

TRANSPORTATION PLANNING REPORT

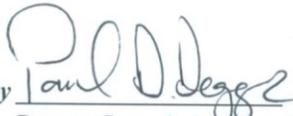
Special Bridge Replacement Program

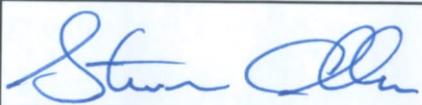
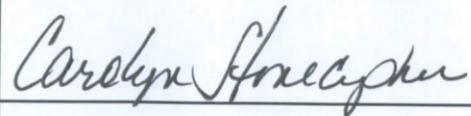
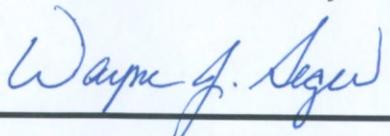
LOCAL ROUTE 01495
BRIDGE OVER CHAMBERS BRANCH AT L.M. 2.28
LAUDERDALE COUNTY
PIN: 117277.00



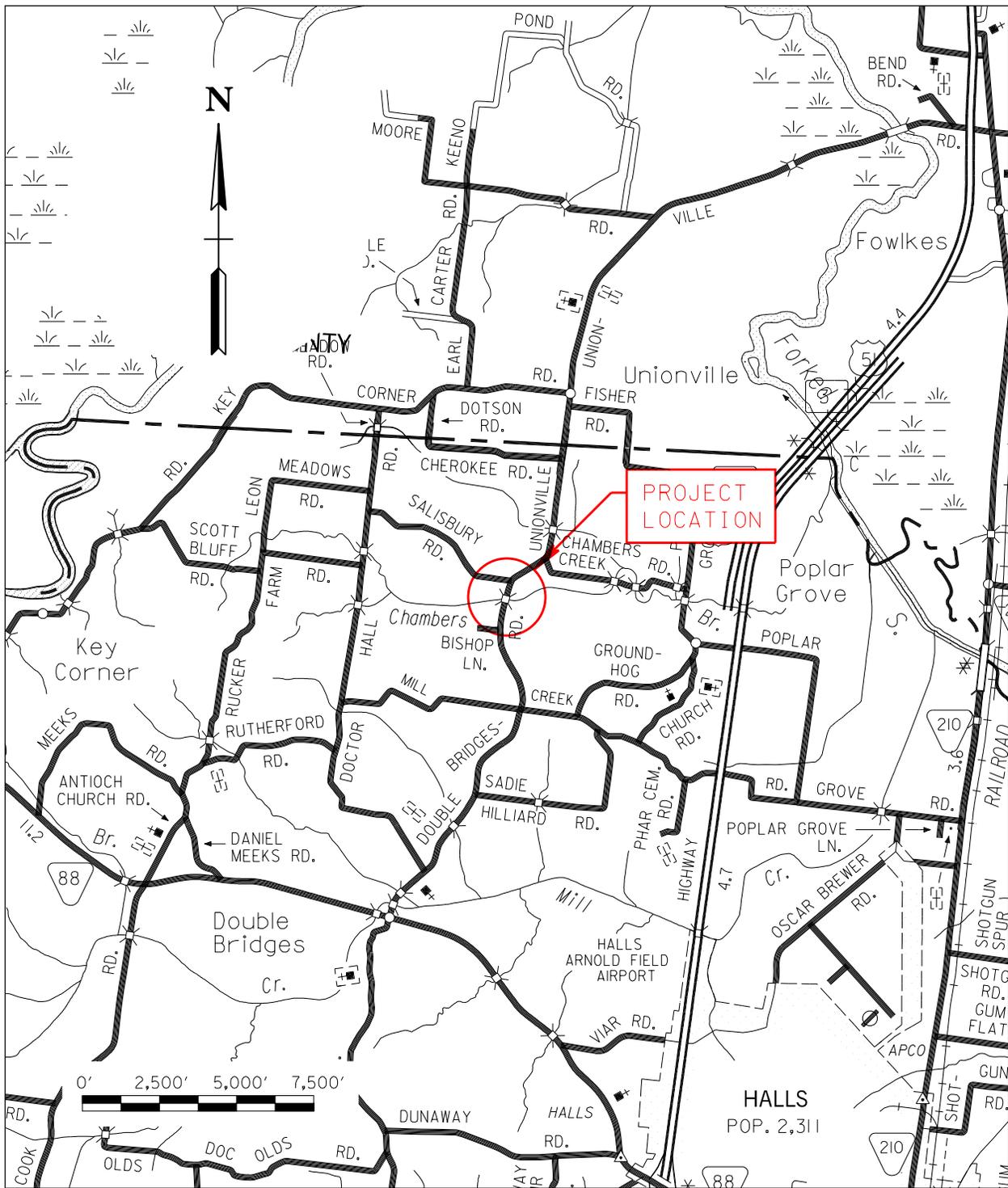
PREPARED BY
TRANSYSTEMS CORPORATION
FOR THE
TENNESSEE DEPARTMENT OF TRANSPORTATION

Approved by  Date 4/25/13
Chief of Environment and Planning

Approved by  Date 5/13/13
Deputy Commissioner and Chief Engineer

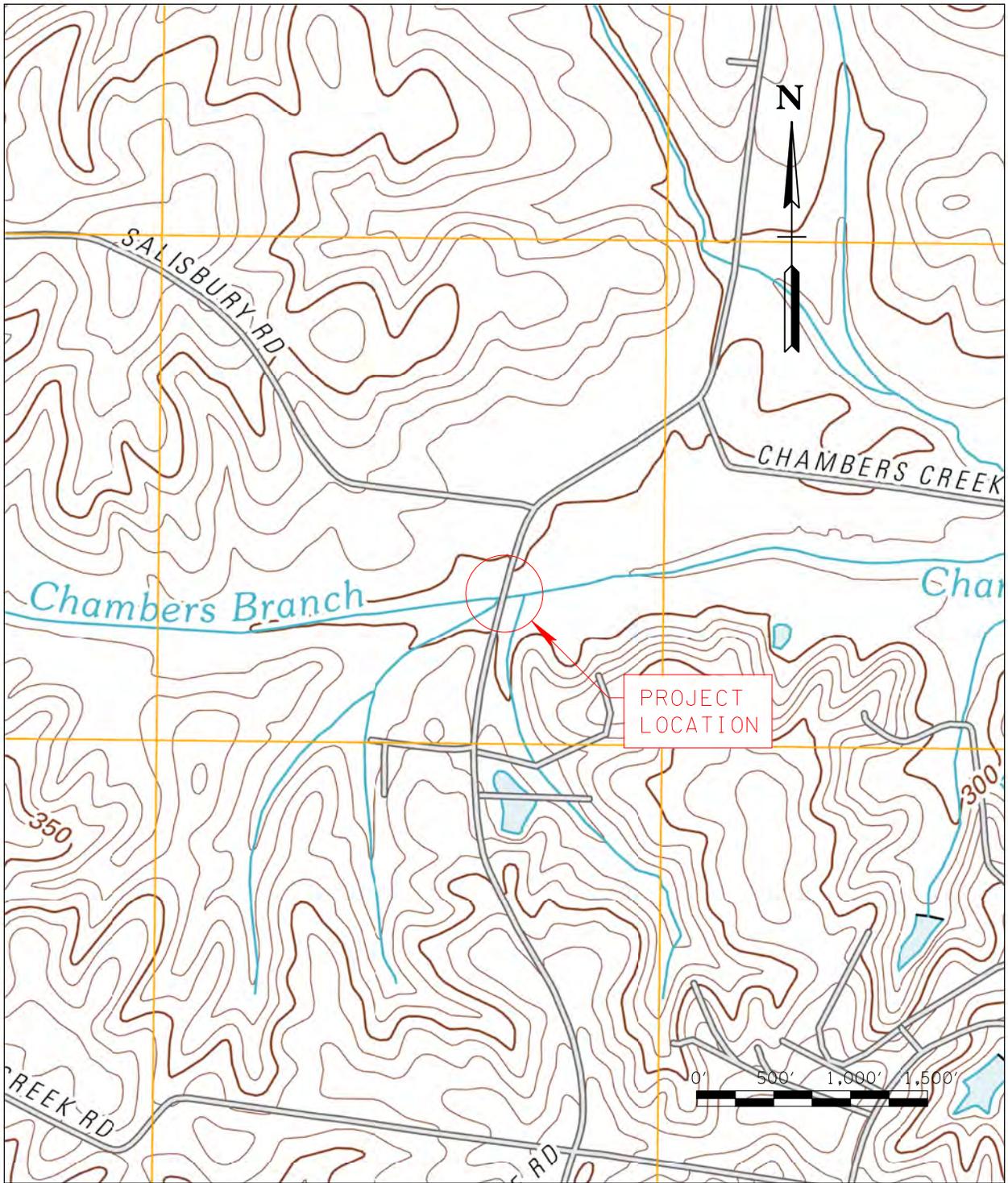
Approved by:	Signature:	Date:
Transportation Director Project Planning Division		4-11-13
Engineering Director Design Division		4-18-13
Engineering Director Structures Division		4-22-13

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 01495 (DOUBLE BRIDGES-UNIONVILLE ROAD)
 BRIDGE #49S80260007 OVER CHAMBERS BRANCH (L.M. 2.28)
 LAUDERDALE COUNTY



PROJECT MAP

LOCAL ROUTE 01495 (DOUBLE BRIDGES-UNIONVILLE ROAD)
BRIDGE #49S80260007 OVER CHAMBERS BRANCH (L.M. 2.28)
LAUDERDALE COUNTY



AERIAL MAP

LOCAL ROUTE 01495 (DOUBLE BRIDGES-UNIONVILLE ROAD)
BRIDGE #49S80260007 OVER CHAMBERS BRANCH (L.M. 2.28)
LAUDERDALE COUNTY

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

County: Lauderdale Route: Local Route 01495 (Double Bridges–Unionville Road) Log Mile: 2.28
 Feature Crossed: Chambers Branch System: Local
 Functional Class: Rural Minor Collector Bridge ID: 49S80260007

EXISTING CONDITIONS

2016 AADT: 240 App. Cross Section: 18' / 24' / 50' No. Lanes: 2
 Approach Alignment: Tangent Year Built: 1931 Load Limit: 10 tons
 Width (out to out): 26 ft. Sidewalks: Right N/A Left N/A Length: 61 ft.
 No. Spans: Approach: 0 Main: 3
 Substructure: Steel I-beam / Timber Piles Vertical Clearance: 20 ft. Sufficiency Rating: 39.7
 Other: _____

PROPOSED IMPROVEMENTS

STANDARDS FROM RD01-TS-2 (Table 1) Type of Work: Replace
 Design Year: 2036 Design AADT: 290 Terrain Rolling ADL (F): N/A (R): N/A
 Project Length: 350 ft Bridge Length: 72 ft Approach Length: 288 ft
 Design Speed (MPH): 40 Posted Speed (MPH): N/A
 Approach Width:* 20' / 24' / As Req. Bridge Width (C to C): 24 ft No. Lanes: 2
 Right-of-Way Required: 0 Ac. (Est.) Tract(s) 0 Structure Type: Conc. I-beam

MAINTENANCE OF TRAFFIC

Temporary Detour: Temporary Runaround: Stage Construct:
 Alternate Route: 4.3 miles total. From north of bridge: left on Salisbury Road, left on Doctor Hall Road, left on Mill Creek Road. From south of bridge: right on Mill Creek Road, right on Doctor Hall Road, right on Salisbury 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: \$129,200 Structure: \$315,000
 Preliminary Engineering: \$65,200 Utilities: \$28,000 Misc./Cont.: \$141,600
 Mobilization: \$28,200 Total: \$717,200

Remarks: Replace existing bridge with single-span, 72-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), Andy Vaughan (Lauderdale County Highway Department), Fred Vinson (TDOT Region 4 ROW)

Route:	Local Route 01495 (Double Bridges–Unionville Road)
Description:	Bridge #49S80260007 over Chambers Branch (LM 2.28)
County:	Lauderdale
Length:	0.07 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	\$ 5,600		\$ 22,400	\$ 28,000
Structures	\$ 63,000		\$ 252,000	\$ 315,000
Pavement Removal	\$ 2,300		\$ 9,200	\$ 11,500
Paving	\$ 10,060		\$ 40,240	\$ 50,300
Roadway and Pavement Appurtenances	\$ -		\$ -	\$ -
Retaining Walls	\$ -		\$ -	\$ -
Topsoil	\$ 380		\$ 1,520	\$ 1,900
Seeding	\$ 60		\$ 240	\$ 300
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%) ¹	\$ 14,470		\$ 57,900	\$ 72,300
Maintenance of Traffic	\$ -		\$ 10,000	\$ 10,000
Mobilization (5%)	\$ 5,500		\$ 22,700	\$ 28,200
CONSTRUCTION COST (rounded)	\$ 116,400		\$ 476,400	\$ 592,700
Engineering and Contingency (10%)	\$ 11,600		\$ 47,600	\$ 59,300
TOTAL CONSTRUCTION COST (rounded)	\$ 128,000		\$ 524,000	\$ 652,000
Preliminary Engineering (10%)	\$ 12,800		\$ 52,400	\$ 65,200
PROJECT COST (ROUNDED)²	\$ 140,800		\$ 576,400	\$ 717,200

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

² 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
RIGHT-OF-WAY TOTAL (ROUNDED)					\$ 10,000
201-01	Clearing and Grubbing	LS	1	\$ 15,000.00	\$ 15,000
CLEAR AND GRUBBING TOTAL (ROUNDED)					\$ 15,000
203-03	Borrow Excavation (Unclassified)	CY	1,000	\$ 15.00	\$ 15,000
EARTHWORK TOTAL (ROUNDED)					\$ 15,000
202-03 01	Removal of Asphalt Pavement	SY	765	\$ 15.00	\$ 11,475
PAVEMENT REMOVAL TOTAL (ROUNDED)					\$ 11,500
DRAINAGE TOTAL (ROUNDED)					\$ -
—	Relocation of Above-Ground Utilities	LF	1,400	\$ 10.00	\$ 14,000
—	Relocation of Underground Utilities	LF	350	\$ 40.00	\$ 14,000
UTILITIES TOTAL (ROUNDED)					\$ 28,000
—	Removal of Existing Structure	SF	1,560	\$ 15.00	\$ 23,400
—	Structure	SF	1,944	\$ 150.00	\$ 291,600
STRUCTURES TOTAL (ROUNDED)					\$ 315,000
RAILROAD CROSSING OR SEPARATION TOTAL (ROUNDED)					\$ -
303-01	Mineral Aggregate, Type A Base, Grading D	TON	495	\$ 20.00	\$ 9,900
307-01 01	ACS Mix (PG64-22) (BPMB-HM) Grading A	TON	20	\$ 100.00	\$ 2,000
307-01 08	ACS Mix (PG64-22) (BPMB-HM) Grading B-M2	TON	11	\$ 90.00	\$ 990
402-01	Bituminous Material for Prime Coat (PC)	TON	0.2	\$ 610.00	\$ 122
402-02	Aggregate for Cover Material (PC)	TON	0.6	\$ 25.00	\$ 15
403-01	Bituminous Material with Tack Coat (TC)	TON	0.2	\$ 635.00	\$ 127
411-01.10	ACS Mix (PG64-22) Grading D Roadway	TON	49	\$ 120.00	\$ 5,880
604-03 04	Pavement at Bridge Ends	SY	160	\$ 195.00	\$ 31,200
PAVING TOTAL (ROUNDED)					\$ 50,300
ROADWAY AND PAVEMENT APPURTENANCES TOTAL (ROUNDED)					\$ -
RETAINING WALLS TOTAL (ROUNDED)					\$ -
712-01	Traffic Control	LS	1	\$ 10,000.00	\$ 10,000
MAINTENANCE OF TRAFFIC TOTAL (ROUNDED)					\$ 10,000
203-07	Furnishing and Spreading Topsoil	CY	122	\$ 15.00	\$ 1,830
TOPSOIL TOTAL (ROUNDED)					\$ 1,900
801-01	Seeding (With Mulch)	UNIT	7	\$ 28.00	\$ 196
801-03	Water (Seeding and Sodding)	MG	1	\$ 5.00	\$ 5
SEEDING TOTAL (ROUNDED)					\$ 300
SODDING TOTAL (ROUNDED)					\$ -
—	Signs	LS	1	\$ 1,000	\$ 1,000
SIGNING TOTAL (ROUNDED)					\$ 1,000
716-05 01	Painted Pavement Marking (4" Line)	LM	0.179	\$ 850.00	\$ 152
PAVEMENT MARKINGS TOTAL (ROUNDED)					\$ 200
LIGHTING TOTAL (ROUNDED)					\$ -
SIGNALIZATION TOTAL (ROUNDED)					\$ -
FENCE TOTAL (ROUNDED)					\$ -
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
GUARDRAIL TOTAL (ROUNDED)					\$ 11,500
709-05 06	Machined Rip-Rap (Class A-1)	TON	750	\$ 30.00	\$ 22,500
RIP-RAP OR SLOPE PROTECTION TOTAL (ROUNDED)					\$ 22,500
PAY ITEM TOTAL (ROUNDED)					\$ 492,200



TranSystems

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MEMORANDUM

To: TDOT Project Planning Office
From: TranSystems Corporation
Date: August 31, 2012
Subject: **Project No. 99109-1453-04, PIN 117277.00**
Transportation Planning Report (TPR) Bridge Replacement
Local Route 01495 (Double Bridges–Unionville Road)
Bridge #49S80260007 over Chambers Branch (L.M. 2.28)
Lauderdale County

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

Name	Organization	Phone	E-mail
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	lrsullivan@transystems.com
Andy Vaughan	Lauderdale County Highway Department	(731) 635-9251	lchd@lctn.com
Fred Vinson	TDOT Region 4 ROW	(731) 935-0115	fred.vinson@tn.gov

The existing bridge, built in 1931, is a three-span, steel I-beam structure with a length of approximately 61 feet and an out-to-out deck width of approximately 25.5 feet. The bridge features a timber deck, piles, and abutments. The most recent sufficiency rating for this bridge, determined during a May 21, 2012 inspection, is 39.7. Based on regression equations supplied by TDOT and the United States Geological Survey (USGS), the estimated 10-year depth of flow for the Chambers Branch drainage basin is approximately 7.6 feet and the 100-year depth of flow is approximately 10.0 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 Double Bridges–Unionville Road at the design year is approximately 290 vehicles per day. The roadway is classified as a low-volume rural minor



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collector and will feature two 11-foot travel lanes and 4-foot shoulders at a design speed of 40 miles per hour, per TDOT standard drawing RD01-TS-2.

The proposed structure is a single-span, prestressed concrete I-beam bridge approximately 72 feet in length and with a deck width of approximately 27 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; some easements may be required during construction. Some overhead telephone and electric lines may need to be relocated during construction, though there are no utilities attached to the structure. The low chord of the proposed bridge provides approximately 6.8 feet of clearance above the 100-year high water elevation. Double Bridges—Unionville 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 \$717,200, 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: Unionville Road
 COUNTY: Lauderdale CITY: Poplar Grove
 PROJECT PIN NUMBER: _____
 PROJECT DESCRIPTION: Bridge over Chamber Branch on Unionville Road
L.M. 2.28

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
240	2016	290	35	12	2036	65-35	2	3		

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

REVIEWED BY: TONY ARMSTRONG Tony Armstrong DATE 5-14-12
 TRANSPORTATION MANAGER 1
 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 2011 Cycle 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)



4/8/2013 5:24:56 PM
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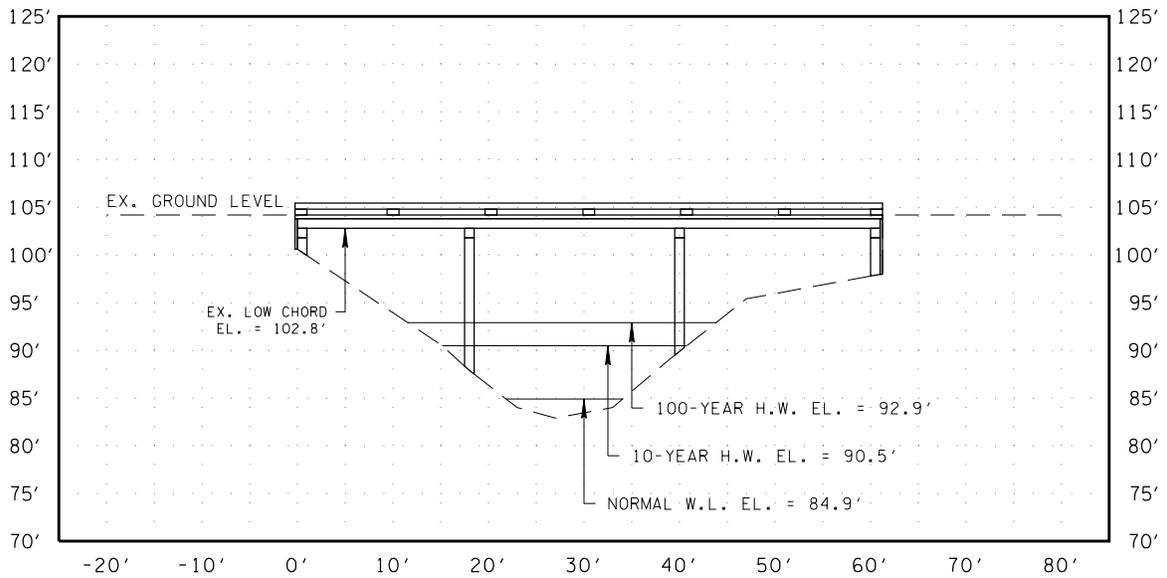
ROAD SAFETY AUDIT REVIEW

LOCAL ROUTE 01495 (DOUBLE BRIDGES-UNIONVILLE ROAD)
 BRIDGE #49S80260007 OVER CHAMBERS BRANCH (L.M. 2.28)
 LAUDERDALE COUNTY

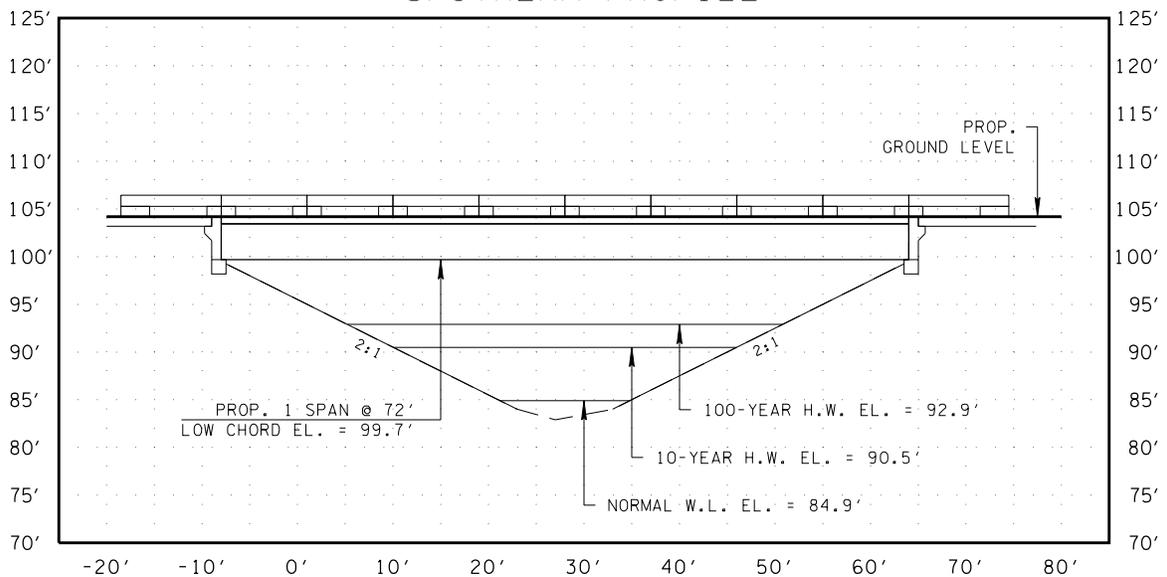
STATE OF TENNESSEE
 DEPARTMENT OF TRANSPORTATION

FIGURE 1
 LOCAL 01495
 L.M. 2.28

EXISTING BRIDGE UPSTREAM PROFILE



PROPOSED BRIDGE UPSTREAM PROFILE



BRIDGE PROFILE

LOCAL ROUTE 01495 (DOUBLE BRIDGES-UNIONVILLE ROAD)
BRIDGE #49S80260007 OVER CHAMBERS BRANCH (L.M. 2.28)
LAUDERDALE COUNTY

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

County:	<u>Lauderdale</u>	By:	<u>TranSystems Corp.</u>
Bridge ID:	<u>49S80260007</u>	Date:	<u>August 31, 2012</u>
Route:	<u>Local Route 01495 (Double Bridges-Unionville Road)</u>	PIN:	<u>117277.00</u>
Feature Crossed:	<u>Chambers Branch</u>		
Log Mile:	<u>2.28</u>		

DRAINAGE BASIN

Measurement from USGS quad =	<u>1,215</u>	ac.
Contributing drainage area (CDA) =	<u>1.90</u>	mi. ²

USGS REGRESSION EQUATIONS FOR FLOW

2-Year Flood Flow Rate = $Q_2 = 436 \times (CDA)^{0.527} =$	<u>611</u>	ft. ³ /sec.
5-Year Flood Flow Rate = $Q_5 = 618 \times (CDA)^{0.545} =$	<u>876</u>	ft. ³ /sec.
10-Year Flood Flow Rate = $Q_{10} = 735 \times (CDA)^{0.554} =$	<u>1,048</u>	ft. ³ /sec.
25-Year Flood Flow Rate = $Q_{25} = 878 \times (CDA)^{0.564} =$	<u>1,260</u>	ft. ³ /sec.
50-Year Flood Flow Rate = $Q_{50} = 981 \times (CDA)^{0.570} =$	<u>1,414</u>	ft. ³ /sec.
100-Year Flood Flow Rate = $Q_{100} = 1080 \times (CDA)^{0.575} =$	<u>1,561</u>	ft. ³ /sec.

FLOOD DEPTH OF FLOW EQUATIONS

10-Year Flood Depth of Flow (D_{10}) = $6.98 \times (CDA)^{0.142} =$	<u>7.6</u>	ft.
100-Year Flood Depth of Flow (D_{100}) = $9.24 \times (CDA)^{0.116} =$	<u>10.0</u>	ft.

FLOOD AREAS

Existing Area Below Low Chord =	<u>658</u>	ft. ²
Proposed Area Below Low Chord =	<u>653</u>	ft. ²
Proposed 10-Year Flood Area (A_{10}) =	<u>155</u>	ft. ²
Proposed 100-Year Flood Area (A_{100}) =	<u>253</u>	ft. ²

FLOOD VELOCITIES

Proposed 10-Year Flood Velocity (V_{10}) = $Q_{10} / A_{10} =$	<u>6.8</u>	ft./sec.
Proposed 100-Year Flood Velocity (V_{100}) = $Q_{100} / A_{100} =$	<u>6.2</u>	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.