**US 421**

From NC 16 to US 421 Business

Construct Operational Improvements, Wilkesboro

Wilkes County

Federal-Aid Project NHS-0421(72)

WBS 454461.1

**STIP Project U-5312**

ADMINISTRATIVE ACTION

**CATEGORICAL EXCLUSION**

**U.S. DEPARTMENT OF TRANSPORTATION**
**FEDERAL HIGHWAY ADMINISTRATION**
**AND**
**N.C. DEPARTMENT OF TRANSPORTATION**
Submitted pursuant to 42 U.S.C. 4332(2) (c)

for Gary Ohrhausen — 05/26/2015

**Richard W. Hancock, PE, Unit Manager** — Date
Project Development and Environmental Analysis Unit, NCDOT

for Michael J. Sullivan III — 5-26-15

**John F. Sullivan III, PE, Division Administrator** — Date
Federal Highway Administration

# US 421

From NC 16 to US 421 Business
Construct Operational Improvements, Wilkesboro
Wilkes County
Federal-Aid Project NHS-0421(72)
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## CATEGORICAL EXCLUSION

## FEBRUARY 2015

**Prepared for:**
**N.C. Department of Transportation**
**Project Development and Environmental Analysis Unit**

Marshall Edwards 5/19/15
Marshall Edwards — Date
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**Prepared by:**

5/20/15
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# PROJECT COMMITMENTS

**US 421**
**From NC 16 to US 421 Business**
**Construct Operational Improvements, Wilkesboro**
**Wilkes County**
**Federal-Aid Project NHS-0421(72)**
**WBS 454461.1**
**STIP Project U-5312**

NCDOT Division 11

This project involves construction activities on or adjacent to Federal Emergency Management Agency (FEMA)-regulated stream(s). Therefore, the NCDOT Division shall submit sealed as-built construction plans to the NCDOT Hydraulics Unit upon completion of project construction, certifying that the drainage structure(s) and roadway embankment that are located within the 100-year floodplain were built as shown in the construction plans, both horizontally and vertically.

NCDOT Roadway Design Unit

Roadway Design Unit will evaluate bicycle and pedestrian accommodations at superstreet intersections during final design, in accordance with what is proposed within the 2007 Town of Wilkesboro Pedestrian Plan (indicates sidewalks to be built along Curtis Bridge Road and extending along US 421 to Addison Avenue; and crosswalk improvements for the Addison Avenue and US 421 intersection) and the 2014 High Country Regional Bike Plan (indicates New Browns Ford Road is designated as a bike route with planned paved shoulders) outlined in Section 3.3 of this document.

Roadway Design Unit and Congestion Management will evaluate opportunities for emergency vehicle access to US 421, once the new fire station location is determined by the City of Wilkesboro.

NCDOT Hydraulics Unit

NCDOT Hydraulics Unit will coordinate with the NC Floodplain Mapping Program (FMP) to determine the status of 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).

NCDOT Natural Environment Section

Construction authorization will not be requested until any pending coordination with the U.S. Fish and Wildlife Service concerning the Northern Long-eared Bat is complete.

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    a. Historic Architecture Review
    b. Archaeological Review
B. Relocation Report

# 1.0 PURPOSE AND NEED

## 1.1 PROPOSED ACTION

The project is located within Wilkes County, in the Town of Wilkesboro. The project involves upgrading an existing 3.4-mile section of US 421 from a five-lane roadway to a four-lane divided roadway with a 30-foot raised grass median and network of superstreet intersection configurations. The proposed improvements are intended to provide better traffic flow with reducing conflicts by controlling access points. Figure 1-1 provides the project location and the study area.

## 1.2 SUMMARY OF PROJECT PURPOSE

The purpose for the proposed action is as follows:

- To improve the traffic carrying capacity of US 421 by providing movement Level of Service (LOS) of D or better in the design year.

Access to side streets and driveways is more controlled with left turns onto the main highway restricted and replaced by right turns followed by U-turns, known as a superstreet intersection. Improvements including a median and these superstreet intersections are expected to operate at an arterial LOS B during the 2035 peak hours. Capacity analysis results indicate that all intersections and intersection movements of the proposed improvements are expected to operate at LOS D or better with acceptable queuing in the 2035 design year peak hours.

## 1.3 SUMMARY OF PROJECT NEED

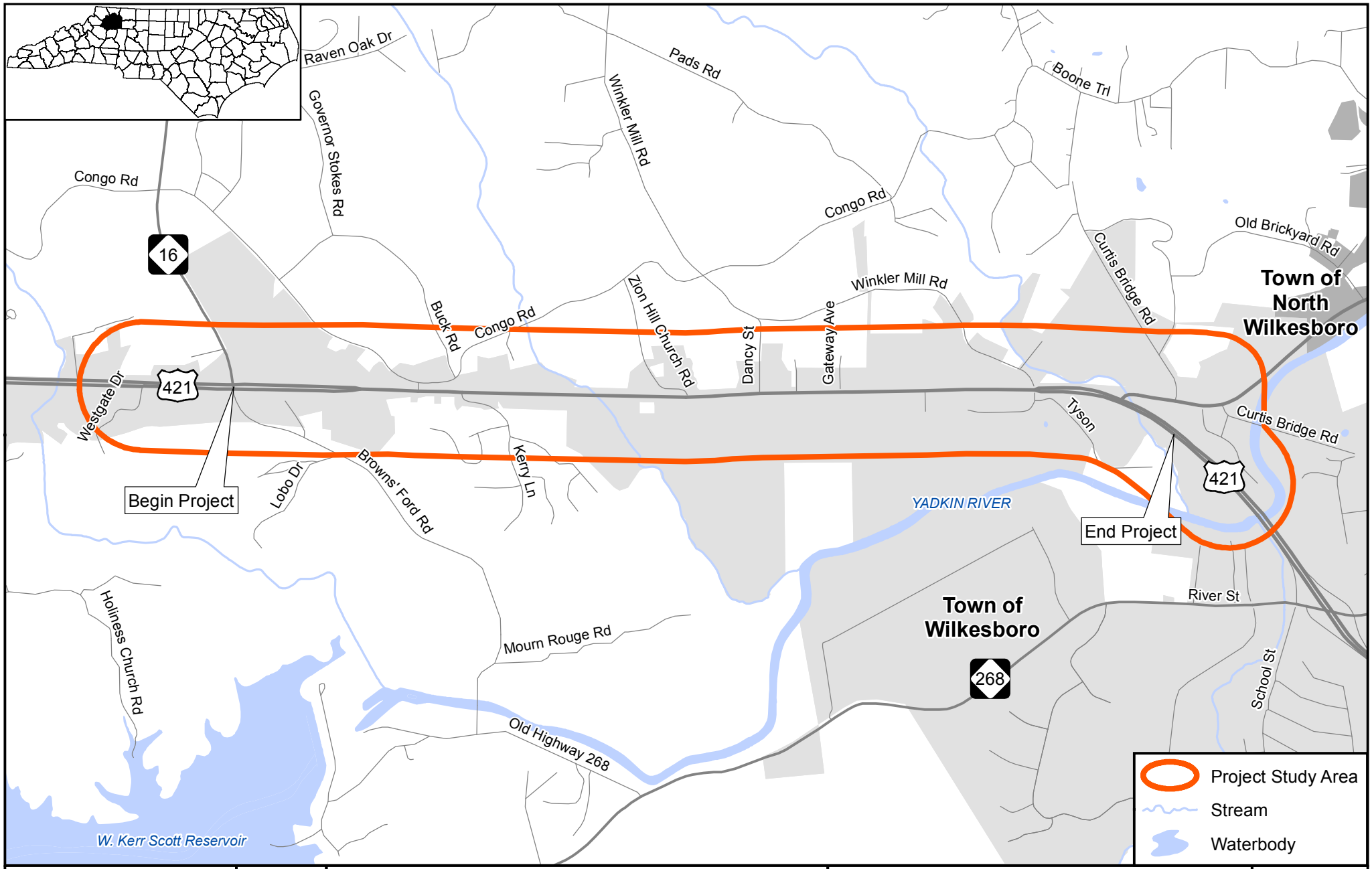
The need for this study can be summarized as follows:

- Traffic congestion exists along the existing facility and is expected to worsen in the future.

US 421 operates as a freeway to the east and to the west of the project corridor. Vehicles traveling through the area are slowed and stopped by congestion, traffic signals, and vehicles accessing the numerous driveways throughout the corridor.

In 2012, traffic volumes were between 23,000 vehicles per day (vpd) and 35,000 vpd along this section of US 421 (see Figure 1-2). By 2035, traffic volumes along US 421 are expected to increase by 15-30 percent (see Figure 1-3).

- Conflict exists from the numerous access driveways and continuous two-way left-turn lane throughout much of the corridor.




# Project Location Map

Data Sources: NCDOT; NC One Map; NCDENR-DWR; Wikes County

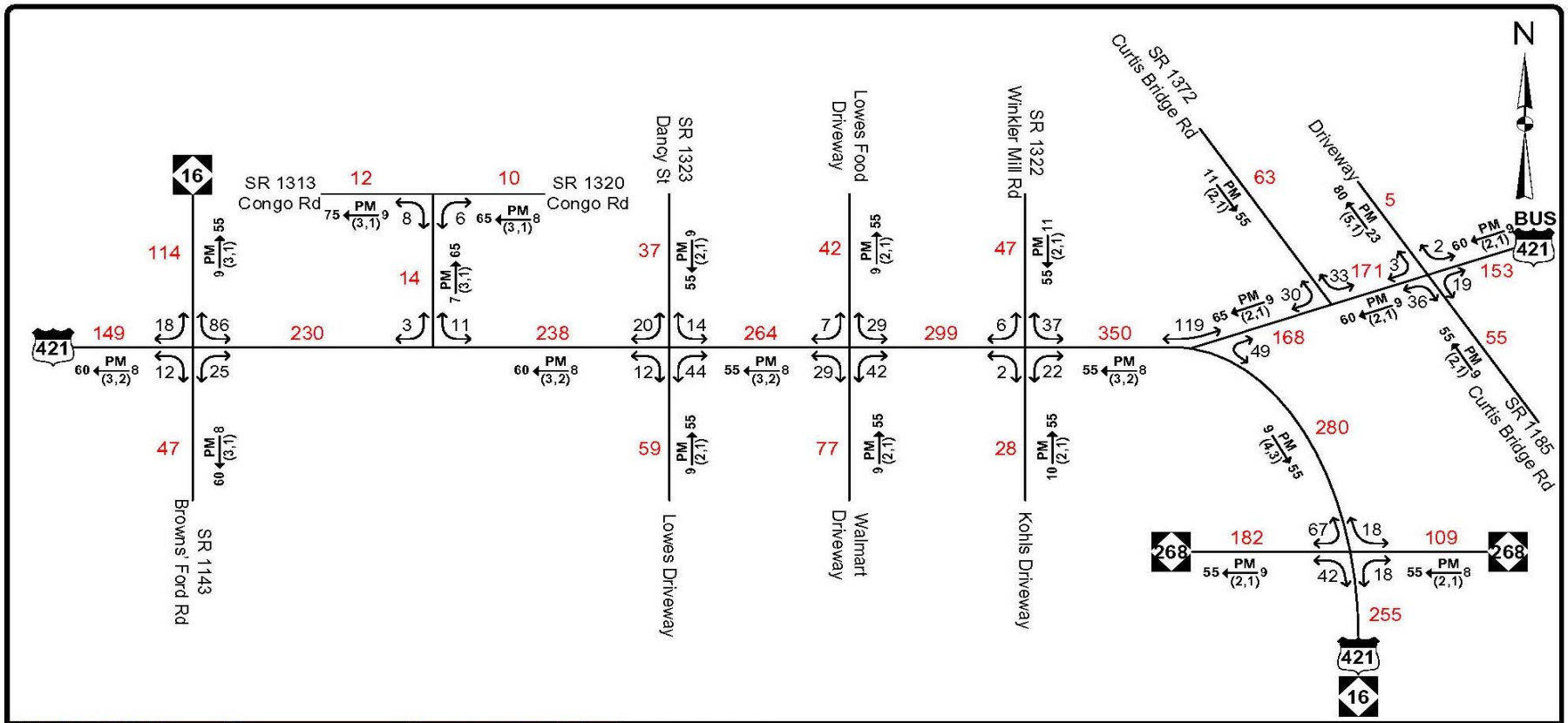
US 421 Improvements

U-5312

Wilkes County

**Figure 1-1**

10/30/2014




# 2012 AVERAGE ANNUAL DAILY TRAFFIC

## NO BUILD

**SHEET 1-1**

## LEGEND

| | |
|---|---|
| ### | No. of Vehicles Per Day in 100s |
| 1- | Less than 50 vpd |
| X | Movement Prohibited |
| K PM (d, t) D | |
| K | Design Hour Factor (%) |
| PM | PM Peak Period |
| D | Peak Hour Directional Split (%) |
| → | Indicates Direction of D |
| (d, t) | Duals, TT-STs (%) |

**TIP:** U-5312 **WBS:** 45446.1.1

**COUNTY:** Wilkes **DIVISION:** 11

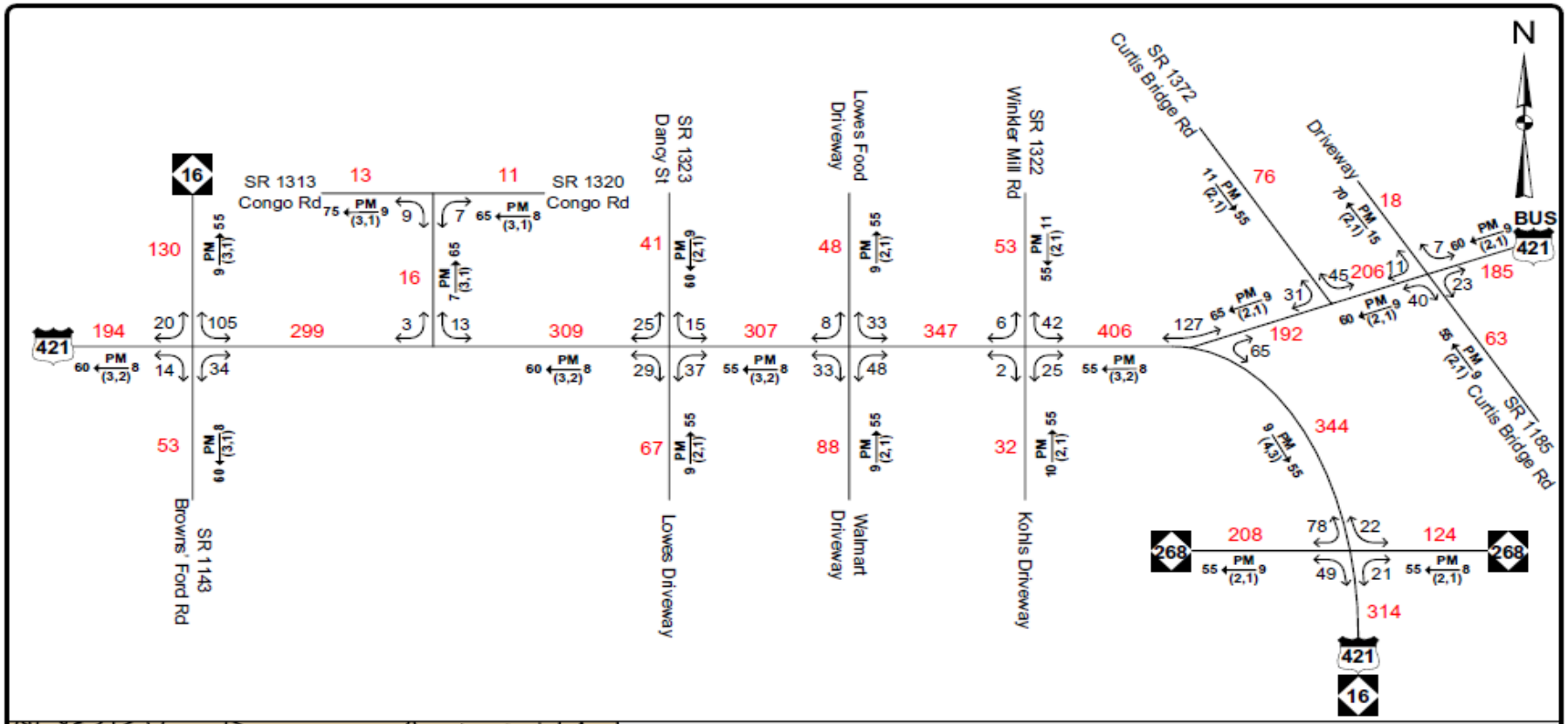
**DATE:** 10-16-2012 **Supplement:** 9-24-2014

**PREPARED BY:** Bryan D. Johnson

**LOCATION:** Wilkesboro, NC

**PROJECT:** Operational Improvements on US 421 from SR 1266 to the Yadkin River

| | | | | |
|---|---|---|---|---|
| Not to Scale | | Base Year (2012) Build Traffic Forecast | US 421 Improvements<br>U-5312<br>Wilkes County | Figure<br>1-2 |




| | | | | |
|---|---|---|---|---|
| Not to Scale | | Design Year (2035) Build Traffic Forecast | US 421 Improvements<br>U-5312<br>Wilkes County | Figure<br>1-3 |

The continuous two-way center left-turn lane allows traffic to make left turns into driveways all along the corridor. These competing movements contribute to the congestion along the project corridor.

## 1.4 PURPOSE AND NEED STATEMENT

The purpose and need of the project is to address the existing and future traffic congestion along this 3.4-mile section of US 421 by improving the traffic carrying capacity, providing movement LOS of D or better in the design year.

### 1.4.1 Background

NCDOT proposes to improve the existing US 421 corridor in Wilkesboro in Wilkes County, to a four-lane divided facility with superstreet intersection designs. The project would extend 3.4 miles from NC 16 to US 421 Business.

US 421 functions as an important regional route for travel to and from the mountains of North Carolina. Within the immediate project vicinity, this section of US 421 is one of the main commercial and business areas for the Town of Wilkesboro and the Town of North Wilkesboro.

The corridor currently has no control of access, with numerous driveways along the highway within the study area. Some major commercial developments have signalized access; however, the majority of driveways on US 421 are uncontrolled and allow all turning movements.

### 1.4.2 Project Area Description

The study area is in the Town of Wilkesboro in western North Carolina. The western half of the study area is primarily rural and suburban residential; the eastern half is commercial retail. The study area is rolling terrain.

### 1.4.3 Roadway Conditions

#### *1.4.3.1 Existing Characteristics*

The typical cross section along the study corridor is five lanes with a center left turn lane. There are small portions of the corridor near each terminus that are four lanes with a grass median. The lanes are 12 feet wide, with varied shoulder widths (typically 8 feet total, with 4 feet paved; some areas have curb and gutter with an 8-foot berm).

#### *1.4.3.2 Existing Traffic Conditions*

The 2012 Annual Average Daily Traffic (AADT) is between 23,000 and 35,000 vehicles per day on this section of US 421, as shown on Figure 1-2. Field observations and anecdotal information indicate that as drivers enter this section of US 421, they experience delay at the first intersections in the transition from freeway operation to signalized corridor. Analysis indicates that there are

some approaches and individual movements at traffic signals along the corridor that operate at LOS D or E; however, all analyzed signalized intersections along the corridor operate at overall acceptable levels of service (LOS) during both daily peak hours (AM and PM).

#### *1.4.3.3 Projected Traffic Conditions*

Under projected 2035 conditions, Annual Average Daily Traffic (AADT) is between 29,900 and 40,600 vehicles per day on this section of US 421, as shown on Figure 1-3. The No-Build (2035) analysis indicates that operations are expected to decline in comparison to existing operations. Four of the five analyzed intersections are expected to have at least one approach operating at LOS E during the peak hours, indicating additional congestion and delay along the corridor due to increased volumes throughout the network.

### 1.4.4 Accident Analysis

An accident analysis indicates there were 336 reported accidents from January 1, 2010 to December 31, 2014. Current statewide averages for crash rates along facility types across the state are available for the 2010-2012 data period. This corridor was evaluated as an Urban US Route. Accident rates do not exceed the statewide average accident rates or critical accident rates in any category, with the exception being fatal injury crashes. That category is slightly above (+4%) the statewide average for similar facilities. Total accident rates, non-fatal injury accident rates, and night and wet accident rates are all lower than statewide averages.

Despite safety not being the primary purpose, there are opportunities for safety to be addressed as part of the project.

The most prevalent accident pattern along this corridor is rear-end accidents, which account for approximately 38 percent of the total. This accident pattern is generally a symptom of congestion. The other predominant accident pattern along this corridor is angle crashes, which account for approximately 27 percent of the total and is attributable to the many turning conflicts encountered when a center turn lane is present along a corridor.

### 1.4.5 System Linkages

#### *1.4.5.1 Existing Road Networks*

US 421 is designated as an Other Principal Arterial and functions as an important regional route in Wilkes County, carrying both local and regional traffic. US 421 provides a major route between Winston-Salem and Boone, connecting through Wilkesboro. The proposed project would provide an improved connection between existing freeway sections of US 421 to the east and west of Wilkesboro, completing a more uniform and freer flow route between Winston-Salem and Boone.

The cross-section of US 421 varies along the length of the project. From west to east, the cross-section of US 421 is as follows:

- At NC 16/New Browns Ford Road: Four-lane, 46-foot grass median-divided roadway with two through lanes in each direction.
- NC 16/New Browns Ford Road east to Winkler Mill Road: Five-lane roadway with two through lanes in each direction and a center two-way left-turn lane. Right turn lanes are included at Congo Road, Kerry Lane, Lowes Home Improvement, Dancy Road, Staples shopping center, Addison Avenue, and WalMart.
- Winkler Mill Road to US 421 Business: The five-lane roadway transitions to a four-lane, 46-foot median divided roadway with two through lanes in each direction.

Exclusive right-turn lanes are present at most major intersections along the corridor. The posted speed limit within the study area varies between 45 miles per hour (mph) and 55 mph.

The US 421 project corridor has little to no restrictions on access to properties along the roadway.

#### *1.4.5.2 Transportation Plans*

The proposed improvement of US 421 is included in the NCDOT draft 2015-2025 State Transportation Improvement Plan (STIP) as project U-5312, scheduled for right-of-way in 2018 and construction to begin after 2020.

The proposed US 421 corridor is listed in the 2008 *Wilkesboro Tomorrow Comprehensive Land Use Plan* as a significant state-maintained thoroughfare.

The 1993 Thoroughfare Plan for the Towns of Wilkesboro and North Wilkesboro indicates congestion along US 421 west of Wilkesboro to be a system deficiency. The plan notes that US 421 is expected to exceed its capacity within the design period (2020).

#### *1.4.5.3 Modal Interrelationships*

The US 421 corridor is currently served by a public transit route that runs along the eastern portion of the project. The Wilkes Express Shuttle provides deviated fixed-route service through Wilkesboro and North Wilkesboro with three stops within the study area. The service provides ten total trips per day, Monday through Friday, on a loop.

The Yadkin Valley Railroad, based in Rural Hall, NC, is a subsidiary of the Gulf and Ohio Railways, provides freight rail service in Wilkes County, on tracks leased from Norfolk Southern.

The railroad, which is approximately two miles east of the project, extends into the county from the east, following the Yadkin River to its terminus in North Wilkesboro.

Wilkes County Airport is located approximately 7 miles northeast of the project corridor. Piedmont Triad International Airport in Greensboro and Charlotte-Douglas International Airport in Charlotte are both approximately 90 miles away.

# 2.0 DEVELOPMENT OF ALTERNATIVES

This section provides a discussion of the alternatives considered prior to this Categorical Exclusion, and the alternatives carried forward and studied in this Categorical Exclusion.

## 2.1 PREVIOUS ALTERNATIVES STUDIED

A Feasibility Study for Operational Improvements along US 421 from SR 1226 (Westgate Drive) to the Yadkin River was completed in 2010. Four alternatives were examined in that study – a four-lane divided shoulder section, a six-lane divided shoulder section, a four-lane divided superstreet shoulder section, and a six-lane divided superstreet shoulder section. Traffic forecasts completed prior to this feasibility study had indicated a level of future traffic that would necessitate a six-lane section of roadway. However, updated traffic forecasts were completed in 2012 after the economic recession and a traffic capacity analysis evaluated two alternatives, a four-lane and a six-lane divided network of superstreet intersections. Results indicate that a four-lane divided superstreet network through this corridor would accommodate the future traffic in this area. This NEPA document evaluates this four-lane divided superstreet network alternative.

## 2.2 NO-BUILD ALTERNATIVE

The No-Build Alternative would involve routine maintenance only, with no improvements made to existing roads.

With no improvements, intersection delay for the No-Build Alternative is expected to increase in the design year. The existing eight-phase traffic signals contribute to substantial stopping along the corridor. Continued use of the eight-phase signals with the No-Build Alternative would result in additional stopping and delay for vehicles travelling US 421.

The No-Build Alternative would not have any adverse environmental impacts. However, the increased traffic could lead to further delays and numerous conflicts for turning vehicles. Additionally, according to the FHWA "Safe Access is Good for Business" publication, the lack of an efficient transportation system could also cause a reduction of customers to existing businesses.

The No-Build Alternative was eliminated because it does not meet the purpose and need of the project.

## 2.3 TRAVEL DEMAND MANAGEMENT ALTERNATIVE

Travel Demand Management (TDM) improvements are strategies and policies designed to reduce travel demand or to redistribute that demand to other locations or to other time periods. Road pricing, pedestrian-oriented design, and improving public transportation infrastructure are some examples of TDM strategies. Improvements such as these are not effective solutions for this project because of the nature of the region and the highway carrying regional traffic to the east and west of Wilkesboro. TDM strategies are designed to work in more urban settings with higher peak hour traffic congestion problems related to commuting. Therefore, the TDM Alternative was not considered a reasonable and feasible alternative and was eliminated from further study and consideration.

## 2.4 TRANSPORTATION SYSTEMS MANAGEMENT ALTERNATIVE

Transportation Systems Management (TSM) improvements involve addressing congestion issues by enhancing the existing transportation system through improvements such as intersection and signal improvements or addressing geometric deficiencies such as narrow lanes and shoulders, inadequate signage and pavement striping. These types of improvements would not increase the capacity nor improve the levels of service along US 421. They also would not address the conflict between turning vehicles attempting to access the businesses along US 421 from the center turn lane. Therefore, the TSM Alternative was not considered a reasonable and feasible alternative and was eliminated from further study and consideration.

## 2.5 MASS TRANSIT ALTERNATIVE

The eastern portion of the study area is currently served by transit, described in Section 1.4.5.3. The existing transit service is in place for those trips that would utilize transit. A large portion of the traffic through this area, however, has origins, destinations, and trip lengths that are not conducive to transit. Because of this, and the rural nature and low density of the area, the Mass Transit Alternative was not considered a viable alternative.

## 2.6 BUILD ALTERNATIVE

The Build Alternative is a 3.4-mile long widening for the addition of a grass median with a network of superstreet intersections from Westgate Drive to US 421 Business (shown in Figure 2-1). There are eight proposed superstreet intersections:

- Westgate Drive (signalized);

**CONCEPTUAL DESIGN**
THESE FIGURES ARE CONCEPTUAL AND ARE SUBJECT TO CHANGE WITHOUT NOTICE. THIS IS NOT THE PRODUCT OF EXTENSIVE DESIGN

Begin Construction

421

Parsons Dr

16

421

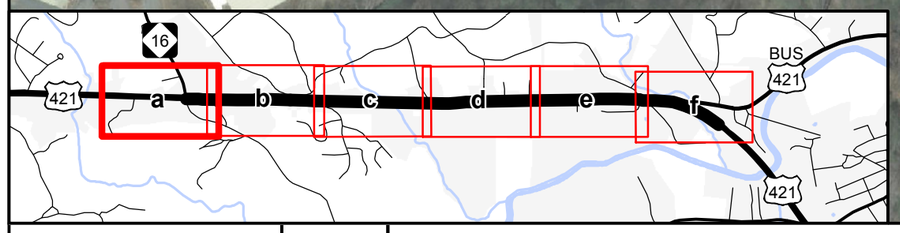
Matchline

Westgate Dr

Begin Project

Old Browns

New Browns Ford Rd




0 200 Feet

## Build Alternative

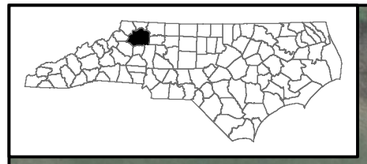
Data Sources: NCDOT; NC One Map; NCDENR-DWR; Wikes County

- Proposed Centerline
- Proposed Curb and Gutter
- Proposed Paved Shoulder
- Proposed Remove Asphalt
- Proposed Concrete Median
- Proposed Grass Median

US 421 Improvements
U-5312
Wilkes County

**Figure 2-1a**

5/8/2015



**CONCEPTUAL DESIGN**

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Buck Rd

Congo Rd

Congo Rd

Matchline

421

421

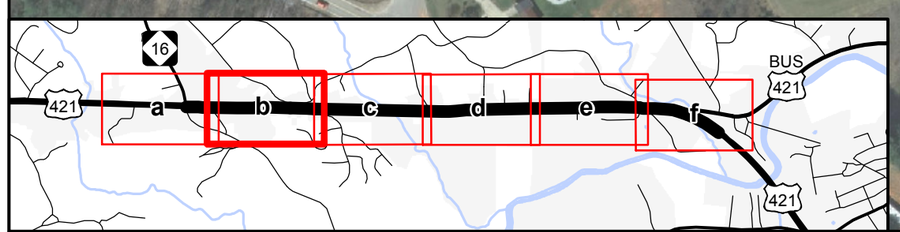
Matchline

Kerry Ln

Old Browns Ford Rd

New Browns Ford Rd

Azalea Ln

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## Build Alternative

Data Sources: NCDOT; NC One Map; NCDENR-DWR; Wikes County

- Proposed Centerline
- Proposed Curb and Gutter
- Proposed Paved Shoulder
- Proposed Remove Asphalt
- Proposed Concrete Median
- Proposed Grass Median

US 421 Improvements

U-5312

Wilkes County

**Figure 2-1b**

5/6/2015

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Congo Rd
Millers Creek
Zion Hill Church Rd
Matchline
421
Kerry Ln
Cherry Brook Ln
16
BUS
a
b
c
d
e
f

0 200 Feet

N

## Build Alternative

Data Sources: NCDOT; NC One Map; NCDENR-DWR; Wikes County

- Proposed Centerline
- Proposed Curb and Gutter
- Proposed Paved Shoulder
- Proposed Remove Asphalt
- Proposed Concrete Median
- Proposed Grass Median

US 421 Improvements
U-5312
Wilkes County

**Figure 2-1c**

5/8/2015

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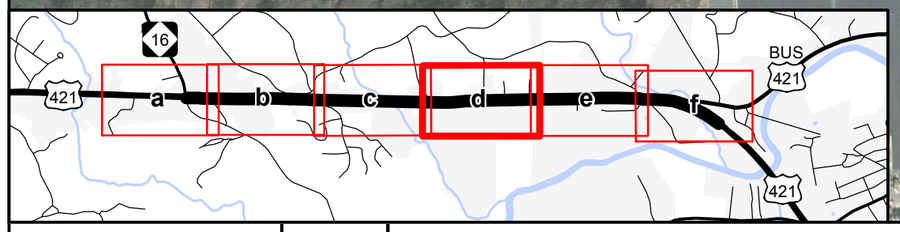
Zion Hill Church Rd
Matchline
421
Dancy St
Kennedy St
Gateway Ave
Matchline
421
421




0 200 Feet

N

## Build Alternative

Data Sources: NCDOT; NC One Map; NCDENR-DWR; Wikes County

- Proposed Centerline
- Proposed Curb and Gutter
- Proposed Paved Shoulder
- Proposed Remove Asphalt
- Proposed Concrete Median
- Proposed Grass Median

US 421 Improvements
U-5312
Wilkes County

**Figure 2-1d**

5/8/2015

**CONCEPTUAL DESIGN**

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Winkler Mill Rd

Tucker Hole Creek

Winkler St

Matchline

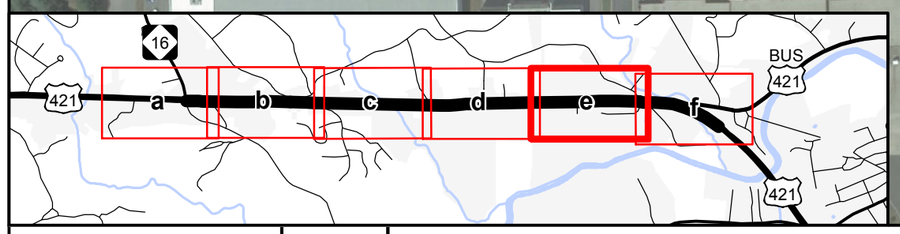
421

Addison Ave

Stonecrest Oaks

Matchline

Tyso




0 200 Feet

N

## Build Alternative

Data Sources: NCDOT; NC One Map; NCDENR-DWR; Wikes County

- Proposed Centerline
- Proposed Curb and Gutter
- Proposed Paved Shoulder
- Proposed Remove Asphalt
- Proposed Concrete Median
- Proposed Grass Median

US 421 Improvements

U-5312

Wilkes County

**Figure 2-1e**

5/8/2015

**CONCEPTUAL DESIGN**
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Matchline

Tyson

Stonecrest Oaks

421

Tucker Hole Creek

Curtis Bridge Rd

BUS 421

Curtis Bridge Rd

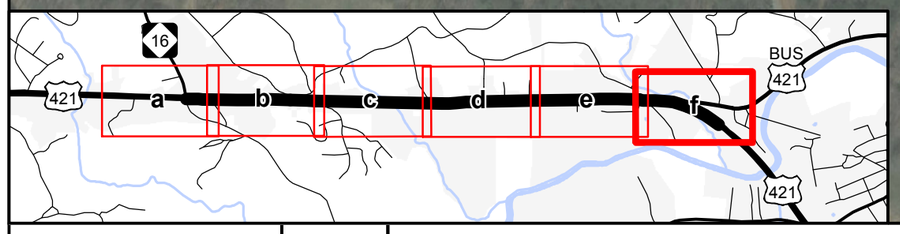
Pennell St

Central St

End Project

End Construction

421

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N

## Build Alternative

Data Sources: NCDOT; NC One Map; NCDENR-DWR; Wikes County

- Proposed Centerline
- Proposed Curb and Gutter
- Proposed Paved Shoulder
- Proposed Remove Asphalt
- Proposed Concrete Median
- Proposed Grass Median

US 421 Improvements
U-5312
Wilkes County

**Figure 2-1f**

5/8/2015

- NC 16 (signalized);
- Congo Road;
- Laurelwood Drive;
- Zion Hill Church Road;
- Dancy Road (signalized);
- Addison Avenue (signalized); and
- Winkler Mill Road (signalized).

The recommended intersection treatments at these locations are shown in Figure 2-2. U-turn points on each side are included as part of the superstreet intersections. The intersection with US 421 Business would be reconfigured to a continuous flow intersection, including a new connection between Curtis Bridge Road and US 421. This concept provides continuous traffic flow between the three intersections of; US 421 and US 421 Business, US 421 and Curtis Bridge Road Extension, and Curtis Bridge Road and US 421 Business.

The Build Alternative would include the addition of a median which would eliminate left turns from side streets along the length of the corridor. This would require that vehicles turn right and then make a U-turn at select points. The proposed typical section for the project is a four-lane divided highway with a 30-foot raised grass median with mountable curb and gutter. This section accommodates 12-foot travel lanes and a 10-foot outside shoulder. This typical section will fit within the 200-foot right of way that exists along the corridor, with only minor right-of-way acquisition required to accommodate specific superstreet intersections. The typical section is illustrated in Figure 2-3. A photo simulation showing what the completed Build Alternative may look like from Zion Hill Church Road is shown as Figure 2-4.

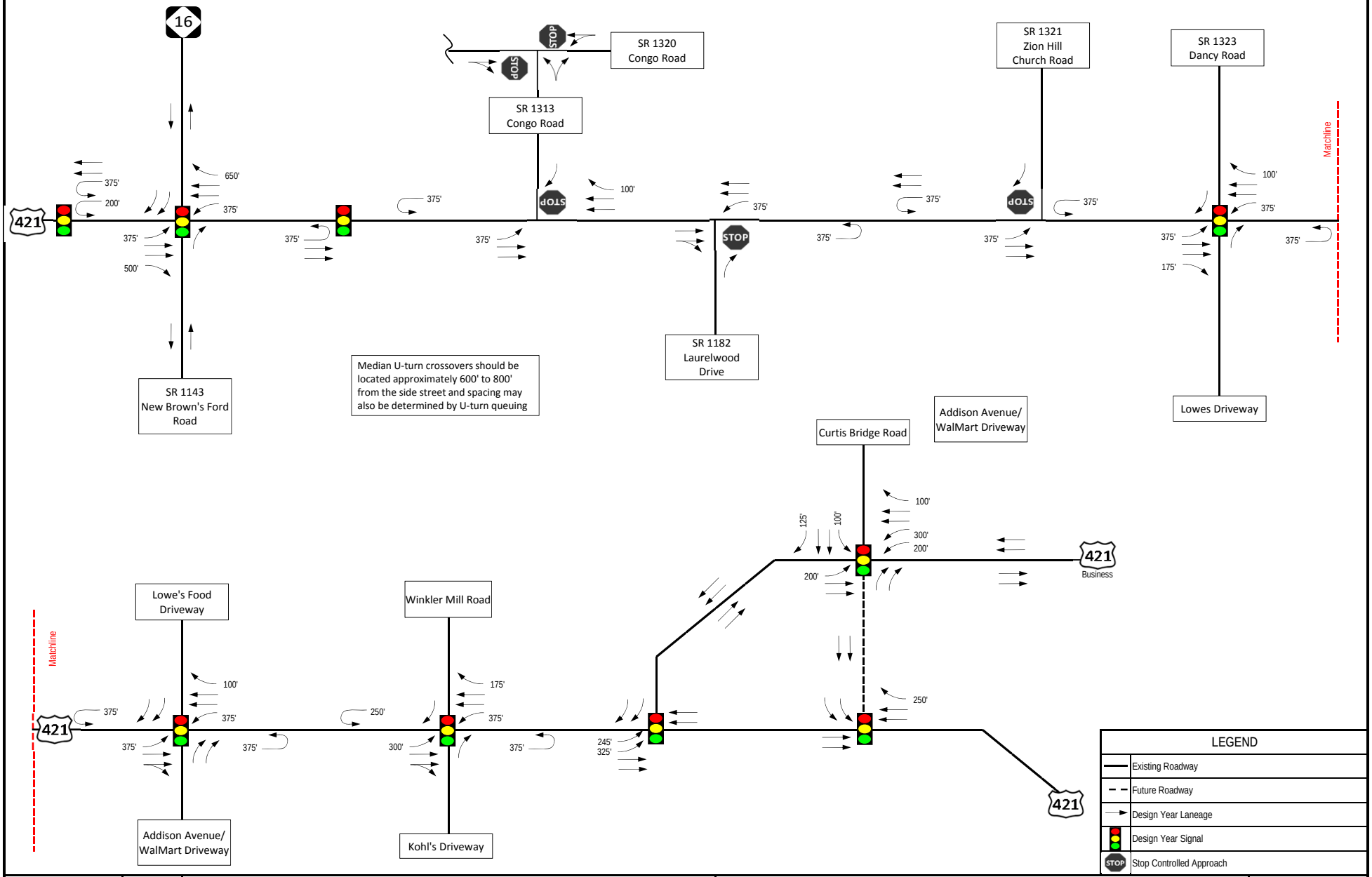
In developing the Build Alternative, multiple configurations of the NC 16 intersection were considered, including traditional widening opportunities. Ultimately, the superstreet intersection configuration was determined to be the best option.

There are no relocations with the Build Alternative.

For this Build alternative, the estimated cost of right-of-way is $2.6 million; the estimated cost for utility relocation is $4.4 million; and the estimated construction cost is $18.2 million. The total project cost estimate is $25.2 million.

## 2.7 OTHER STIP PROJECTS

The STIP Project B-4977 is the only other transportation project that is proximate to STIP Project U-5312. It is a bridge replacement on SR 1313 (Congo Road) over Fish Dam Creek, and is scheduled for construction in 2018.

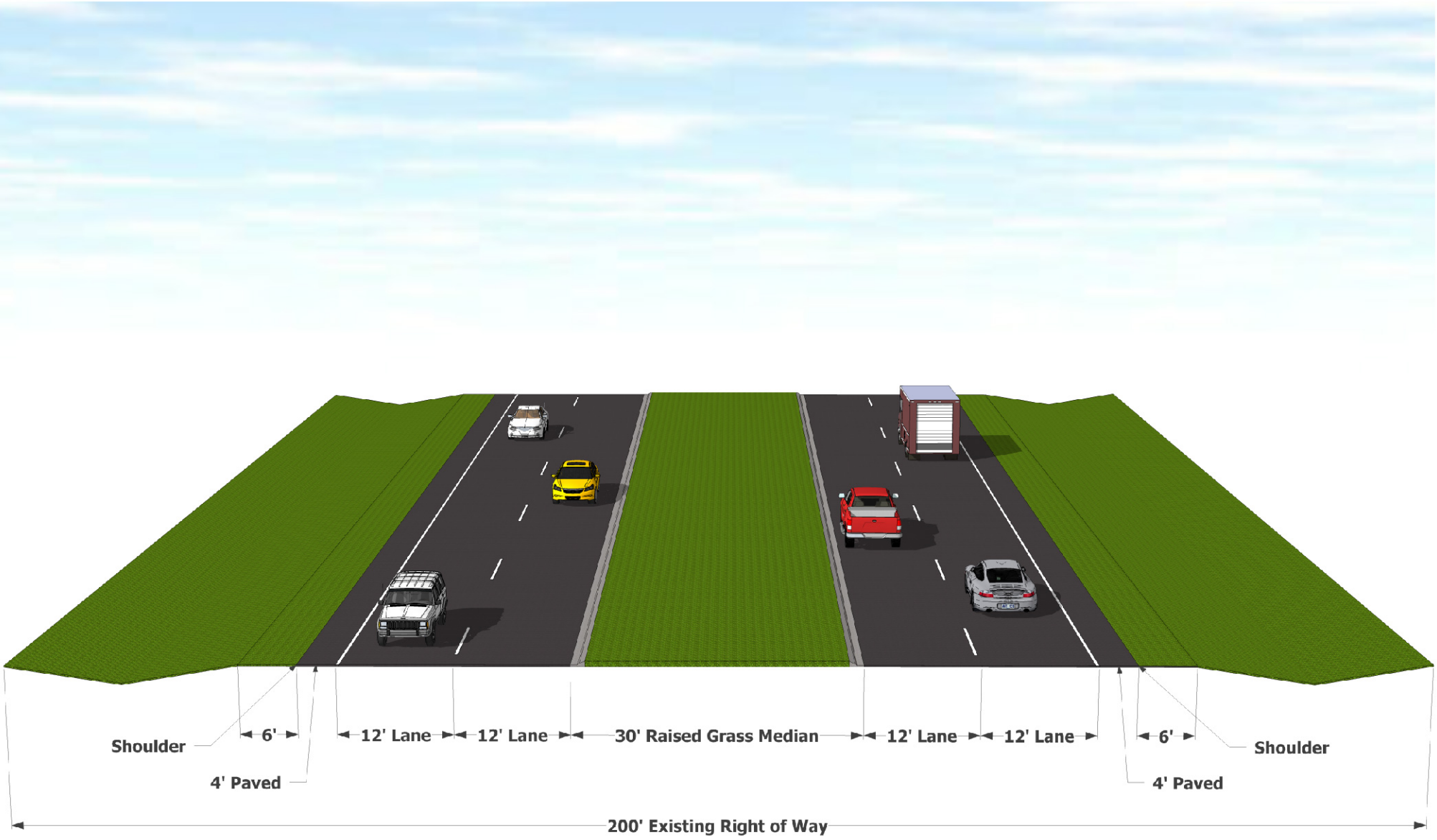



Not to Scale

**Design Year (2035) Lane Geometrics and Traffic Control**

**US 421 Improvements**
**U-5312**
**Wilkes County**

**Figure 2-2**




| | | | |
|---|---|---|---|
| Not To Scale | **Typical Section** | US 421 Improvements<br>U-5312<br>Wilkes County | **Figure**<br>**2-3** |


| | | | |
|---|---|---|---|
| Not To Scale | **Build Alternative Photo Simulation** | US 421 Improvements<br>U-5312<br>Wilkes County | **Figure**<br>**2-4** |

10/30/2014

# 3.0 SOCIAL, ECONOMIC, AND ENVIRONMENTAL EFFECTS

## 3.1 COMMUNITY CHARACTERISTICS

The surrounding study area is primarily rural and suburban residential in the western half and commercial retail in the eastern half. The frontage on the study corridor itself is on fairly flat land, but the surrounding parts of the study area are hilly. The development along US 421 throughout the study area is primarily commercial, but there are a few residential properties as well. The commercial portion in the eastern half is characterized by big box retail stores, restaurants, auto sales and service businesses.

There are several churches in or near the study area. None are located directly on US 421, and impacts from this project are not anticipated.

## 3.2 POPULATION CHARACTERISTICS

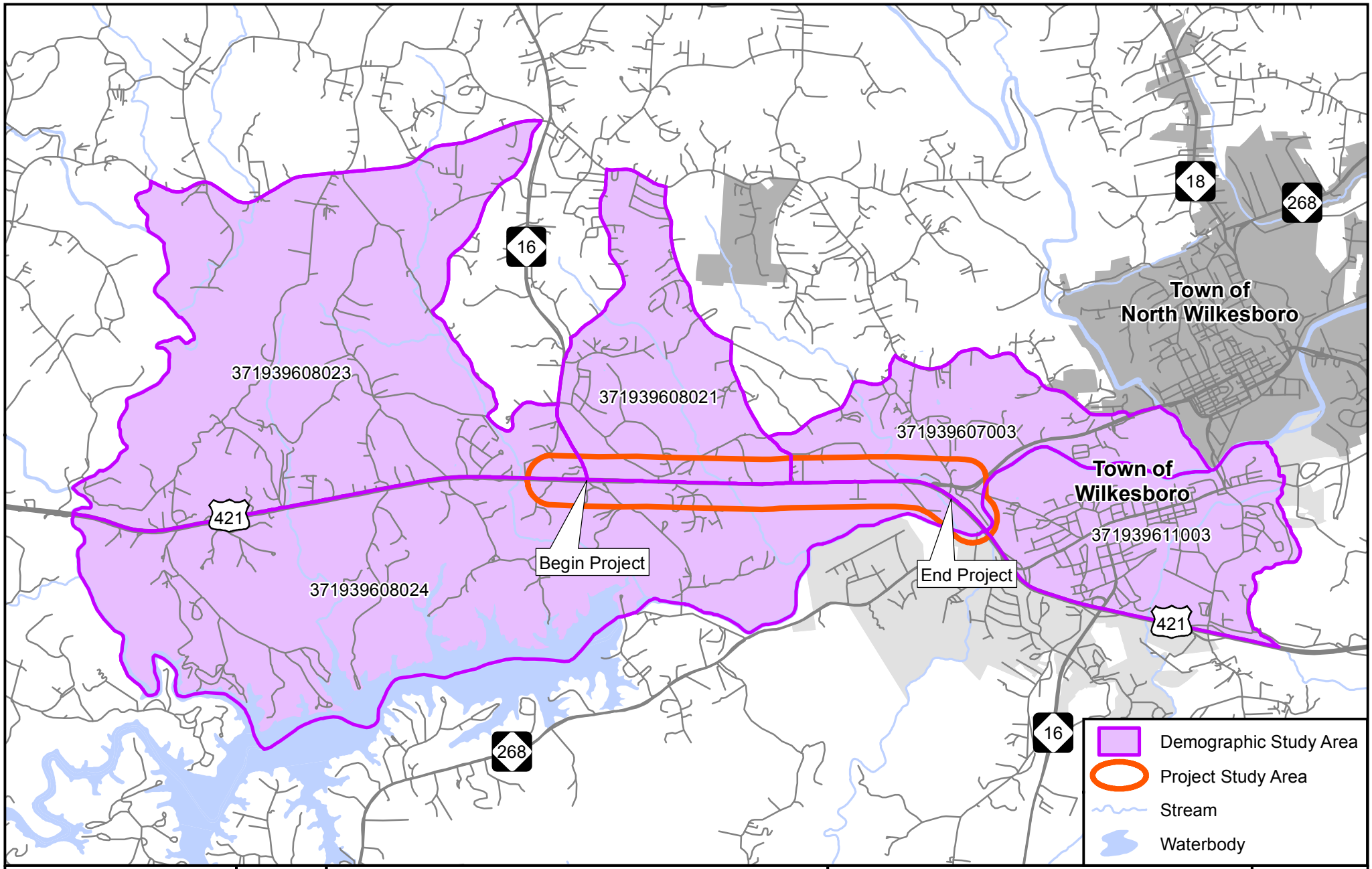
The Town of Wilkesboro is centrally located in the southern part of Wilkes County. The town is approximately 30 miles east of Boone in Watauga County, home to Appalachian State University. Wilkes County had a population of more than 69,000 in 2010. The county population grew by 5.6 percent from 2000 to 2010, while the state as a whole grew by 18.5 percent over that same period.

The Demographic Study Area is shown in Figure 3-1. The minority population in Census Tract 9607, Block Group 3 is 20.6 percent, which exceeds the county average (9.4 percent) by more than 10 percentage points. The percentage of Hispanic population in that block group (14.1 percent) is almost three times that of the county (5.4 percent). There are no impacts to minority populations.

There are no populations living in the study area that meet the criteria for Limited English Proficiency but does for Language Assistance for Spanish speaking populations.

## 3.3 LOCAL AND REGIONAL PLANS

The *Wilkesboro Tomorrow Comprehensive Plan* was adopted in March 2008. The plan references the *Thoroughfare Plan* for The Town of Wilkesboro and the Town of North Wilkesboro from 1993, which notes widening and alignment improvements scheduled for US 421 (see Section 1.4.5.2). The plan noted that improvements were scheduled to improve the level of service of US 421, a "major carrier of through traffic."




0 5,000 Feet

N

# Demographic Study Area

Data Sources: NCDOT; NC One Map; NCDENR-DWR; Wikes County; US Census

US 421 Improvements

U-5312

Wilkes County

**Figure 3-1**

10/30/2014

Wilkes County has plans to constuct a raw water intake, pipeline, etc. on the W. Kerr Scott Reservoir.

The Town of Wilkesboro has a zoning ordinance that covers the study area. Almost all of the US 421 frontage in the study area is zoned "B-2 – General Business," designating it for general commercial and retail use. The rest of the study area is mostly zoned "R-20 – Suburban Residential" and "R-20A – Residential/Agricultural," which are low to moderate density residential designations.

The High Country Council of Governments adopted the High Country Regional Bike Plan, which covers Wilkes County and the study area in addition to other counties and municipalities in the region. The plan was adopted in 2014. New Browns Ford Road is designated as a bike route and the plan calls for four-foot paved shoulders to the south of US 421 and five-foot paved shoulders to the north of US 421.

The 2007 *Town of Wilkesboro Pedestrian Plan* calls for two pedestrian improvements within the study area. One proposed improvement is for sidewalks to be built along Curtis Bridge Road and then extend along US 421 to Addison Avenue. The other proposed improvement is crosswalk improvements for the Addison Avenue and US 421 intersection.

## 3.4 INDIRECT EFFECTS

There is low concern for indirect and cumulative effects potential for this project. The proposed project is not expected to alter land use development. New traffic patterns at the US 421/US 421 Business intersection could result in increased exposure and access to the parcels to the south of this intersection. Water and sewer service exists and has available capacity in the study area.

There are development plans and regulations in place for growth in the study area. The Town of Wilkesboro and the Town of North Wilkesboro have zoning and future land use plans that cover the study area. Wilkes County and the Town of Wilkesboro have watershed protection ordinances that require riparian buffers for development taking place near water features. The study area is within WS-IV Critical and Protected Water Supply Watersheds, but there are plans to move the public water supply site, which would reduce the amount of water supply watershed area within the study area.

No additional indirect and cumulative effects studies are recommended as a result of this project.

## 3.5 CUMULATIVE EFFECTS

Minimal indirect effects as a result of this proposed project may occur in the form of increased commercial and residential development. Impacts to stormwater runoff and downstream water quality are not anticipated from any change in development patterns due to existing development regulations, policies, and stormwater runoff controls. The cumulative effect of this project, when considered in the context of other past, present, and future actions, and the resulting impact to notable human and natural features should be minimal.

## 3.6 TITLE VI AND ENVIRONMENTAL JUSTICE

The Build Alternative does not require any relocations and no specific neighborhoods or communities would be impacted.

No notably adverse community impacts are anticipated with this project; thus, impacts to minority and low-income populations are not disproportionately high or adverse. Benefits and burdens resulting from the project are anticipated to be equitably distributed throughout the community, and no denial of benefit is expected. Public involvement and outreach activities ensure full and fair participation of all potentially affected communities in the transportation decision-making process.

## 3.7 RELOCATIONS AND PROPERTY IMPACTS

There are no residential or business relocations with this project. Some businesses would lose parking because of expanded right-of-way. None of the parking loss would require the relocation of any of the businesses. One business property would lose direct access to US 421. A second access point to the business would remain along K Street.

## 3.8 ACCESSIBILITY

There are numerous access driveways in the study corridor and the corridor currently has no control of access. Some major commerical developments have signalized access. However, the vast majority of driveways on US 421 are uncontrolled. There are five signalized intersections in the corridor and many unsignalized intersections.

The addition of a median and superstreet intersections with the Build Alternative will alter access to properties located on US 421 by limiting left-in and left-out access. Instead, vehicles would be required to turn right and make a U-turn, or would need to continue straight, U-turn, and then turn right-in.

As previously mentioned under property impacts, one of two driveways to the Olive Garden/Red Lobster property would be removed because of the construction of a U-turn bulb out.

On the east end of the project, three intersections connect US 421, US 421 Business and Curtis Bridge Road and its extension. Their intersections are designed to operate as a single continuous flow intersection. The addition of access points would require integration with its operations. The area south of this intersection is one of the locations being considered for a new fire station so access is critical. As a result, two access points were planned for future operations. The westernmost of these access points would tie into the US 421/US 421 Business intersection and would accommodate a right-in, right-out movement, and dual left turns in. The median of US 421 would need to be altered to provide a dual-lane leftover movement into this site. The eastern access is located across from the US 421/Curtis Bridge Road Extension intersection and would provide a right-in and double lefts out of the property. US 421 would not require any alteration for this future access point.

While no development plans exist at this time, accommodating for future access with the project improvements may increase the exposure of these parcels.

Along the entire corridor, the proposed project is anticipated to change access by limiting left-in/left-out access to parcels that currently have full access driveways. This limit on access would be through the use of a median, resulting in left-overs and U-turn bulbs. While direct parcel access would be altered in some places, the overall impact to accessibility is anticipated to be moderately low.

The addition of a median and a network of superstreet intersections will reroute some left turn movements, permanently changing direct access patterns to businesses located along the project corridor; however, FHWA has completed extensive research showing that safe access is good for business and overall corridor efficiency.

During the construction phase, access to businesses could be disrupted or altered temporarily, with traffic diverted to other access points.

## 3.9 BICYCLE AND PEDESTRIAN CONSIDERATIONS

No bicycle activity on this portion of US 421 was evident during a site visit. There are three bike routes designated by Wilkes County in the study area, however. The Dam Loop runs in a loop from downtown Wilkesboro to the dam on the W. Kerr Scott Reservoir and uses portions of Congo Road, NC 16, New Browns Ford Road, and NC 268. The Southern Rendezvous Mountain route starts in downtown Wilkesboro and runs along Congo Road. The Lake Loop is a loop starting at the W. Kerr Scott Reservoir visitor center with a portion running along NC 16 and New

Browns Ford Road. There are no designated on- or off-road bicycle facilities within the study area.

## 3.10 EMERGENCY VEHICLE CONSIDERATIONS

### 3.10.1 Fire

According to local fire officials, a new fire station is proposed with two locations being considered. Both locations are along this section of US 421 – one behind the Lowes Hardware across from Dancy Road on the western end of the project; the other on the eastern end, on the Town owned property known as the Tyson shaving bend property to the south side of US 421 across from the intersection of US 421 and US 421 Business. Fire trucks would need easy access to both directions on US 421 from a new station location. Fire officials indicate that either fire station location would require a traffic device to allow emergency vehicle egress through the median without needing to travel to a U-turn point. Continued coordination with local fire officials is recommended.

### 3.10.2 EMS

According to the Wilkes County EMS Director, lane closure during construction would be a concern for the movement of emergency vehicles. EMS transports approximately three to five people per day to Winston Salem and construction delays could affect response times. Long-term impacts as a result of the superstreet are not anticipated by EMS officials.

## 3.11 CULTURAL RESOURCES

A historic architecture review was completed by a NCDOT architectural historian. It was determined on May 2, 2013 that a historic architecture and landscape survey was not required for this project (see Appendix A).

A NCDOT archaeologist completed an archaeology review. The archaeology review dated May 20, 2014 indicates that an archaeological survey was not required for this project (see Appendix A).

## 3.12 NATURAL ENVIRONMENT

### 3.12.1 Water Resources and Hydraulic Impacts

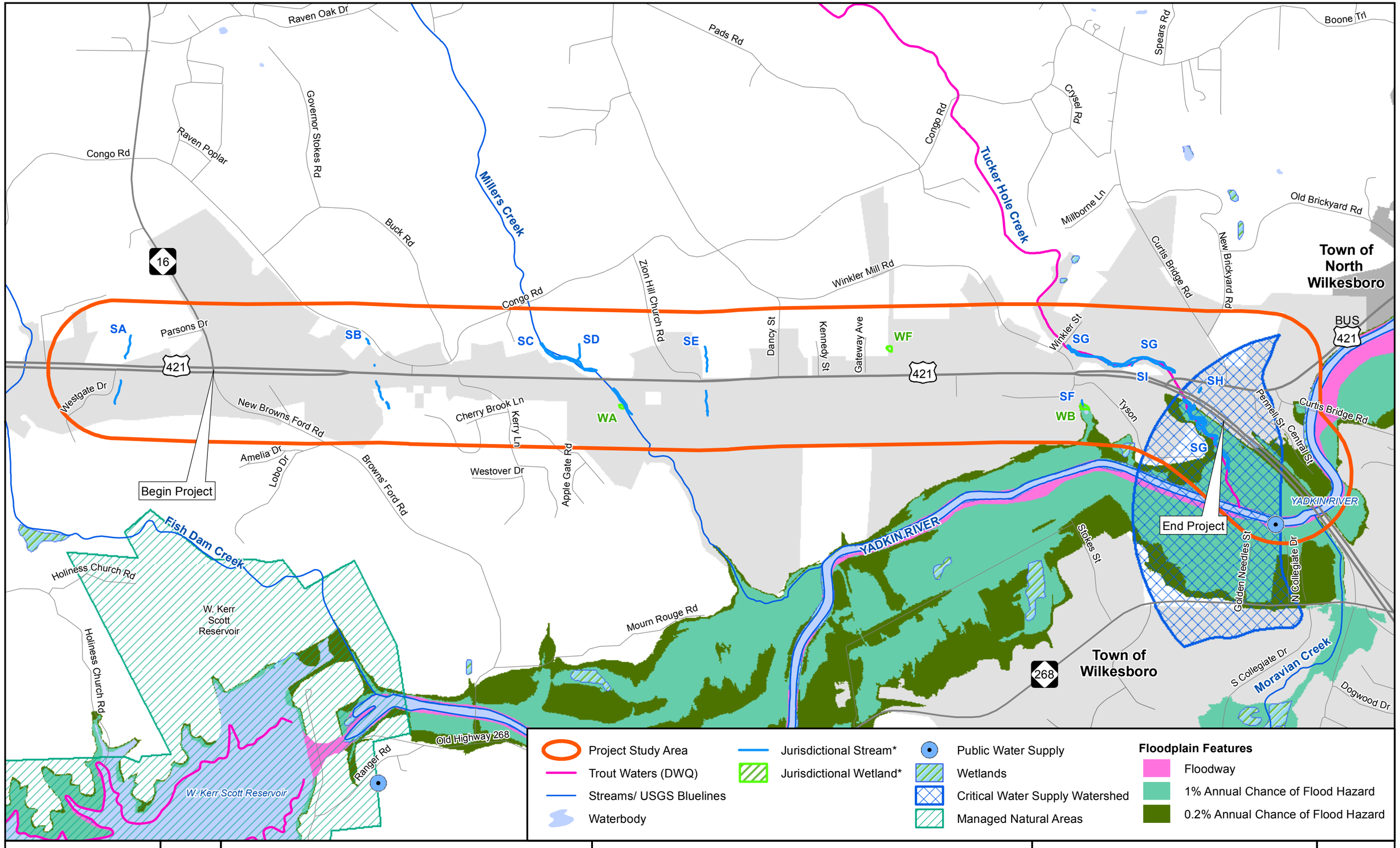
There are eight stream crossings (three major and five minor), all part of the Yadkin-Pee Dee River Basin, which were identified within the study area. One additional stream is identified as being in the study area but is not crossed by US 421. None of the streams are subject to any Buffer Rules. There are no waters within the study area that have been designated by the USCG as a Navigable Water under Section 10 of the Rivers and Harbors Act. Table 3-1 summarizes the

existing hydraulic structures at these crossings and the length of new stream impact that will result from this project. There would be 459 feet of additional stream impacts (based on slope stakes) as a result of widening the highway at six stream crossings; two existing stream crossings are not expected to be widened and thus would not create additional impact. Of that impact, 416 feet is to perennial stream and 43 feet is to intermittent stream.

**Table 3-1**
**Stream and Hydraulic Impacts**

| Stream Designation | Stream Name | Drainage Area | Existing Structure | Adequate? | Length of Stream Impact |
|---|---|---|---|---|---|
| **Major Stream Crossings** | | | | | |
| SB | UT to Yadkin River | 341 acres | 78″ CMP | Yes | 15 ft |
| SC | Millers Creek | 2.27 $mi^2$ | 2 @ 9′ x 11′ RCBC | Yes | 223 ft |
| SG | Tucker Hole Creek | 2.74 $mi^2$ | 2 @ 11′ x 11′ RCBC | Yes | 121 ft |
| **Minor Stream Crossings** | | | | | |
| SA | UT to Fish Dam Creek | 53 acres | 60″ CMP* | Yes | NA |
| SE | UT to Millers Creek | 147 acres | 60″ CMP | Yes | 43 ft |
| SF | UT to Yadkin River | 109 acres | 60″ CMP* | Yes | NA |
| SH | UT to Tucker Hole Creek | 72 acres | 66″ CMP | Yes | 35 ft |
| SI | UT to Tucker Hole Creek | 7 acres | 24″ CMP | Yes | 22 ft |

Two Section 404 jurisdictional wetlands were identified in the study area along with one non-Section 404 wetland. A preliminary jurisdictional determination has not been made by the US Army Corps of Engineers (USACE) and the North Carolina Department of Natural Resources – Division of Water Resources (NCDNR-DWR). However, no impact would result to any wetland from construction of this project. The streams and wetlands are shown on Figure 3-2.




0 1,200 Feet

N

## Wetlands, Streams and Floodplains

Data Sources: NCDOT; NC One Map; NCDENR-DWR; Wikes County; NC Floodmaps

* This information is from the Natural Resources Technical Report.
Field verified streams and wetlands are shown in the Project Study Area only.

US 421 Improvements
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Wilkes County

**Figure 3-2**

2/25/2015

Recent field review and preliminary hydraulic analysis indicates all hydraulic structures within the study area are hydraulically adequate and appear to be in good condition. The preliminary recommendation from NCDOT's Hydraulics Unit for all structures would be to retain and extend as necessary to accommodate the roadway footprint. These recommendations are preliminary and could be subject to change based on information obtained from a more detailed analysis during the final hydraulics design phase of the project.

There are no lakes or ponds within the study area. There are no designated High Quality Waters (HQW), Outstanding Resource Waters (ORW), or water supply watersheds (WS-I or WS-II) within one mile downstream of the study area.

A small eastern portion of the study area is located within the Yadkin River WS-IV Critical Water Supply Watershed. The remaining portion of the study area is within the Yadkin River WS-IV Protected Water Supply Watershed. WS-IV waters are used as sources of water supply for drinking, culinary, or food processing purposes. These waters are protected for Class C uses. WS-IV waters are generally in moderately to highly developed watersheds or Protected Areas.

Stream SG (Tucker Hole Creek) lies within one-half mile of the critical area of the water supply intake. Because the project will not be a major highway improvement, a hazardous spill basin at this crossing will not be warranted. Classifications of all streams are listed in the Natural Resources Technical Report (NRTR). NCDOT's Hydraulics Unit has noted that an existing storm water basin located on the south side of US 421 east of Kohl's Department Store appears to be lacking adequate maintenance by the owner. A 60-inch corrugated metal pipe (Stream SF) outlets to the site after crossing the road. The inlet end of this pipe is in a closed system beneath the shopping center to the north of US 421. Preliminary analysis indicates all existing stream crossing structures meet NCDOT's level of service requirements.

No streams in the study area are listed as impaired waters. There are no Wild and Scenic Rivers in the study area. The Yadkin River is, however, a state listed Natural and Scenic River, but is not impacted by the project. Impacts to the floodplain are discussed in Section 3.12.5.

### 3.12.2 Biotic Resources

The project is not anticipated to have much of an effect on these resources. The acres of terrestrial communities affected by the project are shown in Table 3-2. There would be 1.9 acres of forested communities affected with construction of the project based on slope stakes plus 25 feet.

**Table 3-2**
**Terrestrial Community Impacts**

| Terrestrial Community | Impact (acres) |
|---|---|
| Maintained and Disturbed Land | 2.4 |
| Impervious Surface | 1.8 |
| Mesic Mixed Hardwood Forest (Piedmont) | 1.5 |
| Mixed Pine / Hardwood Forest | 0.1 |
| Piedmont Alluvial Forest | 0.2 |
| Piedmont Levee Forest | 0.1 |

Note: Impact based on slope stakes plus 25 feet.

### 3.12.3 Wetland and Stream Mitigation

NCDOT has sought to avoid and minimize impacts to streams and wetlands to the greatest extent practicable. If mitigation is required it will be provided by the North Carolina Department of Environment and Natural Resources (NCDENR) Ecosystem Enhancement Program (EEP).

### 3.12.4 Threatened and Endangered Species

The U.S. Fish and Wildlife Service (USFWS) has identified one federally protected species (the bog turtle) for Wilkes County. The project is not expected to affect the bog turtle because no suitable habitat is present within the study area. Additionally, due to the lack of Bald Eagle occurrences within a 1.13 mile (1.0 mile plus 660 feet) radius of the project, it has been determined that this project will not affect this species.

A US Fish and Wildlife Service 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 will become effective on or before April 2015. Furthermore, this species is included in USFWS's current list of protected species for Wilkes 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. Construction authorization will not be requested until any pending coordination with the U.S. Fish and Wildlife Service concerning the Northern Long-eared Bat is complete.

### 3.12.5 Floodplains

The project limits do not include the Yadkin River to the east, which is in a Federal Emergency Management Agency (FEMA) detailed study. None of the stream crossings within the study area are within a FEMA flood zone. The proposed project would add fill to the floodplain (0.1 acre of 100-year floodplain and 0.2 acre of 500-year floodplain) of the Yadkin River, shown on Figure 3-2.

## 3.13 SECTION 4(F) AND SECTION 6(F) RESOURCES

There are no properties or areas protected under Section 4(f) that would be impacted by the project. There also are no areas that are protected under Section 6(f) Land and Water Conservation Fund Resources.

## 3.14 FARMLANDS

There are no impacts to farmlands with this proposed project. Coordination was conducted with the Natural Resources Conservation Service (NRCS) of the USDA and they confirmed that CPA-106 Farmland Conversion Impact Rating Form was not required.

## 3.15 TRAFFIC CAPACITY ANALYSIS

There are multiple commercial driveway intersections along the corridor that were not included in the forecast, and thus are not analyzed in the capacity analysis.

The traffic analysis results are discussed below and summarized in Table 3-3 and Figure 3-3.

### 3.15.1 Base-Year (2012) No-Build

The Base-Year (2012) Average Daily Traffic (ADT) on this section of US 421 ranges between 23,000 and 35,000 vehicles per day. While peak hour capacity analysis indicates that all analyzed signalized intersections along the corridor operate at overall acceptable levels of service (LOS) during both daily peak hours (AM and PM), the lowest operating movements at all intersections along the corridor currently operate at a LOS D or E. Analysis of the intersection of US 421 and Winkler Mill indicates that the westbound left-turn approach experiences queues greater than 900 feet during the PM peak hour.

### 3.15.2 Design-Year (2035) No-Build

Peak hour capacity analysis indicates that all analyzed signalized intersections along the corridor would continue to operate at acceptable LOS during daily peak hours, with slightly decreased operations in comparison to the Base-Year (2012) results. Four of the five analyzed intersections are expected to have at least one approach operating at LOS E during the peak hours, indicating

**Table 3-3**
**Traffic Capacity Analysis Results**

| Intersection | Traffic Control | Base Year (2012) No-Build | | Design Year (2035) No-Build | | Design Year (2035) Build | |
|---|---|---|---|---|---|---|---|
| | | AM | PM | AM | PM | AM | PM |
| US 421 and NC 16 | Signalized | C | C | C | C | See Figure 3-3 for LOS Results | |
| US 421 and Dancy Road/ Lowes Drive | Signalized | A | A | B | B | | |
| US 421 and WalMart/ Lowes Drive | Signalized | B | B | B | B | | |
| US 421 and Winkler Mill Road | Signalized | B | B | B | B | | |
| US 421 and US 421 Business | Signalized | B | C | C | C | | |

*LOS Results are reported for signalized intersections only and indicate overall LOS for that intersection.

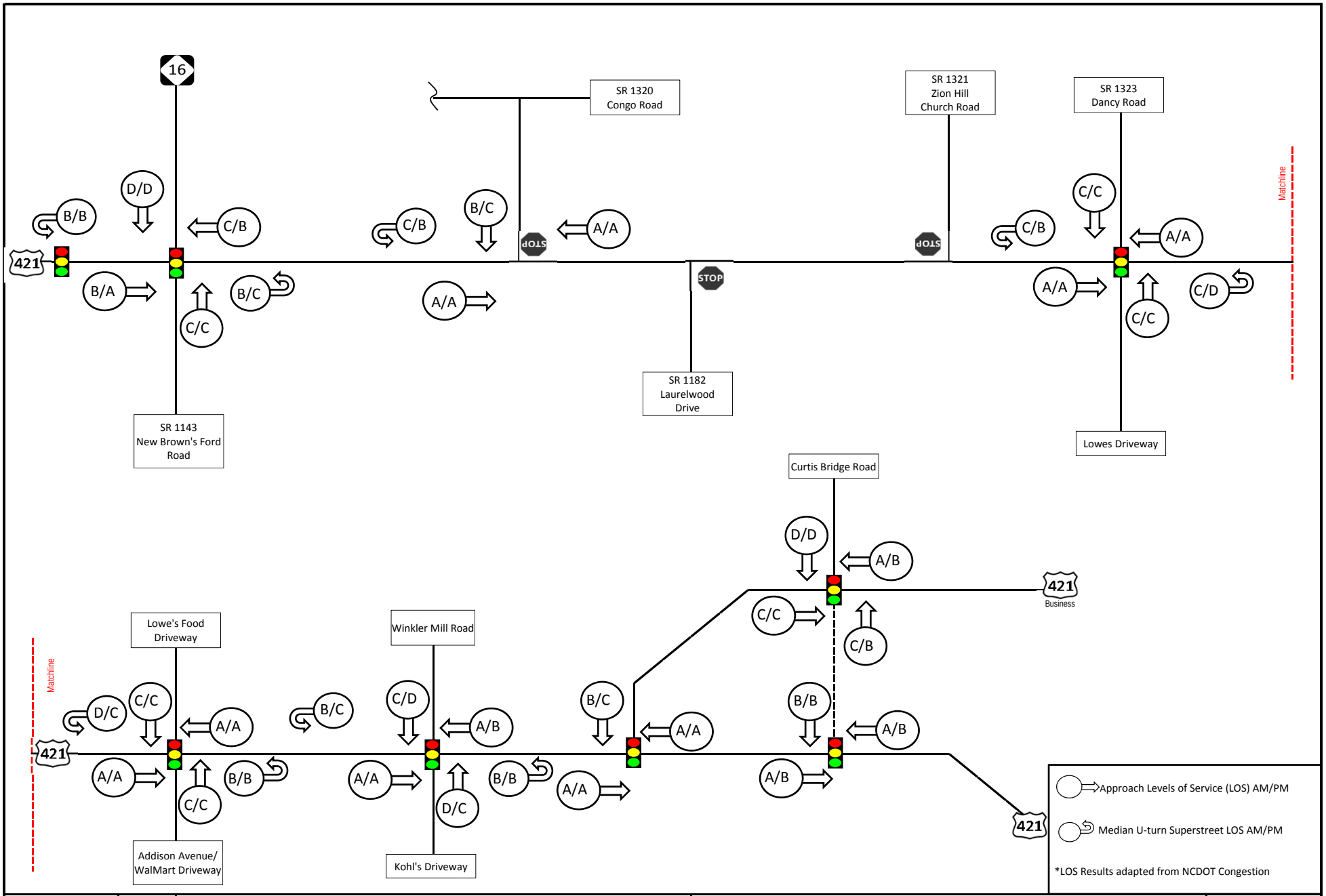
additional congestion and delay along the corridor due to increased volumes throughout the network.

### 3.15.3 Design-Year (2035) Build

The Design-Year (2035) ADT on this section of US 421 ranges between 29,000 and 41,000 vehicles per day. To provide continuity along the corridor, a four-lane median-divided network of superstreet intersections for US 421 from NC 16 to US 421 Business is recommended. This configuration is expected to operate at an arterial LOS B during the Design-Year (2035) peak hours with average speeds of 37 miles per hour or greater. All intersections and intersection approaches to the superstreet facility are expected to operate at LOS D or better with acceptable queuing in the Design-Year (2035) peak hours.

## 3.16 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 State or




| Not to Scale | Design Year (2035) Levels of Service | US 421 Improvements<br>U-5312<br>Wilkes County | Figure<br>3-3 |
|---|---|---|---|

Federal highway projects for construction of a highway or interchange on new location, improvements of an existing highway that substantially 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 (FHWA) and following procedures detailed in Title 23 CFR 772, the NCDOT Traffic Noise Abatement Policy 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. 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.

A copy of the unabridged version of the full Traffic Noise Analysis (TNA) document is on file at NCDOT and can be obtained through the Project Development & Environmental Analysis Unit, Century Center Building A, 1000 Birch Ridge Drive, Raleigh.

### 3.16.1 Traffic Noise Impacts and Noise Contours

The maximum number of receptors in the proposed project predicted to become impacted by future traffic noise is shown in Table 3-4. The table includes those receptors expected to experience traffic noise impacts by either approaching or exceeding the FHWA Noise Abatement Criteria (NAC) or by a substantial increase in exterior noise levels.

The maximum extent of the 71- and 66- dBA noise level contours measured from the center of the proposed roadway is 63 feet and 121 feet, respectively.

### 3.16.2 No-Build Alternative

The Traffic Noise Analysis also considered traffic noise impacts for the “No-Build" alternative. If the proposed project does not occur, five (5) receptors are predicted to experience traffic noise impacts and the future traffic noise levels will increase by approximately one (1) dBA. Based upon research, humans barely detect noise level changes of 2-3 dBA. A 5-dBA change is more readily noticeable. Therefore, most people working and living near the roadway will not notice this predicted increase.

**Table 3-4**
**Predicted Traffic Noise Impacts by Alternative***

| Alternative | Traffic Noise Impacts | | | |
|---|---|---|---|---|
| | Residential (NAC B) | Places of Worship/Schools, Parks, etc. (NAC C & D) | Businesses (NAC E) | Total |
| Existing | 2 | 0 | 0 | **2** |
| No-Build | 5 | 0 | 0 | **5** |
| Build | 6 | 0 | 0 | **6** |

*Per TNM2.5 and in accordance with 23 CFR Part 772

### 3.16.3 Traffic Noise Abatement Measures

Measures for reducing or eliminating the traffic noise impacts were considered for all impacted receptors in each alternative. The primary noise abatement measures evaluated for highway projects include highway alignment changes, traffic system management measures, establishment of buffer zones, noise barriers and noise insulation (NAC D only). For each of these measures, benefits versus costs (reasonableness), engineering feasibility, effectiveness and practicability and other factors were included in the noise abatement considerations.

Substantially changing the highway alignment to minimize noise impacts is not considered to be a viable option for this project due to engineering and/or environmental factors. Traffic system management measures are not considered viable for noise abatement due to the negative impact they would have on the capacity and level of service of the proposed roadway. Costs to acquire buffer zones for impacted receptors will exceed the NCDOT base dollar value of $37,500 plus an incremental increase of $525 (as defined in the NCDOT Policy) per benefited receptor, causing this abatement measure to be unreasonable.

### 3.16.4 Nosie Barriers

Noise barriers include two basic types: earthen berms and noise walls. These structures act to diffract, absorb, and reflect highway traffic noise.

This project will maintain uncontrolled right of way access, meaning that most noise-sensitive land uses will have direct access connections to the proposed project, and most intersections will adjoin the project at grade. The Traffic Noise Analysis for this project confirmed that the physical breaks in potential noise barriers that would occur due to the uncontrolled right of way access

would prohibit any noise barrier from providing the minimum required traffic noise level reductions at all predicted traffic noise impacts, as defined by the noise abatement measure feasibility criteria of the NCDOT Traffic Noise Abatement Policy.

### 3.16.5 Summary

Based on this preliminary study, traffic noise abatement is not recommended and no noise abatement measures are proposed. This evaluation 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 substantial change in the project's design concept or scope.

In accordance with NCDOT Traffic Noise Abatement Policy, the Federal/State governments are not responsible for providing noise abatement measures for new development for which building permits are issued after the Date of Public Knowledge. The Date of Public Knowledge of the proposed highway project will be the approval date of the Categorical Exclusion (CE). For development occurring after this date, local governing bodies are responsible to ensure that noise compatible designs are utilized along the proposed facility.

## 3.17 AIR QUALITY ANALYSIS

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 ($SO_2$), and lead (Pb) (listed in order of decreasing emission rate).

The Federal Clean Air Act of 1970 established the 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 ($SO_2$), particulate matter ($PM_{10}$, 10-micron and smaller, $PM_{2.5}$, 2.5 micron and smaller), carbon monoxide (CO), nitrogen dioxide ($NO_2$), ozone ($O_3$), 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 $NO_2$. 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.

A project-level air quality analysis was prepared for this project. A copy of the unabridged version of the full technical report entitled Air Quality Analysis, *US 421 Improvements from NC 16 to US 421 Business in Wilkes County* dated November 25, 2014 can be viewed at the Project Development & Environmental Analysis Unit, Century Center Building A, 1000 Birch Ridge Drive, Raleigh.

### 3.17.1 Attainment Status

The project is located in Wilkes County, which has been determined to comply with the National Ambient Air Quality Standards. The proposed project is located in an attainment area; therefore, 40 CFR Parts 51 and 93 are not applicable. This project is not anticipated to create any adverse effects on the air quality of this attainment area.

### 3.17.2 Mobile Source Air Toxics (MSAT)

*Background*

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the U.S. Environmental Protection Agency (EPA) regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007), and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS) ( http://www.epa.gov/iris/). In addition, EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA) (http://www.epa.gov/ttn/atw/nata1999/). These are acrolein, benzene, 1,3-butidiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules. The 2007 EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. Based on an FHWA analysis using EPA's MOVES2010b model, even if vehicle miles traveled (VMT) increases by 102 percent as assumed from 2010 to 2050, a combined reduction of 83 percent in the total annual emissions for the priority MSAT is projected for the same time period.

MSAT analyses are intended to capture the net change in emissions within an affected environment, defined as the transportation network affected by the project. The affected environment for MSATs may be different than the affected environment defined in the NEPA document for other environmental effects, such as noise or wetlands. Analyzing MSATs only within a geographically-defined "study area" will not capture the emissions effects of changes in

traffic on roadways outside of that area, which is particularly important where the project creates an alternative route or diverts traffic from one roadway class to another. At the other extreme, analyzing a metropolitan area's entire roadway network will result in emissions estimates for many roadway links not affected by the project, diluting the results of the analysis.

*Incomplete or Unavailable Information for Project Specific MSAT Health Impact Analysis*

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 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, 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 (www.epa.gov/risk/basicinfor mation. 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 1 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 1 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.

*MSAT Conclusion*

The science of mobile source air toxics is still evolving. As the science progresses, FHWA will continue to revise and update this guidance. FHWA is working with stakeholders, EPA and others to better understand the strengths and weaknesses of developing analysis tools and the applicability on the project level decision documentation process.

### 3.17.3 Summary

Vehicles are a major contributor to decreased air quality because they emit a variety of pollutants into the air. Changing traffic patterns are a primary concern when determining the impact of a new highway facility or the improvement of an existing highway facility. 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. Substantial progress has been made in reducing criteria pollutant emissions from motor vehicles and improving air quality, even as vehicle travel has increased rapidly.

Based on the air quality analysis completed for the proposed improvements, the US 421 Improvements project would not contribute to any violation of the NAAQS or result in any increases in MSATs. Therefore, it is not anticipated to create any adverse air quality effects.

## 3.18 HAZARDOUS MATERIALS AND UNDERGROUND STORAGE TANKS

Fifteen (15) UST facilities were identified within the study area. All 15 sites are anticipated to be low risk. The preliminary design of the project does not affect any of these sites. Field verification of the hazardous waste sites and identification of unknown sites will be performed during final design.

## 3.19 UTILITIES

There are several utilities that are located within the project area. Relocation of gas, electric, telephone, CATV, water, and sewer lines will be required with this project. The total estimated cost of the utility relocation is $4.4 Million ($3.6 Million of which is for water and sewer lines, $0.8 Million is for power lines).

### 3.19.1 Electric Power Transmission

Duke Energy has distribution lines within the project area. They have an aerial 250KV transmission line that crosses over US 421 just east of New Browns Ford Road. There would be no impact to this transmission line. There would be power poles relocated at various other locations along the project.

### 3.19.2 Water and Sewer Facilities

West Wilkes Water Works has a two inch PVC water line buried at Westgate Drive. The Town of Wilkesboro has an eight inch force main sewer line, an eight inch gravity sewer line, and an eight inch PVC line that runs within the project area. Water and sewer lines will be impacted at certain locations along the corridor.

### 3.19.3 Natural Gas Service and Other Pipelines

Frontier Natural Gas has a 16-inch steel and a 10-inch plastic line, both buried, that run throughout the project area. No impacts to these pipelines are anticipated.

### 3.19.4 Communications/Fiber Optic

Charter Communications and CenturyLink each have aerial facilities on Duke Energy's poles. CenturyLink has buried Fiber Optic on the north side of US 421. Some of Duke Energy's power poles will need to be relocated as mentioned in Section 3.19.1, therefore some communication lines may be temporarily affected.

## 3.20 PERMITS

A US Army Corp of Engineers (USACE) Nationwide Permit (NWP) 23 will be applicable for the construction of this project. NWP 23 covers all actions included in the approved CE document. Any activities not mentioned in the CE are temporary impacts that would be covered by a NWP 33 (Permit for Temporary Construction, Access, and Dewatering) as needed. The USACE holds the final discretion as to what permit will be required to authorize project construction. If a Section 404 permit is required then a Section 401 Water Quality Certification (WQC) from the NCDWR will be needed.

## 3.21 COST ESTIMATES

Preliminary construction cost estimates were developed for the Build Alternative from the preliminary designs. Three cost components were included in the total estimated cost, including right-of-way acquisition, utility relocations and construction costs. The estimated cost of each component is; right-of-way $2.6 million; utility relocation $4.4 million; and construction

$18.2 million. The total project cost estimate is $25.2 million. The most recent Draft STIP shows a cost estimate of $34.5 million, $30 million for construction and $4.5 million for utility relocation.

## 3.22 CONSTRUCTION IMPACTS

NCDOT Best Management Practices for Construction and Maintenance Activities will be adhered to during construction to minimize potential adverse effects caused by construction.

## 3.23 SUMMARY OF IMPACTS

The impacts as a result of this project are not expected to be significantly adverse. Table 3-5 lists the engineering factors and anticipated environmental impacts associated with the Build Alternative. These factors and impacts are based on the preliminary roadway designs.

**Table 3-5**
**Engineering and Environmental Evaluation Factors**

| Evaluation Factor | Build Alternative |
|---|---|
| Traffic Volumes (2035 ADT) | 29,000 – 41,000 |
| Relocations (Residences, Businesses, and Churches) | 0 |
| Cemeteries | 0 |
| Access Changes | One business would lose one of two access points; all businesses would be accessed by right-in, right-out, with some left-over in |
| Parking Impacts | 28 spaces lost from five locations |
| Traffic Noise Impacts (affected properties) | 6 (no mitigation recommended) |
| Stream Crossings – number[1] | 8 existing crossings/6 impacted by extending culverts |
| Stream Crossings – linear feet[2] | 459 |
| Major Drainage Structures (≥72″ Dia.) | 3 total extensions (2 @ 9′ X 11′ RCBC, 2@ 11′ X 11′ RCBC, and 1 78″ CMP) |
| Floodplain Encroachment - # of Regulatory Floodways Impacted[2] | 0 |
| Floodplain Encroachment – acres of 100-year Floodplain Impacted[2] | 0.1 |
| Floodplain Encroachment – acres of 500-year Floodplain Impacted[2] | 0.2 |
| Forested Communities – acres [3] | 1.9 |
| Prime, Unique, and Locally Important Farmlands – acres | 0 |
| Wetlands – acres[3] | 0 |
| Historic Architectural Sites | 0 |
| Archaeological Sites | 0 |
| Hazardous Material Sites | 0 |
| Construction Cost | $18.2 Million |
| Right of Way Cost | $2.6 Million |
| Utilities Cost | $4.4 Million |
| **Total Cost** | **$25.2 Million** |

[1]9 Streams in Study Area; 8 Streams cross US 421; 6 Streams impacted by culvert extensions
[2]Based on Slope Stakes
[3]Based on Slope Stakes plus 25 feet

# 4.0 COMMENTS AND COORDINATION

## 4.1 PUBLIC INVOLVEMENT

### 4.1.1 Mailing List

All property owners within the study area were added to a mailing list that was used to send out meeting notices and a newsletter. After each public meeting or communication from the public, the mailing list was updated to account for all interested parties. The mailing list contains approximately 400 names.

### 4.1.2 Newsletters

Approximately 400 copies of the newsletter were mailed in December 2013 to property owners within the study area. The newsletter contained information about the study process and schedule, the purpose and need of the project, project contacts, and public meeting locations and times.

### 4.1.3 Local Officials Meeting

A Local Officials Meeting was held at the Wilkesboro Town Hall on January 14, 2014. More than 20 people attended, including the Mayor of Wilkesboro and all Town Councilmen. The purpose of the meeting was to inform local officials about the project, to convey a conceptual understanding of the superstreet intersection design, and to receive input. The map showing the proposed project was on display and a traffic simulation was shown to visually identify how a superstreet intersection would operate. Project representatives were on hand to answer questions following the presentation. There were questions about accident history that were answered and there was general support for the project.

### 4.1.4 Public Meeting

A Public Meeting was held at the Wilkes County Civic Center on January 14, 2014. The purpose of the meeting was to inform attendees about the project, to convey a conceptual understanding of the superstreet intersection design, and to receive input from the public. In one room, a presentation explaining the superstreet intersection and project details, such as schedule and cost, was given continuously throughout the public meeting. In a separate room, three maps showing the superstreet intersection concepts for the project were on display for the public. A traffic simulation was shown so the public could visually understand how the proposed superstreet intersections would operate. Project representatives were on hand to answer questions in both rooms.

The superstreet concept was generally well received by those in attendance. People who spoke at the meeting were in general agreement that there is a problem along the project corridor that needs to be addressed. Most verbal comments indicated that the public is in favor of the superstreet design, though some comments showed concern about access to and from particular sites along the corridor. Many citizens did express concern about the superstreet intersection at the intersection of NC 16 and US 421, noting that NC 16 carries a level of traffic that some meeting attendees do not believe would work well with a superstreet intersection. The majority of those commenting about this intersection lived along NC 16.

# 5.0 CONCLUSION

On the basis of planning and environmental studies, it is concluded that no substantial adverse environmental impacts will result from the implementation of this project. The project is therefore considered to be a Categorical Exclusion due to its limited scope and lack of substantial environmental consequences.

# APPENDICES

# APPENDIX A:

# Agency Coordination

Historic Architecture Review

Archaeological Review

# HISTORIC ARCHICTECTURE AND LANDSCAPES NO SURVEY REQUIRED FORM

This form only pertains to Historic Architecture and Landscapes for this project. It is not valid for Archaeological Resources. You must consult separately with the Archaeology Group.

## PROJECT INFORMATION

| | | | |
|---|---|---|---|
| ***Project No***: | U-5312 | ***County***: | Wilkes |
| ***WBS No.***: | 45446.1.1 | ***Document Type***: | |
| ***Fed. Aid No***: | | ***Funding***: | ☐ State ☒ Federal |
| ***Federal Permit(s):*** | ☒ Yes ☐ No | ***Permit Type(s)***: | NWP 14 |

***Project Description***:
Improve US 421 from NC 16 to US 421 bridge over Yadkin River in Wilkesboro

## SUMMARY OF HISTORIC ARCHICTECTURE AND LANDSCAPES REVIEW

***Description of review activities, results, and conclusions***:
Review of HPO quad maps, relevant background reports, historic designations roster, and indexes was undertaken on May 2, 2013. Based on this review there are no NR, DE, LL, SL, or SS in the project area. There is one identified historic site (WK 272 Parson House) indicated on the HPO GIS map but it was determine not eligible in 2006. According to Wilkes County Tax Data there are no ot her p rimary structures that are greater than 50 years of age in the APE. There are no other National Register eligible structures in the APE of this project.

***Why the available information provides a reliable basis for reasonably predicting that there are no unidentified significant historic architectural or landscape resources in the project area***:
Using HPO GIS website and the Wilkes County GIS Tax Data website provides reliable information regarding the structures in the APE. These combined utilities are considered valid for the purposes of determining the likelihood of historic resources being present.

## SUPPORT DOCUMENTATION

☒Map(s) ☐Previous Survey Info. ☐Photos ☐Correspondence ☐Design Plans

## FINDING BY NCDOT ARCHITECTURAL HISTORIAN

Historic Architecture and Landscapes -- NO SURVEY REQUIRED

Shelby Spiller — May 2, 2013

NCDOT Architectural Historian — Date

**13-04-0040**

# NO ARCHAEOLOGICAL SURVEY REQUIRED FORM

This form only pertains to ARCHAEOLOGICAL RESOURCES for this project. It is not valid for Historic Architecture and Landscapes. You must consult separately with the Historic Architecture and Landscapes Group.

## PROJECT INFORMATION

| | | | |
|---|---|---|---|
| *Project No:* | **U-5312** | *County:* | **Wilkes** |
| *WBS No:* | **45446.1.1** | *Document:* | **CATEGORICAL EXCLUSION** |
| *F.A. No:* | **NHS-042(72)** | *Funding:* | ☐ State ☒ Federal |

*Federal Permit Required?* ☒ Yes ☐ No *Permit Type:* **NWP 14**

***Project Description:*** Improve US 421 for 3-mile segment from NC 16 to US 421 Business in Wilkes County including adding 30 ft. median, superstreet designs and possible widening. Area of Potential Effects (A.P.E.) is approximately 4.8 kilometers (3 miles) long and 60 meters (200 ft.) wide. No design plans provided. Federally-funded; will require Federal permits; will require temporary and/or permanent easements for construction and drainage.

## SUMMARY OF CULTURAL RESOURCES REVIEW

***Brief description of review activities, results of review, and conclusions:***
see attached

***Brief Explanation of why the available information provides a reliable basis for reasonably predicting that there are no unidentified historic properties in the APE:***
See attached.

## SUPPORT DOCUMENTATION

See attached: ☒ Map(s) ☐ Previous Survey Info ☒ Photos ☐ Correspondence ☐ Photocopy of County Survey Notes Other:

## FINDING BY NCDOT ARCHAEOLOGIST

*NO ARCHAEOLOGY SURVEY REQUIRED*

Caleb Smith 5/20/2014

NCDOT ARCHAEOLOGIST II Date

# APPENDIX B:

# Relocation Report

Relocation Report

# EIS RELOCATION REPORT

**North Carolina Department of Transportation**
**RELOCATION ASSISTANCE PROGRAM**

☒ E.I.S. ☐ CORRIDOR ☐ DESIGN

| | | | | | |
|---|---|---|---|---|---|
| WBS ELEMENT: | 454461.1 | COUNTY | Wilkes | Alternate 1 of 1 Alternate | |
| T.I.P. NO.: | U-5312 | | | | |
| DESCRIPTION OF PROJECT: | US-421 from SR-1226, Westgate Drive to the Yadkin River | | | | |

## ESTIMATED DISPLACEES

| Type of Displacees | Owners | Tenants | Total | Minorities |
|---|---|---|---|---|
| Residential | 0 | 0 | 0 | 0 |
| Businesses | 0 | 0 | 0 | 0 |
| Farms | 0 | 0 | 0 | 0 |
| Non-Profit | 0 | 0 | 0 | 0 |

## INCOME LEVEL

| 0-15M | 15-25M | 25-35M | 35-50M | 50 UP |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 |

### VALUE OF DWELLING

| Owners | | Tenants | |
|---|---|---|---|
| 0-20M | 0 | $ 0-150 | 0 |
| 20-40M | 0 | 150-250 | 0 |
| 40-70M | 0 | 250-400 | 0 |
| 70-100M | 0 | 400-600 | 0 |
| 100 UP | 0 | 600 UP | 0 |
| TOTAL | 0 | | 0 |

### DSS DWELLING AVAILABLE

| For Sale | | For Rent | |
|---|---|---|---|
| 0-20M | 0 | $ 0-150 | 0 |
| 20-40M | 0 | 150-250 | 0 |
| 40-70M | 0 | 250-400 | 0 |
| 70-100M | 0 | 400-600 | 0 |
| 100 UP | 0 | 600 UP | 0 |
| | 0 | | 0 |

## ANSWER ALL QUESTIONS

| Yes | No | Explain all "YES" answers. |
|---|---|---|
| | x | 1. Will special relocation services be necessary? |
| | x | 2. Will schools or churches be affected by displacement? |
| x | | 3. Will business services still be available after project? |
| | x | 4. Will any business be displaced? If so, indicate size, type, estimated number of employees, minorities, etc. |
| | x | 5. Will relocation cause a housing shortage? |
| x | | 6. Source for available housing (list). |
| | x | 7. Will additional housing programs be needed? |
| x | | 8. Should Last Resort Housing be considered? |
| | x | 9. Are there large, disabled, elderly, etc. families? |
| | x | 10. Will public housing be needed for project? |
| x | | 11. Is public housing available? |
| x | | 12. Is it felt there will be adequate DSS housing housing available during relocation period? |
| | x | 13. Will there be a problem of housing within financial means? |
| x | | 14. Are suitable business sites available (list source). |
| | | 15. Number months estimated to complete RELOCATION? **18 mos.** |

## REMARKS (Respond by Number)

**3. Businesses will continue to operate**

**5. The plans that were submitted for the EIS study did not indicate residential or business relocatees. In case of plan changes there is enough replacement properties for housing and businesses. There are some miscellaneous items that have to be relocated but will be handled accordingly.**

**6. MLS Services, local realtors, newspapers, etc…**

**8. As mandated by law if needed.**

**11. Housing Authority is available in this area.**

**14. Source same as for available housing on No. 6. Also indicates sufficient business properties will be available.**

**NEGATIVE REPORT**

| | | | |
|---|---|---|---|
| Daneil S. Miles | 10/13/14 | | 10/15/14 |
| Daneil S. Miles<br>Division Right of Way Agent | Date | Relocation Coordinator | Date |

FRM15-E
Revised 7/7/14