

**12. SOURCES****10. NAME(S) OF STRUCTURE**

State Bridge Number 688

**11. PHOTOS (W/ FILM ROLL & FRAME NO.) AND SKETCH MAP OF LOCATION**

83A:22-36A

3E:3-4



83A:24

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The National Cyclopaedia, vol. A. (New York: James T. White & Company, 1930).

Spero, Paula A. C. Metal Truss Bridges in Virginia: Suffolk Construction District. (Charlottesville, Virginia: Virginia Highway & Transportation Research Council, 1981).

Wilmington Evening Journal, 29 September 1927; 29 October 1927.

Wilmington Morning News, 6 December 1958; 19 July 1965.

Delaware State Archives. State of Delaware, New Castle County Levy Court, Specifications, Proposals, Contract and Bond. ms., State Archives, Dover, DE.

Delaware State Archives. New Castle County Road Commissioners Papers, various years 1750-1940, ms. State Archives, Dover, Delaware.

Delaware DOT records: Annual Reports; contract files.

Plans on file at Delaware DOT: Contract #72-72A, B, & C, 927A, 2049, 81-071-02, 64-020-18, 73-080-02

**13. INVENTORIED BY:**

P.A.C. Spero &amp; Company with Kidde Consultants for Delaware DOT

**AFFILIATION****DATE**

April-November 1988

**8. HISTORICAL DATA (continued)**

Christina River by ferry. The wooden "turn bridge" initiated a long history of movable bridges at this site and operated as a tollbridge until 1851 when the county assumed control of the bridge. It was replaced in 1883 by a truss swing span and then in 1927 with the present double leaf trunnion bascule bridge. The South Market Street Bridge opened with a large, crowded ceremony on November 11, 1927, Armistice Day. Senator Tasker L. Oddie of Nevada addressed the audience with comments relating to the development of roads and bridges in Delaware and the nation. Activities such as a pageant were also held in honor of Armistice Day. The celebration committee chose two honorary chairmen for the festivities: Francis V. DuPont, Chairman of the State Highway Commission, and H. D. Faulkner, chairman of the Levy Court of New Castle County. The entire celebration was financed by the Wilmington Civic Association. Bridge 688 was designed by the firm of Harrington, Howard and Ash of Kansas City, Missouri, who made movable bridges a specialty; several of the movable bridges surveyed in Delaware were designed by the principals of this firm or its successors. John Lyle Harrington and Ernest E. Howard both began their bridge-building careers in association with J. A. L. Waddell, whose 1892 design for a vertical lift bridge at South Halstead Street in Chicago had established his eminence as a pioneer of the type. Harrington went to work in Waddell's office in Kansas City, Missouri, after graduating from the University of Kansas in 1895; he left to pursue further education and worked for a succession of bridge companies until 1907, when he returned to Kansas City to enter a consulting practice in partnership with Waddell. It was there that he met Howard, who had been working with the firm of Waddell and Hedrick since 1901 as draftsman, designer, and resident engineer. Upon the 1907 reorganization of the firm as Waddell and Harrington, Howard assumed the position of associate engineer. In 1914, Harrington, Howard, and Louis R. Ash formed Harrington, Howard & Ash which designed and constructed bridges until 1928. In addition to Bridge 688, their work in Delaware includes Bridge 393, a center bearing, plate girder swing span and one of two remaining highway swing bridges in Delaware. They also were consulting engineers for the Rising Sun Bridge over the Brandywine Creek (#1), the only through truss highway bridge identified within the state, and constructed in 1928. Howard and Ash became associated with the firm of Ash, Howard, Needles and Tammen which produced the bascule bridge carrying North Church Street over the Brandywine in Wilmington (Bridge #577, built 1932). Both Harrington and Howard patented numerous improvements to movable bridges; both held offices in national professional organizations, and Howard contributed several articles to professional journals.

# HABS/HAER INVENTORY

See "HABS/HAER Inventory Guidelines" before filling out this card.

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| <b>1. NAME(S) OF STRUCTURE</b><br>State Bridge Number 688   |  | <b>3. DATE(S) OF CONSTRUCTION</b><br>1927     |
| <b>2. LOCATION</b><br>South Market Street over Christina River<br>Wilmington, New Castle County, Delaware   |  | <b>4. USE (ORIGINAL/CURRENT)</b><br>Vehicular |
|   |  | <b>5. RATING</b><br>BASC                      |
| <b>6. CONDITION</b><br><br>Good: Some loose paint on girders. Southwest girder is damaged at bascule joint. Some previous section loss, especially in floor beams.<br><br>State Bridge Number 688 (South Market Street Bridge) is a 208'-0" double leaf trunnion bascule bridge of plate girder construction. It carries three lanes of traffic on a 38'-0" wide deck, and has a 6'-0" sidewalk with a simple metal railing cantilevered off each elevation. The underside of the bascule girders is curved to form a segmental arch. Plate girder floor beams support a deck of steel grating. There are two operators's towers constructed of tan brick with corbeling and rustication, featuring hipped roofs with sheet metal cornices and roof covering. The abutments and U-shaped wing walls are concrete; the wing walls support concrete parapets with incised panels and striations and a peaked coping. The operating equipment is concealed below the roadway in the bascule pier. A plaque indicates the bridge was constructed in 1927 and designed by the firm of Harrington, Howard and Ash. The State Bridge Engineer was listed as A.G. Livingston and the State Road Commissioners were listed. The bridge is dedicated to Delaware Legislator John E. Reilly, Sr. (1893-1963).<br>Delaware Department of Transportation records state that Bridge 688 was completed in 1927 to replace an 1883 245'-0" pin connected Warren through truss swing span. In 1925 the State Highway Department completed surveys and preliminary planning for a new bridge at this site. The 1883 bridge was determined inadequate, both functionally and aesthetically. Drawings dated August 1925 on file at the Delaware Department of Transportation document the configuration of the swing bridge which formerly existed at the site, and include specifications for the design of the replacement structure. The new bridge was required to be operated electrically and have a 38'-0" clear roadway with two 6'-0" sidewalks. It was to have a clear opening of 160 feet for the passage of boats, and was to be located at the center of the stream or to the south; a note indicated that the south opening was preferred by navigators, because of a bend in the river. The specifications advised that "the design submitted should give careful consideration to architectural features as the bridge is used by all North and South traffic and a pleasing structure to the eye is desired". Drawings for the replacement structure are dated July 1926, and document the details of construction, materials, and machinery and operation of the bascule bridge. Harrington, Howard and Ash of Kansas City and New York were the structural consultants for the design. The span's steel was fabricated by the Bethlehem Steel Corporation. A Westinghouse 220 volt, 3 phase, 100 horsepower A.C. motor powered the lift span. Separate contracts were let for the concrete substructure (#72) to Dravo Construction Corporation of Pittsburgh for \$229,220 and for the steel superstructure (#72A) to Bethlehem Steel for \$236,837.68 on December 3, 1926. The balustrade shown in the plans incorporated lattice and scroll work. The final cost of the bridge amounted to approximately \$545,000, about 8% over bid. This overrun was attributed to the necessity of sinking the foundation piers deeper than anticipated. The cost was borne by the State Highway Department and the New Castle Levy Court, which contributed \$166,666.66 to the final cost of the bridge. Original specifications call for creosoted timber as the decking material; this was replaced with steel grating in 1946, under contract #927. The wiring was repaired in 1961, and machinery frame was replaced in 1974-75. A general rehabilitation was undertaken in 1981-82, under contract #81-071-02. Historically, the crossing of the Christina River at South Market Street has been an important component in Wilmington's transportation routes. The river was first bridged at the South Market Street location in 1808 when the Wilmington Bridge Company opened its toll swing bridge. Chartered by the General Assembly, the Wilmington Bridge Company was composed of private citizens who supported a bridge at this location and raised \$15,000 for its construction. Prior to the construction of the first movable bridge at this site, people crossed the (continued on second side)<br>State Bridge 688 is one of seven remaining historic bascule bridges carrying vehicular traffic in Delaware; it continues to function as a movable bridge. J. A. L. Waddell, imminent bridge engineer and historian, as well as an innovator of the type, described bascule bridges in 1916 as follows: "they represent, probably, the best and most profound thought that has ever been devoted to bridge engineering". The bascule bridge was the earliest type of movable bridge built. In its most primitive form it was a shallow deck which could be raised to a vertical or inclined position by means of an outhaul cable attached to the free end. The bascule bridge design evolved over the centuries, and during the late nineteenth and early twentieth centuries it was developed in numerous patented types. In general, these patented bascule designs were either of a pivoting, or trunnion, variety or a rolling type. State Bridge 688 is of the trunnion type. There are several patented types of trunnion bascule bridges including the Strauss, Chicago , Waddell and Harrington, patented by J. L. Harrington, principal in the firm which designed Bridge 688. The trunnion bascule differs from the rolling lift bascule in that the entire weight of the leaf and counterweight is carried by the trunnion and trunnion bearings, located approximately at the center of gravity of the mass. In some cases, the machinery and the counterweight are placed in a pit below the deck within the bascule pier; this made possible an exterior design free of visible machinery, an appropriate choice for urban settings. In addition to its significance as an extant bascule bridge, Bridge 688 has technological significance and derives additional significance from its association with a prominent engineering firm, and as an example of an embellished urban bridge. |  |   |
| <b>7. DESCRIPTION</b>   |  |   |
| <b>8. HISTORICAL DATA</b>   |  |   |
| <b>9. SIGNIFICANCE</b>  |  |   |