Maryland Historical Trust

Maryland Inventory of Historic Properties number: BA-1140

Name: PAPER MILL BRIDGE.

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
HISTORIC BRIDGE INVENTORY
MARYLAND STATE HIGHWAY ADMINISTRATION/
MARYLAND HISTORICAL TRUST

MHT No. BA-1140

SHA Bridge No. BC 6506 Bridge name Paper Mill Bridge

LOCATION:
Street/Road name and number [facility carried] Paper Mill Road over Gunpowder Falls

City/town Hunt Valley Vicinity X

County Baltimore

This bridge projects over: Road____ Railway_____ Water X Land ____

Ownership: State County ____ Municipal X 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 _____:
Beam Bridge _____ Truss -Covered ___ Trestle ____ Timber-And-Concrete ___

Stone Arch Bridge _____

Metal Truss Bridge X

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 _____

BA-1140

DESCRIPTION:

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

Describe Setting:

Bridge BC 6506 carries Paper Mill Road over Gunpowder Falls in Loch Raven Reservoir, in the Hunt Valley vicinity, Baltimore County. Paper Mill Road runs in a generally east/west direction in the vicinity of the bridge, while Gunpowder Falls flows north/south. In this area, Gunpowder Falls has heavily wooded streambanks and there is a small island under the bridge.

Describe Superstructure and Substructure:

Bridge BC 6506 is a six-span steel truss and multi-beam bridge measuring 139.9 meters (459 feet) in total length, constructed in 1922. It comprises a single, three-hinged, spandrel-braced arched through-truss span and five (5) steel-girder spans. The truss span measures 110 meters (361 feet) in length. The arch rises 20.1 meters (66 feet) above the pins. The top truss consists of nineteen (19) sections of variable depth with a smooth arched appearance at its underside. The upper chord is designed as a parabolic arch. There are fifteen (15) suspenders which carry the metal open grid deck supported by floorbeams and which divide the arch shape in seventeen (17) equal length segments. The bridge originally had a concrete deck with a bituminous wearing surface and concrete curbs. A strip of metal grill extends across the interior truss members and functions as a railing.

The exterior vertical truss members of the eight (8) sway frames are open, latticed types consisting of four (4) angles and thin diagonal plates. All original steel construction is riveted. There are two (2) columns at each portal end of the truss with non-functional ornamental lights capping each. On the exterior sway frames is a small cast panel with the seal of the City of Baltimore and the inscription "City of Baltimore, 1797" around which is a decorative arched lattice section.

The abutments which are built on a slight curve consist of reinforced concrete with ornamental solid balustrades and inscribed panels on the four pilasters on each side face. The east abutment is a cellular type while the west abutment is full cantilevered. Both have counterfort concrete wingwalls. There are solid concrete endposts on the abutments.

The bridge is posted for 16.2 tonnes (18 tons) and 25 mph and has a sufficiency rating of 66.1.

Discuss Major Alterations:

After 1934, the open concrete balustrade which extended across the bridge was infilled and topped with a plaster coating. In 1968, the lower truss bracing at the section of lower chord was replaced, as was the concrete and bituminous deck and concrete curbs. A steel grid deck and structural tubing was installed. In 1986, two (2) concrete beams and angle braces were replaced.

A 1991 inspection report notes the rehabilitation of the structure, including a new deck and replacement of lower truss bracing with new bolted members in 1990. An inspection report from 1995 notes collision damage to the ornamental steel bridge railing and missing rivets at the railing connections to the vertical members of the north truss. In addition, it was noted that several stringer connections to the floorbeams were loose and not full bearing. Some of the stringer connection bolts were sheared or were missing.

BA-1140

HISTORY:

WHEN was the bridge built 1922
This date is: Actual X **Estimated** _____
Source of date: Plaque _____ **Design plans** ___ **City bridge files/inspection form** X
Other (specify):

WHY was the bridge built?

To provide a reliable crossing over Gunpowder Falls when the level of Loch Raven Reservoir was increased to satisfy the needs of the population of Baltimore City. Secondarily, this satisfied the servicing of the reservoir area both for City maintenance crews to the waterworks and dam as well as park users and the residents of the surrounding growth areas of Baltimore County. The Paper Mill Bridge replaced a 2-span covered wood bow-string truss supported on stone abutments.

WHO was the designer?

Hershel Hethcote Allen of the J.E. Greiner Company

WHO was the builder?

Bethlehem Steel Bridge Corporation

WHY was the bridge altered?

Originally, the bridge was altered to replace concrete superstructure members, including the deck and curbing, which were deteriorating. Later, alterations were needed to replace the deteriorated metal open grid deck and truss members and to upgrade the bridge, to the extent possible, to current design and safety specifications.

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

Yes; Bridge BC 6506 was built as part of the reconstruction of elements at the Loch Raven Reservoir. It also was a component of the campaign after World War I to modernize local bridges due to the impact of high growth in the Baltimore area with the advent of motorized vehicles.

The Loch Raven Reservoir area, including 33.8 kilometers (21 miles) of the Gunpowder River from tidewater to Meredith's Bridge and 647.5 hectare (1600 acres) of land, had been purchased by the City of Baltimore as early as 1866. In 1874, an ordinance was passed creating a permanent water supply for the City of Baltimore at Loch Raven. Construction of the dam and waterworks began in 1875 and was completed in 1881. The water supply system consisted of the dam and lake at Loch Raven and a tunnel along the alignment of Harford Street, about 3.2 kilometers (2 miles) north of the City limits, connecting Loch Raven with a distributing reservoir called Lake Montebello and a second pipeline connecting Lake Montebello with Lake Clifton near the Johns Hopkins estate.

By 1908, plans were underway to create a new dam at Loch Raven. It would be located approximately .8 kilometers (.5 miles) upstream from the earlier dam. This dam was completed in 1914. Because of the geographical expansion of Baltimore City and its associated population growth it was necessary to increase the dam level by 15.8 meters (52 feet). This required the construction of four (4) new roads, four (4) new bridges, a balancing reservoir, relocation of 8 kilometers (5 miles) of railroad track, removal of two (2) villages, and the clearing of 96.5 kilometers (60 miles) of river shore.

Furthermore, improvements to local Baltimore County bridges and roads resulted from the population growth from Baltimore City after World War I, as well as the need to improve the infrastructure to meet the demands of the advent of motorized vehicles. This period saw the first development of farm tracts into subdivided plots which would later result in the suburban area. A secondary phase of the Good Roads movement focused on the geometric improvements required for the secondary road system and the replacement of older, weaker, narrower bridges with modern standard structures. This occurred at the location of BC 6506, as a deficient timber structure was replaced with a modern truss. In this case, however, it appears that the crossing was too wide for a standard bridge due to the raising of the dam waters. Finally, by the 1920s, improvements were made to the road system now focusing on the safety and comfort of the motorized vehicular user and the improvement of the farm-to-market network.

SURVEYOR/HISTORIAN ANALYSIS:

This bridge may have National Register significance for its association with:

A - Events X **B- Person** _____

C- Engineering/architectural character X

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

Yes; the construction of the waterworks at Loch Raven Reservoir associated with the increased demand for drinking water in Baltimore City and the growth of this section of Baltimore County led to the construction of the Paper Mill Bridge.

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?

Yes; the location of the structure had a significant impact on this area of Maryland as well as the park area of Loch Raven Reservoir itself. Loch Raven Reservoir is both a municipal water supply and a recreational area. The reservoir provides areas for fishing, boating, hiking and picnicking and has encouraged development of the surrounding area. This bridge facilitated access to Loch Raven and promoted growth of the area as a whole.

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?

Yes; the Loch Raven Reservoir area may be eligible for historic designation and Bridge BC 6506, which dates to the same time period as the reservoir, adds to both the historic and visual character of the potential district. In addition, an adjacent former mill site may be eligible for historic designation.

Is the bridge a significant example of its type?

Yes; the bridge is a significant example of an arched through-truss and the steel work is indicative of a time period where labor was inexpensive, enabling decorative elements to be manufactured for the structure. Arch design was implemented in areas which required moderate spans over deep ravines and the three hinge design was a method of producing a less rigid but statically determinate structure where stress calculations for dead and live loads could be exactly computed. The architectural features of this structure distinguish the Paper Mill Bridge.

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

Yes; although rehabilitated, this bridge retains integrity of location, design, setting, materials, workmanship, feeling and association. The original concrete deck and curbing were replaced but the truss components and substructure units retain their integrity.

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

Yes; both the type of bridge and the level of architectural detail are unique to the State and the design firm. The structure's concept was derived from the 1917 design of the Hell Gate Arch over the East River in New York City, by Gustav Lindenthal, one of the best known bridge engineers in the early twentieth century. This structure was the longest, heaviest and strongest steel arch bridge in the world when it was constructed. It was Lindenthal's greatest achievement and hailed as "one of the finest creations of engineering art which this century has produced". Greiner himself was an admirer and mentor of Lindenthal and in a review of one of his papers, compared "a daring and handsome structure" as being "Lindenthalic in all its features".

During this time period, the J.E. Greiner Company could be categorized as the unofficial bridge designers for Baltimore City, in that many of its structures especially those of complexity were chosen for this firm to complete. This was the third bridge at Loch Raven Reservoir that Greiner had designed. The cost of the bridge was $110,969.50 and was completed in one year. It appears that this bridge was a favorite of the design firm, in that it was used quite extensively in the firm's promotional brochures into the 1960s.

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.

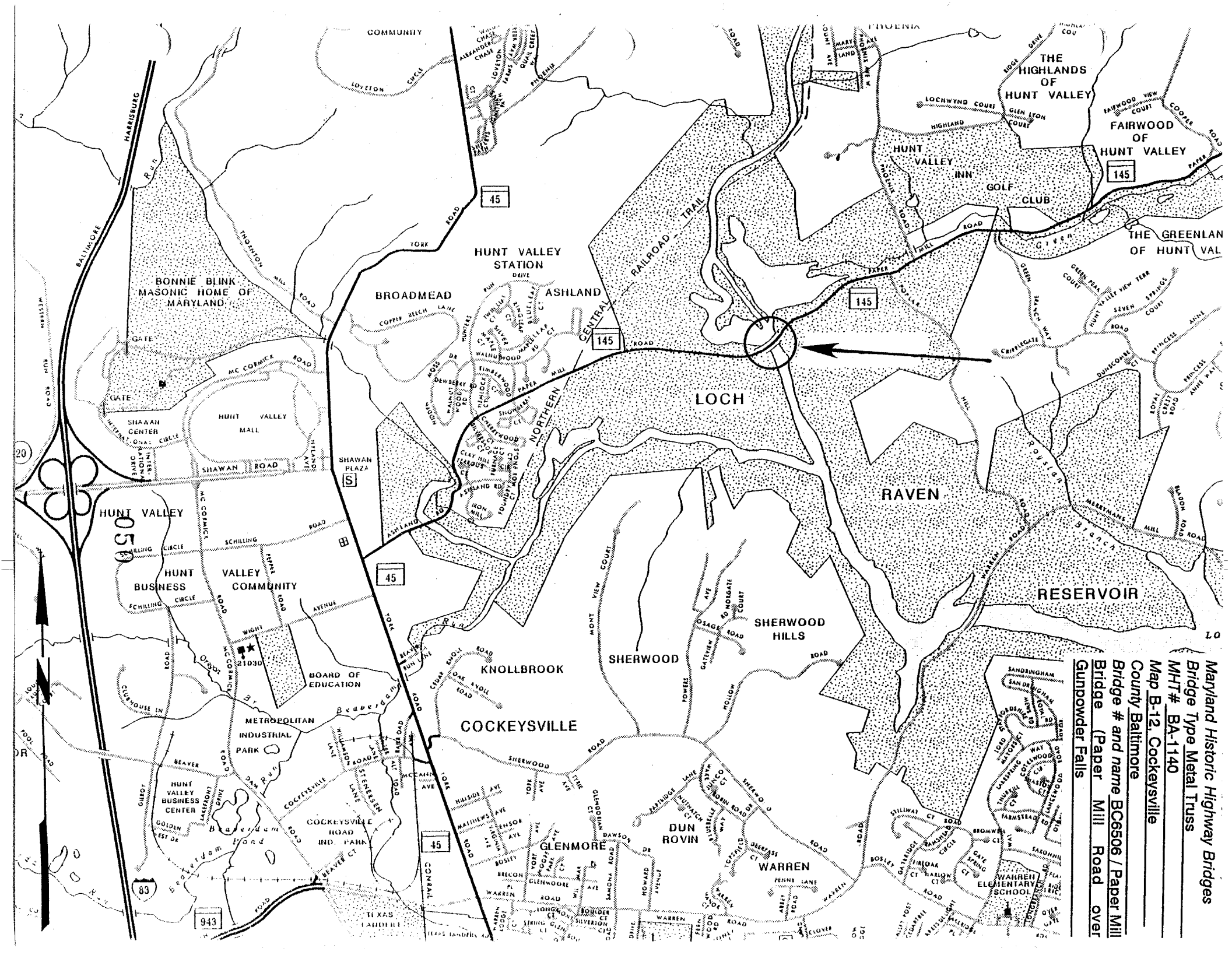
BIBLIOGRAPHY:

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

Determination of Eligibility Report, Robinson & Associates, 11/23/93
Engineers of Dreams-Great Bridge Builders and the Spanning of America, Henry Petroski, 1995

SURVEYOR:

Date bridge recorded August 9, 1996/revised August 28, 1996
Name of surveyor James T. Aguirre
Organization/Address Environmental Section, Office of Project Planning, SHA, Baltimore, MD
Phone number 410-545-8559 **FAX number** 410-333-1105
Edited by: P.A.C. Spero & Company, March 1998


Maryland Historic Highway Bridges
Bridge Type Metal Truss
MHT# BA-1140
Map B-12, Cockeysville
County Baltimore
Bridge # and name BC6506 / Paper Mill Bridge (Paper Mill Road over Gunpowder Falls
HUNT VALLEY STATION
BROADMEAD
ASHLAND
BONNIE BLINK MASONIC HOME OF MARYLAND
LOCH RAVEN
RESERVOIR
HUNT VALLEY
HUNT VALLEY MALL
SHAWAN PLAZA
HUNT VALLEY BUSINESS COMMUNITY
BOARD OF EDUCATION
METROPOLITAN INDUSTRIAL PARK
KNOLLBROOK
SHERWOOD
SHERWOOD HILLS
COCKEYSVILLE
COCKEYSVILLE ROAD IND. PARK
HUNT VALLEY BUSINESS CENTER
GLENMORE
DUN ROVIN
WARREN
WARREN ELEMENTARY SCHOOL
TEXAS
THE HIGHLANDS OF HUNT VALLEY
FAIRWOOD OF HUNT VALLEY
HUNT VALLEY INN GOLF CLUB
THE GREENLAN OF HUNT VAL
HARRISBURG
BALTIMORE
YORK ROAD
CENTRAL RAILROAD TRAIL
NORTHERN
SHAWAN ROAD
MC CORMICK ROAD
SCHILLING ROAD
BEAVER DAM RUN
GUNPOWDER FALLS
21030
45
145
83
943
20
695


3 23'98

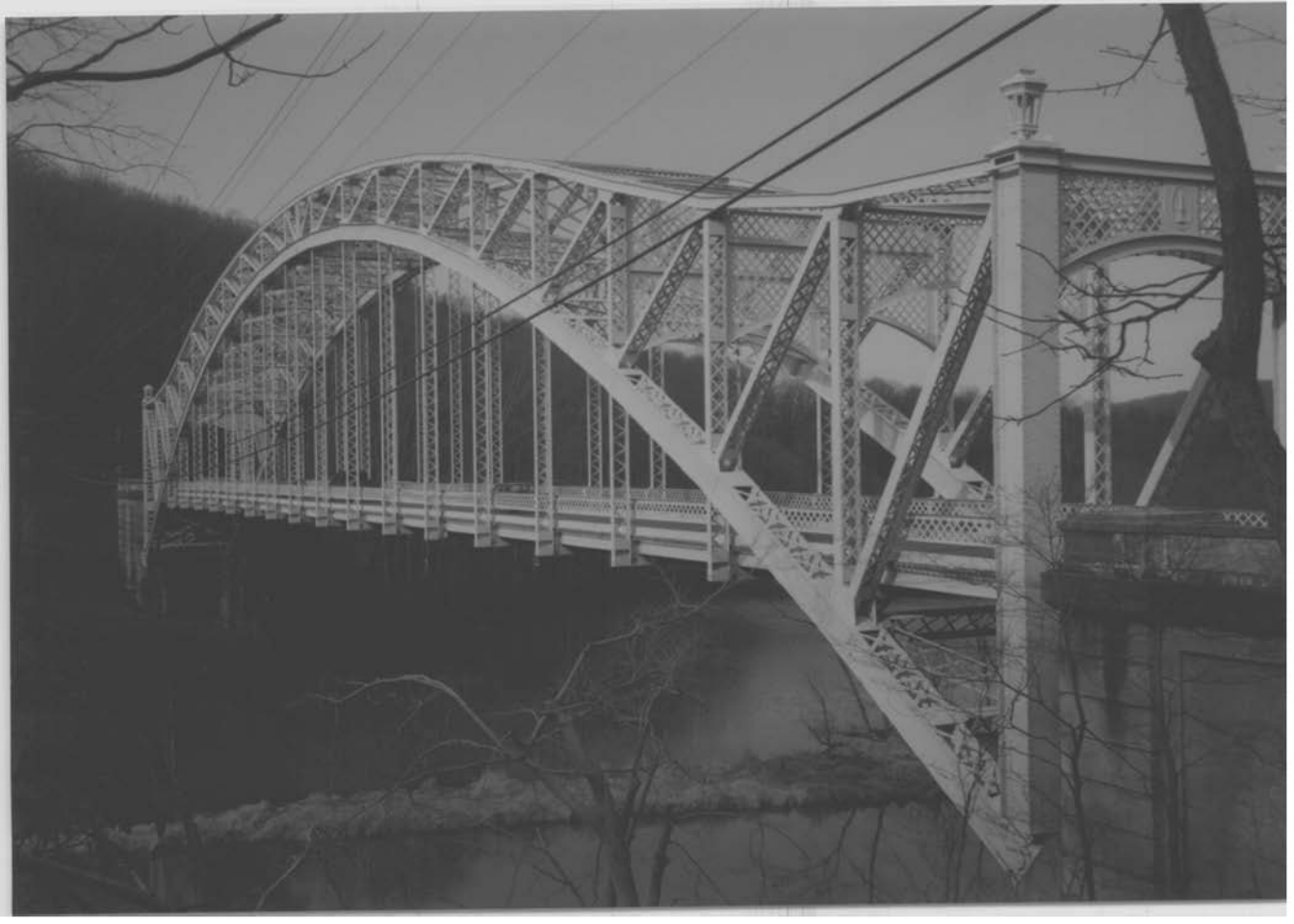
1. BA-1140
2. BC 6506, Paper Mill Bridge
3. Baltimore County, MD
4. Dave Dick, WM & Assoc.
5. March 1998
6. MD SHPO
7. East approach, view west
8. 1 of 7

1. BA-1140
2. BC 6506, Paper Mill Bridge
3. Baltimore County, MD
4. Dave Dick, WRM & Assoc.
5. March 1998
6. MD SHPO
7. West approach, view east
8. 2 of 7

1. BA-1140
2. BC6506, Paper Mill Bridge
3. Baltimore Co., MD
4. Dave Dick, WM + Assoc.
5. March 1998
6. MD SHPO
7. North elevation, view south
8 3 of 7

1. BA-1140
2. BC6506, Paper Mill Bridge
3. Baltimore County, MD
4. Dave Dick, WRT & Assoc.
5. March 1998
6. MD SHPO
7. South elevation, view north
8. 4 of 7

1. BA-1140
2. BC 6506, Paper Mill Bridge
3. Baltimore County, MD
4. Dave Dick, WM & Assoc.
5. March 1998
6. MD SHPO
7. City of Balt. 1797 plague
8. 5 of 7



1. BA - 1140
2. BC 6506, Paper Mill Bridge
3. Baltimore County, MD
4. Dave Dirk, Wm. Assoc.
5. March 1998
6. MD SHPO
7. South elevation, view north
8. 6 of 7

1. BA-1140
2. BC 6506, Paper Mill Bridge
3. Baltimore County, MD
4. Dave Dick, WM + Assoc.
5. March 1998
6. MD SHPO
7. East approach, view west
8. 7 of 7

9400500

INDIVIDUAL PROPERTY/DISTRICT
MARYLAND HISTORICAL TRUST
INTERNAL NR-ELIGIBILITY REVIEW FORM

Property/District Name: Paper Mill Road Bridge Survey Number: BA-1140

Project: Replace Paper Mill Road Bridge over Gunpowder Falls Agency: FHWA/IDBC

Site visit by MHT Staff: __ no _X_ yes Name Elizabeth Hannold Date 4/11/94

Eligibility recommended _X_ Eligibility **not** recommended ____

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

Justification for decision: (Use continuation sheet if necessary and attach map)

The Paper Mill Road Bridge was constructed in 1922 to carry Paper Mill Road over the Loch Raven reservior in Baltimore County. The three-hinged, steel-arch through bridge is significant under Criteria A for its association with the massive civil engineering effort undertaken by the City of Baltimore at Loch Raven Reservior in Baltimore County in the early 1920s to increase water supplies for the rapidly expanding city. The bridge is significant under Criteria C for its unique design and its association with the J.E. Greiner Company, probably the most prominent Maryland bridge engineering firm of the 20th century. The design is highly unusual for its use of the three-hinged arch and its relationship to the 1917 Hell Gate Arch over the East River in New York City.

Documentation on the property/district is presented in: Project File, "Determination of Eligibility Report, Paper Mill Bridge over Gunpowder Falls, Baltimore County, Maryland," November 23, 1993 BA 1140

Prepared by: Robinson & Associates, Inc.

Elizabeth Hannold — April 8, 1994
Reviewer, Office of Preservation Services — Date

NR program concurrence: X yes ___ no ___ not applicable

Reviewer, NR program — 4/11/94 Date

Survey No. BA-1140

MARYLAND COMPREHENSIVE HISTORIC PRESERVATION PLAN DATA - HISTORIC CONTEXT

I. Geographic Region:

____	Eastern Shore	(all Eastern Shore counties, and Cecil)
____	Western Shore	(Anne Arundel, Calvert, Charles, Prince George's and St. Mary's)
__X__	Piedmont	(Baltimore City, Baltimore, Carroll, Frederick, Harford, Howard, Montgomery)
____	Western Maryland	(Allegany, Garrett and Washington)

II. Chronological/Developmental Periods:

____	Paleo-Indian	10000-7500 B.C.
____	Early Archaic	7500-6000 B.C.
____	Middle Archaic	6000-4000 B.C.
____	Late Archaic	4000-2000 B.C.
____	Early Woodland	2000-500 B.C.
____	Middle Woodland	500 B.C. - A.D. 900
____	Late Woodland/Archaic	A.D. 900-1600
____	Contact and Settlement	A.D. 1570-1750
____	Rural Agrarian Intensification	A.D. 1680-1815
____	Agricultural-Industrial Transition	A.D. 1815-1870
__X__	Industrial/Urban Dominance	A.D. 1870-1930
____	Modern Period	A.D. 1930-Present
____	Unknown Period (___ prehistoric	___ historic)

III. Prehistoric Period Themes:

____	Subsistence
____	Settlement
____	Political
____	Demographic
____	Religion
____	Technology
____	Environmental Adaption

IV. Historic Period Themes:

____	Agriculture
__X__	Architecture, Landscape Architecture, and Community Planning
____	Economic (Commercial and Industrial)
__X__	Government/Law
____	Military
____	Religion
____	Social/Educational/Cultural
____	Transportation

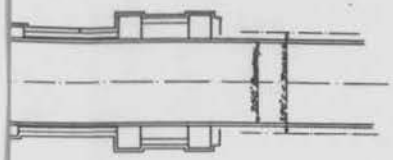
V. Resource Type:

Category: Structure

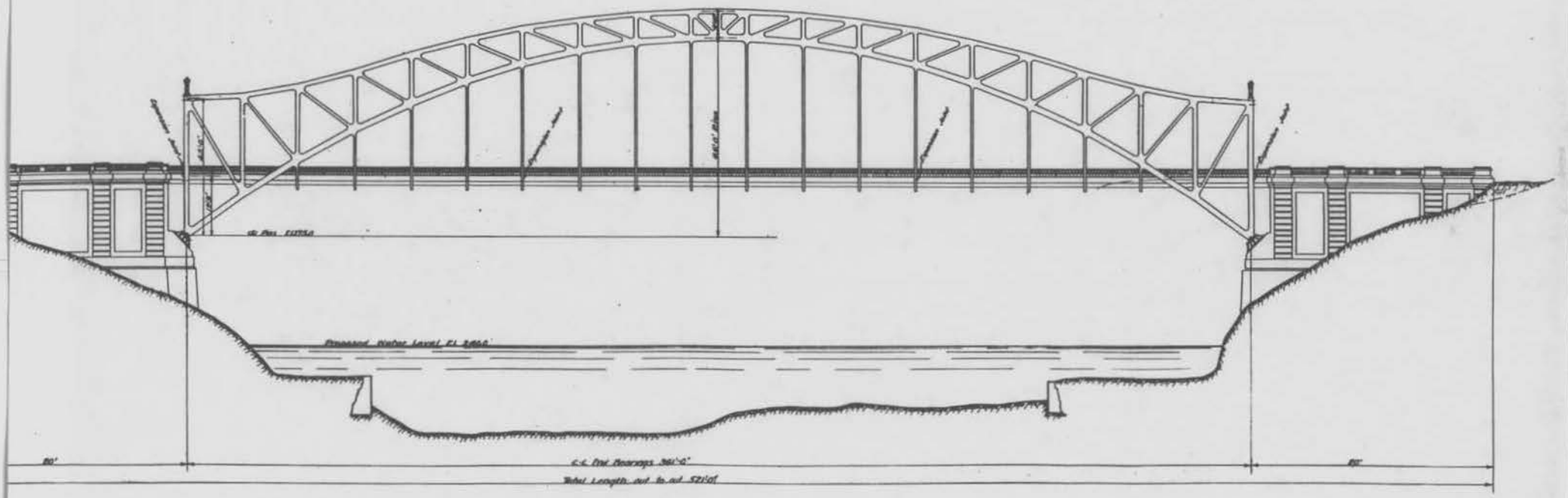
Historic Environment: Rural

Historic Function(s) and Use(s): Transportation, vehicular

Known Design Source: J.E. Greiner Co., designer, Bethlehem Steel Bridge Corp., fabricator



PLAN



ELEVATION

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC IMPROVEM
WATER DEPARTMENT
PAPER MILL BRIDG
OVER
GUNPOWDER RIVER
GENERAL DESIGN
Scale:- 1"=16'0"

William A. Megraw
Water Engineer

J.E. Greiner C
Consulting E
Baltimore, M

October 21, 1921 Contract No. 53. C-

Made by E.H.H.
Checked by H.K.A.

13: Paper Mill Bridge, Specification Drawing (Greiner, Inc.)

BA-1140

BA-1140

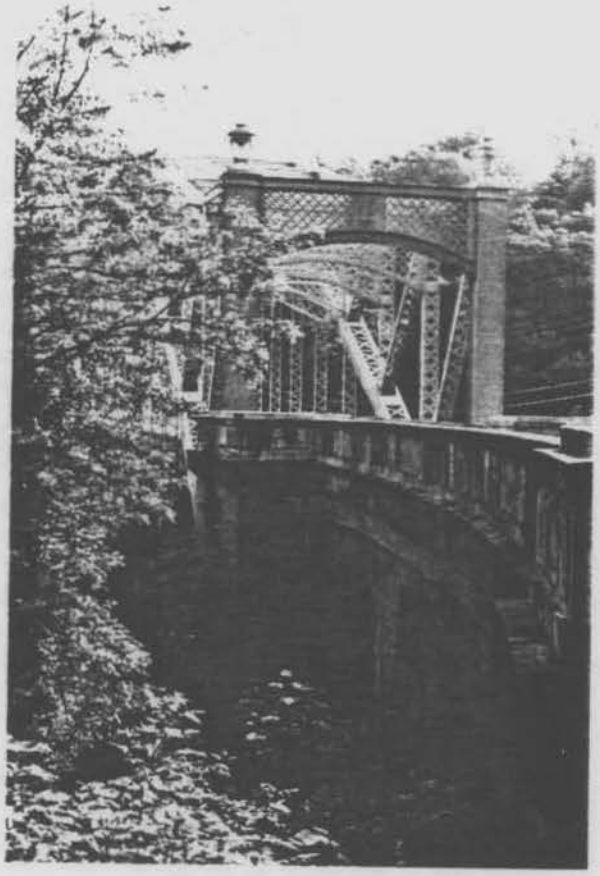


Figure 18: *Paper Mill Bridge (1993)*
(E.A. Comer)

BA-1140

Figure 21: *Paper Mill Bridge (1993)*
(E.A. Comer)