Assessment of Kentucky’s Historic Truss Bridges

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Assessment of Kentucky’s Historic Truss Bridges
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November 2013
# Assessment of Kentucky’s Historic Truss Bridges

## Abstract

This study created an information base to improve decisions about the replacement or rehabilitation of historic truss bridges. During the first phase of the research, information on the history and design of the 109 bridges in the study was assembled. With the assistance of historic preservation professionals, 75 of those bridges were selected for further study for their potential for rehabilitation. During the second phase, the KTC research team, engineers from the KYTC bridge division, and 12 highway district engineers, who are responsible for the day-to-day care and maintenance of the bridges, evaluated the condition and functional context of the 75 bridges. The goal was to identify those that are good candidates for preservation through rehabilitation. The district engineers were of the opinion that only 14 of the 75 bridges needed to be replaced. However, there was an additional subset of 13 bridges that, in their opinion, present some significant obstacles to preservation related to functional inadequacy or some other problem with the bridge. The bridge engineers estimated considerably higher levels of effort to preserve these 13 bridges (an average of 7.42 on a 10 point scale) than for the 48 remaining bridges (an average of 3.82 on the 10 point scale).

## Key Words

- Truss bridges
- Truss types
- Historic preservation
- Replacement
- Rehabilitation
- Historic attributes
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Executive Summary

In 2008 there were 157 truss bridges still on the KYTC system. All appear to be threatened by replacement and/or lack of maintenance. Clearly it is increasingly important to protect these historic bridges as their numbers rapidly dwindle.

Kentucky has been making decisions about bridge rehabilitation or replacement on a case-by-case basis, without being able to consider the historic preservation impacts of each decision. This is particularly true of truss bridges around the state. While there is a fairly coherent and comparative body of information about the condition (structural or functional deficiency) of the bridges (in PONTIS), the Cabinet lacked a consistent data and evaluation system for the historic value of each structure. Similarly, there has not been an effort to integrate the “rehabilitate vs. replace decision” with state-of-the-art rehabilitation techniques.

The goal of this project was to create an information base that would improve decisions about the replacement or rehabilitation of truss bridges—a decision process that would include their historic significance along with potential for rehabilitation. However, not all truss bridges were reviewed. During this phase of the study, it was agreed to exempt some of the bridges from consideration due to their size and/or importance to the flow of traffic across rivers and state boundaries. In all likelihood, the decision to replace or rehabilitate major bridges crossing state borders will be made in conjunction with the adjoining state. Similarly, due to their significant replacement costs, rehabilitation/replacement strategies for most large bridges will be customized to the structure and context, and so they would likely not require the same sort of analysis as smaller bridges statewide. Consequently, all bridges over the Ohio River and all bridges with four or more spans were exempted, as were covered bridges. Also eliminated were truss bridges built after 1962, as they are not yet 50 years old. Additionally, several bridges that were listed in the data set were discovered to have already been demolished and replaced. This reduced the total number of bridges for project consideration to 109.

This research was conducted in two phases. During the first phase, information on the history and design of each bridge was assembled and a rating process developed. This phase included review of previous studies. Combining that review process and the judgment of KYTC historic preservation professionals, a set of 75 bridges was then selected, based on their comparatively greater historic value, for further study of their potential for rehabilitation. During the second phase, the KTC team, engineers from the KYTC bridge division, and District engineers who were responsible for the day-to-day care and maintenance of the bridges evaluated the condition and functional context of the bridges. The goal was to identify those that could be considered good candidates for preservation through rehabilitation. This evaluation drew on the extensive data contained in the PONTIS system, which data was then more fully developed and elaborated upon through face-to-face interviews with the District bridge engineers.
Main Findings

Appendix 1 contains written summaries of each interview along with pertinent features of the bridge from inspection reports. For each bridge, the summaries describe the bridge’s historic qualities, truss type, and condition information from the most recent NBI, as well as the bridge engineer’s recommendations for the major repairs or work needed to maintain the bridge for 20 years. The engineers were also asked to give their opinion regarding preservation or replacement along with a rough estimate of the likely cost to repair the bridge. They were also asked to estimate the amount of effort to preserve the bridge on a scale of one (very little effort or no effort) to ten (greatest effort or most difficult). The latest estimates of ADT and projected ADT are included as are the current weight limitations and postings for load. Photos and plans are included when available and were obtained from Kentucky Transportation Cabinet files.

The table below summarizes the opinions of the bridge engineers from all 12 districts. They were of the opinion that only 14 of the 75 bridges needed to be replaced. However, there was an additional subset of 13 bridges that, in their opinion, present some significant obstacles to preservation related to functional inadequacy or some other problem with the bridge. The bridge engineers estimated considerably higher levels of effort to preserve these 13 bridges (an average of 7.42 on the 10 point scale) than for the 48 remaining bridges (an average of 3.82 on the 10 point scale). The 14 bridges the engineers viewed as in need of replacement received an average effort estimate of 8.53.
Results of Interviews by Three Opinion Categories and KYTC Highway District

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Policy Implications

Currently, some of the bridges that the bridge engineers view as candidates for preservation are on the highway plan for replacement. The results of the interviews suggest that even some of these bridges can be saved, usually with minor to moderate structural repairs and cleaning and painting.

Beyond the imperative imposed by Section 106 to exhibit a good faith effort to preserve historic bridges, there may well be a substantial monetary benefit associated with maintaining many of the bridges, as the bridge engineers’ rough estimates of the cost to repair many of the bridges were far lower than the cost of replacement. Thus, it appears advisable to reconsider the decision to replace many of these bridges.

Another implication of the findings is the need to fund more routine maintenance, especially painting. Clearly, more funding for regular maintenance can arrest deterioration. Several of the bridge engineers thought that a spot painting program and the use of marine grease would prolong the useful life of truss bridges. The prevalence of problems with the joints implies that more frequent joint repair or replacement could also lengthen the life of the bridges.
Most of the bridges are functionally obsolete due to their width, their approaches, or some other feature, as well as rising levels of traffic volume. To a large extent, this contributes to their low sufficiency ratings. However, many of the bridges are on lightly travelled roads and can handle the estimated future traffic volumes despite their functional obsolescence. If these bridges do not have to handle heavy agricultural or industrial trucks and equipment, they may be able to stay in service.

Funding bridge repair and preservation is costly; fortunately Federal monies can be used to repair structurally and functionally obsolete bridges. A bridge is eligible for federal funding for the purpose of rehabilitation if it has a sufficiency rating below 80. But, there is no requirement to reach a specific sufficiency rating after it has been rehabilitated. The only post-repair requirement is that the bridge be rehabilitated “to maintain or upgrade its structural capacity to the present and anticipated future capacity needed for route traffic.” Transportation officials at the state level are empowered to make the decision regarding the capacity to handle present and future traffic. The state is also free to set a posted weight limit below its recommended levels for county roads, state routes, and AAA highways. Once the bridge is rehabilitated, it is not eligible for Federal rehabilitation funds for another ten years.

In sum, the Cabinet is granted a great deal of flexibility in its effort to preserve its historic truss bridges. While a bridge must be able to safely handle its customary and predicted traffic load, the Cabinet can keep a functionally obsolete bridge with a low sufficiency rating in service. Thus, the Cabinet may devise creative approaches to each bridge depending on the specific conditions associated with the bridge, its route, and the landscape feature that the bridge spans. Such creativity was recently on display when the Cabinet rehabilitated a functionally obsolete, but historic, truss bridge with a sufficiency rating of only 38.7—the Rockcastle River bridge--on a low volume road. Built in 1921, its truss is a 205 foot Pennsylvania Petit, one of only three of that type remaining in Kentucky.

The Rockcastle River Bridge was scheduled for replacement at an estimated cost greater than $1.8 million dollars. The estimate for the new bridge included necessary expenditures for new right of way acquisition and utilities. Due to the estimated cost of a replacement bridge as well as its location in an environmentally sensitive area above a river containing endangered mussels, the Cabinet considered the possibility of rehabilitation.

The Cabinet estimated that the cost of rehabilitation, which would involve cleaning and painting, gusset plate repairs, resealing and replacing joints, vertical member repairs, and end post plate work, would add up to $913,000. Four companies entered bids for the work, ranging from $465,000 to $690,000. The low bid was accepted and the bridge was rehabbed with little disruption of traffic. Let on September 28, 2011, the work was completed December 5 of that year.
The success of the Rockcastle River Bridge project, combined with the results of this study, offers several lessons for the effort to preserve Kentucky’s dwindling stock of historic truss bridges:

(1) Rehabilitation of historic bridges should always be considered in some detail, even for the bridges currently slated for “replacement” on the highway plan.

(2) The Cabinet needs to improve its methods and knowledge in regard to estimating rehabilitation costs.

(3) The district bridge engineers are interested in preserving and maintaining historic bridges and should be consulted about the steps needed to preserve each bridge in their respective districts.

(4) The Cabinet may need to invest more resources in preventive maintenance.

(5) Preservation can “right size” a project, resulting in lower project costs and fewer environmental impacts.
Implementation Plan for Truss Bridge Preservation Study

Who Will Benefit and How
This research provides an inventory and organization to help KYTC better decide which historic truss bridges will be replaced or rehabilitated. It combines historic value considerations with rehabilitation / replacement costs and outcomes to enable maximum value to be realized with bridge project funds. Consequently, the KYTC Historic Preservation professionals in the Division of Environmental Analysis can have better knowledge of the value of each bridge, and the District Bridge Engineers can have a better sense of the importance of each structure as they contemplate how best to update it.

Development of New Practices
This research will result in some new practices being undertaken within KYTC regarding truss bridge update decisions. Specifically:

(1) Rehabilitation of truss bridges will be considered in more detail, even for the bridges currently slated for “replacement” on the highway plan.

(2) The Cabinet will pursue an improvement in its methods and knowledge for estimating rehabilitation costs.

(3) The District Bridge Engineers have demonstrated an interest in preserving and maintaining their truss bridges, where practical, and will be consulted about the steps needed to preserve each bridge in their respective districts.

(4) The Cabinet will explore ways to provide more resources to support preventive maintenance of truss bridges.

(5) The Cabinet will consider rehabilitation options as a way to “right size” a project, if it can result in lower project costs and fewer environmental impacts.

Technology Transfer
The results of this study will be communicated to the Districts through presentations at the Partnering Conference, the Kentucky Society of Professional Engineers, and other conferences as are approved by KYTC. The results will also be communicated through the distribution of digital and printed reports to each District Bridge Engineering office and District Project Development office.

It is anticipated that the change in practices regarding truss bridge updates can commence upon the information reaching District Bridge and Project Development engineers.
**Responsible Parties for Implementation**
Implementation of the 5 new practices will involve the District Bridge Engineers in each District, the Project Development Engineers in each District, the Division of Environmental Analysis in KYTC, and the Bridge Preservation Branch of the Division of Maintenance in KYTC.

**Implementation Follow-up**
KTC will periodically monitor the extent to which the new practices are being followed.
Acknowledgements

This study benefitted greatly from the expertise and cooperation of many people including Phil Logsdon, David Steele, Erin Van Zee, Amanda Abner, and Rebecca Turner. The contributions of the district engineers were invaluable: Harold Gibson, Jonathon Beasley, Darren Stewart, David Kemper, Royce Meredith, Brandon Seiter, Michael Vaughn, Jason Coe, Joe Callahan, Doug Watts, Mike West, and Robin Justice.
Chapter 1: The Study Issue and Work Plan

1.1 The Issue
Following the advent of rail transportation in the mid-1800s, railroad companies erected truss bridges in Kentucky with ever growing frequency. Engineering marvels, truss bridges could be built in many styles and sizes, from the small pony truss that crosses a narrow creek to the long multiple-span through-truss that can cross powerful rivers, including the Ohio, Tennessee, and Cumberland. Their engineering virtues were many: an ability to span large bodies of water, low labor cost to build, a proven capacity to carry heavy loads, and the general ease with which they could be reconfigured to cross rivers and gorges of varying widths. Moreover, truss bridges were much less difficult to maintain than covered wooden bridges and, being made of iron (and then steel), possessed a far longer life expectancy.

Many of these early truss bridges were built in the late 1800s by the railroads. But, by the early 20th century, truss bridges were also built by local governments and private bridge companies (such as the Champion, King, Smith, Empire and Vincennes Bridge Companies) to carry automobiles and trucks. Truss bridges were (and continue to be) popular due to the simplicity of construction in the field and the high degree of standardization among their manufacturers.

1.2 An Endangered Resource
In 2008 there were 157 truss bridges still on the KYTC system. Many are threatened by replacement and/or lack of maintenance. These important structures are not just architectural features of the landscape, but engineering treasures, many of which could be preserved for future generations to use and admire. These remaining truss bridges vividly illustrate many of the ways in which engineering and technology have changed over time and stand as still-functioning examples of our bridge history. Indeed, many are on the National Register of Historic Places and many others are eligible for it. Those constructed 50 or more years ago are protected by Section 106 of the National Historic Preservation Act of 1966, requiring that impacts to historic properties be considered for federally funded or permitted undertakings.

Clearly, it is increasingly important to protect these bridges as their numbers rapidly dwindle. For example, in the 15 years from 1997 to the present, the number of Pratt Through Trusses, the most common type of truss, has declined from 66 to 30. Many of the less common types of trusses have only four or fewer examples left standing. At the current rate of demolition and replacement, many types will disappear completely without a concerted effort to select examples of each type of truss for preservation.
Figure 1.1 Some Examples of Truss Configurations

**Overview:** One of the two most common configurations, it tends to occupy the earlier half of the truss bridge era, but was used throughout. Originally developed by Thomas and Caleb Pratt in 1844.

**Appearance:** Diagonal members angle toward the center and bottom of bridge.

**Overview:** The other most common truss configuration, this design tended to be used in the second half of the truss bridge era, and with riveted connections. Originally developed in 1848 by James Warren and Willoughby Monzoni.

**Appearance:** Alternating diagonal members form a repeating “V” shape. A true Warren does not have vertical members.

**Overview:** Charles H. Parker modified the Pratt design to create what became known as the Parker truss configuration. This design allowed one to use less materials to get the a similar load capacity. The downside was the more complex design.

**Appearance:** Characterized by an arch-shaped (polygonal) top chord, with diagonals that follow the Pratt configuration.

**Overview:** The Baltimore railroad designed a truss configuration that eventually found use on both railroads and highways. It is a Pratt truss with additional members added for additional strength.

**Appearance:** Characterized by a Pratt configuration with extra smaller members branching off of the diagonals, which subdivide the panels.
**Camelback**

*Overview:* Some bridges that appear to be simple Parker truss bridges but have exactly five sections of top chord are referred to more specifically as a Camelback truss.

*Appearance:* Characterized by exactly five different angled sections of top chord, with a Pratt layout of the diagonals.

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**Pennsylvania**

*Overview:* Sometimes called the Petit truss. Designed by the Pennsylvania railroad, this configuration combines the engineering ideas behind the Baltimore with those of the Parker or Camelback. Those with the 5 slopes like a Camelback are sometimes called “Pennsylvania Camelback” truss bridges.

*Appearance:* Features an arch-shaped (polygonal) top chord with a diagonal arrangement like the Baltimore, which subdivide the panels.

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**Warren: With Verticals**

Most Warren truss bridges do in fact feature vertical members. They may be referenced generally as “warren with verticals” truss bridges. Vertical members may occur at each connection, or every other connection.
1.3 Distribution of Truss Types by Highway District

Table 1.1 presents the number of bridges by type of truss and district. In all there are 25 types of trusses. Fourteen of the types have four or fewer examples still standing in Kentucky.

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<td></td>
<td>1</td>
<td></td>
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<td>2</td>
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<tr>
<td>District 10</td>
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<tr>
<td>District 11</td>
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<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

\(^1\) Only Warren span in KY that does not have verticals, part of 010B00040N
<table>
<thead>
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<td>5</td>
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<td>7</td>
<td>2</td>
<td>1</td>
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<td>11</td>
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<td>District</td>
<td>Cantilever</td>
<td>Bailey</td>
<td>Whipple</td>
<td>Camelback</td>
<td>Suspension</td>
<td>Wheeler</td>
<td>Bedpost/Bedstead</td>
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<td>District 5</td>
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<td>District 6</td>
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<td>District 7</td>
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<td>District 8</td>
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<tr>
<td>District 9</td>
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<tr>
<td>District 10</td>
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<tr>
<td>District 11</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>District 12</td>
<td></td>
<td>3</td>
<td></td>
<td>1</td>
<td>1 (closed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4</strong></td>
<td><strong>4</strong></td>
<td><strong>3</strong></td>
<td><strong>6</strong></td>
<td><strong>3</strong></td>
<td><strong>1</strong></td>
<td><strong>2</strong></td>
</tr>
</tbody>
</table>
Figure 1:2

Kentucky Truss Bridges in Study

Truss Bridges
- Lower Historic Significance
- Higher Historic Significance
  - Closed
  - Preserve
  - Preserve - Conditionally
  - Replace

Major Roads
ROUTE_TYPE
- Interstate
- Parkway

ROUTE_TYPE
- US Road
- State Roads
- Local Roads
- Lakes

Highway Districts
1 2 3 4 5 6 7 8 9 10 11 12

Miles
0 25 50 100 150 200

Kentucky Division of Geographic Information (DG)
1.4 Work Plan and Objectives

Kentucky has been making decisions about bridge rehabilitation or replacement on a case-by-case basis, without being able to consider the cumulative Historic Preservation impacts of each decision. This is particularly true of truss bridges around the state. While there is a fairly coherent and comparative body of information about the number and condition (structural or functional deficiency) of the bridges (in PONTIS), the Cabinet has needed a consistent data and evaluation system for the historic value of each structure. Nor has there been an effort to integrate the “rehabilitate vs. replace” decision with state-of-the-art rehabilitation techniques.

In the interest of preserving our heritage, the Kentucky Transportation Cabinet desired to make more consistent and efficient decisions regarding the rehabilitation or replacement of truss bridges in the state. As of this writing there are 109 such bridges in the state, and the Cabinet lacks reliable information about the relative number, type, and condition of the various types of truss bridges. Without having the necessary information, and a process for evaluating them, the Cabinet risks destroying historically valuable bridges and/or expending considerable resources to rehabilitate structures with little historic value.

The goal of this project was to create an information base that would improve decisions about the replacement or rehabilitation of truss bridges—a process that would include their historic significance and potential for rehabilitation. The results of this study enable KYTC to make a better-informed and potentially less costly bridge rehabilitation/replacement decision. The work plan consisted of these overlapping steps:

1. Develop the historic context and evaluation process for identifying potentially historic truss bridges.
2. Develop a method that integrates historic value and technical condition information into a consistent decision support process.

This research was conducted in two phases. During the first phase, information on the history and design of each bridge was assembled and a rating process developed. This phase included review of previous studies. Combining that review process and the judgment of KYTC historic preservation professionals, a set of 75 bridges was then selected, based on their comparatively greater historic value, for further study of their potential for rehabilitation. During the second phase, the KTC team, engineers from the KYTC bridge division, and District engineers who were responsible for the day-to-day care and maintenance of the bridges evaluated the condition and functional context of the bridges. The goal was to identify those that could be considered good candidates for preservation through rehabilitation. This evaluation drew on the extensive data contained in the PONTIS system, which data was then more fully developed and elaborated upon through one-on-one interviews with the District bridge engineers.
Chapter 2: Summary of Findings from First Phase of Study

This study developed a method for balancing the historic value of a bridge against a complex consideration of its transportation utility and its cost to rehabilitate or replace. In this chapter we discuss the use of standard, existing databases to accomplish these purposes, and describe the resulting initial database, compiled from a variety of sources.

2.1 Establishing Historic Value

In the first phase of the study, Ted Grossardt and Len O’Connell of the Kentucky Transportation Center worked with Phil Logsdon, Rebecca Turner, and Amanda Abner from the Kentucky Transportation Cabinet’s Division of Environmental Analysis to identify more than 70 historic truss bridges as candidates for preservation. Erin Van Zee of the Division of Maintenance provided valuable engineering and technical assistance.

During this phase of the study, it was agreed to exempt some of the bridges from consideration due to their size and/or importance to the flow of traffic across rivers and state boundaries. In all likelihood, the decision to replace or rehabilitate major bridges crossing state borders will be made in conjunction with the adjoining state. Similarly, due to their significant replacement costs, rehabilitation/replace strategies for most large bridges will be customized to the structure and context, and so they would likely not require the same sort of analysis as smaller bridges statewide. Consequently, all bridges over the Ohio River and all bridges with four or more spans were exempted, as were covered bridges. Also eliminated were truss bridges built after 1962, as they are not yet 50 years old. Additionally, several bridges that were listed in the data set were discovered to have already been demolished and replaced. This reduced the total number of bridges to assess for possible preservation to 109.

In consultation with KYTC’s historic preservation professionals and after a review of previous studies, eight indicators of historic value were identified. The research team surveyed available documentation for the bridges and used GIS to obtain all available information that would help establish the historic value of each of the 109 bridges.

The Kentucky Transportation Cabinet provided an Excel spreadsheet with information on the remaining truss bridges. For each bridge the spreadsheet contained the following information: a) the highway district with responsibility for the bridge; b) the bridge’s identification number; c) the year it was built; d) the road or route on the bridge; e) the river, creek or facility crossed; f) the truss type; g) its latitude and longitude; h) a bridge description with number of trusses and length of each; and i) the bridge name, if any.

To obtain additional information, the following reports were reviewed:
Information from these studies was added to the spreadsheet so that it contained additional data regarding the historic quality of the bridge, including a) the bridge company that built the bridge (if known); b) the type of connections—pin or rivet; c) the type of abutments—concrete or stone; d) WPA status; e) rareness of truss type; and f) eligibility for the National Register of Historic Places, if known. The spreadsheet was also supplemented with information on recent National Bridge Inventory (NBI) ratings of the deck, superstructure, substructure, and channel (waterway) along with any additional information concerning the bridge’s history. All of the above information was used to evaluate the overall historic importance of each bridge.

The following criteria were considered when evaluating historic value:

1. A bridge previously recommended (in 1982 or 1988) as eligible for or listed on the National Register (15 bridges);
2. A construction date of 1910 or earlier (12 bridges);
3. A bridge being the only one of a common type (e.g., a Warren) in its KYTC district (13 bridges);
4. A bridge that was built by the Works Progress Administration—a WPA bridge (2 bridges);
5. A bridge that has “pin” as opposed to rivet connections (11 bridges);
6. A bridge located in or within 2000 feet of an historic district (9 bridges);
7. A bridge that has some other indicator of historic value (e.g., named after a person, built by an historic builder, or associated with an historic project) and the bridge is not in or near an historic district (12 bridges).
8. A bridge that has a “rare” truss configuration (four or fewer examples of the truss configuration left in Kentucky (27 bridges).

A variety of scoring methods were attempted, but ultimately none was completely satisfactory. With the limited number of bridges under consideration, each of the 109 bridges was considered individually and evaluated based on the criteria listed above and the specialized knowledge of the KYTC historic preservation professionals. This yielded a set of 73 bridges of comparatively higher historic value, and, during the course of the interviews with the district bridge engineers, two additional truss bridges were identified as good candidates for preservation by the district
engineers themselves. Thus the research team compiled additional information on a total of 75 select bridges.

The remaining 34 truss bridges are of comparatively lesser historic value, in the context of the full complement of 109. This does not necessarily mean that they should be presumed as candidates for replacement, as they may still provide more than adequate service in the transportation system. Thus, their value to the system is primarily functional at this time. Nevertheless, they may represent significant value, purely as a bridge. The following section presents a brief comparison of these two categories of bridges, based on various condition ratings. Because there was no need to ‘balance’ considerations of historic value against functional value and costs, the remaining 34 bridges were not further analyzed in this study.

2.2 Establishing Transportation System Value
The national and state DOT’s keep quite detailed databases on the condition of the bridges charged to their care. These databases include both physical condition data and ‘performance’ data regarding the ability of the bridge to accommodate certain vehicle sizes and volumes of traffic. This information formed the foundation for a more detailed examination of the transportation system value of each of the 75 selected bridges.

2.3 FHWA rating of Four Bridge Elements: Deck, Superstructure, Substructure, and Channel
FHWA has established a recording and coding system for the appraisal of the condition of the nation’s bridges. Four specific ratings of condition are relevant to our concerns: (1) the rating of the bridge deck, (2) the superstructure (the truss), (3) the substructure (under the deck), and (4) the channel (components of the river, such as bank stabilization). Each bridge is given a rating on each of the four that varies from "0" (a failed bridge beyond corrective action) to "9" (a bridge in excellent condition). Thus it is a reasonably succinct overview of the physical condition of the bridge.

The condition codes are described as follows in descending order:

(9) excellent condition
(8) very good condition (no problems noted)
(7) good condition (some minor problems)
(6) satisfactory condition (minor deterioration)
(5) fair condition (all primary structural elements are sound but the bridge may have minor section loss, cracking, spalling or scour)
(4) poor condition (advanced section loss, deterioration, spalling or scour)
(3) very poor condition (loss of section, deterioration, spalling, or scour have seriously affected primary structural components)
(2) critical condition (advanced deterioration of primary structural elements)

(1) imminent failure condition (bridge is closed to traffic).

Table 2.1 below shows the distribution of superstructure condition ratings for the 75 bridges selected as most likely to possess the greatest amount of historic value. Twenty-six (35 percent) of the 75 bridges have a superstructure condition rating of 4, which indicates poor condition, or an even lower rating, which indicates a condition worse than poor. In other words, a full 65 percent of the bridges had a superstructure rating of 5 or higher, which indicates a fair or good condition.

<table>
<thead>
<tr>
<th>Condition Rating</th>
<th>Number with Rating among 75 Selected Bridges</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>17</td>
</tr>
<tr>
<td>5</td>
<td>29</td>
</tr>
<tr>
<td>6</td>
<td>17</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 2.2 shows the average condition rating for the four types of structural concerns for the 75 selected bridges and the remaining 34 not selected. It also presents the average year in which they were built. The average rating of the selected bridges for the superstructure (4.75) was lower than that for the deck (5.46), the substructure (4.99) and channel (6.11). The selected bridges had lower ratings than the 34 other bridges on all four of the attributes rated. The average age of the bridges does not appear to be a significant factor contributing to the differences in condition ratings between the selected and not selected, as the average year built for the 75 selected was 1931, while that of the 34 others was 1932.
Table 2.2: Comparison of Average Condition Ratings of 75 Selected to 34 Not Selected Bridges

<table>
<thead>
<tr>
<th></th>
<th>Average Year Built</th>
<th>Deck Condition Rating</th>
<th>Superstructure Condition Rating</th>
<th>Substructure Condition Rating</th>
<th>Channel Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>74 Selected Bridges</td>
<td>1931</td>
<td>5.46</td>
<td>4.75</td>
<td>4.99</td>
<td>6.11</td>
</tr>
<tr>
<td>34 Not Selected Bridges</td>
<td>1932</td>
<td>5.47</td>
<td>4.94</td>
<td>5.78</td>
<td>6.44</td>
</tr>
</tbody>
</table>

2.4 The National Bridge Inventory Ratings of the Bridges

The National Bridge Inventory database is a broad-based information system that contains detailed technical and engineering information about hundreds of thousands of bridges in the United States including year built, bridge design, condition and many other fields. The National Bridge Inventory incorporates the FHWA rating system described above, including the structural evaluation of deck, superstructure, and substructure, on a 0-9 scale.

The NBI is used to support decisions regarding federal funding for rehabilitation or replacement. A "bridge sufficiency rating" of 1 to 100 is calculated, based 55 percent on the structural evaluation, 30 percent on the obsolescence of its design (functional deficiencies), and 15 percent on its importance to the public. A score of 80 or less is required to make the bridge eligible for federal rehabilitation funding, and 50 or less for federal replacement funding.

The NBI scoring method first looks for structural problems. If the bridge is without structural problems, it is then assessed for functional deficiencies. The NBI rating system classes all bridges into one of three categories: structurally deficient, not structurally deficient, or functionally obsolete. In practice, many of the bridges categorized as structurally deficient are also functionally obsolete. Many bridges are functionally deficient due to a change in the standards for bridge width. However, functionally deficient narrow bridges may remain in service, if they are deemed capable of handling the types and volume of traffic that they are predicted to carry in the future.

Functional obsolescence is considered when computing the sufficiency rating given to bridges. Thus, the sufficiency rating of a bridge is not an appropriate measure of the structural integrity of a bridge. The sufficiency rating looks at the approach to a bridge and the capacity of the bridge, so narrow bridges with approaches that require a slow speed are often given a low rating. The truss, itself, may be in good condition. Typically, the earlier the bridge was built, the more likely
the design of the approach and the bridge width will tend toward ‘insufficiency’ based on functional obsolescence.

As mentioned earlier, to qualify for federal rehabilitation funds, a bridge must have a sufficiency rating below 80. But, it is not required that the bridge rehabilitation bring the bridge up to a sufficiency rating of 80 or above. In fact, it is acceptable for a rehabilitated truss bridge to have a sufficiency rating well below 80. Most often, the rehabilitated bridge will earn a low sufficiency rating due to functional obsolescence, such as narrow width, curved approaches, and other factors that are not improved by structural rehabilitation. So it is important to determine what the goal is when making a decision about rehabilitation or replacement. But clearly, if the goal is the preservation of an historic bridge, it is acceptable to have a sufficiency rating below 80 after the bridge work is finished. Table 2.4 presents the number and percent of the selected and not selected bridges by the NBI ratings.

<table>
<thead>
<tr>
<th>NBI = 0</th>
<th>NBI = 1</th>
<th>NBI = 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Deficient</td>
<td>Structurally Deficient and Frequently Functionally Obsolete</td>
<td>Functionally Obsolete but Not Structurally Deficient</td>
</tr>
<tr>
<td>12 (16%)</td>
<td>41 (56%)</td>
<td>20 (27%)</td>
</tr>
</tbody>
</table>

- Two of the selected and two of the not selected bridges did not have available NBI ratings.

2.5 Analysis of the Condition Ratings

In this section, we assess the current information on the condition ratings of the 75 bridges to estimate the number of bridges that may be good candidates for preservation, given what is known about their current condition and the amount of work likely to be needed.

As noted above, a bridge structural feature—superstructure, substructure, or deck—with a rating of 5 is considered to be in fair condition and needs preventative maintenance or repairs. A bridge feature with a rating of 4 is in poor condition and is considered to be in need of rehabilitation or replacement. Taking the average across these three features is a possible indicator of degree of work needed, for two reasons: (1) Often a bridge has problems with only one component, which is likely to render it less difficult or costly to preserve; and (2) The scores
for the channel rating were uniformly high with only one rated a four and none having a lower rating. Thus the channel rating rarely adversely influenced the overall rating of the structure.

For this analysis, a bridge with an average rating across the three structural features of 5 or higher is likely a very good candidate for preservation, while a bridge with an average score of between 4 and 5 is likely to be more difficult or costly to preserve. A bridge with an average rating of less than 4 is likely to be a poor candidate for preservation. Also, repairing a deck in poor condition is typically less likely to affect the historic quality of a bridge and/or cost less than repairing the substructure or superstructure.

Table 2.7 below presents the number of bridges in four categories. Sixteen (21%) of the 75 selected bridges had an average rating on superstructure, substructure and deck of 6 or higher. Thirty-seven (49%) had an average rating from 5 to 5.67. Fourteen (19%) had a rating from 4 to 4.67. Only eight bridges (11%) had an average rating less than 4. Three of the eight had a rating of 1, which indicates that a bridge is closed to traffic.

<table>
<thead>
<tr>
<th>Categories for Average of Three Ratings</th>
<th>Bridges in Rating Categories</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average of 6 or higher</td>
<td>16</td>
<td>21%</td>
</tr>
<tr>
<td>Average from 5 to 5.67</td>
<td>37</td>
<td>49%</td>
</tr>
<tr>
<td>Average from 4 to 4.67</td>
<td>14</td>
<td>19%</td>
</tr>
<tr>
<td>Average less than 4</td>
<td>8</td>
<td>11%</td>
</tr>
<tr>
<td>Total</td>
<td>75</td>
<td>100%</td>
</tr>
</tbody>
</table>
Chapter 3: Results of Second Phase of Historic Truss Bridge Study—Interviews with District Bridge Engineers

The second phase of the study involved discussions with the district bridge engineer in each of the state’s twelve highway districts concerning the feasibility of preserving the selected historic bridges in his or her district. As part of their duties, the bridge engineers supervise inspection of the bridges and are very knowledgeable about their condition, functionality, and maintenance needs. Prior to interviewing the bridge engineers in their district offices, the researchers reviewed the latest inspection reports and requested that the engineers also review the reports. This preparation for the interviews ensured productive discussions. Erin Van Zee of the Division of Maintenance provided valuable engineering and technical assistance.

The bridge engineers were asked to identify the major issues with the bridge, and the repairs needed to preserve the bridge for a minimum of 20 years. The engineers were also asked to give their opinion regarding rehabilitation or replacement of the structure. They were then asked to estimate the amount of effort to preserve the bridge on a scale of 1 (very little effort or no effort) to 10 (greatest effort or most difficult). Finally, and perhaps most challenging, they were asked to provide a rough estimate of the likely cost to repair the bridge.

A few of the bridges on the list had already been demolished and replaced. Additionally, two engineers identified additional truss bridges in their districts that they deemed good candidates for preservation. Information on the preservation potential of each bridge was obtained. In all, the study compiled assessments of 75 historic truss bridges.

A written summary of each interview is provided for each bridge in Appendix 1. These describe its historic qualities, truss type, and condition information from the most recent NBI, as well as the bridge engineer’s recommendations for the major repairs or work needed to maintain the bridge for 20 years. The latest estimates of ADT and projected ADT are included as are the current weight limitations and postings for load. Photos and plans are included when available from KYTC files.
Figure 3.1: Example of a Summary of an Interview with the Bridge Engineer in District 1

KY 58 over Obion Creek (053B00042) Hickman County

Built in 1928 by the Department of Highways, this bridge is one of eighteen Pratt Pony truss bridges in the state. Its span length is 100.1 feet. It is described as functionally obsolete. In 2011, its ADT was 681. Its projected ADT by 2031 is 817. It appears eligible for the National Register of Historic Places under Criteria A and C.

On the NBI, the deck, superstructure and substructure are each rated respectively 6, 6, and 5. The channel and channel protection are rated 6. Last inspected in September 2010, its sufficiency rating was 52.5. The operating rating is 41 tons and the inventory rating is 24 tons. The bridge is not posted for load.

Mr. Harold Gibson, the District 1 bridge engineer, said that this bridge could be preserved. It is being assessed for repairs and needs to be painted. He said it needs some work on connections, new bracing in several spots, along with some work on the deck and substructure. The caps and bearings need to be repaired or replaced and several members that were bent by vehicle impact need to be straightened. He estimated that the preservation cost for 20 years might reach $3.5 million. On a scale of 1 to 10 in regard to effort and cost to preserve, he rated this bridge a 3 or 4.
After the interviews were summarized verbally, they were summarized in tabular form for each of the twelve highway districts. This facilitated the detection of patterns in the findings. The information obtained on each bridge is summarized by district. For each bridge in a district, the following information is provided in the tables: (1) its sufficiency rating from the NBI; (2) the year built according to inventory data; (4) the bridge engineers opinion on whether the bridge should be preserved or replaced; (5) the bridge engineer’s estimate of the likely difficulty or effort needed to preserve the bridge ranging from 1 (quite easy) to 10 (most difficult); (6) an estimate of the likely cost to preserve; and (7) identification of some of the each bridge’s historic qualities in addition to its age.

Table 3.1 describes the bridge attributes presented in the tables that summarize the interview results.

<table>
<thead>
<tr>
<th>Bridge Identification Number</th>
<th>A bridge with a B in its number is a state maintained bridge; a Bridge with a C is a county maintained bridge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sufficiency Rating</td>
<td>From the NBI, ranging from 0.0 (closed) to 100 (new)</td>
</tr>
<tr>
<td>Year Built</td>
<td>This is the year built, although it may also be the year it was rehabilitated, repaired, or taken into KYTC’s inventory system. Some of the years may not be accurate, especially for very old bridges.</td>
</tr>
<tr>
<td>Work Effort to Preserve</td>
<td>Ranges from quite easy or no work (one) to most difficult (ten)</td>
</tr>
<tr>
<td>Replace or Preserve</td>
<td>Engineer’s recommendation or opinion on bridge’s preservation potential</td>
</tr>
<tr>
<td>Estimated Cost to Preserve</td>
<td>This is a rough estimate of the total cost to preserve the bridge including painting, if needed</td>
</tr>
<tr>
<td>Historic Qualities</td>
<td>This identifies some of the qualities that make the bridge historically significant.</td>
</tr>
</tbody>
</table>

Table 3.2 summarizes the interview findings from District 1. It shows that the bridge engineer thought that five of the six historic bridges selected for preservation in his district could in fact be preserved. However, he was of the opinion that one of those five bridges might be replaced anyway, if the facility is widened to four lanes to accommodate rising traffic levels. The traffic volume on that bridge is projected to rise from 7,680 in 2011 to 10,368 in 2031 (see appendix 1). Considering the other four bridges that could, in his opinion, be preserved for 20 years, he foresaw moderate levels of difficulty for rehabilitation—estimates of 3, 3.5, 4.5 and 4.5. In comparison, he rated the bridge to be replaced at a difficulty level of 10, if it were to be preserved. He was unable to estimate repair costs for two of the bridges.
### Table 3.2: District 1 Summary

<table>
<thead>
<tr>
<th>Bridge ID</th>
<th>Suf. Rating</th>
<th>Year Built</th>
<th>Bridge Work Effort Rating</th>
<th>Replace of Preserve</th>
<th>Estimated Cost to Preserve</th>
<th>Historic Qualities</th>
</tr>
</thead>
<tbody>
<tr>
<td>053B00042</td>
<td>52.5</td>
<td>1928</td>
<td>3.5</td>
<td>Preserve</td>
<td>$3,500,000</td>
<td></td>
</tr>
<tr>
<td>070B00017 N</td>
<td>32.70</td>
<td>1931, re-con. 1954</td>
<td>10</td>
<td>Replace</td>
<td></td>
<td>Eligible for NR, Lucy Jefferson Lewis Bridge, Nashville Bridge Co.</td>
</tr>
<tr>
<td>070B00065</td>
<td>48.8</td>
<td>1952</td>
<td>3</td>
<td>Preserve</td>
<td>$2,000,000 to $3,000,000</td>
<td>Eligible for NR</td>
</tr>
<tr>
<td>079B00040</td>
<td>27.5</td>
<td>1933</td>
<td>4.5</td>
<td>Preserve</td>
<td></td>
<td>Irvine Cobb Bridge</td>
</tr>
<tr>
<td>018C00105</td>
<td>56.6</td>
<td>1924</td>
<td>4.5</td>
<td>Preserve</td>
<td></td>
<td>Double intersection Warren</td>
</tr>
<tr>
<td>073B00004</td>
<td>15</td>
<td>1931</td>
<td>7</td>
<td>Preserved until road widened</td>
<td>$10,000,000 to 15,000,000</td>
<td>International Iron and Steel, eligible for NR</td>
</tr>
</tbody>
</table>

The District 1 bridge engineer’s opinion that a majority of the bridges in his district could be preserved for 20 or more years proved similar to the opinions of bridge engineers in the other districts. Table 3.3 summarizes the opinions of the bridge engineers from all twelve districts, revealing that they were of the opinion that only 14 of the 75 selected bridges needed to be replaced. However, while they considered the rest of the bridges as candidates for preservation, there was a subset of 13 bridges that in their opinion presented significant impediments to preservation, related to functional inadequacy or some other, usually structural, deficiency with the bridge. In those 13 cases, the engineers seemed less willing to endorse preservation despite recognizing its feasibility. Presumably, some of these 13 may prove more difficult to preserve. Finally, those bridges of lower historic value are shown by district. Additional assessment was not made of them. Table 3.3 presents the number of bridges in each of the four categories by district along with the total number in each of the four categories.
Table 3.3: Bridge Engineer Opinions by KYTC Highway District

<table>
<thead>
<tr>
<th>District</th>
<th>Replace</th>
<th>Preserve</th>
<th>Preserve but bridge engineer expressed reservations about preservation</th>
<th>Bridges of Lower Historic Value, Not Assessed</th>
<th>Total Number of Truss Bridges by District</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>8</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>10</td>
<td>1</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>11</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>12</td>
<td>2</td>
<td>7</td>
<td>0</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>Totals</td>
<td>14</td>
<td>48</td>
<td>13</td>
<td>34</td>
<td>109</td>
</tr>
</tbody>
</table>

The bridge engineers were asked to estimate the amount of effort it would take to preserve each bridge for 20 years. They estimated considerably higher levels of effort to preserve the thirteen bridges about which they expressed reservations (an average of 7.42 on the 10 point scale) than for the 48 other bridges they viewed as better candidates for preservation (an average of 3.82 on the 10 point scale). This is in stark contrast with the estimated work effort to preserve the bridges the engineers viewed as in need of replacement—an average estimate of 8.53.

Table 3.4 identifies the thirteen bridges by bridge number and highway district along with the estimate of the work effort and the associated problem mentioned. Two of the bridges are closed at this time and three could be preserved as pedestrian bridges or by moving to a new location.
Two bridges were said to need considerable work. In several cases the bridge engineer mentioned the cost and/or infrequent use. Several others mentioned concerns with the approaches or other problems related to functional adequacy.
Figure 3.2: Bridge Locations and Recommendations by District

District 1
District 2
District 3
District 4
District 5
District 6
District 9

Kentucky Truss Bridges in Study

- Green: Preserve
- Yellow: Preserve - Conditionally
- Red: Replace

Major Roads

ROUTE_TYPE
- Interstate
- Parkways
- US Road
- State Roads
- Local Roads
- Lakes

Scale: 0 - 5 - 10 - 15 - 20 - 25 - 30 - 35 - 40 Miles

Kentucky Division of Geographic Information (DGI)
District 10
District 11
District 12
### Table 3.4: Estimated Work Effort and Reservation Mentioned for 13 Bridges about Which District Engineers Expressed Reservations regarding Preservation

<table>
<thead>
<tr>
<th>District</th>
<th>Bridge Number</th>
<th>Estimate of Effort to Preserve</th>
<th>Reservation Mentioned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>073B00004</td>
<td>7</td>
<td>Road needs widening to four lanes</td>
</tr>
<tr>
<td>4</td>
<td>014B00050</td>
<td>6</td>
<td>Needs a lot of work on the lower truss</td>
</tr>
<tr>
<td>4</td>
<td>090C00024</td>
<td>7</td>
<td>Only a few people use the road</td>
</tr>
<tr>
<td>4</td>
<td>043C00024</td>
<td>4.5</td>
<td>Problems with the approach</td>
</tr>
<tr>
<td>4</td>
<td>109C00015</td>
<td>8</td>
<td>Cost more to preserve than replace</td>
</tr>
<tr>
<td>5</td>
<td>106C00047</td>
<td>7</td>
<td>Needs to be moved</td>
</tr>
<tr>
<td>7</td>
<td>011B00005</td>
<td>10</td>
<td>Preserve as pedestrian bridge</td>
</tr>
<tr>
<td>7</td>
<td>084C00013</td>
<td>6</td>
<td>Preserve if operating rating of 3 tons is acceptable</td>
</tr>
<tr>
<td>8</td>
<td>074B00007</td>
<td>7</td>
<td>Only preserve part of bridge due to superelevated curves</td>
</tr>
<tr>
<td>8</td>
<td>100C00033</td>
<td>8</td>
<td>Preserve as pedestrian bridge</td>
</tr>
<tr>
<td>9</td>
<td>010C00019</td>
<td>8</td>
<td>Bridge closed</td>
</tr>
<tr>
<td>10</td>
<td>013C00039</td>
<td>9</td>
<td>Needs a lot of work</td>
</tr>
<tr>
<td>11</td>
<td>118C00027</td>
<td>9</td>
<td>Bridge closed</td>
</tr>
<tr>
<td><strong>Average Effort Level</strong></td>
<td></td>
<td>7.42</td>
<td></td>
</tr>
</tbody>
</table>

Table 3.5 presents the bridge engineer opinions by sufficiency rating categories. It shows that most of the bridges have very low sufficiency ratings on the NBI. In fact, only 14 of the 75 bridges are rated 50 or above. Yet even in the lowest categories, the engineers thought some of the bridges could be preserved. A primary reason for the low ratings was the functional inadequacy of the bridges. Most are deemed functionally inadequate because they are too narrow.
to meet current roadway standards for lane width. However, the engineers often endorsed preservation due to the relatively low traffic volumes on most of the roads.

There is a tendency for the engineers to view the bridges in the lower sufficiency rating categories as more in need of replacement or presenting greater obstacles to preservation. Thus, of the 37 bridges in the three lowest sufficiency rating categories (0.0 to 29.99), the bridge engineers viewed only 16 as able to be preserved without reservation, 11 in need of replacement, and 10 able to be preserved but having significant functional adequacy or other obstacles to preservation. Conversely, of the 38 in the higher sufficiency rating categories, they viewed 32 as able to be preserved without reservation, 3 in need of replacement, and expressed less willingness to preserve only 3 bridges.

Table 3.5: Bridge Engineer Opinion for 75 Truss Bridges by Sufficiency Rating Category

<table>
<thead>
<tr>
<th>Sufficiency Rating Category</th>
<th>Opinion Preserve</th>
<th>Opinion Replace</th>
<th>Preserve but bridge engineer expressed reservations</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0-9.99</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>10-19.99</td>
<td>5</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>20-29.99</td>
<td>8</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>30-39.99</td>
<td>4</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>40-49.99</td>
<td>16</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>50-59.99</td>
<td>7</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>60-69.99</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>70-79.99</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>80-89.99</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>90-100</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Totals</td>
<td>47</td>
<td>14</td>
<td>13</td>
</tr>
</tbody>
</table>
Chapter 4: Preservation Opportunities

This research was designed to answer the study objectives in two phases. The first concerned the development of an evaluation process to assess potentially historic truss bridges. This was done using available information on the remaining truss bridges. Unfortunately, the method developed proved to be of limited use. To ensure inclusiveness, the historic preservationists on the research team then selected additional bridges based on their knowledge of the bridges.

By the end of Phase One, the research team had identified a total of 75 bridges for consideration in the second phase of the project, during which the district bridge engineers were interviewed to obtain their opinion of the work needed to preserve the bridges for 20 years.

Currently, some of the bridges that the bridge engineers view as candidates for preservation are on the highway plan for replacement. The results of the assessments suggest that some of these bridges can be saved, usually with minor to moderate structural repairs and cleaning and painting. In fact, the district bridge engineers thought that many of the identified bridges could be maintained for 20 years, even many of those with sufficiency ratings below 30. Indeed, they thought only 14 of the 75 historic bridges needed to be replaced and a total of 61 could be preserved with varying degrees of effort. They did, however, indicate some reservation for 13 of the bridges that they thought could be preserved. But they expressed no major reservations about the remaining 48 bridges. In short, reservations notwithstanding, the Cabinet appears to be well situated to preserve a considerable number of Kentucky’s historic truss bridges.

Beyond the imperative imposed by section 106 to exhibit a good faith effort to preserve historic bridges, there may well be a substantial monetary savings associated with maintaining many of the bridges, as the bridge engineers’ initial estimates of the cost to repair many of the bridges are far lower than the cost of replacement. Thus, it appears advisable to carefully reconsider whether to rehabilitate or replace many of these bridges.

One clear message garnered from the district interviews is the need to fund more routine maintenance, especially painting. Regular maintenance and painting can arrest deterioration. Several of the bridge engineers suggested that a spot painting program and the strategic use of marine grease would prolong the useful life of truss bridges. This latter concept has been advanced recently by KYTC to the District bridge engineers. The prevalence of problems with the joints implies that more frequent joint repair or replacement could also lengthen the life of the bridges.

Most of the bridges are functionally obsolete due to their width, their approaches, or some other geometric feature. In some cases, rising levels of traffic volume argue for replacement with a
more modern, wider bridge. To a large extent, this contributes to their low sufficiency ratings. However, many of the bridges are on lightly travelled roads and can handle the predicted future traffic volumes despite their functional obsolescence. If these bridges do not have to handle heavy agricultural or industrial trucks and equipment, they may be able to stay in service.

Funding bridge replacement, repair and preservation is costly; fortunately federal monies can be used to repair structurally and functionally obsolete bridges. A bridge is eligible for federal funding for the purpose of rehabilitation if it has a sufficiency rating below 80. But, as noted earlier, there is no specific sufficiency rating that must be achieved upon rehabilitation. The only post-repair requirement is that the bridge be rehabilitated “to maintain or upgrade its structural capacity to the present and anticipated future capacity needed for route traffic.” Transportation officials at the state level are empowered to make the decision regarding the capacity to handle present and future traffic. The state is also free to set a posted weight limit below its recommended levels for county roads, state routes, and AAA highways. Once a bridge is rehabilitated, the only stipulation is that it will not be eligible for Federal rehabilitation funds again for ten years.

In sum, the Cabinet is granted a great deal of flexibility in its effort to preserve its historic truss bridges. While a bridge must be able to safely handle its customary and predicted traffic, the Cabinet can legally keep a functionally obsolete bridge with a low sufficiency rating in service. Thus, the state is well positioned to devise creative approaches for each bridge depending on the specific conditions associated with the bridge, its route, and the landscape feature that the bridge spans.

As an illustration of this opportunity, the Cabinet recently rehabilitated a functionally obsolete (a sufficiency rating of only 38.7) but historic truss bridge—the Rockcastle River bridge—on a low volume road. Built in 1921, its truss is a 205 foot Pennsylvania Petit, one of only three of that type remaining in Kentucky.

The Rockcastle River Bridge was scheduled for replacement at an estimated cost greater than $1.8 million dollars. The estimate for the new bridge included expenditures for new right of way acquisition and utilities to allow for improvement of approaches that contribute to its low functionality score. Due to the estimated cost of a replacement bridge as well as its location in an environmentally sensitive area above a river containing endangered mussels, the Cabinet considered the possibility of rehabilitation.

The Cabinet estimated that the cost of rehabilitation, which would involve cleaning and painting, gusset plate repairs, resealing and replacing joints, vertical member repairs, and end post plate work, would add up to $913,000. Four companies entered bids for the work, ranging from $465,000 to $690,000. The low bid was accepted and the bridge was rehabilitated with little disruption of traffic. The contract was let on September 28, 2011, and the work was completed December 5 of that year, about 75 days later.
The before and after photos presented here illustrate a major transformation in the Rockcastle bridge’s appearance and condition. Not only is the repair expected to last 20+ years, it increased the weight limit on the bridge from 3 to 15 tons, and did so at approximately 25 percent of the estimated replacement cost. Except for 5 days when the bridge was completely closed, at least one lane was always open for the duration of the rehabilitation project.
The success of the Rockcastle River Bridge project combined with the results of this study offers several lessons for the effort to preserve Kentucky’s dwindling stock of historic truss bridges.

(1) Rehabilitation of historic bridges should always be considered in some detail, even for the bridges currently slated for “replacement” on the highway plan.

(2) The Cabinet needs to improve its methods and knowledge in regard to estimating rehabilitation costs.

(3) The district bridge engineers are interested in preserving and maintaining historic bridges and should be consulted about the steps needed to preserve each bridge in their respective districts.

(4) The Cabinet may need to invest more resources in preventive maintenance.

(5) Preservation can “right size” a project, resulting in lower project costs and fewer environmental impacts.
Appendix 1: Interview Summaries
Truss Bridges Selected for Assessment in District 1

KY 58 over Obion Creek (053B00042)

Hickman County

Built in 1928 by the Department of Highways, this bridge is one of 18 Pratt pony truss bridges in the state. Twelve of these are single span bridges. Its span length is 100.1 feet. It is described as functionally obsolete. In 2011, its ADT was 681. Its projected ADT by 2031 is 817. It appears eligible for the National Register of Historic Places under Criteria A and C.

On the NBI, The deck, superstructure and substructure are each rated respectively 6, 6, and 5. The channel and channel protection are rated 6. Last inspected in September 2010, its sufficiency rating was 52.5. The operating rating is 41 tons and the inventory rating is 24 tons. The bridge is not posted for load.

Mr. Harold Gibson, the district 1 bridge engineer said that this bridge could be preserved. It is being assessed for repairs and needs to be painted. He said it needs some work on connections, new bracing in several spots, along with some work on the deck and substructure. The caps and bearings need to be repaired or replaced and several members that were bent by vehicle impact need to be straightened. He estimated that the preservation cost for 15 to 20 years might reach $3.5 million.

On a scale of 1 to 10 in regard to effort and cost to preserve, he rated this bridge a 3 or 4.
US 60 over the Cumberland River (070B00017N)

Livingston County

Built in 1931 and reconstructed in 1954, this bridge is one of two built by the Nashville Bridge Company. This bridge is comprised of a 500 foot long Warren through truss with verticals and a polygonal top chord and twelve 101-foot long plate girder spans. It is the only bridge with this arrangement of spans in the state and one of ten bridges utilizing a polygonal Warren truss with verticals. It is described as functionally obsolete. In 2011, its ADT was 4,510. Its projected ADT by 2031 is 6,990. Named after the Lucy Jefferson Lewis, who was the sister of Thomas Jefferson, the bridge was deemed eligible for listing on the National Register in 1988 under Criteria A and C.

On the NBI, The deck, superstructure and substructure are each rated respectively 7, 5, and 5. The channel and channel protection are rated 6. Last inspected in April 2012, its sufficiency rating was 32.70. The operating rating is 41 tons and the inventory rating is 24 tons. However, the bridge is currently posted at 3.0 tons.

Mr. Harold Gibson, the district 1 bridge engineer said that this bridge could not be preserved and currently is under review for replacement or rehabilitation. This bridge has extensive section loss throughout and 100 percent loss on the flanges. It has a crack on the pedestal being held together with clamps and epoxy. He was of the opinion that not replacing the bridge was tantamount to playing Russian-Roulette.

On a scale of 1 to 10 in regard to effort and cost to preserve, he rated this bridge a 10.

070B00017N plan, 1931
US 62 over Cumberland (070B00065N)

Livingston County

Built in 1952, this bridge was built by the State Department of Highways and is eligible for the National Register under Criterion C. With three cantilever truss spans that add up to 700.1 feet, this Warren truss bridge with verticals is described as functionally obsolete. The bridge has a unique truss shape with two deck truss spans connecting to a polygonal through truss span and is the only one in the state. It is one of 11 cantilever spans statewide that use a Warren truss. In 2011, its ADT was 7,180. Its projected ADT by 2031 is 10,698.

On the NBI, The deck, superstructure and substructure are each rated respectively 7, 6, and 5. The channel and channel protection are rated 5. Last inspected in June 2011, its sufficiency rating was 48.8. The operating rating is 39 tons and the inventory rating is 22 tons. The bridge is posted for load.

Mr. Harold Gibson, the district 1 bridge engineer said that this bridge will not be replaced and is currently being assessed for repairs. The bridge has a new overlay deck, retrofitted bearings, and was recently painted. A letting is planned for new floor beams. The bridge carries timber vehicles. He estimated the cost of repairs at $2 to 3 million and replacement at $50 million or higher. On a scale of 1 to 10 in regard to effort and cost to preserve, he rated this bridge a 3.
KY 402 over East Fork of Clarks River (079B00040)

Marshall County

Built in 1933, its main span is a Pratt through truss of 109.9 feet in length. It is one of 30 bridges statewide that utilize a Pratt through truss in some configuration. It has 16 reinforced concrete deck girder spans that are each 30 feet long. The arrangement of approach spans makes this bridge unique among Pratt through trusses. It has a decorative concrete railing. It is described as functionally obsolete. In 2011, its ADT was 2660. Its projected ADT by 2031 is 4123. It appears eligible for the National Register.

On the NBI, The deck, superstructure and substructure are each rated respectively 6, 5, and 5. The channel and channel protection are rated 6. Last inspected in February 2012, its sufficiency rating was 27.5. The operating rating is 25 tons and the inventory rating is 15 tons. The bridge is posted for load.

Mr. Harold Gibson, the district 1 bridge engineer said that this bridge will be preserved. It is being assessed for repairs and will be rehabbed and painted. It will be necessary to replace or straighten some overhead laterals and retrofit with some new plates. Some concrete work will also be required.

On a scale of 1 to 10 in regard to effort and cost to preserve, he rated this bridge a 4 or 5.
Old Salem Road over East Fork of Clarks River (018C00105N)

Calloway County

Built in 1924, this bridge is the only pony truss in Calloway County. Its truss span is a Pratt pony truss of 87.9 feet. It is one of 18 Pratt pony truss bridges statewide. Twelve of these are single span bridges. The bridge was determined eligible under Criterion C in the year 2000. It is described as structurally deficient. The NBI report does not list current and prospective ADTs. It appears eligible for the National Register.

On the NBI, The deck, superstructure and substructure are each rated respectively 5, 4, and 4. The channel and channel protection are rated 4. Last inspected in February 2012, its sufficiency rating was 56.6. The operating rating is 47.5 tons and the inventory rating is 28.5 tons. The bridge is not posted for load.

Mr. Harold Gibson, the district 1 bridge engineer said that this bridge can be preserved, but he described the bridge as too narrow. He said the bridge needs to be cleaned and painted, the connections need to be replaced, and the bridge needs a new concrete deck.

On a scale of 1 to 10 in regard to effort and cost to preserve, he rated this bridge a 4 or 5.
018-C105
LOOKING EAST
07/30/2012

018C00105N photo
US-60 over the Tennessee River (073B00004N)

McCracken County

This polygonal Warren truss bridge with verticals was built in 1931 by International Iron and Steel and is eligible for the National Register under Criteria A and C. It is known as the George Rogers Clark Memorial or Ledbetter Bridge and was designed by Modjeski and Masters Engineers, a prominent firm that designed many large bridges around the country, including the Second Street Bridge in Louisville. It is one of ten bridges statewide that utilize the polygonal Warren through truss. The bridge has three truss spans that are each 399.9 feet long and 11 steel plate girder spans. This bridge is described as structurally deficient. In 2011, its ADT was 7,680. Its projected ADT by 2031 is 10,368. On the NBI, the deck, superstructure and substructure are rated respectively 3, 3, and 3. The channel and channel protection are rated 6. Last inspected in April 2012, its sufficiency rating was 15. The operating rating is 3.1 tons and the inventory rating is 3.1 tons. The bridge is posted for load.

Mr. Harold Gibson, the district 1 bridge engineer said that this bridge is under construction and near completion. A demolition contract for the old bridge will be let in the Fall of 2013. Its 10 foot lanes were too narrow. He thought that the bridge could be moved and re-used. On a scale of 1 to 10 in regard to effort and cost to preserve he rated this bridge a 4 if it is repaired to last 10 years and a 7 if expected to last 20 years. He estimated that the 10 year repair would cost $8 to $10 million and the 20 year from $10 million to $15 million. A demolition contract may have been let in 2013.

073B00004N plan, 1929
Truss Bridges Selected for Assessment in District 2

Ray Road over Blackford Creek (030C00018N)

Daviess County

Built in 1884 by the Smith Bridge Company of Toledo, Ohio this bridge is a single span, pin-connected Pratt through truss. It is one of three in Kentucky built by this company and is the oldest bridge in Daviess County. It is one of 30 bridges in the state that utilize the Pratt through truss. It spans a length of 89.9 feet. It is described as structurally deficient. In 2006, its ADT was 25. Its projected ADT by 2026 is 39. It has been determined eligible for the National Register.

On the NBI, the deck, superstructure and substructure are each rated respectively 5, 3, and 3. The channel and channel protection are rated 6. Last inspected in July 2011, its sufficiency rating was 18.9. The operating rating is 3 tons and the inventory rating is 3 tons. The bridge is posted for load.

A replacement bridge was let for construction in July 2013 for $506,417.

On a scale of 1 to 10 in regard to effort and cost to preserve, he rated this bridge a 10.
US 431 over Green River (075B00018N)

McLean County

Built in 1939, this bridge is a polygonal Warren through truss bridge with verticals and is a structure documented as built as a Public Works Administration project and one of four bridge projects statewide identified as such. Most New Deal bridges in Kentucky can be attributed to the Works Projects Administration or Civilian Conservation Corps and are usually smaller concrete or stone structures. The bridge has a 319.9 foot long Warren truss span with verticals and a polygonal top chord and three Warren deck truss spans with verticals. It is one of ten polygonal Warren through truss bridges with verticals and the only bridge with this particular arrangement of spans. The bridge is one of ten that include Warren deck truss spans. It was determined eligible for the National Register in 1988 under criteria A and C. Also, it is claimed to be the only bridge in the world that begins and ends in the same county while crossing two rivers and part of another county (Ohio). Its longest span is 319.9 feet. The three deck trusses are 150 feet each. The entire structure is 1,644.0 feet long. It is described as structurally deficient. In 2011, its ADT was 6550. Its projected ADT by 2031 is 10,152.

On the NBI, the deck, superstructure and substructure are each rated respectively 7, 4, and 6. The channel and channel protection are rated 7. Last inspected in July 2011, its sufficiency rating was 28.30. The operating rating is 45.7 tons and the inventory rating is 27.4 tons. The bridge is not posted for load.

Mr. Jonathon Beasley, the district 2 bridge engineer said that the bridge can be preserved but will need structural repairs including replacement of gusset plates. Sections will have to be added to strengthen vertical bearing. The bridge will also require painting. On a scale of 1 to 10 in regard to effort and cost to preserve, he rated this bridge a 3 or 4.
US 62 over Green River (092B00050N)

Ohio County

This bridge is comprised of six 50-foot long reinforced concrete deck girder spans, seven 117-foot long Warren deck truss spans with verticals, and a three span (200'-299'-200') continuous Warren through truss with verticals. It was constructed in 1938 as a Public Works Administration project in Kentucky and is one of at least four PWA bridges statewide. It is the only bridge in the state with this particular span arrangement. It is one of nine Warren through truss bridges with verticals and one of ten bridges that utilize a Warren deck truss in some way. It was determined eligible for the National Register in 1988 under criteria A and C. Its longest span is 298.9 feet. It has two deck trusses of 200 feet. The entire structure is 1,845 feet. It is described as functionally obsolete. In 2011, its ADT was 2,130. Its projected ADT by 2031 is 2,556.

On the NBI, the deck, superstructure and substructure are each rated respectively 6, 5, and 5. The channel and channel protection are rated 7. Last inspected in March 2011, its sufficiency rating was 50.30. The operating rating is 41 tons and the inventory rating is 23 tons. The bridge is posted for load.

Mr. Jonathon Beasley, the district 2 bridge engineer said that they just spent $2 million on this bridge and it can be preserved but will need numerous repairs due to section loss, including replacement of 15 to 20 gusset plates and replacement of some bracing. The bridge will also require painting. Also there is cracking on a pedestal, which will need to be encased and recapped on one side. He estimated that the steel repairs will cost between one and two million dollars.

On a scale of 1 to 10 in regard to effort and cost to preserve, he rated this bridge a 3.
looking west, 31T class III load rating.
KY-270 over Crab Orchard Creek (117B00050N)

Webster County

Built in 1922 and reconstructed in 1955, this riveted Pratt pony truss bridge is the only bridge left standing in the state that was built by the M&P Contract Company of Rockport, Indiana. It was built for the Department of State Roads and Highways, which was formed in 1920 when the state legislature reorganized the Department of Public Roads. It is one of 18 Pratt pony truss bridges remaining statewide. Its span length is 80.1 feet. It is described as functionally obsolete. In 2011, its ADT was 260. Its projected ADT by 2031 is 317. It appears eligible for the National Register under Criterion C and potentially Criterion A as an early state highway project.

On the NBI, The deck, superstructure and substructure are each rated respectively 8, 5, and 7. The channel and channel protection are rated 7. Last inspected in November 2010, its sufficiency rating was 48.6. The operating rating is 37 tons and the inventory rating is 18 tons. The bridge is not posted for load.

Mr. Jonathon Beasley, the district 2 bridge engineer said that this bridge could last 20 years as it is. It has a new aluminum deck and the paint is good. He mentioned two problems: a need to replace plates on the lower chord and section loss in the top flanges on the stringers. On a scale of 1 to 10 in regard to effort and cost to preserve, he rated this bridge a 2.
US 60 over the Green River (051B00015N)

Henderson County

Built in 1930, this is the Livermore Memorial Bridge and is also known as the Spottsville Bridge. It is the only Parker truss bridge in the district. It is one of 15 bridges statewide that utilize a Parker through truss and one of ten non-Cantilever bridges that use a Warren deck truss. It is the only bridge statewide with this arrangement of spans. It also retains a decorative concrete fence-type railing on its east side. It utilizes four Warren deck trusses with verticals and two Parker through truss spans for a total bridge length of 1,103 feet. Its maximum span length is 359.9 feet. It is described as structurally deficient. In 2011, its ADT was 3,190. Its projected ADT by 2031 is 4,753. It appears eligible for the National Register.

On the NBI, The deck, superstructure and substructure are each rated respectively 6, 4, and 5. The channel and channel protection are rated 7. Last inspected in March 2012, its sufficiency rating was 39. The operating rating is 43.7 tons and the inventory rating is 26.1 tons. The bridge is posted for load.

Mr. Jonathon Beasley, the district 2 bridge engineer said that this bridge is on the six year plan to be replaced. It had some recent work on pier caps and bearings but it still has a pier cap problem. He said that preserving the bridge would require a lot of work, as the bridge is too narrow and has been damaged. He said that diagonal and vertical members have been cut. There is a great deal of section loss on the lower chord and section loss near the bearings and in other places. He said the bridge could be repaired but it would cost $4 million to $6 million. Replacement of the bridge he estimated at $20 million to $30 million. The replacement for this bridge is currently under development.

On a scale of 1 to 10 in regard to effort and cost to preserve, he rated this bridge a 5.
Truss Bridges Selected for Assessment in District 3

Logan Mill over the Red River (071C00023N)

Logan County

Built in 1925 according to state records, this bridge is a Pratt through truss with stone abutments and pin connections. The pin connections indicate that the bridge may date to an earlier period than the date given in the database. It was repaired in 1965. It is one of 30 bridges statewide that utilize a Pratt through truss in its configuration. It is the last truss bridge remaining in use in Logan County. One other truss bridge dating to 1910 remains in its original location, but was closed to traffic in 2010 (071C00029N). The span length of the Logan Mill bridge is 90 feet. It is described as structurally deficient. In 2006, its ADT was 51. Its projected ADT by 2026 is 83. It appears eligible for the National Register.

On the NBI, the deck, superstructure and substructure are each rated respectively 4, 5, and 5. The channel and channel protection are rated 8. These numbers suggest repair is feasible. Last inspected in June 2011, its sufficiency rating was 25.0. The operating rating is 10 tons and the inventory rating is 10 tons. The bridge is posted for loads.

On the KYTC bridge report, the condition state data for the elements indicates that the truss top is in condition state 3.

Mr. Darren Stewart, the district 3 bridge engineer, said that this bridge can be retrofitted and preserved. The necessary tasks include replacing a pin, retrofitting the flanges with plating, replacing the end of a stringer, fixing the pin connections on the lower chord and replating the interior compression post. He estimated the total cost at about $80,000 without painting and $600,000 with painting. He estimated the replacement cost at $1.3 million.

On a scale of 1 to 10 in regard to effort and cost, he rated this bridge a 3 or 4.
Mosby Ridge Rd over the East Fork of the Little Barren River (085C00005N)

Metcalfe County

Built in 1911, this bridge is a single span Camelback through truss with pin connections. It was determined eligible for the National Register in 1996 under Criteria A and C. It is one of six bridges statewide that utilize the Camelback through truss as its primary span type. It is the only pin-connected bridge in Metcalfe County. It was likely built by a bridge company, but the builder is unknown. Its span length is 148 feet. It is described as structurally deficient. In 2006, its ADT was 200. Its projected ADT by 2026 is 200.

On the NBI, the deck, superstructure and substructure are each rated respectively 8, 4, and 6. The channel and channel protection are rated 7. These numbers suggest repair is feasible. Last inspected in August 2011, its sufficiency rating was 25.0. The operating rating is 9 tons and the inventory rating is 9 tons. The bridge has no restrictions.

Mr. Darren Stewart, the district 3 bridge engineer said that this bridge can be retrofitted and preserved. The necessary tasks include replacing a hairpin on the top and bottom chord, retrofitting the flanges, replacing a stringer, and new build-up plates on the upper chord at 4 locations. He estimated the total cost at about $100,000. He estimated the replacement cost at $1.5 million.

On a scale of 1 to 10 in regard to effort and cost, he rated this bridge a 2 or 3.
Bogle Road over RJC Railroad (114C00007N)

Warren County

Built in 1900, this bridge is a Pratt half-hip pony truss with pin connections and stone abutments. It spans the RJ Corman Railroad and is the only steel truss bridge in the state that does not span a waterway. It is one of 11 Pratt half-hip pony truss bridges remaining statewide. It has been determined eligible for the National Register and is one of the oldest bridges in District 3. Its span is 50 feet. It is described as structurally deficient. In 2006, its ADT was 56. Its projected ADT by 2026 is 59.

On the NBI, The deck, superstructure and substructure are each rated respectively 6, 5, and 6. These numbers suggest repair is feasible. Last inspected in March 2012, its sufficiency rating was 16.5. The operating rating is 3 tons and the inventory rating is 3 tons. The bridge is posted for load.

Mr. Darren Stewart, the district 3 bridge engineer said that this bridge can be retrofitted and preserved. The necessary tasks include replacing the deck and a tension counter, replacing some eyebars, retrofitting the lower chord pin connections, and replacing the plates around pins, and fixing a misaligned pin collar. He estimated the total cost at $500,000 to $800,000. He estimated the replacement cost at $800,000 plus road realignment.

On a scale of 1 to 10 in regard to effort and cost, he rated this bridge a 5 or 6. This is an active replacement project as of August 2012.
114C00007N photo
**Glasgow Street over Clay Lick Creek (085C00007N)**

**Metcalfe County**

Built in 1921, this bridge is a riveted Pratt pony truss built by the Vincennes Bridge Company of Vincennes, Indiana. It is one of 18 Pratt pony truss bridges remaining in use statewide. Its span length is 75 feet. It is described as structurally deficient. In 2006, its ADT was 75. Its projected ADT by 2026 is 75. It appears eligible for the National Register.

On the NBI, The deck, superstructure and substructure are each rated respectively 4, 4, and 6. The channel and channel protection are rated 7. Last inspected in March 2012, its sufficiency rating was 24.7. The operating rating is 10 tons and the inventory rating is 10 tons. The bridge is posted for load.

Mr. Darren Stewart, the district 3 bridge engineer said that this bridge cannot be preserved and described it as falling apart, with the lower chord connections being sheared or in the process of failing. Every connection point has severe problems. The bridge has severe pack rust and section loss on all gusset plates. He added that the compression posts need replacing. He said he could not estimate the total cost of preservation. He estimated the replacement cost at $1,000,000.

On a scale of 1 to 10 in regard to effort and cost to preserve, he rated this bridge a 9.
Old Richardsville Road over Barren River (114C00011N)

Warren County

Built in 1889 and perhaps rebuilt in 1920, this bridge is one of two bowstring trusses. It was built by the King Bridge Company of Vincennes, Indiana. Its span length is 138.8 feet. It is described as structurally deficient. In 2006, its ADT was 165. Its projected ADT by 2026 is 177. It appears eligible for the National Register.

On the NBI, the deck, superstructure and substructure are each rated respectively 5, 6, and 6. The channel and channel protection are rated 6. Last inspected in May 2012, its sufficiency rating was 19.00. The operating rating is 3 tons and the inventory rating is 3 tons. The bridge is posted for load.

Mr. Stewart said this bridge is currently being maintained by David Garvin, a local resident of Bowling Green. At this time, it is in good condition and can be preserved if the three ton weight limit with posting is acceptable. He was of the opinion that the three ton limit was appropriate, as traffic over the bridge is light and there is a nearby route for heavier vehicles.

Mr. Stewart said that the bridge probably needs a new wooden deck and pointing of the mortar joints on the substructure. Also, the lower lateral bracing should be replaced along with the related connections. But there is little rusting or fatigue failure at present.

Mr. Garvin has had the bridge painted at regular intervals. He has also mounted fiber optic lights on it for aesthetic purposes and has installed interesting posting signs shaped like badges.
Truss Bridges Selected for Assessment in District 4

KY-144 over Sinking Creek (014B00016N)

Breckinridge County

Built in 1950 by the Department of Highways according to 1944 design standards and known as the Stephensport Bridge, this single span Warren through truss bridge with verticals and a polygonal top chord is located in Breckenridge County. It is one of ten polygonal Warren through truss bridges with verticals in the state. Its span length is 319.9 feet. It is described as not structurally deficient. In 2011, its ADT was 348. Its projected ADT by 2031 is 424. It appears eligible for the National Register.

On the NBI, the deck, superstructure and substructure are each rated respectively 5, 6, and 6. The channel and channel protection are rated 6. Last inspected in August 2011, its sufficiency rating was 74.4. The operating rating is 56.4 tons and the inventory rating is 33.8 tons. The bridge is not posted for load.

Mr. David Kemper, the district 4 bridge engineer, said that this bridge could be preserved and does not need to be painted. He said it needs some steel repairs and work on the top flanges. It also needs a deck replacement. He estimated that the preservation cost is only $500,000, while the replacement cost is 3 or 4 million.

On a scale of 1 to 10 in regard to effort and cost to preserve, he rated this bridge a 4.
014B00016N photo
KY-289 over Rolling Fork (078B00023N)

Marion County

Built in 1922 by the Brookville Bridge Company and reconstructed in 1972, this bridge is in Marion County and has a span of 149.9 feet. It is one of six bridges statewide that utilize a Camelback trough truss. It is one of two bridges remaining in the state and documented as built by Brookville. It is a camelback truss bridge with stone abutments and is described as functionally obsolete. In 2011, its ADT was 348. Its projected ADT by 2031 is 1117. It appears eligible for the National Register.

On the NBI, The deck, superstructure and substructure are each rated respectively 7, 5, and 5. The channel and channel protection are rated 7. Last inspected in January 2012, its sufficiency rating was 52.9. The operating rating is 40 tons and the inventory rating is 29 tons. The bridge is not posted for load.

Mr. David Kemper, the district 4 bridge engineer, said that this bridge could be preserved. It was recently painted. He said it needs some steel repairs and stringer replacement. He said it would be necessary to take the deck off and re-deck. He recommended work on the gusset plates and the floor beams. He estimated that the preservation cost is only $500,000.

On a scale of 1 to 10 in regard to effort and cost to preserve, he rated this bridge a 6.
078B00023N plan, 1972

078B00023N photo
US-31W over the Green River (050B0004N)

Hart County

Built in 1938, this bridge is the only Warren deck truss with verticals in the county and one of ten non-Cantilever bridges in the state that utilize a Warren deck truss. It is originally had a decorative concrete railing, but this has been replaced with a plain Jersey barrier. It is named after the civil war general, Simon Bolivar Buckner. It was determined eligible for the National Register in 2010 under Criterion C. The maximum span length is 200.1 feet. Described as functionally obsolete, its ADT in 2011 was 9,540. Its projected ADT by 2031 is 11,448.

On the NBI, the deck, superstructure and substructure are each rated respectively 7, 6, and 6. The channel and channel protection are rated 7. Last inspected in January 2012, its sufficiency rating was 70.9. The operating rating is 46.8 tons and the inventory rating is 33.7 tons. The bridge is not posted for load and was last inspected in December 2011.

Mr. David Kemper, the district 4 bridge engineer, said that this bridge was repaired and painted in 2011 so it needs no work at this time.

On a scale of 1 to 10 in regard to effort and cost to preserve, he rated this bridge a 1.
Yeaman-Olaton Rd over Mistaken Creek (043C00023N)

Grayson County

Allegedly built in 1920, this bridge is the only surviving bedpost truss bridge in District 4. The single span bridge is pin-connected and possibly dates to an earlier period than its official construction date in the database indicates. It is one of only two Bedpost trusses left in use in the state. The other is located on Deep Creek Road in Mercer County. There are only three truss bridges in Grayson County. It is eligible for the National Register under Criterion C. The maximum span length is 78.1 feet. Described as structurally deficient, its ADT in 2006 was 50. Its projected ADT by 2026 is 50.

On the NBI, the deck, superstructure and substructure are each rated respectively 7, 4, and 5. The channel and channel protection are rated 6. Last inspected in April 2011, its sufficiency rating was 19.80. The operating rating is 3 tons and the inventory rating is 3 tons. The bridge is posted for load and was last inspected in December 2011. The bridge has been closed and barricaded to traffic since that time.

Mr. David Kemper, the district 4 bridge engineer, said that there is no hope for preserving this bridge. He was of the opinion that only the upper chords and verticals could be saved. The four end lower chords, the stringers, the deck and all diagonals need replacing. Even if the bridge is entirely redone, it would still have a mere 4 ton rating.

He stated that it would cost more to repair the bridge than to replace it and when repaired there would still be a problem with the approach. His estimated cost for replacement was $275,000.

On a scale of 1 to 10 in regard to effort and cost to preserve, he rated this bridge a 10.
043C00023N photo
US 60X over Clover Creek (014B00050N)

Breckinridge County

Built in 1922 in Breckinridge County, this bridge is one of only three Pennsylvania Petit trusses in the state and is the only remaining bridge in Kentucky documented as built by the Pan Am Bridge Company. It is eligible for the National Register under Criteria A and C. The maximum span length is 250 feet. Described as structurally deficient, its ADT in 2011 was 1280. Its projected ADT by 2031 is 1561.

On the NBI, the deck, superstructure and substructure are each rated respectively 4, 4, and 5. The channel and channel protection are rated 7. Its sufficiency rating was 23.40. The operating rating is 25 tons and the inventory rating is 15 tons. It carries a substantial amount of truck traffic (29 percent). The bridge is not posted for load and was last inspected in August 2011.

Mr. David Kemper, the district 4 bridge engineer, said that the bridge can be preserved, but requires a lot of repairs on the lower part of the truss including replacement of stringers, the deck, cover plates, bearings and rollers. It was painted in 2008.

He estimated the cost for repairs at $500,000.

On a scale of 1 to 10 in regard to effort and cost to preserve, he rated this bridge a 6.
014B00050N painting plan, 1947
Fredericktown Rd over Beach Fork at Washington County Line (090C00024N)

Nelson County

Built in 1909 in Nelson County by Champion Bridge Company, this two-span Camelback through truss bridge is eligible for the National Register under Criteria A and C. It is one of six Camelback through truss bridges left statewide. Champion built many bridges in Kentucky, but there are only eight of them left that can be documented to this company. The maximum span length is 166 feet. It is considered a contributing element to the Fredrickstown Historic District. It is described as structurally deficient, its ADT in 2011 was 354. Its projected ADT by 2026 is 530.

On the NBI, the deck, superstructure and substructure are each rated respectively 6, 5, and 4. The channel and channel protection are rated 6. Last inspected in July 2011, its sufficiency rating was 24.10. The operating rating is 9 tons and the inventory rating is 9 tons. The bridge is posted for load.

Mr. David Kemper, the district 4 bridge engineer, said that the bridge can be preserved, but is not needed because it serves only a few families, who have other routes available with a bypass/detour route of 1.9 miles. The stringers and deck were replaced in 2008, but the bridge needs to be cleaned and painted. Steel repairs are also needed and the lower chord needs to be straightened, which will require picking up the bridge to reset it. Also the masonry substructure is in poor condition. It also needs new concrete caps and bearings. The combined repair work will be costly—an estimated 2.5 to 3.0 million dollars.

On a scale of 1 to 10 in regard to effort and cost to preserve, he rated this bridge a 7.
Pat Tousey Rd. over Spring Fork (043C00024N)

Grayson County

Reportedly built in 1950, but likely older, this bridge is eligible for the National Register under Criterion C. The maximum span is 47.9 feet. It is one of three Warren pony truss bridges left standing in District 4, but one of only five statewide. Described as structurally deficient, its ADT in 2006 was 25. Its projected ADT by 2026 is 25.

On the NBI, the deck, superstructure and substructure are each rated respectively 7, 4, and 6. The channel and channel protection are rated 6. Last inspected in April 2011, its sufficiency rating was 16.80. The operating rating is 3 tons and the inventory rating is 3 tons. The bridge is posted for load.

Mr. David Kemper, the district 4 bridge engineer, said that the bridge can be preserved, but the effort would be pointless due to the low traffic level and the availability of another route with a bypass/detour route of 3.1 mile. To preserve the bridge it would be necessary to replace stringers, repair connections and put in a new timber deck. Painting is also required. The bridge also has a 90 degree turn on the approach and has 10 foot width. The combined repair work will be costly—an estimated 300,000 dollars. Mr. Kemper believes that a bridge 20 feet wide with a new approach could handle heavier vehicles and be built for $500,000. If that happened the old bridge could be painted and left standing.

On a scale of 1 to 10 in regard to effort and cost to preserve, he rated this bridge a 4 or 5.
Tebbs Bend Rd over Green River (109C00015N)

Taylor County

Built in 1920 and rehabbed in the late 1990s, this pin connected Pratt through truss bridge was built by the Champion Bridge Company. It has a steel grid deck and dry stone masonry abutments—one of which is failing. The maximum span is 165 feet. It is one of 30 Pratt through truss bridges remaining statewide. It is a contributing element to the Tebbs Bend Historic District and the river crossing is associated with the Battle of Tebbs Bend during the Civil War. The battle involved General John Hunt Morgan. The bridge is NR eligible under Criteria A and C. Described as structurally deficient, its ADT in 2006 was 64. Its projected ADT by 2026 is 90.

On the NBI, the deck, superstructure and substructure are each rated respectively 6, 4, and 5. The channel and channel protection are rated 7. Last inspected in August 2011, its sufficiency rating was 25.20. The operating rating is 3 tons and the inventory rating is 3 tons. The bridge is posted for load.

Mr. David Kemper, the district 4 bridge engineer, said that the bridge can be preserved, but the effort would be very costly—more than the cost of replacement. To preserve the bridge it would be necessary to replace the entire floor system-- stringers, beams and deck. It would also be necessary to repair the lower and upper chords to get the bridge to a ten ton capacity. The bridge needs to be cleaned and painted and one abutment needs work. However, this bridge is under design for replacement.

On a scale of 1 to 10 in regard to effort and cost to preserve, he rated this bridge an 8 and estimated a repair cost of $1.5 million. Currently, the bridge is under design for replacement in 2014. The truss was not successfully marked.
Fragrant Rd over Branch-Rock Creek (043C00050N)

Grayson County

Reportedly built in 1950, but likely older, this Pratt half-hip pony truss bridge is one of three truss bridges left in Grayson County and may have experienced a loss of integrity. It is one of 11 Pratt half-hip pony trusses remaining statewide. The maximum span is 41.0 feet. Described as functionally obsolete, its ADT in 2006 was 5. Its projected ADT by 2026 is 5. It appears eligible for the National Register.

On the NBI, the deck, superstructure and substructure are each rated respectively 7, 5, and 6. The channel and channel protection are rated 6. Last inspected in April 2011, its sufficiency rating was 28.20. The operating rating is 3 tons and the inventory rating is 3 tons. The bridge is posted for load.

Mr. David Kemper, the district 4 bridge engineer, said that the bridge can be preserved, but the effort would be wasteful as the bridge would cost $150,000 to replace and $450,000 to repair. It needs a new lower chord and floor beams and the abutment needs repair. He also said that the bridge is on a driveway and not a through road, as the road ends at a house near the bridge.

On a scale of 1 to 10 in regard to effort and cost to preserve, he rated this bridge a 7.
Sulphur Lick Rd over Sulphur Creek (115C00005N)

Washington County

Built in 1920, this Pratt pony truss bridge is the only truss bridge left in Washington County. It is one of 18 Pratt pony truss bridges statewide. It is supported on dry stone abutments. The maximum span is 81.0 feet. Described as structurally deficient, its ADT in 2006 was 30. Its projected ADT by 2026 is 30. It appears eligible for the National Register.

On the NBI, the deck, superstructure and substructure are each rated respectively 7, 5, and 4. The channel and channel protection are rated 7. Last inspected in August 2011, its sufficiency rating was 20.80. The operating rating is 7.1 tons and the inventory rating is 7.1 tons. The bridge is posted for load.

Mr. David Kemper, the district 4 bridge engineer, said that the bridge can be preserved, but the effort would be wasteful as the bridge would cost $300,000 to replace and $500,000 to repair. It needs a new deck and stringers, painting, replacement of a tilted pin, new bearings, and repair of the abutments.

On a scale of 1 to 10 in regard to effort and cost to preserve, he rated this bridge a 6.
Truss Bridges Selected for Assessment in District 5

Fifth Street/Jail Hill Road over Clear Creek (106C00047N)

Shelby County

Built at this location in 1982, this is a double-single Bailey Temporary Bridge span with a dry stone substructure. The construction of the superstructure likely predates its erection at this location and was built by Thomas Storey Engineers, Ltd. of England, the original manufacturer of World War II era Bailey Bridges. The dry stone abutments exhibit superior workmanship and at one time supported a covered bridge. It is one of four Bailey Bridges remaining in use statewide. It is currently closed to traffic. The span is 91.0 feet. Described as structurally deficient, its ADT in 2006 was 145. Its projected ADT by 2026 is 199. It has been determined eligible for the National Register.

On the NBI, the deck, superstructure and substructure are each rated respectively 6, 1, and 1. The channel and channel protection are rated 6. Last inspected in April 2011, its sufficiency rating was 17.60. The operating rating is 0.0 tons and the inventory rating is 0.0 tons. The bridge is closed.

Royce Meredith, the bridge engineer in district 5, said that the main problem with the bridge is that the floor beams need replacing and the stone masonry is failing near the bottom of the substructure. He also mentioned section loss on the tension members, which are held together with pins. There is an alignment problem that impairs sight distance. And the bridge needs to be painted.

Mr. Meredith said the bridge could be moved to another location. On the 1 to 10 scale he rated the work effort to preserve a 7.
Truss Bridges Selected for Assessment in District 6

In district 6, bridge 041C00023N was replaced in 2006. Bridge 012C00023N is still standing but has been closed since 1991 and is not being inspected.

Long Stretch Road over Turtle Creek (012C00003N)

Bracken County

Built in 1920 and rehabbed in 2007, this bridge is a Bowstring arch pony truss on a county road and is listed on the National Register under Criterion C. It may have been built by the Wrought Iron Bridge Company of Canton, Ohio prior than 1920. It is one of two Bowstring arch trusses remaining statewide. It was significantly altered when the county placed steel I-beams above the bottom chord and laid down a concrete deck, so that the truss no longer bears the load. In 2010 its ADT was 98 vehicles and is projected to increase to only 135 by 2026. The bridge is listed as not deficient but is probably functionally obsolete due to its narrow width—12.1 feet, curb to curb. The operating rating is 12 tons and the inventory rating is 12 tons. It is posted for 12 tons. Mr. Brandon Seiter said the bridge can safely handle its current level of traffic.

Its sufficiency rating is 23.9, with an NBI condition rating for the deck of 7, for the superstructure a rating of 6, for the substructure a rating of 4, and for the channel and channel protection a rating of 7.

The inspection report states that the truss no longer carries a load. Moreover, the bridge is in the backwater area of the Ohio River and its normal pool channel is only a few inches from the bottom of the structure at all times. According to a bridge inspection report, “the structural elements (abutments, deck soffit area, steel stringers, steel floor beams, joints etc.) could not be inspected.” The inspector evaluated the I-beams that support the concrete deck and noted, “both exterior stringer elements have vertical welds located at mid span area, which is splicing steel members together.”

Mr. Seiter said that the bottom of the bridge is under water most of the year and the bridge is scheduled for replacement in two years. In 2007, the county took the old deck off, laid down I-beams, and placed a concrete deck on the bridge. He stated that the bridge should be replaced as the bridge cannot handle emergency vehicles when another route into a nearby town is blocked by a train. He also said that the truss bridge cannot be reworked to carry a modern traffic load and the trusses can not be used as guardrails, as they do not meet contemporary crash standards. He was also concerned about the alignment of the bridge with a nearby tunnel.
012C00003N photo
KY 355 over Severn Creek (094B00006N)

Owen County

Built in 1942, this bridge is a Parker through truss designed by the State Highway Department. It is one of 15 bridges statewide that utilize a Parker through truss. It retains a decorative concrete railing and is known as the Monterey Bridge. In 2010 its ADT was 710 vehicles and is projected to increase to 852 by 2031. The bridge is listed as not deficient. The operating rating is 40 tons and the inventory rating is 25 tons. Mr. Seiter said the bridge can safely handle its current level of traffic. It appears eligible for the National Register.

Its sufficiency rating is 53.7, with an NBI condition rating for the deck of 5, for the superstructure a rating of 6, for the substructure a rating of 6, and for the channel and channel protection a rating of 7.

Inspected in July 2011, the stringers were mostly in condition state 1 with some section loss. The deck, however, is in condition state 3. Most of the top truss is in condition state 1 and most of the truss bottom is in condition state 2. Most of the other bridge elements are in condition state 1 and 2. The bridge inspector noted some section loss on the stingers and bottom chord. He called for repair or replacement of pier caps, expansion joints and strip seal joints.

Mr Seiter said that the bridge will need a new deck at some time in the next five years and new joints. This will help keep water off the bridge. The pier caps have been replaced. He saw no need to replace beams or other structural features. However, some structural repairs are needed and the bridge needs to be painted. He estimated the total cost for preservation to be about $500,000, which was below his estimate of $1,000,000 to replace the bridge.

Mr. Seiter said the bridge will not require a lot of work. On a scale of 1 to 10 in regard to effort and cost, he rated this bridge a 3.
KY 177 over South Fork of Licking River @ Butler (096B00001N)

Pendleton County

Built in 1936, this bridge is a Parker through truss with a maximum span of 150.9 feet. It is one of 15 Parker through truss bridges remaining statewide and was designed by the State Highway Department. It is functionally obsolete due to its deck width of 24 feet. In 2011, its ADT was 2770. Its projected ADT by 2031 is 3324. It appears eligible for the National Register.

On the NBI, The deck, superstructure and substructure are each rated respectively 6, 5, and 6. The channel and channel protection are rated 7. These numbers suggest repair is feasible. Last inspected in February 2012, its sufficiency rating was 47.8. The operating rating is 38 tons and the inventory rating is 23 tons. The bridge is posted.

On the KYTC bridge report, the condition state data for the elements indicates that the truss top is in condition state 1. However 41 feet of the truss bottom is in condition state 3 and 4. Twenty-four feet of the stringers are in condition state 4. The pier walls and abutments are in condition state 1 and 2.

Mr. Seiter said that this bridge is in good shape and can be retrofitted. The necessary tasks include resetting the bearings, new joint seals, some structural plating and painting. The piers will also need some work. He estimated the total cost at about $500,000.

On a scale of 1 to 10 in regard to effort and cost, he rated this bridge a 3 due to the modest amount of work needed to preserve it.
096B00001N plan, 1935

096B00001N photo
Fourth Street Bridge over the Licking River (059B00037N)

Kenton County

Built in 1936 and referred to as the Veterans Memorial Bridge, this bridge is comprised of a polygonal Warren through truss with verticals, two Warren deck truss spans, and 11 girder spans. It is a unique bridge, but one of ten statewide that utilize the polygonal Warren through truss and one of ten non-Cantilever bridges utilizing a Warren deck truss. The bridge is 1002 feet long and its maximum span length in 250 feet. It is functionally obsolete due to its deck width of 36 feet. In 2012, its ADT was 16,100. Its projected ADT by 2031 is 21735. It appears eligible for the National Register.

On the NBI, The deck, superstructure and substructure are each rated respectively 6, 5, and 5. The channel and channel protection are rated 7. These numbers suggest repair is feasible. Last inspected in February 2012, its sufficiency rating was 48.3. The operating rating is 40 tons and the inventory rating is 23 tons. The bridge is open with no restrictions.

On the KYTC bridge report, the condition state data for the elements indicates that the truss top is in condition state 1 and 2. However 125 feet of the truss bottom is in condition state 3 and 4. Fifty percent of the length of the stringers is in condition state 3 and 4. Most of the pier walls and abutments are in condition state 1 and 2.

According to Mr. Seiter, this bridge will be preserved and is scheduled for painting and structural repairs including steel repairs throughout truss spans 2, 3 and 4. Some stringers and gusset plates will be repaired or replaced. The bridge will receive a new deck and sidewalk heaving issues will be addressed.

He estimated the total cost at about $2.5 million and replacement cost at $6 million.

On a scale of 1 to 10 in regard to effort and cost, he rated this bridge a 4 or 5.
059B00037N plan, 1934
Recommended for Preservation by Mr. Seiter

KY 8 over Twelve Mile Creek (019B00003N)

Campbell County

This Parker through truss bridge was designed in 1946 by the Department of Highways. It is one of 15 bridges statewide that utilize a Parker through truss. It retains a decorative concrete railing and has a maximum span length of 147 feet. The approach spans are two 45-foot long reinforced concrete deck girders. It appears eligible for the National Register.

On the NBI, The deck, superstructure, and substructure are each rated respectively 6, 4, and 4. The channel and channel protection are rated 6.

Mr. Seiter said that this bridge can be retrofitted. A number of structural repairs need to be made along with painting. He thought it could be done for approximately $500,000.

On a scale of 1 to 10 in regard to effort and cost, he rated this bridge a 4.
Truss Bridges Selected for Assessment in District 7

In District 7, bridge 040C00029N (Old US 27 over the Kentucky River) is standing; but has been closed since 1998. It is not being inspected.

Interview with Michael Vaughn, Bridge Engineer, on January 19, 2012.

Meadowbrook Road over Muddy Creek (076C00015N)

Madison County

This bridge is a 108-foot single-span Warren through Truss with verticals that is the last truss bridge remaining in use in Madison County. It is one of nine Warren through truss bridges remaining statewide. It most likely predates its inventoried date of 1930. It is a converted railroad bridge with pin connections and is categorized as functionally obsolete due to its narrow width and one lane. However, its ADT in 2006 was 444 vehicles with only a small projected increase in ADT to 562 in 2026. Its condition ratings are as follows: deck is rated 6, superstructure is rated 5, substructure is rated 6, and the channel and channel protection is rated 6. Inspected in March of 2011, its sufficiency rating was 42.10. The rating for scour is a 4, which indicates a possible problem. It appears eligible for the National Register.

The operating rating is 23 tons and the inventory rating is 15 tons.

According to the KYTC bridge inspection report, the vast majority of bridge elements are in condition state 1 and 2. Most of the problem areas are described as minor. Many involve rust, which can be treated by painting. Mr. Vaughn said that the wooden abutment caps, which are described as rotting, splitting and cracking, can be replaced with concrete. The failed open expansion joint can be replaced. The moveable bearings can be sand blasted and painted. The pourable joint seals can be resealed. He was not concerned about the minor cracking on the deck and curbs.

Overall he said the bridge has few issues. He expressed some concern for the scour rating and said it should be looked into. He added that if there is an issue with scour, it can be addressed.

On a scale of 1 to 10 in regard to effort and cost with 10 indicating the greatest level of effort and cost to preserve, he rated this bridge a 3 and said none of its problems are major.
Deep Creek Rd. over Chaplin River (084C0013N)

Mercer County

Built in 1915 by the Empire Bridge Company of Lexington, Kentucky the bridge is a combination 120-foot long Pratt through truss with a 64-foot long Bedstead/Bedpost approach span. There are also three I-beam approach spans. It is eligible for the National Register under Criterion A and C and is one of two examples of a Bedstead truss with pin connections in Kentucky. There are 30 bridges that utilize a Pratt through truss, but this is the only bridge in Kentucky that uses a Pratt and Bedstead truss. With an 11 foot deck, it is on a local road and categorized as functionally obsolete. However, its ADT in 2006 was only 186 vehicles and its projected traffic volume in 2026 is only 296.

The superstructure is rated 4, while the deck and substructure are rated 5 and the channel and channel protection are rated 5. Last inspected in August 2011, the bridge is said to be structurally deficient and its sufficiency rating is 0.00.

Both the operating and the inventory rating are listed as 3 tons, which means the bridge can handle cars and pick-ups, but no larger trucks. The bridge is posted for 3 tons. Mr. Vaughn said that the key to preserving this bridge is the amount of weight that the bridge will carry. It can be preserved if the low rating of 3 tons is acceptable. In his opinion, if the load rating is not from deterioration then it is possible to strengthen the floor beam, stringers or truss and restore to structural adequacy.

At this time many of the bridge elements are in a condition state of 3. However, more than 80 percent of the truss bottom and truss top is in condition state 2, as is the paint on the floor beam. The open grid, steel deck is a condition 3.

The KYTC Bridge Inspection Report lists some specific problems that can be treated. The floor beams with minor rust can be painted, as can the moderate surface rust on the stringers. If the members are undersized they can be strengthened or replaced.

The problems with the pin connections will be expensive to repair, if the pins must be replaced; but the pins are probably paintable to keep from getting worse. The loose bolts can be replaced.

On span 4, the vertical post 2 is twisted and bowed. It can be replaced if the low operating rating is kept. Loose bolts need to be tightened or replaced. This retrofit or the addition of steel support could change the look of the bridge.

Metal piers are probably paintable to keep from getting worse. Mr. Vaughn said the old dry stone abutments with minor to moderate cracking and minor to moderate spalling in the concrete face are repairable.

On a scale of 1 to 10 in regard to effort and cost, he rated this bridge a 6, provided an operating rating of 3 tons is acceptable.
Weisenberger Mill Rd. over South Elkhorn Creek (120C00006N)

Woodford County

Built in 1930, this bridge is located next to the historic Weisenberger Mill. A good example of a Pratt pony truss, it is a 72-foot long single span with stone abutments. It is one of 18 Pratt pony truss bridges remaining statewide. It is functionally obsolete due to its deck width of 12.1 feet. In 2006, its ADT was 602. Its projected ADT by 2026 is also 602. It appears eligible for the National Register.

The deck, superstructure and substructure are each rated 5 on the NBI. The channel and channel protection are rated 6. These numbers suggest repair is feasible. Last inspected in December 2011, its sufficiency rating was 36.40. The operating and inventory ratings are posted at 15 tons.

On the KYTC bridge report, the condition state data for the elements indicates that the truss top is in condition state 2. However the truss bottom is in condition state 3 and 4, as are the stringers. Twenty-five percent of the abutment is in condition state 4.

Mr. Vaughn indicated that the bridge needed a lot of work. He added that it may be necessary to lower the load rating from 15 tons. He stated that the lower chord problems had to be fixed. The stringers may need to be replaced but to do so will require taking the truss off. Regarding the heavy rust with major section loss in some of the bottom truss members at the splice areas, he said the members were fixable but it would be expensive. Fixing the floor beams might require the addition of plates. The batten plates can be repaired. A new deck may also be needed. The bearings can be replaced or sand blasted and painted. Work will be needed on the northwest side of abutment 2. The bridge and railing will require painting. He believes the abutments have been damaged by flood waters and if nothing is done eventually flooding and potential scour could compromise the stability of the abutments. This issue should be addressed and it will require some spending.

At this time this bridge is under design for replacement.

On a scale of 1 to 10 in regard to effort and cost, he rated this bridge a 9 due to the amount of work needed to preserve it.
KY3042 over Dix River near Herrington Lake (011B000005N)

Boyle County

Built in 1924 and reconstructed in 1961, this three-span bridge is an iconic example of a Baltimore truss, one of only three remaining in the state if the closed Broadway Bridge in Frankfort and closed KY 840 bridge in Harlan County are counted. Otherwise, it is the last Baltimore through truss bridge remaining in use in Kentucky. Referred to as the Chenault Bridge, it was built by F. K. Ketler and Co. The ADT in 2010 was 1030 vehicles. Its ADT is projected to rise to 1256 by 2030. The roadway width is 20 feet curb to curb. The bridge appears to be functionally obsolete due to its load carrying capacity and width. It appears eligible for the National Register.

Its condition ratings for deck, superstructure and substructure are all a 4 and the bridge is rated on the NBI as structurally deficient with a sufficiency rating of only 13. Its channel and channel protection ratings are rated 7; but its scour rating is a 3, which indicates a problem with scour. The operating rating is 25 tons and the inventory rating is 15 tons. But the KYTC Bridge Inspection Report indicates that it is field posted for 3 tons, which limits its service to cars and pickups.

According to the KYTC Bridge Inspection Report, there are no problems with the stringers, which were installed in 1995. There are substantial amounts of section loss on the truss bottom and top. The truss bottom has condition ratings of 3 for approximately 85 percent and 4 for approximately 15 percent of structure. The entire truss top has a condition state rating on the KYTC Inspection Report of 3. The steel floor beam is in condition state 2 and 3; but much work is needed on rivets, bolts, gusset plates, and other elements. Coverplates will be needed to address extensive section loss.

The asphalt on the deck is broken up and potholes need patching. The joint seals need replacing. There is much rust and preservation will require a lot of painting.

Mr. Vaughn said there was a need for extensive repair and retrofit for most members and to address section loss. An end post would have to be replaced. Repair of section loss and painting will both be expensive. He believes that a full retrofit to increase load capacity from its current level of 3 tons would cost $1.5 million.

It would, however, be less expensive if the bridge is preserved for 3 tons, which is possible because trucks use a newer road. In that case, painting with some retrofit would preserve the bridge. He thinks the bridge can be closed to all traffic and turned into a pedestrian/recreation facility, which would further decrease the need for maintenance work.

On a scale of 1 to 10 in regard to effort and cost, he rated this bridge a 10.
011B00005N repair plan, 1949
KY974 over Upper Howard Creek (025B00089N)

Clark County

Built in 1945 and reconstructed in 2006, this bridge is a single span polygonal Warren pony truss and is one of four remaining in the state. It is supported on stone abutments. In 2010, its ADT was 189 vehicles and is projected to increase to only 230 by 2030. The bridge is functionally obsolete due to its narrow width—13.8 feet, curb to curb. The operating rating is 22 tons and the inventory rating is 20 tons. There is no posting. Mr. Vaughn said the bridge can safely handle its current level of traffic. It appears eligible for the National Register.

Its sufficiency rating is 52.4, with an NBI condition rating for the deck of 7, for the superstructure a rating of 6, for the substructure a rating of 6, and for the channel and channel protection a rating of 6.

The bridge was recently painted and is in good condition. Inspected in September 2011, all its elements were said to be in condition state 1. It was noted that there are moderate vertical cracks in the caps of both abutments and abutment number 1 has some minor scour along the wingwall. There was also some minor scour at abutment number 2. In addition, a diagonal on the upstream side was damaged by a traffic impact, which has led to some minor rust.

Mr. Vaughn said the bridge requires no work at this time. On a scale of 1 to 10 in regard to effort and cost, he rated this bridge a 1.
Fayette County

Built in 1937, this bridge is a one-lane, 80.1 foot long polygonal Warren pony truss with verticals. It has a beam approach span. It is one of four polygonal Warren pony trusses remaining statewide. It is located within the Boone Creek Rural Historic District. In 2006, its ADT was 364 vehicles and that is projected to increase to 473 by 2026. The bridge is structurally deficient. The operating rating is 3 tons and the inventory rating is 3 tons. There is a posting for load. It appears eligible for the National Register.

Its sufficiency rating is only 7.60, with an NBI condition rating for the deck of 4, for the superstructure a rating of 4, for the substructure a rating of 3, and for the channel and channel protection a rating of 6.

Mr. Vaughn described the alignment as horrible due to a sharp curve. The city of Lexington is handling the design of the new bridge. If the bridge is not replaced, it will need a new floor system with all new stringers and beams. He thought that the new design would widen the bridge and re-use the trusses to preserve the appearance of a truss bridge. However, at this time the bridge is being rehabilitated and is currently under construction with work by LFUCG.
KY-2328 over Kentucky River Near Clays Ferry (034B00010N)

Fayette County

Built in 1871 and reconstructed in 1955 and again in 2005, this bridge is a two span, one lane Warren through truss with a structure length of 442.9 feet. It is one of nine Warren through truss bridges remaining in the state. It is also the second oldest truss bridge in Kentucky. The structure may be composed of wrought iron, the use of which predates steel in bridge construction. It is supported by stone and concrete piers and abutments. It is National Register listed. In 2011, its ADT was 1570 vehicles and is projected to increase to 1918 by 2031. The bridge is functionally obsolete. The operating rating is 15 tons and the inventory rating is 15 tons.

Its sufficiency rating is 46.10, with an NBI condition rating for the deck of 7, for the superstructure a rating of 7, for the substructure a rating of 7, and for the channel and channel protection a rating of 6.

Mr. Vaughn said that this bridge was restored in 2005; so it does not need repair work at this time. It has a new deck and was cleaned and painted. He noted one problem: the center pier catches debris. He said this bridge is a 1 or 2 on the rating scale.
034B00010N repair plan, 1934
Truss Bridges Selected for Assessment in District 8

Goochtown Road over Caney Creek (100C00033N)

Pulaski County

Built in 1935, this single span Warren pony truss bridge is 64.0 feet long. It is one of five Warren pony truss bridges left statewide. Last inspected in August 2011, the bridge is described as not deficient. Its ADT in 2011 was 274. Its projected ADT by 2031 is 334. It appears eligible for the National Register under Criterion C.

On the NBI, the deck, superstructure and substructure are each rated respectively 5, 5, and 5. The channel and channel protection are rated 4. Its sufficiency rating is listed at 39.2. The operating rating is 13.0 tons and the inventory rating is 13.0 tons. It is posted for load.

Mr. Coe, the bridge engineer for District 8 said it was possible to preserve this bridge. It needs cleaning and painting of the superstructure with minor structural steel repairs to stringers, floor-beams and gusset connections. It also needs substructure repairs at the bearings, along with some scour countermeasures. The structure could be re-used as a pedestrian bridge.

In regard to cost, he estimated repairs at about $115,000 and replacement at $170,000.

On a scale of one to ten, he rated this bridge an 8.
Ky-92 over S. Fork of Cumberland (074B00007N)

McCreary County

Built in 1941, this is a two span Warren deck truss with verticals. It also has four plate girder approach spans. It is one of ten non-Cantilever bridges statewide that use a Warren deck truss. It retains the original decorative concrete railing. The maximum span is 100.1 feet. Last inspected in February 2012, the bridge is described as not functionally obsolete. Its ADT in 2011 was 1640. Its projected ADT by 2031 is 1968. It appears eligible for the National Register.

On the NBI, the deck, superstructure and substructure are each rated respectively 5, 6, and 6. The channel and channel protection are rated 7. Its sufficiency rating is listed at 54.3. The operating rating is 40.0 tons and the inventory rating is 22.0 tons. It is not posted for load.

Jason Coe, the bridge engineer in District 8 said that it is possible to preserve this structure. It needs painting and cleaning of the superstructure with minor structural steel repairs to floor-beams and bearing devises. It also needs a latex overlay with joint elimination of the full-depth joints over each floor beam and railing repair and minor substructure repairs to patch pier columns and pier caps.

Mr. Coe remarked that he could not imagine this bridge being reused in its entirety, as it has two, super-elevated curves. He added that some of the spans might be reused as part of a smaller structure for county roads or pedestrian routes. Regarding costs he estimated that it would cost $1.1 million to repair the bridge and $2.4 million to build a new one.

On a scale of one to ten, he rated this bridge a 7.
Bridges Selected for Assessment in District 9

CR-1334A over Williams Creek (010C00019N)

Boyd County

Built in 1921 by the Vincennes Bridge Company, this single span Pratt pony truss bridge is 80.1 feet long. It is one of 18 Pratt pony truss bridges statewide. The bridge has been closed to traffic for several years and has not been inspected recently. Described as structurally deficient, its ADT in 2006 was 72. Its projected ADT by 2026 is 72. At this time, the bridge has no deck and is barricaded. It appears eligible for the National Register.

On the NBI, the deck, superstructure and substructure are each rated respectively 1, 1, and 1. The channel and channel protection are rated 1. Its sufficiency rating is listed at 33. The operating rating is 0.0 tons and the inventory rating is 0.0 tons.

Joe Callahan, the bridge inspector, said he does not know if the bridge can be preserved, as it has not had a thorough inspection since being closed. He said the deck was beyond repair and had to be replaced. There is extensive section loss and the bridge will need new stringers and lower chords and retrofits at chord connections.

He could not estimate repair costs due to the lack of recent inspections.

On the scale of one to ten, he said this bridge was probably an 8.
KY 1661 over the Little Sandy River (022B00017N)

Carter County

Built in 1950, this single span polygonal Warren through truss with verticals is 200.1 feet long. It is one of ten bridges of this type statewide. Inspected in March 2012, it is described as not deficient, its ADT in 2011 was 212. Its projected ADT by 2031 is 258. It appears eligible for the National Register.

On the NBI, the deck, superstructure and substructure are each rated respectively 6, 6, and 5. The channel and channel protection are rated 6. Its sufficiency rating is listed at 62.80. The operating rating is 44.2 tons and the inventory rating is 26.5 tons. It has no restrictions.

Mr. Callahan said that the bridge is in good shape and was painted in 2002. He said it could last 20 years in its current condition. But it could use a few minor repairs. The substructure needs some work.

One a scale of one to ten, he rated this bridge a 2 or 3. He did not offer estimates of repair and replacement costs.

022B00017N plan, 1950
View from the approach to abutment

022B00017N photo
EK Railroad Drive (Old Fultz Rd.) over the Little Sandy River (022C00051N)

Carter County

Built in 1873, this former railway bridge is a single span, one lane Pratt through truss, which is 161.9 feet long with a timber deck. It is one of 30 Pratt through truss bridges in the state inventory, but is one of the oldest in the state. Inspected in March 2012, it is described as structurally deficient; its ADT in 2006 was 100. Its projected ADT by 2026 is 100. It has been determined eligible for the National Register under Criteria A and C.

On the NBI, the deck, superstructure and substructure are each rated respectively 3, 5, and 5. The channel and channel protection are rated 6. Its sufficiency rating is listed at 43.80. The operating rating is 18.0 tons and the inventory rating is 18.0 tons. It has no restrictions.

Mr. Callahan said the bridge needs a new deck and it needs painting along with some minor repairs to truss and abutments. He thought it would be converted into a pedestrian trail.

On a scale of 1 to 10, he rated this bridge a five. He said it would cost $500,000 to repair the bridge and a $1 million to replace it.
EK Railroad Drive over the Little Sandy River (022C00052N)

Carter County

Built in 1873, this former railway bridge is a single span, one lane Pratt through truss, which is 161.9 feet long with a timber deck. It is one of 30 Pratt through truss bridges remaining statewide. It originally carried rail traffic on the Eastern Kentucky Railroad. Inspected in April 2012, it is described as structurally deficient. Its ADT in 2006 was 100. Its projected ADT by 2026 is 100. It has been determined eligible for the National Register.

On the NBI, the deck, superstructure and substructure are each rated respectively 4, 5, and 5. The channel and channel protection are rated 6. Its sufficiency rating is listed at 45.90. The operating rating is 18.0 tons and the inventory rating is 18.0 tons. It has no restrictions.

Mr. Callahan said the bridge needs a new deck and it needs painting along with some minor repairs to truss and abutments. He thought it would be converted into a pedestrian trail.

On a scale of 1 to 10, he rated this bridge a five. He said it would cost $500,000 to repair the bridge and a $1 million to replace it.
EK Railroad Drive over the Little Sandy River (022C00053N)

Carter County

Built in 1873, this former railway bridge is a single span, one lane Pratt through truss, which is 157.15 feet long and has a timber deck. It is one of 30 Pratt through truss bridges in the state database. Inspected in April 2012, it is described as structurally deficient. Its ADT in 2006 was 100. Its projected ADT by 2031 is 100. It has been determined eligible for the National Register.

On the NBI, the deck, superstructure and substructure are each rated respectively 4, 5, and 5. The channel and channel protection are rated 6. Its sufficiency rating is listed at 45.90. The operating rating is 18.0 tons and the inventory rating is 18.0 tons. It has no restrictions.

Mr. Callahan said the bridge needs a new deck and it needs painting along with some minor repairs to truss and abutments. He thought it would be converted into a pedestrian trail.

On a scale of 1 to 10, he rated this bridge a five. He said it would cost $500,000 to repair the bridge and a $1 million to replace it.
CR 1206 over the Little Sandy River (032C00032N)

Elliot County

Built in 1930, this bridge is a single span Parker through truss, which is 208.33 feet long. There are 15 bridges statewide that utilize a Parker through truss. Inspected in September 2011, it is described as structurally deficient. Its ADT in 2006 was listed as 0. Its projected ADT by 2026 was also listed as 0. It was said to be possibly eligible for the NR or is in a state or local historic register. There is a new bridge nearby and Mr. Callahan said that this bridge carries light traffic. This bridge appears eligible for the National Register under Criterion C. On the NBI, the deck, superstructure and substructure are each rated respectively 5, 4, and 7. The channel and channel protection are rated 6. Its sufficiency rating is 42.50. The operating rating is 15.0 tons and the inventory rating is 15.0 tons. It is posted for load.

Mr. Callahan said that the bridge needs new stringers and some new beams. It will need to be painted and will need new plates or retrofitting. He considered the bridge to be a good candidate for preservation due to the mountain heritage of its location and the adjacency of a boat ramp.

On a scale of 1 to 10, he rated this bridge a 7. He said it would cost $750,000 to $1,000,000 to repair.
KY 3306 (Tunnel Branch Road) over the Little Sandy River (045B00063N)

Greenup County

Built in 1868 and reconstructed in 1990, this bridge is a one-lane, single span double intersection Pratt through truss, or Whipple truss, which is 157 feet long. It is the oldest truss bridge in Kentucky and may be composed of wrought iron, a material which predates steel for truss bridge construction. It is one of two Whipple truss bridges remaining in use on the state system. There is an additional Whipple truss bridge in Frankfort over Benson Creek that is used as a pedestrian crossing. Inspected in September 2011, it is described as functionally obsolete. Its ADT in 2011 was listed as 215. Its projected ADT by 2031 was also listed as 262. It is listed on the National Register of historic places.

On the NBI, the deck, superstructure and substructure are each rated respectively 7, 5, and 6. The channel and channel protection are rated 6. Its sufficiency rating is listed at 41.90. The operating rating is 22.0 tons and the inventory rating is 15.0 tons. It is not posted for load.

Mr. Callahan said that the bridge was last painted in 1990 and needs to be repainted. He thought the section loss could be repaired with painting. Some rivets need to be replaced and the bridge needs to be cleaned.

On a scale of 1 to 10, he rated this bridge a 2 or 3. He did not estimate the cost of repair.
View from the approach to abutment

045B00063N photo
KY 1215 (Bennet’s Mill/Brown Cover Bridge) over Tygart’s Creek (045B00085N)

Greenup County

This is a wood truss covered bridge that was originally built in 1855 and was reconstructed in 2003. It is a two-lane, single-span Wheeler truss and is the sole remaining example of this truss type in the United States. It is 159.12 feet long with pin connections and has a cut stone substructure. Inspected in September 2011, it is described as not deficient. Its ADT in 2011 was listed as 111. Its projected ADT by 2031 was listed as 135. It is listed on the National Register of Historic Places.

On the NBI, the deck, superstructure and substructure are each rated respectively 7, 7, and 7. The channel and channel protection are rated 7. Its sufficiency rating is listed at 19.90. The operating rating is 3.0 tons and the inventory rating is 3.0 tons. It is posted for load.

Mr. Callahan said that this bridge was restored in 2003 and is in good condition. It needs minor repair work. He rated the work as a 1 or 2 on the 1 to 10 scale of difficulty.
Dixon Pike over Licking River (081C00018N)

Mason County

Built in 1935, this is a single span polygonal Warren pony truss with verticals and is one of four bridges of this type in the state. The bridge is 91.0 feet long. Inspected in March 2012, it is described as structurally deficient. Its ADT in 2011 was listed as 97. Its projected ADT by 2031 is listed as 118. The bridge appears eligible for the National Register under Criterion C.

On the NBI, the deck, superstructure and substructure are each rated respectively 4, 4, and 4. The channel and channel protection are rated 6. Its sufficiency rating is listed at 26.5. The operating rating is 6.0 tons and the inventory rating is 6.0 tons. It is posted for load.

Mr. Callahan said the bridge needs to be restored with new floor beams, a new deck and stringers, and some plates and rivets. The stone abutments also need minor repairs. When repaired, it will be able to carry 18.0 tons.

He rated the work as a 7 or 8 on the 1 to 10 scale of difficulty. He estimated that the bridge would cost $500,000 to repair and the same amount to replace.
Davis Lane over the North Fork of the Licking River (081C00022N)

Mason County

Built in 1918 by the Toledo Bridge Company, this bridge is a one-lane, single span Pratt through truss, which is 118.1 feet long and pin-connected. It is supported on stone abutments. It is one of 30 Pratt through truss bridges remaining statewide. Inspected in December 2011, it is described as structurally deficient. Its ADT in 2011 was listed as 64. Its projected ADT by 2031 was also listed as 78. On the NBI, the bridge is considered possibly eligible for the NR or is on a state or local historic register. But it was considered ineligible in 1996.

On the NBI, the deck, superstructure and substructure are each rated respectively 7, 4, and 6. The channel and channel protection are rated 6. Its sufficiency rating is listed at 22.50. The operating rating is 9.0 tons and the inventory rating is 9.0 tons. It is posted for load.

Mr. Callahan said that this bridge was recently rehabbed by the county which replaced the stingers and deck and painted it. He was of the opinion that the bridge could last 20 years with some spot painting to control rust. He added however that some of the previous welding may be an issue.

On the 1 to 10 scale, he rated this bridge a 2 or 3.

081C00022N repair plan, 1967
View of the west 9 ton posting sign.

081C00022N photo
Old US 68 Connector over Licking River (091C00024N)

Nicholas County

Built in 1917, this bridge is a two-lane, two-span Pratt through truss, which has two 122 foot long spans. It is one of 30 bridges statewide that utilize a Pratt through truss. It is supported by a stone pier and abutments. Inspected in May 2012, it is described as structurally deficient. Its ADT in 2006 was listed at 215. Its projected ADT by 2026 was also listed as 215. This bridge is closed to traffic. It appears eligible for the National Register.

On the NBI, the deck, superstructure and substructure are each rated respectively 1, 1, and 1. The channel and channel protection are rated 1. Its sufficiency rating is listed at 15.70. The operating rating is 0.0 tons and the inventory rating is 0.0 tons. Again, the bridge is closed.

Mr. Callahan said the bridge is in danger of collapse and would be too expensive to save. Moreover, there is a new bridge next to it, which is the reason there have been no complaints about its closing. Among the repairs or replacements needed, he listed the lower chord connection points, the stringers, the floor beams, the abutments, and painting. He estimated a total cost of $1 million to repair the bridge and observed that the retrofit would greatly alter the bridge.

On the 1 to 10 scale, he rated this bridge a 9.
Additional truss bridges in District 9 that might be good candidates for preservation

(068C00007N)

Mr. Callahan identified two additional bridges in District 9 that could be preserved. The city of Vanceburg owns a bridge (068C00007N) that he described as having abutments in good condition. It is a three span Pratt pony (one span) and Pratt half-hip pony (two spans) truss bridge.
A bridge in Garrison, Kentucky (068B00003N) that is on the replacement list could in his opinion be saved. It is a two span Pratt through and one span Parker through truss combination bridge. It has three truss spans and needs painting along with some structural repairs and work on the lower chords. The condition ratings for the deck, superstructure, and substructure are 5, 5, and 6, respectively. That for the channel is 6. The sufficiency rating is 26.5. It is not posted for load.

He rated the work effort needed to save it as a 4 or 5. Both appear eligible for the National Register.
Truss Bridges Selected for Assessment District 10

KY 399 over Kentucky River at Heidelberg (065B00016N)

Lee County

Built in 1968, this bridge is a single span polygonal Warren truss with verticals built by the Commonwealth of Kentucky. The bridge has two approach spans constructed of wide flange beams. It is one of ten bridges of this type remaining statewide. The maximum span is 288.1 feet. Last inspected in October 2011, the bridge is evaluated as not deficient. Its ADT in 2011 was 413. Its projected ADT by 2031 is 495. The bridge appears eligible for the National Register under Criterion C.

On the NBI, the deck, superstructure and substructure are each rated respectively 7, 7, and 7. The channel and channel protection are rated 7. Its sufficiency rating is listed at 50.70. The operating rating is 25.0 tons and the inventory rating is 15.0 tons. It is not posted for load.

Doug Watts, the bridge engineer in district 10 described this bridge as being in good shape. It only needs regular maintenance. He estimated replacement costs at $6 million.

On a scale of one to ten, he rated this bridge a 1.
KY 1812 over Quicksand Creek (013B00012N)

Breathitt County

Built in 1929, this bridge is a two span Pratt pony truss. The maximum span is 100.1 feet. It is one of 18 bridges statewide that utilize a Pratt pony truss. It was designed by the State Highway Department. Last inspected in July 2010, the bridge is evaluated as functionally obsolete. Its ADT in 2011 was 2060. Its projected ADT by 2031 is 2472. This bridge appears eligible for the National Register under Criterion C.

On the NBI, the deck, superstructure and substructure are each rated respectively 7, 5, and 5. The channel and channel protection are rated 6. Its sufficiency rating is listed at 61.40. The operating rating is 42.0 tons and the inventory rating is 35.1 tons. It is not posted for load.

Mr. Watts said that the bridge needs some structural rehabilitation, which would include new bracing and a few plates along with spot painting. He estimated the repair costs at $200,000 and the replacement cost at $500,000.

On a scale of one to ten, he rated this bridge a 4.
Looking south

013B00012N photo
KY 3193 over the North Fork of the Kentucky River (013B00044N)

Breathitt County

Built in the early 1900s or possibly even late 1800s, this bridge is a single span Whipple through truss with two approach spans, one of only two left in use in the state. It is supported on cut sandstone piers. The bridge originally served as a railroad bridge on the C & O railroad line from Jackson to Index. It was extensively repaired and raised in 1956. The maximum span is 188.0 feet. Last inspected in Jan. 2012, the bridge is evaluated as structurally deficient. Its ADT in 2011 was 409. Its projected ADT by 2031 is 498. The bridge is eligible for the National Register under Criteria A and C.

On the NBI, the deck, superstructure and substructure are each rated respectively 6, 4, and 4. The channel and channel protection are rated 5. Its sufficiency rating is listed at 23.10. The operating rating is 25.0 tons and the inventory rating is 15.0 tons. It is not posted for load.

Mr. Watts said the bridge needs some work including painting, replacement of some pins, and a reset of the bearings. The substructure masonry also needs work. He estimated the repair costs at $2,000,000 and the replacement cost at $5,000,000.

On a scale of one to ten, he rated the bridge a 2.
Robinson Rd. over the North Fork of the Kentucky River (013C00039N)

Breathitt County

Built in 1914, this bridge consists of an 89.9 ft. Camelback through truss with a Pratt Pony truss and I-beam approach span. It is supported on concrete abutments and steel encased tubular concrete piers. The bridge was raised and repaired in 1944 and 1950. The bridge provides the only access in and out of the Quicksand community, a historic logging camp now used by UK as a forestry research station. The bridge was originally built to carry the railroad. It is one of six Camelback through truss bridges in the state and one of 18 utilizing the Pratt pony truss. Last inspected in July 2011, the bridge is evaluated as structurally deficient. Its ADT in 2006 was 129. Its projected ADT by 2026 is 498. The bridge has been determined eligible for the National Register under Criterion A and C.

On the NBI, the deck, superstructure and substructure are each rated respectively 5, 3, and 5. The channel and channel protection are rated 7. Its sufficiency rating is listed at 7.40. The operating rating is 3.0 tons and the inventory rating is 3.0 tons. It is posted for load.

Mr. Watts said the bridge has been retrofitted but needs a great deal of work, which will require taking the bridge apart. It will need work on the lower chords and replacement of the floor beams. It will also need work on the four corner panel points in addition to painting.

On a scale of one to ten, he rated the bridge a 9.

The district is proceeding with replacement because of deteriorating conditions. The project was let to construction in December 2012 for $1,800,000.
KY 451 over the CSX RR at the N. Fork of the Kentucky River (097B00016N)
Perry County

Built in 1927 by the St. Louis Structural Steel Company for the Kentucky Department of Highways, this bridge utilizes two Parker through truss spans. It is one of 15 bridges statewide that use the Parker through truss. The maximum span is 134.8 feet. Last inspected in April 2012, the bridge is evaluated as structurally deficient. Its ADT in 2011 was 2380. Its projected ADT by 2031 is 2856. The bridge appears eligible for the NR under Criterion C. On the NBI, the deck, superstructure and substructure are each rated respectively 3, 5, and 6. The channel and channel protection are rated 7. Its sufficiency rating is listed at 0.00. The operating rating is 3.1 tons and the inventory rating is 3.1 tons. It is posted for load.

Mr. Watts said that the main problem with this bridge is the deck and with a new deck its operating rating would go up to 20 tons from its current 3.1 tons. It also needs painting and several plates. With these repairs it will last at least 20 years. He said it would cost $2.5 million to repair; but did not offer an estimate of the replacement cost. On a scale of 1 to 10, he rated this bridge a 3.
Kenmont Road over the North Fork of the Kentucky River (097C00005N)

Perry County

Built in 1926 by the Atlantic Bridge Company and the only surviving one by that company in the state, this bridge is a two span Pratt pony truss. It is one of 18 bridges statewide that utilize the Pratt pony truss. The maximum span is 100.1 feet. Last inspected in April 2012, the bridge is evaluated as structurally deficient. Its ADT in 2006 was 648. Its projected ADT by 2026 is 783. The bridge appears eligible for the National Register.

On the NBI, the deck, superstructure and substructure are each rated respectively 5, 5, and 5. The channel and channel protection are rated 7. Its sufficiency rating is listed at 35.30. The operating rating is 13.0 tons and the inventory rating is 13.0 tons. It is posted for load.

Mr. Watts said that the bridge needs painting and a new deck. It is also necessary to replace bearings and some plates. He estimates that it would cost $4 million to repair and $5 million to replace with a concrete bridge that could carry a much heavier load.

The bridge is used by coal trucks that weigh more than the operating rating. For this reason he thinks a bridge failure is a real possibility. The coal trucks use it because the bridge is next to a coal tipple and the alternative route to the highway has a sight distance problem when entering the highway. Fast moving cars could collide with the trucks as they enter the highway.

On a scale of 1 to 10, he rated this bridge an 8 or 9 to repair.
KY 77 over Red River (099B00029N)

Powell County

Built in 1935, this bridge is a two span Pratt through truss. It is one of 30 bridges of this type statewide. The maximum span is 126.0 feet. Last inspected in April 2012, the bridge is evaluated as not deficient. Its ADT in 2001 was 253. Its projected ADT by 2031 is 303. The bridge appears eligible for the NR.

On the NBI, the deck, superstructure and substructure are each rated respectively 5, 7, and 6. The channel and channel protection are rated 7. Its sufficiency rating is listed at 42.90. The operating rating is 22.0 tons and the inventory rating is 15.0 tons. It is not posted for load.

Mr. Watts said that the bridge was recently painted and is in good condition. All it needs is routine maintenance.

On a scale of 1 to 10, he rated it a 1.

099B00029N plan, 1935
Truss Bridges Selected for Assessment in District 11

KY 72 over Clover Fork of Cumberland River (048B00051N)

Harlan County

Built in 1924, this is a Baltimore truss built by the Vincennes Bridge Company of Vincennes, Indiana for the Department of State Roads and Highways. It is one of three remaining Baltimore trusses and one of two that are currently closed to traffic. It is the last remaining highway truss bridge in Harlan County. It is located near the Coal Monument in Baxter, KY, an obelisk made of cut coal blocks on a concrete base. There were two other Baltimore truss bridges built by Vincennes around the same time in Harlan County, but they no longer exist. It consists of two 149.9 feet long spans. Last inspected in August 2011, the bridge is described as structurally deficient and has been closed since the 1990s. Its ADT in 2011 was 1130. Its projected ADT by 2031 is 1378. It appears eligible for the National Register. The annual inspections of this bridge look only to see that the barricades are up and the bridge remains impassable to traffic. In reality, the bridge has not had a thorough inspection since its closing.

On the NBI, the deck, superstructure and substructure are each rated respectively 3, 0, and 5. The channel and channel protection are rated 5. Its sufficiency rating is listed at 2.0. The operating rating is 0.0 tons and the inventory rating is 0.0 tons. It is not posted for load.

Mike West, the bridge engineer for District 11, said the bridge was closed because it is not safe for vehicles and there is a four lane bridge nearby. The stringers and bottom chords need work, including plates and paint. He said the bridge is close to Harlan and the county has shown interest in turning it into a foot bridge. He estimated a cost of $750,000 to repair and paint for vehicle travel.

On a scale of one to ten, he rated this bridge an 8 to make it suitable for vehicles and 5 or 6 if it is turned into a pedestrian bridge. Rehabilitation for vehicles seems unlikely as the original road has been bypassed.
048B00051N photo
Old Highway 25 over Laurel River (063C00036N)

Laurel County

Built in 1925, this is a single span Pratt deck truss and the only one of this subtype in the state. It has pin connections and wet stone abutments. It originally had a decorative fence-type concrete railing, but this has been partially replaced. The length of the single span is 84.0 feet. Last inspected in August 2011, the bridge is not deficient. Its ADT in 2006 was 63. Its projected ADT by 2026 is 115. It appears eligible for the National Register. On the NBI, the deck, superstructure and substructure are each rated respectively 6, 6, and 6. The channel and channel protection are rated 6. Its sufficiency rating is listed at 74.0. The operating rating is 18.0 tons and the inventory rating is 18.0 tons. It is not posted for load.

Mike West, the bridge engineer for District 11, said the bridge was in good condition and only needs spot cleaning and painting. He would lubricate the connections. He recommended pressure washing and marine grease to control rusting. He said painting the bridge would cost about $250,000 but pressure washing and marine grease would only cost $50,000. On a scale of one to ten, he rated this bridge a 2.

063C00036N photo
Old Mountain Ash Pike over Clear Creek (118C00027N)

Whitley County

Built in 1917, this bridge is comprised of a pin connected Pratt deck truss and two pin-connected Warren deck trusses. This is the only bridge with this truss configuration in the state and one of only two pin-connected deck truss bridges in the state inspection inventory. The Pratt span is 115.2 feet long and the Warren spans are each 55 feet long. The bridge has been closed and barricaded since the 1980s and likely originally served as a railroad bridge. Last inspected in July 2011, the bridge is described as structurally deficient. Its ADT in 2006 was 300. Its projected ADT by 2026 is 1968. It is eligible for the National Register of Historic Places under Criterion C. It has pin connections and a rough cut stone substructure.

On the NBI, the deck, superstructure and substructure are each rated respectively 0, 4, and 0. The channel and channel protection are rated 0. Its sufficiency rating is listed at 19.50. The operating rating is 0.0 tons and the inventory rating is 0.0 tons. It is closed.

Mike West, the bridge engineer for District 11, said the bridge was closed because the deck is gone and the railings may be gone. The piers need grouting and the truss top is severely corroded. He estimated a cost of $500,000 to repair and paint.

On a scale of one to ten, he rated this bridge a 9, but he thought it may not be preservable at all.
Watts Creek Road over Watts Creek (118C00001N)

Whitley County

Built in 1935 by the Champion Bridge Company, this is a two span bridge comprised of a Pratt pony truss (78.1 feet long) and a Pratt half-hip pony truss (46 feet long) that is closed to traffic and barricaded. It has pin connections. It is the only bridge with this configuration of trusses in the state. It is one of 18 bridges that use a Pratt pony truss and one of 11 that use a Pratt half-hip pony truss, but one of only two that use them in combination. The maximum span is 78.1 feet. Last inspected in June 2011, the bridge is described as structurally deficient. Its ADT in 2006 was 250. Its projected ADT by 2026 is 250. It appears eligible for the National Register.

On the NBI, the deck, superstructure and substructure are each rated respectively 1, 1, and 1. The channel and channel protection are rated 4. Its sufficiency rating is listed at 16.50. The operating rating is 0.0 tons and the inventory rating is 0.0 tons. It is closed. Mike West, the bridge engineer for District 11, said the bridge can be preserved but will require new stringers, a deck, and new grouting. Sections of the superstructure will need replacing and plating is called for. He estimated the cost at $400,000 to $500,000. On a scale of one to ten, he rated this bridge a 6 or 7.

118C00001N photo
Verne Road over Patterson Creek (118C00012N)

Whitley County

This is a single span Pratt half-hip pony with pin connections. It is one of 11 trusses of this type remaining in the state. The official construction date is given as 1947, but the bridge is likely much older based on its connections and appearance. It is 74.1 feet long. Last inspected in July 2011, the bridge is described as structurally deficient. Its ADT in 2006 was 250. Its projected ADT by 2031 is 1968. It appears eligible for the National Register under Criterion C.

On the NBI, the deck, superstructure and substructure are each rated respectively 5, 3, and 5. The channel and channel protection are rated 5. Its sufficiency rating is listed at 16.50. The operating rating is 3.0 tons and the inventory rating is 3.0 tons. Posted for load was recommended but not legally implemented.

Mike West, the bridge engineer for District 11, said the bridge was barely serviceable and is in a replacement program. It has already been re-worked three times. They have strengthened the floor beams by adding bracing and welding. The end posts have been reworked with plates and the bridge has new pins. Still the bridge is not safe because the lower chords must be replaced along with the end posts. “The bottom chord has the potential to fail at any time.” He thought these repairs will change the character of the bridge.

On a scale of one to ten, he rated this bridge an 8 or 9 and estimated a repair cost of $600,000 to $700,000.
118C00012N photo
Bingham Road over Cumberland River (061C00035N)

Knox County

Built in 1905, this is a Parker truss with pins and stone abutments and piers. It has a unique semi-circular portal that is evocative of the Victorian era in which it was built. It has I-beam approach spans of 45 and 49 feet respectively. The maximum span is 210.8 feet. It is one of 15 Parker truss bridges statewide. The bridge was formerly a railroad structure and the stone piers that once supported a parallel structure remain in place next to it. Last inspected in December 2011, the bridge is described as functionally obsolete. Its ADT in 2006 was 119. Its projected ADT by 2026 is 166. It was determined eligible for the National Register in 1996. This determination remains accurate.

On the NBI, the deck, superstructure and substructure are each rated respectively 3, 4, and 5. The channel and channel protection are rated 5. Its sufficiency rating is listed at 18.1. The operating rating is 3.0 tons and the inventory rating is 3.0 tons. It is recommended for posting for load.

Mike West, the bridge engineer for District 11, said the bridge is one of the better ones in district 11, because it is an old, strongly built railroad bridge. It will require new gussets, a new deck and some minor plating. It will also require painting as rust is a problem. He estimated a total cost to preserve, including painting of $400,000 to $500,000 and a replacement cost of $1 million.

On a scale of one to ten, he rated this bridge a 3 or 4.
Truss Bridges Selected for Assessment in District 12

KY 644 over Levisa Fork of the Big Sandy (064B00038N)

Lawrence County

Built in 1904 and rebuilt in 1970, this is a one-lane, three-span Pratt and Warren through truss bridge on rough cut wet stone abutments and piers. It is one of 30 Pratt through truss bridges statewide and one of nine that utilize a Warren through truss. It is the longest pin-connected bridge in Kentucky. The bridge is unique in that it appears to date to at least two building periods and is comprised of two Pratt through truss spans and one Warren through truss span with verticals. The Warren truss span appears to date to a later period and may be a replacement span. The Pratt spans utilize tubular steel beams, a building technique that dates this bridge to earlier than 1904. Both the Phoenix Bridge Company of Phoenixville, PA and the King Bridge Company of Cleveland, Ohio patented tubular beams for bridge construction. The finials on the portals of this bridge are characteristic of bridges built by the Phoenix Bridge Company, the probable builder of this structure. Similar bridges were being constructed elsewhere in the 1880s, the likely period of the Pratt truss spans’ construction. The bridge is 475 feet in total length with a maximum span length of 170.9 feet. Last inspected in January 2012, the bridge is described as functionally obsolete. Its ADT in 2011 was 1300. Its projected ADT by 2031 is 1560. It was determined eligible for the National Register in 1982.

On the NBI, the deck, superstructure and substructure are each rated respectively 7, 7, and 6. The channel and channel protection are rated 7. Its sufficiency rating is listed at 38.80. The operating rating is 8.3 tons and the inventory rating is 8.3 tons. It is posted for load.

Ms. Robin Justice said that this is a unique bridge with tubular steel and good wet-stone masonry. She said it needs painting and a new deck and new plates along with some bearings. Some of the rivets should be replaced with bolts. The substructure is good.

She estimated the cost or repairs to be $500,000 and the cost of replacement to be $1,500,000. On the scale of 1 to 10, she said this bridge was an 8.
Hurts Bridge over Johns Creek (098C00128N)

Pike County

Built in its current location in 1991, but likely older, this is a one-lane, one span Bailey Bridge with two girder spans. The Bailey span is 59.1 feet in length. Last inspected in March 2012, the bridge is described as functionally obsolete. Its ADT in 2006 was 500. Its projected ADT by 2026 is 500. The bridge appears eligible for the National Register.

On the NBI, the deck, superstructure and substructure are each rated respectively 7, 7, and 6. The channel and channel protection are rated 7. Its sufficiency rating is listed at 41.0. The operating rating is 18.0 tons and the inventory rating is 18.0 tons. It is posted for load.

Ms. Justice said that the bridge needs painting and the substructure may need encasing in concrete. She estimated a repair cost of $300,000 and a replacement cost of $600,000. On the 1 to 10 scale, she rated this bridge a 4.
Petty Fork over Long Fork Shelby Creek (098C00121N)

Pike County

Built in its current location in 1982, this is a one-lane, one span Bailey bridge. The span is 36.1 feet in length. Last inspected in March 2012, the bridge is described as not deficient. Its ADT in 2006 was 50. Its projected ADT by 2026 is 50. The bridge appears eligible for the National Register.

On the NBI, the deck, superstructure and substructure are each rated respectively 5, 5, and 5. The channel and channel protection are rated 6. Its sufficiency rating is listed at 41.0. The operating rating is 18.0 tons and the inventory rating is 18.0 tons. It is not posted for load.

Ms Justice said this bridge needs to be painted and cotter pins need replacing. It has some scour problems and will need a new foundation for an abutment. She recommended an aluminum box culvert.

She estimated a repair cost of $150,000 and a replacement cost of $300,000. On the one to ten scale of effort, she rated this bridge a 5.
Harvey Street Bridge (US 119) over Tug Fork of Big Sandy River (098B00001N)

Pike County

Built in 1951, this is a two-lane, one-span polygonal Warren through truss bridge with verticals and two steel approach spans. It is one of ten bridges of this type statewide. The bridge span is 208 feet in length. Last inspected in March 2012, the bridge is described as structurally deficient. Its ADT in 2011 was 8,320. Its projected ADT by 2031 is 12,396. It appears eligible for the National Register.

On the NBI, the deck, superstructure and substructure are each rated respectively 7, 7, and 7. The channel and channel protection are rated 8. Its sufficiency rating is listed at 42.70. The operating rating is 40.0 tons and the inventory rating is 15.0 tons. It is posted for load.

Ms. Justice said this bridge is maintained by West Virginia; but Kentucky shares the maintenance cost. She said it was recently painted, is in good shape, and needs no work. She added that the local residents are committed to taking care of this bridge.

On the 1 to 10 scale she rated this bridge a 1.
KY 588 over N. Fork of Kentucky River (067B00037N)

Letcher County

Built in 1930 by the Commonwealth of Kentucky, this is a two-lane, two-span Pratt through truss with a wet sandstone substructure. It is one of 30 Pratt through truss bridges statewide. The bridge span has two 100-foot long spans. Last inspected in May 2012, the bridge is described as structurally deficient. Its ADT in 2011 was 812. Its projected ADT by 2031 is 990. It appears eligible for the National Register.

On the NBI, the deck, superstructure and substructure are each rated respectively 5, 4, and 5. The channel and channel protection are rated 6. Its sufficiency rating is listed at 29.70. The operating rating is 34.0 tons and the inventory rating is 22.0 tons. It is not posted for load.

Ms. Justice said that this bridge needs to be painted and the deck replaced. It is also necessary to replace some gusset plates and floor beams. The pier caps and the cracks in the substructure need to be repaired. She noted that the community likes this bridge and actively cares for it by for instance landscaping around it. She estimated the repair cost at $600,000 and the replacement cost at $1,200,000. On the 1 to 10 scale this bridge is a 6.
KY 581 over Georges Creek (064B00049)

Lawrence County

Built in 1924 by the Vincennes Bridge Company and reconstructed in 1971, this is a two-lane, one-span Parker pony truss with approach spans. It is the only bridge of this type in the state. The bridge is 100.1 feet long. Last inspected in April 2012, the bridge is described as not deficient. Its ADT in 2011 was 99. Its projected ADT by 2031 is 99. The bridge appears eligible for the National Register.

On the NBI, the deck, superstructure and substructure are each rated respectively 5, 5, and 5. The channel and channel protection are rated 6. Its sufficiency rating is listed at 70.90. The operating rating is 45.6 tons and the inventory rating is 27.4 tons. It is not posted for load.

Ms. Justice said that the floor beams were replaced last year but the bridge needs a new deck and painting. She said that it is listed by the state for replacement because the timber piles will not last 20 years. Ms. Justice estimated that the bridge would cost $1,000,000 to repair and $1,000,000 to replace. On the 1 to 10 scale she rated it a 9.
Billy Lowe Branch over Brushy Fork-John’s Creek (098C00120)

Pike County

Built in its current location in 1982, this is a one-lane, one span Bailey Bridge with a timber deck. The span is 30.8 feet in length. Last inspected in March 2012, the bridge is described as functionally obsolete. Its ADT in 2006 was 50. Its projected ADT by 2026 is 50. It appears eligible for the National Register.

On the NBI, the deck, superstructure and substructure are each rated respectively 6, 6, and 5. The channel and channel protection are rated 7. Its sufficiency rating is listed at 48.5. The operating rating is 33.3 tons and the inventory rating is 20.0 tons. It is not posted for load.

Ms. Justice said the bridge needs painting and a concrete deck. She estimated that it would cost $200,000 to fix and the same amount to replace. On the 1 to 10 scale, she called this bridge a 5 to repair.
KY 777 over Right Fork of Beaver Creek (036B00076N)

Floyd County

Built in 1944, this is a one-lane, one-span Pratt through truss. The span is 97.1 feet long. It is one of 30 bridges statewide that use a Pratt through truss. Last inspected in September 2011, the bridge is described as structurally deficient. Its ADT in 2011 was 1200. Its projected ADT by 2031 is 1464. It has been determined eligible for the National Register.

On the NBI, the deck, superstructure and substructure are each rated respectively 4, 4, and 4. The channel and channel protection are rated 6. Its sufficiency rating is listed at 3.0. The operating rating is 10.0 tons and the inventory rating is 10.0 tons. It is posted for load.

Ms. Justice said that the bridge is under contract for repair. It needs a new substructure, deck, paint, and plating. It also needs some sidewalk repair and grade work.

She estimated the repair cost at $750,000 and the replacement cost at a lower $650,000. On the rating scale, she said it was an 8. As of August 2012, District 12 is working to rehabilitate this bridge.
KY 2557 (Scalf Rd.) over Levisa Fork (036B00040N)

Floyd County

Built in 1920 by the American Bridge Company, this is a one-lane, one-span polygonal Warren with verticals through truss bridge. There are seven steel girder approach spans. It is one of ten bridges of this type statewide. The truss span is 200.0 feet long. Last inspected in January, 2012, the bridge is described as structurally deficient. Its ADT in 2011 was 326. Its projected ADT by 2031 is 387. It was determined eligible for the National Register in 1988.

On the NBI, the deck, superstructure and substructure are each rated respectively 7, 4, and 3. The channel and channel protection are rated 7. Its sufficiency rating is listed at 19.90. The operating rating is 110.0 tons and the inventory rating is 110.0 tons. It is not posted for load.

Ms. Justice said that this is a 700 foot one-lane bridge with a curve in it. The bridge causes back-ups and delays with traffic occasionally backing up to U.S 23. She added that local residents want a 2 lane bridge to eliminate back-ups and delays. She also said that the substructure needs fiber wrapping. The NBI suggests a need to replace the gusset plates and plating in a number of locations. She estimated repair costs at $500,000 for the substructure and replacement by a two lane bridge at $1,200,000. She placed the difficulty level for repair at 7.

036B00040N repair plan, 1947
Appendix 2: Summary Tables for Each District
## District 1 Summary Table

<table>
<thead>
<tr>
<th>Bridge ID</th>
<th>Suf. Rating</th>
<th>Year Built</th>
<th>Historic Rating in First Phase</th>
<th>Bridge Work Effort Rating 1 = easy 10 = difficult</th>
<th>Replace of Preserve</th>
<th>Estimated Cost to Preserve</th>
<th>Historic Qualities</th>
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<td>Preserve</td>
<td>Could last 20 years as is</td>
<td>Only M&amp;P Contract Co. Bridge</td>
</tr>
<tr>
<td>051B00015</td>
<td>39.00</td>
<td>1920</td>
<td>5</td>
<td></td>
<td>Preserve, but on plan for replacement for now</td>
<td>$4,000,000 to $6,000,000</td>
<td>Parker</td>
</tr>
</tbody>
</table>
## District 3 Summary Table

<table>
<thead>
<tr>
<th>Bridge ID</th>
<th>Suf. Rating</th>
<th>Year Built</th>
<th>Historic Rating</th>
<th>Bridge Work Effort Rating</th>
<th>Replace of</th>
<th>Estimated Cost to Preserve</th>
<th>Historic Qualities</th>
</tr>
</thead>
<tbody>
<tr>
<td>071C00023</td>
<td>25.00</td>
<td>1925</td>
<td>0</td>
<td>3.5</td>
<td>Preserve</td>
<td>$600,000 with painting, $80,000 without</td>
<td>Stone abutments, pin connections</td>
</tr>
<tr>
<td>085C00005</td>
<td>25.00</td>
<td>1911</td>
<td>3</td>
<td>2.5</td>
<td>Preserve</td>
<td>$100,000</td>
<td>Camelback with pin connections</td>
</tr>
<tr>
<td>114C00007</td>
<td>16.5</td>
<td>1911</td>
<td>3</td>
<td>5.5</td>
<td>preserve</td>
<td>$500,000 to $800,000</td>
<td>Pratt half-hip pony with pins and stone abutments</td>
</tr>
<tr>
<td>085C00007</td>
<td>24.7</td>
<td>1921</td>
<td>2</td>
<td>9</td>
<td>Replace</td>
<td>Stated it could not be preserved</td>
<td>Vincennes Company</td>
</tr>
<tr>
<td>114C00011N</td>
<td>19.00</td>
<td>1920</td>
<td>4</td>
<td>3</td>
<td>Preserve</td>
<td>Bowstring On NR King Bridge Company</td>
<td></td>
</tr>
<tr>
<td>Bridge ID</td>
<td>Suf. Rating</td>
<td>Year Built</td>
<td>Historic Rating</td>
<td>Bridge Work Effort Rating</td>
<td>Replace or Preserve</td>
<td>Estimated Cost to Preserve</td>
<td>Historic Qualities</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
<td>------------</td>
<td>-----------------</td>
<td>---------------------------</td>
<td>---------------------</td>
<td>---------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>014B00016</td>
<td>74.4</td>
<td>1950</td>
<td>0</td>
<td>4</td>
<td>Preserve</td>
<td>$500,000</td>
<td>Built by highway department</td>
</tr>
<tr>
<td>078B00023</td>
<td>52.9</td>
<td>1923</td>
<td>2</td>
<td>6</td>
<td>Preserve</td>
<td>$500,000</td>
<td>Camelback with stone abutments, Built by Brookville</td>
</tr>
<tr>
<td>050B00004</td>
<td>70.9</td>
<td>1938</td>
<td>1</td>
<td></td>
<td>Preserve</td>
<td>Needs no work due to recent repairs and paint</td>
<td>Eligible for NR, Buckner Bride</td>
</tr>
<tr>
<td>043C00023</td>
<td>19.80</td>
<td>1920</td>
<td>3</td>
<td>10</td>
<td>Replace—bad approach and many bridge elements need replacing</td>
<td>No estimate</td>
<td>Bedpost, eligible for NR</td>
</tr>
<tr>
<td>014B00050</td>
<td>23.40</td>
<td>1922</td>
<td>5</td>
<td>6</td>
<td>Preserve, but needs lot of work on lower truss</td>
<td>$500,000, painted in 2008</td>
<td>Pennsylvania petit, eligible for NR, built by Pan Am Bridge Co</td>
</tr>
<tr>
<td>090C00024</td>
<td>24.10</td>
<td>1904</td>
<td>3</td>
<td>7</td>
<td>Can be preserved but only few use it</td>
<td>$2,500,000 to $3,000,000</td>
<td>Champion Bridge, eligible NR, in Frederickstown Historic district</td>
</tr>
<tr>
<td>043C00024</td>
<td>16.8</td>
<td>1950, but may be older</td>
<td>0</td>
<td>4.5</td>
<td>Preserve, but low traffic and approach problems</td>
<td>$300,000</td>
<td>Warren pony, eligible NR</td>
</tr>
<tr>
<td>109C00015</td>
<td>25.20</td>
<td>1920, rehab in 1990s</td>
<td>0</td>
<td>8</td>
<td>Preserve but cost more than replacement</td>
<td>$1,500,000</td>
<td>Pin connected, Champion Bridge, stone masonry,</td>
</tr>
<tr>
<td>Object ID</td>
<td>Year</td>
<td>Age</td>
<td>Status</td>
<td>Costs</td>
<td>Notes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------</td>
<td>------</td>
<td>-----------</td>
<td>----------------</td>
<td>------------------</td>
<td>-------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>043C00050</td>
<td>1950</td>
<td>0-7</td>
<td>Replace, costs three times as much to preserve</td>
<td>$450,000</td>
<td>Tebbs Bend historic district</td>
<td></td>
<td></td>
</tr>
<tr>
<td>115C00005</td>
<td>1920</td>
<td>0-6</td>
<td>Replace, costs less to replace</td>
<td>$500,000</td>
<td>Only truss in county</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## District 5 Summary Table

<table>
<thead>
<tr>
<th>Bridge ID</th>
<th>Suf. Rating</th>
<th>Year Built</th>
<th>Historic Rating</th>
<th>Bridge Work Effort Rating</th>
<th>Replace of Preserve</th>
<th>Estimated Cost to Preserve</th>
<th>Historic Qualities</th>
</tr>
</thead>
<tbody>
<tr>
<td>106C00047</td>
<td>17.60</td>
<td>1982</td>
<td>5</td>
<td>7</td>
<td>Preserve and move</td>
<td>Dry stone, double single Bailey</td>
<td></td>
</tr>
</tbody>
</table>
## District 6 Summary Table

<table>
<thead>
<tr>
<th>Bridge ID</th>
<th>Suf. Rating</th>
<th>Year Built</th>
<th>Historic Rating</th>
<th>Bridge Work Effort Rating 1 = easy, 10 = difficult</th>
<th>Replace of Preserve</th>
<th>Estimated Cost to Preserve</th>
<th>Historic Qualities</th>
</tr>
</thead>
<tbody>
<tr>
<td>012C00003</td>
<td>23.9</td>
<td>1920</td>
<td>2</td>
<td>Replace, bottom of bridge underwater most of time</td>
<td>Preserve</td>
<td>$500,000</td>
<td>Bowstring pony, on NR</td>
</tr>
<tr>
<td>094B00006</td>
<td>53.7</td>
<td>1942</td>
<td>0</td>
<td>Preserve</td>
<td>$500,000</td>
<td>Parker Monterey Bridge, built by state highway department</td>
<td></td>
</tr>
<tr>
<td>096B00001</td>
<td>47.8</td>
<td>1936</td>
<td>0</td>
<td>Preserve</td>
<td>$500,000</td>
<td>Pratt half-hip,</td>
<td></td>
</tr>
<tr>
<td>059B00003</td>
<td>48.3</td>
<td>1936</td>
<td>4</td>
<td>Preserve</td>
<td>$2,500,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>019B00003</td>
<td>1931</td>
<td>1</td>
<td>4</td>
<td>Preserve</td>
<td>$500,000</td>
<td>Only Pratt in 6</td>
<td></td>
</tr>
</tbody>
</table>
## District 7 Summary Table

<table>
<thead>
<tr>
<th>Bridge ID</th>
<th>Suf. Rating</th>
<th>Year Built</th>
<th>Historic Rating</th>
<th>Bridge Work Effort Rating 1 = easy 10=difficult</th>
<th>Replace of Historic Qualities</th>
<th>Estimated Cost to Preserve</th>
<th>Historic Qualities</th>
</tr>
</thead>
<tbody>
<tr>
<td>076C00015</td>
<td>42.10</td>
<td>1930</td>
<td>0</td>
<td>3</td>
<td>Preserve</td>
<td></td>
<td>Last in-use truss in Madison County</td>
</tr>
<tr>
<td>084C00013</td>
<td>0.00</td>
<td>1915</td>
<td>6</td>
<td>6, if operating rating of 3 tons is acceptable</td>
<td>Preserve, if 3 tons is acceptable</td>
<td></td>
<td>Pin connections, Empire Bridge Co.</td>
</tr>
<tr>
<td>120C00006</td>
<td>36.40</td>
<td>1930</td>
<td>3</td>
<td>9</td>
<td>Preserve</td>
<td>$750,000</td>
<td>Next to Weisenberger Mill, mortared Limestone abutments</td>
</tr>
<tr>
<td>011B00005</td>
<td>13.00</td>
<td>1924, recon in 1961</td>
<td>3</td>
<td>10</td>
<td>Preserve as a pedestrian bridge</td>
<td>If retrofitted for load, the cost would be $1,500,000</td>
<td>Baltimore truss, Chenault bridge, F.K. Ketler and Co.</td>
</tr>
<tr>
<td>025B00089</td>
<td>52.4</td>
<td>1945</td>
<td>0</td>
<td>1</td>
<td>Preserve</td>
<td>Requires no work</td>
<td>Camelback</td>
</tr>
<tr>
<td>034C00010</td>
<td>7.60</td>
<td>1937</td>
<td>5</td>
<td>Replace due to alignment and condition</td>
<td></td>
<td>Warren pony</td>
<td></td>
</tr>
<tr>
<td>034B00010</td>
<td>46.10</td>
<td>1871, recon in 1955</td>
<td>4</td>
<td>1</td>
<td>Preserve</td>
<td>Requires no work</td>
<td>On NR, Clays Ferry Bridge, pin connections, stone abutments</td>
</tr>
</tbody>
</table>
## District 8 Summary Table

<table>
<thead>
<tr>
<th>Bridge ID</th>
<th>Suf. Rating</th>
<th>Year Built</th>
<th>Historic Rating</th>
<th>Bridge Work Effort Rating</th>
<th>Replace of Preserve</th>
<th>Estimated Cost to Preserve</th>
<th>Historic Qualities</th>
</tr>
</thead>
<tbody>
<tr>
<td>100C00033</td>
<td>39.2</td>
<td>1939</td>
<td>2</td>
<td>8</td>
<td>Preserve and perhaps use as Ped. bridge</td>
<td>$115,000</td>
<td>Warren pony</td>
</tr>
<tr>
<td>074B00007</td>
<td>54.3</td>
<td>1941</td>
<td>1</td>
<td>7</td>
<td>Preserve but not in its entirety due to super elevated curves</td>
<td>$1,100,000</td>
<td>Warren deck truss</td>
</tr>
</tbody>
</table>
## District 9 Summary Table

<table>
<thead>
<tr>
<th>Bridge ID</th>
<th>Suf. Rating</th>
<th>Year Built</th>
<th>Historic Rating</th>
<th>Bridge Work Effort Rating 1 = easy 10=difficult</th>
<th>Replace of Preserve</th>
<th>Estimated Cost to Preserve</th>
<th>Historic Qualities</th>
</tr>
</thead>
<tbody>
<tr>
<td>010C00019</td>
<td>33.00</td>
<td>1921</td>
<td>8</td>
<td>Not sure about preserving, as bridge closed, not recently inspected</td>
<td>Replace of Preserve</td>
<td>Couldn’t estimate</td>
<td>Vincennes bridge company</td>
</tr>
<tr>
<td>022B00017</td>
<td>62.80</td>
<td>1950</td>
<td>0</td>
<td>2.5</td>
<td>Preserve</td>
<td>Could last 20 years in current condition</td>
<td>Parker</td>
</tr>
<tr>
<td>022C00051</td>
<td>43.80</td>
<td>1873</td>
<td>2</td>
<td>5</td>
<td>Preserve</td>
<td>$500,000</td>
<td>Former RR bridge</td>
</tr>
<tr>
<td>022C00052</td>
<td>45.90</td>
<td>1873</td>
<td>2</td>
<td>5</td>
<td>Preserve</td>
<td>$500,000</td>
<td>Former RR bridge</td>
</tr>
<tr>
<td>022C00053</td>
<td>45.90</td>
<td>1873</td>
<td>2</td>
<td>5</td>
<td>Preserve</td>
<td>$500,000</td>
<td>Former RR bridge</td>
</tr>
<tr>
<td>081C00018</td>
<td>26.5</td>
<td>1935</td>
<td>0</td>
<td>7.5</td>
<td>Preserve</td>
<td>$500,000</td>
<td></td>
</tr>
<tr>
<td>081C00022</td>
<td>22.50</td>
<td>1918</td>
<td>0</td>
<td>2.5</td>
<td>Preserve</td>
<td>Could last 20 years with spot painting</td>
<td>Toledo Bridge Co. Pin connected</td>
</tr>
<tr>
<td>091C00024</td>
<td>15.70</td>
<td>1917</td>
<td>9</td>
<td>Replace, in danger of collapse</td>
<td>$1,000,000</td>
<td>but bridge would be greatly altered</td>
<td></td>
</tr>
<tr>
<td>032C00032</td>
<td>42.50</td>
<td>1930</td>
<td>0</td>
<td>7</td>
<td>Preserve</td>
<td>$750,000 to $1,000,000</td>
<td></td>
</tr>
<tr>
<td>045B00063</td>
<td>41.90</td>
<td>1868, recon in 1990</td>
<td>3</td>
<td>2.5</td>
<td>Preserve</td>
<td>No estimate but needs repainting and rivets replaced</td>
<td>Double intersection Pratt, cut stone, pins, eligible NR</td>
</tr>
<tr>
<td>045B00085</td>
<td>19.90</td>
<td>Recon in 2003</td>
<td>1.5</td>
<td>Preserve</td>
<td>No estimate, in good condition</td>
<td>Double intersection Warren, Covered Bridge, On NR</td>
<td></td>
</tr>
</tbody>
</table>
## District 10 Summary Table

<table>
<thead>
<tr>
<th>Bridge ID</th>
<th>Suf. Rating</th>
<th>Year Built</th>
<th>Historic Rating</th>
<th>Bridge Work Effort Rating 1 = easy 10=difficult</th>
<th>Replace of Preserve</th>
<th>Estimated Cost to Preserve</th>
<th>Historic Qualities</th>
</tr>
</thead>
<tbody>
<tr>
<td>065B00016</td>
<td>50.70</td>
<td>1968</td>
<td>1</td>
<td>Preserve</td>
<td>In good condition</td>
<td></td>
<td>Warren w/ verticals</td>
</tr>
<tr>
<td>013B00012</td>
<td>61.40</td>
<td>1929</td>
<td>4</td>
<td>Preserve</td>
<td>$200,000</td>
<td></td>
<td>Built by Commonwealth</td>
</tr>
<tr>
<td>013B00044</td>
<td>23.10</td>
<td>1956 but probably early 1900s</td>
<td>2</td>
<td>2</td>
<td>Preserve</td>
<td>$2,000,000</td>
<td>Whipple truss; on NR</td>
</tr>
<tr>
<td>013C00039</td>
<td>7.40</td>
<td>1914</td>
<td>2</td>
<td>9</td>
<td>Preserve but needs a lot of work, active replacement project (Nov. letting)</td>
<td>$4,000,000</td>
<td>Camelback</td>
</tr>
<tr>
<td>097B00016</td>
<td>0.00</td>
<td>1927</td>
<td>3</td>
<td>3</td>
<td>Preserve w/ new deck, plates and painting</td>
<td>$2,500,000</td>
<td>Parker, St. Louis Br. Co.</td>
</tr>
<tr>
<td>097C00005</td>
<td>35.30</td>
<td>1967</td>
<td>3</td>
<td>8.5</td>
<td>Wants to replace with a bridge that can handle coal trucks</td>
<td>$4,000,000</td>
<td>Only bridge by Atlantic Bridge Company</td>
</tr>
<tr>
<td>099B00029</td>
<td>42.90</td>
<td>1935</td>
<td>1</td>
<td>1</td>
<td>Preserve</td>
<td>Good condition</td>
<td></td>
</tr>
</tbody>
</table>
### District 11 Summary Table

<table>
<thead>
<tr>
<th>Bridge ID</th>
<th>Suf. Rating</th>
<th>Year Built</th>
<th>Historic Rating</th>
<th>Bridge Work Effort Rating 1 = easy 10=difficult</th>
<th>Replace of Preserve</th>
<th>Estimated Cost to Preserve</th>
<th>Historic Qualities</th>
</tr>
</thead>
<tbody>
<tr>
<td>048B00051</td>
<td>0.00</td>
<td>1925</td>
<td>8</td>
<td>Replace, bridge is closed, County may take as a foot bridge</td>
<td>$750,000</td>
<td>Baltimore, Vincennes Br. Co.</td>
<td></td>
</tr>
<tr>
<td>063C00036</td>
<td>74.00</td>
<td>1925</td>
<td>2</td>
<td>Preserve</td>
<td>$250,000 w/ painting, $50,000 with pressure washing and marine grease</td>
<td>Only Pratt of this subtype, wet stone abutments, pins, NR eligible</td>
<td></td>
</tr>
<tr>
<td>118C00027</td>
<td>19.50</td>
<td>1917</td>
<td>9</td>
<td>Closed and may not be able to preserve</td>
<td>$500,000</td>
<td>On NR, pins, rough cut stone</td>
<td></td>
</tr>
<tr>
<td>118C00001</td>
<td>16.50</td>
<td>1935</td>
<td>3</td>
<td>Preserve</td>
<td>$400,000 to $500,000</td>
<td>Pratt half-hip pony, pins, Champion Br. Co.</td>
<td></td>
</tr>
<tr>
<td>118C00012</td>
<td>16.50</td>
<td>1947</td>
<td>3</td>
<td>Replace</td>
<td>$600,000 to $700,000</td>
<td>Pins</td>
<td></td>
</tr>
<tr>
<td>061C00035</td>
<td>18.10</td>
<td>1905</td>
<td>1</td>
<td>Preserve</td>
<td>$400,000 to $500,000</td>
<td>Parker, pins, stone abutments and piers</td>
<td></td>
</tr>
</tbody>
</table>
## District 12 Summary Table

<table>
<thead>
<tr>
<th>Bridge ID</th>
<th>Suf. Rating</th>
<th>Year Built</th>
<th>Historic Rating</th>
<th>Bridge Work Effort Rating</th>
<th>Replace of Preserve</th>
<th>Estimated Cost to Preserve</th>
<th>Historic and/or other Qualities</th>
</tr>
</thead>
<tbody>
<tr>
<td>064B00038</td>
<td>38.80</td>
<td>1904, rebuilt 1970</td>
<td>8</td>
<td>Preserve</td>
<td>$500,000</td>
<td>Pins and stone abutments</td>
<td></td>
</tr>
<tr>
<td>098C00128</td>
<td>41.00</td>
<td>1998 or 1991</td>
<td>4</td>
<td>Preserve</td>
<td>$300,000</td>
<td>Bailey</td>
<td></td>
</tr>
<tr>
<td>098C00121</td>
<td>41</td>
<td>1982</td>
<td>5</td>
<td>Preserve</td>
<td>$150,000</td>
<td>bailey</td>
<td></td>
</tr>
<tr>
<td>098B00001</td>
<td>42.70</td>
<td>1951</td>
<td>0</td>
<td>Preserve</td>
<td>Needs no work</td>
<td>Warren w/ verticals</td>
<td></td>
</tr>
<tr>
<td>067B00037</td>
<td>29.70</td>
<td>1930</td>
<td>0</td>
<td>Preserve</td>
<td>$600,000</td>
<td>Wet stone, Community likes bridge</td>
<td></td>
</tr>
<tr>
<td>067B00049</td>
<td>70.90</td>
<td>1924, recon 1971</td>
<td>1</td>
<td>Replace due to timber piles not lasting 20 years</td>
<td>$1,000,000</td>
<td>Vincennes Bridge co.</td>
<td></td>
</tr>
<tr>
<td>098C00120</td>
<td>48.5</td>
<td>1982</td>
<td>5</td>
<td>Preserve</td>
<td>$200,000</td>
<td>Bailey truss</td>
<td></td>
</tr>
<tr>
<td>036B00076</td>
<td>3.00</td>
<td>1944</td>
<td>0</td>
<td>Preserve, currently under contract for repair</td>
<td>$750,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>036B00040</td>
<td>19.90</td>
<td>1920</td>
<td>3</td>
<td>Replace, due to traffic back-ups on 700 foot one lane bridge, locals want a two lane bridge</td>
<td>$500,000</td>
<td>American Bridge Company, eligible for NR</td>
<td></td>
</tr>
</tbody>
</table>