Maryland Historical Trust

Maryland Inventory of Historic Properties number: K-681

Name: MD 299 (Massay Rd) over Jacobs Creek

The bridge referenced herein was inventoried by the Maryland State Highway Administration as part of the Historic Bridge Inventory, and SHA provided the Trust with eligibility determinations in February 2001. The Trust accepted the Historic Bridge Inventory on April 3, 2001. The bridge received the following determination of eligibility.

MARYLAND HISTORICAL TRUST

Eligibility Recommended ___X___ Eligibility Not Recommended _____

Criteria: ___A ___B ___C ___D Considerations: ___A ___B ___C ___D ___E ___F ___G ___None

Comments: _____

_____

_____

Reviewer, OPS: Anne E. Bruder Date: 3 April 2001

Reviewer, NR Program: Peter E. Kurtze Date: 3 April 2001

MARYLAND INVENTORY OF HISTORIC BRIDGES **MHT No.** K-681
HISTORIC BRIDGE INVENTORY
MARYLAND STATE HIGHWAY ADMINISTRATION/
MARYLAND HISTORICAL TRUST

SHA Bridge No. 14018 **Bridge name** MD 299 (Massey Road) over Jacobs Creek

LOCATION:
Street/Road name and number [facility carried] MD 299 (Massey Road)

City/town Sassafras **Vicinity** X

County Kent

This bridge projects over: Road____ **Railway**_____ **Water** X **Land** ____

Ownership: State X **County** _____ **Municipal** _____ **Other** _____

HISTORIC STATUS:
Is the bridge located within a designated historic district? Yes _____ **No** X
National Register-listed district ____ **National Register-determined-eligible district** __
Locally-designated district _____ **Other** _____

Name of district _____

BRIDGE TYPE:
Timber Bridge X:
Beam Bridge _____ **Truss -Covered** ___ **Trestle** ___ **Timber-And-Concrete** X

Stone Arch Bridge _____

Metal Truss Bridge _____

Movable Bridge ____:
Swing _____ **Bascule Single Leaf** __ **Bascule Multiple Leaf** _____
Vertical Lift _____ **Retractile**_____ **Pontoon** _____

Metal Girder_____:
Rolled Girder _____ **Rolled Girder Concrete Encased** _____
Plate Girder _____ **Plate Girder Concrete Encased** _____

Metal Suspension _____

Metal Arch _____

Metal Cantilever _____

Concrete _____:
Concrete Arch_____ **Concrete Slab** ____ **Concrete Beam** ___ **Rigid Frame** _____
Other _____ **Type Name** _____

K-681

DESCRIPTION:

Setting: Urban _____ **Small town** _____ **Rural** X

Describe Setting:

Bridge No. 14018 carries Maryland Route 299 (Massey Road) over Jacobs Creek in Kent County. Maryland Route 299 runs north-south and Jacobs Creek flows from east to west. The bridge is located in the vicinity of Sassafras, and is surrounded by trees and open space.

Describe Superstructure and Substructure:

Bridge No. 14018 is a three-span, two-lane, composite timber and concrete bridge. The bridge was originally built in 1938, with fiberglass and epoxy pile jacketings, steel cap strengtheners, and new timber cross-bracing added in 1994. The structure is 21.3 meters (70 feet) long, consisting of three 6.1 meter (20 foot) spans, and has a clear roadway width of 7.9 meters (26 feet); there are no sidewalks. The out-to-out width is 9.3 meters (30.4 feet). The superstructure consists of two timber beams which support a composite timber and concrete deck and concrete rails. There is a concrete wearing surface. The structure has reinforced concrete railings made up of square posts, cyma curve end posts, both with Art Deco detailing, and two horizontal square reinforced concrete rails. The roadway approaches are patched full-width. A number on the end post identifies the bridge as 14018. The substructure consists of two timber abutments and two 6-pile intermediate bents at 6.1 meters (20 foot) intervals. There are no wingwalls. The bridge is not posted, and has a sufficiency rating of 58.8.

According to the 1997 inspection report, this structure was in satisfactory condition with wet and rotting timber stringers, piles, and abutments. The concrete wearing surface has transverse and longitudinal cracks and light surface scaling. Also, the concrete parapet is cracking and spalling with reinforcement bars exposed and rusting in some areas.

Discuss Major Alterations:

The fiberglass pile jackets and steel channels on the caps were constructed in 1994. New timber cross-bracing was also added at this time.

HISTORY:

WHEN was the bridge built: 1938
This date is: Actual X **Estimated** _____
Source of date: Plaque ____ **Design plans** ___ **County bridge files/inspection form** __
Other (specify): State Highway Administration bridge files/inspection reports

WHY was the bridge built?

The bridge was constructed in response to the need for more efficient transportation network and increased load capacity.

WHO was the designer?

State Roads Commission

K-681

WHO was the builder?

State Roads Commission

WHY was the bridge altered?

The bridge was altered to ensure its structural integrity.

Was this bridge built as part of an organized bridge-building campaign?

The bridge was constructed by the State, as part of a campaign to improve Tidewater highways and crossings over bodies of water during the late 1930s.

SURVEYOR/HISTORIAN ANALYSIS:

This bridge may have National Register significance for its association with:
A - Events _____ B- Person _____
C- Engineering/architectural character X

The bridge is eligible for the National Register of Historic Places under Criterion C, as a significant example of composite timber and concrete construction. It is the only example of composite timber and concrete bridge construction built in Kent County in the 1937-1938 time period. The structure has a high degree of integrity, including integrity of location, design, setting, workmanship, and feeling, and retains such character-defining elements of the type as an intact concrete railing with Art Deco influenced curved endposts and square posts, and two square horizontal rails. The timber bents with timber piles have undergone minor changes, including jacketing and strengthening of the bent caps, neither of which affects the immediate visual impact of the bridge. The 1938 date of construction indicates that this was an early use of composite timber and concrete construction technology patented in 1935. The State Roads Commission chose the composite technology for its greater strength and durability over timber alone. A laminated timber deck supports a concrete slab which interlocks with the timber base, creating a structure that functions as a single unit.

Was the bridge constructed in response to significant events in Maryland or local history?

The earliest bridges built in North America were timber bridges. According to one account, European settlers at first utilized the bridges constructed by the Native American populations, which consisted of tied timbers laid across up-turned forked tree trunks (American Association of State Highway Officials 1953: 19). This design was adopted by the settlers, who then modified the design by hewing the upper portions of the timbers to provide a flat surface and by adding a handrail to one side (American Society of Civil Engineers 1976: 143). Where crossings exceeded the length of the available timber, short spans were joined and supported on wood piles or on timber cribs filled with earth or stone. In fact, the earliest recorded bridge built by European settlers in America was most likely this type of design. Constructed in 1611 on James Towne Island, Virginia, this timber bridge extended approximately 200 feet into the water and provided docking facilities in the 12 foot deep channel (American Association of State Highway Officials 1953: 19).

The combination of timber with other materials began with the invention of the Howe truss in 1840. William Howe patented a truss which utilized iron verticals as tension members and wood diagonals as compression members. The Howe truss became a standard of railroad bridge design. By the 1860s, the problem of wood deterioration was under better control with the invention of pressure

creosote treatments, which extended the life of the wood members. Timber pile bent structures remained popular, in particular in tidal areas, into the twentieth century. These were most often used in combination with concrete.

Timber bridges continued to be constructed in the United States during the twentieth century. A significant technological development of the 1930s permitted construction of timber-concrete composite structures, featuring decks utilizing both timber and reinforced concrete. The 1975 American Society of Civil Engineers Design Guide and Commentary on Wood Structures offered the following description of composite decks of timber and concrete:

> Composite timber-concrete decks are commonly used in bridge construction. Construction is such that timber carries most of the tension forces. Composite construction is of two basic types, T-beams and slab decks.... Composite T-beam sections consist of timber stringers, which form the stem, and concrete slab for the flange area. Notches are cut into the top edge of the stringers to resist horizontal shear and mechanical fasteners are driven into the top to prevent vertical separation so that the two components perform integrally. Stresses due to temperature changes must be considered in the concrete section.
>
> Composite slabs consist of nominal 2-inch lumber, usually nailed-laminated with the wide faces vertical, and a concrete section cast monolithically in place. Grooves are formed by using alternate laminations that differ in width by 2 inches or by fabricating panels with a 2-inch offset between laminations. Horizontal shear is resisted by grooves cut into the projecting laminations or by metal shear plates. Transverse joints in the timber portion are made by dapping or cutting alternate laminations to a different length to provide finger joints. The concrete slab should be reinforced for temperature stress and for negative bending stresses when the deck is continuous over a support. No falsework or extensive forming is necessary with this construction (American Society of Civil Engineers 1975:372-73).

The timber-concrete composite slab type of bridge construction was pioneered in the United States by James F. Seiler and the American Wood-Preservers Association between 1932 and 1935. The latter organization's 1935 patent for "composite wood and concrete construction" became the basis for such technology.

Such timber-and-concrete composite structures were evidently introduced in Maryland by the State Roads Commission engineers, who kept abreast of early twentieth century trends in composite bridge design. In the 1937-1938 *Report of the State Roads Commission*, Bridge Division Chief Engineer Walter C. Hopkins acknowledged professional interest in such structures:

> The bridges constructed have been varied, with miscellaneous types and of different materials. Bridges have been built of concrete, steel, timber, or stone, or combinations thereof. Careful study is given the employment of those materials most satisfactorily adapted to the structure in question. Balance, proportion and treatment that will result in simplicity, gracefulness and pleasing appearance are always considered and sought by the designer (State of Maryland, State Roads Commission 1938:71).

The Bridge Division's earliest timber-and-concrete composite bridges were built in 1937-1938 in Tidewater Maryland. Three such bridges were constructed in Wicomico County, and one each in Calvert, St. Mary's, Queen Anne's, Kent, and Caroline counties. Pictured in the 1937-1938 State Roads Commission report, the longest such bridge was "a timber and concrete composite bridge of twelve 20-foot spans, providing a clear roadway of 26 feet, and two 3-foot, 1-inch sidewalks, over

K-681

Tony Tank Pond, on the road from Salisbury to Princess Anne near Salisbury, Wicomico County" (State of Maryland, State Roads Commission 1938:83).

Subsequent State Roads Commission reports refer to additional timber-concrete composite bridges constructed under state authority between 1939 and 1960, primarily at Tidewater (Coastal Plain) sites on the Eastern Shore and in Southern Maryland (State of Maryland, State Roads Commission 1939:71; 1943:45). In 1947, Bridge Division engineers observed that "the development of the composite use of timber and concrete has permitted the design of economical structures with the general appearance from the roadway of a much more costly bridge" (State of Maryland, State Roads Commission 1947:53).

When the bridge was built and/or given a major alteration, did it have a significant impact on the growth and development of the area?

There is no evidence that the construction of this bridge had a significant impact on the growth and development of this area.

Is the bridge located in an area which may be eligible for historic designation and would the bridge add to or detract from the historic/visual character of the potential district?

The bridge is located in an area which does not appear to be eligible for historic designation.

Is the bridge a significant example of its type?

The bridge is a good example of the State Roads Commission standard bridge design associated with the building of bridges over bodies of water on Tidewater highways of the late 1930s. It is the only example of a composite timber and concrete bridge built by the State Roads Commission in Kent County in 1937-1938.

Does the bridge retain integrity of important elements described in Context Addendum?

The bridge retains the character-defining elements of its type, as defined by the Statewide Historic Bridge Context, including concrete railings, a composite timber and concrete deck and timber bents and piles, however some deterioration is evident.

Is the bridge a significant example of the work of a manufacturer, designer, and/or engineer?

This bridge is a significant example of the work of the State Roads Commission in the late 1930s.

Should the bridge be given further study before an evaluation of its significance is made?

No further study of this bridge is required to evaluate its significance.

BIBLIOGRAPHY:

County inspection/bridge files _____ **SHA inspection/bridge files** X
Other (list):

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1908 *The Design of Highway Bridges and the Calculation of Stresses in Bridge Trusses.* The Engineering News Publishing Co., New York.

K-687

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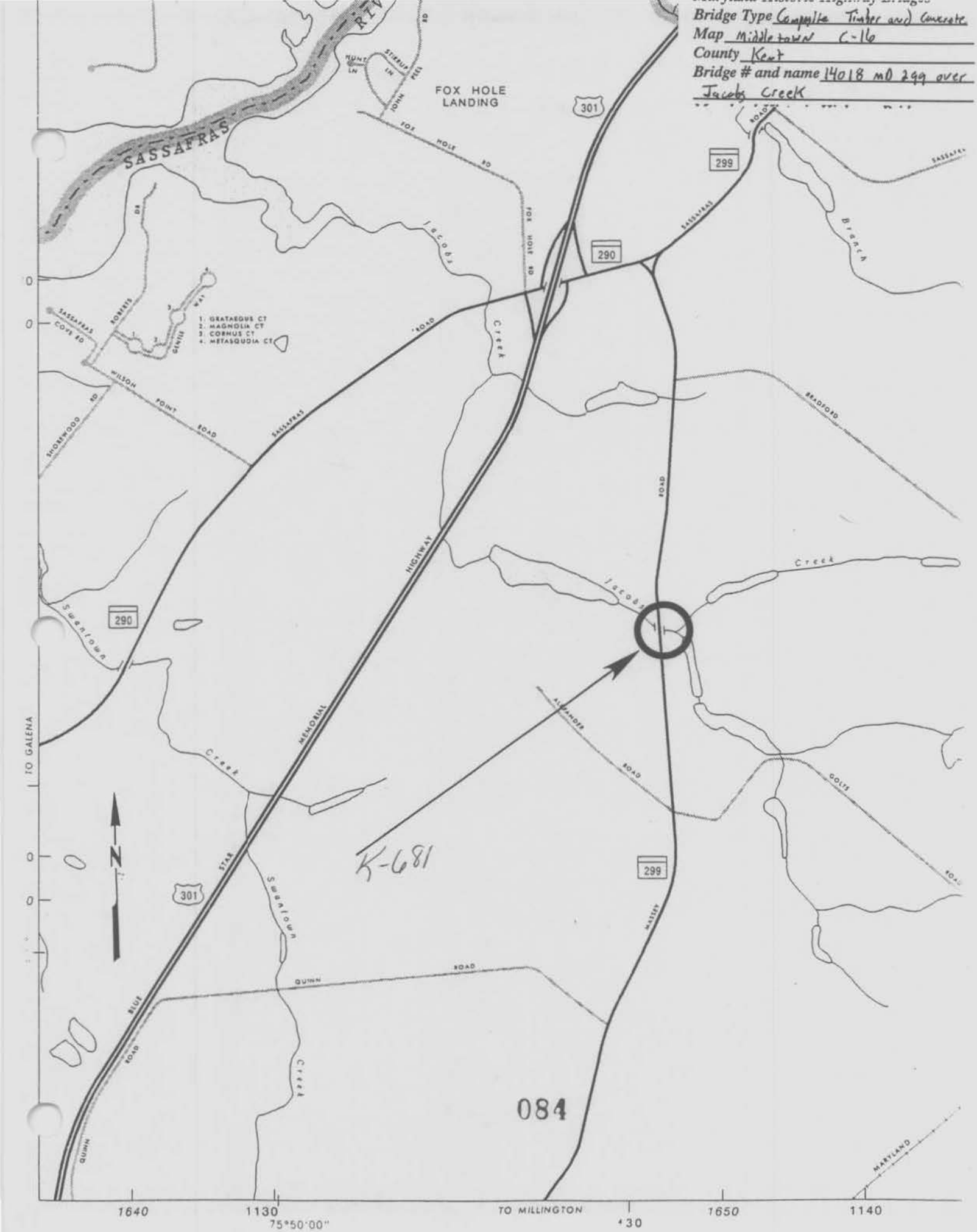
SURVEYOR:

Date bridge recorded 7/18/97
Name of surveyor Caroline Hall/Susan Taylor
Organization/Address P.A.C. Spero & Co., 40 W. Chesapeake Avenue, Suite 412, Baltimore, MD 21204 **Phone number**(410) 296-1635 **FAX number** (410) 296-1670


Bridge Type Composite Timber and Concrete
Map Middletown C-16
County Kent
Bridge # and name 14018 MD 299 over Jacobs Creek
SASSAFRAS RIVER
FOX HOLE LANDING
FOX HOLE RD
JACOBS ROAD
SASSAFRAS ROAD
WILSON POINT ROAD
SASSAFRAS COVE RD
1. GRATAEGUS CT
2. MAGNOLIA CT
3. CORNUS CT
4. METASQUOIA CT
HIGHWAY
MEMORIAL
ALEXANDER ROAD
GOLTS ROAD
MASSEY
BLUE STAR
SWANSON
QUINN ROAD
BRADFORD ROAD
Creek
290
299
301
K-681
084
TO GALENA
TO MILLINGTON
MARYLAND
1640
1130
1650
1140
75°50'00"
430

1. K-681
2. 14018, MO 299 over Jacobs Creek
3. Kent County, MD
4. Susan Taylor
5. July 1997
6. MO SHPO
7. North approach
8. 1 of 6

1. K-681

2. 1401, MD 299 over Jacobs Creek

3. Kent County, MD

4. Susan Taylor

5. July 1997

6. MD SHPO

7. South approach

8. 2 of 6

1. K-681

2. 14018. MO 299 over Jacobs Creek

3. Kent County, MO

4. Susan Taylor

5. July 1997

6. MO SHPO

7 East parapet wall

8. 3 of 6

1. K-6 81

2. 14018, MD 299 over Jacobs Creek

3. Kent County, MD

4. Susan Taylor

5. July 1994

6. MD SHPO

7. West parapet wall

8. 4 of 6

1. K-6 81

2. 14018, MD 299 over Jacobs Creek

3 Kent County, MD

4. Sandra Taylor

5. July 997

6. MD 514-20

7. Detail of end

8 5 of 6

1. K-681
2. K-618, MD 299 over Jacobs Creek
3. Kent County, MD
4. Susan Taylor
5. July 1997
6. MD SHPO
7. Detail of west parapet
8. 6 of 6