

# TRANSPORTATION PLANNING REPORT

## Special Bridge Replacement Program

LOCAL ROUTE 0A230

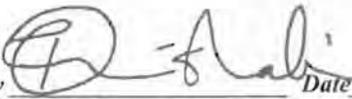
BRIDGE AT L.M. 2.59

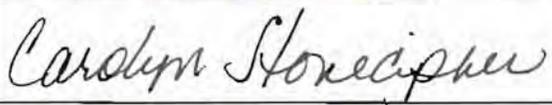
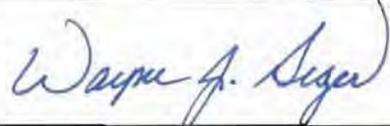
HARDEMAN COUNTY

PIN: 117274.00

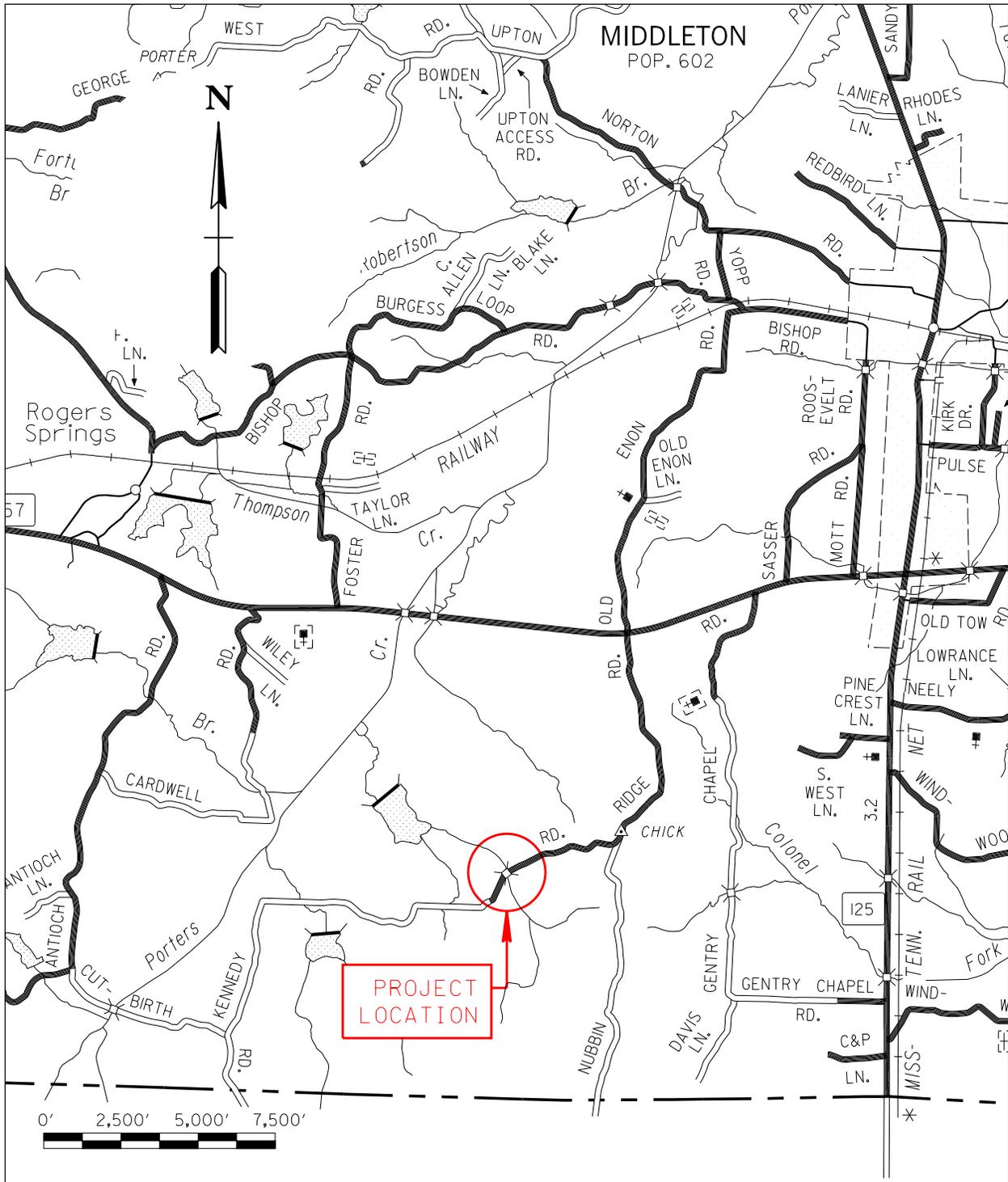


PREPARED BY  
TRANSYSTEMS CORPORATION  
FOR THE  
TENNESSEE DEPARTMENT OF TRANSPORTATION

Approved by  Date 04/04/13 Approved by  Date 4/22/13  
Chief of Environment and Planning Deputy Commissioner and Chief Engineer

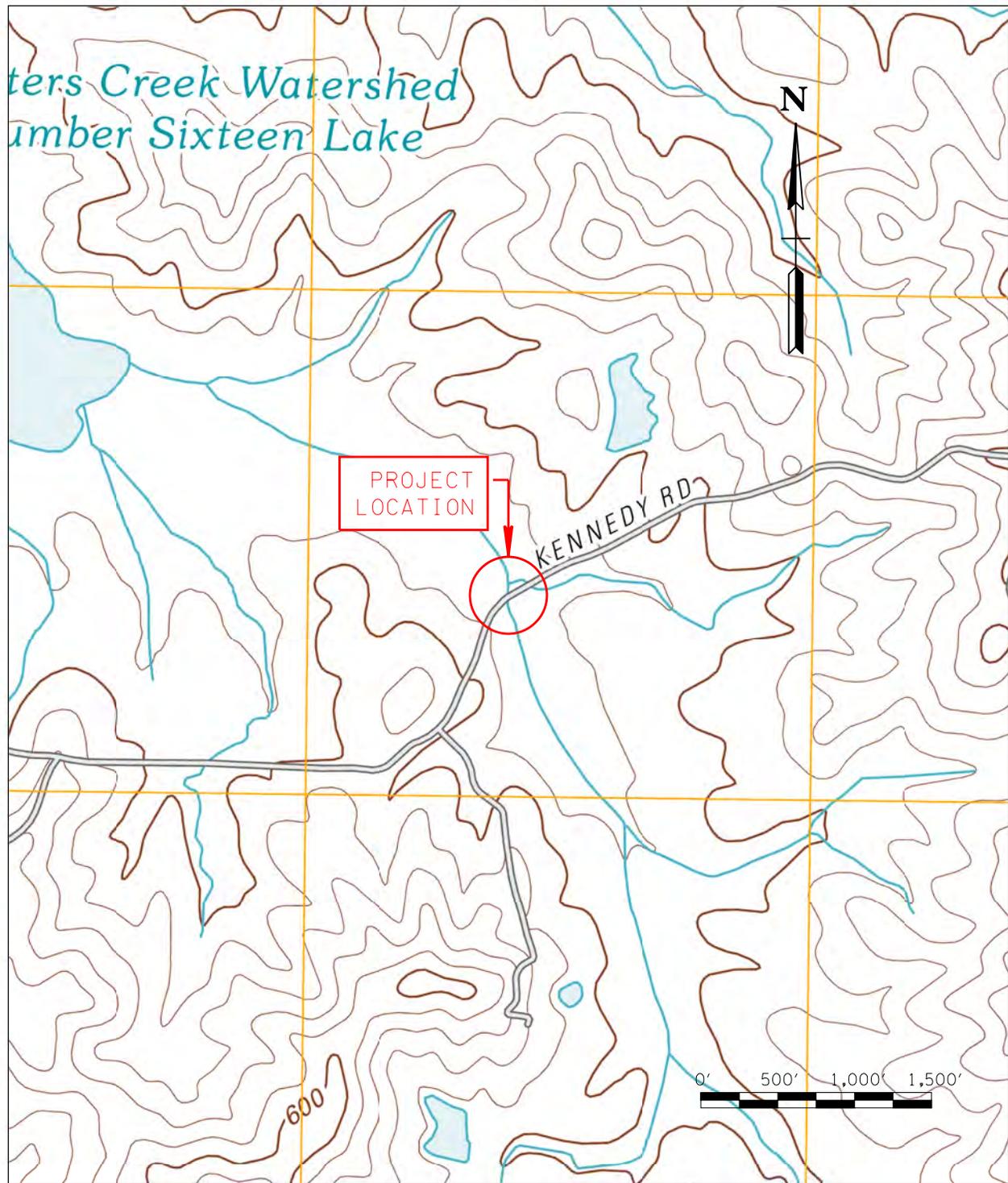
Approved by:	Signature:	Date:
Transportation Director Project Planning Division		3-26-13
Engineering Director Design Division		4-2-13
Engineering Director Structures Division		4-2-13

This document is covered by 23 USC § 409 and its production pursuant to fulfilling public planning requirements does not waive the provisions of § 409.



## LOCATION MAP

LOCAL ROUTE 0A230 (KENNEDY ROAD)  
 BRIDGE 350A2300001 (L.M. 2.59)  
 HARDEMAN COUNTY



## PROJECT MAP

LOCAL ROUTE 0A230 (KENNEDY ROAD)  
BRIDGE 350A2300001 (L.M. 2.59)  
HARDEMAN COUNTY



## AERIAL MAP

LOCAL ROUTE 0A230 (KENNEDY ROAD)  
BRIDGE 350A2300001 (L.M. 2.59)  
 HARDEAMAN COUNTY

**TRANSPORTATION PLANNING WORKSHEET  
BRIDGE REPLACEMENT ANALYSIS, NEEDS, AND COSTS**

County: Hardeman Route: Local Route 0A230 (Kennedy Road) Log Mile: 2.59  
 Feature Crossed: [Unnamed Branch] at LM 2.59 System: Local  
 Functional Class: Rural Local Bridge ID: 350A2300001

**EXISTING CONDITIONS**

2016 AADT: 60 App. Cross Section: 16' / 20' / 44' No. Lanes: 2  
 Approach Alignment: Transition Year Built: 1950 Load Limit: 15 tons  
 Width (out to out): 25.25 ft. Sidewalks: Right N/A Left N/A Length: 51 ft.  
 No. Spans: Approach: 0 Main: 3  
 Substructure: Timber Vertical Clearance: 10 ft. Sufficiency Rating: 77.5  
 Other: Abandoned utility conduit attached to upstream (south) side of bridge.

**PROPOSED IMPROVEMENTS**

STANDARDS FROM RD01-TS- 1A (Table 1) Type of Work: Replace  
 Design Year: 2036 Design AADT: 70 Terrain Level ADL (F): N/A (R): N/A  
 Project Length: 333 ft Bridge Length: 56 ft Approach Length: 277 ft  
 Design Speed (MPH): 30 Posted Speed (MPH): N/A  
 Approach Width\*: 18' / 20' / As Req. Bridge Width (C to C): 22 ft No. Lanes: 2  
 Right-of-Way Required: 0 Ac. Tract(s) 0 Structure Type: Conc. I-beam

**MAINTENANCE OF TRAFFIC**

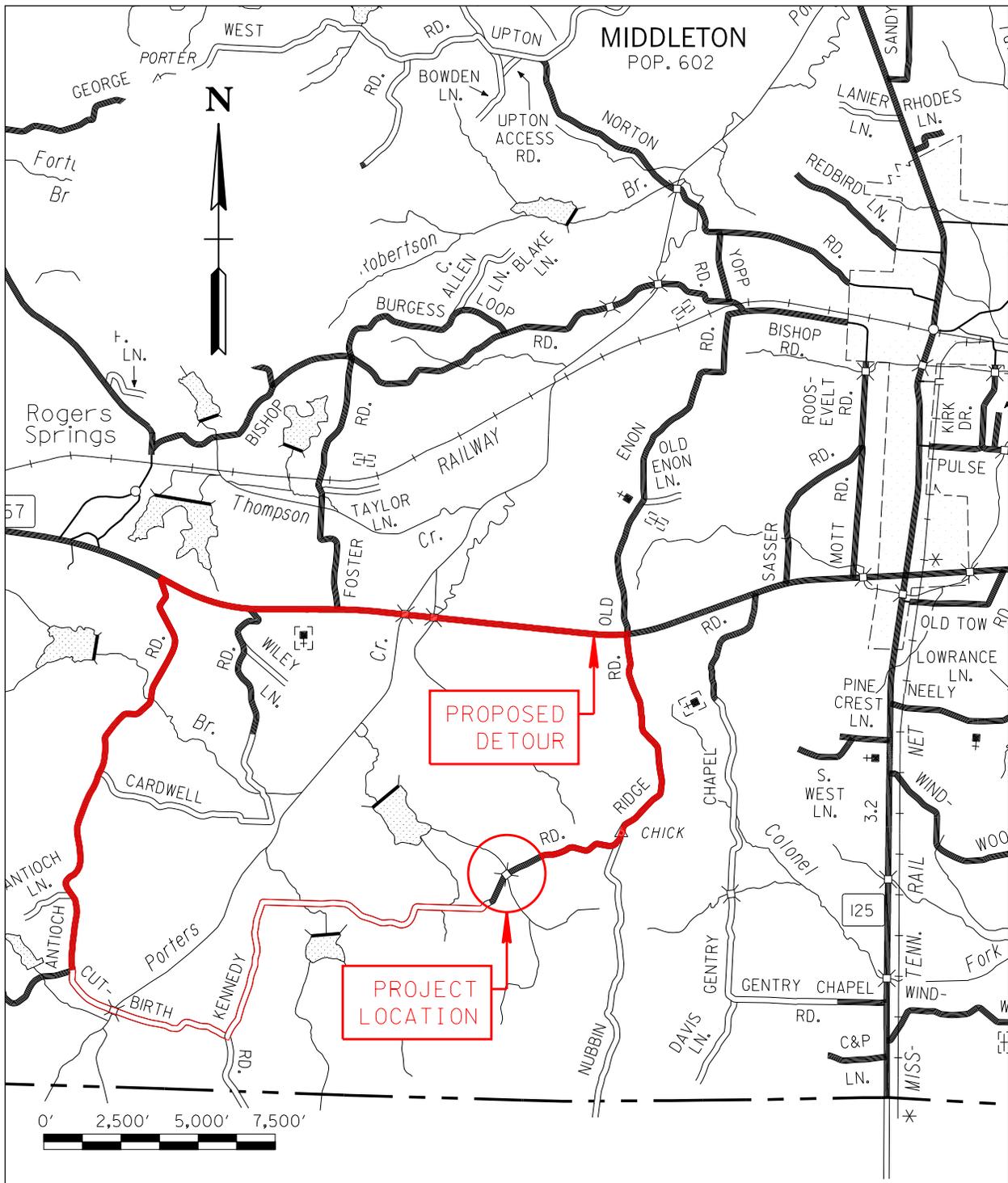
Temporary Detour:  Temporary Runaround:  Stage Construct:   
 Alternate Route: 11.5 miles total. From east of bridge: left on Nubbin Ridge Road, left on State Route 57, left on Antioch Road, left on Cutbirth Road. From west of bridge: right on Cutbirth Road, right on Antioch Road, right on State Route 57, right on Nubbin Ridge Road.  
 Remarks: Close roadway and detour traffic. See Detour Map for detour route. Road closure letter required.

**ESTIMATED COST**

Right-of-Way: \$10,000 Approaches: \$118,400 Structure: \$221,000  
 Preliminary Engineering: \$47,600 Utilities: \$27,400 Misc./Cont.: \$105,600  
 Mobilization: \$20,600 Total: \$550,600

Remarks: Replace existing bridge with single-span, 52-foot structure. No horizontal or vertical grade change required.

**Field investigation by:** Glen Blankenship (TDOT Region 4 Survey), Mike Gilbert (TDOT Project Planning), Gena Gilliam (TDOT Project Planning), Jane Jones (TDOT Region 4 Design), Jason Moody (TDOT Region 4 Traffic), Patrick Murray (TranSystems Corporation), Lisa Reaney (TDOT Project Planning), Luke Sullivan (TranSystems Corporation), Fred Vinson (TDOT Region 4 ROW)



## DETOUR MAP

LOCAL ROUTE 0A230 (KENNEDY ROAD)  
 BRIDGE 350A2300001 (L.M. 2.59)  
 HARDEAMAN COUNTY

Route:	Local Route 0A230 (Kennedy Road)
Description:	Bridge 350A2300001 (LM 2.59)
County:	Hardeman
Length:	0.06 Miles
Date:	August 31, 2012

<u>DESCRIPTION</u>	<u>LOCAL</u>	<u>STATE</u>	<u>FEDERAL</u>	<u>TOTAL</u>
Right-of-Way	\$ 2,000		\$ 8,000	\$ 10,000
Clearing and Grubbing	\$ 3,000		\$ 12,000	\$ 15,000
Earthwork	\$ 3,000		\$ 12,000	\$ 15,000
Railroad Crossing or Separation	\$ -		\$ -	\$ -
Drainage	\$ -		\$ -	\$ -
Utilities	\$ 5,480		\$ 21,920	\$ 27,400
Structures	\$ 44,200		\$ 176,800	\$ 221,000
Pavement Removal	\$ -		\$ -	\$ -
Paving	\$ 5,120		\$ 20,480	\$ 25,600
Roadway and Pavement Appurtenances	\$ -		\$ -	\$ -
Retaining Walls	\$ -		\$ -	\$ -
Topsoil	\$ -		\$ -	\$ -
Seeding	\$ 40		\$ 160	\$ 200
Sodding	\$ -		\$ -	\$ -
Rip-Rap or Slope Protection	\$ 4,500		\$ 18,000	\$ 22,500
Fencing	\$ -		\$ -	\$ -
Signing	\$ 200		\$ 800	\$ 1,000
Pavement Markings	\$ 40		\$ 160	\$ 200
Lighting	\$ -		\$ -	\$ -
Signalization	\$ -		\$ -	\$ -
Guardrail	\$ 2,300		\$ 9,200	\$ 11,500
Pay Item Quantity Adjustment (15%) <sup>1</sup>	\$ 10,480		\$ 41,900	\$ 52,400
Maintenance of Traffic	\$ -		\$ 10,000	\$ 10,000
Mobilization (5%)	\$ 4,000		\$ 16,600	\$ 20,600
<b>CONSTRUCTION COST (rounded)</b>	<b>\$ 84,400</b>		<b>\$ 348,000</b>	<b>\$ 432,400</b>
Engineering and Contingency (10%)	\$ 8,400		\$ 34,800	\$ 43,200
<b>TOTAL CONSTRUCTION COST (rounded)</b>	<b>\$ 92,800</b>		<b>\$ 382,800</b>	<b>\$ 475,600</b>
Preliminary Engineering (10%)	\$ 9,300		\$ 38,300	\$ 47,600
<b>PROJECT COST (ROUNDED)<sup>2</sup></b>	<b>\$ 102,100</b>		<b>\$ 421,100</b>	<b>\$ 523,200</b>

<sup>1</sup> For estimating purposes pay items are adjusted for fluctuation of cost based on quantity.

<sup>2</sup> For estimating future project costs, a compounded inflation rate of 10% should be applied from the date of this estimate.

TDOT PAY ITEM	TDOT DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
—	Right-of-Way	LS	1	\$ 10,000.00	\$ 10,000
<b>RIGHT-OF-WAY TOTAL (ROUNDED)</b>					<b>\$ 10,000</b>
201-01	Clearing and Grubbing	LS	1	\$ 15,000.00	\$ 15,000
<b>CLEAR AND GRUBBING TOTAL (ROUNDED)</b>					<b>\$ 15,000</b>
203-03	Borrow Excavation (Unclassified)	CY	1,000	\$ 15.00	\$ 15,000
<b>EARTHWORK TOTAL (ROUNDED)</b>					<b>\$ 15,000</b>
<b>PAVEMENT REMOVAL TOTAL (ROUNDED)</b>					<b>\$ -</b>
<b>DRAINAGE TOTAL (ROUNDED)</b>					<b>\$ -</b>
—	Relocation of Above-Ground Utilities	LF	1,400	\$ 10.00	\$ 14,000
—	Relocation of Underground Utilities	LF	335	\$ 40.00	\$ 13,400
<b>UTILITIES TOTAL (ROUNDED)</b>					<b>\$ 27,400</b>
—	Removal of Existing Structure	SF	1,290	\$ 15.00	\$ 19,350
—	Structure	SF	1,344	\$ 150.00	\$ 201,600
<b>STRUCTURES TOTAL (ROUNDED)</b>					<b>\$ 221,000</b>
<b>RAILROAD CROSSING OR SEPARATION TOTAL (ROUNDED)</b>					<b>\$ -</b>
303-01	Mineral Aggregate, Type A Base, Grading D	TON	23	\$ 20.00	\$ 460
402-01	Bituminous Material for Prime Coat (PC)	TON		\$ 610.00	\$ -
402-02	Aggregate for Cover Material (PC)	TON		\$ 25.00	\$ -
403-01	Bituminous Material with Tack Coat (TC)	TON	0.1	\$ 635.00	\$ 64
411-01.10	ACS Mix (PG64-22) Grading D Roadway	TON	35	\$ 120.00	\$ 4,200
604-03.04	Pavement at Bridge Ends	SY	107	\$ 195.00	\$ 20,865
<b>PAVING TOTAL (ROUNDED)</b>					<b>\$ 25,600</b>
<b>ROADWAY AND PAVEMENT APPURTENANCES TOTAL (ROUNDED)</b>					<b>\$ -</b>
<b>RETAINING WALLS TOTAL (ROUNDED)</b>					<b>\$ -</b>
712-01	Traffic Control	LS	1	\$ 10,000.00	\$ 10,000
<b>MAINTENANCE OF TRAFFIC TOTAL (ROUNDED)</b>					<b>\$ 10,000</b>
203-07	Furnishing and Spreading Topsoil	CY	105	\$ 15.00	\$ 1,575
<b>TOPSOIL TOTAL (ROUNDED)</b>					<b>\$ -</b>
801-01	Seeding (With Mulch)	UNIT	6	\$ 28.00	\$ 168
801-03	Water (Seeding and Sodding)	MG	1	\$ 5.00	\$ 5
<b>SEEDING TOTAL (ROUNDED)</b>					<b>\$ 200</b>
<b>SODDING TOTAL (ROUNDED)</b>					<b>\$ -</b>
—	Signs	LS	1	\$ 1,000	\$ 1,000
<b>SIGNING TOTAL (ROUNDED)</b>					<b>\$ 1,000</b>
716-05.01	Painted Pavement Marking (4" Line)	LM	0.142	\$ 850.00	\$ 121
<b>PAVEMENT MARKINGS TOTAL (ROUNDED)</b>					<b>\$ 200</b>
<b>LIGHTING TOTAL (ROUNDED)</b>					<b>\$ -</b>
<b>SIGNALIZATION TOTAL (ROUNDED)</b>					<b>\$ -</b>
<b>FENCE TOTAL (ROUNDED)</b>					<b>\$ -</b>
705-01.01	Guardrail at Bridge Ends	LF	60	\$ 65.00	\$ 3,900
705-04.04	Guardrail Terminal (Type 21)	EA	4	\$ 1,900.00	\$ 7,600
<b>GUARDRAIL TOTAL (ROUNDED)</b>					<b>\$ 11,500</b>
709-05.06	Machined Rip-Rap (Class A-1)	TON	750	\$ 30.00	\$ 22,500
<b>RIP-RAP OR SLOPE PROTECTION TOTAL (ROUNDED)</b>					<b>\$ 22,500</b>
<b>PAY ITEM TOTAL (ROUNDED)</b>					<b>\$ 359,400</b>



TranSystems

216 Centerview Drive  
Suite 250  
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Tel 615 221 1131  
Fax 615 221 1132

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## **MEMORANDUM**

**To:** TDOT Project Planning Office

**From:** TranSystems Corporation

**Date:** August 31, 2012

**Subject:** **Project No. 99109-1453-04, PIN 117274.00**  
Transportation Planning Report (TPR) Bridge Replacement  
Local Route 0A230 (Kennedy Road)  
Bridge 350A2300001 (L.M. 2.59)  
Hardeman County

A field review for the Kennedy Road bridge replacement TPR was held on July 12, 2012. The following table lists attendees present:

<b>Name</b>	<b>Organization</b>	<b>Phone</b>	<b>E-mail</b>
Glen Blankenship	TDOT Region 4 Survey	(731) 935-0137	glen.blankenship@tn.gov
Mike Gilbert	TDOT Project Planning	(615) 741-0772	michael.gilbert@tn.gov
Gena Gilliam	TDOT Project Planning	(615) 253-7692	gena.gilliam@tn.gov
Jane Jones	TDOT Region 4 Design	(731) 935-0140	jane.jones@tn.gov
Jason Moody	TDOT Region 4 Traffic	(731) 935-0183	jason.d.moody@tn.gov
Patrick Murray	TranSystems Corporation	(615) 829-7737	rpmurray@transystems.com
Lisa Reaney	TDOT Project Planning	(615) 741-0967	lisa.reaney@tn.gov
Luke Sullivan	TranSystems Corporation	(615) 829-7734	lsullivan@transystems.com
Fred Vinson	TDOT Region 4 ROW	(731) 935-0115	fred.vinson@tn.gov

The existing bridge, built in 1950, is a three-span, precast concrete slab (PCCS) structure with a length of approximately 51 feet and an out-to-out deck width of approximately 25.3 feet. The bridge features timber piles and abutments. The most recent sufficiency rating for this bridge, determined during a November 9, 2010 inspection, is 77.5. Based on regression equations supplied by TDOT and the United States Geological Survey (USGS), the estimated 10-year depth of flow for the drainage basin is approximately 6.9 feet and the 100-year depth of flow is approximately 9.2 feet.

Based on the conditions of the existing bridge, it is recommended that the structure be replaced. The design year for the new structure is 2036; the projected average annual daily traffic (AADT) for Kennedy Road at the design year is approximately 70 vehicles per day. The roadway is classified as a low-volume rural local road and will feature two (2) nine-foot-wide travel lanes with two-foot-wide shoulders at a design speed of 30 miles per hour, per TDOT standard drawing RD01-TS-1A.



## TranSystems

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The proposed structure is a single-span, prestressed concrete I-beam bridge approximately 52 feet in length and with a deck width of approximately 24 feet. The proposed bridge will be constructed in the same location and have the same vertical and horizontal alignment as the existing structure. No permanent ROW acquisition is necessary, though construction may require easements. The existing utility conduit on the south side of the existing structure should be relocated to or replaced on the new structure. The low chord of the proposed bridge provides approximately 1.1 feet of clearance above the 100-year high water elevation. Kennedy Road is recommended to be closed at the construction limits during construction of the proposed bridge; a road closure agreement letter is necessary.

The estimated replacement cost for this bridge is approximately \$429,300, including costs for right-of-way, approaches, structure, preliminary engineering, utilities, mobilization, and miscellaneous items.

## CHECKLIST OF DETERMINANTS FOR LOCATION STUDY

If any of the following facilities or ESE categories are located within the project area or corridor, place an "X" in the blank opposite the item. Where more than one alternate is to be considered, place its letter designation in the blank.

- |     |  |   |
|-----|--|---|
| 1.  | Agricultural land usage                        | X |
| 2.  | Airport (existing or proposed)                 |   |
| 3.  | Commercial area or shopping center             |   |
| 4.  | Floodplains                                    | X |
| 5.  | Forested land                                  | X |
| 6.  | Historical, cultural, or natural landmark      |   |
| 7.  | Industrial park or factory                     |   |
| 8.  | Institutional usages                           |   |
|     | a. School or educational institution           |   |
|     | b. Church, cemetery, or religious institution  |   |
|     | c. Hospital or medical facility                |   |
|     | d. Public building (e.g., fire station)        |   |
|     | e. Defense installation                        |   |
| 9.  | Recreational usages                            |   |
|     | a. Park or recreational area                   |   |
|     | b. Game preserve or wildlife area              |   |
| 10. | Residential establishment                      | X |
| 11. | Urban area, town, city, or community           |   |
| 12. | Waterway, lake, pond, river, stream, or spring | X |
|     | Permits Required:                              |   |
|     | Coast Guard                                    |   |
|     | Section 404                                    |   |
|     | TVA Section 26a Review                         |   |
|     | NPDES  | X |
|     | Aquatic Resource Alteration                    | X |
| 13. | Other  |   |
| 14. | Location coordinated with local officials      | X |
| 15. | Railroad crossings                             |   |
| 16. | Hazardous materials site                       |   |

**TENNESSEE DEPARTMENT OF TRANSPORTATION  
PROJECT PLANNING DIVISION**

PROJECT NO.: 99109-1453-04 ROUTE: Kennedy Road  
 COUNTY: Hardeman CITY: Middleton  
 PROJECT PIN NUMBER: \_\_\_\_\_  
 PROJECT DESCRIPTION: Bridge over Branch on Kennedy Road  
L.M. 2.59

**DIVISION REQUESTING:**

MAINTENANCE  PAVEMENT DESIGN   
 PLANNING  STRUCTURES   
 PROG. DEVELOPMENT & ADM.  SURVEY & DESIGN   
 PUBLIC TRANS. & AERO.  TRAFFIC SIGNAL DESIGN   
 OTHER   
 YEAR PROJECT PROGRAMMED FOR CONSTRUCTION: \_\_\_\_\_  
 PROJECTED LETTING DATE: \_\_\_\_\_

**TRAFFIC ASSIGNMENT:**

BASE YEAR		DESIGN YEAR					DESIGN ROADWAY % TRUCKS		DESIGN AVERAGE DAILY LOADS	
AADT	YEAR	AADT	DHV	%	YEAR	DIR.DIST.	DHV	AADT	FLEX	RIGID
60	2016	70	9	14	2036	65-35	1	2		

REQUESTED BY: NAME Glenda Tyus DATE 5/10/12  
 DIVISION Project Planing  
 ADDRESS 10th Floor, JKP Bldg  
Nashville, TN 37243

REVIEWED BY: TONY ARMSTRONG *Tony Armstrong* DATE 5-14-12  
 TRANSPORTATION MANAGER I  
 SUITE 1000, JAMES K. POLK BUILDING

APPROVED BY: DUDLEY DANIEL *Dudley Daniel* DATE 15 May 12  
 TRANSPORTATION MANAGER 2  
 SUITE 1000, JAMES K. POLK BUILDING

**COMMENTS:**

This Traffic is based on 2007 Bridge Count from ADAM. The Future Traffic Count is based on the Growth Rate from the ADAM Computer Program.

**DHV'S ARE NOT REQUIRED FOR SIDE ROADS LESS THAN 1000 AADT.**

NOTE: FOR BRIDGE REPLACEMENT PROJECTS, ADLs ARE NOT REQUIRED FOR ADTs OF 1000 OR LESS AND PERCENTAGE OF TRUCKS OF 7% OR LESS.

SEE ATTACHMENTS FOR TURNING MOVEMENTS AND/OR OTHER DETAILS.

(REV. 4/10/12)



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## TRANSPORTATION PLANNING REPORT

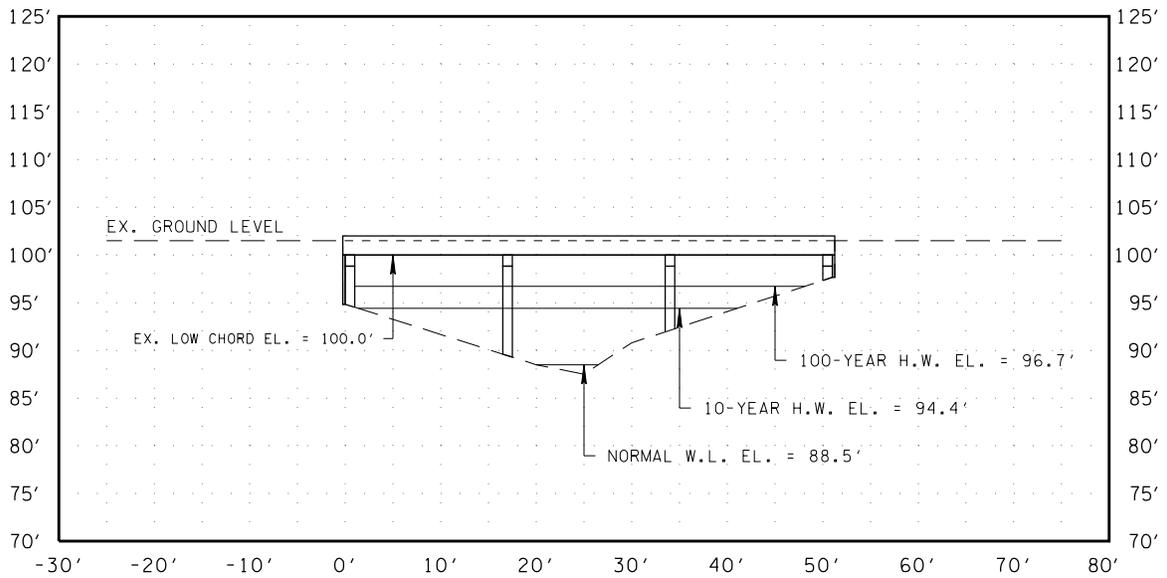
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STATE OF TENNESSEE  
 DEPARTMENT OF TRANSPORTATION

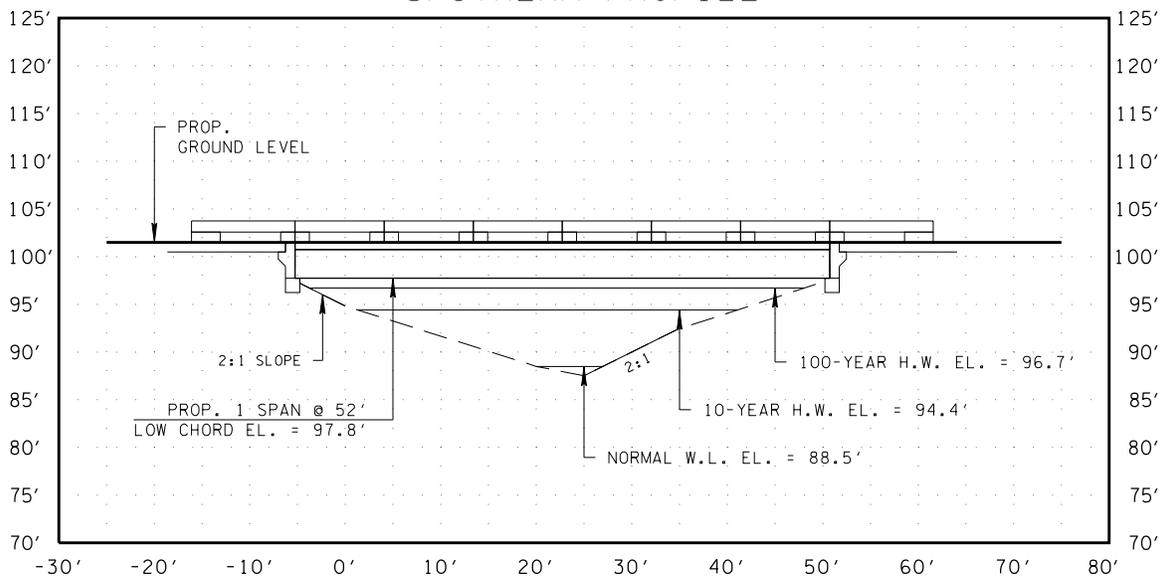
FIGURE 1  
 LOCAL 0A230  
 L.M. 2.59



## EXISTING BRIDGE UPSTREAM PROFILE



## PROPOSED BRIDGE UPSTREAM PROFILE



## BRIDGE PROFILE

LOCAL ROUTE 0A230 (KENNEDY ROAD)  
BRIDGE 350A2300001 (L.M. 2.59)  
HARDEMAN COUNTY

**Bridge TPR Flow Calculations  
for Hydrologic Area 4  
Area > 486 Acres**

County:	Hardeman		By:	TranSystems Corp.
Bridge ID:	350A2300001		Date:	August 31, 2012
Route:	Local Route 0A230 (Kennedy Road)		PIN:	117274.00
Feature Crossed:	[Unnamed Branch]			
Log Mile:	2.59			

**DRAINAGE BASIN**

Measurement from USGS quad =	590	ac.
Contributing drainage area (CDA) =	0.92	mi. <sup>2</sup>

**USGS REGRESSION EQUATIONS FOR FLOW**

2-Year Flood Flow Rate = $Q_2 = 436 \times (CDA)^{0.527} =$	418	ft. <sup>3</sup> /sec.
5-Year Flood Flow Rate = $Q_5 = 618 \times (CDA)^{0.545} =$	591	ft. <sup>3</sup> /sec.
10-Year Flood Flow Rate = $Q_{10} = 735 \times (CDA)^{0.554} =$	703	ft. <sup>3</sup> /sec.
25-Year Flood Flow Rate = $Q_{25} = 878 \times (CDA)^{0.564} =$	839	ft. <sup>3</sup> /sec.
50-Year Flood Flow Rate = $Q_{50} = 981 \times (CDA)^{0.570} =$	937	ft. <sup>3</sup> /sec.
100-Year Flood Flow Rate = $Q_{100} = 1080 \times (CDA)^{0.575} =$	1,031	ft. <sup>3</sup> /sec.

**FLOOD DEPTH OF FLOW EQUATIONS**

10-Year Flood Depth of Flow ( $D_{10}$ ) = $6.98 \times (CDA)^{0.142} =$	6.9	ft.
100-Year Flood Depth of Flow ( $D_{100}$ ) = $9.24 \times (CDA)^{0.116} =$	9.2	ft.

**FLOOD AREAS**

Existing Area Below Low Chord =	376	ft. <sup>2</sup>
Proposed Area Below Low Chord =	299	ft. <sup>2</sup>
Proposed 10-Year Flood Area ( $A_{10}$ ) =	137	ft. <sup>2</sup>
Proposed 100-Year Flood Area ( $A_{100}$ ) =	243	ft. <sup>2</sup>

**FLOOD VELOCITIES**

Proposed 10-Year Flood Velocity ( $V_{10}$ ) = $Q_{10} / A_{10} =$	5.1	ft./sec.
Proposed 100-Year Flood Velocity ( $V_{100}$ ) = $Q_{100} / A_{100} =$	4.2	ft./sec.



View upstream from bridge.



Right view of upstream floodplain.



Left view of upstream floodplain.



View downstream from bridge.



Right view of downstream floodplain.



Left view of downstream floodplain.



View forwards on route from bridge.



View backwards on route from bridge.



View of bridge inlet.



View of bridge outlet.