TENNESSEE
DEPARTMENT OF TRANSPORTATION

TRANSPORTATION INVESTMENT REPORT
IMPROVE Act

State Route 436
Bridge over Reedy Creek, Log Mile 0.68
Carroll County
PIN 124139.00

PREPARED BY ALFRED BENESCH & COMPANY
for the
Strategic Transportation Investments Division

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

Approved by _____ *Date* 3/23/18
Deputy Commissioner and Chief Engineer

Approved by:	Signature	DATE
TRANSPORTATION DIRECTOR STRATEGIC TRANSPORTATION INVESTMENTS DIVISION		3-13-18
ENGINEERING DIRECTOR DESIGN DIVISION		3/22/18
ENGINEERING DIRECTOR STRUCTURES DIVISION		3/21/18

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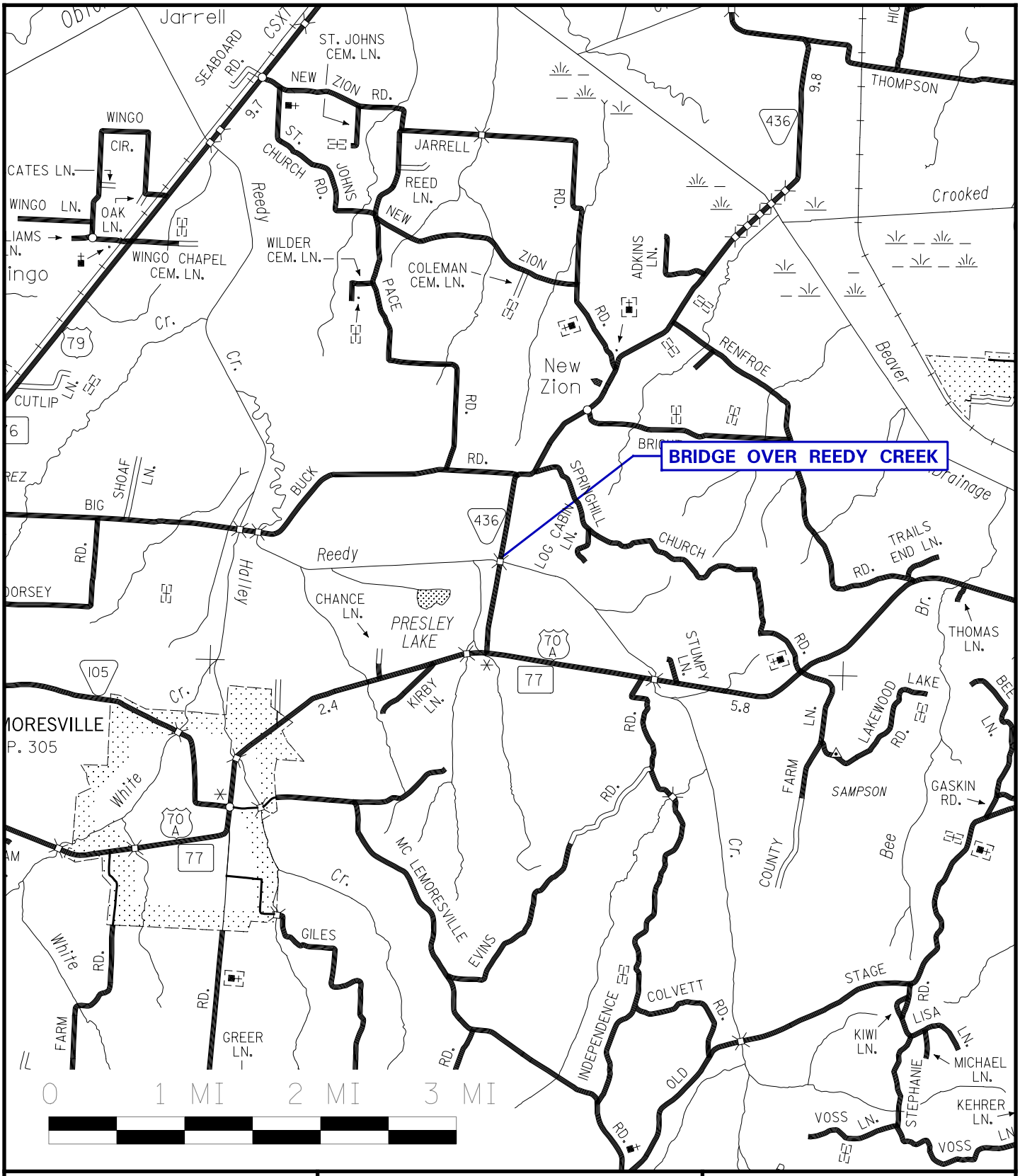
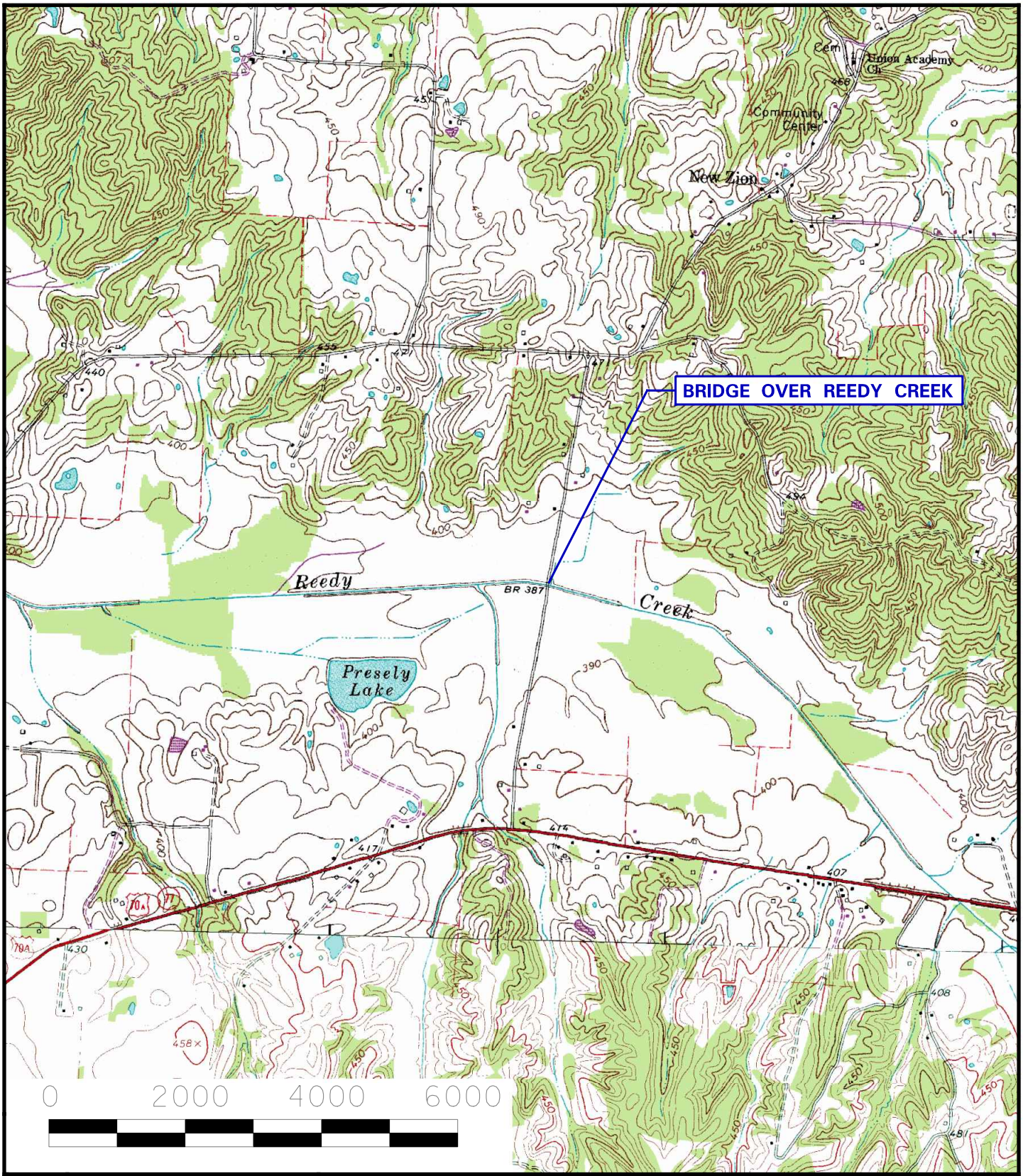


AREA MAP
BRIDGE TIR
STATE ROUTE 436 (REEDY CREEK ROAD)
BRIDGE OVER REEDY CREEK (LM 0.68)
CARROLL COUNTY

TN TDOT Department of Transportation



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TOPOGRAPHIC MAP
BRIDGE TIR
STATE ROUTE 436 (REEDY CREEK ROAD)
BRIDGE OVER REEDY CREEK (LM 0.68)
CARROLL COUNTY

TN TDOT Department of Transportation

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LOCATION MAP
BRIDGE TIR
STATE ROUTE 436 (REEDY CREEK ROAD)
BRIDGE OVER REEDY CREEK (LM 0.68)
CARROLL COUNTY

TN TDOT Department of Transportation

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

JOHN C. SCHROER
COMMISSIONER

BILL HASLAM
GOVERNOR

MEMORANDUM

TO: Steve Allen, Transportation Director
Strategic Transportation Investments Division

FROM: Zane Pannell, Transportation Project Specialist
Strategic Transportation Investments Division

DATE: March 21, 2018

SUBJECT: TIR Field Review (IMPROVE Act
State Route 436, Bridge over Reedy Creek
Bridge ID: 09S82330001
Log Mile 0.68
Carroll County
PIN: 124139.00

A field review was held for the above-mentioned project on January 24, 2018

The existing structure, built in 1939, is a four span concrete bridge crossing Reedy Creek. The structure has an out-to-out width of 22 feet. The overall structure length is 90 feet with approximately 9.33 feet of vertical clearance. The sufficiency rating for this structure is 47.1 based on the Bridge Inspection Report from October 2, 2017.

The discharges for the drainage basin were determined using StreamStats Version 3.0. which used a drainage area of 26.1 square miles. The 10-year discharge rate (Q10) was 4,480 cubic feet per second (cfs), Q50 was 6,300 cfs, and Q100 was 7,050 cfs.

The proposed alignment for the replacement structure will shift approximately ten (10) feet to the west and the grade will be raised approximately 2.5 feet to maintain the existing vertical clearance. The proposed structure will maintain the 90-degree skew with the river channel. There is a 45 mph posted speed limit on State Route 436 so the design speed will be 50 MPH. The proposed structure will be a single span pre-stressed concrete box beam structure with a total vertical clearance of 9.33 feet and a length of 90 feet. It is estimated that four (4) tracts of land

will be affected resulting in 1.13 acres of estimated ROW. It is also estimated that overhead utilities will need to be relocated.

The route has a base year 2022 AADT of 380 and a design year 2042 AADT of 450. The existing structure and roadway approaches have 2 travel lanes 9 feet wide each. The route is classified as a Rural Major Collector and Standard Drawing RD01-TS-2 was used for design considerations. Table I, used for Rural Collectors, gave a minimum roadway width of 22 feet with shoulder widths of 3 feet. Therefore, the typical section on the proposed structure will consist of 2 travel lanes 11 feet wide with shoulder widths of 3 feet and concrete parapets for a total out-to-out width of 29.25 feet on the structure. The project will extend 500 feet from the structure to the north and to the south in order to accommodate the alignment shift, raise the grade and for the proposed one lane signal to maintain traffic during construction.

Per TDOT Headquarters Construction Division, this bridge is recommended as a Design-Build project.

The cost for the estimated required approach work, estimated replacement, and estimated preliminary engineering for this bridge replacement is approximately $2,016,000.

ZP

cc: File

TENNESSEE D.O.T.
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION
FILE NO.

TYPE	YEAR	COUNTY	FIGURE NO.
TIR	2018	CARROLL	1

500′
APPROX. 77′
PROP. GUARDRAIL
500′
EXISTING:
2 @ 9′ LANES
WITH 2′ SHOULDERS
PRES. R.O.W.
PROP. R.O.W.
PROP. R.O.W.
PRES. R.O.W.
STATE ROUTE 436
STATE ROUTE 436
PRES. R.O.W.
PRES. R.O.W.
PROP. R.O.W.
PROP. R.O.W.
PRES. R.O.W.
PROPOSED BRIDGE:
LENGTH = 90′
1 SPAN
SKEW = 90°
APPROX. 77′
PROP. GUARDRAIL
EXISTING:
OVERHEAD
UTILITY POLES
PROPOSED:
2 @ 11′ LANES
WITH 3′ SHOULDERS
100′ PROPOSED R.O.W.
REEDY CREEK

0′ 100′ 200′ 300′

N

BRIDGE TIR

STATE ROUTE 436
BRIDGE OVER REEDY CREEK @ L.M. 0.68
CARROLL COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

FIGURE 1
S.R. 436
L.M. 0.68

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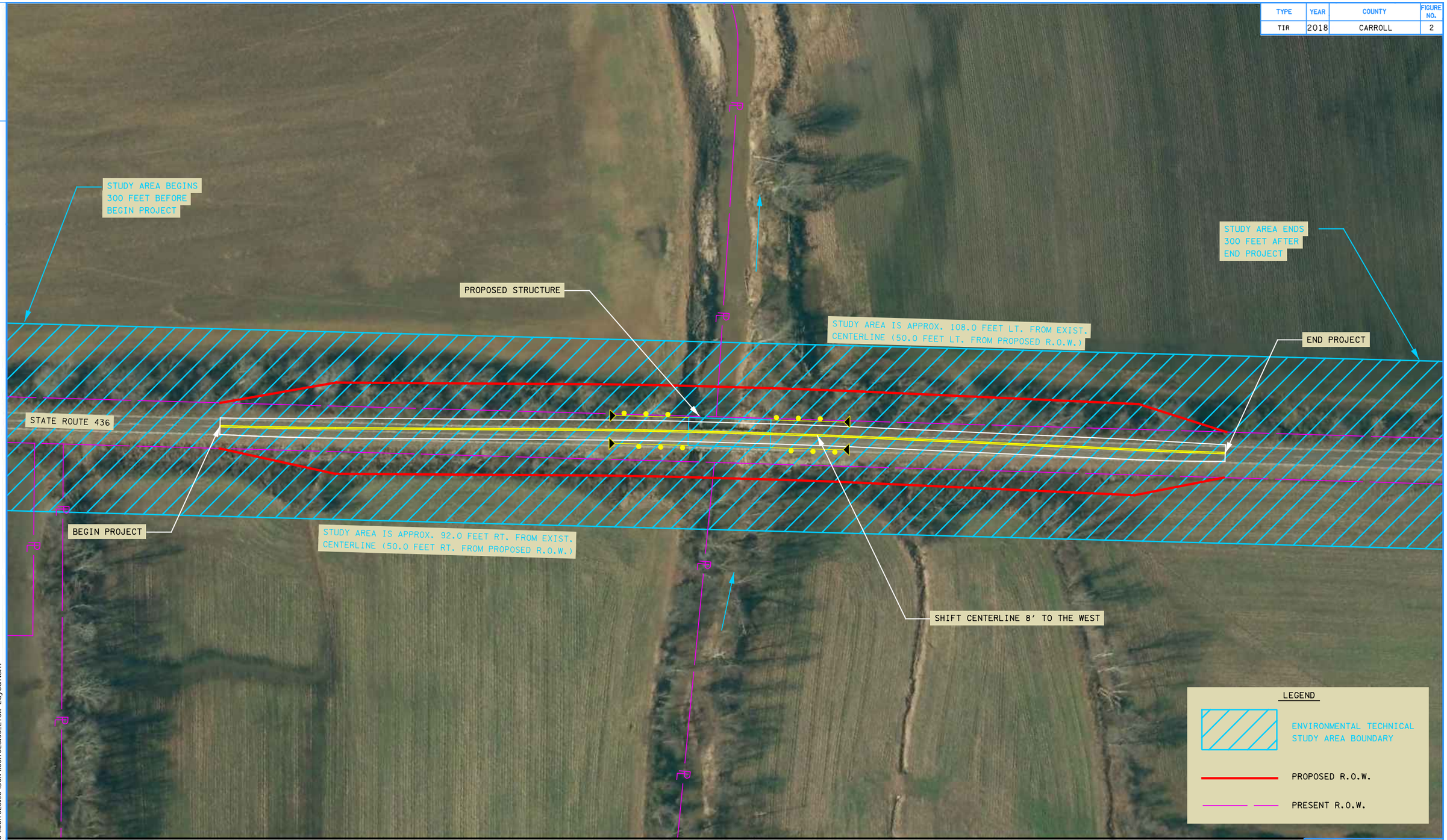
TENNESSEE D.O.T.
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION
FILE NO.

TYPE	YEAR	COUNTY	FIGURE NO.
TIR	2018	CARROLL	2



0' 100' 200' 300'

N

ENVIRONMENTAL TECHNICAL STUDY AREA

STATE ROUTE 436
BRIDGE OVER REEDY CREEK @ L.M. 0.68
CARROLL COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

FIGURE 2
S.R. 436
L.M. 0.68

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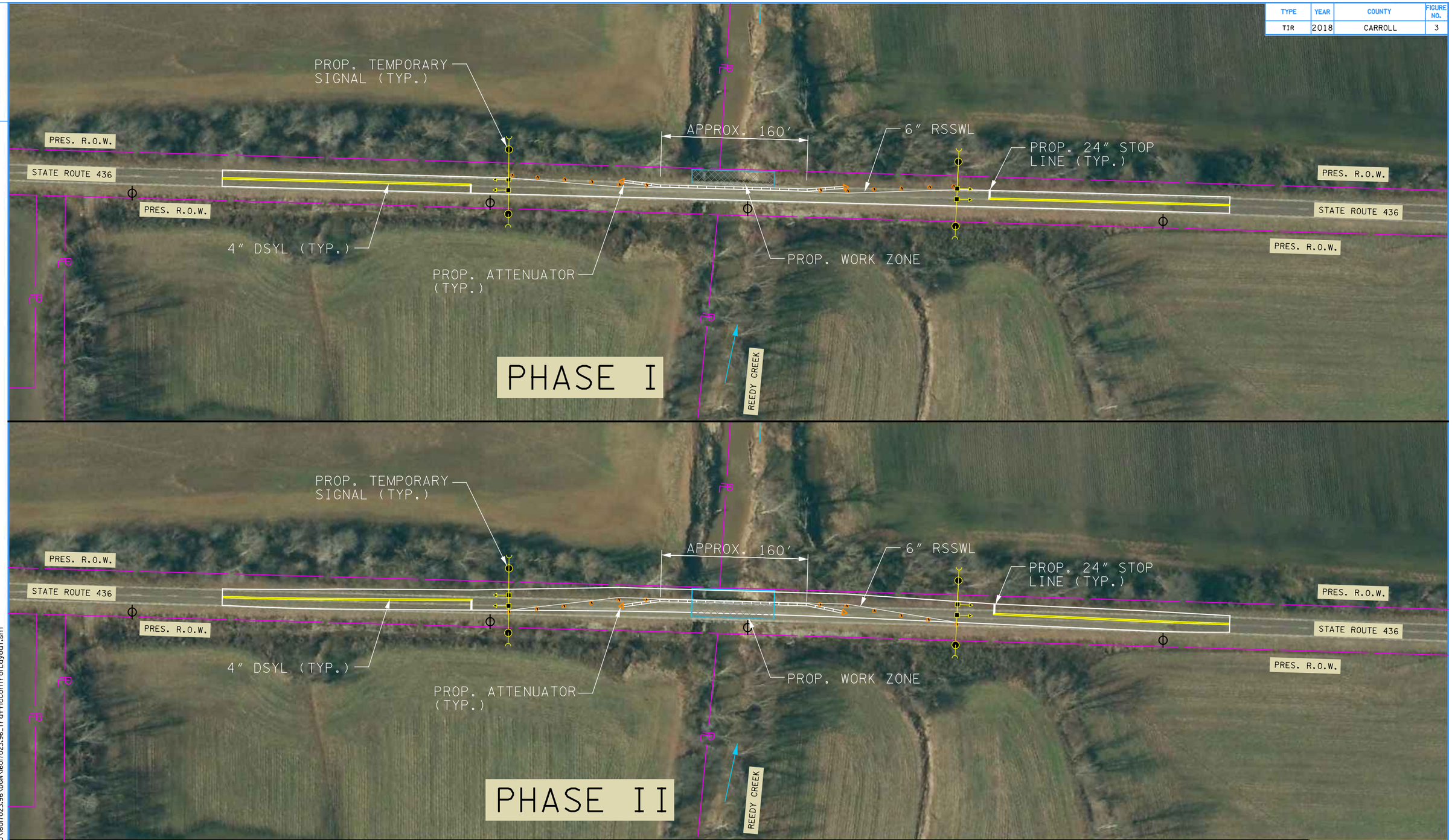
Y:\Nashville\160170005\160170023.00\160170023.96\DGN\160170023.96_ETSA Layout.sht

TENNESSEE D.O.T.
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION
FILE NO.

TYPE	YEAR	COUNTY	FIGURE NO.
TIR	2018	CARROLL	3



0' 100' 200' 300'

N

BRIDGE TIR

STATE ROUTE 436
BRIDGE OVER REEDY CREEK @ L.M. 0.68
CARROLL COUNTY

SEE STANDARD DRAWING T-WZ-32 FOR ADDITIONAL DETAILS.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

FIGURE 3
S.R. 436
L.M. 0.68

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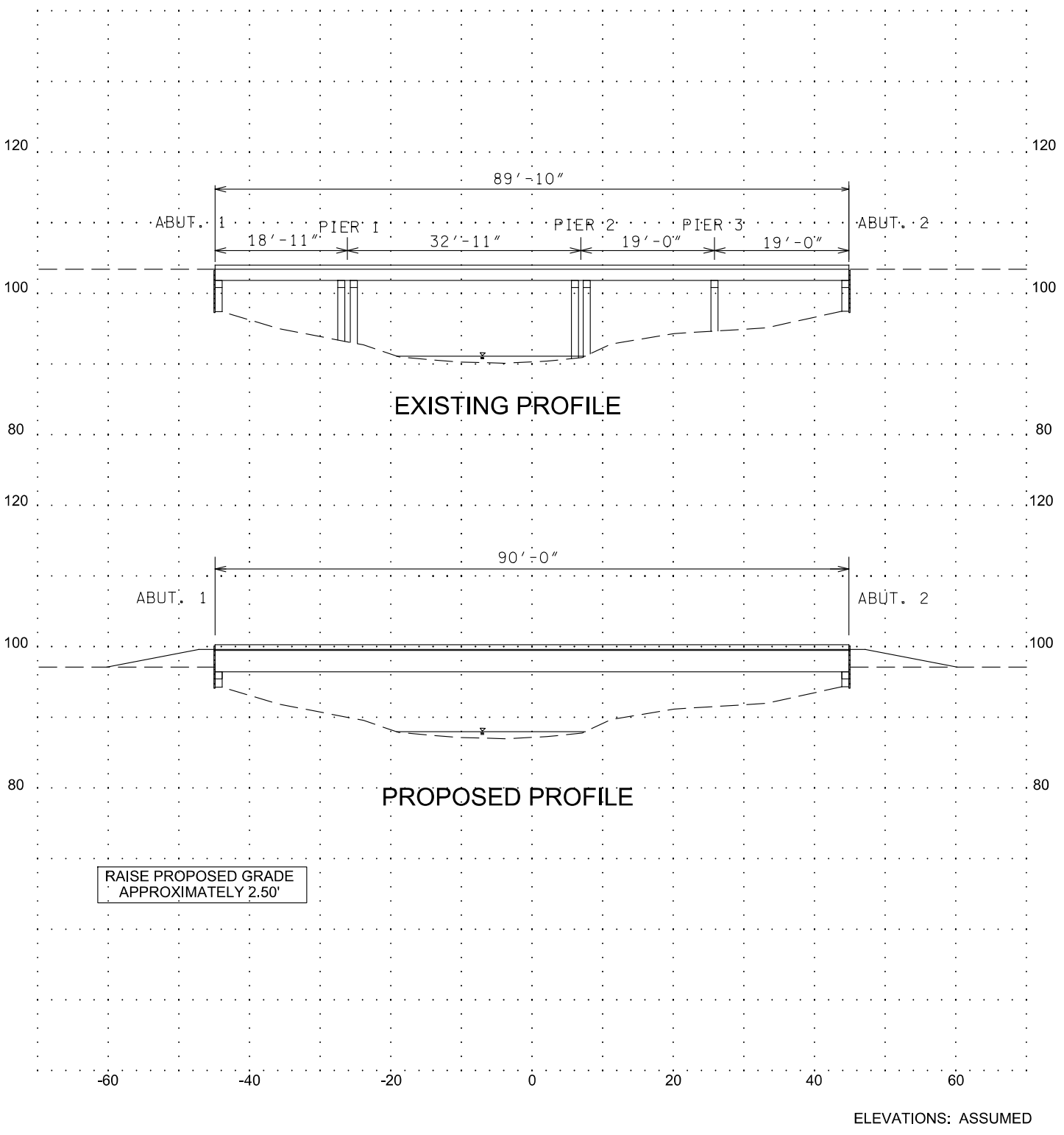


0' 10' 20' 30'

SCALE: 1" = 20'

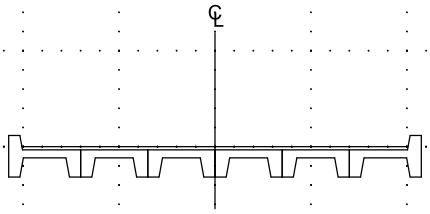
PROPOSED PROFILE

STATE ROUTE 436 CARROLL COUNTY

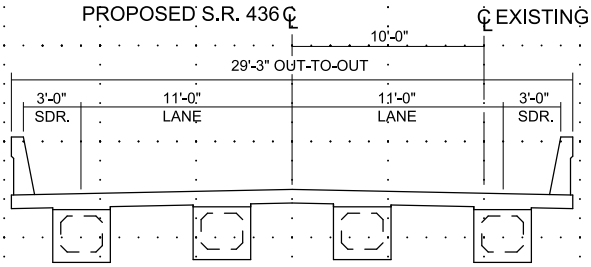
BRIDGE OVER REEDY CREEK L.M. 0.70

BRIDGE ID: 09S8233001

EXISTING STRUCTURE



PROPOPSED STRUCTURE



TRAFFIC WILL BE MAINTAINED WITH 10'-0" SHIFT AND 1-LANE SIGNAL.

PROPOSED GRADE TO BE RAISED APPROXIMATELY 2.50'

110 100 90

-30 -20 -10 0 10 20 30

ELEVATIONS: ASSUMED

0' 5' 10' 15'

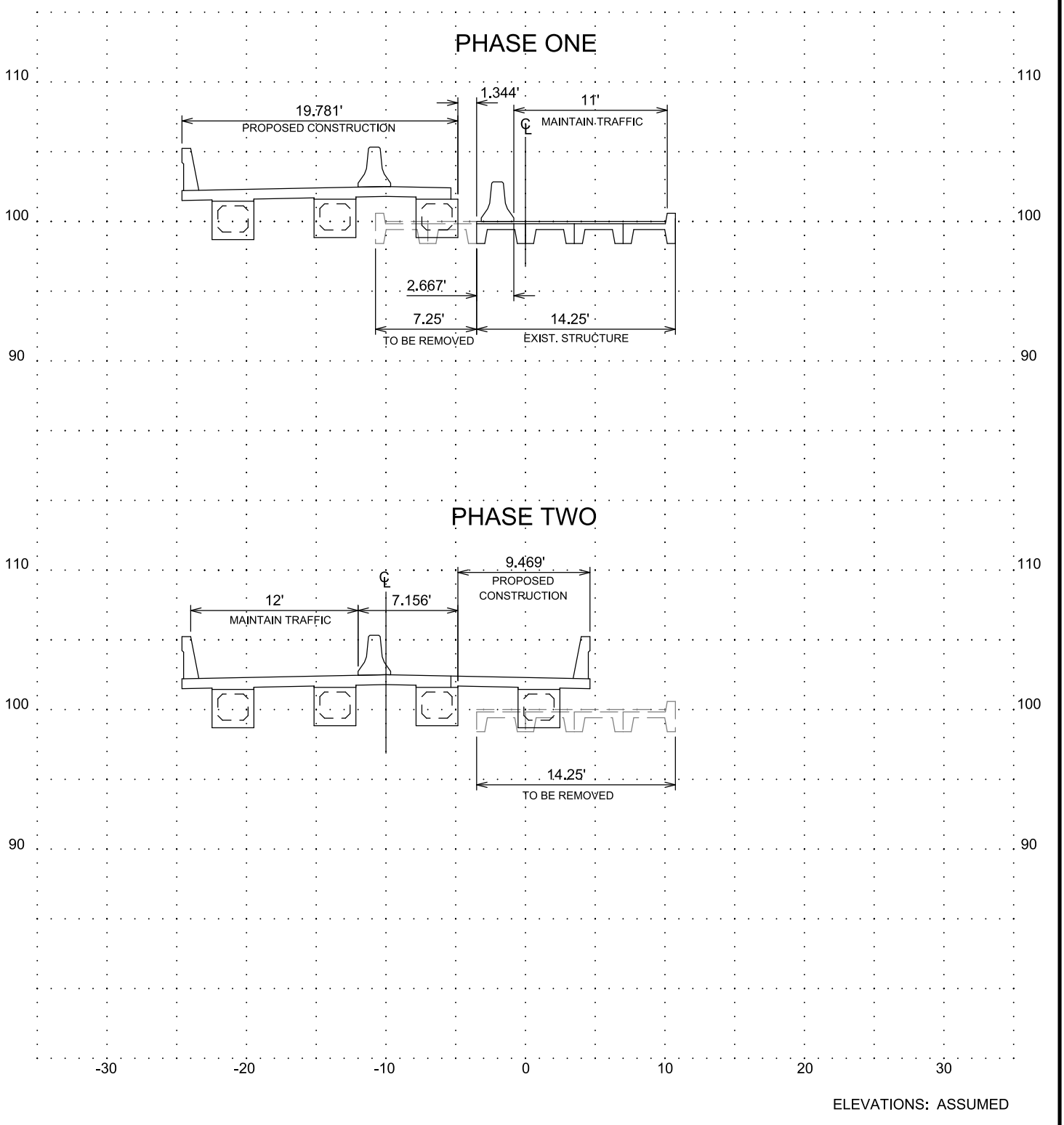
SCALE: 1" = 10'

PROPOSED TYPICAL SECTION

STATE ROUTE 436 CARROLL COUNTY

BRIDGE OVER REEDY CREEK L.M. 0.70

BRIDGE ID: 09S8233001



0' 5' 10' 15'

SCALE: 1" = 10'

STAGE CONSTRUCTION DETAIL

STATE ROUTE 436 CARROLL COUNTY

BRIDGE OVER REEDY CREEK L.M. 0.70

BRIDGE ID: 09S8233001

COST ESTIMATE SUMMARY

Route:	State Route 436
Description:	Bridge over Reedy Creek
	L.M. 0.68
County:	Carroll
Length:	0.21 Miles
Date:	March 9, 2018

DESCRIPTION	LOCAL 0%	STATE 0%	FEDERAL 0%	TOTAL
Construction Items				
Pavement Removal	$0	$0	$0	$0
Asphalt Paving	$0	$0	$0	$223,100
Concrete Pavement	$0	$0	$0	$0
Drainage	$0	$0	$0	$29,400
Appurtenances	$0	$0	$0	$0
Structures	$0	$0	$0	$368,000
Fencing	$0	$0	$0	$0
Signalization	$0	$0	$0	$20,000
Railroad Crossing or Separation	$0	$0	$0	$0
Earthwork	$0	$0	$0	$428,200
Clearing and Grubbing	$0	$0	$0	$0
Seeding & Sodding	$0	$0	$0	$11,500
Rip-Rap or Slope Protection	$0	$0	$0	$27,400
Guardrail	$0	$0	$0	$53,500
Signing	$0	$0	$0	$1,200
Pavement Markings	$0	$0	$0	$4,600
Maintenance of Traffic	$0	$0	$0	$71,000
Mobilization (5%)	$0	$0	$0	$61,900
Other Items = 10%	$0	$0	$0	$130,000
Const. Contingency = 15%	$0	$0	$0	$159,300
Construction Estimate	$0	$0	$0	$1,589,100
Interchanges & Unique Intersections				
Roundabouts	$0	$0	$0	$0
Interchanges	$0	$0	$0	$0
Right-of-Way & Utilties	**LOCAL 0%**	**STATE 0%**	**FEDERAL 0%**	**TOTAL**
Right-of-Way	$0	$0	$0	$12,500
Utilities	$0	$0	$0	$78,800
Preliminary & Construction Engineering and Inspection				
Prelim. Eng. 10%	$0	$0	$0	$168,000
Const. Eng. & Inspec. 10%	$0	$0	$0	$168,000
Total Project Cost	$0	$0	$0	$ 2,016,000

PAY ITEM SUMMARY

TDOT PAY ITEM	TDOT DESCRIPTION	UNIT	TOOL QUANTITIES	ADDITIONAL QUANTITIES	TOOL QUANTITIES + ADDITIONAL QUANTITIES	Statewide UNIT COST	TOTAL COST
Pavment Removal							
						PAVEMENT REMOVAL TOTAL (ROUNDED)	$ -
Asphalt Roads							
303-01	Mineral Aggregate, Type A Base, Grading D	TON	3158		3158	$ 31.77	$ 100,323.92
307-02.01	Asphalt Concrete Mix (PG70-22) (BPMB-HM) Grading A	TON	383		383	$ 100.78	$ 38,593.78
307-02.02	Asphalt Cement (PG70-22)(BPMB-HM) Grading A-S	TON	9		9	$ 727.09	$ 6,537.07
307-02.03	Aggregate (BPMB-HM) Grading A-S Mix	TON	291		291	$ 73.98	$ 21,507.05
307-02.08	Asphalt Concrete Mix (PG70-22) (BPMB-HM) Grading B-M2	TON	251		251	$ 113.28	$ 28,416.12
402-01	Bituminous Material For Prime Coat (PC)	TON	4		4	$ 711.17	$ 2,783.48
402-02	Aggregate For Cover Material (PC)	TON	14		14	$ 65.60	$ 926.74
403-01	Bituminous Material For Tack Coat (TC)	TON	2		2	$ 780.21	$ 1,574.56
411-01.07	ACS (PG64-22) GR "E"	TON	49		49	$ 112.41	$ 5,487.19
411-02.10	ACS Mix(PG70-22) Grading D	TON	147		147	$ 115.13	$ 16,932.29
						PAVING TOTAL (ROUNDED)	**$ 223,100**
Concrete Roads							
						CONCRETE RAMPS AND ROADWAYS TOTAL (ROUNDED)	$ -
Drainage							
607-05.02	24" Concrete Pipe Culvert (Class III)	LF	130		130	$ 85.20	$ 11,057.75
611-07.01	Class A Concrete (Pipe Endwalls)	CY	7		7	$ 1,047.48	$ 6,948.15
611-07.02	Steel Bar Reinforcement (Pipe Endwalls)	LB	630		630	$ 2.30	$ 1,450.90
710.02	Aggregate Underdrains (with pipe)	LF	1816		1816	$ 5.46	$ 9,917.11
						DRAINAGE TOTAL (ROUNDED)	**$ 29,400**
Appurtenances							
						ROADWAY AND PAVEMENT APPURTENANCES TOTAL (ROUNDED)	$ -
Earthwork & Mineral							
105-01	Constrction Stakes, Lines, and Grades	LS	1		1	$ 112,407.96	$ 112,407.96
203-01	Road & Drainage Excavation (Unclassified)	CY	9028		9028	$ 16.73	$ 151,024.12
203-02.02	Borrow Excavation (Graded Solid Rock)	CY		3000	3000	$ 32.25	$ 96,764.91
203-03	Borrow Excavation (Unclassified)	CY	7523	-3000	4523	$ 15.02	$ 67,941.35
						EARTHWORK & MINERAL TOTAL (ROUNDED)	**$ 428,200**
Structures							
N/A	Removal of Bridge	SF	1942		1942	$ 20.00	$ 38,844.00
N/A	New Bridge (Concrete Girder):	SF	2633		2633	$ 125.00	$ 329,062.50
						STRUCTURES TOTAL (ROUNDED)	**$ 368,000**
Interchanges and Unique Intersections							
						INTERCHANGES AND UNIQUE INTERSECTIONS TOTAL (ROUNDED)	$ -
Lighting & Signalization							
730-40	Temporary Traffic Signal System	EA		1	1	$ 20,000.00	$ 20,000.00
						LIGHTING & SIGNALIZATION TOTAL (ROUNDED)	**$ 20,000**
Guardrail							
705-01.01	Guardrail at Bridge Ends	LF	100		100	$ 73.64	$ 7,364.49
705-02.02	Single Guardrail (Type 2)	LF	598		598.224	$ 18.77	$ 11,225.71
705-04.07	Tan Energy Absg Term (NCHRP, 350, TL3)	EA	5	-1	4	$ 2,352.59	$ 9,410.38
705-04.09	Earth Pad for Type 38 GR End Treatment	EA	5	-1	4	$ 1,294.80	$ 5,179.21
705-08.51	Portable Impact Attenuator NCHRP 350, TL3	EA		4	4	$ 5,076.58	$ 20,306.31
						GUARDRAIL TOTAL (ROUNDED)	**$ 53,500**
Seeding and Sodding							
801-01	Seeding (With Mulch)	UNIT	95		95	$ 76.61	$ 7,290.76
801-01.07	Temporary Seeding (With Mulch)	UNIT	71		71	$ 29.79	$ 2,126.59
801-02	Seeding (Without Mulch)	UNIT	71		71	$ 28.15	$ 2,009.20
						SODDING TOTAL (ROUNDED)	**$ 11,500**
Maintenace of Traffic							
N/A	Traffic Control	LS	1		1		$ 46,676.00
712-02.02	Interconnected Portable Barrier Rail	LF	54	450	504	$ 31.95	$ 16,112.73
712-04.01	Flexible Drums (Channelizing)	EA		24	24	$ 25.83	$ 619.99
712-06	Signs (Construction)	SF		250	250	$ 7.55	$ 1,887.83
712-09.01	Removable Pavement Marking Line	LF		2500	2500	$ 2.09	$ 5,233.48
712-09.04	Removable Pavement Marking (Stop Line)	LF		24	24	$ 18.67	$ 448.17
						MAINTENANCE OF TRAFFIC TOTAL (ROUNDED)	**$ 71,000**
Signs							
Not Listed	Signs (Construction)	LS	1		1	$ -	$ 1,200
						SIGNING TOTAL (ROUNDED)	**$ 1,200**
Pavement Markings							
716-13.06	Spray Thermo P.M. (40 mil 4")	LM	1.6		1.6	$ 2,881.01	$ 4,510.50
						PAVEMENT MARKINGS TOTAL (ROUNDED)	**$ 4,600**
Fencing							
						FENCE TOTAL (ROUNDED)	$ -
Rip-Rap							
709-05.05	Machined Rip-Rap (Class A-3)	TON		500	500	$ 34.74	$ 17,369.37
709-05.08	Machined Rip-Rap (Class B)	TON		200	200	$ 33.70	$ 6,739.51
709-05.09	Machined Rip-Rap (Class C)	TON		100	100	$ 32.78	$ 3,277.72
						RIP-RAP & SLOPE PROTECTION TOTAL (ROUNDED)	**$ 27,400.00**
Clearing and Grubing							
						CLEAR AND GRUBBING TOTAL (ROUNDED)	$ -
Railroad At-Grade Crossing							
						RAILROAD CROSSING OR SEPARATION TOTAL (ROUNDED)	$ -
Utilties							
N/A	Overhead Distribution	LM	0.21		0.21	$ 375,000	$ 78,750
						UTILITIES TOTAL (ROUNDED)	**$ 78,800.00**
Right-of-Way							
N/A	Right-of-Way	LS	1		1	$ 12,484.85	$ 12,484.85
						RIGHT-OF-WAY TOTAL (ROUNDED)	**$ 12,500.00**

BRIDGE TIR

Carroll County
State Route 436

LOCATION			
Bridge #:	09S82330001	Feature Crossed:	Reedy Creek
Road Name:	State Route 436	Log mile:	0.68
Route ID:	SR436	System:	05-STP Rural, State
City:		Functional Class:	Rural Major Collector
County:	Carroll	State Project Number	09035-0220-94
PIN:	124139.00		

ROADWAY		
	Existing	**Proposed (Preliminary Design Estimate)**
Design Standard		RD01-TS-2 / 2011 Green Book
Route Characteristics		
AADT:	380	450
AADT Year:	2022	2042
Terrain:	Rolling	Rolling
No. Lanes:	2	2
Speed(Posted):	45	45
Speed (Design):		50
Approach Character.		
Lane Width (ft):	9	11
Shoulder Width (ft):	2	3
ROW Width (ft):	50	As Required
ROW Tracts Affected		4
ROW Required (acre)		1.13
Cross Section Width (ft):	18 / 22 / 50	22 / 28 / As Req'd
Approach Length (ft):		500
Alignment:	Tangent	Tangent
Grade:		Raise Grade approximately 2.5'
Surface Material:	Asphalt/Concrete	Asphalt
Sidewalks (R/L):	No	No
App. Lower Than Structure	No	Yes
Utilities (list)	**OH:** Power, Telephone	
Utilities to be Relocated		3 Power Poles
Comments	TDOT Environmental indicated that there is atleast one other stream running along SR-436.	Potential stream relocation of roadside stream.

BRIDGE TIR

Carroll County
State Route 436

STRUCTURE		
	Existing	**Proposed (Preliminary Design Estimate)**
Bridge Characteristics		
Year Built	1939	
Load Limit	40 tons	
Sufficiency Rating	47.1	
Skew	90	90
Structure Type	Box Beam	Concrete Box Beam
Structures in Channel	No	No
Length (ft)	90	90
No. Spans (App./Main)	3 | 1	0 | 1
Width (curb to curb) (ft)	20	28
Width (o to o) (ft)	22	29.25
Sidewalks on Structure	No	No
Vert. Clearance (ft)	11.8	11.8
Superstructure Depth (in)	19	45
Girder Depth (in)	12	33
Finish Grade-Low Girder (in)	7	12
High Water Marks	5'-6' Above Pool	
Bridge Rail Type	Concrete	Concrete Parapet (STD-1-1SS)
Bridge Rail Height (ft)	GR-28"	3
Indication Overtopping	No	
Local Scour	Around Piers Repaired	
Obstructions	Around Piers Repaired	
Other Structures	N/A	N/A
Comments	Rehab work was completed in October 2017 on some of the timber piles of the existing structure.	Raise grade approximately 2.5'

BRIDGE TIR

Carroll County
State Route 436

FLOW RATES (from USGS StreamStats Program Version 3)	
Drainage Area (sq. miles)	26.1 sq. miles
10 Year Discharge Rate (Q10) cfs	4480 cfs
50 Year Discharge Rate (Q50) cfs	6300 cfs
100 Year Discharge Rate (Q100) cfs	7050 cfs

CHANNEL	
Depth (ft)	6
Width of Normal Flow (ft)	27
Depth of Normal Flow (ft)	1
Skew of Channel with Roadway	90
Type of Material in Stream Bed	Silt, Large Rocks
Type of Vegetation on Banks	Brush, Small Trees
Are Channel Banks Stable	Yes
Signs of Stream Aggradation	Yes, Silt/Sand Deposits
Signs of Stream Degradation	No
Drift or Drift Potential	No
Comments	

FLOODPLAIN	
Skew Same as Channel	Yes
Symmetrical About Channel	Yes
Approx. Floor Elevations	N/A
Type of Vegetation in Floodplain	Farmland, Cult. Field
Any Buildings in Floodplain	No
Flood Information From Locals	N/A
Comments	Large Ditches/Channels in all four quadrants.

MAINTENANCE OF TRAFFIC	
Method of Maintaining Traffic	stage construct
Description	Stage Construct with One Lane Signal & Shift alignment approximately 8' to the west
Comments	

TENNESSEE DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

PROJECT NO.: 09035-0220-94 ROUTE: S.R. 436
COUNTY: CARROLL CITY:
PROJECT PIN NUMBER: 124139.00
PROJECT DESCRIPTION: BRIDGE OVER REEDY CREEK (L.M. 0.68)

DIVISION REQUESTING:

MAINTENANCE	☐	PAVEMENT DESIGN	☐
S.T.I.D.	☒	STRUCTURES	☐
PROG. DEVELOPMENT & ADM.	☐	SURVEY & ROADWAY 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
380	2022	450	68	15	2042	65-35	3	5	13	18

REQUESTED BY: NAME MICHAEL GILBERT DATE 2/28/18
DIVISION S.T.I.D.
ADDRESS 505 DEADERICK STREET
NASHVILLE, TN. 37243

REVIEWED BY: TONY ARMSTRONG DATE 2.28.18
TRANSPORTATION MANAGER 1
SUITE 1000, JAMES K. POLK BUILDING

APPROVED BY: JIM WATERS DATE 3/1/18
ASSISTANT DIRECTOR
SUITE 1000, JAMES K. POLK BUILDING

COMMENTS:

THIS TRAFFIC IS BASED ON 2017 CYCLE COUNTS. THE DESIGN YEAR TRAFFIC IS BASED ON 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. 2/22/17)

TENNESSEE DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

PROJECT NO.: 09035-0220-94 ROUTE NO.: S.R. 436
COUNTY: CARROLL CITY:
PROJECT DESCRIPTION: BRIDGE OVER REEDY CREEK @ (L.M. 0.68)

FAP Rural

Pavement Structural Design

Calculation of Equivalent Daily 18 Kip Single Axle Loads

Type Vehicle		ADT (No. Counted)	Flexible 18-kip Factor	Flexible ADL	Rigid 18-kip Factor	Rigid ADL
Pass. cars and motorcycles (1-2)		277	0.001	0	0.001	0
Pick-up, Panel, Van (3)		117	0.005	1	0.004	0
Sing. Unit	Buses (4)	0	0.300	0	0.300	0
	2-axle, 6-tire (5)	5	0.240	1	0.310	2
	3-axle or more (6-7)	8	1.700	14	2.300	18
Comb.	4-axle (8)	4	1.110	4	1.500	6
	5-axle or more (9-13)	4	1.320	5	2.200	9
Totals (2032 AADT)		415		25		35

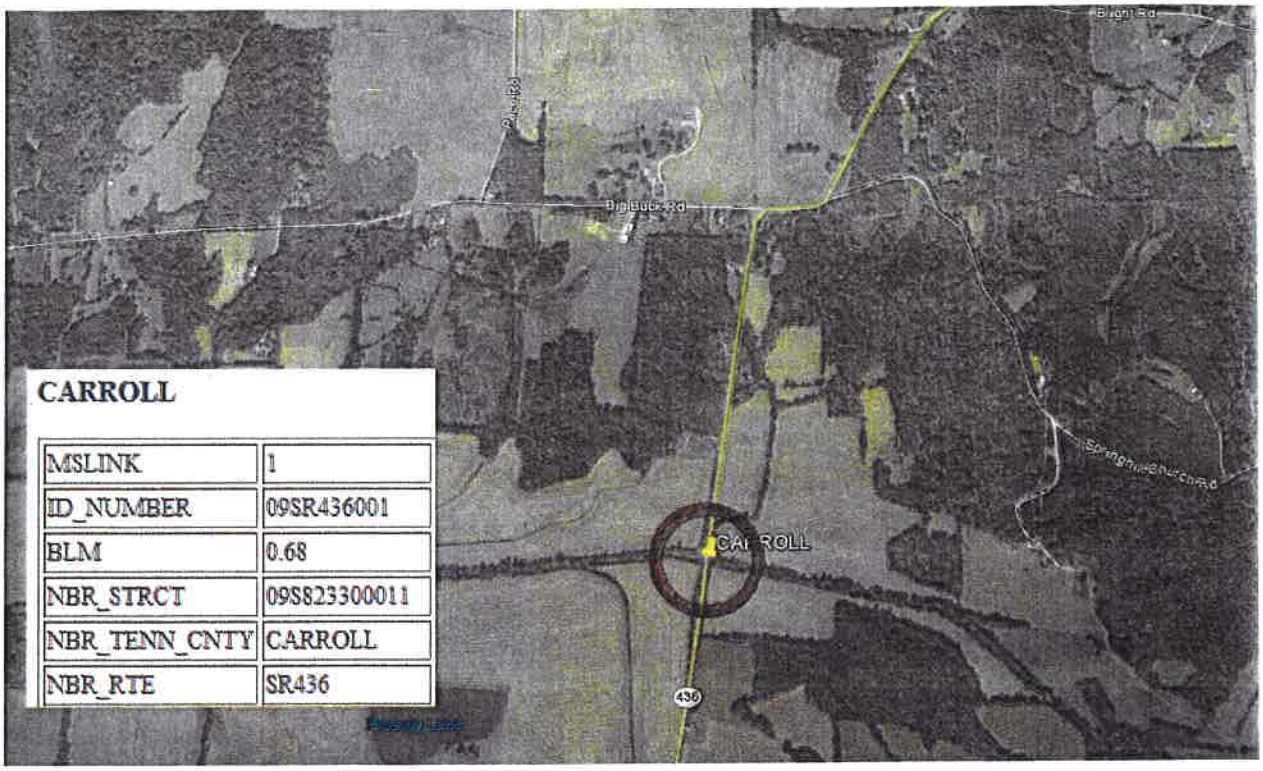
Suggested Percentages of Trucks in Design Lane

5,000 or less ADT	95%
5,000 - 10,000 ADT	90%
10,000 - 15,000 ADT	85%
15,000 - 20,000 ADT	80%
20,000 - 30,000 ADT	75%
30,000 - 40,000 ADT	70%
40,000 Plus	60%

No. of Lanes: 2
% Trucks in Design Lane: 100%
ADL in Design Lane:

FLEX:	0.5	X	1.00	X	25.4	=	13
RIGID:	0.5	X	1.00	X	35.5	=	18

ADL Calculations By: RANDY BOGUSKIE Date: 2/28/2018
Reviewed By: Tony Kuntz Date: 2.28.18
[REV. 7/1/14]

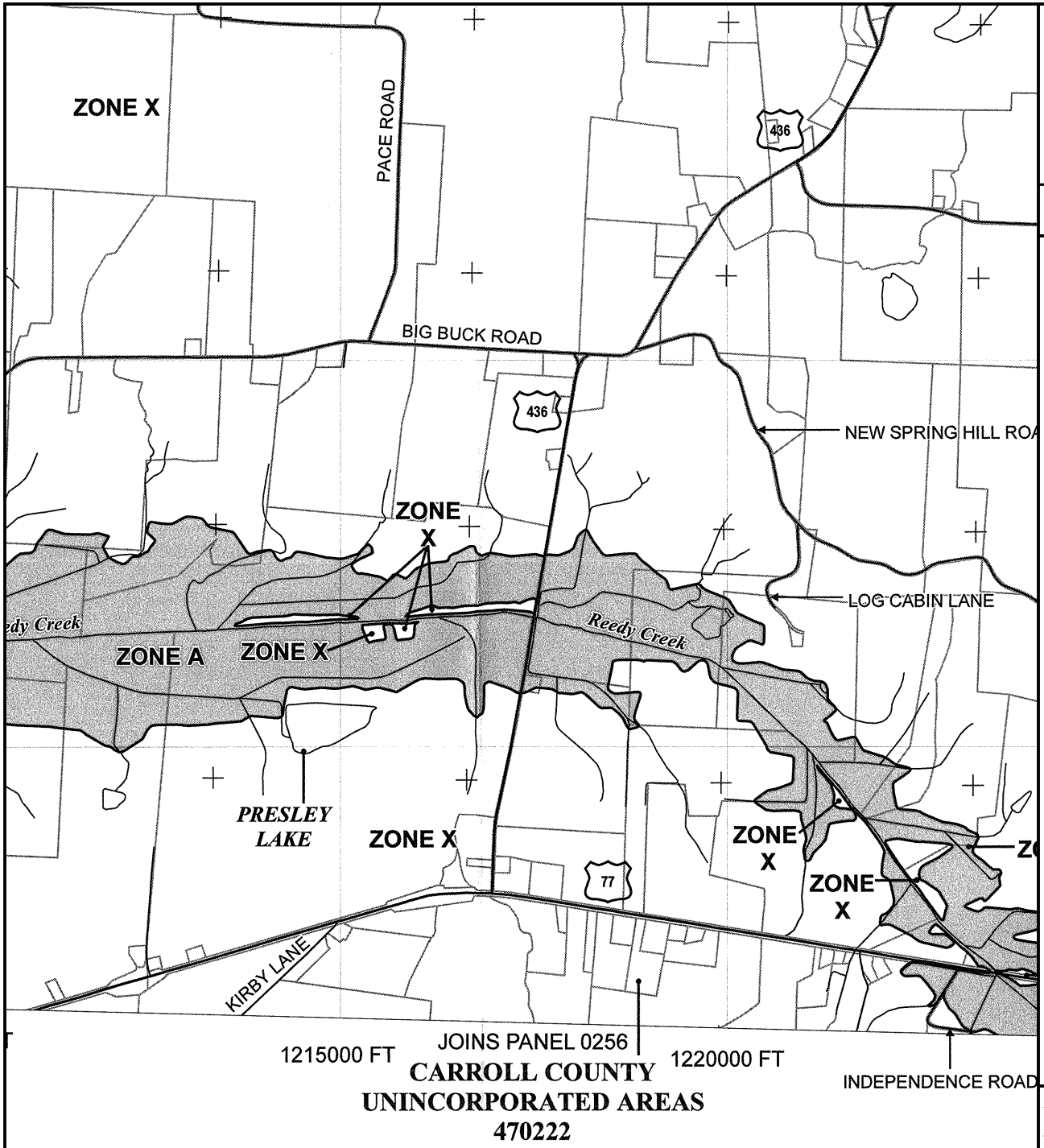


CARROLL

MSLINK	1
ID_NUMBER	09SR436001
BLM	0.68
NBR_STRCT	09S823300011
NBR_TENN_CNTY	CARROLL
NBR_RTE	SR436

CARROLL COUNTY

S.R. 436 @ L.M. 0.68



MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0150C

FIRM

FLOOD INSURANCE RATE MAP

CARROLL COUNTY TENNESSEE AND INCORPORATED AREAS

PANEL 150 OF 475

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CARROLL COUNTY	470222	0150	C
MCKENZIE, CITY OF	470023	0150	C
MCLEMORESVILLE, TOWN OF	470427	0150	C
TREZEVANT, TOWN OF	470243	0150	C

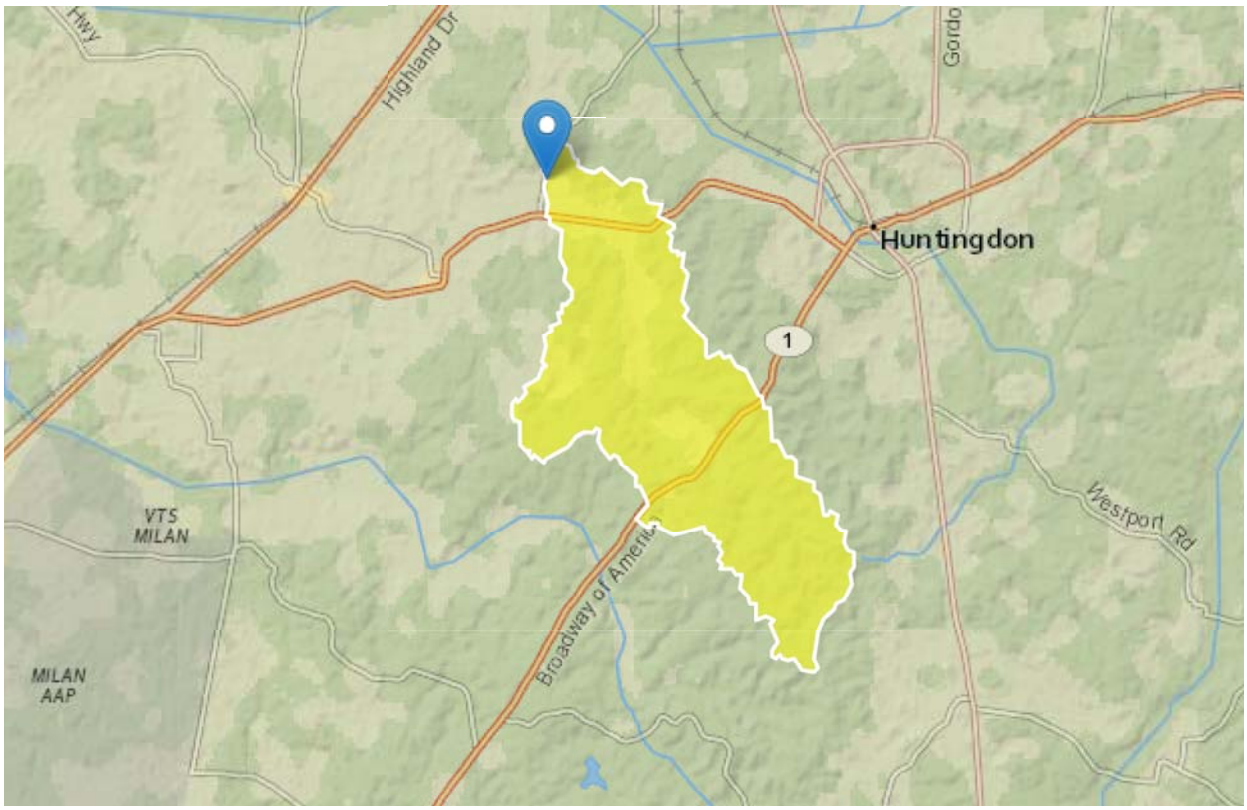
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
47017C0150C
EFFECTIVE DATE
MARCH 18, 2008

Federal Emergency Management Agency

SR 436 Over Reedy

Region ID: TN
Workspace ID: TN20180102201441459000
Clicked Point (Latitude, Longitude): 36.01436, -88.53959
Time: 2018-01-02 14:14:55 -0600



Bridge 09S82330001

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
CONTDA	Area that contributes flow to a point on a stream	26.1	square miles
DRNAREA	Area that drains to a point on a stream	26.14	square miles
RECESS	Number of days required for streamflow to recede one order of magnitude when hydrograph is plotted on logarithmic scale	350	days per log cycle
PERMGTE2IN	Percent of area underlain by soils with permeability greater than or equal to 2 inches per hour	81.736	percent
CLIMFAC2YR	Two-year climate factor from Lichy and Karlinger (1990)	2.362	dimensionless
SOILPERM	Average Soil Permeability	2.06	inches per hour

Peak-Flow Statistics Parameters [DAOnly Area 4]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
CONTDA	Contributing Drainage Area	26.1	square miles	0.76	2308

Peak-Flow Statistics Flow Report [DAOnly Area 4]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PII	PIu	SE	SEp	Equiv. Yrs.
2 Year Peak Flood	2430	ft^3/s	1310	4520	38.7	38.7	1.8
5 Year Peak Flood	3660	ft^3/s	2010	6660	37.2	37.2	2.4
10 Year Peak Flood	4480	ft^3/s	2440	8230	38	38	3.1
25 Year Peak Flood	5530	ft^3/s	2910	10500	40.1	40.1	3.8
50 Year Peak Flood	6300	ft^3/s	3220	12300	42.2	42.2	4.2
100 Year Peak Flood	7050	ft^3/s	3470	14300	44.7	44.7	4.4
500 Year Peak Flood	8860	ft^3/s	3980	19700	51.1	51.1	4.7

Peak-Flow Statistics Citations

Law, G.S., and Tasker G.D.,2003, Flood-Frequency Prediction Methods for Unregulated Streams of Tennessee, 2000: U.S. Geological Survey Water-Resources Investigations Report 03-4176, 79p. (http://pubs.usgs.gov/wri/wri034176/)

Low-Flow Statistics Parameters [Low Flow West Region 2009 5159]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	26.14	square miles	2	2405
RECESS	Recession Index	350	days per log cycle	32	350
PERMGTE2IN	Percent permeability gte 2 in per hr	81.736	percent	2	98

Low-Flow Statistics Flow Report [Low Flow West Region 2009 5159]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SEp
7 Day 10 Year Low Flow	6.01	ft^3/s	123
30 Day 5 Year Low Flow	7.08	ft^3/s	93.5

Low-Flow Statistics Citations

Law, G.S., Tasker, G.D., and Ladd, D.E.,2009, Streamflow-characteristic estimation methods for unregulated streams of Tennessee: U.S. Geological Survey Scientific Investigations Report 2009–5159, 212 p., 1 pl. (http://pubs.usgs.gov/sir/2009/5159/)

Annual Flow Statistics Parameters [Low Flow West Region 2009 5159]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	26.14	square miles	2	2405
RECESS	Recession Index	350	days per log cycle	32	350
CLIMFAC2YR	Tennessee Climate Factor 2 Year	2.362	dimensionless	2.307	2.455
PERMGTE2IN	Percent permeability gte 2 in per hr	81.736	percent	2	98

Annual Flow Statistics Flow Report [Low Flow West Region 2009 5159]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SEp
Mean Annual Flow	38.1	ft^3/s	13.1

Annual Flow Statistics Citations

Law, G.S., Tasker, G.D., and Ladd, D.E.,2009, Streamflow-characteristic estimation methods for unregulated streams of Tennessee: U.S. Geological Survey Scientific Investigations Report 2009–5159, 212 p., 1 pl. (http://pubs.usgs.gov/sir/2009/5159/)

Seasonal Flow Statistics Parameters [Low Flow West Region 2009 5159]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	26.14	square miles	2	2405
RECESS	Recession Index	350	days per log cycle	32	350
PERMGTE2IN	Percent permeability gte 2 in per hr	81.736	percent	2	98

Seasonal Flow Statistics Flow Report [Low Flow West Region 2009 5159]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SEp
Summer Mean Flow	18.9	ft^3/s	38.3

Seasonal Flow Statistics Citations

Law, G.S., Tasker, G.D., and Ladd, D.E.,2009, Streamflow-characteristic estimation methods for unregulated streams of Tennessee: U.S. Geological Survey Scientific Investigations Report 2009–5159, 212 p., 1 pl. (http://pubs.usgs.gov/sir/2009/5159/)

Flow-Duration Statistics Parameters [Low Flow West Region 2009 5159]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	26.14	square miles	2	2405
RECESS	Recession Index	350	days per log cycle	32	350
PERMGTE2IN	Percent permeability gte 2 in per hr	81.736	percent	2	98
CLIMFAC2YR	Tennessee Climate Factor 2 Year	2.362	dimensionless	2.307	2.455
SOILPERM	Average Soil Permeability	2.06	inches per hour	0.97	2.44

Flow-Duration Statistics Flow Report [Low Flow West Region 2009 5159]

PII: Prediction Interval-Lower, Plu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SEp
99.5 Percent Duration	5.55	ft^3/s	122
99 Percent Duration	5.91	ft^3/s	105
98 Percent Duration	6.29	ft^3/s	96.4
95 Percent Duration	7.31	ft^3/s	90.5
90 Percent Duration	8.25	ft^3/s	85.8
80 Percent Duration	10.1	ft^3/s	79.6
70 Percent Duration	12.1	ft^3/s	75
60 Percent Duration	12.1	ft^3/s	69.2
50 Percent Duration	16.8	ft^3/s	57
40 Percent Duration	19	ft^3/s	46.9
30 Percent Duration	27.8	ft^3/s	36.6
20 Percent Duration	41.7	ft^3/s	27.4
10 Percent Duration	84.6	ft^3/s	17.7

Flow-Duration Statistics Citations

Law, G.S., Tasker, G.D., and Ladd, D.E.,2009, Streamflow-characteristic estimation methods for unregulated streams of Tennessee: U.S. Geological Survey Scientific Investigations Report 2009–5159, 212 p., 1 pl. (http://pubs.usgs.gov/sir/2009/5159/)

BRIDGE TIR

Carroll County
State Route 436

SITE VISIT ATTENDEES			DATE: 3/17/2016
Name	Organization	Phone	Email
Brian Gaffney	Benesch	615-370-6079	bgaffney@benesch.com
Bob Baird	Benesch	615-370-6079	rbaird@benesch.com
Zane Pannell	TDOT STID	865-806-4319	zane.pannell@tn.gov
Konner Spradlin	TDOT STID	615-253-2432	konner.spradlin@tn.gov
Amy Rauch	TDOT STID	615-253-2432	amy.rauch@tn.gov
Gina Golightly	TDOT Reg 4 Design	731-935-0324	gina.golightly@tn.gov
Larry Brasher	TDOT Reg 4 Design	731-935-0144	larry.brasher@tn.gov
Dustin Tucker	TDOT Reg 4 Ecol	731-935-0101	dustin.tucker@tn.gov
Shawna Smith	TDOT Reg 4 Const	731-352-5327	shawna.b.smith@tn.gov
James Boyd	TDOT Reg 4 Survey	731-935-0138	james.boyd@tn.gov
Robert Hope	TDOT Reg 4 Survey	731-935-0241	robert.hope@tn.gov
Steven Collins	TDOT Reg 4 Util	731-935-0112	steven.a.collins@tn.gov

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	
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	**X**
11.	Urban area, town, city, or community	**X**
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	
15.	Railroad crossings	
16.	Hazardous materials site	

Transportation Investment Report for Bridge ID: 09S82330001
Carroll County
State Route 436, Reedy Creek

Photo 1: Bridge Number

Photo 2: Bridge Load Rating

Photo 3: Southbound Bridge Approach

Photo 4: Northbound Bridge Approach

Photo 5: View Looking North From Bridge

Photo 6: View Looking South From Bridge

Photo 7: View Looking Upstream

Photo 8: View Looking Downstream

Photo 9: Upstream Profile View Of Bridge

Photo 10: North Abutment Of Bridge