

Chapter 1

**Purpose of and
Need for Action**

1.0 PURPOSE OF AND NEED FOR ACTION

The North Carolina Department of Transportation's (NCDOT, 2005) 2006-2012 *Transportation Improvement Program* (TIP) includes a highway improvement project in Caldwell and Watauga counties at Blowing Rock from SR 1500 (Blackberry Road) north to US 221 in Blowing Rock. Consequently, studies are underway in accordance with the requirements set forth in the North Carolina Environmental Policy Act (NCEPA). This purpose and need statement explains why an improvement should be implemented.

1.1 Project Need

The primary needs of the proposed action include:

- **Traffic service deficiencies exist along US 321 within the project area and service will continue to deteriorate.**

US 321 currently operates at a peak hour level of service (LOS) F between Blackberry Road and Green Hill Road (in Blowing Rock). Since LOS F reflects traffic volumes greater than the capacity of the road, it indicates high delays and basically no passing opportunities exist during peak periods. A primary reason for this condition is the mountainous terrain of the southern half of the project, which results in slow uphill truck speeds. Within the balance of the project area in Blowing Rock, the level of service is undesirable (LOS D/E) all along US 321.

In 2025, US 321 south of Green Hill Road would continue to operate at LOS F in the peak periods, although delays would increase substantially as traffic grows. Operations on US 321 through Blowing Rock would operate at LOS E between Green Hill Road and US 321 Business. Between US 321 Business and US 221, US 321 would operate at LOS F. Traffic under these conditions would be extremely congested during peak periods.

Refer to Table 1-3 and Table 1-4 in Section 1.5.6, "Level of Service," for the exact locations expected to operate at undesirable levels of service and Table 1-2 for level of service definitions.

- **Crash rates on existing US 321 within the Town of Blowing Rock are far higher than statewide averages for similar roads.**

The total crash rate for existing US 321 within Blowing Rock is higher than for similar urban US routes in North Carolina. Statewide and critical crash rates were exceeded by the total, night, and wet crash categories. Critical rates were exceeded because of rear end and lane departure crashes. The primary contributing factors for exceeding critical rates were grade, horizontal curvature, darkness, and weather.

Refer to Table 1-5 in Section 1.5.7, "Crashes/Safety," for more specific details on the types and locations of crashes.

Furthermore, in the 1989 Highway Trust Fund Act, the North Carolina State legislature designated a network of US and North Carolina highways as intrastate corridors. The Intrastate System was established to connect major population centers and provide safe, convenient travel for motorists. The intrastate system plan calls for the widening of the system's existing two-lane roads to at least four travel lanes. US 321 from the South Carolina border south of Gastonia to its junction with US 421 west of Boone is part of the Intrastate System. This corridor is defined as the principal north-south route uniting the western Piedmont region of North Carolina. The section of US 321 in the project area is the last segment of US 321 in the intrastate system for which the approach to building four lanes remains unresolved.

US 321 from Gastonia to Johnson City, Tennessee, which includes the project area, is Corridor 15 in North Carolina's Strategic Highway Corridors System. The designation of Strategic Highway Corridors recognizes the need to improve, protect, and maximize the use of a set of primarily existing highways critical to statewide mobility and regional connectivity. Each corridor represents an opportunity for the NCDOT and stakeholders to consider long-term vision, consistency in decision-making, land use partnerships, and overarching design and operational changes.

1.2 Project Purpose

The primary purposes of the proposed action include the following:

- **Improve traffic flow and level of service on US 321 from Blackberry Road to US 221.**

Without road improvements, the forecast traffic along this section of US 321 will exceed the road's capacity (and already does in some places), creating undesirable levels of service. The proposed improvement would provide congestion relief.

- **Reduce crash potential on US 321 within Blowing Rock.**

Without road improvements, high crash rates are expected to continue. The number of crashes will likely rise as traffic volumes continue to rise. Improvements would increase sight distances by straightening curves, thereby providing a new facility with better horizontal and vertical alignments. The improvements would also provide wider lanes, separate lanes for drivers turning left at key locations, and provide drivers with an additional through lane.

Furthermore, it is a purpose of the proposed action to achieve the system continuity objectives of the Highway Trust Fund Act. Improvements to US 321 in the project area also are an acknowledgement of the importance of US 321 as a Strategic Corridor.

1.3 Background Information

1.3.1 Setting and Land Use

The project area is in western North Carolina (see Figure 1-1) and encompasses the northern part of Caldwell County and the southern part of Watauga County, including the resort community of Blowing Rock (see Figure 1-2). The project area extends well east of US 321 to encompass the locations of potential bypass alternatives. Land use in the project area includes scattered rural residential development in Caldwell County and eastern Blowing Rock, as well as concentrated

Figure 1-1. Regional Map and TIP Projects

Figure 1-2. Project Area Map

low-density residential, commercial, and recreational development in Blowing Rock, both east and west of US 321. Within Blowing Rock, US 321 passes through a district that is listed in the National Register of Historic Places (NRHP). US 321 is adjacent to the Green Park Inn and the Blowing Rock Country Club, which are included in the historic district. It is adjacent to the Bollinger-Hartley House, a residential structure also listed in the National Register. Development along US 321 in the southern portion of Blowing Rock is primarily low-density residential, while the primary development along US 321 in the northern portion of Blowing Rock is highway commercial. Development in Blowing Rock off of US 321 is primarily single-family residential with very few commercial structures. The Blue Ridge Parkway is not crossed by the existing road within the project limits, but a bypass alternative assessed in this document would pass under the Parkway in a tunnel.

1.3.2 Population Growth

Traditionally, Caldwell County's population has increased at a slower rate than the surrounding counties and the State of North Carolina. However, Caldwell County's population grew 4.4 percent (67,746 to 70,709) from 1980 to 1990; between 1990 and 2000, the County experienced a 9.5 percent growth in population (70,709 to 77,415). The population is expected to increase to 86,577 by 2020, a 15.1 percent growth rate.

Watauga County's population grew by 16.7 percent from 1980 to 1990 (31,666 to 36,952); a 15.5 percent increase in population was experienced for the period 1990 to 2000 (36,952 to 42,695). The population is expected to increase 8.8 percent over the next 20 years (42,695 to 51,567). The permanent population of the Town of Blowing Rock has not changed substantially since 1980. It was 1,423 in June 2000. The census population figures do not represent the seasonal/part-year residents. Blowing Rock's population rises to about 10,000 persons in the summer months, as estimated by Blowing Rock town planners.

1.3.3 Project History

In 1993, an Environmental Assessment (EA) (NCDOT, August 1993) was prepared that recommended widening US 321 from NC 268 in Patterson to US 221 in Blowing Rock. Based on comments from state and Federal regulatory and environmental resource agencies, including the State Historic Preservation Officer, and the general public, a Finding of No Significant Impact (FONSI) (NCDOT, September 1994) was prepared for the southern 10.8 miles of the project area, from NC 268 to SR 1500 (Blackberry Road). This section has independent utility and its selection did not preclude consideration of alternatives in the Blowing Rock area. Because of the mountainous terrain, steep grades and poor alignment, improvements from NC 268 to SR 1500 (Blackberry Road) are much needed from a safety and capacity standpoint. At public hearings, representatives of government, businesses, Appalachian State University, and the public spoke in favor of a four-lane US 321 between NC 268 and US 221. However, many citizens from Blowing Rock strongly supported a project that included a bypass around Blowing Rock. The FONSI therefore indicated that an environmental impact statement (EIS) would be prepared for the northern 4.3 miles of the EA's project area (from Blackberry Road to US 221 in Blowing Rock) that compared the Widening Alternative with a Blowing Rock bypass.

1.4 Thoroughfare Planning

1.4.1 Overview of the Thoroughfare Planning Process

The thoroughfare planning process is a comprehensive transportation planning process that integrates urban area planning practices with local, regional, and statewide transportation planning practices. The process identifies transportation planning needs by evaluating land development and population growth trends in rural counties and urbanized areas. The process begins through a cooperative effort between the NCDOT's Statewide Planning Branch and local planning officials. Socio-economic data is collected, including business and residential area inventories, existing street inventories, identification of environmental constraints, and information about the history of the area. A base year transportation model is built. Utilizing input from local planning officials, land development and population growth trends are projected and applied to the model. Through this modeling process and local knowledge of the area's socio-economic conditions, the thoroughfare planning team identifies transportation deficiencies and determines short- and long-term solutions for eliminating or diminishing those deficiencies.

1.4.2 Caldwell and Watauga County Thoroughfare Planning

Watauga County adopted the *Watauga County Thoroughfare Plan* in July 2002 (NCDOT, 2002). The plan states that US 321 is currently over capacity, so without any improvements, congestion will worsen based on traffic growth projections. The plan calls for improving US 321 to four lanes in the Blowing Rock area. The current Caldwell County plan is an urban area thoroughfare plan (NCDOT, November 2001). The Blowing Rock portion of the county is not included in the plan, which focuses on the Lenoir area and points southeast of Lenoir.

1.4.3 North Carolina Transportation Improvement Program

The project is included as TIP Project No. R-2237C in the 2006-2012 NCDOT *Transportation Improvement Program* (NCDOT, 2005) covering the period from Federal Fiscal Year (FFY) 2006 (October 2005) to FFY 2012 (September 2012).

The following planned or recently completed transportation improvement projects are near the project area:

- | | |
|---------|--|
| R-2237B | Widen US 321 to a multi-lane road from SR 1370 (Nelson Chapel Road) to SR 1500 (Blackberry Road) in Caldwell County. Construction began on this project in January 2005. |
| R-529 | Widen US 421 to a multi-lane road from NC 194 in Boone to two miles east of US 221 in Watauga County. This project's construction was completed in January 2004. |
| U-3800 | Widen US 321 (Harden Street), to five lanes from Rivers Street to US 421/ NC 194 in Boone. This project's construction was completed in June 2002. |
| R-2566 | Widen NC 105 to a multi-lane road from US 221 in Avery County to SR 1107 in Boone. This project is identified as a future need only. |
| R-2615 | Widen US 421 to a multi-lane road from US 221 in Boone to the Tennessee State Line. This project is identified as a future need only. |

R-2915	Widen US 221 to a four-lane divided road from US 421 in Watauga County to US 221 Bypass South of West Jefferson. Right-of-way acquisition is scheduled to begin in FFY 2009 and 2010, and construction is scheduled to begin in FFY 2010 and 2011.
U-2703	US 421 proposed bypass south of Boone, part on new location. This project is identified as a future need only. It is scheduled for an environmental review.
U-4020	Widen US 421 (King Street) to a multi lane road from US 221 to US 321 (Harden Street) in Boone. Right-of-way acquisition is scheduled for FFY 2008; construction is scheduled for FFY 2010.
U-2211	Widen SR 1001 (Connelly Springs Road), southwest loop to east of US 321 in Lenoir. Widen to multi-lanes with curb and gutter, part on new location and construct an interchange at US 321. Part of the project already completed. For the remainder, right-of-way acquisition is scheduled for FFY 2008; construction is scheduled for FFY 2009.
U-4435	Construct an interchange at the intersection of US 64 and US 321 in Lenoir. This project is programmed for a planning and environmental study only.
E-4569	Restoration of historic pedestrian walkway along US 321 Business (South Main Street), downtown Blowing Rock to Chestnut Drive. This project is under construction.
FS-0511A	Widening US 321 to multi-lanes from US 421 to the Tennessee State Line is scheduled for a feasibility study.

The locations of these projects are shown in Figure 1-1.

1.5 Transportation Network and Operating Characteristics

1.5.1 Existing Road Network

US 321 is designated as a principal arterial in the statewide highway network and carries both local and through traffic. It is a part of North Carolina's intrastate system. It is an important transportation link uniting the western Piedmont region of North Carolina from Charlotte to the mountains. It is a two-lane road within the project area and there is no control of access. Other US routes in Watauga and northern Caldwell counties are US 421, which passes east to north through Watauga County and Boone, and US 221, which passes southwest to northeast through Watauga County via Blowing Rock and Boone. NC 105 and NC 194 also serve Watauga County. I-40 is the interstate highway nearest the project area; its interchange with US 321 is 40 miles southeast of Blowing Rock. (See Figure 1-1.)

1.5.2 Roadway Characteristics and Posted Speeds

The roadway in the project area can be described best in three sections, each with common characteristics:

- The rural section south of Blowing Rock.
- The urban section between Green Hill Road and US 321 Business in Blowing Rock.

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- The urban section between US 321 Business and US 221 in Blowing Rock.

The two-lane rural section south of Blowing Rock has a 22-foot paved travelway with a 1-foot paved shoulder on each side and a speed limit of 50 miles per hour (mph). The horizontal alignment is poor with numerous sharp curves up to 30 degrees (the design speed is approximately 25 mph). In addition, the terrain is mountainous with nearly continuous grades between six and eight percent uphill into Blowing Rock.

The two-lane urban section of US 321 between the Green Hill Road area and US 321 Business (which passes through the Green Park Historic District) has a 24-foot pavement width and a 22-foot travelway. The speed limit is 35 mph. Grass shoulders are either non-existent or very narrow. The horizontal alignment is fair with a series of four reverse curves up to 24 degrees (the design speed is approximately 30 mph).

The urban section between US 321 Business and US 221 has two lanes with a pavement width varying between 20 and 22 feet and a speed limit of 35 mph. Shoulders here are still narrow. The northernmost 0.1 mile of this section has four lanes. The alignment is generally straight on rolling terrain with a maximum grade of five percent.

Passing opportunities along the entire project length are limited because of the terrain and sight distance restrictions.

1.5.3 Sidewalks and Pedestrian Movements

There are no sidewalks along the project, except for a single existing sidewalk in front of the Green Park Inn. Concentrations of pedestrian travel across US 321 occur at three points in Blowing Rock: the Green Park Inn, Sunset Drive, and Possum Hollow Road. In the Green Park Inn area, pedestrians cross US 321 between the Green Park Inn and a parking lot opposite the Inn.

1.5.4 Intersections and Access Control

The intersections at US 221, Sunset Drive, and Possum Hollow Road/Shoppes on the Parkway in Blowing Rock are signalized. Traffic volumes on most intersecting roads are low. No restriction on access to abutting properties currently applies.

1.5.5 Traffic Volumes

Figure 1-3 and Table 1-1 show the 1998 Average Daily Traffic (ADT), the 2025 forecast ADT, and the Design Hourly Volume (DHV) for each major link on US 321.

The starting point for these traffic projections were 1994 traffic counts taken in May as a part of preparation of a new Boone thoroughfare plan. May was chosen for the counts by the NCDOT after consultation with local officials; it represents an “average” month in this area, which experiences high degrees of seasonal traffic variations. The forecast traffic volumes for the design year 2025 are based on regional population and employment growth objectives and trends and the NCDOT’s 1998 Blowing Rock Origin and Destination Study. The 1998 ADT figures are interpolated volumes calculated by the NCDOT between its 1994 traffic counts and its 2025 forecasts. The DHV is the volume the project is being designed to serve. New or improved roads in North Carolina are designed to serve, at a desirable level of service, the “design hourly volume” 20 to 25 years in the future. This volume is usually expressed as a percentage of the

Figure 1-3. Existing and Forecast Traffic Volumes

Table 1-1. Existing (1998) and Forecast Average Daily Traffic (ADT) and Forecast Design Hour Volume

Link Description	Link Maximum			
	1998 (ADT)	2025 (ADT)	2025 (Design Hour Volume) ¹	% Growth 1998 to 2025
South of Green Hill Road	7,525	14,100	1,970	87.4%
Green Hill Road-Goforth Road	8,925	15,900	2,230	78.2%
Goforth Road-US 321 Business	9,525	16,900	2,370	77.4%
US 321 Business-Sunset Drive	10,000	17,400	2,440	74.0%
Sunset Drive-Food Lion Driveway	12,300	21,300	2,980	73.2%
Food Lion Driveway-US 221	12,275	21,600	3,020	76.0%
US 221-Possum Hollow Road	15,350	27,450	3,840	78.8%
North of Possum Hollow Road	14,525	26,150	3,660	80.0%

¹ 14 percent of Average Annual Traffic

ADT. For existing US 321 in 2025, the design hour volume was selected as 14 percent of the ADT. The selected 14 percent factor is consistent with the Highway Capacity Manual's (Transportation Research Board, 1985) criteria for selecting a design hour volume.

As indicated in Figure 1-3, the 1998 ADT was 7,525 vehicles south of Blowing Rock, 8,325 to 10,000 vehicles south of Sunset Drive in Blowing Rock, and 11,750 to 15,350 vehicles north of Sunset Drive.

The 2025 ADT is forecast to be 14,100 vehicles south of Blowing Rock (south of Green Hill Road); 15,150 to 17,400 vehicles south of Sunset Drive in Blowing Rock; and 21,300 to 27,450 vehicles north of Sunset Drive. Traffic is expected to grow between 73 and 87 percent between 1998 and 2025.

The 2025 design hour volumes for each US 321 link are also shown in Figure 1-3 and range between 1,970 and 3,840 vehicles per hour depending on the link.

The traffic volumes include eight percent daily truck traffic on US 321, including three percent tractor-trailers and five percent other trucks. Because non-truck traffic makes up a higher percentage of total traffic during peak hours, the peak hour truck percentages are estimated to be one-half of the daily percentages (four percent daily truck traffic, 1.5 percent tractor-trailers and 2.5 percent other trucks).

1.5.6 Level of Service

Level of service (LOS) is a qualitative measure that characterizes the operational conditions within a traffic stream and represents the perception of traffic service by motorists and passengers. The different levels of service characterize these conditions in terms of such factors as vehicle speed, travel time, freedom to maneuver, traffic interruptions, comfort, and

convenience. Six levels are used to measure level of service. They range from the letter A to F. For roadways, LOS A indicates no congestion and LOS F represents more traffic demand than road capacity and extreme delays.

Table 1-2 provides a general description of various levels of service for roadways as given in the *2000 Highway Capacity Manual*, as well as descriptions for signalized and unsignalized intersections. Specific level of service definitions vary for two-lane highways, multi-lane highways, and intersections. In addition, the level of service for signalized and unsignalized intersections cannot be compared directly. In general, a poor level of service rating still can be considered acceptable for an unsignalized intersection. This is because the unsignalized intersection analysis is based upon the delay for minor street drivers as they await sufficient gaps in major street traffic. The signalized intersection analysis provides an overall average delay and level of service for the entire intersection.

Table 1-2. Level of Service Criteria

Level of Service	Traffic Flow on Roadways	Delay at Signalized Intersection	Delay at Two-Way Stop Intersection
A	Free flowing traffic with little or no delays.	<= 5 sec	<=5 sec
B	A stable flow with few congestion-related restrictions on operating speed.	5-15 sec	5-10 sec
C	Stable flow but with more restrictions on speed and changing lanes.	15-25 sec	10-20 sec
D	Approaches unstable conditions and passing becomes extremely difficult. Motorists are delayed an average of 75 percent of the time.	25-40 sec	20-30 sec
E	The capacity of a roadway. Passing is virtually impossible, speeds drop when slow vehicles or other interruptions are encountered.	40-60 sec	30-45 sec
F	Heavily congested flow with traffic demand exceeding the capacity of the highway.	>60 sec	>45 sec

New or upgraded roads in rural areas in North Carolina typically are designed for LOS C for the peak hour volume in the design year (design hourly volume). This policy is based on pages 84 to 88 of *A Policy on Geometric Design of Highways and Streets* (American Association of State Highway and Transportation Officials, 2001). For urban areas, LOS D is typically acceptable when it is too costly or environmentally damaging to design for a better level of service, but LOS C is preferred. The goal for the US 321 improvements is LOS C or better in 2025.

1998

Table 1-3 presents the design hour level of service for each roadway link. As shown, US 321 currently operates at LOS F south of Green Hill Road (and Blowing Rock). Since LOS F reflects traffic volumes greater than the capacity of the road, it indicates high delays and basically no passing opportunities exist during peak periods. A primary reason for this condition is the mountainous terrain, which results in slow truck speeds. Through Blowing Rock, the level of service is undesirable (LOS D/E) in all locations, except north of the signalized intersection of US 221, where it improves to LOS C. The better level of service (LOS B) north of Possum Hollow Road occurs because US 321 has four lanes north of that point.

Table 1-3. Design Hour Roadway Level of Service

Link Description	1998	2025
South of Green Hill Road	F	F
Green Hill Road-Goforth Road	D	E
Goforth Road-US 321 Business	D	E
US 321 Business-Sunset Drive	D	F
Sunset Drive-Food Lion Driveway	E	F
Food Lion Driveway-US 221	E	F
US 221-Possum Hollow Road	C	F
North of Possum Hollow Road	B	C

Table 1-4 summarizes the level of service for each intersection. All signalized and unsignalized intersections currently operate at LOS C or better. However, a few of the side-street movements at the unsignalized intersections are experiencing long delays (LOS F) during peak periods.

2025

Table 1-3 also includes level of service for year 2025 forecast traffic. The road south of Blowing Rock would continue to operate at LOS F in the peak periods although delays would increase substantially. US 321 through Blowing Rock would operate at LOS E between Green Hill Road and US 321 Business. Between US 321 Business and Possum Hollow Road, US 321 would operate at LOS F. Traffic flow under these conditions would be extremely congested during the design hour.

The level of service at all existing signalized intersections on US 321 would deteriorate to a poor LOS F, as shown in Table 1-4. The level of service of the unsignalized intersections at Green Hill Road, US 321 Business, and the Food Lion entrance also would deteriorate to F. A planning level signal warrant analysis [using ADT and peak hour-based warrants and the Institute of Transportation Engineers' (Kell and Fullerton, 1982) *Manual of Traffic Signal Design, Second Edition*] indicates the need for traffic signals at these intersections by 2025, although not as a part of an initial improvement. Even with signals, however, traffic at two of the three intersections would continue to operate at LOS F.

Table 1-4. Design Hour Intersection Level of Service

Intersection		1998	2025
US 321/Green Hill Road	(Unsignalized)	D	F*
	(Signalized)	-	F ¹
US 321/Goforth	(Unsignalized)	C	F
US 321/US 321 Business	(Unsignalized)	F	F* ²
	(Signalized)	-	D
US 321/Food Lion	(Unsignalized)	F ³	F* ³
	(Signalized)	-	F ¹
US 321/Sunset Drive	(Signalized)	C	F*
US 321/US 221	(Signalized)	B	F*
US 321/Shoppes on the Parkway	(Signalized)	B	F*

Notes:

LOS F* indicates level of service worse than F and V/C (volume/capacity ratio) greater than 1.2.

¹ US 321 through traffic would operate at LOS F.

² Signal may be warranted.

³ Traffic signals on either side of this intersection create large gaps. This may result in better levels of service in reality than the level of service analysis indicates.

1.5.7 Crashes/Safety

Crash data for the project area were assessed for the period between June 1, 2001 and May 31, 2004. Crash rates, categorized by fatal crashes, non-fatal injury crashes, night crashes, wet weather crashes, and total number of reported crashes, were compared to average rates for other roads with similar characteristics in North Carolina. Average crash rates for various roads in North Carolina are based on NCDOT data for the years 2000 through 2002.

A simple comparison of roadway crash rates versus average crash rates would identify nearly one-half of all locations as having a potential highway safety concern. Thus, critical crash rates also were calculated. This is a tool that identifies at what point over the mean (average) crash rate, the number of actual crashes on a road segment becomes statistically significant. If a road segment has an actual crash rate higher than the critical rate, the location is considered to have a potential highway safety deficiency. The critical crash rate also accounts for exposure (the number of vehicle-miles traveled on the road segment being assessed) so that locations with a short segment of road or a segment of road with low traffic volumes are not over identified as having an accident problem when compared to locations with high traffic volumes and high crash counts.

The accident rates are summarized as crashes per 100 million vehicle-miles driven. For example, if a 10-mile section of road carries an average of 10,000 vehicles per day, in one year 36.5 million vehicle-miles of travel would occur on that 10-mile stretch of road (10 miles times 10,000 vehicles per day times 365 days per year). If five crashes occur on this 10-mile section of road in a three-year period, the crash rate is 4.6 crashes per 100 million vehicle-miles. The 4.6 crashes per 100 million vehicle-miles assumes that over the three-year period 109.5 million vehicle-miles

of travel occur (36.5 million times 3). The 4.6 is calculated by dividing 100 million vehicle-miles by 109.5 million vehicle-miles and multiplying the result by 5. If one were interested in the average number of crashes per year, one would divide 5 by 3 for an average of 1.7 crashes per year.

Table 1-5 shows the number of crashes along the studied section of US 321 from 2001 to 2004 and crash rates for the existing roadway compared with the average rates for similar US routes in North Carolina and critical crash rates. Fatal crash rates are not statistically significant because of the small frequency of these types of crashes.

Table 1-5. Crash Rates¹

Rate	Crashes	US 321 Rate ²	Statewide Rate ³	Critical Rate ⁴
Rural Section South - SR 1500 (Blackberry Road) to Blowing Rock Town Limits				
TOTAL	44	310.63	170.47	231.07
Fatal ⁵	1	7.06	2.12	12.01
Non-Fatal Injury	13	91.78	74.31	115.62
Night	15	105.90	50.49	85.08
Wet	6	42.36	30.42	58.06
Urban Section - Town Limits (south) to Town Limits (north of Possum Hollow Road)				
TOTAL	104	407.70	321.84	382.23
Fatal ⁵	0	0.00	0.98	6.16
Noon-Fatal Injury	27	105.84	117.08	154.28
Night	25	98.00	62.62	90.35
Wet	28	109.76	53.87	79.74

¹ Rates based upon 100 million vehicle-mile exposure.

² NCDOT accident data 6/1/01 through 5/31/04.

³ Statewide average rates prepared by the NCDOT for all rural (2,664 system miles) and urban (494 system miles) two-lane undivided US routes for 2000-2002.

⁴ Based on the statewide crash rate (95 percent level of confidence).

⁵ Fatal crash rates are not statistically significant because of the small frequency of these types of crashes.

Rural Section

The rural portion of US 321 starts at SR 1500 (Blackberry Road) and ends at the Blowing Rock town limits, 0.2 mile south of the intersection with Green Hill Road. It has a total length of 1.8 miles. The predominate crash types were lane departure crashes (48 percent), which include run off road, sideswipe (opposite direction), head on, and fixed object crashes, and rear end crashes (27 percent). Statewide crash rates were exceeded in all categories, and the critical rates were exceeded for the total crash and night crash categories. The critical rate analysis indicated that critical rates were exceeded because of lane departure crashes and that primary contributing factors for exceeding critical rates were grade and horizontal curvature.

Urban Section

The urban section of US 321 is a 2.3-mile route through the Town of Blowing Rock. It starts at the town limits, just south of Green Hill Road, and ends just north of Possum Hollow Road. The existing crash rates in the urban section are presented and compared with North Carolina averages and critical crash rates in Table 1-5. The predominate crash types were rear end crashes (49 percent), and lane departure crashes (29 percent), which include run off road, sideswipe (opposite direction), head on, and fixed object crashes. Angle and turning vehicle crashes accounted for an additional 12 percent of the total crashes. Statewide and critical crash rates were exceeded by the total, night, and wet crash categories. The critical rate analysis indicated that critical rates were exceeded because of rear end and lane departure crashes, and that primary contributing factors for exceeding critical rates were grade, horizontal curvature, darkness, and weather.

1.6 Modal Interrelationships

The project area is not served by rail. An airport is in Boone. There is no relationship between the proposed project and the airport in Boone.

1.7 Summary

The proposed improvement is included in the county thoroughfare plans and the NCDOT's 2004-2010 *Transportation Improvement Program*. Without the proposed action, the forecast traffic along this section of US 321 will exceed the road's capacity by 2025, creating undesirable levels of service. Improvements are needed to provide improve mobility. In addition, without improvement, high crash rates are expected to continue. The number of crashes will likely rise as traffic volumes continue to rise. Improved sight distances can be created by straightening curves and by providing separate lanes for drivers turning left or by providing an additional through lane so through traffic has the opportunity to pass those turning.

This portion of US 321 is part of the North Carolina Intrastate System. The US 321 corridor is defined as the principal north-south route uniting the western Piedmont. The intrastate system plan calls for the widening of the system's existing two-lane roads to at least four travel lanes. The proposed project is necessary for system continuity and a reasonable expenditure of public funds even if no additional improvements are made.