Over-Dimensional Vehicle Restriction Study for US 129 in TN

July 30, 2015
US 129
Location Map
US 129
Topography and Scenery
Operational and Safety Study
August 2014, US129

Operational and Safety Review

US 129, THE DRAGON
From Tabcat Bridge to North Carolina State Line
Project Length 11.19 miles
Blount Co.

Final Report
August 28, 2014

Prepared by
TDOT
Region 1 Traffic Office

Operational and Safety Review

• Regional Alternative Routes
• History of Improvements
• Operational Review of US 129
• Safety Review
• Commercial Vehicle Restrictions
• Summary and Recommendations

TRUCK RESTRICTION

NO TRUCKS WITH
TRAILERS OVER 30FT
SINGLE UNIT OVER 30 FT
Operational Study
Alternative Routes - Knoxville, TN to Robbinsville, NC

Route 1:
- US 129 South

Drive 1 h 39 min
74 mi
Operational Study
Alternative Routes - Knoxville, TN to Robbinsville, NC

Route 2:
• I-40 West to
• I-75 South to
• US 64 East to
• US 74 East to
• US 129 North

Drive 3 h 5 min 178 mi
Operational Study
Alternative Routes - Knoxville, TN to Robbinsville, NC

Route 3:
- US 129 South to
- US 411 South to
- SR 68 South to
- US 64/74 East to
- US 129 North

Drive 2 h 55 min
140 mi
Operational Study
Alternative Routes - Knoxville, TN to Robbinsville, NC

Route 4:
- I-40 East to
- US 23/74 West to
- US 19/74 West to
- US 129 North

Drive 2 h 48 min 166 mi
Operational Study
Alternative Routes, US129

- Drive 2 h 48 min
  166 mi

- Drive 3 h 5 min
  178 mi

- Drive 1 h 39 min
  74 mi

- Drive 2 h 55 min
  140 mi
Past Studies and Projects
2007 Roadway Safety Audit Review

2008 RSAR Project – Blount County
Project Limits – LM 0.00 (N.C. state line) to LM 11.19 (Tabcat Bridge)
Cost - $900,900

1. Geometric Warning, Regulatory, Guide Signs
   Hairpin Curve       Reverse Curve
   Standard Curve      Dip
   Winding Road        One directional arrows
   Truck Advisory      Speed limit
   Route Markers       Stay in Lane
   Do Not Pass         Scenic Overlook

2. Pavement Markings
3. Earthen Berms
4. Paving of 60 gravel pulloffs
5. Increase in Enforcement
   The GHSO awarded a $60,000 grant for increased enforcement of
   the traffic laws
Past Studies and Projects
2007 Roadway Safety Audit Review

Road Safety Audit Review
Blount County
State Route 115 (U.S.129)
From Log Mile 0.00 to Log mile 11.19
Date of Review: May 17, 2007

Description of Project and Background
This project involves approximately 11 miles of State Route 115 known as the “Tail of the Dragon”. This segment of roadway has become a popular tourist attraction for motorcyclists and sports car enthusiasts for its twisting turns and natural setting. The Project Planning Division was asked to evaluate this segment to determine what safety measures can be applied to reduce the high number of crashes which occur at various points along the roadway. The study segment is eligible for Hazard Elimination Safety Program funds.

Team Members
- Steve Allen - Director, TDOT Project Planning Division.
- Dudley Daniel - Transportation Manager 1, TDOT Conceptual & NEPA Planning Office.
- Amanda Snowden - Operations Specialist Supervisor 2, TDOT Region 1 Traffic Engineering Office.
- Nathan Vatter - Operations Specialist 3, TDOT Region 1 Traffic Engineering Office.
- Tony Armstrong - Transportation Manager 1, TDOT Project Planning Division.
- Michelle Powell - Operations Specialist, TDOT/Headquarters Traffic Engineering Office.
- Eric Jackson - Graduate Transportation Associate, TDOT Headquarters/Traffic Engineering Office.
- Paul Lane - Transportation Specialist 1, TDOT Project Planning Division.
- Ron Johnson - Webmaster of tailofthдрagon.com and motorcycle enthusiast.
- Tim Wilson - Blount County Sheriff’s Deputy.
- Houston Daugherty - Consultant, Smith Seckman Reid, Inc. (Observer).
Past Studies and Projects

2008 RSAR Project – Blount County

North Carolina Line (LM 0.00)
- Tabcat Bridge (LM 11.2)
- Pull Off (LM 12.8 to 13.0)
- Pull Off (LM 13.9)

Foothills Pkwy (LM 14.4)
- Pull Off (LM 14.4 to 14.5)
- Pull Off (LM 15.16)
- Pull Off (LM 15.16)

Blount Co.
- Monroe Co.
- Blount Co.

17.7 MILES

Warning to Trucks
SWITCHBACK CURVES AHEAD
LAST TURNAROUND
3' x 7'

Warning to Trucks
SHARP CURVES AHEAD
CONSIDER ALT ROUTE
6' x 9'

Truck Advisory
SWITCHBACK CURVES AHEAD
CONSIDER ALT ROUTE
6' x 9.5'

Warning to Trucks
SWITCHBACK CURVES AHEAD
CONSIDER ALT ROUTE
6.5' x 12'

Warning to Trucks
SWITCHBACK CURVES AHEAD
CONSIDER ALT ROUTE

Past Studies and Projects

2009 Traffic Operation Improvements – Blount and Monroe Counties
Project Limits – LM 11.19 (Tabcat Bridge) to US 411
Project Length – 20.84 miles
Cost - $50,000

1. Raised Pavement Markers – Beginning at the Tabcat Bridge and ending at US 411, length 20.84-mile

2. Centerline Rumble Stripes & Spray Thermo Plastic Markings – Beginning near LM 20.0 in Blount County and ending at US 411, Length 12.04-mile

3. Improvements at the intersection of US 129 with SR 72
   - Channelized Markings shoulders near radii of intersection
   - Dotted skips on Centerline and Edgeline
   - New Stop Lines
   - Extend Double Yellow toward intersection on SR 72
   - Additional Warning and Route signs for intersection
Operational Study
Traffic Volumes, US129

Blount

<table>
<thead>
<tr>
<th>Count Station</th>
<th>2013 AADT</th>
<th>% Passenger Vehicles</th>
<th>% Single Unit Truck</th>
<th>% Multi Unit Truck</th>
<th>Total Truck AADT</th>
</tr>
</thead>
<tbody>
<tr>
<td>000088</td>
<td>1070</td>
<td>94%</td>
<td>1%</td>
<td>5%</td>
<td>64</td>
</tr>
<tr>
<td>000075</td>
<td>980</td>
<td>94%</td>
<td>1%</td>
<td>5%</td>
<td>59</td>
</tr>
<tr>
<td>000071</td>
<td>1300</td>
<td>93%</td>
<td>5%</td>
<td>2%</td>
<td>91</td>
</tr>
<tr>
<td>000206</td>
<td>4130</td>
<td>94%</td>
<td>3%</td>
<td>3%</td>
<td>248</td>
</tr>
<tr>
<td>000065</td>
<td>6390</td>
<td>96%</td>
<td>2%</td>
<td>2%</td>
<td>256</td>
</tr>
</tbody>
</table>

NOTE: All count stations are located in Blount County.

<table>
<thead>
<tr>
<th>Year</th>
<th>000088</th>
<th>000075</th>
<th>000071</th>
<th>000206</th>
<th>000065</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>1070</td>
<td>980</td>
<td>1300</td>
<td>4130</td>
<td>6390</td>
</tr>
<tr>
<td>2012</td>
<td>1400</td>
<td>1160</td>
<td>1420</td>
<td>4000</td>
<td>6580</td>
</tr>
<tr>
<td>2011</td>
<td>1270</td>
<td>1070</td>
<td>1460</td>
<td>4300</td>
<td>6640</td>
</tr>
<tr>
<td>2010</td>
<td>1060</td>
<td>1050</td>
<td>1300</td>
<td>3810</td>
<td>6600</td>
</tr>
</tbody>
</table>
Operational Study
Roadway Geometry

- Mountainous Terrain
- Grades
- 318 Curves in 11-miles
- Curves and Embankments limit SSD
- 9 feet Lane Widths
- Limited Shoulder Width
Operational Study
GIS Crash Mapping, US129

Fatal Crash 5
9/28/2012  Time of crash is unknown
BCSD arrived at 11:39
Motorcycle traveling SB. Vehicle
lost control in a curve and ran off the
right side of the roadway striking an
earthen berm and sending the driver
and motorcycle airborne.
Non-Local Driver (Cherry Point, NC), Age 24

Fatal Crash 4
8/3/2011  9:30
Tractor trailer traveling NB. Motorcycle
traveling SB. Tractor Trailer was
making a left hand turn. Truck tractor
was in the NB lane while the semi trailer
was in the SB lane. Motorcycle struck
the rear axle of the semi trailer.
TT: Non-Local Driver (Nashville, GA), Age 47
MC: Non-Local Driver (Christiana, TN), Age 45

Fatal Crash 3
8/28/2010  8:28
Motorcycle traveling SB. Vehicle
lost control in a curve and ran off the right
side of the roadway before traveling down
an embankment and colliding with a tree.
Non-Local Driver (Rogersville, TN), Age 44

Fatal Crash 2
10/22/2012  11:40
Motorcycle traveling SB. Vehicle
lost control in a curve and left the
roadway. Vehicle struck a wooden
post and flipped, throwing the driver,
Witness states driver's speed was
approximately 25 mph.
Non-Local Driver (Wilmington, NC), Age 62

Fatal Crash 6
8/28/2010  8:28
Motorcycle traveling NB. Vehicle
lost control in a curve and ran off the left
side of the roadway before colliding
with several objects.
Non-Local Driver (Naples, FL), Age 53

SR 115, US 129 - Dragon Crash Locations
Type of Crash
- Fatal
- Incapacitating Injury
- Non-Incapacitating Injury
- PDO (Over)
- PDO (Under)
Operational Study
GIS Crash Mapping, US129

Fatal Crash 1
10/24/2012 10:20
Motorcycle traveling NB crossed SB lane, entered ditch and overturned.
Non-Local Driver (KY), Age 71

Fatal Crash 2
5/29/2010 14:05
Motorcycle traveling SB could not maintain lane in curve and entered ditch.
Non-Local Driver (KY), Age 71

Fatal Crash 3
3/20/2012 11:40
Motorcycle traveling SB could not maintain lane in curve, entered NB lane, collided head on with pick-up truck.
MC - Local Driver (Maryville TN), Age 44
PU - Local Driver (Madisonville TN), Age 44

Fatal Crash 4
11/17/2011 17:55
Large SUV traveling SB, tires came off right side of road. Vehicle lost control, flipped several times. Occupants were not wearing seat belts. 3 Passengers, Ages: 16, 17, 18
Local Driver (Maryville TN), Age 16

Fatal Crash 5
11/05/2011 24:00
Passenger car traveling SB, entered curve, lost control, skidded into building
2 Passengers, Ages: 26, 33
Local Driver (Maryville TN), Age 27

Fatal Crash 6
4/5/2012 00:33
DUI (BAC = 0.20)
Passenger car traveling SB. Vehicle veered off road during a right turn. Vehicle drove in a yard until becoming airborne.
Local Driver (Maryville TN), Age 61

Motorcycle Related Crashes
45 (26.9%) total Crashes involved Motorcycles - 2010 to 2012
3 Fatal Crash
14 Incap. Injury Crash
25 Other Injury Crash

State Route 115 Blount & Monroe County
From the Talcot Bridge to US 411
LMI 11.190 to 10.450

170 Crashes - 2010 to 2012
State Average: 1.57
Acc/MVM

2 IC Ratio: 2.95

6 Fatal Crash
52 Incap. Injury Crash
53 Other Injury Crash

9 Motorcycle Related Crashes
45 (26.9%) total Crashes involved Motorcycles - 2010 to 2012
3 Fatal Crash
14 Incap. Injury Crash
25 Other Injury Crash

DUI (BAC = 0.20)
Passenger car traveling SB. Vehicle veered off road during a right turn. Vehicle drove in a yard until becoming airborne.
Local Driver (Maryville TN), Age 61

1 Fatal Crash
4/6/2011 02:16
Passenger car traveling SB, entered curve, lost control, skidded into building. 2 Passengers, Ages: 26, 33
Local Driver (Maryville TN), Age 27
Operational Study
Vehicle Simulation

PC: Passenger Car
S-BUS-36: School Bus
SU-30: Single Unit Truck
SU-40: Single Unit Truck
WB-40: Intermediate Semi Trailer
WB-62: Interstate Semi Trailer
Sight Distance

- Length of roadway ahead that is visible to a driver

- 4 Types
  - Intersection
  - Stopping
  - Passing
  - Complex Decisions

- Special Consideration
  - Grades
  - Speeds
  - Design Vehicles
Stopping Sight Distance

Driving along the Major Roadway

“Stopping sight distance is provided continuously along each highway or street so that drivers have a view of the roadway ahead that is sufficient to allow drivers to stop, AASHTO pg 650 & 651.”

<table>
<thead>
<tr>
<th>Roadway Grade</th>
<th>Speed</th>
<th>Brake Reaction Distance</th>
<th>Braking Distance</th>
<th>SSD, feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Grade</td>
<td>30</td>
<td>t = 2.5 sec</td>
<td>90</td>
<td>200</td>
</tr>
<tr>
<td>Down Grade, 3%</td>
<td>30</td>
<td>110</td>
<td>95</td>
<td>205</td>
</tr>
<tr>
<td>Down Grade, 6%</td>
<td>30</td>
<td>110</td>
<td>105</td>
<td>215</td>
</tr>
<tr>
<td>Down Grade, 9%</td>
<td>30</td>
<td>110</td>
<td>117</td>
<td>227</td>
</tr>
<tr>
<td>Upgrade, 3%</td>
<td>30</td>
<td>110</td>
<td>90</td>
<td>200</td>
</tr>
<tr>
<td>Upgrade, 6%</td>
<td>30</td>
<td>110</td>
<td>74</td>
<td>184</td>
</tr>
<tr>
<td>Upgrade, 9%</td>
<td>30</td>
<td>110</td>
<td>69</td>
<td>179</td>
</tr>
</tbody>
</table>
Grades and Effect on Stopping Distance

<table>
<thead>
<tr>
<th>Elevation at Tabcat Bridge</th>
<th>880 feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevation at NC State line</td>
<td>1,980 feet</td>
</tr>
<tr>
<td>Elevation Change</td>
<td>1,100 feet</td>
</tr>
<tr>
<td>Distance</td>
<td>11.2-miles</td>
</tr>
<tr>
<td>Average Grade</td>
<td>1.9%</td>
</tr>
<tr>
<td>Maximum</td>
<td>6.0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grade</th>
<th>Speed mph</th>
<th>Braking Distance for sum of approaching vehicles</th>
<th>Sum of Reaction Distance t=2.5 sec</th>
<th>Distance if approaching vehicle is in your lane</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>30</td>
<td>173</td>
<td>221</td>
<td>393</td>
</tr>
<tr>
<td>3%</td>
<td>30</td>
<td>185</td>
<td>221</td>
<td>405</td>
</tr>
<tr>
<td>6%</td>
<td>30</td>
<td>179</td>
<td>221</td>
<td>399</td>
</tr>
<tr>
<td>9%</td>
<td>30</td>
<td>186</td>
<td>221</td>
<td>406</td>
</tr>
</tbody>
</table>
Stopping Distance with Approaching Vehicles

~ 185’ of Sight Distance
Stopping Distance with Approaching Vehicles

~ 185' of Sight Distance
Operational Study
Restrictions in North Carolina, US129

NCDOT TEAAS Ordinance Report

Trucks Prohibited Route

| COUNTY | SWAIN | DIVISION | 14 |

DECLARE THE FOLLOWING

<table>
<thead>
<tr>
<th>County</th>
<th>Ordinance Number</th>
<th>Effective Date</th>
<th>Route</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWAIN</td>
<td>1065132</td>
<td>7/11/2012</td>
<td>US 129</td>
<td>No truck tractors with trailers longer than 30 feet between the Graham County line and the Tennessee State line unless specifically authorized by the NCDOT.</td>
</tr>
</tbody>
</table>

Current ordinance was effective July 11, 2012.
• They do allow exclusion to one business to operate after sunset with an escort.

Past ordinance 8/29/2008 through 7/12/2012
• Restricted no through trucks with trailers longer than 30 feet
• Prohibited all trucks with trailers longer than 48 feet between the Cheoah Dam and the Tennessee State Line.
Coordination Meetings and Partners
Restrictions in Tennessee, US129

Brookfield Renewable Energy Partners

Commissioner and Chief of Staff
Community Relations Office
HQ Traffic & Permits
Strategic Transportation Investments Division
Region 1 Director’s Office
Region 1 Traffic
Region 1 Incident Management
Region 1 Sign and Marking
News Release
Restrictions in Tennessee, US129

Truck Restrictions on “The Dragon” in Blount County; Limits for commercial vehicles longer than 30 feet on US 129 (SR 115)

Tuesday, December 02, 2014 | 10:45 am

KNOXVILLE, Tenn. – Following the completion of an operational and safety review, the Tennessee Department of Transportation has determined that vehicles over 30 feet in length will no longer be allowed to utilize a mountainous section of US 129 (SR 115) in Blount County, known as “The Dragon.”

From 2010 to 2012, there were 204 total crashes from the Tennessee/North Carolina State Line to Tabcat Bridge (Log Mile 11.19) in Blount County, with six of those involving fatalities. This is considered a critical number of crashes based on the type of road and number of vehicles per day on this facility. While only one of the fatal crashes involved a tractor trailer, there were a number of incidents involving large trucks. Due to the curvy and narrow roadway, incidents involving tractor trailers usually block the highway for several hours and prevent travel for all motorists.

Signage detailing these restrictions will be installed in mid-January. TDOT has coordinated these efforts with the Tennessee Highway Patrol and Blount County law enforcement.

North Carolina has similar restrictions for truck traffic on US 129 from the Tennessee/North Carolina State Line to the Graham (NC) County Line.
Restriction Signs for Tennessee
Contractor Replaces Truck Advisories with Regulatory Signs
Restriction Signs for Tennessee
Placed in North Carolina
Exception Signs for Brookfield
Smoky Mountain Hydro
## Project Impacts

<table>
<thead>
<tr>
<th>Crash Data Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Pre 2007 RSAR</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Post 2007 RSAR</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>2014 Operational Study</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Post Study</td>
</tr>
</tbody>
</table>

- Past RSAR and Improvement Projects had a positive impact on Safety and Crash Reductions
- Truck Traffic was not eliminated with 2007 Warning initiative, 6% of AADT or 60 to 65 a day using the Mountainous section of US 129
- Rollover Truck Crashes also continued to occur blocking the roadway multiple times in the Past
- Future Studies to evaluate Truck Restrictions in regard to Operations and Safety of route
Thank you

NATHAN VATTER, REGION 1 TRAFFIC ENGINEER
Phone: (865)594-2456
Nathan.Vatter@tn.gov
Chapman Highway
Sevier County

August 7th 2015
TDOT Revenue Sources

Budget FY 2015

- $976 Million (Federal)
- $826 Million (State)
- $38 Million (Local)
How We Spend Our Money

FY 2013

2% Overhead
83% Construction Projects and Maintenance

- 68% Construction Projects
- 15% Maintenance & Preservation
- 8% Grants
- 2% Field Operations
- 2% Equipment & Facility
- 2% Other State Agencies
- 2% Administration
- 1% Other
- 8% Other
Tennessee Gas Tax

- Tennessee has a fixed-rate gas tax
  - Federal gas tax – $0.184 per gallon
  - State gas tax - $0.214 per gallon
- Last tax increase was 1989 (25 years ago)
- $312 per Capita
Fatalities & Injuries in Tennessee

Figure 10 - Serious Injuries Percent of Total by Contributing Factor (2008-2012)
Stakeholder Meeting – January 21st 2014

- Attendees –
  - Governor’s Highway Safety Office (Organizer)
  - Sevier County
  - Sevier County Sheriff’s Office
  - TN Highway Patrol
  - Knoxville Police Department
  - TDOT

- Meeting Purpose – Discuss recent fatal and serious injury crashes and possible counter measures
Safety Projects Underway

Legend:
- Fatal Crash (3)
- Incapacitating Crash (42)
- Log Mile: State Route
- 4 Lane Undivided
- 5 Lane Section (TWLTL)
- 4 Lane Median-Divided (0)
- 2013 Traffic Volumes
- Upcoming Projects
- Region_1_Counties

NHTSA PROJECT
STATE ROUTE 71, US 441
EVANS RD TO BURNETT STATION
KNOX AND SEVIER COUNTY
WIDEN FROM FOUR LANES TO FIVE LANES WITH 2 SHOULDER
ROW PLANS UNDER DEVELOPMENT
ROW TURN-IN 1ST QUARTER 2015

NHTSA PROJECT
STATE ROUTE 71, US 441
MENORON CHAPEL TO SIMPSON RD
KNOX AND SEVIER COUNTY
WIDEN FROM FOUR LANES TO FIVE LANES WITH 2 SHOULDER
PRELIMINARY PLANS UNDER DEVELOPMENT
PUBLIC DESIGN MEETING 3RD QUARTER 2015

NHTSA PROJECT
STATE ROUTE 71, US 441
MACOWN LN TO SR 336
SEVIER COUNTY
WIDEN FROM FOUR LANES TO FIVE LANES WITH 2 SHOULDER
CURB & GUTTER AND SIDEWALK
ROW PLANS UNDER DEVELOPMENT
ROW TURN-IN 1ST QUARTER 2015

Upcoming Projects Map
Chapman Highway
Knox, Blount, and Sevier County
Tennessee
Severe Crashes from January 2011 to November 2014
Source: TDOT GIS
### Fatal Crashes
#### Henley Bridge to Sevierville

#### (2011-2014)

## Chapman Highway 2011-2014 Fatalities

<table>
<thead>
<tr>
<th>Fatality Number</th>
<th>Driver Age Vehicle 1</th>
<th>Driver Age Vehicle 2</th>
<th>Speed Limit</th>
<th>Type of Crash</th>
<th>Injury Driver 1</th>
<th>Injury Driver 2</th>
<th>Driver at Fault</th>
<th>Correctable?</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>78</td>
<td>N/A</td>
<td>45</td>
<td>Run-Off Road</td>
<td>Non-Incap</td>
<td>N/A</td>
<td>1</td>
<td>No</td>
<td>Passenger (Age 83) Died</td>
</tr>
<tr>
<td>2</td>
<td>54</td>
<td>N/A</td>
<td>45</td>
<td>Run-Off Road</td>
<td>Fatal</td>
<td>N/A</td>
<td>1</td>
<td>No</td>
<td>Alcohol was present</td>
</tr>
<tr>
<td>3</td>
<td>73</td>
<td>71</td>
<td>45</td>
<td>Angle</td>
<td>Unknown</td>
<td>Fatal</td>
<td>1</td>
<td>No</td>
<td>V1 failed to yield and turned left in front of Motorcycle</td>
</tr>
<tr>
<td>4</td>
<td>67</td>
<td>43</td>
<td>45</td>
<td>Angle</td>
<td>Non-Incap</td>
<td>Non-Incap</td>
<td>1</td>
<td>No</td>
<td>V1 attempted to cross Chapman and failed to yield</td>
</tr>
<tr>
<td>5</td>
<td>41</td>
<td>Ped = 45</td>
<td>45</td>
<td>Pedestrian</td>
<td>None</td>
<td>Fatal</td>
<td>Ped</td>
<td>Maybe</td>
<td>Ped crossing at Meridian St (Old Wal-Mart)</td>
</tr>
<tr>
<td>6</td>
<td>74</td>
<td>82</td>
<td>50</td>
<td>Head-On</td>
<td>Fatal</td>
<td>Incap</td>
<td>1</td>
<td>Maybe</td>
<td>Head On, 4-L undivided past (Old Wal-Mart)</td>
</tr>
<tr>
<td>7</td>
<td>60</td>
<td>23</td>
<td>50</td>
<td>Angle</td>
<td>None</td>
<td>Fatal</td>
<td>1</td>
<td>No</td>
<td>NB V1 (Age 60) made U-turn and NB V2 Motorcycle was unable to stop (near Ye Old)</td>
</tr>
<tr>
<td>8</td>
<td>58</td>
<td>N/A</td>
<td>50</td>
<td>Run-Off Road</td>
<td>Fatal</td>
<td>N/A</td>
<td>1</td>
<td>No</td>
<td>Alcohol Related</td>
</tr>
<tr>
<td>9</td>
<td>85</td>
<td>29</td>
<td>45</td>
<td>Head-On</td>
<td>Fatal</td>
<td>None</td>
<td>2</td>
<td>No</td>
<td>V2 fell ill while driving</td>
</tr>
<tr>
<td>10</td>
<td>61</td>
<td>38</td>
<td>45</td>
<td>Angle</td>
<td>Fatal</td>
<td>None</td>
<td>1</td>
<td>No</td>
<td>Left-turning vehicle failed to yield</td>
</tr>
<tr>
<td>11</td>
<td>39</td>
<td>17</td>
<td>45</td>
<td>Angle</td>
<td>Non-Incap</td>
<td>Fatal</td>
<td>1</td>
<td>No</td>
<td>Driver 1 Ran Red Light/ V2 Passenger (Age 56) Fatal</td>
</tr>
<tr>
<td>12</td>
<td>19</td>
<td>N/A</td>
<td>55</td>
<td>Run-Off Road</td>
<td>Fatal</td>
<td>N/A</td>
<td>1</td>
<td>Maybe</td>
<td>High Speed (From Crash Report)</td>
</tr>
<tr>
<td>13</td>
<td>19</td>
<td>51</td>
<td>55</td>
<td>Angle</td>
<td>Fatal</td>
<td>None</td>
<td>1</td>
<td>Maybe</td>
<td>V1 (Age 19) left-turning from Canyon Hills struck by NB V2</td>
</tr>
<tr>
<td>14</td>
<td>57</td>
<td>55</td>
<td>55</td>
<td>Angle</td>
<td>Non-Incap</td>
<td>Fatal</td>
<td>1</td>
<td>Yes</td>
<td>V1 lost control when braking for stopped vehicle attempting left-turn (D1 was on opiates and other drugs)</td>
</tr>
<tr>
<td>15</td>
<td>26</td>
<td>N/A</td>
<td>55</td>
<td>Run-Off Road</td>
<td>Fatal</td>
<td>N/A</td>
<td>1</td>
<td>No</td>
<td>Ran-off the road, Alcohol and drugs were present/ Passenger (Age 2) possibly injured</td>
</tr>
<tr>
<td>16</td>
<td>21</td>
<td>45</td>
<td>55</td>
<td>Head-On</td>
<td>Incap</td>
<td>Fatal</td>
<td>1</td>
<td>Maybe</td>
<td>Drugs were present in V1/ V2 was church bus w/ 12 pass and 1 Fatal</td>
</tr>
<tr>
<td>17</td>
<td>59</td>
<td>N/A</td>
<td>55</td>
<td>Run-Off Road</td>
<td>Fatal</td>
<td>N/A</td>
<td>1</td>
<td>Yes</td>
<td>Ran off Right side of road and overturned</td>
</tr>
<tr>
<td>18</td>
<td>22</td>
<td>Ped = 27</td>
<td>55</td>
<td>Pedestrian</td>
<td>Unknown</td>
<td>Fatal</td>
<td>Ped</td>
<td>No</td>
<td>Ped had BAC of 0.33, was either walking or standing in travel lane</td>
</tr>
<tr>
<td>19</td>
<td>45</td>
<td>Ped = 53</td>
<td>50</td>
<td>Pedestrian</td>
<td>None</td>
<td>Fatal</td>
<td>Ped</td>
<td>No</td>
<td>Pedestrian wore dark clothes/ did not respond to any vehicle horns</td>
</tr>
</tbody>
</table>
Chapman Hwy
Typical Section from Seymour and Sevierville
**Alternative 1**
Widen to 5-Lane

**Pros**
- Provides Efficient Operations
- Improves Future Capacity
- Improves Travel Time Reliability
- Improves Safety

**Cons**
- Cost $40 to 50 million
- Time for Delivery
  - Volume do not support concept in near future
  - Competes for funding with other Regional Projects
- Project Impacts
  - ROW Acquisition
  - Utility Relocations
Alternative 2
3-Lane

Pros

- Improves Safety
- Provides Center Turn Lane
- Buffer between opposing traffic
- Safe Refuge for turning traffic
- Reduces Rear-end crashes
- Improves access

- Provides 7 ft. paved shoulders
- Refuge for emergency or disabled vehicles
- Recovery area for errant vehicle
- Safe refuge for mail carrier
- Use for right turning traffic

- Traffic Calming and Reduces speed differentials
- Eliminates Weaving
- Simplifying road scanning and gap selection for entering vehicles
- Cost $1.5 to 2.5 million, Potential Safety Project through HSIP funds

Cons

- Increases time spent following
- Limits Future Capacity

Correctable Problems with 3-Lane

<table>
<thead>
<tr>
<th>Category</th>
<th>Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety</td>
<td>Rear-end crashes with left-turning traffic due to speed discrepancies</td>
</tr>
<tr>
<td></td>
<td>Sideswipe crashes due to lane changes</td>
</tr>
<tr>
<td></td>
<td>Left-turn crashes due to negative offset left turns from the inside lanes</td>
</tr>
<tr>
<td></td>
<td>Bicycle and pedestrian crashes</td>
</tr>
<tr>
<td>Operational</td>
<td>Delays associated with left-turning traffic</td>
</tr>
<tr>
<td></td>
<td>Side street delays at unsignalized intersections</td>
</tr>
<tr>
<td></td>
<td>Bicycle operational delay due to shared lane with vehicles or sidewalk use</td>
</tr>
<tr>
<td>Other</td>
<td>Bicycle and pedestrian accommodation due to lack of facilities</td>
</tr>
<tr>
<td></td>
<td>Aesthetics</td>
</tr>
<tr>
<td></td>
<td>Traffic calming</td>
</tr>
</tbody>
</table>
Alternative 3
Modified 3-Lane with Passing

**Pros**
- Improves Safety
- Provide safe designated passing areas
- Provides Center Turn Lane
  - Buffer between opposing traffic
  - Safe Refuge for turning traffic
  - Reduces Rear-end crashes
  - Improves access
- Provides 7 ft. paved shoulders
  - Refuge for emergency or disabled vehicles
  - Recovery area for errant vehicle
  - Safe refuge for mail carrier
  - Use for right turning traffic
- Traffic Calming and Reduces speed differentials
- Eliminates Weaving
- Simplifying road scanning & gap selection for entering vehicles
- Cost $1.5 to 2.5 million, Potential Safety Project, HSIP funds

**Cons**
- Some time spent following
- Limits Future Capacity
Thank you

Questions & Comments

NATHAN VATTER, REGION 1 TRAFFIC ENGINEER