



DELAWARE DIVISION OF HISTORICAL AND CULTURAL AFFAIRS
STATE HISTORIC PRESERVATION OFFICE
21 THE GREEN, DOVER, DE 19901

CRS # S04045
SPO Map 08-09-10
Hundred Seaford
Quad Seaford East
Other 3310030000840

CULTURAL RESOURCE SURVEY
PROPERTY IDENTIFICATION FORM

- HISTORIC NAME/FUNCTION: Hearns Pond dam and spillway (Bridge 200H-1) that carries access road 544B between Clear Brook waterway and Hearns Pond
- ADDRESS/LOCATION: Hearns Pond Dam, located north of Seaford, Sussex County
- TOWN/NEAREST NAMED PLACE: Seaford vicinity?
- MAIN TYPE OF RESOURCE: building structure site object
landscape district
- MAIN FUNCTION OF PROPERTY: Section of the Hearns Dam and Spillway for water level control
- PROJECT TITLE/ REASON FOR SURVEY (if applicable): T201207603, Hearns Pond Dam Improvement

7. ADDITIONAL FORMS USED:

#:	Form:	List property types:
	CRS 2 Main Building Form	
	CRS 3 Secondary Building Form	
	CRS 4 Archaeological Site Form	
	CRS 5 Structure (Building-Like) Form	
	CRS 6 Structure (Land Feature) Form	
	CRS 7 Object Form	
	CRS 8 Landscape Elements Form	
1	CRS 9 Map Form	N/A
1	CRS 13 Photographs Form	N/A
	CRS 14 Proposed District Form	
1	CRS 15 Structure (Bridge) Form	

8. SURVEYOR INFORMATION:

Surveyor name: Nathaniel Delesline, Architectural Historian, DeIDOT

Principal Investigator name: Michael Hahn, Architectural Historian, AICP, DeIDOT

Organization: Delaware Department of Transportation Date: 3/11/2014

9. OTHER NOTES OR OBSERVATIONS:

CRS# S04045

The bridge (really a culvert), dam, and spillway were constructed in 1912 as part of an improvement to the mill water power system. The bridge (200H-1) is once National Register (NR) eligible as found in Delaware's Historic Bridges Survey and Evaluation (DelDOT Editions 1991, 2000).

Bridge 200H-1 is a box culvert that carries a single lane road (no longer publicly accessible for motorized vehicles) over Hearn's Pond. The outlet structure consists of twin concrete box culverts; each cell is about 5-feet wide and 10-feet high. The water level is controlled by two pairs of double sliding metal gates about 4-feet high and 5-feet wide; the gates can be adjusted to control the water level. The upstream side of the abutment system is also braced by an angled shaped beam with ties. The structure from surface level is also evident with concrete curbing surmounted by metal pipe railing that serve as parapets. The historic mill structure (S00436 or S00213) associated with the spillway and earthen dam is situated at the southern most section of the dam. Water from the pond was used to supply power to the mill by a separate water control structure (48" concrete encased metal pipe). The mill building is currently NR listed, but nothing is ever said in the 1977 nomination about how this spillway culvert are associated to the mill operations.

The bridge and dam were overtopped during storms of Aug. 11, 2001 and June 25, 2006. Damage to the structure include cracks and section loss in the wing walls and control gates. The spillway is undersized by today's standards for pond drainage, operations, and water control. Inspections deem it structurally critical. A 200 foot section in the nearly 525 foot earthen dam was replaced while being reconstructed. New spillway gates, which are operated by wheels on the dam, replaced the old gates. The NR integrity of the structure is in question based on the alterations/modifications to the structure and with the mill building after the 2001 and 2006 storms. There is also natural deterioration and section loss in the concrete.

10. STATE HISTORIC CONTEXT FRAMEWORK (check all appropriate boxes; refer to state management plan(s)):

- a) Time period(s)
 - Pre-European Contact
 - Paleo-Indian
 - Archaic
 - Woodland I
 - Woodland II
 - 1600-1750± Contact Period (Native American)
 - 1630-1730± Exploration and Frontier Settlement
 - 1730-1770± Intensified and Durable Occupation
 - 1770-1830± Early Industrialization
 - 1830-1880± Industrialization and Early Urbanization
 - 1880-1940± Urbanization and Early Suburbanization
 - 1940-1960± Suburbanization and Early Ex-urbanization

- b) Geographical zone
 - Piedmont
 - Upper Peninsula
 - Lower Peninsula/Cypress Swamp
 - Coastal
 - Urban (City of Wilmington)

- c) Historic period theme(s)

<input type="checkbox"/> Agriculture	<input type="checkbox"/> Transportation and Communication
<input type="checkbox"/> Forestry	<input type="checkbox"/> Settlement Patterns and Demographic Changes
<input type="checkbox"/> Trapping/Hunting	<input checked="" type="checkbox"/> Architecture, Engineering and Decorative Arts
<input type="checkbox"/> Mining/Quarrying	<input type="checkbox"/> Government
<input type="checkbox"/> Fishing/Oystering	<input type="checkbox"/> Religion
<input type="checkbox"/> Manufacturing	<input type="checkbox"/> Education
<input type="checkbox"/> Retailing/Wholesaling	<input type="checkbox"/> Community Organizations
<input type="checkbox"/> Finance	<input type="checkbox"/> Occupational Organizations
<input type="checkbox"/> Professional Services	<input type="checkbox"/> Major Families, Individuals and Events



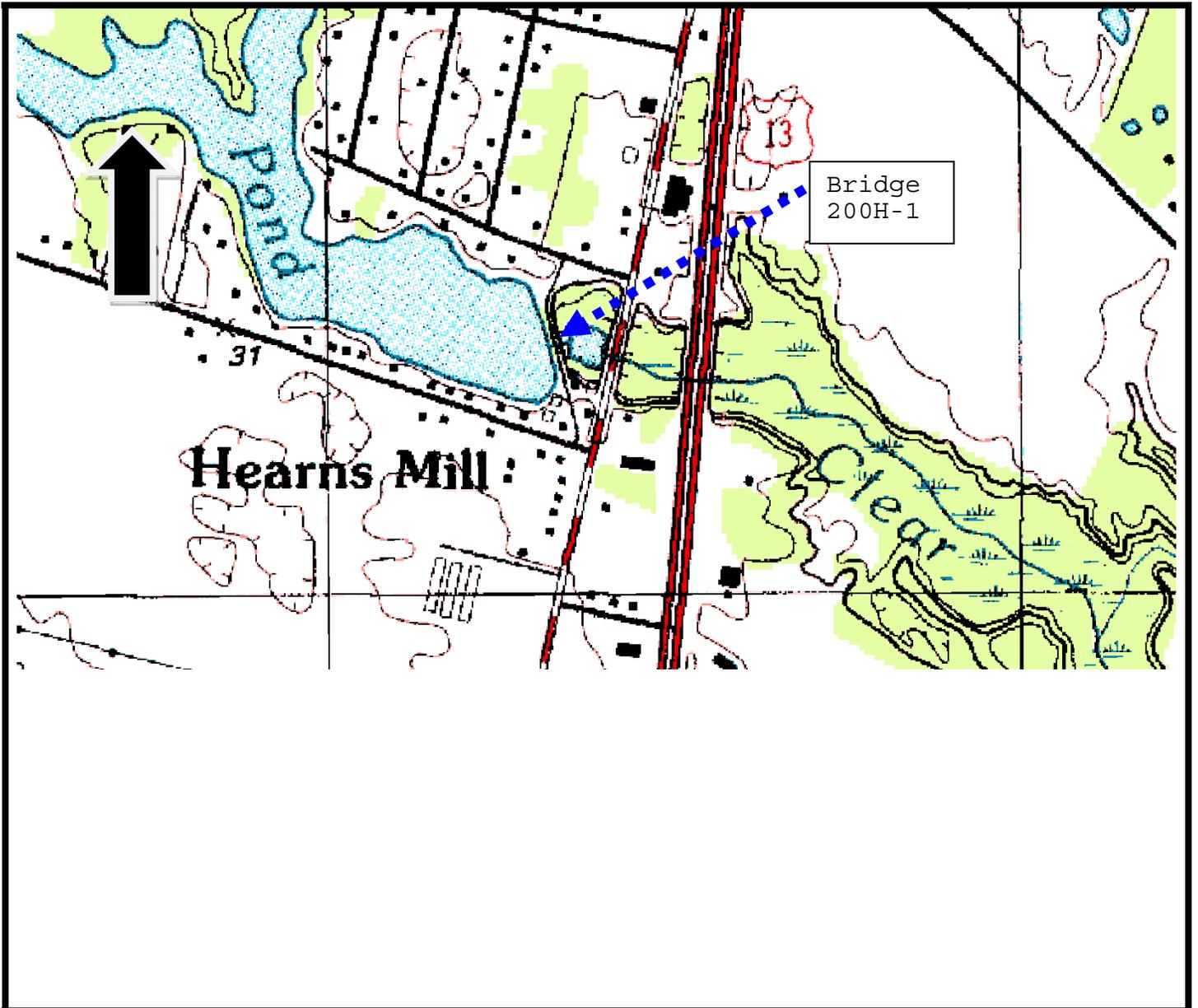
DELAWARE DIVISION OF HISTORICAL AND CULTURAL AFFAIRS
STATE HISTORIC PRESERVATION OFFICE
21 THE GREEN, DOVER, DE 19901

CULTURAL RESOURCE SURVEY
MAP FORM

CRS # S04045

1. ADDRESS/LOCATION: Hearns Pond Dam, located on Clear Brook, Sussex County, Seaford
2. NOT FOR PUBLICATION reason: _____
3. LOCATION MAP:
Indicate position of resource in relation to geographical landmarks such as streams and crossroads.
(insert section of USGS quad map or aerial photograph with location marked)

INDICATE NORTH ON SKETCH

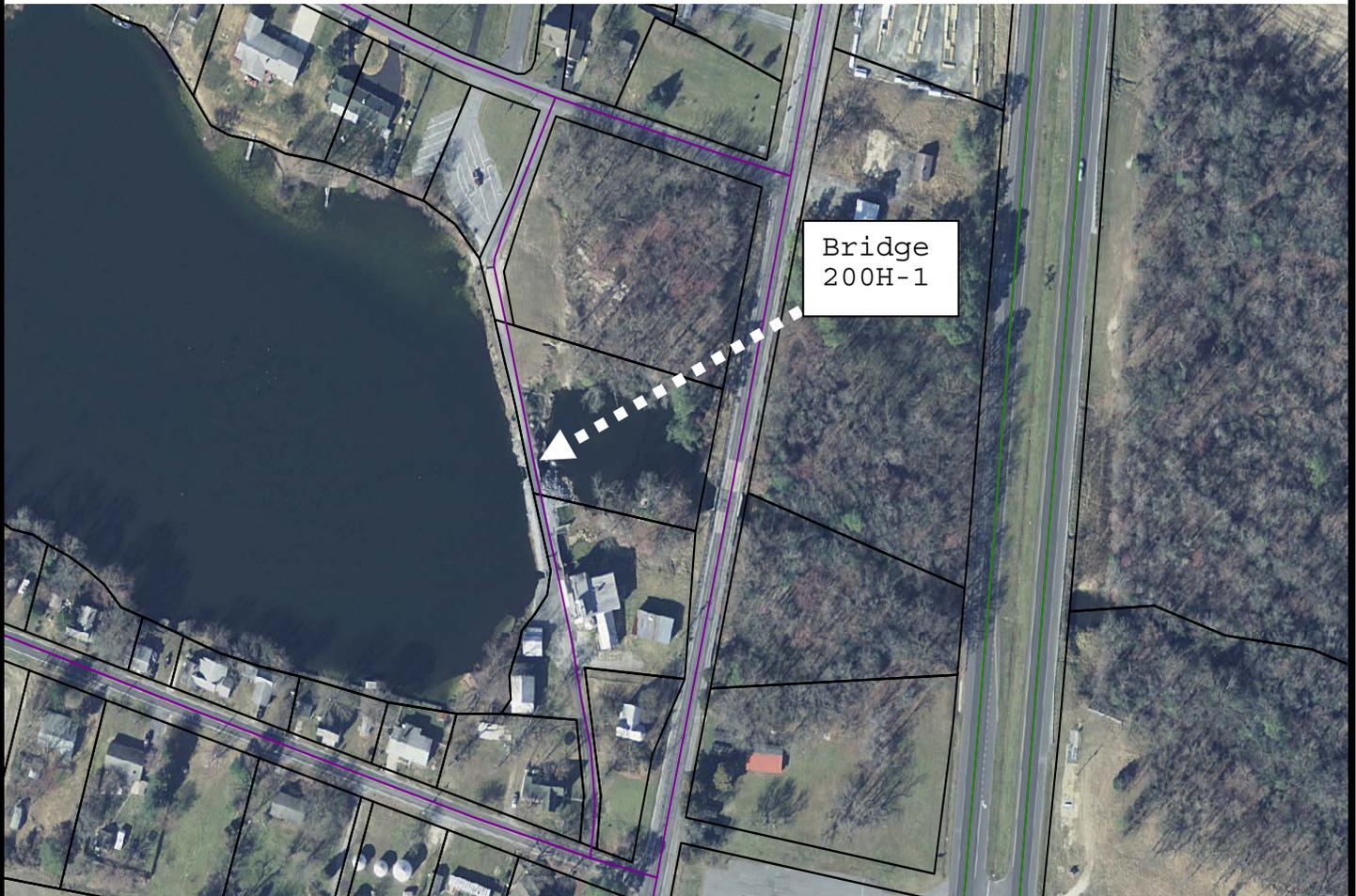


4. SITE PLAN:

(insert aerial photograph or map showing relationship of buildings, driveway, outbuildings, fences, etc., to each other; label elements as needed; add other pages as needed)

INDICATE NORTH ON PLAN

Taken from DeIDOT Geomedia aerial dated 2007



Aerial Taken in 2012 from DeIDOT ArcInfo



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21 THE GREEN, DOVER, DE 19901

CULTURAL RESOURCE SURVEY
SURVEY UPDATE FORM

CRS # S04045

1. **HISTORIC NAME/FUNCTION:** Hearns Pond Spillway Culvert (Bridge 200H-1)/access road 544B between Clear Brook waterway and pond
2. **ADDRESS/LOCATION:** Sussex County north of Seaford between Hearns Pond Road and Shore Drive
3. **CURRENT CONDITION:** excellent good fair poor demolished
4. **INTEGRITY:** Poor - Beyond typical structural use and deterioration, the spillway culvert and approach earthen dam were severely damaged after being overtopped by flooding during storms in 2001 and 2006. Sections of the earthen dam and spillway culvert collapsed or had been damaged. The dam complex water control section was also reconstructed. Sections of wingwalls are damaged/missing as well as water control gates replaced. The culvert has to be braced from collapse of front wing walls.
5. **SETTING INTEGRITY:** Fair - destruction in sections of the mill and structures associated with the mill complex; replacement in sections of the earthen dam and roadway; generous placement of rip-rap and geotextile matting; replacement of the water control systems and retrofit of a new boat dock. Mid 20th century homes and updated older dwellings surround the area.

6. **FORMS ADDED (give number of forms completed for each):**

#:	Form:	List property types:
	CRS 2 Main Building Form	
	CRS 3 Secondary Building Form	
	CRS 4 Archaeological Site Form	
	CRS 5 Structure (Building-Like) Form	
	CRS 6 Structure (Land Feature) Form	
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7. **SURVEYOR INFORMATION:**

Surveyor name: Nathaniel Delesline, Architectural Historian, DeIDOT

Principal Investigator name: Michael Hahn, Architectural Historian, AICP, DeIDOT

Principal Investigator signature: Michael C. Hahn 10/21/13

8. OTHER NOTES OR OBSERVATIONS:

CRS# S04045

Bridge 200H-1 as a dam spillway and water control outlet structure consisting of a two cell reinforced concrete box culvert; each cell is about 5-feet wide and 10-feet high. The boxed culvert is approximately 14 feet wide and carries an access road that is no longer publically accessible for motorized vehicles. The spillway culvert structure has continuing concrete curbs surmounted by metal pipe railings. Abutment extensions are L-shaped on the east (outfall) and V-shaped or flaired on the west to form the spillway system. The upstream side of the abutment system is also based by an angled shaped beam with ties. The upstream sluice gate tracks area a series of metal I-beams with metal control gates. The bridge was first constructed in 1912 and the sluice gates were of wood construction material.

The dam, spillway, and access roadway associated with the bridge were overtopped in 2001 and 2006. Flood water produced by torrential rains pushed over the dam and cause the pond to drain. The structure (buidings, dam, bridge/spillway) all incurred damage and a 200-foot section in the nearly 525-foot dam was replaced. The structure also has two new spillway gates, which can be manually lowered or raised to allow water thru the spillway culvert.

The water level is now controlled by two pairs of double sliding gates (modern) about 4-feet high and 5-feet wide. One of the gates is inoperable and the other can be adjusted to control the water level. The adjustable gate is normally set between elevation 24.0 and 25.0 feet but it can be lowered to about elevation 21.5 feet at its lowest position.

A historic mill structure (now inoperable) is situated at the southern most section of the dam which is currently owend by the State of Delaware (DNREC, Fish and Wildlife).

9. STATE HISTORIC CONTEXT FRAMEWORK (check all appropriate boxes; refer to state management plan(s)):

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<input type="checkbox"/> Forestry	<input type="checkbox"/> Settlement Patterns and Demographic Changes
<input type="checkbox"/> Trapping/Hunting	<input checked="" type="checkbox"/> Architecture, Engineering and Decorative Arts
<input type="checkbox"/> Mining/Quarrying	<input type="checkbox"/> Government
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<input type="checkbox"/> Manufacturing	<input type="checkbox"/> Education
<input type="checkbox"/> Retailing/Wholesaling	<input type="checkbox"/> Community Organizations
<input type="checkbox"/> Finance	<input type="checkbox"/> Occupational Organizations
<input type="checkbox"/> Professional Services	<input type="checkbox"/> Major Families, Individuals and Events



CULTURAL RESOURCE SURVEY
DIGITAL PHOTOGRAPHS FORM

CRS # S04045

Date 10/21/13 Surveyor/Photographer Michael Hahn, DelDOT; DNREC (unknown)

Insert photographs; note file name and brief description of view:
(size photograph 3" on longest side; MAINTAIN ASPECT RATIO – DO NOT STRETCH PHOTO) 1: looking north, 2: Looking south, 3: Looking south, 4: looking south, 5:looking north, 6:looking west, 7: looking west.
8: looking south, 9: looking south, 10: looking south, 11: looking west, 12: looking south, 13: looking south, 14: looking east,

1.



2.



3.



4.



5.



6.



7.



8. DNREC Taken 2001



9. DNREC Taken 2001



10. DNREC Taken 2006



11. DNREC Taken 2007



12. DNREC Taken 2007

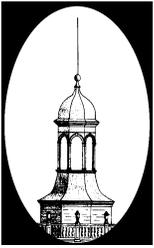


13. DNREC Taken 2006



14. DNREC Taken 2001





DELAWARE STATE HISTORIC PRESERVATION OFFICE
21 THE GREEN, SUITE A, DOVER, DE 19901

CULTURAL RESOURCE SURVEY
STRUCTURE – BRIDGE/CULVERT

CRS #	<u>S04045</u>
SPO Map	<u>08-09-10</u>
Hundred	<u>Seaford</u>
Quad	<u>Seaford East</u>
Other	<u>3310030000840</u>

BRIDGE NUMBER: 200H-1 OWNER: State of Delaware CRS#:S04045
COUNTY: Sussex HUNDRED: Seaford ZONE: L. Peninsula
LOCATION: Hearn's Pond, Sussex County SPO MAP: 08-09-10
ROAD NUMBER: 544B (closed) MILEPOST: N/A USGS QUAD: Seaford East

FACILITY CARRIED: may be abandoned or vacated road number 544B; bypassed in ca. 1919
NAME/FEATURE INTERSECTED: Spillway culvert between Hearn's Pond and Clear Brook waterway

TYPE: Two-cell 11 feet long (each cell 5'); each cell 10 feet high; reinforced concrete box culvert

DESIGN: box culvert flared wingwalls

MATERIAL: Reinforced concrete (cast in place) with metal pipe railings; road/access way overtopped with stone and dirt fill

OF SPANS: 1 LENGTH: 11' WIDTH: 14 feet

DATE OF CONSTRUCTION: 1912 ALTERATION: the dam & spillway in 2002 and 2007 SOURCE: DNREC

DESIGNER/BUILDER: Unknown, but mill and earthen spillway, including the spillway structure, improvement had to be commissioned by Marcellus Hearn who was mill and pond owner/operator at the time. Sussex County Levy Court was likely in charge.

SETTING: Bridge 200H-1 is situated in a mostly rural area, just north of Seaford and carries a restricted (non-public) lane between the pond and Clear Brook. State Route 13A is just east.

PAST NR STATUS: Bridge 200H-1 was listed NR eligible according to *Delaware Historic Bridges Survey and Evaluation* book (1991; 2000 editions) as integral to the mill complex and by association (S00436/S00213).

NR RECOMMENDATION: Beyond its natural deterioration and human alterations, the bridge, earthen dam, and the individual mill building were all damaged during the storms of 2001 and 2006. Alterations and modifications to the structures after the storms have compromised the NR integrity of the structure and of the project area. Even with irrevocable damage, replacement, section loss, and demolition of accessory buildings and to the main dwelling and with the mill complex, the property as a complex of interwoven buildings and man-made engineering structures may still be or found eligible/listed under criteria A or C. However, this should preclude the dam with culvert spillway due to integrity and lack of association that is now conveyed. It is more appropriate given its threat of demolition, deterioration, and necessary structural replacement that Criterion D is appropriate for additional information that this property or structural asset may be to the mill complex. As a standing or man-made structure, the dam area, including the culvert spillway of BR 200H-1, remaining earthen built areas, and former sluice should not be contributing to the Hearn's & Rawlins Mill (S00436/S00213). Individually, this culvert spillway has become altered and deteriorated with section loss, new parts, and new engineering design elements supported along the dam and embankment area to the structure. Individually, the culvert spillway itself is altered and damaged that it should not be individually eligible as an engineering feature. The culvert spillway design is not unusual or complex.

SUMMARY: Bridge 200H-1 is a single span, two-cell, reinforced concrete box culvert 11 feet long, 14 feet wide which carries a single lane road/path thru and across the spillway. The culvert has concrete curbs surmounted by replacement pipe railings. The bridge was constructed in 1912.

PHOTO: See CRS 13

Prepared By: Michael Hahn, AICP

DATE: 3/11/13
8/26/14

revision

NAME/LOCATION/DATE OF CONSTRUCTION: Bridge 200H-1, Hearn's Pond Spillway @ Hearn's Pond. The bridge was constructed in 1912 by sources unknown, but likely authorized by property owner/operator of the mill and spillway area Marcellus Hearn and as assisted by Sussex County.

Physical Description: Bridge 200H-1 is a simple box culvert that carries a single lane road (no longer publicly accessible for motorized vehicles) over Hearn's Pond. As a spillway structure, the outlet structure consists of twin concrete box culverts; each cell is about 5-feet wide and 10-feet high. The water level is controlled by two pairs of double sliding metal gates about 4-feet high and 5-feet wide, the gates can be adjusted to control the water level. The upstream side of the abutment system is also braced by an angled shaped beam with ties. The structure from surface level is also evident with concrete curbing surmounted by metal pipe railing that serve as parapets. Abutment extensions are L-shaped on the east (outfall) and V-shaped or flared on the west to form the spillway system. Modern rip-rap with geotextile and cell grid line reinforcements line both the dam and downstream outfall area. The historic mill structure (see S00436 or S00213) associated with the spillway and earthen/concrete dam is situated at the southern most section of the dam. Water from the pond was used to supply power to the mill by a separate water control structure (i.e. sluice/ an encased 48" metal pipe). The mill building is currently NR listed (original 1977 nomination), but nothing is ever said about how the spillway culvert are associated to the mill operations. The historic information is being updated for year 2014.

Summary of Alterations/Modifications: The bridge and dam were overtopped during storms of August 11, 2001 and June 25, 2006. Damage to the structure include cracks and section loss in the wing walls and control gates. The spillway is undersized by today's standards for pond drainage, operations, and water control. Additionally, inspections deem it structurally critical. A 200 foot section in the nearly 525 foot earthen dam was replaced. New spillway control gates, which are operated by wheels on the dam, replaced the old gates. Added steel bracing on the upstream end also strengthens the culvert wingwalls from pressure and collapse.

Historical and Technological Significance: Reinforced concrete box culverts were used initially on American highways in the first decade of the 20th century. They have a history nearly identical to the development of slab bridges. A box culvert derives its name from its similarity to a box with open ends. It is distinguished from a slab bridge by a slab integral with the side walls and floor (invert slab). Box culverts are especially appropriate for minor or seasonal streams and locations where head-room is limited. They require little expensive form or foundation work, and they can be placed or formed in trenches. The cover (top) slab can either directly support the roadway or be placed under fill. The culvert is proportioned to carry both live load and the entire weight of the fill, if any. Box culverts may be single or multiple cells (one or more openings) with the single-cell span length rarely exceeding twice the height.

Since the 1910s, box culverts have been found to be economical and practical under the majority of conditions for spans in the range of 8' to 15'. The technology has changed little since the early 20th century; the only noteworthy change is the increasing substitution of precast box sections for cast-in-place sections during the last 30 years.

In Delaware, it is the early, unaltered box culverts and those historically associated with larger water control projects, such as the reconstruction of mill pond spillways and dams that best represent the box culvert technological significance. Two early examples are the ca. 1910 Willow Street over Records Pond box culvert (State Bridge S-329) in Laurel and the 1912 Hearn's Millpond Spillway box culvert (200H-1). The dam, mill building(s), and culvert were first constructed in 1912 as part of overall improvements to the mill's waterpower system.

Sources:

Lichtenstein Consulting Engineers, Inc. *Delaware's Historic Bridges: Survey and Evaluation of Historic Bridges with Historic Contexts for Highway and Railroad*, 2nd Edition, Prepared for the Delaware Department of Transportation, 2000.