BELLEVILLE ROAD BRIDGE
Spanning Belleville Lake at Belleville Road
Belleville
Wayne County
Michigan

HAER No. MI-66

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
Northeast Region
U.S. Custom House
200 Chestnut Street
Philadelphia, PA 19106

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BELLEVILLE ROAD BRIDGE HAER No. MI-66

Location: Spanning Belleville Lake at Belleville Road, Belleville, Wayne County, Michigan

UTM: 17.294364.4676100
Quad: Belleville

Engineer/Builder: The bridge was designed by the Wayne County Road Commission. The substructure was constructed by the Ferguson & Edmondson Company of Pittsburgh, Pennsylvania, and the superstructure by the Mount Vernon Bridge Company of Mount Vernon, Ohio.

Date of Construction: 1924. Deck replacement 1943 and 1959.

Present Owner: County of Wayne
Wayne County Building
600 Randolph
Detroit, MI 48226

Present Use: Vehicular and pedestrian bridge.

Significance: The Belleville Road Bridge is important in local history for its relation to events surrounding the creation of Belleville Lake and the local economic, recreational, residential and agricultural development of the surrounding area. It has been identified as being potentially eligible for the National Register of Historic Places as a late example of a rivetted camelback pony truss.

Project Information: This documentation was undertaken in January 1994 in accordance with the Memorandum of Agreement by the Wayne County Department of Public Services as a mitigative measure prior to the removal, relocation and replacement of the bridge.

George R. Schneider
Division of Engineering
Wayne County Department of
Public Services
Detroit, MI

SUMMARY DESCRIPTION OF BRIDGE AND SETTING

The bridge carries Belleville Road, originally known as State Trunk Line No. 56, over Belleville Lake, also formerly known as Edison Lake. The bridge straddles the boundary between the City of Belleville and Van Buren Township in Wayne County, Michigan. (See Location Map). Situated as it is, the bridge serves as the "front door" to the City of Belleville.

The City of Belleville encompasses 1.16 square miles and had a 1990 census population of 3270 persons. The City's land use is primarily commercial and residential. Van Buren Township surrounds the City of Belleville, is 35.96 square miles in area, and had a 1990 census population of 21,010 persons. The Township's land use is predominantly open land including agricultural uses.

The Belleville Road Bridge is one of only four bridges crossing the five mile long Belleville Lake. This particular bridge is centrally located and provides access to the I-94 Freeway and into and out of the area's largest commercial and residential district, the City of Belleville. Main Street, the southerly continuation of Belleville Road, is developed heavily with commercial uses that support the recreational attributes of Belleville Lake. These include boat rentals, bait shops and convenience stores.

Because of its strategic location, the Belleville Road Bridge is critical to the economic vitality of the area's businesses and to the social integrity of the area's residents. Consumers use it to access business establishments and retail sales and area residents to access their homes. Public safety is very dependent upon this bridge since the area's police and fire departments regularly cross it when responding to emergencies.

The current average daily traffic (ADT) is both directions on the exiting two-lane bridge is 23,000 vehicles. By the year 2010, it is estimated that the ADT will be approximately 29,000 vehicles. These high volumes are attributable to the fact that Belleville Road is the only north-south road crossing Belleville Lake and the I-94 Freeway between Rawsonville and Haggerty Roads, a distance of 5.2 miles.

In 1924, Belleville was a small village along the banks of the Huron River. Access from the north was provided by Belleville Road, a 16' wide concrete pavement, which had been completed in the spring of 1915. The road was then part of the trunk line system of the State and also a link in the Outer Belt Route around the County. To construct this road the Wayne County Road Commission had received from the State a reward of $3400 per mile which was

double the ordinary reward offered. (1)

Two narrow and inadequate bridges carried Belleville Road across the Huron River and an old mill race. Near these crossings, the road was a mix of a very narrow highway on a high fill with two steep grades and two right angle turns. Many accidents had resulted from this dangerous combination. (2)

Due to a combination of favorable circumstances in 1924, Wayne County availed itself of an opportunity to correct this serious condition. At that time the Detroit Edison Company was proposing to carry out a hydroelectric development project on the Huron River. This project, which was to change the very face of Van Buren Township, involved the construction of a high dam at French Landing some two miles down river from Belleville Road. The resulting impoundment would create a five mile long body of water to be known concurrently as both Belleville and Edison Lake. (3).

Inasmuch as the impoundment would result in raising the water level many feet over the then existing Belleville Road and its bridges, an agreement was reached whereby the Detroit Edison Company would procure right-of-way for the relocation of the road and also pay all costs associated with a new bridge and a raised roadway of equal capacity to those being replaced. Because the project was located on a State Trunk Line Road, the State Highway Department approved this arrangement and they also approved the County's suggestion that advantage be taken of this opportunity to construct a wider road and bridge than had formerly existed. (4)

Under the terms of a 1923 three-party agreement, the bridge and road work had to be sufficiently complete to allow the reservoir to be flooded on January 1, 1925. In order to meet this deadline, contracts (which included bonus and penalty clauses for completion on specified dates) were let early in 1924. (5)

The new Belleville Road alignment eliminated all sharp turns and steep grades by construction of a long earthen causeway through the old river valley. This extremely high causeway fill, which involved approximately 100,000 cubic yards of earthwork, was constructed in the dry in one-foot lifts with the use of horse drawn wagons and lifting graders. When the bridge was essentially complete and the reservoir was completely filled with water the causeway became so saturated that it settled more than had been anticipated. The result was that the bridge approach pavements failed. The County then waited until 1927, for the settling and consolidation to stop, before it repaved the bridge approach pavements. (6) (7) (8)

Shortly after the dam at French Landing and the Belleville Road Bridge were completed, a most frightening event occurred. On April 13, 1925, the earthen embankment abutting the dam broke. (See April 13, 1925 Photograph of Break in Edison Dam). According to a Dr. Samuel Robbe, "...the earthwork gave way with a roar that could be heard for several miles." Although area lowlands were flooded, no deaths resulted from the breaking of the dam, and the Detroit Edison Company corrected the problem. (9)

The break in the dam resulted in a total draw down of the reservoir. A dirt fan around the south abutment of the Belleville Road Bridge and the riprap on that fan were washed out and fill behind the abutment settled somewhat. The fan around the north abutment was damaged to a lesser extent. Fortunately, however, no serious damage was done to the bridge and the Detroit Edison Company paid for the necessary repairs.

The bridge was designed in 1923 and 1924 under the direction of Leroy C. Smith, Engineer-Manager and Harry A. Shuptrine, Bridge Engineer of the Wayne County Road Commission. Road Commission engineers Franklin H. Chapin, Julian C. Mead and C.E. Scott performed the actual design. Construction of the bridge began in 1924 and was completed in 1925. The Mount Vernon Bridge Company of Mount Vernon, Ohio prepared eleven shop drawings for the fabrication of the superstructure. The fabrication was performed in accordance with the American Railway Engineering Association (AREA) specifications of 1920. This same firm also fabricated and erected the metal superstructure completing its task in early November of 1924. (See November 12, 1924 Photograph of New and Old Belleville Road Bridges).

The bridge is a two-lane wide, 120-foot long, single span, steel, riveted camelback pony truss. "Pony" indicates that it is a type of truss that utilizes its lower chords to carry the traffic deck without overhead lateral supports. "Camelback" has reference to its shape and designates a Parker (i.e., a polygonal chord Pratt) truss with a top chord of five slopes. The bridge consists of a total of eight truss panels each 15' long. (See Photograph of original contract drawing 5 titled "General Plan of Structural Steel").

The end posts and top chords, which are compression members, are girders formed from angles joined to web plates with their top and bottom flanges connected by a lattice work web. The bottom chords, which are tension members, consist of vertical channels and horizontal plates riveted together in a box like configuration. The diagonals consist of flange angles connected to lattice bar webbing while the verticals consist of flange angles joined to

a solid web plate. All joint connections between truss members are accomplished by riveting to gusset plates. (See Photograph, View North, showing truss and sidewalk on east side of bridge).

The concrete roadway floor of the bridge is supported by stringer beams framed into the floor beams which are located opposite each panel point of the truss. Diagonal bracing between the panel points consists of back to back riveted angles. The trusses rest on two fixed pedestal bearings at the north abutment and two expansion pedestal bearings at the south abutment. (See Photographs of original contract drawing 6 titled "Details Structural Steel").

The shop drawings called for all metal bridge members to be painted with one coat of red lead and oil (100 # pure red lead to 4 gallons purg boiled linseed oil and not to exceed 1/2 pint turpentine Japan dryer) prior to leaving the shop. Field painting consisted of two coats. The contract plans called for the first coat to be Graphite #502 or egual and the second coat to be Detroit Graphite #308 or egual. The field painting, which cost $585.50, was not included as part of the contract.

The truss superstructure rests on 30-foot high reinforced concrete abutments which are supported on wood piles. (See August 15, 1924 Photograph of abutment falsework and apparatus to pour abutment concrete). The bridge was constructed in the dry at the ends of two long causeway fills, prior to the damming of the Huron River at French Landing to create Belleville Lake. During the 1970's the causeway approaches were widened with broken concrete fill.

The bridge was completed in 1925 at a cost of $86,048.99. The Detroit Edison Company contributed $87,000.00 towards the cost of the whole improvement, including both bridge and road work. (10) The contract cost for the 335,500 pounds of steel superstructure, including fabrication and erection, came to $20,510.25.(11)

On December 8, 1930 the Michigan Department of State Highways canceled that portion of Trunk Line Road No. 56 containing the Belleville Road Bridge as a State trunk line but continued to perform maintenance on it. On January 1, 1943 the State also ceased to perform maintenance functions on this section of road and those duties reverted to the County. On March 26, 1943 the Wayne County Board of Road Commissioners passed a resolution assuming jurisdiction of the section of Belleville Road containing the Belleville Road Bridge.

Over the years a number of repairs and alterations were made to the Belleville Road Bridge. A search of county maintenance records resulted in the following chronological listing of the more significant of these:

1. In 1926, approximately 300' of approach pavement had to be replaced due to pavement failure caused by consolidation and settlement of the approach fills.

2. In 1943, due to concrete deterioration under the pedestal bearings on the south abutment, "temporary" pedestals were erected under the end floor beam, 3'-4" from the center of each truss bearing, to support the structure during the period of time that concrete repairs were to be made. Due to engineering considerations, the repairs were never made and the "temporary" auxiliary pedestals were made permanent, with certain modifications, in 1954.

3. In 1943, the badly disintegrated bridge deck slab was reconstructed.

4. In 1949, a number of disintegrated handrail spindles on the wingwall railings were replaced. The truss was also cleaned by sand blasting and repainted.

5. In 1949, an 8" natural gas main, feeding some 5800 homes in Belleville and South Van Buren Township, was suspended beneath the east sidewalk of the bridge.

6. In 1952, masonry repairs were made to both abutments when the water level in the lake was lowered approximately two feet.

7. In 1958, the entire steel work of the bridge was cleaned and painted.

8. In 1959, the bridge deck slab was again reconstructed.

9. In 1964, the deteriorated cast stone handrails on the wingwalls were replaced with a new concrete parapet and steel pipe railing. Extensive repairs to the abutment bridge seats were also made in that year.

10. In 1968, and again in 1986, all exposed superstructure steel was cleaned by sandblasting and painted.

11. In 1985, due to continued deterioration of the abutment and backwall concrete, the bridge was posted to restrict heavy truck traffic. The posting restrictions have remained in effect to this day.

At this writing, the Belleville Road Bridge has served the people of Michigan at its original location for some 70 years. It is a significant landmark and will undoubtedly be missed by many. The encouraging aspect of its removal is the probability that this historic structure will be rehabilitated and continue to serve the people of this state for many years to come at a new rural location in Kent County, Michigan.

BIBLIOGRAPHY

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2. Eighteenth Annual Report of the Board of County Road Commissioners of Wayne County, Michigan. (Wayne County, Michigan 1923-1924), p. 85, 87.

3. Horste, C. S., and D. F. Wilson: Water Under the Bridge, 1977, p. 353. A History of Van Buren Township. Library of Congress Catalog Card Number 77-92431.

4. Eighteenth Annual Report, Board of County Road Commissioners, p. 87.

5. Ibid.

6. Nineteenth Annual Report of the Board of County Road Commissioners of Wayne County, Michigan. (Wayne County, Michigan 1924-1925), p. 64, 65.

7. Photocopy of a letter dated June 16, 1926 from Leroy C. Smith, Engineer-Manager of the Wayne County Road Commission, to C. E. Foster, Construction Engineer of the State Highway Department.

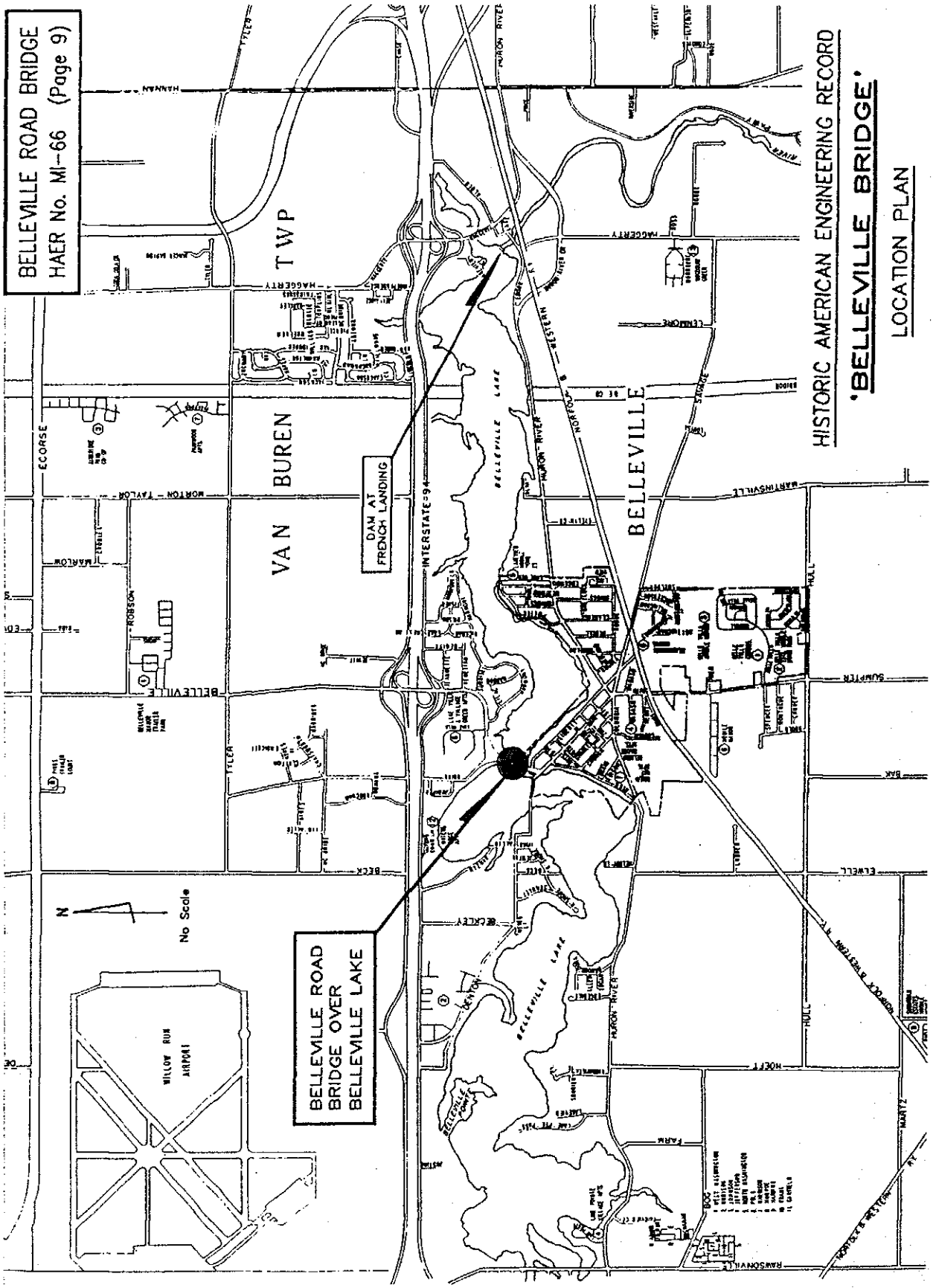
8. Twentieth Annual Report of the Board of County Road Commissioners of Wayne County, Michigan. (Wayne County, Michigan 1925-1926), p. 65.

9. Horste, C. S., and D. F. Wilson: Water Under the Bridge, 1977, p. 356.

10. Nineteenth Annual Report, Board of County Road Commissioners, p. 65.

11. Eighteenth Annual Report, Board of County Road Commissioners, p. 87.

Note: Copies of the pertinent pages of the documents included in this bibliography have been included as attachments to this report.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HISTORIC AMERICAN ENGINEERING RECORD
'BELLEVILLE BRIDGE'
LOCATION PLAN
VAN BUREN TWP
BELLEVILLE
DAM AT FRENCH LANDING
INTERSTATE-94
BELLEVILLE LAKE
HURON RIVER
WILLOW RUN AIRPORT
BELLEVILLE ROAD BRIDGE OVER BELLEVILLE LAKE
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No Scale