TRANSPORTATION PLANNING REPORT

Special Bridge Replacement Program

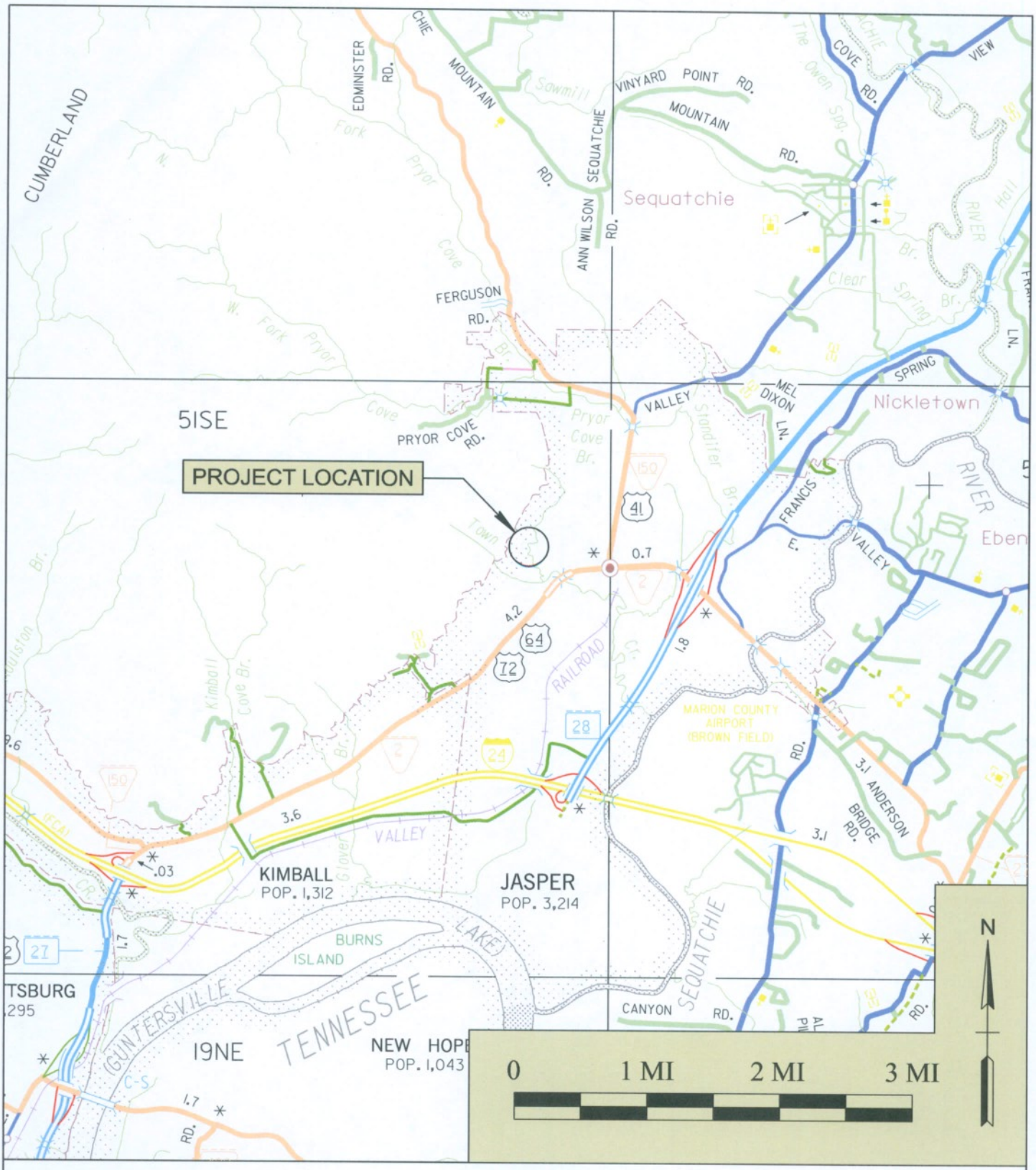
LOCAL ROUTE 0A331 - WEST 2ND STREET
BRIDGE OVER TOWN CREEK CROSSED AT L.M. 0.94
JASPER, MARION COUNTY
PIN: 117486.00

PREPARED BY
R.W. ARMSTRONG
FOR THE
TENNESSEE DEPARTMENT OF TRANSPORTATION

Approved by _____ *Date* _____
Chief of Environment and Planning

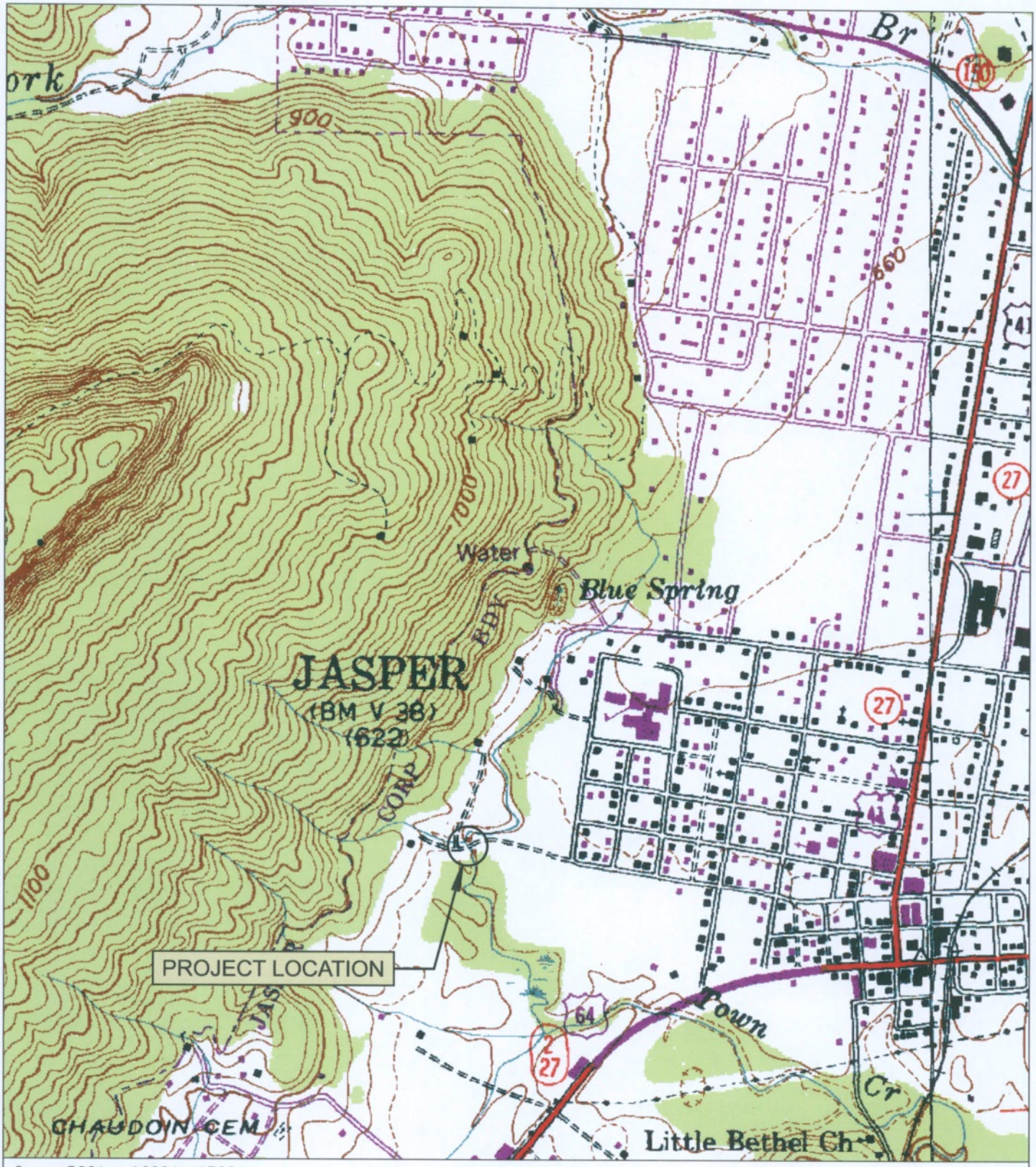
Approved by Paul Degges *Date* 6/21/13
Deputy Commissioner and Chief Engineer

Approved by:	Signature:	Date:
Transportation Director **Project Planning Division**	Steve Allen	5-30-13
Engineering Director **Design Division**	Carolyn Stonecipher	6-6-13
Engineering Director **Structures Division**	Wayne J. Seger	6-13-13



AREA MAP

WEST 2ND STREET - LOCAL ROUTE 0A331
BRIDGE ID 580A3310001 (L.M. 0.94)
MARION COUNTY



PROJECT MAP

WEST 2ND STREET - LOCAL ROUTE 0A331

BRIDGE ID 580A3310001 (L.M. 0.94)

MARION COUNTY

0' 100' 200' 300'

SCALE: 1" = 200'

AERIAL MAP

WEST 2ND STREET - LOCAL ROUTE 0A331

BRIDGE ID 580A3310001 (L.M. 0.94)

MARION COUNTY

TRANSPORTATION PLANNING WORKSHEET
BRIDGE REPLACEMENT ANALYSIS, NEEDS, AND COSTS

County: Marion Route: West 2nd Street - Local Route 0A331 Log Mile: 0.94
Feature Crossed: Town Creek System: Local Route
Functional Class: Rural / Local Bridge ID: 580A3310001

EXISTING CONDITIONS

2017 AADT: 70 App. Cross Section: 10' / 14 ' / 36 ' No. Lanes: 1
Approach Alignment: Curved Approaches Year Built: 1988 Load Limit: 12 tons
Width (out to out): 14' - 6.75" Sidewalks: Right -- Left -- Length: 42 '- 6.5"
No. Spans: Approach: -- Main: 3
Substructure: Steel Vertical Clearance: 7.3' Sufficiency Rating: 44.1
Other:

PROPOSED IMPROVEMENTS

STANDARDS FROM RD01-TS- 1A Type of Work: Replace
Design Year: 2037 Design AADT: 90 Terrain Level ADL (F): -- (R): --
Project Length: 448 ft. Bridge Length: 45 ft Approach Length: 1 @ 203' & 1 @ 200'
Design Speed (MPH): 30 Posted Speed (MPH): 30
Approach Width: 18' / 18 ' / As Req'd Bridge Width (O to O): 27.5 ft No. Lanes: 2
Right-of-Way Required: (0.53 acres) Tract(s) 1 Structure Type: Box Bridge

MAINTENANCE OF TRAFFIC

Temporary Detour: ☐ Temporary Runaround: ☐ Stage Construct: ☑
Alternate Route: None

Remarks: Traffic traverse existing crossing while new Box Bridge is constructed, then traffic shifted to new structure while existing structure is removed.

ESTIMATED COST

Right-of-Way: $8,000 Approaches: $79,900 Structure: $138,300
Preliminary Engineering: $31,900 Utilities: $13,900 Misc./Cont.: $64,200
Mobilization: $13,800 Total: $350,000

Remarks: The proposed alignment will shift to the south approximately twenty (20) feet, and the grade will remain the same to limit the amount of earthwork. The roadway widening and alignment shift will require additional right-of-way and an existing utility pole will need to be relocated.

Field Investigation by: Gary Chapman (Reg. 2 Survey), Alan Wolfe (Reg. 2 Traffic), Landon Castleberry (Reg. 2 Traffic), Mike Gilbert (Conceptual Planning), Glenda Tyus (Trans. Specialist I), Lisa Reaney (Planner), Adam Davidson (RW Armstrong), James Kelley (RW Armstrong), John Rehm (RW Armstrong)

Route:	West 2nd Street - Local Route 0A331
Description:	Bridge over Town Creek (580A3310001)
	L.M. 0.94
County:	Marion
Length:	0.10 Miles
Date:	May 23, 2013

DESCRIPTION	LOCAL	STATE	FEDERAL	TOTAL
Right-of-Way	$ 1,600	$ -	$ 6,400	$ 8,000
Clearing and Grubbing	$ 3,000	$ -	$ 12,000	$ 15,000
Earthwork	$ 1,700	$ -	$ 7,000	$ 8,700
Railroad Crossing or Separation	$ -	$ -	$ -	$ -
Drainage	$ 500	$ -	$ 2,100	$ 2,600
Utilities	$ 2,800	$ -	$ 11,100	$ 13,900
Structures	$ 27,700	$ -	$ 110,600	$ 138,300
Pavement Removal	$ 500	$ -	$ 1,900	$ 2,400
Paving	$ 5,800	$ -	$ 23,300	$ 29,100
Roadway and Pavement Appurtenances	$ -	$ -	$ -	$ -
Retaining Walls	$ -	$ -	$ -	$ -
Topsoil	$ 300	$ -	$ 1,400	$ 1,700
Seeding	$ 100	$ -	$ 400	$ 500
Sodding	$ -	$ -	$ -	$ -
Rip-Rap or Slope Protection	$ -	$ -	$ -	$ -
Fencing	$ -	$ -	$ -	$ -
Signing	$ -	$ -	$ -	$ -
Pavement Markings	$ 100	$ -	$ 400	$ 500
Lighting	$ -	$ -	$ -	$ -
Signalization	$ -	$ -	$ -	$ -
Guardrail	$ 2,900	$ -	$ 11,500	$ 14,400
Pay Item Quantity Adjustment (15%)	$ 7,000	$ -	$ 28,300	$ 35,300
Maintenance of Traffic	$ 1,000	$ -	$ 4,000	$ 5,000
Mobilization (5%)	$ 2,800	$ -	$ 11,000	$ 13,800
CONSTRUCTION COST (rounded)	$ 57,800	$ -	$ 231,400	$ 289,200
Engineering and Contingency (10%)	$ 5,800	$ -	$ 23,100	$ 28,900
TOTAL CONSTRUCTION COST (rounded)	$ 63,600	$ -	$ 254,500	$ 318,100
Preliminary Engineering (10%)	$ 6,400	$ -	$ 25,500	$ 31,900
PROJECT COST [1] (rounded)	**$ 70,000**	**$ -**	**$ 280,000**	**$ 350,000**

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

Marion County

West 2nd Street - Local Route 0A331
L.M. 0.94 (Bridge Replacement)

Pay Item Summary

TDOT PAY ITEM	TDOT DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
-	Right-of-Way (0.53)	LS	1	$8,000.00	$8,000.00
				RIGHT-OF-WAY TOTAL (ROUNDED)	**$ 8,000**
201-01	Clearing And Grubbing	LS	1	$15,000.00	$15,000.00
				CLEAR AND GRUBBING TOTAL (ROUNDED)	**$ 15,000**
203-03	Borrow Excavation (Unclassified)	CY	575	$15.00	$8,625.00
				EARTHWORK TOTAL (ROUNDED)	**$ 8,700**
202-03.01	Removal of Asphalt Pavement	SY	471	$5.00	$2,355.00
				PAVEMENT REMOVAL TOTAL (ROUNDED)	**$ 2,400**
209-08.02	Temporary Silt Fence (w/backing)	LF	773	3.25	$2,512.25
				DRAINAGE TOTAL (ROUNDED)	**$ 2,600**
	Above Ground Utilities	LF	887	$10	$8,870
770-18.10	35FT Wood Pole	EACH	1	$5,000	$5,000
				UTILITIES TOTAL (ROUNDED)	**$ 13,900**
-	Removal of Existing Bridge	SF	616.25	$15.00	$9,243.75
-	3 @14'X9' Box Bridge	SF	1228.43	$105.00	$128,985.15
				STRUCTURES TOTAL (ROUNDED)	**$ 138,300**
				RAILROAD CROSSING OR SEPARATION TOTAL (ROUNDED)	**$ -**
303-01	Mineral Aggregate, Type A Base, Grading D	TON	351	$18	$6,318.00
307-01.01	Asphalt Concrete Mix (64-22) (BPMB-HM) Grading A	TON	134	$79	$10,519.00
307-01.08	Asphalt Concrete Mix (64-22) (BPMB-HM) Grading B-M2	TON	88	$78	$6,820.00
402-01	Bituminous Material For Prime Coat (PC)	TON	1.2	$509	$610.80
402-02	Aggregate For Cover Material (PC)	TON	5	$23	$116.35
403-01	Bituminous Material For Tack Coat (TC)	TON	0.2	$571	$114.24
411-01.10	ACS MIX (PG64-22) Grading D	TON	52.0	$87	$4,505.80
				PAVING TOTAL (ROUNDED)	**$ 29,100**
				ROADWAY AND PAVEMENT APPURTENANCES TOTAL (ROUNDED)	**$ -**
				RETAINING WALLS TOTAL (ROUNDED)	**$ -**
712-01	Traffic Control	LS	1	$ 5,000.00	$5,000.00
				MAINTENANCE OF TRAFFIC TOTAL (ROUNDED)	**$ 5,000**
203-07	Furnishing and Spreading Topsoil	CY	164	$10.00	$1,640.00
				TOPSOIL TOTAL (ROUNDED)	**$ 1,700**
801-01	Seeding (with Mulch)	UNIT	11	$40	$440.00
801-03	Water	MG	1.5	$7	$10.50

Marion County

West 2nd Street - Local Route 0A331
L.M. 0.94 (Bridge Replacement)

Pay Item Summary

TDOT PAY ITEM	TDOT DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
			SEEDING TOTAL (ROUNDED)	$	500
			SODDING TOTAL (ROUNDED)	$	-
			SIGNING TOTAL (ROUNDED)	$	-
716-13.06	Spray Thermo Pvmt Mrkng (40 mil)(4" Line)	LM	0.4	$1,250	$500.00
			PAVEMENT MARKINGS TOTAL (ROUNDED)	$	500
			LIGHTING TOTAL (ROUNDED)	$	-
			SIGNALIZATION TOTAL (ROUNDED)	$	-
			FENCE TOTAL (ROUNDED)	$	-
705-02.02	Single Guardrail (Type 2)	LF	125	$15.66	$1,957.50
705-04.04	Guardrail Terminal (Type 21)	EACH	4	$1,823.00	$7,292.00
705-01.04	Metal Beam Guard Fence	LF	90	$57.00	$5,130.00
			GUARDRAIL TOTAL (ROUNDED)	$	14,400
709-05.06	Machined Rip-Rap (Class A-1)	TON	200	$30	$6,000.00
			RIP-RAP OR SLOPE PROTECTION TOTAL (ROUNDED)	$	6,000

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

MEMORANDUM

TO: Project Planning Office

FROM: James Kelley, Project Manager
RW Armstrong

DATE: May 23, 2013

SUBJECT: TPR Field Review (Special Bridge Replacement Program)
Local Route 0A331 - West 2nd Street Bridge over Town Creek
Log Mile 0.94
Bridge ID 580A3310001
PIN 117486.00

A field review was held for the above-mentioned project on January 8, 2013.

The existing bridge consists of a three (3) span, steel structure with a corrugated steel deck and an asphalt surface. The bridge has an out-to-out width of fourteen feet, six inches (14'-6") and a total length of forty-two feet, six and a half inches (42'– 6.5"). The sufficiency rating for the existing bridge is 44.1. The 10-year and 100-year discharges and depths of flow for the drainage basin were determined using the appropriate regression equations. The 10-year flood level is 3.7 feet and the 100-year flood level is 4.7 feet.

The proposed alignment for this structure will be shifted south approximately twenty (20) feet, and the grade will remain the same to limit the amount of earthwork. The structure and approaches will be designed according to TDOT standard drawing RD01-TS-1A with a design speed of 30 mph. The proposed roadway will have an out-to-out width of eighteen (18) feet with nine (9) foot travel lanes in order to meet TDOT standards. The roadway widening and alignment shift will require one (1) tract of right-of-way (ROW) totaling 0.53 acres and an existing utility pole will need to be relocated (See Figure 1).

The route has a base year (2017) AADT of 70 and a design year (2037) AADT of 90. The proposed bridge over Town Creek will be designed to meet the Road Design

Standard RD01-TS-1A. The structure will consist of a reinforced concrete box bridge with three (3) barrels at fourteen (14) feet with nine (9) feet of clearance. The total length of the box bridge will be forty-five (45) feet. The structure will also contain two (2) nine (9) foot travel lanes with two (2) four foot, nine inches (4'-9") areas to accommodate the guardrail attachment to the structure.

It is recommended that the bridge be shifted twenty (20) feet given the additional amount of roadway width required to replace the structure and no viable detour route that can maintain traffic on this route.

The required approach work, utility relocations, estimated replacement cost, right-of-way, and preliminary engineering costs for the bridge are approximately $350,000. The total local match for this project is approximately $70,000.

JK

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	X
5.	Forested land	X
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	X
	NPDES	
	Aquatic Resource Alteration	X
13.	Other	
14.	Location coordinated with local officials	
15.	Railroad crossings	
16.	Hazardous materials site	

TENNESSEE DEPARTMENT OF TRANSPORTATION
PROJECT PLANNING DIVISION

PROJECT NO.: _____ ROUTE: W. 2nd Avenue (0A331)
COUNTY: Marion CITY: Jasper
PROJECT PIN NUMBER: 117486.00
PROJECT DESCRIPTION: Special Bridge Replacement Program
Bridge over Town Creek (Bridge ID# 580A3310001)
L.M. 0.94

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
70	2017	90	12	13	2037	65-35	1	1		

REQUESTED BY: NAME Mike Gilbert DATE 7/17/12
DIVISION Planning
ADDRESS 10th Floor, JK Polk Bldg.
Nashville, TN 37243

REVIEWED BY: TONY ARMSTRONG Tony Armstrong DATE 7-20-12
TRANSPORTATION MANAGER 1
SUITE 1000, JAMES K. POLK BUILDING

APPROVED BY: DUDLEY DANIEL DATE 7-20-12
TRANSPORTATION MANAGER 2
SUITE 1000, JAMES K. POLK BUILDING

COMMENTS:

This Traffic is based on 1998 Structure 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)

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

TYPE	YEAR	COUNTY	FIGURE NO.
BRIDGE	2013	MARION	1

0' 50' 100' 150'

N

BRIDGE REPLACEMENT

WEST 2ND STREET - LOCAL ROUTE 0A331
BRIDGE ID 580A3310001 (L.M. 0.94)
MARION COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
PROJECT PLANNING DIVISION

FIGURE 1
L.R. 0A331
L.M. 0.94

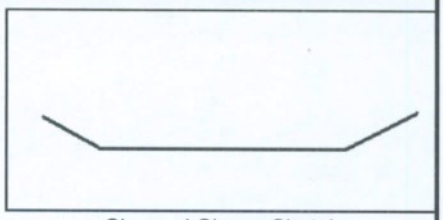
9/23/2013 9:47:25 AM
N:\2026550_T001 PLNG-RD *8_BRIDGE TPR-400 TECHNICAL\405_Design\Layout.dgn

SITE INSPECTION

INSPECTION MADE BY: A. Davidson, J. Kelley, J. Rehm BRIDGE ID: 580A3310001 COUNTY: Marion
Date: 1/8/13 Route Name: West 2nd Street - Local Route 0A331 Stream Name: Town Creek @ L.M. 0.94

CHANNEL

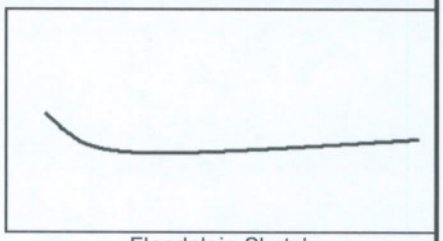
Approx depth and width of channel: Horizontal: 27' - 0" Vertical: 2 - 3'
Depth of normal flow: 3' - 2" In Reservoir: ☐ Yes ☑ No
Depth of Ordinary High Water: 4' - 5" from Low Chord
Type of material in stream bed: Small Rock / Earth
Type of vegetation on banks: Grass / Brush
"N" factor of the channel: 0.03
Are channel banks stable: ☑ Yes ☐ No
If the streambed is gravel: D_{30} = -- D_{85} = --
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.: Trees / Grass (0.050) Right U.S.: Trees / Grass (0.50)
Left D.S.: Trees / Brush (0.050) Right D.S.: Trees / Grass (0.50)
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: 42' - 6.5" No. of spans: 3 Structure type: Asphalt on Steel No. of lanes: 1 Skew: 90 °
Width (out to out): 14' - 6.75" Width (curb to curb): 14' - 6.75" Approach: ☑ paved ☐ graveled
Sidewalks on Structure: ☐ Yes ☑ No Bridgerail type: Guardrail Bridgerail height = 31"
Superstructure depth: 17" Finished Grade to low girder = 17" Girder depth = 12"
Are any substructures in the channel? ☑ Yes ☐ No Vertical Clearance= 7.3 ft
Indications of overtopping: None
High water marks: 4' - 5" from Low Chord
Local scour: ☐ Yes, ☑ No
Any signs of stream ☐ aggradation or ☐ degradation? None
Any drift or drift potential? ☐ Yes, None ☑ No
Any obstructions (pipes,stock fences,etc.)? None

PROPOSED STRUCTURE

☑ Replacement ☐ Rehabilitate ☐ Widening ☐ New Location
Bridge length: 45 ft Bridge type: Box Bridge Span arrangement: 3 @ 14' X 9' Skew: 90 °
Bridge width: 27.5 ft Sidewalks: No Design Speed (MPH): 30 ADT (2036) = 90
Proposed grade: Same Proposed alignment: Shifted South Approximately 20 ft
Method of maintaining traffic: ☐ Stage construction ☐ On site detour ☐ Close road ☑ Shift Centerline 20 ft South
Cost of proposed Structure: $105 per ft^2 X 45 / 27.5 length (ft) / width (ft) Cost = $129,000
Cost of bridge removal: $15 per ft^2 X 42.5 / 14.5 length (ft) / width (ft) Cost = $9,300
Detour structure: Type and size = N/A Cost = $0

Total Structure Cost = $138,300

Bridge TPR Flow Calculations
For Hydrologic Area 1
Area > 230 Acres

County: Marion
Bridge ID: 580A3310001
Route: West 2nd Street - Local Route 0A331
Feature Crossed: Town Creek
Log Mile: 0.94

By: JTL /RSC
Date: 2/25/13
PIN: 117486.00

DRAINAGE BASIN

Measurement from quad =	339 acres
Contributing Drainage Area, CDA = acres/640 =	0.53 sq. mi.

USGS REGRESSION EQUATIONS FOR FLOW

Q_2 = 119(CDA)^0.756 =	74 cfs
Q_5 = 197(CDA)^0.740 =	123 cfs
Q_{10} = 258(CDA)^0.731 =	162 cfs
Q_{25} = 343(CDA)^0.721 =	217 cfs
Q_{50} = 412(CDA)^0.715 =	262 cfs
Q_{100} = 485(CDA)^0.709 =	309 cfs

DEPTH OF FLOW EQUATIONS

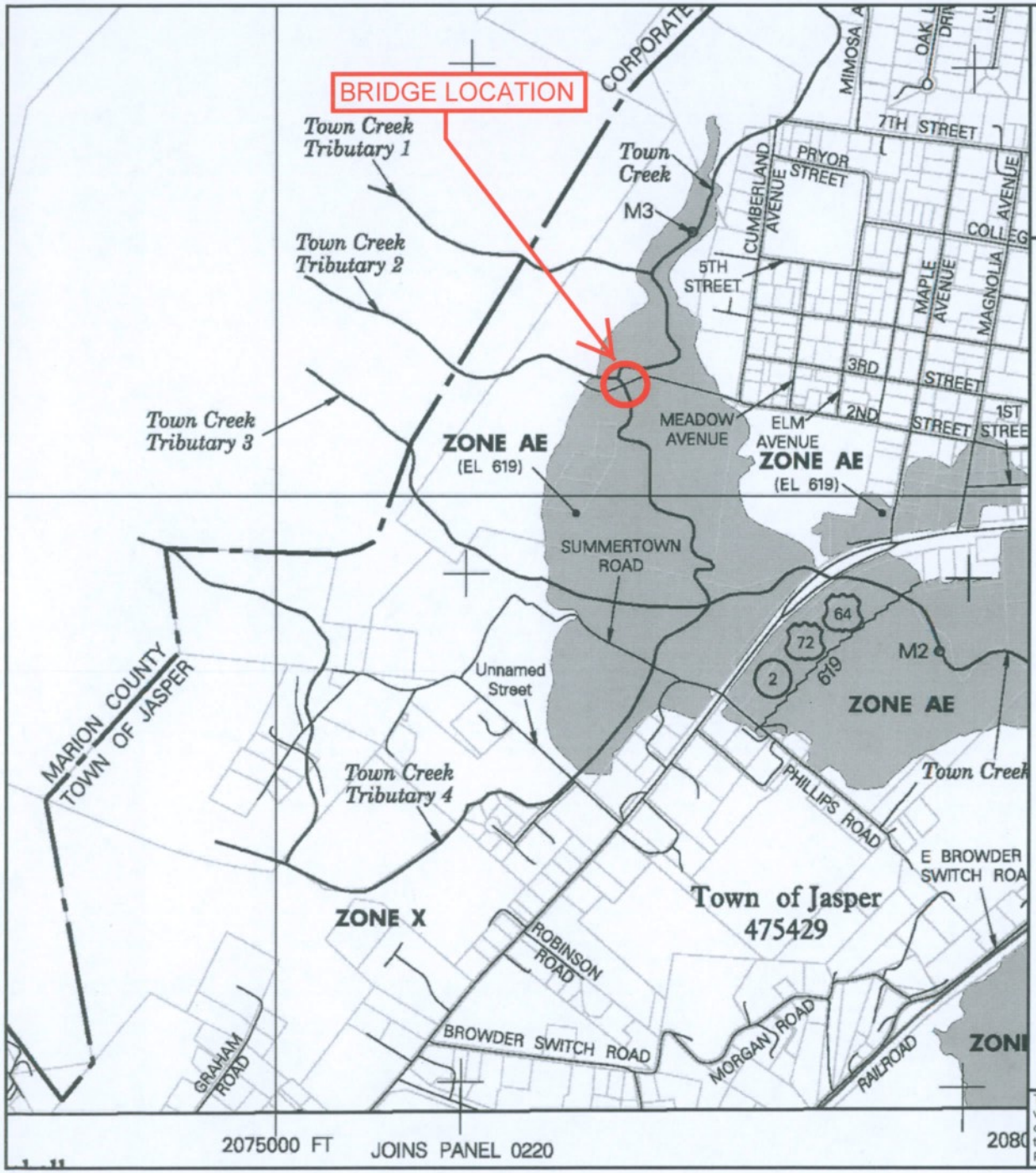
10-Year Flood Depth = 4.11(CDA)^0.184 =	3.7 ft
100-Year Flood Depth = 5.32(CDA)^0.186 =	4.7 ft

AREAS

Existing Area Below Low Chord =	206 ft^2
Proposed Area Below Low Chord =	252 ft^2
Proposed 10-Year Flood Area, A_{10} =	82 ft^2
Proposed 100-Year Flood Area, A_{100} =	111 ft^2

VELOCITIES

Proposed 10-Year Flood Velocity, $V_{10} = Q_{10}/A_{10}$ =	2.0 fps
Proposed 100-Year Flood Velocity, $V_{100} = Q_{100}/A_{100}$ =	2.8 fps



MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0210D

FIRM

FLOOD INSURANCE RATE MAP

MARION COUNTY, TENNESSEE AND INCORPORATED AREAS

PANEL 210 OF 425

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
JASPER, TOWN OF	475429	0210	D
KIMBALL, TOWN OF	470116	0210	D
MARION COUNTY	470114	0210	D

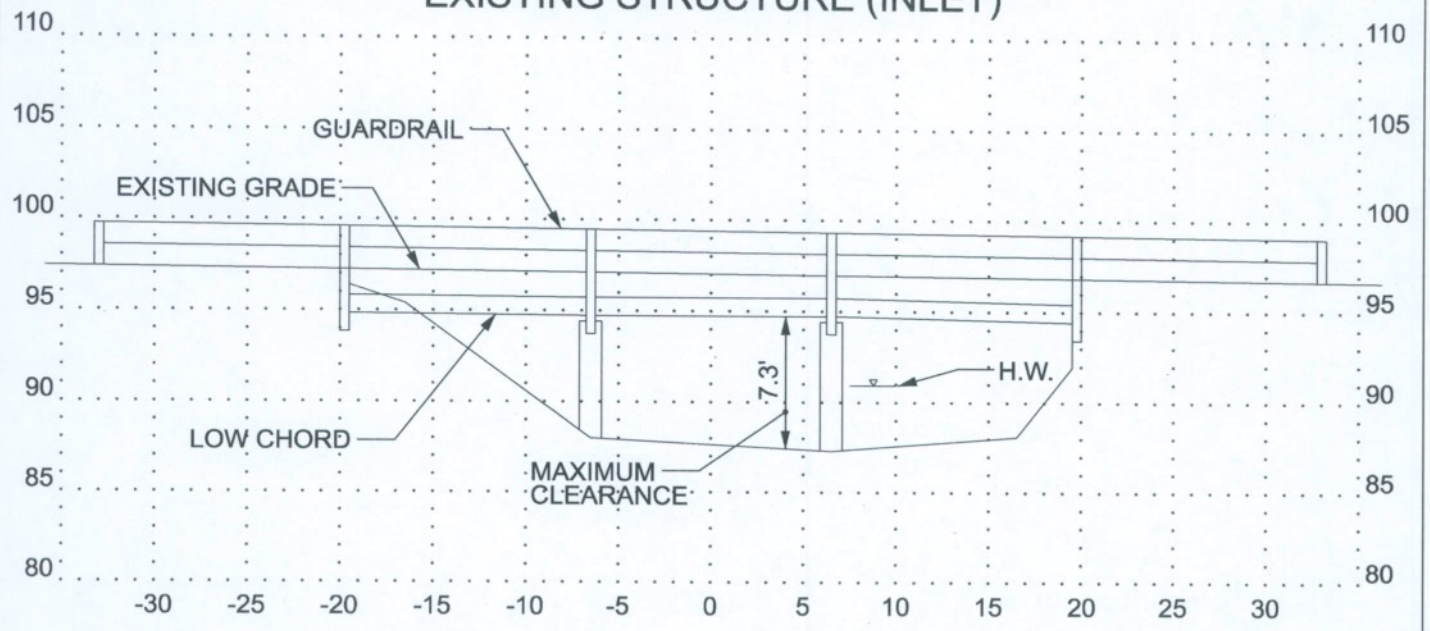
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
47115C0210D

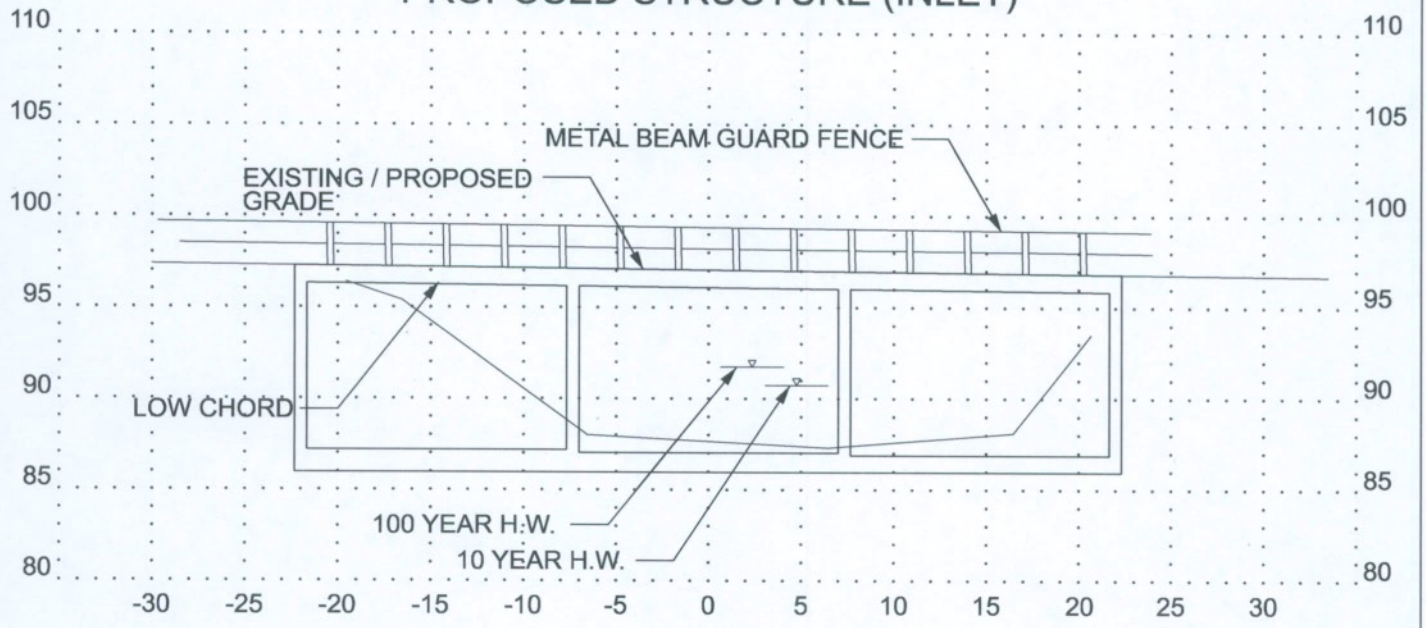
MAP REVISED
JANUARY 6, 2012

Federal Emergency Management Agency

EXISTING STRUCTURE (INLET)



PROPOSED STRUCTURE (INLET)



0' 5' 10' 15'

SCALE: 1" = 10'

BRIDGE SECTIONS

WEST 2ND STREET - LOCAL ROUTE 0A331

BRIDGE ID 580A3310001 (L.M. 0.94)

MARION COUNTY

View of Structure

Bridge Number

Westbound Approach

Eastbound Approach

Bridge Looking East on West 2nd Street

Bridge Looking West on West 2nd Street

Bridge Rail

Structure

Substructure Looking West

Substructure Looking East

Slope Repair West Approach

Inlet

Outlet

Upstream View

Bridge ID: 580A3310001

Marion County

Upstream (Right)

Upstream (Left)

Downstream View

Downstream (Right)

Downstream (Left)