TENNESSEE
DEPARTMENT OF TRANSPORTATION

TRANSPORTATION INVESTMENT REPORT
Special Bridge Replacement Program

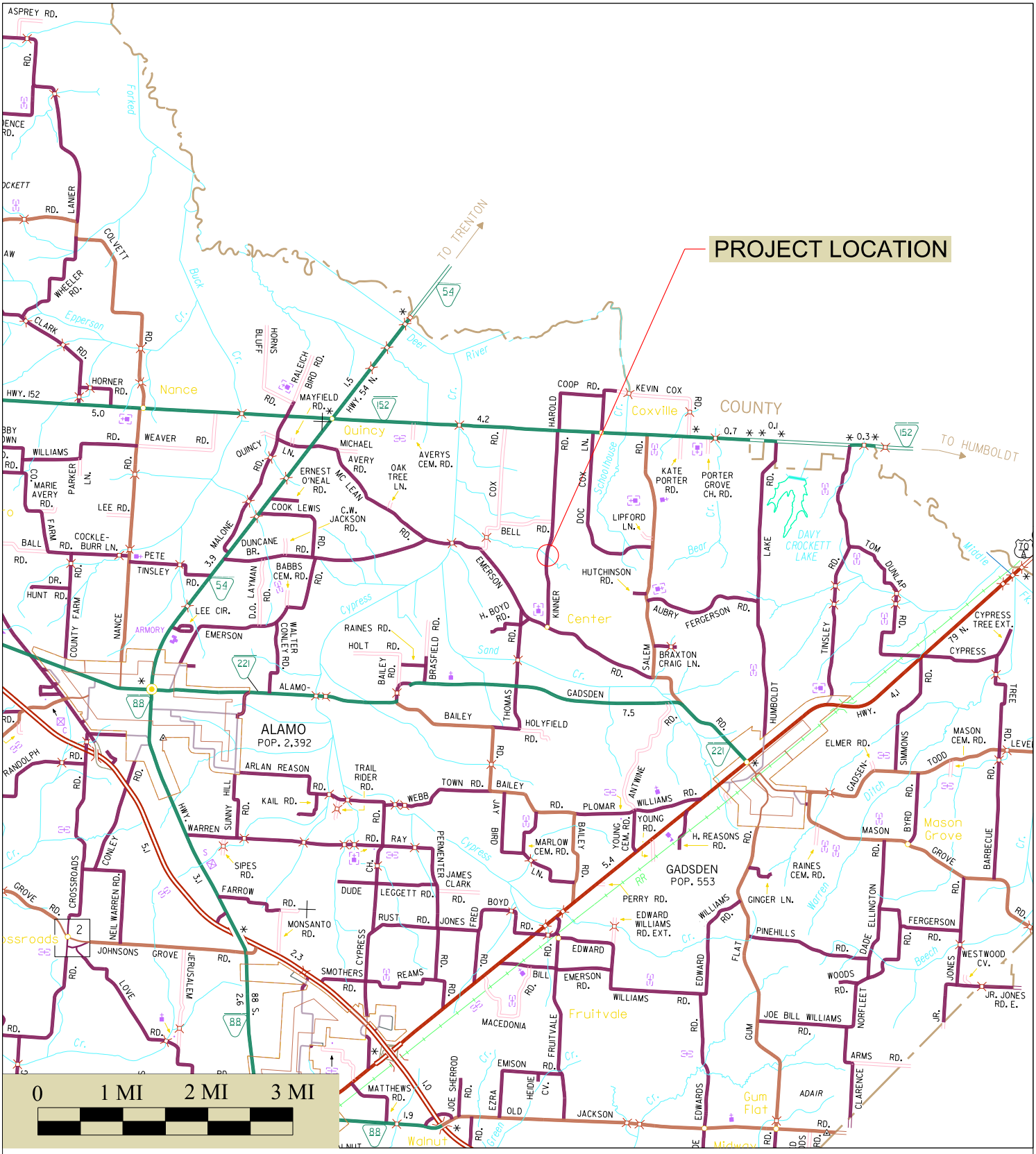
Local Route 0A170 – Kinner Road
Bridge over Branch,
Log Mile 0.84 Crockett County
PIN 103840.00

PREPARED BY TENNESSEE DEPARTMENT OF TRANSPORTATION
Strategic Transportation Investments Division

Approved by _____ *Date* 7/24/14
Chief of Environment and Planning

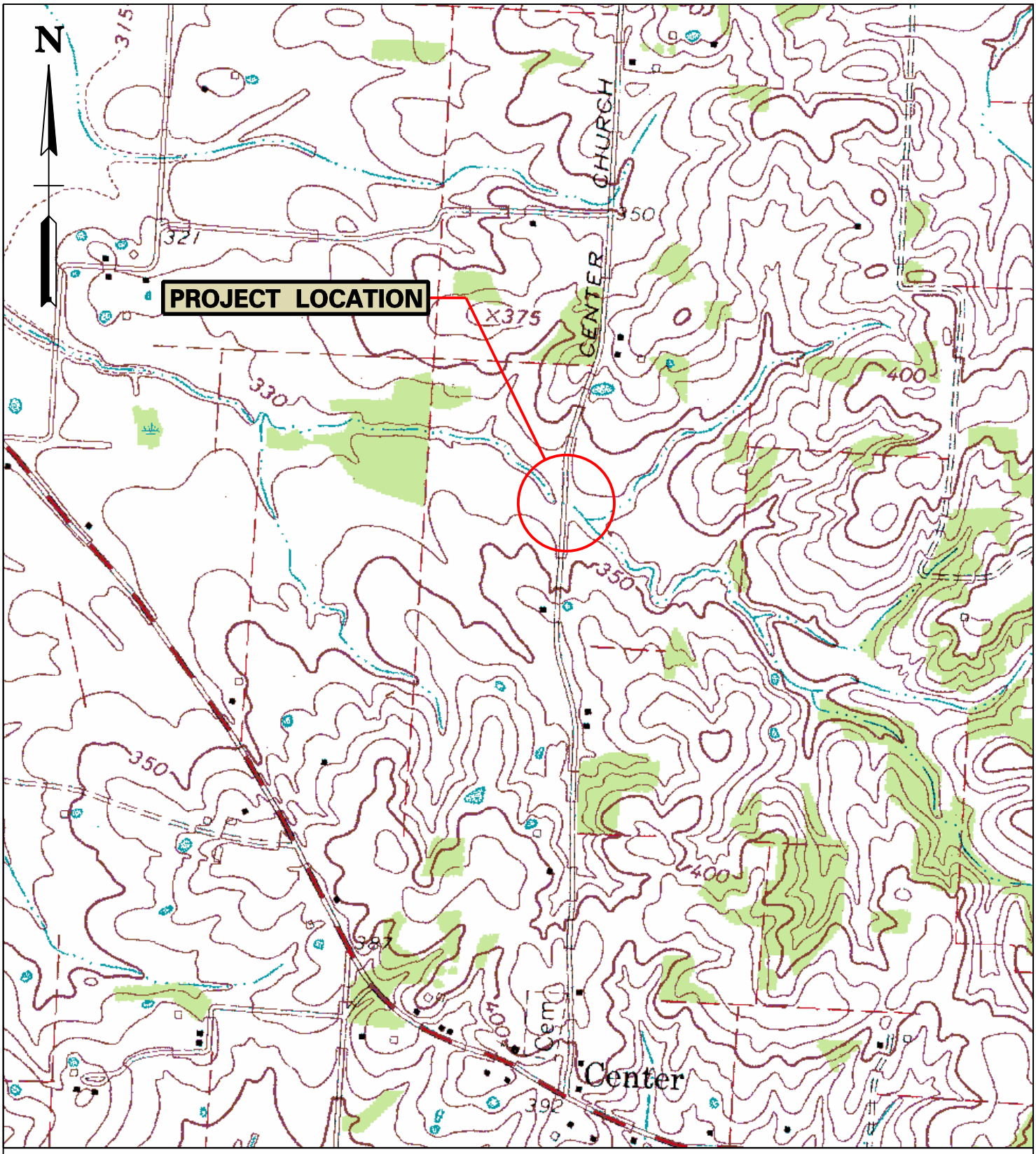
Approved by _____ *Date* 8/5/14
Deputy Commissioner and Chief Engineer

Approved by:	Signature	DATE
TRANSPORTATION DIRECTOR STRATEGIC TRANSPORTATION INVESTMENTS DIVISION		6-30-14
ENGINEERING DIRECTOR DESIGN DIVISION	Jennifer Lloyd	7-08-14
ENGINEERING DIRECTOR STRUCTURES DIVISION	Wayne J. Seger	7-17-14



AREA MAP

KINNER ROAD (0A170) CROCKETT COUNTY
BRIDGE OVER BRANCH @ L.M. 0.84
BRIDGE ID 170A1700001



0 500' 1000' 1500'

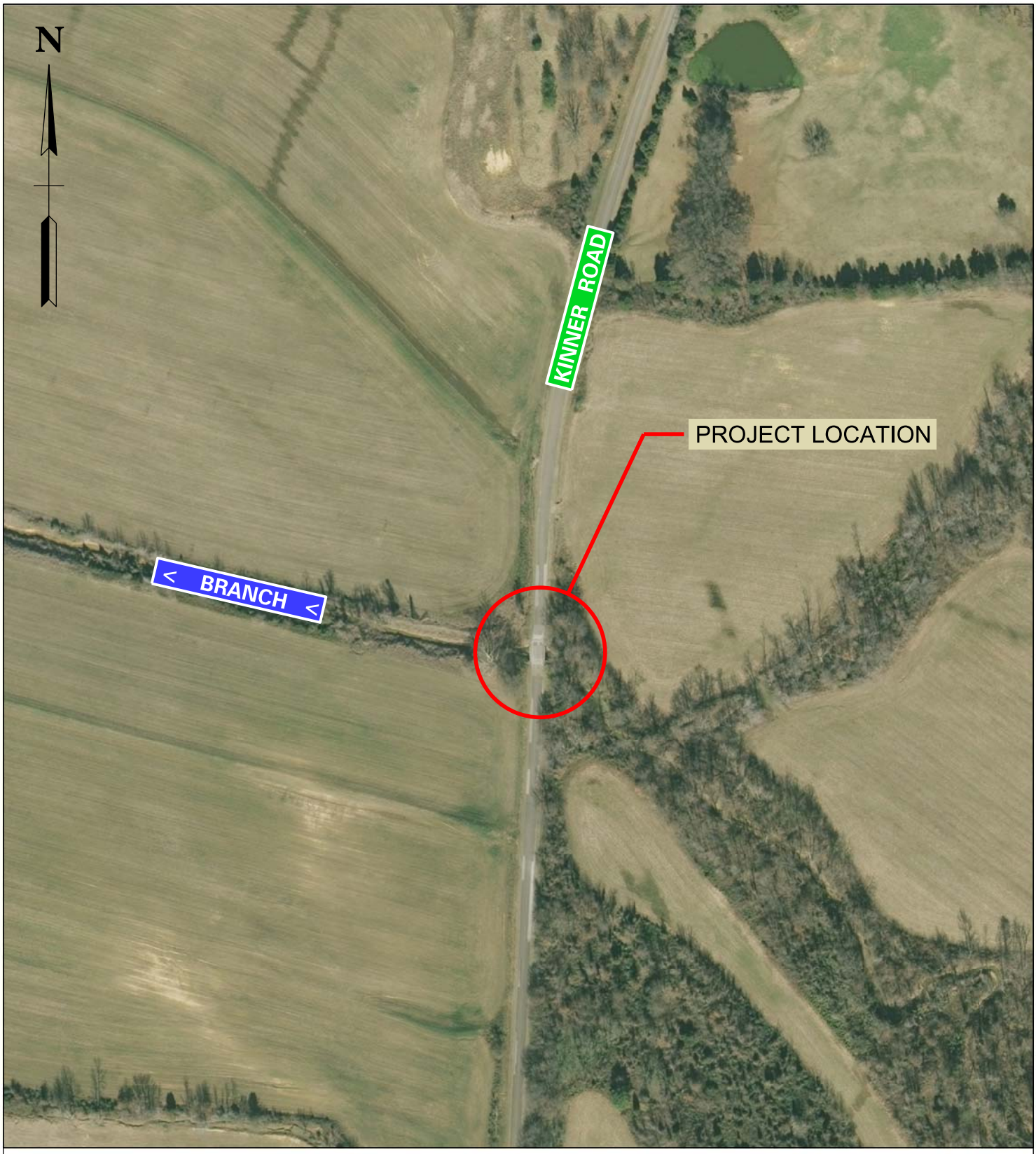
SCALE: 1" = 1000'

PROJECT MAP

KINNER ROAD (0A170) CROCKETT COUNTY

BRIDGE OVER BRANCH @ L.M. 0.84

BRIDGE ID 170A1700001



0' 100' 200' 300'

SCALE: 1" = 200'

AERIAL MAP

KINNER ROAD (0A170) CROCKETT COUNTY
BRIDGE OVER BRANCH @ L.M. 0.84
BRIDGE ID 170A1700001

TRANSPORTATION PLANNING WORKSHEET
BRIDGE REPLACEMENT ANALYSIS, NEEDS, AND COSTS

County: Crockett Route: Kinner Road (0A170) Log Mile: 0.84
Feature Crossed: Branch System: Local Road
Functional Class: Rural Local Bridge ID: 170A1700001

EXISTING CONDITIONS

2018 AADT: 120 App. Cross Section: 18' / 18' / 48' No. Lanes: 2
Approach Alignment: Tangent Year Built: 1970 Load Limit: 10 tons
Width (out to out): 20' 4" Sidewalks: Right -- Left -- Length: 31'
No. Spans: Approach: -- Main: 2
Substructure: Timber Piers Vertical Clearance: 12.2 Sufficiency Rating: 46.7
Other: Speed limit is not posted. TRIMS data details Kinner Road to have 18' roadway width plus 2' (each side) of shoulder width; however, no shoulders were present based on field observations.

PROPOSED IMPROVEMENTS

STANDARDS FROM RD01-TS-1A Type of Work: Replacement
Design Year: 2038 Design AADT: 140 Terrain Rolling ADL (F): -- (R): --
Project Length: 238 ft Bridge Length: 38 ft Approach Length: 2 at 100 ft
Design Speed (MPH): 30 Posted Speed (MPH): N/A
Approach Width: 18' / 20 ' / As Req'd Bridge Width (O to O): 22 ft No. Lanes: 2
Right-of-Way Required: 0.168 acres Tract(s) 2 Structure Type: Box Bridge

MAINTENANCE OF TRAFFIC

Temporary Detour: ☑ Temporary Runaround: ☐ Stage Construct: ☐
Alternate Route: Salem Road runs parallel to Kinner Road, with State Route 152 and Emerson Road connecting the two routes. Traffic shall utilize this approximately 7.7 mile detour during construction of the proposed bridge.
Remarks:

ESTIMATED COST

Right-of-Way: $5,000 Approaches: $59,200 Structure: $97,300
Preliminary Engineering: $26,200 Utilities: $24,000 Misc./Cont.: $65,100
Mobilization: $11,300 Total: $288,100
Remarks: See Figure 1

Field Investigation by: Ryan Philpott (Region 4 GTA), Jason Moody (Region 4 Traffic), Burt Hutchins (Region 4 Design), Blake Mayo (HQ Hydraulics), Herman Odle (TDOT R.O.W.), Ben Bradberry (NWTDD RPO), Amy Rauch (Strategic Transportation Investments), Paige Harris (Strategic Transportation Investments) David Duncan (Strategic Transportation Investments), Mike Gilbert (Strategic Transportation Investments)

Route:	**Kinner Road (0A170)**
Description:	**Bridge over Branch @ L.M. 0.84**
County:	**Crockett**
Length:	**236'**
Date:	**February 14, 2014**

DESCRIPTION	LOCAL	STATE	FEDERAL	TOTAL
Right-of-Way	$ 1,000		$ 4,000	$ 5,000
Clearing and Grubbing	$ 2,000		$ 8,000	$ 10,000
Earthwork	$ 1,540		$ 6,160	$ 7,700
Railroad Crossing or Separation	$ -		$ -	$ -
Drainage	$ 360		$ 1,440	$ 1,800
Utilities	$ 4,800		$ 19,200	$ 24,000
Structures	$ 19,500		$ 77,800	$ 97,300
Pavement Removal	$ 1,000		$ 4,000	$ 5,000
Paving	$ 3,000		$ 11,900	$ 14,900
Roadway and Pavement Appurtenances	$ -		$ -	$ -
Retaining Walls	$ -		$ -	$ -
Topsoil	$ 260		$ 1,040	$ 1,300
Seeding	$ 100		$ 400	$ 500
Sodding	$ -		$ -	$ -
Rip-Rap or Slope Protection	$ 900		$ 3,700	$ 4,600
Fencing	$ -		$ -	$ -
Signing	$ 100		$ 600	$ 700
Pavement Markings	$ 100		$ 200	$ 300
Lighting	$ -		$ -	$ -
Signalization	$ -		$ -	$ -
Guardrail	$ 1,600		$ 6,300	$ 7,900
Other Construction Items (15%)	$ 5,400		$ 21,700	$ 27,200
Maintenance of Traffic	$ 3,700		$ 14,880	$ 18,600
Mobilization (5%)	$ 2,300		$ 9,100	$ 11,300
CONSTRUCTION COST (rounded)	$ 47,600		$ 190,400	$ 238,100
Engineering and Contingency (10%)	$ 4,800		$ 19,000	$ 23,800
TOTAL CONSTRUCTION COST (rounded)	$ 52,400		$ 209,400	$ 261,900
Preliminary Engineering (10%)	$ 5,200		$ 20,900	$ 26,200
PROJECT COST[1] (rounded)	**$ 57,600**	**$ -**	**$ 230,300**	**$ 288,100**

[1] For estimating future project costs, a compounded inflation rate of 10 % should be applied from the date of this esimate.

TDOT PAY ITEM	TDOT DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
-	Right-of-Way	LS	LS	$ 5,000.00	$ 5,000
			RIGHT-OF-WAY TOTAL (ROUNDED)		**$ 5,000**
201-01	Clearing and Grubbing	LS	LS	$ 10,000.00	$ 10,000
			CLEAR AND GRUBBING TOTAL (ROUNDED)		**$ 10,000**
203-01	Road & Drainage Excavation (Unclassified)	CY	1901	$ 3.75	$ 7,129
203-03	Borrow Excavation (Unclassified)	CY	190	$ 2.97	$ 564
			EARTHWORK TOTAL (ROUNDED)		**$ 7,700**
202-03.01	Removal of Asphalt Pavement	SY	400	$ 12.07	$ 4,828
415-01.02	Cold Planing Bituminous Pavement	SY	56	$ 1.35	$ 75
			PAVEMENT REMOVAL TOTAL (ROUNDED)		**$ 5,000**
209-08.02	Temporary Silt Fence (w/ backing)	LF	472	$ 3.64	$ 1,718
			DRAINAGE TOTAL (ROUNDED)		**$ 1,800**
	Underground Utilites	LF	600	$ 40.00	$ 24,000
			UTILITIES TOTAL (ROUNDED)		**$ 24,000**
	Removal of Existing Bridge	SF	629.3	$ 15.00	$ 9,440
	Box bridge	SF	836	$ 105.00	$ 87,780
			STRUCTURES TOTAL (ROUNDED)		**$ 97,300**
Asphalt					
303-01	Mineral Aggregate, TY A Base, Grading D	TON	210.0	$ 15.82	$ 3,322
307-01.01	Asphalt Concrete Mix (PG64-22) (BPMB-HM) Grading A	TON	66.0	$ 74.58	$ 4,922
307-01.08	Asphalt Concrete Mix (PG64-22) (BPMB-HM) Grading B-M2	TON	43	$ 77.20	$ 3,320
402-01	Prime Coat	TON	0.6	$ 365.52	$ 219
402-02	Aggregate for Cover	SY	2.3	$ 24.91	$ 57
403-01	Bituminous Material for Tack Coat (TC)	TON	0.1	$ 24.91	$ 2
411-01.07	ACS Mix (PG64-22) Grading E	TON	4.0	$ 79.44	$ 318
411-01.10	ACS Mix (PG64-22) Grading D	TON	31.0	$ 85.53	$ 2,651
			PAVING TOTAL (ROUNDED)		**$ 14,900**
712-01	Traffic Control	LS	1	$ 18,589.00	$ 18,589
			MAINTENANCE OF TRAFFIC TOTAL (ROUNDED)		**$ 18,600**
203-07	Furnishing & Spreading Topsoil	CY	139	$ 9.18	$ 1,276
			TOPSOIL TOTAL (ROUNDED)		**$ 1,300**
801-01	Seeding (With Mulch)	UNIT	18	$ 25.01	$ 450
801-03	Water	MG	1	$ 12.24	$ 12
			SEEDING TOTAL (ROUNDED)		**$ 500**
803-01	Sodding (New Sod)	SY	0	$ 2.45	$ -
			SODDING TOTAL (ROUNDED)		**$ -**
713-16.20	Signs	S.F.	4.0	$ 134.66	$ 539
			SIGNING TOTAL (ROUNDED)		**$ 700**
716-13.06	Spray Thermo Pvmt Mrkng (40 mil)(6" Line)	LM	0.180	$ 1,207.04	$ 217
			PAVEMENT MARKINGS TOTAL (ROUNDED)		**$ 300**
705-02.02	Single Guardrail (Type 2)	LF	50	$ 15.78	$ 789
705-04.07	Type 21 End Terminal	EACH	4	$ 1,763.43	$ 7,054
			GUARDRAIL TOTAL (ROUNDED)		**$ 7,900**
709-05.06	Machined Rip-Rap (Class A-1)	TON	159	$ 28.42	$ 4,519
			RIP-RAP OR SLOPE PROTECTION TOTAL (ROUNDED)		**$ 4,600**

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION
SUITE 1000, JAMES K. POLK BUILDING
505 DEADERICK STREET
NASHVILLE, TENNESSEE 37243-1402
(615) 741-2208

JOHN C. SCHROER
COMMISSIONER

BILL HASLAM
GOVERNOR

MEMORANDUM

TO: Strategic Transportation Investments Division

FROM: Paige Harris, Graduate Transportation Associate
Project Coordination and Investigation Office

DATE: May 29, 2014

SUBJECT: TIR Field Review (Special Bridge Replacement Program)
Kinner Road, Bridge over Branch
Log Mile 0.84
Crockett County
PIN: 103840.00

A field review was held for the above-mentioned project on July 18, 2013.

The existing structure is a timber bridge with an out-to-out width of 20.3 feet. The overall bridge length is 31.0 feet with approximately 12.2 feet for the vertical clearance. The sufficiency rating for this bridge is 46.7. The 10-year and 100-year discharges and depths of flow for the drainage basin were determined using the appropriate regression equations. It was determined that the 100-year flow depth is 7.0 feet, and the 10-year flow depth is 5.0 feet.

The proposed alignment for this structure will remain on the existing centerline and will be designed to meet TDOT design standard RD01-TS-1A for a design speed of 30 mph. The proposed structure will be a reinforced concrete box bridge (2 @ 18 x 12) with a total clearance of 12 feet. It is estimated that a small amount of ROW will be required for widening of roadway approaches and for the adjustment of side slopes. There were no above ground utilities directly adjacent to the structure and its approaches or any visible underground utility markers.

The route has a base year (2018) AADT of 120 and a design year (2038) AADT of 140. The bridge over branch will consist of an out-to-out width of 22.2 feet with two, nine (9) feet lanes and one (1) foot shoulders. The length of the entire project will be approximately 236 feet.

It is recommended to close Kinner Road and utilize a temporary detour during construction of the proposed bridge. Traffic will be detoured to Salem Road, which runs parallel to Kinner Road, and utilize State Route 152 and Emerson Road which connects the two roadways for an approximate 7.7 mile detour (See Detour Map).

The required approach work, utility relocations, estimated replacement, and preliminary engineering costs for this bridge is approximately $288,100.00.

PH

cc: File

CHECK LIST 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, shopping center	
4.	Floodplains	
5.	Forested land	
6.	Historical, cultural, or natural landmark	
7.	Industrial park, factory	
8.	Institutional usages	
	a. School or other educational institution	
	b. Church or other religious institution (Cemetery)	
	c. Hospital or other medical facility	
	d. Public building, e.g., fire station	
	e. Defense installation	
9.	Recreation usages	
	a. Park or recreational area	
	b. Game preserve or wildlife area	
10.	Residential establishment	
11.	Urban area, town, city, or community	
12.	Waterway, lake, pond, river, stream, spring	X

Permit required:		
	Coast Guard	
	Section 404	X
	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: Kinner Road (0A170)
COUNTY: Crockett CITY: Alamo
PROJECT PIN NUMBER: 103840.00
PROJECT DESCRIPTION: Special Bridge Replacement Program
Bridge over Branch
L.M. 0.84

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
120	2018	140	21	15	2038	65-35	4	6		

REQUESTED BY: NAME Michael Gilbert DATE 5/21/13
DIVISION Planning
ADDRESS 10th Floor
J.K. Polk Building

REVIEWED BY: TONY ARMSTRONG Tony Armstrong DATE 5-23-13
TRANSPORTATION MANAGER 1
SUITE 1000, JAMES K. POLK BUILDING

APPROVED BY: BILL HART Bill Hart DATE 5/23/13
TRANSPORTATION MANAGER 2
SUITE 1000, JAMES K. POLK BUILDING

COMMENTS:

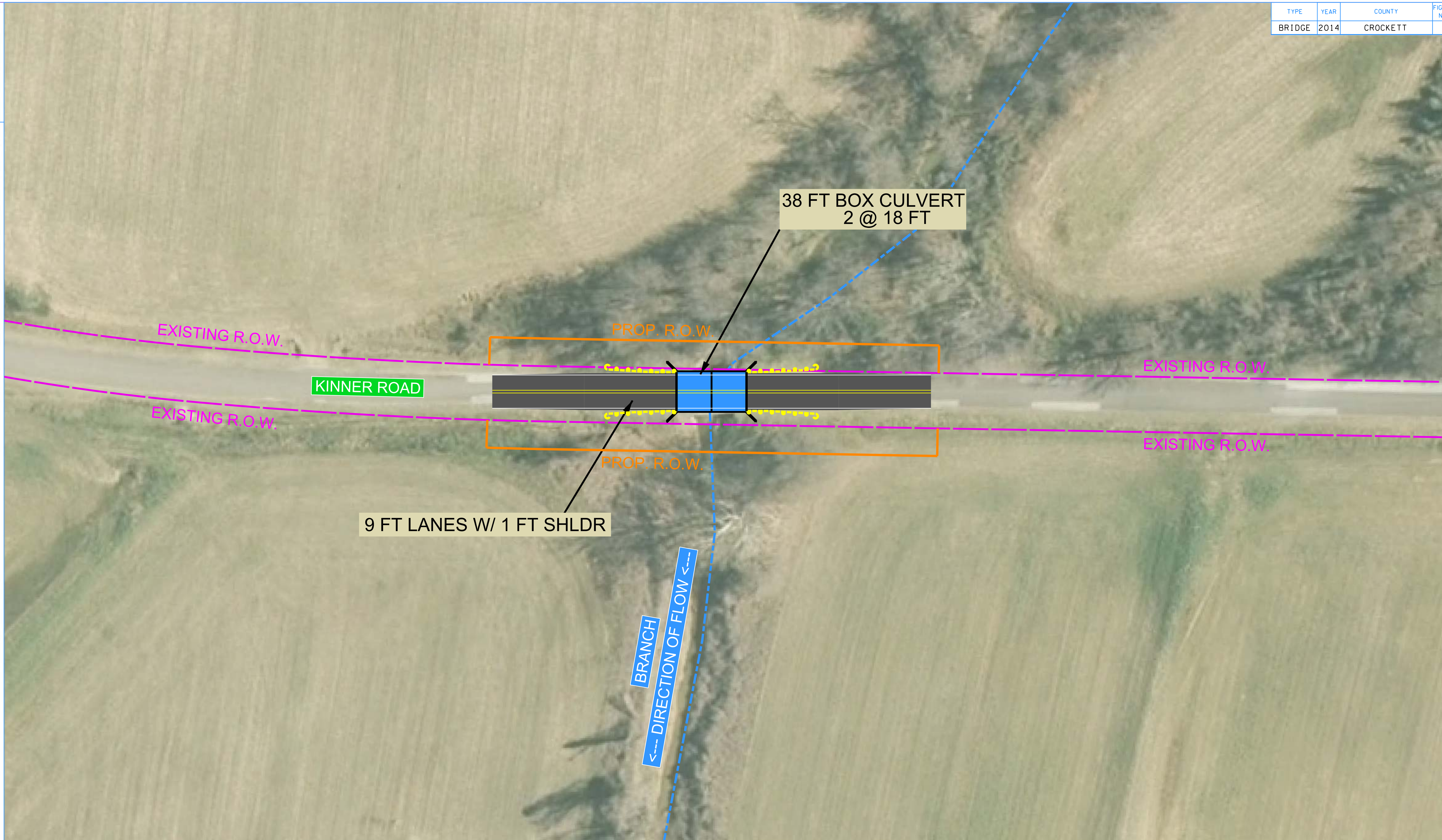
This Traffic is based on 2005 Structure Count. The Future Traffic is based on ADAM Computer Program.

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

NOTE: FOR BRIDGE REPLACEMENT PROJECTS, ADLs ARE NOT REQUIRED FOR AADT's OF 1000 OR LESS AND PERCENTAGE OF TRUCKS OF 7% OR LESS.
SEE ATTACHMENTS FOR TURNING MOVEMENTS AND/OR OTHER DETAILS. (REV. 9/20/07)

TENNESSEE D.O.T.
PROJECT PLANNING DIVISION
FILE NO.

TYPE	YEAR	COUNTY	FIGURE NO.
BRIDGE	2014	CROCKETT	1



0' 50' 100' 150'

N

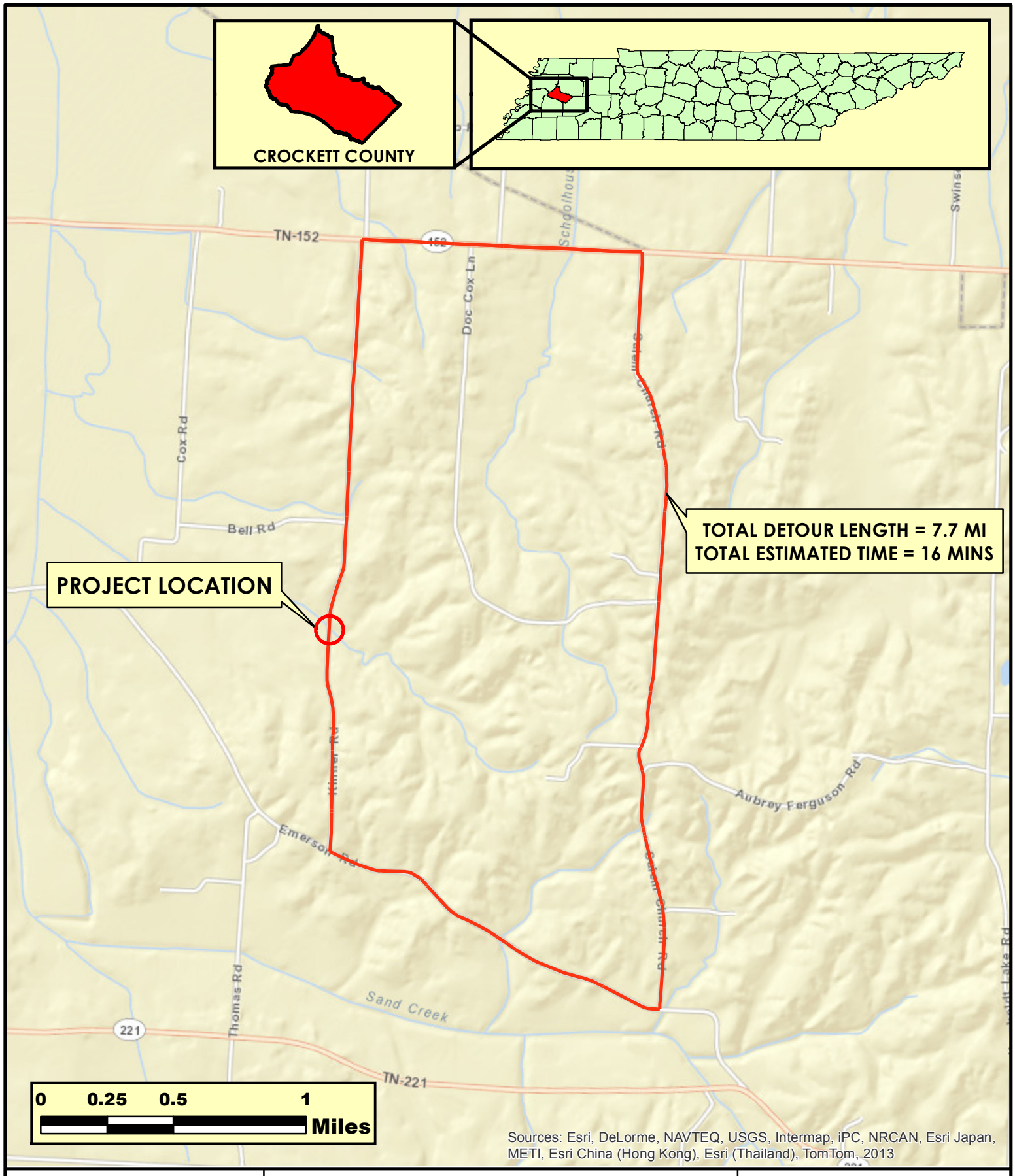
BRIDGE REPLACEMENT

KINNER ROAD (OA170)
BRIDGE OVER BRANCH @ L.M. 0.84
CROCKETT COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
PROJECT PLANNING DIVISION

FIGURE 1
KINNER RD
(OA170)
L.M. 0.84

$$$$SYTIME$$$$$$
$$$$DGNSPEC$$$



N

DETOUR MAP
BRIDGE REPLACEMENT
KINNER ROAD (0A170)
BRIDGE OVER BRANCH @ L.M. 0.84
CROCKETT COUNTY

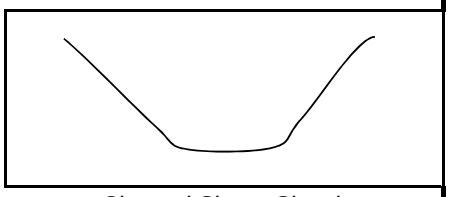
TDOT

SITE INSPECTION

INSPECTION MADE BY: Paige Harris BRIDGE ID: 170A1700001 COUNTY: Crockett
Date: 2/14/14 Route Name: Kinner Road (0A170) Stream Name: Branch

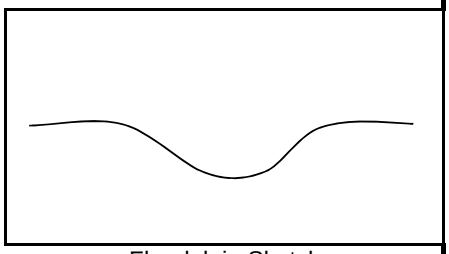
CHANNEL

Approx depth and width of channel: Horizontal: 20 Vertical: 12.2
Depth of normal flow: 2.5 In Reservoir: ☐ Yes No
Depth of Ordinary High Water: --
Type of material in stream bed: Gravel
Type of vegetation on banks: Large Timber
"N" factor of the channel: 0.03
Are channel banks stable: Yes ☑ No ☐
Skew of the channel with the roadway: 90 °


Channel Shape Sketch

FLOODPLAIN

Is the skew same as the channel? ☑ Yes ☐ No
Is it symmetrical about the channel? ☑ Yes ☐ No
Type of vegetation in the floodplain and "N" factors
Left U.S.: 0.15 Right U.S.: 0.15
Left D.S.: 0.15 Right D.S.: 0.15
Are roadway approaches lower than the structure? ☐ Yes ☑ No
Are there any buildings in the floodplain? ☐ Yes ☑ No
Approx. floor elevations: --
Flood information from local residents:
(elevations & dates) --


Floodplain Sketch

EXISTING STRUCTURE

Length: 31' No. of spans: 2 Structure type: Timber / Conc. No. of lanes: 2 Skew: 90 °
Width (out to out): 20' 4" Width (curb to curb): 19' 4" Approach: ☑ paved ☐ graveled
Sidewalks on Structure: ☐ Yes ☑ No Bridgerail type: Timber Wheelguard Bridgerail height = 0.7'
Superstructure depth: 1.7' Finished Grade to low girder = 1' Girder depth = 0.7'
Are any substructures in the channel? ☑ Yes ☐ No Vertical Clearance = ft
Indications of overtopping: None
High water marks: None
Local scour: ☐ Yes, ☑ No
Any signs of stream ☑ aggradation or ☐ degradation?
Any drift or drift potential? ☐ Yes, ☑ No
Any obstructions (pipes,stock fences,etc.)?

PROPOSED STRUCTURE

✓ Replacement ☐ Rehabilitate ☐ Widening ☐ New Location
Bridge length: 38 ft Bridge type: Box Bridge Span arrangement: 2 @ 18 feet Skew: 90 °
Bridge width: 22.0 ft Sidewalks: No Design Speed (MPH): 30 ADT (2038) = 140
Proposed grade: Maintain existing Proposed alignment: Maintain existing
Method of maintaining traffic: ☐ Stage construction ✓ On site detour ☐ Close road ☐ Shift Centerline
Cost of proposed Structure: $105 per ft^2 X 38 / 22.0 length (ft) / width (ft) Cost = $87,780
Cost of bridge removal: $15 per ft^2 X 31 / 20.3 length (ft) / width (ft) Cost = $9,440
Detour structure: Type and size = N/A Cost = N/A

Total Structure Cost = $97,220

Bridge TPR Flow Calculations
For Hydrologic Area 2
Area > 300 Acres

County:	Crockett	By:	MG
Bridge ID:	170A1700001	Date:	5/21/13
Route:	Kinner Road (0A170)	PIN:	103840.00
Feature Crossed:	Branch		
Log Mile:	0.84		

DRAINAGE BASIN

Measurement from quad =	467	acres
Contributing Drainage Area, CDA = acres/640 =	0.73	sq. mi.

USGS REGRESSION EQUATIONS FOR FLOW

Q_2 = 207(CDA)^0.725 =	165	cfs
Q_5 = 344(CDA)^0.715 =	275	cfs
Q_{10} = 444(CDA)^0.711 =	355	cfs
Q_{25} = 578(CDA)^0.708 =	463	cfs
Q_{50} = 682(CDA)^0.706 =	546	cfs
Q_{100} = 788(CDA)^0.705 =	631	cfs

DEPTH OF FLOW EQUATIONS

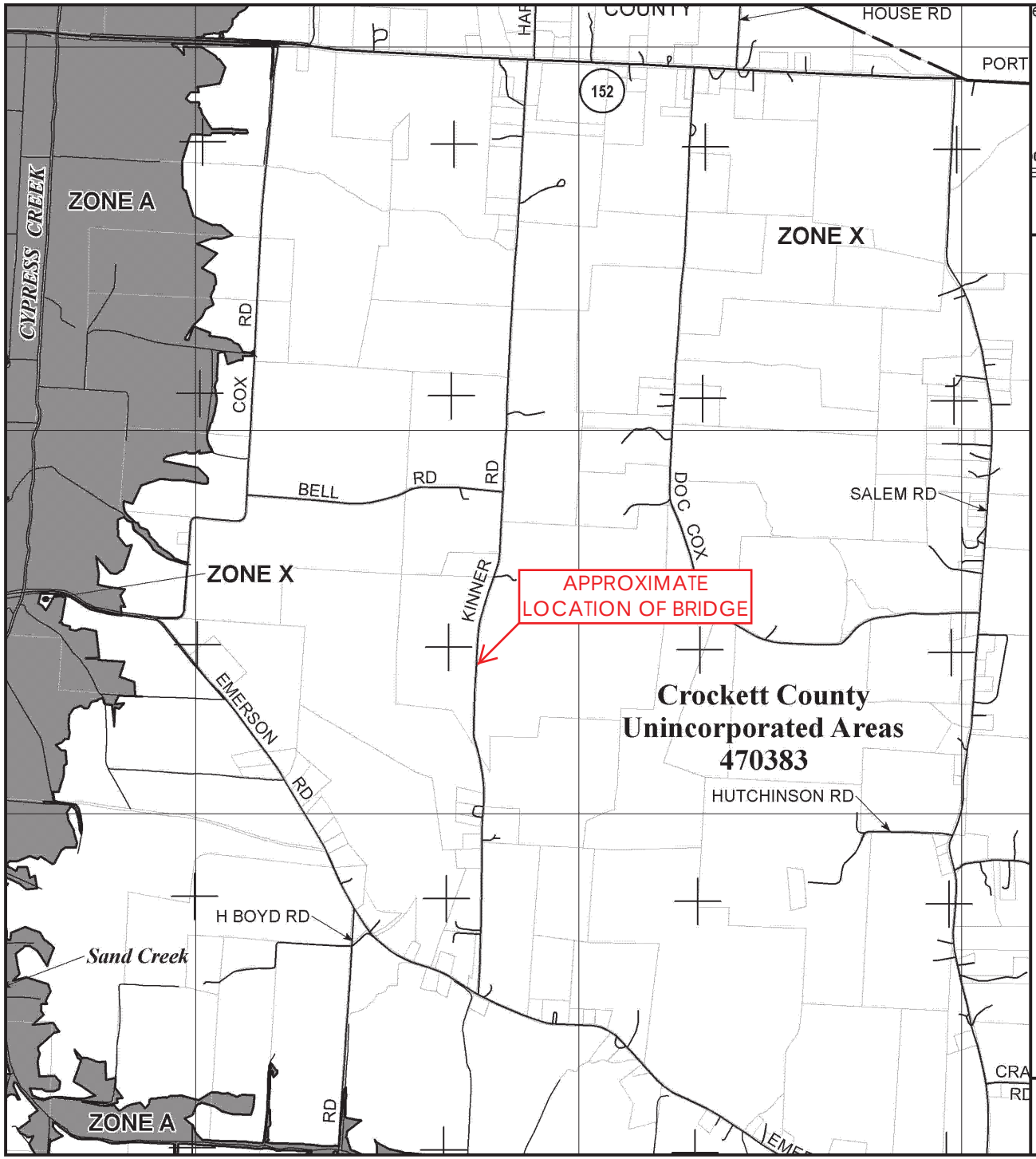
10-Year Flood Depth = 5.33(CDA)^0.197 =	5.0	ft
100-Year Flood Depth = 7.43(CDA)^0.181 =	7.0	ft

AREAS

Existing Area Below Low Chord =	566	ft^2
Proposed Area Below Low Chord =	570	ft^2
Proposed 10-Year Flood Area, A_{10} =	183	ft^2
Proposed 100-Year Flood Area, A_{100} =	303	ft^2

VELOCITIES

Proposed 10-Year Flood Velocity, $V_{10} = Q_{10}/A_{10}$ =	1.9	fps
Proposed 100-Year Flood Velocity, $V_{100} = Q_{100}/A_{100}$ =	2.1	fps



e Program at 1-800-638-6620.

MAP SCALE 1" = 2000'

0 0 1,000 2,000 3,000 4,000 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0175C

FIRM

FLOOD INSURANCE RATE MAP

CROCKETT COUNTY
TENNESSEE
AND INCORPORATED AREAS

PANEL 175 OF 275

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CROCKETT COUNTY	470383	0175	C

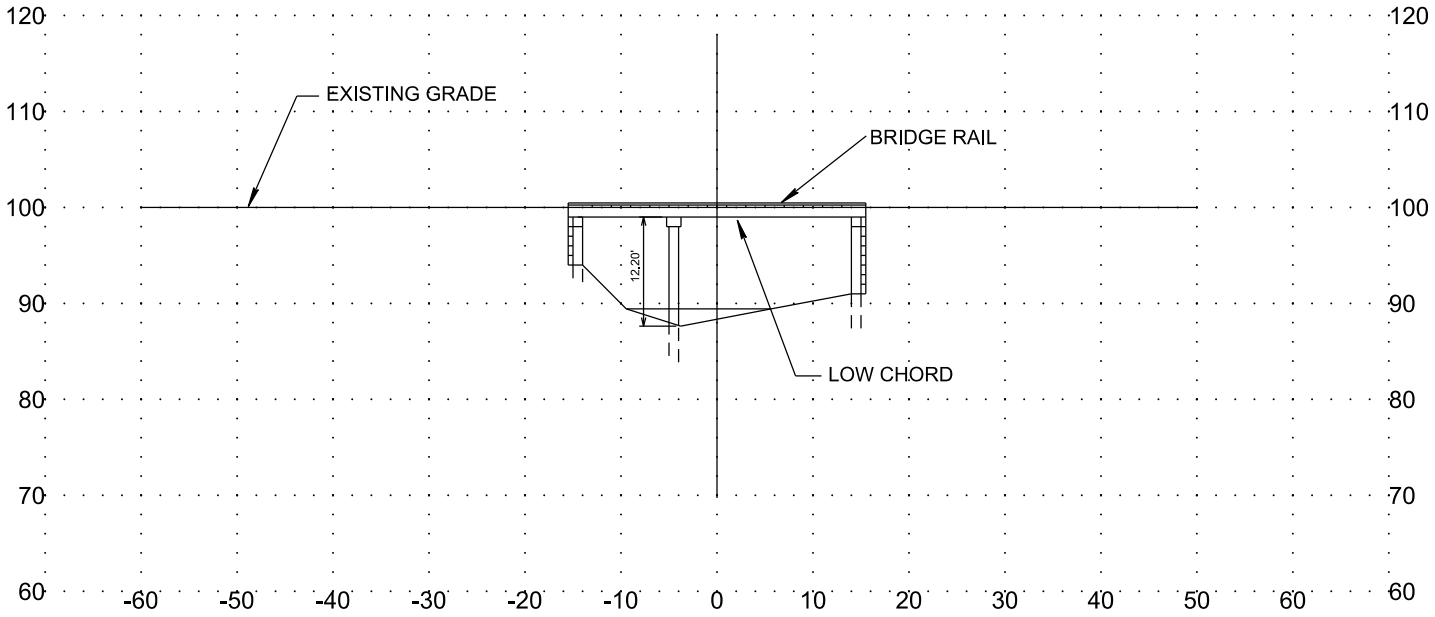
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
47033C0175C

EFFECTIVE DATE
SEPTEMBER 25, 2009

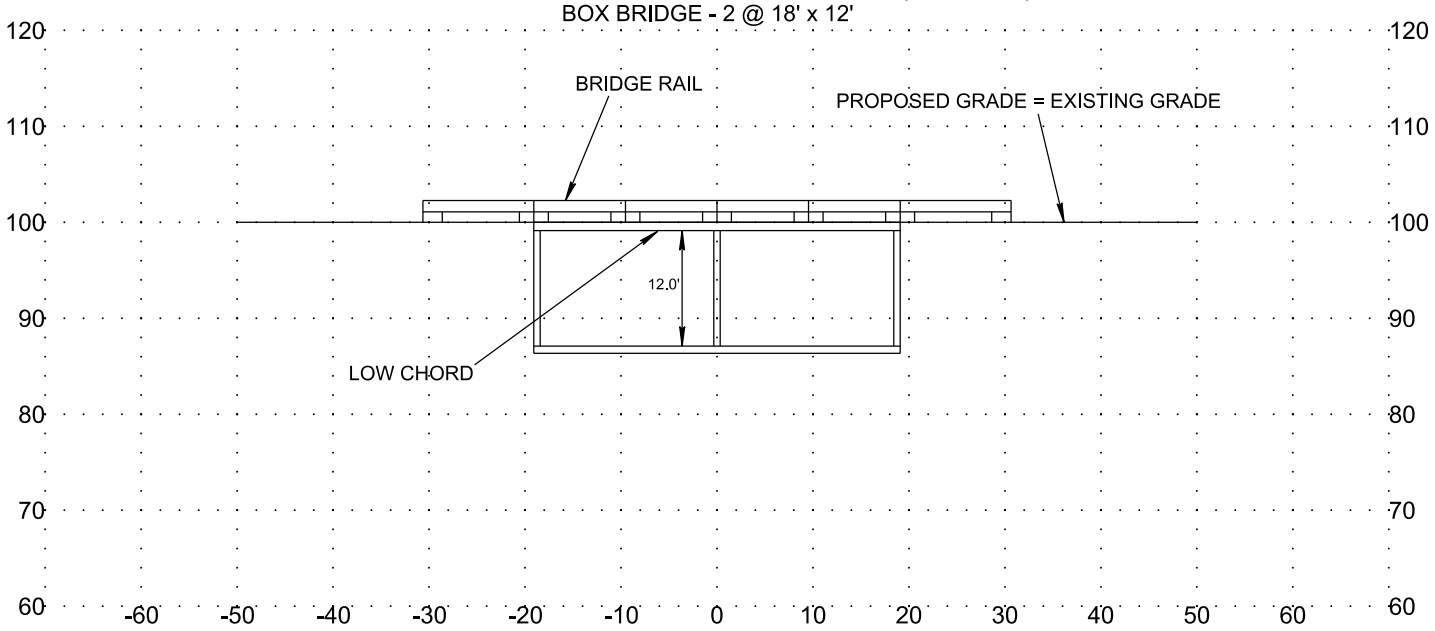
Federal Emergency Management Agency

EXISTING STRUCTURE (INLET)



PROPOSED STRUCTURE (INLET)

BOX BRIDGE - 2 @ 18' x 12'



0' 10' 20' 30'

SCALE: 1" = 20'

BRIDGE SECTIONS

KINNER ROAD (0A170) CROCKETT COUNTY

BRIDGE OVER BRANCH @ L.M. 0.84

BRIDGE ID: 170A1700001

CROCKETT COUNTY
BRIDGE ID: 170A1700001

Weight Limit

Bridge Number

17 – 0A170 – 0084

Co. Route Log Mile

CROCKETT COUNTY
BRIDGE ID: 170A1700001

Bridge Looking North on Kinner Road

Bridge Looking South on Kinner Road

CROCKETT COUNTY
BRIDGE ID: 170A1700001

Looking South on Kinner Road

Looking North on Kinner Road

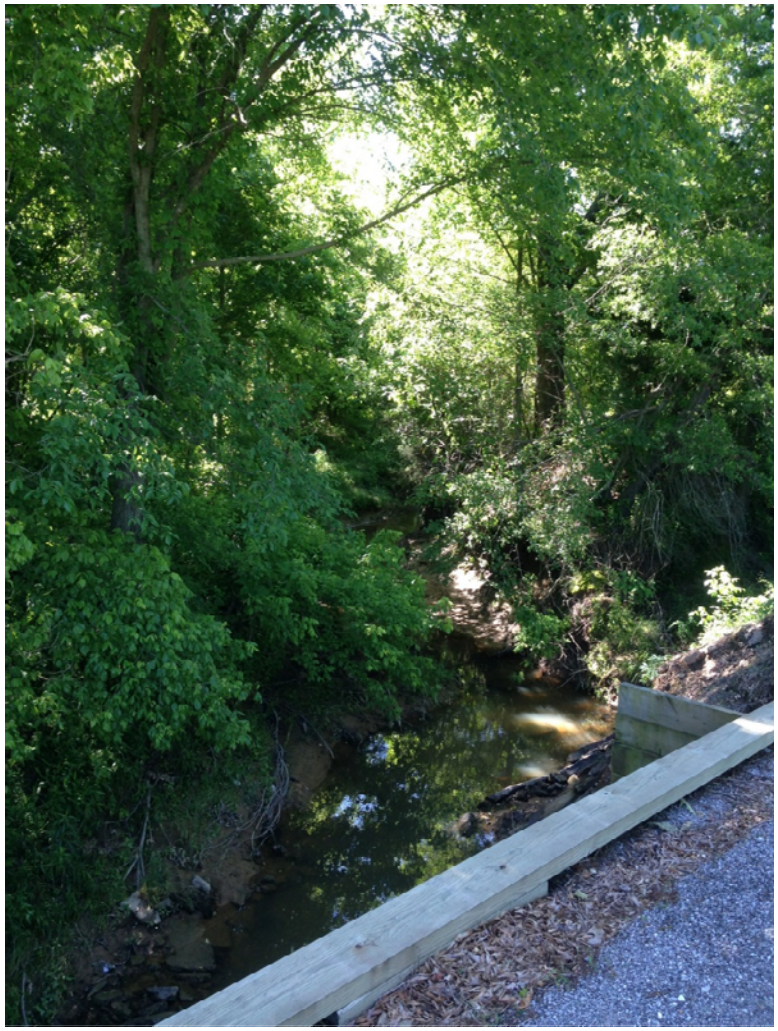
CROCKETT COUNTY
BRIDGE ID: 170A1700001

Downstream

Downstream Right

CROCKETT COUNTY
BRIDGE ID: 170A1700001

Downstream Left



Upstream

CROCKETT COUNTY
BRIDGE ID: 170A1700001

Upstream Left

Looking Upstream Right

CROCKETT COUNTY
BRIDGE ID: 170A1700001

Inlet

Upstream Right/Substructure

CROCKETT COUNTY
BRIDGE ID: 170A1700001

Outlet

Abutment 1

Abutment 2

View under Deck