	one
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Connecticut Statewide Inventory of Historic Resources  
State - 1975  
Connecticut Historical Commission  
Hartford, CT

# 7 DESCRIPTION

CONDITION		CHECK ONE	CHECK ONE
<input type="checkbox"/> EXCELLENT	<input type="checkbox"/> DETERIORATED	<input type="checkbox"/> UNALTERED	<input type="checkbox"/> ORIGINAL SITE
<input checked="" type="checkbox"/> GOOD	<input type="checkbox"/> RUINS	<input checked="" type="checkbox"/> ALTERED	<input checked="" type="checkbox"/> MOVED DATE <u>C. 1895</u>
<input type="checkbox"/> FAIR	<input type="checkbox"/> UNEXPOSED		

## DESCRIBE THE PRESENT AND ORIGINAL (IF KNOWN) PHYSICAL APPEARANCE

This cast and wrought iron bridge carries Riverside Avenue over the tracks at the Riverside railroad station in Greenwich. A single-span, through double-intersection Pratt truss, it was originally part of a six-span, double-track railroad bridge over the Housatonic River in Stratford. It was designed by Francis Lowthrop and built by the Keystone Bridge Company in 1871 for the New York and New Haven Railroad. It was replaced in 1884 and in 1894 or 1895, one span was re-erected at Riverside. The bridge is 163' 0 13/16" long between abutments and 5' 6" wide between truss centers. The roadway is about 22' wide and is about 20' above the tracks. There is 19' of clearance at the sides and 23' in the center of the opening.

The 15-panel truss is similar to that commonly called a Whipple truss but it has vertical instead of inclined end posts. The top chord and uprights are compressional members and the diagonals, which run across two panels, are in tension. The top chord is made up of hollow cast iron tubes, two to a panel, which flare to over a foot in diameter where they are joined. The uprights are similar, but instead of being joined in the middle they are connected to ribbed girders which have an opening through which the diagonals pass. The diagonals are in groups of wrought iron rods with threaded ends bolted into the connecting girders. They vary from four rods of 2 1/8" diameter at the end panel to two rods of 1 1/2" diameter at the eleventh panel. The lower chord consists of eight threaded rods between adjacent pair of uprights, except for the end panels, in which a ribbed hollow cast iron cylinder is substituted, and the panels next to them, which have four rods. The rods are graduated in diameter from 3" to 1 3/4", with the thickest ones in the center panel.

The trusses are connected by lattice girders cast in two pieces and by diagonal tie-rods with turnbuckles. There are elaborately cast curved brackets butting the crosspiece and uprights, forming an oval portal at each end and at every third set of uprights. The end posts have finials in the shape of little gabled-roof buildings with spires; some of these are damaged slightly. There is a sidewalk cantilevered out from the east side of the bridge with two wooden stairways to the platform below.

The bridge abutments are a random ashlar of rough-surfaced brownstone. The substructure of the bridge is not original but dates from about 1925. Plate girder crossbeams, diagonally braced by angle-iron, carry 6 x 14" stringers upon which is laid 4 x 7" diagonal tongue-and-groove planking.

Railroad bridges such as this one were frequently converted to highway use when train loads exceeded their capacity. The historical value of the Riverside Avenue Bridge is increased by its easy accessibility (Riverside Avenue is a major road) and by its continued association with the railroad.

# 8 SIGNIFICANCE

PERIOD	AREAS OF SIGNIFICANCE -- CHECK AND JUSTIFY BELOW			
PREHISTORIC	<input type="checkbox"/> ARCHEOLOGY-PREHISTORIC	<input type="checkbox"/> COMMUNITY PLANNING	<input type="checkbox"/> LANDSCAPE ARCHITECTURE	<input type="checkbox"/> RELIGION
1400-1499	<input type="checkbox"/> ARCHEOLOGY-HISTORIC	<input type="checkbox"/> CONSERVATION	<input type="checkbox"/> LAW	<input type="checkbox"/> SCIENCE
1500-1599	<input type="checkbox"/> AGRICULTURE	<input type="checkbox"/> ECONOMICS	<input type="checkbox"/> LITERATURE	<input type="checkbox"/> SCULPTURE
1600-1699	<input type="checkbox"/> ARCHITECTURE	<input type="checkbox"/> EDUCATION	<input type="checkbox"/> MILITARY	<input type="checkbox"/> SOCIAL/HUMANITARIAN
1700-1799	<input type="checkbox"/> ART	<input checked="" type="checkbox"/> ENGINEERING	<input type="checkbox"/> MUSIC	<input type="checkbox"/> THEATER
1800-1899	<input type="checkbox"/> COMMERCE	<input type="checkbox"/> EXPLORATION/SETTLEMENT	<input type="checkbox"/> PHILOSOPHY	<input checked="" type="checkbox"/> TRANSPORTATION
1900-	<input type="checkbox"/> COMMUNICATIONS	<input type="checkbox"/> INDUSTRY	<input type="checkbox"/> POLITICS/GOVERNMENT	<input type="checkbox"/> OTHER (SPECIFY)
		<input type="checkbox"/> INVENTION		

SPECIFIC DATES 1871 - constructed BUILDER/ARCHITECT Francis C. Lowthrop, Engineer  
Keystone Bridge Co., builder

## STATEMENT OF SIGNIFICANCE

The Riverside Avenue Bridge is of great importance in the history of engineering and technology because of its material, form, and manufacture. Bridges made predominantly of cast iron are extremely rare today. Few were constructed after 1870 because the compressional strength of wrought iron members was finally accepted and all-wrought iron bridges became the norm. Moreover, virtually all the early railroad bridges were replaced because of track widening and increased locomotive weight. Most ended up as scrap or like this bridge, were re-erected for highway use. The progress of bridge engineering in the 19th century was in part the result of improved materials, from wood to cast to wrought iron to steel. It is important that examples of each be preserved, yet only a handful of the cast iron spans remain.

The appearance of cast iron trusses is quite distinctive, with the large tubular compression members and the box-like junctures. Although it looks like so much plumbing to the modern eye, this bridge, when first erected over the Housatonic River, was considered an aesthetic as well as a technological accomplishment: "at a little distance it has an appearance of airy lightness and frailty. A nearer inspection convinces any one of its permanent and substantial qualities."<sup>1</sup> In the Victorian mind, the strength of iron and its use in bridges was a sign of material and moral progress. In this view, the frank functionalism of the truss itself is totally compatible with the lacy ornamental brackets, since both express the "airy lightness" made possible by iron's inherent strength. The Riverside Avenue Bridge preserves for us both the technological and the aesthetic significance of cast iron bridges.

The form of the bridge is interesting because it reveals the other aspect of 19th century engineering, the increased understanding of statics in bridge design. Squire Whipple of New York recommended this type of double-intersection truss in his Treatise on Bridgebuilding of 1847 and other engineers employed it frequently, including J.H. Linville and Francis C. Lowthrop, the designer of this span. Lowthrop knew Whipple's work, and it is most apparent in the graduation in size of the diagonals, which recognizes that stress increases toward the ends of the bridge. Another subtlety is the use of the cast iron cylinders in the lower chord of the end panels: this is the only part of the lower chord subject to compression only. Lowthrop is best known for a long viaduct (similar in form to this bridge) built in 1857 near Foglesville, Pennsylvania. Lowthrop patented three improvements on the Whipple truss, two of which are represented in the Riverside bridge: the junctures at the base of the uprights and the ribbed blocks through which the diagonals pass. This bridge may be the only remaining work of Lowthrop as well as being the only surviving example of a cast-iron variant of the Whipple truss.

The manufacturer of the bridge was the Keystone Bridge Company of Pittsburgh,

<sup>1</sup>New York and New Haven Railroad, Handbook (Newburgh, N.Y., 1871).

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CONTINUATION SHEET	ITEM NUMBER	PAGE
Riverside Avenue Bridge	8	two

a joint venture of engineer J.H. Linville and Andrew Carnegie. A textbook example of monopolistic tendencies in the American economy, the Keystone Company achieved vertical integration by buying Carnegie iron and horizontal integration by buying up almost all of the smaller bridge-building companies, until as the American Bridge Company it dominated the field. Thus, the Riverside Avenue Bridge illustrates the economic as well as the technological evolution of American bridge building.

# 9 MAJOR BIBLIOGRAPHICAL REFERENCES

Connecticut Railroad Commissioners, Annual Report. Hartford, 1872, 1885.

Consolidated Rail Corporation, New York Engineering Office, File 1300 N.H., on O.H. Bridge No. 30.26. Two letters from Lowthrop, 4 plans.

New York and New Haven Railroad. Handbook of the New York and New Haven Railroad. Newburgh, New York, 1871.

# 10 GEOGRAPHICAL DATA

AGREEMENT OF NOMINATED PROPERTY .1

UTM REFERENCES

A	1,8	6,1,8	6,6,0	45	4,3	0,1,0	B			
	ZONE	EASTING	NORTHING		ZONE	EASTING				
C							D			

VERBAL BOUNDARY DESCRIPTION

The structure itself is owned by the railroad but carries a town road over the tracks. The property includes the abutments on which the bridge rests. Presumably, these are the property of the State of Connecticut, which owns the nearby station.

LIST ALL STATES AND COUNTIES FOR PROPERTIES OVERLAPPING STATE OR COUNTY BOUNDARIES

STATE	CODE	COUNTY	CODE
STATE	CODE	COUNTY	CODE

# FORM PREPARED BY

NAME / TITLE

Bruce Clouette, Consultant

ORGANIZATION

Connecticut Historical Commission

DATE

October 19, 1976

STREET & NUMBER

59 South Prospect Street

TELEPHONE

(203) 566-3005

CITY OR TOWN

Hartford

STATE

CT

# 12 STATE HISTORIC PRESERVATION OFFICER CERTIFICATION

THE EVALUATED SIGNIFICANCE OF THIS PROPERTY WITHIN THE STATE IS:

NATIONAL

STATE

LOCAL

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service.

STATE HISTORIC PRESERVATION OFFICER SIGNATURE



TITLE State Historic Preservation Officer and  
Director, Connecticut Historical Commission

DATE March 30, 1977

FOR NPS USE ONLY

I HEREBY CERTIFY THAT THIS PROPERTY IS INCLUDED IN THE NATIONAL REGISTER

DATE

DIRECTOR, OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION

ATTEST:

DATE

KEEPER OF THE NATIONAL REGISTER

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CONTINUATION SHEET	ITEM NUMBER	PAGE
Riverside Avenue Bridge	9	three

Plowden, David. Bridges: the Spans of North America. New York: Viking Press, 1974.  
U.S. Patent Office. Annual Report of the Commissioner of Patents. Washington:  
1857, 1860, 1867.