

North Carolina Department of Transportation

Relocation of Old Beatty Ford Road (SR 1221) From
SR 1210/SR 1221 to Lentz Road (SR 1337)

Rowan County

Federal Aid Project No. HISP-1221 (18)

WBS No. 44105.1.FD1

TIP No. W-5516

ENVIRONMENTAL ASSESSMENT

U.S. Department of Transportation
Federal Highway Administration
and
N.C. Department of Transportation

Approved:

5/16/2014

DATE



Richard W. Hancock, P.E., Manager
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5/16/2014

DATE



for John F. Sullivan, III, P.E.
Division Administrator
FHWA

North Carolina Department of Transportation

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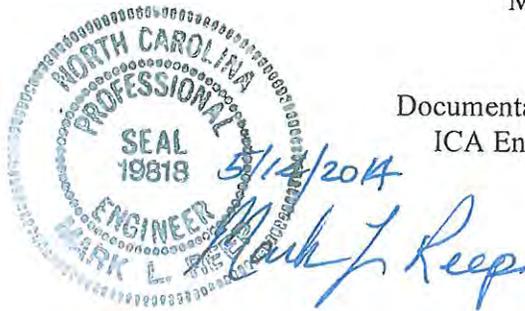
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May 2014



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PROJECT COMMITMENTS

North Carolina Department of Transportation
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PROJECT COMMITMENTS

Commitments Developed Through Project Development and Design

NCDOT Hydraulics Unit

- The NCDOT Hydraulics Unit will coordinate with the NC Floodplain Mapping Program (FMP), to determine status of the project with regard to applicability of NCDOT'S Memorandum of Agreement, or approval of a Conditional Letter of Map Revision (CLOMR) and subsequent final Letter of Map Revision (LOMR).
- The eastern section of the project draining to the Dutch Buffalo Creek water supply watershed (WS-II, HQW) will be designed according to Design Standards in Sensitive Watersheds (DSSW).

NCDOT Division 9

- This project involves construction activities on or adjacent to Federal Emergency Management Agency regulated streams. Therefore, the NCDOT Division 9 shall submit sealed as-built construction plans to the NCDOT Hydraulics Unit upon completion of project construction, certifying that the drainage structures and roadway embankment that are located within the 100-year floodplain were built as shown in the construction plans, both horizontally and vertically.
- During final design, NCDOT will investigate removing the existing culvert at Old Beatty Ford Road and Cold Water Creek for potential on-site stream and wetland mitigation use.
- NCDOT will design the cul-de-sacs on existing Old Beatty Ford Road with Alternative 2 to be large enough to allow school buses to turn around.

NCDOT Project Development & Environmental Analysis Unit

- NCDOT will continue to coordinate appropriately with USFWS to determine if this project will incur potential effects to the Northern long-eared bat, and how to address these potential effects, if necessary.

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I. DESCRIPTION OF PROPOSED ACTION

A. General Description

The North Carolina Department of Transportation (NCDOT) Division 9 Office proposes to improve or relocate Old Beatty Ford Road (SR 1221) from its intersection with Bostian Road (SR 1210/1221) to Lentz Road (SR 1337) in Rowan County (see Figure 1.1).

The project will construct a two-lane road on new location with a new grade separation over I-85 near Kannapolis, Landis, and China Grove. The bridge carrying existing Old Beatty Ford Road over I-85 will be removed as part of this project. The proposed project is approximately 3.1 miles long. The project proposes the following:

- 26-foot paved roadway (two 11-foot wide lanes and two-foot wide shoulders)
- Straighter alignment that reduces horizontal and vertical curves
- Paved shoulders
- Improved intersections
- Improved bridge over I-85

B. Historical Resume and Project Status

The project is included in the 2012-2020 State Transportation Improvement Program (STIP) and is scheduled for right-of-way acquisition in Fall 2014 and construction in Fall 2015. The Cabarrus-Rowan Metropolitan Planning Organization's (CRMPO) Comprehensive Transportation Plan has identified this section of Old Beatty Ford Road as a major thoroughfare that needs improvement.

In 2007, NCDOT performed a Road Safety Review for an approximate 16-mile portion of Old Beatty Ford Road.¹ The Road Safety Review found that Old Beatty Ford Road had higher fatal and non-fatal injury crash rates that occurred over a five year period (January 1, 2000 through January 31, 2005) when compared to similar roadways statewide.

In general, the Road Safety Review found that Old Beatty Ford Road experienced a substantial number of lane departure crashes due to a poor alignment, narrow pavement, and inadequate

¹ The 2007 NCDOT Safety Review analyzed crash data along Old Beatty Ford Road from just west of US 52 near Gold Hill to Bostian Road.

shoulders (see *Section II.B.4, Safety* for more information). Several intersections also contributed to frontal impact and other collisions. The review provided the following recommendations regarding safety conditions within the project study area:

- Widen the roadway to a minimum of 11 feet per lane with two-foot paved shoulders.
- Rebuild and rework shoulders along much of the route.
- Examine and replace guardrail and bridge treatments as necessary.
- Add pavement markers for entire route.
- Remove obstructions within the right-of-way.
- Remove trees and shrubs that obscure intersection sight distances.
- Install additional warning signs throughout the study area, particularly at curves.
- Replace the existing signs and add lighting at the Lentz Road intersection.

The Road Safety Review led to the project being developed for funding through the Hazard Elimination Program. The federally-funded Hazard Elimination Program is used to address specific traffic safety concerns with a goal to reduce the frequency and severity of traffic crashes involving injuries and fatalities on public roadways. The project was prioritized for funding based on a high safety benefit to cost (B/C) ratio, with the safety benefit being based on crash reduction.

C. Cost Estimates

The estimated cost in the STIP is \$6,111,000. This includes \$1,111,000 for right-of-way acquisition and \$5,000,000 for construction. The current total estimated cost for Alternative 1 is \$18,200,000, consisting of \$4,400,000 for right-of-way acquisition and \$13,800,000 for construction. The current total estimated cost for Alternative 2 is \$16,300,000, consisting of \$1,200,000 for right-of-way acquisition and \$15,100,000 for construction.

II. PURPOSE AND NEED FOR PROJECT

A. Purpose of Project

The purpose of this project is to improve vehicular safety on Old Beatty Ford Road by reducing the frequency of lane departure and frontal impact crashes that have resulted in fatal and non-fatal injuries. A secondary purpose is to improve the deficient bridge. Proposed safety countermeasures include:

- improving the horizontal and vertical alignment
- increasing the lane widths and adding paved shoulders
- widening shoulders and improving clear zones

These countermeasures have been shown to substantially reduce crashes.

B. Need for Project

This project is needed to reduce lane departure and frontal impact crashes along Old Beatty Ford Road between Bostian Road and Lentz Road. The 2007 NCDOT Road Safety Review identified higher than average fatal and non-fatal injury crash rates along a 16-mile portion of Old Beatty Ford Road when compared to similar roadways statewide.

More recent data (gathered between 2008 and 2013) shows 33 crashes occurred along Old Beatty Ford Road between Bostian Road and Lentz Road, including one fatality and 14 non-fatal injuries. Lane departure and frontal impact crashes accounted for nearly 75 percent of the total crashes. See *Section II.B.4, Safety* for more information regarding crashes.

A number of roadway deficiencies on Old Beatty Ford Road contribute to the crash frequencies. These include narrow lane widths, insufficient shoulder widths and clear zones, a poor vertical and horizontal alignment, and a stop condition at the Old Beatty Ford Road/ Lentz Road intersection.

The project is also needed to address a deficient bridge. The bridge over I-85 has a low sufficiency rating, posted weight limits for trucks, and is considered functionally obsolete and structurally deficient.

1. Description of Existing Conditions

a. Functional Classification

Old Beatty Ford Road is classified by NCDOT as a major collector west of China Grove Road, a minor collector east of Lentz Road, and a local road between China Grove Road and Lentz Road. It is designated by the CRMPO as a major thoroughfare that needs improvement.

b. Physical Description of Existing Facility

Existing Facility

The existing two-lane roadway is 18 to 22 feet wide with narrow, unpaved shoulders and multiple sharp curves. The right-of-way is generally 60 feet wide, but it widens to approximately 200 feet at the bridge over I-85. There is no control of access. It has a speed limit of 55 miles per hour (mph), but several curves are posted with 25 to 35 mph advisory signs. The existing bridge over I-85 is located between sharp curves in the alignment and is in need of rehabilitation. This bridge is considered structurally deficient and functionally obsolete, has posted weight limits, and has a sufficiency rating of 38 out of a possible 100. At the project's eastern terminus, Old Beatty Ford Road forms a T-intersection with Lentz Road. This condition requires traffic to turn to remain on Old Beatty Ford Road and contributes to the occurrence of crashes at the intersection.

Railroad Crossings

There are no existing railroad crossings associated with this project nor are any being proposed.

Pedestrian/ Bicycle Facilities and Greenways

There are no sidewalks or pedestrian designated areas located in the project area. The CRMPO's Comprehensive Transportation Plan Pedestrian Map (August 24, 2011) does not recommend any future sidewalks or pedestrian facilities in the project area.

There are no existing County, State, or local bicycle facilities or greenways in the project area. No State or local plans call for bicycle facilities in the project area.

Structures

One culvert and one bridge are located on Old Beatty Ford Road in the project area and are described in Table 1.

Table 1: Existing Structures

Crossing Location	Structure Description	Year Built	Sufficiency Rating (0 to 100)	Posted Weight Limit (tons)
Cold Water Creek (Culvert No. 399)*	3 @ 10'x12'x 131' RCBC	1966	99.8	Not Posted
I-85 (Bridge No. 65)	34' x 249' @ 3 spans, RC deck, I-beams, caps, piles, and footings	1967	38.2	40 (SV) 44 (TTST)

RC = reinforced concrete; RCBC = reinforced concrete box culvert;
SV = Single Vehicle Truck; TTST = Tractor Trailer Semi-Truck.

* This structure is located beside Site 4 in the *Preliminary Hydraulics Study for Environmental Impact* (January 23, 2014). The study is available in NCDOT's project file.

Proposed bridge and drainage structures are discussed in *Section IV.F, Structures*.

c. Traffic Volumes

Annual Average Daily Traffic (AADT) volumes in the project area currently (2013) range from 1,400 vehicles per day (vpd) to 2,200 vpd on Old Beatty Ford Road.

Traffic forecasts are a useful tool for determining the elements of roadway design required to accommodate anticipated future volumes. According to forecasts for the year 2035, traffic volumes in the two locations mentioned in the previous paragraph are estimated to range from 2,700 vpd to 5,100 vpd under No Build conditions. Trucks account for eight percent of the daily volumes. A two-lane roadway is sufficient to carry the future year traffic volumes at an acceptable level of service. Traffic volumes are shown in Appendix D.

2. Transportation and Land Use Plans

a. North Carolina Transportation Improvement Program (TIP)

According to the 2012-2020 State Transportation Improvement Program (TIP), the following projects are in the vicinity of the study area (see Figure 4):

- I-3802B proposes to add additional lanes to I-85 from north of Lane Street (SR 2180) (Exit 63) in Cabarrus County to the US 29/ US 601 Connector (Exit 68) in Rowan County. Right-of-way acquisition is to begin in FY 2018 with construction in FY 2020.
- I-3610 proposes to revise the I-85/ US 29/ NC 152 interchange area (Exit 68). This project is included in I-3802B. Right-of-way acquisition is to begin in FY 2018 with construction in FY 2020.
- W-5313 proposes to widen existing two-lane Old Beatty Ford Road to improve the horizontal and vertical alignment, provide wider travel lanes, and improve shoulders and clear zones from Lower Stone Church Road (SR 2335) to Lentz Road. Right-of-way acquisition is to begin in FY 2014 with construction in FY 2015.
- P-5206 proposes to restore a second railroad track from north of Kannapolis to south of Salisbury. Right-of-way acquisition is to begin in FY 2013 with construction in FY 2014.
- B-5365 proposes to replace two US 29/ NC 152 bridges (Bridge No. 21 and Bridge No. 34) over the Norfolk Southern Railroad and US 29. Right-of-way acquisition is to begin in FY 2017 with construction in FY 2019.

I-3804, a new interchange at Old Beatty Ford Road, had been in a previous version of the TIP as part of I-3802 but was removed because land use and traffic projections did not support the need for a new interchange at that time. An interchange is included in the Cabarrus-Rowan Metropolitan Planning Organization's (CRMPO) current 2035 Long Range Transportation Plan (LRTP) and the draft 2040 LRTP (as a 2016-2025 horizon year project) and is scheduled to be reevaluated in NCDOT's Prioritization 3.0. The location of an interchange has not been determined.

b. Local Thoroughfare Plans

The CRMPO's *Comprehensive Transportation Plan (CTP)*, adopted in October 2011 and last updated in July 2013, is a series of maps of recommended transportation improvements. Improvements to Old Beatty Ford Road are included in this plan as well as a future I-85 interchange at Old Beatty Ford Road (see Figure 5).

The *Long Range Transportation Plan (LRTP) 2035* was updated by the CRMPO in April 2009. The LRTP lists the transportation improvements and policies to be implemented in the MPO area. Improvements to Old Beatty Ford Road are included in this plan as well as a future I-85 interchange at Old Beatty Ford Road.

c. Land Use Plans

Rowan County's *Land Use Plan, Areas East of I-85* was adopted on January 17, 2012. It describes the existing characteristics of unincorporated areas of the County and serves as a guide for future land use decisions. Improvements to Old Beatty Ford Road are included in this plan as well as a new I-85 interchange at Old Beatty Ford Road. According to this plan, the project area is currently considered to be in a low-density residential and agricultural area of the County. Future plans for the area are to preserve the rural character by limiting non-residential development to regional and community nodes.

3. System Linkage

a. Existing Road Network

Four US routes (US 29, US 70, US 601, and US 52) and I-85 traverse Rowan County. I-85, which passes through the project area, provides direct access in a regional sense north to the Triad and south to Charlotte. This excellent connectivity and its strategic location between two of North Carolina's largest metropolitan areas is an economic asset for the County. US 29 generally parallels I-85 from Greensboro to Charlotte and is approximately 0.6 mile from the project area. US 70 also parallels I-85, but it turns to the west in Salisbury and takes travelers west to I-77 and I-40 near Statesville in neighboring Iredell County. US 601 heads north out of Rowan County to I-40 and south to nearby Kannapolis in Cabarrus County. US 52 passes through Rowan County in the north / south direction and takes motorists north to Lexington and Winston Salem and south through Stanly and Anson Counties.

Old Beatty Ford Road crosses over I-85, but there is no direct connection to the interstate via an interchange. It connects to US 29 beyond the project's western terminus.

b. Modal Interrelationships

Public Transportation

Project area residents have the following options for public transportation:

- Rowan Individual Transportation Assistance (RITA) – RITA provides a reservation service that takes riders to places such as doctor appointments, grocery shopping, connections to other area transit systems, etc. It operates in a different area of the County Tuesday through Friday.
- Rowan Express South – this is a fixed-route service operated by Rowan County. It carries passengers between the Kannapolis train station and the Salisbury train station with stops in between at the Landis Town Hall, South Rowan YMCA, a Food Lion, the China Grove police station, and the Employment Security Commission. Rowan Express South operates Monday through Friday.
- Rider – Rider is a fixed-route bus system providing passengers transportation to destinations primarily in the cities of Kannapolis and Concord. The Blue Route is the northern-most route bringing customers to just south of downtown Landis.

There are no scheduled transit stops along the project.

4. Safety

Between 2008 and 2013, 33 crashes occurred along Old Beatty Ford Road between Lentz Road and Bostian Road, including one fatality and 14 non-fatal injuries. This equates to total, fatal, and non-fatal crash rates that are higher than statewide rates for similar type roads but lower than the respective critical crash rates. The critical crash rate is used as a tool to identify or screen for high accident locations. It is developed by statistically adjusting study area crash rates based on other roads with similar characteristics to remove elements of chance and randomness. Approximately 49 percent of crashes resulted from lane departures and 24 percent resulted from frontal impacts.

Within the project limits, crashes primarily occurred in and near the sharp curves between China Grove Road and State Road. Another area of concern is the Old Beatty Ford Road/ Lentz Road intersection where three crashes occurred during the five-year period. The sole fatality during this period occurred from a fixed object accident near Serenity Ridge Road. The most prevalent types of crashes and their locations are as follows and shown on Figure 1.2:

- Lane departure due to head-on, sideswipe, opposite direction, and vehicles running off the road (Lentz Road; I-85 to State Road; and China Grove to Bostian Road)
- Frontal impacts due to angle and turning collisions (China Grove Road)

Table 2 provides crash statistics along Old Beatty Ford Road between Lentz Road and Bostian Road between September 1, 2008 and August 31, 2013.

Table 2: Crash Statistics

Category	Crashes	Crashes per 100 Million Vehicle Miles (MVM)	Statewide Rate	Critical Rate ¹
Total	33	371.28	335.34	442.04
Fatal	1	11.25	3.38	19.16
Non-Fatal	14	157.51	112.58	176.77
Night	13	146.26	138.62	209.23
Wet	5	56.26	57.39	104.83

¹ Based on the statewide crash rate (95% level confidence). The critical crash rate is a statistically derived value against which a calculated rate can be compared to see if the rate is above and average far enough so that something besides chance must be the cause.

Safety countermeasures proposed with this project include:

- improving the horizontal and vertical alignment
- increasing the lane widths and adding paved shoulders
- widening shoulders and improving clear zones

The effectiveness of these improvements in addressing the specific deficiencies is well documented. NCDOT's *Regional Crash Reduction Factors* (dated November 1, 2012) are developed through agreement of a committee of NCDOT representatives formed to develop the factors and are based on available research. Specific references used by the committee as guidance to develop crash reduction factors include publications from the Kentucky Transportation Center and FHWA.^{2,3}

C. Benefits of the Project

The project will reduce the frequency of crashes that have resulted in fatal and non-fatal injuries. It will improve the pavement width, shoulders, clear zones, and horizontal and vertical alignment. These treatments have been proven to reduce the frequency and severity of crashes when applied to similar roadways experiencing similar crash patterns. Table 3 illustrates the extent to which the proposed design will correct the narrow lane widths, insufficient shoulder widths and clear zones, and the poor alignment to result in safer conditions.

The proposed relocation of Old Beatty Ford Road will divert more than 80 percent of design year traffic from the existing roadway. This will decrease the crash exposure between China Grove Road and Goldfish Road where the highest frequency of crashes occurred. The project will remove the existing bridge over I-85, close the existing road to through traffic by adding cul-de-sacs on each side of I-85, and add signs to notify drivers of the dead ends. The existing road will remain open east and west of I-85 to serve local traffic where drivers are most familiar with the existing roadway conditions.

Table 3 – Design Characteristics

Design Element	Existing and No-Build Conditions	Proposed Design Conditions
Posted Speed (mph)	45	45
Speed Posted on Advisory Signs (mph)	25 to 35	none
Minimum Design Speed (mph)	30 (Based on vertical alignment)	50
Lane Widths (feet)	≤ 11	11
Usable Shoulder Widths (feet)	4 - 6	6
Paved Shoulder Widths (feet)	None	2
Clear Zone Width (feet)	N/A	14
Number of Curves Requiring Design Exceptions	5 (Horizontal) 13 (Vertical)	None
Minimum Horizontal Curve Radius (feet)	280	760
Minimum Rate of Vertical Curvature (K Value = curve length ÷ change in % grade)	37 (sag) 19 (crest)	96 (sag) 84 (crest)
Sight Distance (feet)	270 (minimum)	> 500

² *Development of Accident Reduction Factors* (Kentucky Transportation Center, 1996).

³ *Annual Report on Highway Safety Improvement Programs* (FHWA, 1996) and *Highway Safety Evaluation System*, (FHWA, 1982)

III. ALTERNATIVES

A. Preliminary Study Alternatives

“No-Build” Alternative

As the name implies, the No-Build Alternative is an alternative for which no improvements to the existing roadway or construction of a new facility are proposed. The No-Build Alternative typically includes short-term minor restoration activities designed to continue operation of the existing roadway. Examples of these activities include safety and maintenance improvements such as patching and resurfacing roads, re-grading shoulders, and maintaining ditches.

The advantages of the No-Build Alternative include: no additional right-of-way requiring acquisition of residential or commercial property, no disturbances of the natural environment such as wetlands and wildlife habitat, and no construction-related costs.

The No-Build Alternative would not meet the purpose of the project or satisfy the projected transportation needs. Furthermore, it is not consistent with NCDOT’s TIP. The existing roadway cannot serve the purpose of this project – to improve vehicular safety on Old Beatty Ford Road.

While the No-Build Alternative does not meet the purpose or need for the project, it is included in this Environmental Assessment (EA) as a baseline for comparing impacts and benefits.

B. Detailed Study Alternatives

Two alternatives are being studied in detail for this project.

Alternative 1

Alternative 1 generally follows existing Old Beatty Ford Road from Bostian Road to Lentz Road, but will also remove a number of curves to straighten the roadway (see Figures 2.1-2.2). It includes the replacement of the existing bridge over I-85. This alternative is approximately 3.1 miles long.

This alternative is estimated to cost \$18,200,000 (see Table 4). This includes \$4,400,000 for right-of-way and \$13,800,000 for construction. It will relocate ten residences and one business. It crosses two streams requiring major structures and impacts approximately 115 feet of stream channel. A bridge spanning I-85, Cold Water Creek, and adjacent wetlands is proposed to minimize stream and wetland impacts. Wetland impacts are expected to be approximately 0.2 acre. Noise impacts are expected at one residence. Impacts to prime and statewide important farmlands are anticipated and are expected to be about 9.3 acres. One hazardous material site (UST) was identified for Alternative 1, and geo-environmental impacts are expected to be low. Impacts to floodplains, endangered species, cultural resources, or Section 4(f) resources associated with Alternative 1 are not anticipated.

Alternative 1 corrects the deficiencies along the existing roadway and has less impact to streams. However, it has the highest cost, relocates the largest number of residences and businesses, acquires land from more properties, and moves the roadway closer to more homes located beside the existing road.

Alternative 2 (Recommended)

Alternative 2 begins near the Old Beatty Ford Road/ Bostian Road intersection, extends east on new location to Lentz Road, and follows Lentz Road for approximately 0.6 mile to its intersection with Old Beatty Ford Road (see Figures 3.1-3.2). It will also include a new bridge over I-85. As a result, the existing bridge will be removed, cul-de-sacs will be constructed along existing Old Beatty Ford Road on both sides of I-85, and signs will be added to notify drivers of the dead ends. This alternative is also approximately 3.1 miles long.

This alternative is estimated to cost \$16,300,000 (see Table 4). This includes \$1,200,000 for right-of-way and \$15,100,000 for construction. It will relocate one residence and no businesses. It crosses three streams requiring major structures and impacts approximately 965 feet of stream channel. A bridge spanning I-85, Cold Water Creek, and adjacent wetlands is proposed to minimize stream and wetland impacts. Impacts to wetlands will be less than 0.1 acre, and floodplain impacts are not expected. Noise impacts are not expected. Impacts to prime and statewide important farmlands are anticipated and are expected to be about 19.2 acres. Impacts to endangered species, cultural resources, Section 4(f) resources, or hazardous materials sites associated with Alternative 2 are not anticipated.

Table 4: Summary of Impacts – Detailed Study Alternatives

Impacts	Alternative 1	Alternative 2 (Recommended)
Costs		
Right-of-way	\$4,400,000	\$1,200,000
Construction	\$13,800,000	\$15,100,000
Total	\$18,200,000	\$16,300,000
Length (miles)	3.1	3.1
Relocations		
Residential	10	1
Business	1	0
Non Profit	0	0
Farms	0	0
Total	11	1
Prime/ Statewide Important Farmland (acres)	9.3	19.2
Water Resource Impacts		
Stream Crossings (major structures)	2	3
Stream Crossings (pipes)	0	4
Stream Impacts (feet)	115	965
Open Water Impacts (acres)	0.0	0.0
Wetland Impacts (acres)	0.2	< 0.1
Floodplain Impacts (acres)	0.0	0.0
Endangered Species		
Schweinitz's sunflower	No Effect	No Effect
Historic Property Impacts	No Effect	No Effect
Archaeological Sites	No Effect	No Effect
Section 4(f) Resources (Parks, Recreation Areas, Wildlife Management Areas)	0	0
Noise Impacts	1	0
Hazardous Material Sites (including USTs)	1	0

Alternative 2 is recommended as the preferred alternative. Although it impacts more streams, it has the lowest cost, relocates fewer residences and businesses, and affects the least number of properties. Alternative 2 diverts most of the design year traffic from the existing roadway to a new location with fewer access points. The existing road will remain open east and west of I-85 to serve a much lower volume of local traffic and have a lower exposure to potential crashes.

IV. PROPOSED IMPROVEMENTS

A. Roadway Cross-section and Alignment

The project proposes to provide a 26-foot paved roadway width (two 11-foot lanes with two-foot paved shoulders), a straighter horizontal alignment, improved vertical alignment, improved intersections, and a new bridge over I-85 (see Figures 2.1-3.2).

B. Right-of-way and Access Control

The proposed right-of-way width is 60 feet, and there will be no access control. Temporary and permanent easements are also anticipated.

C. Speed Limit

The proposed posted speed limit is 45 mph.

D. Design Speed

The design speed for both alternatives is 50 mph.

E. Intersections/Interchanges

Currently, Old Beatty Ford Road travelers are required to stop at the intersection with Lentz Road, which is the through movement. Under both proposals, Old Beatty Ford Road will become the through movement, and stop signs will be placed along Lentz Road. Old Beatty Ford Road is, and will continue to be, the through movement at all other intersections within the project limits.

As discussed in *Section II.B.2, Transportation and Land Use Plans*, a new I-85 interchange at Old Beatty Ford Road is being considered for a future transportation project – separate from W-5516. The proposed project does not include an interchange with I-85, but it does not preclude the construction of one in the future.

F. Structures

Structure and drainage requirements are shown in Table 5 (see Figure 6).

Drainage Structures

According to the January 23, 2014 *Preliminary Hydraulics Study for Environmental Impact* for this project (available from NCDOT), one new culvert is required for Alternative 1, and Alternative 2 will require two new culverts.

Grade Separation/ Drainage Structures

A new bridge is proposed over I-85, Cold Water Creek, and adjacent wetlands for both Build Alternatives.

Table 5: Proposed Structures

Structure No. (Site)	Build Alternative(s)	Crossing	Proposed Structure
Drainage Structures			
1 (NL-1)	Alternative 2	Proposed project over Town Branch (SA)	Two 10'x9' RCBC approximately 133' long
3 (NL-3)	Alternative 2	Proposed project over UT to Cold Water Creek (SE)	One 8'x9' RCBC approximately 75' long
5 (IE-2)	Alternative 1	Proposed project over Cold Water Creek Tributary #1 ¹	Two 8'x9' RCBC approximately 130' long
Grade Separation/ Drainage Structures			
2 (NL-2)	Alternative 2	Proposed project over I-85 and Cold Water Creek (SG)	Approximately 51' wide by 610' long
4 (IE-1)	Alternative 1	Proposed project over I-85, Cold Water Creek (SG), and adjacent wetlands	Approximately 51' wide by 1,070' long

RCBC = reinforced concrete box culvert.

¹ The Natural Resources Technical Report for the proposed project did not identify Cold Water Creek Tributary #1 as a jurisdictional stream.

G. Utilities

Utilities in the study area primarily consist of aerial power lines and phone lines. In some cases, power and phone lines are underground.

Construction of the project is not expected to cause any serious disruptions in service to any of the utilities serving the area. Before construction is started, a preconstruction conference involving the contractor, local officials, utility companies, and the Division of Highways will be held to discuss various construction procedures. It will include a discussion of precautionary steps to be taken during the time of construction that will minimize interruption of utility service.

H. Noise Barriers

Traffic noise abatement measures were considered but were determined not to be feasible. Based on this preliminary study, traffic noise abatement is not recommended, and no noise abatement measures are proposed. See *Section V.I, Traffic Noise Analysis* for more information. A copy of the technical report entitled, *Traffic Noise Analysis, Relocation of Old Beatty Ford Road (SR 1221/ SR 1210) From SR 1210/ SR 1221 to Lentz Road (SR 1337)* (March 14, 2014), is available from NCDOT.

V. ENVIRONMENTAL EFFECTS OF PROPOSED ACTION

A. Natural Resources

The project study area lies in the piedmont physiographic region of North Carolina (see Figures 7.1-7.3). Topography in the project vicinity is comprised of gently rolling hills with narrow to wide level floodplains along streams. Elevation is 650 – 800 ft above sea level. Land use consists of residential areas, agriculture, fallow fields, mixed hardwoods, mixed pine forests, cutover forests, and commercial property.

1. Biotic Resources

a. Terrestrial Communities

Five terrestrial communities were identified in the project study area: maintained/ disturbed, mixed pine community, bottomland hardwood forest, piedmont alluvial forest, and mesic mixed hardwood forest (see Figures 7.1-7.3). A brief description of each community type follows. Scientific names of species identified are included in Appendix B of the W-5516 *Natural Resources Technical Report* (March 2014) – available from NCDOT.

Maintained/Disturbed

Maintained/disturbed areas are scattered throughout in places where the vegetation is periodically maintained or mowed, such as agriculture fields, fallow fields, pastures, churches, residential lawns, commercial properties, utility easements, and roadside shoulders. Vegetation observed in agriculture fields during the field investigations include but are not limited to soybeans, and winter cover crops such as fescue, cereal rye, and annual rye. Fallow fields, utility easements, and roadside shoulders are mostly open consisting of sweetgum, poplar, hickory, and pine saplings. Shrubs include silverling and winged sumac, while the herbs include broomsedge, tall goldenrod, blackberry, sour grass, and tall fescue. Pastures are generally open, but comprised of some scattered canopy species including sweetgum, white oak, tulip poplar, green ash, loblolly pine, shortleaf pine, and Virginia pine. Fescue and other pasture grasses dominate the herbaceous layer. Residential areas consist of fully exposed maintained lawns to fully shaded hardwood canopied lots. Canopy species mainly consist of Virginia pine, shortleaf pine, loblolly pine, sweetgum, red maple, pignut hickory, mockernut hickory, white oak, red oak, willow oak, water oak, and tulip poplar. Subcanopy and shrub species include, but are not limited to, flowering dogwood, American holly, crepe myrtle, eastern red cedar, azalea, boxwood, and Chinese privet. Grasses and herbs include tall fescue, annual bluegrass, perennial ryegrass, clover, dandelion, wild garlic, broomsedge, and purple henbit. Commercial properties and roadside shoulders are comprised of grasses and herbs including tall fescue, Bermuda grass, bahia grass, dandelion, purple henbit, broomsedge, and perennial ryegrass. Invasive species within these communities include mimosa, Bradford pear, tree of heaven, golden bamboo, Chinese privet, multiflora rose, gill-over-the-ground, English ivy, Japanese stiltgrass, and Japanese honeysuckle. Wetland WAT, WAG, and WG were observed within this community type (see Figures 7.1-7.3 for the location of wetlands). WAT and a portion of WAG is a floodplain depression that is periodically mowed that classifies as a disturbed bottomland

hardwood forest according to the North Carolina Wetland Assessment Method (NCWAM). WG is a small headwater forest according to the NCWAM classification.

Cutover Forest

The cutover forest community type is scattered throughout, ranging from one to ten years old. These cutover communities are predominantly immature mesic mixed hardwood forests and one Piedmont alluvial forest. Dominant tree species are comprised of sweetgum, tulip poplar, red maple, black cherry, shagbark hickory, black oak, red elm, green ash, blackgum, American beech, white oak, northern red oak, willow oak, mockernut hickory, pignut hickory, loblolly pine, shortleaf pine, Virginia pine, eastern red cedar, and winged elm. Shrubs observed include silverling, Chinese privet, American holly, and multiflora rose. Herb and vine species include broomsedge, tall goldenrod, horseweed, dog fennel, blackberry, poison ivy, muscadine grape, common greenbrier, Japanese stiltgrass, Chinese trumpet creeper, and Japanese honeysuckle. Herbaceous species observed include broomsedge, tall goldenrod, horseweed, dog fennel, and blackberry. Wetland WAN and WAQ are within this community type. Wetland WAN and WAQ are classified as bottomland hardwood forest and headwater forest respectively, according to NCWAM.

Mixed Pine Forest

Mixed pine forest areas were interspersed throughout the study area. The canopy was mainly comprised of loblolly pine, Virginia pine, and shortleaf pine. Some stands were monotypic while others were a mix of pine species. Subcanopy species include red maple, sweetgum, tulip poplar, and red elm. The understory within this community is open with a sparse herb and vine layer composed of ebony spleenwort and common greenbrier. No wetlands were observed within this community type.

Piedmont Alluvial Forest

The piedmont alluvial forest community occurs along the floodplains of the larger streams observed within the study area. Dominant canopy species include sycamore, green ash, box elder, swamp chestnut oak, river birch, sweetgum, hackberry, tulip poplar, red elm, and red maple. Dominant subcanopy and shrub species include ironwood, paw-paw, spicebush, sugar maple, eastern redbud, willow oak, flowering dogwood, and Chinese privet. Herbs and vines include false nettle, common rush, sedges, wild ginger, snakeroot, grape fern, cinnamon fern, netted chain fern, Christmas fern, poison ivy, muscadine grape, common greenbrier, and crossvine. Invasive species observed include tree of heaven, Chinese privet, Japanese stilt grass, Japanese honeysuckle. Wetland WB, WE, WAG, WAH, WAP, and WAO are included within this community and are classified as bottomland hardwood forests according to the NCWAM classification.

Mesic Mixed Hardwood Forest

The mesic mixed hardwood forest community is scattered throughout the study area, occurring within undisturbed uplands and along small stream valleys. Dominant canopy species include

sweetgum, tulip poplar, red maple, sugar maple, red elm, green ash, blackgum, American beech, white oak, southern red oak, northern red oak, willow oak, mockernut hickory, pignut hickory, shagbark hickory, loblolly pine, shortleaf pine, and Virginia pine. Subcanopy and shrub species include flowering dogwood, eastern red cedar, trifoliolate orange, sugar maple, black haw, winged elm, , and American holly. Herb and vine species include Christmas fern, ebony spleenwort, cranefly orchid, rattlesnake plantain, poison ivy, muscadine grape, and common greenbrier. Invasives observed include tree of heaven, Japanese stiltgrass, Asiatic dayflower, Chinese privet, nandina, and Japanese honeysuckle. Wetland WA, WC, WD, WF, WG, WH, and WI are within this community type. WA, WC, WD, WF, and WG are classified as headwater forest according to NCWAM. WH and WI are classified as a non-tidal freshwater and seep respectively, according to NCWAM.

Table 6: Coverage of Terrestrial Communities within the Study Area

Community	Coverage (ac.)
Maintained/ Disturbed	212.0
Cutover Forest	32.5
Mixed Pine Forest	49.3
Piedmont Alluvial Forest	18.2
Mesic Mixed Hardwood Forest	129.7
Total	441.7

b. Terrestrial Wildlife

Terrestrial communities in the study area are comprised of natural and disturbed habitats that may support several wildlife species (those species actually observed are indicated with *). Mammal species that commonly exploit forested habitats and stream corridors include eastern cottontail, raccoon, Virginia opossum, and white-tailed deer*. Birds that commonly use forest and forest edge habitats include the American crow*, cardinal*, robin*, white breasted nuthatch*, blue jay*, Carolina chickadee*, tufted titmouse*, Carolina wren*, and red-shouldered hawk*. Birds observed in open exposed habitats include black vulture*, turkey vulture*, bluebird*, brown thrasher, mockingbird*, and red-tailed hawk*. Reptile and amphibian species that may use terrestrial communities include the northern copperhead, black rat snake*, black racer, eastern box turtle*, eastern fence lizard*, ground skink*, five-lined skink, Fowler’s toad*, and American toad.

c. Aquatic Communities

Aquatic communities in the study area include five perennial streams (SA, SC, SE, SI, and SG) and three intermittent streams (SB, SF, SH, and SJ) (see Figures 7.1-7.3 for stream locations). Stream SC and SE had both intermittent and perennial portions within the study area. SA and SG are medium to large sized streams with shallow riffles and pools with some interspersed cobble features that could support fish, crayfish, amphibians, and various benthic macroinvertebrates. SB is a much smaller intermittent stream that had no water in it during the investigations with the exception of an occasional pool supporting some macroinvertebrates. SC is a small perennial stream with a steeper grade with a cobble boulder substrate. Mosquito fish, crayfish, dusky salamanders, and benthic macroinvertebrates were observed.

SE is a perennial stream that crosses the study area in two locations that had fish and benthic macroinvertebrates. SF is a short intermittent tributary to SE that had no flow and an occasional pool containing a macroinvertebrate assemblage. SH is a short intermittent tributary to SI supporting some macroinvertebrates and could provide habitat for crayfish and amphibians. SI is a tributary from a pond where crayfish, larval salamanders, and a diverse assemblage of benthic macroinvertebrates were observed. SJ is tributary draining into Wetland WG where crayfish and benthic macroinvertebrates were observed.

d. Invasive Species

Fourteen species from the NCDOT Invasive Exotic Plant List for North Carolina were found in the project study area: tree of heaven (Threat), multiflora rose (Threat), Chinese lespedeza (Threat), Japanese stilt grass (Threat), Asian dayflower (Threat), Chinese privet (Threat), Japanese honeysuckle (Moderate Threat), mimosa (Moderate Threat), golden bamboo (Moderate Threat), gill over the ground (Moderate Threat), English ivy (Moderate Threat), Bradford pear (Watch List), nandina (Watch List), and Asiatic dayflower (Watch List). It is anticipated NCDOT will manage invasive plant species in the right-of-way as appropriate.

2. Waters of the United States

Water resources in and adjacent to study area are part of the Yadkin-Pee Dee River basin (U.S. Geological Survey [USGS] Hydrologic Unit 03040105). Eleven stream channels were identified (see Table 7) according to the North Carolina Division of Water Resources (NCDWR) stream identification form (Version 4.11) (see Figures 7.1-7.3). The physical characteristics of these streams are provided in Table 8. There are two ponds in the study area, totaling approximately 1.3 acres.

Table 7: Water Resources in the Study Area

Stream Name	Map ID*	Figure No.	NCDWR Index Number	Best Usage Classification
Town Branch***	SA	7.1	12-84-1-2	WS-IV
UT to Town Branch	SB	7.1	12-84-1-2	WS-IV
UT to Town Branch	SC**	7.1	12-84-1-2	WS-IV
UT to Cold Water Creek	SE	7.2	13-17-9-4-(0.5)	WS-IV
UT to Cold Water Creek	SF	7.2	13-17-9-4-(0.5)	WS-IV
Coldwater Creek	SG	7.1/ 7.2	13-17-9-4-(0.5)	WS-IV
UT to Lake Fisher	SH	7.3	13-17-9-4-(0.5)	WS-IV
UT to Lake Fisher	SI	7.3	13-17-9-4-(0.5)	WS-IV
UT to Coldwater Creek	SJ	7.2	13-17-9-4-(0.5)	WS-IV
<i>I-3802 Streams</i>				
UT to Cold Water Creek	SIE	7.1-7.3	13-17-9-4-(0.5)	WS-IV
UT to Cold Water Creek	SZD	7.1	13-17-9-4-(0.5)	WS-IV

* There is no stream SD within the Study Area

** Stream contains both intermittent and perennial sections

*** Stream name according to FIRM Panel 5625K

Table 8: Physical Characteristics of Water Resources in the Study Area

Map ID	Bank Height (ft)	Bankful Width (ft)	Water Depth (in)	Channel Substrate	Velocity	Clarity
SA	3-5	12-16	3-6	Sand, Gravel, Cobble, Bedrock	Moderate	Clear
SB	3-5	5-8	0-3	Clay, Sand, Gravel, Cobble	Slow	Clear
SC(I)	1	1-2	2-6	Silt, Sand	Slow	Slightly Turbid
SC(P)	2-3	2-3	2-8	Sand, Gravel, Cobble, Bedrock	Moderate	Clear
SE	5-6	6-8	3-15	Sand, Gravel, Cobble, Bedrock	Slow	Clear
SF	4-6	6-8	0-4	Sand, Gravel, Cobble	Slow	Clear
SG	6-8	20	2-20	Sand, Gravel, Cobble	Moderate	Clear
SH	1-2	2-3	0-1	Sand, Gravel	Slow	Clear
SI	3	4-6	3-10	Sand, Gravel, Cobble	Slow	Clear
SJ	1	2-3	0-2	Sand, Clay	Slow	Clear
<i>I-3802 Streams</i>						
SIE	1-3	10-20	2-6	Silt, Gravel		
SZD	1-3	1-3	0	Silt, Sand	Water Absent	Water absent

(I) = Intermittent segment

(P) = Perennial segment

The project is located within the Cold Water Creek water supply watershed and has a North Carolina water quality classification of WS-IV. Lentz Road is the approximate boundary

between the Cold Water Creek and the Dutch Buffalo Creek (WS-II) water supply watersheds. Cold Water Creek, Town Branch, and an unnamed tributary of Cold Water Creek cross the project study area. No features within the study area have been designated as Outstanding Resource Water (ORW) or as trout waters. There are no designated anadromous fish waters, Primary Nursery Areas (PNA), or designated High Quality Waters (HQW) within one mile downstream.⁴ There are no impaired waters, identified on the North Carolina 2012 Final 303(d) list for sedimentation or turbidity, within one mile downstream of the study area.

a. Clean Water Act Waters of the United States

Jurisdictional streams were identified in the study area (see Table 9). SA, SB, and SC are part of the Town Creek stream complex draining to Coldwater Creek. SE, SF, SG, SH, SI, and SJ are unnamed tributaries to Coldwater Creek. SA (Town Creek) flows as a perennial stream throughout the study area with two floodplain wetlands (WB, WE). SB is perennial throughout with a small headwater wetland (WA) near the study area boundary. SC begins as an intermittent stream within a fallow field of the study area and transitions to a perennial stream near wetland WD. SC also has one small headwater wetland (WC) along the perennial reach. SE is a perennial stream throughout the study area and flows through wetland WH. A small intermittent stream (SF) is an unnamed tributary to SE that also flows from WH. SG (Coldwater Creek), is the largest creek within the study area to which all waters in the study area flow and it traverses the study area in two locations. SH is a pond-fed perennial stream that converges with a small intermittent stream (SI). SJ is a small intermittent stream that flows into wetland WG. Stream SJ is the only stream identified as intermittent, unimportant with no mitigation required. The locations of all streams are shown on Figures 7.1-7.3. The jurisdictional streams have been designated as warm water streams for the purposes of stream mitigation.

⁴ While Dutch Buffalo Creek (WS-II) water supply watershed has a secondary designation of HQW, there are no jurisdictional streams within the project area that drain to it.

Table 9: Jurisdictional Characteristics of Water Resources in the Study Area

Stream Name	Map ID	Length (ft.)	Classification	Anticipated Impacts (ft.) ¹		Compensatory Mitigation Required	River Basin Buffer
				Alt. 1	Alt. 2		
Town Branch	SA	1,221	Perennial	--	205	Yes	Not Subject
UT to Town Branch	SB	923	Perennial	--	215	Yes	Not Subject
UT to Town Branch	SC(I)	218	Intermittent	--	185	Yes	Not Subject
UT to Town Branch	SC(P)	853	Perennial	--	--	Yes	Not Subject
UT to Cold Water Creek	SE(P)	1,123	Perennial	--	140	Yes	Not Subject
UT to Cold Water Creek	SF	187	Intermittent	--	105	Yes	Not Subject
Cold Water Creek	SG	600	Perennial	--	--	Yes	Not Subject
UT to Lake Fisher	SH	18	Intermittent	--	--	Yes	Not Subject
UT to Lake Fisher	SI	440	Perennial	--	--	Yes	Not Subject
UT to Cold Water Creek	SJ ²	414	Intermittent	--	115	No ³	Not Subject
<i>I-3802 Streams</i>							
UT to Cold Water Creek	SIE ⁴	3,332	Perennial	115	--	Yes	Not Subject
UT to Cold Water Creek	SZD ⁵	780	Intermittent	--	--	Yes	Not Subject
Total		10,109	--	115	965	--	--

¹ Anticipated Impacts: Impacts to jurisdictional areas are considered to be all areas which fall within 25 feet of the proposed slope-stake limits.

² Unimportant Jurisdictional Channel

³ USACE identifies this stream as unimportant with no mitigation required. Since this is an intermittent stream NCDWR will require mitigation if impacts are greater than 149' linear feet.

⁴ Stream characteristics for SIE are from the I-3802 *Natural Resources Technical Report* (March 2008).

⁵ Stream SZD is an I-3802 jurisdictional stream that was verified in July 2012 as part of W-5516.

Jurisdictional wetlands were identified within the study area (see Figures 7.1-7.3). Seven wetlands were previously identified in the original *I-3802 Natural Resources Technical Report* (March 2008). Wetland classifications and quality ratings are presented in Table 10. All wetlands are within the Yadkin Pee-Dee River basin (USGS Hydrologic Unit 03040105). United States Army Corps of Engineers (USACE) wetland delineation forms and NCDWR wetland rating forms (4th Version) are included in Appendix C of the *W-5516 Natural Resources Technical Report* (March 2014) – available from NCDOT. Descriptions of the terrestrial communities containing these wetlands are presented in *Section V.A.1, Biotic Resources*.

WA, WC, WD, and WF are headwater wetlands located with the mesic mixed hardwood forest community. WG is located next to a maintained field. WB and WE are small local depressions within the piedmont alluvial forest. Wetland WH is included in the Non-Tidal Freshwater Marsh community. WI is a small seep located within a mesic mixed hardwood forest downstream of the pond and contiguous to stream SI.

Table 10: Jurisdictional Characteristics of Wetlands in the Study Area

Map ID	NCWAM Classification	Hydrologic Classification	NCDWR Wetland Rating ¹	Area (ac.)	Anticipated Impacts ²	
					Alt. 1	Alt. 2
WA	Headwater Forest	Riparian	29	0.13	--	--
WB	Bottomland Hardwood Forest	Riparian	16	0.12	--	--
WC	Headwater Forest	Riparian	19	0.01	--	--
WD	Headwater Forest	Riparian	15	0.02	--	--
WE	Bottomland Hardwood Forest	Riparian	7	0.04	--	< 0.1
WF	Headwater Forest	Riparian	23	0.10	--	--
WG	Headwater Forest	Riparian	23	0.26	--	--
WH	Non-Tidal Freshwater Marsh	Riparian	35	0.25	--	--
WI	Seep	Riparian	6	0.01	--	--
<i>I-3802 Wetlands (Verified July 2012)³</i>						
WAG	Bottomland Hardwood Forest	Riparian	58	0.17	--	--
WAH	Bottomland Hardwood Forest	Riparian	27	0.01	--	--
WAN	Bottomland Hardwood Forest	Riparian	68	0.02	--	--
WAO	Bottomland Hardwood Forest	Riparian	29	0.20	0.2	--
WAP	Bottomland Hardwood Forest	Riparian	30	0.35	--	--
WAQ	Headwater Forest	Riparian	24	0.01	--	--
WAT	Bottomland Hardwood Forest	Riparian	30	1.51	< 0.1	--
Total				3.21	0.2	< 0.1

¹ I-3802 wetland rating scores from I-3802 NRTR

² Anticipated Impacts: Impacts to jurisdictional wetlands are considered to be all areas which fall within 25 feet of the proposed slope-stake limits.

³ Only including actual area within the W-5516 study area

b. Clean Water Act Permits

As the project is anticipated to have jurisdictional impacts to surface waters, Clean Water Act permits will be required. It is anticipated that a Section 404 Nationwide 14 Permit and the corresponding NCDWR Section 401 Water Quality Certification will be applicable. Ultimately, the USACE holds the final discretion as to what permit will be required to authorize project construction.

c. Construction Moratoria

Rowan County is not identified as having trout waters and habitat for anadromous fish; therefore, construction moratoria are not anticipated for the project.

d. North Carolina River Basin Buffer Rules

The project is located within the Yadkin-Pee Dee River Basin. The project is not within an area where buffer rules will apply.

e. Rivers and Harbors Act Section 10 Navigable Waters

There are no Traditionally Navigable Waters, as defined under Section 10 of the Rivers and Harbors Act, in the study area.

f. Wetland and Stream Mitigation

Avoidance and Minimization of Impacts

Alternative 1 avoidance and minimization measures include:

- A longer bridge over I-85 that will also span Cold Water Creek and adjacent wetlands.
- Realigning Old Beatty Ford Road to the north of the existing bridge over I-85 to avoid impacts to parallel streams.
- Consideration given to adjusting the alignment closer to the existing bridge.⁵

Alternative 2 avoidance and minimization measures include:

- A longer bridge over I-85 that will also span Cold Water Creek.
- Locating the alignment to avoid wetlands and parallel streams where possible.
- Adjusting the grades to reduce the footprint at stream crossings.

NCDOT will continue to avoid and minimize impacts to streams and wetlands to the greatest extent practicable during project design. The eastern section of the project draining to Dutch

⁵ Adjusting the alignment closer to the existing bridge was considered but not pursued because it would have resulted in greater stream impacts.

Buffalo Creek water supply watershed (WS-II, HQW) will be designed according to Design Standards in Sensitive Watersheds (DSSW).

Compensatory Mitigation of Impacts

During final design, NCDOT will investigate removing the existing culvert at Old Beatty Ford Road and Cold Water Creek for potential on-site stream and wetland mitigation use. Other potential on-site stream and wetland mitigation opportunities will also be considered once a final decision has been rendered on the location of the preferred alternative. If on-site mitigation is not feasible, it is anticipated mitigation will be provided by North Carolina Department of Environment and Natural Resources Ecosystem Enhancement Program (EEP).

3. Rare and Protected Species

As of December 26, 2012, the United States Fish and Wildlife Service (USFWS) lists one federally protected species for Rowan County, Schweinitz's sunflower (*Helianthus schweinitzii*). A brief description of habitat requirements follows, along with the Biological Conclusion rendered based on survey results in the study area. Habitat requirements are based on the current best available information from referenced literature and/or USFWS.

Schweinitz's Sunflower

USFWS Optimal Survey Window: May - October

Schweinitz's sunflower is endemic to the Piedmont of North and South Carolina. The few sites where this rhizomatous perennial herb occurs in relatively natural vegetation are found in Xeric Hardpan Forests. The species is also found along roadside rights-of-way, maintained power lines and other utility rights-of-way, edges of thickets and old pastures, clearings and edges of upland oak-pine-hickory woods and Piedmont longleaf pine forests, and other sunny or semi-sunny habitats where disturbances (*e.g.*, mowing, clearing, grazing, blow downs, storms, frequent fire) help create open or partially open areas for sunlight. It is intolerant of full shade and excessive competition from other vegetation. Schweinitz's sunflower occurs in a variety of soil series, including Badin, Cecil, Cid, Enon, Gaston, Georgeville, Iredell, Mecklenburg, Misenheimer, Secrest, Tatum, Uwharrie, and Zion, among others. It is generally found growing on shallow sandy soils with high gravel content; shallow, poor, clayey hardpans; or shallow rocky soils, especially those derived from mafic rocks.

Biological Conclusion: No Effect

Potential habitat is present within the study area. Current habitats within the study area include roadsides, periodically disturbed or maintained utility rights of way, old pastures, and sunny or semi-sunny woodland openings. A plant by plant survey of approximately 22 man-hours was conducted within the study area by qualified personnel from The Catena Group on October 18 and 19, 2013 within all suitable habitats found. No Schweinitz's sunflowers were observed. A sunflower population was visited previous to the surveys to reference the current conditions of flowering, plant structure, and appearance. A review of the NCNHP database on October 17, 2013, indicated no populations of Schweinitz's sunflower are known to occur within

a one mile radius of the study area. Therefore, the proposed road improvement project will have No Effect on the Schweinitz's sunflower.

A USFWS proposal for listing the Northern Long-eared Bat (*Myotis septentrionalis*) as an endangered species was published in the Federal Register in October 2013. The listing may become effective as soon as October 2014. Furthermore, this species is included in USFWS's current list of protected species for Rowan County. NCDOT is working closely with the USFWS to understand how this proposed listing may impact NCDOT projects. NCDOT will continue to coordinate appropriately with USFWS to determine if this project will incur potential effects to the Northern long-eared bat, and how to address these potential effects, if necessary.

Bald and Golden Eagle Protection Act

Habitat for the bald eagle primarily consists of mature forest in proximity to large bodies of open water for foraging. Large dominant trees are utilized for nesting sites, typically within one mile of open water.

A desktop-GIS assessment of the study area, as well as within a 1.13 mile radius of the project limits, was performed on October 17, 2013, using 2010 color aerials. Lake Fisher, which is large enough and sufficiently open to be considered foraging habitat, was the only appropriate foraging habitat observed. No other water bodies large enough or sufficiently open to be considered foraging habitat were identified. Since foraging habitat is located within 1.13 miles of the study area, an onsite survey for suitable nesting habitat was conducted within the study area and within 660 feet beyond the study area limits. The study area was surveyed for suitable nesting habitat and no bald eagles or nests were observed. A review of the North Carolina National Heritage Program (NCNHP) database reveals no known occurrences of this species within one mile of the study area. Additionally there are no known occurrences of bald eagles at Lake Fisher. Due to the lack of habitat, known occurrences, and minimal impact anticipated for this project, it has been determined that this project will not affect this species.

Endangered Species Act Candidate Species

As of December 26, 2012 the USFWS lists one Candidate species for Rowan County, the Georgia aster (*Symphyotrichum georgianum*). A review of NCNHP records, updated October 2013, indicates no known occurrence of Georgia aster within one mile of the study area.

Essential Fish Habitat

According to the National Marine Fisheries Service (NMFS), there is no essential fish habitat within the study area.

4. Soils

The Rowan County Soil Survey identifies 19 soil series within the study area (see Table 11).

Table 11: Soils in the Study Area

Soil Series	Mapping Unit	Drainage Class	Hydric Status
Appling sandy loam, 1 to 6 percent slope	ApB	Well drained	Non-Hydric
Cecil sandy loam, 2 to 8 percent slopes	CcB	Well drained	Non-Hydric
Cecil sandy loam, 8 to 15 percent slopes	CcC	Well drained	Non-Hydric
Chewacla loam, 0 to 2 percent slopes	ChA	Somewhat poorly drained	Hydric
Enon fine sandy loam, 2 to 8 percent slopes	EnB	Well drained	Hydric
Enon fine sandy loam, 8 to 15 percent slopes	EnC	Well drained	Hydric
Helena sandy loam, 1 to 6 percent slopes	HeB	Moderately well drained	Hydric
Lloyd clay loam, 2 to 8 percent slopes	LdB2	Well drained	Non-Hydric
Mecklenburg clay loam, 2 to 8 percent slopes	MeB2	Well drained	Non-Hydric
Pacolet sandy clay loam, 8 to 15 percent slopes	PcC2	Well drained	Non-Hydric
Pacolet sandy loam, 15 to 25 percent slopes	PaD	Well drained	Non-Hydric
Poindexter-Rowan complex, 2 to 8 percent slopes	PxB	Well drained	Non-Hydric
Poindexter-Rowan complex, 8 to 15 percent slopes	PxC	Well drained	Non-Hydric
Poindexter-Rowan complex, 15 to 25 percent slopes	PxD	Well drained	Non-Hydric
Rion-Wedowee complex, 2 to 8 percent slopes	RnB	Well drained	Non-Hydric
Rion-Wedowee complex, 8 to 15 percent slopes	RnC	Well drained	Non-Hydric
Sedgefield fine sandy loam, 1 to 6 percent slopes	SeB	Moderately well drained	Non-Hydric
Vance sandy loam, 2 to 8 percent slopes	VaB	Well drained	Non-Hydric
Vance sandy loam, 8 to 15 percent slopes	VaC	Well drained	Non-Hydric

B. Cultural Resources

The project is subject to compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, and implemented by the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106, codified as 36 CFR Part 800. Section 106 requires federal agencies to take into account the effect of their undertakings (federally-funded, licensed, or permitted) on properties included in or eligible for inclusion in the National Register of Historic Places and to afford the Advisory Council a reasonable opportunity to comment on such undertakings.

1. Historic Architectural Resources

In correspondence dated November 5, 2013, the State Historic Preservation Office (HPO) recommended that a qualified architectural historian identify and evaluate the National Register

eligibility of the following properties and any other structures over 50 years of age within the project's Area of Potential Effect (APE):

- Samuel Deal House (RW 0317)
- Yost Post Office (RW 0773)
- Ketner-Funderburke House (RW 1402)
- Correll-Albright House (RW 1365)
- Moses Ketner House and Farm (RW 1411)

The HPO also noted that the Bostian School (RW 1772) (currently known as Bostian Elementary School) was previously identified with TIP Project W-5313 as being eligible for listing in the National Register of Historic Places.

Pursuant to Section 4(f) of the Department of Transportation Act of 1966, Section 106 of the National Historic Preservation Act of 1966, as amended, and the Advisory Council on Historic Preservation's regulations, Protection of Historic Properties (36 CFR 800), a Phase II (Intensive Level) Architectural Survey and Evaluations of Eligibility (2014) was conducted for the proposed project. This survey was conducted within the project's APE, defined as the geographic area or areas within which a project may cause changes to the character or use of historic properties. The APE for this project was determined during an initial field survey and generally follows modern development, woodland, and sharp changes in topography that serve as effective physical buffers to the project. The architectural resources survey consisted of background research into the historical and architectural development of the study area and a field survey of the APE.

The December 2013 survey of the APE resulted in the identification of a total of 58 properties that were built prior to 1964. These findings were presented to HPO staff on January 7, 2014. Fifty-one of the surveyed properties did not warrant any further examination. Seven properties required intensive-level investigation to determine National Register eligibility. Following in-depth investigations of these resources, two properties, Bostian School (RW1772) and the Yost-Weddington Farm-Yost Post Office (RW0773), were recommended for National Register eligibility (see Figure 8). The other five properties surveyed at the intensive level were considered ineligible for the National Register.

Bostian School (RW1772) is located west of Lentz Road and was determined eligible for the National Register under Criterion A for education (NCHPO 2012). The school has not changed significantly since the 2012 Determination of Eligibility (DOE) and remains eligible under Criterion A. The DOE boundary encompasses the 1936 school and the 1997 addition, but excludes the 1988 cafeteria/gymnasium. Neither alternative will acquire right-of-way or involve construction activities within the property's DOE boundary. The project will have no effect on the property, and the HPO concurs with this determination (see correspondence in Appendix A).

The Yost-Weddington Farm-Yost Post Office (RW0773) is located at 3175 Lentz Road north of Alternative 2. The Yost-Weddington Farm spans the east and west sides of Lentz Road.

Originally comprised of roughly 45 acres, the farm tract now encompasses approximately 12 acres of fields, woodland, and a large complex of outbuildings oriented to the farmhouse.

Sited on the Yost-Weddington Farm, the Yost Post Office stands on the east side of Lentz Road, facing the main farm complex, situated on the west side of the road. Now vacant and in poor but stable condition, this simple, frame, one-story, gable-front building served as the Yost Post Office between 1888 and 1889. Based on the findings of the Historic Architecture Report, the Yost-Weddington Farm-Yost Post Office is recommended as eligible for the National Register under Criterion A for agriculture, politics/government, and commerce. Neither alternative will acquire right-of-way or involve construction activities within the property's DOE boundary. The project will have no effect on the property, and the HPO concurs with this determination (see correspondence in Appendix A).

2. Archaeological Resources

In correspondence dated November 5, 2013, HPO commented that there is a high probability that prehistoric and historic archaeological features associated with past residents may exist within the project area (see Appendix A). The HPO recommended a comprehensive archaeological survey be conducted to identify and evaluate the significance of any archaeological remains that may be damaged or destroyed by the proposed project. An archaeological survey was conducted by an archaeology consultant firm for NCDOT in January and February 2014 for this project.

The archaeological survey and evaluation gave full consideration to approximately 123 acres comprising the APE. Of this total area, approximately 93 acres were intensively investigated using subsurface shovel testing. Of the 11 newly recorded resources that were documented during the course of the survey, eight meet the definition of an archaeological site (Native American and/or historic period). These are Sites 31RW250, 31RW253/253**, 31RW254**, 31RW255**, 31RW256, 31RW257, 31RW258, and 31RW259**. Three others are considered isolated finds and are characterized by one or two artifacts (31RW251, 31RW252**, and 31RW260**). The 11 archaeological resources include four newly recorded precontact Native American sites, three newly recorded historic period sites, one newly recorded multicomponent precontact Native American and historic period site, and three isolated finds.

All eight of the archaeological sites that have been identified in, or have portions in, the current APE are recommended as either not eligible for the National Register of Historic Places (NRHP) or not contributing to any NRHP eligibility. The site areas typically have either low artifact densities or have evidence suggesting disturbed deposits that would be unable to yield contextual data and contribute to studies involving significant research questions. The three isolated finds recorded during the current survey are also recommended as not eligible for the NRHP under Criteria A, B, C or D, as all of them lack sufficient context for further interpretation. The isolated finds may relate to site areas extending outside of the APE; however, the area outside of the APE was not surveyed. The project has been determined to have no effect on any eligible archaeological resources, and the HPO Office of State Archaeology concurs with this determination (see Appendix A).

C. Farmland

The Farmland Protection Policy Act (FPPA) of 1981 (7 CFR 568) requires that for all highway projects involving federal action, the impact of land acquisition and construction activities must be considered regarding prime and statewide important farmland, as defined by the Natural Resources Conservation Services (NRCS). In addition, FPPA is intended to minimize the impact that federal programs, or projects completed with federal assistance, have on the unnecessary and irreversible conversion of farmland to non-agricultural uses. Prime farmland is defined as "that land best suited for producing food, feed, fiber, forage, and oil seed crops." These soils are favorable for all major common crops, have a favorable growing season, and receive the moisture needed to produce high yields on an average of eight out of every ten years. Land that is already in or committed to urban development or water storage is not included. Farmland of statewide and local importance is defined as "soils important for agriculture as determined by the appropriate state or local government agency."

North Carolina Executive Order 96 requires all state agencies under the jurisdiction of the Governor to ensure that actions taken by those agencies will minimize the loss of prime agricultural lands and forest lands. It also requires the identification and disclosure of prime soil impacts.

As is required by the FPPA, the Form AD-1006 has been completed according to FHWA guidelines (see Appendix A). Alternative 1 and Alternative 2 were analyzed and both received total point values of 70 points for Parts III and VI of the Form AD-1006. Therefore, because point totals for both alternatives exceeded 60 points, and in accordance with FHWA guidance of FPPA, they were submitted to NRCS for review.

NRCS has completed their review (Parts IV and V of the Form AD-1006) and both alternatives received final point totals of less than 160 points. Therefore, both alternatives fall below the NRCS minimum criteria rating and will not be evaluated further for farmland impacts. These alternatives will not have a significant impact to farmland.

Part VII of Form AD-1006 will be completed once an alternative has been selected and will be included in the final environmental document.

No other alternatives other than those already discussed in this document will be considered without a re-evaluation of the project's potential impacts upon farmland.

The North Carolina Agricultural Development and Farmland Preservation Trust Fund's Agricultural District Program encourages the preservation and protection of farmland from non-farm development. This is in recognition of the importance of agriculture to the economic and social well-being of North Carolina. In Chapter 106, Article 61 of the North Carolina General Statutes, the North Carolina General Assembly authorized counties to undertake a series of programs to encourage the preservation of farmland. As a result, counties throughout the state of North Carolina have begun to adopt Voluntary Agricultural District Ordinances (VAD) and Enhanced Voluntary Agricultural District Ordinances (EVAD).

Rowan County has an adopted EVAD ordinance, but, according to information found on Rowan County's website, none are located within the project area.

D. Social Effects

1. Neighborhoods/ Communities

There should be no community/ neighborhood cohesion or stability impacts as a result of this project. The proposed project will not prevent area residents from interacting with one another, nor will it hinder access to neighbors or frequent business destinations. The neighborhoods in the project area are not cohesive as a whole or individually. There is no major employment or retail center (groceries, shopping, entertainment, etc.) in the project area.

The relatively low traffic volume suggests Old Beatty Ford Road is not a major commuting route. See *Section II.B.1.d, Traffic Volumes* for more information.

If Alternative 2 is selected as the preferred alternative, travel patterns and the accessibility to some Old Beatty Ford Road properties will change. However, this should not have any effect on community/ neighborhood cohesion and stability. With Alternative 2, the existing Old Beatty Ford Road bridge over I-85 will be removed and cul-de-sacs will be constructed on both sides of the interstate. Residents, school buses, and emergency responders would be required to use the relocated Old Beatty Ford Road and Lentz Road, which will increase trip distances by as much as 3.4 miles and travel times by five minutes or more. During and following a public meeting held in November 2013, some Old Beatty Ford Road residents expressed concern over the increased distance and time.

This project will have a positive effect on community safety. The purpose of this project is to improve vehicular safety on Old Beatty Ford Road by reducing the frequency of lane departure and frontal impact crashes that have resulted in fatal and non-fatal injuries as well as property damage. A straighter horizontal/ vertical alignment, wider roadway, and paved shoulders can reduce crashes by more than 70 percent.

2. Relocation of Residences and Businesses

The number of residential and business displacements for the Build Alternatives was determined by reviewing current tax maps, aerial maps and by conducting site visits. Alternative 1 displaces ten residences and one business for a total of 11 relocations. Alternative 2 displaces one residence. There are no minority-owned or rented residential units and no minority-owned business units that will be relocated for either Build Alternative. No farming businesses, non-profit organizations, churches, or schools will be relocated for either Build Alternative. Detailed information is provided in the Relocation Reports included in Appendix B.

It is the policy of NCDOT to ensure that comparable replacement housing is available for those relocated, prior to construction of state and/or federally assisted projects. Furthermore, the NCDOT has three programs to minimize the inconvenience of relocation including relocation

assistance, relocation moving payments, and relocation replacement housing payments or rent supplement.

With the Relocation Assistance Program, experienced NCDOT staff will be available to assist displacees with information such as availability and prices of homes, apartments, or businesses for sale or rent, and financing or other housing programs. The Relocation Moving Payments Program, in general, provides for payment of actual moving expenses encountered in relocation. Where a displacement will force an owner or tenant to purchase or rent property of higher cost or to lose a favorable financing arrangement (in cases of ownership), the Relocation Replacement Housing Payments or Rent Supplement Program will compensate owners and tenants who are eligible and qualify.

The relocation program for the proposed action will be conducted in accordance with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646) and the North Carolina Relocation Assistance Act (GS-133-5 through 133-18). This program is designed to provide assistance to displaced persons in relocating to a replacement site in which to live or do business. At least one relocation officer is assigned to each highway project for this purpose.

The relocation officer will determine the needs of displaced families, individuals, businesses, non-profit organizations, and farm operations without regard to race, color, religion, sex, or national origin. The NCDOT will schedule its work to allow ample time, prior to displacement, for negotiations and possession of replacement housing that meets decent, safe, and sanitary standards. The displacees are given a 90-day written notice to vacate after NCDOT purchases the property. Relocation of displaced persons will be offered in areas not generally less desirable in regard to public utilities and commercial facilities.

Rent and sale prices of replacement housing will be within the financial budget of the families and individuals displaced and will be reasonably accessible to their places of employment. The relocation officer will also assist owners of displaced businesses, non-profit organizations, and farm operations in searching for and moving to replacement property.

All tenant and owner residential occupants who may be displaced will receive an explanation regarding all available options, such as: 1) purchases of replacement housing; 2) rental of replacement housing, either private or public; 3) moving existing owner-occupant housing to another site (if practicable). The relocation officer will also supply information concerning other state or federal programs offering assistance to displaced persons and will provide other advisory services as needed in order to minimize hardships to displaced persons in adjusting to a new location.

The Moving Expense Payments Program is designed to compensate the displaced persons for the costs of moving personal property from homes, businesses, non-profit organizations, and farm operations acquired for a highway project. Under the Replacement Program for Owners, NCDOT will participate in reasonable incidental purchase payments for replacement dwellings such as attorney's fees, surveys, appraisals, and other closing costs and if applicable, make a

payment for any increased interest payments, and incidental purchase expenses, except under the Last Resort Housing Provision.

A displaced tenant may be eligible to receive a payment to rent a replacement dwelling or to make a down payment, including incidental expenses, on the purchase of a replacement dwelling. The down payment is based upon what the state determines is required, when the rent supplement exceeds a given threshold.

It is a policy of the State that no person will be displaced by the NCDOT's federally-assisted construction projects unless and until comparable or adequate replacement housing has been offered or provided for each displacee within a reasonable period of time prior to displacement. No relocation payment received will be considered as income for the purpose of the Internal Revenue Code of 1954 or for the purposes of determining eligibility or the extent of eligibility of any person for assistance under the Social Security Act or any other federal law.

Last Resort Housing is a program used when comparable replacement housing is not available, or is unavailable within the displacee's financial means, and the replacement payment exceeds the federal and state legal limitation. The purpose of the program is to allow broad latitude in methods of implementation by the state so that decent, safe, and sanitary replacement housing can be provided. The Last Resort Housing Program may be necessary if the opportunity for relocation within the area is inadequate.

3. Demographics

Table 12 presents demographic data gathered from the 2000 and 2010 US Census for the Demographic Study Area (DSA), Rowan County, and North Carolina.⁶ An examination of the data indicates the DSA grew considerably more than the County between 2000 and 2010. The DSA had a lower percentage of minorities compared to Rowan County for the 2010 Census.

⁶ The Demographic Study Area (DSA) includes the 2010 US Census boundary for Census Tract 514/ Block Group 1. See the *Community Impact Assessment* for this project (available from NCDOT) for more demographic information.

Table 12: Demographic Overview

Population Growth, 2000 - 2010						
	Demographic Study Area ¹		Rowan County		North Carolina	
2000 Population	1,629		130,340		8,049,313	
2010 Population	1,936		138,428		9,535,483	
Difference	307		8,088		1,486,170	
% Change	18.8%		6.2%		18.5%	
Population By Race/ Ethnicity, 2010						
Race	Demographic Study Area		Rowan County		North Carolina	
	Pop.	%	Pop.	%	Pop.	%
White	1,864	96.3%	105,923	76.5%	6,528,950	68.5%
African-American	28	1.4%	22,392	16.2%	2,048,628	21.5%
Hispanic or Latino ²	49	2.5%	10,644	7.7%	800,120	8.4%
Total ³	1,892	97.7%	128,315	92.7%	8,577,578	90.0%

Source: US Census Bureau, 2000 and 2010 census.

1. The Demographic Study Area consists of Census Tract 514/ Block Group 1 in Rowan County.

2. Hispanic or Latino is an ethnic category and can include persons of any race; therefore, the Hispanic or Latino population data is not included in the total.

3. Race population and percentages do not equal population totals due to other racial groups not shown here. For table simplicity, and due to other racial groups being either nonexistent or very small, complete racial breakdown data is provided in the Appendix of the *Community Impact Assessment* (January 2014), available from NCDOT.

African-Americans are the largest minority population in the DSA and Rowan County. However, the percentage of African-Americans in the DSA is well below that of Rowan County. There are no population data that suggests a minority community would be disproportionately affected by the proposed project.

Executive Order 13166 "Improving Access to Services for Persons with Limited English Proficiency" requires all recipients of federal funds to provide meaningful access to persons who are limited in their English proficiency (LEP). The US Department of Justice defines LEP individuals as those "who do not speak English as their primary language and who have a limited ability to read, write, speak, or understand English" (67 FR 41459). Data about LEP populations were gathered from the US Census' 2007-2011 American Community Survey (ACS).

According to data obtained from the ACS, there are no groups within the DSA in which more than five percent of the adult population or 1,000 persons, whichever is less, speak English less than "Very Well." Therefore, demographic assessment does not indicate the presence of LEP language groups that exceed the Department of Justice's Safe Harbor threshold. See the *Community Impact Assessment* for this project (available from NCDOT) for more information concerning LEP groups.

4. Environmental Justice

No notably adverse community impacts are anticipated with this project and no Environmental Justice populations appear to be affected. Thus, based on demographic data, information from local officials, and field observations, impacts to minority and low income populations do not appear to be disproportionately high and adverse. Benefits and burdens resulting from the project are anticipated to be equitably distributed throughout the community, and no denial of benefit is expected. A demographic analysis summary of the project area may be found in *Section V.D.3, Demographics*.

Title VI of the Civil Rights Act of 1964, protects individuals from discrimination on the grounds of race, age, color, religion, disability, sex, and national origin. Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations” provides that each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects on minority and low-income populations. Special populations may include the elderly, children, the disabled, low-income areas, American Indians and other minority groups. Executive Order 12898 requires that Environmental Justice principles be incorporated into all transportation studies, programs, policies and activities. The three environmental principles are: 1) to ensure the full and fair participation of all potentially affected communities in the transportation decision-making process; 2) to avoid, minimize or mitigate disproportionately high and adverse human health or environmental effects, including social and economic effects, on minority or low-income populations; 3) to fully evaluate the benefits and burdens of transportation programs, policies, and activities, upon low-income and minority populations.

5. Bicycle and Pedestrian Facilities

According to local officials, there is very little pedestrian or bike activity along Old Beatty Ford Road, and there are no accommodations for them in the designs of this project. There are no requests from the state or local governments to provide bike or pedestrian accommodations as part of this project.

6. Other Public Facilities and Services

Other public facilities and services in, or in close proximity to, the project area include (see Figure 8):

- Bostian Elementary School located along Old Beatty Ford Road south of its intersection with Lentz Road.
- Highest Praise Family Worship Center along Bostian Road north of the Old Beatty Ford Road/ Bostian Road intersection.
- Oak Grove Freewill Baptist Church at the end of Chastity Lane (approximately 0.5 mile west of the Old Beatty Ford Road/ Lentz Road intersection).
- The Kannapolis Moose Family Center along Old Beatty Ford Road just south of the Old Beatty Ford Road/ Bostian Road intersection.

Alternative 1 will have no effect on any of the above facilities.

Alternative 2 will require right-of-way from the Highest Praise Family Worship Center property. The affected portion of the property is more than 1,000 feet behind the church and is currently undeveloped. The proposed project should not impact any facilities belonging to the church or its operations. As discussed in *Section V.D.1, Neighborhoods/ Communities*, if Alternative 2 is selected as the preferred, accessibility to some properties along Old Beatty Ford Road will be altered. This includes accessibility to Oak Grove Freewill Baptist Church. Churchgoers from the west side of I-85 that currently use Old Beatty Ford Road will have to use the relocated Old Beatty Ford Road, Lentz Road, and existing Old Beatty Ford Road to travel to and from the church. Alternative 2 will have no effect on Bostian Elementary School, the Highest Praise Family Worship Center, or the Kannapolis Moose Family Center.

7. School Bus Usage

According to information found on its web site (January 2014), Rowan-Salisbury School System operates six buses (12 trips) within and near the project study area on school days. The following schools serve the project area: Bostian Elementary, Landis Elementary, China Grove Middle, Jesse Carson High, and South Rowan High.

According to Rowan-Salisbury School System officials, neither alternative will have a considerable impact on bus routing nor is there a preference for one alternative over the other (see correspondence in Appendix A). Should Alternative 2 be selected, they request the cul-de-sacs on existing Old Beatty Ford Road be large enough to allow buses to turn around. NCDOT will design the cul-de-sacs to be large enough to allow school buses to turn around.

E. Economics

1. Economic and Infrastructure Data

Economic data gathered from the 2007-2011 ACS is shown in Table 13.

Table 13: Economic Indicators

	Demographic Study Area ¹	Rowan County	North Carolina
Median Household Income	\$56,250	\$43,121	\$46,291
Income Below Poverty Level (% Population) in the Past 12 Months	15.3%	16.9%	16.1%
Households Receiving Public Assistance in the Past 12 Months	1.5% ²	2.5%	1.8%

Source: US Census Bureau, 2007-2011 American Community Survey.

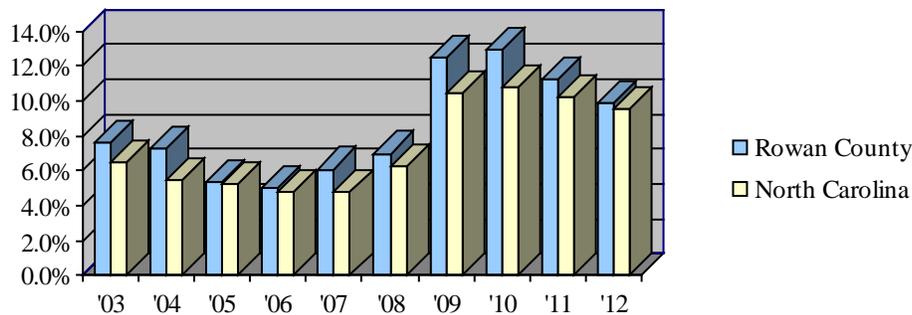
1. The Demographic Study Area consists of Census Tract 514/ Block Group 1 in Rowan County except as noted below.

2. Based on Tract 514 data. This information is not available at the Block Group level.

Over the five-year period from 2007 to 2011, residents of the DSA had higher household incomes than Rowan County. The percentage of households with incomes below the poverty level and the number of households receiving public assistance was lower than the rest of the County.

Based on Division of Employment Security (DES) information over a 10-year period from 2003 through 2012, Rowan County’s annual unemployment rate fluctuated between five percent in 2006 and seven percent in 2008. Unemployment rates jumped considerably in 2009 to 12.5 percent. The County’s unemployment rate followed the statewide trend – falling steadily between 2003 and 2006 and climbing beginning in 2007. Through August of 2013, the average unemployment rate in Rowan County is 9.3 percent.

Annual Unemployment Rates, 2001-2010



2. Economic Effects

If Alternative 1 is selected as the preferred alternative, one business (Steve’s Corner Store) will likely have to be relocated. Alternative 2 is not expected to require any business relocations. There are active farms near the proposed project that could be affected, but neither alternative is expected to require the relocation of farms operating as a business. No resources that are considered major economic attractions will be affected by the proposed project.

Nearby businesses farther removed from the project area should not be affected by the proposed project.

The proposed project is not expected to affect economic development in the area or serve a specific development. Local officials are anticipating a future I-85 interchange with Old Beatty Ford Road will be constructed within the project study area as a separate project. Although there are no specific development plans on file or under review at this time, local officials have received inquiries from interested developers and expect commercial and industrial development to occur adjacent to a new interchange. This project does not include an interchange with I-85, but it does not preclude the construction of one in the future. It is not expected to interfere with any development plans.

F. Land Use

This project is not expected to have any considerable effect on local land use, character, or development plans.

1. Existing Land Use and Zoning

According to Rowan County's *Land Use Plan, Areas East of I-85* (January 17, 2012), the project area is currently considered to be in a low-density residential and agricultural area of the County. In the past ten years, a few small areas near the proposed project have transitioned from agricultural uses to homes on large lots. Recent residential development along Lentz Road is the best example of this transition. Houses tend to be on larger lots with considerable separation between them. There are no commercial centers (i.e. grocery stores, shopping centers, etc.) in the project area. According to local officials, residential development has not been attracted to the area by any specific characteristics or development plans.

The Rowan County Zoning Map (August 26, 2013) shows the majority of the project area is zoned as rural agricultural. Exceptions to this are: commercial zones along I-85 (from south of Daugherty Road to Pine Ridge Road and from Moose Road south to the County line) and US 29; industrial zones south of Old Beatty Ford Road between Ebenezer Road and China Grove Road; and an area zoned for a mobile home park south of the Old Beatty Ford Road/ Lentz Road intersection adjacent to Bostian Elementary School.

2. Future Land Use

The proposed project is a safety project and is unlikely to alone alter land use patterns or create transportation nodes. According to Rowan County's land use plan, the project area is generally expected to maintain its rural residential/ agricultural characteristics. A lack of water/ sewer utilities, soil types not suitable for septic systems or wells, and the presence of two water supply watersheds are factors that are likely to prevent dense development.

Rowan County's land use plan indicates a future "regional node" at Old Beatty Ford Road and I-85. However, this is predicated on an interchange being built in this location in the future. According to the land use plan, examples of land uses in a regional node include: shopping complexes, grocery stores, convenience goods, gas stations, office complexes, restaurants and health care services. If one is built, an interchange in this area could become a transportation node. A land use or transportation node is unlikely to occur without the construction of an I-85/ Old Beatty Ford Road interchange. The proposed project does not include an interchange with I-85.

3. Project Compatibility With Local Plans

This project is consistent with local area plans and goals. Improvements to Old Beatty Ford Road are included in the following local plans:

- Rowan County's *Land Use Plan, Areas East of I-85* (January 17, 2012)
- The *Zoning Ordinance of Rowan County* (adopted in January 1998 and amended in January 2001)
- The Cabarrus-Rowan Metropolitan Planning Organization's (*CRMPO*) *Comprehensive Transportation Plan (CTP)* (adopted in October 2011 and last updated in July 2013)
- CRMPO's *Long Range Transportation Plan (LRTP) 2035* (updated by the CRMPO in April 2009)

G. Indirect and Cumulative Effects

Indirect impacts are those impacts that, as a result of an event such as this proposed transportation project, occur over a longer period of time and can take place away from the immediate project area. A short-term example would be the development of a small subdivision along a new or widened roadway that would otherwise not have occurred. Closely related is the concept of cumulative impacts, which are the collective effects of multiple events and actions. These may be dependent or independent of the proposed action.

A more detailed assessment of potential indirect and cumulative effects associated with this project is given in the *Indirect and Cumulative Effects Screening Report* for this project, dated February 2014, available from the NCDOT.

1. Future Land Use Study Area

The Future Land Use Study Area (FLUSA) is the area surrounding a project that could be indirectly affected as a result of the proposed project and other actions. This study area encompasses all of the areas examined for potential increases in development pressure as a result of project construction. Although it is the focus for data collection and analysis, it is not meant to infer that land use effects will be felt throughout the FLUSA. The area outlined in orange and black on Figure 9 is the FLUSA for the proposed project.

The FLUSA includes four jurisdictions – Landis, China Grove, Kannapolis, and Rowan County. Unincorporated parts of Rowan County make up the majority of the FLUSA followed by China Grove and Landis. The portion of the Kannapolis extra territorial jurisdiction (ETJ) is only a very small fraction of the FLUSA. The FLUSA boundary was defined so that potential land use nodes (i.e., future commercial development) at major intersections could be included in the analysis. It also accounts for a large amount of undeveloped land to the east and north of the proposed alternatives.

2. Indirect Effects

No notable indirect effects are expected from the proposed project alone. The major factors contributing to this result a lack of travel time savings, a lack of existing water and sewer infrastructure, stagnant development growth, and a population that is projected to decrease over the next 20 years.⁷

⁷ The decline in population was determined based on county projections from the North Carolina Office of State Budget and Management.

The proposed project intends to improve the safety of a 3.1-mile stretch of Old Beatty Ford Road by either improving the existing alignment or relocating it to a new alignment. Although the new location alternative will increase exposure to some properties, this project should not cause the affected properties to become more attractive for non-residential development. Any residential development will be limited in size due to a lack of water and sewer services, soil unsuitable for septic systems, and growth management policies such as water supply watershed development restrictions. This project has been taken into account in local land use plans.

Other transportation projects are planned for this area, including widening I-85 and a potential I-85/ Old Beatty Ford Road interchange. The *combination* of the subject project and a future interchange will have an effect on the rate and type of development in the FLUSA, but this project alone should not result in notable indirect effects.

3. Cumulative Effects

Past Projects

There have not been any notable past actions. Past actions, such as the construction of I-85 and a trucking facility and automobile salvage yard in the northwest corner of the FLUSA, have not resulted in considerable cumulative effects on environmental resources.

Current Projects

There are no notable development actions that are currently underway. The ongoing construction of homes in Castlebrooke Farms (located along Lentz Road) includes relatively few homes on large lots and is not likely contributing to cumulative effects on environmental resources.

Future Projects

Projects planned for the future include:

- Widening I-85 (I-3802);
- Revising the I-85/ US 29/ NC 152 interchange area (Exit 68) (I-3610);
- Widening Old Beatty Ford Road to a multi-lane facility from Lower Stone Church Road to Lentz Road (W-5313);
- Adding a second railroad track to the North Carolina Railroad corridor (P-5206);
- A new I-85 interchange at Old Beatty Ford Road (I-3804).

Since there have not been any notable past or present actions, it is reasonable to assume there has been very little cumulative effect on environmental resources. Future transportation projects, especially a new interchange at Old Beatty Ford Road, could spur non-residential development in the interchange area, which would most likely prompt utility providers to extend water and sewer services to accommodate the new development. These potential development and infrastructure projects could have a cumulative effect on environmental resources.

Notable Environmental Resources

Notable features include two protected water supply watershed areas [Cold Water Creek (WS-IV) and Dutch Buffalo Creek (WS-II)], a critical area of the Cold Water Creek Water Supply Watershed, and Lake Fisher. There are no outstanding resource waters, trout waters, anadromous fish waters, primary nursery areas, high quality waters, or essential fish habitats.

Impacts on Environmental Resources

Direct environmental impacts from NCDOT projects are addressed by avoidance, minimization, and/or mitigation. These are consistent with programmatic discussions with the natural resource agencies occurring during the project development and permitting processes.

Based on the findings and conclusions from this project's *Indirect and Cumulative Effects Screening Report* (dated February 2014 and available from the NCDOT), cumulative effects resulting from the proposed project and primarily from other actions such as a potential future I-85/ Old Beatty Ford Road interchange will have the potential to minimally impact water quality in the FLUSA. State, local, and water supply watershed development regulations are in place to help protect sensitive environmental resources, which include: National Pollutant Discharge Elimination System (NPDES) Phase II regulations, local growth management strategies and stormwater management plans, and development restrictions within the two water supply watersheds.

H. Flood Hazard Evaluation

All of the streams in the project area drain to Lake Fisher. This includes the tributaries Town Branch and Unnamed Tributaries to Cold Water Creek. Town Branch and Cold Water Creek are located west of the I-85 corridor, while Cold Water Creek Tributary 1 and Unnamed Tributary to Cold Water Creek are located to the east of the I-85 corridor. The majority of the project is located in the Cold Water Creek watershed, with only a small western portion of the project located in the Town Branch watershed.

Five major stream crossings (see Table 14 and Figures 6-7.3) have been identified. Drainage areas were delineated based on the China Grove, North Carolina United States Geological Survey (USGS) quadrangle map.

Table 14: Major Stream Crossings and FEMA Floodplain Involvement

Structure No.	Site	Alternative	Stream	Drainage Area (mi ²)	Flood Zone	FIRM
1	NL-1	2	Town Branch (SA)	1.3	AE	3710562500K
2	NL-2	2	Cold Water Creek (SG)	5.9	AE	3710563500J
3	NL-3	2	UT to Cold Water Creek (SE)	0.3	X	3710563500J
4	IE-1	1	Cold Water Creek (SG)	7.7	AE	3710563500J
5	IE-2	1	Cold Water Creek Tributary 1 (SIE)	1.2	AE	3710563500J

Rowan County is a current participant in the National Flood Insurance Program (NFIP). There are no sites within a designated flood hazard zone where an approximate flood study has been completed. There are four crossings within a designated flood hazard zone where a detailed flood study has been completed. Federal Emergency Management Agency (FEMA) involvement for the project is summarized in Table 14.

For the sites within a designated flood hazard zone, the proposed structure will provide conveyance sufficient to limit the resulting backwater to less than one foot above the natural 100-year water surface elevation; therefore, the project should not have any significant adverse impact on the existing floodplain or on the associated flood hazard to the adjacent properties. Floodway coordination with North Carolina Floodplain Mapping Program (NCFMP) will be required for all crossings located within a FEMA-designated AE flood zone.

I. Traffic Noise Analysis

In accordance with Title 23 Code of Federal Regulations Part 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise* (Title 23 CFR 772) and the *North Carolina Department of Transportation Traffic Noise Abatement Policy*, each Type I highway project must be analyzed for predicted traffic noise impacts. In general, Type I projects are proposed federal or federal-aid highway projects for construction of a highway or interchange on new location, improvements of an existing highway which significantly changes the horizontal or vertical alignment or increases the vehicle capacity, or projects that involve new construction or substantial alteration of transportation facilities such as weigh stations, rest stops, ride-share lots or toll plazas.

Traffic noise impacts are determined through implementing the current Traffic Noise Model (TNM®) approved by the Federal Highway Administration and following procedures detailed in Title 23 CFR 772 and the *NCDOT Traffic Noise Analysis and Abatement Manual*. When traffic noise impacts are predicted, examination and evaluation of alternative noise abatement measures must be considered for reducing or eliminating these impacts.

A copy of the technical report entitled, *Traffic Noise Analysis, Relocation of Old Beatty Ford Road (SR 1221/ SR 1210) From SR 1210/ SR 1221 to Lentz Road (SR 1337)* (March 14, 2014), is available from NCDOT. The evaluation in the technical report completes the highway traffic noise requirements of Title 23 CFR Part 772. No additional noise analysis will be performed for this project unless warranted by a significant change in the project scope, vehicle capacity or alignment.

1. Traffic Noise Impacts and Noise Contours

One receptor is anticipated to be impacted by the project (see Table 15 and Figure 2.1). With Alternative 1, Receptor 26, a residence near the Old Beatty Ford Road/ China Grove Road intersection, would experience a five-decibel [dB(A)] increase in noise levels that would approach the Federal Highway Administration (FHWA) noise abatement criteria (NAC). The noise level for the impacted receiver would increase from an existing level in 2013 of 61 dB(A)

to a 2035 predicted level of 66 dB(A). The NAC for this type of receptor is 67 dB(A). No other study area receptors would result in traffic noise impacts.

Predicted build-condition traffic noise level contours are not a definitive means by which to assess traffic noise level impacts; however, they can aid in future land use planning efforts in presently undeveloped areas. Correlating to the traffic noise impact thresholds for FHWA NAC “E” and NAC “B” and “C” land uses, the TNM-predicted for 66 dB(A) noise level contours were calculated to reach a maximum of 38.5 feet from the center of the proposed roadway. The 71 dB(A) contour could not be achieved, even at the roadway edge.

According to 23 CFR 772.9(c) and NCDOT Policy, noise contour lines shall not be used for determining highway traffic noise impacts. However, the 71 dB(A) and 66 dB(A) noise level contour information should assist local authorities in exercising land use control over the remaining undeveloped lands, so as to avoid development of incompatible activities adjacent to the roadways within local jurisdiction.

Table 15: Traffic Noise Impact Summary¹

Location	Approximate # of Impacted Receptors Approaching or Exceeding FHWA NAC ²							Subst'l Noise Level Incr. ³	Impacts Due to Both Criteria	Total Impacts Per 23 CFR 772
	A	B	C	D	E	F	G			
Alternative 1	0	1	0	0	0	0	0	0	0	1
Alternative 2	0	0	0	0	0	0	0	0	0	0

1. This table presents the number of build-condition traffic noise impacts as predicted for Alternatives 1 and 2.
2. Predicted traffic noise level impact due to approaching or exceeding NAC. Predicted “substantial increase” traffic noise level impact.
3. Predicted traffic noise level impact due to exceeding NAC and “substantial increase” in build-condition noise levels.

Temporary and localized noise impacts will likely occur as a result of project construction activities. Construction noise control measures will be incorporated into the project plans and specifications.

2. Traffic Noise Abatement Measures

FHWA and NCDOT require that feasible and reasonable measures be considered to mitigate noise impacts at the impacted receptors. Noise abatement measures must be considered for all receptors that are predicted to experience a noise impact. Measures considered include highway alignment selection, traffic systems management, buffer zones, proper use of land controls, noise barriers, and earth berms.

Traffic noise abatement measures were considered but were determined not to be feasible. Based on the traffic noise analysis for this project, traffic noise abatement is not recommended, and no noise abatement measures are proposed.

Highway Alignment Selection

Highway alignment selection involves the horizontal or vertical orientation of the proposed improvements in such a way as to minimize impacts and costs. The selection of alternative alignments for noise abatement purposes must consider the balance between noise impacts and other engineering and environmental parameters. For noise abatement, horizontal alignment selection is primarily a matter of constructing the proposed roadway at a sufficient distance from noise sensitive areas. The selected alignment has been located to minimize impacts to residences, businesses, historic properties, and recreational areas.

Traffic System Management Measures

Traffic management measures such as prohibition of truck traffic, lowering speed limits, limiting of traffic volumes, and/or limiting time of operation were considered as possible traffic noise impact abatement measures. The purpose of the proposed project is to improve safety. Prohibition of truck traffic, speed limit reduction, or screening total traffic volumes would diminish the functional capacity of the highway facility and are not considered practicable.

Buffer Zones

Buffer zones are typically not practical and/ or cost effective for noise mitigation due to the substantial amount of right-of-way required, and would not be a feasible noise mitigation measure for this project. Furthermore, if the acquisition of a suitable buffer zone had been feasible, the associated costs would exceed the NCDOT Policy reasonable abatement cost threshold per benefited receptor.

Proper Use of Land Controls

One of the most effective means to prevent future traffic noise impacts is the proper use of land controls. As indicated in the July 2011 *NCDOT Traffic Noise Abatement Policy*, local jurisdictions with zoning control should use the information contained in this report to develop policies and/ or ordinances to limit the growth of noise-sensitive land uses located adjacent to the proposed project; however, regulation of land use is not within the purview of FHWA or NCDOT.

3. Noise Barriers

Noise barriers include two basic types: earthen berms and noise walls. These structures act to diffract, absorb, and reflect highway traffic noise. For this project, earthen berms and noise walls are not found to be a viable abatement measure because neither would be able to achieve the minimum seven dB(A) reasonableness criteria design goal for at least one impacted receptor. As identified in the project Traffic Noise Analysis, no areas exist for which potential traffic noise abatement measures are feasible and reasonable, as defined in the NCDOT Traffic Noise Abatement Policy.

J. Air Quality Analysis

This project will not add substantial new capacity or create a facility that is likely to meaningfully increase emissions. It is not anticipated to create any adverse effects on the air quality of this area.

Air pollution originates from various sources. Emissions from industry and internal combustion engines are the most prevalent sources. The impact resulting from highway construction ranges from intensifying existing air pollution problems to improving the ambient air quality. Changing traffic patterns are a primary concern when determining the impact of a new highway facility or the improvement of an existing highway facility. Motor vehicles emit carbon monoxide (CO), nitrogen oxide (NO), hydrocarbons (HC), particulate matter, sulfur dioxide (SO₂), and lead (Pb) (listed in order of decreasing emission rate). New highways or the widening of existing highways increase localized levels of vehicle emissions, but these increases could be offset due to increases in speeds from reductions in congestion and because vehicle emissions will decrease in areas where traffic shifts to the new roadway. Significant progress has been made in reducing criteria pollutant emissions from motor vehicles and improving air quality, even as vehicle travel has increased rapidly.

The Federal Clean Air Act of 1970 established the National Ambient Air Quality Standards (NAAQS). These were established in order to protect public health, safety, and welfare from known or anticipated effects of air pollutants. The most recent amendments to the NAAQS contain criteria for sulfur dioxide (SO₂), particulate matter (PM₁₀, 10-micron and smaller, PM_{2.5}, 2.5 micron and smaller), carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), and lead (Pb).

The primary pollutants from motor vehicles are unburned hydrocarbons, NO_x, CO, and particulates. Hydrocarbons (HC) and Nitrogen oxides (NO_x) can combine in a complex series of reactions catalyzed by sunlight to produce photochemical oxidants such as ozone and NO₂. Because these reactions take place over a period of several hours, maximum concentrations of photochemical oxidants are often found far downwind of the precursor sources. These pollutants are regional problems.

The project is located in Rowan County, which is within the Charlotte-Gastonia-Rock Hill nonattainment area for ozone (O₃) as defined by the EPA. This area was designated marginal nonattainment for O₃ under the 2008 eight-hour ozone standard on July 20, 2012. Section 176(c) of the CAAA requires that transportation plans, programs, and projects conform to the intent of the state air quality implementation plan (SIP). The current SIP does not contain any transportation control measures for Rowan County. The Cabarrus Rowan Metropolitan Planning Organization 2040 Long Range Transportation Plan (LRTP) and the 2012-2018 Transportation Improvement Program (TIP) conform to the intent of the SIP. The USDOT made a conformity determination on the LRTP on May 2, 2014 and the TIP on May 2, 2014. The current conformity determination is consistent with the final conformity rule found in 40 CFR Parts 51 and 93. There are no significant changes in the project's design concept or scope, as used in the conformity analyses.

A copy of the technical report entitled, *Air Quality Analysis, Relocation of Old Beatty Ford Road (SR 1221) From SR 1210/ SR 1221 to Lentz Road (SR 1337)* (January 15, 2014), is available from NCDOT. The evaluation in the technical report completes the assessment requirements for air quality of the 1990 Clean Air Act Amendments and the NEPA process, and no additional reports are necessary.

1. Carbon Monoxide

Automobiles are considered the major source of CO in the project area. In order to determine the ambient CO concentration at a receptor near a highway, two concentration components must be used: local and background. The local concentration is defined as the CO emissions from cars operating on highways in the near vicinity (i.e., distances within 400 feet) of the receptor location. The background concentration is defined by the North Carolina Department of Environment, Health and Natural Resources as "the concentration of a pollutant at a point that is the result of emissions outside the local vicinity; that is, the concentration at the upwind edge of the local sources."

2. Mobile Source Air Toxics (MSATs)

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how potential public health risks posed by MSAT exposure should be factored into project-level decision-making within the context of the National Environmental Policy Act (NEPA).

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The US Environmental Protection Agency (EPA) is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, <http://www.epa.gov/iris/>). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in

Appendix D of FHWA's Interim Guidance Update on Mobile source Air Toxic Analysis in NEPA Documents. Among the adverse health effects linked to MSAT compounds at high exposures are: cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI, <http://pubs.healtheffects.org/view.php?id=282>) or in the future as vehicle emissions substantially decrease (HEI, <http://pubs.healtheffects.org/view.php?id=306>).

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts - each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable.

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific location; and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (<http://pubs.healtheffects.org/view.php?id=282>). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA (<http://www.epa.gov/risk/basicinformation.htm#g>) and the HEI (<http://pubs.healtheffects.org/getfile.php?u=395>) have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine an "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than one in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than one in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two step decision framework.

Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than deemed acceptable.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

Nonetheless, air toxics concerns continue to be raised on highway projects during the NEPA process. Even as the science emerges, we are duly expected by the public and other agencies to address MSAT impacts in our environmental documents. The FHWA, EPA, the Health Effects Institute, and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. The FHWA will continue to monitor the developing research in this field.

A qualitative analysis of MSATs for this project appears in its entirety in the project *Air Quality Analysis*, dated January 15, 2014. A copy of this report is available from NCDOT.

K. Hazardous Material

A hazardous material evaluation was performed to identify properties within the project study area that are, or may be, contaminated, and therefore result in increased project costs and future liability if acquired by NCDOT. Hazardous material impacts may include, but are not limited to, active and abandoned underground storage tank (UST) sites, hazardous waste sites, regulated landfills and unregulated dumpsites. Geographical Information System (GIS) data was consulted to identify known sites of concern in relation to the proposed project. NCDOT personnel conducted a field reconnaissance along portions of the project in December 2010 and again in September 2012. A search of appropriate environmental agencies' databases was performed to assist in evaluating sites identified during the evaluation.

One UST site was identified (see below). It is anticipated to present low geo-environmental impacts to the project.

- Steve's Corner Store currently operates as a convenience store and gas station (see Figure 8). It is located in the fork between Old Beatty Ford Road and Lentz Road. The tank bed is located approximately 45 feet from the Lentz Road centerline. According to the UST Section Registry, there are two tanks currently in use. A groundwater incident occurred in April 1992 while under the ownership of Carolina Oil Company. The site has received a "No Further Action", and the incident closed out in May 1992. There are no monitoring wells on site. This parcel is identified as Site #1 in the W-5313 Hazardous Material Report dated January 5, 2011.

For a full evaluation of hazardous materials, see the Hazardous Materials Report (November 7, 2013) available from NCDOT.

VI. COMMENTS AND COORDINATION

A. Public Comments

A Local Officials Information Meeting (LOIM) and a Public Meeting were held on November 12, 2013. The LOIM was held from 1:00 p.m. to 2:00 p.m. at the China Grove Town Hall, 333 North Main Street, China Grove. The Public Meeting was held between 4:00 p.m. and 7:00 p.m. at the Kannapolis Moose Family Center, 990 Old Beatty Ford Road, China Grove. Approximately 22 people attended the LOIM, including representatives from Rowan County, Kannapolis, and China Grove. Approximately 117 people attended the Public Meeting. The Public Meeting was conducted in an open house-style format with no formal presentation. The purpose of the meeting was to introduce the project to the community and to receive comments on the alternatives and issues to be considered during the project development process. Based on comments received during and after the Public Meeting, more than twice the number of people who submitted comments preferred Alternative 2 over Alternative 1.

Generally, those that prefer Alternative 2 said it meets the purpose and need better than Alternative 1 and does not impact as many homes.

The people who prefer Alternative 1 oppose Alternative 2 primarily because it would result in the removal of the existing bridge over I-85 and make Old Beatty Ford Road a dead end on either side of the interstate. Residents expressed concern over the increase in time and distance it would take them to reach some destinations. Another concern was about the additional time it would take emergency responders to get to their homes. Other concerns about Alternative 2 include:

- it will take too much land that could otherwise be developed for residential and commercial uses;
- it is being influenced by owners of large tracts of land that would financially benefit from the increased exposure and the development potential of their property.

Some citizens suggested alternative ways to improve Old Beatty Ford Road while reducing costs and impacts including:

- improve only those curves west of State Road;
- repave existing Old Beatty Ford Road;
- enforce the speed limit.

After the public meeting, in early 2014, NCDOT coordinated with representatives from the Highest Praise Family Worship Center to request their comments. Alternative 2 crosses the church property just east of China Grove Road. Church leaders raised questions regarding the amount of land needed, limitations on the use of remaining land, remnants that would be isolated by the road, and future access to Old Beatty Ford Road. NCDOT agreed to maintain contact with church representatives and to notify them when a preferred alternative is announced.

The specific public comments and the corresponding responses may be found in Appendix C.

B. Public Hearing

A public hearing will be held after the EA is made available for public review to inform the public of the recommended alternative and to receive comments on the EA.

C. Agency Coordination

Input from the appropriate federal, state, and local agencies concerning effects of the proposed project on the environment was requested in a scoping letter (dated September 25, 2013) in preparation for the environmental document. Written comments were received from agencies noted with an asterisk (*) (see Appendix A). The agencies contacted are listed below:

- * Department of Army - Corps of Engineers
- Department of Interior - U.S. Fish and Wildlife Service
- Department of Transportation - Federal Highway Administration
- * Department of Agriculture and Consumer Services – Agricultural Services
- * Department of Public Safety – Emergency Management
- * Environmental Protection Agency
- * Department of Cultural Resources
- * Department of Environment and Natural Resources
- * Division of Water Resources
- * Division of Waste Management
- * NC Wildlife Resources Commission
- Rowan County
- Rowan County Board of Commissioners
- Rowan-Salisbury School System
- Rowan County Department of Emergency Services
- Rowan County Sheriff's Office
- Rowan County Planning and Development
- Rowan Transit System
- City of Kannapolis
- Town of China Grove
- Town of Landis
- * Cabarrus Rowan Metropolitan Planning Organization (CRMPO)

On September 25, 2013, NCDOT initiated the project scoping process to invite input from federal, state, and local agencies. Responses from the agencies were collected, and no formal interagency scoping meeting was held for the project.

An informal Interagency Meeting was held November 15, 2013 at NCDOT's Century Center in Raleigh for the proposed improvements to Old Beatty Ford Road (see Appendix A for a summary of the Interagency Meeting). The purpose of the meeting was to obtain input on the preliminary purpose and need, alternatives, and potential impacts. Meeting participants included

representatives from the Army Corps of Engineers, Federal Highway Administration, Division of Water Resources, and the NCDOT. Two alternatives were presented, and options were discussed for reducing impacts to streams and wetlands. The project team agreed to consider refining Alternative 1 near the existing bridge over I-85 so that it is closer to the existing alignment to avoid and minimize impacts. The participants agreed that as long as the stream and wetland impacts are below the nationwide permit thresholds, the project can be developed without following the Merger Process. Following the meeting, refinements to Alternative 1 to bring the proposed bridge closer to the existing alignment were considered to further avoid and minimize impacts. Because wetlands and streams are on both sides of the existing road, the refinements did not reduce overall stream and wetland impacts and were not evaluated in detail.

A second interagency meeting with the same representatives was held March 12, 2014 at NCDOT's Century Center to review more detailed analysis results, initial cultural resource findings, and proposed recommendations (see Appendix A for a meeting summary). Costs and impacts for Alternatives 1 and 2 were presented along with refinements considered to avoid and minimize impacts along both the existing alignment and the new location alignment. Agency representatives requested more information about the evaluation of historic period farm buildings near Alternative 2 (see the response to the first agency comment below). It was also noted that Alternative 2 crosses more streams and has the potential to open more vacant land to future development. Stream mitigation costs were noted to be higher with Alternative 2. NCDOT agreed to investigate the potential for restoring a portion of Cold Water Creek and associated wetlands by removing the existing Old Beatty Ford Road culvert (see Project Commitments). FHWA requested detailed information describing the measures of performance for the project and the effectiveness of the proposed improvements in reducing crashes (see *Section II.C, Benefits of the Project*).

Responses to project-specific agency comments are addressed as follows.

Comment: The USACE noted historic period buildings within the Alternative 2 study area and requested a copy of the cultural resources evaluation.

Response: *Comment noted. A copy of the cultural resources evaluation has been sent to the USACE.*

Comment: The EPA recommends that strict avoidance and minimization measures to water supply watershed streams (i.e., Cold Water Creek & Dutch Buffalo Creek) be made.

Response: *NCDOT's "Best Management Practices for Protection of Surface Waters" will be implemented, as applicable. The eastern section of the project draining to the Dutch Buffalo Creek water supply watershed (WS-II, HQW) will be designed according to Design Standards in Sensitive Watersheds (DSSW) (see Project Commitments).*

Comment: The NC Department of Public Safety Emergency Management Division requested the project to be coordinated with NCDOT Hydraulics to determine if the project is eligible to fall within the Memorandum of Agreement for the compliance with NC Executive Order 123 regarding FHWA floodplain management requirements.

Response: *The NCDOT Hydraulics Unit will coordinate with the NC Floodplain Mapping Program (FMP), to determine status of the project with regard to applicability of NCDOT'S*

Memorandum of Agreement, or approval of a Conditional Letter of Map Revision (CLOMR) and subsequent final Letter of Map Revision (LOMR) (see Project Commitments).

Comment: The NC Department of Agriculture and Consumer Services encouraged NCDOT to consider routing and/or designs that would reduce the potential negative effects on farm and forest land, including the use of existing Old Beatty Ford Road. The project has the potential to adversely impact the agricultural environmental and economic resources.

Response: As is required by the FPPA, the Form AD-1006 has been completed according to FHWA guidelines (see Appendix A). NRCS has completed their review (Parts IV and V of the Form AD-1006) and both alternatives received final point totals of less than 160 points. Therefore, both alternatives fall below the NRCS minimum criteria rating and will not be evaluated further for farmland impacts. These alternatives will not have a significant impact to farmland. Part VII of Form AD-1006 will be completed once an alternative has been selected and will be included in the final environmental document. See Section V.B, Farmland for more information.

Comment: The NC Department of Cultural Resources recommended NCDOT conduct a comprehensive archaeological survey to identify and evaluate the significance of any archaeological remains that may be damaged or destroyed by the proposed project. The agency further recommended that a qualified architectural historian identify and evaluate the National Register eligibility of structures of historic or architectural importance as well as any structures over 50 years of age within the project's Area of Potential Effect (APE).

Response: An archaeological survey was completed for this project in January and February 2014. It identified 11 newly recorded archaeological resources and recommended all of them as either not eligible for the National Register of Historic Places (NRHP) or not contributing to any NRHP eligibility. An in-depth architectural investigation revealed two properties, Bostian School and the Yost-Weddington Farm-Yost Post Office, recommended for National Register eligibility. Neither alternative will acquire right-of-way or involve construction activities in close proximity to either of these two properties. The Historic Preservation Office (HPO) concurs the proposed project will have no effect on either property. See Section V.B, Cultural Resources for more information.

Comment: The NCDENR Division of Water Resources requests that NCDOT strictly adhere to North Carolina regulations entitled Design Standards in Sensitive Watersheds (15A NCAC 04B .0124) throughout design and construction of the project. This would apply to any area that drains to streams having WS CA (Water Supply Critical Area) classifications.

Response: See the response to the comment from the EPA above.

Comment: During the March 12, 2014 interagency meeting, a representative from the NCDENR Division of Water Resources requested a copy of the Indirect and Cumulative Effects (ICE) Screening Report for the proposed project.

Response: A copy of the ICE Screening Report has been sent to the Division of Water Resources.

Comment: The NCDENR Division of Water Resources requests placement of culverts and other structures in waters and streams to be placed below the elevation of the stream bed by one foot for all culverts with a diameter greater than 48 inches and 20 percent of the culvert diameter for

culverts having a diameter less than 48 inches to allow low flow passage of water and aquatic life. Design and placement of culverts and other structures, including temporary erosion control measures, are not to be conducted in a manner that may result in dis-equilibrium of wetlands or stream beds or banks adjacent to or upstream and downstream of the above structures.

Response: Comment noted. The final design and placement of proposed structures will be in accordance with the above recommendations.

Comment: The NCDENR Division of Waste Management recommends removal of any abandoned or out-of-use petroleum underground storage tanks (USTs) or petroleum above ground storage tanks (ASTs). Petroleum spills of significant quantity must be reported to the Division of Waste Management. Any soils excavated during construction that show evidence of petroleum contamination must be reported to the local Fire Marshall and to the Division of Waste Management. In addition, sedimentation and erosion control must be addressed in accordance with NCDOT's approved program.

Response: Comments noted. Alternative 1 would affect one UST site. However, removal of the UST is not expected since Alternative 1 is not the recommended alternative. NCDOT will use Best Management Practices for erosion control and protection of surface waters during construction of the proposed project.

Comment: The NC Wildlife Resources Commission recommends NCDOT should strive to minimize direct and indirect impacts to streams, wetlands and terrestrial habitats. Impervious surfaces should also be minimized. The agency also commented that Town Creek is one of the streams that cross the project study area, and that Town Creek is on the 303(d) list of impaired waters.

Response: The preliminary alternatives have been designed and the alignments placed to avoid and/ or minimize direct and indirect impacts to natural resources to the extent possible. NCDOT will continue to investigate ways to further reduce impacts during the final design of the proposed project. Based on flood insurance rate map (FIRM) panel 5625K from the North Carolina Floodplain Mapping Program, Town Branch – not Town Creek – crosses the project study area (see Figure 7.1). Town Creek is located approximately 2.5 miles north of the Alternative 2 project area and will not be impacted by this project.

Comment: On January 22, 2014 the CRMPO's Transportation Advisory Committee (TAC) unanimously voted to endorse and support Alternative 2.

Response: Comment noted – no response necessary.

Comment: In an email dated April 3, 2014, Tim Beck, Transportation Supervisor from Rowan-Salisbury Schools, stated there would be little to no impact to bus routing for either alternative. If Alternative 2 is chosen as the preferred alternative, Rowan-Salisbury Schools request the cul-de-sacs along existing Old Beatty Ford Road be built large enough to allow buses to turn around.

Response: NCDOT will design the cul-de-sacs large enough to allow buses to turn around (see Project Commitments).

VII. CONCLUSION

The purpose of the project is to improve vehicular safety by reducing the frequency of lane departure and frontal impact crashes along Old Beatty Ford Road. A secondary purpose is to improve the deficient bridge.

Two Build Alternatives are being considered – Alternative 1 and Alternative 2 (Recommended). The current total estimated cost for Alternative 1 is \$18,200,000, consisting of \$4,400,000 for right-of-way acquisition and \$13,800,000 for construction. The current total estimated cost for Alternative 2 is \$16,300,000, consisting of \$1,200,000 for right-of-way acquisition and \$15,100,000 for construction.

This project is not expected to have any considerable effect on local land use, character, or development plans.

There are active farms near the proposed project that could be affected, but neither alternative is expected to require the relocation of farms operating as a business. No resources that are considered major economic attractions will be affected by the proposed project. The proposed project is not expected to affect economic development in the area or serve a specific development.

Alternative 1 will relocate ten residences and one business. Alternative 2 will relocate one residence. There are no minority-owned or rented residential units and no minority-owned business units that will be relocated. No farms, non-profit organizations, churches, or schools will be relocated.

The proposed project will not prevent area residents from interacting with one another, nor will it hinder access to neighbors or frequent business destinations. The neighborhoods in the project area are not cohesive as a whole or individually. There is no major employment or retail center (groceries, shopping, entertainment, etc.) in the project area.

No notably adverse community impacts are anticipated with this project and no Environmental Justice populations appear to be affected; thus, impacts to minority and low income populations do not appear to be disproportionately high and adverse.

The project has been determined to have no effect on historic architectural or archaeological resources, and the HPO concurs with these determinations.

No Section 4(f) or Section 6(f) resources are anticipated to be impacted.

No notable indirect effects are expected from the proposed project alone. The major factors contributing to this result are the limited scope of the project, a lack of existing water and sewer infrastructure, stagnant development growth, and a population that is projected to decrease over the next 20 years. Since there have not been any notable past or present actions, it is reasonable to assume there has been very little cumulative effect on environmental resources.

Alternative 1 will cross two streams requiring major structures, impacting 115 feet. It will impact 0.2 acre of wetlands. Alternative 2 will cross three streams requiring major structures, impacting 965 feet. It will impact less than 0.1 acre of wetlands.

The project is located within the Cold Water Creek water supply watershed and has a North Carolina water quality classification of WS-IV. Lentz Road is the approximate boundary between the Cold Water Creek and the Dutch Buffalo Creek (WS-II) water supply watersheds. No features within the study area have been designated as Outstanding Resource Water (ORW) or as trout waters. There are no designated anadromous fish waters, Primary Nursery Areas (PNA), or designated High Quality Waters (HQW) within one mile downstream. There are no impaired waters, identified on the North Carolina 2012 Final 303(d) list for sedimentation or turbidity, within one mile downstream of the study area.

NCDOT will attempt to avoid and minimize impacts to streams, open waters, and wetland areas to the greatest extent practicable with the preferred alternative and during project design.

There are four crossings within a designated flood hazard zone where a detailed flood study has been completed. For the sites within a designated flood hazard zone, the proposed structure will provide conveyance sufficient to limit the resulting backwater to less than one foot above the natural 100-year water surface elevation; therefore, the project should not have any significant adverse impact on the existing floodplain or on the associated flood hazard to the adjacent properties.

The Schweinitz's sunflower is the only federally protected species listed for Rowan County according to the US Fish and Wildlife Service. A biological conclusion of "No Effect" has been determined for this species.

With Alternative 1, only one residence would be impacted by traffic noise levels. Noise impacts will not occur with Alternative 2. Traffic noise abatement is not recommended or proposed for the project.

The project is located in Rowan County, which is within the Charlotte-Gastonia-Rock Hill nonattainment area for ozone (O₃) as defined by the EPA. It is within an attainment area for PM_{2.5} and PM₁₀. This project will not add substantial new capacity or create a facility that is likely to meaningfully increase emissions. Therefore, it is not anticipated to create any adverse effects on the air quality of this area. This evaluation completes the assessment requirements for air quality of the 1990 Clean Air Act Amendments and the NEPA process, and no additional reports are necessary.

Alternative 1 would impact one hazardous material site, but geo-environmental impacts are expected to be low. Alternative 2 is not expected to impact hazardous materials sites.

To date, public involvement efforts have included one project newsletter, a Public Officials Informational Meeting, and a Public Meeting. No public controversy is anticipated with this project. A public hearing will be held after the EA is made available for public review to inform the public of the recommended alternative and to receive comments on the EA.

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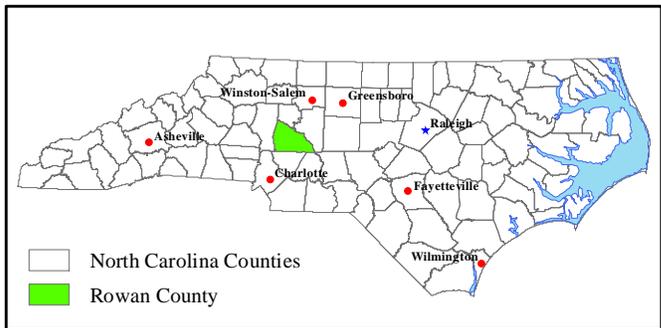
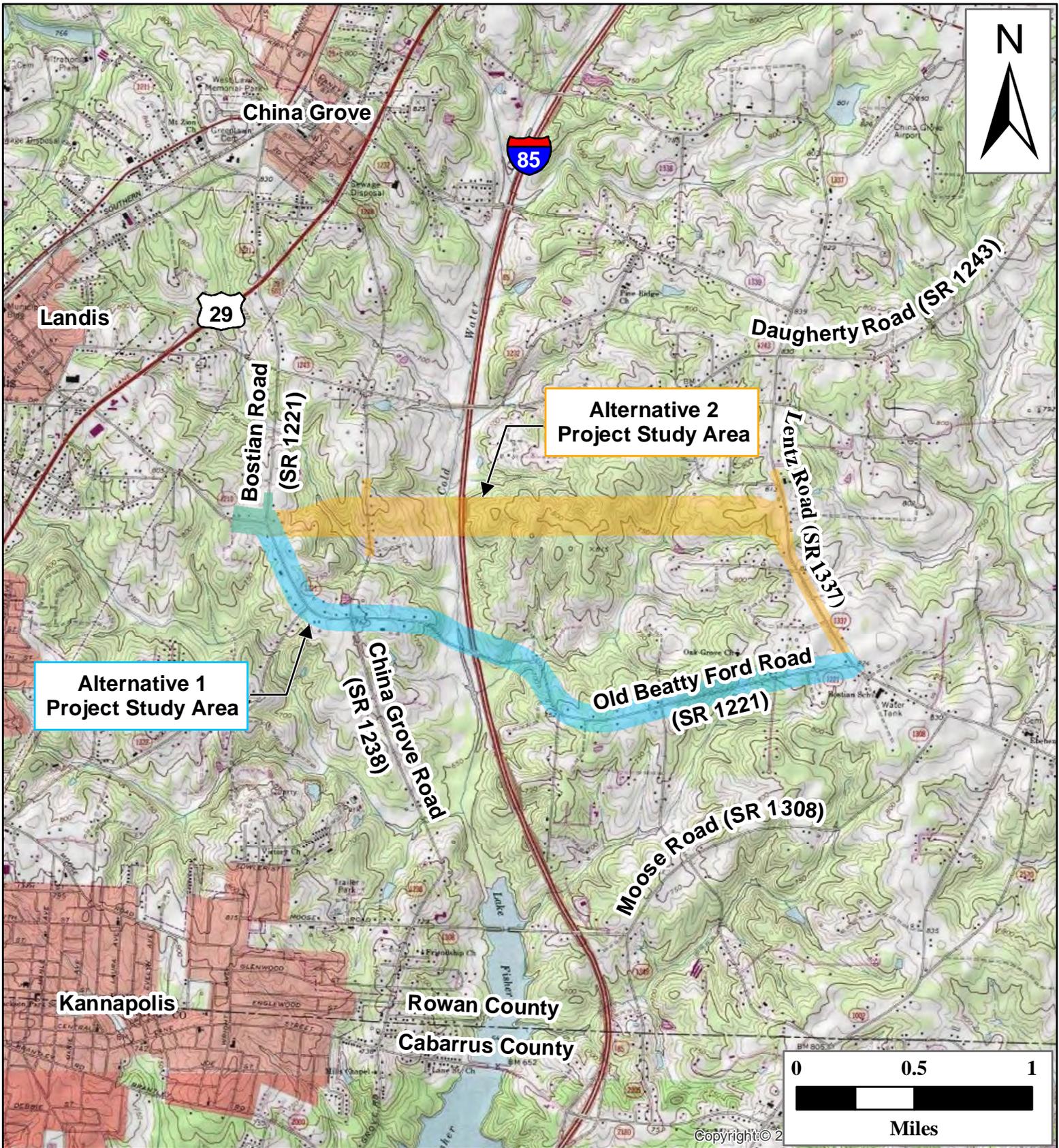
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FIGURES



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 DIVISION 9

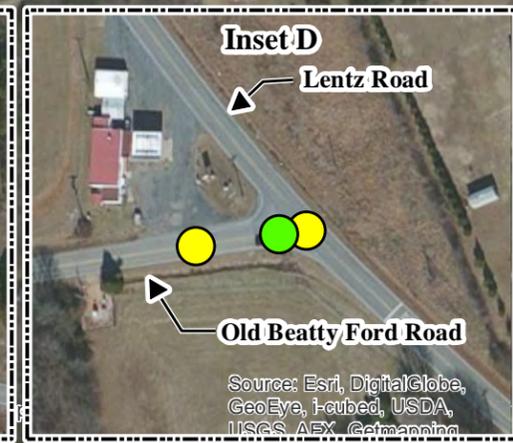
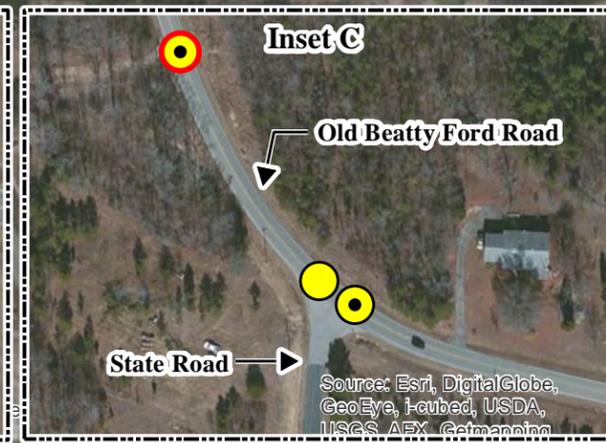
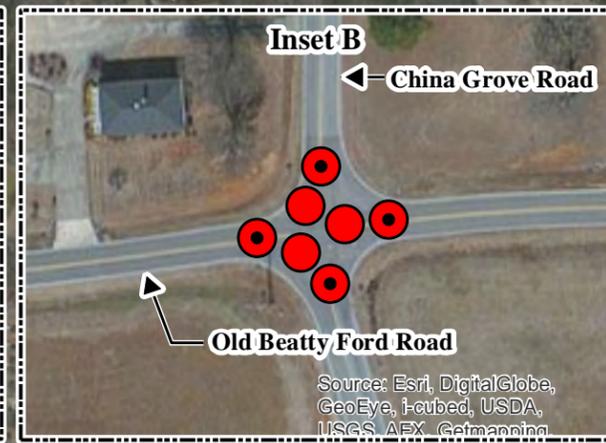
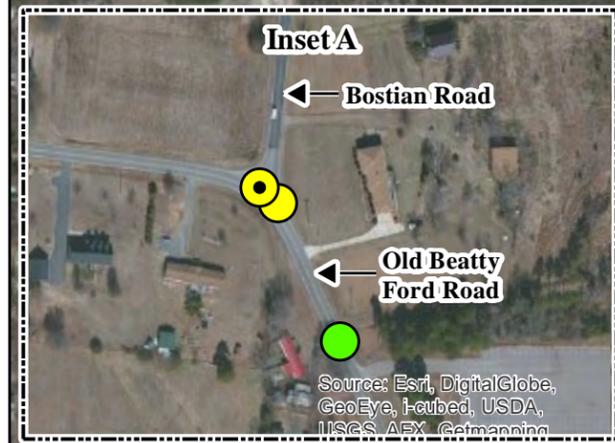
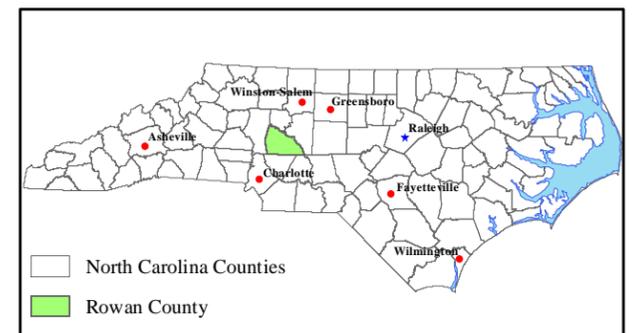
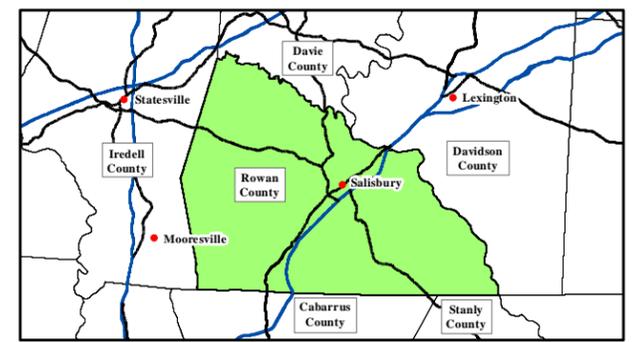
Figure 1.1 - Project Vicinity Map
W-5516
Relocation of Old Beatty Ford Road (SR 1221)
Rowan County



Figure 1.2 - Crashes, 2008-2013

- Alternative 1 Project Corridor
- Lane Departure Crash
- Lane Departure Crash with Injury(s)
- Lane Departure Crash with Fatality
- Frontal Impact Crash
- Frontal Impact Crash with Injury(s)
- Other Crash
- Other Crash with Injury(s)

Map Sources:
North Carolina Department of Transportation
ESRI ArcGIS Online World Imagery
ICA Engineering



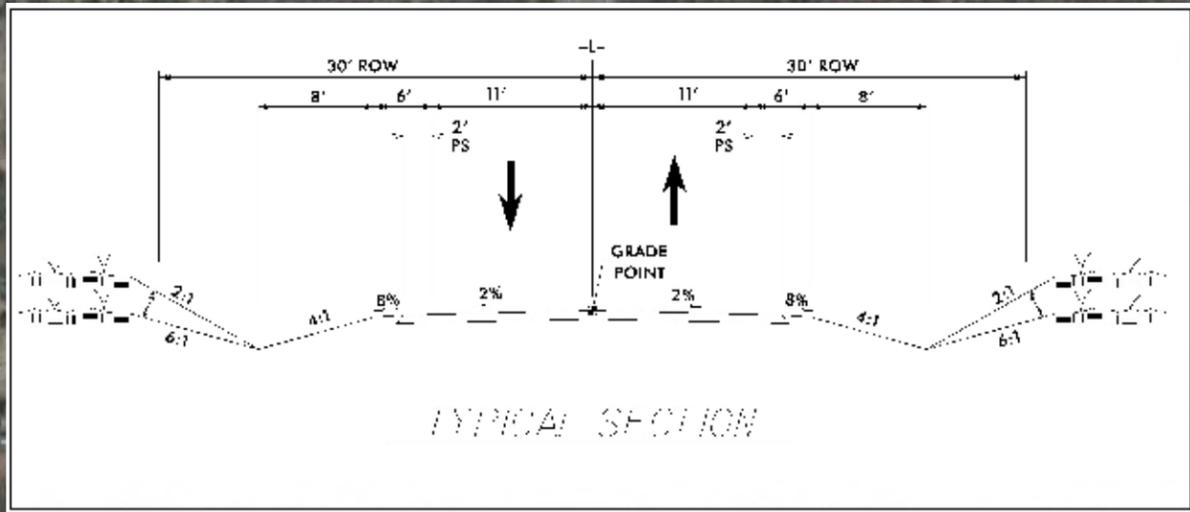
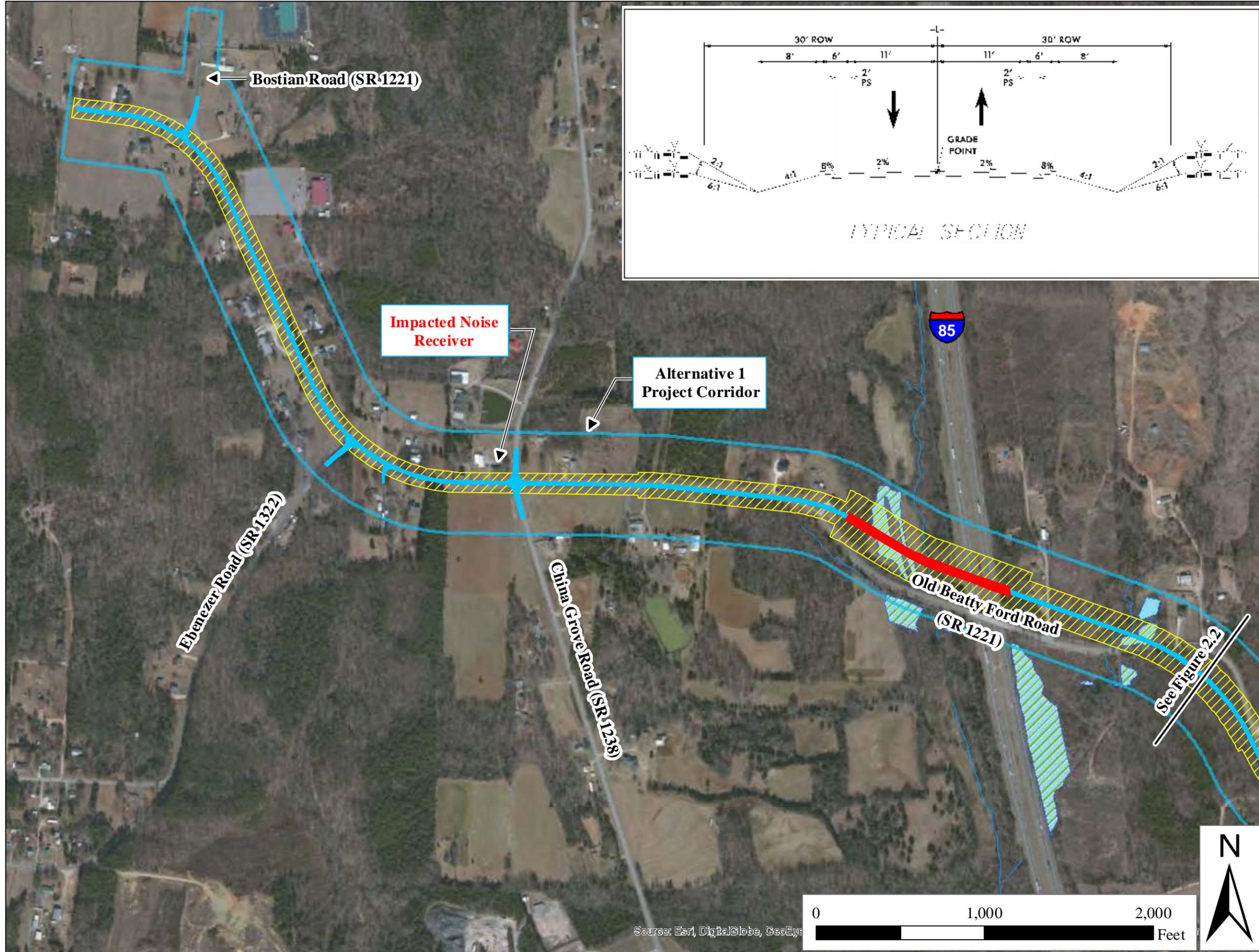
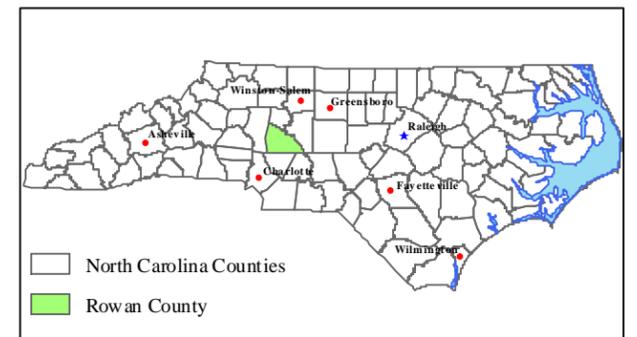
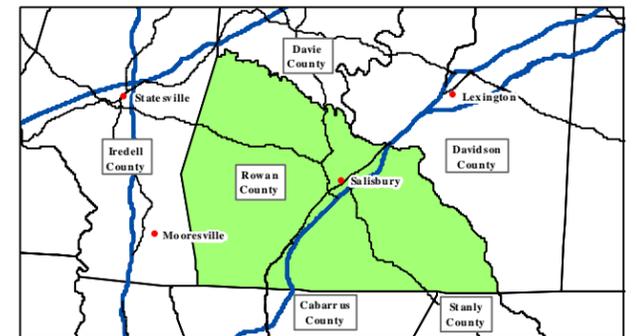


Figure 2.1 - Alternative 1

- Alternative 1 Project Corridor
- Alternative 1
- Preliminary Construction Limits
- Proposed Structure (No. 4)
- Jurisdictional Wetland
- Jurisdictional Open Water
- Jurisdictional Stream

Map Sources:
North Carolina Department of Transportation
ESRI ArcGIS Online World Imagery
ICA Engineering



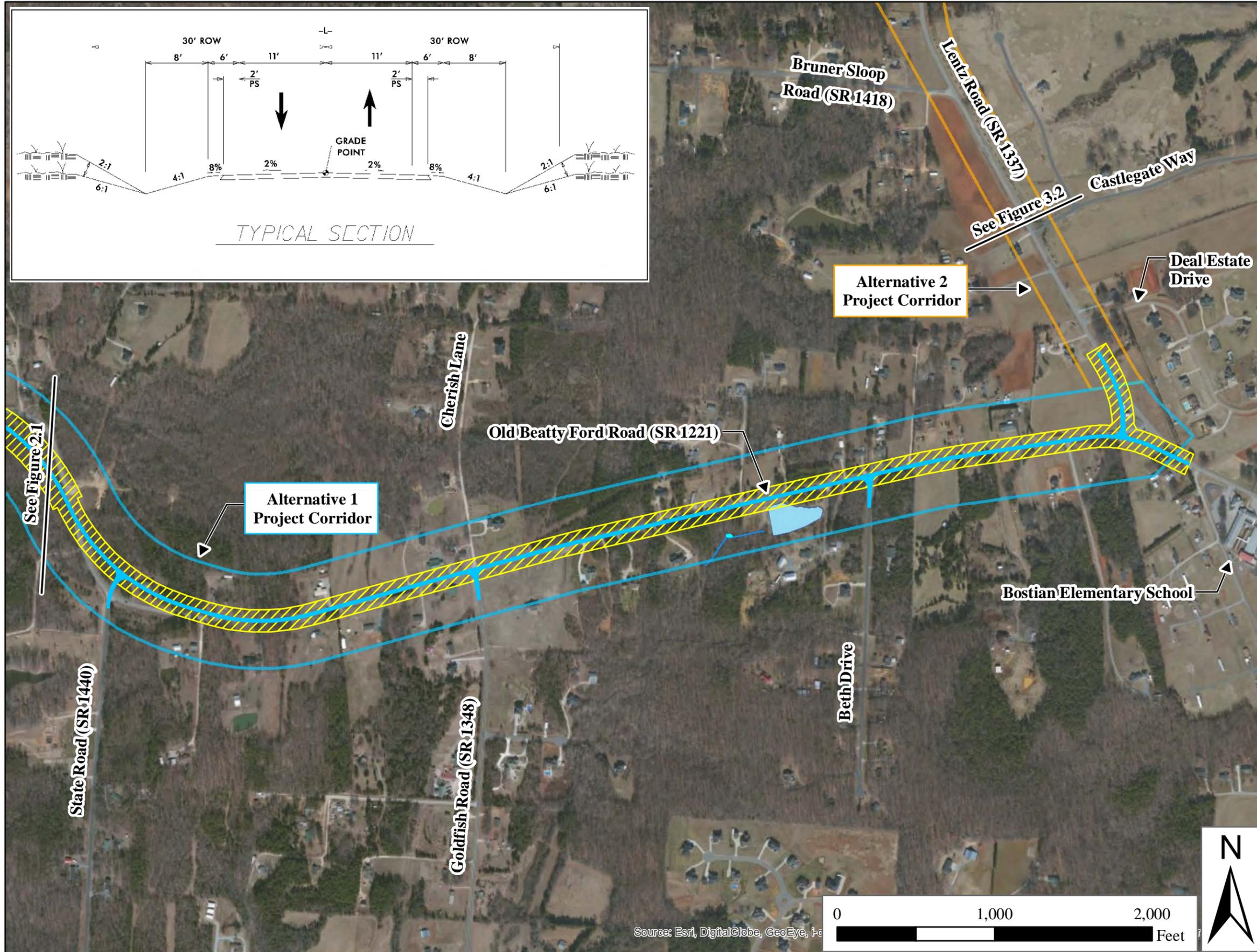
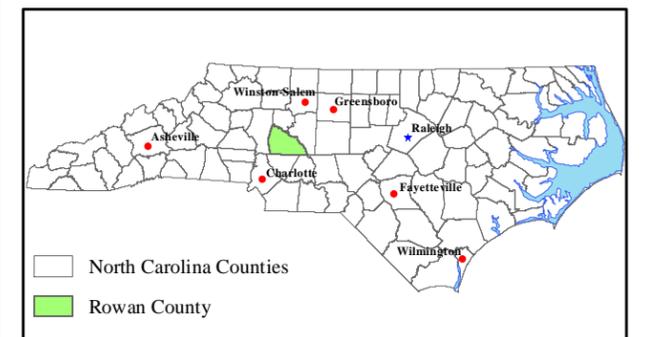
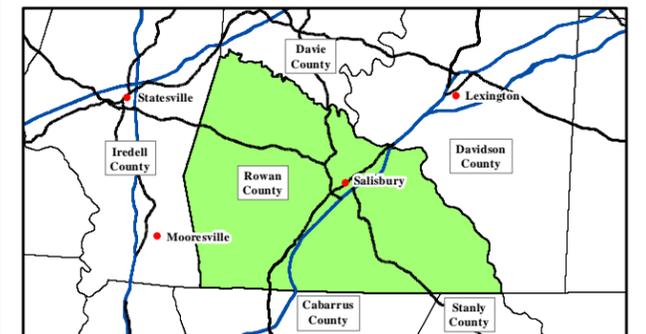


Figure 2.2 - Alternative 1

- Alternative 1 Project Corridor
- Alternative 2 Project Corridor
- Alternative 1
- Preliminary Construction Limits
- Jurisdictional Wetland
- Jurisdictional Open Water
- Jurisdictional Stream

Map Sources:
North Carolina Department of Transportation
ESRI ArcGIS Online World Imagery
ICA Engineering



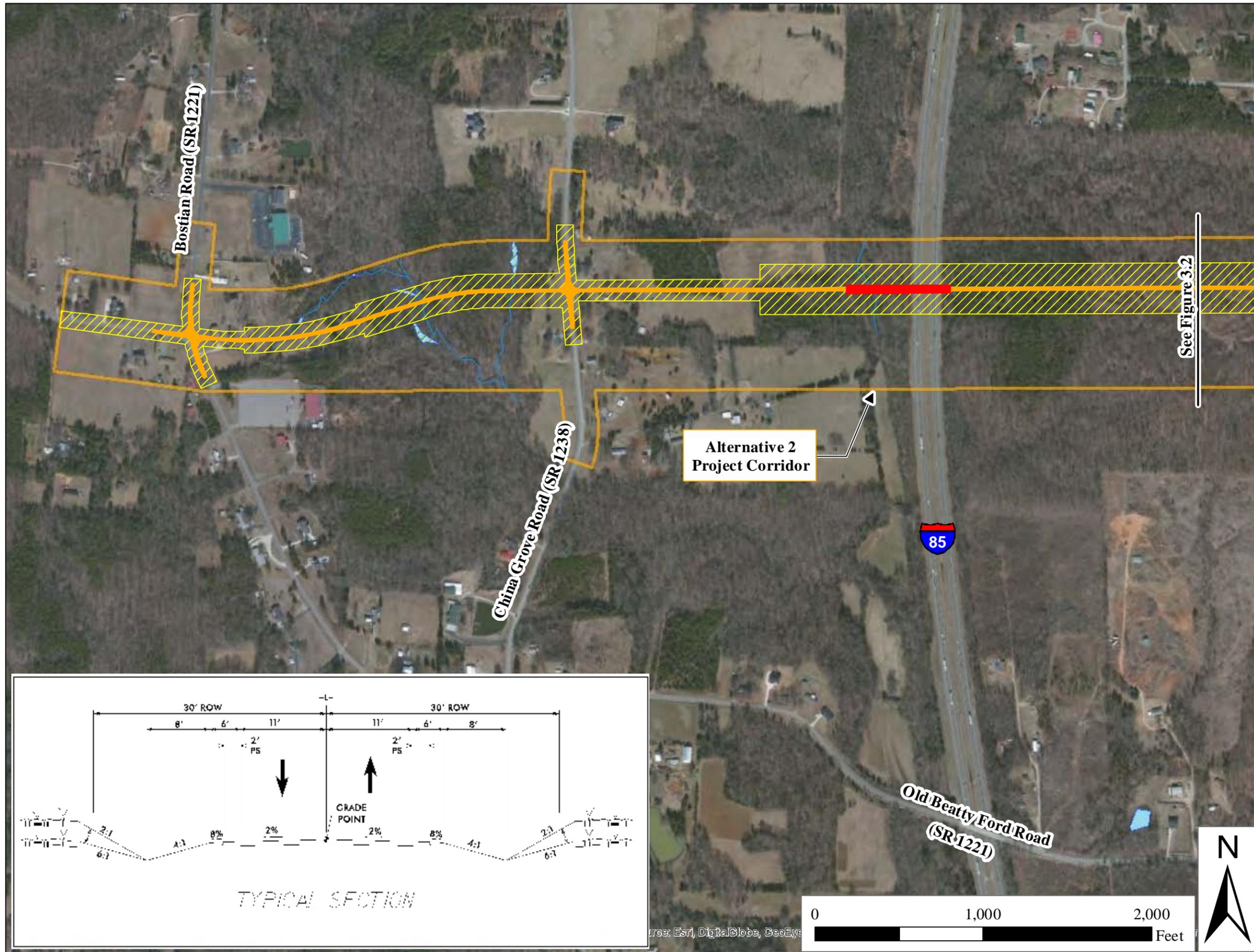
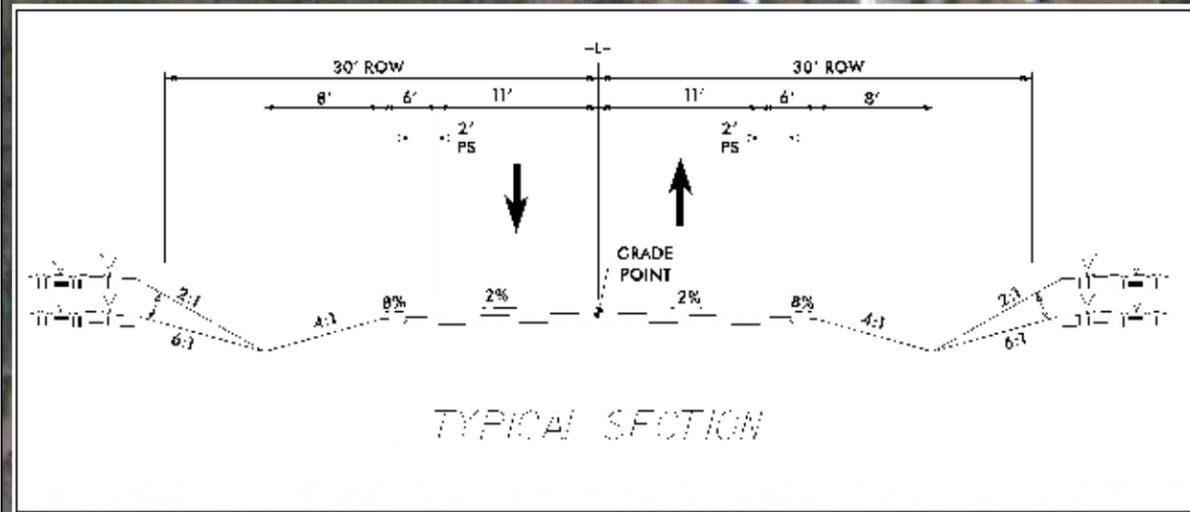
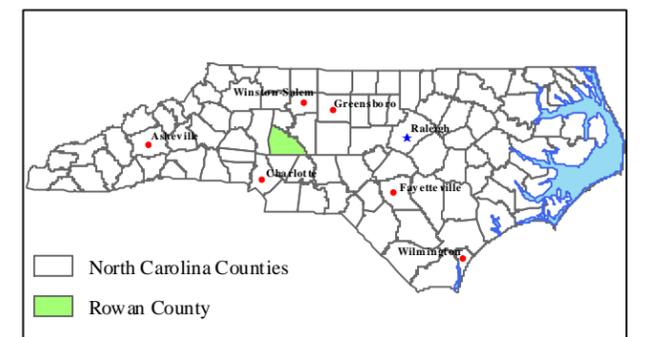
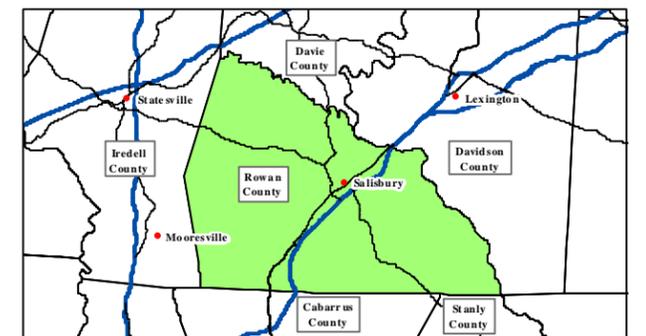


Figure 3.1 - Alternative 2

-  Alternative 2 Project Corridor
-  Alternative 2
-  Bridge
-  Preliminary Construction Limits
-  Jurisdictional Wetland
-  Jurisdictional Open Water
-  Jurisdictional Stream

Map Sources:
North Carolina Department of Transportation
ESRI ArcGIS Online World Imagery
ICA Engineering



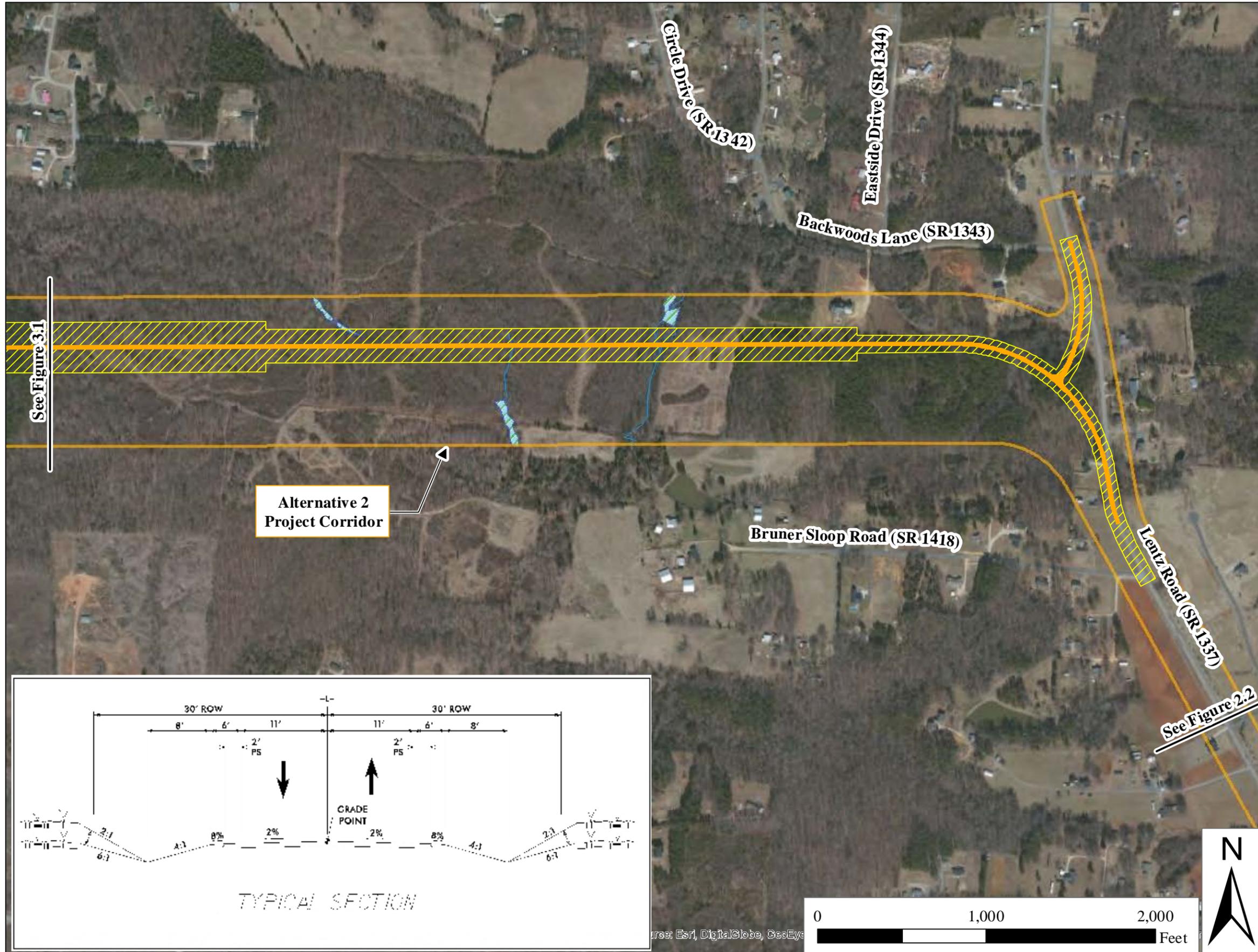
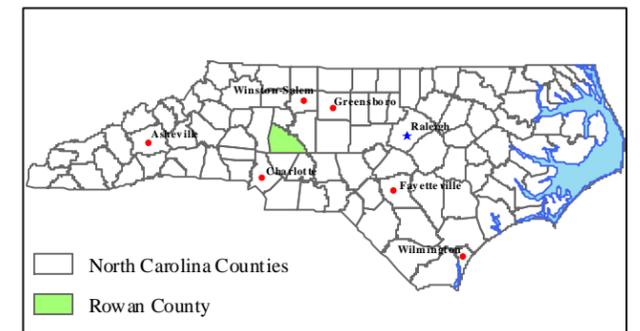
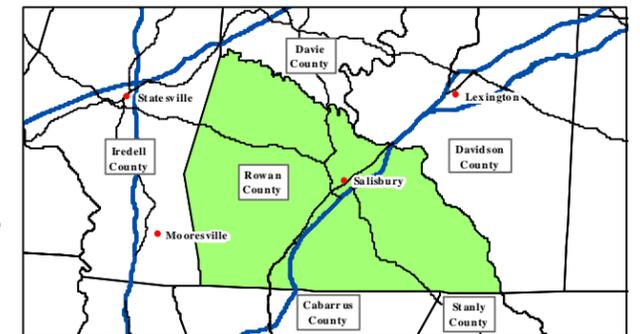


Figure 3.2 - Alternative 2

-  Alternative 2 Project Corridor
-  Alternative 2
-  Preliminary Construction Limits
-  Jurisdictional Wetland
-  Jurisdictional Open Water
-  Jurisdictional Stream

Map Sources:
North Carolina Department of Transportation
ESRI ArcGIS Online World Imagery
ICA Engineering



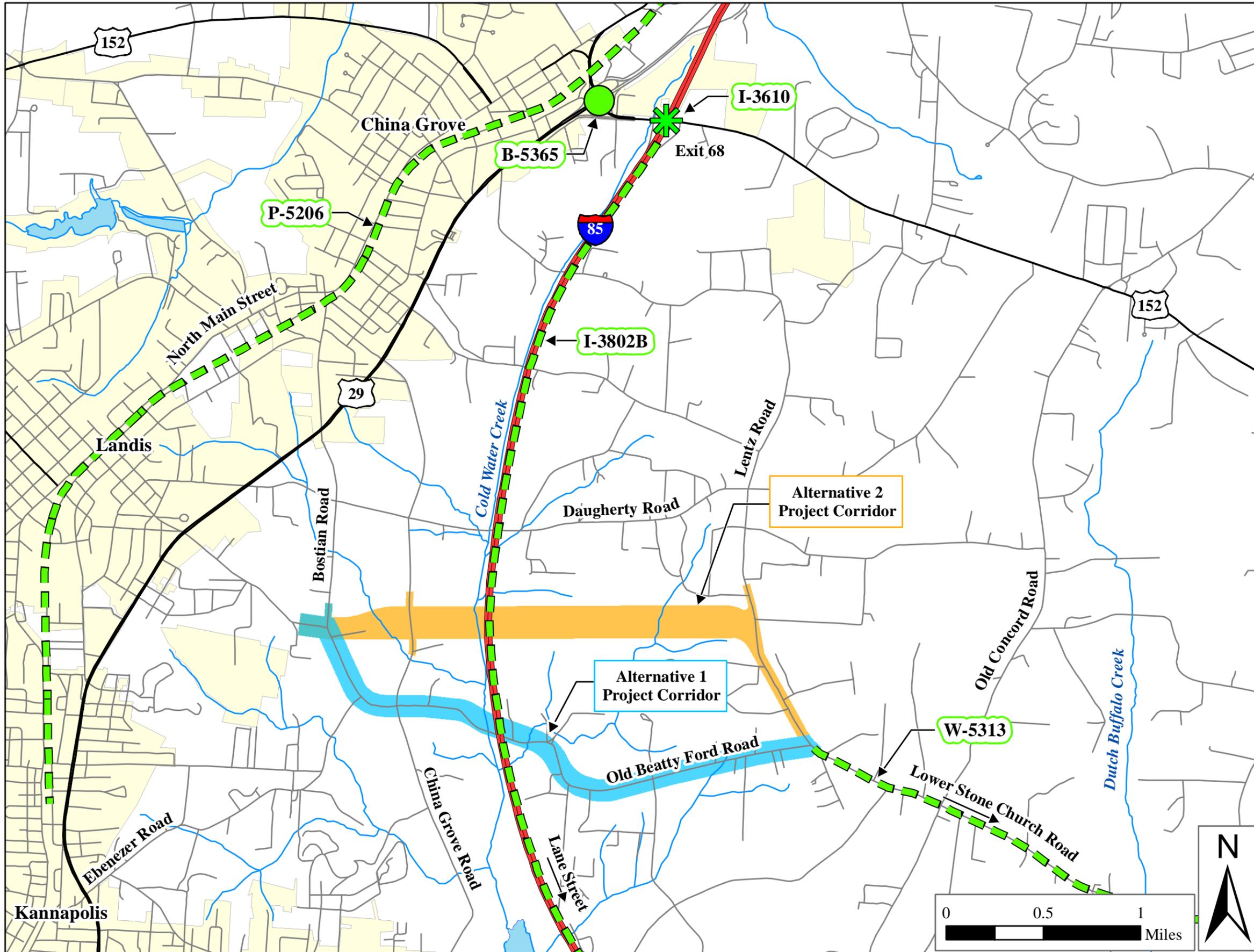
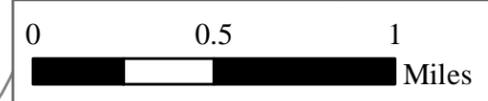
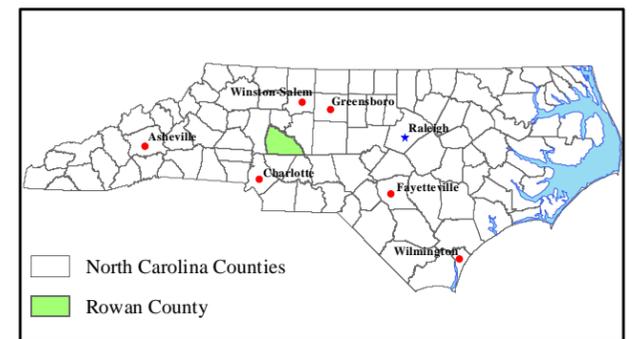
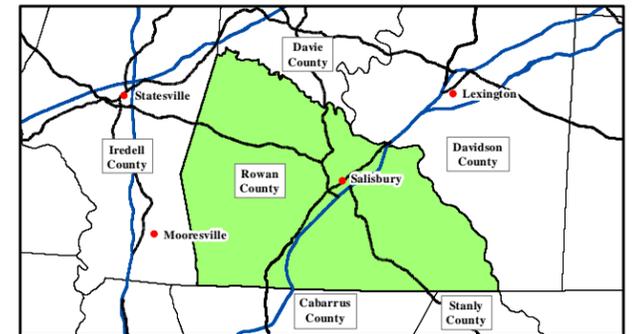


Figure 4 - Other TIP Projects

- Alternative 1 Project Corridor
- Alternative 2 Project Corridor
- Municipal Boundary
- Water Body
- Stream or Creek
- TIP Project
- Interstate
- Major Road
- Road
- TIP Interchange Improvement Project
- TIP Bridge Replacement Project

Map Sources:
North Carolina Department of Transportation
Rowan County
NC One Map
ICA Engineering



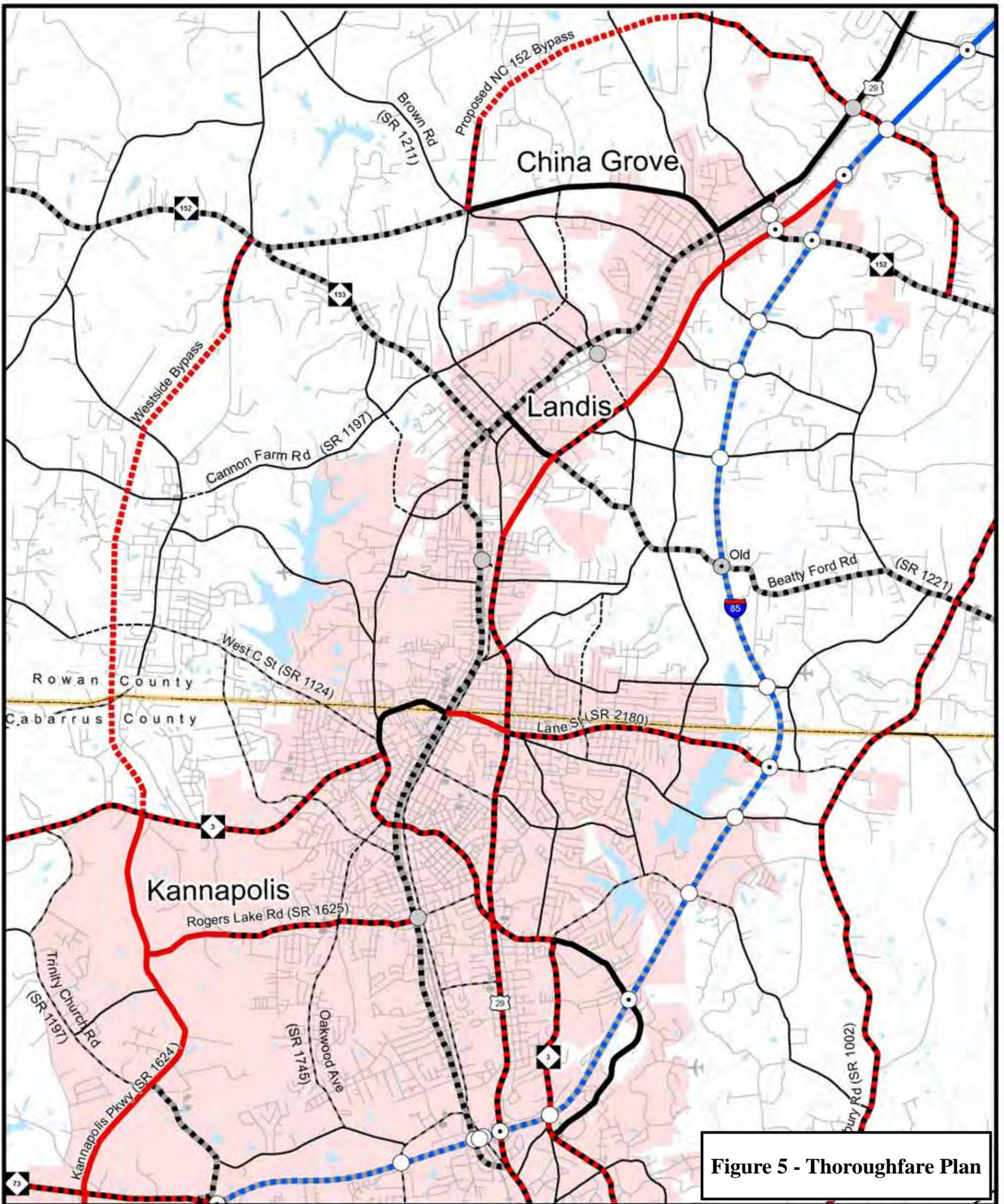
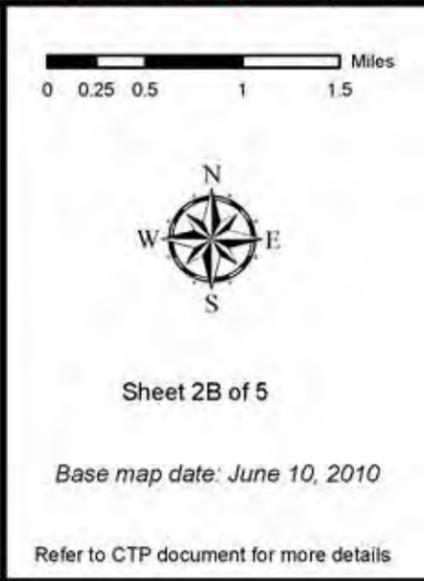
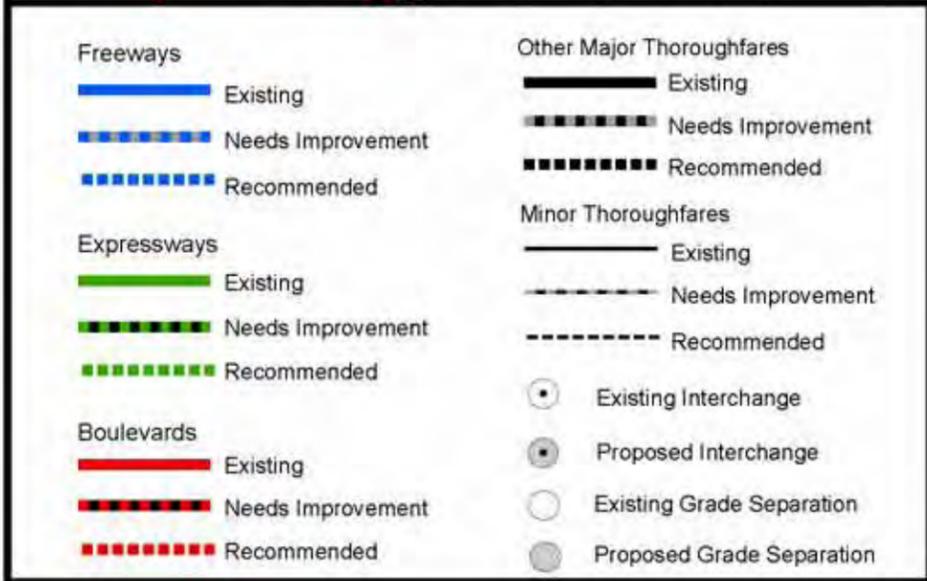


Figure 5 - Thoroughfare Plan



Highway Map

Inset B

Cabarrus-Rowan MPO

Comprehensive Transportation Plan

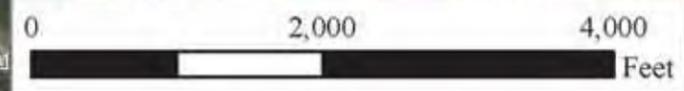
Plan date: August 24, 2011



Figure 6 - Proposed Structures

- Alternative 1 Project Study Area
- Alternative 2 Project Study Area
- National Wetland Inventory
- Floodplain
- Water Supply Watershed Critical Area
- Water Supply Watershed Boundary
- Stream or Creek
- School
- Major Hydraulic Structure

Map Sources:
North Carolina Department of Transportation
NC Floodplain Mapping Program
NC One Map
ESRI ArcGIS Online World Imagery
ICA Engineering



Source: Esri, DigitalGlobe, GeoEye, etc

Date: January 2014

Scale: As Shown

Job No.: 6182

Title:
**W-5516
 Old Beatty
 Ford Road**
 Natural
 Communities
 Map

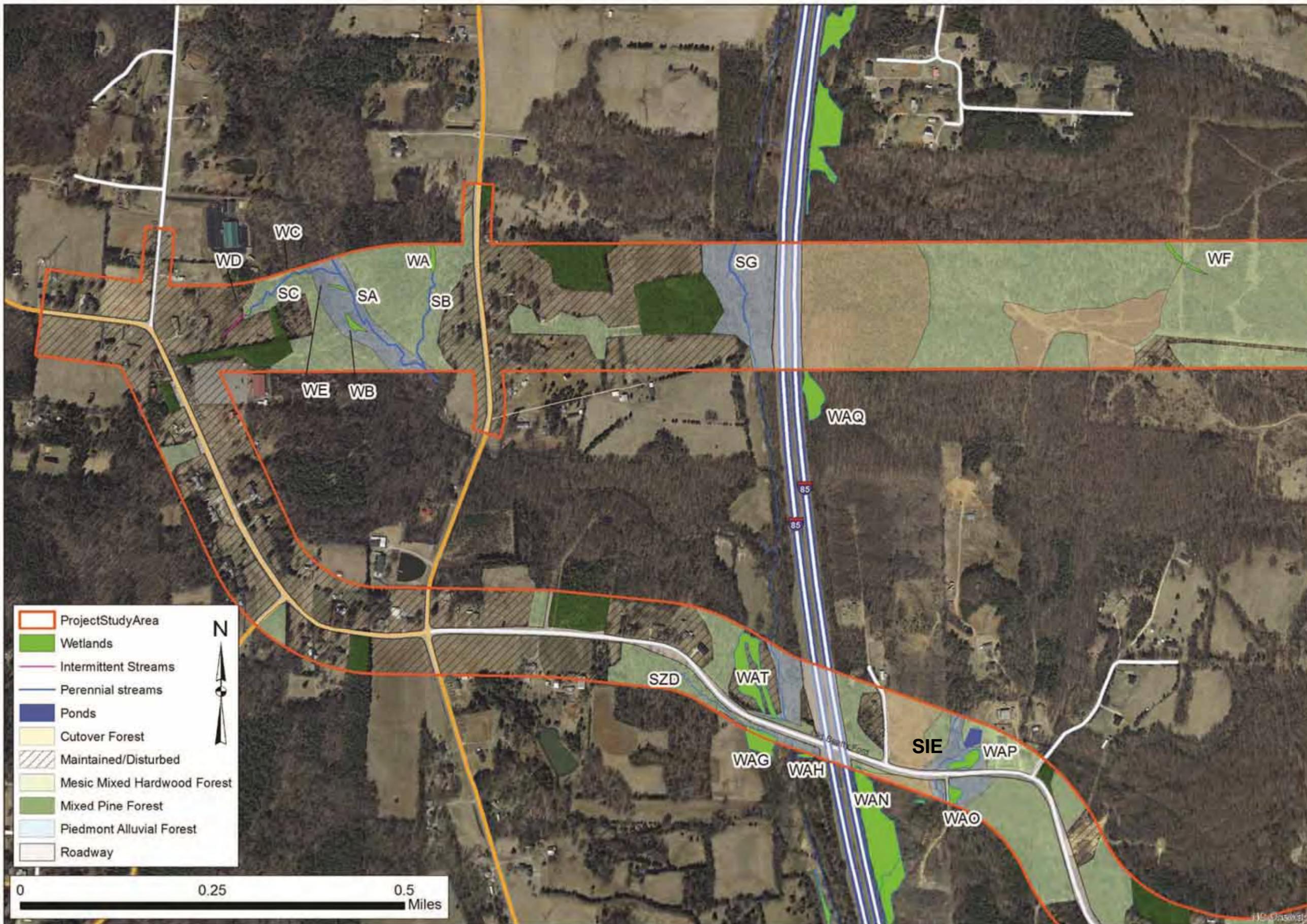
Rowan County, NC

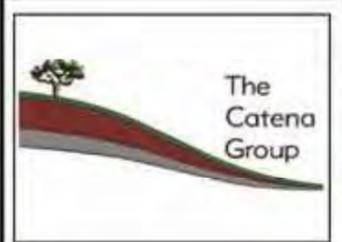
Client:



Figure

7.1





Date: January 2014
 Scale: As Shown
 Job No.: 6182

Title:
**W-5516
 Old Beatty
 Ford Road**
 Natural
 Communities
 Map
 Rowan County, NC



Figure
7.2

Date: January 2014

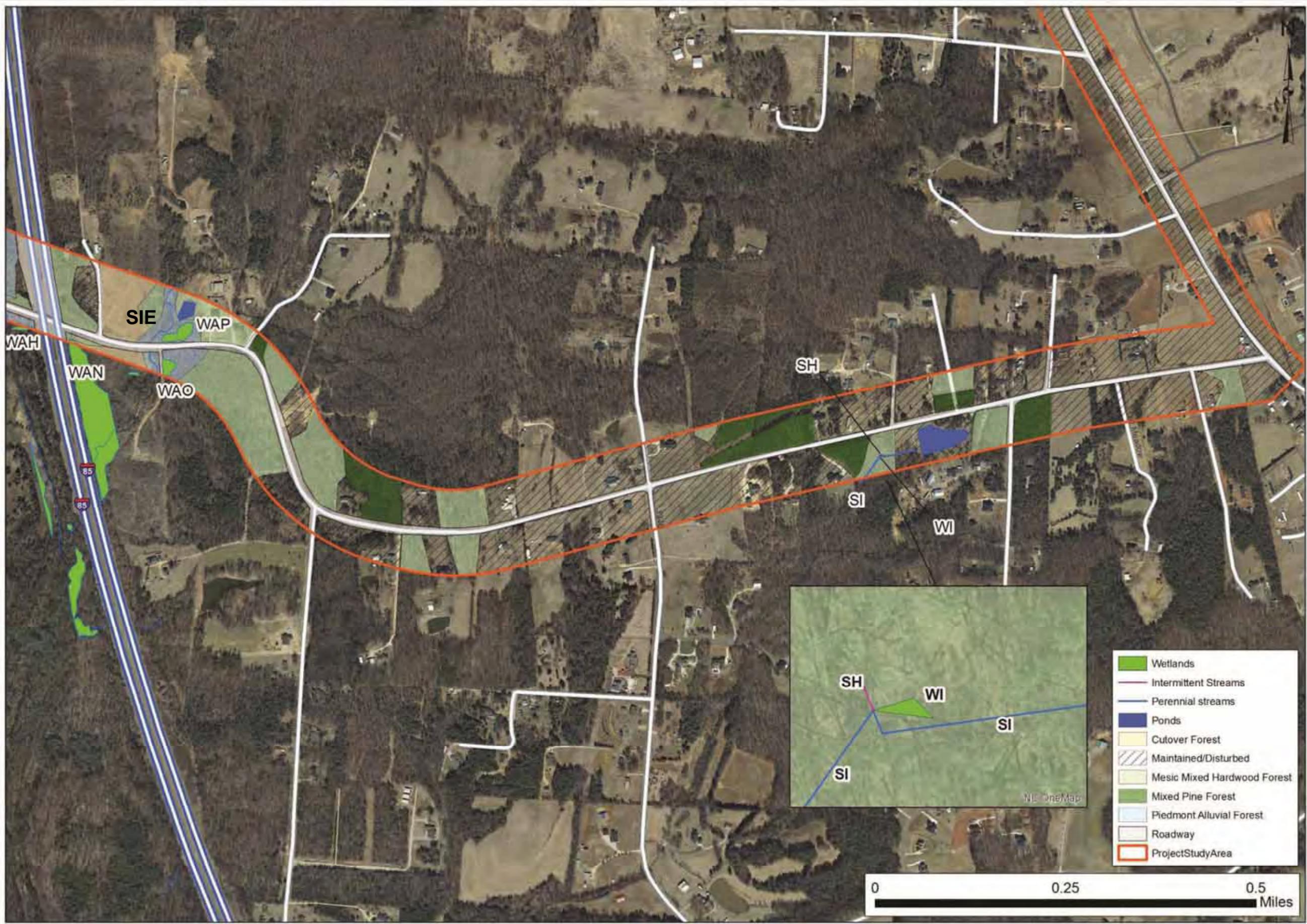
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Job No.: 6182

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Client:


Figure
7.3



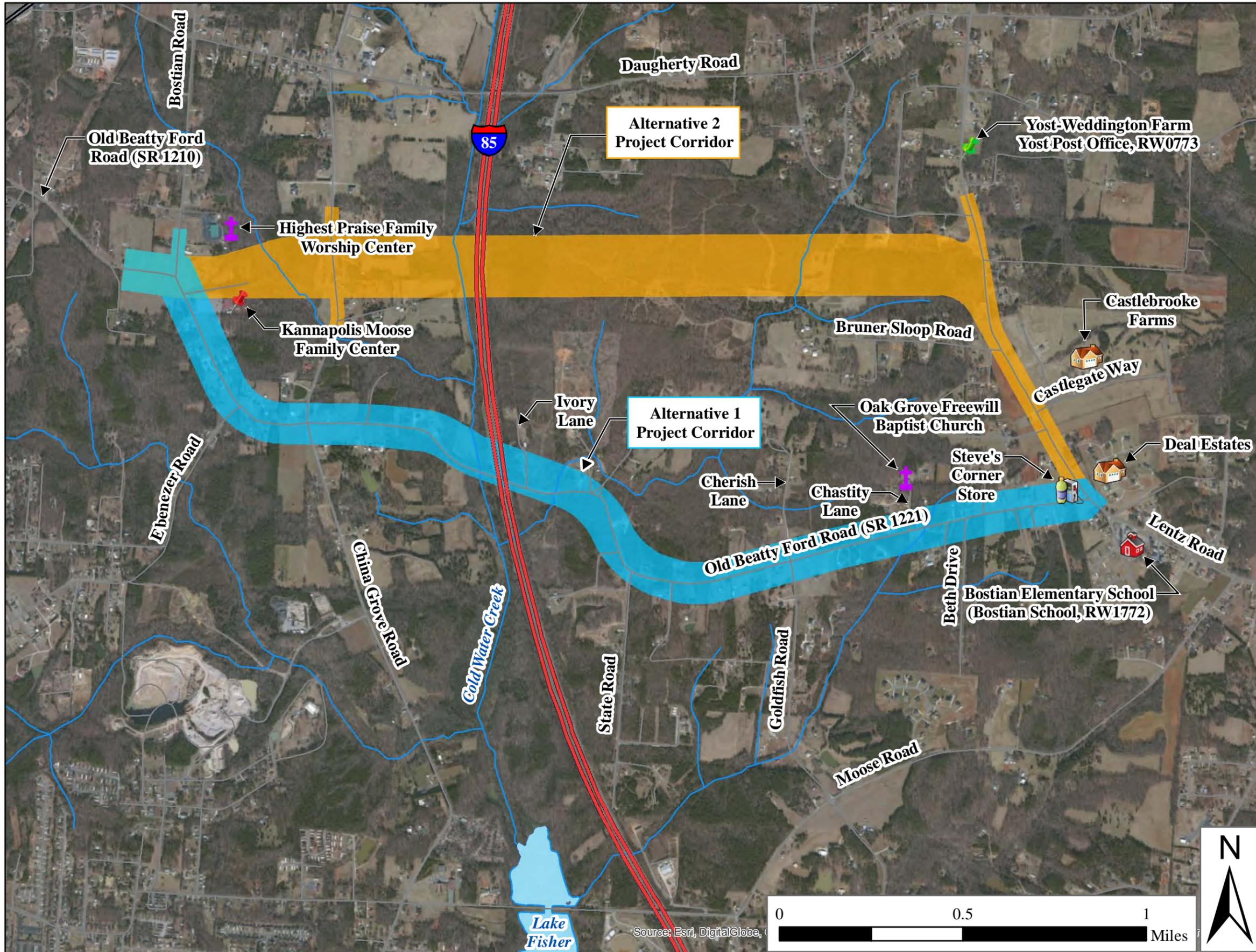
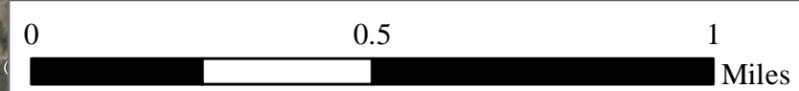
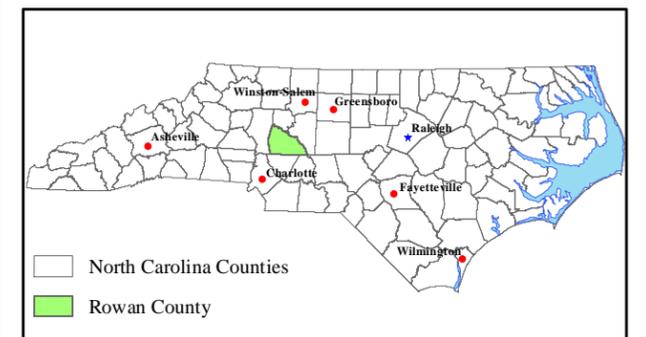
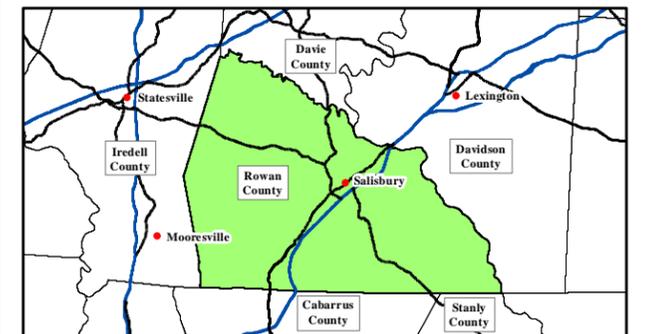


Figure 8 - Community Resources

- Alternative 1 Project Corridor
- Alternative 2 Project Corridor
- Water Body
- Stream or Creek
- Interstate
- Residential Subdivision
- Place of Worship
- Kannapolis Moose Family Center
- Steve's Corner Store
- Bostian Elementary School
- Yost Post Office

Map Sources:
North Carolina Department of Transportation
Rowan County
NC One Map
ICA Engineering



Source: Esri, DigitalGlobe, (

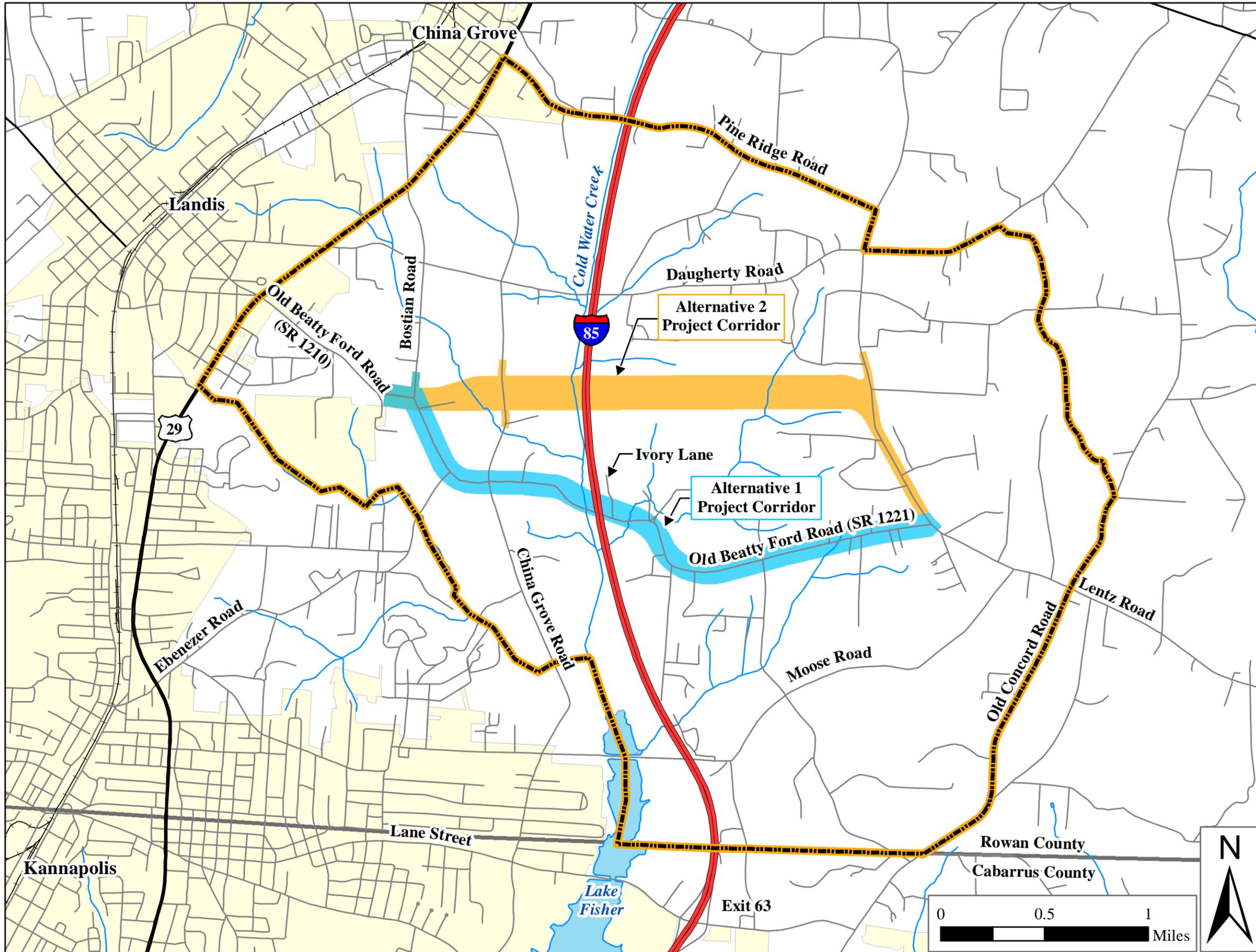


Figure 9 - Future Land Use Study Area (FLUSA)

- Future Land Use Study Area (FLUSA)
- Alternative 1 Project Corridor
- Alternative 2 Project Corridor
- Municipal Boundary
- County Boundary
- Water Body
- Stream or Creek
- Interstate
- Major Road
- Road

Map Sources:
North Carolina Department of Transportation
Rowan County
US Census Bureau
NC One Map
ICA Engineering

