

Methodology for 2017 Metal Truss Bridge Reevaluation

Introduction

The PennDOT Historic Bridge Inventory and Evaluation, one of the earliest comprehensive inventories of historic highway bridges in the country when it was completed in 2001, identified bridges that meet the criteria for National Register of Historic Places (National Register) listing. This inventory considered all metal truss bridges included in the 2001 survey and in PennDOT's Bridge Management System (BMS2).¹ There has been a significant loss of historic bridges in the intervening 15 years, particularly among the metal truss bridge population. The Historic Bridge Inventory and Evaluation, begun in 1996 and completed in 2001, identified 851 metal truss bridges. By April 2017, the population dropped to 414 metal truss bridges, a 51% loss.² In consideration of this loss, PennDOT, in consultation with the Pennsylvania State Historic Preservation Office (SHPO), is now updating that inventory and evaluation with a focus on metal truss bridges. This update also includes consideration of a previous update, completed in 2008, for metal truss bridges. The purpose of this document is to provide the methodological approach for recommendations of National Register eligibility made under the 2017 metal truss bridge inventory update. Wood truss bridges were not included in this inventory and evaluation. Bridges that carry railroads were also excluded except where a railroad truss crosses over highway.

The methodology is based on continuing the approach outlined in a *Historic Context for Common Bridge Types in Pennsylvania* (1998) and the *Pennsylvania Historic Bridge Inventory and Evaluation* (A.G. Lichtenstein, 1999) with some updates/revisions based on recent scholarship. Several historic bridge surveys have been completed since 2001, most notably Indiana (2009) and Maryland (2011). These and other useful publications, including NCHRP's *A Context for Common Historic Bridge Types* (2005), were consulted in the refinement of the methodology.

As part of the update effort, bridges were only evaluated for National Register significance under Criterion C for engineering significance or relative to having high artistic merit. Given the focus of the update on primarily engineering significance, the metal truss bridge population was divided by bridge type and design. Bridge types were defined as pony, thru, and deck trusses and were further broken down into designs³. Population loss numbers were examined to understand rarity across the state and in regions (PennDOT engineering districts were utilized as representing a region⁴). In addition, evaluation criteria were developed for each type and design (Appendix A). A point-based system was created to provide a consistent and replicable approach to determining the eligibility of a bridge, regardless of its type, materials, features, or age.

¹ PennDOT's Bridge Management System or "BMS2" is a database used by PennDOT and FHWA that stores, updates, and reports on the physical and operating characteristics of road related structures in Pennsylvania, with bridges being the largest category of structures. BMS2 provides information such as location, features carried/crossed, owner, maintenance responsibility, posting status, structural capacity, load rating, inspection condition information, underwater inspection information and proposed/completed maintenance items. The database is updated daily.

² Many of these bridges are locally owned and their removal may not have been federally funded.

³ Relevant designs include Baltimore, Bowstring, Camelback, Cantilever*, Haupt, Howe, King Post, Lattice, Lenticular, Parker, Pennsylvania, Pratt, Warren, Whipple and Wichert. *Cantilever thru bridges of different designs we combined and evaluated together.

⁴ PennDOT divides the Commonwealth into eleven Engineering Districts (Districts 1-6, 8-12) which are responsible for the state maintained transportation network in that region.

Bridges determined not eligible for the National Register during the inventory update lack integrity due to alterations; are part of a remaining population that includes earlier and more complete examples; or are late examples of designs which do not possess engineering significance in Pennsylvania. Of the 414 remaining metal truss bridges, 193 bridges are recommended not individually eligible after the bridge inventory update.

Truss bridges recommended to be National Register eligible during this 2017 inventory update include: 28 thru trusses, 17 pony trusses, and 7 deck trusses. A total of 52 trusses were elevated as National Register eligible and they include: 24 Pratt trusses, 10 Warren trusses, 8 Parker trusses, 4 Baltimore trusses, 3 Pennsylvania trusses, and one each of Cantilever, Howe, and Wichert trusses.

Three hundred twenty-two (322) metal truss bridges were identified as eligible or listed in the National Register during either the 2001 statewide inventory or during the 2008 metal truss bridge inventory update. The 2017 reevaluation found that only 181 of these bridges remained (a 44% loss in the eligible/listed population). The 2017 reevaluation identified 52 bridges to be potentially elevated to the National Register, bringing the number of eligible and listed bridges to a total of 209. This number reflects the removal of 13 previously eligible bridges that are recommended not eligible by the 2017 reevaluation; 1 bridge that was determined not eligible by the Keeper of the National Register in 2010; and 10 eligible bridges that were moved or adaptively reused as part of the Historic Bridge Marketing Program.

The eligibility recommendations for the 54 additional bridges identified through this 2017 update as meeting National Register criteria will be sent to the PennDOT engineering districts, the FHWA, and the public for input prior to being finalized. It is possible that the final list will be different from the recommendations included in this document.

Research

In preparation for this inventory update, background research included an examination of the following sources and consultation with the following people:

- PennDOT's *Historic Context for Common Bridge Types in Pennsylvania* (1998)
- PennDOT's *Pennsylvania Historic Bridge Inventory and Evaluation* (1999)
- NCHRP's *A Context for Common Historic Bridge Types* (2005)
- *Indiana Historic Bridge Inventory: Volume I: National Register Eligibility Results* (2009)
- *Historic Highway Bridges in Maryland: 1631-1960, Historic Context Report* (1995)
- PennDOT standard bridge plans
- Gerry Kunzio and Mary McCahan, historians who worked on the 2001 Pennsylvania historic bridge inventory
- Mike Cuddy, Historic Bridge Engineer, Transystems
- PennDOT Historic Bridge Survey database (2001)
- PennDOT Bridge Management System (BMS2)
- PA SHPO files related to bridges, including survey records, Historic American Engineering Record forms, nominations for National Register listing, and determinations of eligibility
- Historic Bridges website www.historicbridges.org
- Bridge Hunters website www.bridgehunter.com
- Bridges & Tunnels of Allegheny County and Pittsburgh, PA website www.pghbridges.com
- Bridge Mapper www.bridgemapper.com

- Bradford County’s Truss Bridges – Bridge Fabrication Companies website
<http://www.skellyloy.com/bctb/bm.htm>
- Google Maps/Google Earth

A list of all metal truss bridges from the 2001 Statewide Historic Bridge Inventory was compiled and an effort was undertaken by PennDOT interns and SHPO staff to reconcile the data. The data reconciliation effort consisted of:

- Identifying extant and demolished bridges
- Verifying Bridge Key numbers⁵ and Bridge Management System (BMS) identification numbers⁶
- Linking bridges with current photo documentation from online resources such as: HistoricBridges.org, bridgehunter.com, pghbridges.com, bridgemapper.com, BMS2 inspection photos, and/or Google Maps or Earth
- Verifying bridge types and design

The *Historic Context for Common Bridge Types in Pennsylvania* (1998) provides the framework to understand the significant broad patterns of roadway transportation development and bridge design and construction in Pennsylvania. The understanding of relevant themes that emerged from the context study shaped the methodology for evaluating the National Register significance of bridges as part of this update for metal truss bridges. The *Pennsylvania Historic Bridge Inventory and Evaluation* (1999) and National Register eligibility evaluation justifications from the accompanying database, as well as the 2008 metal truss bridge reevaluation, were also consulted in the development of the methodology for the 2017 metal truss inventory and evaluation update.

Information sources on bridge alterations consulted in assessing the integrity of these bridges included: the 2001 Statewide Historic Bridge Inventory and Evaluation, recent photographs available on relevant bridge websites (e.g. historicbridges.org, bridgehunter.com, pghbridges.com, Google maps), and PennDOT’s bridge inspection files and photographs (reviewed by PennDOT’s Bridge Engineers and Cultural Resources Personnel).⁷

Approach

The reevaluation of National Register eligibility for metal truss bridges recorded in PennDOT’s BMS2 was carried out by a committee that included staff of the agencies of PennDOT (Kara Russell) and the Pennsylvania SHPO (Barbara Frederick, Tyra Guyton, and Cheryl Nagle). In meetings, bridges were individually examined within their relevant context (by type and design, as well as within the regional and statewide populations) using established National Register registration requirements. Questions requiring further research were tabled for review and revisited in subsequent committee meetings.

It was discovered through these meetings that the previous (2001) Statewide Historic Bridge Inventory presented inconsistencies in National Register eligibility evaluations and an inconsistent level of detail regarding character defining features. For example, the inventory provided more detailed information for early bridges, calling out design features or characteristics (e.g. unique floorbeam hangers, or the

⁵ Bridge Key or BK numbers refer to the bridge structure itself and are a second structure reference number established by PennDOT for the Bridge Management System 2 (BMS2) database to provide each bridge structure with a unique identification number that will not change for the life of the bridge.

⁶ Bridge Management System (BMS) identification numbers or BMS numbers are a 14-digit structure identification number assigned to each bridge location and may be subject to change.

⁷ In a few cases, site visits were made by PennDOT staff to collect updated information on integrity

work of a prominent builder). Other bridges with the same characteristics would be described as “traditionally composed” or a “late example” with little descriptive information beyond “no unusual or noteworthy features.” The inconsistencies and lack of consistent information on character defining features of previously evaluated bridges made it difficult to formulate a consistent approach for the reevaluation effort.

For some bridge designs the previous approach to metal truss evaluation was determined to be no longer viable. For example, in the 2001 inventory those bridges with minor alterations were determined not eligible because those types and designs were “common in the county and region”; only the most complete examples were considered significant. For some truss bridge designs, only a few early or complete examples remain in 2017. In addition, the previous inventory did not reevaluate National Register eligibility of preexisting determinations of eligibility (DOEs). This included state owned truss bridges listed in the National Register in 1988 following the 1983-1986 inventory. These earlier determinations often neglected to include any information on engineering significance or notable features.

After developing an understanding of the shortcomings of the 2001 inventory and 2008 update and reviewing more recent inventories from other states, the team reevaluating the metal truss bridge population decided on a points-based system to produce a more consistent application of the National Register Criteria for Evaluation. The point system awards points to all bridges with distinctive characteristics, special features, or innovations, as well as early and rare bridges and subtracts points for loss of distinctive characteristics and features. The system is similar to that used in the evaluation of the state of Indiana’s historic bridge population (2009). The point system was applied to all metal truss bridges in BMS. Previously determined eligible and listed bridges helped guide which distinctive characteristics, special features and important innovations were awarded points. Truss bridges that were previously not evaluated for individual significance due to their status as contributing to a historic district were evaluated for individual significance under Criterion C.

The evaluation system is based on the application of National Register Criterion C. Although truss bridges may be eligible for the National Register under any of the National Register criteria, only Criterion C was considered for this reevaluation. Assessment of significance under National Register Criterion A was not undertaken but notes were made when a need for evaluation of potential historic significance under Criterion A was identified. It was not practical or feasible to evaluate bridges for associative value under Criterion A or B as part of this effort. Criterion A assessments, including contributing status to historic districts, will be ongoing, and generally undertaken on a case-by-case basis during future Section 106 project reviews. In most cases, bridges will not be individually eligible under Criterion A but may be contributing components of historic districts or historic sites.

Like any resource evaluation, the significance of a historic bridge is best judged and explained when the bridge is evaluated within its historic context, in this case the context emphasizes engineering significance as manifested in particular types and designs. Consideration was also given to the work of important bridge builders. An understanding of the historic context for bridges in Pennsylvania informed the development of the point system used to evaluate each bridge type. The point based system includes three steps:

- 1) Establish significance
- 2) Assess integrity
- 3) Determine eligibility

More detail on the points-based system is provided below and in Appendix A

Recent Loss of the Metal Truss Bridge Population

The reassessment of National Register eligibility considers the significant loss of metal truss bridges both regionally and statewide since the conclusion of the statewide inventory in 2001.⁸ In the previous inventory, 847 metal truss bridges were identified. The 2017 reevaluation identified 4 additional bridges that were not included in the 2001 survey. These bridges were added to the 2001 population numbers to account for their inclusion in the 2017 population, bringing the total population of metal truss bridges to 851. The 2017 reevaluation found that only 414 metal truss bridges remained as of March 2017, a population loss of 51%. Table 1 summarizes the loss of historic metal truss bridges by bridge type and design. The remaining example of Baltimore deck, King Post pony, Lattice pony, and Pratt combination truss bridges have been lost. The largest percentage of loss involved the Warren pony, Pratt pony, and Pratt thru trusses; more than 50% of the population of these types and designs have been lost since 2001. In the previous inventory, these were the bridge types/designs with the largest populations. The Warren Pony truss population fell from 116 to 39, a 66% loss; Pratt pony bridges declined from 238 to 100, a 58% loss; and Pratt thru truss bridges decreased from 185 bridges to 85, a 54% population loss.

Table 2 summarizes the loss of historic trusses by type. The biggest loss (57%) is seen in the pony truss population which went from 421 to 179. Thru trusses declined from 373 to 203, a 46% decline. Table 3 summarizes the loss of historic trusses by design (irrespective of truss type); Warren, Pratt, and Pennsylvania trusses had a 50% or more loss.

⁸ Bridges that were repurposed for a non-vehicular adaptive reuse are included in the extant population and do not count towards the loss in population.

Table 1. Summary of Historic Metal Truss Bridge Population Loss between 2001 and 2017 by Type and Design

Design	Type	Date Range	Extant		% Loss
			2001 Population	2017 Population	
Baltimore Deck	Deck	1891	1	0	100
King Post	Pony	1875ca	1	0	100
Lattice	Pony	1883ca.	1	0	100
Pratt Combination	Half Thru	1934	1	0	100
Warren	Pony	1879-1953	116	39	66
Miscellaneous*		1832-1997	24	9	63
Pratt**	Pony	1870ca.-1954	238	100	58
Pratt	Thru	1880ca.-1949	185	85	54
Bowstring**	Thru	1870-1928	4	2	50
Pennsylvania**	Thru	1890-1937	26	13	50
Howe**	Pony	1896-1927	2	1	50
Double Intersection Warren	Thru	1890ca.-1911	9	5	44
Camelback	Thru	1884-1922	5	3	40
Parker	Pony	1903-1952	55	33	40
Parker	Thru	1888ca.-1948	89	55	38
Warren	Thru	1871-1937	20	13	35
Bowstring	Pony	1869-1880ca	6	4	33
Cantilever	Thru	1887-1949	6	4	33
Baltimore	Thru	1894-1935	13	9	31
Pratt	Deck	1908-1952	18	13	28
Warren	Deck	1892ca.-1956	11	8	27
Whipple	Thru	1871-1904	11	9	18
Haupt	Pony	1850ca	1	1	0
Howe	Thru	1910	1	1	0
Lenticular	Pony	1890ca.	1	1	0
Lenticular	Thru	1878-1889	3	3	0
Quadruple intersection Warren	Thru	1890	1	1	0
Wichert	Deck	1936-1938	2	2	0
Total of All Bridges			851	414	51
*Miscellaneous bridges include modern truss bridges, wood truss bridges, and truss bridges of unknown design.					
**The 2017 reevaluation identified 4 bridges that were not included on the 2001 survey. These bridges have been added into the 2001 survey numbers (bridges include a Bowstring Thru, Howe Pony, Pennsylvania Thru (camelback design), and a Pratt Pony).					

Table 2. Summary of Historic Metal Truss Bridge Population Loss between 2001 and 2017 by Type

Type	Date Range	Extant		% Loss
		2001 Population	2017 Population	
Pony	1832-1995	421	179	57
Thru	1870-1949	373	203	46
Deck	1891-1956	32	23	28
Does not include Miscellaneous bridges or Pratt Combination Half Thru				

Table 3. Summary of Historic Metal Truss Bridge Population Loss between 2001 and 2017 by Design

Type	Date Range	Extant		% Loss
		2001 Population	2017 Population	
King Post	1875ca.	1	0	100
Lattice	1883ca.	1	0	100
Miscellaneous*		24	9	63
Warren	1879-1956	157	66	58
Pratt	1870ca.-1954	453	207	54
Pennsylvania	1890-1937	26	13	50
Bowstring	1869-1928	10	6	40
Camelback	1884-1922	5	3	40
Parker	1888ca.-1952	144	88	39
Baltimore	1894-1935	14	9	36
Cantilever	1884-1922	6	4	33
Howe	1896-1889	3	2	33
Haupt	1850ca	1	1	0
Lenticular	1878-1889	4	4	0
Wichert	1936-1938	2	2	0

*Miscellaneous bridges include modern truss bridges, wood truss bridges, and truss bridges of unknown design.

Recent Loss of the National Register Eligible Metal Truss Bridge Population

The statewide historic bridge inventory identified 851 metal truss bridges. Prior to the 2017 reevaluation, 322 of those 851 bridges were considered eligible for, or listed in, the National Register of Historic Places. This included bridges determined eligible in 2008 as part of a metal truss bridge reevaluation, and bridges that were determined eligible after 2001 as part of the Section 106 review process.⁹

National Register eligible or listed metal truss bridges remain extant in slightly higher percentages than the non-eligible population of metal truss bridges with 44% loss overall. The 2017 reevaluation found 181 National Register eligible or listed bridges remain. Table 4 summarizes the loss of all National Register eligible metal truss bridges by type and design. The Commonwealth's Lattice pony, King Post pony, and Baltimore deck truss populations, all of which were eligible or listed, were lost. Warren Pony trusses experienced a 58% loss (from 33 to 14). Both Warren thru trusses and Parker pony trusses experienced a 57% loss (both went from 7 eligible bridges to 3). There was a 50% loss in the population of Howe Pony (from 2 to 1), Parker thru (from 20 bridges to 10), Baltimore thru (from 6 to 3) and Warren deck trusses (from 2 to 1).

Table 5 summarizes the loss of National Register eligible and listed bridges by type. National Register eligible and listed pony trusses experienced the greatest loss at 46% (from 136 to 73), with thru truss

⁹ Bridges determined to be contributing components of a National Register eligible historic district but not individually eligible are not included in this number.

bridges experiencing a 41% loss (from 175 to 103) and deck trusses experiencing a 38% loss (from 8 to 5).

Table 6 summarizes the loss of National Register eligible and listed bridges by design. The remaining examples of King Post and Lattice designs were demolished. Baltimore trusses experienced a 57% loss (from 7 to 3). Warren trusses experiences a 54% loss (from 50 to 23) and Parker trusses experienced a 52% loss (from 27 to 13). Howe trusses experienced a 50% loss in population when one of the remaining two examples was demolished.

Some general assumptions can be made from the pattern of truss bridge loss. Bridges that are at the greatest risk for demolition are older and narrower bridges with weight and height restrictions. Bridges that are retained and rehabilitated as part of the transportation system are generally younger and wider bridges, with no or limited height constraints. Larger bridges that go over major river crossings are usually retained although a number of major river crossing bridges have also been demolished, primarily in areas where there is no redundancy in the regional network (e.g. large detours for heavier vehicles).

Table 4: Summary of National Register Eligible Metal Truss Bridge Loss between 2001 and 2017

Design	Type	Date Range	NR Eligible Bridges		% Loss
			Prior to Reevaluation**	2017 Population	
Lattice	Pony	1883ca.	1	0	100
King Post	Pony	1875ca	1	0	100
Baltimore Deck	Deck	1891	1	0	100
Miscellaneous*		1903ca	2	0	100
Pratt Combination	Half Thru	1934	1	0	100
Warren	Pony	1879-1935	33	14	58
Warren	Thru	1871-1851	7	3	57
Parker	Pony	1903-1940	7	3	57
Howe	Pony	1896-1927	2	1	50
Parker	Thru	1888ca.-1932	20	10	50
Baltimore	Thru	1894-1901	6	3	50
Warren	Deck	1892ca.-1928	2	1	50
Pratt	Thru	1880ca-1936	96	53	45
Double Intersection Warren	Thru	1890ca.-1907	7	4	43
Pratt	Pony	1870ca.-1936	86	50	42
Pennsylvania	Thru	1890-1937	15	10	33
Camelback	Thru	1884-1905	3	2	33
Cantilever	Thru	1887-1949	4	3	25
Pratt	Deck	1908-1940	4	3	25
Bowstring	Pony	1869-1875ca.	4	3	25
Whipple	Thru	1871-1904	11	9	18
Bowstring	Thru	1870	2	2	0
Wichert	Deck	1938	1	1	0
Quadruple intersection Warren	Thru	1890	1	1	0
Lenticular	Thru	1878-1889	3	3	0
Lenticular	Pony	1890ca.	1	1	0
Haupt	Pony	1850ca	1	1	0
Howe	Thru	1910	0	0	
All Bridges			322	181	44
* Miscellaneous bridges include modern truss bridges, wood truss bridges, and truss bridges of unknown design.					
**This number includes bridges determined individually eligible by the previous bridge inventory, 2008 metal truss bridge reevaluation, and through the Section 106 review process.					

Table 5: Summary of National Register Eligible Metal Truss Bridge Loss between 2001 and 2017 by Type

Type	Date Range	NR Eligible Bridges		% Loss
		Prior to Reevaluation**	2017 Population	
Pony	1869-1940	136	73	46
Thru	1871-1949	175	103	41
Deck	1891-1940	8	5	38
**This number includes bridges determined individually eligible by the previous bridge inventory, 2008 metal truss bridge reevaluation and through the Section 106 review process.				

Table 6: Summary of National Register Eligible Metal Truss Bridge Loss between 2001 and 2017 by Design

Design	Date Range	NR Eligible Bridges		% Loss
		Prior to Reevaluation**	2017 Population	
King Post	1875ca	1	0	100
Lattice	1883ca.	1	0	100
Miscellaneous*		2	0	100
Baltimore	1894-1901	7	3	57
Warren	1871-1935	50	23	54
Parker	1888ca.-1940	27	13	52
Howe	1896-1927	2	1	50
Pratt	1870ca.-1940	198	115	42
Camelback	1884-1905	3	2	33
Pennsylvania	1890-1937	15	10	33
Cantilever	1887-1949	4	3	25
Bowstring	1869-1875	6	5	17
Haupt	1850ca	1	1	0
Lenticular	1878-1890ca.	4	4	0
Wichert	1938	1	1	0
* Miscellaneous bridges include modern truss bridges, wood truss bridges, and truss bridges of unknown design. **This number includes bridges determined individually eligible by the previous bridge inventory, 2008 metal truss bridge reevaluation and through the Section 106 review process.				

Regional Population of Metal Truss Bridges

The population of metal truss bridges was analyzed at the regional level to determine which regions had experienced the greatest loss since the previous bridge inventory, the earliest remaining bridges in a region, and regional distribution of bridge types and designs. Each of the 11 PennDOT engineering districts was considered a region for the purposes of this evaluation. The District 6 region lost the least number of metal truss bridges with a 23% loss in truss bridges (from 86 bridges to 66) and District 10 region had the greatest loss in truss population at 71% (from 55 bridges to 16).

Table 7. District Population of Bridges by Type and Design, 2017 and 2001

Design	Type	Date Range	# Extant Bridges in 2017 Reevaluation/# Bridges extant in 2001 Inventory by District											
			1	2	3	4	5	6	8	9	10	11	12	Total
Baltimore	Thru	1894-1935	0/1	0/1	3/4	2/2	0	1/1	1/2	1/1	1/1	0	0	9/13
Baltimore	Deck	1891	0	0	0	0	0	0	0	0	0	0/1	0	0/1
Bowstring	Thru	1870-1928	1/1	0	0	0	1/1	0	0	0	0	0/2	0	2/4
Bowstring	Pony	1869-1880ca	0/1	0	0/1	0	1/1	1/1	1/1	0	1/1	0	0	4/6
Camelback	Thru	1884-1922	1/2	0	1/2	1/1	0	0	0	0	0	0	0	3/5
Cantilever	Thru	1887-1949	0	0	0	0	1/1	1/1	0	0	0	2/3	0/1	4/6
Double Intersection Warren	Thru	1890ca.-1911	0	0/1	3/3	0	1/2	1/1	0	0	0	0/1	0/1	5/9
Haupt	Pony	1850ca	0	0	0	0	0	1/1	0	0	0	0	0	1/1
Howe	Pony	1896-1927	0	1/1	0	0	0	0	0/1	0	0	0	0	1/2
Howe	Thru	1910	0	0	0	0	0	0	0	0	0	0	1/1	1/1
King Post	Pony	1875ca	0/1	0	0	0	0	0	0	0	0	0	0	0/1
Lattice	Pony	1883ca.	0	0	0	0	0/1	0	0	0	0	0	0	0/1
Lenticular	Thru	1878-1889	0	0	1/1	1/1	0	0	0	0	0	1/1	0	3/3
Lenticular	Pony	1890ca.	0	0	0	0	0	0	1/1	0	0	0	0	1/1
Miscellaneous		1832-1997	0/1	0/1	0/4	0	0	8/10	0	0/1	0/3	0/1	1/3	9/24
Parker	Thru	1888ca.-1948	4/10	6/9	17/22	5/13	1/3	1/1	2/2	2/4	4/5	8/13	5/7	55/89
Parker	Pony	1903-1952	1/2	4/9	12/15	3/4	0	1/1	1/1	7/9	0/3	0/1	4/10	33/55
Pennsylvania	Thru	1890-1937	2/3	0	0/4	2/2	1/1	0	4/4	1/1	0/1	1/3	2/7	13/26
Pratt	Pony	1870ca.-1954	7/26	4/13	5/17	13/23	5/9	30/38	6/25	5/14	4/26	2/4	19/43	100/238
Pratt	Thru	1880ca.-1949	16/34	4/16	14/29	1/9	7/10	10/13	8/19	11/20	1/4	4/16	9/15	85/185
Pratt	Deck	1908-1952	1/2	1/1	0	0	3/5	0	0	0	1/2	7/8	0	13/18
Pratt Combination	Half Thru	1934	0/1	0	0	0	0	0	0	0	0	0	0	0/1
Quadruple intersection Warren	Thru	1890	0	0	1/1	0	0	0	0	0	0	0	0	1/1
Warren	Pony	1879-1953	3/15	1/7	6/19	3/11	1/4	6/12	4/13	0/4	3/6	7/10	5/15	39/116
Warren	Thru	1871-1937	0	0	1/1	2/2	0/1	4/4	0/1	2/5	0/2	3/3	1/1	13/20
Warren	Deck	1892ca.-1956	0	0	0	1/1	1/1	0/1	0	0	1/1	4/5	1/2	8/11
Whipple	Thru	1871-1904	1/2	2/2	0	0	1/1	1/1	2/3	0	0	1/1	1/1	9/11
Wichert	Deck	1936-1938	0	0	0	0	0	0	0	0	0	2/2	0	2/2
		Total	37/102	23/61	64/123	34/69	24/41	66/86	30/73	29/59	16/55	42/75	49/107	414/851
		% Loss	64	62	48	51	41	23	59	51	71	44	54	51

National Register Significance—Criterion C

Metal truss bridges may be eligible for the National Register under Criterion C in the areas of engineering and/or architecture for their age, technological significance, as the work of a master, or for aesthetics. As per PennDOT's *Pennsylvania Historic Bridge Inventory and Evaluation* (1999)

Criterion C . . . addresses bridges that meet at least one of the following characteristics: they embody distinctive characteristics of a type, period, or method of construction; they are the work of a master; they possess high artistic value. . . The criterion affords recognition of the evolution of bridge types and bridge building technology over time, as well as the importance of the engineer/engineering firm who designed a bridge and the fabricator/contractor who erected it. Architectonic and aesthetic bridges, bridges with unusual construction details or rare surviving examples of a type that was significant in the development of a bridge technology . . . can be eligible under Criterion C.

Common types will be evaluated to identify which examples are technologically significant. Priority will be placed on identifying examples that mark the introduction of a particular technology, illustrate engineering advances within a technology, and/or have distinguishing details. This often means that significant examples are the earlier, longer, or more complicated

bridges. Evaluation of common bridge types and designs will be done at a regional and statewide basis to ensure the most significant examples are identified.

As explained above, the team reevaluating the metal truss bridge population decided on a points-based system to foster a consistent application of the National Register Criteria for Evaluation. The point system awards points to bridges with distinctive characteristics, special features, or innovations as well as early and rare bridges. The points based system is organized by bridge type and design.

Bridges were awarded points for items under the following categories which correspond with the requirements of National Register Criterion C:

- Distinctive characteristics of type, period, or method of construction
- A variation, evolution, and/or transition of a type that reflects an important phase in bridge construction
- High artistic value
- Work of a master/builder

Distinctive characteristics of a type, period, and method of construction

Early examples of a bridge usually represent the pioneering period for a bridge type and design. Bridges built in the 19th century are increasingly rare, therefore all bridges built before 1900 were awarded points. The previous bridge inventory methodology and context provided a date range that was considered early for each bridge type and design; points were assigned to bridges built before this date. This assessment was made using the current state and PennDOT engineering district populations.

Increasingly **rare** bridge types important in the development of metal truss bridge technology were awarded points. As outlined in the 1999 methodology, “Unique, rare, or infrequent surviving types . . . are also evaluated as having engineering significance under Criterion C . . . the unique, rare or infrequent criterion will be evaluated on a county and statewide basis.” The 2017 update examined rarity based on the remaining statewide and engineering district populations. Regional rarity was defined as 3 or fewer remaining examples of a bridge type and design in an engineering district.

Rarity is also seen in materials and types of construction. For example, additional points were awarded to bridges constructed of cast or wrought iron and deck trusses that were continuous or cantilevered. Bridges of a distinctive, or uncommon, design in the current population were also awarded points; these include Warren thru trusses with a polygonal top, Wichert deck trusses, Pratt pony trusses with continuous design, Double Intersection Warren trusses, Bowstring pony trusses, Camelback trusses, Lenticular trusses, and Whipple trusses. Bridges types and designs that are the only known highway example in the state (Howe truss, Quadruple Intersection Warren truss, Bowstring thru truss, and Lenticular Pony truss) were assigned points for rarity.

Examples of **early standard plan** examples from the State Highway Department were also recognized because of the important role the Pennsylvania Department of Highways played in the development of the state’s bridges. As outlined in the previous statewide bridge inventory methodology, this includes bridges that demonstrate early use, or evolution of, State Highway Department design types. Based on an examination of PennDOT bridge plans available, the Parker thru and pony bridges were found to have a state standard plan, both created in 1932; the rest of the truss types and designs of this period do not appear to be associated with state standard designs. Additional points were awarded to all 1932 Parker bridges as these are the earliest bridges to reflect state standard designs.

Variation, evolution, or transition that reflects an important phase in bridge construction.

Points were awarded to features or innovations that illustrate an **important change, transition, or experimentation in technology within the remaining bridge population**. This refers to notable design details related to engineering innovations or variations or refinements within a type and design including connection transitions (i.e. transition from pin connections to rivets or from rivets to welds). The previous bridge inventory often indicated when a change, transition, or technology was considered early and important and generally only the earliest examples were evaluated as significant. However, considering the amount of demolition that has occurred over the past 15 years, these date ranges are no longer valid in terms of the extant population. For example, the previous bridge inventory established the important transition period from pins to rivets for Pratt thru bridges to be 1895 to 1905. In 2017, the earliest remaining riveted Pratt thru trusses date to 1905 and 1910. Given the remaining bridge population, the period reflecting the important transition period from pins to rivets in Pratt thru bridges in Pennsylvania has shifted to 1905 to 1915; four riveted Pratt thru bridges built between 1905 and 1915 were awarded points for this transition period.

Bridges with **special features or innovations** reflect innovations by engineers, designers, fabricators, or builders, compared to common designs and features for a type. These innovations include patented designs such as Phoenix columns and idiosyncratic features. These innovations and features were generally identified in the previous bridge inventory and points were applied to all bridges that exhibited these innovations. In a few cases, idiosyncratic features were noted by bridge historians that were not noted in the statewide inventory and, upon validation, points were awarded.

Points were also awarded for bridges that show **notable technological achievement**, including those bridges that were uncommonly constructed due to the challenging nature of their design and/or construction, typically due to topographical conditions. This includes bridges that test the limits of a particular type or design in relation to span length, skew, and incline. Points were awarded to bridges with exceptional span length and bridges with exceptional overall length in the statewide highway population. Bridge length was not considered on a regional/district level. Exceptional lengths were sometimes noted in the 2001 Statewide Historic Bridge Inventory and these numbers were used to assess exceptional technological achievement. For example, a Pennsylvania thru truss (bridge key #28915) is noted as “pushing the single span truss design to the limit at 550’” so a baseline was set at 500’ for this type and points were given to the bridges that exceeded the baseline. If no specifics related to technological achievements were noted in the Statewide Historic Bridge Inventory, the statewide population of a particular type and design were compared and the longest bridges were awarded points.

Bridges with multiple examples of special features, innovations, and notable technological achievements reflect a more dynamic change or transition in a type, technology, or material and are highly significant. These bridges represent a greater accomplishment and are awarded additional points.

Possesses High Artistic Values

Several bridges evaluated in the 2017 evaluation have outstanding ornamentation, style, or architectural treatments that could be considered “high artistic value” as outlined under National Register Criterion C. This ornamentation ranges from cresting or finials to unusual design features; for example, the large arch portal and smooth curved appearance of the Boston Bridge in Allegheny County. This also includes simpler features such as lattice portal and bracing on a more modest thru truss. Bridges with ornamental or architectural treatment in the overall design were awarded points. Notable but isolated

ornamentation, such as decorative railings or end posts, also received recognition but were assigned less points than those bridges that incorporated ornamentation into their overall design.

Work of a Master

Bridges were evaluated as the work of a master if they were documented as attributable to specific engineers, designers, fabricators, or builders of national recognition, or Pennsylvania-based individuals or firms that designed and built bridges within the state and whose work is distinguishable. Bridges built by out-of-state builders without national recognition were not considered to be the work of a master unless unusual evidence suggests otherwise. All bridges attributable to a master through distinguishing design features were awarded points. Work of a master was considered important in conjunction with other features, such as a high artistic value or unusual features or innovations. Therefore, to meet the point threshold for significance, “work of a master” bridges had to receive points for other characteristics as well.

Following is a list of builders that were identified in the previous bridge inventory as significant as either a major bridge builder in Pennsylvania or a region or as a significant innovator in bridge construction in the nation.

Table 8. Notable Metal Truss Bridge Fabricators and Builders

Bridge Company	Historic Location	Significance (Information from previous bridge study)
Denithorne Bros.	Phoenixville PA	Also, John Denithorne and Son or James Denithorne and Co. Considered a leading fabricator of metal truss highway bridges in the county and region.
Farris Engineering Co.	Pittsburgh, PA	Prolific regional bridge builder
Groton Bridge Co.	Groton, NY	Prolific regional bridge builder.
King Bridge Co.	Cleveland, OH	Important early national bridge building company and one of the largest and most diversified bridge fabricators of the late 19th century.
Morse Bridge Co.	Youngstown, OH	Short lived but prolific regional bridge fabricator.
Nelson & Buchanan	Chambersburg, PA	Noted as a prolific instate fabricator, also an agent that erected bridges for Pittsburgh Bridge Co.
Penn Bridge Works or Penn Bridge Co. or T. & S. White	Beaverfalls, PA	One of many bridge companies producing truss bridges for a regional market in the late 19th and early 20th centuries. Founded in 1868 in New Brighton, Beaver County, Penn Bridge moved to Beaver Falls in 1879 and changed its name from West Penn Bridge Co. Referred to early on as T & S White of New Brighton, PA.
Phoenix Bridge Co.	Phoenixville, PA	Company was instrumental in refining and popularizing metal truss bridge technology during the last half of the 19th century.
Pittsburgh Bridge Co.	Pittsburgh, PA	One of the state's most prolific fabricators of local highway bridges from 1878 to 1901.
West Penn Bridge Co.	New Brighton, PA	In 1879, this company changed its name to Penn Bridge Works of Beaver Falls.
Wrought Iron Bridge Co.	Canton, OH	Prominent fabricator of metal truss bridges and among the best known and most successful builders to establish a national market for its bridges.
York Bridge Co.	York, PA	According to Skelly and Loy website on Bridge Fabrication Companies, they were a small regional fabricator of metal truss bridges

National Register Significance Assessment (Appendix A)

A matrix to assess significance was developed for each bridge type (Appendix A). Accordingly, those bridges with more points represent the earliest bridges with distinctive characteristics, special features, and important innovations. Any bridge that received 13 or more points was determined to have significance and was advanced for an assessment of integrity.

National Register Integrity Assessment (Appendix B)

National Register eligibility is a combination of significance and integrity. Integrity is the ability of a resource to convey its significance. In accordance with National Register Criterion C, integrity is directly related to whether a bridge retains sufficient integrity of materials, design and workmanship- those aspects of integrity that allow a structure to convey its physical features as well as characterize the type, period, or method of construction. In the points-based system of eligibility assessment, points were deducted for those bridges that have lost integrity of materials, design, and workmanship.

In assessing retention of integrity, consideration was given to the following factors:

- extent of change to historic character (appearance from the period of significance)
- importance of character defining features
- continued ability of bridge to convey historic significance (engineering function)
- visibility of the alteration to the public
- craftsmanship

Integrity loss was divided into 4 categories, as outlined in more detail in Appendix B:

Level 1 integrity loss involves limited replacement, alterations, or additions to character defining features in accordance with the Secretary of the Interior's (SOI) Standards as well as replacement or alterations to non-character defining features. Bridges with limited integrity loss received a deduction of 1 point from their overall significance score. If a bridge had one issue of integrity loss under this category, then a total of 1 point was deducted from its overall score. Multiple issues of integrity loss under this category moved it to Level 2.

Level 2 integrity loss involves replacement, removal, alterations, or additions to essential character defining features in accordance with the SOI Standards. It also involves replacement, removal, additions, or alterations to secondary character defining features.¹⁰ If a bridge had one issue of integrity loss under this category, then a total of 3 points were deducted from its overall score. Multiple issues of integrity loss under this category moved it to Level 3.

Level 3 integrity loss involves replacement, removal, alterations, or additions, to essential character defining features not in accordance with the SOI Standards. If a bridge had one issue of integrity loss under this category, then a total of 7 points was deducted from its overall score. Multiple issues of integrity loss under this category moved it to Level 4.

Level 4 integrity loss involves excessive replacement, removal, alterations, or additions, to essential character defining features not in accordance with the SOI Standards in a manner that significantly affects historic character and the ability to convey engineering significance.

¹⁰ The SHPO developed guidance for the application of the Secretary of the Interior's Standards for the treatment of historic bridges. This guidance defines the secondary character defining features of a metal truss bridge and can be found at <https://www.paprojectpath.org/docs/default-source/penndot-crm---general-documents/draft-secretary-of-interior-standards-for-historic-bridges-in-pa-6-1-17.pdf?sfvrsn=2>

The 1999 methodology from the Statewide Historic Bridge Inventory states, “When a resource type or detail becomes so infrequent or rare that losing one or two examples will mean that it is no longer represented in the bridge population, then the integrity question is secondary to recognizing the worthiness of preserving a disappearing bridge type or design.” The point system recognizes a lower threshold for integrity is sometimes acceptable for bridges that are extraordinarily rare. More points are awarded to rare bridges which allows for more points to be deducted for integrity loss while still staying within the point range for eligibility. Therefore, bridge types with few other extant examples are justified in accepting a greater degree of alteration or fewer remaining physical features to convey the engineering significance of the type.

In general, any bridge that no longer functioned as a truss, such that the truss was not carrying live loads and/or its own weight, was considered to have excessive integrity loss and was recommended as not eligible. However, some trusses were considered so rare that integrity was secondary to recognizing the significance of the design. For example, a Henszey bowstring pony truss (bridge key #21911) is one of only two bowstrings in the country attributed to Joseph G. Henszey’s patented design. All that remains of the bridge is the historic trusses which were attached decoratively to the bridge and no longer carry a live load¹¹. Because of the exceptionally rare design, integrity is considered secondary to recognizing the historical and technological significance of this bridge as it represents the early developmental era of metal truss bridge technology.

Recommendations of National Register Eligibility

Following the significance and integrity assessments, a bridge received a total point value. Bridges that met the established point threshold (13 points) were recommended eligible for the National Register or recommended to remain National Register eligible if previously determined eligible. Those bridges that did not meet the threshold were recommended not eligible except for bridges that were previously listed in the National Register. These bridges remain listed regardless of points.¹² See Appendix C for a significance statement for each elevated bridge and the associated rationale for the eligibility recommendation. See Appendix D for a significance statement and the associated rationale for each bridge that remains eligible. See Appendix E for a list of previously determined eligible bridges that will be recommended not eligible as a result of this reevaluation. Table 9 summarizes all the bridges that are recommended eligible or recommended to remain National Register eligible. Geospatial data and images of each bridge recommended elevated or demoted can be found at the following website: <http://pennshare.maps.arcgis.com/apps/webappviewer/index.html?id=e4c8112754b14cb18a21a615dc2d8aae>.

¹¹ This bridge has since been successfully marketed to a non-profit organization. The historic Henszey trusses, which were decoratively attached to a non-historic bridge that was slated for demolition, were removed and placed in storage. The new owners plan to rehab the trusses and apply them decoratively to a new bridge on their property.

¹² Only one listed bridge did not retain sufficient points in the evaluation. This bridge was retrofitted with a steel arch and no longer functions as a truss, therefore the bridge cannot convey its engineering significance.

Table 9: Summary of National Register Eligible Bridges as a result of the 2017 Reevaluation

Design	Type	Date Range	Eligible Bridges	Population of Eligible Bridges by District											
				1	2	3	4	5	6	8	9	10	11	12	
Baltimore	Thru	1895-1935	7	0	0	1	2	0	1	1	1	1	0	0	
Bowstring	Thru	1875ca.-1876	2	1	0	0	0	1	0	0	0	0	0	0	
Camelback	Thru	1897-1905	2	1	0	0	1	0	0	0	0	0	0	0	
Cantilever	Thru	1896-1951	4	0	0	0	0	1	1	0	0	0	2	0	
Double Intersection Warren	Thru	1904-1907	5	0	0	3	0	1	1	0	0	0	0	0	
Howe	Pony	1902	1	0	1	0	0	0	0	0	0	0	0	0	
Howe	Thru	1910	1	0	0	0	0	0	0	0	0	0	0	1	
Lenticular	Pony	1890ca.	1	0	0	0	0	0	0	1	0	0	0	0	
Lenticular	Thru	1883-1889	2	0	0	1	0	0	0	0	0	0	1	0	
Parker	Pony	1903-1932	3	0	0	0	0	0	1	1	0	0	0	1	
Parker	Thru	1902-1937	17	0	1	3	2	1	1	0	0	2	4	3	
Pennsylvania	Thru	1890-1937	13	2	0	0	2	1	0	4	1	0	1	2	
Pratt	Deck	1928-1949	6	0	0	0	0	1	0	0	0	0	5	0	
Pratt	Pony	1883-1936	50	4	2	1	10	3	17	2	3	1	2	6	
Pratt	Thru	1880ca-1936	57	12	1	7	0	4	9	6	9	1	2	7	
Quadruple intersection Warren	Thru	1890	1	0	0	1	0	0	0	0	0	0	0	0	
Warren	Deck	1892ca.-1956	4	0	0	0	1	1	0	0	0	0	1	1	
Warren	Pony	1879-1935	15	0	0	1	2	1	4	3	0	0	2	2	
Warren	Thru	1826-1851	6	0	0	0	1	0	2	0	0	0	2	1	
Whipple	Thru	1876-1889	8	0	2	0	0	1	1	2	0	0	1	1	
Wichert	Deck	1936-1938	2	0	0	0	0	0	0	0	0	0	2	0	
		Total	209*	20	7	18	21	16	38	20	14	5	25	25	

*This does not include bridges that are NR eligible or listed and repurposed or moved for adaptive reuse (Includes 3 Bowstring pony, 1 Haupt pony, 1 Lenticular thru, 3 Pratt Pony, 1 Pratt thru, and 1 Whipple)

Public Participation

Subsequent to the reevaluation investigation, notifications will be sent by PennDOT to bridge owners, state historical societies and preservation groups, and bridge groups via ProjectPATH informing them of the metal truss historic bridge inventory update and inviting their comments. Comments will be summarized and considered for revisions of the truss bridge inventory update.

Recommendations

This document outlines the methodology for the development of eligibility recommendations for the 2017 historic metal truss bridge update. It is possible that new or additional information on significance or integrity may become known about a bridge, such as at the time of a project. This information may warrant reconsideration of eligibility. For example, an alteration that was not apparent through available records or photographs may be identified as affecting the ability of a bridge to convey its significance. The bridge should then undergo reevaluation through application of the points-based system used in the current assessment, outlined in Appendix A of this document.

The methodology that was developed for the 2017 metal truss bridge inventory update provides a consistent and replicable approach to determining the eligibility of a bridge, regardless of its type, design, materials, features, or age. This methodology can be replicated for other bridge types and designs. The 2017 amendment to the Federal Aide Programmatic Agreement between FHWA, PennDOT and the SHPO establishes a process by which the signatories to the agreement will consult at least every 10 years to determine if conditions have changed that would require updating the list of National Register eligible bridges. Future bridge updates should be completed using the methodology outlined in this document.

APPENDIX A CRITERION C POINT APPLICATION FOR SIGNIFICANCE BY METAL TRUSS BRIDGE TYPE

Category	Item	Bridge type and design	Points to assign
Distinctive characteristics of type, period, or method of construction	Built before a specified year	Bridges built 1900	7
	Building material OR Method of construction	Defined for each bridge type and design	7
	Distinctive type and/or uncommon type OR Only known example in the state	Defined for each bridge type and design	7
	Early example in the state	1932 Parker	3
	Early standard plan in the state	Defined for each bridge type and design	3
	Earliest example in a PennDOT district	Defined for each bridge type and design	3
	Rare in a PennDOT district	Three or fewer examples within the PennDOT district	3
Variation, evolution, and/or transition of a type	Exceptional length of main span	Defined for each bridge type and design	3

	Exceptional length overall	Defined for each bridge type and design	3
	Special features/innovations – important or unusual	Defined for each bridge type and design	3
	Special features/innovations – highly important or unusual	Defined for each bridge type and design	4
	Outstanding technological achievement	Defined for each bridge type and design	7
<hr/>			
High artistic value	Selected ornamentation, notable but isolated	Single decorative feature	3
	Outstanding ornamentation or architectural treatment in overall design	Highly artistic or decorative	6
<hr/>			
Work of a master	Prolific or important designer/builder/engineer		3

APPENDIX B CRITERION C POINT APPLICATION FOR INTEGRITY BY METAL TRUSS BRIDGE TYPE

Level 1 Integrity Loss	Replacement in kind ¹³	Replacement of a limited amount of character defining features such as: <ul style="list-style-type: none"> • Elements of a built-up member (i.e., battens, v-lacing, lattice, angles, or cover plates) • Top and bottom lateral bracing, struts, sub-struts or ties, portal bracing, or sway bracing • Bearings • 3 or less verticals and/or diagonals and/or end posts 	-1
	Replacement not in kind	Replacing non-character defining features such as: <ul style="list-style-type: none"> • floorbeams and stringers • limited number of rivets with modern bolts 	-1
	Alterations/Additions	Limited functional and safety improvements in accordance with the SOI Standards ¹⁴ <ul style="list-style-type: none"> • Minor increase of vertical clearance by removal of knee bracing • Removable improvements such as the addition of safety (Jersey) barriers 	-1
		Limited strengthening in accordance with the SOI Standards** <ul style="list-style-type: none"> • Post tensioning • Adding plates of small size and/or number 	-1
Level 2 Integrity Loss	Replacement in kind	Replacing essential character defining features: <ul style="list-style-type: none"> • Upper chord • Lower chord including eyebars • Connections including pins, hangers, pin plates • Verticals and/or diagonals and/or end posts 	-3
	Replacement not in kind	Replacing secondary character defining features such as <ul style="list-style-type: none"> • Fishbelly floorbeams • Top and bottom lateral bracing, struts, sub-struts or ties, portal bracing, or sway bracing 	-3

¹³ In kind replacement refers to Secretary of the Interior’s Standards for Rehabilitation, Standard 6: Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.

¹⁴ With regards to additions and alterations, The Secretary of the Interior’s Standards for Rehabilitation, Standard 9 states: New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment. The Secretary of the Interior’s Standards for Rehabilitation, Standard 10 states: New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

	Alterations/Additions	Removal of secondary character defining features such as <ul style="list-style-type: none"> • Original outriggers • Ornamentation commonly found during the period of significance (railings) 	-3
		Strengthening not in accordance with the SOI Standards <ul style="list-style-type: none"> • Adding a significant number of plates • Adding large plates 	-3
		Functional and Safety Improvement not in accordance with the SOI Standards such as: <ul style="list-style-type: none"> • Minor widening (less than a lane width) • Widening through sidewalk extension • Increasing vertical clearance 	-3
	Two or more examples from the Level 1 Integrity loss category		-3
Level 3 Integrity Loss	Replacement not in kind	Replacing essential character defining features <ul style="list-style-type: none"> • Upper chord • Lower chord including eyebars • Connections including pins, hangers, pin plates • Verticals and/or diagonals and/or end posts • Large number of rivets with bolts in highly visible areas 	-7
	Additions/Alterations	Removal of character defining features such as <ul style="list-style-type: none"> • Ornamentation that conveys high artistic value or craftsmanship (portals) 	-7
		Strengthening not in accordance with the SOI Standards <ul style="list-style-type: none"> • Alteration of method of connection such as welding pin connections • Concrete encasement of lower chord connections 	-7
		Functional and Safety Improvement not in accordance with the SOI Standards <ul style="list-style-type: none"> • Widening • Increasing vertical clearance 	-7
	Two or more examples from the Level 2 Integrity loss category		-7
Level 4 Integrity loss	Two or more examples from the Level 3 Integrity loss category		-10

Note: Bridges that no longer function as a truss are considered not eligible for listing as they cannot convey their engineering significance.

APPENDIX C BRIDGES ELEVATED TO ELIGIBLE UNDER CRITERION C¹⁵

County	District	Bridge Key #	BMS #	Design	Significance
Allegheny	11	712	02005101100000	Warren Thru	<ul style="list-style-type: none"> • Unusual design for a Warren • Regionally rare • Exceptional span length • Multiple spans • Main span holds a suspended deck • Designed with oval cutouts instead of V lacing and lattice
Allegheny	11	1108	02036600600328	Pratt Deck	<ul style="list-style-type: none"> • Uncommon type (cantilevered) • Exceptional span length • Exceptional overall length • Multiple spans • Cantilevered with suspended sections
Allegheny	11	1475	02103800100059	Parker Thru	<ul style="list-style-type: none"> • Exceptional span length • Exceptional overall length • Multiple spans • Pin connected is unusual variation with Parker thru construction
Allegheny	11	2394	02730100003005	Wichert Deck	<ul style="list-style-type: none"> • Uncommon design • Regionally rare • Multiple spans • Hinged quadrilateral sections over intermediate piers
Allegheny	11	2461	02730100003115	Parker Thru	<ul style="list-style-type: none"> • Early use of riveting • Early use of rolled metal truss member • Decorative railing on sidewalk
Allegheny	11	2579	02742322882394	Cantilever Thru	<ul style="list-style-type: none"> • Uncommon design • Regionally rare • Exceptional overall length • Multiple spans • Retains period lamp posts, light fixtures, and bridge plaques
Allegheny	11	2653	02744900002146	Pratt Deck	<ul style="list-style-type: none"> • Uncommon design (cantilevered) • Multiple spans • Cantilevered with suspended sections
Beaver	11	3622	04035101600000	Warren Deck	<ul style="list-style-type: none"> • Early example of type/design in the state • Earliest example of type/design in district 11 • Rare variation of Warren truss where Warren pattern is broken up in the center by an x pattern of diagonals
Berks	5	5364	06721507619463	Pratt Thru	<ul style="list-style-type: none"> • Early use of rolled metal truss members • Floorbeams connected to pins by riveted pin plates instead of U shaped hangers marking the transition from all pinned to riveted connections • Artistic value

¹⁵ Geospatial data and images of elevated bridges can be found here:

<http://pennshare.maps.arcgis.com/apps/webappviewer/index.html?id=e4c8112754b14cb18a21a615dc2d8aae>

To search for bridges on the website: Open the link, click on the filter option in the upper right corner, enter the bridge key number under elevated bridges, and turn the search function on by sliding the dot across from “Elevated Bridges” to the right. An elevated bridge will appear as a green diamond on the map and an image of the bridge can be viewed by clicking on the diamond. It may be necessary to zoom out of the map to access the crossing information for the bridge.

Bradford	3	6576	08720605520006	Pratt Thru	<ul style="list-style-type: none"> • Early use of riveting • Artistic value • Important designer, builder, or engineer
Bradford	3	6593	08721003440014	Pratt Pony	<ul style="list-style-type: none"> • Built before 1900 • Earliest example of type/design in district 3 • Early use of rolled metal truss members • Important designer, builder, or engineer
Bucks	6	7118	09100602900282	Pratt Pony	<ul style="list-style-type: none"> • Built before 1900 • Early example of type/design in the state • Exceptional span length • Lightweight built up floorbeams • Decorative finials, plaque, and end posts
Bucks	6	7173	09219000100000	Pratt Pony	<ul style="list-style-type: none"> • Built before 1900 • Exceptional overall length • Multiple spans
Bucks	6	7528	09700903760339	Pratt Pony	<ul style="list-style-type: none"> • Built before 1900 • Unusual lower panel point connection and cruciform on outriggers • Important designer, builder, or engineer
Bucks	6	7561	09700904320361	Pratt Pony	<ul style="list-style-type: none"> • Uncommon type (all welded) • Early use of welding
Bucks	6	7640	09722199910005	Warren Thru	<ul style="list-style-type: none"> • Uncommon design • Early example of type/design in the state • Earliest example of type/design in district 6 • Multiple spans
Bucks	6	7648	09722499910005	Double Intersection Warren Thru	<ul style="list-style-type: none"> • Uncommon design • Early example of type/design in the state • Earliest example of type/design in district 6 • Regionally rare • Exceptional overall length • Early use of riveting • Multiple spans
Cambria	9	8660	11303900100766	Baltimore Thru	<ul style="list-style-type: none"> • Uncommon design • Early example of type/design in the state • Regionally rare • Earliest use of riveting • Engineered with incline inside the truss
Cameron	2	8843	12012002200742	Parker Thru	<ul style="list-style-type: none"> • Earliest example of type/design in district 2 • Earliest use of riveting • Earliest use of rolled metal truss members • Artistic value – decorative lattice railing on sidewalk
Chester	6	10361	15103500502222	Warren Pony	<ul style="list-style-type: none"> • Uncommon design – polygonal top chord • Exceptional overall length • Multiple span • Artistic value – decorative railing
Chester	6	10653	15701503220035	Pratt Pony	<ul style="list-style-type: none"> • Built before 1900 • Wrought Iron • Important designer, builder, or engineer
Chester	6	10861	15725606950001	Pratt Pony	<ul style="list-style-type: none"> • Uncommon type (all welded) • Early use of welding
Clarion	10	10986	16036800100000	Parker Thru	<ul style="list-style-type: none"> • Exceptional span length • Multiple spans • Built at a 6.32% grade, an important achievement at the time of construction
Columbia	3	12760	19720103670048	Pratt Thru	<ul style="list-style-type: none"> • Early use of rolled metal truss members • Floorbeam connection marks the transition from all pinned to riveted field connection • Artistic value – decorative railing, lattice portal and portal bracing, decorative builder's plaque

Crawford	1	12905	20000609000114	Pennsylvania Thru	<ul style="list-style-type: none"> • Uncommon type • Early example of type/design in the state • Regionally rare
Crawford	1	13421	20720607513008	Pratt Pony	<ul style="list-style-type: none"> • Built before 1900 • Artistic value – decorative railings, decorative rivets on center of original lattice railings
Greene	12	18502	30720505672026	Howe Thru	<ul style="list-style-type: none"> • Uncommon design – only example in the state • Early example of type/design in the state • Earliest example of type/design in district 12 • Regionally rare • Early use of riveting • Artistic value – decorative railing
Greene	12	18506	30720707162054	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Early use of rolled metal truss members • Artistic value – decorative portal and portal bracing • Important designer, builder, or engineer
Greene	12	18532	30721503572008	Pratt Pony	<ul style="list-style-type: none"> • Early use of rolled metal truss members • Floorbeams are above the lower chord • Artistic value – decorative railing
Greene	12	18564	30793562141300	Pratt Pony	<ul style="list-style-type: none"> • Exceptional overall length • Early use of rolled metal truss members • Floorbeams are above lower chord
Indiana	10	19276	32200200100000	Baltimore Thru	<ul style="list-style-type: none"> • Uncommon design • Earliest example of type/design in district 10 • Regionally rare • Exceptional span length • Multiple span
Lawrence	11	22183	37001803002363	Pennsylvania Thru	<ul style="list-style-type: none"> • Uncommon design • Regionally rare • Exceptional overall length • Multiple spans
Lawrence	11	22341	37048800600000	Pratt Thru	<ul style="list-style-type: none"> • Substantially skewed • Multiple spans • Artistic value – decorative lattice railing on sidewalk
Lawrence	11	22538	37720603951010	Parker Thru	<ul style="list-style-type: none"> • Early standard plan • Exceptional span length • Substantially skewed • Multiple spans
Lebanon	8	22744	38102000100966	Parker Pony	<ul style="list-style-type: none"> • Early standard plan • Earliest example of type/design in district 8 • Regionally rare • Multiple spans • Early use of rolled metal truss members • Artistic value – decorative railing
Lehigh	5	23207	39087301601859	Pratt Deck	<ul style="list-style-type: none"> • Early example of type/design in the state • Earliest example of type/design in district 3 • Regionally rare • Multiple span •
Luzerne	4	23616	40001107901610	Baltimore Thru	<ul style="list-style-type: none"> • Uncommon design • Regionally rare • Multiple spans • Artistic value – decorative lattice railing on sidewalk

Luzerne	4	24451	40730202040002	Pennsylvania Thru	<ul style="list-style-type: none"> • Uncommon design • Regionally rare • Exceptional overall length • Multiple spans • Unusual combination of a Pennsylvania and Parker truss with multiple connection types • Artistic value – decorative portal and portal bracing
Luzerne	4	24453	40730323050004	Parker Thru	<ul style="list-style-type: none"> • Early example of type/design in the state • Exceptional overall length • Multiple spans • Pin connected is unusual variation with Parker thru construction • Important designer, builder, or engineer
Lycoming	3	24507	41001402701507	Baltimore Thru	<ul style="list-style-type: none"> • Uncommon design • Earliest example of type/design in district 3 • Regionally rare • Substantially skewed
Monroe	5	26986	45202400100427	Warren Pony	<ul style="list-style-type: none"> • Uncommon design – polygonal top chord • Exceptional overall length • Artistic value – decorative railing
Northampton	5	Unknown	48721003710001	Pratt Pony	<ul style="list-style-type: none"> • Built before 1900 • Cast and wrought iron • Continuous design • Early example of type/design in the state • Regionally rare • Multiple spans • Early use of rolled metal truss members • Octagonal top chord • Artistic value – decorative flower shape design on face of top chord connection boxes and octagonal members
Northampton	5	28912	48730200000001	Pratt Thru	<ul style="list-style-type: none"> • Exceptional overall length • Multiple spans • Uncommon use of rolled I and wide flange H for the top chord and end post sections representing the transitions from built up to all rolled beams • Artistic value – decorative railings
Perry	8	29662	50300900201815	Pratt Pony	<ul style="list-style-type: none"> • Exceptional overall length • Multiple spans • Early use of rolled metal truss members • Important designer, builder, or engineer
Pike	4	30073	51740299940005	Warren Deck	<ul style="list-style-type: none"> • Continuous design • Regionally rare • Exceptional span length • Exceptional overall length • Multiple spans • Artistic value – selected as one of ten most beautiful steel bridges in the 26th annual (1953) national aesthetic bridge competition sponsored by the American Institute of Steel Construction
Snyder	3	31159	54101300400000	Pratt Thru	<ul style="list-style-type: none"> • Early use of rolled metal truss members • Artistic value – some original lattice railings, lattice portal and bracing • Important designer, builder, or engineer
Susquehanna	4	32735	57740104800113	Pratt Pony	<ul style="list-style-type: none"> • Built before 1900 • Wrought iron • Artistic value – lattice railing • Important designer, builder, or engineer

Somerset	9	31911	55741181423038	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Early example of type/design in the state • Artistic value – lattice portal and uncommon sway bracing style • Important designer, builder, or engineer
Wayne	4	35488	63019112001649	Warren Thru	<ul style="list-style-type: none"> • Earliest example of type/design in district 4 • Regionally rare • Exceptional span length • Multiple span • Important designer, builder, or engineer
Westmoreland	12	36053	64007004740000	Warren Deck	<ul style="list-style-type: none"> • Continuous design • Regionally rare • Exceptional span length • Exceptional overall length
Westmoreland	12	36137	64015600401528	Parker Thru	<ul style="list-style-type: none"> • Multiple spans • Entire structure is composed of rolled beams which is unusual
York	8	38291	66742030003274	Warren Pony	<ul style="list-style-type: none"> • Early example of type/design in the state • Earliest example of type/design in district 8 • Early use of rivets • Early use of rolled metal

APPENDIX D BRIDGES THAT WILL REMAIN ELIGIBLE OR LISTED UNDER CRITERION C

County	District	Bridge Key #	BMS #	Design	Significance
Adams	8	396	01720206463118	Warren Pony	<ul style="list-style-type: none"> • Early use of rolled metal truss member • Multiple Span • U-shaped floor beam hangers are uncommon in riveted bridges • Artistic value – decorative railings • Important designer, builder, or engineer
Adams	8	422	01720603293005	Warren Pony	<ul style="list-style-type: none"> • Uncommon design – polygonal top chord • Early example of type/design in the state • Earliest example of type/design in district 8 • Early use of riveting • Artistic value – decorative railings • Important designer, builder, or engineer
Allegheny	11	684	02004801300203	Warren Thru	<ul style="list-style-type: none"> • Uncommon design – only one in the state • Earliest example of type/design in district 11 • Regionally rare • Exceptional span length • Exceptional overall length • Multiple Spans • Early use of rolled metal truss member • Artistic Value – Ornamental and artistic • Important designer, builder, or engineer
Allegheny	11	1380	02100500200000	Pratt Deck	<ul style="list-style-type: none"> • Uncommon design • Exceptional overall length • Multiple spans • Cantilevered with suspended sections
Allegheny	11	1668	02211400200000	Parker Thru	<ul style="list-style-type: none"> • Earliest example of type/design in district 11 • Exceptional span length • Exceptional overall length • Multiple Span • Pin Connected Parkers are unusual • Important designer, builder, or engineer

Allegheny	11	1742	02302700200000	Lenticular Thru	<ul style="list-style-type: none"> • Built before 1900 • Wrought iron • Uncommon type • Early example of type/design in the state • Earliest example of type/design in district 11 • Regionally rare • Exceptional span length • Double lenticular truss • Only lenticular in the country not built by the Berlin Iron Co. • Nationally Significant – National Historic Landmark • Artistic value – decorative portal
Allegheny	11	1808	02306901100150	Pratt Deck	<ul style="list-style-type: none"> • Uncommon design • Early example of type/design in the state • Earliest example of type/design in district 11 • Exceptional span length • Exceptional overall length • Multiple spans
Allegheny	11	2436	02730100003081	Warren Pony	<ul style="list-style-type: none"> • Early example of type/design in the state • Early use of rivets • Lower chords have built up plates and angles resembling a girder • Artistic value – decorative sidewalk railing and end posts
Allegheny	11	2456	02730100003109	Pratt Deck	<ul style="list-style-type: none"> • Uncommon design • Early example of type/design in the state • Exceptional span length • Multiple spans • Artistic value – decorative railing
Allegheny	11	2462	02730100003118	Warren Pony	<ul style="list-style-type: none"> • Early example of design/type in the state • Early use of rivets • Lower chords have built plates and angles resembling a girder • Artistic value – decorative sidewalk railings with end posts
Allegheny	11	2503	02730130472392	Wichert Deck	<ul style="list-style-type: none"> • Uncommon type • Earliest example of type/design in district 11 • Regionally rare • Multiple span • Hinged quadrilateral sections over intermediate piers • Important designer, builder, or engineer
Allegheny	11	2610	02744100001001	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Wrought Iron • Early example of type/design in the state • Earliest example of type/design in district 11 • Unusual Z sections or corrugated built up beams on the hip verticals and bottom chords • Artistic value – unusual twisted railing of sidewalk and decorative lattice portal and portal bracing • Important designer, builder, or engineer
Armstrong	10	3401	03722107480024	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Earliest examples of type/design in district 10 • Regionally rare • Z shaped floorbeam hangers
Armstrong	10	3157	03103800600080	Parker Thru	<ul style="list-style-type: none"> • Early State Standard Design (1932) • Exceptional span length • Multiple spans • Early use of rivets

Beaver	11	3740	04400900600000	Pratt Pony	<ul style="list-style-type: none"> • Built before 1900 • Wrought Iron • Uncommon design • Early example of type/design in the state • Earliest example of type/design in district 11 • Regionally rare • Multiple spans • Important designer, builder, or engineer
Beaver	11	3894	04740200004001	Cantilever Thru Trusses	<ul style="list-style-type: none"> • Uncommon design • Early example of type/design in the state • Earliest example of type/design in district 11 • Regionally rare • Exceptional span length • Exceptional overall length • Multiple span • Artistic value – decorative finials • Important designer, builder, or engineer
Beaver	11	3900	04741200004026	Double Intersection Pratt (Whipple)	<ul style="list-style-type: none"> • Built before 1900 • Wrought Iron • Uncommon type • Early example of type/design in the state • Earliest example of type/design in district 11 • Regionally rare • Multiple Span • Distinctive two pin connection detail at the ends of top chords • Cantilevered • Artistic value – decorative railing, ornamental portal and bracing, and cast iron end posts • Important designer, builder, or engineer
Bedford	9	4498	05720906553004	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Early example of type/design in the state • Artistic value – decorative railing and lattice portal and bridge plaque • Important designer, builder, or engineer
Berks	5	5369	06721507879467	Pratt Thru	<ul style="list-style-type: none"> • Earliest example of type/design in district 5 • Early use of rolled metal truss members • Floorbeams connected to pins by riveted pin plates instead of U shaped hangers marking the transition from all pinned to riveted connections
Berks	5	5423	06722807499591	Double Intersection Pratt (Whipple)	<ul style="list-style-type: none"> • Built before 1900 • Uncommon design • Early example of type/design in the state • Earliest example of type/design in district 7 • Regionally rare • Distinctive two pin connection detail at the ends of top chords • Artistic value – ornamental portal bracing and bridge plaque • Important designer, builder, or engineer
Blair	9	5962	07721405123048	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Wrought iron • Artistic value – decorative railing, portal, lateral and sway bracing • Important designer, builder, or engineer
Bradford	3	6571	08720409370000	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Early example of type/design in the state • Deep built up floorbeams suspended from lower panel point • Important designer, builder, or engineer

Bradford	3	6588	08720903500013	Double Intersection Warren Thru	<ul style="list-style-type: none"> • Uncommon design • Early example of type/design in the state • Earliest example of type/design in district 3 • Regionally rare • Early use of rivets • Early use of rolled metal truss members • Artistic value – decorative railing, lattice portal and portal bracing • Important designer, builder, or engineer
Bradford	3	6603	08721203300016	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Early example of type/design in the state • Rare bottom chord connections are framed into the floorbeams instead of using a U bolt hanger system • Artistic Value – Lattice portal and portal bracing • Important designer, builder, or engineer
Bradford	3	6650	08722307810027	Warren Pony	<ul style="list-style-type: none"> • Built before 1900 • Early example of type/design in the state • Earliest example of type/design in district 3 • Early use of riveting • Important designer, builder, or engineer
Bradford	3	6675	08723307630038	Double Intersection Warren Thru	<ul style="list-style-type: none"> • Uncommon type • Early example of type/design in the state • Regionally rare • Artistic value – decorative railing, lattice portal and portal bracing • Important designer, builder, or engineer
Bradford	3	6678	08723403280008	Double Intersection Warren Thru	<ul style="list-style-type: none"> • Uncommon type • Early example of type/design in the state • Regionally rare • Artistic value – decorative railing, lattice portal and portal bracing • Important designer, builder, and engineer
Bradford	3	6686	08723704610041	Parker Thru	<ul style="list-style-type: none"> • Early example of type/design in the state • Earliest example of type/design in district 3 • Pin connected is unusual in Parkers • Important designer, builder, or engineer
Bucks	6	7383	09401301101126	Pratt Pony	<ul style="list-style-type: none"> • Exceptional span length • Exceptional overall length • Substantial skew • Rare design with verticals and diagonals the same size instead of compression verticals being heavier than tension diagonals • Artistic value – lattice sidewalk railing
Bucks	6	7496	09700903340256	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Earlier example of type/design in the state • Unusual lower panel point connection detail where the vertical is bolted to the top flange of the floorbeam and pin joining the lower chord and diagonals • Artistic value – lattice portal and portal bracing • Important designer builder or engineer
Bucks	6	7515	09700903620240	Pratt Pony	<ul style="list-style-type: none"> • Built before 1900 • Wrought iron • Early example of type/design in the state • Important designer, builder, or engineer

Bucks	6	7529	09700903810127	Double Intersection Pratt (Whipple)	<ul style="list-style-type: none"> • Built before 1900 • Wrought Iron • Uncommon type • Earliest example of type/design in district 6 • Regionally rare • U shaped floorbeam hangers • Multiple spans • Artistic value – ornamental portal and bracing, cast iron end posts
Bucks	6	7535	09700903900151	Pratt Pony	<ul style="list-style-type: none"> • Built before 1900 • Distinctive two pin connection detail at the ends of top chords • Unusual “eye ended” bolts • Artistic value – decorative railing • Important designer, builder, or engineer
Bucks	6	7555	09700904210244	Pratt Pony	<ul style="list-style-type: none"> • Built before 1900 • Star iron or cruciform outriggers • Unusual panel point connection • Artistic value – decorative railing
Bucks	6	7644	09722304320000	Pratt Pony	<ul style="list-style-type: none"> • Uncommon type (all welded) • Early use of welding
Bucks	6	7688	09740999910020	Warren Thru	<ul style="list-style-type: none"> • Early example of type/design in the state • Exceptional overall length • Multiple spans • Early use of rolled metal truss members
Bucks	6	7689	09740999910025	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Cast and wrought iron • Early example of type/design in the state • Exceptional span length • Exceptional overall length • Multiple spans • Phoenix columns • Artistic value – decorative finials and bridge plaque • Important designer, builder, or engineer
Butler	10	8268	10722303480059	Pratt Pony	<ul style="list-style-type: none"> • Built before 1900 • Rolled star iron or cruciform or outriggers • Floorbeams placed above the lower chords • Important designer, builder, or engineer
Cambria	9	8636	11302200100000	Pennsylvania Thru	<ul style="list-style-type: none"> • Built before 1900 • Uncommon type • Early example of type/design in the state • Early example of type/design in district 9 • Regionally rare • Artistic value – lattice portal
Cambria	9	8736	11720404593001	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • U shaped floorbeam hangers • Cast iron guide blocks for the lower chords at the outside lower panel points are distinctive details • Fishbelly floorbeams • Artistic value – lattice portal and bracing
Chester	6	10518	15305200100000	Pratt Pony	<ul style="list-style-type: none"> • Built before 1900 • Cast and Wrought iron • Early example of type/design in the state • Phoenix Columns • Important designer, builder, or engineer

Chester	6	10682	15701504090138	Pratt Pony	<ul style="list-style-type: none"> •Built before 1900 •Wrought iron •Early example of type/design in the state •Earliest example of type/design in district 6 •Early use of rolled metal truss members •Bottom chord is not connected to the hip vertical •Fishbelly floorbeams •Artistic value – decorative vertical members with two rows of lattice and decorative cast iron caps •Important designer, builder, or engineer
Chester	6	10686	15701504240199	Pratt Pony	<ul style="list-style-type: none"> •Built before 1900 •Wrought iron •U shaped floorbeam hangers •Important designer, builder, or engineer
Chester	6	10692	15701504380111	Pratt Thru	<ul style="list-style-type: none"> •Early use of riveting •Early use of rolled metal truss members •U shaped floorbeam hangers •Artistic value – decorative railing
Chester	6	10707	15701504910194	Pratt Thru	<ul style="list-style-type: none"> •Built before 1900 •Wrought iron •Early example of type/design in the state •U shaped floorbeam hangers •Important designer, builder, or engineer
Chester	6	10712	15701505020196	Warren Pony	<ul style="list-style-type: none"> •Early example of type/design in the state •Exceptional overall length •Early use of rivets •U shaped floorbeam hangers are uncommon in riveted bridges •Artistic value – decorative railing •Important designer, builder, or engineer
Chester	6	10720	15701505400167	Pratt Pony	<ul style="list-style-type: none"> •Built before 1900 •Cast and wrought iron •Early example of type/design in the state •U shaped floorbeam hangers •Fishbelly floorbeams •Cast iron connections •Important designer, builder, or engineer
Chester	6	10727	15701505930166	Pratt Pony	<ul style="list-style-type: none"> •Built before 1900 •Wrought iron •U shaped floorbeam hangers •Fishbelly floorbeams •Important designer, builder, or engineer
Chester	6	10821	15723604170001	Warren Pony	<ul style="list-style-type: none"> •Built before 1900 •Wrought iron •Early example of type/design in the state •Earliest example of type and design in district 6 •Exceptional overall length •Pin connection is uncommon on Warrens
Clearfield	2	11939	17722312240005	Howe Pony	<ul style="list-style-type: none"> •Wrought iron •Uncommon type •Early example of type/design in the state •Earliest example of type/design in district 2 •Regionally rare
Clearfield	2	11945	17722602060005	Pratt Pony	<ul style="list-style-type: none"> •Built before 1900 •Cast and wrought iron •Early of type/design in the state •Earliest example of type/design in district 2 •Regionally rare •Cast iron connections •Flat bar lower chord with bolted lap joints •Verticals composed of I beams •U shaped floorbeam hangers

Clearfield	2	11915	17721704210005	Double Intersection Pratt (Whipple)	<ul style="list-style-type: none"> • Built before 1900 • Wrought iron • Uncommon type • Early example of type/design in the state • Earliest example of type/design in district 2 • Regionally rare • U shaped floorbeam hangers • Artistic value – ornamental portal bracing and bridge plaque
Clearfield	2	11930	17722205660010	Double Intersection Pratt (Whipple)	<ul style="list-style-type: none"> • Built before 1900 • Wrought iron • Uncommon type • Early example of type/design in the state • Regionally rare • Unusual framed lower chord pin connections • Artistic value – ornamental portal and bracing • Important designer, builder, or engineer
Columbia	3	12824	19721404680042	Parker Thru	<ul style="list-style-type: none"> • Early example of type/district in the state • Floorbeam framing reflects transition from pinned to riveted connections • Pin connection is uncommon on Parkers • Artistic value – decorative railings and end posts • Important designer, builder, or engineer
Crawford	1	13408	20720208853003	Pratt Pony	<ul style="list-style-type: none"> • Built before 1900 • Early example of type/design in the state • Early example of type/design in district 1 • Cast iron connections • Important designer, builder, or engineer
Crawford	1	13435	20721006203014	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Artistic value – decorative bridge plaque, portal, and portal bracing • Important designer, builder, or engineer
Crawford	1	13450	20721409933020	Bowstring Thru	<ul style="list-style-type: none"> • Built before 1900 • Wrought iron • Uncommon type • Early example of type/design in the state • Earliest example of type/design in district 1 • Regionally rare • Keystone style top chord • U shaped floorbeam hangers • Fishbelly floorbeams • Important designer, builder, or engineer
Crawford	1	13513	20723506003041	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • U shaped floorbeam hangers • Artistic value – decorative railing, portal, and portal bracing
Crawford	1	13434	20721005743013	Pratt Pony	<ul style="list-style-type: none"> • Built before 1900 • Wrought iron • Important designer, builder, or engineer
Crawford	1	13546	20730288253035	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Early example of type/design in the state • Floorbeams placed above the lower chord • Pins framed into the box shaped verticals • Artistic value – cast iron end posts, lattice portal and portal bracing • Important designer, builder, or engineer
Crawford	1	13549	20740603843029	Pratt Pony	<ul style="list-style-type: none"> • Built before 1900 • Early use of rolled metal truss members • U shaped floor beam hangers • Fishbelly floorbeams • Important designer, builder, or engineer

Crawford	1	13550	20740688093006	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Early use of rolled metal truss members • Artistic value – decorative sidewalk railing, end posts, portal, and portal bracing with cresting
Crawford	1	13554	20740909623025	Pennsylvania Thru	<ul style="list-style-type: none"> • Uncommon type • Early example of type/design in the state • Early example of type/design in district 1 • Regionally rare • U shaped floorbeam hangers • Artistic value – decorative railing
Cumberland	8	14041	21710206483802	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Wrought iron • Early example of type/design in the state • Phoenix columns • Artistic value – decorative cast iron stars of portal bracing and bridge plaque • Important designer, builder, or engineer
Cumberland	8	14048	21710406123809	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Early use of rolled metal truss members • Artistic value decorative railing • Important designer, builder, or engineer
Cumberland	8	14064	21720404273616	Pennsylvania Thru	<ul style="list-style-type: none"> • Built before 1900 • Uncommon type • Early example of type/design in the state • Regionally rare • Z shaped plate floorbeam hangers • Artistic value – decorative railing, lattice portal and bridge plaque • Important designer, builder, or engineer
Cumberland	8	14077	21720605083611	Pennsylvania Thru	<ul style="list-style-type: none"> • Built before 1900 • Uncommon type • Early example of type/design in the state • Regionally rare • Z shaped plate floorbeam hangers • Artistic value – lattice portal • Important designer, builder, or engineer
Cumberland ¹⁶	8	14097	21721305203818	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Artistic value – decorative railing, portal, portal bracing and sway bracing • Important designer, builder, or engineer
Dauphin	8	14693	22721204743027	Baltimore Thru	<ul style="list-style-type: none"> • Likely built before 1900 • Uncommon type • Early example of type/design in the state • Earliest example of type/design in district 8 • Regionally rare
Erie	1	16449	25721106364002	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Early example of type/design in the state • Distinctive hip verticals with four-pronged connection details at the lower chord panel points • Important designer, builder, or engineer
Fayette	12	17042	26403801100000	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Early example of type/design in the state • Exceptional span length • Exceptional overall length • Multiple spans • Unusual deck design where the deck runs through the middle of the truss web rather than along the bottom

¹⁶ This bridge (Bridge Key # 14097 - BMS#21721305203818) was marketed since the creation of this document and ownership of this bridge was transferred to a private owner. The bridge remains at its original location.

Franklin	8	17679	28720706423066	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Wrought iron • Early example of type/design in the state • Earliest example of type/design in district 8 • Rare bottom chord connections are framed into the floorbeams instead of using a U shaped hanger and secondary pin connection from vertical members to gusset plate • Artistic value – bridge plaque • Important designer, builder, or engineer
Franklin	8	17726	28721204814001	Double Intersection Pratt (Whipple)	<ul style="list-style-type: none"> • Built before 1900 • Wrought iron • Uncommon type • Early example of type/design in the state • Earliest example of type/design in district 8 • Regionally rare • Distinctive two pin connection detail at the ends of top chords • Threaded rod with nut type connections on top chord connections • Bottom chord is formed with up-set eyebars with rounded rectangle heads • Artistic value – ornamental portal, bracing, shields, and bridge plaque • Important designer, builder, or engineer
Greene	12	18346	30300105101775	Pratt Thru	<ul style="list-style-type: none"> • Early use of rolled metal truss members • Floorbeams connected to pins by riveted pin plates instead of U shaped hangers marking the transition from all pinned to riveted connections • Artistic value – decorative railing, portal, and portal bracing
Greene	12	18488	30720306342015	Parker Pony	<ul style="list-style-type: none"> • Built before 1930 • Earliest example of type/design in district 12 • Early use of rivets • Artistic value – decorative railing • Important designer, builder, or engineer
Greene	12	18518	30721305972022	Double Intersection Pratt (Whipple)	<ul style="list-style-type: none"> • Built before 1900 • Wrought iron • Uncommon type • Early example of type/design in the state • Earliest example of type/design in district 12 • Regionally rare • Early rolled I section • Artistic value – unusual portal bracing, ornamental portal, bracing and bridge plaque
Greene	12	18521	30721306592087	Pennsylvania Thru	<ul style="list-style-type: none"> • Uncommon type • Earliest example of type/design in district 12 • Regionally rare • Artistic value – decorative railing, lattice portal, bracing, and bridge plaque • Important designer builder or engineer
Huntington	9	18879	31400501200000	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Early example of design/type in the state • Artistic value – lattice portal and portal bracing • Important designer, builder, or engineer
Huntington	9	18931	31722003733009	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Early example of design/type in the state • Multiple spans • Artistic value – lattice portal and portal bracing • Important designer, builder, or engineer

Huntington	9	18945	31722503683012	Pratt Pony	<ul style="list-style-type: none"> •Built before 1900 •Wrought Iron •Rolled star iron or cruciform on the outriggers •Floorbeams placed above the lower chord •Artistic value – decorative railing
Lancaster	8	21910	36721308070303	Pratt Pony	<ul style="list-style-type: none"> •Built before 1900 •Wrought iron •Early use of rolled metal truss members •U shaped floorbeam hangers •Important designer, builder, or engineer
Lawrence	11	22522	37720303567011	Pratt Pony	<ul style="list-style-type: none"> •Built before 1900 •Regionally rare •Exceptional span length •Early use of rolled metal truss members •Distinctive two pin connection detail at the ends of top chords •Important designer, builder, or engineer
Lebanon	8	22889	38721505753007	Pennsylvania Thru	<ul style="list-style-type: none"> •Built before 1900 •Uncommon type •Early example of type/design in the state •Regionally rare •Z shaped pate floorbeam hangers •Artistic value – lattice portal, portal bracing and bridge plaque •Important designer, builder, or engineer
Luzerne	4	24209	40301400202380	Camelback Thru	<ul style="list-style-type: none"> •Uncommon type •Early example of type/design in the state •Earliest example of type/design in district 4 •Regionally rare •Early use of rolled metal truss members •Artistic value – decorative railing
Luzerne	4	24405	40721503755802	Warren Pony	<ul style="list-style-type: none"> •Early example of type/design in the state •Earliest example of type/design in district 4 •Regionally rare •Early use of rivets •Early use of rolled metal truss members
Luzerne	4	24406	40721503925810	Pratt Pony	<ul style="list-style-type: none"> •Built before 1900 •Wrought iron •Phoenix columns •U shaped floorbeam hangers
Luzerne	4	24408	40721618090001	Parker Thru	<ul style="list-style-type: none"> •Early example of type/design in the state •Earliest example of type/design in district 4 •Exceptional overall length •Multiple spans •Pin connected Parkers are unusual
Luzerne	4	24409	40721704556016	Pratt Pony	<ul style="list-style-type: none"> •Built before 1900 •Wrought and cast iron •Phoenix Columns •Floorbeams placed above the lower chords •Important designer, builder, or engineer
Luzerne	4	24410	40721704726018	Pratt Pony	<ul style="list-style-type: none"> •Built before 1900 •Wrought iron •Phoenix columns •Floorbeams placed above the lower chords •Important designer, builder, or engineer
Luzerne	4	24411	40721704826006	Pratt Pony	<ul style="list-style-type: none"> •Built before 1900 •Cast and wrought iron •Phoenix columns •Floorbeams placed above the lower chords •Outriggers meet verticals at about its midpoint •Important designer, builder, or engineer

Luzerne	4	24412	40721704906007	Pratt Pony	<ul style="list-style-type: none"> •Wrought iron •Early use of rolled metal truss members •Phoenix columns •Floorbeams placed above the lower chords •Important designer, builder, or engineer
Luzerne	4	24446	40722303427312	Pratt Pony	<ul style="list-style-type: none"> •Wrought and cast iron •Phoenix columns •Floorbeams placed above the lower chords •Important designer, builder, or engineer
Luzerne	4	24427	40722303564706	Pratt Pony	<ul style="list-style-type: none"> •Built before 1900 •Wrought iron •Early example of type/design in the state •Earliest example of type/design in district 4 •Distinctive two pin connection detail at the ends of top chords •Unusual adjustable eye bolt detail at the hip vertical at the lower chord connection •Important designer, builder, or engineer
Lycoming	3	24759	41041403300000	Quadruple Intersection Warren Thru	<ul style="list-style-type: none"> •Built before 1900 •Wrought iron •Uncommon type •Only example of type/design in the state •Earliest example of type/design in district 3 •Regionally rare •Early use of riveting •Unusual diagonal strut riveted to the inner vertical surface of the lower chord and to a horizontal plate on the bottom of the lower chord •Artistic value – highly ornamental and decorative portal
Lycoming	3	24964	41300300100000	Lenticular Thru	<ul style="list-style-type: none"> •Built before 1900 •Likely wrought iron •Uncommon type •Early example of type/design in the state •Earliest example of type/design in district 3 •Regionally rare •Exceptional span length •Artistic value – highly ornamental and decorative portal
McKean	2	25583	42720903850005	Pratt Thru	<ul style="list-style-type: none"> •Built before 1900 •Wrought iron •Early example of type/design in the state •Earliest example of type/design in district 2 •U shaped floorbeam hangers •Artistic value – decorative railing, portal, portal bracing, and bridge plaque
Mercer	1	26217	43721807401015	Pratt Thru	<ul style="list-style-type: none"> •Built before 1900 •Early example of type/design in the state •Artistic value – decorative railing, lattice portal, and portal bracing. •Important designer, builder, or engineer
Mercer	1	26326	43730303882304	Camelback Thru	<ul style="list-style-type: none"> •Built before 1900 •Uncommon type •Early example of type/design in the state •Early example of type/design in district 1 •Regionally rare •Artistic value – decorative railing, lattice portal and portal bracing and bridge plaque •Important designer, builder, or engineer
Mercer	1	26334	43740388110803	Pratt Thru	<ul style="list-style-type: none"> •Multiple spans •Artistic value – decorative railing, ornate cresting, sidewalk railing and bridge plaque •Important designer, builder, or engineer

Montgomery	6	27901	46704601500190	Warren Pony	<ul style="list-style-type: none"> • Polygonal top chord • Exceptional overall length • Multiple spans
Montgomery	6	27913	46704602100146	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Early example of type/design in the state • Multiple spans • Unusual built up members do not reflect the standards of the period • Artistic value – lattice portal and bridge plaque • Important designer, builder, or engineer
Montgomery	6	27927	46704604000231	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Some cast iron • Early example of type/design in the state • Earliest example of type/design in district 6 • Early use of rivets • Early use of rolled metal truss members • Hollow cylinder verticals with packing blocks and flat bar chords representing idiosyncratic details • Artistic value – highly decorative with artistic details
Montgomery	6	27928	46704604100232	Pratt Thru	<ul style="list-style-type: none"> • Exceptional overall length • Multiple spans • Unusual stone arch approach span
Montgomery	6	27939	46704605000154	Pratt Pony	<ul style="list-style-type: none"> • Built before 1900 • Multiple spans • Early use of rolled metal truss members
Montgomery	6	27941	46704605100156	Parker Thru	<ul style="list-style-type: none"> • Early example of type/design in the state • Earliest example of type/design in district 6 • Regionally rare • Multiple span (Parker pony and Parker thru) • Unusual pony truss only has four slopes instead of 5 • Pin connections are uncommon in Parkers • Important designer, builder, or engineer
Montgomery	6	27948	46704606200059	Pratt Pony	<ul style="list-style-type: none"> • Built before 1900 • Early example of type/design in the state • Exceptional overall length • Multiple spans • Important designer, builder, or engineer
Montgomery	6	27999	46704610700027	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Early example of type/design in the state
Montgomery	6	27816	46720600302039	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Early example of type/design in the state • Phoenix columns • Artistic value – decorative finials and portal bracing
Northampton	5	28847	48720899920005	Double Intersection Warren Thru	<ul style="list-style-type: none"> • Uncommon type • Early example of type/design in the state • Earliest example of type/design in district 4 • Regionally rare • Exceptional overall length • Early use of rivets • Early use of rolled I sections • Multiple spans • Artistic value – lattice portal, portal bracing and bridge plaque
Northampton	5	28904	48730100009019	Pratt Thru	<ul style="list-style-type: none"> • Uncommon type (only all welded thru truss in the state) • Uncommon use of tolled I and wide flange H for the top chord and end post sections representing the transition of all built up to all rolled beams • Early all welded bridge

Northampton	5	28914	48730299920005	Cantilever Thru Trusses	<ul style="list-style-type: none"> • Built before 1900. • Uncommon type • Early example of type/design in the state • Earliest example of type/design in district 5 • Regionally rare • Multiple spans • Rare pin connected cantilever • Artistic value – highly artistic with finials, plaques, and statues
Northampton	5	28915	48730299920010	Pennsylvania Thru	<ul style="list-style-type: none"> • Uncommon type • Earliest example of type/design in district 5 • Regionally rare • Exceptional overall length • Only riveted Pennsylvania truss in the state • Artistic value – designed without lattice and v lacing, instead has oval cutouts
Northampton	5	28919	48740200009115	Pratt Pony	<ul style="list-style-type: none"> • Uncommon type (all welded) • Early use of welding
Perry	8	29763	50740340004001	Lenticular Pony	<ul style="list-style-type: none"> • Built before 1900 • Likely wrought iron • Uncommon type • Only example of type/design in the state • Earliest example of type/design in district 8 • Regionally rare • Fishbelly floorbeams
Philadelphia	6	38666	67029100600000	Cantilever Thru	<ul style="list-style-type: none"> • Uncommon type • Regionally rare • Exceptional span length • Exceptional overall length • Multiple spans • Artistic value – designed with oval cutouts instead of V lacing
Philadelphia	6	39140	67730100400004	Baltimore Thru	<ul style="list-style-type: none"> • Built before 1900 • Uncommon type • Early example of type/design in the state • Earliest example of type/design in district 6 • Regionally rare • Exceptional bridge length • Multiple spans • Artistic value – decorative railing, highly ornamental and decorative portal, and portal bracing
Philadelphia	6	39171	67730100700178	Parker Pony	<ul style="list-style-type: none"> • Early example of type/design in the state • Earliest example of type/design in district 6 • Regionally rare • Early use of rivets
Pike	4	29949	51101100102574	Pennsylvania Thru	<ul style="list-style-type: none"> • Uncommon type • Early example of type/design in the state • Earliest example of type/design in district 4 • Regionally rare • Multiple span • Artistic value – decorative railing and lattice portal • Important designer, builder, or engineer
Potter	2	30458	52721205160005	Pratt Pony	<ul style="list-style-type: none"> • Built before 1900 • Regionally rare • Early use of rivets • Early use of rolled metal truss members
Schuylkill	5	30965	53723507069094	Parker Thru	<ul style="list-style-type: none"> • Early example of type/design in the state • Earliest example of type/design in district 5 • Regionally rare • Pin connections is uncommon in Parkers • Artistic value – decorative railing • Important designer, builder, or engineer

Schuylkill	5	30982	53730100000001	Warren Deck	<ul style="list-style-type: none"> • Built before 1900 • Early example of type/design in the state • Earliest example of type/design in district 5 • Regionally rare • Early use of riveting • Multiple spans
Schuylkill	5	Unknown	53000000000001	Bowstring Thru	<ul style="list-style-type: none"> • Built before 1900 • Likely wrought iron • Uncommon type • Early example of type/design in the state • Earliest example of type/design in district 5 • Regionally rare
Somerset	9	31850	55720603513021	Pratt Thru	<ul style="list-style-type: none"> • Punch plate rather than eyebars for lower chords • Loop forged connections for hip floorbeams and lower sway bracing • Artistic value – decorative portal and bridge plaque • Important designer, builder, or engineer
Somerset	9	31853	55720608053025	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Wrought iron • Early example of type/design in the state • U shaped floorbeam hangers • Artistic value – lattice portal and portal bracing
Somerset	9	31888	55721906663048	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Wrought iron • Early example of type/design in state • Earliest example of type/design in district 9 • U shaped floorbeam hangers • Artistic value – decorative finials, plaque, lattice portal, portal bracing and sway bracing • Important designer, builder, or engineer
Somerset	9	31890	55722007123056	Pratt Pony	<ul style="list-style-type: none"> • Built before 1900 • Wrought and cast iron • Early example of type/design in the state • Earliest example of type/design in district 9 • Early use of rolled metal truss members • Combination pin and compression fittings
Somerset	9	31906	55722405043067	Pratt Pony	<ul style="list-style-type: none"> • Built before 1900 • Wrought iron • Early example of type/design in the state • U shaped floorbeam hangers • Important designer, builder, or engineer
Sullivan	3	32131	56793551200012	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Early use of rolled metal truss members • U shaped floorbeam hangers • Artistic value – decorative portal and portal bracing
Susquehanna	4	32725	57722104980130	Pratt Pony	<ul style="list-style-type: none"> • Built before 1900 • Likely wrought iron •
Susquehanna	4	32741	57740910140002	Warren Pony	<ul style="list-style-type: none"> • Regionally rare • Early use of rolled metal truss members • U shaped floorbeam hangers are uncommon in riveted bridges
Tioga	3	33587	59720304210002	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Wrought iron • Early example of type/design in the state • Earliest example of type/design in district 3 • U shaped floorbeam hangers • Artistic value – decorative portal and portal bracing
Tioga	3	33592	59720403090024	Parker Thru	<ul style="list-style-type: none"> • Early example of type/design in the state • Pin connections in uncommon in Parkers • Artistic value – decorative railings • Important designer, builder, or engineer

Venango	1	33770	60100400100196	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Cast and wrought iron • Early example of type/design in the state • Multiple spans • Artistic value – decorative portal bracing and pediment top brace • Important designer, builder, or engineer
Venango	1	33905	60721206353034	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Early example of type/design in the state • Artistic value – lattice portal and decorative portal bracing
Venango	1	33928	60721705223041	Pratt Pony	<ul style="list-style-type: none"> • Built before 1900 • Early example of type/design in the state
Venango	1	33914	60721406274005	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Wrought iron • Early example of type/design in the state • Earliest example of type/design in district 1 • Phoenix columns • Ribbon lacing or unusual batten details represent a period of experimentation
Warren	1	34174	61301200300000	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Early example of type/design in the state • Z shaped plate floorbeam hangers • Artistic value – minor lattice portal with lattice portal bracing • Important designer, builder, or engineer
Washington	12	35024	62206700100000	Pennsylvania Thru	<ul style="list-style-type: none"> • Uncommon type • Regionally rare • Exceptional span length • Multiple spans • Artistic value – decorative railing at approach span and decorative portal design
Washington	12	35244	62720107334040	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Early example of type/design in the state • Distinctive two pin connection detail at the ends of top chords • Fishbelly floorbeams • Artistic value – decorative railing, lattice portal and portal bracing • Important designer, builder, or engineer
Washington	12	35246	62720204764029	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Early example of type/design in the state • Distinctive two pin connection detail at the ends of the top chords • Artistic value – decorative cast iron covers for top chord, decorative medallions affixed to knees of portal bracing • Important designer, builder, or engineer
Washington	12	35271	62720904874004	Pratt Pony	<ul style="list-style-type: none"> • Built before 1900 • Some wrought iron • Early use of rolled metal truss members
Washington	12	35296	62721208614005	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Early example of type/design in the state • Artistic value – decorative railing, lattice portal and portal bracing • Important designer, builder, or engineer
Washington	12	35333	62722407194028	Pratt Pony	<ul style="list-style-type: none"> • Early use of rivets • Floorbeams placed above the lower chord • Important designer, builder, or engineer

Washington	12	35346	62722808444001	Pratt Pony	<ul style="list-style-type: none"> • Built before 1900 • Distinctive two pin connection detail at the ends of top chords • Verticals are flared to accommodate a rivet connected triangular shaped pin plate for lower panel points • Fishbelly floorbeams • Lower hanger detail with single nut and bolt in unusual • Important designer, builder, or engineer
Washington	12	35352	62723003604008	Pratt Pony	<ul style="list-style-type: none"> • Built before 1900 • Wrought iron • Early example of type/design in the state • Earliest example of type/design in district 12 • Rare vertical end posts (square end posts) • Floorbeams placed above lower chords
Washington	12	35367	62740190004001	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Early example of type/design in state • Early example of type/design in district 12 • Distinctive two pin connection detail at the ends of top chords • Artistic value – lattice portal, decorative portal bracing and bridge plaque • Important designer, builder, or engineer
Washington	12	34533	62007004001415	Warren Thru	<ul style="list-style-type: none"> • Uncommon design – only two like it in the state • Exceptional span length • Exceptional overall length • Multiple span • Unusual design for a Warren, main span holds a suspended deck • Artistic value – designed without V lacing, instead has oval cutouts • Important designer, builder, or engineer
Wayne	4	35588	63100202300739	Baltimore Thru	<ul style="list-style-type: none"> • Uncommon type • Early example of type/design in the state • Earliest example of type/design in district 4 • Regionally rare • Multiple spans • Artistic value – lattice railing, highly ornamental and decorative cresting, and bridge plaque • Important designer, builder, or engineer
Wayne	4	35776	63401700102711	Pratt Pony	<ul style="list-style-type: none"> • Built before 1900 • Cast and wrought iron • Early example of type/design in the state • Earliest example of type/design in district 4 • Exceptional overall length • Multiple span • Artistic value – decorative railing
Westmoreland	12	36123	64013600501938	Parker Thru	<ul style="list-style-type: none"> • Early example of type/design in the state • Multiple span • Pin connection is uncommon in Parkers
Westmoreland	12	36452	64106000100037	Parker Thru	<ul style="list-style-type: none"> • Early example of type/design in the state • Earliest example of type/design in district 12 • Multiple span • Pine connection is unusual in Parkers
Westmoreland	12	36697	64401900700961	Warren Pony	<ul style="list-style-type: none"> • Early example of type/design in the state • Early use of rivets • Artistic value – ornate cast iron railing and end posts • Important designer, builder, or engineer
Westmoreland	12	36969	64721706990008	Warren Pony	<ul style="list-style-type: none"> • Early example of type/design in the state • Exceptional overall length • Early use of riveting

York	8	37988	66402100100000	Double Intersection Pratt (Whipple)	<ul style="list-style-type: none"> • Built before 1900 • Uncommon type • Regionally rare • U shaped floorbeam hangers • Early use of rolled truss members (floorbeams) • Double loop floorbeam hangers in end panels • Artistic value – ornamental portal, portal bracing, building plaques, and medallions • Important designer, builder, or engineer
York	8	38118	66720809683257	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Cast and wrought iron • Early example of type/design in the state • U shaped floorbeam hangers • Phoenix columns • Artistic value – decorative portal bracing and bridge plaques • Important designer, builder, or engineer
York	8	38247	66723098483226	Pratt Thru	<ul style="list-style-type: none"> • Built before 1900 • Multiple spans • Early use of rolled metal truss members • Artistic value – decorative railing • Important designer, builder, or engineer
York	8	37504	6601810200YY00	Camelback Pennsylvania Thru	<ul style="list-style-type: none"> • Built before 1900 • Uncommon type • Early example of type/design in state • Earliest example of type/design in district 8 • Regionally rare • U shaped hangers • Some bottom chord panels are composed of both eyebars and built-up beams, having both compression and tension members at the same point • Artistic value – lattice portal and portal bracing • Important designer, builder, or engineer

APPENDIX E BRIDGES THAT ARE RECOMMENDED NOT ELIGIBLE (DEMOTED) UNDER CRITERION C¹⁷

County	District	Bridge Key #	BMS #	Design
Adams	8	397	01720304633062	PRATT PONY
Allegheny	11	2565	02741500002066	WARREN PONY
Armstrong	10	3387	03721703460001	WARREN PONY
Bucks	6	7583	09700904790198	PRATT PONY
Clinton	2	12405	18721505370005	PRATT PONY
Columbia	3	12600	19048705800000	PARKER PONY
Columbia	3	12797	19720905360089	PRATT PONY
Crawford	1	13390	20720107433001	PRATT PONY
Jefferson	10	19852	33721603850001	PRATT PONY
Lehigh	5	23179	39032901300882	PRATT THRU
Lehigh	5	23356	39400301901518	PRATT THRU
Somerset	9	31874	55721607133043	PRATT PONY
Venango	1	33851	60401001000934	PRATT THRU

¹⁷ Geospatial data and images of demoted bridges can be found here:

<http://pennshare.maps.arcgis.com/apps/webappviewer/index.html?id=e4c8112754b14cb18a21a615dc2d8aae>

To search for bridges on the website: Open the link, click on the filter option in the upper right corner, enter the bridge key number under demoted bridges, and turn the search function on by sliding the dot across from “Demoted Bridges” to the right. A demoted bridge will appear as a red diamond on the map and an image of the bridge can be viewed by clicking on the diamond. It may be necessary to zoom out of the map to access the crossing information for the bridge.

Thru Truss Point System

Category	Item	Design						Points to Assign
		Warren	Parker	Pratt	Other Variations	Pennsylvania	Baltimore	
1. Distinctive characteristics of type, period, or method of construction	A. Built before specified year	Built before 1900						7
	B. Building Material	Iron Truss						7
	C. Distinctive type and/or uncommon type or Only known example in the state	No - polygonal top chord Yes - top chord anything other than polygonal ¹	No	Yes - All welded design	Yes – Quadruple Intersection Warren, Double Intersection Warren, Camelback, Cantilever, Double Intersection Pratt (Whipple), Bowstring, Howe, and Lenticular	Yes	Yes	7
	D. Early example in the State	Before 1930	Before 1915	Before 1895	Quadruple Intersection Warren – before 1891; Double Intersection Warren – before 1908; Camelback – before 1917; Cantilever – before 1928; Whipple – before 1985; Bowstring – before 1877; Howe – before 1911; Lenticular – before 1890	Before 1905	Before 1915	7
	E. Early standard plan in the State		1932	No standard plan				3
	F. Earliest example in PennDOT district	Earliest example in each district	Earliest example in each district	Earliest example in each district	Earliest example in each district	Earliest example in each district	Earliest example in each district	4
	G. Rare – PennDOT Dist. (<3 bridges)	Dist. 3,4,9, 11	Dist. 5,6,8,9	Dist. 4, 10	All Regions	Dist. 3,4,9,10,12	Dist. 3,4,6,8,9,10	3
2. Variation, evolution, and/or transition of a type	A. Exceptional length – main span	Greater than 225'	Greater than 250'	Greater than 170'	Cantilever - greater than 500' Whipple – greater than 500'	Greater than 500' ²	points awarded to bridge with largest main span	3
	B. Exceptional length – overall	Greater than 1000'	Greater than 1000'	Greater than 350'	Double Intersection Warren - greater than 500' Cantilever - greater than 1000'	Greater than 1000'	points awarded to largest overall bridge	3
	C. Special feature/ innovations - important or unusual	Employing multiple thru-truss spans allows significant distances to be achieved, while substantially limiting the amount of substructure construction required, and represents an important variation in the design of the overall structure. Substantial skew represents a distinctive construction method to address engineering challenges. (Only bridges called out in the 2001 inventory or Historicbridges.org as having extreme skew or more than 45 degree skew) Early use of riveting represents the initial application of a new metal bridge construction technique for each design (Pratt Thru pre-1910, Parker Thru pre-1932, Baltimore 1914, Double Intersection Warren 1904, Camelback 1916) Early fabrication and use of rolled metal truss members represents the initial application of an important innovation in metal bridge construction (Pre-1932 for Warren Thru, pre-1916 for Pratt Thru, pre-1932 for Parker Thru, Double Intersection Warren 1904, Camelback 1905)						3
	D. Special feature/ innovations – highly important or unusual	Non-uniform or unusual design features ³						4
	E. Outstanding technological achievement	Multiple examples of 2C, 2D or a combination of 2C and 2D above. Early use of welding represents the initial application of a highly important innovation in metal bridge construction (pre-1937) Pinned connections represent a highly unusual variation within Warren, Parker, and Cantilever thru construction						7
3. High artistic value	A. Selected ornamentation, notable but isolated	Single decorative features such as decorative railing or decorative end posts						3
	B. Outstanding ornamentation or architectural treatment in overall design	Ornamental portal elements, highly artistic or decorative design						6
4. Work of a Master	A. Prolific or Important Designer/Builder/Engineer	See list of Designers/Builders/Engineers						3

¹Population consists of 7 polygonal top chord, 3 regular top chord, and 2 with unique design.

²The 2001 inventory notes that bridge key #28915 pushes the simple span truss design to the limit at 550'

³2D - Non-uniform or unusual design features:

Warren: Unusual Warren design with a suspended deck

Baltimore: Unusually engineered with deck inclined inside the truss

Pennsylvania: z shaped plate floorbeam hangers

Bottom chord consisting of both eyebars and built up beams, having both compression and tension members at the same point

Parker: Floorbeam framing that reflects transition from a pinned to riveted connection

Entire structure is composed of rolled beams which is unusual

Built at a 6.32% grade (an important achievement at the time it was built)

Pratt: "Hollow Cylinder" verticals with packing blocks (rolled I beams held together with packing blocks which are idiosyncratic details)

Flat bar chords (Idiosyncratic details)

Phoenix Columns are significant as a unique patented type of built up beam

Ribbon lacing or unusual batten details (represent period of experimentation reflected in idiosyncratic details)

Lightweight portal bracing (represent period of experimentation reflected in idiosyncratic details)

Rare bottom chord connections are framed into the floorbeams instead of using a U bolt hanger system

Secondary Pin connection from vertical members to gusset plate

Fishbelly floorbeams

Floorbeams placed above the lower chords

Pins framed into the box shaped verticals

Z shaped plate floorbeam hangers

U shaped floorbeam hangers

Distinctive 2 pin connection on upper chord (1 for inclined end post and 1 for verticals and diagonals)

Distinctive hip verticals with four-pronged connection details at lower chord panel points

Unusual lower panel point connection detail where the vertical is bolted to the top flange of the floor beam and the pin joining the lower chord and diagonals is cut out in the floor beam and a strap pin plate connects the pin to the floor beam

Unusual deck design where the deck runs through the middle of the truss web rather than along the bottom

Unusual build up members that do not reflect the standards of the period

Cast iron guide blocks for the lower chords at the outside lower panel points are distinctive detail

Punched plate rather than eye bars for lower chords

Loop forged connections for hip floor beam hangers and lower sway bracing

Floorbeams connected to pins by riveted pin plates instead of U shaped hangers marking the transition from all pinned to riveted connections

Uncommon use of rolled I and wide flange H for the top chord and end post sections represents the transitions from built up to all rolled beams

Longitudinal struct running down center is unusual in pin connected bridge

Quadruple Intersection Warren Thru: Diagonal strut riveted to the inner vertical surface of the lower chord and to a horizontal plate on the bottom of the lower chord

Pony Trusses

Category	Item	Design					Points to Assign
		Warren	Parker	Pratt	Other Variations		
1. Distinctive characteristics of type, period, or method of construction	A. Built before specified year	Built before 1900					7
	B. Building Material	Iron Truss					7
	C. Distinctive type and/or uncommon type or Only known example in the state	No - regular top chord; Yes - Polygonal top chord and all welded design	No	Yes – Continuous design and all welded design	Yes – Bowstring, Howe, and Lenticular		7
	D. Early example in the State	Before 1909 ¹	Before 1930	Before 1886	Bowstring - before 1877; Howe – before 1903; Lenticular – before 1891		7
	E. Early standard plan in the State	No Standard Plan	1932	No Standard Plan			3
	F. Earliest example in PennDOT district	earliest example in each district	earliest example in each district	earliest example in each district	earliest example in each district		4
	G. Rare – PennDOT Dist. (≤3 bridges)	Dist. 1,2,4,5	Dist. 1,4,6, 8	Dist. 2,11	All Regions		3
2. Variation, evolution, and/or transition of a type	A. Exceptional length – main span	Greater than 85 feet - regular horizontal top chord Greater than 120 feet - polygonal top chord	Greater than 119 feet	Greater than 85 feet			3
	B. Exceptional length – overall	Greater than 700 feet ²	Greater than 350 feet	Greater than 130 feet	points awarded to largest overall bridge		3
	C. Special feature/ innovations - important or unusual	Employing multiple pony-truss spans allows significant distances to be achieved, while substantially limiting the amount of substructure construction required, and represents an important variation in the design of the overall structure. Substantial skew represents a distinctive construction method to address engineering challenges. ((Only bridges called out in the 2001 inventory or Historicbridges.org as having extreme skew or more than 45 degree skew) Early use of riveting represents the initial application of a new metal bridge construction technique for each design (Warrens pre-1909; Pratts pre-1910, Parkers pre-1920) Early fabrication and use of rolled metal truss members represents the initial application of an important innovation in metal bridge construction (pre-1920 for Warren Pony, pre-1916 for Pratt Pony, pre-1932 for Parker Pony)					3
	D. Special feature/ innovations – highly important or unusual	Non-uniform or unusual design features ³					4
	E. Outstanding technological achievement	Multiple examples of 2C, 2D or a combination of 2C and 2D above Early use of welding represents the initial application of a highly important innovation in metal bridge construction (pre-1937) Pinned connections represent a highly unusual variation within Warren and Parker truss construction					7
3. High artistic value	A. Selected ornamentation, notable but isolated	Single decorative features such as decorative railing or decorative end posts					3
	B. Outstanding ornamentation or architectural treatment in overall design	Ornamental portal elements, highly artistic or decorative design					6
4. Work of a Master	A. Prolific or Important Designer/Builder/Engineer	See list of Designers/Builders/Engineers					3

¹The 2001 inventory states a 1909 is not early for a Warren riveted pony truss (Bridge Key #28441)

²The longest Warren pony truss is 720' (Indiana gave extra points for Warren bridges over 1000')

³2D - Non-uniform or unusual design features:

Warren: Lower Chords have built up plates and angles resembling a girder

U-shaped floorbeam hangers are uncommon in riveted bridges

Pratts: Rare design features or features that represent a transitional period includes:

Octagonal top chord

Vertical end posts (square end posts)

Fishbelly floorbeams

Lightweight built up floor beams

Floorbeams placed above the lower chords

Cast iron connections

U shaped floorbeam hangers

Combination pin and compression fittings

Distinctive 2 pin connection on upper chord (1 for inclined end post and 1 for verticals and diagonals)

Unusual "eye-ended" bolts

Unusual lower panel point connection represents idiosyncratic truss design

Rolled star iron or cruciform on outriggers

Verticals are flared to accommodate a rivet connected triangular shaped pin plate for lower panel points

Phoenix columns are significant as a unique patented type of built up beam

Bottom chord not connected to the hip vertical

Verticals and diagonals the same size instead of compression verticals being heavier than tension diagonals

Bowstring: Built up tubular upper chord members similar to Phoenix half sections

Phoenix half sections

Cast Iron connections

Keystone style columns for top chords

Star-iron cruciform members

Lenticular: Fishbelly floorbeams

Double Lenticular truss

Whipple: Keystone columns

Distinctive 2 pin connection on upper chord (1 for inclined end post and 1 for verticals and diagonals)

Bottom chord formed from up-set eyebars with rounded rectangle heads

Unusual framed lower chord pin connections

U shaped floorbeam hangers

Double loop floorbeam hangers in end panels

Deck Trusses

Category	Item	Design				Points to Assign
		Warren	Wichert	Pratt		
1. Distinctive characteristics of type, period, or method of construction	A. Built before specified year	Built before 1900				7
	B. Method of Construction	Continuous or Cantilevered Design				7
	C. Distinctive type and/or uncommon type or Only known example in the state		Yes - uncommon type ¹			7
	D. Early example in the State	Before 1940 ²	Before 1939 ³	Before 1940		7
	E. Early standard plan in the State					3
	F. Earliest example in PennDOT district	earliest example in each district	earliest example in each district	earliest example in each district		3
	G. Rare – PennDOT Dist. (≤3 bridges)	All regions except 11	All regions	All regions except 11		3
2. Variation, evolution, and/or transition of a type	A. Exceptional length – main span	Greater than 250'		Greater than 300'		3
	B. Exceptional length – overall	Greater than 1000'		Greater than 1500'		3
	C. Special feature/ innovations - important or unusual	Employing multiple thru-truss spans allows significant distances to be achieved, while substantially limiting the amount of substructure construction required, and represents an important variation in the design of the overall structure. Early use of riveting represents the initial application of a new metal bridge construction technique for each design (Warren - 1892ca.)				3
	D. Special feature/ innovations – highly important or unusual	Non-uniform or unusual design features ⁴				4
	E. Outstanding technological achievement	Multiple examples of 2C, 2D or a combination of 2C and 2D above Early use of welding represents the initial application of a highly important innovation in metal bridge construction (pre-1937)				7
3. High artistic value	A. Selected ornamentation, notable but isolated	Single decorative features such as decorative railing or decorative end posts				3
	B. Outstanding ornamentation or architectural treatment in overall design	Ornamental portal elements, highly artistic or decorative design				6
4. Work of a Master	A. Prolific or Important Designer/Builder/Engineer	See list of Designers/Builders/Engineers				3

¹ The Wichert truss uses a hinged quadrilateral section over intermediate piers to address the stress caused to continuous trusses due to settlement of the intermediate pier

² The 2001 inventory states this bridge type was well developed prior to World War II

³ Maryland Metal Truss Bridge Historical Development lists an early example of the Wichert truss between 1937-1939

⁴ 2D - Non-uniform or unusual design features:

Pratt: Cantilever bridge with a suspended span