Asheville
Road Safety Audit 1 Report
Tunnel Road North

October 27-28, 2015

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Introduction

Background

The City of Asheville lies in the Blue Ridge Mountains and is the largest city in western North Carolina. The city has a population of 83,393 with 424,858 people in the four-county metropolitan area according to the 2010 census. It is a popular tourist destination because of the many attractions in and around the city limits, including the Biltmore Estate, The Blue Ridge Parkway, numerous hiking trails, and many acclaimed restaurants and breweries.

The North Carolina Department of Transportation (NCDOT) published the *North Carolina Pedestrian Crash Facts 2008-2012* in 2014 and the city of Asheville was identified as one of the cities with higher rates of pedestrian/motor vehicle crashes. The objective of this effort is to identify potential strategies to improve the pedestrian environment in Asheville, NC. The initial task included conducting a review of pedestrian and bicycle crashes in the City of Asheville to identify contributing factors, trends, and patterns from the ten most recent years of available crash data. Based on this review of crash data along with additional input from a Steering Committee comprised of NCDOT and City representatives, thirteen locations were selected as candidate locations for more detailed study. The Steering Committee further refined the list down to three specific corridors identified for a pedestrian and bicycle-focused road safety audit (RSA) by an independent, multi-disciplinary RSA team. Once the specific locations were chosen, the RSA team analyzed data from several different sources to gain a better understanding of the conditions surrounding the RSA locations. Some sources of the data include the Asheville Redefining Transit (ART) system, pedestrian counts, intersection movement counts, vehicle and pedestrian crash data, and traffic counts. This report summarizes the findings and recommendations of the first RSA conducted, which included a safety review of Tunnel Road (US 70), from Old Chunns Road to the I-240 Exit 6 ramps.

RSA Site Location

In light of the frequency of severe pedestrian and bicyclist crashes, Tunnel Road (US 70) was selected as the focus of this effort. As shown in Figure 1 and Figure 2, the segment between Old Chunns Cove Road and the I-240 Exit 6 ramps was examined as part of this RSA.

Figure 1. Location of RSA 1.

Figure 2. Map of the RSA corridor.

Geometric Conditions and Multimodal Volume Summary

Tunnel Road, between Old Chunns Cove Road and the I-240 Exit 6 ramps, is a five-lane roadway with two through lanes in each direction and a two-way left-turn lane in the center of the roadway. The cross-section changes north of Chunns Cove Road as the inside through lane drops leaving one lane northbound. Also, the road narrows to one lane in each direction just south of the tunnel and continues through the tunnel. This segment is 2,600 ft long and has a posted speed limit of 35 mph.

The City of Asheville lies on mountainous terrain and the corridor has an approximately 6-percent downgrade when traveling southbound. This can lead to increased vehicle speeds during periods of lighter traffic (i.e., nighttime after the PM peak). There are three signalized intersections along the corridor, which are located at (1) the main driveway for the Ingles supermarket, (2) the intersection of Chunns Cove Road, and (3) the I-240 Exit 6 ramps. There are many businesses along the corridor, including hotels, long-standing motor lodges, restaurants, attached commercial uses, gas stations, and an Ingles supermarket. Because of the high density of businesses along Tunnel Road, the corridor is filled with closely-spaced driveways to provide access to these businesses.

Vehicle Traffic

The 2014 annual average daily traffic (AADT) in the northern section of the corridor, between Old Chunns Cove Road and Chunns Cove Road, is 12,000 vehicles per day. In the southern section, between Chunns Cove Road and the I-240 ramps, the AADT is 14,000 vehicles per day.

Pedestrian Traffic

The RSA team gathered available information on pedestrian activity from the City of Asheville and NCDOT to the best extent possible. To supplement available data and obtain a quantifiable volume for pedestrian activity, a new pedestrian count was conducted on two sections of Tunnel Road on Thursday, January 14, 2016. Although the schedule dictated an off-season count, the day selected was relatively warm with clear weather (high 58°F, 0.0 in precipitation) so pedestrians would be active. The 13-hour count began at 6:00 a.m. and ended at 7:00 p.m. The northern section (Section 1) was between the signal at the entrance to Ingles and Chunns Cove Road. The southern section (Section 2) was between Chunns Cove Road and the signal at the I-240 ramps. Within each section, pedestrian counts were grouped into individual zones, represented by the yellow arrows shown in Figure 3. Although the team observed a large

amount of pedestrian activity in January, it can be presumed that pedestrian volumes will be higher in the peak seasons.

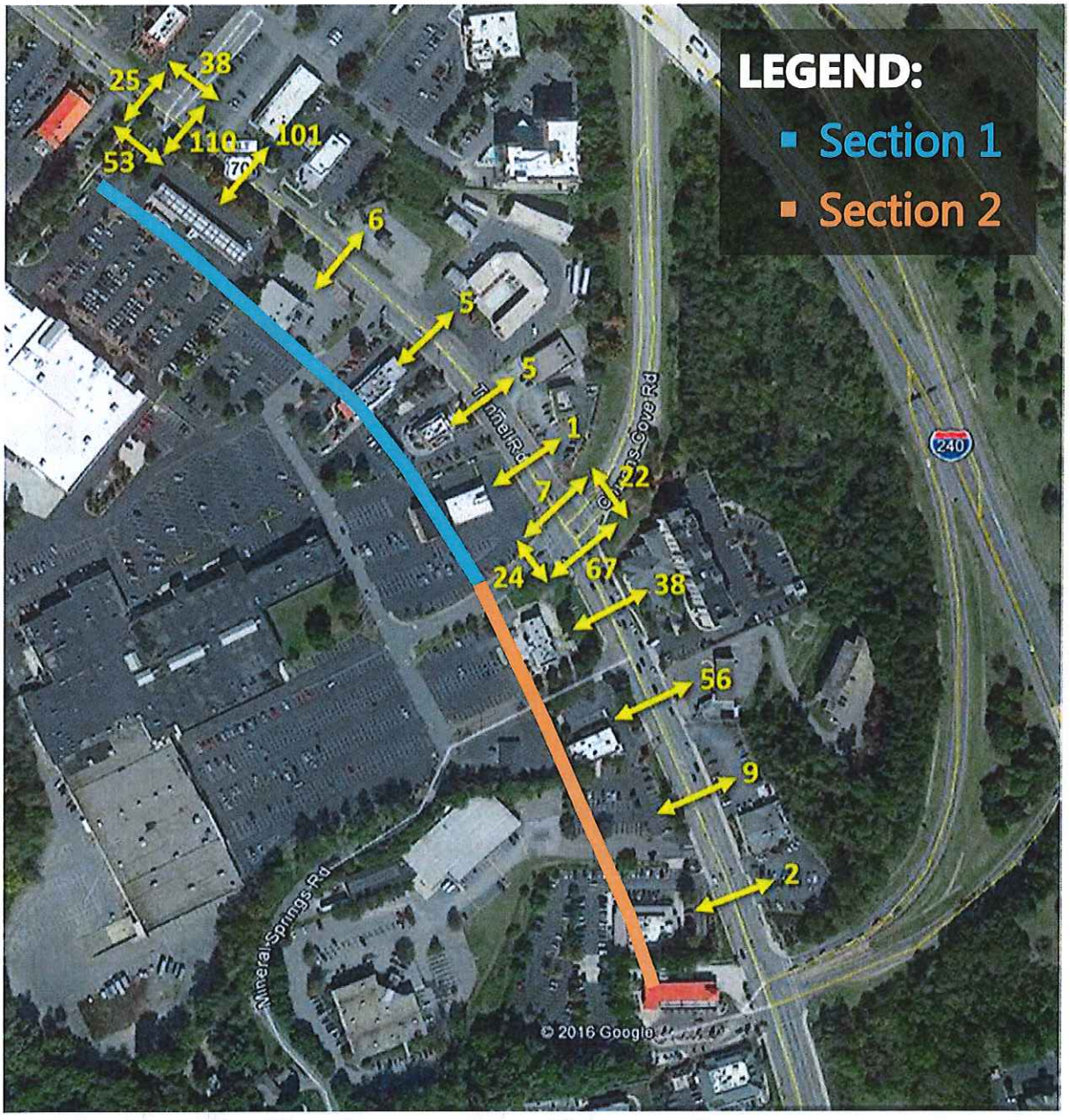


Figure 3. Number of pedestrian trips in the RSA study area (13-hour count).

Section 1

A total of 162 pedestrians were observed crossing the road in Section 1. The majority of the pedestrians (86 percent) crossed Tunnel Road in the 225-ft. segment between the signalized intersection to the Ingles supermarket and the driveway exiting Ingles Gas Express. The largest generators of pedestrian traffic are the Ingles supermarket and adjacent bus stop. These

destinations accounted for 59 percent of observed pedestrian trips in Section 1. As shown in Figure 4, the majority (73 percent) of pedestrians made trips in the afternoon (12 noon to 7:00 p.m.), with almost half (48 percent) of all pedestrian trips taking place in the evening (3:00 p.m. and 7:00 p.m.).

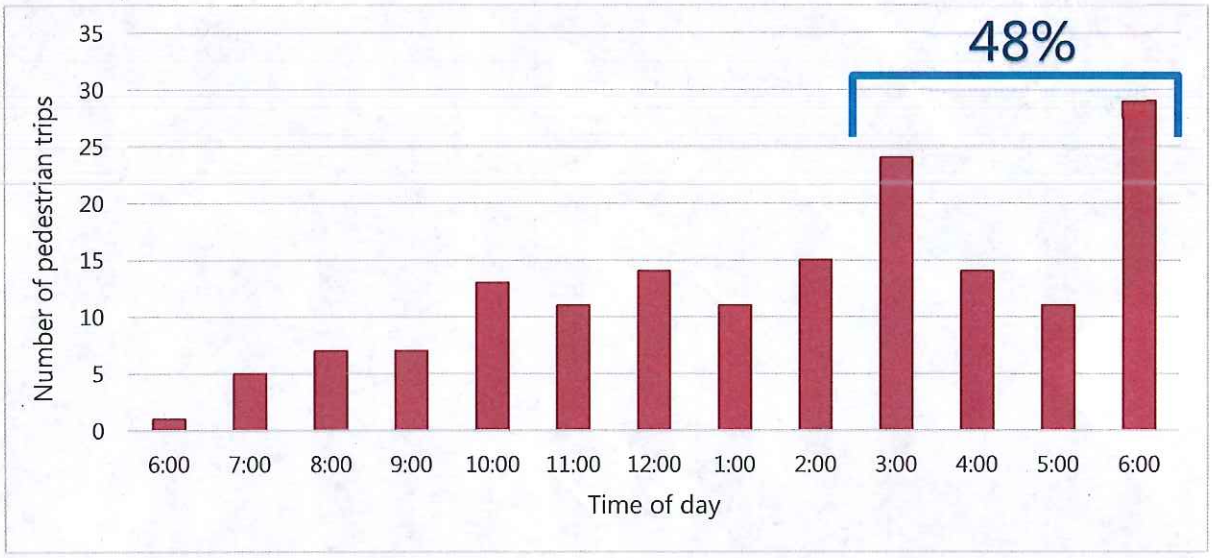


Figure 4. Pedestrian Trips on Section 2 of Tunnel Road.

Section 2

A total of 143 pedestrians were observed crossing the road in Section 2. The majority of the pedestrians (56 percent) crossed the segment of Tunnel Road between Mineral Springs Road and just south of the Applebee's driveway. Approximately 80 percent of pedestrians performed midblock crossings and did not use the crosswalks at Chunns Cove Road and the I-240 ramps. As shown in Figure 5, pedestrian traffic increased as the day progressed.

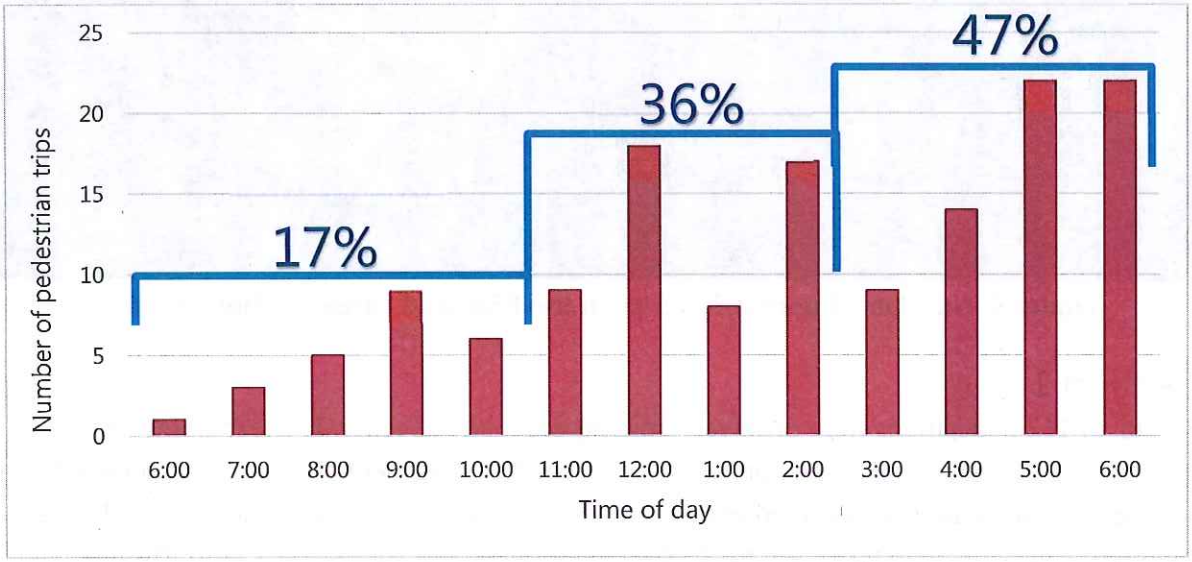


Figure 5. Pedestrian Trips on Section 2 of Tunnel Road.

Bicycle Traffic

Bicyclists were also counted in the 13-hour traffic count that took place on January 14, 2016. There were six observed bicyclists at the intersection of Tunnel Road and the Ingles Driveway and seven observed bicyclists at the intersection of Tunnel Road and Chunns Cove Road. This represents a low demand, particularly when compared with other areas of the City. The lack of space for bicyclists within the tunnel north of the corridor, likely reduces cycling demand along this corridor.

Transit

The Asheville Redefines Transit (ART) transit system has 6 bus stops along the corridor, which have an average of 393 boardings and alightings per weekday. Transit is a generator of pedestrian activity, with the most popular destination being the Ingles supermarket.
The areas north, west, and southwest of the corridor are residential, which makes Tunnel Road a desirable destination for vehicles and pedestrians because of the available amenities (e.g., restaurants, shops, banks) along the corridor.

Crash History

The vehicle crash analysis period for this RSA spanned five years, from September 1, 2010 to August 31, 2015. The pedestrian and bicyclist crash analysis period for this RSA spanned 10 years, from 2005 to 2014. NCDOT's Traffic Safety Systems Section provided the crash data. Note that the North Carolina Crash Report Form (DMV-349) defines crash severity by the following categories:

- *Killed.*
- *A type injury (disabling).*
- *B type injury (evident).*
- *C type injury (possible).*
- *Property damage only.*
- *Unknown.*

Pedestrian and Bicyclist Crash History

In the past 10 years (2005–2014), 18 pedestrian crashes and 2 bicycle crashes were reported within the study corridor (see Figure 6. Location of pedestrian and bicycle crashes on Tunnel Road North.). These 20 reported crashes included one fatality, one A-injury, six B-injuries, eight C-injuries, three property damage only crashes, and one crash where the severity is unknown. Nine of the crashes (45 percent) occurred while it was dark, and three crashes (15 percent) occurred when the road was wet. The fatality in 2010 occurred while the roadway was dark and

wet. Additional details relating to these crashes are contained in the RSA Team packet provided in the Appendix.

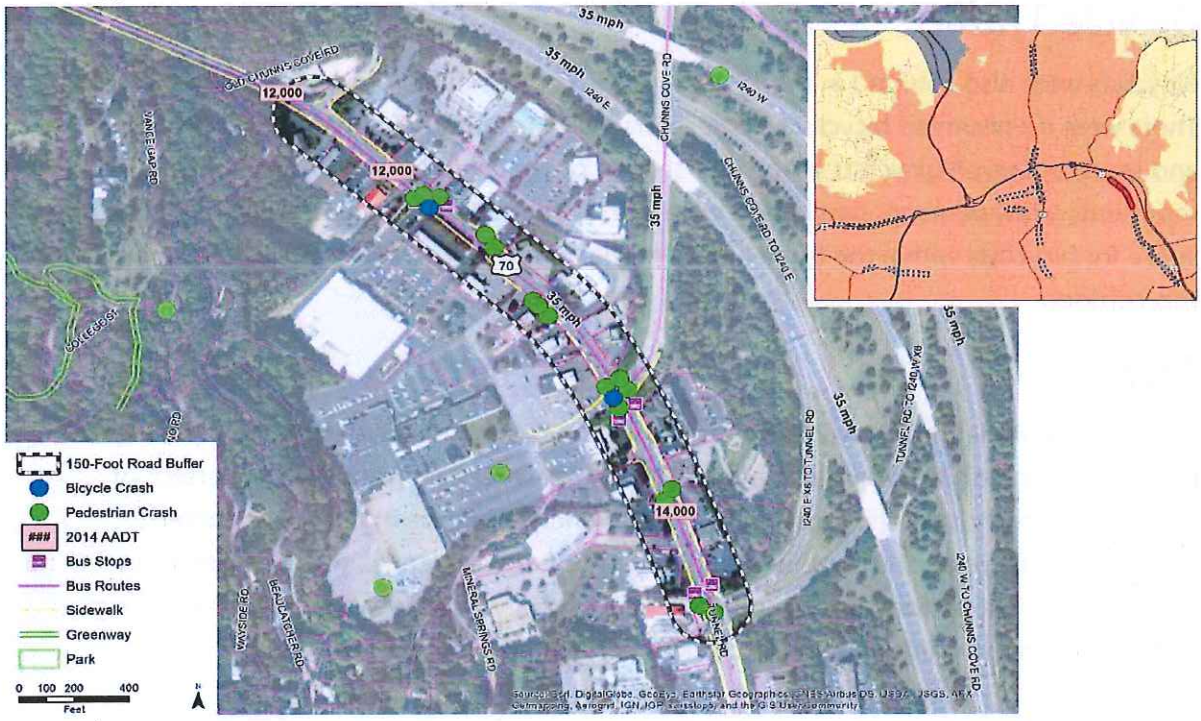


Figure 6. Location of pedestrian and bicycle crashes on Tunnel Road North.

Vehicle Crash History

During the five-year analysis period (9/1/10 to 8/31/15), there were 169 reported vehicle crashes within the study area of Tunnel Road (mileposts 15.61 - 16.09). Figures 7 through 11 illustrate the location, speed, severity, crash type, and other characteristics of each crash in the past three years (9/1/12 to 8/31/15). The crash data reveals that rear end crashes are the most common crash type at 27 percent of the total crashes, followed by angle crashes at 25 percent, left-turn (same roadway) at 10 percent, and sideswipe (same direction) also at 10 percent. Table 1 shows the severity and crash type of all collisions in the five-year study period. Rear end and angle crashes account for 51 percent of the total number of crashes.

Figure 7. Collision Diagram from Old Chunns Cove Road to the Ingles Driveway.

Figure 8. Collision Diagram from the Ingles Driveway to the Taco Bell Driveway.

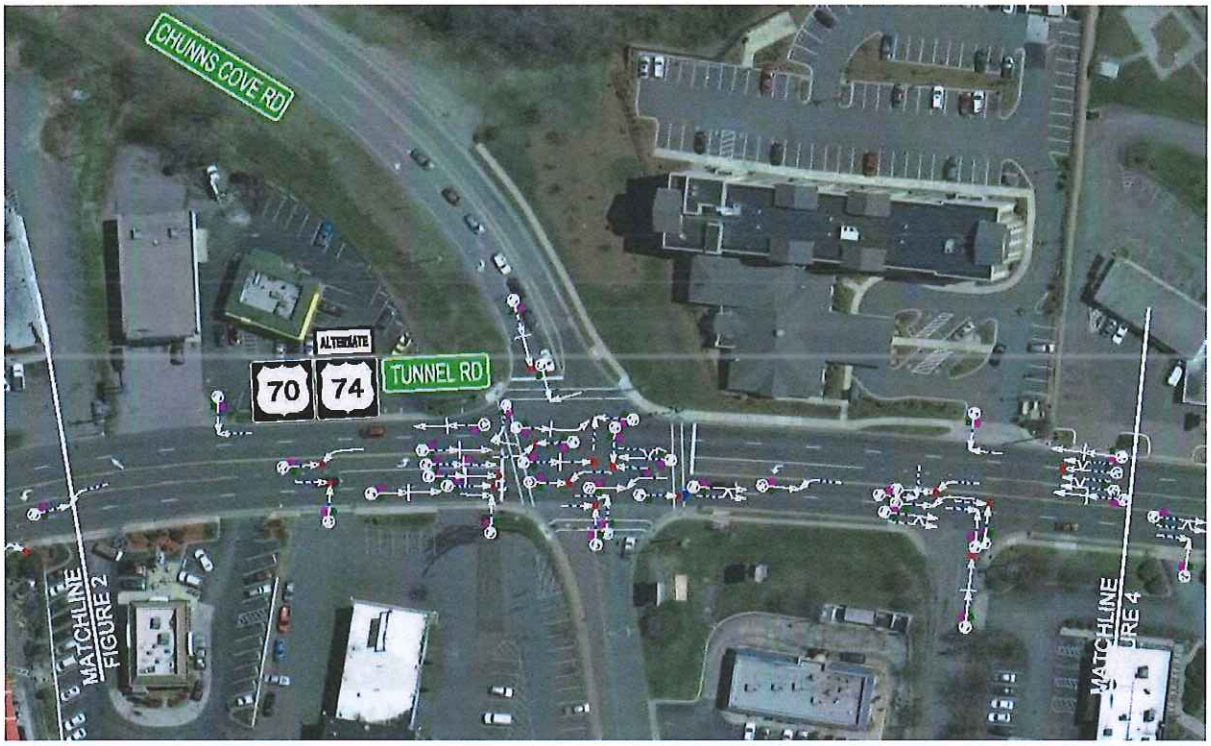


Figure 9. Collision Diagram from the Taco Bell Driveway to the Applebee's Driveway.

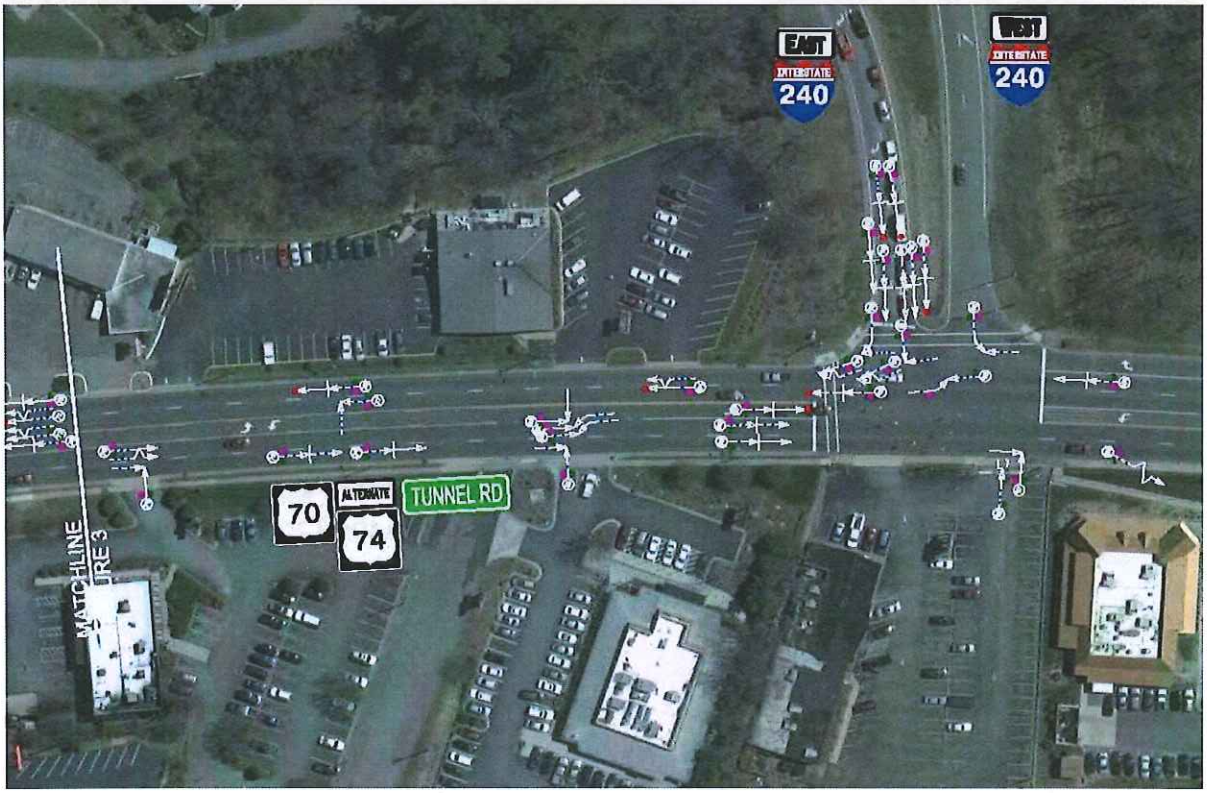


Figure 10. Collision Diagram from the Applebee's Driveway to the I-240 Exit 6 Ramps.

Table 1. Tunnel North Crash Summary (Sept. 2010 – Aug. 2015).

Highest Injury Severity	Crash Type	Number of Crashes	Percent of Total
	Fatal	1	0.6
	Class A (Disabling injury)	1	0.6
	Class B (Evident injury)	14	8.3
	Class C (Possible injury)	38	22.5
	Property Damage Only	115	68.0
	TOTAL	169	100.0
Crash Type			
	Rear end, slow or stop	45	26.63
	Angle	42	24.85
	Sideswipe, same direction	18	10.65
	Left turn, same roadway	17	10.06
	Ran off road – right	10	5.92
	Left turn, different roadways	9	5.33
	Pedestrian	6	3.55
	Fixed object	4	2.37
	Right turn, different roadways	4	2.37
	Right turn, same roadway	4	2.37
	Rear end, turn	3	1.78
	Sideswide, opposite direction	3	1.78
	Movable object	2	1.18
	Backing up	1	0.59
	Pedalcyclist	1	0.59
	Other Collision with Vehicle	1	0.59
	TOTAL	169	100.00

Figure 11 depicts the distribution of crashes along the study area by 1/100th of a mile (52.8 feet) beginning at milepost 15.61 (just west of Old Chunns Cove Road) and ending at milepost 16.09 (just east of the I-240 ramps). The key intersections are labeled in Figure 11, which shows that 83 crashes (49 percent) occurred within the functional area (0.03 mile or 158 ft.) of the three signalized intersections (Ingles, Chunns Cove Road, and I-240 ramps); however, collisions occurred between signalized intersections as well.

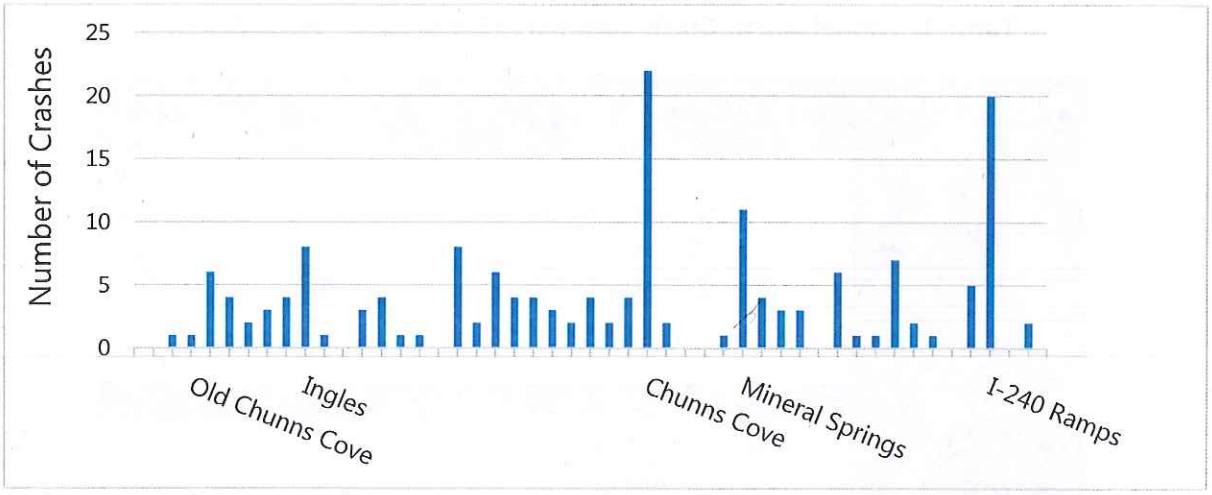


Figure 11. Histogram of vehicular crashes along Tunnel Road, Sept 2010 through Aug 2015.

RSA Team

The success of a comprehensive RSA hinges on the strength of the team. The members of the RSA team were chosen to represent the wide array of transportation professionals. Each person offers a unique perspective based on their line of work and experience.

Table 2 includes the names and contact information of the RSA team members.

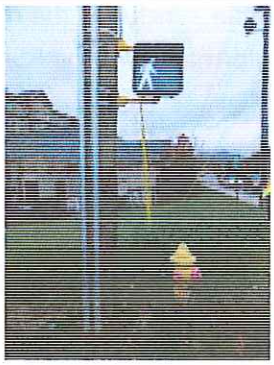
Table 2. RSA team members and stakeholders.

Name	Organization	Email Address
NCDOT Division Staff		
Scott Cook	NCDOT Division 14 Traffic Engineer	scook@ncdot.gov
NCDOT Regional Staff		
John Button	NCDOT Triad Regional Traffic Safety Engineer	jbutton@ncdot.gov
NCDOT Signals Staff		
Zach Little	NCDOT – Signal Design Section	zmlittle@ncdot.gov
Tim Williams	NCDOT – Signal Design Section	tjwilliams@ncdot.gov
NCDOT Safety Staff		
Susie James	NCDOT – Traffic Safety Unit	sjjames@ncdot.gov
City Staff		
Mark Young	City of Morganton City Engineer	myoung@ci.morganton.nc.us
Asheville Police Department		
Scott Fry	Asheville Police Department	sfry@ashevillenc.gov
VHB		
Andrew Topp	VHB Senior Project Manager	atopp@vhb.com
Frank Gross	VHB Highway Safety Engineer	fgross@vhb.com
Matt Albee	VHB Transportation Analyst	malbee@vhb.com

Assessment Findings

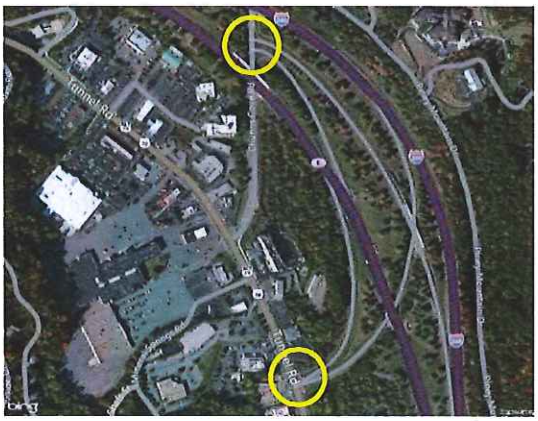
The team conducted the RSA on Tuesday, October 27, 2015 and Wednesday, October 28, 2015. The team visited the corridor on three different occasions to observe the PM peak, nighttime operations, and the AM peak. The RSA team noted both positive features and potential safety concerns found throughout the study locations; both are detailed in the following sections.

Positive Existing Features



Based on its review of existing site conditions, the RSA team identified the following positive characteristics of the roadway:

- In areas where **redevelopment** has occurred, **sidewalks** have been built or improved to meet the City of Asheville Standard Specifications and Details Manual; however, there are still areas lacking sidewalks and connectivity.
- The consistent spacing of the **roadway lighting** on both sides of the road enhances nighttime visibility, but there were some areas where tree foliage blocked streetlights and other streetlights where the bulbs were out.
- **Pedestrian signals** and **pushbuttons** are present at signalized intersections. Pedestrian signals enhance safety by providing a designated crossing time and alerting pedestrians to the appropriate time to cross. Studies have shown that more pedestrians enter on the 'do not walk' but fewer pedestrians are in the roadway at the end of the phase.
- The **bus stops are well-lit.** Since buses generate pedestrian activity, a well-lit bus stop is important to improve pedestrian visibility to all users.
- The **guide signs** along the corridor are useful for unfamiliar drivers. This was especially helpful near the I-240 ramps because the Exit 6 interchange is unconventional. The entrance and exit ramps for I-240 Exit 6 are split up between two intersections. The intersection with Tunnel Road is the exit for I-240 E and entrance for I-240 W. The entrance for I-240 E and the exit for I-240 W is located on Chunns Cove Road, almost a quarter-mile north of its intersection with Tunnel Road. Appropriate signage helps reduce driver confusion and the potential for wrong-way driving.



- The traffic signals seem to accommodate the vehicular demand (i.e., **lack of congestion**). The team did not observe instances of significant queueing or delay; however, the team identified potential operational improvements.
- The corridor uses **raised pavement markings** (RPMs) to increase nighttime visibility of the travel lanes. This is especially effective when the pavement is wet.

Identified Safety Issues and Suggestions for Improvement

Upon completing the data analyses and field observations, the RSA team identified 10 overarching issues that are summarized in
Table 4. Members of the RSA team were given three votes to select the issues that they thought were the highest priority. The results of the voting are given in Table 3.

Table 3. Ranking of Issues by RSA Team.

Number of votes	Issue
9	Crossings
7	Continuity and Connectivity of the Pedestrian Network
6	Driveway Conflicts / Access Management
2	Pedestrian/Driver Behavior
1	Maintenance and Drainage
1	Signals, Signs, and Markings
0	Lighting
0	Geometric Design
0	Continuity and Connectivity of the Bicycle Network
0	Bus Stops

For each issue identified, the team proposed one or more targeted countermeasures to address the issue. The suggestions have been categorized as near-term, intermediate, and long-term. Near-term improvements can typically be implemented through maintenance forces, while intermediate and long-term improvements often require additional planning, design, and funding.

Table 4. Noted overarching safety issues and suggestions for improvement.

1. Crossings	
Issue Description	**Suggested Action**
• Wide crossing distance - Tunnel Road is a five-lane cross-section, which results in a long crossing distance (approximately 55 feet at its widest) - Large corner radius increases crossing distance and allows vehicles to turn at higher speeds at the intersections of Tunnel Road with the I-240 ramps and Chunns Cove Road (NE and SE). - Excess capacity on minor roads (separate left-turn lane for split phase) increases the crossing distance for pedestrians • Lack of median refuge islands - I-240 ramp (and other side roads)  - Open median/two-way left-turn lane along Tunnel Road • Lack of crosswalk markings, particularly at Ingles intersection • Narrow truncated domes • At several crossings, the orientation of curb ramps and truncated domes are not properly aligned, therefore users (especially visually impaired pedestrians) could be misled into	**Near Term** • Consider installing high visibility pavement markings at signalized intersections when resurfaced • Remove antiquated truncated domes and replace with standard ADA-compliant domes **Intermediate** • Add pedestrian phase to westbound approach at I-240 interchange and consider extending the median to install a pedestrian refuge island [Note the RSA team observed large trucks turning left from Tunnel Road onto the I-240 ramp and the extension of the median should not create issues with turning radius] **Long Term** • Consider consolidating eastbound approach turn lanes at the I-240 ramps and reducing southeast and northeast corner radii to narrow crossing distance and to reduce turning speeds • At Chunns Cove Road, consider reducing the radius of the southeast corner • The team decided that a more detailed evaluation of midblock crossing opportunities should be conducted at the conclusion of the RSA. This included the collection of new pedestrian data along the corridor (Figure 3) and review of applicable NCDOT/FHWA/ITE guidance concerning midblock crossings. Below are some noted findings from this evaluation: - According to the, North Carolina Pedestrian Crossing Guidance midblock crossings should be located at least 400 ft. from signalized intersections. The space between the closest Chunns Cove Road and I-240

the intersection rather than into the crosswalk  *Truncated dome plate is not centered in the curb ramp, and the ramp and dome direct pedestrians into the center of the intersection*	Ramps crosswalks is approximately 800 feet, which immediately limits consideration of a crosswalk between those signals. Space between Chunns Cove Road and the Ingles signal is about 965 feet, which provides only a narrow distance for a midblock crossing. - Secondly, there must be sufficient demand to warrant a new midblock crossing. There were only 11 pedestrians counted crossing the middle third of this block, which is well under NCDOT's minimum of 25 pedestrian's per hour for at least four hours of a typical day. Even if the pedestrian volumes were adjusted upward to reflect peak season conditions, the midblock pedestrian volumes are not expected to meet this minimum criteria anywhere.

2. Continuity and Connectivity of Pedestrian Network

Issue Description	Suggested Action
• Gaps in the sidewalk network, mainly the east side of Tunnel Road, north of Chunns Cove Road 	**Intermediate** • Install pedestrian signals at the I-240 intersection • Consider community development building grant (CDBG) opportunities to fill-in gaps in the pedestrian network • Look into local ordinances to pay for sidewalk installation/repair/redesign - Sidewalk should continue across driveways rather than driveways continuing across sidewalks - Minimum of 5-ft widths per Table 3-19 of the City of Asheville Standard Specifications and Details Manual - Eliminate the buffer strip on the west side of Tunnel Road (near the tunnel) and infill with sidewalk - Eliminate obstructions in sidewalk - Ensure accessibility to bus stops - Consider landing space for kneeling buses • Install curb to separate the sidewalk and travel way on the west side of Tunnel Road (near the tunnel)

Gaps in the sidewalk network

- Lack of pedestrian signals at I-240 ramps
- The bus stop just north of the I-240 ramps on the west side of Tunnel road is the only bus stop without proper access to the bus from the sidewalk
- Sidewalks stop at most driveways rather than continuing sidewalks across driveways, which sends a message of priority to the driver rather than the pedestrian
- Narrow sidewalks (4 ft in many locations)
- Narrow or nonexistent buffer (1 ft or less)

- Obstructions in sidewalk (e.g., utility pole) in a few locations

Long Term

- Fill-in gaps and enhance sidewalk network as redevelopment occurs. For example, sidewalks should continue across driveways rather than driveways continuing across sidewalks, widen sidewalks to 6 ft, and eliminate obstructions in sidewalk.

Example of a sidewalk stopping at driveway, instead of continuing across driveways

3. Driveway Conflicts / Access Management

Issue Description

- The large number of closely spaced openings leads to a higher chance of collisions between turning vehicles and through vehicles, bicyclists, and pedestrians.
- Some openings are wider than needed. These large distances increase pedestrian exposure to vehicles and allow vehicles to enter and exit driveways at higher speeds.

Example of an unnecessarily wide driveway

- Some driveways are located within the functional area of intersections. The RSA team noted this as a particular issue at signalized intersections. This adds additional conflict points to an area of the roadway that is already demanding in terms of information processing and potential conflicts. The AASHTO Green Book notes that "Driveways and entrances should be located away from

Suggested Action

Near Term

- Consider targeted signing to restrict left-turn movements at driveways that are not currently restricted (Ingles Gas Express Exit and Mineral Springs Road are currently restricted)
- Start conversations with business owners to identify opportunities to consolidate, share, and narrow driveway openings
  - For shared locations, consider shared signing in splitter island
  - Check access management manual for preferred widths
  - Prioritize removal of driveways within functional area of intersection
- Review State and local access policies
  - Consider opportunities to strengthen local ordinances to support decisions

Intermediate

- Consider installing a "pork chop" island through a phased approach; start with paint and move to a raised island at the driveways with existing left-turn restrictions (e.g., Ingles exit, Mineral Springs Road) [Note there is a need to accommodate pedestrians in the design of any pork chop islands.]

other intersections to minimize crashes, to reduce traffic interference, and to provide for adequate storage lengths for vehicles turning into entrances."

- Lack of physical elements to prohibit left-turns at locations with left-turn restrictions. Existing signage and pavement markings are not effective at these locations.

The RSA team observed that signage and pavement markings are not effective in preventing vehicles from turning left. This location is at the exit of the Ingles gas station.

Long Term

- Close, consolidate, narrow driveways as redevelopment occurs
  - Prioritize removal of driveways within functional area of intersection
- A raised median is a standard measure for addressing driveway conflicts; however, the team decided not to recommend a median at this time for the following reasons:
  - Difficult to accommodate u-turns
  - With I-240 serving as a parallel route for through traffic, Tunnel Road can accommodate a high level of access
  - Driveway crash patterns may not be substantial enough to warrant high costs and impacts associated with a median
  - Pushback from businesses
- An alternative to a median is for better connectivity between businesses
  - The grade and terrain will make it difficult to connect several lots

4. Pedestrian and Driver Behavior

Issue Description	Suggested Action
• There are several points of interest on both sides of Tunnel Road, which attract midblock crossings. The only crosswalks are located at signalized intersections, which are spaced approximately 1,000 ft apart. So many pedestrians are choosing to cross midblock rather than walk to the nearest crosswalk.  • The RSA team observed several pedestrians crossing against the signal. This was a particular	**Near Term** • Continue current citywide campaign (Watch for Me NC)  • Target crosswalks for enforcement (of drivers failing to yield and of pedestrians crossing against the signal)

concern for pedestrians alighting the bus at bus stops.  *Pedestrians crossed Tunnel Road at Chunns Cove Road immediately after alighting the bus without waiting for the pedestrian signal. In this instance, vehicles with a green light on Tunnel Road had to yield in the road for the pedestrians* • Although there is a noticeable downgrade in the southbound direction, speeding during the day is not an apparent issue due to vehicles stopped at the signals and higher traffic volumes relative to nighttime traffic volumes (vehicles are traveling at 35-45 mph and there are no citizen complaints, as reported by the local police representative) • Northbound drivers at Ingles intersection passed stopped bus using left-turn lane • Aggressive driving and lack of driver courtesy where lanes merge north of Chunns Cove Road	• Consider opportunities to include audible safety messages on buses and with signs/posters inside the buses • Consider targeted enforcement for vehicles passing stopped bus using left-turn lane at the Ingles intersection • Install additional signing/marking to alert drivers to the lane drop and which lane drops north of the Chunns Cove Road intersection **Intermediate** • Consider opportunity to eliminate the second northbound lane north of Chunns Cove Road. The lane drop would occur as a continuous right-turn lane onto Chunns Cove Road (an operational comparison of this scenario is included in the following section) - The additional space gained could be alternatively be used for a sidewalk (currently missing), planting strip, or wide outside lane. - Consider right-turn volumes at Chunns Cove Road to test whether this option is viable and does not create additional weaving and queueing (see operational analysis in the following section).

5. Maintenance and Drainage	
Issue Description	**Suggested Action**
• Drainage issues - Lack of storage ponds and best management practices (BMPs) for storm water management - Large impervious areas - Water ponding in parking areas and flowing onto sidewalks - Water sheeting across driveways onto sidewalks - The bars on drainage grates are spaced too far apart so that bicycle tires could fall through	**Near Term** • Replace drainage grates with bicycle-friendly grates • Alert city to maintenance issues • Review City storm water ordinances (Phase 2 or MS4) **Intermediate** • Install curb near tunnel to separate sidewalk and roadway

Water has gathered in the corner of the parking lot and has leached through the ground flowing onto the sidewalk

- Sidewalk disrepair
  - Tripping hazards (settling)
  - Broken sidewalks
  - Drop-offs adjacent to sidewalk
  - Near tunnel there is exposed rock and no sidewalk to act as a buffer between pedestrians and vehicles
- Lack of curb in some locations
  - West side of Tunnel Road (near tunnel)

Example of sidewalk disrepair

This drainage grate is located just south of the Telco Community Credit Union, on the north side of Tunnel Road

6. Signals, Signs, and Markings	
Issue Description	**Suggested Action**
• Southbound protected-only left-turn phase at I-240 intersection may be unnecessary • Lack of high visibility pedestrian markings • Inconspicuous speed limit sign (southbound exiting tunnel) [Note that most RSA team members agreed that speed limit signs are a good reminder, but at least one member indicated that they may not be necessary given the 35 mph statutory speed.]	**Near Term** • Consider replacing fully protected southbound left-turn signal at I-240 intersection with protected/permitted movement and Flashing Yellow Arrow (FYA) - Look at conflicting movements and monitor crashes after installation to see if left-turn crashes increase - In northbound direction (for left-turn into car wash), consider 3-section FYA to allow lag in southbound direction • Install high-visibility crosswalks on all approaches of signalized intersections (piano key style)

- Historical Marker sign at Chunns Cove Road is obstructing/cluttering other information (important message is the lane drop)

  - Consider wheel paths for cars and motorcycles to help with maintenance and friction for motorcycles
- Consider increasing the conspicuity of the speed limit sign near the tunnel
- Consider relocating historical sign at Chunns Cove Road to eliminate sign clutter

7. Lighting	
Issue Description	**Suggested Action**
• Street light near Blue Ridge Motor Lodge is out • Trees in front of Applebee's and near tunnel (west side) cast shadows below light  • Dark spot on east side of Tunnel Road near tunnel (where sidewalk exits tunnel) • Dark spot at Ingles intersection (good lighting at other signals)	**Near Term** • Replace light at Blue Ridge Motor Lodge • Remove branches or trees that are blocking street lights **Long Term** • Add lighting near tunnel and the signalized intersection at Ingles

8. Geometric Design	
Issue Description	**Suggested Action**
• Unusual widening near McDonalds on west side of Tunnel Road south of Ingles intersection, likely part of an old bus turnout  • Tunnel - Narrow pedestrian accommodations - Narrow bicycle accommodations  • Vertical grade contributes to downhill speeds • Vertical grade slows down bicycles traveling uphill	**Intermediate** • Reclaim unused roadway space near McDonalds to allocate for sidewalk/bus stop accommodations • Widening the tunnel is cost-prohibitive; however, the team discussed reallocating sidewalk and travel lane widths within the tunnel, but decided not to recommend any changes. Reducing lane widths to widen the sidewalk was not advised since it could result in increased vehicle or bicycle crashes. In addition, shifting the lanes is not feasible due to clearance height within the tunnel. Due to the current tunnel width and its difficulty to safely accommodate bicyclists, NCDOT has expressed concerns with designs that attract bicyclists to this location.