Alabama Historic Bridge Inventory

By

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Department of Civil and Environmental Engineering

Prepared for

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Design Bureau
Environmental Services Section

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Ackowledgements

Many people contributed to the historic bridge inventory project. These people are mentioned here in the chronological order in which they participated in the project. Jay Lindly (UA) wrote the project proposal, which defined the scope and time frame for the project. Mrs. Mary Lou Crenshaw (ALDOT) was the ALDOT contact throughout the project. Her ready assistance scheduling meetings, reviewing draft copies of project work, and providing constructive comments greatly facilitated the smooth

Michael Davis (UA) put together the first working computer database based using the Maintenance Bureau's SI&A bridge data file and earlier historic bridge inventory reports by Bell and Owsley (AU) and Parker (then at ALDOT).

Jim Richardson (UA) and Michael Davis sent historic eligibility criteria and bridge data sheets to all county engineers, ALDOT division engineers, and local historic societies in Alabama. Response from the engineers was good (70% of the county engineers and 100% of the division engineers responded). The county engineers were very helpful in providing directions for the bridge site visits. Michael Triche (UA) and Michael Davis visited every bridge included in this report. Site visits consisted of locating the bridge (not always easy), sketching the plan and elevation views of the bridge, noting information affecting historic eligibility, and taking several black and white print and color slide photographs of the bridge. Triche and Davis also selected the bridges to be recommended as eligible or possibly eligible for the historic register, based on their state-wide survey.

This report was also written as a team effort. Jay Lindly wrote Chapters I and IV, Dan Turner (UA) wrote Chapter II and Jeff Norrell (UA-History Dept.) wrote Chapter III. Michael Davis keyed-in all of the information from the bridge site visits, organized and checked the large database, and printed the bridge data sheets appearing at the end of this report. The bridge location maps adjacent to each data sheet were based on digital county map files provided by Ronnie Pouncey (ALDOT). Bridge locations were drawn on the maps by a team of Civil Engineering undergraduate students: Todd Hudson, Wade Doss, Hansel Stewart and Frank Summers. The students also mounted the photographs on the pages with the bridge location drawings.

Gang Xu (UA-Computer Science), under the supervision of Jim Richardson, wrote the computer program for this project. This program provides a convenient user interface to manage the historic bridge data. Renee Flowers (ALDOT) extracted selected fields from the large SI&A database and converted the data to a form usable by the computer program.

Project work was reviewed by Mary Lou Crenshaw (ALDOT), Bill Van Luchene (FHWA), Ellen Merten (AHC), Nathan Farris (AHC), Greg Rhinehart (AHC) and Jim Parker (AHC). Jim Parker's many comments about specific bridges were especially helpful.

Photo on Front Cover from *Sixteenth Annual Report of the State Highway Commission of Alabama*, 1926

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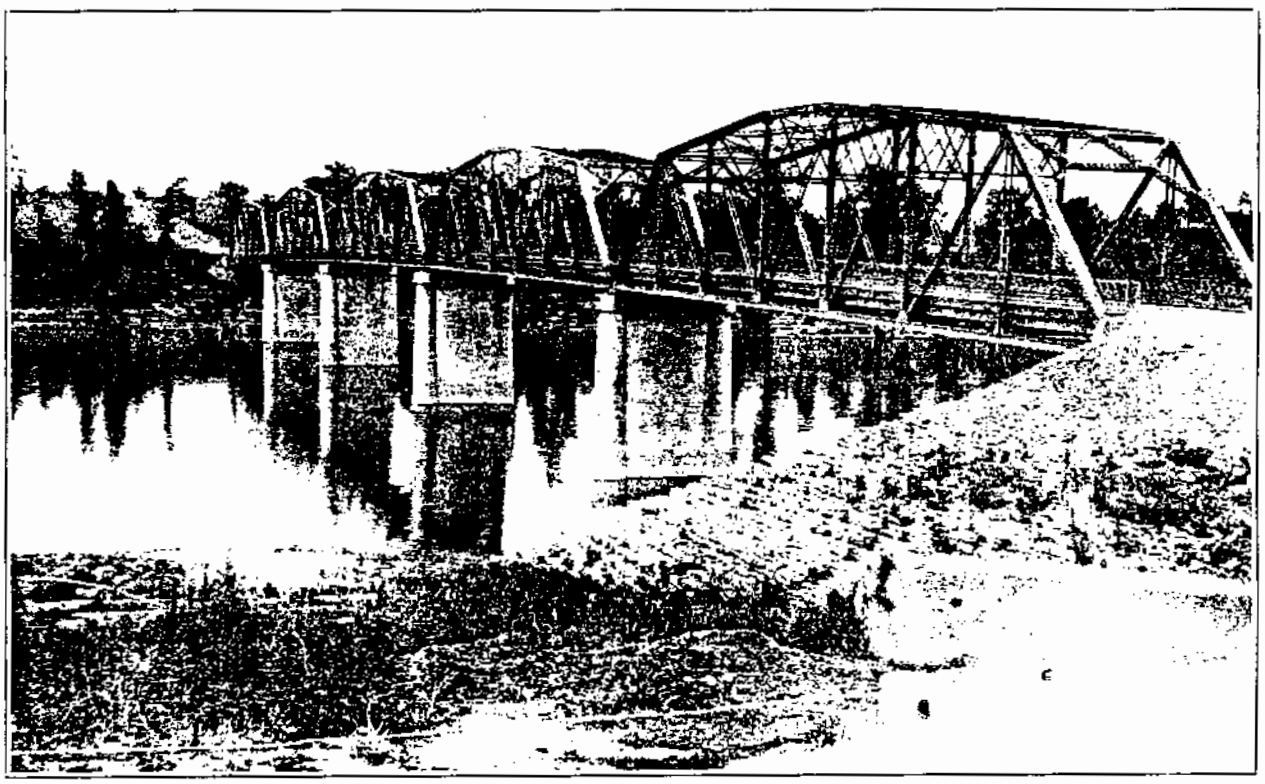
I. INTRODUCTION



Bridge over Shoal Creek—F. A. Proj. No. 144, Lauderdale County

Alabama is blessed with an abundance of rivers and streams, both navigable and non-navigable, and approximately 55 inches per year of rainfall. Thus, bridges have played an important role in its settlement, history, and economy. There are approximately 15,000 bridges on roads currently maintained by state, county, and local agencies. There are an additional 2,000 roadway structures which are classified as culverts, not bridges, because their length is less than twenty feet.

Approximately 4,500 of the bridges were constructed prior to 1956. These bridges are frequently demolished to be replaced by newer structures due to more stringent requirements for bridge width and safer bridge approaches, larger traffic loads, and the erosions of time. The loss of these bridges is a loss to the cultural heritage of Alabama. Before they are gone, it is important to study their historical significance.

Photo from *Fourteenth Annual Report of the State Highway Commission of Alabama*, 1925

The Alabama Department of Transportation (ALDOT) Historical Bridge Study has two primary objectives:

- To review the bridges in ALDOT's Bridge Inventory (a computer database of 15,000 bridges and culverts maintained by the Maintenance Bureau of ALDOT) and to evaluate their eligibility for inclusion in the National Register of Historic Places (NRHP).
- To use the results of the study during the planning stages of bridge rehabilitation and replacement projects.

The study took place between May, 1996 and January, 1998 and was conducted by personnel from the University of Alabama Department of Civil and Environmental Engineering with oversight from the Federal Highway Administration (FHWA), ALDOT, and the Alabama Historic Commission.

It is important to note that not all bridges found in Alabama are on the ALDOT Bridge Inventory. For example, railroad bridges are not on the inventory, as well as bridges in areas controlled by governmental units other than ALDOT. A sample list of such areas follows:

- Department of Natural Resources lands
- Military reservations
- National forests
- City parks
- State parks

Additionally, not all city and county bridges are in ALDOT's Bridge Inventory. Those bridges which are not eligible for Federal aid funding are not in the Inventory.

Two previous historic bridge studies performed for the ALDOT in the 1980's helped form the foundation for the study described here. The first study documented 112 bridges built before 1931 and was performed by Bell and Owsley [2]. The second study documented 280 bridges built before 1940 and was performed by Parker [3]. Both studies concentrated on the metal truss bridges built in Alabama during those years, but they also investigated the limited number of other types of bridges built then. Both studies contain valuable comments on the truss bridges and their builders that will not be repeated here; however, an excerpt from the Parker [3] study is presented in an appendix to this report. None of the three reports (the two previous studies and this one) review Alabama's covered bridges, because they are already on the NRHP.

Eligibility Criteria

Bridges were evaluated for NRHP eligibility using U.S. Department of Interior criteria [1]. Those criteria indicate that bridges less than fifty years old are not to be nominated unless they are exceptionally important. However, the ALDOT study included bridges built as recently as 1956 so that the study would not be immediately out of date.

To be eligible for NRHP registration, a bridge must possess both historic significance and integrity. To qualify as historically significant, the bridge must satisfy at least one of the following four criteria [1]:

- Bridges that are associated with events that have made a significant contribution to the broad patterns of our history.

- Bridges that are associated with the lives of persons significant in our past.
- Bridges that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.
- Bridges that yielded, or may be likely to yield, important information in pre-history or history.

To understand how a bridge may be historically significant, the study team prepared Figure I-1, which was used internally and was also sent to participating agencies to help them understand the criteria. Examples are given for the four criteria, and Figure I-1 goes on to note that the bridges in this study will not qualify for significance under criteria B or D.

A bridge must also retain its integrity to qualify for registration. Integrity is the ability of a property to convey its significance [1]. To qualify, a bridge must exhibit at least one of the following characteristics of integrity:

- Location
- Design
- Setting
- Materials
- Workmanship
- Feeling
- Association

Determination of integrity may involve both objective and subjective evaluation. To understand the concept completely, the reader is referred to NRHP criteria [1], but the following examples are supplied as an introduction to the subject.

Location and setting are similar features. Many bridges would lose their integrity if they were moved. Other bridges may retain their integrity if they were moved to a location which still spans a river, railroad track, etc. The setting of a bridge may be compromised if modern intrusions are too prominent.

Not all bridges can be evaluated for workmanship. For example, metal truss bridges may contain primarily prefabricated parts, which do not allow a display of workmanship. However, concrete bridges constructed on site may have more opportunity to express a craftsman's precision and attention to detail.

A bridge retains its integrity of materials if the materials have been unchanged since construction. However, if changes were made during the historical period or were made in modern times using the same materials of original construction, the bridge may also retain its integrity for materials. Railings are an important bridge component; the loss of railings may cause loss of material integrity.

Integrity of design is normally maintained if the structural members retain their original spacing and configuration.

Integrity of feeling and association are often impacted by design, materials, and workmanship. For example, if too much replacement materials has been used on the bridge, the feeling and association with the historical period may be lost.

Criteria for the National Register of Historic Places:

(note: a bridge only needs to qualify for *one* criteria to be eligible)

A. The bridge must be associated with *events* that have made a significant contribution to the broad patterns of history

1. Did the bridge allow significantly increased settlement or economic growth of a region?
   Example: *on major trading route of state commerce*
2. Was the bridge a critical part of a new regional transportation system?
   Example: *critical part of construction of U.S. Federal-Aid Primary Highway System*
3. Was the bridge associated with an industry important to Alabama?
   Example: *the steel industry*
4. Is the bridge associated with major political, historical, or social events?
   Example: *Edmund Pettus Bridge in Selma, Civil Rights demonstration, 1965*

B. The bridge must be associated with the *lives of persons* significant in our past

not applicable for bridges

C. The bridge must have engineering significance

Is the bridge a good example of:

1. a ***particular type*** of bridge?
   Examples: *Warren, Pratt, Bowstrung, or pony steel truss*
   Open or Solid Spandrel concrete arch
2. a ***historical period of bridge construction***?
   Examples: *First Federal Funding for Alabama Bridges (1917)*
   1927 Legislative Act that created the Alabama Bridge Corporation
   New Deal Programs
3. a ***method of construction***?
   Examples: *Prefabricated trusses*
   Flood resistant concrete bridges
   Convict labor
4. the work of an ***important bridge designer or builder***?
   Examples: *Horace King*
   Southern Bridge Co., Birmingham
   Champion Bridge Co., Ohio
5. ***distinctive esthetic details***?
   Examples: *Distinctive details on portal members*
   Art Deco railing

D. The bridge must have yielded, or may be likely to yield, information important in prehistory or history

not applicable for bridges

Figure I-1. Criteria for Judging Eligibility of Bridges for the National Register

Selecting Bridges for Inspection

To help select bridges for further analysis and field visits, the University of Alabama research team obtained the computerized structure, inventory, and appraisal (SI&A) data from ALDOT. Each of the 15,000 bridges in the state was listed by bridge identification number, bridge type, age, length of spans, number of spans, etc. Any data from the two historic bridge projects which was not already in the SI&A database was added.

In October 1996, the project team described the project goals and methodology at a meeting of the Alabama County Engineers Association in Montgomery, Alabama. Slides of old bridges were shown, and the county engineers were asked to participate in the statewide bridge survey.

The pool of bridges was reduced from 15,000 to 4,500 by removing bridges constructed after 1956. Four thousand, five hundred bridges were too many to visit individually. The SI&A data was examined to select a reasonable number of bridges for inspection. To get to a figure of roughly 900 bridges (an average of 15 per county), bridges were excluded on a variety of grounds. For example, timber bridges have elements replaced so frequently that it is difficult or impossible to verify their ages. Thus, timber stringer bridges were eliminated from consideration. Bridge types still used for new construction were also eliminated on the grounds that these bridges were not yet historic.

Armed with a list of 900 bridges for inspection, the project team sent each county engineer and ALDOT Division Bridge Engineer a letter asking for more information about the bridges on the list in that area. A copy of Figure I-1 was sent with each letter so that the engineer would understand the historic eligibility criteria. A separate sheet for each bridge in that area was also provided, with data from the database already printed on it (see Figure I-2).

After several weeks, a follow-up letter was sent to those individuals who had not responded. After several further weeks, phone calls were made to those who had not responded. Eventually, of the seventy-six county engineers or ALDOT division bridge engineers, responses were received from all but fifteen. Data from the responses was then added to the SI&A database.

The same information was sent to each of seventy local historical societies. Unfortunately, response from these entities was not as good, with only five replies received. Those replies which were received often listed tunnels, railroad bridges, or other items which were not the subjects of this study.

It was hoped that the county engineers and local historical societies would supply, via the surveys, information regarding the local historical significance of the bridges in the study. This did not occur, resulting in two consequences. First, eligibility for the NRHP was determined primarily on the basis of Criteria "C" in Figure I-1 (engineering significance). Second, information regarding a bridge's local historic significance will need to be gleaned from local libraries and county courthouses and added to the database (via the computer program described below).

ID & Location

BIN	916	County	Morgan
Structure Number	053-52-0087	Owner	State Highway Agency
Name of Facility Carried	US 231: SR 53	Features Crossed	TENNESSEE RIVER
Directions	MORGAN-MADISON CO LINE	Survey Date/Time	206PM on 61197
UTM Coordinates	Section 24, Township 5S, Range 1E	No. of Pictures & ID	3, T0 to T2

Structure

Main Span Type	Steel Truss - Thru	Exemplifies Particular Design Type	Warren Improved (saddle)
Number of Spans	7 main, 6 approach	Length (ft)	288 main, 1852 total
Distinctive esthetic details		Truss Connections (pin or gusset plate)	gusset plate
Year Built	1931	Year Rebuilt	

Structural Integrity Ratings	Description	Condition
Deck		5
Superstructure		5
Substructure		6
Comments (Modifications):		
Operational Status	Posted for load, operating rating 47 tons	
Posted (tons)		

Historical Significance

Transportation Significance	Alabama Bridge
Major Road Building Programs	
Assoc'd with Historical Events	Clement Comer Clay (Whitesburg) Bridge
Builder/Fabricator/Engineer	Hardaway
Builder/ Date Plate	
Associated with an Industry	
Historical Const. Method	
Historical Comments	1 of 15 memorial bridges constructed as result of 1927 Legislative Act creating Alabama Bridge replaced Whitesburg Ferry on the Huntsville-Cullman Road; operated as toll bridge
ALDOT's SI&A Eligibility (old)	Possibly Eligible

Functionality	Rating		
Structural Evaluation	Slightly above minimum adequacy	Traffic Lanes On	2
Width Evaluation	Intolerable, requires replacement	Average Lane Width (ft)	9.84
Underclearance Evaluation	Not Applicable	Detour length (miles)	1
Approach Roadway Alignment	Slightly above minimum adequacy	ADT	9825
Sufficiency Rating	49.40	% Truck	3

Assesment of Eligibility for the National Historic Register

Good example of this type		Setting	Rural
Parallel structure possible		Visual Quality	High
Movable		Site Integrity	Retained
Rehabilitation Feasibile		Moved	

Recommended Eligibility (new)	Eligible under Criteria A.2, C.3
Explanation	Provided a critical part of a new regional transportation system: Good example of a method of construction Major crossing of Tennessee River on U.S. 231.

Figure I-2. Bridge Data Sheet.

The project team went on two one-day surveys of nearby counties to compare the bridges on the list of 900 to those bridges not on the list. The results of these one-day trips were significant; it was observed that many bridges not on the short list appeared more likely to qualify for NRHP registration than some already on the list. Thus, the team modified the statewide list of bridges to be visited.

The original list of 4,500 bridges built since 1956 was re-examined. The bridge data was sorted in a variety of ways; for example, by bridge type, age, and maximum span length. Team members looked at the data for each of the bridges individually, seeking bridges which pushed the limits of engineering design for span length, for example. They also looked for continuous span stringer bridges as opposed to simple span stringer bridges because the continuous span stringers represent a design advance. Team members also eliminated many of the newer concrete stringer and steel and concrete stringer bridges with short spans. Based on the results of the one-day survey trips, survey forms sent to engineers and historical societies, and database sortings, bridges were added and deleted from the original list of 900. The result was a list of 444 bridges scheduled for visits.

Bridge Inspections

The team visited each of the 444 bridges between March, 1997 and August, 1997. Inspections were performed county by county, and a Bridge Field Inspection Sheet was completed for each bridge (see Figure I-3). In addition to gaining an overall impression of the bridge and its setting, inspectors looked for such items as damage, corrosion, and general upkeep. For example, if a truck had caved in the bridge portal frame, that bridge would probably not be considered a good example of its type. On the other hand, a well painted bridge might qualify as a good example of its bridge type.

The inspectors took black and white photographs and color 35-millimeter slides of 372 of the 444 bridges visited. The 74 bridges not photographed either no longer existed or were judged by the field inspector to lack even a remote possibility of historical significance (e.g., a steel stringer bridge with less significance than dozens already inspected.) Though not included in the printed report, data for these bridges was entered into the data base, and this data can be accessed using the computer program written for this project.

For each of the 372 bridges included in the report, the inspectors sketched the bridge in plan and profile. They looked for builder/date plates and historical markers either on or near the bridges. Distinctive aesthetic details were noted, such as art deco or lattice railings.

Data Analysis

The photos, slides, and negatives for each bridge were catalogued when the inspectors returned from the field. They also input data from the field inspection sheets into a computer spreadsheet. Next, they designed a two-page investigation report form to be filled out for each of the 372 bridges. The first page contains photographs of the bridge and a location map showing how to find the bridge. The second page is a data sheet summarizing information from the bridge inspection sheets and data obtained previously. A report for each bridge inspected is presented in Appendix 3 of this report.

ID & Location

BIN | Structure Number | County

Name of Facility Carried | Features Crossed | Year Built

Directions | Operational Status | Year Rebuilt

Structure

Type (Examples Particular Design Type) | Main Span Length (ft) | Owner

Distinctive esthetic details | Builder/ Date Plate | Moved

Truss Connections (pin or gusset plate) | Traffic Lanes On | History

Structural Integrity Ratings

	Description	Condition	
Deck			Posted (tons)
Superstructure			Operational Rating (tons)
Substructure			

Comments:

Modifications:

Functional Obsolescence

Vertical Clearance | Roadway Width | ADT

Detour Miles | Alignment Approach | % TRUCK

Feasibility of Preservation

Setting

Visual Quality

Site Integrity

Preservation Alternatives

Parallel structure possible

Movable

Rehabilitation Feasibile

Good example of this type:

SIDE VIEW

N

PLAN VIEW

Number of Pictures Taken: | Picture ID Beginning: | Date:

Bridge Field Inspected | Picture ID End: | Time:

Figure I-3. Bridge Field Inspection Sheet.

After the individual bridge reports were assembled, the inspection team collaborated in selecting a draft list of sixty to seventy bridges to be nominated as eligible for National Registry of Historic Places designation. An equal number of bridges were designated as possibly eligible. The list represented a starting point for a final list to be prepared jointly by the inspectors and the oversight team.

As the bridge reports were being prepared, a Visual Basic computer interface was being written. The interface combines the SI&A data with the field survey data from the 372 bridges inspected. The combined information will be used by ALDOT during the planning stages of ALDOT bridge rehabilitation and replacement projects.

Data Review

Two-page reports for each of the 372 bridges were sent to the oversight agencies for the project:

- ALDOT
- FHWA
- Alabama Historic Commission

After a review period by the three agencies, they and the University of Alabama Project Team met to discuss additions and deletions to the draft list of bridges eligible for the NRHP. The historical bridge data and report was modified as recommended by the review team in the following ways:

- Sorting the bridges by structural design type (e.g., Pratt trusses were separated from Warren trusses)
- Explaining why bridges were not recommended as eligible for the historic register
- Clarifying the difference between the historic status data item in ALDOT's SI&A Bridge Inventory and the recommended eligibility for the historic register.

The result of the work by the combined team is a list of 194 bridges which were considered to be eligible or possibly eligible (see Table I-1). The majority of the eligible or possibly eligible masonry/concrete bridges are arches; and the majority of the eligible or possibly eligible steel and timber bridges are trusses. Appendix 1 contains a list showing the recommended eligibility of all 372 bridges that were surveyed.

Table I-1. Eligibility of Surveyed Bridges by Material Type

	Eligible	Possibly Eligible	Not Eligible	Total
Masonry/Concrete	26	23	58	**107**
Steel	80	54	113	**247**
Timber	10	1	7	**18**
Total	**116**	**78**	**178**	**372**

Organization of This Report

The following three chapters of this report present a history of bridges in America

(Chapter II), a history of road and bridge development in Alabama (Chapter III) and a history of the Alabama Department of Transportation (Chapter IV). Appendix 1 contains a list of the surveyed bridges and the recommended eligibility. Appendix 2 is an excerpt from Parker's earlier historic bridge inventory [3] that provides additional historical information on the history of Alabama's bridges. And finally Appendix 3 is the data sheets and photos of the 372 bridges surveyed.

References

1. "National Register Bulletin 15: How to apply National Register Criteria for Evaluation," U.S. Department of the Interior, National Park Service Interagency Resources Division.

2. Bell, L.C. and Owsley, F.L., "Alabama Historic Bridge Inventory", Alabama Highway Research Project No. 50 001 014 960 083, Montgomery, AL.

3. State of Alabama Highway Department, "Draft Report: Historic Bridge Inventory", Montgomery, AL.

ID & Location

BIN	543	County	De Kalb
Structure Number	117-25-0050	Owner	State Highway Agency
Name of Facility Carried	SR 117	Features Crossed	WEST FORK LITTLE RIVER
Directions	5 MI NW ALA-GA ST LINE	Survey Date/Time	1030AM on 61197
UTM Coordinates	Section 27, Township 5S, Range 10E	No. of Pictures & ID	2, AE14 to AE15

Structure

Main Span Type	Concrete Arch - Deck	Exemplifies Particular Design Type	Open Spandrel
Number of Spans	1 main, 2 approach	Length (ft)	90 main, 127 total
Distinctive esthetic details		Truss Connections (pin or gusset plate)	
Year Built	1928	Year Rebuilt	

Structural Integrity Ratings	Description	Condition
Deck		5
Superstructure		6
Substructure		7
Comments (Modifications):		
Operational Status	Open, no restriction, operating rating 25 tons	
Posted (tons)		

Historical Significance

Transportation Significance	
Major Road Building Programs	
Assoc'd with Historical Events	
Builder/Fabricator/Engineer	
Builder/ Date Plate	
Associated with an Industry	
Historical Const. Method	
Historical Comments	bridge card on file
ALDOT's SI&A Eligibility (old)	Historical significance is not determinable at this time

Functionality	Rating		
Structural Evaluation	Adequate to be left in place as is	Traffic Lanes On	2
Width Evaluation	Intolerable, requires replacement	Average Lane Width (ft)	10.00
Underclearance Evaluation	Not Applicable	Detour length (miles)	7
Approach Roadway Alignment	Slightly above minimum adequacy	ADT	2600
Sufficiency Rating	54.00	% Truck	8

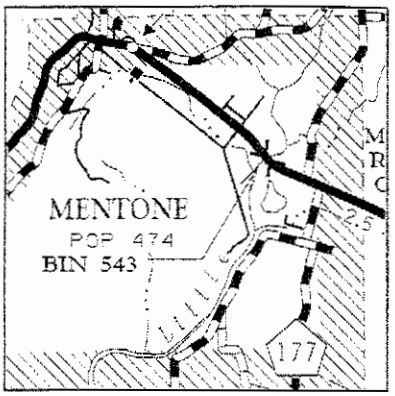
Assesment of Eligibility for the National Historic Register

Good example of this type	yes	Setting	Rural Town
Parallel structure possible	yes	Visual Quality	High
Movable	no	Site Integrity	Retained
Rehabilitation Feasibile	yes	Moved	

Recommended Eligibility (new): Eligible under Criteria C.1

Explanation: Good example of a particular type of bridge

One of the best examples of a smaller concrete open spandrel arch spans a branch of the Little River in De Kalb County.



BIN 543, De Kalb County
Sect. 27, T. 5S, R. 10E

Picture ID: AE14

Picture ID: AE15