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# Bridge Design Speed Investigation

**850094**

Structure #94 on SR 1727 (Linville Road) over Ararat River

Surry County



Document Prepared By:

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September 25, 2013

**Project Manager**

A handwritten signature in black ink, reading "Jacob D. Carpenter".

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Jacob D. Carpenter, PE  
Regional Manager

**Principal Investigator**

A handwritten signature in black ink, reading "Andrew Eagle".

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Andrew Eagle, PE, PTOE  
Traffic Engineer



# Bridge and Approach Investigation Checklist

Project W02881

Description Bridge # 94 over Ararat River

Route SR 1727 (Linville Road)

Division 11

County Surry

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Existing Speed Limit 35 ☒ Posted ☐ Statutory

Reasonable & Comfortable Passenger Car Speed 40

Speed Data 35-40 mph

Ball Bank Speed Study -Slight curve on both sides of bridge  
-Readings were less than 5 at 40 mph in both directions  
-Bridge speed good at 40 mph per BBI

Warning Signs at Bridge 4x Bridge End Delineators, 2x Weight Limit (33 ton SV, 37 ton TTST)

Roadside Development Industrial, Wooded

ADT History 1800 vpd (From NCDOT TEAAS); 2700 vpd (2011)

Pedestrian/Bicycle Traffic Minimal Expected

Bridge and Approach Digital Photos Attached

Approach Lane Width 9.5 ft

Approach Shoulder Width: 6-8 ft  
Shoulder Type grass

Lane Width (existing bridge) 10 ft

Shoulder width (existing bridge) 2 ft (~24 ft total width)

Strategic Corridor / Thoroughfare Designation and Recommended Cross Section SR 1727 is classified as a local facility in the Statewide Functional Classification System. 2-lane cross-section recommended.

Crash History and Safety Considerations Crash analysis completed for 7/1/2008 to 6/30/2013. One collision reported. Two vehicles were involved in a non-collision accident in snowy conditions.

Comments Reasonable bridge speed 35 mph.

Reasonable Bridge Speed 35

Investigated by: J. Andrew Eagle, PE, PTOE

Reviewed by: 

**County:** Surry

**Bridge and Route:** 850094 – SR 1727 Linville Rd.  
**Eastbound**

**Date:** 9/17/13

**Eastbound**



**Westbound**

**Westbound**





## Bridge Location Map - Bridge #850094



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**Summary Statistics**

**High Level Crash Summary**

| Crash Type                        | Number of<br>Crashes | Percent<br>of Total |
|-----------------------------------|----------------------|---------------------|
| Total Crashes                     | 1                    | 100.00              |
| Fatal Crashes                     | 0                    | 0.00                |
| Non-Fatal Injury Crashes          | 0                    | 0.00                |
| Total Injury Crashes              | 0                    | 0.00                |
| Property Damage Only Crashes      | 1                    | 100.00              |
| Night Crashes                     | 1                    | 100.00              |
| Wet Crashes                       | 0                    | 0.00                |
| Alcohol/Drugs Involvement Crashes | 0                    | 0.00                |

**Crash Severity Summary**

| Crash Type                   | Number of<br>Crashes | Percent<br>of Total |
|------------------------------|----------------------|---------------------|
| Total Crashes                | 1                    | 100.00              |
| Fatal Crashes                | 0                    | 0.00                |
| Class A Crashes              | 0                    | 0.00                |
| Class B Crashes              | 0                    | 0.00                |
| Class C Crashes              | 0                    | 0.00                |
| Property Damage Only Crashes | 1                    | 100.00              |

**Vehicle Exposure Statistics**

Annual ADT = 1800

Total Length = 0.224 (Miles)

0.36 (Kilometers)

Total Vehicle Exposure = 0.74 (MVMT)

1.18 (MVKMT)

| Crash Rate           | Crashes Per 100 Million<br>Vehicle Miles | Crashes Per 100 Million<br>Vehicle Kilometers |
|----------------------|------------------------------------------|-----------------------------------------------|
| Total Crash Rate     | 135.82                                   | 84.40                                         |
| Fatal Crash Rate     | 0.00                                     | 0.00                                          |
| Non Fatal Crash Rate | 0.00                                     | 0.00                                          |
| Night Crash Rate     | 135.82                                   | 84.40                                         |
| Wet Crash Rate       | 0.00                                     | 0.00                                          |
| EPDO Rate            | 135.82                                   | 84.40                                         |

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**Miscellaneous Statistics**

|                                      |         |
|--------------------------------------|---------|
| Severity Index =                     | 1.00    |
| EPDO Crash Index =                   | 1.00    |
| Estimated Property Damage Total = \$ | 2050.00 |

**Accident Type Summary**

| <b>Accident Type</b> | <b>Number of<br/>Crashes</b> | <b>Percent<br/>of Total</b> |
|----------------------|------------------------------|-----------------------------|
| OTHER NON-COLLISION  | 1                            | 100.00                      |

**Injury Summary**

| <b>Injury Type</b>       | <b>Number of<br/>Injuries</b> | <b>Percent<br/>of Total</b> |
|--------------------------|-------------------------------|-----------------------------|
| Fatal Injuries           | 0                             | 0.00                        |
| Class A Injuries         | 0                             | 0.00                        |
| Class B Injuries         | 0                             | 0.00                        |
| Class C Injuries         | 0                             | 0.00                        |
| Total Non-Fatal Injuries | 0                             | 0.00                        |
| Total Injuries           | 0                             | 0.00                        |

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**Monthly Summary**

| <b>Month</b> | <b>Number of<br/>Crashes</b> | <b>Percent<br/>of Total</b> |
|--------------|------------------------------|-----------------------------|
| Jan          | 0                            | 0.00                        |
| Feb          | 0                            | 0.00                        |
| Mar          | 0                            | 0.00                        |
| Apr          | 0                            | 0.00                        |
| May          | 0                            | 0.00                        |
| Jun          | 0                            | 0.00                        |
| Jul          | 0                            | 0.00                        |
| Aug          | 0                            | 0.00                        |
| Sep          | 0                            | 0.00                        |
| Oct          | 0                            | 0.00                        |
| Nov          | 0                            | 0.00                        |
| Dec          | 1                            | 100.00                      |

**Daily Summary**

| <b>Day</b> | <b>Number of<br/>Crashes</b> | <b>Percent<br/>of Total</b> |
|------------|------------------------------|-----------------------------|
| Mon        | 0                            | 0.00                        |
| Tue        | 0                            | 0.00                        |
| Wed        | 0                            | 0.00                        |
| Thu        | 0                            | 0.00                        |
| Fri        | 0                            | 0.00                        |
| Sat        | 1                            | 100.00                      |
| Sun        | 0                            | 0.00                        |

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**Hourly Summary**

| <b>Hour</b> | <b>Number of<br/>Crashes</b> | <b>Percent<br/>of Total</b> |
|-------------|------------------------------|-----------------------------|
| 0000-0059   | 0                            | 0.00                        |
| 0100-0159   | 0                            | 0.00                        |
| 0200-0259   | 0                            | 0.00                        |
| 0300-0359   | 0                            | 0.00                        |
| 0400-0459   | 0                            | 0.00                        |
| 0500-0559   | 0                            | 0.00                        |
| 0600-0659   | 0                            | 0.00                        |
| 0700-0759   | 0                            | 0.00                        |
| 0800-0859   | 0                            | 0.00                        |
| 0900-0959   | 0                            | 0.00                        |
| 1000-1059   | 0                            | 0.00                        |
| 1100-1159   | 0                            | 0.00                        |
| 1200-1259   | 0                            | 0.00                        |
| 1300-1359   | 0                            | 0.00                        |
| 1400-1459   | 0                            | 0.00                        |
| 1500-1559   | 0                            | 0.00                        |
| 1600-1659   | 0                            | 0.00                        |
| 1700-1759   | 0                            | 0.00                        |
| 1800-1859   | 0                            | 0.00                        |
| 1900-1959   | 0                            | 0.00                        |
| 2000-2059   | 1                            | 100.00                      |
| 2100-2159   | 0                            | 0.00                        |
| 2200-2259   | 0                            | 0.00                        |
| 2300-2359   | 0                            | 0.00                        |

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**Light and Road Conditions Summary**

| Condition | Dry | Wet | Other | Total |
|-----------|-----|-----|-------|-------|
| Day       | 0   | 0   | 0     | 0     |
| Dark      | 0   | 0   | 1     | 1     |
| Other     | 0   | 0   | 0     | 0     |
| Total     | 0   | 0   | 1     | 1     |

**Vehicle Type Summary**

| Vehicle Type | Number<br>Involved | Percent<br>of Total |
|--------------|--------------------|---------------------|
| PICKUP       | 1                  | 50.00               |
| VAN          | 1                  | 50.00               |

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Yearly Totals Summary

Accident Totals

| Year  | Total<br>Accidents | Fatal<br>Accidents | Injury<br>Accidents | Property Damage<br>Only Accidents |
|-------|--------------------|--------------------|---------------------|-----------------------------------|
| 2008  | 0                  | 0                  | 0                   | 0                                 |
| 2009  | 0                  | 0                  | 0                   | 0                                 |
| 2010  | 1                  | 0                  | 0                   | 1                                 |
| 2011  | 0                  | 0                  | 0                   | 0                                 |
| 2012  | 0                  | 0                  | 0                   | 0                                 |
| 2013  | 0                  | 0                  | 0                   | 0                                 |
| Total | 1                  | 0                  | 0                   | 1                                 |

Injury Totals

| Year  | Fatal Injuries | Class A, B,<br>or C Injuries |
|-------|----------------|------------------------------|
| 2008  | 0              | 0                            |
| 2009  | 0              | 0                            |
| 2010  | 0              | 0                            |
| 2011  | 0              | 0                            |
| 2012  | 0              | 0                            |
| 2013  | 0              | 0                            |
| Total | 0              | 0                            |

Miscellaneous Totals

| Year  | Property Damage | EPDO Index |
|-------|-----------------|------------|
| 2008  | \$ 0            | 0.00       |
| 2009  | \$ 0            | 0.00       |
| 2010  | \$ 2050         | 1.00       |
| 2011  | \$ 0            | 0.00       |
| 2012  | \$ 0            | 0.00       |
| 2013  | \$ 0            | 0.00       |
| Total | \$ 2050         | 1.00       |

Type of Accident Totals

| Year | Left Turn | Right Turn | Rear End | Run Off Road & |       |            |       |
|------|-----------|------------|----------|----------------|-------|------------|-------|
|      |           |            |          | Fixed Object   | Angle | Side Swipe | Other |
| 2008 | 0         | 0          | 0        | 0              | 0     | 0          | 0     |
| 2009 | 0         | 0          | 0        | 0              | 0     | 0          | 0     |

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| Run Off Road & |           |            |          |              |       |            |       |
|----------------|-----------|------------|----------|--------------|-------|------------|-------|
| Year           | Left Turn | Right Turn | Rear End | Fixed Object | Angle | Side Swipe | Other |
| 2010           | 0         | 0          | 0        | 0            | 0     | 0          | 1     |
| 2011           | 0         | 0          | 0        | 0            | 0     | 0          | 0     |
| 2012           | 0         | 0          | 0        | 0            | 0     | 0          | 0     |
| 2013           | 0         | 0          | 0        | 0            | 0     | 0          | 0     |
| Total          | 0         | 0          | 0        | 0            | 0     | 0          | 1     |

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Strip Diagram

| Features                         | Milepost | Crash IDs |
|----------------------------------|----------|-----------|
| Structure:850094   ML-MOUNT AIRY | 0.82     |           |
|                                  | 0.83     |           |
|                                  | 0.84     |           |
|                                  | 0.85     |           |
|                                  | 0.86     |           |
|                                  | 0.87     |           |
|                                  | 0.88     |           |
|                                  | 0.89     |           |
|                                  | 0.90     |           |
|                                  | 0.91     |           |
|                                  | 0.92     |           |
|                                  | 0.93     |           |
|                                  | 0.94     |           |
|                                  | 0.95     |           |
|                                  | 0.96     |           |
|                                  | 0.97     |           |
|                                  | 0.98     |           |
|                                  | 0.99     |           |
|                                  | 1.00     | 103057262 |
|                                  | 1.01     |           |
|                                  | 1.02     |           |
|                                  | 1.03     |           |
|                                  | 1.04     |           |

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**Study Criteria**

| Study Name    | Log No. | PH No. | TIP No. | K/A Cf. | B/C Cf. | ADT  | ADT Route |
|---------------|---------|--------|---------|---------|---------|------|-----------|
| SURRYBRIDGE94 |         |        |         | 76.8    | 8.4     | 1800 | 40001727  |

| Request Date | Courier Service | Phone No. | Ext. | Fax No. |
|--------------|-----------------|-----------|------|---------|
|--------------|-----------------|-----------|------|---------|

| County |      |      | Municipality  |      |            |            |           |       |
|--------|------|------|---------------|------|------------|------------|-----------|-------|
| Name   | Code | Div. | Name          | Code | Y-Line Ft. | Begin Date | End Date  | Years |
| SURRY  | 85   | 11   | All and Rural |      | 0          | 7/1/2008   | 6/30/2013 | 5.00  |

| Location Text                                          | Requestor |
|--------------------------------------------------------|-----------|
| SR 1727 (Linville Rd), 500 ft either side of Bridge 94 |           |

| Fiche Roads |          |
|-------------|----------|
| Name        | Code     |
| SR 1727     | 40001727 |
| LINVILLE    | 50017770 |

| Strip Road |          |          |        |       |            |
|------------|----------|----------|--------|-------|------------|
| Name       | Code     | Begin MP | End MP | Miles | Kilometers |
| SR 1727    | 40001727 | 0.818    | 1.042  | 0.224 | 0.360      |