A DATA NEEDS ANALYSIS STUDY

Item 7-1116.00 Bridge Replacement on Herrington Lake, KY 152 at Mercer/Garrard County line

Prepared By: Division of Planning & District 7

Kentucky Transportation Cabinet

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I. INTRODUCTION

A. Data Needs Analysis (DNA) Studies

A DNA Study is a Pre-Design Scoping Study performed on projects that did not have a prior Planning study. A DNA Study is a shortened version of Planning study and is conducted to better define the scope of the project before design starts. They are done to document existing data, to initiate early project requests and to accomplish early agency coordination.

A preliminary environmental overview is also a part of these studies to identify potential environmental impacts due to the project. These studies help develop a project schedule and identify possible alternates and costs. A "Purpose and Need" statement is developed by the Project team. By investigating a project early in the process, scope creep can be kept to a minimum.

B. FHWA Recommended Elements for Purpose and Need

Federal Highway Administration (FHWA) National Environmental Policy Act (NEPA) recommends that the following nine elements may be considered as part of Purpose and Need statement during the transportation decision making of a project:

- Legislation
- Project Status
- System Linkage
- Modal Interrelationships
- Transportation Demand
- Capacity
- Safety
- Roadway Deficiencies
- Social Demands/Economic Development

As part of developing a Purpose and Need statement for the current project, these FHWA recommendations will be addressed to the extent applicable.

C. Item 7-1116.00 DNA Study

Item 7-1116.00 is a Bridge Replacement project on Herrington Lake on KY 152 at the Mercer/Garrard County line.

The Project Team discussed and developed possible alternates and planning level cost estimates for the alternates based on project scope. Other information that will be of assistance in the Project Development Phase of this project was noted during the study.

D. Project Location

The bridge project is located on KY 152 over Herrington Lake at the Mercer/Garrard county line (See Figure 1 below and Exhibit 1 in Appendix A). Mile point locations for the bridge are MP 18.818 to 18.894 in Mercer County and MP 0 to 0.076 in Garrard County. The bridge has an ID 084B00005N. Bridge deck width is 20 ft and bridge length is 797.9 ft.

Beginning at its intersection with Chimney Rock Road on the west side of the project, KY 152 is flanked by residential property on either side. There are residential properties on the east end of the project. There is a camping area on Chimney Rock Road and there are Marinas at the end of the same road. There are several other marinas and businesses within the project vicinity.

A topographic map of the study area is shown as Exhibit 2 in Appendix A.

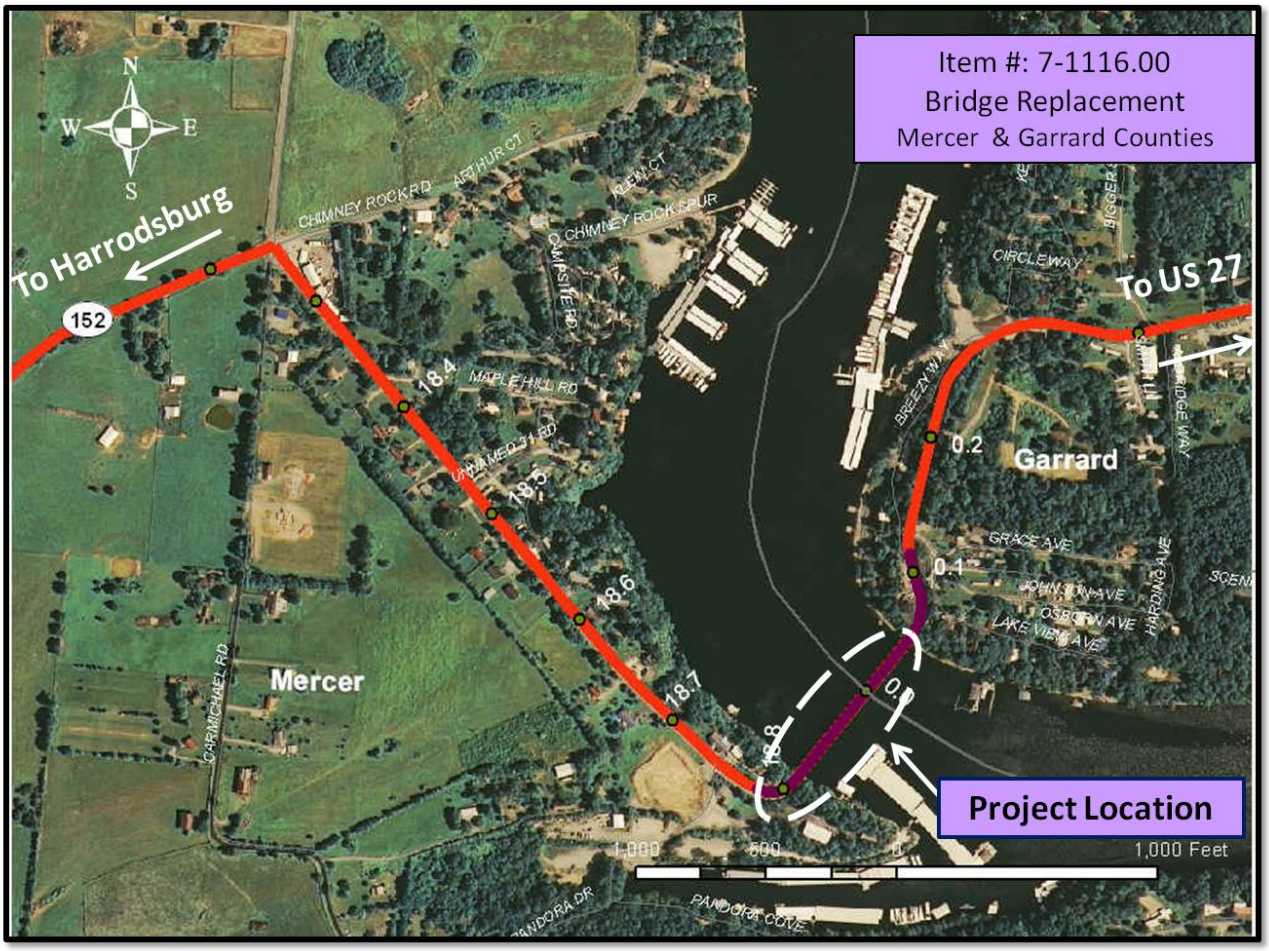


Figure 1: Project Location Map

II. PROJECT PURPOSE AND NEED

As discussed in Section IB, FHWA recommends nine elements to be considered as part of Purpose and Need for a project. For the current project, these nine elements will be discussed in the following section. A Purpose and Need statement agreed by the Project Team can be seen in Section VII later in this report.

A. Legislation

The following is a description of the project as it is listed in the 2010 General Assembly's Enacted Roadway Plan. 2010 Highway Plan projects for District 7, Mercer and Garrard Counties can be seen in Appendix B.

MERCER	P:			0	P:			0
Item No: 07-1116	D:	BRO	2010	1,000,000	D:	BRO	2010	1,000,000
Route: KY-152	R:	BRO	2012	500,000	R:	BRO	2012	500,000
	U:	BRO	2012	400,000	U:	BRO	2012	400,000
DESCRIPTION	C:			0	C:			0
REPLACE BRIDGE AND APPROACHES ON KY-152 OVER HERRINGTON LAKE AT THE MERCER/GARRARD COUNTY LINE (B05). (SR=3.0); (084B00005N)								

B. Project Status

Federal funds (BRO) have been authorized at the time of this report. See below current Project status. Previously, a bridge repair project was completed in 2009 which increased the Sufficiency Rating from 2.0 to 28.9.

Preconstruction Project Status for 7-1116.00

Description: REPLACE BRIDGE AND APPROACHES ON KY-152 OVER HERRINGTON LAKE AT THE MERCER/GARRARD COUNTY LINE (B05). (SR=3.0); (084B00005N)
Location: Route1 MERCER COUNTY KY-152 From MP 18.818 to MP 18.894
Route2 GARRARD KY-152 0 - 0.076
Length: 0.1 mi.

Project Status: Active

Current Phase Info:

Phase	Fund Code	Estimated Cost	Scheduled FY	Phase Funding Status	Authorized Date	Authorized Amount
Design	BRO	$0.00		AUTHORIZED	4/21/2011	$1,000,000.00
Right of way	BRO	$350,000.00	2012	ESTIMATED		$0.00
Utility Relocation	BRO	$280,000.00	2012	ESTIMATED		$0.00
Construction	BRO	$8,330,000.00	2014	NON-SIXYEAR		$0.00

Highway Plan Phase Info:

Phase	Funding	FY	Amount
Design	BRO	2010	$1,000,000.00
Right of way	BRO	2012	$500,000.00
Utility Relocation	BRO	2012	$400,000.00
Construction	BRO	2014	$11,000,000.00

Project Authorization can be seen in Appendix C.

C. System Linkage

KY 152 connects the Cities of Harrodsburg and Burgin on the west side of the project to US 27 in the East. See Figure 2 for a System Linkage map.

D. Modal Interrelationship

There is no public transit or intermodal use currently on this route.

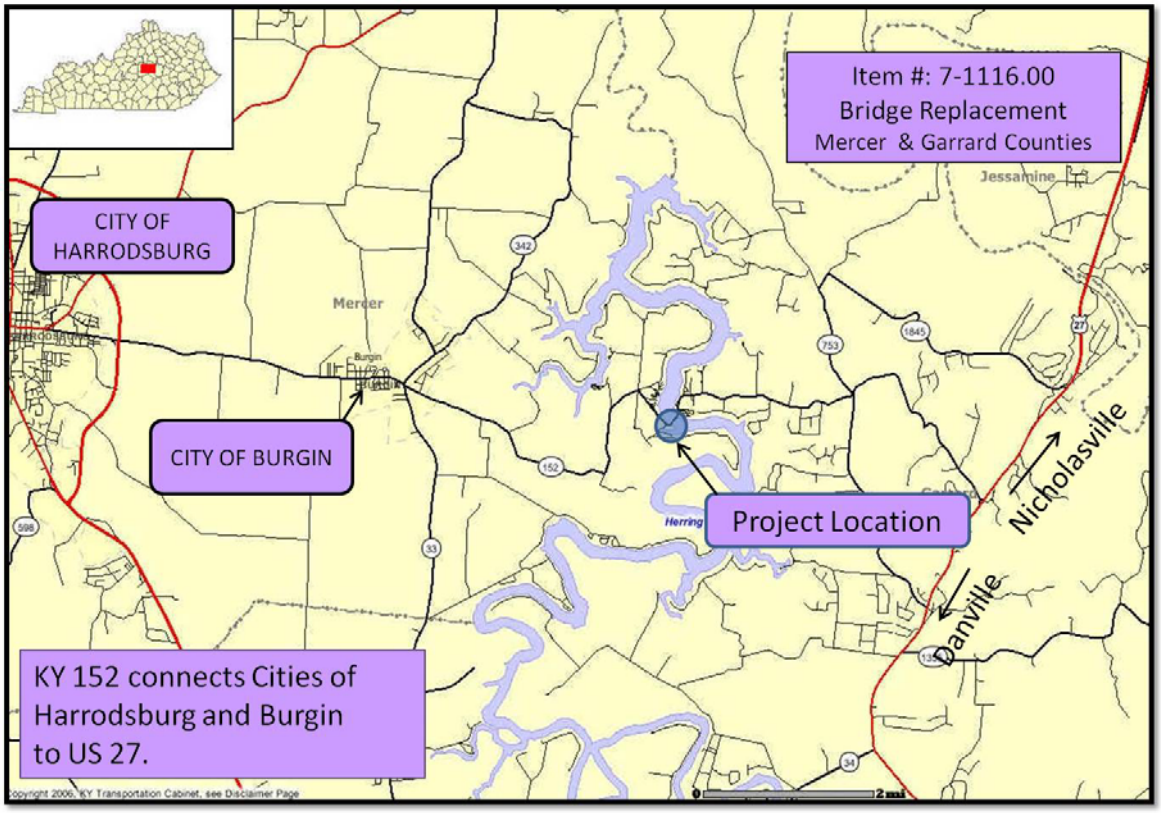


Figure 2: System Linkage Map

E. Social Demands or Economic Development

According to Director of Economic Development in Garrard County, KY 152 is the main artery between Mercer and Garrard counties. Herrington Lake and Peninsula Golf course are major attractions. The upgrade of US 127 to four lane traffic has caused an increase in traffic on KY 152. There is a lot of real estate development in the area.

F. Transportation Demand

Traffic data was obtained from CTS – Traffic Counts summary data. The 2010 ADT on KY 152 along the project is estimated at 1590. A traffic forecast has been requested at the time of this report. There is no truck data collected in the area.

G. Capacity

According to the KYTC Division of Planning's Adequacy Ratings Data, the Volume to Service Flow (VSF) ratio on this segment is 0.23 in Mercer County and 0.11 in Garrard County.

H. Safety

The crash history of this segment was studied using Kentucky State Police data. In the past ten years, six crashes have been reported at either end of the bridge. There were two side swipe crashes, one rear end crash, two run-off road crashes and one crash with a tree. The approaches to the bridge have sharp horizontal curves. Appendix D shows crash locations in the project area.

I. Geometric Deficiencies

a. Existing Roadway Conditions

The current roadway approach is two 9-10 foot lanes. Shoulder width is 1-3 feet. There are no shoulders on the bridge. There is guardrail at the edge of the pavement on the bridge. Bridge width is 20 feet. KYTC Common Geometric Practices for Rural Collector Roads suggest a lane width of 12 feet and 8 feet shoulders for a speed limit of 35 mph with an ADT over 2000 (Appendix E).

The Composite Adequacy Rating percentile of the roadway is 75.9 in Mercer County and 44.0 in Garrard County. The rating is a composite of roughness (IRI), safety (CRF) and service (VSF) of the roadway and compares this segment to other similar State roads. For example, a rating of 76 means that about 24% of the roads are rated better in that functional class in Kentucky. Figures 3 & 4 show the existing roadway on Herrington Lake bridge. Roadway approaches to the bridge have horizontal curves that do not meet KYTC Current Geometric criteria.

Figure 3: Roadway on Herrington Lake Bridge

Figure 4: Roadway on Herrington Lake Bridge at the West End

Other existing roadway information is available in the roadway plans in Appendix F. A summary of the existing conditions at the project site can be seen in Table 1.

Figure 5: Structural condition of the bridge in 2009

Table 1: Existing Conditions and Data Summary

County	*Mercer and Garrard*	**Item No.**	*7-1116.00*
Route Number(s)	*KY 152*	**Funding Type**	*BRO*
ADT (2010)	*1,590*	**MP**	*18.818 to 18.894 (Mercer), 0 to 0.076 (Garrard)*
Terrain	*Level*	**Posted Speed**	*35 mph*
Median Type	*Undivided*		
Roadway Data			
Functional Classification	*Rural Major Collector*	**State Primary Road System**	*State Secondary Route*
National Highway System (NHS)	*No*	**Coal Haul Route**	*No*
National Truck Network	*No*	**Truck Weight Classification**	*AA*
Bike Route	*No*	**Adequacy Rating Percentile**	*75.9 (Mercer) & 44.0 (Garrard)*
Roadway Geometry			
	Existing Conditions	**KYTC Common Geometric Practices (35 mph Design Speed)**	
Number of Lanes	*2*	*2*	
Lane Width	*9 - 10 foot*	*12 foot*	
Shoulder Width	*1 - 3 foot*	*8 foot*	
Bridge Data *(see Appendix I for Bridge Inventory Report)*			
Bridge Number	*084B00005N*		
Bridge Type	*4 span Steel Truss*		
Max. Span Length	*210 foot (45',60',3-210',45')*		
Length	*797.9 foot*		
Sufficiency Rating	*28.9*		
Bridge Roadway width curb to curb	*20.0*		
Deck width out to out	*20.0*		

b. Existing Bridge Conditions

The 797.9 foot bridge was built in 1924. It has six spans total; there are 4 main spans and 2 approach spans (one approach span on each end of the bridge). The main spans are steel deck truss and the approach spans are a girder/floorbeam system. Repairs were done in 1940, 1944, 1991, 2003 and 2009. The bridge had a Sufficiency Rating of 2.00 before the 2009 repairs. The interim repairs improved the Sufficiency Rating to 28.9. The bridge is functionally obsolete because of the geometric deficiencies.

Typical view of previously rehabed diagonals. Having problems were the bolt holes had to be redrilled during the rehab.

Typical view of floor beam bracing. Most have heavy section loss and some braces are completely gone or broken.

Close up view of bearing device #2 at Pier #2. Bearing device needs to be replaced.

Exterior view of bearing device #2 at Pier #2. Bearing device needs to be replaced.

Figure 6: Severe rusting seen on the bridge before 2009 repairs

Posted weight limit

Due to the condition and changes in the weight carrying capacity of the bridge, the posted weight limit is 15T (see Figure 7). A memo was released on June 1, 2010 by District 7 Office to this effect (Appendix G).

History of the Bridge Piers

The history of the piers was discussed during the Project Team meeting. In the Bridge Inspection File there was an article (Appendix H) concerning substructure movement written by F.C. Mahan, former Design Engineer in the Bridge Section in Central Office from 1931 – 1942. The article was written sometime after 1943, but the exact date is unknown. The article states that the bridge was built in 1924 when Herrington Lake was still empty. After the bridge was built, the lake was flooded and an inspection report from 1932 revealed that the deep water pier nearest the Mercer County side was having movement. At this point, the pier had actually risen approximately 16 inches. Elevation surveys were performed from 1934–1936. At the height of movement, the pier had risen approximately 30 inches and tilted upstream and toward the Mercer County side approximately 12 inches. The piers were built by the Weber Chimney Company of Chicago and are hollow.

Figure 7: Current posted weight limit on the bridge is 15T

Bridge Inventory and Inspection reports can be seen in Appendix I.

Drainage

FEMA Flood Insurance Rate Maps (FIRM) are shown in Appendix J. The lake is designated as Zone A for floods. Zone A represents a 100 year flood zone. Dix Dam is located approximately 8 miles north of the bridge. The dam is used to control the water level and typically in the late fall, the water level is lowered. Melting snow and rain runoff from the winter and spring then refills the lake before the summer season. Kentucky Utilities Power Plant is the owner of the dam.

III. PRELIMINARY ENVIRONMENTAL OVERVIEW

A. Air Quality

Mercer and Garrard Counties are in attainment for all monitored air pollutants.

B. Archaeology

The OSA database indicated that there were no sites recorded in close proximity to the project area, but no surveys have taken place in the area to verify. An Archaeology Phase I survey will need to be completed in order to rule out any impacts to archaeological sites. Optimum time for a survey would be during a winter draw-down when more of the shoreline is exposed.

C. Threatened and Endangered Species

The USFWS has identified the known and potential presence of threatened and endangered species in Mercer County (See Table 1) and Garrard County (Table 2). During a site visit on May 2, 2011 potential habitat was observed for the bat species in the project area; however a Habitat Assessment will need to be conducted to examine the habitat potential more closely. A Biological Assessment may also be needed. It is unlikely that federally listed mussel species would be found in this location due to the depth. No historical records of endangered mussels have been found. Endangered bats would not likely use the bridge for anything other than a temporary night roost. Any impacts to threatened and endangered species must be mitigated for through coordination with USFWS.

D. Hazardous Materials

During a site visit on May 2, 2011, no properties were observed that would have a high probability of hazardous materials. However, due to the age of the bridge, it will need to be tested for asbestos prior to demolition.

Table 2–USFWS listing of Threatened and Endangered Species in Mercer County

Group	Species	Common Name	Legal Status
Mammals	*Myotis sodalis*	Indiana bat	E
	Myotis grisescens	Gray bat	E
Mussels	*Pleurobema clava*	*Pleurobema clava*	E
	Cyprogenia stegaria	fanshell	E
	Epioblasma torulosa rangiana	Northern riffleshell	E
	Obovaria retusa	Ring Pink	E
Plants	*Trifolium stoloniferum*	Running Buffalo Clover	E

Table 3 – USFWS listing of Threatened and Endangered Species in Garrard County

Group	Species	Common Name	Legal Status
Mammals	*Myotis sodalis*	Indiana bat	E
	Myotis grisescens	Gray bat	E
Plants	*Trifolium stoloniferum*	Running Buffalo Clover	E

E. Historic Resources

The bridge itself was built in 1924, which means it meets the first screening requirement for listing on the National Register for Historic Places. Several homes near the bridge or within the project viewshed are also potentially older than 50 years and may therefore be eligible for the National Register of Historic Places. A thorough assessment of the eligibility and listed status of the bridge and other structures should be completed in future project phases.

F. Permitting

Any impacts below the ordinary high water mark within Herrington Lake will need a USACE 404 Permit (NW 14 or LOP depending on impact size) and potentially a Water Quality Certification from the Division of Water.

G. Noise

The scope of the project may require noise analyses if additional lanes of traffic are planned for this project. The noise associated with construction and demolition will be temporary.

H. Socioeconomic

There will likely be no socioeconomic impacts associated with this project.

I. Section 4(f) Resources

If the bridge or any residences located nearby are ruled as eligible for the National Register of Historic Places they could also be afforded protection under Section 4(f). The KYTC has options to mitigate and avoid impacts to Section 4(f) resources including a programmatic agreement for mitigating historic bridges and using “de minimus” guidance for minor strip takings.

J. Section 6(f) Resources

At this time, there do not appear to be any resources in the project area that are protected under Section 6(f) of the Land Water Conservation Fund Act.

IV. OTHER PROJECT INFORMATION

A. Utilities at Site

The location of utilities will need to be verified as the project survey is completed in Phase I Design. Utilities that may be affected by each alternate are electricity, gas, cable TV, telephone and water.

B. Right of Way

Existing right of way could not be easily determined as old plans or microfilm could not be located for this segment of KY 152.

V. PROJECT TEAM MEETING, GEOTECHNICAL ASSESSMENT & SITE VISIT

A. Project Team Meeting

A Project Team meeting was held on January 11, 2011 at the District 7 office in Lexington. It was attended by the KYTC Central Office Planning team and District 7 Office staff. An introduction to DNA Pre-Design Scoping studies was presented which was followed by a PowerPoint presentation and discussion of the DNA study for Item 7-1116.00. Existing conditions, preliminary environmental overview, possible alternates were discussed and a draft “Purpose and Need” statement was defined. Meeting minutes can be seen in Appendix K.

B. Preliminary Geotechnical Assessment

At the Project Team meeting held in January, 2011, it was discussed whether the piers are stable and re-usable. Existing piers have been re-used on other bridge replacement projects depending on their condition. The Project Team decided that the stability and re-use has to be further investigated. The KYTC Geotechnical Branch was consulted to assess and make recommendations regarding the substructure.

Findings of the preliminary geotechnical assessment (partial copy) can be seen in Appendix L. Portions of the report can be seen below:

"A bridge at the same location may require a new foundation or portions of the existing foundations may be reused. This office has discussed reuse of these piers in the past. A site visit was performed to review the existing piers. It is unlikely that it would be desirable or economically viable to reuse abutment number 1, abutment number 2, or piers 1, 4 or 5 as shown in the below schematic (retrieved from the Division of Structural Design's plan database). Due to their size and location in the lake, it could be very desirable to reuse piers 2 and/or 3".

"In order to make a decision as to whether Pier 2 and/or Pier 3 can be reused, a thorough investigation would be required. Drilling through the footing in numerous places would be desirable to examine the bearing stratum of both piers. Additionally, the existing concrete would need to be examined so that a useful remaining service life can be determined. Similar studies have been undertaken by the Cabinet in the past. Replacement of the bridge at approximately the same location or just adjacent to this location, without the reuse of the piers, will also require a very thorough site investigation. It would be very desirable to try to find out the mechanism that caused the movement at pier 2 so that future problems with a new bridge can be avoided".

C. Site Visit Observations

A site visit was held on May 2, 2011 which was attended by KYTC Central Office Planning team and District 7 Office staff. A walk through was conducted from one end of the bridge to the other end. Alternates proposed during the project team meeting were discussed.

Possible alignments to improve the horizontal curves at the bridge approaches and resulting impacts were discussed. The closest pier on the west side was visited by some members of the team. The recent structural repairs to the bridge may sustain the bridge for 3 - 4 more years. Some members of the team visited the marinas and the access roads leading to them which fall in the vicinity of the proposed bridge at an alternate location. Investigation of Environmental and Utilities was also part of the site visit.

VI. PROPOSED TYPICAL SECTION

The Project Team discussed the proposed typical section for the project. Bridge design criteria should follow the proposed project design criteria on KY 152 as established in the Highway Design Guidance Manual.

KY 152 is a Rural Major Collector. Current ADT (2010) is estimated at 1590. A traffic forecast is not available at this time. If the future estimated ADT is over 2000, KYTC Common Geometric Practices (see Appendix D) for Rural Collector Roads suggest a lane width of 24 feet and 8 feet shoulders for a speed limit of 35 mph. The Team decided that a typical section will be finalized during Phase I studies. However, for the purpose of this study and cost estimates, the typical section is as shown in Figure 8.

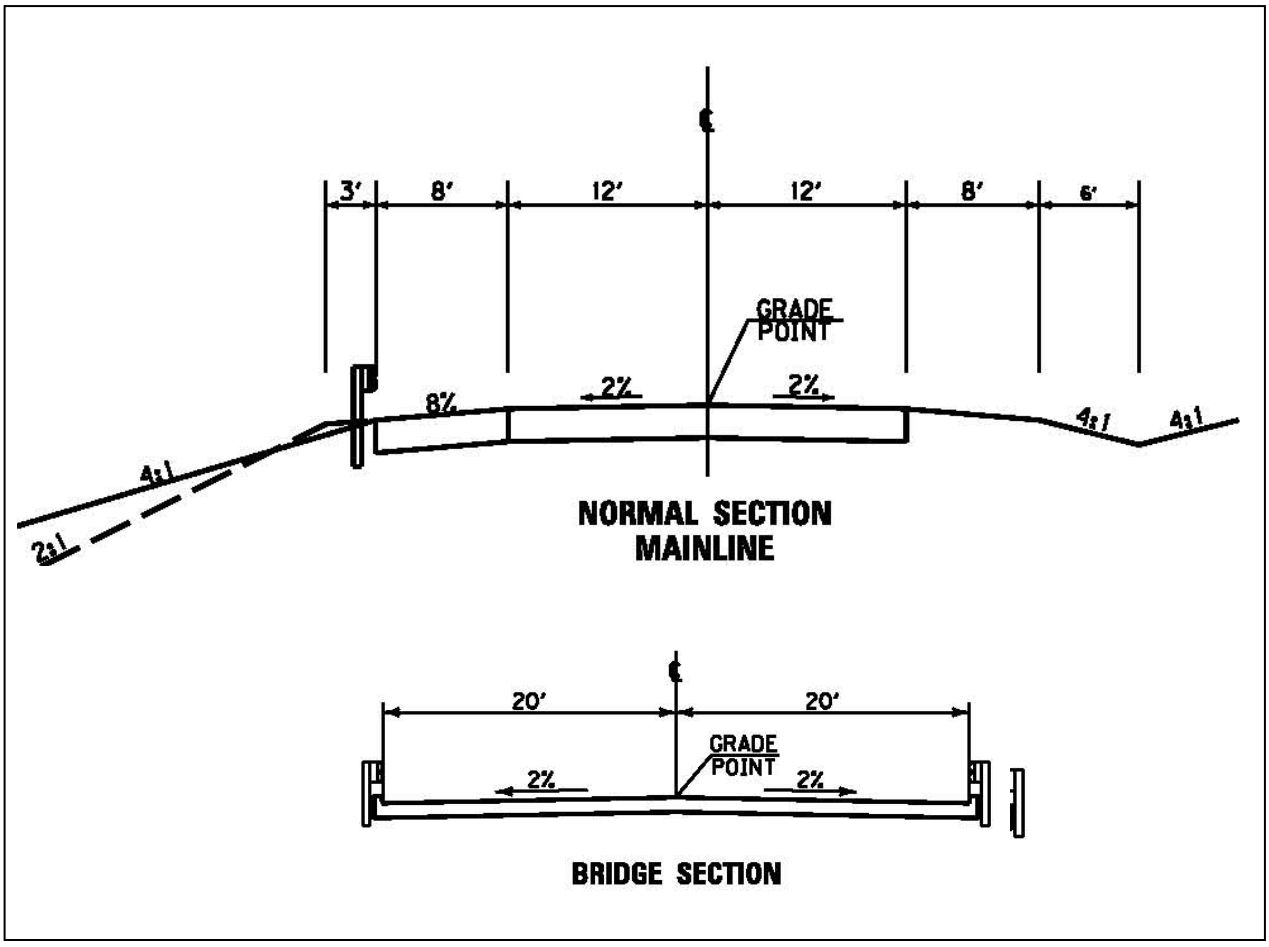


Figure 8: Proposed Typical Section

VII. PROJECT PURPOSE AND NEED STATEMENT

A Purpose and Need Statement is the foundation for project decision making. The need for the Bridge Replacement is to improve the current posted weight limit of 15 tons and improve the bridge's geometric deficiencies.

Based upon the information presented in Section II (Project Purpose and Need) of this report and discussion of the Project Team, the following Purpose and Need Statement was agreed upon by the Project Team:

> **The purpose of the project is to address the structural capacity of the bridge, the geometric deficiencies of the bridge and the approach roadway on each side, and to maintain connectivity and enhance the movement of recreational traffic.**

VIII. POSSIBLE ALTERNATES

At the Project Team meeting, the Team decided to consider the following alternates. Each of the alternates has advantages and disadvantages.

- ALTERNATE 1: No Build
- ALTERNATE 2: Replace with a bridge at same location
- ALTERNATE 3: Replace at an adjacent location
- ALTERNATE 4: Replace at an alternate location

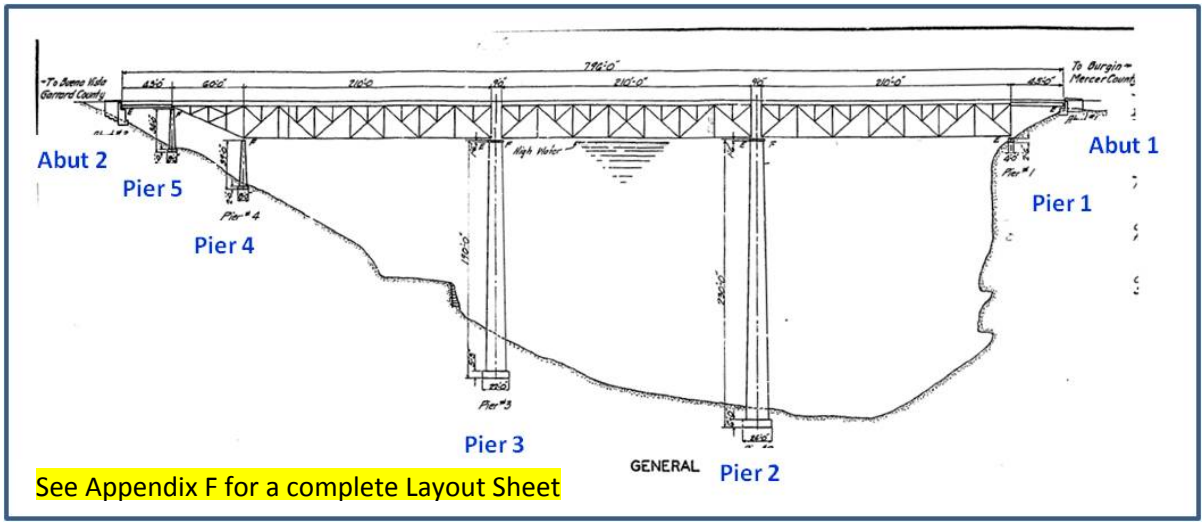


Figure 9: Elevation of the existing bridge

Complete description of the alternates is provided below. Basis of cost estimation is shown in Appendix O.

A. ALTERNATE 1 – No Build

In the last 10 years there have been two maintenance/repair projects on this bridge. The most recent project was done to keep the bridge open and provide more time to move forward on replacing the bridge while only increasing the sufficiency rating from 2.0 to 28.9. Even with this improvement, the existing bridge has a current posted limit of 15T and is functionally obsolete (geometric deficiency). This alternate will lead to the closing of the bridge in possibly two to three years. This alternate is undesirable.

B. ALTERNATE 2 - Replace with a bridge at the current location

The KYTC Geotechnical Branch was consulted to examine the condition of the existing piers. Preliminary Geotechnical findings were explained in Section V of this report. Also, Appendix L has a copy of the report. According to the report, further investigation is necessary to determine re-use of the deep water piers. Also, the remaining service life of the piers needs to be determined.

Some of the advantages of this alternate are possible construction cost savings because of re-use (remain in place) of some or all of the existing piers. Required right of way will be minimal. Ferry service or a detour route is needed during construction. If ferry service is not feasible during construction, motorists have to detour over 30 miles to reach US 27 from KY 152. This is a disadvantage for this alternate.

Considering the crashes occurring in the roadway curves leading to and leaving the bridge, geometric improvements to the approach roadway such as horizontal curve, sight distance may be included in this alternate. On the west side of the bridge, there is a steep drop in grade on the side road close to the approach roadway. Estimated length of each approach reconstruction is 750 feet.

A life cycle cost should be considered when comparing costs between Alternate 2 and Alternate 3, because, if the substructure is reused in Alternate 2, the typical 100 year life span for a bridge may not be obtainable since the existing substructure is already 86 years old. More information (complete inspection of the bridge structure, etc.) than is available must be obtained to properly calculate the life cycle cost. The life cycle cost should be considered in Phase I Design if using existing piers continues as an option.

There are four possibilities along the existing alignment that have been considered for this alternate whereby the final decision will be based on the geotechnical assessment.

- Alternate 2a: Use all existing piers
- Alternate 2b: Replace the deep water pier nearest the Mercer County side which showed upward movement/tilting and re-use the remaining piers
- Alternate 2c: Replace all piers
- Alternate 2d: Replace the abutments and piers except the two deep water piers

A sketch of this alternate is shown in Figure 10.

Alternate 2a: *Use all existing piers*

The first of these alternates is to use all the existing piers if they are found re-usable. This alternate involves replacing the superstructure, rehabilitating the piers and abutments and realigning the bridge approaches (2-lane roadway construction) to improve the geometric deficiencies.

The following is the estimated cost for Alternate 2a:

Phase	**Estimated Cost**
Right of Way	$1,000,000
Utilities	$750,000
Construction	$6,400,000

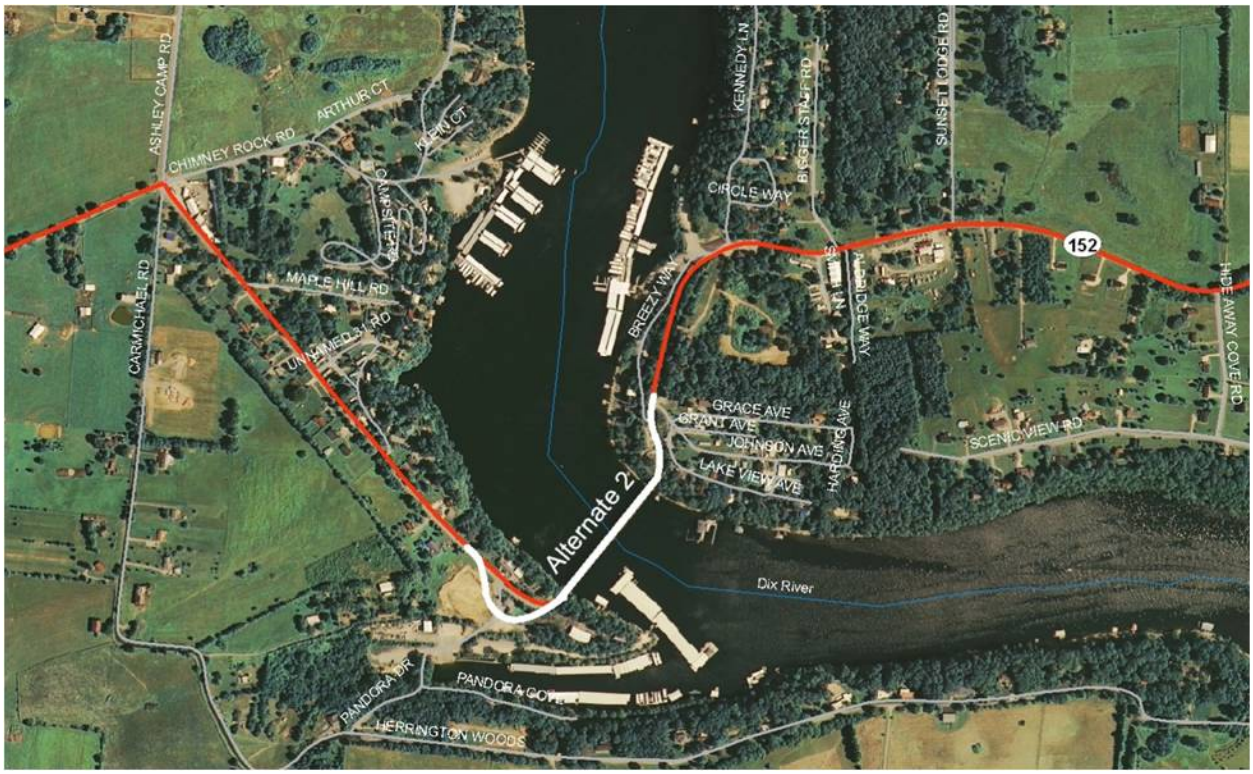


Figure 10: Alternate 2 - Replace with a bridge at the current location

Alternate 2b: *Replace the deep water pier which showed upward movement/tilting and re-use the remaining piers*

The second of these alternates is to replace the deep water pier nearest the Mercer County side which showed upward movement/tilting and re-use the remaining piers. The estimated cost for this alternate has been determined for replacing the pier in the same location or eliminating the pier and utilizing a longer span length for the bridge. The longer span length would require the beam depth to increase, which would cause the cost of the bridge to increase. This alternate involves replacing the superstructure, rehabilitating the remaining piers and abutments and realigning the bridge approaches (2-lane roadway construction) to improve the geometric deficiencies.

The following is the estimated cost for Alternate 2b:

Phase	Estimated Cost
Right of Way	$1,000,000
Utilities	$750,000
Construction	$6,750,000

Alternate 2c: *Replace all piers*

The third of these alternates is to replace all piers if they cannot be re-used. This alternate involves replacing the bridge, piers, and abutments, and realigning the bridge approaches (2-lane roadway construction) to improve the geometric deficiencies.

The following is the estimated cost for Alternate 2c:

Phase	Estimated Cost
Right of Way	$1,000,000
Utilities	$750,000
Construction	$10,500,000

Alternate 2d: *Replace the abutments and piers except the two deep water piers*

The fourth of these alternates would replace the abutments and piers except the two deep water piers. This alternate involves replacing the superstructure, abutments and all the piers except the two deep water piers, rehabilitating the two deep water piers, and realigning the bridge approaches (2-lane roadway construction) to improve the geometric deficiencies.

The following is the estimated cost for Alternate 2d:

Phase	Estimated Cost
Right of Way	$1,000,000
Utilities	$750,000
Construction	$6,800,000

Additional costs involved in a ferry service operation are listed under Table 4. Section X discusses detour and ferry service options in detail.

C. ALTERNATE 3: Replace with a bridge at an adjacent location

This alternate involves construction of a new bridge approximately 50 feet and set at an angle adjacent to the existing bridge. This would help to improve the sharp curves that are on each end of the existing bridge. This also takes into account that the locations of the piers may be different from the existing bridge whereby longer spans may be utilized without piers being located in the deep part of the lake.

The advantage of this alternate is that no detour (over 30 miles) is required during construction of the new bridge since existing bridge will remain open. During the previous bridge close down in 2009 (Appendix M), the main concern of the motorists was the lengthy detour of over 30 miles which can be avoided with this alternate. KY 152 traffic can continue to operate on the existing route without interruption during the construction of the new bridge, but will experience some delays during the tie-in of the reconstructed approaches. The right of way estimated cost includes the acquisition of several homes/buildings that have access to the lake. Estimated length of each approach reconstruction is 750 feet. This alternate is more expensive compared to Alternate 2.

A sketch of this alternate can be viewed below in Figure 11.

The following is the estimated cost for ALTERNATE 3:

Phase	**Estimated Cost**
Right of Way	$1,000,000
Utilities	$750,000
Construction	$11,000,000

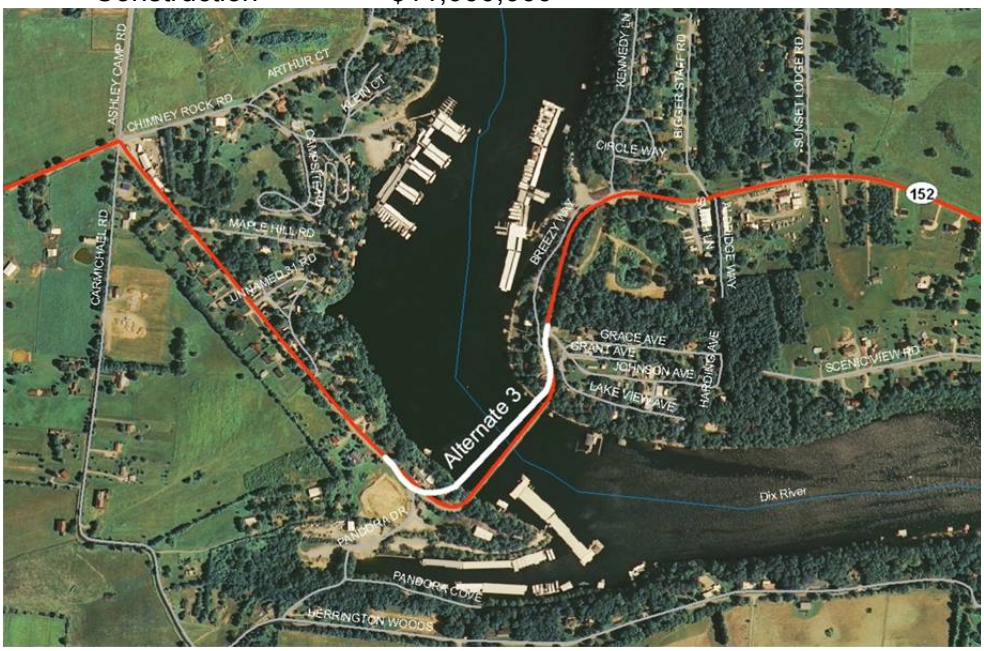


Figure 11: Alternate 3 - Replace with a bridge at an adjacent location

D. ALTERNATE 4: Replace with a bridge at an alternate location

This alternate will consider a new location for the new bridge. The new alignment would connect KY 152 on the west side at Chimney Rock Road to KY 152 on the east side in the vicinity of Kennedy Lane. This alternate would involve the construction of a new bridge, and new approaches to tie to KY 152 on both sides.

The advantage of this alternate is that traffic can be maintained on the existing Kennedy Mill Bridge while the new bridge and approaches are constructed. Therefore, there would be no need for a detour route or ferry service for this alternate. Another advantage is that the new roadway can be built in accordance with KYTC Current Geometric Practices for horizontal and vertical geometry. Current geometric deficiencies of KY 152 leading to and leaving the existing bridge location can be avoided and safety can be improved. Estimated length of approaches is 1850 feet total.

The disadvantage is that the alternate will affect the marinas located along this alternate. This alternate will be the most expensive compared to the other alternates because of the possibility of relocating the operating marinas. The cost to relocate the marinas along with the higher cost for construction, right of way, and utilities would possibly eliminate the feasibility of this alternate as a viable alternate for this project. **The estimated costs below do not reflect the cost associated with the relocation of the marinas which could be a significant cost.**

A sketch of this alternate is shown below in Figure 12.

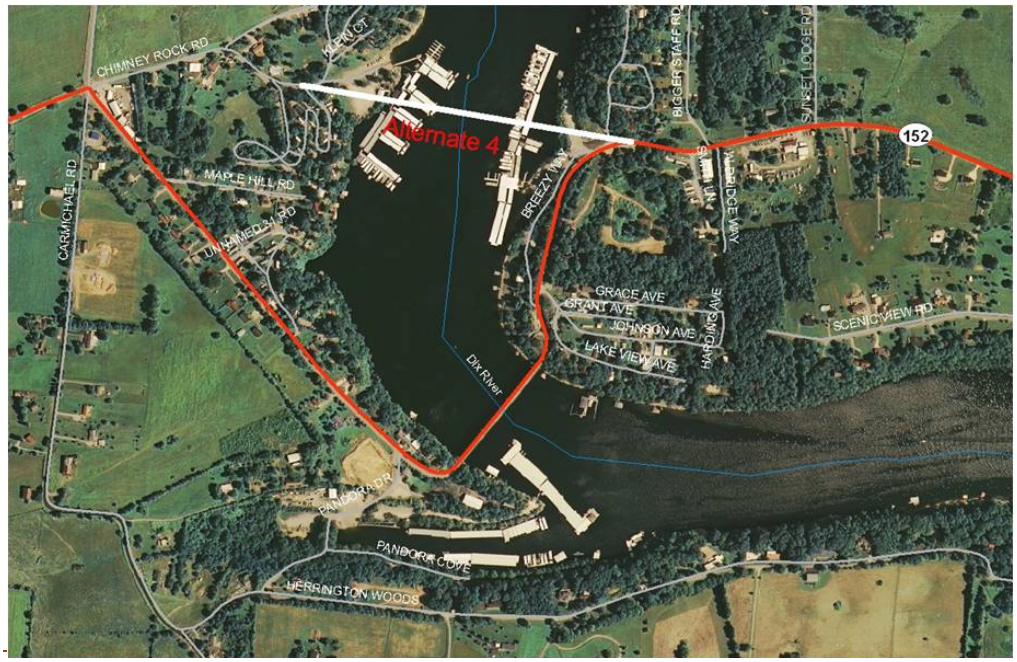


Figure 12: Alternate 4 - Replace with a bridge at an alternate location

The following is the estimated cost for ALTERNATE 4 (not including cost for relocating marinas) :

Phase	**Estimated Cost**
Right of Way	$1,000,000
Utilities	$750,000
Construction	$15,070,000

Figure 13: Chimney Rock Road and Boat launch ramp may be used as access road for Ferry Service during construction

Figure 14: Another view of Chimney Rock Road and Boat launch ramp

IX. SUMMARY OF ALTERNATES AND THEIR COST ESTIMATES

The alternates mentioned in the previous section have been summarized in the following table for comparison purposes.

Table 4: Summary of Alternates and their cost estimates

ALTERNATE	DESCRIPTION	RIGHT OF WAY	UTILITIES	CONSTRUCTION	TOTAL [x]
2010 BIENNIAL PLAN		$500,000	$400,000	$11,000,000	$11,900,000
ALTERNATE 1	No build	-	-	-	-
ALTERNATE 2	Replace with a bridge at the current location				
Alternate 2a	*Use all existing piers*	$1,000,000	$750,000	$6,400,000	$8,150,000 [+∞]
Alternate 2b	*Replace the deep water pier which showed upward movement/tilting and re-use the remaining piers*	$1,000,000	$750,000	$6,750,000	$8,500,000 [+∞]
Alternate 2c	*Replace all piers*	$1,000,000	$750,000	$10,500,000	$12,250,000 [+∞]
Alternate 2d	*Replace the abutments and piers except the two deep water piers*	$1,000,000	$750,000	$6,800,000	$8,550,000 [+∞]
ALTERNATE 3	Replace with a bridge at an adjacent location	$1,000,000	$750,000	$11,000,000	$12,750,000
ALTERNATE 4	Replace with a bridge at an alternate location	$1,000,000	$750,000	$15,070,000	$16,820,000 [♦]

x Design costs are not included

+ add $810,000 for a ferry service operation (2 year construction period assumed) if used

∞ add $150,000 for upgrade of local roads leading to and leaving the ferry service if used

♦ does not include cost of relocating marinas, cost includes local roads upgrade

X. OTHER ISSUES

A. Public Involvement Discussion

There was a discussion at the beginning of the DNA Study whether Public Involvement which includes input from the Public Officials can be introduced into the Project early in the project development phase. This issue was discussed at the Project Team meeting. It was decided by the Project Team that the DNA Study will not involve any Public Involvement activities. Public Involvement will be included early in the Phase I Design, which will start in a few months.

XI. CONSTRUCTION

A. Detour route

In the Plans for the 2009 repair project (see Appendix F), the detour involved re-routing eastbound traffic from KY 152 along KY 33/US 68/KY 29, then south on KY 1268 to reach US 27. During construction, the detour was actually routed to continue northward on US 68 to KY 29, then along KY 29 to reach US 27. It was decided that the detour needed to avoid KY 1268 because this road has a section with a historic stone laid arch culvert that has a single, 13 foot wide lane with several sharp curves on each side of the structure. The total length of the modified detour when the bridge was closed during the 2009 Bridge repairs was over 30 miles.

If a detour route has to be used for the proposed project, it would be the same as the detour used during the 2009 bridge closure.

B. Ferry Service

The proposed detour route discussed in the previous section would put motorists over 30 miles out of their way. That was a primary area of concern to the motorists when the bridge was closed for repairs in 2009 (Appendix M). The possibility of using ferry service to transport motorists and their vehicles during construction was discussed at the Project Team meeting.

On the west side, Chimney Rock Road is an access road (approximately 1700 ft) from KY 152 that leads to the lake side. It is a county road (CR 1131 & CR 1152), 19 ft wide at the junction of KY 152. The road has no shoulders. Possibility of using Chimney Rock Road for access to ferry service should be evaluated for feasibility for traffic diversion.

On the east side, there is no good access road for traffic leaving the ferry service to reach KY 152. Kennedy Lane is a County Road and is on a hill with only private road connections to the Lake. It is a single lane, 10 ft wide road. The other roads from the lake side to KY 152 are Private roads. Traffic diversion on Private roads would require an easement.

Floating bridges (military type) can also be used during construction. The Team agreed that a floating bridge may not be practical or useful in the current situation.

XII. SUMMARY

The DNA study investigated several alternates and presented the advantages and disadvantages of the alternates. During Phase I studies, the alternates will be further developed and a preferred alternate may be recommended.

As indicated in the report, if the new bridge is located at the current location or an adjacent location, more detailed Geotechnical investigation is necessary to investigate the underlying cause of pier movement experienced in the past. Necessary solutions are needed to prevent future problems with the new bridge at the same location.

As seen in Table 4 in Section IX, the estimated cost of some of the alternates exceeds the programmed cost in the 2010 Biennial Plan. Additional funds may have to be requested depending on which alternate is selected.

Upon completion of the project, a new bridge built to current KYTC Geometric Practices for the bridge and approaches will replace the current bridge that has a Sufficiency Rating of 28.9 and eliminate the current restricted weight of 15T. The Project Purpose and Need to improve connectivity and enhance recreational activity will be achieved.

Additional Project photos can be seen in Appendix N.

For more information regarding this study please contact:

Sreenu Gutti, P.E., Steve Ross, P.E. or Keith Damron, P.E.
Kentucky Transportation Cabinet
Division of Planning, 5th Floor West
200 Mero St.
Frankfort, KY 40622
Ph: (502) 564-7183

APPENDIX A

EXHIBITS

EXHIBIT 1: PROJECT LOCATION

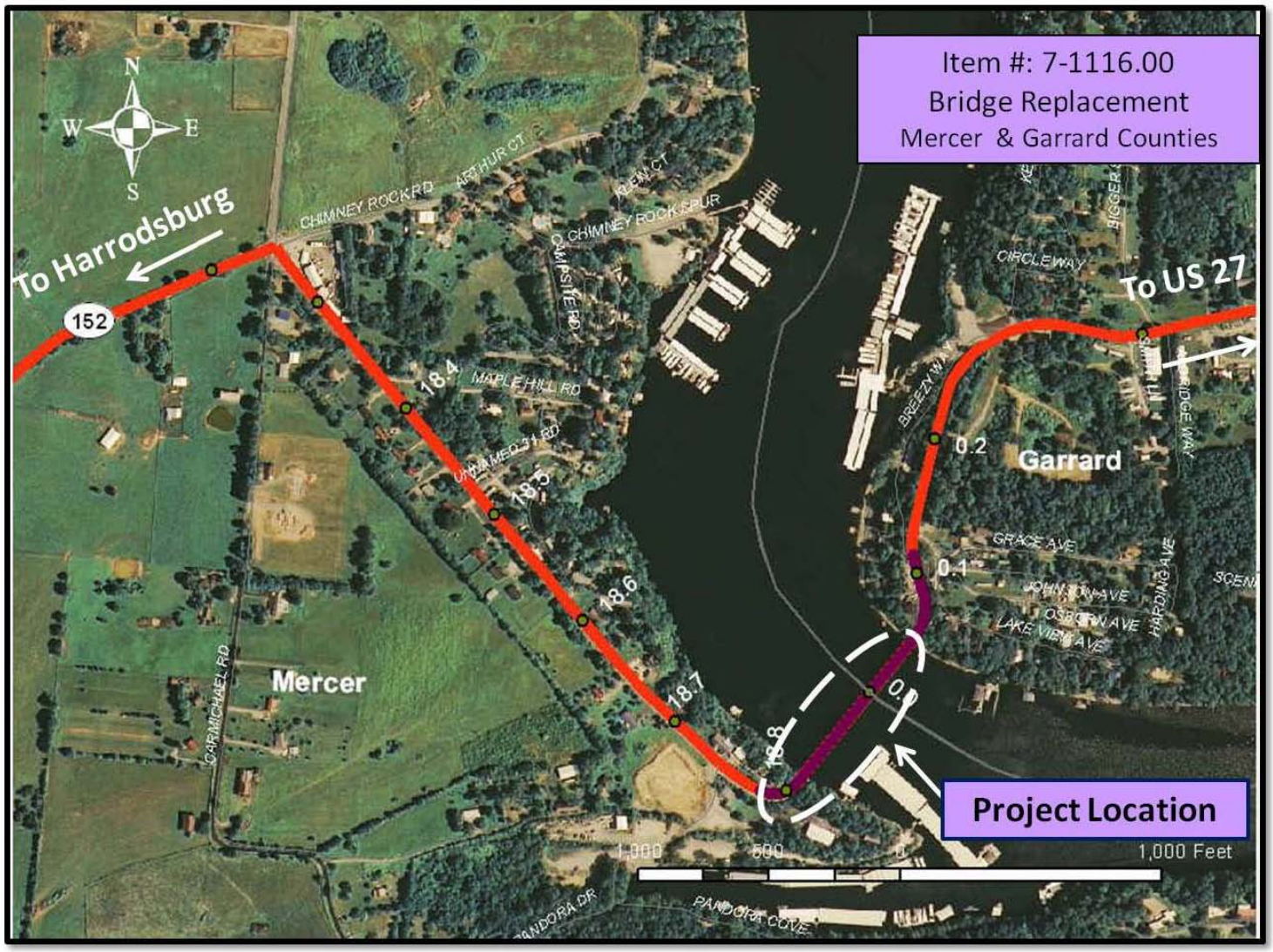
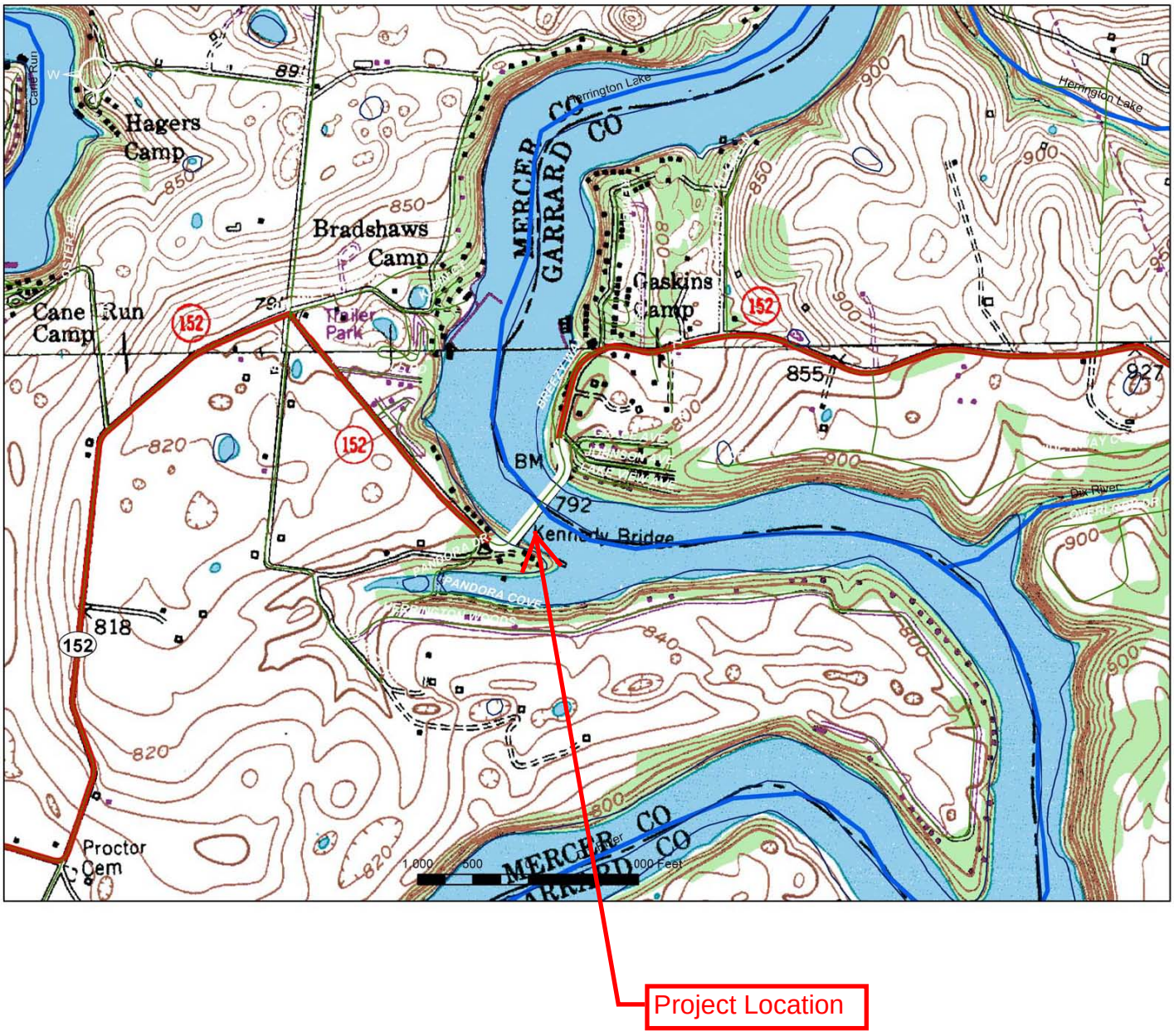


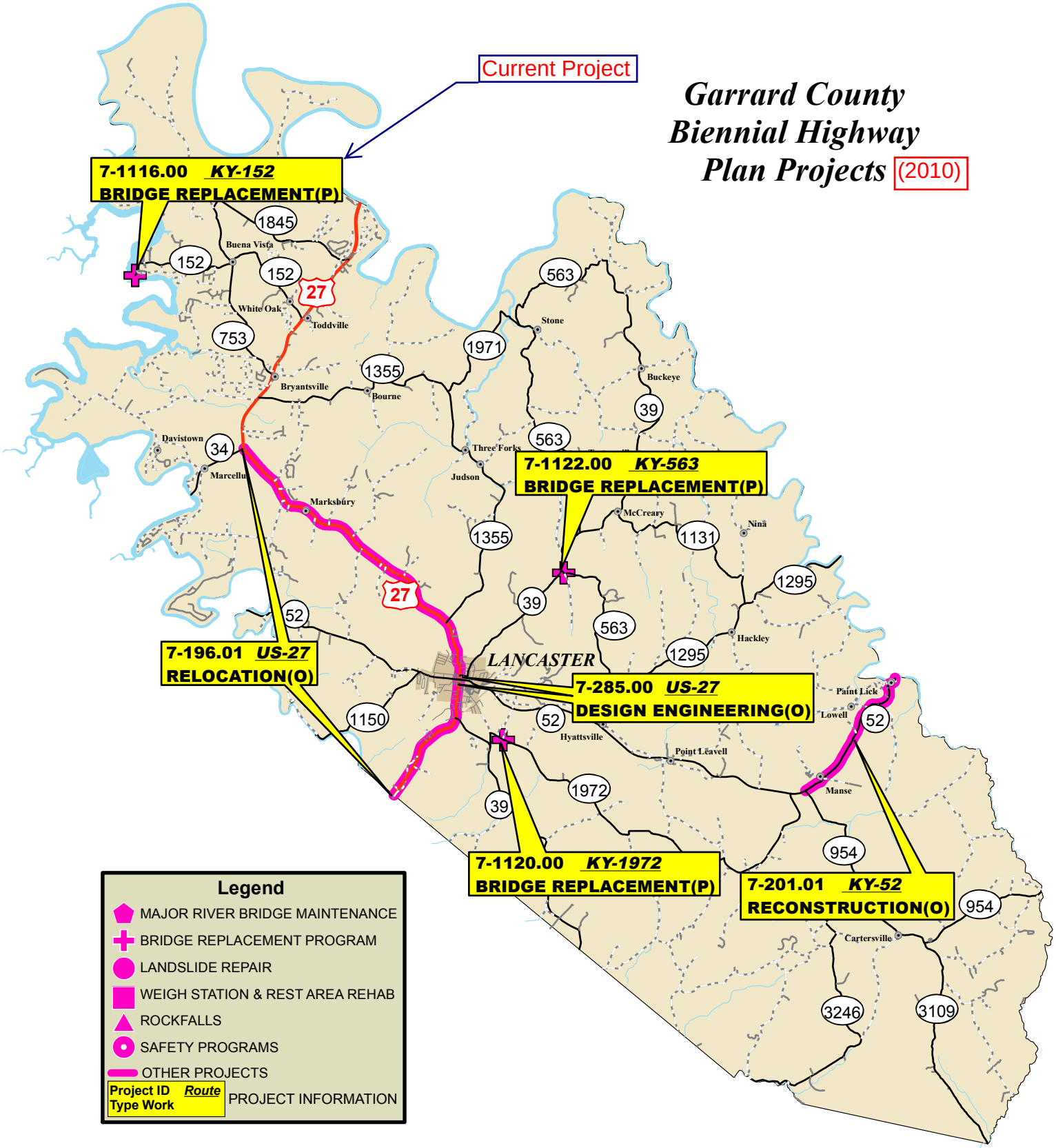
EXHIBIT 2: TOPOGRAPHIC MAP

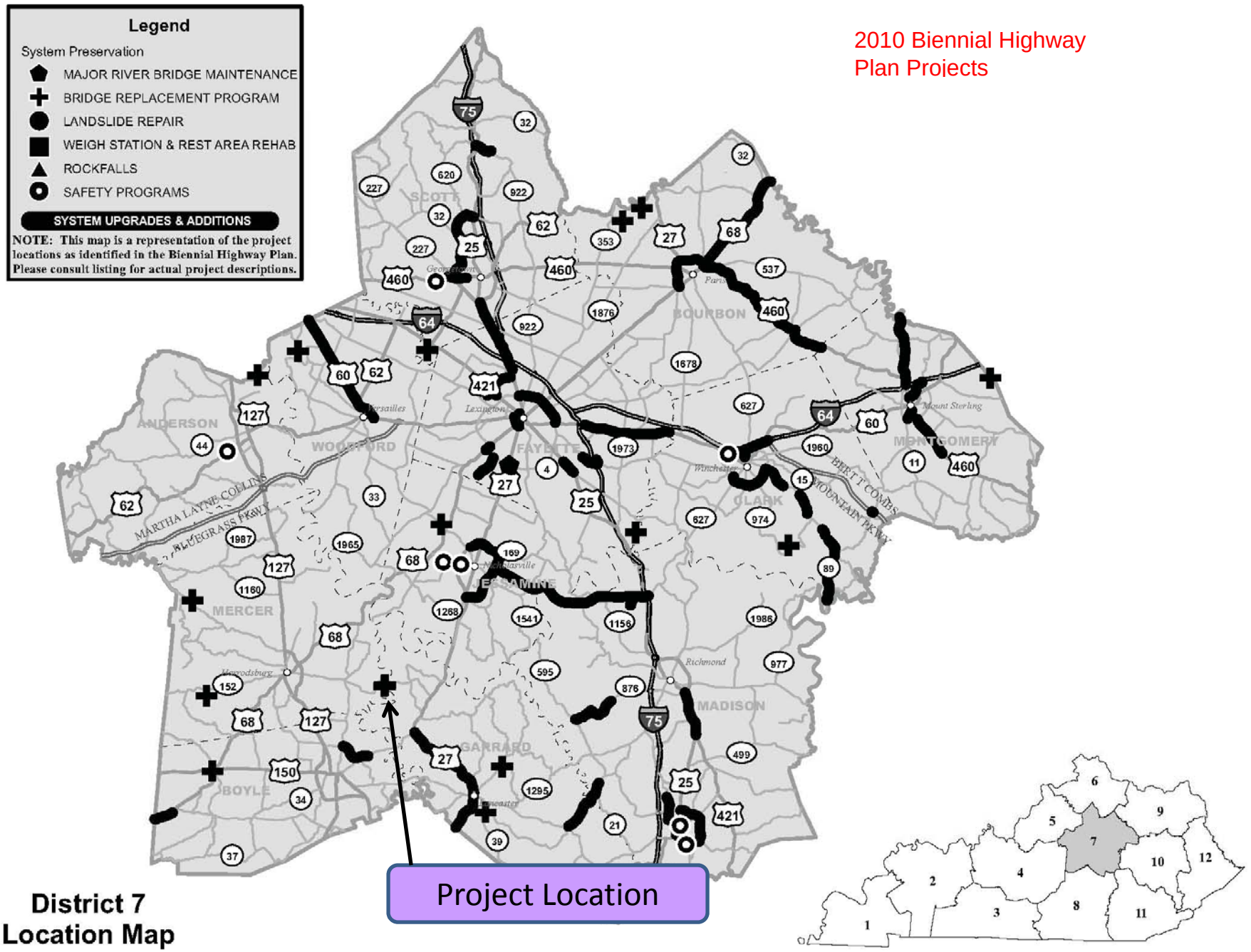


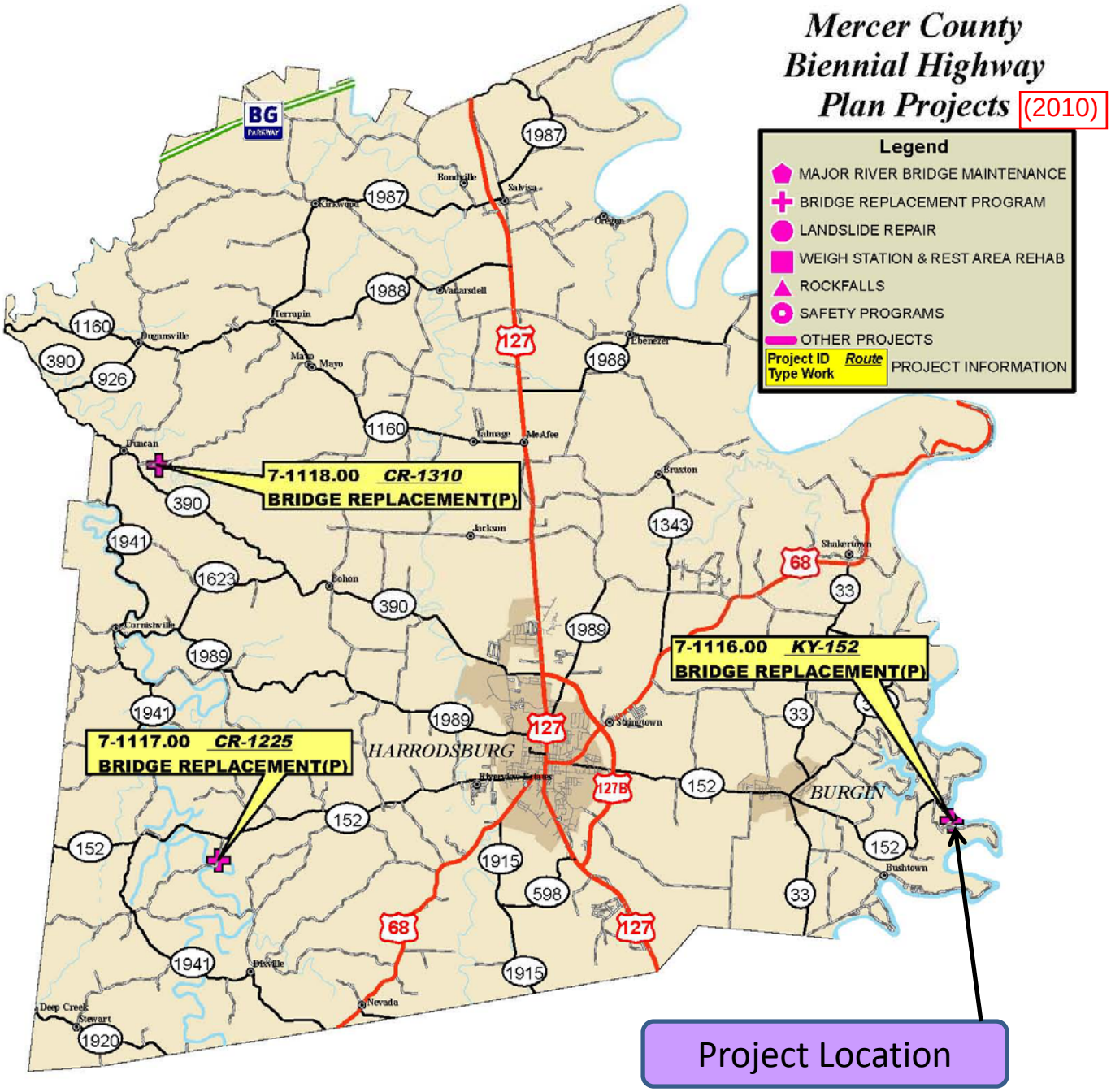
APPENDIX B

2010 General Assembly's Enacted Roadway Plan

for Mercer, Garrard & District 7


Garrard County
Biennial Highway
Plan Projects (2010)
Current Project
7-1116.00 KY-152
BRIDGE REPLACEMENT(P)
7-1122.00 KY-563
BRIDGE REPLACEMENT(P)
7-196.01 US-27
RELOCATION(O)
7-285.00 US-27
DESIGN ENGINEERING(O)
7-1120.00 KY-1972
BRIDGE REPLACEMENT(P)
7-201.01 KY-52
RECONSTRUCTION(O)
LANCASTER
Buena Vista
White Oak
Toddville
Bryantsville
Bourne
Davistown
Marcellus
Marksbury
Three Forks
Judson
Stone
Buckeye
McCreary
Nina
Hackley
Hyattsville
Point Leavell
Paint Lick
Lowell
Manse
Cartersville
1845
152
753
1355
1971
563
39
34
52
27
1131
1295
1150
1972
954
3246
3109
Legend
MAJOR RIVER BRIDGE MAINTENANCE
BRIDGE REPLACEMENT PROGRAM
LANDSLIDE REPAIR
WEIGH STATION & REST AREA REHAB
ROCKFALLS
SAFETY PROGRAMS
OTHER PROJECTS
Project ID Route
Type Work
PROJECT INFORMATION


Legend
System Preservation
MAJOR RIVER BRIDGE MAINTENANCE
BRIDGE REPLACEMENT PROGRAM
LANDSLIDE REPAIR
WEIGH STATION & REST AREA REHAB
ROCKFALLS
SAFETY PROGRAMS
SYSTEM UPGRADES & ADDITIONS
NOTE: This map is a representation of the project locations as identified in the Biennial Highway Plan. Please consult listing for actual project descriptions.
2010 Biennial Highway Plan Projects
SCOTT
BOURBON
ANDERSON
WOODFORD
FAYETTE
CLARK
MONTGOMERY
MERCER
GARRARD
MADISON
BOYLE
Georgetown
Versailles
Lexington
Winchester
Mount Sterling
Harrodsburg
Richmond
Danville
MARTHA LAYNE COLLINS BLUEGRASS PKWY
BERT T COMBS MOUNTAIN PKWY
Project Location
District 7
Location Map


Mercer County
Biennial Highway
Plan Projects (2010)
Legend
MAJOR RIVER BRIDGE MAINTENANCE
BRIDGE REPLACEMENT PROGRAM
LANDSLIDE REPAIR
WEIGH STATION & REST AREA REHAB
ROCKFALLS
SAFETY PROGRAMS
OTHER PROJECTS
Project ID Route
Type Work
PROJECT INFORMATION
7-1118.00 CR-1310
BRIDGE REPLACEMENT(P)
7-1116.00 KY-152
BRIDGE REPLACEMENT(P)
7-1117.00 CR-1225
BRIDGE REPLACEMENT(P)
HARRODSBURG
BURGIN
Project Location

APPENDIX C

PROJECT AUTHORIZATION

PROJECT AUTHORIZATION

AUTHORIZATION NO: 84690 0

It is hereby ordered that the project herein described be undertaken and accomplished within the funding level authorized

Project Id	Project Id Number	Federal Project No.	District HWY	District ADD	County	6 Yrp Item Number
	084 0152 018-019 040 0152 000-001	BRO 5129(012)	07		MERCER GARRARD	07-01116

TYPE OF PROJECT	ROUTE NUMBER	FACILTY NAME	SYSTEMS
080 BRIDGE REPLACEMENT	KY 152	KENNEDY BRIDGE ROAD	

PROJECT LENGTH	SCOPE OF PROJECT
0.1 MI	REPLACE BRIDGE AND APPROACHES ON KY-152 OVER HERRINGTON LAKE AT THE MERCER/GARRARD COUNTY LINE (B05).

NUMBER OF BRIDGES	PROGRAM PRIORITY	RS ITEM NUMBER	6 YR PLAN ITEM PARENT NUMBER
			7-01116.00-2008

PROJECT PHASE AND RESPONSIBILITY	PLANNING	DESIGN	RIGHT OF WAY	UTILITIES
	DOH	DOH		
	CONSTRUCTION	TITLE DEEDED TO:	MAINTENANCE	OTHER

FUNDING & TIME ACCOUNTABILITY	PARTICIPATING AGENCIES				
	FEDERAL FHWA	STATE	LOCAL	OTHER	

REQUESTED FUNDS FOR THIS AUTHORIZATION

ITEM NUMBER SUFFIX	PHASE	FUND	PROGRAM	FISCAL YEAR FEDERAL	FISCAL YEAR STATE	FEDL APPR. CODE	ENACTED 6YR PLAN AMOUNT	% DIFFERENCE VS 6YP AMT	CURRENT FUNDING REQUEST
07-01116.00	D	12	FD52	2011	2011	H100			35,000

Current Estimate Approved by	RT	Date 10/25/2010	Current Funding Request Total	35,000

AUTHORIZATION SUMMARY FOR THIS 10-1 SERIES

PHASE	INITIAL PROJECT ESTIMATE	CURRENT PROJECT ESTIMATE	TOTAL AUTHORIZATION TO DATE (INCL. CURRENT REQUEST)
Design	$ 35,000	$ 35,000	$ 35,000
Total	$ 35,000	$ 35,000	$ 35,000

REMARKS: THIS AUTHORIZATION PROVIDES INITIAL DESIGN FUNDS FOR THE PROJECT. DE.

Project Approval Recommended By:
KFD

10/26/2010

Signed and Approved by:
MWH

10/26/2010

PROJECT AUTHORIZATION

AUTHORIZATION NO: 84690 1

It is hereby ordered that the project herein described be undertaken and accomplished within the funding level authorized

Project Id	Project Id Number	Federal Project No.	District HWY	District ADD	County	6 Yrp Item Number
	084 0152 018-019 040 0152 000-001	BRO 5129(012)	07		MERCER GARRARD	07-01116

TYPE OF PROJECT	ROUTE NUMBER	FACILTY NAME	SYSTEMS
080 BRIDGE REPLACEMENT	KY 152	KENNEDY BRIDGE ROAD	

PROJECT LENGTH	SCOPE OF PROJECT
0.1 MI	REPLACE BRIDGE AND APPROACHES ON KY-152 OVER HERRINGTON LAKE AT THE MERCER/GARRARD COUNTY LINE (B05).

NUMBER OF BRIDGES	PROGRAM PRIORITY	RS ITEM NUMBER	6 YR PLAN ITEM PARENT NUMBER
			7-01116.00-2008

PROJECT PHASE AND RESPONSIBILITY	PLANNING	DESIGN	RIGHT OF WAY	UTILITIES
	DOH	DOH		
	CONSTRUCTION	TITLE DEEDED TO:	MAINTENANCE	OTHER

FUNDING & TIME ACCOUNTABILITY	PARTICIPATING AGENCIES			
	FEDERAL FHWA	STATE	LOCAL	OTHER

REQUESTED FUNDS FOR THIS AUTHORIZATION

ITEM NUMBER SUFFIX	PHASE	FUND	PROGRAM	FISCAL YEAR FEDERAL	FISCAL YEAR STATE	FEDL APPR. CODE	ENACTED 6YR PLAN AMOUNT	% DIFFERENCE VS 6YP AMT	CURRENT FUNDING REQUEST
07-01116.00	D	12	FD52	2010	2011	L1CE			965,000

Current Estimate Approved by	RWN	Date 11/18/2010	Current Funding Request Total	965,000

AUTHORIZATION SUMMARY FOR THIS 10-1 SERIES

PHASE	INITIAL PROJECT ESTIMATE	CURRENT PROJECT ESTIMATE	TOTAL AUTHORIZATION TO DATE (INCL. CURRENT REQUEST)
Design	$ 35,000	$ 1,000,000	$ 1,000,000
Total	$ 35,000	$ 1,000,000	$ 1,000,000

REMARKS: THIS MODIFICATION PROVIDES ADDITIONAL DESIGN FUNDS FOR PHASE I DESIGN AND ENVIRONMENTAL WORK FOR BRIDGE REPLACEMENT. DE.

Project Approval Recommended By:
KFD

12/1/2010

Signed and Approved by:
MWH

12/5/2010

APPENDIX D

CRASH DATA

Safety – Crashes on KY 152

Project Area past 10 year data

Mercer County

MP 18.7 to MP 18.938, 10 Yr Crash Data (1/2000 to 1/2011)

Date	MP	Manner of Collision	Injury	Units	Time	Road	Weather
8/4/2009	18.864	Sideswipe-opposite	0	2	1400	Wet	Cloudy
5/15/2004	18.9	Sideswipe-opposite	0	2	1915	Dry	Clear
2/5/2002	18.938	Ran Off – Struck a tree	1	1	1210	Dry	Clear

Garrard County

MP 0.0 to MP 0.5, 10 Yr Crash Data (1/2000 to 1/2011)

Date	MP	Manner of Collision	Injury	Units	Time	Road	Weather
6/30/2005	0.038	Ran Off Road	0	1	2352	Dry	Cloudy
5/4/2010	0.052	Ran Off Road	1	1	1640	Dry	Clear
9/24/2010	0.053	Rear End	0	2	2106	Wet	Cloudy

APPENDIX E

KYTC COMMON GEOMETRIC PRACTICE GUIDELINES

EXHIBIT 700-02

COMMON GEOMETRIC PRACTICES
RURAL COLLECTOR ROADS

Project Location

		TRAFFIC VOLUME			
	TERRIAN	UNDER 400 A.D.T.	400-2000 A.D.T.		OVER 2000 A.D.T.
MINIMUM DESIGN SPEED (7) (M.P.H.)	LEVEL	40	50		60
	ROLLING	30	40		50
	MOUNTAIN	20	30		40
PAVEMENT WIDTH (FEET) (1) (8)	DESIGN SPEED	UNDER 400 A.D.T.	400-1500 A.D.T.	1500-2000 A.D.T.	OVER 2000 A.D.T.
	20 MPH	20 (9)	20	22	24
	25 MPH				
	30 MPH				
	35 MPH		22		
	40 MPH				
	45 MPH	20			
	50 MPH				
	55 MPH	22		24	
	60 MPH				
MINIMUM GRADED SHOULDER WIDTH (FEET) (6)	ALL SPEEDS	2	5 (10)	6	8
MIN. CLEAR ROADWAY WIDTH OF NEW AND RECONSTRUCTED BRIDGES	ALL SPEEDS	APPROACH ROADWAY WIDTH			

MINIMUM RADIUS (FEET)	DESIGN SPEED	eMAX. 4%	eMAX. 6%	eMAX. 8%
	20 MPH	125	115	105
	25 MPH	205	185	170
	30 MPH	300	275	250
	35 MPH	420	380	350
	40 MPH	565	510	465
	45 MPH	730	660	600
	50 MPH	930	835	760
	55 MPH	1190	1065	965
	60 MPH	1505	1340	1205

NORMAL PAVEMENT CROSS SLOPES (4)	RATE OF CROSS SLOPE = 2%									
NORMAL SHOULDER CROSS SLOPES	EARTH = 8%						PAVED = 4%			
MAXIMUM GRADE (PERCENT) (5)	M.P.H.	20	25	30	35	40	45	50	55	60
	LEVEL	7						6		5
	ROLLING	10		9		8		7		6
	MOUNTAIN	12	11	10				9		8
MINIMUM STOPPING SIGHT DISTANCE (2)	(FEET)	115	155	200	250	305	360	425	495	570
MINIMUM PASSING SIGHT DISTANCE (3)	(FEET)	710	900	1090	1280	1470	1625	1835	1985	2135

(1) WIDEN PAVEMENT ON CURVES IN ACCORDANCE WITH APPROVED DESIGN STANDARDS. REFER TO CURRENT STANDARD DRAWING FOR ADDITIONAL DETAIL.

(2) MINIMUM STOPPING SIGHT DISTANCE BASED ON HEIGHT OF EYE OF 3.5 FT AND HEIGHT OF OBJECT OF 2.0FT. CONSIDER BOTH HORIZONTAL AND VERTICAL ALIGNMENTS.

(3) MINIMUM PASSING SIGHT DISTANCES BASED ON HEIGHT OF EYE 3.5 FT AND HEIGHT OF OBJECT OF 3.5 FT. CONSIDER BOTH HORIZONTAL AND VERTICAL ALIGNMENTS.

(4) NORMAL PAVEMENT CROSS SLOPES ON BRIDGES IS 2%.

(5) MAY USE ONE PERCENT STEEPER MAXIMUM GRADES ON SHORT LENGTHS (LESS THAN 500 FT) AND ON ONE-WAY DOWN GRADES.

(6) WIDEN 3 FT FOR GUARDRAIL.

(7) DOCUMENT AND RETAIN JUSTIFICATION FOR A DESIGN SPEED LESS THAN THE REGULATORY OR POSTED SPEED IN THE PROJECT FILES.

(8) ON ROADWAYS TO BE RECONSTRUCTED, A 22 FT TRAVELLED WAY MAY BE RETAINED WHERE THE SAFETY RECORDS AND ALIGNMENT ARE SATISFACTORY.

(9) 18 FT MINIMUM WIDTH MAY BE USED FOR ROADWAYS WITH DESIGN VOLUMES UNDER 250 A.D.T.

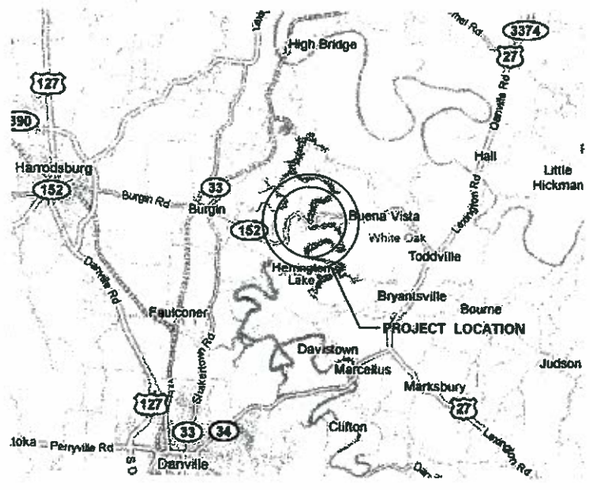
(10) SHOULDER WIDTH MAY BE REDUCED FOR DESIGN SPEEDS GREATER THAN 30 MPH PROVIDED A MINIMUM ROADWAY WIDTH OF 30 FT IS MAINTAINED.

APPENDIX F

EXISTING ROADWAY PLANS
(partial sheets from 1940, 1991, 2009 Plans)

TRANSPORTATION CABINET
DEPARTMENT OF HIGHWAYS

MERCER COUNTY
HARRODSBURG-LANCASTER ROAD, KY 152
OVER HERRINGTON LAKE



ESTIMATE OF QUANTITIES

BID ITEM CODE		03298			21969NN	22020NN						08435																	
BID ITEM		Exp. Joint Replacement 4"	Bridge Handrail/ Guardrail Repair	Reinforce Bridge Guardrail	Bearing Replacement	Repair Beam	Floor Beam Bearing Repair	Cross-Bracing Repair	Lower Lateral Bracing Repair	Lacing Bar Repair	Repair Truss Member	Jack & Support Bridge Span	Reinforce Truss Members	Reinforce Truss Joints															
UNIT		L.F.	L.F.	L.F.	EA.	EA.	EA.	EA.	EA.	EA.	EA.	L.S.	L.F.	EA.															
Substructure	Abutment #7	20			2	2																							
	Pier #6		10																										
	Pier #5						2																						
	Pier #4	20					4																						
	Pier #3	20					4																						
	Pier #2						2																						
	Abutment #1	20																											
Superstructure				1596				6	21	1000	40	1	2393	126															
BRIDGE TOTALS		80	10	1596	2	2	12	6	21	1000	40	1	2393	126															

INDEX OF SHEETS

Sheet No.	Description
S1	Title Sheet
S2	General Notes
S3	Layout
S4	Guardrail Details
S5	Expansion Joint Replacement
S6	Repair Beam
S7	Typical Joint Numbering
S8	Installation Sequence
S9	L0, L0' Repair Details
S10	L0 Span 4 Repair Details
S11	M3, M1' Repair Details
S12	U2, U2' Repair Details
S13	U3, U3' Reinforcing Details
S14	U4, U4' Reinforcing Details
S15	L4, L4' Repair Details
S16	L6, L6' Repair Details
S17	Bracing Repair
S18	Lower Lateral Bracing Repair
S19	Member Patching Detail
S20	Detour Route
S21	Maintenance of Traffic - Phasing Plan
S22	Vicinity Map

SPECIAL NOTES

SPECIAL PROVISIONS

STANDARD DRAWINGS

BBP-001-11	Elastomeric Bearing Pads for Prestressed Beams
BBP-002-04	Bearing Details
BJE-001-11	Neoprene Expansion Dams and Armored Edges

SPECIFICATIONS

2004 Standard Specifications for Road and Bridge Construction.

2002 AASHTO Standard Specifications for Highway Bridges.

Commonwealth of Kentucky
DEPARTMENT OF HIGHWAYS

COUNTY: **MERCER**

ROUTE: KY 152 | CROSSING: HERRINGTON LAKE

TITLE SHEET

BRIDGE NUMBER: FE02-084-0152-B00005N

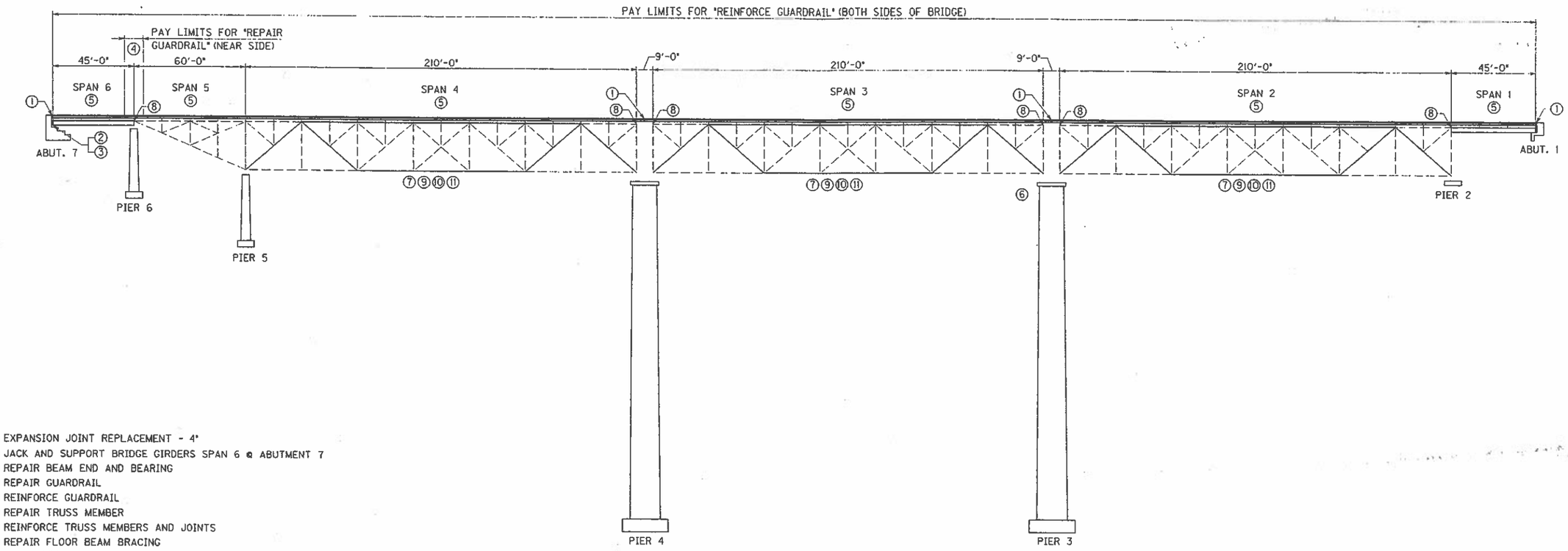
PREPARED BY: Division of Structural Design
AMERICAN ENGINEERS, INC.

SHEET NO. S1

DRAWING 2230

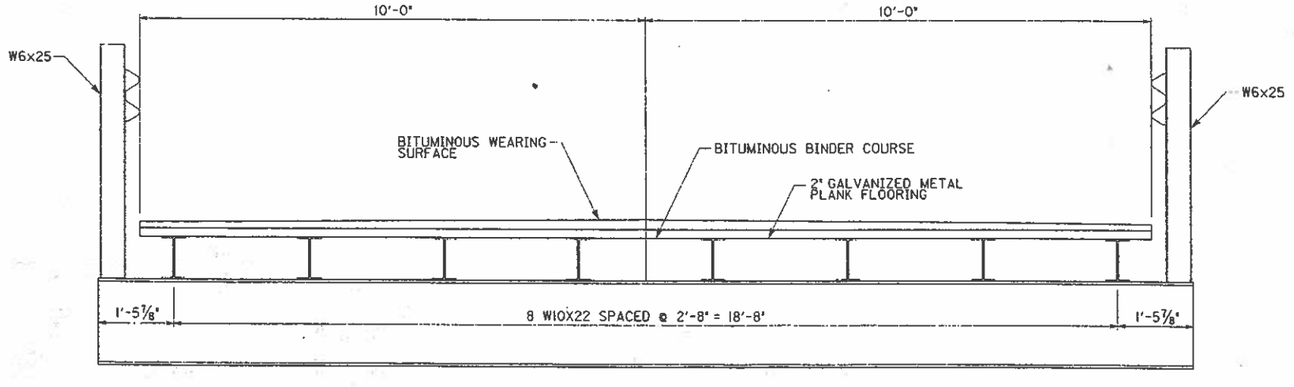
TO BUENA VISTA

TO BURGIN



① EXPANSION JOINT REPLACEMENT - 4"
② JACK AND SUPPORT BRIDGE GIRDERS SPAN 6 @ ABUTMENT 7
③ REPAIR BEAM END AND BEARING
④ REPAIR GUARDRAIL
⑤ REINFORCE GUARDRAIL
⑥ REPAIR TRUSS MEMBER
⑦ REINFORCE TRUSS MEMBERS AND JOINTS
⑧ REPAIR FLOOR BEAM BRACING
⑨ CROSS BRACING REPAIR
⑩ LOWER LATERAL BRACING REPAIR
⑪ LACING BAR REPAIR

ELEVATION
(FACING SOUTH)



EXISTING TYPICAL

Commonwealth of Kentucky
DEPARTMENT OF HIGHWAYS

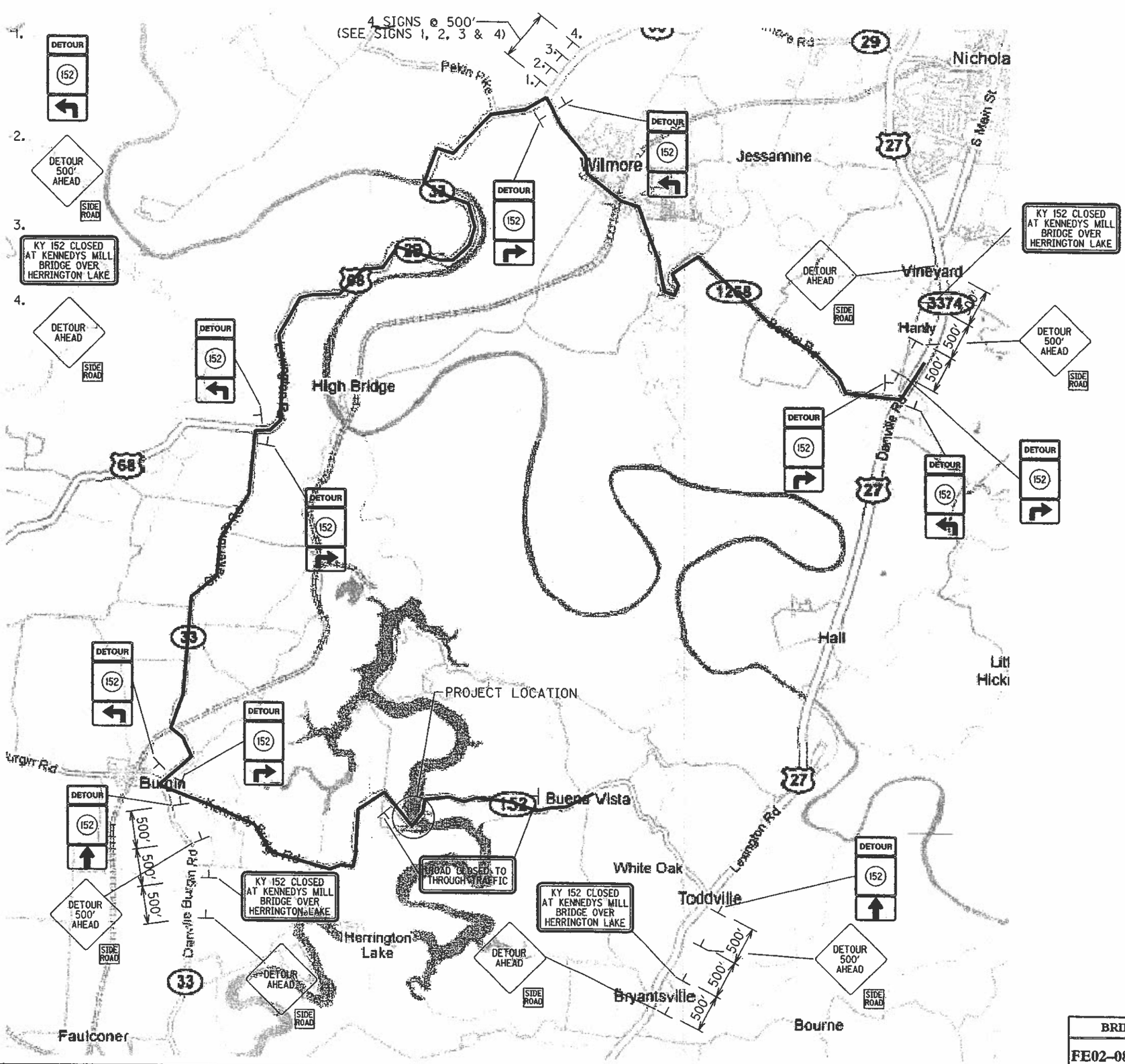
COUNTY: **MERCER**

ROUTE: **KY 152**

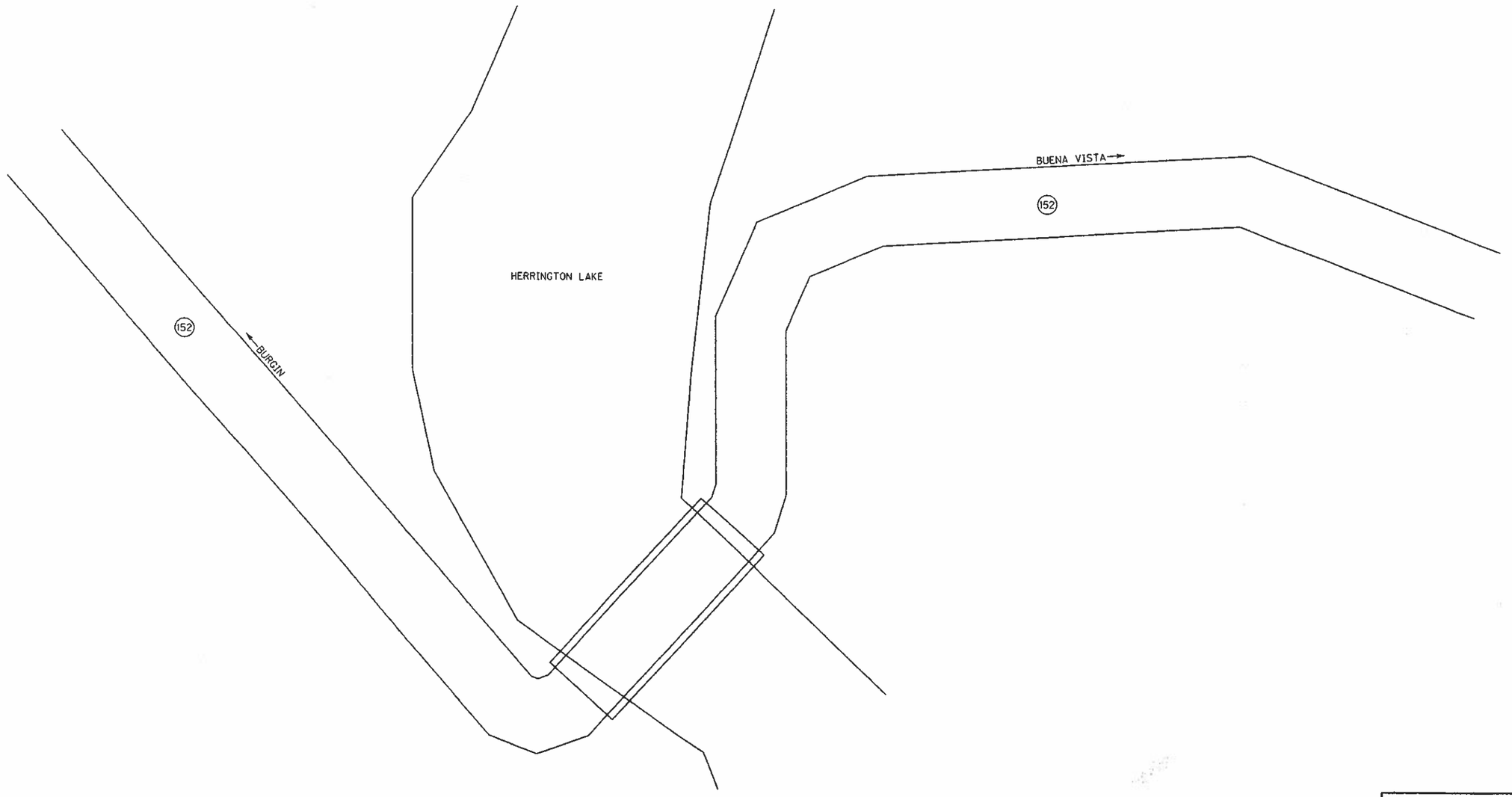
CROSSING: **HERRINGTON LAKE**

LAYOUT

BRIDGE NUMBER	PREPARED BY:	SHEET
FE02-084-0152-B00005N	Division of Structural Design *AMERICAN ENGINEERS, INC.*	S3 DRAWING 2230



Commonwealth of Kentucky DEPARTMENT OF HIGHWAYS	
COUNTY **MERCER**	
ROUTE KY 152	CROSSING HERRINGTON LAKE
DETOUR ROUTE	
BRIDGE NUMBER FE02-084-0152-B00005N	PREPARED BY Division of Structural Design *AMERICAN ENGINEERS, INC.*
	SHEET NO S20 DRAWING NO 22305



Commonwealth of Kentucky
DEPARTMENT OF HIGHWAYS

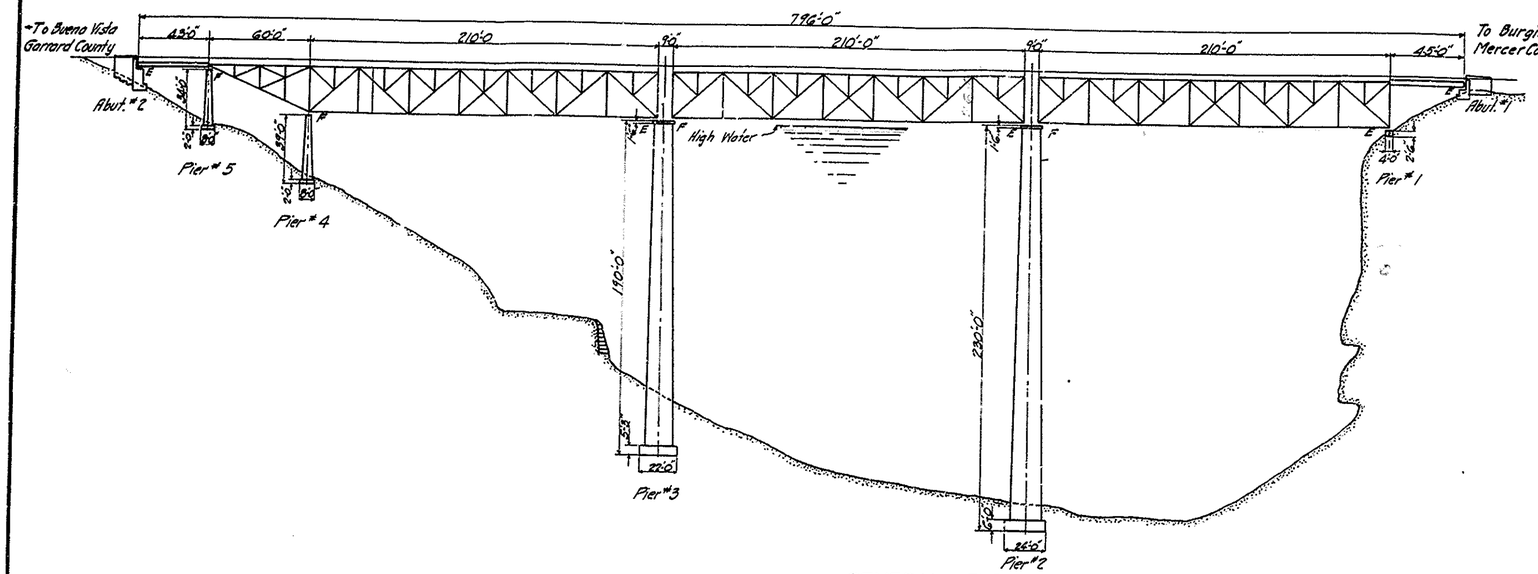
COUNTY
MERCER

ROUTE	CROSSING
KY 152	HERRINGTON LAKE

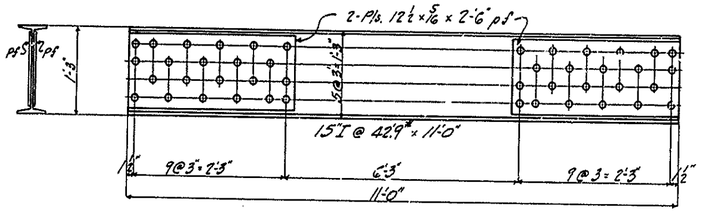
VICINITY MAP

BRIDGE NUMBER	PREPARED BY	SHEET NO.
FE02-084-0152-B00005N	Division of Structural Design *AMERICAN ENGINEERS, INC.*	S22 DRAWING NO. 2230

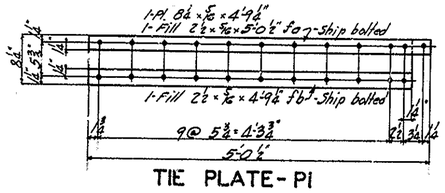
FED. ROAD DIST.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY.				



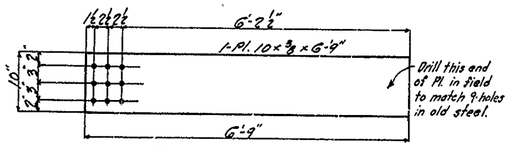
GENERAL ELEVATION



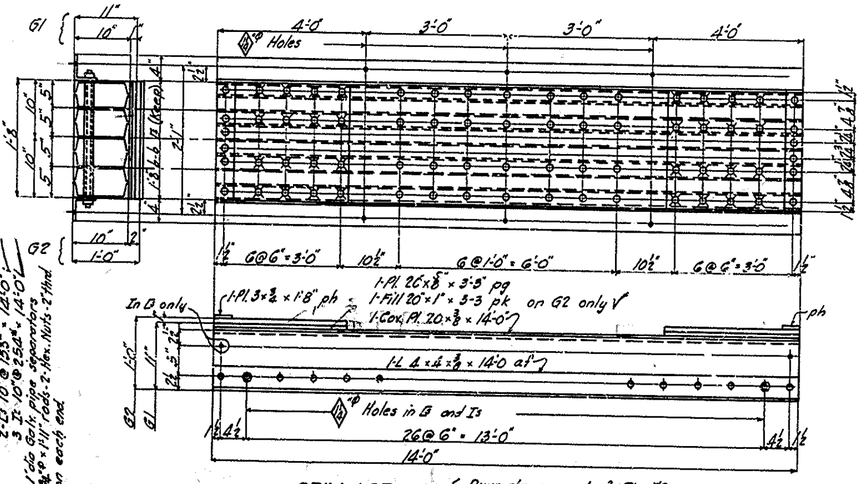
JACKING BEAM - JBI



TIE PLATE - PI

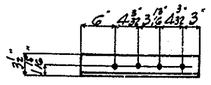


TIE RLATE - P2

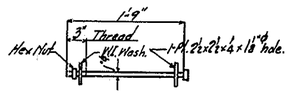


GRILLAGE G1 { Down-stream end of Pier #2 / Both ends of Pier #3

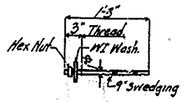
GRILLAGE G2 - Up-stream end of Pier #2



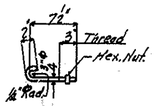
GUIDE ANGLE-AI



ANCH. BOLT-ABI



ANCH BOLT-AB2



HOOK BOLT-HI

GENERAL NOTE

SPECIFICATIONS- Kentucky State Highway Department. Standard 1932 with adopted amendments.
INSPECTION - State Highway Department. Frankfort, Ky.
TEST REPORT ON STRUCTURAL STEEL- The State Highway Commission shall be furnished certified copies of mill test reports, showing that structural steel shapes for this work meet requirements of the Specifications.
SHOP CLEANING- All steel to be thoroughly cleaned of rust, loose mill scale, dirt, oil or grease, and all other foreign substances.
SHOP PAINTING - No shop paint required.
FIELD CLEANING AND PAINTING All new steel to be thoroughly cleaned and given one coat of Red Lead or Basic Sulphate Blue Lead paint, followed by one coat each of No. 1 and No. 2. White Lead paint in the order named. Paint on old steel that is damaged by repair work to be replaced.
CONCRETE - All to be Class 'A'
REINFORCEMENT- To be deformed bars. Dimensions from face of concrete are clear distances. Dimensions for bar spacing are center to center of bars. Bars shall be wired at all intersections and held in correct position by precast mortar or concrete blocks, spaced not more than 50 diameters of supported bar.
CORNERS - All exposed corners to be chamfered '3'
SHEET LEAD To be commercial grade. Payment will be made for sheet lead at the contract unit price per pound complete in place. as specified.

SPECIAL NOTE

Work to be done consists of encasing Pier #5 and jacking ends of spans on Piers #2 and #3 and replacing old shoes with Grillages G1 and G2. All traffic on bridge to be stopped during jacking operations.

The following suggested order of procedure may be varied by the contractor; who shall assume all responsibility for safety of bridge and do any additional work he may think necessary, in order to complete the work required by plans and specifications. The cost of any additional work to be included in the unit bid prices. The unit bid prices shall include all costs for complete acceptable work.

SUGGESTED ORDER OF PROCEDURE

1. Remove handrail above pier.
2. Cut loose L bracing between vert. posts at bottom and at X, drill post is for struts S1, and bolt S1 in place, on both spans over pier.
3. Cut out lacing in posts as shown, mark and drill new holes, and place pls. P1 and P2.
4. Cut off and drill brac. Ls, then rivet up P1, P2, S1, and brac.
5. Remove shoe Ls and burn Inch. Bolts off as noted, and check top of pier for uniform seat for G1 or G2.
6. Place JB1, jacking Sill and jacks. Send G1, or G2 as read. across end of pier outside of old shoes, then raise spans just enough to remove old shoes, and slide new grillage into place. Bolt guide Ls AI2 in place before lowering jacks to insure proper placing of grillage
7. Wedge up grillage and place sheet lead in position shown. Use ½" thickness of lead under each end of each grillage.
8. Remove jacks and anchor grillage to pier. Rivet guide Ls AI2.
9. Repeat jacking operation at other end of S1, and repeat entire operation at other pier.

Any parts of the present bridge, not included in proposed work, that are temporarily removed or changed to complete the proposed work shall be replaced in as good condition as before removal or change at the full expense of the Contractor.

REQUIRED LIST - STRUCT. STEEL.

Mark	No.	Description
S1	4	Jacking Strut
JB1	1	Jacking Beam
G1	3	Grillage
G2	1	"
P1	8	Tie Pls.
AI[R]	8	Guide Ls
AI[L]	8	" "
AB1	16	Anchor Bolts
AB2	8	" "
H1	10	Hook Bolts (3 extra)
P2	8	Tie Plates
⅛	16	28 lb lead Sheets, 3'-0" long (cut to order)

Note- All Rivets ⅞" ø
All Open holes 13/16" ø unless noted.

ESTIMATE OF QUANTITIES

Structural Steel	18250.0	Lb.
Sheet Lead	1000	"
Reinforcing Steel	4600.0	"
Concrete Class 'A'	49.0	Cu. Yds.
Structure Excavation, Unclassified	10.0	Cu. Yds.

DESIGNED BY E.H.C. DATE 10-32
TRACED BY R.H.C. DATE 10-32
CHECKED BY H. Griffith DATE 10-23
REVISED DATE
REVISED DATE
REVISED DATE

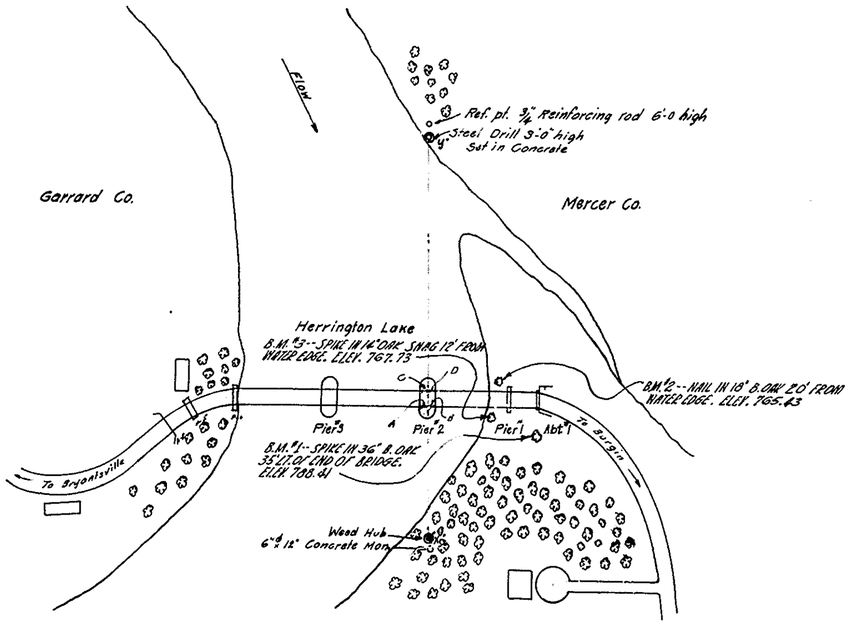
Repairs to Kennedys Mill Bridge Sheet 1 of 3

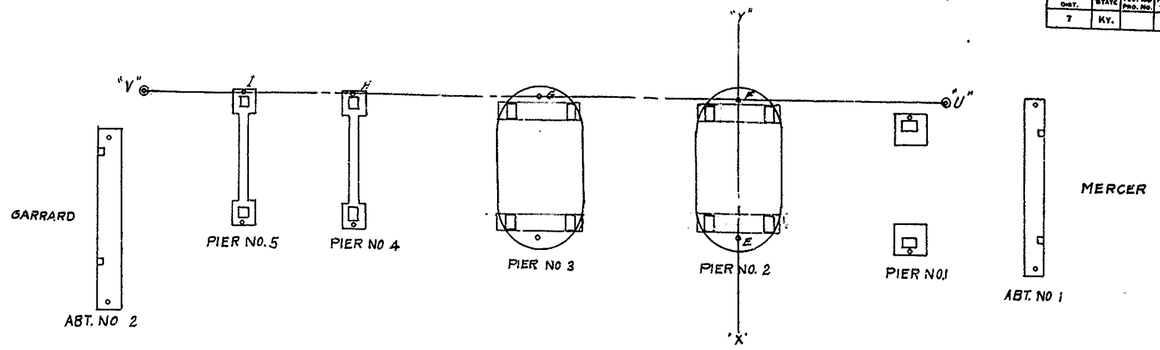
COMMONWEALTH OF KENTUCKY
STATE HIGHWAY DEPARTMENT
FRANKFORT
COUNTY OF
MERCER - GARRARD
HARRODSBURG - LANCASTER ROAD
STATION PROJECT NO.
Approved: Chairman
Number 5493

11 F 2492-1

BRIDGE

FED. ROAD DIST.	STATE	FED. AID PRO. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY.				





NOTE: On the line was sighted from wood hub marked "X" across top of Pier No. 2 to the steel drill marked "Y". Drill holes in top of pier on this line and set copper plugs in concrete grout of places shown by small circles on plan and mark with a center punch to be exactly on the line.
Set a new concrete monument properly centered at "U" and sight across Piers 2, 3, 4 & 5 to a new monument set at "V". On this line copper plugs are to be set at small circles shown on plans and center marked. These plugs are to serve for alignment also as bases to set level rod when taking elevations. On opposite side of piers copper plugs are to be set for elevation readings.
FUTUEE READINGS: Measure distances from line of sight to plugs and record distance as right or left of line as run from "X" to "Y" and "U" to "V".
Each date of observation read the thermometer and record the temperature.

Special Observations Pier No 2					Elevations													
Date	A	B	C	D	Abt No 1		Pier No 1		Pier No 2		Pier No 3		Pier No 4		Pier No 5		Abt No 2	
					Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
3- 7-34	4.37	5.36	4.50	5.77														
2- 5-36	4.39	5.94	3.98	6.29	786.33	786.33	761.44	761.47	763.62	763.49	761.71	761.68	761.41	761.47	786.45	786.44	786.26	786.26
3- 5-36	4.35	5.98	3.95	6.32														
4- 6-36	4.35	5.98	3.95	6.32														
11- 27-36	4.38	5.95	3.93	6.34														
12- 20-37	4.28	6.05	3.80	6.47														
1- 18-38	4.04	6.29	3.65	6.62														
2- 4-38	4.15	6.18	3.75	6.52														
2- 17-38	4.15	6.18	3.72	6.55														
3- 16-38	4.20	6.13	3.75	6.52														
4- 7-38	4.20	6.13	3.75	6.52														
11- 14-38	4.20	6.13	3.74	6.53														
12- 20-38	4.12	6.21	3.64	6.63														
1- 20-39	4.12	6.21	3.62	6.65														
2- 20-39	4.10	6.23	3.62	6.65														
5- 2- 39	4.10	6.23	3.63	6.64														
1- 15-40	3.88	6.45	3.44	6.73														
1- 26-42	3.90	6.43	3.48	6.79														
3- 15-43	3.95	6.38	3.50	6.77														
3 18-43	3.90	6.43	3.40	6.87														
11- 18-43	3.99	6.34	3.47	6.80														
2- 24-44	3.74	6.59	3.37	6.90														
2- 6-45	3.77	6.56	3.30	6.97	786.33	786.33	761.48	761.50	763.81	763.69	761.83	761.78	761.58	761.56	786.50	786.49	786.31	786.29
12- 2-45	3.93	6.40	3.38	6.89	786.34	786.36	761.48	761.50	763.80	763.64	761.83	761.77	761.55	761.55	786.49	786.48	786.29	786.27
3- 6-46	3.89	6.44	3.41	6.86	786.34	786.36	761.48	761.50	763.80	763.65	761.83	761.78	761.56	761.56	786.50	786.47	786.31	786.29
1- 27-47	3.81	6.52	3.32	6.95	786.35	786.36	761.48	761.50	763.79	763.65	761.84	761.78	761.57	761.56	786.53	786.52	786.34	786.32
3-24-47	3.87	6.46	3.42	6.85	786.34	786.38	761.47	761.50	763.83	763.66	761.84	761.79	761.58	761.57	786.53	786.51	786.31	786.31
3-9-48	3.84	6.49	3.37	7.00	786.33	786.34	761.48	761.50	763.86	763.69	761.87	761.84	761.60	761.63	786.54	786.53	786.34	786.33

RECORDED BY DATE
REVISED BY DATE
REVISED BY DATE

Date	Temperature	Line "X"-"Y" Rt. or Lft. of Points at E		F		Line "U"-"V" Right or Left of Points at F		G		H		I		Elevations Abt No. 1		Pier No.1		Pier No.2		Pier No. 3		Pier No 4		Pier No. 5		Abt. No. 2	
		Rt.	Lt.	Rt.	Lt.	Rt.	Lt.	Rt.	Lt.	Rt.	Lt.	Rt	Lt.	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left
3-15-50	55°	0.0	1/2"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	786.38	786.36	761.50	761.60	763.77	763.91	761.88	761.92	761.72	761.69	786.55	786.55	792.60	792.60
6-27-50	80°		1/4"											786.36	786.35	761.50	761.49	763.72	763.86	761.80	761.87	761.56	761.57	786.57	786.58	792.63	792.63
10-27-50	72°	0.0	0.0	1/4"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	786.35	786.37	761.50	761.49	763.78	763.87	761.79	761.83	761.53	761.47	786.55	786.56	792.65	792.63
4-11-51	54°	1/16	0.0	1/2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	786.37	786.36	761.50	761.48	763.76	763.87	761.78	761.85	761.58	761.54	786.52	786.53	792.61	792.60
11-14-51	65°	0.0	0.0	0.0	0.0	1/8	"	1/2"		0.0	0.0	0.0	0.0	786.36	786.36	761.50	761.48	763.73	763.88	761.78	761.80	761.56	761.55	786.52	786.52	792.60	792.60
12-16-52	45°	0.0	1/8"	0.0	1/8"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	786.36	786.37	761.50	761.49	763.74	763.88	761.79	761.87	761.54	761.53	786.53	786.53	792.60	792.61
12-23-53	22°	0.0	0.10"	0.0	0.11	0.0	0.0	0.00		0.0	0.0	0.0	0.0	786.39	786.35	761.50	761.50	763.75	763.90	761.81	761.85	761.58	761.55	786.55	786.55	792.62	792.61
6-16-54	92°	0.0	0.05	0.0	0.03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	786.38	786.36	761.50	761.50	763.76	763.90	761.82	761.87	761.61	761.56	786.53	786.56	792.67	792.62
12-21-54	30°	0.0	11/16"	0.0	10/16"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	786.388	786.375	761.50	761.50	763.748	763.828	761.793	761.851	761.570	761.595	786.531	786.545	792.615	792.611
1-17-55	42°	0.0	1"	0.0	8"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	786.389	786.373	761.50	761.50	763.734	763.847	761.760	761.800	761.494	761.464	786.536	786.535	792.618	792.614
2-18-55	55°	0.0	14"	0.0	00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	786.393	786.385	761.50	761.502	763.721	763.912	761.791	761.871	761.511	761.471	786.525	786.525	792.605	792.605
* 3-8-55	44°	Point "Y" under Water.				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	786.344	786.354	761.50	761.488	763.727	763.905	761.747	761.926	761.488	761.626	786.508	786.519	792.595	792.589
3-25-55	43°	"	"	"	"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	786.365	786.353	761.50	761.50	763.718	763.875	761.738	761.845	761.468	761.430	786.543	786.557	792.627	792.625
4-25-55	61°	0.0	1/16"	0.0	1"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	786.360	786.350	761.50	761.498	763.710	763.860	761.723	761.820	761.454	761.469	786.495	786.500	792.580	792.574
5-13-55	75°	0.0	1 7/16	0.0	3/16"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	786.376	786.354	761.50	761.498	763.709	763.86	761.722	761.802	761.479	761.485	786.530	786.542	792.610	792.620
6-15-55	72°	0.0	13/16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	786.366	786.352	761.50	761.498	763.718	763.869	761.740	761.821	761.476	761.482	786.518	786.538	792.615	792.618
7-18-55	85°	0.0	7/8"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	786.377	786.362	761.50	761.488	763.749	763.929	761.749	761.931	761.480	761.491	786.527	786.549	792.628	792.624
8-16-55	83°	0.0	7/8"	0.0	0.0	0.0	0.0	0.0	3/16	0.0	0.0	0.0	0.0	786.391	786.390	761.50	761.488	763.721	763.936	761.755	761.946	761.462	761.488	786.521	786.536	792.607	792.607
10-3-55	65°	0.0	1"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	786.384	786.373	761.50	761.506	763.729	763.920	761.739	761.930	761.474	761.510	786.538	786.545	792.607	792.607
10-21-55	60°	0.0	7/8"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	786.398	786.377	761.50	761.500	763.759	763.90	761.779	761.891	761.510	761.506	786.526	786.546	792.608	792.606
11-21-55	50°	0.0	15/16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	786.387	786.372	761.50	761.50	763.751	763.873	761.829	761.860	761.493	761.504	786.538	786.55	792.627	792.623
12-19-55	36°	0.0	7/8"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	786.381	786.379	761.50	761.50	763.759	763.90	761.788	761.850	761.511	761.504	786.524	786.544	792.616	792.618
1-20-56	38°	0.0	7/16"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	786.387	786.379	761.50	761.50	763.759	763.838	761.797	761.838	761.510	761.506	786.530	786.546	792.609	792.611
* 2-21-56	36°	Point "Y" Under Water				0.0	1"	0.0	0.0	0.0	0.0	0.0	0.0	786.355	786.369	761.50	761.50	763.867	763.915	761.819	761.838	761.582	761.523	786.513	786.542	792.617	792.613
* 3-19-56	32°	Point "Y" Under Water				0.0	16"	16"	0.0	0.0	0.0	0.0	0.0	786.36	786.35	761.50	761.50	763.73	763.90	761.85	761.90	761.58	761.56	786.57	786.55	792.59	792.59
* 4-11-56	40°	Point "Y" Under Water				0.0	16"	1"	0.0	0.0	0.0	0.0	0.0	786.35	786.35	761.50	761.50	763.77	763.89	761.83	761.86	761.60	761.53	786.52	786.55	792.63	792.62
5-18-56	65°	0.0	1/8	0.0	11/16"	0.0	16"	1/16"	0.0	0.0	0.0	0.0	0.0	786.35	786.35	761.50	761.49	763.79	763.89	761.87	761.86	761.65	761.56	786.51	786.53	792.60	792.59
6-19-56	84°	0.0	16"	0.0	1"	0.0	16"	1"	0.0	0.0	0.0	0.0	0.0	786.377	786.367	761.50	761.488	763.76	763.906	761.804	761.908	761.577	761.576	786.529	786.529	792.606	792.606
7-13-56	60°	0.0	3/16	0.0	3/16"	0.0	1/8"	1/16"	0.0	0.0	0.0	0.0	0.0	786.38	786.37	761.50	761.49	763.79	763.92	761.88	761.93	761.65	761.62	786.53	786.55	792.61	792.61
8-10-56	83°	0.0	1"	0.0	3/16"	0.0	1/4"	1/4"	0.0	0.0	0.0	0.0	0.0	786.38	786.37	761.50	761.49	763.78	763.90	761.86	761.90	761.66	761.58	786.53	786.54	792.61	792.61
9-21-56	65°	0.0	1 3/16	0.0	1/2"	0.0	1/16"	1/4"	0.0	0.0	0.0	0.0	0.0	786.39	786.37	761.50	761.49	763.78	763.90	761.86	761.90	761.66	761.58	786.53	786.54	792.61	792.61

NOTE: * OBSERVATIONS MADE DURING EXTREME HI-WATER. E.O.S.
THIS LINE RESERVED FOR FIELD RECORDER. E.O.S.
(SEE SHEET #3 FOR ADDITIONAL OBSERVATION DATA.)

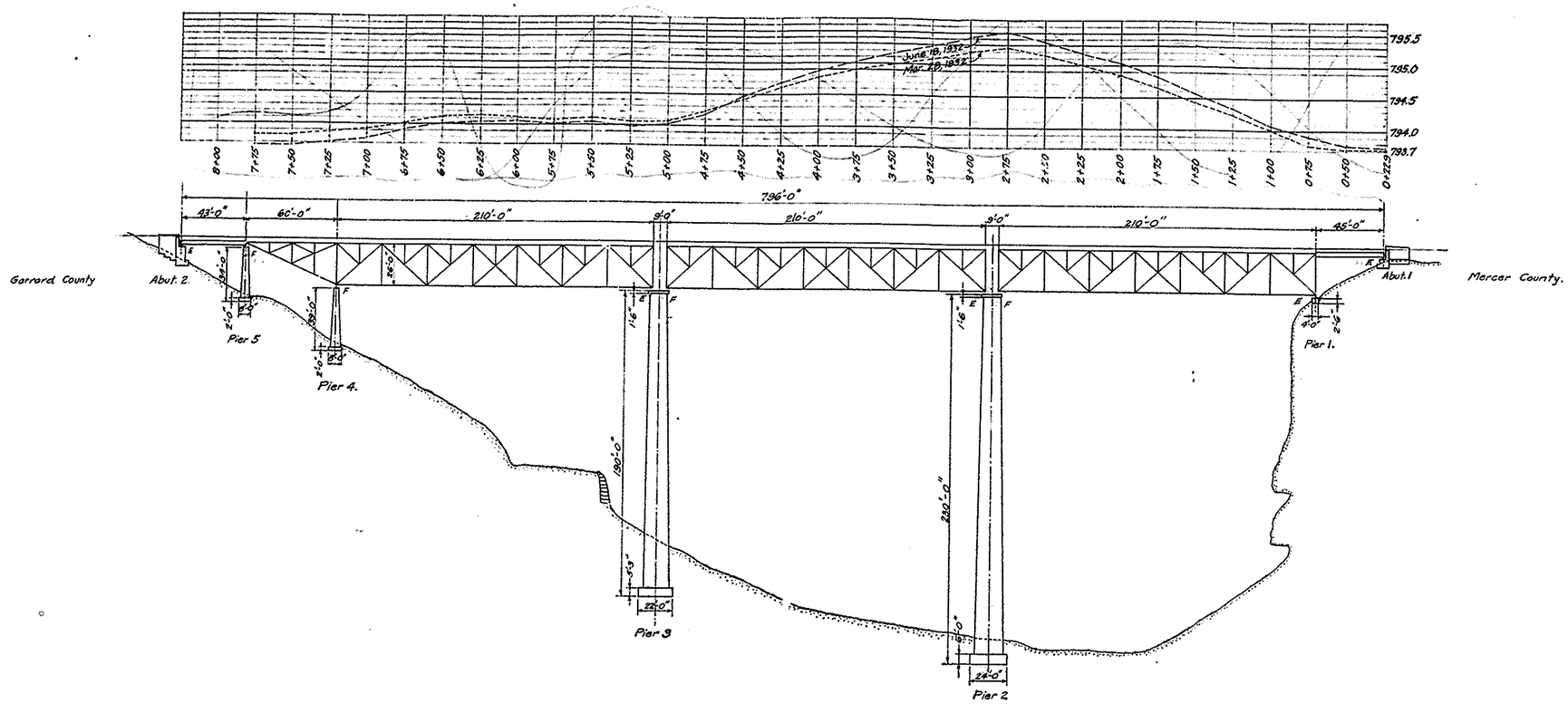
SHEET #2 OF 3

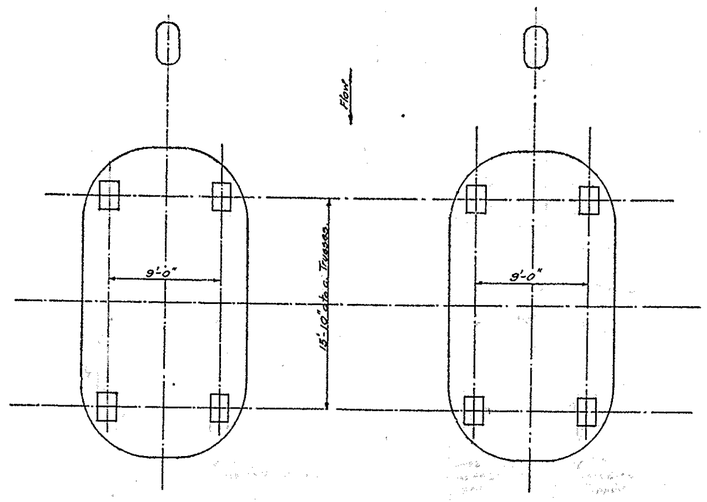
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
MERCER-GARRARD
BURGIN-BUENA VISTA

84-92-1

DRAWING No. 5493

FED. ROAD DIST.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY.				





Repairs to Kennedy's Mill Bridge

SHEET D

COMMONWEALTH OF KENTUCKY
STATE HIGHWAY DEPARTMENT
FRANKFORT
COUNTY OF
Mercer - Garrard
Kennedy Mill Bridge

STATION	ROAD PROJECT NO.
	84-92-1

DRAWN BY	DATE	REVISED	DATE	REVISED	DATE
TRACED BY	DATE	REVISED	DATE	REVISED	DATE
CHECKED BY	DATE	REVISED	DATE	REVISED	DATE

UPDATE DATE 9-13-91
LETTING DATE

PLANS PREPARED BY GOODPASTER JOINT DESIGN SECTION

DATE
DATE
DATE

REVISED
REVISED
REVISED

FINAL CHECK [illegible]
DATE: 9/91

INDEX OF SHEETS

SPECIAL NOTES

FOR MAINTENANCE OF TRAFFIC
FOR GALVANIZED METAL PLANK FLOORS
FOR CLEANING AND PAINTING
FOR HIGH STRENGTH BOLTS, WASHERS AND NUTS

STANDARD DRAWINGS

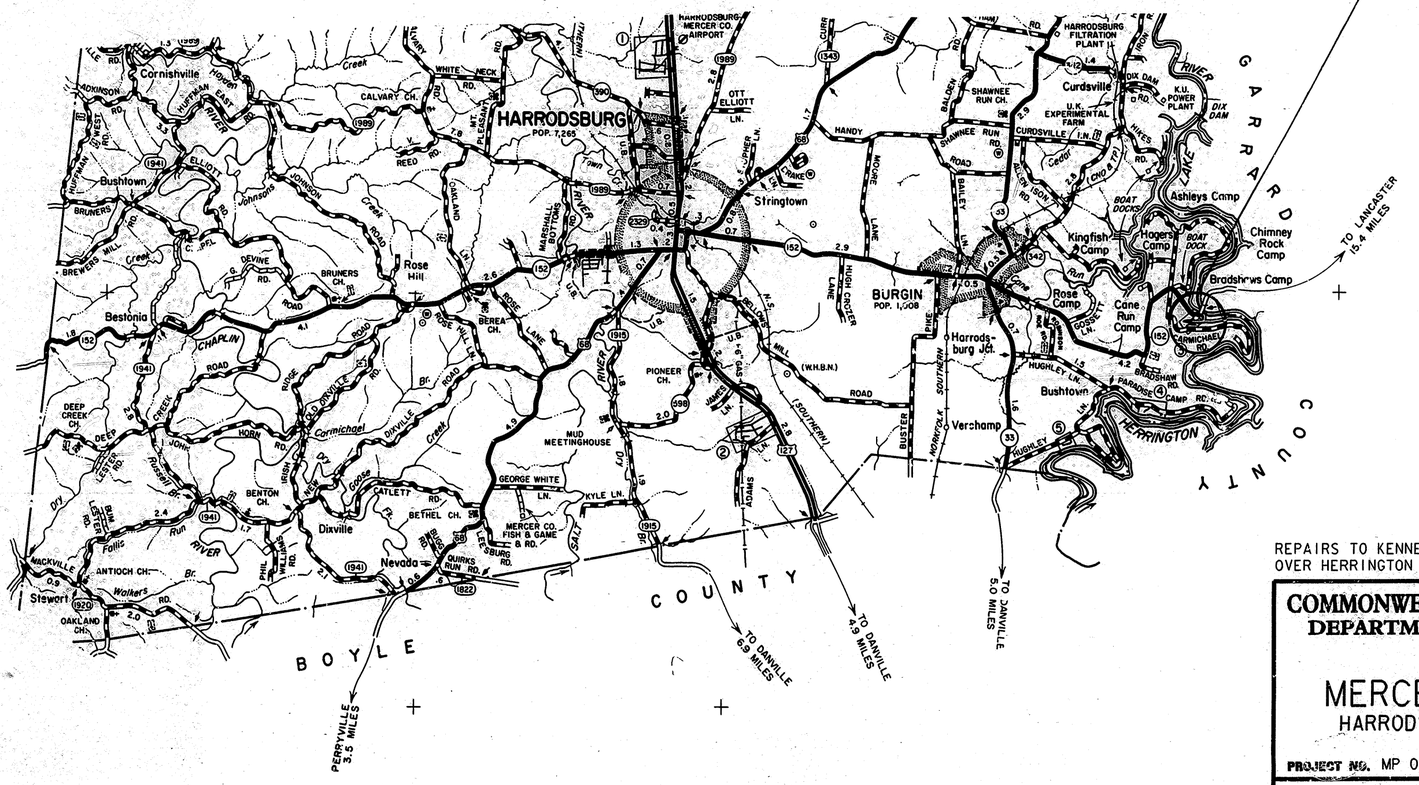
TSC-260-07	MISC. TRAFFIC CONTROL DEVICES
TSC-261-04	MISC. TRAFFIC CONTROL DEVICES
RBR-001-08	STEEL BEAM GUARDRAIL (W BEAM)
RBR-005-07	GUARDRAIL COMPONENTS
RBR-015-02	GUARDRAIL POSTS
RBR-050	END TREAMENT TYPE 7
BHS-007-02	STEEL W BEAM GUARDRAIL (SINGLE FACE A)

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS

PLANS OF PROPOSED PROJECT

MERCER COUNTY

BRIDGE REPAIRS
MP 084 0152 018.551



GRAPHIC SCALE IN MILES
0 1 2 3

LAYOUT MAP

REPAIRS TO KENNEDYS MILL BRIDGE
OVER HERRINGTON LAKE SHEET 1 OF 11

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT
COUNTY OF

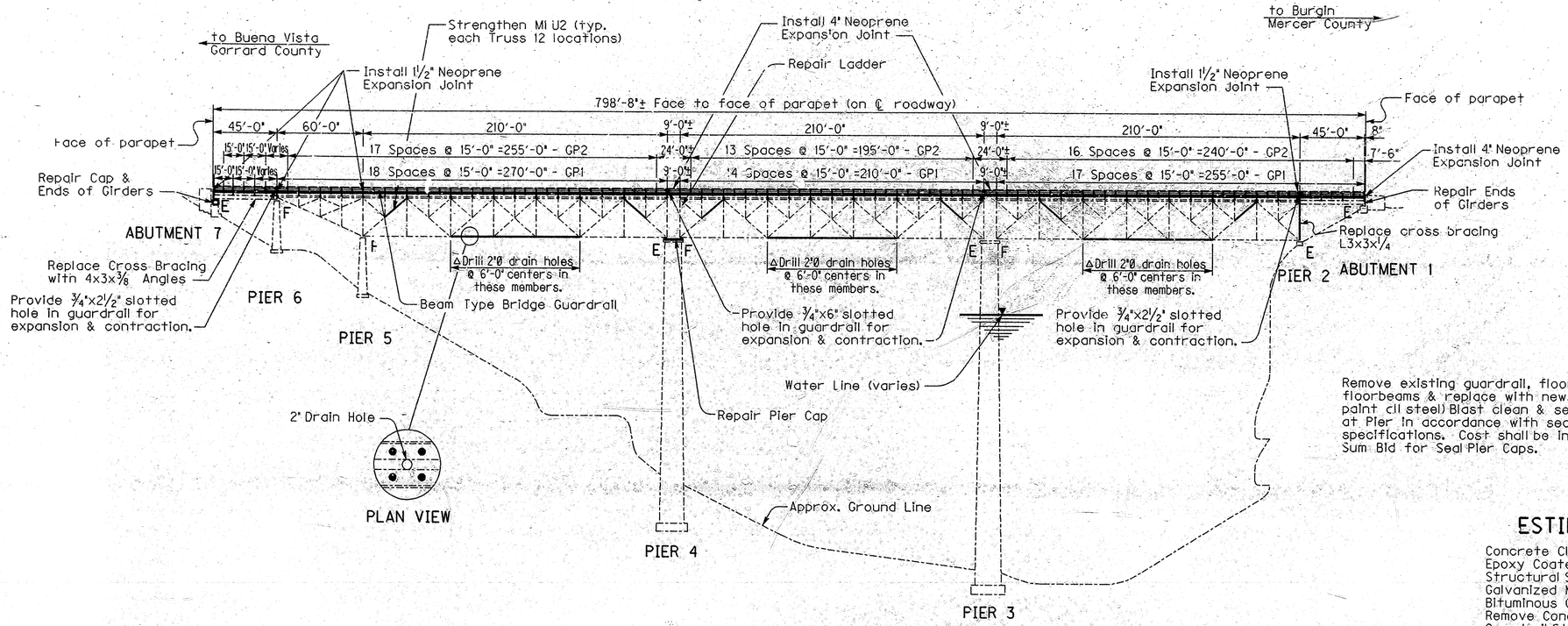
MERCER-GARRARD
HARRODSBURG-LANCASTER
ROAD

PROJECT NO. MP 084 0152 018.551

PLAN APPROVED 8/30 1991 BY Art Duncan
DIRECTOR OF BRIDGES

PLAN APPROVED 8/30 1991 BY O.J. Mewmes
STATE HIGHWAY ENGINEER

DRAWING NO. 22305



ELEVATION

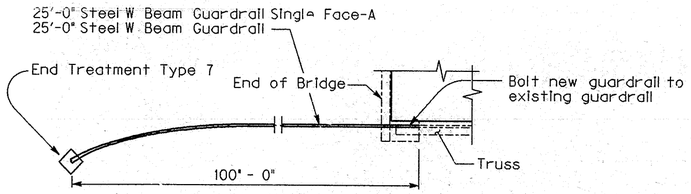
Remove existing guardrail, flooring, stringers, floorbeams & replace with new. (clean and paint all steel) Blast clean & seal existing caps at Pier in accordance with section 731 of the specifications. Cost shall be included in Lump Sum Bid for Seal Pier Caps.

ESTIMATE OF QUANTITIES

Concrete Class "A"	19.0 C.Y.
Epoxy Coated Steel Reinforcement	2190 Lbs.
Structural Steel ①	1 L.S.
Galvanized MetalPlank Flooring	16000 S.F.
Bituminous Concrete Class I	270 Tons
Remove Concrete Masonry	14 C.Y.
Guardrail Steel W Beam Single Face BR	1600 L.F.
Guardrail Steel W Beam Single Face A	100 L.F.
Guardrail Steel W Beam Single Face	100 L.F.
Remove Existing Bridge Flooring	1 L.S.
Cleaning & Painting	1 L.S.
Seal Pier Cap	1 L.S.
End Treatment Type 7	4 Each
Elastomeric Bearing Pads	4 Each
Drain Holes	42 Each
Demobilization	1 L.S.
Detour Signing	1 L.S.

① Approximate weight of Structural Steel is 260,000 lbs.

② Estimated weight of Cleaning and Painting is 360 Tons.



PLAN OF GUARDRAIL
(Typical Each Corner of Bridge)

BILL OF INCIDENTAL MATERIALS

No.	Description
12800	½" Øx 1¾" Nelson Threaded Stud with Hex Nut and Washer
3	1½" Preformed compression joint seal 20'-0" long
3	4" Strip seal and extrusion 20'-0" long

UPDATE DATE
LETTING DATE

	DATE		DATE		DATE
DESIGNED BY		CHECKED BY		REVISED	
DETAILED BY	L.T. Fookes	CHECKED BY	S.E. Goodpaster 7-91	REVISED	
PREPARED BY GRAPHICS SECTION		CHECKED BY		REVISED	

Sheet 3

Repairs to Kennedys Mill Bridge over Herrington Lake

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT
COUNTY OF
MERCER-GARRARD
HARRODSBURG-LANCASTER
ROAD

STATION	P.E. PROJECT NO.	
CONSTRUCTION PROJECT NO.	MAINTENANCE PROJECT NO.	DRAWING NO. 22305

LAYOUT

APPENDIX G

POSTED WEIGHT LIMIT (15T) MEMO

Steven L. Beshear
Governor

TRANSPORTATION CABINET
Frankfort, Kentucky 40622
www.transportation.ky.gov/

Michael W. Hancock, P.E.
Acting Secretary

Memo To: James Ballinger, P.E.
Chief District Engineer
District Seven

From Anne Lynch Irish, P.E. ALI
Chief Load Rating Engineer
Division of Maintenance

Date: June 1, 2010

Subject: Bridge Posting
Mercer County
KY 152 over Herrington Lake, "Kennedy's Mill Bridge"

After review of the condition and analysis or changes in the weight carrying capacity of the subject structure by the bridge preservation analysis staff, this office concurs that the posting level for the following bridge should be as follows:

084B00005N **Post the structure at 15 tons for all traffic due to recent repairs to the superstructure.**

Please notify the proper officials of this posting change. Should you have any questions, please advise.

ALI

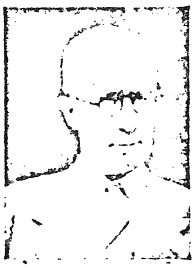
cc: File
Kelly Baker
Michael Vaughn
Cole Griggs
Tony Karsner
Jessica Wheeler

APPENDIX H

KENNEDY MILL BRIDGE ARTICLE

Kennedy Mill Bridge

By F. C. Mahan, M.E. 1906



EDITOR'S NOTE.—Mr. Mahan graduated in Mechanical and Electrical Engineering, University of Kentucky, 1906. From 1906 to 1908 he was surveying and assisting in abstracting land titles in eastern Kentucky. From 1908 to 1913 he was Chief Draftsman, Bureau of Land, at Manila, P. I. In this connection he made surveys on both Corregidor Island and Bataan Peninsula. Then from 1913 to 1931 he was Mining Engineer, Mine Superintendent, and Coal Operator in eastern Kentucky. From 1931 to 1942 he served as Design Engineer in the Bridge Office of the Highway Department at Frankfort, Kentucky. Since September, 1942, the beginning of the Enlisted Specialist Branch U. S. Army Engineer School at Lexington, Mr. Mahan has been a civilian instructor in charge of the Surveying Course.

The old turnpike road between Burgin and Buena Vista, Kentucky, crossed the Dick's River on an old wooden bridge in the vicinity of Kennedy's Mill, thus the name of the present bridge which has caused so much comment because it is apparently defying all of Newton's laws of gravitation by rising instead of settling.

The old bridge was a low level wooden bridge situated at the bottom of a precipitous gorge some 250 to 300 feet deep. The picturesque road leading to it was blasted out of the cliffs on either side and, through the old covered bridge, crossed the historic river which Daniel Boone named or rather "gave" to his faithful servant, Dick.

When the Dick's River dam (now spelled "Dix" by the Kentucky Utilities Company) was started, it became necessary to build a high level bridge over the impounded water and the reservoir thus formed was named Herrington Lake.

The new bridge was completed and turned over to Mercer and Garrard counties April 7, 1925. The superstructure consists of three 220 foot, one 60 foot and two 45 foot spans, all deck type. The 220 foot spans were erected by cantilever method and the trusses were designed to carry the extra stresses of erection. The substructures are of reinforced concrete, abutments are stub type on or near the top of the cliffs. On the Garrard County end there are two H. type concrete piers 34'-0" and 39'-0" high. Piers Nos. 2 and 3 are in the gorge proper, pier No. 3 being 190'-0" high and pier No. 2 being 230'-0" high, which levels are some 20'-0" below the roadway deck.

At about the time the bridge was completed the "Engineering News Record" had a very good description of the two taller piers. (See Figure No. 1.) These piers are hollow reinforced concrete tubes, similar to chimneys. They were built by the Weber Chimney Company of Chicago by its regular chimney building procedure. The foundation for the 230' pier has a 6½' reinforced concrete slab and the shaft or stack is anchored to the footing with 1" steel bars. The shell thickness at the bottom is 26⅞". Both piers are 12' wide and 22'-0" long at the top and covered with a concrete slab, and both piers have 3' square ports at top and bottom to permit them to fill with water. They are flat on the sides and round on both ends and the shell thickness gradually decreases toward top.

All substructures were supposed to be on solid rock. A closer inspection of the cliffs, however, reveals that the rock formation is in many layers with thin layers of fireclay between. From best information now obtainable, pier No. 2, the one in question, was judged to have had better foundation at the time of its erection.

The upward movement must have started after the impounded waters began to rise because it was still some time before it was realized that this pier was actually

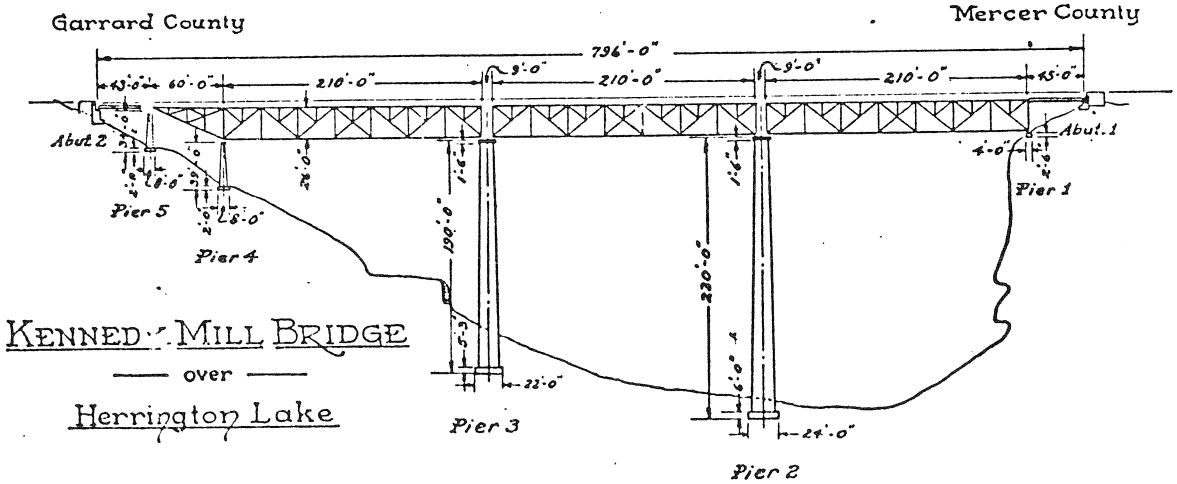


Fig. 1

rising. The earliest inspection on record in the Department of Highways was made by Mr. P. D. Gilliam, March 17, 1932. Pier No. 2 at that time was 1.33' higher than pier No. 3. Previous records had been made but had unfortunately been lost in a fire.

the pier with 4"x4" wood blocks inserted between the cable and the concrete masonry. From the four corners of the pier, cables were stretched to anchor on the lake shores. Turn buckles were inserted in each line to obtain uniform tension in all cables. (See Figure 2.) Even

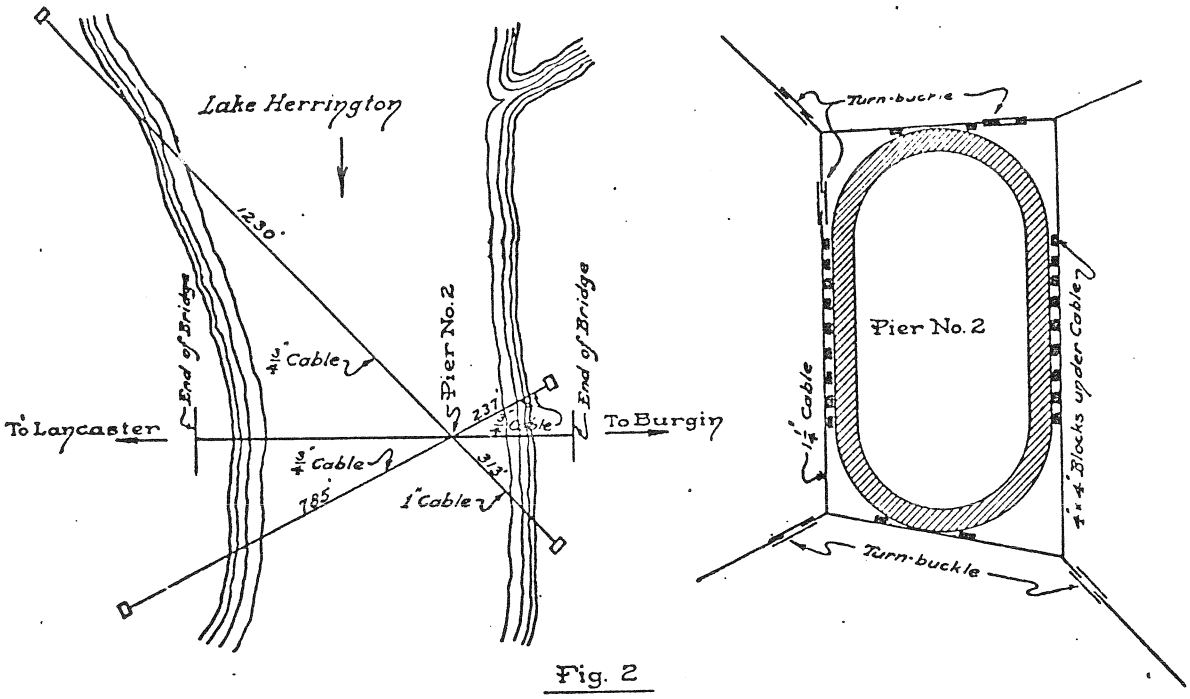


Fig. 2

Since the first inspection there has been a constant and careful check kept on the actions of this pier. Commencing in April, 1934, for a period of about two years, precise levels and a check on the alignment was run twice a month by Mr. Threlkel, Resident Engineer. His observations and data showed the most pronounced movements occurred in the early fall and spring. This fact might lead to a conclusion that the depth of the lake had some effect upon the pier's action. At the height of the movement the pier had risen approximately 30" and tilted up stream and toward the Mercer County side about 12".

The bench mark at the bridge was established by carrying the elevation from the U.S.G.S. bench mark in Burgin some 5 miles away and then checked back to the Burgin bench mark.

The tilting and upward movements of the pier were such that it was about to drag one of the bridge shoes off the pier. It was very evident that, to keep the bridge from falling into the lake, something had to be done.

It was decided to jack the bridge up and place an extended grillage under the shoes. To do this, it was necessary first to rivet a new I-beam to the bottom of the trusses of sufficient strength to carry the weight of the bridge. The grillage consisted of three 7" I-beams and two 7" channels bolted together to form a base for the new shoe to rest on and of sufficient length to extend beyond the pier cap. After doing this, there was some apprehension as to what would happen when the bridge was cut loose from the pier. As a precaution to prevent any sudden movement or vibration, it was decided to anchor the top of the pier to the shore line. A 1¼" wire cable band was stretched tightly around the top of

with this precaution there was a considerable vibration period when the bridge was cut loose. Final inspection showed that one of the shoes extended for more than half its length beyond the edge of the pier's cap. Had the extended grillage not been built, this span would now be in the lake.

The pier has shown no appreciable movement for some time. Possibly it has reached a stable point and will remain in its present condition. This, however, may be wishful thinking. Figures 3 and 4 were taken shortly after the bridge was completed and before the lake filled. It will be noted that the floor and bottom chord are in a straight line. Figures 5 and 6 were recently

(Continued on page 18)

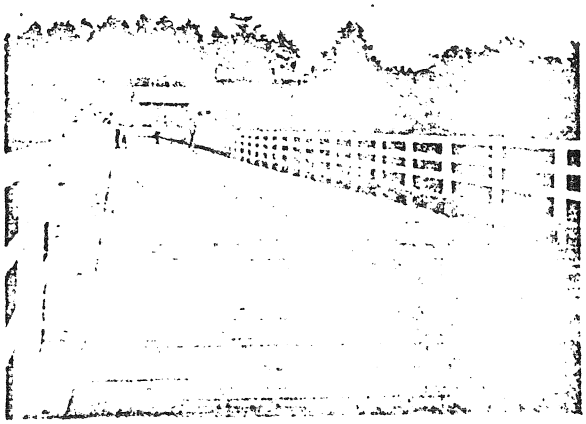


Fig. 3: May 31, 1925

KENNEDY MILL BRIDGE

(Continued from page 3)

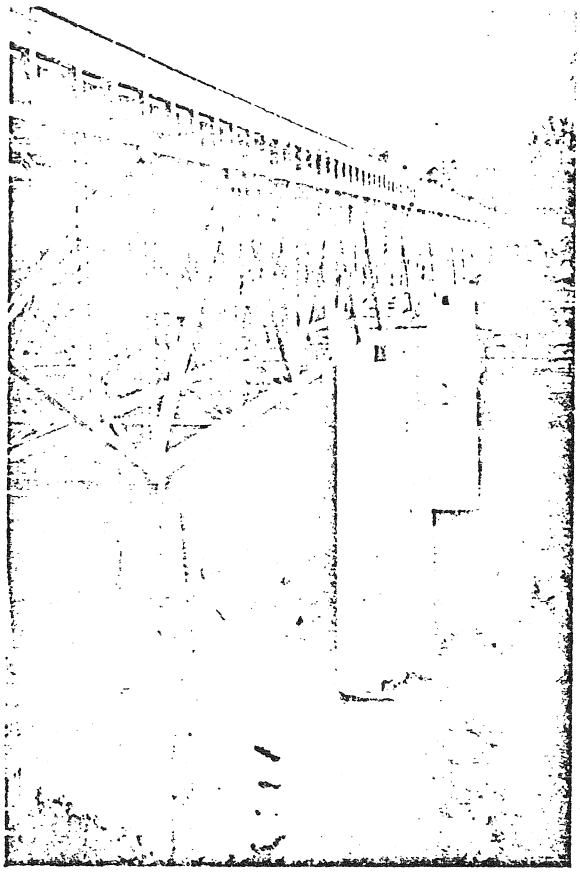


Fig. 4: May 31, 1925

taken and show very clearly the hump in the road and how the bottom chord is out of line. Figure 7 shows the lake filled and it is very noticeable that pier No. 2 is higher than pier No. 3. Note the top of ports in pier No. 2 are plainly visible and are completely submerged in pier No. 3 whereas they were originally on the same elevation.

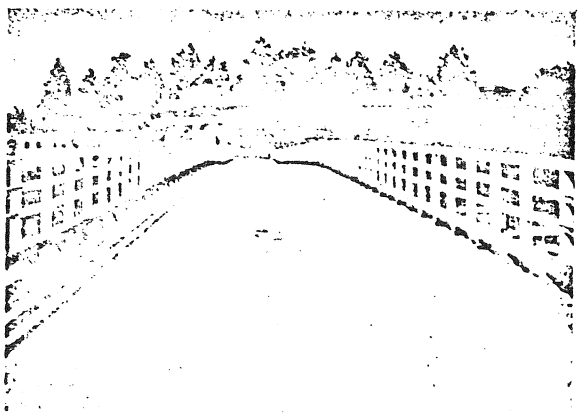


Fig. 5: June 9, 1932

There has been much speculation from various sources as to the cause of the movement of pier No. 2. If it were possible to inspect the footing at the bottom of the lake some evidence might be discovered as to the cause. It is generally attributed in some way to the creation of the lake. This movement might have taken place, however, had there never been a Lake Herrington.

Some of the many theories that have been advanced as to the probable cause are:

1. Trapped gases under footing.
2. Hydrostatic pressure.
3. Since the lime cliffs are full of crevices, holes, etc., and may be cavernous in places, the extra weight of the water may have caused some shift in the immediate terrain.
4. There is a possibility of heaving of the bottom when certain stratas are wet and softened.

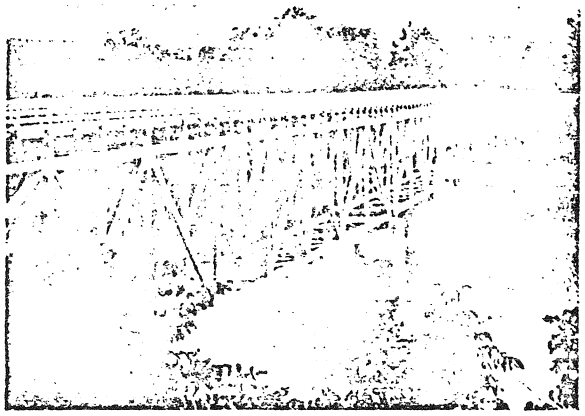


Fig. 6: June 9, 1932

Careful observations also indicate that possibly the whole cliff on the Mercer County side may be slowly moving toward the lake. Knowing the cause of such a phenomenon would be a real satisfaction to the engineer's curiosity even though it might be of little value as far as the present bridge is concerned. If the bridge should completely fail, a suspension bridge from cliff to cliff would apparently be the only solution due to the great depth of the water; but at that, this might not be a permanent solution if one cliff is tending to slide into the lake.

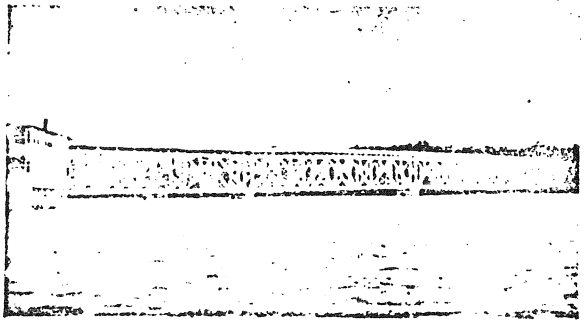


Fig. 7: March 28, 1943

APPENDIX I

INVENTORY AND INSPECTION REPORTS

NATIONAL BRIDGE INVENTORY

KENTUCKY INVENTORY AND APPRAISAL REPORT

Use of this document subject to 23 USC SEC 409

(8) STRUCTURE NUMBER: 084B00005N

*******IDENTIFICATION*******	
(1) STATENAME:	**KENTUCKY**
(5) INVENTORY ROUTE (ON/UNDER):	**131001520**
(2) DISTRICT AGENCY DISTRICT:	**7**
(3) COUNTY CODE: **84**	(4) PLACECODE: **0000**
(6) FEATURES INTERSECTED:	**HERRINGTON LAKE**
(9) LOCATION:	**AT GARRARD - MERCER CL**
(11) MILE POINT:	**18.86**
(7) FACILITY CARRIED:	**KY-152**
(12) BASE HIGHWAY NETWORK:	
(13) LRS INVENTORY ROUTE & SUBROUTE:	
(16) LATITUDE:	**37.745268563 N DEGREES**
(17) LONGITUDE:	**-84.704666374 W DEGREES**
(98) BORDER BRIDGE STATECODE **Unknown -**	%SHARED: **Unknown**
(99) BORDER BRIDGE STRUCTURE NUMBER:	
*******STRUCTURE TYPE AND MATERIAL*******	
(43) STRUCTURE TYPE MAIN:	**309 - Steel Truss - Deck**
(44) STRUCTURE TYPE APPR:	**-Steel Girder and Floorbeam System**
(45) NUMBER OF SPANS IN MAIN UNIT:	**4**
(46) NUMBER OF APPROACH SPANS:	**2**
(107) DECK STRUCTURE TYPE	**6 - Corrugated Steel**
(108) WEARING SURFACE/PROTECTIVE SYSTEM	
(108A) TYPE OF WEARING SURFACE:	**6 - Bituminous**
(108B) TYPE OF MEMBRANE:	**0 - None**
(108C) TYPE OF DECK PROTECTION:	**0 - None**
*******AGE AND SERVICE*******	
(27) YEAR BUILT:	**1924**
(106) YEAR RECONSTRUCTED:	**0**
(42A) TYPE OF SERVICE-ON:	**1 - Highway**
(42B) TYPE OF SERVICE-UNDER	**5 - Waterway**
(28) LANES ON STRUCTURE: **2**	UNDER STRUCTURE: **0**
(29) AVERAGE DAILY TRAFFIC: **1510**	
(30) YEAR OF ADT: **2010**	(109) TRUCK ADT%: **7**
(19) BYPASS DETOUR LENGTH:	**19.9 mi.**
*******GEOMETRIC DATA*******	
(48) LENGTH OF MAXIMUM SPAN:	**210.0 ft.**
(49) STRUCTURE LENGTH:	**798.0 ft.**
(50) CURB OR SIDE WALK LEFT: **0.0 ft.**	RIGHT: **0.0 ft.**
(51) BRIDGE ROADWAY WIDTH CURB TO CURB:	**20.0 ft.**
(52) DECK WIDTH OUT TO OUT:	**21.6 ft.**
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS):	**20.0**
(33) BRIDGE MEDIAN:	**No**
(34) SKEW: **0**	STRUCTURED FLARED: **No**
(10) INVENTORY ROUTE MIN VERT CLEAR:	**100.0 ft.**
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR:	**20 ft.**
(53) MIN VERT CLEAR OVER BRIDGE RDWY:	**99.99 ft.**
(54) MIN VER UNDER CLEAR REF: **N**	**(b) 0 ft.**
(55) MIN LAT UNDER CLEAR RT REF: **N**	**(b) 0 ft.**
(56) MIN LAT UNDER CLEAR LEFT:	**0 ft.**
*******NAVIGATION DATA*******	
(38) NAVIGATION CONTROL	**0 - No navigation control on waterway**
(111) PIER PROTECTION:	**- Not Coded**
(39) NAVIGATION VERTICAL CLEARENCE:	**0.0 ft.**
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEARENCE:	**ft.**
(40) NAVIGATION HORIZONTAL CLEARENCE:	**0.0 ft.**
SUFFICIENCY RATING:	**28.90**
STATUS:	**2 - Functionally Obsolete**

*******CLASSIFICATION*******	
(112) NBIS BRIDGE LENGTH:	**Yes**
(104) HIGHWAY SYSTEM:	**0 - Inventory Route is not on the NHS**
(26) FUNCTIONAL CLASS	**07 - Major Collector**
(100) STRAHNET HIGHWAY:	**0 - The inventory route is not a STRAHNET route**
(101) PARALLEL STRU	**N - No parallel structure exists**
(103) TEMPORARY STRUCTURE:	**Not Applicable**
(102) DIRECTION OF T	**2 - 2-way traffic**
(105) FEDERAL LANDS HIGHWAYS:	**0 - Not applicable**
(110) DESIGNATED NATIONAL NETWORK:	**0 - The inventory route is not part of the national network for trucks**
(20) TOLL:	**3 - On Free Road**
(21) MAINTAIN:	**01 - Not Coded**
(22) OWNER:	**01 - State Highway Agency**
(37) HISTORICAL SIGNIFICANCE:	**3 - Bridge is possibly eligible for the National Register of Historic Places or bridge is on a State or local historic register**
*******CONDITION*******	
(58) DECK:	**5**
(59) SUPERSTRUCTURE:	**5**
(60) SUBSTRUCTURE:	**5**
(61) CHANNEL AND CHANNEL PROTECTION:	**7**
(62) CULVERTS:	**N**
*******LOAD RATING AND POSTING*******	
(31) DESIGN LOAD:	**2 - H 15**
(63) OPERATING RATING METHOD:	**1 - Load Factor**
(64) OPERATING RATING:	**15.0 Tons**
(65) INVENTORY RATING METHOD:	**1 - Load Factor**
(66) INVENTORY RATING:	**15.0 Tons**
(70) BRIDGE POSTING:	**0 - >39.9% below**
(41) STRUCTURE OPEN, POSTED OR CLOSED:	**P - Posted for load**
*******APPRAISAL*******	
(67) STRUCTURAL EVALUATION:	**4**
(68) DECK GEOMETRY:	**2**
(69) UNDERCLEARENCE, VERTICAL & HORIZONTAL:	**N**
(71) WATERWAY ADEQUACY:	**8**
(36) TRAFFIC SAFETY FEATURES:	**1000**
(113) SCOUR CRITICAL BRIDGES:	**8**
*******PROPOSED IMPROVEMENTS*******	
(75) TYPE OF WORK:	**311**
(76) LENGTH OF STRUCTURE IMPROVEMENT:	**798 ft.**
(94) BRIDGE IMPROVEMENT COST:	**$9,000,000.00**
(95) ROADWAY IMPROVEMENT COST:	**$3,900,000.00**
(96) TOTAL PROJECTION COST:	**$12,900,000.00**
(97) YEAR OF IMPROVEMENT COST ESTIMATE:	**2010**
(114) FUTURE ADT:	**1812**
(115) YEAR OF FUTURE ADT:	**2030**
*******INSPECTIONS*******	
(90 INSPECTION DATE:	**2/10/2011**
(92) CRITICAL FEATURE INSPECTION:	
(92A) FRACTURE CRITICAL DETAIL:	**Y24**
(92B) UNDERWATER INSPECTION:	**Y60**
(92C) OTHER SPECIAL INSP:	**N**
(91) FREQUENCY:	**12 months**
(93) CFI DATE:	
(93A):	**10/1/2006**
(93B):	**10/25/2004**

084B00005N

KYTC Bridge Inspection Report

Summary:
Inspection Date: 2/10/2011
Inspector: CGRIGGS (30)
Primary Type: Substandard (12 Months)

Types of Inspections Performed:

National Bridge Inventory:	Y
Element:	Y
Fracture Critical:	N
Underwater:	N
Other Special:	N

Inspector Signature:

District Review Date: 2/10/2011
District Reviewer: MVAUGHN (136)

IDENTIFICATION

Bridge ID (8):	084B00005N MAP BRIDGE	**District Number:**	7
Route Carried (7):	KY-152	**County (3):**	84 Mercer
Mile Point:	18.856	**Feature Intersected (6):**	HERRINGTON LAKE
Location (9):	AT GARRARD - MERCER CL	**Road Name:**	KENNEDY BRIDGE RD
Structure Description:	798 Foot - 4 Span Steel Truss - Deck		

NBI CONDITION

Deck (58):	5
Superstructure (59):	5
Substructure (60):	5
Culverts (62):	N
Channel/Protection (61):	7

SCHEDULE TAB

Schedule:	Required (Y/N)	Last Date		Frequency	Next Date
NBI (90):		2/10/2011	**(91):**	12 mos	2/10/2012
Fracture Critical (92A):	Y	**(93A):** 10/1/2006	**(92A):**	24 mos	9/24/2011
Underwater (92B):	Y	**(93B):** 10/25/2004	**(92B):**	60 mos	1/22/2015
Other Special (92C):	N	**(93C):** 10/1/2006	**(92C):**	mos	5/11/2012
Elemental:	NA			12 mos	2/10/2012

Load Rating and Posting

Truck Type	Typ I	Typ II	Typ III	Typ IV	Gross
Recomm. Posting:	15	15	15	15	15
Field Posting:	15	15	15	15	15

Posting Status (41): P Posted for load
Signs Posted: **Cardinal:** Y **Non-Cardinal:** Y

WATERWAY

Scour Critical (113):	8
Observed 113 Rating:	8
Waterway Adeq. (71):	8

DECK/WEARING SURFACE

Deck Type (107):	6 Corrugated Steel								
Wearing Surface/Protective System (108):		**Type:**	6	**Membrane:**	0	**Protection:**	0		
Traffic Safety Features (36):		**Bridge Rail:**	1	**Transition:**	0	**Appr. Rail:**	0	**Rail Ends:**	0
Overlay:	Y								
Overlay Type:	Asphalt								
Overlay Thickness:	2.00								

Vertical Clearances

Minimum Vertical Overclearance (53):	99.99
Minimum Vertical Underclearance (54):	0.00
Maximum Vertical Clearance (10):	99.99
Minimum Vertical Clearance:	99.99

Sufficiency Ratings

SR: 28.90 **SD/FO:** 2 Functionally Obsolete

Element Condition State Data

Elm/Env	Description	Units	Total Qty.	Qty. CS1	Qty. CS2	Qty. CS3	Qty. CS4	Qty. CS5
107/1	Paint Stl Opn Girder	LF	172.00	6.00	0.00	160.00	6.00	0.00
113/1	Paint Stl Stringer	LF	6,224.02	0.03	5,879.99	344.00	0.00	0.00
130/1	Unpnt Stl Deck Truss	LF	1.00	0.00	1.00	0.00	0.00	0.00

084B00005N

KYTC Bridge Inspection Report

Summary:

Inspection Date: 2/10/2011
Inspector: CGRIGGS (30)
Primary Type: Substandard (12 Months)

Types of Inspections Performed:

National Bridge Inventory:	Y
Element:	Y
Fracture Critical:	N
Underwater:	N
Other Special:	N

Element Condition State Data

Elm/Env	Description	Units	Total Qty.	Qty. CS1	Qty. CS2	Qty. CS3	Qty. CS4	Qty. CS5
131/1	Paint Stl Deck Truss	LF	1,380.00	0.00	1,380.00	0.00	0.00	0.00
152/1	Paint Stl Floor Beam	LF	1,210.00	0.00	1,210.00	0.00	0.00	0.00
205/1	R/Conc Column	EA	6.00	0.00	4.00	2.00	0.00	0.00
210/1	R/Conc Pier Wall	LF	40.00	0.00	40.00	0.00	0.00	0.00
215/1	R/Conc Abutment	LF	128.00	0.00	128.00	0.00	0.00	0.00
234/1	R/Conc Cap	LF	88.00	0.00	88.00	0.00	0.00	0.00
300/1	Strip Seal Exp Joint	LF	80.00	80.00	0.00	0.00	0.00	0.00
30/1	Corrug/Orthotpc Deck	SF	15,920.04	0.00	15,920.04	0.00	0.00	0.00
311/1	Moveable Bearing	EA	6.00	6.00	0.00	0.00	0.00	0.00
313/1	Fixed Bearing	EA	6.00	6.00	0.00	0.00	0.00	0.00
334/1	Metal Rail Coated	LF	1,556.00	1,546.00	10.00	0.00	0.00	0.00
357/1	Pack Rust Smart Flag	EA	1.00	0.00	0.00	1.00	0.00	0.00
363/1	Section Loss SmFlag	EA	1.00	1.00	0.00	0.00	0.00	0.00
601/1	MisAlign/ot of plane	EA	1.00	0.00	1.00	0.00	0.00	0.00

Element Condition State Data

Str Unit	Elm/Env	Description	Description
1	107/1	Paint Stl Opn Girder	THE STEEL GIRDERS IN SPAN #1 HAVE MODERATE PACK RUST, WITH MINOR LOSS OF SECTION THROUGHOUT AND MINOR TO MODERATE LOSS OF SECTION AT THE BEARING AREAS AT ABUTMENT #1 AND PIER #2. THE STEEL GIRDERS IN SPAN #7 HAVE MODERATE PACK RUST WITH MINOR LOSS OF SECTION THROUGHOUT.
1	113/1	Paint Stl Stringer	THE GALVANIZED COATING ON ALL THE STRINGERS IS BEGINNING TO FAIL AND SURFACE RUST IS STARTING TO OCCUR. THE SURFACE RUST IS MOST PREVALENT ON THE TOP FLANGE NEAR THE AREAS WHERE THE CORRUGATED DECKING MAKES CONTACT WITH THE STRINGERS.
1	130/1	Unpnt Stl Deck Truss	(THIS IS A 'DUMMY' BRIDGE ELEMENT THAT IS BEING USED ONLY FOR THE PURPOSE OF HAVING ENOUGH SPACE TO WRITE ALL THE NOTES FOR THE PAINTED STEEL DECK TRUSS ELEMENT.) SPAN #2, NORTH TRUSS, EXTERIOR GUSSET PLATE AT L0 HAS AN AREA OF 100% SECTION LOSS. SPAN #2, NORTH TRUSS, ALL THE LACING BARS ALONG THE LOWER CHORD NEED TO BE REPLACED. SPAN #2, SOUTH TRUSS, ALL THE LACING BARS ALONG THE L2-U1 DIAGONAL NEED TO BE REPLACED. SPAN #2, NORTH TRUSS, INTERIOR GUSSET PLATE AT L2 HAS A 5” x 3” HOLE NEAR THE CONNECTION OF THE L2-U3 DIAGONAL. SPAN #2, NORTH TRUSS, EXTERIOR GUSSET PLAT AT L2 HAS A 1” HOLE NEAR THE CONNECTION OF THE L2-U3 DIAGONAL. SPAN #2, SOUTH TRUSS, EXTERIOR GUSSET PLAT AT L2 HAS A 2” HOLE. SPAN #2, SOUTH TRUSS, INTERIOR GUSSET PLATE AT L5 HAS APPROX. 40% SECTION LOSS NEAR THE CONNECTION POINT OF L5-U4 DIAGONAL. SPAN #2, NORTH TRUSS, INTERIOR GUSSET PLATE AT THE L5-U6 MIDPOINT CONNECTION HAS APPROX. 15-20% SECTION LOSS. SPAN #2, SOUTH TRUSS, THE LACING BARS ALONG THE LOWER CHORD BETWEEN L5 & L7 NEED TO BE REPLACED. SPAN #2, SOUTH TRUSS, THE GUSSET PLATE AT L6 HAS A 5” x 6” HOLE IN THE GUSSET PLATE AND APPROX. 60-80% SECTION LOSS AROUND THE HOLE. SPAN #3, SOUTH TRUSS, THE ANGLES THAT MAKE UP THE INTERIOR & EXTERIOR FLANGES OF VERTICAL MEMBER L2-U2 HAVE APPROX. 50-65% SECTION LOSS JUST ABOVE THE GUSSET PLATE OF THE L2 CONNECTION. SPAN #3, SOUTH TRUSS, THE ANGLES THAT MAKE UP THE INTERIOR & EXTERIOR FLANGES OF VERTICAL MEMBER L5-U5 HAVE APPROX. 50-65% SECTION LOSS JUST ABOVE THE GUSSET PLATE OF THE L5 CONNECTION. SPAN #3, NORTH TRUSS, L2-L3 HAS AN AREA OF 100% SECTION LOSS ON THE EXTERIOR UPPER LEG OF THE LOWER CHORD. SPAN #4, NORTH TRUSS, AT L2, THE EXTERIOR LEGS OF THE VERTICAL MEMBER HAVE APPROX. 60% SECTION LOSS.

084B00005N

KYTC Bridge Inspection Report

Summary:

Inspection Date: 2/10/2011
Inspector: CGRIGGS (30)
Primary Type: Substandard (12 Months)

Types of Inspections Performed:

National Bridge Inventory:	Y
Element:	Y
Fracture Critical:	N
Underwater:	N
Other Special:	N

Element Condition State Data

Str Unit	Elm/Env	Description	Description
			SPAN #4, NORTH TRUSS, THE ANGLES THAT MAKE UP THE INTERIOR & EXTERIOR FLANGES OF VERTICAL MEMBER L5-U5 HAVE APPROX. 50-65% SECTION LOSS JUST ABOVE THE GUSSET PLATE OF THE L5 CONNECTION. (CONT. IN PAINTED STEEL DECK TRUSS ELEME
1	131/1	Paint Stl Deck Truss	(FOR ADDITIONAL NOTES SEE THE UNPAINTED STEEL DECK TRUSS ELEMENT NOTES) (WINTER OF 2009-2010: REPAIRS MADE TO TRUSSES - SEE 5/11/10 INSPECTION NOTES) THE LOWER CHORD CONNECTION OF THE SOUTH TRUSS ABOVE BEARING DEVICE #2 AT PIER #5 HAS TWO AREAS OF 100% SECTION LOSS IN THE INTERIOR AND EXTERIOR GUSSET PLATES. THE EXTERIOR GUSSET PLATE HAS APPROX. 10"-12" OF 100% SECTION LOSS AND THE INTERIOR GUSSET PLATE HAS APPROX. 8"-10" OF 100% SECTION LOSS. BOTH AREAS ARE IN THE LOWER PORTION OF THE GUSSET PLATES BETWEEN THE CONNECTION POINTS OF SPAN #5 MEMBER L0-L1 AND VERTICAL POST MEMBER L0-U0. THIS CONNECTION POINT IS A VITAL TENSION CONNECTION WITHIN THE LOWER CHORD TENSION FORCE TRANSFER AND HAS BEEN MONITORED ON A 3 MONTH CYCLE SINCE 7/17/07. SPAN #5, NORTH TRUSS, EXTERIOR GUSSET PLATE AT L1 HAS A SMALL AREA ALONG THE EDGE WITH 100% SECTION LOSS. SPAN #5, SOUTH TRUSS, INTERIOR GUSSET PLATE AT L1 HAS A SMALL AREA OF 100% SECTION LOSS. SPAN #5, NORTH TRUSS, EXTERIOR SIDE OF MEMBER L1-L2, NEAR THE L2 CONNECTION HAS SEVERAL SMALL AREAS OF 100% SECTION LOSS. SPAN #5, NORTH TRUSS, EXTERIOR SIDE OF MEMBER L2-L3, NEAR THE L2 CONNECTION HAS A SMALL AREA OF APPROX. 50% SECTION. SPAN #5, SOUTH TRUSS, EXTERIOR SIDE OF MEMBER L2-L3, NEAR THE L3 CONNECTION, HAS TWO AREAS WITH 80-100% SECTION LOSS. SPAN #5, SOUTH TRUSS, EXTERIOR SIDE OF MEMBER L3-L4, NEAR THE L3 CONNECTION, HAS TWO AREAS WITH 80-90% SECTION LOSS. SPAN #5, NORTH TRUSS, THE GUSSET PLATE ABOVE PIER #6, HAS THREE AREAS OF 100% SECTION LOSS. SEVERAL DIAGONAL MEMBERS HAVE BEEN PREVIOUSLY REHABED, BUT MANY HAVE PROBLEMS WITH HOW THE BOLT HOLES WERE DRILLED AND REDRILLED DURING THE REHAB. IN GENERAL, APPROX. 60% OF THE LACING BARS ON THE LOWER CHORD HAVE AREAS OF 100% SECTION LOSS AND ABOUT 10% OF THE LACING BARS ON THE VERTICALS AND DIAGONALS HAVE AREAS OF 100% SECTION LOSS. ALL OF THE INTERMEDIATE TRUSS CONNECTION POINTS HAVE HEAVY PACK RUST AND APPROX. 40-50% SECTION LOSS WITH MODERATE DETERIORATION OF THE
1	152/1	Paint Stl Floor Beam	THERE IS HEAVY PACK RUST BETWEEN THE BOTTOM OF THE FLOORBEAMS AND THE TOP OF THE UPPER CHORD. THE GALVANIZED COATING ON ALL THE FLOOR BEAMS IS BEGINNING TO FAIL AND SURFACE RUST IS STARTING TO FORM.
1	205/1	R/Conc Column	PIER #5 HAS BEEN ENCASED WITH CONCRETE. THE COLUMNS AT PIER #2 HAVE HEAVY CRACKING, SCALING, AND SPALLING. THE COLUMNS AT PIERS #5 & 6 HAVE MODERATE CRACKING AND SCALING.
1	210/1	R/Conc Pier Wall	MODERATE CRACKING AND SCALING IN THE PIER WALLS.
1	215/1	R/Conc Abutment	MODERATE CRACKING AND SCALING IN ABUTMENTS.
1	234/1	R/Conc Cap	MODERATE CRACKING AND SCALLING IN THE PIER CAPS. THE GRILL HATCH THAT WAS MISSING ON TOP OF THE PIER CAP AT PIER #3 HAS BEEN FABRICATED AND INSTALLED.
1	300/1	Strip Seal Exp Joint	
1	30/1	Corrug/Orthotpc Deck	THE GALVANIZED COATING ON THE CORRUGATED METAL FLOORING IS BEGINNING TO FAIL AND SURFACE RUST IS FORMING. THE RUST IS MOST PREVALENT WHERE THE FLOORING RESTS ON THE GALVANIZED STRINGERS.
1	311/1	Moveable Bearing	ALL OF THE BEARING AREAS AT THE PIERS HAVE BEEN ENCASED WITH CONCRETE.
1	313/1	Fixed Bearing	ALL OF THE BEARING AREAS AT THE PIERS HAVE BEEN ENCASED WITH CONCRETE.
1	334/1	Metal Rail Coated	MODERATE TRAFFIC DAMAGE TO GUARDRAIL ON THE GARRARD COUNTY SIDE.
1	357/1	Pack Rust Smart Flag	THERE IS HEAVY PACK RUST AT MOST OF THE OLD GUSSETT PLATED CONNECTIONS IN BOTH TRUSSES. THERE IS HEAVY PACK RUST BETWEEN THE BOTTOM OF THE FLOORBEAMS AND THE TOP OF THE UPPER CHORD. THERE IS MODERATE PACK RUST IN THE STEEL GIRDERS IN SPANS #1 & 7.
1	363/1	Section Loss SmFlag	< none >

084B00005N

KYTC Bridge Inspection Report

Summary:

Inspection Date: 2/10/2011
Inspector: CGRIGGS (30)
Primary Type: Substandard (12 Months)

Types of Inspections Performed:

National Bridge Inventory:	Y
Element:	Y
Fracture Critical:	N
Underwater:	N
Other Special:	N

Element Condition State Data

Str Unit	Elm/Env	Description	Description
1	601/1	MisAlign/ot of plane	PIER #3 HAS EXPERIENCED UPWARD MOVEMENT AND TILTING, WHICH HAS CAUSE MISALIGNMENT OF THE PIER. THE UPWARD MOVEMENT AND TILTING OF PIER #3 HAS ALSO CAUSED VERTICAL AND HORIZONTAL MISALIGNMENT OF THE SUPERSTRUCTURE IN SPANS #2 & 3.

BRIDGE.Notes

Pontis Underwater Only

Item - 210 Qty - 70 LF
Condition State - 3 = 70 LF

General Notes (All Piers)
1. There is light scaling located from the water surface to 25' below the water surface (bws).
2. There is moderate biological growth located from the surface to 3' below the surface, growth is light from 3' to 34' and very light from 34' to the bottom.
3. The bottom material consists of soft silt.
4. There is honeycombing on all faces of the pier located at every cold joint and appears to get worse from the surface to 115' bws.
5. The outside and inside of the piers is in fair condition, with section loss located at the cold joints.
6. There is a opening on the east face of Pier 2 measuring approximately 4'W and 4'T extending from the bottom. The top of the opening is 170.5' and the bottom at 178.5 feet bws. The concrete located at this opening is approximately 2.5' thick. Does not have a grate covering it.

Pier 2 (Outside of Pier)
1. There is honeycombing at the following locations: 1'W x 1'T x 6"D middle east face 87' bws, 3.5"W x 6"T x 4"D middle of the east face 8' bws, 2.5"W x 6"T x 4"D 7' North of SE corner 8.5' bws, 2'T x 2'W x 4"D center of the East face 66' bws, 1'W x 4"T x 3"D 54' bws on the Northeast corner, 1'W x 4"T x 4"D center of the south face 100' bws, 6"T x 2"W x 4"D SE cornere 65' bws.

Pier 2 (Inside of Pier)
1. There are several tie wires are exposed throughout the inside of the pier.
2. The two cross beams below 115' appear to be in good condition.
3. There is a 4"T by 6"D area of honeycombing located at the cold joint 20' below the water surface along the East and North faces. Aggregate can be removed with ease.
4. There are crossbeams with honeycombing at the joints up to 3" deep located at the following depths;10, 51', 90' and 134'.
5. The bottom material consists of soft silt with some construction debris. There is a steel grate extending out of the silt bottom approximately 1.5'.

Work Candidates

Inspector Candidates:

Candidate ID:	Status	Priority	Assigned	Action	Elem	Date Recommended
REPLACE BRIDGE	Under Review	High	Unassigned	11	0	7/17/2007

Transportation Cabinet
Division of Operations

TC 71-118
Rev. 1/96

BRIDGE INSPECTION REPORT

Reviewed By:
Review Date:

Two Yr ☐ Substd ☐ Underwater ☑ In-Depth ☐ Fracture Critical ☐

Project No: 84-0152-B00005 NBI-Location: KY 152 over Herrington Lake - Mercer County

Structure Description: Five Span Steel Truss

Milepoint: 18.55 Inspectors Initials: AAC

Inspector's Signature: Allen Cecil Date: 12/15/2009

58	DECK	
1	Structural Condition	
2	Wearing Surface	
3	Joints	
4	Drains	
5	Expansion Devices	
6	Curbs, Sidewalks, Medians	
7	Railings	
8	Lighting and/or Utilities	

59	SUPERSTRUCTURE	
1	Stringers, Girders, Beams	
2	Floor Beams	
3	Trusses - Main Members	
3a	Trusses - Bracing, Portals	
4	Bearing Devices	
5	Alignment/Structural Members	
6	Deflection/Vibration under load	
7	Debris on Members	

59A	PAINT CONDITION		
Color:		Date Painted:	

60	SUBSTRUCTURE	
1	Abutments, Wingwalls	
2	Piers and/or Bents:	
3	Alignment and/or Settling	
4	Scour, Erosions	
5	Debris on Seats, Caps	
6	Protection Systems	
7	Abutments, Wingwalls (S.Z.D.)	N
8	Piers /or Bents (S.Z.D.)	5
9	Alignment or Settling Due to Scour	

61	CHANNEL/CHANNEL PROTECTION	
1	Channel Scour	
2	Embankment Erosion	
3	Drift	
4	Channel Alignment	
5	Vegetation	
6	Erosion	
7	Rip-Rap	

62	CULVERT RETAINING WALLS	
1	Barriers	
2	Wingwalls, Headwalls	
3	Debris	
4	Scour Under Footings (Underwater)	
5	Erosion At Wingwalls (Underwater)	
6	Drainage Adequacy (Underwater)	

10 INVENTORY ROUTE VERTICAL CLEARANCES

Over ft in. 36. TRAFFIC SAFETY

Under ft in.

71	WATER ADEQUACY	
72.	APPROACH ROADWAY ALIGNMENT	

113	SCOUR CRITICAL BRIDGE RATING	8

108 WEARING SURFACE/PROTECTIVE SYSTEM

Type Membrane Protection

OVERLAY ☐ Yes ☐ No Date:

TYPE: LATEX ☐ P.C.C. ☐ ASPHALT ☐

DEPTH OF ASPHALT

RECOMMENDED LOAD CAPACITIES (tons) I II III IV GROSS

FIELD POSTINGS NE SW I II III IV GROSS

Additional Comments

The piers in fair condition with only minor defeciencies noted.

Stantec

STANTEC UNDERWATER BRIDGE INSPECTION FORM

1. Bridge Number: 84-0152-B00005 **2. Date** Tuesday, December 15, 2009

County: Mercer **3. Stantec Project No:** 175569090

Description: KY 152 over Herrington Lake **4. Weather** **Temperature:** 20

Water Body: Herrington Lake ☐ Sunny ☑ Partly Cloudy ☐ Other

5. Supervisor: AAC **Crew:** TCB, FJB, JAG ☐ Cloudy ☑ Windy

Visitors: **Arrive:** **Depart:**

Visitors **Arrive:** **Depart:**

6. Bridge Type:

☐ Continuous Plate Girder ☐ Suspension ☐ Reinforced Concrete Beam

☑ Steel Truss ☐ Wood Truss ☐ Other

7. Element Type:

☑ Reinforced Concrete ☐ Closed Web ☐ Open Web ☐ Steel Piles

☐ Masonry ☐ Timber Piles ☐ Other

8. Foundation Type

☐ Pile with pile cap ☐ Pile without pile cap Pier founded on rock ☐ or soil ☐

☐ Caisson ☑ Spread footing ☐ Other

9. Previous Report Available ☑ **Dates of Report:** 1990,1995,2000

Originator: FMSM

10. Construction or As-Built Plans and/or Reports Available ☑ **Dates:** unknown

11. Water surface reference point on Pier or Bridge

Bottom of Pier 2

Reference Point Elevation: 756.4 **Distance to Water** 19.5 **Water Elevation:** 736.9

12. Pictures Taken

1. Pier 2
2. Pier 3
3. Planview Looking Downstream
4. Planview Looking Upstream

Stantec

STANTEC UNDERWATER BRIDGE INSPECTION FORM

Bridge Number: 84-0152-B00005

Date: Tuesday, December 15, 2009

13. Cross Sections:

	5'	10'	25'	50'	100'
☑ Upstream	☐	☑	☐	☑	☐
☑ Downstream	☐	☑	☐	☑	☐

GPS Data 12/16/2009

View Point L to R Looking: ☑ Upstream ☐ Downstream

Benchmark Location: _____

Benchmark Coordinates Northing _____ Easting _____ Elevation _____

14. Scour:

a. Scour pockets or troughs ☑ No ☐ Yes _____

b. Footing or Foundation Element Exposed ☑ No ☐ Yes _____

c. Scour increased since last inspection ☑ No ☐ Yes ☐ No Previous Report Available

d. Comments: _____

15. Pier/Element Conditions: (see field notes for detailed description)

☑ Biological Growth very light ☐ Zebra Mussel Growth _____

☐ Spalling _____ ☑ Honeycombing _____

☐ Scaling _____ ☐ Reinforcing Steel Exposed _____

☑ Vertical Cracks ☑ Hairline ☐ Measurable See notes

☐ Horizontal Cracks ☐ Hairline ☐ Measurable _____

☐ Impact Damage ☐ Minor ☐ Major _____

☐ Pier Faces not Inspected List Piers _____

Reason for not inspecting _____

☐ Other: _____

16. Heavy debris located around element ☑ No ☐ Yes, elements _____

17. Bottom Conditions:

☑ Silt ☐ Gravel ☐ Boulders ☐ Clay ☑ Debris

☐ Sand ☐ Cobbles ☐ Bedrock, type _____

Debris:

☑ Sticks ☐ Tree Limbs ☐ Trees ☐ Timbers ☐ Steel Beam

☑ Construction Debris ☐ Waste Concrete ☐ Other: _____

Stantec

STANTEC UNDERWATER BRIDGE INSPECTION FORM

Bridge Number: 84-0152-B00005

Date: Tuesday, December 15, 2009

18. Inspection Method

☑ Surface Supplied Air ☐ Scuba ☐ Wading ☐ Other

19. Bridge Access

a. **Boat:** ☐ Skiff ☐ Whaler ☐ Jonboat ☐ Monark ☑ Other: Lobell

Ramp: ☑ Concrete ☐ Gravel ☐ Dirt ☐ None ☑ Ramp fee $10.00

Locked Through ☑ No ☐ Yes

Distance from ramp to bridge: 0.25 **Travel time:** 5 miles

Comments / Directions:

b. **Bank/Shore:** ☐ Grass ☐ Rock ☐ Gravel ☐ Dirt/Mud ☐ Other

20. Boat Traffic

a. **Recreational:** ☐ Heavy ☐ Moderate ☑ Light ☐ N/A

b. **Fishing:** ☐ Heavy ☐ Moderate ☑ Light ☐ N/A

c. **Barge:** ☐ Heavy ☐ Moderate ☑ Light ☐ N/A

Comments:

21. Water Conditions:

Temperature: 40 Degrees F **Visibility:** 8.0

Current: ☐ Heavy ☐ Moderate ☐ Light ☑ None

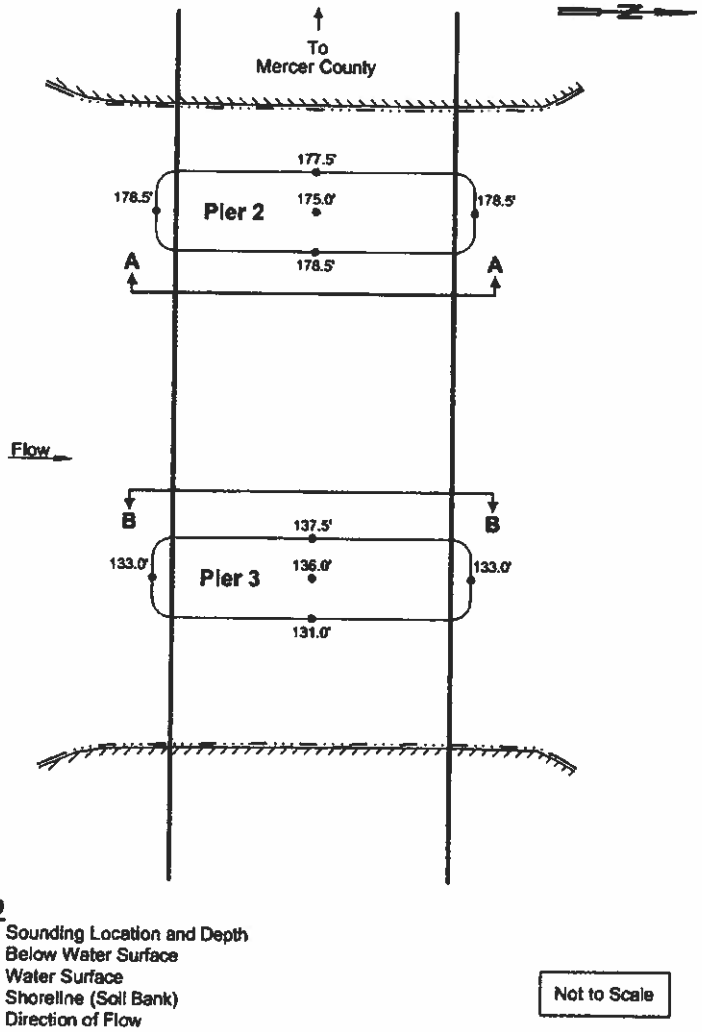
22. General Comments (Include any unusual conditions encountered):

Stantec

Structure 84-0152-B00005 County Mercer Date 12/15/2009

Description Planview Crew AAC, TCB, FJB, JAG

NOTE: All depths refer to depth below water surface at time of inspection



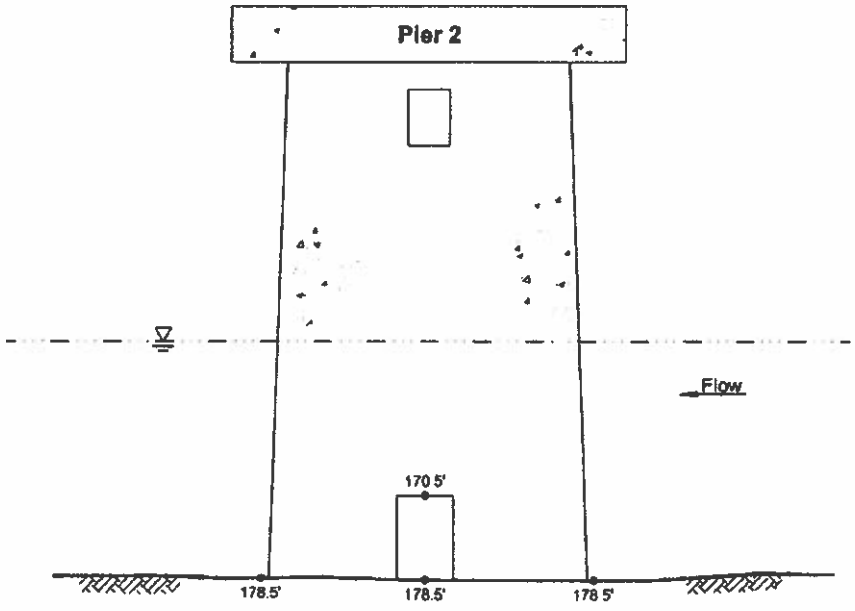
Plan View

Stantec

Structure 84-0152-B00005 Element Pier 2 Date 12/15/2009

Individual Pier Rating _____

NOTE: All depths refer to depth below water surface at time of inspection



LEGEND

- 12.3' — Sounding Location and Depth Below Water Surface
- Water Surface
- Flow — Direction of Flow
- Concrete
- Soil Channel Bottom

Not to Scale

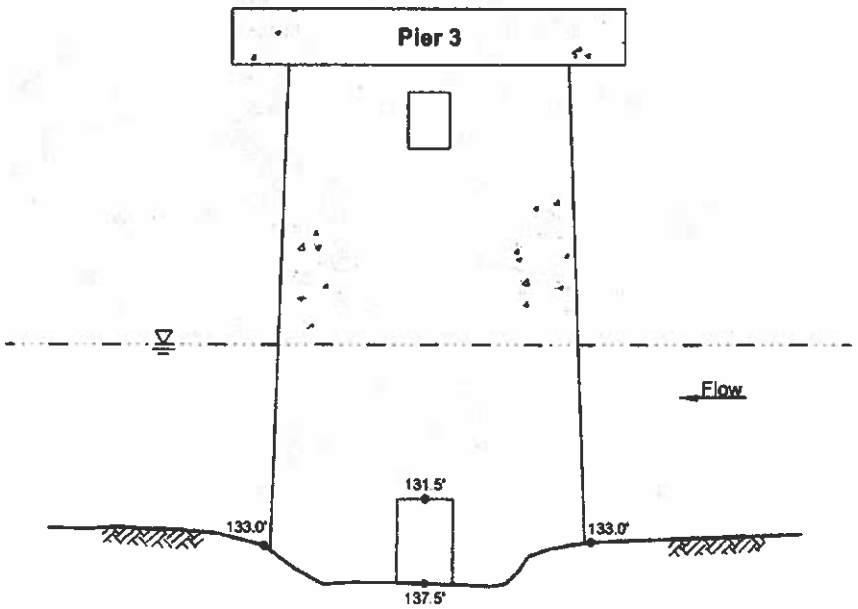
Section A-A

Stantec

Structure 84-0152-B00005 Element Pier 3 Date 12/15/2009

Individual Pier Rating _____

NOTE: All depths refer to depth below water surface at time of inspection



LEGEND

12.3'	Sounding Location and Depth Below Water Surface
	Water Surface
Flow	Direction of Flow
	Concrete
	Soil Channel Bottom

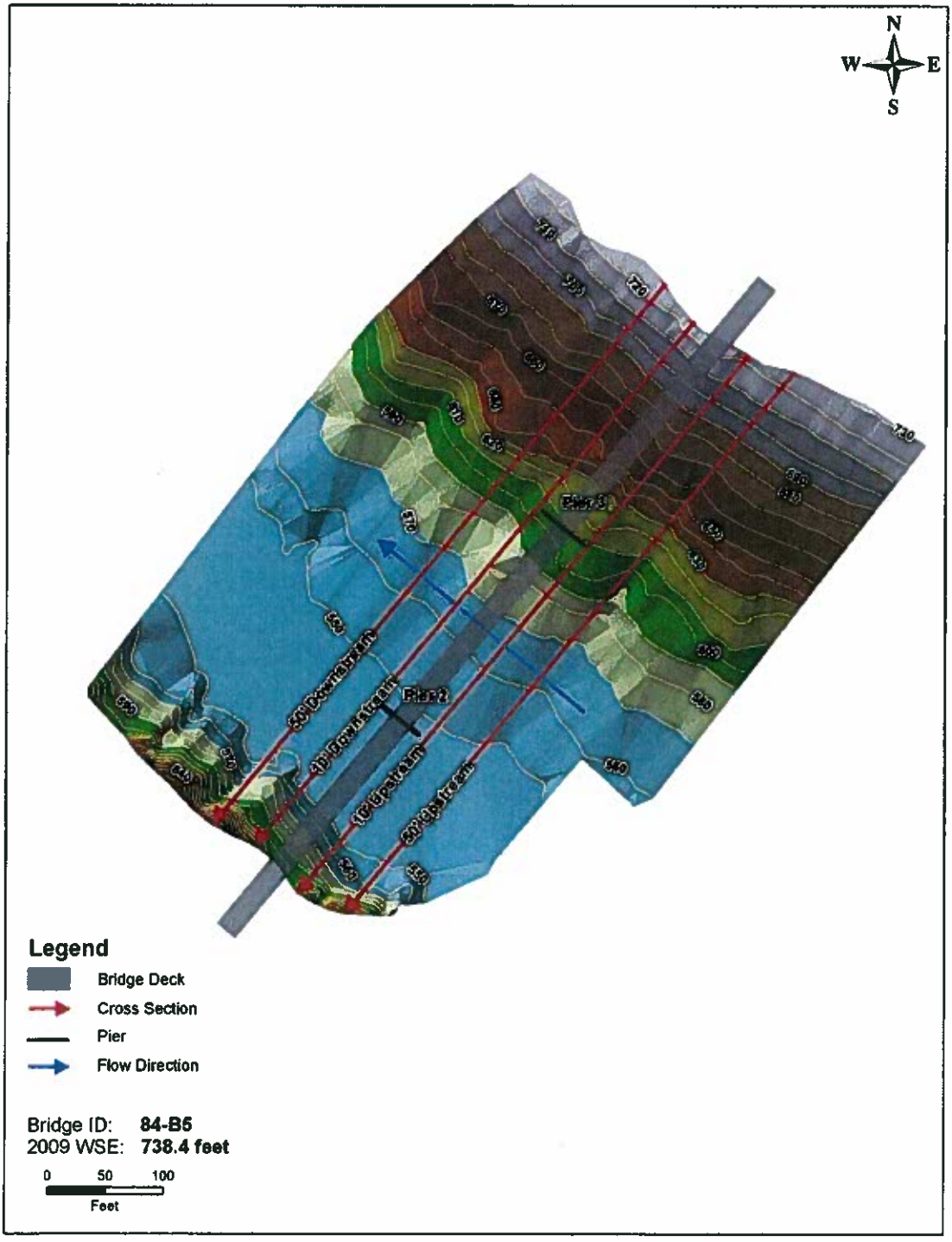
Not to Scale

Section B-B

Stantec

Structure 84-0152-B00005 County Mercer Date 12/15/2009

Description Hydrographic Survey Overview Crew AAC, TCB, FJB, JAG



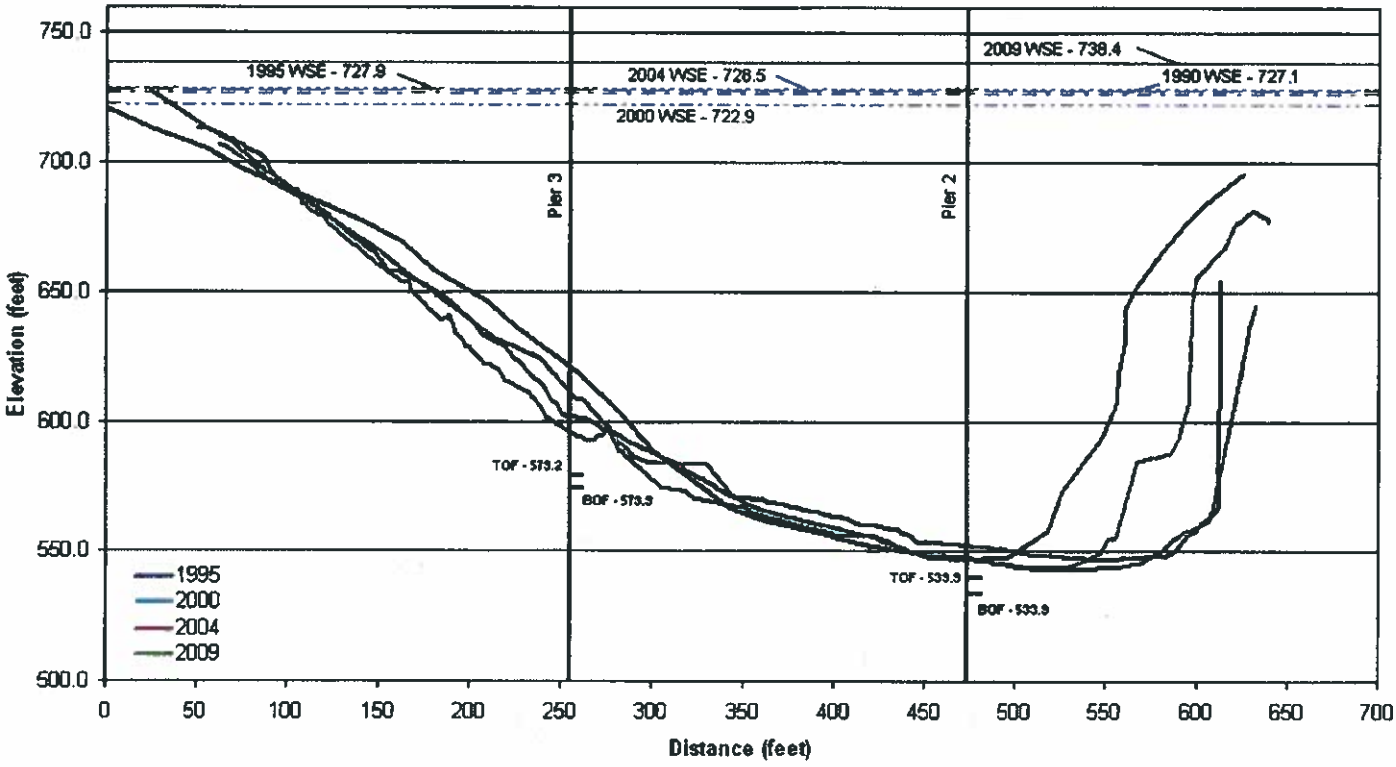
Cross Sections

Stantec

Structure 84-0152-B00005 County Mercer Date 12/15/2009

Description 50 Ft. Upstream Crew AAC, TCB, FJB, JAG

Cross Section Profile
50ft Upstream of Bridge 84-B5



View Aspect: Facing Upstream

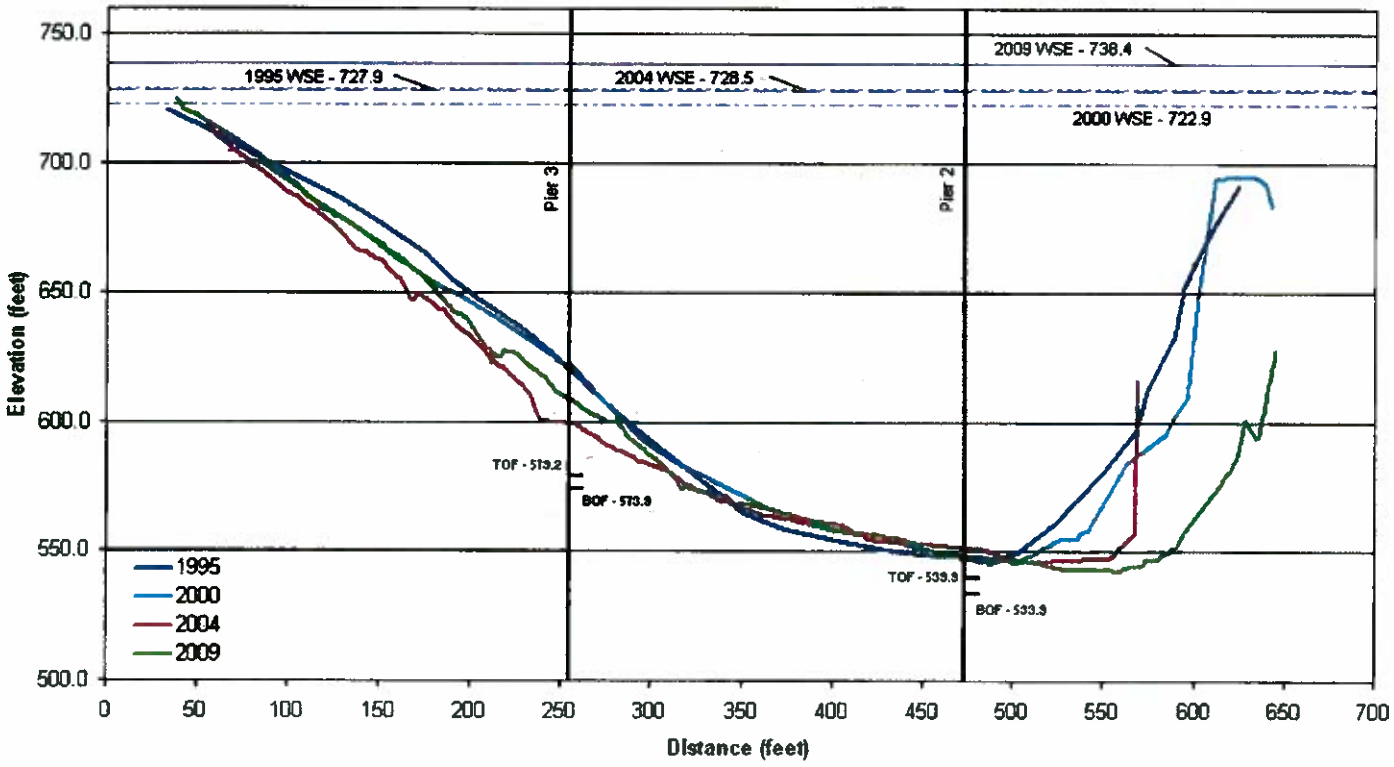
Cross Sections

Stantec

Structure 84-0152-B00005 County Mercer Date 12/15/2009

Description 10 Ft. Upstream Crew AAC, TCB, FJB, JAG

Cross Section Profile
10ft Upstream of Bridge 84-B5



View Aspect: Facing Upstream

Cross Sections

Stantec Structure

84-0152-B00005 County Mercer Date 12/15/2009

Crew AAC, TCB, FJB, JAG

KY 152 over Herrington Lake

Pontis Underwater Only

Item - 210 Qty - 70 LF
Condition State - 3 = 70 LF

General Notes (All Piers)

1. There is light scaling located from the water surface to 25' below the water surface (bws).
2. There is moderate biological growth located from the surface to 3' below the surface, growth is light from 3' to 34' and very light from 34' to the bottom.
3. The bottom material consists of soft silt.
4. There is honeycombing on all faces of the pier located at every cold joint and appears to get worse from the surface to 115' bws.
5. The outside and inside of the piers is in fair condition, with section loss located at the cold joints.
6. There is a opening on the east face of Pier 2 measuring approximately 4'W and 4'T extending from the bottom. The top of the opening is 170.5' and the bottom at 178.5 feet bws. The concrete located at this opening is approximately 2.5' thick. Does not have a grate covering it.

Pier 2 (Outside of Pier)

1. There is honeycombing at the following locations: 1'W x 1'T x 6"D middle east face 87' bws, 3.5"W x 6"T x 4"D middle of the east face 8' bws, 2.5"W x 6"T x 4"D 7' North of SE corner 8.5' bws, 2'T x 2'W x 4"D center of the East face 66' bws, 1'W x 4"T x 3"D 54' bws on the Northeast corner, 1'W x 4"T x 4"D center of the south face 100' bws, 6"T x 2"W x 4"D SE cornere 65' bws.

Pier 2 (Inside of Pier)

1. There are several tie wires are exposed throughout the inside of the pier.
2. The two cross beams below 115' appear to be in good condition.
3. There is a 4"T by 6"D area of honeycombing located at the cold joint 20' below the water surface along the East and North faces. Aggregate can be removed with ease.
4. There are crossbeams with honeycombing at the joints up to 3" deep located at the following depths;10, 51', 90' and 134'.
5. The bottom material consists of soft silt with some construction debris. There is a steel grate extending out of the silt bottom approximately 1.5'.

Stantec Structure

84-0152-B00005 County Mercer Date 12/15/2009

Crew AAC, TCB, FJB, JAG

KY 152 over Herrington Lake

Pier 3 (Outside of Pier)

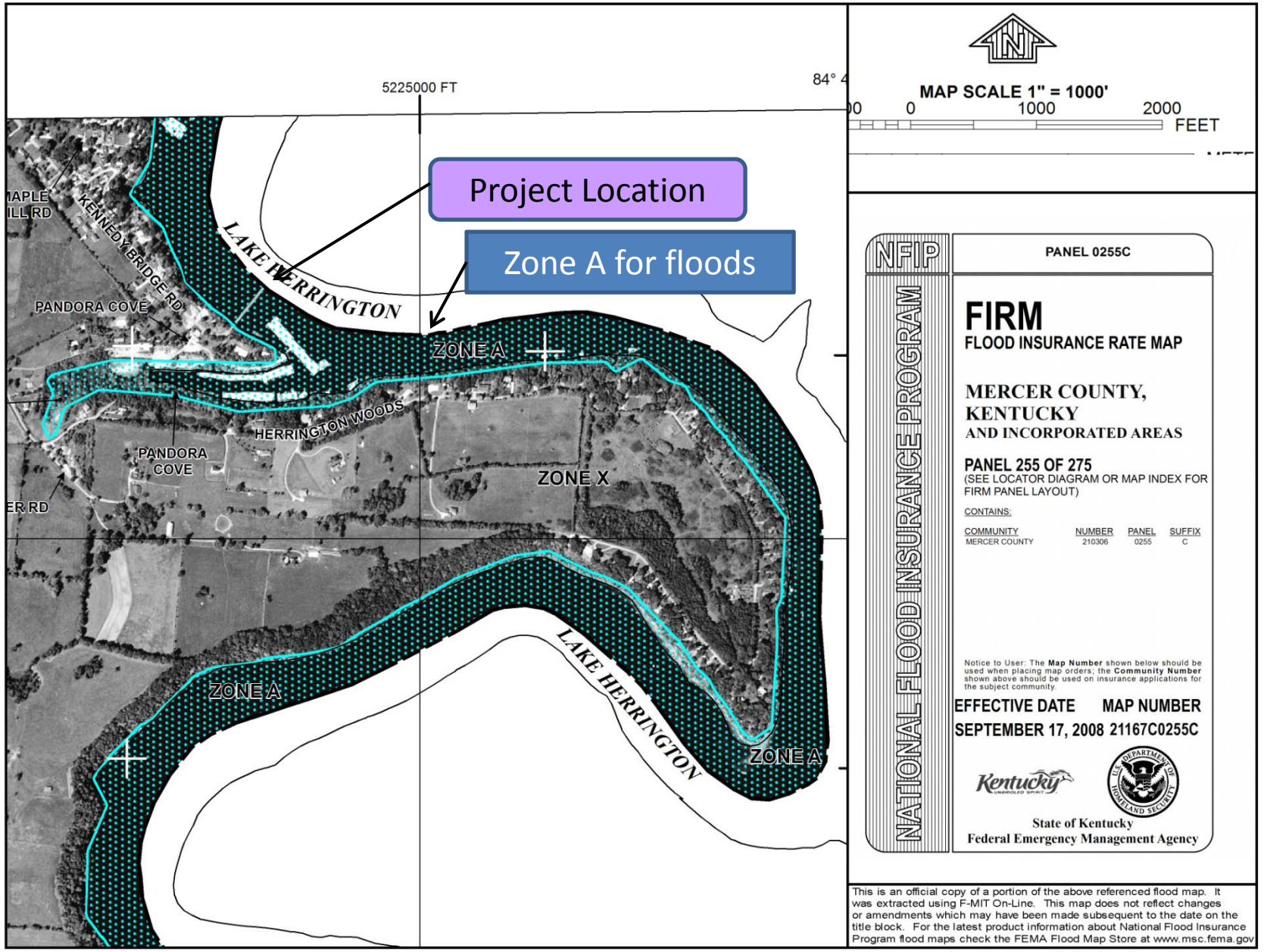
1. There is an opening in the concrete located on the East face bottom. The top of the opening is located 112.0', with the bottom of the opening located 118' bws. There is a rebar grate covering the opening, the opening is 4'W and 6'T. There is rebar covering the opening.
2. There is minor honeycombing and light scaling located on the west face in isolated areas with measurments less then 1" in section depth.
3. There is a 1'W by 2"T by 2"D area of honeycombing located 43' bws on the NE corner.
4. The bottom material consists of silt with construction debris
5. There is a steel grate on the bottom in the SE corner. The grate may be an old access hatch grate from the top of the pier.

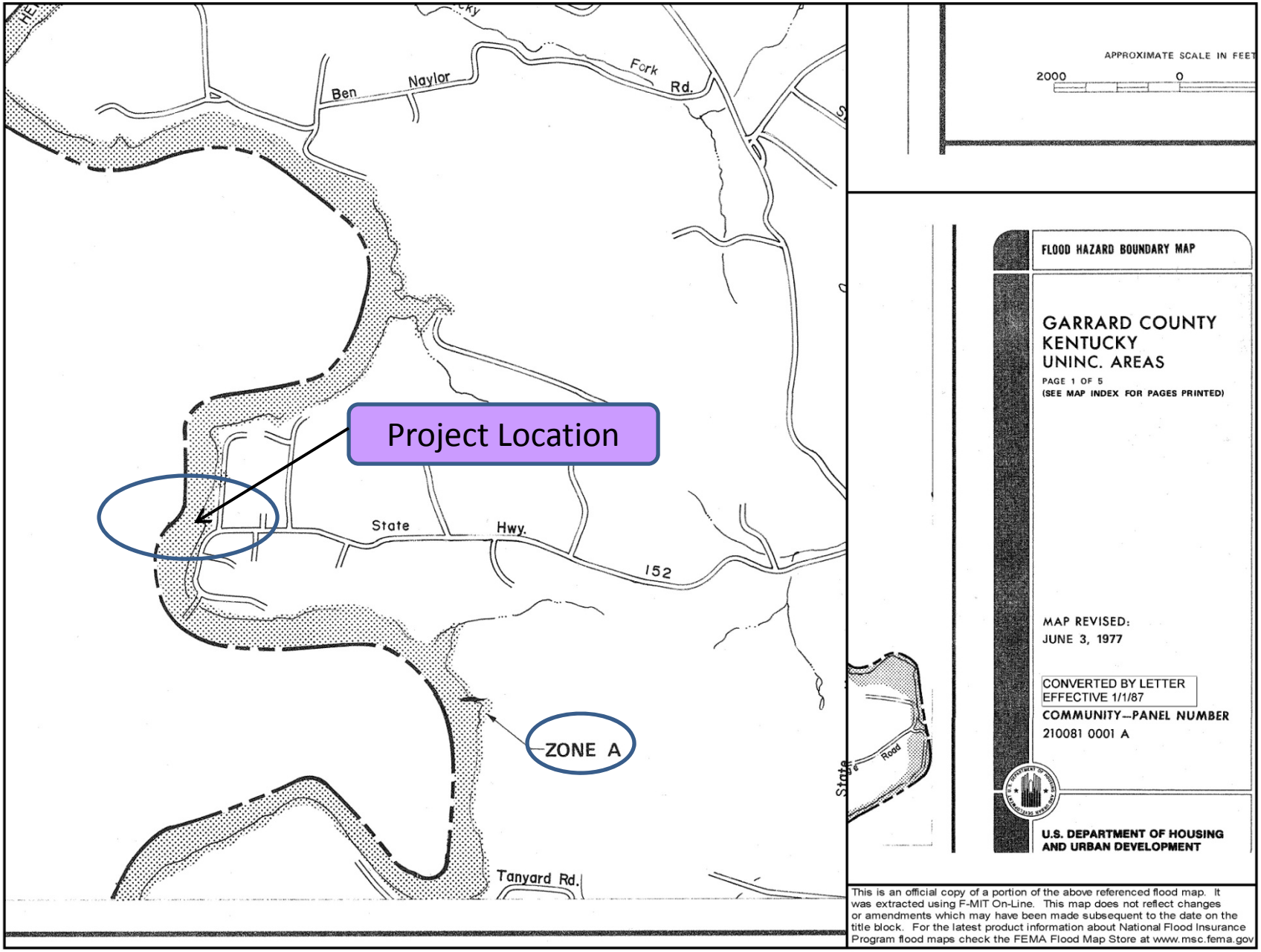
Pier 3 (Inside of Pier)

1. There is exposed rebar located 11' bws on the East face.
2. There is a steel grate on the bottom in the SE corner. The grate may be an old access hatch grate from the top of the pier. The grate was covered with soft silt.
3. There is an opening in the concrete located on the West face bottom. The top of the opening is located 131.5'bws, the bottom of the opening is located 137.5' bws. There is not a grate covering the opening The opening is 4' wide and 6' tall.
4. There is a 9"T by 4"W by 1"D area of spalling located 11' bws on the West face.
5. There is a 2'diameter by 2.5' deep hole located on the NE face. The top of the hole is located 137' bws, the bottom is located 139' bws. The hole is not formed and aggregate can be removed.
6. There is a 2'T by 7"W by 1"D area of spalling located 43' bws on the Northeast face.
7. There is a 2'T by 6"W by 1"D area of honeycombing located 11' bws on the South face.
8. There are cross beams located below the water surface at the following depths; 4.0, 40', 76'and 106'.
9. The bottom material consists of soft silt with some construction debris.

APPENDIX J

FIRM MAPS OF THE STUDY AREA


5225000 FT
84° 4
Project Location
Zone A for floods
LAKE HERRINGTON
KENNEDY BRIDGE RD
PANDORA COVE
ZONE A
HERRINGTON WOODS
PANDORA COVE
ZONE X
ZONE A
LAKE HERRINGTON
ZONE A
MAP SCALE 1" = 1000'
0
1000
2000
FEET
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0255C
FIRM
FLOOD INSURANCE RATE MAP
MERCER COUNTY, KENTUCKY
AND INCORPORATED AREAS
PANEL 255 OF 275
(SEE LOCATOR DIAGRAM OR MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
MERCER COUNTY 210306 0255 C
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.
EFFECTIVE DATE MAP NUMBER
SEPTEMBER 17, 2008 21167C0255C
Kentucky
State of Kentucky
Federal Emergency Management Agency
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov


Ben Naylor
Fork Rd.
Project Location
State Hwy. 152
ZONE A
Tanyard Rd.
APPROXIMATE SCALE IN FEET
2000 0
FLOOD HAZARD BOUNDARY MAP
GARRARD COUNTY
KENTUCKY
UNINC. AREAS
PAGE 1 OF 5
(SEE MAP INDEX FOR PAGES PRINTED)
MAP REVISED:
JUNE 3, 1977
CONVERTED BY LETTER
EFFECTIVE 1/1/87
COMMUNITY–PANEL NUMBER
210081 0001 A
U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAS)

MAP SCALE 1" = 1000'

00 0 1000 2000 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0255C

FIRM

FLOOD INSURANCE RATE MAP

MERCER COUNTY, KENTUCKY

AND INCORPORATED AREAS

PANEL 255 OF 275

(SEE LOCATOR DIAGRAM OR MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MERCER COUNTY	210306	0255	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

EFFECTIVE DATE **MAP NUMBER**

SEPTEMBER 17, 2008 21167C0255C

Kentucky

State of Kentucky

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

APPENDIX K

PROJECT TEAM MEETING MINUTES

Meeting Minutes
Project Team Meeting
Item 7-1116.00, Bridge Replacement

Meeting Date: **January 11, 2010**
Meeting Location: **District 7, Lexington**
In Attendance:

Bob Nunley	District 7 Project Development
Ananias Calvin III	District 7 Design
Don Lawson	District 7 Utilities
Rob Sprague	District 7 Design
Ricky Sizemore	District 7 Planning
Natalia Hoskins	District 7 Planning
Kyle Bidwell	District 7 Structures
Michael Vaughn	District 7 Structures Section Supervisor
Matt Simpson	District 7 Project Delivery & Preservation TEBM
Bret Blair	District 7 Planning
Randy Turner	District 7 Planning
Becky Barrick	District 7 Environmental
Steve Ross	KYTC Division of Planning
Sreenu Gutti	KYTC Division of Planning

INTRODUCTION: The meeting started just around 10.30 a.m. local time. Attendees were requested to "Sign-In". Presentation Handouts were distributed. A Power Point presentation was shown by Sreenu Gutti. The goals for the meeting were two fold - understanding DNA Studies and discussing the DNA Study for Item 7-1116.00. It was explained to the group that DNA stands for Data, Needs and Analysis. It was also explained why these studies are conducted, how they are helpful and the process involved in developing a Study. A "Purpose and Need" statement is developed in a DNA study to better define the intent of the Project. FHWA suggested nine elements for Purpose and Need will be considered in developing a Purpose and Need statement.

DNA STUDY FOR ITEM 7-1116.00: Following the introduction of the concepts of Pre-Design Scoping Study, the Study for Item 7-116.00 was discussed. A site video was played and the Project location was defined. The project is located on KY 152 over Herrington Lake at the Mercer/Garrard county line. Mile point locations for the bridge are MP 18.818 to 18.894 in Mercer County and MP 0 to 0.076 in Garrard County. The bridge has an ID 084B00005N. FHWA recommended nine elements can be briefly described as follows.

Legislation: The project is listed in the 2010 Highway Plan and has a total estimated cost of $12,900,000 (combined D,R,U and C).

Project Status: Funds have been authorized ($1 M) to conduct DNA Studies, Phase 1 Design and Environmental investigation.

System Linkage: KY 152 connects the Cities of Harrodsburg and Burgin to US 27.

Modal Interrelationship: There is no intermodal use on this route.

Social Demands or Economic Development: Per the Director of Economic Development in Garrard County, KY 152 is the main artery between Mercer and Garrard counties. Herrington Lake and Peninsula Golf course are major attractions. The upgrade of US 127 to four lane traffic has caused an increase in traffic on KY 152. There is a lot of real estate development in the area.

Transportation Demand: The 2010 ADT on KY 152 along the project is estimated at 1590. Traffic forecast should be requested for this project.

Capacity: The Volume to Service Flow (VSF) ratio on this segment is 0.23 in Mercer County and 0.11 in Garrard County. VSF under 0.70 indiactes no congestion on this segment.

Safety: The crash history of this segment was studied using Kentucky State Police data. In the past ten years, six crashes have been reported at either ends of the bridge. Crashes seem to be happening in the sharp curves entering the bridge and leaving the bridge from west to east.

Roadway Deficiencies: The current roadway is a two-lane undivided roadway with 9 - 10 foot lanes. Measured shoulder width at the site is 1-3 feet. There are no shoulders on the bridge. KYTC Common Geometric Practices for Rural Collector Roads suggest a pavement width of 24 feet and 8 feet shoulders for a speed limit of 35 mph. The Composite Adequacy Rating percentile of the roadway is 75.9 in Mercer County and 44.0 in Garrard County. The rating is a composite of roughness, safety and service (capacity) of the roadway and compares this segment to other similar State roads.

The bridge was built in 1924. It has six spans total; there are 4 main spans and 2 approach spans (one approach span on each end of the bridge). The main spans are steel deck truss and the approach spans are a girder/floorbeam system. Repairs were done in 1940, 1944, 1991, 2003 and 2009. The bridge is structurally deficient and had a Sufficiency Rating of 2.00 before the 2009 repairs. Mike Vaughn informed the Team that the current Sufficiency Rating is 28.9. The Highway Bridge Replacement and Rehabilitation Program (HBRRP) policy states that any bridge that is Structurally Deficient or Functionally Obsolete, and has a sufficiency rating of 50 or less is eligible for Federal Bridge Replacement funds. The remaining life of the bridge cannot be estimated because of its current structural condition. The current posted weight limit is 15T.

BRIDGE PIERS: A bridge piers video was shown. Mike Vaughn informed the Team that in the Bridge Inspection File there was an article concerning substructure movement written by F.C. Mahan, former Design Engineer in the Bridge Section in Central Office from 1931 – 1942. The article was written sometime after 1943, but the exact date is unknown. The article states that the bridge was built in 1924 when Herrington Lake was still empty. After the bridge was built, the lake was flooded and an inspection report from 1932 revealed that the deep water pier nearest the Mercer County side was having movement. At this point the pier had actually risen approximately 16 inches. Elevation surveys were performed from 1934 – 1936. At the height of movement, the pier had risen approximately 30 inches and tilted upstream and toward the Mercer Co. side approximately 12 inches. The piers were built by the Weber Chimney Company of Chicago and are hollow. Steve Ross expressed an observation that sometimes the movement stabilizes over time.

It was discussed whether the piers are stable and are re-usable. Existing piers have been re-used on other bridge replacement projects depending on their condition. The Project Team decided that the stability and re-use has to be further investigated. Geotech will be consulted to assess the substructure and get a recommendation on how much of the substructure can be re-used.

POSSIBLE ALTERNATES: The following bridge replacement alternates were discussed.

- Alternate 1: No Build
- Alternate 2: Replace with a bridge at same location
- Alternate 3: Replace at an adjacent location
- Alternate 4: Replace at an alternate location
    - Preserve old bridge as historic bridge and open to public for tourism.

Alternate 1: No Build: Considering the poor structural condition of the bridge, this alternate will not be carried forward.

Alternate 2: Replace with a bridge at same location: This alternate will depend on the condition of existing piers. There are three possible alternates based on geotechnical assessment:

- Use all existing piers if they are found re-usable
- Replace the deep water pier nearest the Mercer County side which showed upward movement/tilting and re-use the remaining piers
- Replace all piers if they cannot be re-used

Some of the advantages of this alternate are possible cost savings because of re-use of some or all of the existing piers and the required right of way will be minimal. The disadvantages are: ferry service or a detour route is needed during construction. If ferry service is not feasible during construction, motorists have to detour over 30 miles to reach US 27 from KY 152.

Considering the crashes occurring in the roadway curves leading to and leaving the bridge, geometric improvements to the approach roadway will be included in this alternate. It was pointed out that on the west side (Mercer County), the geometric revisions to the curve leading to the bridge could be expensive due to the steep drop in grade on the side road. The bridge alignment may need to be skewed to minimize the effects.

Alternate 3: Replace with a bridge at an adjacent location: This alternate involves construction of the new bridge at a location adjacent to the current location. The advantage of this alternate is that no detour route or ferry service is required during construction of the new bridge. KY 152 traffic can continue to operate on the existing route without interruption during construction. During the previous bridge close down in 2009, the main concern of the motorists was the lengthy detour of over 30 miles which can be avoided with this alternate. On the other hand, the initial cost of this bridge replacement alternate could be higher compared to Alternate 2 because of a complete new substructure and superstructure, right of way costs, etc. Mike Vaughn pointed out that life cycle costs should be considered when comparing costs between Alternate 2 and Alternate 3, because if the substructure is reused in Alternate 2, the typical 100 year life span for a bridge may not be obtainable since the existing substructure is already 86 years old. Also, in Alternate 3 new piers may not be required in the deep part of the lake since modern trusses have span lengths in the range of 600 – 1000 feet.

Alternate 4: Replace with a bridge at an alternate location: This alternate will consider a new location for the new bridge. The new alignment would connect KY 152 on the west side at Chimney Rock Road to KY 152 on the east side in the vicinity of Kennedy Lane. The advantages of the alternate are: current geometric deficiencies of KY 152 leading to and leaving the existing bridge location can be avoided and safety can be improved. A new roadway built in accordance with KYTC Current Geometric Practices for geometry, sight distance and higher speed is possible. The alternate will be the most expensive compared to the remaining alternates – current operating marinas would have to be relocated, new right of way is required, etc. However, traffic can continue to operate during construction on the existing bridge with this alternate.

UTILITIES: Sreenu informed the Project Team that no overhead utilities were observed on the bridge during a site visit conducted earlier. Don Lawson, District 7 Utilities informed the Team that other utilities will be investigated during a site visit. Old Plans were not investigated for existing utilities at the present time.

DRAINAGE: FEMA Flood Insurance Rate Maps (FIRM) were shown at the meeting. The lake is designated as Zone A for floods. Zone A represents a 100 year flood zone. Mike Vaughn informed the group that Dix Dam is located to the north of the bridge. The dam is used to control the water level and typically in the late fall the water level is lowered. Melting snow and rain runoff from the winter and spring then refills the lake before the summer season. Kentucky Utilities Power Plant is the owner of the dam.

ENVIRONMENTAL ISSUES: Becky Barrick, District 7, Environmental Coordinator presented her findings to the Team. Both counties in the project area are in attainment for all monitored air pollutants. An Archaeology Phase I survey will need to be completed, the optimum time for which is during a winter draw-down when more of the shoreline is exposed. The lake is too deep for mussels. The bridge is not the type that will be used by bats except temporarily. The bridge is historic and needs to be tested for asbestos prior to demolition. Any historic homes are unknown at this time. The environmental document will likely be a CE, with a Level 3 possible if there is substantial public opposition to the project.

TYPICAL SECTION: KY 152 is a Rural Major Collector. Current ADT (2010) is estimated at 1590. A traffic forecast is not available at this time. If the future estimated ADT is over 2000, KYTC Common Geometric Practices for Rural Collector Roads suggest a pavement width of 24 feet and 8 feet shoulders for a speed limit of 35 mph. The Team decided that a typical section will be finalized during Phase I studies.

FUNDING ISSUES: Steve Ross started the discussion regarding FHWA and authorization of funds for the project. Repair projects on the bridge were conducted in 2003 and 2009 and it was suspected if they were done with federal funds. Typically, FHWA does not authorize more funds if the request is made within ten years of a previous request.

Bob Nunley informed the team that Mike Vaughn had investigated and found out that the repairs done in 2003 and 2009 were funded using State Bridge Maintenance Funds (FE02) which are not federal funds. Bob also informed that Ron Rigney was informed about these findings by e-mail.

DETOUR ROUTE DURING CONSTRUCTION: The detour route map used in the 2009 Bridge Repair plans was shown to the Team. According to the 2009 repair plans, the detour re-routed eastbound traffic from KY 152 along KY 33/US 68/KY 29, then south on KY 1268 to reach US 27. Mike Vaughn pointed out that the detour was changed to avoid KY 1268. The detour was actually routed to continue northward on US 68 to KY 29, then along KY 29 to reach US 27. It was decided that the detour needed to avoid KY 1268 because this road has a section with a historic stone laid arch culvert that has a single, 13 foot wide lane with several sharp curves on each side of the structure. The total length of the modified detour when the bridge was closed during the 2009 Bridge repairs was over 30 miles. It was pointed out that if a detour route has to be used, it would need to be the same as the detour used during the 2009 bridge closure.

CONSTRUCTION ISSUES: The proposed detour route discussed earlier would put motorists over 30 miles out of their way. That was a primary area of concern to the motorists when the bridge was closed for repairs in 2009. The possibility of using ferry service to transport motorists and their vehicles during construction was discussed.

Chimney Rock Road is a side road on KY 152 and leads to the boat launch and lake on the west side. Traffic can be re-routed along this route and a Ferry service can be introduced to transport motorists and their vehicles from one side of the lake to the other and onto east KY 152. However, possibility of using Chimney Rock Road and its condition to handle traffic should be evaluated. The road may have to carry limited traffic or allow only certain type of vehicles based on its condition.

The 30 mile detour route described in the previous section can be avoided by providing ferry service. The cost to provide such a service will be investigated by discussing with the Modal section at the Division of Planning. It was also discussed if floating bridges (military type) can be used during construction. However, it was decided that a floating bridge may not be practical or useful in the current situation.

PUBLIC INVOLVEMENT: There was a discussion earlier at the beginning of the DNA Study whether Public Involvement which includes input from the Public Officials can be introduced into the Project early in the project development phase. This issue was discussed at the Project Team meeting. It was decided by the Project Team that the DNA Study will not involve any Public Involvement activities. Public Involvement will be included in the Phase I Design Study which will start in a few months.

PURPOSE AND NEED STATEMENT: The Purpose and Need statement was discussed and the following statements were agreed upon by the Project Team:

> **The need for the Bridge Replacement is to improve the current posted weight limit of 15 tons.**
>
> **The purpose of the project is to address the structural deficiency of the bridge, geometric deficiencies of the approach roadway and to maintain connectivity and enhance recreational traffic.**

SITE VISIT: A site visit scheduled to take place after the Project Team meeting could not be done due to bad weather and road conditions. The site visit will be conducted at a later time.

NEXT STEPS: A site visit will be conducted in the near future. Geotech will be consulted for preliminary assessment of the substructure and recommendation. Cost estimates will be developed by the District. The DNA study report will be started immediately.

END OF MINUTES

APPENDIX L

PARTIAL COPY OF KYTC PRELIMINARY GEOTECHNICAL ASSESSMENT

P-001-2011

cc: R. Nunley
S. Ross
S. Gutti
A. Calvin
D. Moses
M. Hite
M. Vaughn

M E M O R A N D U M

TO: Keith Damron, P.E.
Division of Planning

BY: Bart Asher, P.E., P.L.S.
Geotechnical Branch Manager

DATE: March 7, 2011

SUBJECT: **Mercer-Garrard County**
KY 152 (Kennedy Bridge Road) over Herrington Lake
Item # 7-1116.00
Preliminary Geotechnical Assessment

1. Location and Project Description

This project is located where KY 152 (Kennedy Bridge Road) crosses Herrington Lake at the border of Mercer and Garrard Counties. The bridge was constructed in order to keep the road open once Herrington Lake was built by Kentucky Utilities (KU). The bridge was finished and turned over to the adjoining counties on April 7, 1925 (*Mahan*). Water began impounding in the Lake on March 17, 1925.

The Division of Planning is conducting a Data, Needs and Analysis (DNA) study for the subject project. Project meeting notes indicate that there are currently four options for the replacement:

- Alternate 1: No Build
- Alternate 2: Replace with a bridge at same location
- Alternate 3: Replace at an adjacent location
- Alternate 4: Replace at an alternate location

This abbreviated review will discuss some geotechnical concerns with alternates 2 and 3. Alternate 4 can be reviewed by this office once an alternate location is considered.

The approximate coordinates for this site are: 37.746185 degrees North and -84.703665 degrees West.

2. Site Topography and Geologic Conditions

The current bridge spans Herrington Lake over what once was a deep gorge with Dix River flowing at the bottom. The existing profile indicates that the Mercer County side was basically a sheer cliff before the water was impounded. The slope on the Garrard county side is more gentle but still has some large vertical drops. The entire area of the lake surrounding the bridge has similar topography. It was noted during a field visit that the tops of some of the surrounding cliffs are substantially higher in elevation than where the bridge was constructed.

The site is located in the Bryantsville Quadrangle (# 945). The geologic mapping indicates that the bedrock at this site is (Source KGS):

- Tyrone Limestone – Limestone, of two types: (1) light-gray to light-olive-gray, cryptograined, containing specks and small tubes of clear calcite (birdseye limestone), and (2) very light gray to light-brownish-gray, cryptograined, containing pods and interlaced tubes of yellowish-gray, micrograined, calcareous dolomite. Birdseye limestone predominates in northern part of quadrangle and limestone containing dolomite bodies in southern part of quadrangle. Bentonite, as much as 2 feet thick, is present at top southwest of a line from the northwest corner of the quadrangle to Pollys Bend; a second bentonite bed, as much as 2 feet thick, is present about 25 feet below the top in all but the northwest corner of the quadrangle; a third bentonite bed, 0.1 to 0.3 foot thick and about 80 feet below the top, is present throughout the quadrangle. The upper two bentonites, and locally the lowermost bentonite, are underlain by thin chert layers. Chert nodules are present in some beds. Limestone immediately above the lowermost bentonite contains planar laminae of calcareous dolomite. Persistent units of argillaceous limestone and shale are present in uppermost 10 feet and in middle of unit.

  The Tyrone limestone is the type of bedrock visible in the surrounding cliffs.

- Oregon Formation – Interbedded dolomite and limestone: Dolomite is calcareous, yellowish gray to yellowish white, micrograined to very finely crystalline, thick bedded. Limestone is light gray to light brownish gray, cryptograined; some limestone beds contain pods and interlaced tubes of calcareous dolomite. Contacts are placed at top of highest and base of lowest dolomite bed. Unit thins southward by grading of upper dolomite beds into limestone.

- Camp Nelson Limestone - Limestone, light-gray to light-brownish-gray, cryptograined, containing pods and irregular interlaced tubes of yellowish-gray, micrograined, calcareous dolomite that make up 20 to 50 percent of the rock. Tubes commonly lie in a tangled network parallel to bedding, though some cut across bedding. Contains several zones of cryptograined limestone with specks and minute tubes of clear calcite. Calcareous shale, 5 to 10 feet thick, its base 10 to 15 feet below top of the formation, is present throughout the quadrangle.

  It appears, from available mapping, that the base of Pier 2 and Pier 3 is located in the Camp Nelson Limestone.

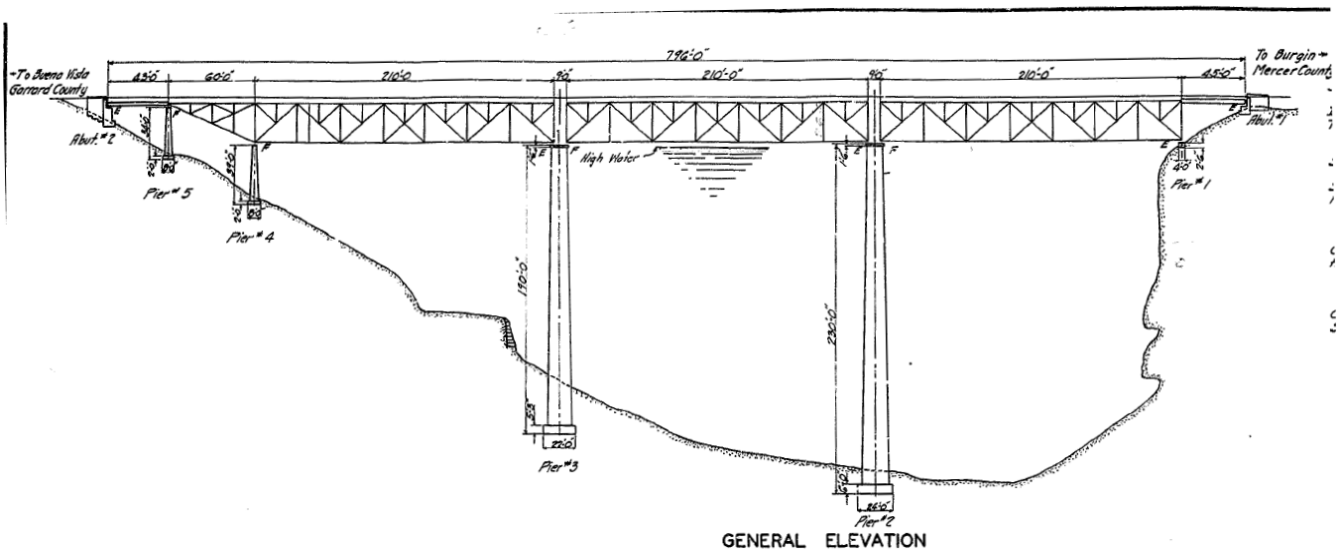
The available mapping indicates fault lines within approximately one mile of the bridge. Additionally, the Kentucky River Fault Zone is within approximately 3 miles of the existing bridge location.

Mapping indicates that this area has numerous karst features. Karst features may include sinkholes, caves and solution features in the bedrock.

3. Discussion of Alternates 2 and 3 Replace with Bridge at Same or Adjacent Location

A bridge at the same location may require a new foundation or portions of the existing foundations may be reused. This office has discussed reuse of these piers in the past.

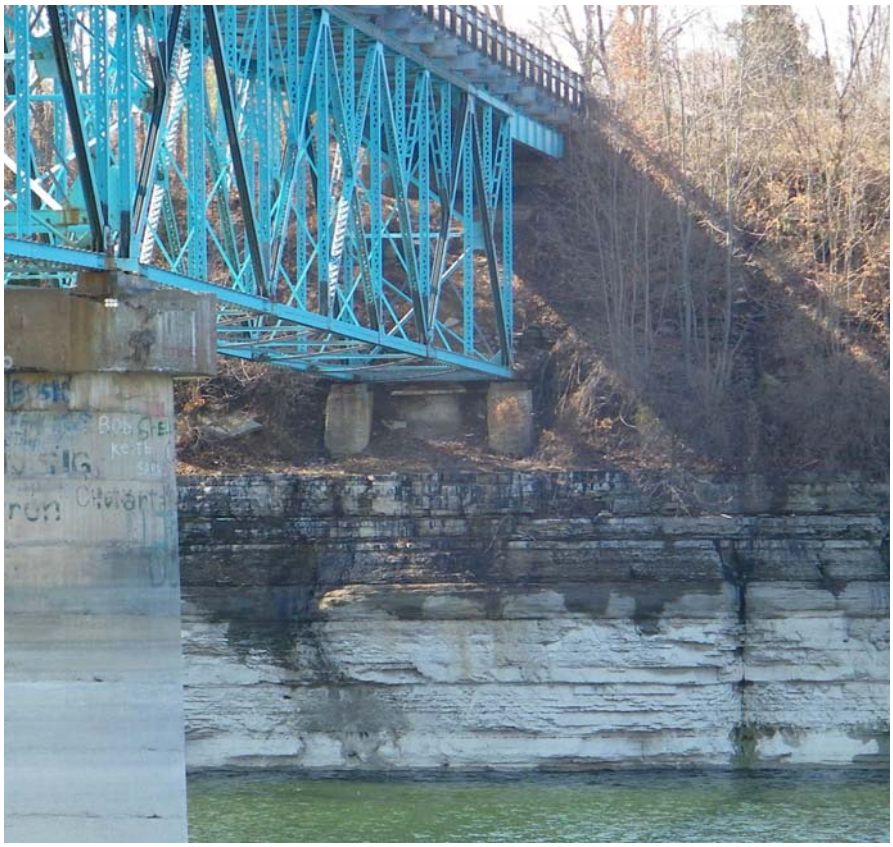
A site visit was performed to review the existing piers. It is unlikely that it would be desirable or economically viable to reuse abutment number 1, abutment number 2, or piers 1, 4 or 5 as shown in the below schematic (retrieved from the Division of Structural Design's plan database). Due to their size and location in the lake, it could be very desirable to reuse piers 2 and/or 3.



Profile view of the existing bridge

Abutment 1

P-001-2011
Mercer-Garrard County
KY 152 over Lake Herrington



Pier 1

Pier 3 (front) Pier 2 (rear)

P-001-2011
Mercer-Garrard County
KY 152 over Lake Herrington

Pier 4

Pier 5

Abutment 2

An article by F.C. Mahan from the *Kentucky Engineer* (year unknown - see appendix) supplied to this office by the District indicates that there have been some significant problems at Pier 2. Once the downstream dam was constructed and water began to back up around the piers it was noted that Pier 2 was actually rising and rotating. In the article Mahan states that the earliest inspection on record was in March of 1932 and that the top of Pier 2 was 1.33 feet higher than pier 3. (Mahan indicates that earlier records had been lost in a fire). Both were supposedly constructed to the same elevation. Mahan also states that "At the height of the movement the pier had risen approximately 30" and had tilted upstream and toward the Mercer County side approximately 12"." This office does not have current information that indicates the elevation difference between the two piers.

The article goes on to discuss various theories behind the movement. Those stated are:

1. *Trapped gas under footing.*
2. *Hydrostatic pressure*
3. *Since the lime cliffs are full of crevices, holes, etc. and may be cavernous in places, the extra weight of the water may have caused some shift in the immediate terrain.*
4. *There is a possibility of heaving of the bottom when certain strata are wet and softened.*

The article goes on to add that "Careful observations also indicate that possibly the whole cliff on the Mercer County side may be slowly moving toward the lake."

There was no conclusive evidence at that time or at this point to indicate the probable mechanism that caused the movement. Mapping does indicate that bentonite layers are prevalent in the Tyrone formation, which is presumably above the footing elevation of Pier 2. Some types of bentonite are known to swell to numerous times their dry size when water is added.

In order to make a decision as to whether Pier 2 and/or Pier 3 can be reused, a thorough investigation would be required. Drilling through the footing in numerous places would be desirable to examine the bearing stratum of both piers. Additionally, the existing concrete would need to be examined so that a useful remaining service life can be determined. Similar studies have been undertaken by the Cabinet in the past.

Replacement of the bridge at approximately the same location or just adjacent to this location, without the reuse of the piers, will also require a very thorough site investigation. It would be very desirable to try to find out the mechanism that caused the movement at pier 2 so that future problems with a new bridge can be avoided.

4. New Foundation and Superstructure Discussion

New foundations in the water would likely be large (12–14 foot) diameter drilled shafts socketed well into bedrock. This construction would have to take place from floating equipment due to the extreme depth of the lake. Conventional piers and stub abutments could likely be used on the shoreline.

A new superstructure on the existing or new foundations would likely be a plate girder structure or another truss of some type.

Attachments:

Site Map
Mahan Article
Bridge Inspection Report
Historical Plans (no plans for the initial construction were located)

APPENDIX M

NEWS ARTICLES OF 2009 BRIDGE CLOSURE

News - Latest News
Thursday, Oct. 08, 2009Comments (5) | Recommend (0)

Kennedy Mill bridge to close 6 months for repairs

By Amy Wilson - awilson1@herald-leader.com

- awilson1@herald-leader.com

Starting Monday, the 84-year-old Kennedy Mill bridge, which spans Herrington Lake on Ky. 152 between Mercer and Garrard counties, will be out of commission for six months for repairs.

David Hughes, an engineer for the state Transportation Cabinet, said construction crews will replace connections on the trusses and reinforce much of the existing bridgework. He said he hopes the bridge will be certified to support 10 tons after the $1.8 million project is finished.

Currently, the bridge has rated to support three tons.

“A car will be all right on that bridge, but if you meet a car in the middle coming in the other direction, that isn’t good,” Hughes said.

The bridge is inspected yearly, Hughes said. The real problem has been the continual use of the bridge by dump trucks that exceed the posted 3-ton limit.

“It’s been a law-enforcement problem,” he said. “Every time more than three tons goes over that bridge, it weakens it.”

Earlier this week, a town meeting in Burgin drew some residents concerned about the state’s posted detour, which would, Hughes agreed, take motorists 40 miles out of the way.

“There might be a shorter route through Danville, but we don’t like to send people through downtowns or back streets,” he said.

Another town meeting is set for 6 p.m. Thursday at Camp Dick Robinson Elementary School in Garrard County.

Reach Amy Wilson at 859-231-3305 or at 800-950-6397, Ext. 3305.

Comments

The Herald-Leader allows readers to comment on stories; the views expressed here are not those of the Herald-Leader or its staff. Readers must avoid personal attacks and libelous or inappropriate

RECENT POPULA

Debate: Gray and issues

Comair to lay off w

Retirement system placement agents

Ex-Miss Ky. to com

Wis. veterans boar

Updated: 6:50 PM Oct 7, 2009

Bridge closing in Central Kentucky

A dangerously rusted out Kentucky bridge will shut down for 6 months worth of repairs.

Posted: 6:13 PM Oct 7, 2009
Reporter: Denny Trease
Email Address: denny.trease@wkyt.com

Story 2 Comments

Font Size:

A dilapidated old bridge between Garrard and Mercer counties will close for months starting next week.

The state transportation cabinet laid out its repair plans during a public meeting in Burgin Tuesday night.

Kennedy Mill Bridge was built in the 1920's. It will be closed to accommodate those badly needed repairs on Monday, October 12, and some say that's none too soon.

Pictures of the deteriorating bridge provided by the transportation cabinet outraged many of the 100 or so people attending the meeting.

David Hughes, an engineer for the transportation cabinet, attended that gathering designed to answer the concerns of drivers who use the bridge. He told 27 NEWSFIRST, "The public reaction was not very good. They could see there are all kinds of indications that the bridge is in real bad shape."

Hughes stood up at the meeting and said that he, personally, would not drive across this bridge. But if it's that dangerous, why not just shut it down immediately? Hughes said, "We need to warn people what's coming and give them time to make other arrangements. I don't see any more risk in doing that than we've had in the last 2 or 3 years."

The recommended detour around the bridge will require some people to drive 40 miles out of their way. John Webb, who works for a boat business just on the Mercer County side of the bridge, says, "The frustration for me is working 100 yards across the bridge and being able to get boats and people in here easily. And there are people who live close by here who work in Lexington and will now have to drive way out of their way."

And there are no guarantees that repairing a bridge this old will make it significantly safer over the long term. Engineer Hughes says, "It won't be a complete repair. We hope we will be able to raise the 3 ton limit after the repair is done, but it's possible we might no be able to."

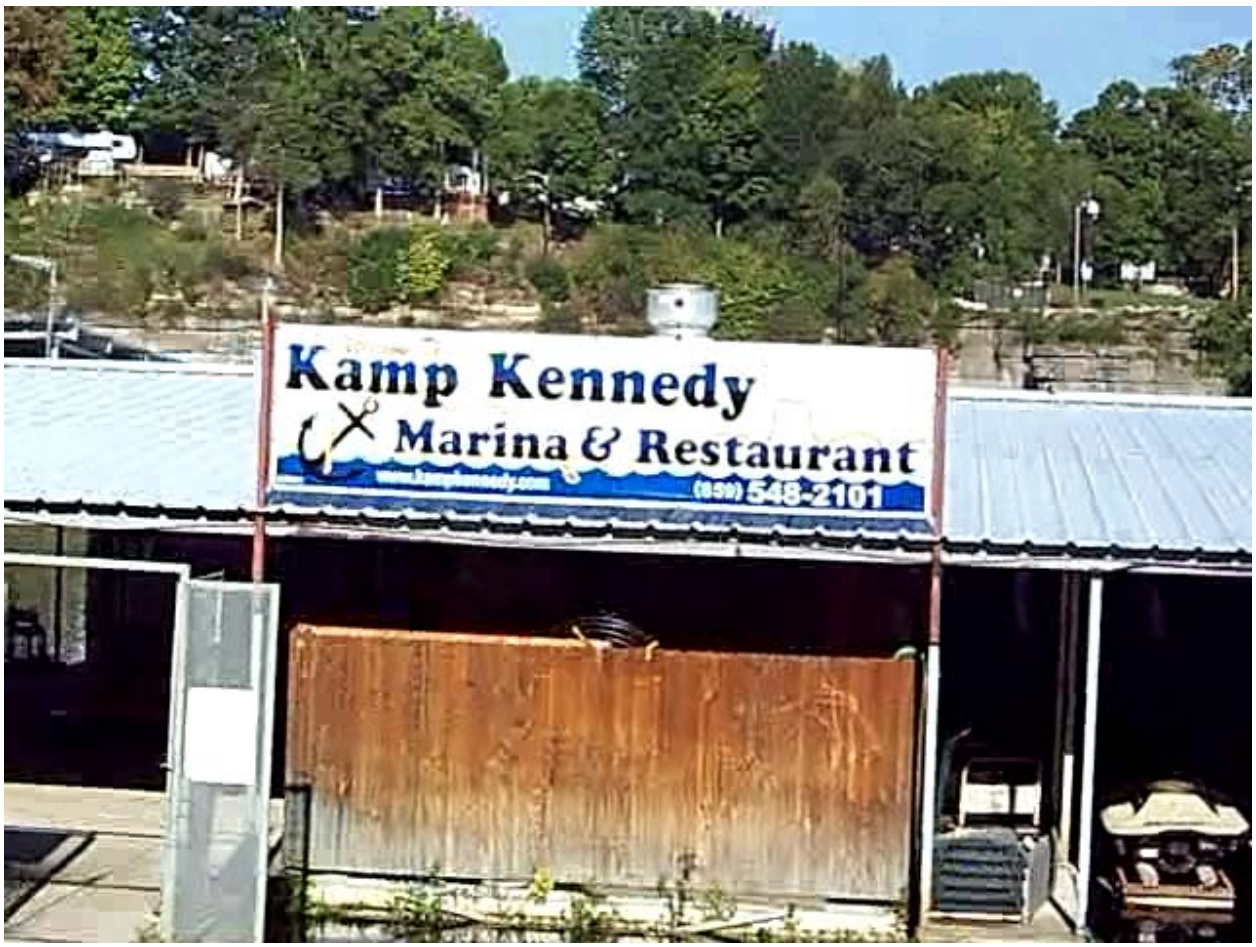
A 1.8 million dollar bridge repair contract has been let with a Lexington firm, Intech, which hopes to complete the work by April of next year.

Another informational meeting is scheduled for Thursday night at six o'clock at Camp Dick Robinson Elementary School in Garrard County.

Latest Comments

APPENDIX N

PROJECT PHOTOS



Marina & Restaurant located on upstream side of bridge

Sharp curve on KY 152 entering the bridge from west side – reason for some crashes

Access road to the Marina on the east side

Crashes occurred at the curve to the bridge on the east side

KY 152 and adjacent residential property on the east side just before the bridge

Only 30 miles from Lexington, Kentucky, picturesque Herrington Lake is the perfect playground for many outdoor and recreational sports. Water skiing, tubing, swimming and even cliff jumping is popular on the lake during the summer months, with many marinas offering boats and cottages for rents. Great fishing is also abundant and the well-stocked lake contains bluegill, catfish, crappie, hybrid striped bass, largemouth bass, spotted bass & white bass. Herrington Lake is known for producing some of the finest reservoir fishing the state has ever known.

Marinas on Herrington Lake

Marina / Milepost	Mailing Address	Phone
Herrington Lake Marina Garrard County www.herringtonmarina.com	136 S. Homestead Ln., Lancaster 40444	859.548.2282
Cane Run Marina	Kennedy Bridge Rd., Harrodsburg mney Rock	859.748.5487
Chimney Rock Marina Mile 4.0 Mercer County	250 Chimney Rock Rd., Burgin 40310	859.748.9065
Chimney Rock RV Park		859.748.5252
Coffey's Cove Mile 18.0 Boyle County	1358 Taylor Rd., Danville 40422	859.516.8873
Gwinn Island Marina and Campground Mile 16.0 Boyle County	1200 Gwinn Island Rd. Danville 40422	859.236.4286
Kamp Kennedy Marina Mile 4.0 Garrard County	P.O. Box H, Burgin 40310	859.548.2101
King's Mill Marina Mile 22.5 Garrard County	570 King's Mill Rd., Lancaster 40444	859.548.2091 859.913.0034
Nelson's Mid Lake Mile 13.5 Mercer County	238 Cedar Lane, Harrodsburg 40330	859.748.5520
Pandora Marina Mile 4.5 Mercer County	Box 642, Burgin 40310	859.748.9121
Redgate Garrard County	305 Red Gate Road, Lancaster 40444	859.548.3507

Royalty's Fishing Camp Mile 2.5 Mercer County	940 Normans Camp Rd., Harrodsburg 40330	859.748.5459
Sunset Marina Mile 3.5 Garrard County	318 Sunset Lodge Rd., Lancaster 40444	859.548.3591

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Golf on Herrington Lake

The Peninsula Golf Resort, a **Pete Dye designed facility** given a 4 1/2 star rating by Golf Digest for top places to play in the May 2002 issue, is Central Kentucky's newest "Stay and Play" golf facility.

The uniqueness of "The Peninsula Golf Resort" and the benefit to your group is that they are more than just another place to play golf. They offer twelve newly constructed "Stay and Play Villas" that can be used for an exceptional golf getaway without an extremely long drive from home. Each Villa consists of 1300 square feet fully furnished with a complete set of linens for your comfort, two bedrooms with two double beds in each, two bathrooms, fully furnished kitchen, large den area, and washer/dryers. Perfect for four golfers!

APPENDIX O

COST ESTIMATION

Cost Calculations: The following estimates were used in the calculations of the alternates

Alternate 2a	Replace Superstructure	$140/SF
	Rehabilitate Piers & Abutments	$150,000
Alternate 2b	Replace Superstructure	$150/SF
	Rehabilitate Piers & Abutments	$100,000
Alternate 2c	Replace Bridge, Piers, & Abutment	$250/SF
Alternate 2d	Replace Superstructure, Abutments, all except deep water piers	$150/SF
	Rehab Deep water piers	$150,000
All alternates above used $3,000,000/mile for bridge approaches geometry improvements		
ALTERNATE 3	New Bridge at Adjacent Location	$250/SF
	Bridge Approaches Geometry Improvements	$3,000,000/mile
ALTERNATE 4	New bridge at alternate location	$250/SF
	New Approaches	$2,000,000/mile