National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in How to Complete the National Register of Historic Places Registration Form (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering information requested. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural class for materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

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ot	her name/si	ite numbe	r <u>Jefferson</u>	Avenue F	ootbridge				·- <u>-</u>	
2.	Location	1		Alexandra						West States
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city	y or town _	Spring	field						N//	A vicinity
sta	te <u>Misso</u>	ouri	code	MO	county Greene	cod	e 077	zip code	6 5803	
3.	State/Fed	leral Age	ncy Certifica	ation 🍃			to design			
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	Missour	ri Departmer	ng official/Title nt of Natural Re ency and bureau	sources	Miles/Deputy SHPO			Date		
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Name of Property		County and State	 	
5. Classification Ownership of Property (check as many boxes as apply)	Category of Property (check only one box)	Number of Resources within Pr (Do not include previously listed resources	roperty s in the count.)	
		Contributing Noncontri	buting	
private	☐ building(s)		buildings	
Dublic-local	district		sites	
public-State	site	1	structures	
public-Federal			objects	
	object	1	Total	
Name of related multiple prop (Enter "N/A" if property is not part of a		Number of contributing resource in the National Register	es previously listed	
N/A	•	0		
6. Function or Use Historic Function (Enter categories from instructions) TRANSPORTATON: Pedestrian-related		Current Function (Enter categories from instruction TRANSPORTATON: Pedestrian		
7. Description Architectural Classification		Materials		
(Enter categories from instructions)		(Enter categories from instruction	ns)	
Other: Centilever Through Truss B	ridge	foundation <u>Concrete</u> walls		
		roof	al	
		METAL. S(86		

Narrative Description (Describe the historic and current condition of the property on one or more continuation sheets.)

See continuation sheet(s) for Section No. 7

Greene County, MO County and State
Areas of Significance (enter categories from instructions)
Engineering
Period of Significance 1902-1953
Significant Dates N/A
Significant Persons (Complete if Criterion B is marked above) N/A
Cultural Affiliation N/A
Architect/Builder Hoover, J.W./engineer
American Bridge Company/builder
_
See continuation sheet(s) for Section No. 8 tinuation sheets.
Primary location of additional data:
State Historic Preservation Office Other State agency Federal agency Local government University Other Name of repository: Greene County Archives, Springfield Public Works Dept. See continuation sheet(s) for Section No. 9

Name of Property	Count	y and State
10. Geographical Data		
Acreage of Property less than one acre		
UTM References (Place additional boundaries of the property on a continuation sheet.)		
1 <u>1/5</u> <u>4/7/4/3/6/0</u> <u>4/1/2/0/5/4/0</u> Zone Easting Northing	2 / // Zone Easting	Northing
3 / / //// / //// Zone Easting Northing	4 / / // Zone Easting	Northing
Verbal Boundary Description (Describe the boundaries of the property.)		
Property Tax No.		
Boundary Justification (Explain why the boundaries were selected.)		
11. Form Prepared By	⊠s	ee continuation sheet(s) for Section No. 10
name/title Robert Flanders, PhD and Oliva hough, Assistant	City Planner	
organization City of Springfield, Department of Planning and De	evelopment	date March 20, 2003
street & number840 Boonville		telephone_417-864-1092
city or town Springfield		state MO zip code 65802
Additional Documentation Submit the following items with the completed form:		
Continuation Sheets Maps A USGS map (7.5 or 15 minute series) indicating the properties A Sketch map for historic districts and properties having Photographs: Representative black and white photographs of Additional items: (Check with the SHPO or FPO for any additional items)	g large acreage of the property.	
Property Owner name/title City of Springfield, Missouri		
street & number 840 Boonville		telephone 417-864-1033
city or town Springfield		state MO zip code 65802
Paperwork Reduction Act Statement: This information is being collected for approperties for listing or determine eligibility for listing, to list properties, and to am	plications to the National end existing listings.	onal Register of Historic Places to nominate . Response to this request is required to obtain a

Greene County, MO

Jefferson Street Footbridge

benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C. 470 et seq.).

Estimated Burden Statement: Public reporting burden for this form is estimated to average 18.1 hours per response including time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding this burden estimate or any aspect of this form to the Chief, Administrative Services Division, National Park Service, P.O. Box 37127, Washington, DC 20013-7127; and the Office of Management and Budget, Paperwork Reductions Projects (1024-0018), Washington, DC 20503.

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Jefferson Street Footbridge Greene County, Missouri

NARRATIVE DESCRIPTION

The Jefferson Street Footbridge, Springfield, Greene County, Missouri, is a three-span steel cantilever through truss footbridge, and the first of its kind known to be built in Missouri. The bridge, originally spanning sixteen railroad tracks of the St. Louis and San Francisco Railroad, is oriented in a north-south line, beginning north of the head of Jefferson Avenue (named Jefferson Street at the time of construction), where it intersects Commercial Street, and continues north over the rail-road tracks to Chase Street and the adjacent residential area. The bridge is approximately 562 feet in length, including an 80 foot long south approach (but excluding entry stairs). The bridge's two towers rise about 50 ft. above grade. The steel substructure is 25 ft. above grade, is supported on concrete piers, and has a six-foot wide wooden walking deck. The footbridge is constructed with through truss system with Warren webbing. The American Bridge Company of Pennsylvania constructed the bridge in 1902. The Construction Engineer was J. W. Hoover of Kansas City, Missouri. While the bridge has sustained some changes, such as the removal of the bicycle ramps and restoration in recent years, it maintains its integrity of material, association, setting, and function.

The overall look and decorative features of the footbridge give it the appearance of a suspension bridge. There are two tall piers connected by trusses whose upper cords were built in catenary curves. However, the bridge is made of rigid materials is structurally a cantilever bridge. The principal bridge spans rest on four sets of concrete footings. The footings are narrow, designed to fit between adjoining sets of railroad tracks. The piers are narrow in order to accommodate trains passing between them. The 80 foot-long approach ramp between the south entry stair and the bridge rests on the first bridge pier and on a series of smaller footers along the approaches length. The north entry stair and the short north approach are supported on a series of verticals and diagonals also resting on square concrete footers. The stairs on either end of the bridge, which years ago replaced the bicycle ramps, are constructed of steel C-channels filled with concrete.

The bridge was built using a though truss system with Warren webbing. The diagonals in Warren webbing act as both tension and compression. This web of diagonals allows for a very rigid and stable truss since Warren webbed trusses can be cantilevered into space with support only at one end.

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Jefferson Street Footbridge Greene County, Missouri

The bridge truss is built entirely of angle-irons. The angle-iron members were riveted together in pairs for stability along the members length. Gusset plates connect the structural members at each node. The two intermediate bent towers are made of steel S-members, angle iron, and steel straps. Standard railroad ties were used for the transverse deck beams and, together with the angle iron cross-bracing along the top and bottom of the truss, provide lateral stability to the truss. Four gold painted decorative balls cap the towers.

The floor's substructure was a distinctive part of the design. It was the strongest part of the bridge. Indeed, only the substructure contained elements larger and stronger than angle irons. It consisted of C-channel ledgers holding pieces of railroad track cut to six-foot lengths, turned upside down, and placed crosswise under the deck. Atop the track pieces, and perpendicular to them, were wooden joists. The wood decking was nailed to the joists. The whole was cross-braced underneath with angle irons. The floor was further strengthened longitudinally by pedestrian hand rails above the deck: angle-i connectors. The railings were also connected to the substructure by a tight lattice of steel straps.

The bridge was built using a though truss system with Warren webbing. The materials consist entirely of angle-irons, save for the floor and deck described above. The angle-irons were short length, light-weight stock items riveted together. The diagonals in Warren webbing act as both tension and compression. This web of diagonals allows for a very rigid and stable truss since Warren webbed trusses can be cantilevered into space with support only at one end.

The bridge has been altered over the years by essential maintenance and repair. Corrosion has been a severe problem. Coal smoke, and steam from thousands of locomotives passing just underneath caused dangerous deterioration of the bridge's lightweight structure. Some structural elements were consequently replaced over time. However, the character of the bridge remains unchanged. The most notable visual alteration is to the bridge approaches. Unlike the typical vehicular bridge, users must access the bridge by the stairs at either end. Intended originally for bicycle as well as foot traffic, stairs for pedestrians and ramps for bicyclists were provided. In 1954 the ramps were removed, and the stair at the south end was reconfigured.

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Jefferson Street Footbridge Greene County, Missouri

In 1998 a major renovation was undertaken. Some angle irons were replaced. Steel angle irons were added to several members to increase the bridge's load capacity to modern code standards, while at the same time maintaining the aesthetics of the bridge. Several new gusset plates were installed. Some rivets were replaced with carriage bolts. Three of the four piers had their concrete footers replaced. The timber joists and deck were also replaced. The bridge was repainted with a white corrosion-resistant paint. The renovation also included new lighting. Lights are located both on the bridge itself and on the ground on either side of the bridge.

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Jefferson Street Footbridge Greene County, Missouri

Summary: The Jefferson Street Footbridge in Springfield, Greene County, Missouri is eligible for listing on the National Register of Historic Places under Criterion C in the area of Engineering as a unique and significant example of bridge construction in Missouri. The period of significance is the date of construction, 1902. The bridge is an impressive multiple-arched, cantilevered bridge built to span the St. Louis and San Francisco Railroad tracts and yard. At the time of construction in 1902, it was the first cantilevered bridge built in the state. In the Missouri, the Jefferson Street Footbridge is the oldest cantilever bridge, the only known cantilever footbridge and is also the most narrow bridge of its type in the state. Furthermore, it is the only known cantilevered bridge in Missouri that was not built at a major river crossing. The bridge is uniquely designed to span multiple, close setting railroad tracks and was built using only stock structural members.

Historical Background

The Jefferson Street Footbridge exemplified both the tension and the cooperation that existed between Springfield city government and the St. Louis and San Francisco Railroad ("the Frisco Line").

The Frisco was the city's largest and best-paying employer. The bridge was built in 1902 at public expense only after the Frisco threatened to pull its division headquarters out of Springfield. A pedestrian bridge was needed to solve a long-standing problem: residents from north of the yards walking across sixteen busy tracks to get to Commercial Street, the principal business street of North Springfield. The consequent \$40,000 bond issue was also to finance two vehicular underpasses beneath the tracks. The bridge itself cost only \$8500.²

¹ Claire F. Blackwell, Missouri Deputy SHPO, "STATEMENT OF THE OPINION OF THE STATE HISTORIC PRESERVATION OFFICER CONCERNING THE ELIGIBILITY OF A PROPERTY FOR THE NATIONAL REGISTER," JULY 8, 1997. The opinion was rendered regarding the Jefferson Street Footbridge when the City of Springfield was planning its rehabilitation.

² Typescript, no author, no date, "Jefferson Str. [sic] Footbridge," Greene County Archives. This widely circulated paper was probably written in 1972 or 1973 for the Springfield Historic Sites Board by one of its members. Principal sources are an editorial entitled "The Wastebasket," *Springfield* News-Leader, May 6, 1936, City Ordinances, and Minutes of the City Council. That particular "Wastebasket" remains the principal source for the bridge's history up to 1936.

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Jefferson Street Footbridge Greene County, Missouri

Maintenance of all bridges is an ongoing project and expense. In the case of the Jefferson Street Footbridge, the maintenance problem was made more acute by its over-the-tracks location, its light construction, and the uncertainty about who was ultimately responsible for maintaining it. The bridge was prone to corrosion due both to the constant effusion of corrosive gases from coal-fired locomotives passing underneath, and from its own light structure. The cooperative aspect of the relationship between city and railroad is illustrated finally by their joint efforts to maintain it. The Frisco was wary of workers other than their own coming on railroad property. So the Railroad seems ordinarily to have supplied the labor, with the City paying out-of-pocket costs.³

In 1975 the bridge was listed in the Springfield register of historic sites. A generation later, in 1998 a major renovation was undertaken. Some angle irons were replaced. Steel angle irons were added to several members to increase the bridge's load capacity to modern code standards, while at the same time maintaining the aesthetics of the bridge. Several new gusset plates were installed. Some rivets were replaced with carriage bolts. Three of the four piers had their concrete footers replaced. The timber joists and deck were also replaced. The bridge was repainted with a white corrosion-resistant paint. The renovation also included new lighting. Lights are located both on the bridge itself and on the ground on either side of the bridge. Floodlighting the newly painted bridge symbolizes the status it has achieved as an historic landmark in Springfield. The Frisco Railroad ceased to exist when its assets were taken over by the Burlington Northern Road. The bridge alone remains.

Narrative Statement of Significance

The Jefferson Street Footbridge is a multiple-arched, cantilevered through truss footbridge built to span the San Francisco Railroad tracks and Yard in North Springfield.

³ Jerry King, Frisco Structural Engineer, to H. E. Lampe, Director of Springfield Public Works, April 15, 1970. Memo in the files of the Springfield Public Works Department. "The files indicate that the railroad is responsible for maintenance of the footbridge, but the city has provided assistance in the past." The bridge had been wired for lights, but three of the four outlets were broken. Furthermore, the bridge's electrical wiring was not grounded. "...grounding... would decrease the rate of steel corrosion due to electrolysis."

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Jefferson Street Footbridge Greene County, Missouri

The earliest use of the cantilever method of bridge construction in the United States was a railroad bridge built across the Kentucky River in 1877. At the time of the Springfield footbridge construction in 1902, it was the first cantilever bridge to be built in Missouri. It is also the narrowest known example of a cantilever bridge. Though it was built some decades after the technology was developed, many years passed before cantilever bridges became common in Missouri.

The American Bridge Company, engineer of the Jefferson Street Footbridge, was a reputable and experienced firm. The American Bridge Co. began in 1870, went defunct, reopened, and eventually (around 1900) became the name of a merger of 40 or more major bridge companies under J.P. Morgan and U.S. Steele. The American Bridge Co. was and still is responsible for the construction of some of the contries most famous bridges and buildings.

The structural issues in designing Missouri's first cantilever as a footbridge included the need to keep the cost down, and to forge a bridge in the narrow spaces between the railroad tracks. Unlike railroad bridges, the most usual employers of the cantilever form, the footbridge needed to carry little load save that of its own weight. The principal load issue was to counter the lateral wracking force of wind.

The site, over a series of railroad tracks, required placing three of the bridge's piers in narrow spaces between tracks. A pier could not occupy more than one of those spaces because of the omnipresence of moving trains. The solution was to design piers consisting of four legs each, to occupy a space no more than two feet wide. They were arranged in-line, with longitudinal stability to be supplied by a strong bridge floor. The two inner legs of the principal central piers were verticals extending upward to the tower peaks. The two outer legs extended downward and outward diagonally from the bridge floor to the ground. These outer legs were to counter the sideways force of wind. The prevailing winds in Springfield are in the northwest to southwest compass quadrant, and would bear directly on the side of the bridge.

The floor's substructure was a distinctive part of the design. It was the strongest part of the bridge. Indeed, only the substructure contained elements larger and stronger than

⁴ Henry Petroski, <u>Great Bridge Builders and the Spanning of America</u>, pp. 222,277.

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Jefferson Street Footbridge Greene County, Missouri

angle irons. It consisted of C-channel ledgers holding pieces of railroad track cut to six-foot lengths, turned upside down, and placed crosswise under the deck. Atop the track pieces, and perpendicular to them, were wooden joists. The wood decking was nailed to the joists. The whole was cross-braced underneath with angle irons. The floor was further strengthened longitudinally by pedestrian hand rails above the deck: angle-i connectors. The railings were also connected to the substructure by a tight lattice of steel straps.

The bridge was built using a though truss system with Warren webbing. The materials consist entirely of angle-irons, save for the floor and deck described above. The angle-irons were short length, light-weight stock items riveted together. The diagonals in Warren webbing act as both tension and compression. This web of diagonals allows for a very rigid and stable truss since Warren webbed trusses can be cantilevered into space with support only at one end. Only the angle irons of the pier legs were more than a few feet long. Few if any structural elements required custom fabrication. Low cost resulted from the use of such stock materials and from the ease of assembling them.

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Jefferson Street Footbridge Greene County, Missouri

Bibliography of Works Consulted

Letters and Memoranda

Files of the Springfield Department of Public Works. Dates range from 1926-1955. Many letters and memoranda passed between City officials and their Frisco counterparts over the years concerning the status of bridge disrepair and the need for maintenance.

Miscellaneous Manuscripts and Documents

American Bridge Company. "Contract ... between the American Bridge Company and the City of Springfield, Missouri...." 1901. Greene County Archives.

No author, no date. "Old Footbridge." Greene County Archives. Handwritten document listing events related to the bridge from June 23, 1901, to December 3, 1912.

No author, no date. "Jefferson Str. [sic] Footbridge." Greene County Archives. Typescript. Probably written in 1972 as a report to the Springfield Historic Sites Board in 1973.

Newspapers

No author. "The Wastebasket." <u>Springfield News-Leader</u>, May 6, 1936, p.7. "The Wastebasket" was a regular editorial feature. This particular piece dealt extensively with the history of the Jefferson Street Footbridge. It was a principal source for subsequent writers on the subject.

Interview

Interview with Bill Trivitt, Springfield Public Works, July 22, 2002. Robert Flanders, interviewer. Trivitt was the official in charge of a major renovation of the bridge in 1998.

Maps

Sanborn Insurance Map. 1957. Greene County Archives.

The data is cumulative from ca. 1900 to 1957.

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Jefferson Street Footbridge Greene County, Missouri

"A Map of Springfield and North Springfield." 1878. Greene County Archives. The two cities were separate corporations until 1887. The railroad was originally in North Springfield only, where the footbridge is located.

"Springfield, Greene County, Missouri, 1888." Greene County Archives. (Showing Springfield and North Springfield newly joined.)

Plan Drawings

"General Plan For Footbridge On Jefferson ... Submitted by the American Bridge Company, New York ... J.W. Hoover, Contr. Mgr. [sic]—Kansas City."

Greene County Archives.

"Profile showing proposed Foot Bridge over ST. L. & S. F. R. R. tracks on North Jefferson Street. May 25, 1901."

Greene County Archives.

Books

Gies, Joseph. Bridges and Men. Garden City: Doubleday, 1963.

Petroski, Henry. <u>Engineers and Dreams: Great Bridge Builders ands the Spanning of America.</u> New York: 1995.

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Jefferson Street Footbridge Greene County, Missouri

Verbal Boundary Description

Beginning at a point on the north curb of Commercial Street due north of the NE corner of Jefferson Avenue and Commercial Street, run a line westward 25 feet along the curb; thence a line northward, parallel to the bridge and perpendicular to the tracks, to the south edge of Chase Street (Chase has no curb); thence a line eastward along the south edge of Chase Street 50 feet; thence a line back southward parallel to the first north-south line to the curb of Commercial Street; thence a line westward 25 feet along the curb to the beginning point.

Boundary Justification

The above-described boundary includes all of the bridge and also the approach stairs, which are integral to the whole structure.

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Jefferson Street Footbridge Greene County, Missouri

Photograph information

The following is true for all photographs

Photographer: Robert Flanders

Date: August 1, 2002

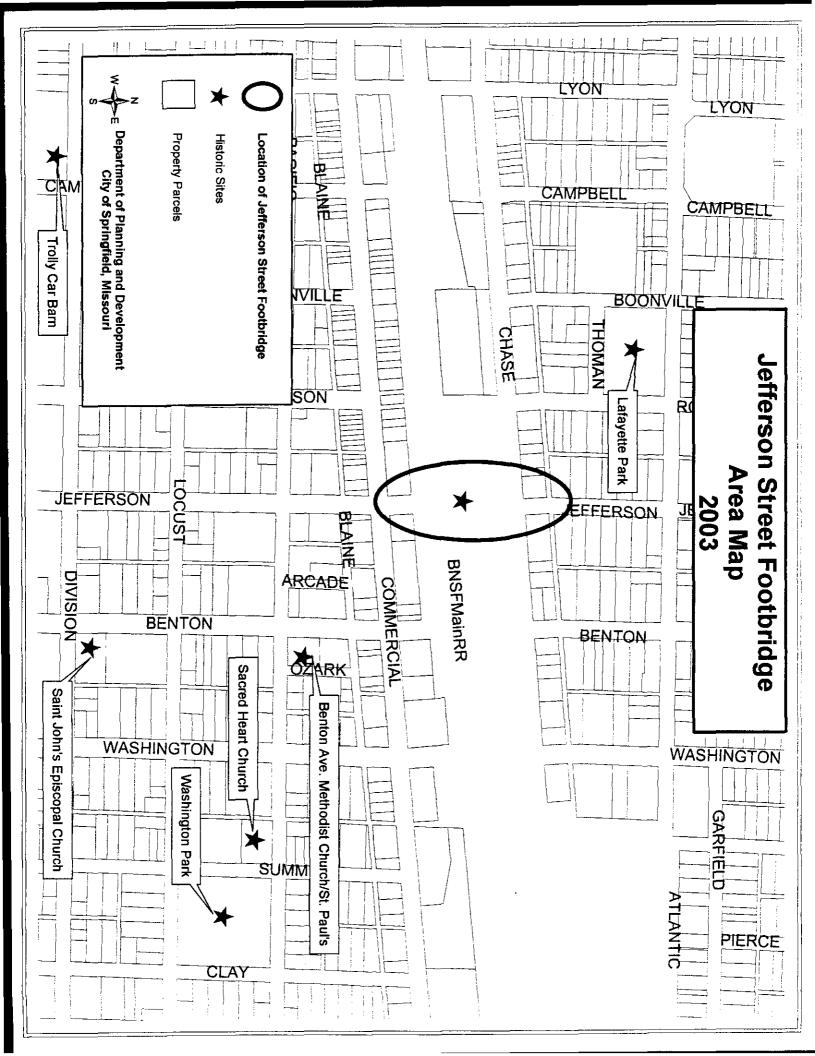
Location of Negatives: Missouri State Historic Preservation Office

P.O. Box 176

Jefferson City, MO 65102

Photograph log

- 1. General view, looking west.
- 2. South approach ramps, looking northwest.
- 3. Underside of floor, looking northwest.
- 4. Underside of floor, diagonals and railing structure, looking northwest.
- 5. General view from the walkway looking north.
- 6. South stairs and part of the approach ramp, looking west.
- 7. North stairs and north section of bridge, looking southwest.
- 8. Detail of northern support structure, looking southwest.
- 9. Joint detail of suspension cords, view west.
- 10. Strengthening strap on second suspension cord, looking north.
- 11. South approach stairs, looking north.



BOONVILLE

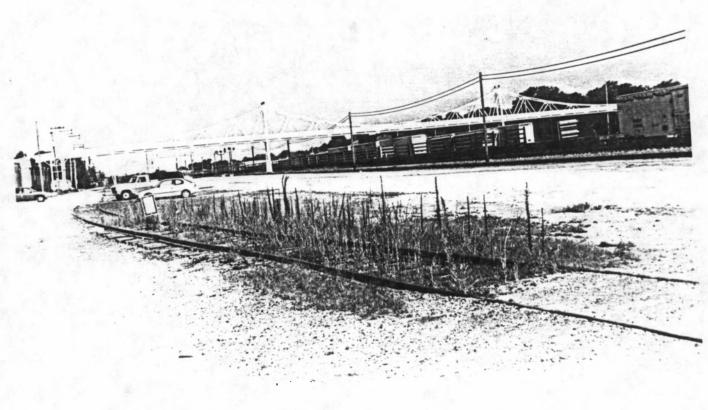
Jefferson Street Footbridge

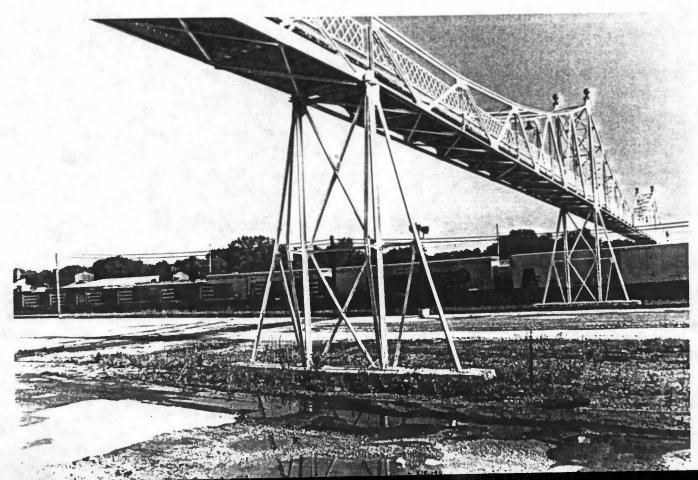
Aerial Map 2003

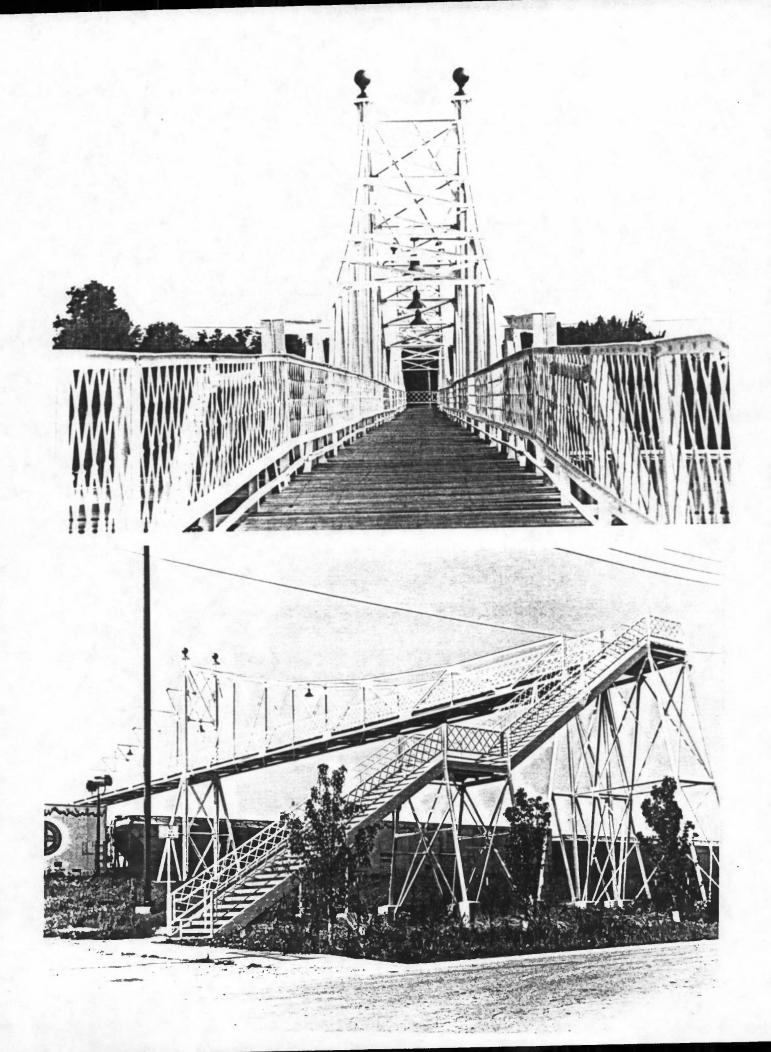
Department of Planning and Development

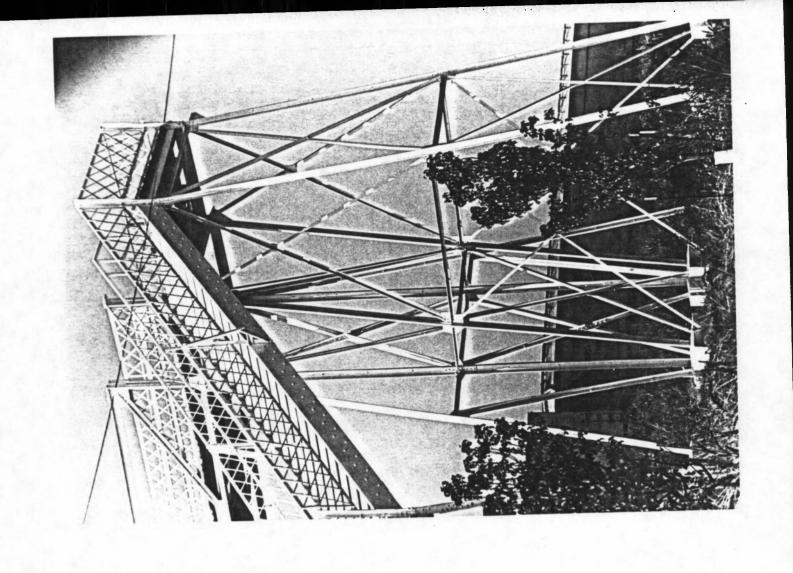
City of Springfield, Missouri

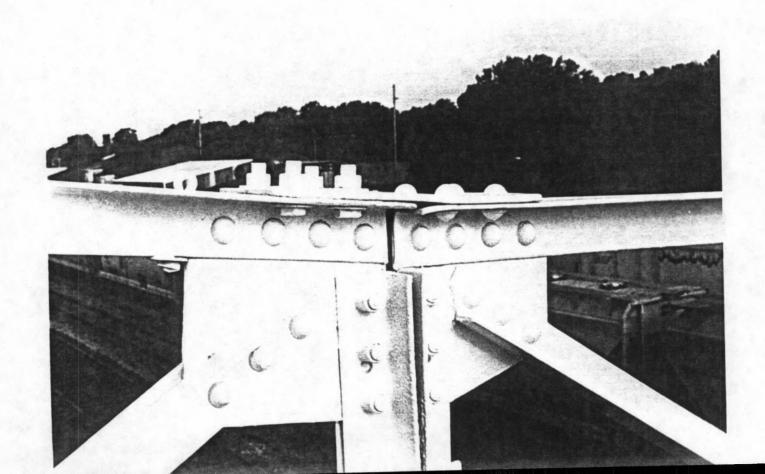
Location of Jefferson Street Footbridge

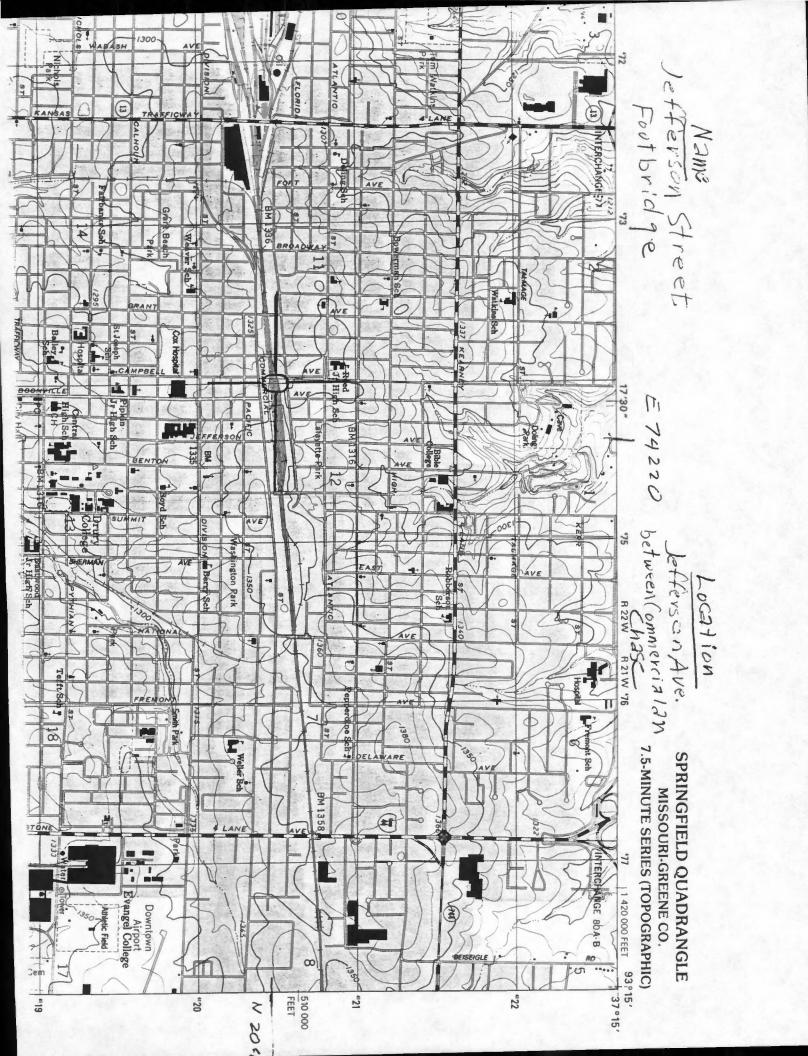












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