



**STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION**

SUITE 1000, JAMES K. POLK BUILDING
505 DEADERICK STREET
NASHVILLE, TN 37243-0349
(615) 741-2208

JOHN C. SCHROER
COMMISSIONER

BILL HASLAM
GOVERNOR

MEMORANDUM

TO: Paul Degges, Deputy Commissioner and Chief Engineer

FROM: Steve Allen, Director
Strategic Transportation Investments Division

DATE: ~~4~~ November 26, 2014

SUBJECT: **Road Safety Audit Review (RSAR)
SR 93
From ramp from SR 126 (LM 10.30) to ramp to Orebank Rd. (LM 10.55)
Sullivan County
PIN 120060.00**

This project was identified through the Tennessee Department of Transportation (TDOT) safety needs identification process. The section of State Route (SR) 93 from log mile (LM) 10.30 to LM 10.55 is a four (4) lane divided expressway, with twelve (12) foot travel lanes, thirty (30) foot grass median, and eight (8) foot paved shoulders. SR 93 was added to the Highway Safety Improvement Program (HSIP) list because SR 93 has a severe crash rate of 0.117, which exceeds the statewide average severe crash rate of 0.026 for an urban four lane divided freeway/expressway.

The total estimated cost of the improvements listed in the report is \$27,100. Right-of-way acquisition is not anticipated. A maintenance agreement is not required. A local match is not required. These improvements will be let to contract.

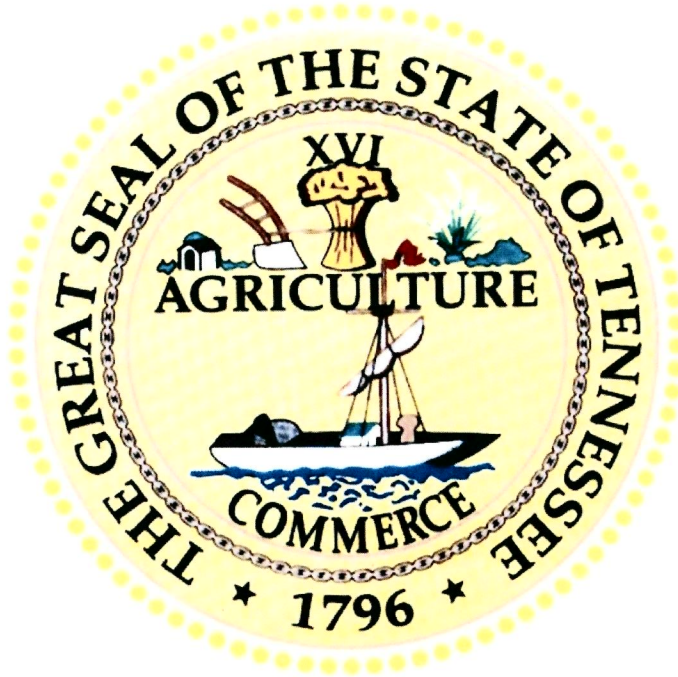
If you should need any further information, please contact me at (615) 741-2208 or e-mail me at Steve.Allen@tn.gov.

SLA/mg

Attachment

CC: Jeff Jones, Steve Borden, Jim Moore, Brad Freeze, Jerry Hatcher, Jim Waters, Brian Hurst, Mike Tugwell, Nathan Vatter, Daniel Oliver, Chris Craig (First TN RPO), Matt Givens, File

TENNESSEE
DEPARTMENT OF TRANSPORTATION



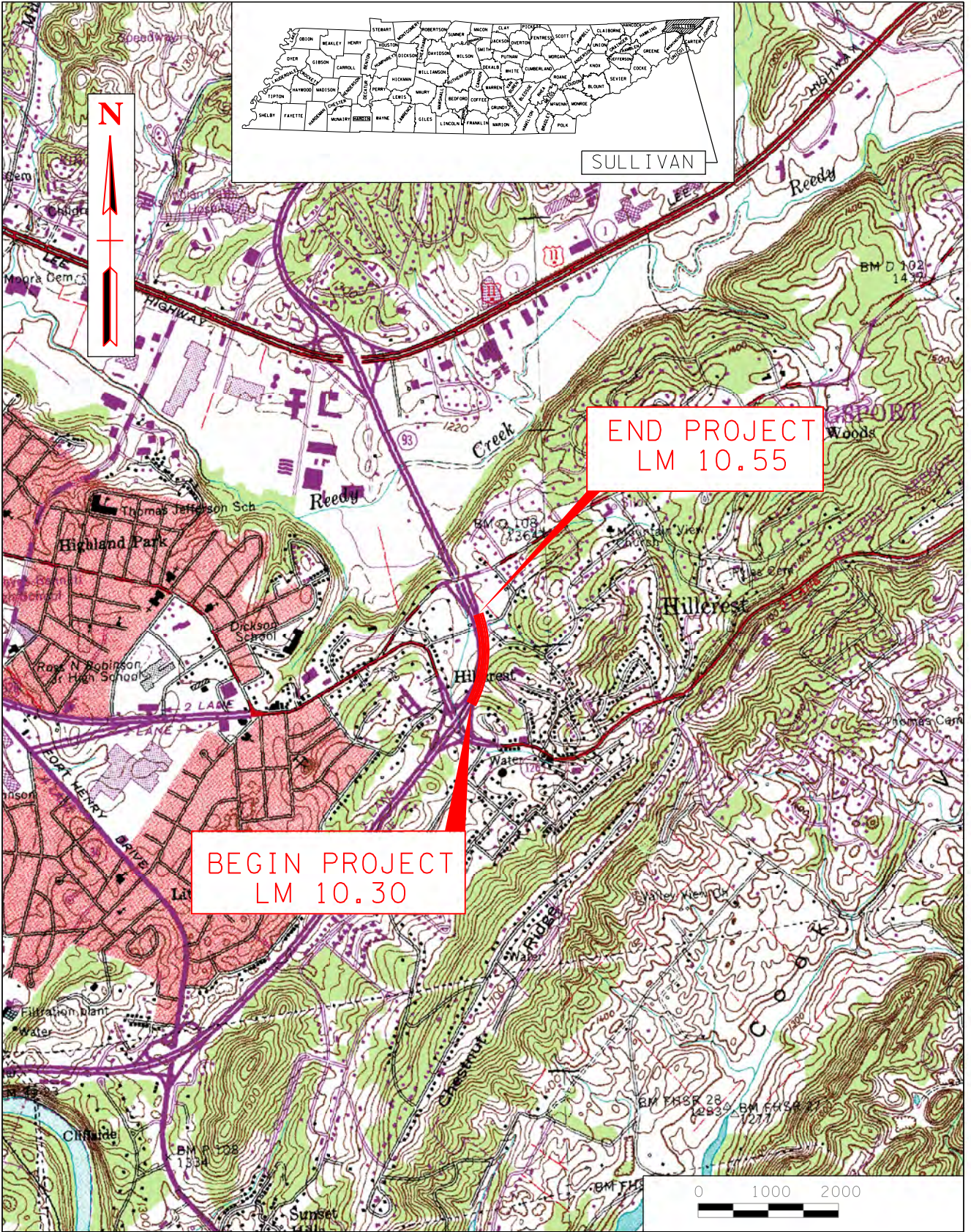
ROAD SAFETY AUDIT REPORT

SR 93 (Valley Home Road)
From Ramp from SR 126 to Ramp to Orebank Road
(Log Mile 10.30 to Log Mile 10.55)
Sullivan County
PIN 120060.00

PREPARED BY GRESHAM, SMITH AND PARTNERS
for the
Strategic Transportation Investments Division

Recommended by:	Signature	DATE
TRANSPORTATION DIRECTOR STRATEGIC TRANSPORTATION INVESTMENTS DIVISION		10-25-14

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



END PROJECT
LM 10.55

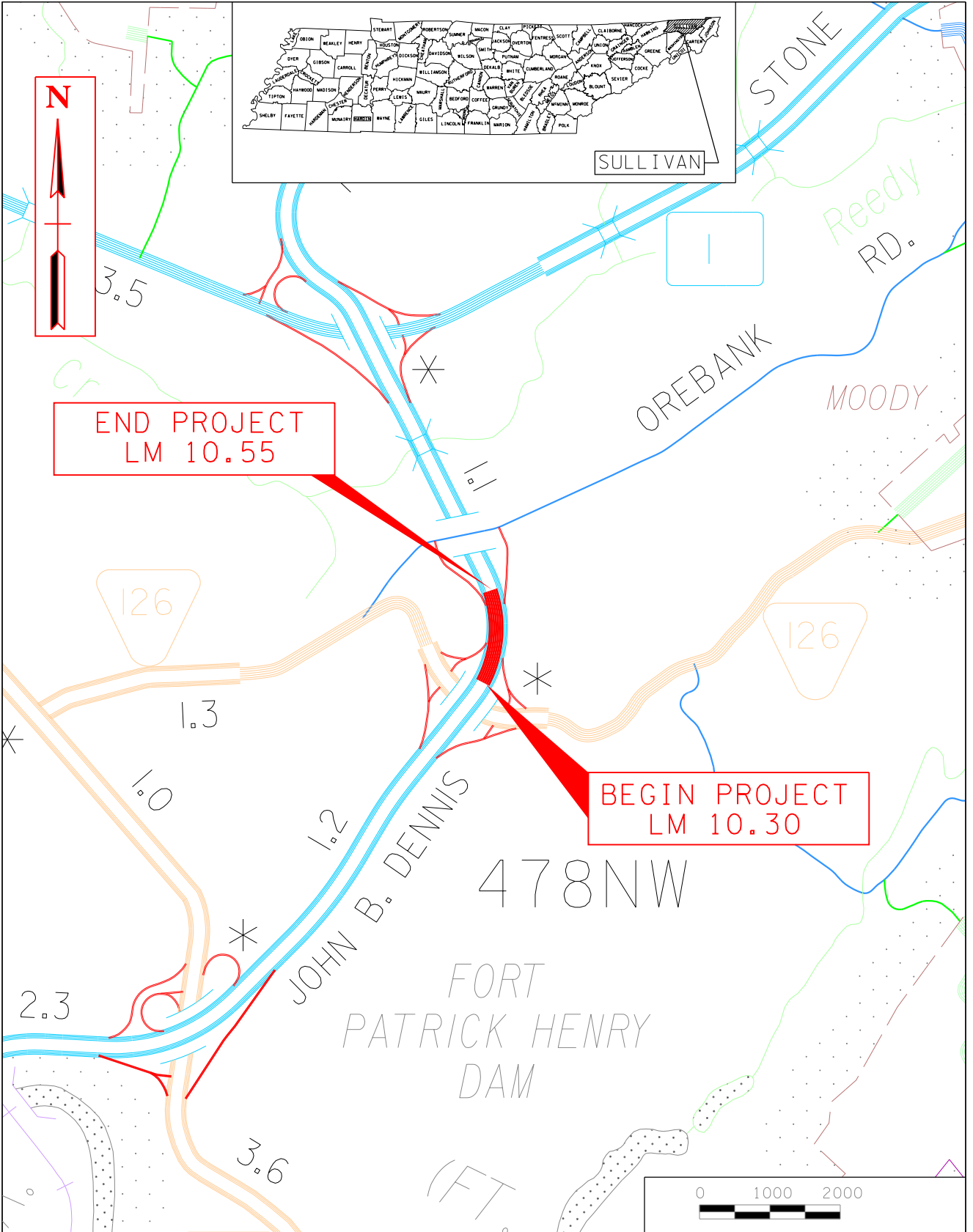
BEGIN PROJECT
LM 10.30



VICINITY MAP

SR 93
LM 10.30 TO LM 10.55
SULLIVAN COUNTY

DRAWN BY: CT	CHECKED BY: SS
SR 93 PIN 120060.00	
SCALE: 1" = 2000'	DATE: 09-26-14



**END PROJECT
LM 10.55**

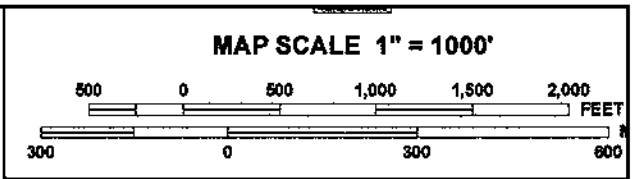
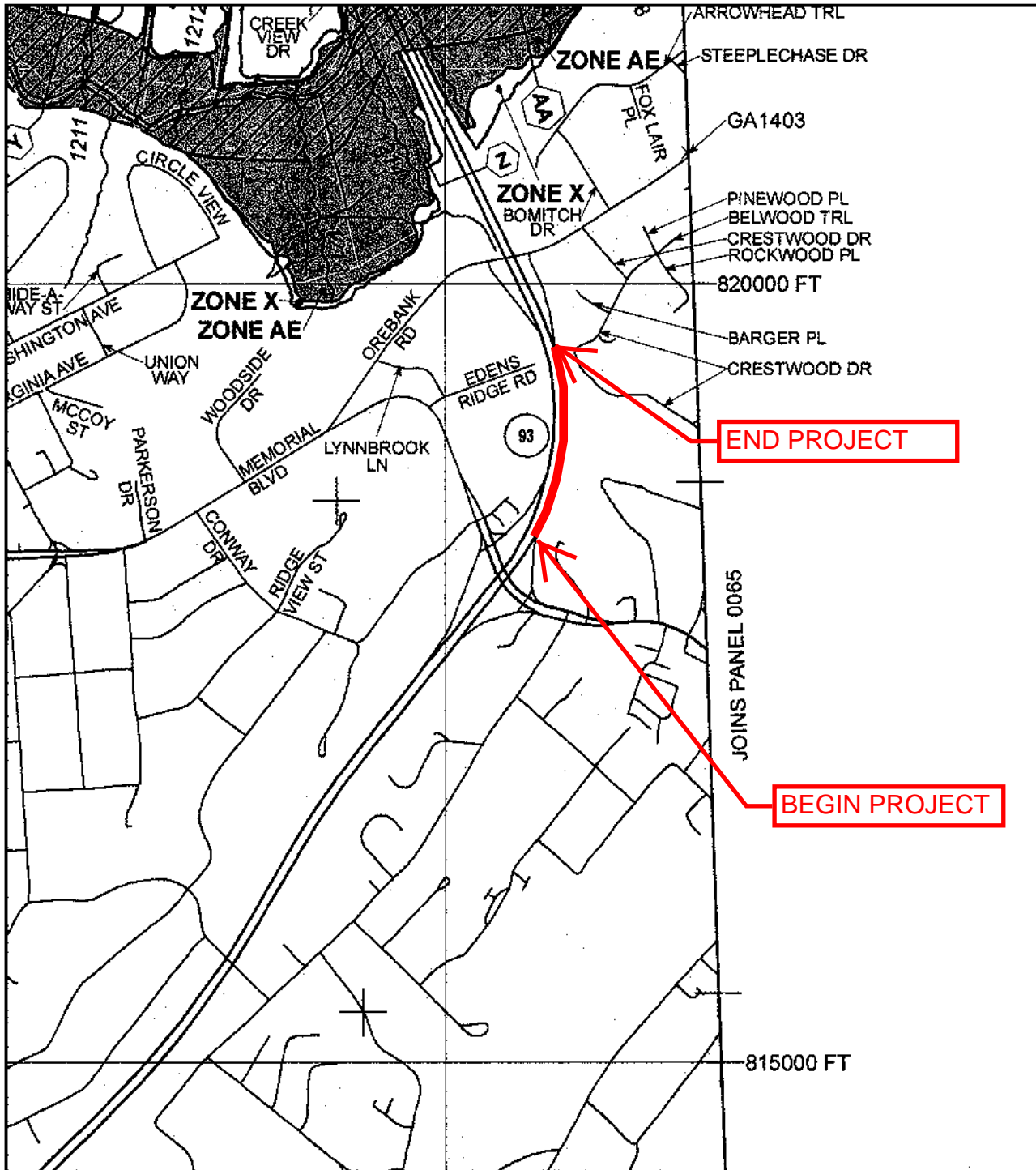
**BEGIN PROJECT
LM 10.30**



LOCATION MAP

SR 93
LM 10.30 TO LM 10.55
SULLIVAN COUNTY

0 1000 2000	
DRAWN BY: CT	CHECKED BY: SS
SR 93	
PIN 120060.00	
SCALE: 1" = 2000'	DATE: 09-26-14



PANEL 0045D

FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS

PANEL 45 OF 375
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
KINGSPORT, CITY OF	470184	0045	D
SULLIVAN COUNTY	470181	0045	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
47163C0045D
EFFECTIVE DATE
SEPTEMBER 29, 2006

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Sullivan County
SR 93
LM 10.30-LM 10.55
PIN: 120060.00

PROJECT DESCRIPTION AND BACKGROUND

This project was identified through the Tennessee Department of Transportation (TDOT) safety needs identification process. The section of State Route (SR) 93 from log mile (LM) 10.30 to LM 10.55 is a four (4) lane divided expressway, with twelve (12) foot travel lanes, thirty (30) foot grass median, and eight (8) foot paved shoulders. SR 93 was added to the Highway Safety Improvement Program (HSIP) list because SR 93 has a severe crash rate of 0.117, which exceeds the statewide average severe crash rate of 0.026 for an urban four lane divided freeway/expressway.

There were a total of ten (10) crashes that occurred along SR 93 between 2009 to 2011, with three (3) property damage crashes, six (6) non-incapacitating injury crashes, one (1) incapacitating injury crash involving one (1) incapacitating injury, and zero (0) fatal crashes.

ROAD SAFETY AUDIT (RSA) TEAM MEMBERS

NAME	ORG.	PHONE #	EMAIL
Jeremy Bowlan	TDOT - STID	615-532-7123	jeremy.bowlan@tn.gov
Matt Givens	TDOT - STID	615-532-4802	matthew.givens@tn.gov
Rick Kilby	TDOT – Reg. 1	423-282-0136	ricky.r.kilby@tn.gov
Stacy Weaver	TDOT – Reg. 1	865-594-2442	stacy.weaver@tn.gov
Nathan Vatter	TDOT – Reg. 1	865-594-2456	nathan.vatter@tn.gov
Jay Morgan	TDOT – Reg. 1	865-594-0714	jay.morgan@tn.gov
Tim Elsea	City of Kingsport	423-224-2426	elsea@kingsporttn.gov
Troy Ebbert	Kingsport MPO	423-224-2670	troyebbert@kingsporttn.gov
Bill Albright	Kingsport MPO	423-224-2677	billalbright@KingsportTN.gov
Chris Craig	First TN RPO	423-722-5091	ccraig@ftdd.org
Patrick Fiveash	GS&P	865-521-6777	patrick_fiveash@gspnet.com
Shap Stiles	GS&P	865-521-6777	shap_stiles@gspnet.com

INFORMATION USED IN REVIEW

- Crash Reports
- Field Review Comments and Photos
- TRIMS Crash Data (2009-2011)
- TRIMS Geometric Report
- Aerial Photographs
- Crash Summary
- County Highway Maps
- TRIMS Route Feature Report
- TRIMS Road Segment Report

PRE-BRIEF MEETING SUMMARY

A Pre-brief meeting was held at TDOT Headquarters at 1:00 P.M. on June 16, 2014. A summary of the topics and information discussed at the meeting is provided below:

- Discussed Crash history and types of crashes.
 - 60% of the crashes (6) were Rear-End
 - 20% of the crashes (2) were Land Departure
 - 90% of the crashes (9) occurred during day light
 - 90% of the crashes (9) occurred during Dry conditions
 - Crashes were clustered around the interchange ramps.
- AADT is 31,124 vehicles per day
- The interchange at Orebank Road is not a full access interchange and it was noted people will use the exit at SR 126 as a turnaround.
- On-ramp from SR 126 to SR 93 has an acceleration lane of 250 feet.
- Discussed construction of an auxiliary lane between the on-ramp at SR 126 to the off-ramp at Orebank Road.
- The section of SR 93 was investigated by TDOT and found to be a good candidate for cable barrier rail within the project corridor.

OBSERVATIONS

An onsite field review was held at 2:00 P.M. on June 19, 2014. The following discussions/observations were noted:

- Roadway pavement was in good condition.
- Pavement markings and snowplowable pavement markers were in good condition.
- A field review of the horizontal alignment along the corridor was performed. A traditional ball-bank indicator was used to analyze each curve. All curves within the limits of the project met the posted speed limit.
- The section of the project is along a horizontal curve and the project team agreed this section is a good candidate for installation of cable barrier along the median. Limits should cover the gap in the guardrail between the interchange at SR 126 (LM 10.30) and Orebank Road (LM 10.64).

The RSAR recommended safety improvements are depicted on the aerial layout sheets included with this report.

The total estimated cost of the improvements listed in the report is \$27,100.00. No right-of-way acquisition is anticipated. A maintenance agreement is not required. A local match is not required. These improvements will be let to contract.

Sullivan County
SR 93
LM 10.30-LM 10.55
PIN: 120060.00

SITE PHOTOS – 06/19/2014



(LM 10.30) SR 93 looking north at beginning of project.



(LM 10.41) SR 93 looking north along horizontal curve.

Sullivan County
SR 93
LM 10.30-LM 10.55
PIN: 120060.00



(LM 10.55) SR 93 looking north at off-ramp at end of project.



(LM 10.55) SR 93 looking south at on-ramp at end of project.

Sullivan County
SR 93
LM 10.30-LM 10.55
PIN: 120060.00



(LM 10.41) SR 93 looking south along horizontal curve.



(LM 10.30) SR 93 looking south at off-ramp at beginning of project.

RSA NO PLANS COST ESTIMATE

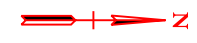
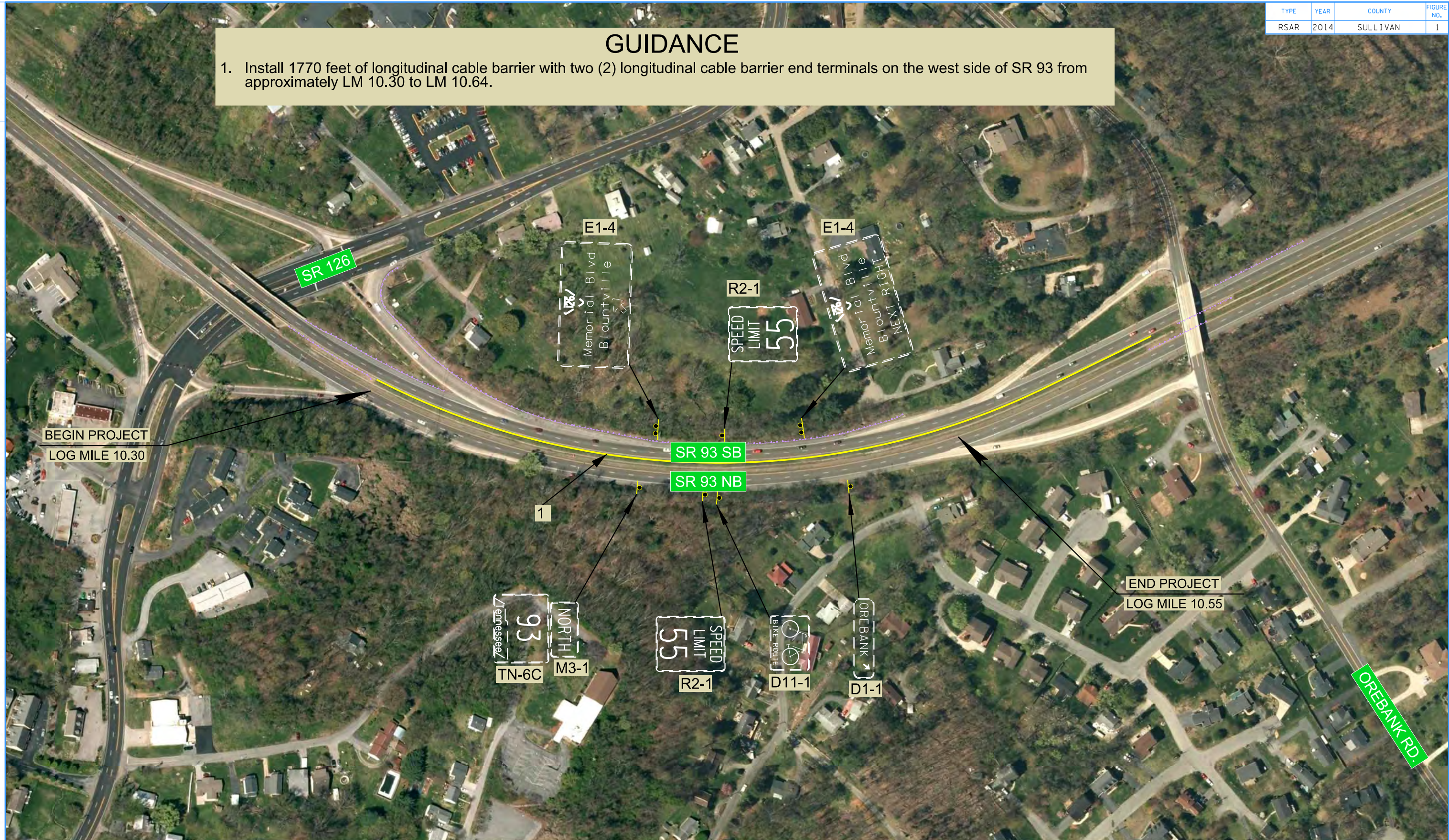
Route: State Route 93
 Description: Ramp from SR 126 Memorial Blvd. (LM 10.30)
 to Ramp to Orebank Road (4792)(LM 10.55)
 County: Sullivan
 Length: 0.25 Mile
 Date: September 26, 2014

<u>DESCRIPTION</u>	<u>LOCAL</u>	<u>STATE</u>	<u>FEDERAL</u>	<u>TOTAL</u>
Right-of-Way	\$ -	\$ -	\$ -	\$ -
Clearing and Grubbing	\$ -	\$ -	\$ -	\$ -
Earthwork	\$ -	\$ -	\$ -	\$ -
Railroad Crossing or Separation	\$ -	\$ -	\$ -	\$ -
Drainage	\$ -	\$ -	\$ -	\$ -
Utilities	\$ -	\$ -	\$ -	\$ -
Structures	\$ -	\$ -	\$ -	\$ -
Pavement Removal	\$ -	\$ -	\$ -	\$ -
Paving	\$ -	\$ -	\$ -	\$ -
Roadway and Pavement Appurtenances	\$ -	\$ -	\$ -	\$ -
Retaining Walls	\$ -	\$ -	\$ -	\$ -
Topsoil	\$ -	\$ -	\$ -	\$ -
Seeding	\$ -	\$ -	\$ -	\$ -
Sodding	\$ -	\$ -	\$ -	\$ -
Rip-Rap or Slope Protection	\$ -	\$ -	\$ -	\$ -
Fencing	\$ -	\$ -	\$ -	\$ -
Signing ¹			\$ -	\$ -
Pavement Markings ¹			\$ -	\$ -
Lighting ¹			\$ -	\$ -
Signalization ¹			\$ -	\$ -
Guardrail ¹			\$ 24,700	\$ 24,700
Pay Item Quantity Adjustment (15%) ²	\$ -		\$ -	\$ -
Maintenance of Traffic (5%)		\$ -	\$ 1,200	\$ 1,200
Mobilization (5%)		\$ -	\$ 1,200	\$ 1,200
CONSTRUCTION COST (rounded)		\$ -	\$ 27,100	\$ 27,100
Engineering and Contingency (10%)			\$ -	\$ -
TOTAL CONSTRUCTION COST (rounded)		\$ -	\$ 27,100	\$ 27,100
Preliminary Engineering (5%)		\$ -	\$ -	\$ -
PROJECT COST ³(rounded)	\$ -	\$ -	\$ 27,100	\$ 27,100

¹ This safety item is 100% eligible and does not require a 10% funding match by the local agency.
² For estimating purposes pay items are adjusted for fluxuation of cost based on quantity.
³ For estimating future project costs, a compounded inflation rate of 7% should be applied from the date of this estimate.

GUIDANCE

1. Install 1770 feet of longitudinal cable barrier with two (2) longitudinal cable barrier end terminals on the west side of SR 93 from approximately LM 10.30 to LM 10.64.



ROAD SAFETY AUDIT REVIEW

SR 93
LM 10.30 TO LM 10.55
SULLIVAN COUNTY

APPENDIX

RSA - SR 93 FROM LM 10.30 TO LM 10.55

2009-2011

ALL CRASHES

PIN: 120060.00

SULLIVAN

	LOG MILE	TYPE OF CRASH				CRASH DESCRIPTION	TIME	WEATHER
		FATAL	INCAP. INJ.	NON-INCAP. INJ.	PROP. DAMAGE			
1	10.300			X		REAR-END; NB ON SR93 AT RAMP; FOLLOWING IMPROPERLY; 2 VEH	DAY	CLEAR
2	10.300				X	REAR-END; NB ON SR93 AT RAMP; FOLLOWING IMPROPERLY; 2 VEH	DAY	CLEAR
3	10.300				X	REAR-END; NB ON SR93; FOLLOWING IMPROPERLY; 2 VEH	DAWN	CLEAR
4	*10.300		X			REAR-END; NB ON SR93; FOLLOWING IMPROPERLY; 3 VEH	DAY	CLEAR
5	10.300			X		REAR-END; NB ON SR93; FOLLOWING IMPROPERLY; 2 VEH	DAY	RAIN
6	10.321			X		SB ON SR 93; LANE DEPARTURE GUARDRAIL; 1 VEH	DAY	CLEAR
7	10.321			X		OTHER (GUARDRAIL 1 VEH)	NIGHT	CLEAR
8	10.359			X		REAR-END; NB ON SR 93; NO CONTRIBUTING ACTIONS; 3 VEH	DAY	CLEAR
9	10.550				X	SAME DIR. SIDESWIPE; NB ON SR 93; 2 VEH	DAY	CLEAR
10	10.550			X		ANGLE; NB ON SR 93; NO CONTRIBUTING ACTIONS; 2 VEH	DAY	CLEAR
		0	1	6	3			

* CRASH REPORT AVAILABLE

**RSA – SR 93 – SULLIVAN COUNTY
CRASH REPORT SUMMARY
FATAL AND INCAPACITATING INJURY CRASHES**

LM 10.300 (Incapacitating Injury): A vehicle traveling northbound on SR 93 slowed for a merging vehicle when it was rear-ended by a vehicle and forced into another lane hitting another vehicle. The crash occurred at 3:37 p.m. during daylight with no adverse weather conditions.

COUNTY = SULLIVAN Date: 7/23/2014
 Route = SR 93 (John B. Dennis Highway)
 Location = FROM RAMP FROM SR 126 MEMORIAL BLVD.
 TO RAMP TO OREBANK ROAD(4792)
 Highway Type = STATE URBAN HIGHWAY
 FUNCTIONAL CLASS= 4 Lane Divided Urban Freeway or Expressway
 DATA YEARS = 2009 - 2011
 ADT YEARS USED= Adam Stations 288 (2009-2011 AVERAGE)
 COMMENTS = 50 MPH SPEED LIMIT
 ANALYZED BY = GS&P

SECTION = MORE THAN 0.10 MILE / SPOT = LESS THAN 0.10 MILE

BLM	ELM	Length	Average AADT	VMT
10.300	10.550	0.25	31,124	7,781
0.00	0.00	0.00	0	0
0.00	0.00	0.00	0	0
0.00	0.00	0.00	0	0
0.00	0.00	0.00	0	0
0.00	0.00	0.00	0	0
0.00	0.00	0.00	0	0

0.25 31,124 7,781

INTERSECTION
 Log Mile = 0

Leg	Traffic AADT
North =	0
East =	0
South =	0
West =	0
<hr/>	
Entering AADT =	0

Adam Stations 288 (2009-2011 Average)

State Urban Highway
 2009 - 2011

	Total	Fatal	Incap. Injury	*Severe Crashes	Other Injury
No. of Crashes =	10	0	1	1	6
No. of Years =	3				
SW avg. rate =	0.981	0.005	0.021	0.026	0.239
08-10 S/W Rates					
Exposure (E) =	8.5202				
Crash Rate (A) =	1.174	0.000	0.117	0.117	0.704
Critical Rate (C) =	1.829				
Severity Index (SI) =	0.8000				
Actual Rate/SW Average =	1.20	0.00	5.59	4.51	2.95
Ratio of A/C =	0.64				

* Severe Crashes are the sum of fatal and incapacitating injury crashes



CRASH LEGEND

- ← VEHICLE PATH (DIRECTION OF TRAVEL)
- ⇐ BACKING VEHICLE
- ⇐ REAR END
- ⇐ HEAD ON
- ⇐ SIDE SWIPE (SAME DIRECTION)
- ⇐ SIDE SWIPE (OPPOSITE DIRECTION)
- ⊥ RIGHT ANGLE
- ↪ LEFT TURN
- ↺ OVERTURN
- ⋯ OUT OF CONTROL
- ⋯ PEDESTRIAN/BICYCLE PEDACYCLE/MOTORCYCLE (SPECIFY ROAD USER)
- ⇐ HEAVY TRUCK/BUS
- ⇐ NON-INVOLVED VEHICLE
- FATAL CRASH
- ⊕ INJURY CRASH
- ◻ PARKED VEHICLE
- ◻ OBJECT (SPECIFY)

TIME: A=AM P=PM

CONDITION CODES LEGEND

X - X - X - # ← NUMBER OF VEHICLES

WEATHER	ROAD SURFACE	LIGHTING
C = CLEAR	D = DRY	D = DAYLIGHT
R = RAIN	W = WET	DKN = DARK NOT LIGHTED
CLD = CLOUDY	I = ICY	DKL = DARK LIGHTED
F = FOG	O = OTHER	DN = DAWN
S = SNOW	U = UNKNOWN	DS = DUSK
U = UNKNOWN		U = UNKNOWN

ROAD SAFETY AUDIT REVIEW

SR 93
LM 10.30 TO LM 10.55
SULLIVAN COUNTY

LEGEND

- FATALITY
- INCAPACITATING INJURY
- NON-INCAPACITATING INJURY
- PROPERTY DAMAGE

9/19/2014 10:53:37 PM K:\2929153\1\Crash Figures\Crash Figure_SR93_01.dgn

TDOT PAY ITEM	TDOT DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
RIGHT-OF-WAY TOTAL (ROUNDED)					\$ -
CLEAR AND GRUBBING TOTAL (ROUNDED)					\$ -
EARTHWORK TOTAL (ROUNDED)					\$ -
PAVEMENT REMOVAL TOTAL (ROUNDED)					\$ -
DRAINAGE TOTAL (ROUNDED)					\$ -
UTILITIES TOTAL (ROUNDED)					\$ -
STRUCTURES TOTAL (ROUNDED)					\$ -
RAILROAD CROSSING OR SEPARATION TOTAL (ROUNDED)					\$ -
PAVING TOTAL (ROUNDED)					\$ -
ROADWAY AND PAVEMENT APPURTENANCES TOTAL (ROUNDED)					\$ -
RETAINING WALLS TOTAL (ROUNDED)					\$ -
712-01	Traffic Control	LS	1	\$ 1,200.00	\$ 1,200
MAINTENANCE OF TRAFFIC TOTAL (ROUNDED)					\$ 1,200
TOPSOIL TOTAL (ROUNDED)					\$ -
SEEDING TOTAL (ROUNDED)					\$ -
SODDING TOTAL (ROUNDED)					\$ -
SIGNING TOTAL (ROUNDED)					\$ -
PAVEMENT MARKINGS TOTAL (ROUNDED)					\$ -
LIGHTING TOTAL (ROUNDED)					\$ -
SIGNALIZATION TOTAL (ROUNDED)					\$ -
FENCE TOTAL (ROUNDED)					\$ -
705-04.10	Longitudinal Cable Barrier	LF	1,770	\$ 10.33	\$ 18,284
705-04.11	Cable Barrier Terminal	EA	2	\$ 3,160.00	\$ 6,320
GUARDRAIL TOTAL (ROUNDED)					\$ 24,700
RIP-RAP OR SLOPE PROTECTION TOTAL (ROUNDED)					\$ -