

**Access 540**

**STIP Project Number R-2635D  
WBS Number 35520.1.FS3**

Proposed Interchange at the Triangle Expressway (Toll NC 540)  
and Old Holly Springs-Apex Road (SR 1153)  
Wake County

ADMINISTRATIVE ACTION

STATE ENVIRONMENTAL ASSESSMENT/  
FINDING OF NO SIGNIFICANT IMPACT

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS**

Submitted pursuant to the North Carolina State Environmental Policy Act



APPROVED:

3-18-2015

Date

A handwritten signature in blue ink, appearing to read "Richard W. Hancock".

Richard W. Hancock, PE  
Unit Head

Project Development and Environmental Analysis Unit, NCDOT

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March 2015

Documentation prepared for the Project Development and Environmental Analysis Unit:

3.18.2015

Date

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**PROJECT COMMITMENTS****Access 540**

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Wake County

March 2015

The following special commitments have been agreed to by NCDOT

**Division 5 Construction**

- NCDOT will evaluate options to minimize disruptions to bicycle mobility along Old Holly Springs-Apex Road during construction.

**Transportation Program Management**

- NCDOT will coordinate with the Town of Apex to prepare a municipal agreement for the construction of a sidewalk along Old Holly Springs-Apex Road.
- 2:1 slopes will be utilized in jurisdictional wetland fill areas.

## Table of Contents

1.0	General Description .....	1
1.1	Project Setting.....	1
2.0	Purpose of and Need for Action .....	4
2.1	Study Area.....	4
2.2	Project Needs.....	4
2.3	Project Purpose.....	8
2.4	Project Description.....	8
2.4.1	Setting and Land Use .....	8
2.4.2	Project History.....	8
2.4.3	System Linkage.....	9
2.4.4	Social and Economic Conditions .....	10
2.4.5	Transportation Planning .....	11
3.0	Alternatives.....	13
3.1	Project Logical Termini and Independent Utility .....	13
3.2	Preliminary Study Alternatives .....	13
3.2.1	No-Build Alternative.....	13
3.2.2	Alternative Modes of Transportation .....	13
3.2.3	Transportation Systems Management.....	14
3.2.4	Build Alternatives.....	14
3.3	Detailed Study Alternative .....	17
3.4	Traffic Forecast and Traffic Capacity Analysis.....	19
3.4.1	Traffic Forecast.....	19
3.4.2	Traffic Capacity Analysis.....	19
3.5	Recommended Alternative .....	20
3.6	Cost Estimates.....	22
4.0	Proposed Improvements .....	23
4.1	Roadway Typical Section.....	23
4.2	Right-of-Way and Access Control .....	23
4.3	Intersections and Interchanges.....	23
4.3.1	Phased Construction .....	25
4.4	Bicycle and Pedestrian Facilities .....	25
4.5	Utilities .....	25
5.0	Environmental Effects of Proposed Action .....	26
5.1	Natural Resources.....	26
5.1.1	Water Resources .....	27
5.1.2	Biotic Resources .....	34
5.1.3	Endangered Species Act Protected Species .....	35
5.2	Hydrology and Drainage .....	36
5.3	Cultural Resources .....	37
5.3.1	Historic Architectural Resources.....	37
5.3.2	Archaeological Resources .....	37
5.4	Parks, Recreational Areas, and Wildlife and Waterfowl Refuges .....	37
5.5	Farmland .....	37
5.6	Social Effects .....	37
5.6.1	Neighborhoods and Communities .....	37

5.6.2 Environmental Justice ..... 38

5.6.3 Limited English Proficiency ..... 38

5.6.4 Visual Impacts ..... 38

5.6.5 Economic Effects ..... 38

5.7 Land Use..... 38

5.8 Indirect and Cumulative Effects ..... 39

5.9 Traffic Noise Analysis ..... 40

5.10 Air Quality Analysis ..... 40

5.10.1 Introduction ..... 40

5.10.2 Attainment Status ..... 41

5.10.3 Carbon Monoxide Hot-Spot Analysis ..... 41

5.10.4 Mobile Source Air Toxics (MSAT) ..... 42

5.10.5 Summary ..... 44

5.11 Hazardous Materials ..... 45

5.12 Construction Impacts ..... 45

5.12.1 Air Quality ..... 45

5.12.2 Noise ..... 45

5.12.3 Water Quality ..... 46

5.12.4 Maintenance of Traffic..... 46

5.12.5 Construction Materials and Waste ..... 46

5.13 Summary of Impacts ..... 47

6.0 Stakeholder Involvement..... 48

6.1 Agency Coordination..... 48

6.2 Project Website..... 48

6.3 Newsletter..... 48

6.4 Local Officials Meeting and Public Meeting..... 49

7.0 Basis for Finding of No Significant Impact ..... 52

8.0 References ..... 53

**List of Figures**

Figure 1-1 Project Vicinity ..... 3

Figure 2-1 Project Study Area & Environmental Features..... 5

Figure 2-2 2010 AADT No-Build..... 6

Figure 2-3 2035 AADT No-Build..... 7

Figure 3-1 Interchange Alternatives ..... 15

Figure 3-2 Recommended Alternative..... 18

Figure 3-3 2035 Ultimate Design Laneage and LOS..... 21

Figure 4-1 Roadway Typical Section – Ultimate Bridge Old Holly Springs-Apex Road ..... 24

Figures 5-1 through 5-4 Water Resources ..... 29-32

**List of Tables**

Table 2-1 Nearby STIP Projects.....12

Table 3-1 2035 Intersection & Freeway Analysis Results.....20

Table 5-1 Water Resources in the Study Area.....27

Table 5-2 Jurisdictional Characteristics of Water Resources in the Study Area.....27

Table 5-3 Jurisdictional Characteristics of Wetlands in the Study Area.....28

Table 5-4 Impacts to Jurisdictional Streams.....33

Table 5-5 Impacts to Jurisdictional Wetlands.....33

Table 5-6 Coverage of Terrestrial Communities in the Study Area.....34

Table 5-7 Biological Conclusions for Federally Protected Species Listed for Wake County.....36

Table 5-8 Highest Modeled CO Concentrations.....42

Table 5-9 Summary of Impacts.....47

**Appendices**

Appendix A – Agency Coordination

Appendix B – Public Involvement Materials

## **Access 540**

### **STIP Project Number R-2635D**

#### **WBS Number 35520.1.FS3**

Proposed Interchange at the Triangle Expressway (Toll NC 540)  
and Old Holly Springs-Apex Road (SR 1153)  
Wake County

## **Summary**

### 1. Type of Action

This is a State Environmental Assessment/Finding of No Significant Impact (EA/FONSI).

### 2. Description of Proposed Action

North Carolina Department of Transportation (NCDOT) State Transportation Improvement Program (STIP) Project No. R-2635D (referred to herein as the "Access 540" project) is the conversion of the grade separation at the Triangle Expressway (Toll NC 540) and Old Holly Springs-Apex Road (SR 1153) to an interchange. The project also includes the conversion of the existing outside shoulders along the Triangle Expressway – between the NC 55 Bypass and US 1 – to auxiliary lanes and the construction of new shoulders.

### 3. Project Benefits

The proposed project would have a positive overall impact by providing improved access and enhanced roadway linkage in response to planned and anticipated growth in southern Apex.

### 4. Summary of Environmental Effects

No residential or business relocations are anticipated due to the Access 540 project. Land uses in the area would not be adversely impacted. There are no historic architectural or archaeological resources that would be impacted. No parks, recreational facilities, wildlife or waterfowl refuges would be impacted. No effects on federally protected plant or animal species are expected. There would be approximately 0.12 acres of wetland impacts, 738 feet of stream impacts and 2.96 acres of pond impacts as a result of the proposed improvements. There would be no traffic noise impacts. The project would not have an adverse effect on air quality. No adverse impacts to the community or environmental justice populations are expected.

### 5. Anticipated Permits

An Individual Section 404 Permit issued by the US Army Corps of Engineers and a 401 Water Quality Certification issued by the NC Department of Environment and Natural Resources, Division of Water Resources are anticipated to be required for this project.

6. Coordination

Several federal, state, and local agencies were consulted during the preparation of this document.

Comments were provided by the following agencies:

- Federal Highway Administration
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- N.C. Wildlife Resources Commission
- N.C. Division of Coastal Management
- N.C. Division of Water Resources
- N.C. Department of Cultural Resources – State Historic Preservation Office
- Town of Apex
- Town of Holly Springs
- Wake County

7. Additional Information

Additional information concerning the proposed project and assessment can be obtained by contacting:

- Jennifer Harris, PE
- Western Region/Turnpike Project Development Section Head
- Project Development and Environmental Analysis Unit
- North Carolina Department of Transportation
- 1548 Mail Service Center
- Raleigh, NC 27699-1548
- Telephone: (919) 707-6025

## **Access 540**

### **STIP Project Number R-2635D**

#### **WBS Number 35520.1.FS3**

Proposed Interchange at the Triangle Expressway (Toll NC 540)  
and Old Holly Springs-Apex Road (SR 1153)  
Wake County

## **1.0 General Description**

North Carolina Department of Transportation (NCDOT) State Transportation Improvement Program (STIP) Project No. R-2635D (referred to herein as the “Access 540” project) is the conversion of the grade separation at the Triangle Expressway (Toll NC 540) and Old Holly Springs-Apex Road (SR 1153) to an interchange. The project also includes conversion of the existing outside shoulders along the Triangle Expressway – between the NC 55 Bypass and US 1 – to auxiliary lanes and the construction of new shoulders. Located in southwestern Wake County, Old Holly Springs-Apex Road is currently a two-lane undivided roadway with a grade-separated crossing and no direct access to Triangle Expressway. Due to the current lack of direct access, as well as forecasted growth of traffic as a result of continuing residential growth and the planned Veridea development utilizing Old Holly Springs-Apex Road, NCDOT proposes to provide an additional interchange on the Triangle Expressway for vehicles to obtain direct access to and from Old Holly Springs-Apex Road. Veridea is a proposed approximately 1,000-acre mixed-use development expected to have 10 million square feet of office, 3.5 million square feet of retail and approximately 2 million square feet of manufacturing space, in addition to 8,000 residential units at build-out. The Access 540 project would provide an important access point to the Triangle Expressway from Old Holly Springs-Apex Road, and would enhance the interconnectivity of the roadway system and provide additional transportation options. The purpose of the proposed project is to provide improved access and enhanced roadway linkage in response to planned and anticipated growth in southern Apex.

This environmental document has been prepared in accordance with the North Carolina State Environmental Policy Act of 1971 (SEPA) and is intended for use by both decision makers and the public. It includes the disclosure of relevant environmental information regarding the proposed project.

## **1.1 Project Setting**

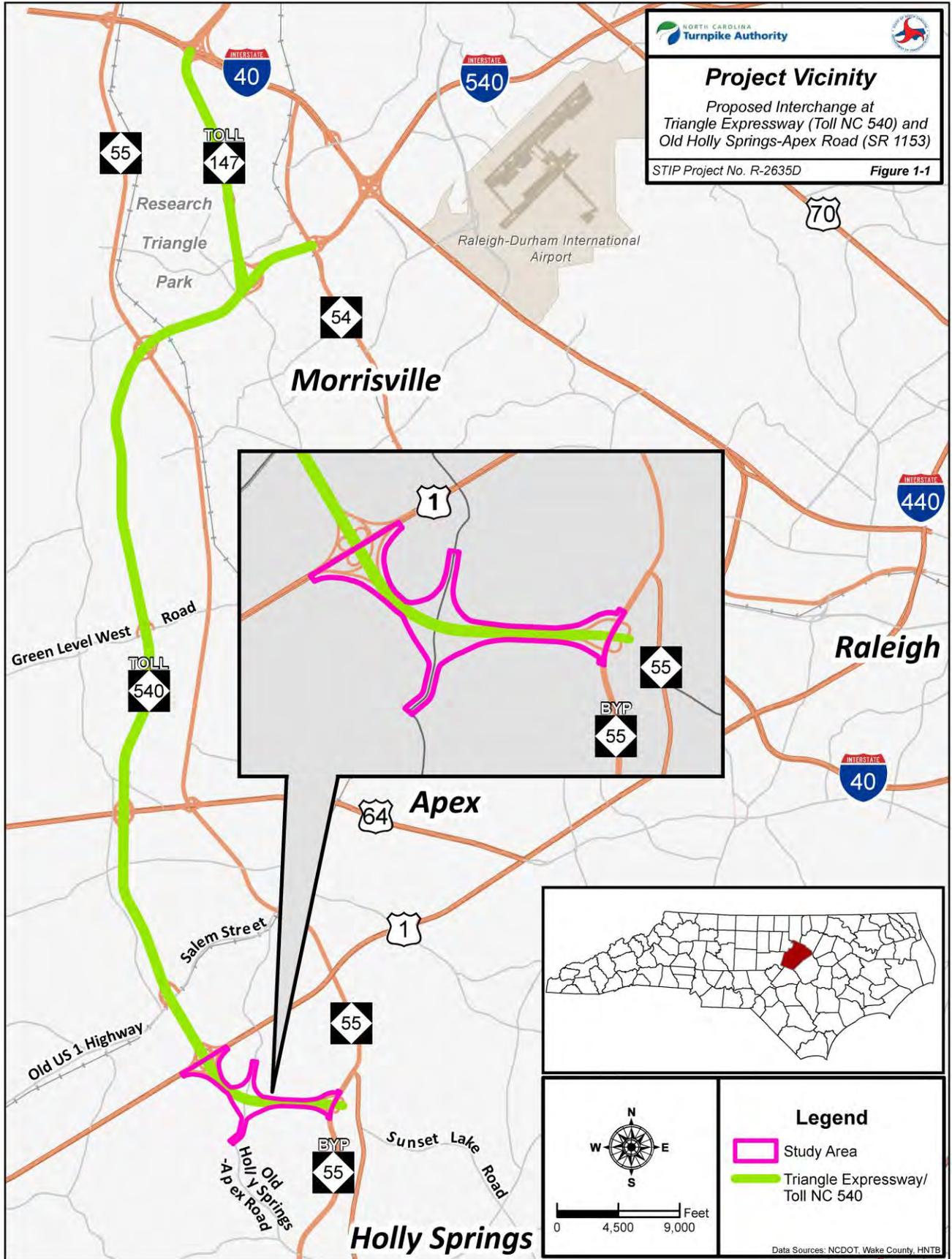
Old Holly Springs-Apex Road has a grade separation, but no direct access, with the Triangle Expressway. The Triangle Expressway is an 18.8-mile, six-lane toll facility that extends from the I-40/NC 147 interchange in Durham County to the NC 55 Bypass near Apex in Wake County. The Triangle Expressway partially completes the “Outer Loop” around the greater Raleigh, North Carolina area. North of the Triangle Expressway, Old Holly Springs-Apex Road travels north, crossing - but with no direct access to - US 1 into Apex. South of the Triangle Expressway, Old Holly Springs-Apex Road travels south towards Holly Springs where it terminates at New Hill Road.

Old Holly Springs-Apex Road is a 3.6-mile south-north facility with its southern terminus located at New Hill Road (SR 1152) in Holly Springs, traveling to its northern terminus where it becomes Tingen Road (continuing SR 1153) in Apex. For residents residing in the area south of the proposed interchange, they must first travel southeast to access NC 55 Bypass or west to access US 1 before they can then travel north on these facilities to reach Apex or access the Triangle Expressway via US 1. For residents of the area north of the proposed interchange, they must first travel north into Apex, then west along Salem Street (SR 1011), before they can access the Triangle Expressway, as there is no access to US 1 from Old Holly Springs-Apex Road. Also of note, Old Holly Springs-Apex Road currently provides an alternate route for local residents to travel between Holly Springs and Apex when they elect to avoid the more congested facilities of NC 55 Bypass, NC 55, and US 1. A project vicinity map is shown on **Figure 1-1**.

Land use throughout the vicinity of the Access 540 project is mostly rural in nature, consisting of large areas of vacant, wooded land with scattered large-lot residential parcels as well as a few parcels with agricultural uses. Higher-density residential areas are located south of the project, as this portion begins to include northern Holly Springs and its residential subdivisions and retail centers. The land area adjacent to and just south of the Triangle Expressway consists of the privately-owned Highway 55 Landfill, as well as the Wake County-owned Feltonville Landfill and the South Wake Landfill. Wake County also owns the Firearms Education and Training Center that is located approximately one mile south of the existing grade separation along Old Holly Springs-Apex Road. In the area northeast of the project, just north of the Triangle Expressway, is the information technology services provider EMC Corporation. A sizeable portion of the existing land in the vicinity of the proposed project is owned by and planned for the Veridea mixed-use development. The bulk of the area west of the project is mostly wooded with sparse residential parcels.



**Old Holly Springs-Apex Road at the Triangle Expressway**



## 2.0 Purpose of and Need for Action

The Access 540 project is a proposal by the North Carolina Department of Transportation (NCDOT) to convert the existing grade separation at the Triangle Expressway (Toll NC 540) and Old Holly Springs-Apex Road (SR 1153) to an interchange. The project also includes conversion of the existing outside shoulders along the Triangle Expressway – between the NC 55 Bypass and US 1 – to auxiliary lanes and the construction of new shoulders. The proposed action is included in the NCDOT’s 2012-2018 STIP, the 2040 Metropolitan Transportation Plan (Capital Area Metropolitan Planning Organization, 2013), the Apex Transportation Plan (Town of Apex, 2011) and the Holly Springs Comprehensive Transportation Plan (Town of Holly Springs, 2013). This statement of purpose and need explains why improvements to the transportation system in the study area (the proposed action) should be considered and implemented.

### 2.1 Study Area

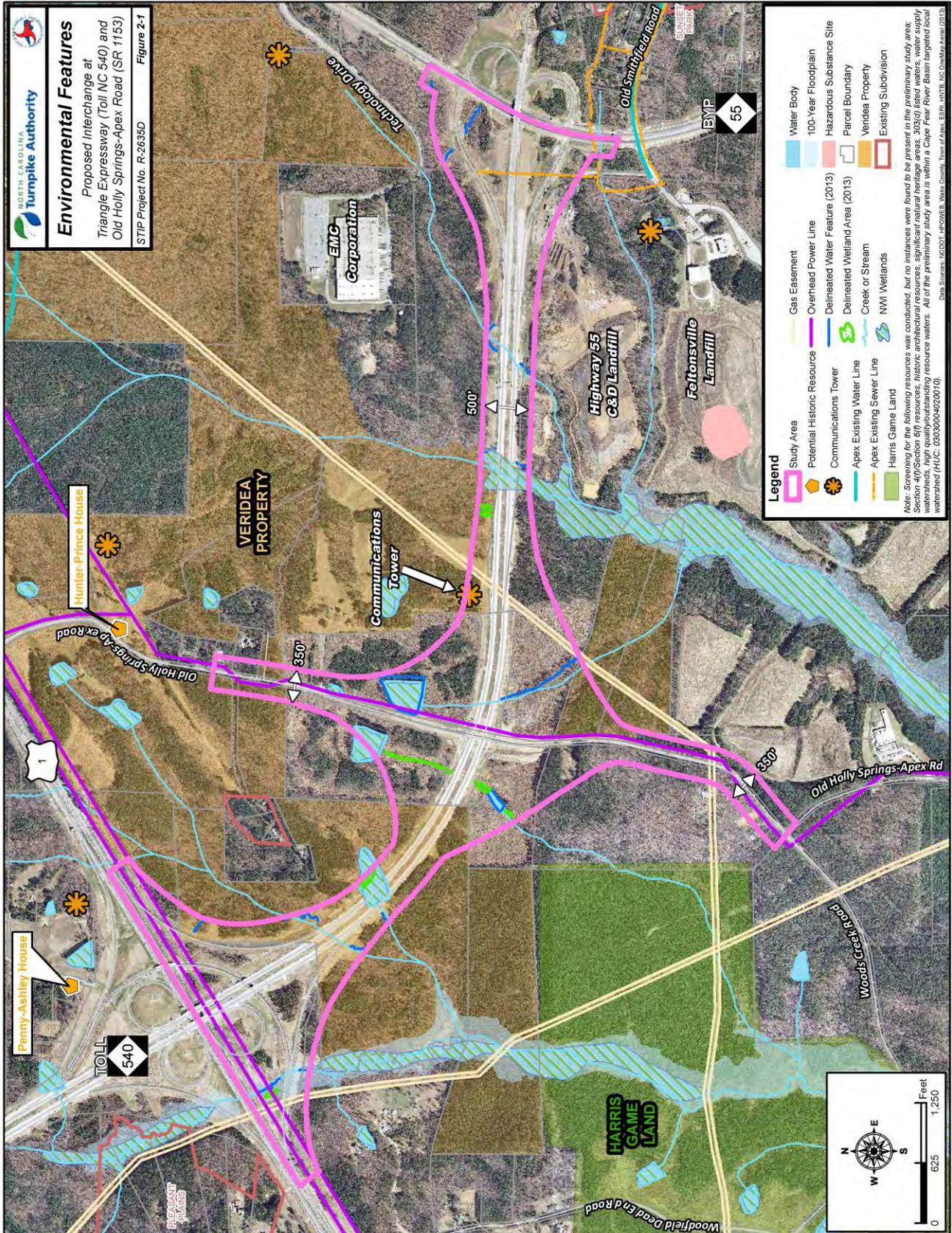
The study area is located in southern Apex in western Wake County. The study area encompasses an approximately two-mile section of the Triangle Expressway and a one-mile section of Old Holly Springs-Apex Road. The study area is bound to the east by the NC 55 Bypass interchange and to the west by the US 1 interchange. Land use in the vicinity of the study area is predominately rural with scattered residential and agricultural uses. However, according to the Peak Plan 2030, The Apex Comprehensive Plan (Town of Apex, 2013), this portion of Apex is designated as a future Regional Mixed-Use node with the proposed development of the approximately 1,000-acre Veridea development. The proposed project would provide an important access point to the Triangle Expressway from Old Holly Springs-Apex Road. This new access would enhance the interconnectedness of the roadway system and provide additional transportation options. The general environmental features of the study area are depicted in **Figure 2-1**.

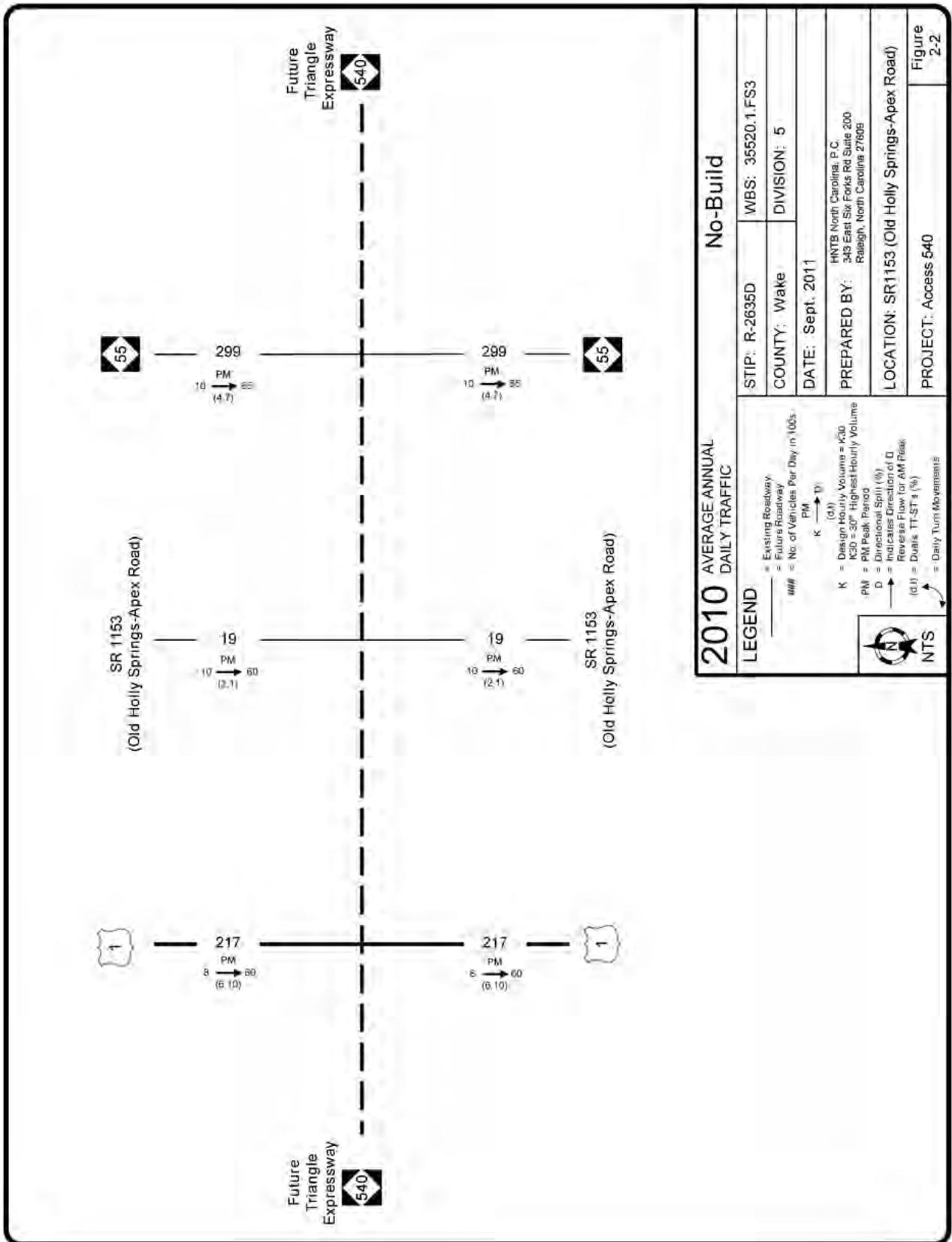
### 2.2 Project Needs

The proposed action responds to the following transportation need:

- ***No direct link exists between the Triangle Expressway (Toll NC 540) and Old Holly Springs-Apex Road (SR 1153). The existing interchanges along the Triangle Expressway do not provide adequate accessibility for planned and anticipated growth in southern Apex.***

The Triangle Expressway is a major north-south freeway facility in western Wake County and southern Durham County. The Triangle Expressway offers a high degree of mobility and convenient access between the towns of Holly Springs, Apex, Cary, and Morrisville and other regional roads such as NC 55, US 1, US 64, I-40, I-540 and NC 147. According to the NC 540 Western Wake Freeway / Old Holly Springs Apex Road Interchange Final Traffic Forecast Technical Memorandum (HNTB, September 2011) prepared for the Access 540 project, traffic along Old Holly Springs-Apex Road is projected to increase substantially – from 1,900 AADT (Average Annual Daily Traffic) in 2010 (**Figure 2-2**) to 34,900 AADT in 2035 (**Figure 2-3**). The increase in traffic is largely due to planned and anticipated growth in southern Apex. Due to the deficiency in roadway linkage, motorists desiring to access the Triangle Expressway from Old Holly Springs-Apex Road have to drive 4.5 to 5.5 miles depending on the route chosen (route options include Tingen Road, Apex Peakway, US 1, NC 55, Woods Creek Road, Friendship Road and Old US 1).







## 2.3 Project Purpose

Given the need described above, the purpose of the proposed action is to:

- ***Improve accessibility and north-south connectivity within southern Apex by providing a direct local link between the Triangle Expressway (Toll NC 540) and Old Holly Springs-Apex Road (SR 1153).***

The Access 540 project would offer enhanced roadway connectivity of regional importance by providing improved access to the Triangle Expressway to accommodate planned and anticipated residential and commercial growth.

## 2.4 Project Description

### 2.4.1 Setting and Land Use

Land use in the vicinity of the Access 540 study area is mostly rural in nature, consisting of large areas of vacant, wooded land with scattered large-lot residential parcels as well as a few parcels with agricultural uses. Higher-density residential areas are located along Old Holly Springs-Apex Road approximately 1.5 miles south of the Triangle Expressway, as this portion begins to include northern Holly Springs and its residential subdivisions and retail centers. The land area adjacent to and just south of the Triangle Expressway consists of the privately-owned Highway 55 Landfill, as well as the Wake County-owned Feltonville Landfill and the South Wake Landfill. Wake County also owns the Firearms Education and Training Center that is located along Old Holly Springs-Apex Road, approximately one-mile south of the Triangle Expressway. Just north of the Triangle Expressway, between Old Holly Springs-Apex Road and the NC 55 Bypass, is the EMC Corporation facility, an information technology services provider. A large portion of land southwest of the Access 540 study area is comprised of a segment of the Harris Game Land with a few residential parcels. These features are depicted on **Figure 2-1**.

Substantial growth is anticipated throughout the vicinity of the Access 540 study area. This is evidenced by the Town of Apex's rezoning approval in 2011 of the proposed Veridea development, an approximately 1,000-acre sustainable mixed-use community in southern Apex, and its designation in the Apex Comprehensive Plan as a Regional Mixed-Use node. Veridea is expected to have 10 million square feet of office, 3.5 million square feet of retail, 2 million square feet of manufacturing space, and 8,000 residential units at build out. Other development is already occurring, such as the residential areas of Forest Springs in Holly Springs and Salem Village in Apex.

### 2.4.2 Project History

The Triangle Expressway opened to traffic in phases beginning in December 2011 with the final phase opening in December 2012. Old Holly Springs-Apex Road was constructed with a grade-separated crossing of the Triangle Expressway but was envisioned to be converted to an interchange in the future as a separate project. The existing grade separation was designed and constructed for future modification to an interchange and the existing outside shoulders along the Triangle Expressway – between the NC 55 Bypass and US 1 – were constructed full depth to allow future conversion to auxiliary lanes.

The Access 540 project was added to the 2012-2018 STIP in September 2013. The project is funded for right-of-way and construction and has a let date of May 2015. The procurement contract method will be design-build.

In June 2013, the North Carolina General Assembly and the Governor approved House Bill 817 entitled “An Act to Strengthen the Economy through Strategic Transportation Investments.” The Strategic Transportation Investments Law (STI) allows the NCDOT to maximize North Carolina’s existing transportation funding to enhance the states infrastructure and support economic growth, job creation, and high quality of life. The STI law established the Strategic Mobility Formula, a new way of allocating available revenues based on data-driven scoring and local input. The Access 540 project has been identified as a ‘transitional’ project under STI, meaning that it is not subject to STI analysis since the project is scheduled for construction let before July 1, 2015.

### 2.4.3 System Linkage

#### 2.4.3.1 Existing Road Network



**The Triangle Expressway at Old Holly Springs-Apex Road**

The Access 540 project would increase accessibility to the Triangle Expressway, an important north-south thoroughfare for regional traffic to and from the study area. The Triangle Expressway is a six-lane median-divided toll facility with a posted speed of 70 miles per hour. Old Holly Springs-Apex Road is a north-south two-lane facility with a posted speed of 35 miles per hour. The existing road network within the study area also includes the NC 55 Bypass and US 1. The NC 55 Bypass is a north-south four-lane divided facility with a posted speed of 55 miles per hour. The NC 55 Bypass has an interchange with the Triangle Expressway that is slightly over one mile from Old Holly Springs-Apex Road. US 1 is an east-west four-lane divided facility with a posted speed of 65 miles per hour. US 1 has an interchange with the Triangle Expressway that is less than one mile from Old Holly Springs-Apex Road.

The Access 540 project would increase accessibility to the Triangle Expressway, an important north-south thoroughfare for regional traffic to and from the study area. The Triangle Expressway is a six-lane median-divided toll facility with a posted speed of 70 miles per hour. Old Holly Springs-Apex Road is a north-south two-lane facility with a posted speed of 35 miles per hour. The existing road network within the study area also includes the NC 55 Bypass and US 1. The NC 55 Bypass is a north-south four-lane divided facility with a posted speed of 55 miles per hour. The NC 55 Bypass has an interchange with the Triangle Expressway that is slightly over one mile from Old Holly Springs-Apex Road. US 1 is an east-west four-lane divided facility with a posted speed of 65 miles per hour. US 1 has an interchange with the Triangle Expressway that is less than one mile from Old Holly Springs-Apex Road.

#### 2.4.3.2 Other Modes of Transportation

**Airport** – The Raleigh-Durham International Airport lies approximately 12.5 miles northeast of the study area and is an approximately 17-mile drive from the proposed Access 540 project. The proposed interchange would increase accessibility to the Triangle Expressway, which provides a major regional connection to and from the airport.

**Bicycle and Pedestrian** – There are no pedestrian or bicycle facilities within the study area. However, the east side of the existing bridge carrying Old Holly Springs-Apex Road over the Triangle Expressway features a bicycle-safe rail and sufficient shoulder width for future sidewalk installation. Although there are no bicycle facilities, moderate bicycle activity occurs along Old Holly Springs-Apex Road.

The Bicycle, Pedestrian, and Equestrian Plan (Town of Apex, 2013), a component of the Apex Transportation Plan, calls for Old Holly Springs-Apex Road to feature sidewalks and wide outside lanes for bicycle use. A greenway is also planned in the northwest quadrant of the proposed interchange.

The Holly Springs Comprehensive Transportation Plan (CTP) (Town of Holly Springs, 2013) calls for two greenways in the study area. Each would cross the Triangle Expressway via an underpass or overpass. One greenway would cross the Triangle Expressway just to the west of Old Holly Springs-Apex Road and the other would cross about half-way between Old Holly Springs-Apex Road and the NC 55 Bypass.

**Transit Services** – There are no fixed-route transit services in the study area. The nearest bus service is offered by Triangle Transit along Route 305 and Route 311. Route 305 provides service between Apex and Cary, downtown Raleigh and Research Triangle Park. Route 311 provides service between Apex and Research Triangle Park. Both routes operate approximately every 30 minutes during morning and evening peak hours. According to Triangle Transit Planning Services, bus service is planned to increase and/or expand in the area of the Access 540 project; however, no timeline has been established for the expansion of services.

According to the Apex Transportation Plan (Town of Apex, 2011), a potential transit center and possible light rail corridor are planned near Old Holly Springs-Apex Road north of the Triangle Expressway. The light rail would connect to the existing CSX Railroad that parallels Old US 1 (South Salem Street) which is also an Amtrak Corridor.

According to the Holly Springs CTP, Route 305 and Route 311 are proposed to add commuter express service from Holly Springs to Research Triangle Park, NC State University and downtown Raleigh. Both routes would utilize the Triangle Expressway through the study area. A fixed-guideway concept is also contemplated in the vicinity of the study area.

Wake Coordinated Transportation Service operates the Transportation and Rural Access or TRACS general transportation program. TRACS provides service to the residents of the non-urbanized areas of Wake County with on-demand transit service.

**Railroads** – There are no rail facilities in the study area. The closest railroad is owned by CSX and is located approximately 1.7 miles from Old Holly Springs-Apex Road where it crosses the Triangle Expressway at the Old US 1 (South Salem Street) interchange.

## 2.4.4 Social and Economic Conditions

### 2.4.4.1 Existing Conditions

The southern Apex area, in which the study area is located, is predominately rural with scattered residential and agricultural land uses, although new residential subdivisions are under construction. The

land area adjacent to and just south of the Triangle Expressway consists of the privately-owned Highway 55 Landfill, as well as the Wake County-owned Feltonville Landfill and the South Wake Landfill. Wake County also owns the Firearms Education and Training Center that is located approximately one mile south of the existing grade separation along Old Holly Springs-Apex Road. Just north of the Triangle Expressway is the IT-services provider EMC Corporation.

#### **2.4.4.2 Future Development**

The Apex Peak Plan 2030 (Town of Apex, 2013) identifies the planned mixed-use development in southern Apex known as Veridea. The largest portion of the Veridea project is encompassed by the Triangle Expressway to the south, NC 55 Bypass to the east, and US 1 to the north and west, with additional parcels adjacent to and south of the Triangle Expressway. Also of note, Old Holly Springs-Apex Road is planned to be the main north-south facility within the development, and the proposed interchange with the Triangle Expressway would provide direct access to that facility. The Apex Peak Plan considers Veridea a major component of a future Regional Mixed-Use node. Mixed-use nodes are prime areas located at the intersection of major regional thoroughfares because they provide the high visibility and accessibility sought by large-scale retailers and businesses.

#### **2.4.4.3 Land Use Plans**

The study area is located entirely within Apex's zoning jurisdiction. Land use in Apex is guided by the Apex Peak Plan and the Unified Development Ordinance (UDO). The Apex Peak Plan is a policy document intended to guide development in the Town of Apex to desired community outcomes. The UDO establishes allowable uses by zoning district and sets forth provisions for development design, such as standards for subdivisions and commercial centers. There are no small area plans in the study area.

### **2.4.5 Transportation Planning**

#### **2.4.5.1 Overview of the Thoroughfare Planning Process**

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

#### **2.4.5.2 CAMPO and Town of Apex Transportation Planning**

The project is included in the Capital Area Metropolitan Planning Organization's (CAMPO) 2040 Metropolitan Transportation Plan and 2012-2018 Metropolitan Transportation Improvement Program, the Apex Transportation Plan and the Holly Springs CTP. Old Holly Springs-Apex Road is designated as a

future thoroughfare that will be widened to a multi-lane facility with accommodations for sidewalks and bicycles. A future interchange with the Triangle Expressway is also anticipated.

### 2.4.5.3 Other Proposed Road Improvements

The project is included as STIP Project No. R-2635D in the 2012-2018 STIP. Right-of-way acquisition and construction are scheduled for state fiscal year (SFY) 2015. The 2012-2018 STIP includes \$4.6 million for right-of-way acquisition and \$15 million for construction, for a total of \$19.6 million. The project is anticipated to follow the design-build procurement process.

The additional transportation improvement projects listed in the 2012-2018 STIP associated with the network serving or feeding the study area are identified in **Table 2-1** below.

**Table 2-1: Nearby STIP Projects**

STIP Project No.	Description	Schedule (Fiscal Year)
R-2721, R-2828 and R-2829	“Complete 540” - extend the Triangle Expressway from the NC 55 Bypass in Apex to the US 64/US 264 Bypass in Knightdale. Freeway on new location (27.3 miles).	Planning/design – underway Right-of-way – unfunded Construction – unfunded <i>Note: The Draft 2015-2025 STIP was released in December 2014 and indicates that segments of the project have been proposed for funding.</i>
U-2901	NC 55 (Williams Street), US 1 to US 64 in Apex. Widen to a multi-lane curb and gutter facility (2.8 miles).	Right-of-way (Section B) – 2017 Construction (Section B) – 2019 <i>Sections AA and AB complete.</i>
U-5301	US 64, West of SR 1308 (Laura Duncan Road) to US 1 in Apex and Cary. Corridor upgrade and improvements (3.0 miles).	Planning/design – underway Right-of-way – 2019 Construction – 2020
U-5315	Morrisville Parkway Extension, SR 1600/SR 1625 (Green Level Church Road) to East of NC 55 in Cary. Multi-lane facility on new location with interchange at NC 540 (Triangle Expressway/Western Wake Freeway).	Planning/Design – underway (by Town of Cary) Right-of-way – unfunded Construction – unfunded <i>Note: The Draft 2015-2025 STIP was released in December 2014 and indicates that segments of the project have been proposed for funding.</i>
B-5321	SR 1153 (Old Holly Springs-Apex Road), Replace bridge number 374 over Little Branch	Planning/design – underway Right-of-way – 2016 Construction - 2017

## 3.0 Alternatives

### 3.1 Project Logical Termini and Independent Utility

To provide a comprehensive analysis, the Access 540 project incorporated accepted methods that the proposed action have logical termini, be of sufficient length to address environmental matters on a broad scope, have independent utility, and not restrict consideration of alternatives for other transportation improvements.

The Access 540 project has logical termini: the eastern terminus of the project would be the interchange of the Triangle Expressway with the NC 55 Bypass, while the western terminus would be the interchange of the Triangle Expressway with US 1. The proposed interchange and auxiliary lanes would not force immediate transportation improvements beyond the termini or along the connecting facilities. Thus, the proposed project would have independent utility, and its construction would be a useful and reasonable expenditure of funds, even if no additional transportation improvements were made in the area.

While the length of the proposed project is relatively short, it is of sufficient length to allow for the evaluation of environmental issues on a broad basis and would neither restrict consideration of alternatives nor prohibit the implementation of other reasonably foreseeable transportation improvements.

### 3.2 Preliminary Study Alternatives

Preliminary study alternatives considered for the Access 540 project include a No-Build Alternative, alternative modes of transportation, transportation system management (TSM), and several Build Alternatives. Descriptions of the preliminary study alternatives are presented in this section.

#### 3.2.1 No-Build Alternative

The No-Build Alternative assumes the proposed project is not completed and no improvements, other than typical maintenance activities, would be made to Old Holly Springs-Apex Road or the Triangle Expressway. Although the No-Build Alternative would not meet the project's purpose and need, the No-Build Alternative was retained for further study to provide a baseline for comparing impacts.

#### 3.2.2 Alternative Modes of Transportation

Alternative modes of transportation includes travel options such as walking, biking, carpooling, telecommuting, and public transportation as means to lessen the reliance on passenger vehicle trips. The Travel Demand Management (TDM) Alternative and Multi-Modal Alternative provide options to reduce the number of single occupancy vehicle trips needed, directly reducing traffic congestion.

Alternative modes of transportation would not meet the project's purpose and need of providing a direct local link between the Triangle Expressway and Old Holly Springs-Apex Road or improving accessibility and north-south connectivity within southern Apex and were eliminated from further consideration.

### 3.2.3 Transportation Systems Management

Transportation Systems Management (TSM) measures typically consist of low-cost minor transportation improvements to an existing facility in place of large-scale modifications. TSM is designed to maximize the use and energy efficiency of a facility and to enhance operations while minimizing capital outlay.

Transportation Systems Management measures would not meet the project's purpose and need of providing a direct local link between the Triangle Expressway and Old Holly Springs-Apex Road or improving accessibility and north-south connectivity within southern Apex and were eliminated from further consideration.

### 3.2.4 Build Alternatives

The Build Alternatives consider improvements to the existing transportation facility as well as the construction of an interchange with the Triangle Expressway at Old Holly Springs-Apex Road, including the addition of auxiliary lanes along the Triangle Expressway between US 1 and the NC 55 Bypass.

#### 3.2.4.1 Improve Existing Transportation Facility

The Improve Existing Transportation Facility Alternative would include upgrades to the roadways within the study area that would provide a similar function as the proposed action. Improvements to these facilities would potentially include widening, new traffic control, or improved access management.

The Improve Existing Transportation Facility Alternative would not meet the project's purpose and need of providing a direct local link between the Triangle Expressway and Old Holly Springs-Apex Road or improving accessibility and north-south connectivity within southern Apex and was eliminated from further consideration.

#### 3.2.4.2 Interchange Alternatives

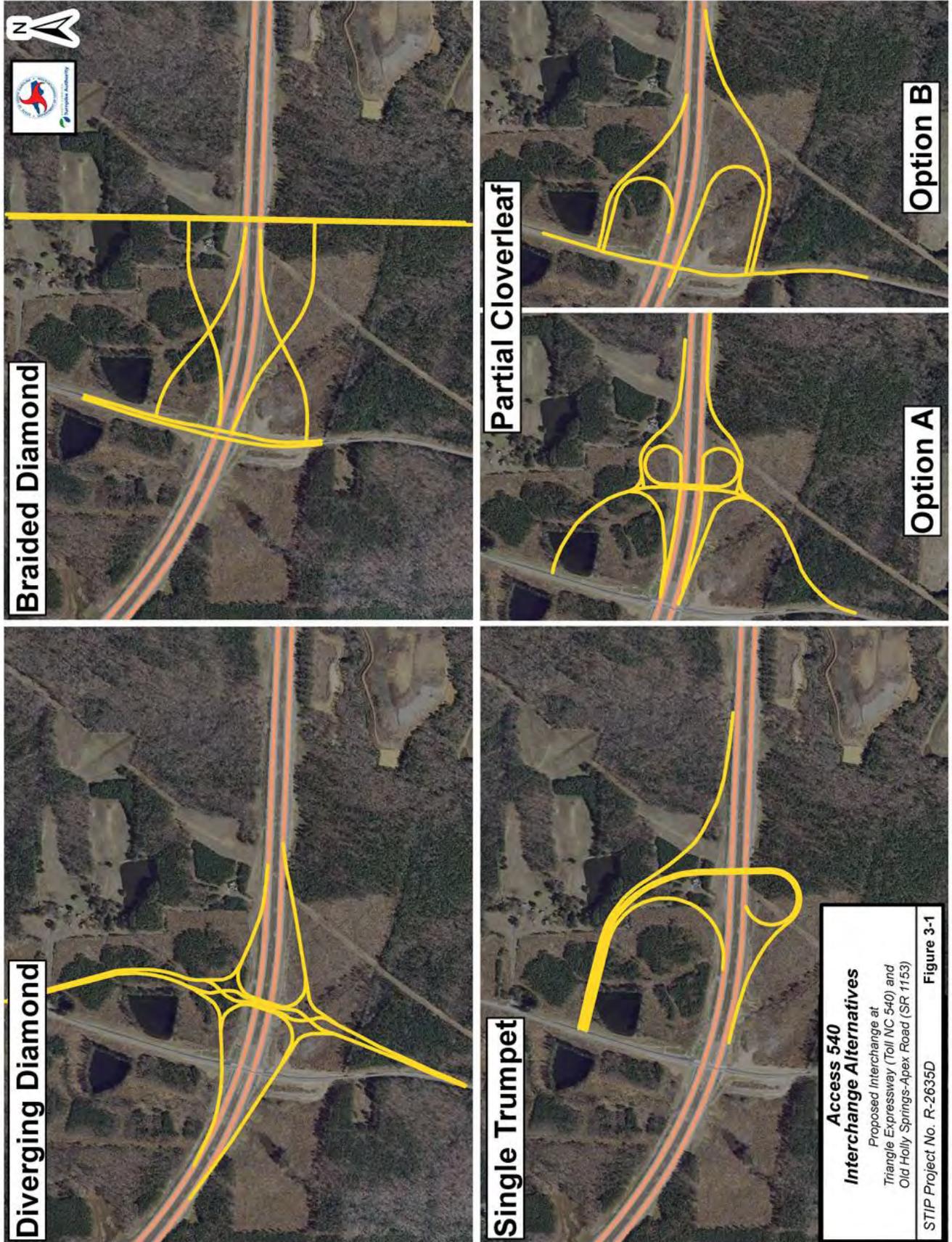
Five interchange design concepts were prepared for the Access 540 project. As shown in **Figure 3-1**, the interchange design concepts varied in their utilization of the existing bridge that spans the Triangle Expressway at Old Holly Springs-Apex Road.

NCDOT screened each interchange design concept against four criteria. These criteria are explained below. It should be noted that all interchanges would meet the purpose and need for the project, so none were eliminated from further consideration on this basis.

1. **Interchange Spacing:** NCDOT's goal is to maintain a minimum of a one-mile separation between interchanges in urban areas - per American Association of State Highway and Transportation Officials (AASHTO) guideline<sup>1</sup>. Old Holly Springs-Apex Road is approximately 1.2 miles from the NC 55 Bypass interchange and approximately 0.8 miles from the US 1 interchange. Interchange design concepts that could be located on the east side of Old Holly Springs-Apex Road could take advantage of the greater spacing provided in that location.

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<sup>1</sup>Minimum spacing of arterial interchanges (distance between intersecting streets with ramps) is determined by weaving volumes, ability to sign, signal progression, and lengths of speed-change lanes. A general rule of thumb for minimum interchange spacing is 1.5 km [1 mi] in urban areas and 3.0 km [2 mi] in rural areas. In urban areas, spacing of less than 1.5 km [1 mi] may be developed by grade-separated ramps or by adding collector-distributor roads." AASHTO, *A Policy on Geometric Design of Highways and Streets, 6th Edition* (AASHTO, 2011), pg. 10-68.



**Access 540  
Interchange Alternatives**  
Proposed Interchange at  
Triangle Expressway (Toll NC 540) and  
Old Holly Springs-Apex Road (SR 1153)  
STIP Project No. R-2635D **Figure 3-1**

2. Communications Tower: To the east of Old Holly Springs-Apex Road and north of the Triangle Expressway is a large communications tower. An anchor block supporting the tower is located adjacent to the Triangle Expressway right of way. Previous estimates indicated that relocation of this tower would cost approximately \$2 million. The Triangle Expressway, a nearly \$1 billion project, was constructed without impacting the tower. A goal of NCDOT is to construct the proposed Access 540 interchange in a way that would continue to avoid the tower.
3. Highway 55 Landfill: To the east of Old Holly Springs-Apex Road and south of the Triangle Expressway is the NC 55 Landfill, a construction and demolition disposal site. Acquisition of landfill property for highway projects can be costly and time consuming and can impose liability risks on NCDOT. Interchange design concepts that avoid – or at the least, minimize – encroachment into the landfill would be desirable over those that would require more substantial property acquisition.
4. Utilization of the Existing Alignment: The degree to which an interchange design concept would utilize the existing Old Holly Springs-Apex Road alignment was also a consideration. Interchanges that require construction of new bridges or that require relocation of Old Holly Springs-Apex Road would not compare favorably with those that utilize the existing alignment. Upgrading the existing Old Holly Springs-Apex Road and its bridge over the Triangle Expressway would serve to reduce the project footprint, lower costs, minimize right-of-way acquisition, and result in potentially lesser human and natural environment impacts.

Each interchange design concept is discussed below in terms of its ability to meet these four screening criteria.

***Diverging Diamond Interchange***: The diverging diamond interchange would require realignment of Old Holly Springs-Apex Road, as well as construction of a new bridge over the Triangle Expressway. This alternative would avoid relocating the existing communications tower. There would also be a minor encroachment into the landfill. Although this alternative would increase the spacing to the US 1 interchange, there would still be short weaving and merging distances along the Triangle Expressway to US 1. Because this alternative would require relocating Old Holly Springs-Apex Road and require constructing a new bridge over the Triangle Expressway, as well as result in potentially higher natural environment impacts, the Diverging Diamond Interchange Alternative was eliminated from further consideration.

***Braided Diamond Interchange***: The braided diamond interchange would require realignment of Old Holly Springs-Apex Road, as well as construction of additional bridges over the Triangle Expressway. There would be undesirable interchange spacing in both directions along the Triangle Expressway. This alternative would require a large, new construction footprint to accommodate the design of the ramp terminals, resulting in relocating the communications tower, a considerable encroachment into the landfill, and potentially higher natural environment impacts. For these reasons, the Braided Diamond Interchange Alternative was eliminated from further consideration.

It should also be noted that the layout of this interchange would be inconsistent with driver expectation. This could result in driver confusion, longer reaction time and driver error.

**Single Trumpet Interchange:** The single trumpet interchange would require an additional bridge and ramps and loops to be constructed east of the existing overpass. Although this alternative would provide for the efficient movement of vehicles onto and off of the Triangle Expressway, it would require a large, new construction footprint to accommodate the ramps and loops, resulting in relocating the communications tower, a considerable encroachment into the landfill, and potentially higher natural environment impacts. For these reasons, the Single Trumpet Interchange Alternative was eliminated from further consideration.

It should also be noted that the layout of this interchange, notably for eastbound traffic exiting off of or onto Triangle Expressway, would be inconsistent with driver expectation. This could result in driver confusion, longer reaction time and driver error.

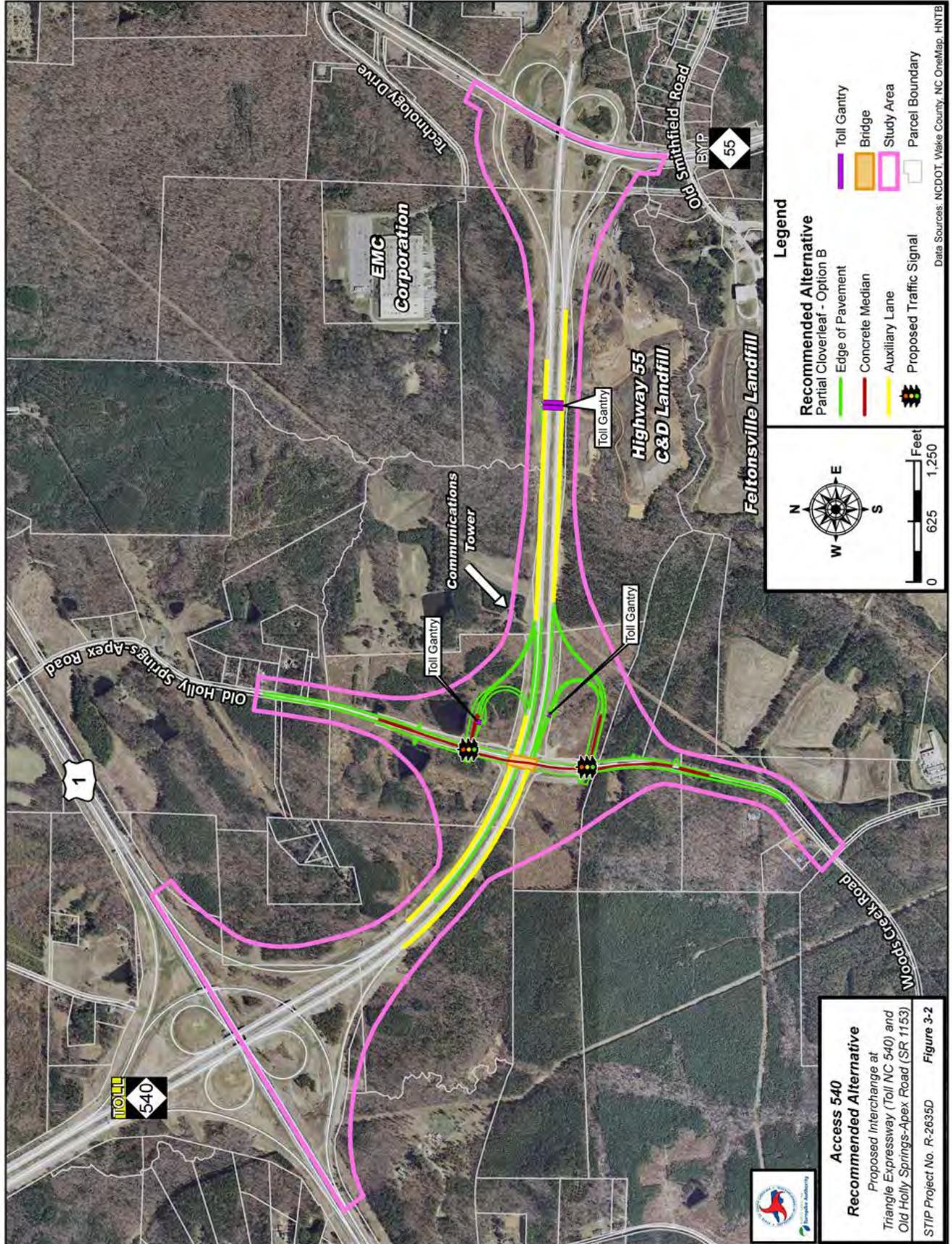
**Partial Cloverleaf Interchange - Option A:** The partial cloverleaf interchange would require realignment of Old Holly Springs-Apex Road and construction of a new bridge over the Triangle Expressway. Although this alternative would provide greater spacing to the US 1 interchange, there would be shorter spacing to the NC 55 Bypass interchange, resulting in short weaving and merging distances. This alternative would require a large, new construction footprint, resulting in relocating the communications tower, a considerable encroachment into the landfill, and potentially higher natural environment impacts. For these reasons, the Partial Cloverleaf Interchange – Option A Alternative was eliminated from further consideration.

**Partial Cloverleaf Interchange - Option B:** The partial cloverleaf interchange would minimize the project footprint by utilizing the existing alignment and bridge on Old Holly Springs-Apex Road. The alternative would avoid the communications tower, would result in only a minor encroachment into the landfill, and potentially lower natural environment impacts. By placing the interchange ramps and loops on the east side of Old Holly Springs-Apex Road, this alternative would take advantage of the greater spacing available to the NC 55 Bypass interchange, allowing NCDOT to achieve its goal of a minimum one-mile separation.

Because the Partial Cloverleaf Interchange – Option B Alternative is the only alternative that would meet all four screening criteria, this alternative was carried forward for detailed study.

### 3.3 Detailed Study Alternative

The Partial Cloverleaf Interchange - Option B Alternative, shown in **Figure 3-2**, was selected for detailed study. This alternative includes the conversion of the existing grade separation at the Triangle Expressway and Old Holly Springs-Apex Road to an interchange. The interchange ramps and loops would be constructed to the east side of Old Holly Springs-Apex Road to take advantage of the greater spacing with the NC 55 Bypass (1.2 miles versus 0.8 miles to US 1). The existing bridge would be widened to the west to accommodate travel lanes, bicycle lanes and sidewalks. The existing outside shoulders of the Triangle Expressway – between the NC 55 Bypass and US 1 – would be converted to auxiliary lanes and new shoulders would be constructed. Preliminary designs, a traffic capacity analysis and a detailed assessment of impacts to the human and natural environments were prepared for this alternative.



### 3.4 Traffic Forecast and Traffic Capacity Analysis

For the Partial Cloverleaf Interchange – Option B Alternative, NCDOT relied on several traffic studies. The traffic studies included a traffic forecast and traffic capacity analysis.

- A “traffic forecast” provides projected traffic volumes for a future year. Traffic volumes are measured in annual average daily traffic (AADT) on various roadways.
- A “traffic capacity analysis” is then developed, based on the traffic forecast. The capacity analysis provides congestion levels, which are typically measured in level of service (LOS); other measures, such as volume/capacity (v/c) ratios, also are sometimes used.

The traffic forecast and capacity analysis used 2035 as the horizon (design) year.

#### 3.4.1 Traffic Forecast

A traffic forecast was prepared for the Access 540 project using the Triangle Regional Model Version 4. The forecast included application of appropriate engineering judgment, review of previous forecasts, comparison between field-counted data and travel demand model data and assessment of future growth trends. Modeling efforts and forecasts are documented in the NC 540 Western Wake Freeway / Old Holly Springs-Apex Road Interchange Final Traffic Forecast Technical Memorandum (HNTB, September 2011). Based on the forecast assuming the Access 540 project is constructed, traffic on the Triangle Expressway is projected to range between 51,900 and 72,400 AADT in 2035. Traffic on Old Holly Springs-Apex Road is projected to range between 32,900 and 43,000 AADT in 2035.

#### 3.4.2 Traffic Capacity Analysis

The traffic capacity analysis for the Access 540 project is documented in Triangle Expressway / Toll NC 540 and Old Holly Springs-Apex Road Interchange Traffic Capacity Analysis Technical Memorandum (HNTB, March 2014). The capacity analysis was used to develop preliminary engineering designs for the project.

##### **Design Year (2035) Build**

##### **Old Holly Springs-Apex Road at the Triangle Expressway Westbound Ramps**

In 2035, adequate overall intersection operations (LOS D or better) would be maintained in both the AM and PM peak hours (see **Table 3-1** on the following page and **Figure 3-3** on page 21).

##### **Old Holly Springs-Apex Road at the Triangle Expressway Eastbound Ramps**

In 2035, adequate overall intersection operations (LOS D or better) would be maintained in both AM and PM peak hours (see **Table 3-1** on the following page and **Figure 3-3** on page 21).

### 2035 Freeway Operations Results

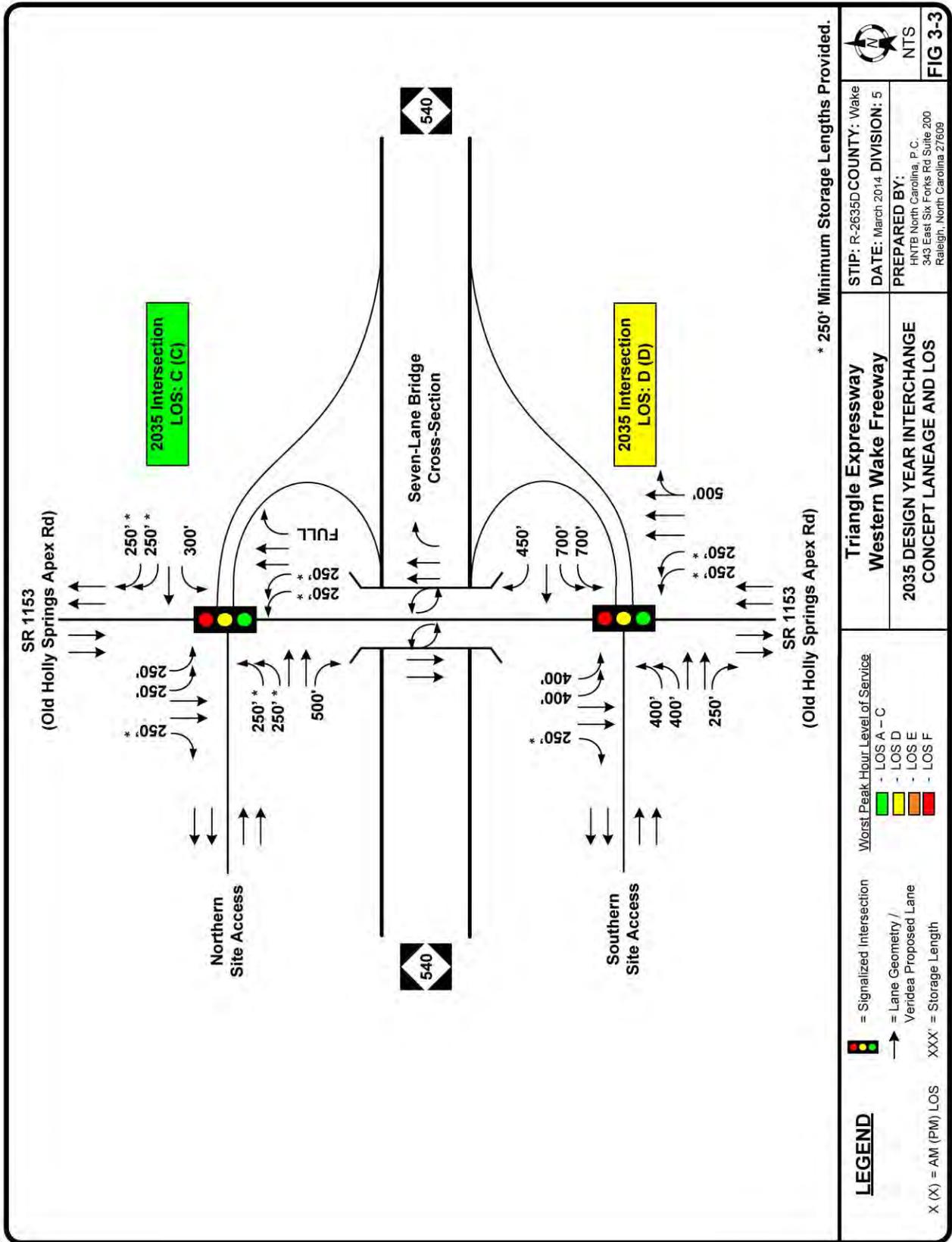
In 2035, adequate traffic operations along the Triangle Expressway in the AM and PM peak hours would be maintained. No individual freeway segment is anticipated to drop below a LOS C in either peak period.

**Table 3-1: 2035 Intersection and Freeway Analysis Results**

Location	Movement	2035 Design Year Level of Service	
		AM Peak	PM Peak
Old Holly Springs-Apex Road at the Triangle Expressway Westbound Ramps	Overall Intersection	C	C
Old Holly Springs-Apex Road at the Triangle Expressway Eastbound Ramps	Overall Intersection	D	D
Triangle Expressway	Westbound	C	B
Triangle Expressway	Eastbound	B	C

### 3.5 Recommended Alternative

The Partial Cloverleaf Interchange – Option B is presented as the Recommended Alternative for the Access 540 project. This alternative would satisfy the purpose and need for the project by improving accessibility and north-south connectivity within southern Apex by providing a local link between the Triangle Expressway and Old Holly Springs-Apex Road. This alternative is consistent with NCDOT’s 2012-2018 State Transportation Improvement Program, CAMPO’s 2012-2018 Metropolitan Transportation Improvement Program, the Apex Transportation Plan and the Holly Springs Comprehensive Transportation Plan. This interchange minimizes environmental impacts and costs by utilizing the existing alignment and bridge on Old Holly Springs-Apex Road. By placing the ramps and loops on the east side of Old Holly Springs-Apex Road, NCDOT’s interchange spacing goal of at least a one-mile separation from the nearest interchange (the NC 55 Bypass in this case) can be achieved. The nearby communications tower would not require relocation and encroachment into the NC 55 Landfill would be minor. Because most improvements could be contained within the existing right of way, only minor additional property would need to be acquired, further reducing cost.



### 3.6 Cost Estimates

As discussed in Section 4.3.1, the Access 540 project would be constructed in phases, with the initial construction including additional lanes on the Triangle Expressway and Old Holly Springs-Apex Road, a portion of the interchange ramps and loops, toll infrastructure, a sidewalk, and widening of the bridge carrying Old Holly Springs-Apex Road over the Triangle Expressway. The remainder of the interchange and additional lanes and widening would be constructed in phases as development occurs to warrant the additional improvements. Based on the preliminary designs completed to date, the estimated cost (in 2014 dollars) for the ultimate build-out of the Access 540 project is:

Construction	\$26,400,000
Right-of-Way	\$3,230,000
Utility Modifications	\$660,000
Environmental Mitigation	<u>\$580,000</u>
Total Estimated Cost	\$30,870,000

As previously noted, the cost for the Access 540 project in NCDOT's 2012-2018 STIP is \$19.6 million. The STIP cost was based on a conceptual level of design that was prepared prior to development of the preliminary designs for the ultimate build-out of the project. The STIP cost included different assumptions than those used to determine the above total estimated cost. These differences include, but are not limited to, the following: 1) the existing 3-lane bridge would not be widened, 2) only a portion of the interchange ramps/loops and widening of Old Holly Springs-Apex Road would be constructed, 3) there would be no new lane in the Triangle Expressway median, and 4) there would be minimal utility conflicts.

## 4.0 Proposed Improvements

### 4.1 Roadway Typical Section

The proposed typical section through the Old Holly Springs-Apex Road interchange would consist of a seven-lane, median-divided roadway (**Figure 4-1**). Adequate travel lanes would be provided to accommodate future anticipated growth in traffic. Lane widths would be 12 feet. Four-foot wide bicycle lanes would be provided in each direction and accommodations for five-foot wide sidewalks would be provided on both sides of the road. The existing bridge on Old Holly Springs-Apex Road would be widened to the west to accommodate the proposed improvements. The design speed for Old Holly Springs-Apex Road would be 50 mph with a posted speed of 45 mph. Once outside the limits of the interchange the project would taper back to the existing two-lane roadway. Proper horizontal and vertical design criteria will be applied to the project, meeting AASHTO and NCDOT standards. No design exceptions are anticipated for this project.

### 4.2 Right-of-Way and Access Control

The minimum proposed right-of-way width along Old Holly Springs-Apex Road in the vicinity of the interchange is approximately 200 feet with a 102-foot roadway section measured from face-of-curb to face-of-curb. Variations in the right-of-way width may occur to accommodate intersection improvements. Additional easements may also be acquired as needed for construction, drainage and utilities.

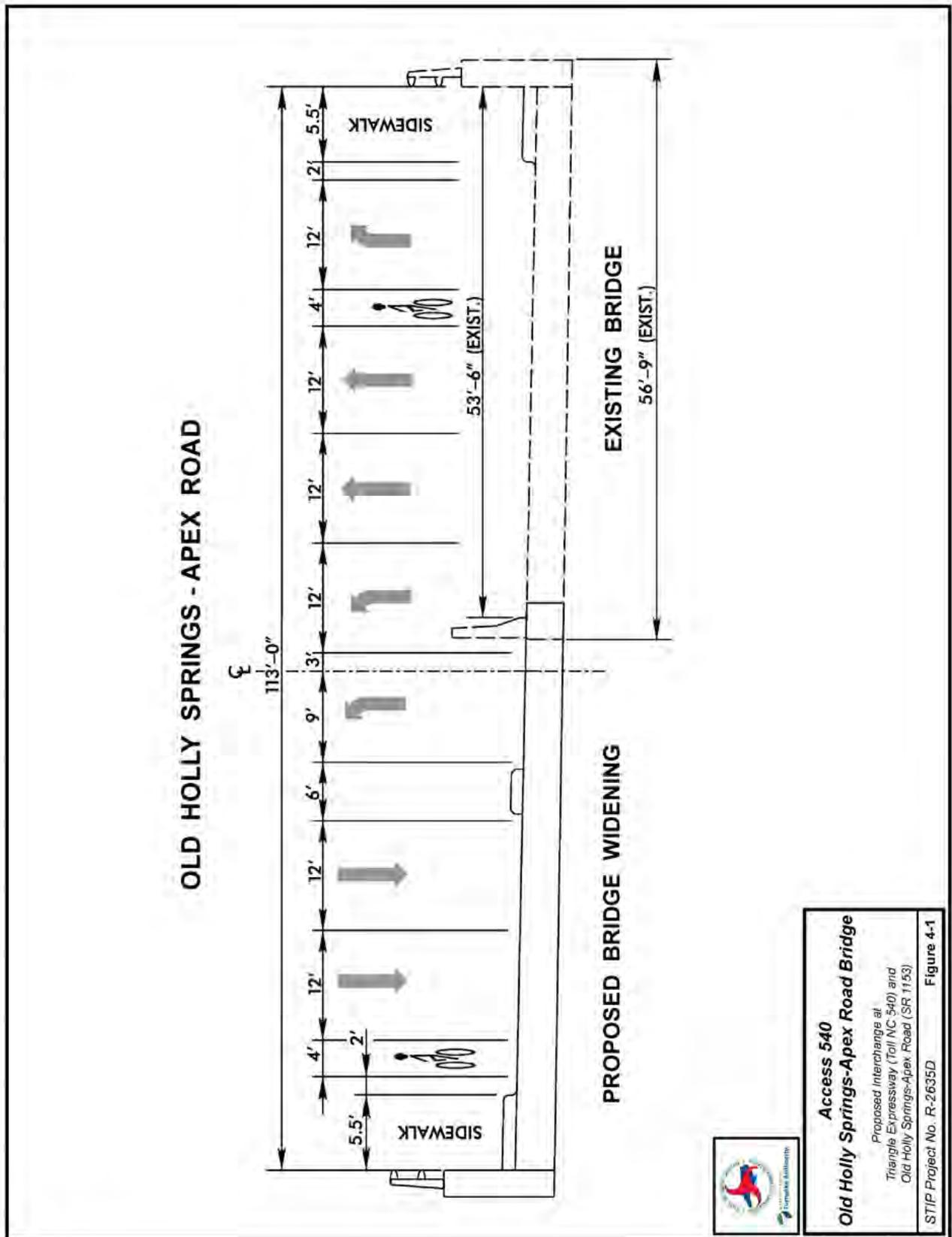
Right-of-way acquisition would impact an estimated five parcels along Old Holly Springs-Apex Road.

Improvements along the Triangle Expressway – including the new auxiliary lanes, new outside shoulders and median widening – would mostly be contained within the existing right-of-way. Easements would be needed in two locations to accommodate culvert extensions and right-of-way would be needed for a portion of the eastbound onramp.

The majority of Old Holly Springs-Apex Road currently features no access control. The Triangle Expressway has full access control. Access on Old Holly Springs-Apex Road through the interchange area would be fully controlled with approved breaks as shown on the preliminary designs.

### 4.3 Intersections and Interchanges

The Recommended Alternative includes an interchange on the Triangle Expressway between the NC 55 Bypass and US 1. The preliminary design for this alternative calls for a partial cloverleaf interchange with ramps and loops located in the northeast and southeast quadrants. This interchange would be located on the Triangle Expressway approximately 0.8 miles east of the US 1 interchange and approximately 1.2 miles west of the NC 55 Bypass interchange. The interchange ramps would terminate at Old Holly Springs-Apex Road with traffic signals. Toll gantries would be added on each ramp to allow for all-electronic toll collection. To accommodate a two-lane onramp from Old Holly Springs-Apex Road to westbound Triangle Expressway, a new lane would be added to the median.



**Access 540**  
**Old Holly Springs-Apex Road Bridge**  
Proposed Interchange at  
Triangle Expressway (Toll NC-540) and  
Old Holly Springs-Apex Road (SR 1153)  
STIP Project No. R-2635D **Figure 4-1**

### 4.3.1 Phased Construction

The Access 540 project would be constructed in phases. The initial construction would include, but not be limited to, the following:

- 1) the auxiliary lanes;
- 2) a portion of the interchange ramps and loops;
- 3) toll gantries and related infrastructure;
- 4) two through lanes and a turn lane on Old Holly Springs-Apex Road, and;
- 5) a sidewalk on the east side of Old Holly Springs-Apex Road between the interchange intersections, subject to approval of a municipal agreement with the Town of Apex.

Additionally, the bridge carrying Old Holly Springs-Apex Road over the Triangle Expressway would be built to its ultimate width to accommodate seven lanes.

The remainder of the interchange – including the additional travel lanes on Old Holly Springs-Apex Road, an additional lane on the westbound onramp to the Triangle Expressway, and the widening in the median of the Triangle Expressway – would be constructed in phases as development occurs to warrant the additional improvements.

## 4.4 Bicycle and Pedestrian Facilities

The proposed roadway typical section for Old Holly Springs-Apex Road provides accommodations for four-foot bicycle lanes and five-foot wide sidewalks on both sides of the roadway.

## 4.5 Utilities



Construction of the proposed project would likely require some degree of adjustment, relocation, or modification to existing public utilities requiring coordination with the affected utility company. Below is a description of the known existing utilities within the project vicinity and any known future improvements to these utilities.

### *Power*

Power in the area is provided by Duke Energy Progress. There are existing power supply lines around and through the study area. There is an existing overhead primary conductor

power supply along the east side of Old Holly Springs-Apex Road that would need to be relocated due to the proposed project.

### *Water and Sewer*

The Towns of Apex and Holly Springs provide water and sewer service through portions of the project vicinity. However, the majority of residents currently do not receive municipal water or sewer service. Instead, they rely on private or shared wells for water and private septic systems. Several steel utility casings have been installed under the Triangle Expressway and Old Holly Springs-Apex Road to accommodate future water and sewer lines.

### *Natural Gas*

PSNC Energy has an existing underground natural gas pipeline that runs along the west side of Old Holly Springs-Apex Road and crosses under the Triangle Expressway. This gas line would need to be relocated due to the proposed project. Dixie Pipeline Company also owns a natural gas line that crosses under the Triangle Expressway to the east of Old Holly Springs-Apex Road. Relocation of this gas line is not anticipated.

### *Fiber Optics/Communication/Intelligent Transportation Systems /All-Electronic Tolling*

AT&T provides communication and fiber optic lines in the vicinity of the proposed project. New and relocated fiber-optic cable, conduit, cameras, and other appurtenances would be needed to support Intelligent Transportation Systems elements. Implementation of All-Electronic Tolling would require installation of hardware (cameras, antennas, GPS units, etc.), software and other items.

## **5.0 Environmental Effects of Proposed Action**

### **5.1 Natural Resources**

This section of the EA provides a summary of the potential impacts to the natural environment within the study area. Further details and analyses related to the natural environment are provided in the Natural Resources Technical Report (NRTR) (Michael Baker Engineering, 2013) and the NRTR Addendum Memorandum (NCDOT, 2014). Field investigations were conducted from September through October in 2013. Walking surveys were undertaken to determine natural resource conditions and to document



natural communities, wildlife, and the presence of protected species or their habitats. During surveys, wildlife identification involved a variety of observation techniques, including active searching, visual observations, and observing the characteristic signs of wildlife (sounds, scats, tracks, and burrows). Wetland and stream delineations were also completed.

### 5.1.1 Water Resources

Water resources in the study area (**Table 5-1**) are part of the Cape Fear River Basin [United States Geological Survey (USGS) Hydrologic Unit 03030004]. Ten jurisdictional streams (**Table 5-2**) and six jurisdictional wetlands (**Table 5-3**) were identified in the study area. The location of these resources is shown in **Figures 5-1** through **Figure 5-4**.

**Table 5-1: Water Resources in the Study Area**

Stream Name	Map ID *	NCDWR Index Number	Best Usage Classification
UT to Little Branch	SA	18-7-6-1-1	C
UT to Little Branch	SB	18-7-6-1-1	C
UT to Little Branch	SC	18-7-6-1-1	C
UT to Little Branch	SD	18-7-6-1-1	C
UT to Little Branch	SE	18-7-6-1-1	C
UT to Big Branch	SG	18-7-6-1	C
UT to Big Branch	SH	18-7-6-1	C
Big Branch	SI	18-7-6-1	C
UT to Big Branch	SK	18-7-6-1	C
UT to Little Branch	SL	18-7-6-1-1	C

\* Streams SF and SJ, depicted in an earlier jurisdictional determination, were eliminated in the study area based on current USACE field-verified conditions.

There are three ponds located in the study area north of the Old Holly Springs-Apex Road overpass and one pond located south of the overpass. Two ponds (OWA and OWD), approximately 2.96 and 0.36 acres respectively, are connected to jurisdictional waters. The remaining two ponds consist of artificially excavated pits that are sustained by high groundwater levels and have no surface water connection to jurisdictional features. Pond OWA is proposed to be drained and thus would be the only pond impacted by the Access 540 project.

**Table 5-2: Jurisdictional Characteristics of Water Resources in the Study Area**

Map ID	Length (feet)	Classification	Compensatory Mitigation Required	River Basin Buffer
SA	106	Perennial	Yes	Not Subject
SB	571	Perennial	Yes	Not Subject
SC	176 335	Intermittent Perennial	Yes	Not Subject
SD	322	Perennial	Yes	Not Subject
SE	986	Intermittent	Yes	Not Subject
SG	134	Intermittent	Yes	Not Subject
SH	728	Perennial	Yes	Not Subject
SI	439	Perennial	Yes	Not Subject
SK	178	Perennial	Yes	Not Subject
SL	35	Intermittent	Yes	Not Subject
<b>Total</b>	<b>4,010</b>			

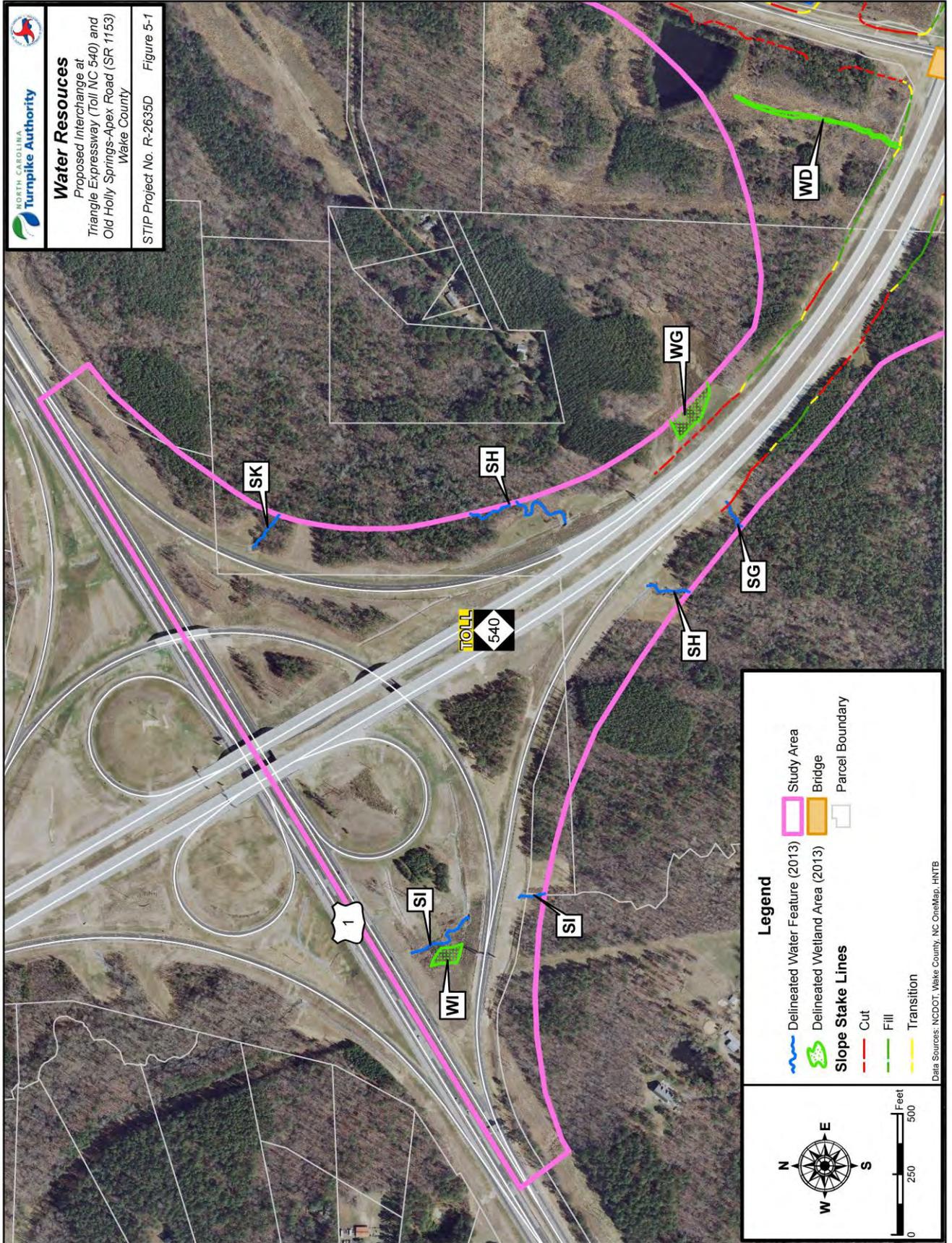
**Table 5-3: Jurisdictional Characteristics of Wetlands in the Study Area**

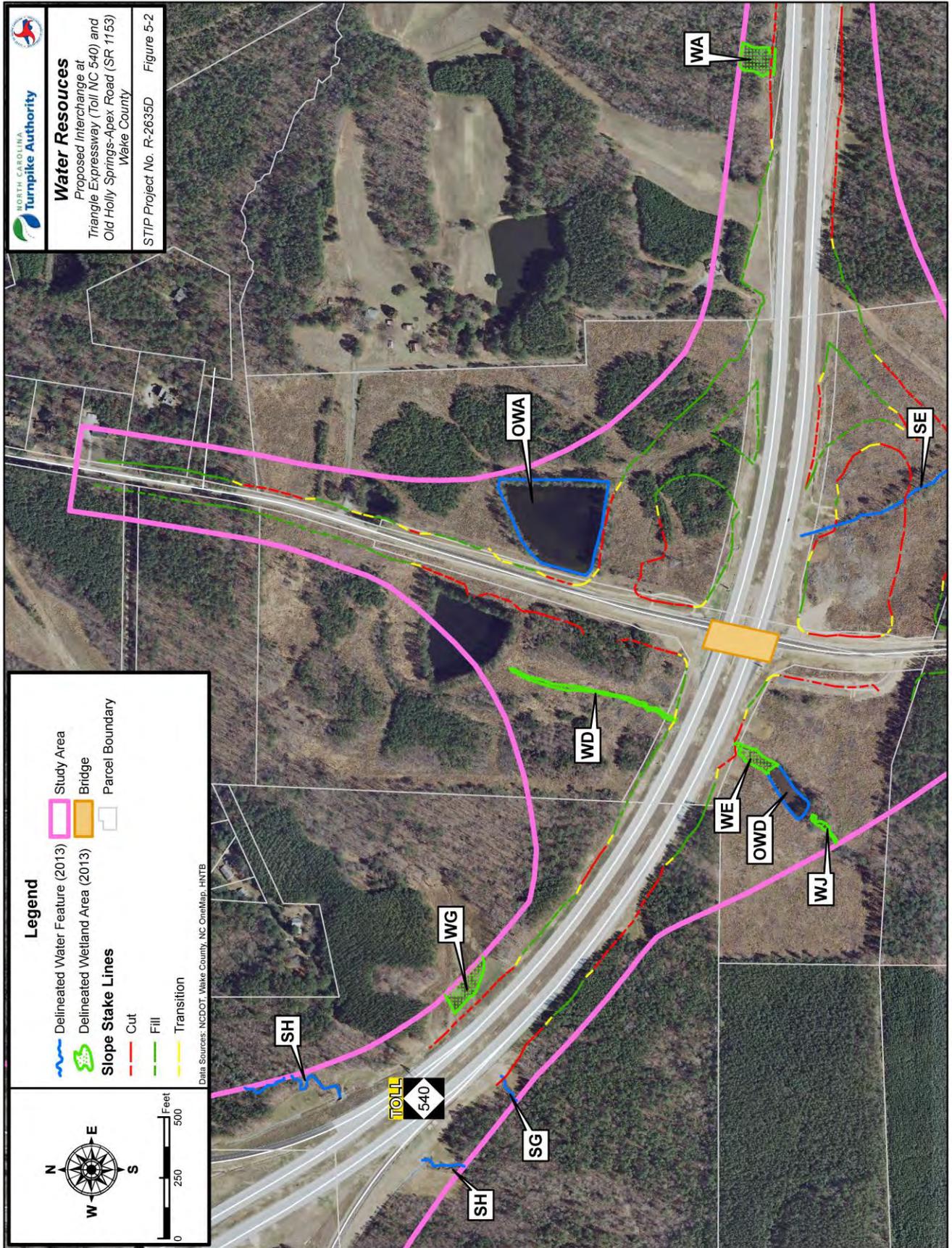
Map ID *	NCWAM Classification	Hydrologic Classification	NCDWR Wetland Rating	Area (acre)
WA	Bottomland Hardwood Forest	Riparian	45	0.33
WD	Headwater Forest	Riparian	26	0.21
WE	Non-Tidal Freshwater Marsh	Riparian	56	0.19
WG	Non-Tidal Freshwater Marsh	Riparian	28	0.35
WI	Headwater Forest	Riparian	38	0.15
WJ	Headwater Forest	Riparian	30	0.05
			<b>Total</b>	<b>1.28</b>

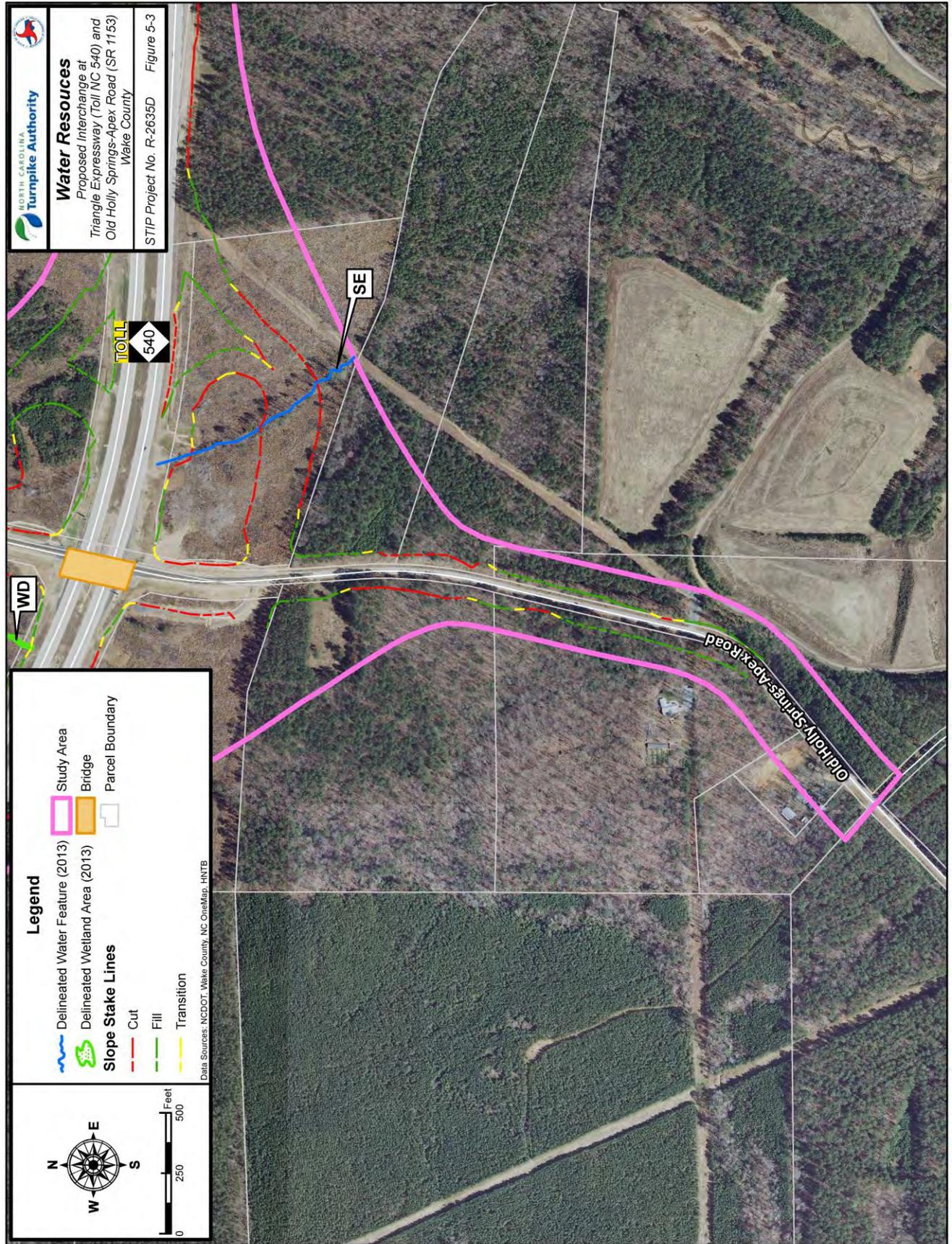
\* Wetlands WB, WC, WF, and WH, depicted in earlier jurisdictional determination, were eliminated in project study area based on current USACE field-verified conditions.

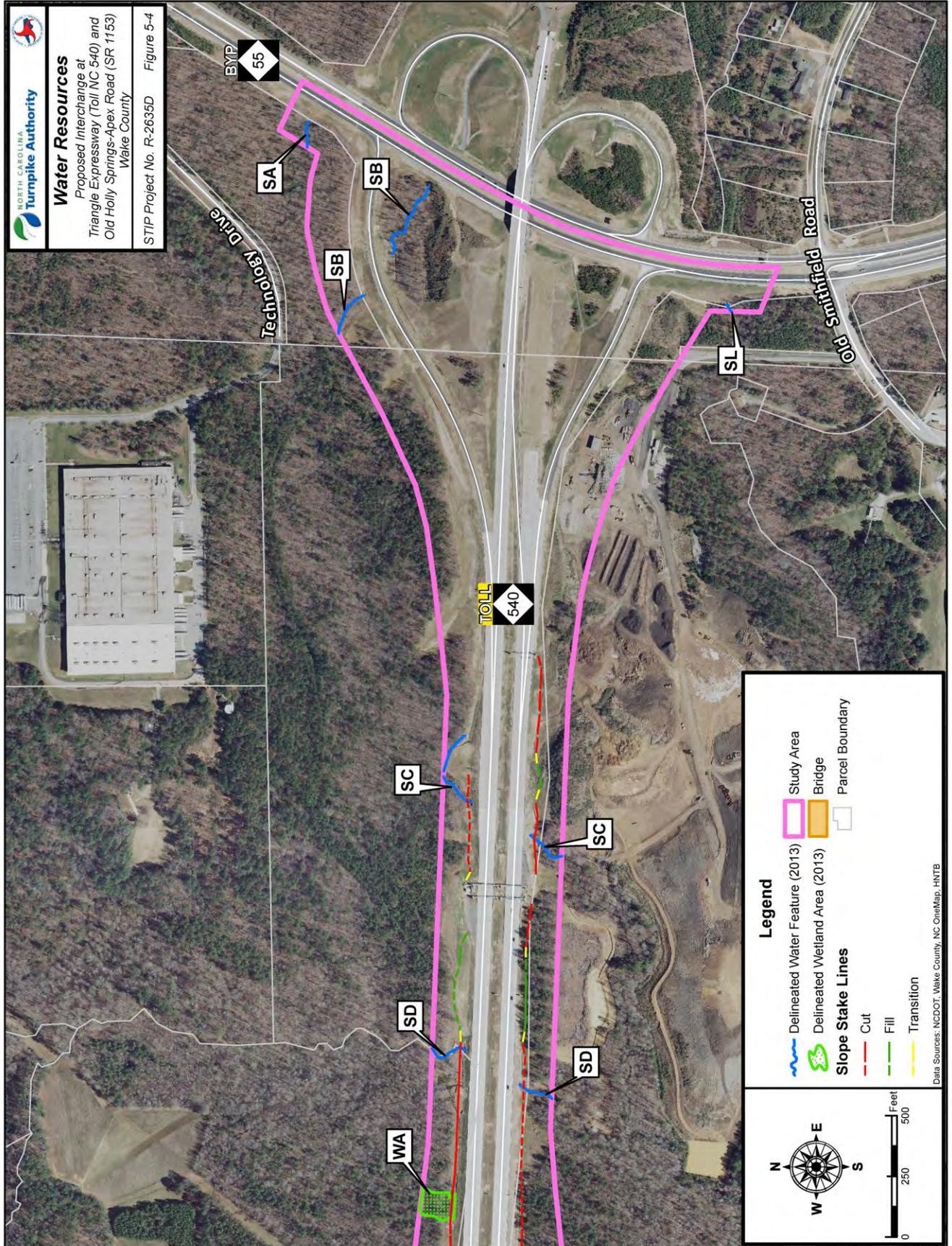
Six jurisdictional wetlands were identified in the study area, and the classification and quality rating for each wetland is presented in **Table 5-3**. Wetland site WA is included within the Piedmont/Mountain Bottomland Forest community and Wetland WJ is within the Piedmont/Low Mountain Alluvial Forest community. The remaining wetland sites are included in the Maintained/Disturbed community.

There are no Outstanding Resource Waters, designated High Quality Waters, or water supply watersheds (WS-I or WS-II) within 1.0 mile downstream of the study area. The North Carolina 2014 Final Section 303(d) list of impaired waters does not include Little Branch, Big Branch, or any other waters listed due to sedimentation or turbidity within 1.0 mile downstream of the study area.









Extending 25 feet from the slope stakes of the preliminary designs, there would be approximately 738 feet of jurisdictional streams and approximately 0.12 acres of jurisdictional wetlands that would be impacted by the Access 540 project. The impacts to these resources are summarized in **Table 5-4** and **Table 5-5**, respectively.

**Table 5-4: Impacts to Jurisdictional Streams**

Stream Name	MAP ID	Best Usage Classification	Classification	Comp. Mitigation Required?	Length in Study Area (feet)	Impacts within Slope Stake Line + 25 feet
UT to Little Branch	SA	C	Perennial	Yes	106	0
UT to Little Branch	SB	C	Perennial	Yes	571	0
UT to Little Branch	SC	C	Intermittent Perennial	Yes	176 335	96
UT to Little Branch	SD	C	Perennial	Yes	322	102
UT to Little Branch	SE	C	Intermittent	Yes	986	540
UT to Big Branch	SG	C	Intermittent	Yes	134	0
UT to Big Branch	SH	C	Perennial	Yes	728	0
Big Branch	SI	C	Perennial	Yes	439	0
UT to Big Branch	SK	C	Perennial	Yes	178	0
UT to Little Branch	SL	C	Intermittent	Yes	35	0
<b>Total</b>					<b>4,010</b>	<b>738</b>

**Table 5-5: Impacts to Jurisdictional Wetlands**

MAP ID	NCWAM Classification	Hydrologic Classification	NCDWR Wetland Rating	Area in Study Area (acre)	Impacts within Slope Stake Line + 25 feet (acre)
WA	Bottomland Hardwood Forest	Riparian	45	0.33	0.09
WD	Headwater Forest	Riparian	26	0.21	0.01
WE	Non-Tidal Freshwater Marsh	Riparian	56	0.19	0.02
WG	Non-Tidal Freshwater Marsh	Riparian	28	0.35	0
WI	Headwater Forest	Riparian	38	0.15	0
WJ	Headwater Forest	Riparian	30	0.05	0
<b>Total</b>				<b>1.28</b>	<b>0.12</b>

### 5.1.2 Biotic Resources

Four terrestrial communities were identified in the study area: maintained/disturbed, piedmont/low mountain alluvial forest, piedmont/low mountain bottomland forest, and mesic mixed hardwood forest. A brief description of each community type is below. The coverage of these terrestrial communities in the study area is identified in **Table 5-6**.

*Maintained/Disturbed* – Maintained/Disturbed areas dominate the study area in places where there is no vegetation or vegetation has been recently cut or is periodically mowed, such as roadside shoulders, utility easements, and residential lawns. The vegetation in this community is comprised of low growing grasses and herbs, including fescue, clover, wild onion, broomsedge, sumac, and goldenrod. Areas less frequently disturbed include sericea, shrubs, and loblolly pine saplings.

*Mesic Mixed Hardwood Forest* – The Mesic Mixed Hardwood Forest (piedmont subtype) community exists in most of the study area that remains forested. The canopy is dominated by northern red oak, tulip poplar, beech, and other mesophytic trees. The shrub layer consists of fringe tree, viburnum species, and dogwood. Herbaceous species include Christmas fern, little brown jug, tall rattlesnake root, and round-lobed hepatica.

*Piedmont/Low Mountain Alluvial Forest* – Piedmont/Low Mountain Alluvial Forest occurs in the floodplains of the larger streams in the study area. Canopy species in this community include tulip poplar, mockernut hickory, sweet gum, loblolly pine, and green ash. Subcanopy and understory species include red maple, dogwood, redbud, sourwood, and ironwood. Herbaceous species include lady fern, Christmas fern, grape fern, yellowroot, poison ivy, bedstraw, and Japanese stilt grass.

*Piedmont/Mountain Bottomland Forest* – The only two occurrences of Piedmont/Mountain Bottomland Forest in the study area are associated with wetland WA and stream SG. Dominant species in this community include loblolly pine, laurel oak, red maple, hickory species, sweet gum, and white oak that dominate the vegetation in this community. Other bottomland species such as green ash and tulip poplar also contribute to the canopy cover. Subcanopy species include ironwood, sweetgum, willow oak, water oak, dogwood and winged elm. Herbaceous species include greenbrier, false nettle, and sedges.

**Table 5-6: Coverage of Terrestrial Communities in the Study Area**

Community	Coverage (acre)
Maintained/Disturbed	212.7
Mesic Mixed Hardwood Forest	95.6
Piedmont/Low Mountain Alluvial Forest	5.2
Piedmont/Mountain Bottomland Forest	1.2

These terrestrial communities may be disturbed by project construction as a result of grading and paving of portions of the study area. Based on slope stake limits, the proposed project would impact a total of approximately 39.31 acres of terrestrial communities; including approximately 31.92 acres of maintained/disturbed communities, approximately 6.73 acres of mesic mixed hardwood forest, and

approximately 0.66 acre of piedmont/low mountain alluvial forest. There would be no impacts to piedmont/low mountain bottomland forest.

Terrestrial communities in the study area are comprised of both natural and disturbed habitats that may support a diversity of wildlife species (those species actually observed during field visits are indicated with \*). Mammal species that commonly exploit forested habitats and stream corridors found within the study area may include species such as Virginia opossum, eastern mole, big brown bat, red bat, eastern cottontail, gray squirrel, southern flying squirrel, beaver, raccoon\*, gray fox, and white-tailed deer\*. Birds that commonly use forest and forest edge habitats include northern cardinal, Carolina chickadee, American crow\*, mourning dove, northern flicker, red-tailed hawk, red-shouldered hawk, blue jay, golden-crowned kinglet, rubycrowned kinglet, northern mockingbird, barred owl, great-horned owl, eastern wood pewee, American robin, yellow-bellied sapsucker, downy woodpecker, red-bellied woodpecker, red-headed woodpecker, brown thrasher, tufted titmouse, eastern towhee, black vulture\*, turkey vulture\*, yellow-rumped warbler, bluegray gnatcatcher, wood thrush, and Carolina wren. Reptile species that may use terrestrial communities located in the study area include northern fence lizard, green anole, slender glass lizard, five-lined skink, broadhead skink, ground skink, worm snake, northern black racer, southern ringneck snake, black rat snake, eastern hognose snake\*, mole kingsnake, eastern kingsnake, rough green snake, brown snake, northern redbelly snake, eastern garter snake, rough earth snake, and copperhead. Amphibian species expected to occur in the terrestrial communities on-site include slimy salamander, eastern newt, spotted salamander, marbled salamander, northern dusky salamander, two-lined salamander, three-lined salamander, four-toed salamander, mud salamander, American toad, Fowler's toad, northern cricket frog, cope's gray treefrog, green treefrog, squirrel treefrog, spring peeper, upland chorus frog, bullfrog, green frog, pickerel frog, and southern leopard frog.

Aquatic community habitat in the study area consists of intermittent and perennial piedmont streams and ponds. Perennial streams and ponds in the study area could support redbreast sunfish, bluegill, warmouth, pumpkinseed, green sunfish, redear sunfish, largemouth bass, black crappie, bluehead chub, creek chub, margined madtom, eastern mosquitofish\*, and johnny darter. Farm ponds may contain introduced grass carp and/or common carp. Reptile species expected to occur in the aquatic communities on-site include northern water snake, snapping turtle, eastern box turtle, eastern mud turtle, common musk turtle, painted turtle, and yellowbellied slider\*.

Two species from the NCDOT Invasive Exotic Plant List for North Carolina were found to occur in the study area. The species identified were Japanese stilt grass (Threat) and sericea (Threat). NCDOT will manage invasive plant species as appropriate.

### 5.1.3 Endangered Species Act Protected Species

As of January 22, 2014, the U.S. Fish and Wildlife Service (USFWS) lists three federally protected species for Wake County: red-cockaded woodpecker (*Picoides borealis*), dwarf wedgemussel (*Alasmidonta heterodon*), and Michaux's sumac (*Rhus michauxii*).

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 will become effective on or before April 2015. Furthermore, this species is included in USFWS’s current list of protected species for Wake 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.

The Biological Conclusions for the three federally protected species listed for Wake County are shown in **Table 5-7**.

**Table 5-7: Biological Conclusions for Federally Protected Species Listed for Wake County**

Scientific Name	Common Name	Federal Status	Habitat Present	Biological Conclusion
<i>Picoides borealis</i>	Red-cockaded woodpecker	E	No	No Effect
<i>Alasmidonta heterodon</i>	Dwarf wedgemussel	E	No	No Effect
<i>Rhus michauxii</i>	Michaux’s sumac	E	Yes	No Effect

*E – Endangered*

Additionally, no water bodies large enough or sufficiently open to be considered potential feeding sources for the bald eagle were identified. Since there was no foraging habitat within the review area, a survey of the study area and the area within 660 feet of the project limits was not conducted. There have been no known occurrences of this species within 1.0 mile of the study area. 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. The National Marine Fisheries Service has not identified Little Branch or Big Branch as an Essential Fish Habitat.

## 5.2 Hydrology and Drainage

Water resources within the study area are part of the Cape Fear River basin [USGS Hydrologic Unit 03030004]. Detailed descriptions of the analysis methodology and proposed drainage structures are contained in the Hydraulic Technical Memorandum, Access 540 (HNTB, July 2014).



The Access 540 project would require conversion of the existing outside shoulders along the Triangle Expressway to auxiliary lanes and the construction of new outside shoulders. These improvements would impact two major stream crossings and both are located along the Triangle Expressway between the NC 55 Bypass and Old Holly Springs-Apex Road. Major stream crossings are defined as structures having a conveyance equal to or greater than a 72”

pipe. The stream crossings impacted by the proposed project are both reinforced concrete box culverts (RCBCs) and have been field investigated and evaluated in accordance with current NCDOT Hydraulic Design criteria. Both culverts would need to be extended by approximately 12 feet upstream and downstream to accommodate the proposed new shoulders.

### **5.3 Cultural Resources**

#### **5.3.1 Historic Architectural Resources**

The Access 540 project would not affect any historic architectural resources eligible for or listed on the National Register of Historic Places. No historic resources were identified in the study area.

#### **5.3.2 Archaeological Resources**

Archaeological investigations completed in 2001 within the Area of Potential Effects of the Access 540 project did not identify any archaeological resources eligible for or listed on the National Register of Historic Places. No archaeological resources eligible for or listed on the National Register of Historic places would be affected by the Access 540 project.

### **5.4 Parks, Recreational Areas, and Wildlife and Waterfowl Refuges**

There are no parks, recreational areas, or wildlife and waterfowl refuges within the study area. Therefore, there would be no impacts to these resources.

### **5.5 Farmland**

The Farmland Protection Policy Act of 1981 (7 CFR 658), implemented by the US Department of Agriculture Natural Resources Conservation Service (NRCS), requires all federal agencies or their representatives to consider the impact of land acquisition and construction activities on prime and important farmland soils (Public Law 97- 98, Section 1539-1549, 7 USC 4201, et seq). As identified in the Community Impact Assessment, R-2635D Wake County (HNTB, February 2014), a preliminary screening of farmland conversion impacts in the study area was completed (NRCS Form AD-1006, Part VI only) and a total score of 40 out of 160 points was calculated for the project. Based on soils information and preliminary designs, approximately 24 acres of prime and statewide important farmland soils would be converted by the project. However, since the total site assessment score does not exceed the 60-point threshold established by NRCS, notable project impacts to eligible soils are not anticipated.

### **5.6 Social Effects**

The Community Impact Assessment completed for the proposed project details the character of the study area and surrounding vicinity. This report examines, in depth, how the proposed project would interact within the social and natural context of the area.

#### **5.6.1 Neighborhoods and Communities**

Current land use within the study area vicinity is predominantly rural, with scattered residential and agricultural uses and, therefore, contains no established neighborhoods. Some acquisition of property to accommodate the proposed improvements would be required but would be primarily restricted to the area of the proposed interchange. No residential or business relocations are anticipated.

### 5.6.2 Environmental Justice

Census data does not indicate a notable presence of low-income or minority populations meeting the criteria for Environmental Justice within the Demographic Study Area. Additionally, no low-income or minority communities were observed within the Direct Community Impact Area during the site visit. The Apex planner has previously noted that the Feltonville Community near East Williams Street at Old Smithfield Road has both minority and low-income households; however, this community is outside of the Direct Community Impact Area and is thus not anticipated to be directly affected by the proposed project.

### 5.6.3 Limited English Proficiency

Census data does not indicate Limited English Proficiency (LEP) populations meeting the US Department of Justice LEP Safe Harbor threshold or a notable presence within the Demographic Study Area.

### 5.6.4 Visual Impacts

Construction of the Access 540 project would involve grading, paving and limited vegetation removal. New structures would be erected for traffic signals, signs and toll gantries. However, these improvements would be located within the existing transportation corridors of the Triangle Expressway and Old Holly Springs-Apex Road. These corridors were previously disturbed during construction of the Triangle Expressway. Bridges, walls, major sign structures and toll gantries would feature similar aesthetic treatments as the remainder of the Triangle Expressway. New landscaping would also be installed similar to the Triangle Expressway. For these reasons, visual impacts associated with the Access 540 project would not be adverse.

### 5.6.5 Economic Effects

The Access 540 project would provide additional access opportunity for planned and anticipated development near the interchange within a future regional activity center, as called for in the Apex Peak Plan.

Despite the apparent large amount of available land, a sizeable portion of that land is owned by the developers of Veridea. When Veridea construction begins, their plan calls for retail, office, industrial and residential development, which would result in job growth. Employment growth may be slightly higher in the southern portion of the project vicinity (northern Holly Springs) due to the anticipated continued residential and retail growth in that area.

## 5.7 Land Use

Western and southern Apex and northwestern Holly Springs have experienced rapid growth in recent years. There have been a number of roadway improvements planned and completed to accommodate this growth, including construction of the Triangle Expressway, the widening of NC 55, and upgrades to roadway arterials, such as Old Holly Springs-Apex Road and Old Smithfield Road. This growth and the accompanying projects have already spurred the rezoning and development of large tracts in the area from agricultural and very low density residential to low and medium density subdivisions. The construction of the proposed project would have little effect on the future land uses as they are already

changing to the mixed uses and medium-density residential uses projected in each town's land use plans.

## 5.8 Indirect and Cumulative Effects

The extent of potential indirect land use effects as a result of the Access 540 project are documented in the Indirect & Cumulative Effects Screening Report, Access 540 (HNTB, July 2014). These effects will be largely dependent upon several key variables, including: the future local economy and market for development, public infrastructure expansion projects, the completion of other transportation improvements in the area, and the construction of the mixed-use Veridea development which would have an important impact on the population and job market within the project vicinity. Due to relatively economical housing prices when compared to surrounding areas, expected continued moderate to brisk population growth, anticipated growth of local jobs in the area, planned extension of existing transportation facilities, and the desire by local municipalities to expand water and sewer service throughout the study area, the local market for development is relatively robust at present. Future land use plans of Apex and Holly Springs recognize the potential for future growth in the project area and have incorporated both the Access 540 project as well as the Veridea project, indicating a desire of rezoning the land near the project as primarily mixed-use with specific pockets of industrial uses.

The project area is poised to undergo considerable growth by 2035, and Apex and Holly Springs have worked to develop and implement land use and infrastructure plans to accommodate this growth. These plans include a comprehensive plan that addresses growth, land use, and transportation-specific small area plans; and a comprehensive transportation plan. In some cases local ordinances for environmental protection, such as the Town of Apex's *Secondary and Cumulative Impacts Master Mitigation Plan*, and the Town of Holly Spring's *Natural Resources Implementation Program*, exceed state and federal requirements. The proposed project has the potential for moderate indirect and cumulative effects because the project would create a new transportation link and a land use node that would reduce travel times, change travel patterns, and expose properties to greater traffic volumes; however, the proposed project is consistent with local land use and transportation plans.

Comprehensive planning efforts by Apex and Holly Springs have put the policies and procedures in place that show the vision and intent for development in the area of the project, to provide the adequate infrastructure to support this growth, and to protect the natural and human environment during the growth. Both Apex and Holly Springs have developed a *Secondary and Cumulative Impacts (SCI) Master Mitigation Plan* in cooperation with the North Carolina Department of Environment and Natural Resources (NC DENR) to provide a holistic review of the environmental impacts and identified mitigation programs associated with planned infrastructure projects deemed necessary by their Town Councils.

The cumulative effect of this project when considered in the context of other past, present, and future actions, and the resulting impact on the notable human and natural features, is expected to be minimal. Forecast development would be the predominant contributor to cumulative effects. Development is already occurring in the area and that development is anticipated to continue.

## 5.9 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 NCDOT 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 Federal highway projects for construction of a highway or interchange on new location, improvements of an existing highway which 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 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 technical report entitled Traffic Noise Analysis, Access 540 (HNTB, September 2014) can be viewed in the Project Development & Environmental Analysis Unit, Century Center Building A, 1000 Birch Ridge Drive, Raleigh.

The traffic noise analysis found that there would be no traffic noise impacts due to the Access 540 project. 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 Access 540 project will be the approval date of this EA/FONSI. For development occurring after this date, local governing bodies are responsible to insure that noise compatible designs are utilized along the proposed facility.

## 5.10 Air Quality Analysis

### 5.10.1 Introduction

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<sub>x</sub>), hydrocarbons (HC), particulate matter, sulfur dioxide (SO<sub>2</sub>), and lead (Pb) (listed in order of decreasing emission rate).

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 (SO<sub>2</sub>), particulate matter (PM<sub>10</sub>, 10-micron and smaller, PM<sub>2.5</sub>, 2.5 micron and smaller), carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), and lead (Pb).

The primary pollutants from motor vehicles are unburned HC, NO<sub>x</sub>, CO, and particulates. Hydrocarbons and nitrogen oxides can combine in a complex series of reactions catalyzed by sunlight to produce photochemical oxidants such as ozone and NO<sub>2</sub>. 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 qualitative air quality analysis was prepared for this project. A copy of the unabridged version of the full technical report entitled Air Quality Analysis, Access 540 (HNTB, September 2014) can be viewed at the Project Development & Environmental Analysis Unit, Century Center Building A, 1000 Birch Ridge Drive, Raleigh.

### 5.10.2 Attainment Status

The project is located in Wake County, which is within the Raleigh-Durham maintenance area for carbon monoxide (CO) as defined by the U.S. Environmental Protection Agency (EPA). The Raleigh-Durham area was redesignated for CO on September 18, 1995 and, due to improved monitoring data, was placed under a limited maintenance plan (conformity is still required without a regional emissions analysis) on July 22, 2013. Section 176(c) of the Clean Air Act Amendments of 1990 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 Wake County.

The Capital Area 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 June 14, 2013, and the TIP on August 29, 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.

### 5.10.3 Carbon Monoxide Hot-Spot Analysis

Carbon monoxide is a colorless and odorless gas which is the product of incomplete combustion, and is the major pollutant from gasoline fueled motor vehicles. CO is a localized air quality issue.

A microscale air quality analysis was performed to determine future CO concentrations resulting from the Access 540 project. The analysis years for the CO hot-spot analysis included 2016, 2021, and 2035. Carbon monoxide vehicle emission factors were calculated for the three analysis years using the

MOVES2010b mobile source emissions computer model. The CAL3QHC model was used to calculate CO concentrations.

The predicted 1-hour and 8-hour average CO concentrations are displayed in **Table 5-8**. Comparison of the predicted CO concentrations with the NAAQS (maximum permitted for 1-hour averaging period = 35 parts per million (ppm); maximum permitted for 8-hour averaging period = 9 ppm) indicates no violation of these standards.

**Table 5-8: Highest Modeled CO Concentrations**

Analysis Year	1-Hour Peak (ppm)	8-Hour (ppm)
2016	3.5	2.8
2021	3.7	2.9
2035	3.4	2.7

*\*NAAQS maximum permitted 1-hour CO concentration: 35ppm; 8-hour CO concentration: 9ppm.*

#### 5.10.4 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 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) ([www.epa.gov/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) ([www.epa.gov/ttn/atw/nata1999/](http://www.epa.gov/ttn/atw/nata1999/)). These are acrolein, benzene, 1,3-butadiene, 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 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/](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 ([www.epa.gov/risk/basicinformation.htm](http://www.epa.gov/risk/basicinformation.htm)) 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.

#### **5.10.5 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 Access 540 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.

## 5.11 Hazardous Materials

Based on information provided by the NCDOT GeoEnvironmental Section, no known potential hazardous waste sites were identified within the study area.

## 5.12 Construction Impacts

### 5.12.1 Air Quality

During construction of the Access 540 project there would be increased emissions from construction equipment and particulate emissions construction activities. Particulate emissions, whether from construction equipment diesel exhaust or dust from construction activities, should be controlled as well as possible. Contractors should follow all local and NCDOT Standard Construction Specification Sections that address the control of burning, construction equipment exhaust, or dust during construction.

Even though construction mitigation measures are not required, there are several measures that should be considered to reduce engine activity or reduce emissions per unit of operating time. Operational agreements that reduce or redirect work or shift times to avoid community exposures could have positive benefits. Also, technological adjustments to construction equipment, such as off-road dump trucks and bulldozers, could be an appropriate strategy. The EPA recommends Best Available Diesel Retrofit Control Technology (BACT) to reduce diesel emissions. Typically, BACT requirements could be met through the retrofit of diesel powered equipment with diesel oxidation catalysts or diesel particulate filters, and other devices that provide an after-treatment of exhaust emissions.

### 5.12.2 Noise

The predominant construction activities associated with this project are expected to be earth removal, hauling, grading, paving and pile driving for bridge construction. Temporary and localized construction noise impacts would likely occur as a result of these activities. During daytime hours, the predicted effects of these impacts would be temporary speech interference for passers-by and those individuals living or working near the project. During evening and nighttime hours, steady-state construction noise emissions such as from paving operations would be audible, and may cause impacts to activities such as sleep. Sporadic evening and nighttime construction equipment noise emissions such as from backup alarms, lift gate closures (“slamming” of dump truck gates), etc., would be perceived as distinctly louder than the steady-state acoustic environment, and could cause impacts to the general peace and usage of noise-sensitive areas – particularly residences.

Generally, low-cost and easily implemented construction noise control measures should be incorporated into the project plans and specifications to the extent possible. These measures include, but are not limited to, work-hour limits, equipment exhaust muffler requirements, haul-road locations, elimination of “tailgate banging”, ambient-sensitive backup alarms, construction noise complaint mechanisms, and consistent and transparent community communication.

### 5.12.3 Water Quality

Roadway construction activities may have some temporary impacts on water quality within the study area. Erosion of soils is the most critical water quality impact during construction. The amount of erosion varies depending upon the size of the construction limits, roadway vertical grades, roadway cut and fill slopes, and the effectiveness of installed erosion control devices.

Impacts to water quality will be minimized through the use of NCDOT's guidance document entitled Best Management Practices for the Protection of Surface Waters. An erosion control plan will be developed prior to the initiation of construction. The plan will incorporate the requirements of the North Carolina Sedimentation Pollution Control Act of 1973, and the BMPs to control nonpoint source impacts from new roadway projects. Temporary and permanent erosion control measures will be utilized throughout the project to prevent off-site sedimentation of adjacent streams and properties.

### 5.12.4 Maintenance of Traffic

Construction of the proposed interchange ramps and loops would mostly occur on new location, limiting its impact on existing traffic. However, because the project would widen Old Holly Springs-Apex Road and tie into existing roadways (Triangle Expressway and Old Holly Springs-Apex Road), there would be some amount of time when existing traffic patterns would be temporarily altered. When the project is under construction, it is expected that through traffic would remain on Old Holly Springs-Apex Road with only brief delays. Traffic on the Triangle Expressway would likely be interrupted but maintained onsite during construction of the new outside shoulders, the interchange ramps, and the widening of the Old Holly Springs-Apex Road bridge.

The construction associated with Old Holly Springs-Apex Road at the Triangle Expressway would require the installation of traffic signals, new pavement construction and bridge widening. During traffic signal installation and turn-lane construction, it is expected that traffic could be maintained on the existing roadway without the need for rerouting. Specific traffic control plans and any necessary phasing of construction will be determined during the final design stage of the project.

Due to the moderate level of bicycle activity along Old Holly Springs-Apex Road, NCDOT will evaluate options to minimize disruptions to bicycle mobility along this road during construction.

### 5.12.5 Construction Materials and Waste

Precautions will be taken to prevent contamination of any watersheds or streams by improper disposal and storage of materials, wastes, and accidental spillage of fuels or other harmful substances during construction. NCDOT specifications for roads and structures and water quality protection best management practices require the contractor to exercise every reasonable precaution throughout construction of the project to prevent pollution of rivers, streams, and water impoundments. Pollutants such as chemicals, fuels, lubricants, bitumens, raw sewage, and other harmful wastes would not be discharged into or alongside rivers, streams, or impoundments, or into natural or man-made channels emptying into such receiving waters.

Solid wastes will be disposed of in strict adherence to NCDOT standard specifications and BMPs. The contractor will be required to observe and comply with all laws, ordinances, regulations, orders, and decrees regarding the disposal of solid waste.

Although there are no known underground storage tanks (USTs) within the study area, if any abandoned USTs are found to be located within the right-of-way, they will be handled in accordance with 40 CFR 280.72 after notifying the NCDENR regional offices of their presence.

### 5.13 Summary of Impacts

**Table 5-9** lists the anticipated environmental impacts associated with the Recommended Alternative. No substantial adverse impacts would result from the Access 540 project.

**Table 5-9: Summary of Impacts for the Recommended Alternative**

Impact	Recommended Alternative
Length (miles)	1.5
Bridges over Streams (#)	0
Major Culvert Crossings >72" (#)	2
Stream Crossings (#/length in ft) <sup>1</sup>	3/738
Wetlands (#/acres) <sup>1</sup>	3/0.12
Ponds (#/acres)	1/2.96
100-year Floodplain (acres)	0
Water Supply Critical Areas (Y/N)	N
Prime/Statewide Important Farmland Soils (acres)	24
Significant Natural Heritage Areas (Y/N)	N
Known Habitat of Federally Listed Threatened and Endangered Species (#/type)	1/Michaux's sumac
Presence of Federally Listed Threatened and Endangered	N
Historic Properties (#)	N
Parks, Recreational Areas, Wildlife/Waterfowl	N
Archaeological Sites (#)	0
Parks (#/acres)	0/0
Wildlife Refuge and Gamelands (Y/N)	N
Federal Lands (Y/N)	N
Greenway Crossings (#)	0
Residential Relocations	0
Business Relocations	0
Low Income/Minority Populations (Y/N)	N
Limited English Proficiency (LEP) Populations	N
Schools (#)	0
Churches (#)	0
Cemeteries (#)	0
Railroad Crossings (#)	0
Major Utility Impacts (#) <sup>2</sup>	2
Noise (# impacted receptors)	0
Air Quality (Y/N)	N
Hazardous Material Sites (#/severity)	0/0
Total Estimated Cost	\$30,870,000

1. Wetland and stream impacts based on preliminary design slope stakes plus 25 feet.
2. Overhead power lines and a natural gas pipeline are located along Old Holly Springs-Apex Road and would need to be relocated.

## 6.0 Stakeholder Involvement

### 6.1 Agency Coordination

The NCDOT held a meeting on January 17, 2014 to determine if the project should follow the Section 404/NEPA Merger Process. The meeting summary is included in **Appendix A**. At this meeting, the US Army Corps of Engineers (USACE), FHWA, NCDENR-Division of Water Resources, and NCDOT agreed that the project would not follow the merger process. However, due to an anticipated need for an individual Section 404 permit and revisions to the existing stormwater drainage system that may be needed to accommodate the proposed improvements, it was agreed that the project would be placed in the merger process at Concurrence Points 4A, 4B and 4C.

Additionally, an external scoping meeting was held on January 22, 2014. The meeting summary is included in **Appendix A**. The purpose of the meeting was to begin early coordination efforts with the environmental resource and regulatory agencies and other stakeholders, to share information on the project's background and history, to transfer known information about the project area, and to discuss the purpose and need for the project.

A Concurrence Point 4A meeting was held with the environmental resource and regulatory agencies on January 21, 2015. The purpose of the meeting was to discuss avoidance and minimization measures. It was agreed that the only minimization measure would be to utilize 2:1 slopes in jurisdictional wetland fill areas. The meeting summary is included in **Appendix A**. The procurement method for the project will be design-build. Consequently, the design-build team will be required to complete Concurrence Points 4B and 4C.

### 6.2 Project Website

The NCDOT has maintained a project website that includes a description of the project, project maps, and is updated with news on the project as it becomes available. The website also provides various forms of contact information for the public to reach NCDOT and ask questions or provide feedback on the project. The project website is located at the following address:  
[www.ncdot.gov/projects/triangleexpressway/access540.html](http://www.ncdot.gov/projects/triangleexpressway/access540.html).

### 6.3 Newsletter

A newsletter updating nearby residents on the progression of the project was mailed to approximately 80 residents in April 2014. This newsletter, included in **Appendix B**, provided a description of the project, explained the status of the project, and provided a map showing the proposed interchange location.

A comment form was also included and residents were encouraged to provide their feedback on the proposed study area, the purpose and need for the project and the alternatives to be considered. Nine comment forms were returned. Most citizens who returned a comment form were supportive of the project. Others expressed concerns regarding property impacts, visual impacts, noise impacts and air quality impacts. One respondent felt there was no current need for the project, that there were other more important transportation needs and that the project was being built to benefit developers.

## 6.4 Local Officials Meeting and Public Meeting

A Local Officials Meeting and Public Meeting for the Access 540 project were held on December 11, 2014 at the Apex Community Center. Detailed information on the meetings can be found in the Public Meeting Summary, Access 540 (HNTB, January 2015).

**Local Officials Meeting:** The Local Officials Meeting began at 2:00 PM with four local government officials in attendance and 13 members of the project team. The local officials invitation letter and mailing list can be found in **Appendix B**.



The following questions were asked during the Local Officials Meeting:

**Question:** When will the ultimate build out of the project occur and who will be responsible for its construction?

**Response:** *After NCDOT completes the interim construction of the interchange, the remainder of the project will be constructed based on development trends and the need for additional traffic capacity. It is anticipated that developers will complete the majority of the unbuilt portions of the interchange based on an agreement between NCDOT and the developer of a planned development called Veridea.*

**Question:** What is Veridea?

**Response:** *Veridea is a planned approximately 1,000-acre mixed-use development consisting of 10 million square feet of office uses, 3.5 million square feet of retail uses and approximately 2 million square feet of manufacturing space, in addition to 8,000 residential units. Veridea is located in the Town of Apex.*

**Public Meeting:** A total of 90 postcard notices were mailed informing the public of the purpose, date, and location of the Public Meeting. Additionally, the meeting was advertised on NCDOT’s Public Meetings website and print advertisements were placed in the News and Observer, Greater Diversity News, Wake Weekly, and the Triangle Tribune. Spanish-language advertisements were placed in La Conexión, Horizonte, AutoGuía, and Que Pasa. Finally, NCDOT sent out a press release to the News and Observer, WRAL-TV, WTVD-TV, WNCN-TV, Time-Warner Cable News, and WPTF Radio. An on-camera interview by NCDOT with WRAL-TV was conducted in advance of the meeting, but no outlets came to the meeting itself. Total attendance numbered 65 (include the project team) based on the sign-in sheets. The three-hour public meeting – held from 4:00 PM until 7:00 PM – was presented in an informal, open-house format with no formal presentation. During conversations with the project team, attendees provided verbal comments which generally related to access and property acquisition (right of way). One comment form was left during the Public Meeting and an additional comment form was mailed to NCDOT after the Public Meeting.

**ACCESS 540**  
**AT OLD HOLLY SPRINGS-APEX ROAD**  
 Wake County  
 STIP Project Number R-2635D

DECEMBER 11, 2014 — PUBLIC MEETING

**What's Inside**  
 Pg. 1...NCDOT Wants To Hear From You  
 Pg. 2...Alternatives Considered  
 Pg. 2...Recommended Alternative  
 Pg. 3...Project Map  
 Pg. 4...Other Information  
 Pg. 4...Next Steps  
 Pg. 4...Contact Information

**Our Mission**  
*Connecting people and places safely and efficiently, with accountability and environmental sensitivity to enhance the economy, health, and well-being of North Carolina.*

**PUBLIC MEETING**  
**—NCDOT WANTS TO HEAR FROM YOU—**

Welcome to today’s public meeting for the “Access 540” project. Your input is valued and your attendance greatly appreciated.

The Access 540 project is a proposal by the North Carolina Department of Transportation (NCDOT) to convert the existing bridge at the Triangle Expressway (Toll NC 540) and Old Holly Springs-Apex Road (SR 1153) to an interchange. The project would also construct approximately 1.5 miles of additional lanes (called “auxiliary lanes”) along the Triangle Expressway between the NC 55 Bypass and US 1.

Planning, engineering design, and environmental studies are underway. This includes identifying the purpose and need for the project, examining alternatives that satisfy the purpose and need, and analyzing the environmental effects of those alternatives.

**Purpose and Need for the Project:** The purpose of the Access 540 project is to improve access and roadway connectivity in response to planned and anticipated development in southern Apex. Traffic along Old Holly Springs-Apex Road is projected to increase substantially – from 1,900 vehicles per day in 2010 to 34,900 vehicles per day in 2035. Since the existing bridge does not connect to the Triangle Expressway, motorists desiring to access the Triangle Expressway from Old Holly Springs-Apex Road must travel an additional 4.5 to 5.5 miles.

The proposed interchange would provide a direct connection between the Triangle Expressway and Old Holly Springs-Apex Road. The proposed auxiliary lanes along the Triangle Expressway would provide an additional lane for entering and exiting traffic that is separate from the through travel lanes along this roadway. This would improve traffic flow and reduce congestion.

**PROJECT SCHEDULE \***

Public Meeting Held.....	December 2014
Environmental Studies Completed.....	February 2015
Construction Bids Opened.....	May 2015
Open to Traffic.....	2018

\* Subject to change

Project Phone No. : (919) 707-6025      Project Website : [www.ncdot.gov/projects/triangleexpressway](http://www.ncdot.gov/projects/triangleexpressway)

Summary of Verbal Comments Received by the Project Team

Attendees provided the following notable verbal comments during conversations with staff. Responses are provided where applicable.

- The new interchange is good planning in anticipation of future growth in the project area.
- How much right of way will be purchased and what will be the widening limits (typical section) when Old Holly Springs-Apex Road is widened on the north end?

*Response: The majority of the right of way needed for the project is already owned by NCDOT. Approximately five parcels would be impacted by right-of-way acquisition. The amount of right of way needed varies depending on the location. For more information on right of way and the roadway typical section, see **Sections 4.1 and 4.2.***

- Do developers have eminent domain? Can they (or the state) force me to sell?  
*Response: Private developers do not have eminent domain and cannot force an unwilling property owner to sell. The state does have eminent domain which gives it the legal authority to acquire private property for public purposes. However, it is NCDOT's sincere desire to reach an amicable agreement with each property owner and acquire property through negotiated agreements.*
- Will future widening of Old Holly Springs-Apex Road to the north be symmetrical or on one side?  
*Response: Widening of Old Holly Springs-Apex Road is not symmetrical where the roadway approaches the bridge. The widening gradually becomes symmetrical as one moves away from the bridge to where the improvements tie in to the existing two-lane roadway.*
- What are the differences between the interim design and ultimate design?  
*Response: See **Section 4.3.1** for a description of how the project's construction would be phased.*
- One citizen was concerned about impacts to a well which he said is 60 feet from the pavement edge of Old Holly Springs-Apex Road. The property is located at 3137 Old Holly Springs-Apex Road (on the east side of Old Holly Springs-Apex Road and north of the proposed interchange).  
*Response: If project construction or right-of-way acquisition would result in displacement of the existing well, this would be handled during right-of-way negotiations between NCDOT and the property owner. The property owner would be compensated for any damages resulting from the project.*
- One citizen was concerned about access to property located at 6300 King David Court (on the east side of Old Holly Springs-Apex Road and north of the proposed interchange). According to the citizen, access to the property is currently provided via a 50-foot easement.  
*Response: There is no control of access along Old Holly Springs-Apex Road in this location. Therefore, the proposed widening of Old Holly Springs-Apex Road would not prevent continued use of King David Court for access to the subject property.*
- One citizen was concerned about access to vacant property located on the west side of Old Holly Springs-Apex Road and south of the proposed interchange.  
*Response: Due to the proposed control of access limits in this location, the existing access drive may need to be relocated. If during final design it is determined that the existing access needs to be modified, this will be discussed with the property owner during right-of-way negotiations. NCDOT is required to provide access to a public street and if this is not feasible, the property will be acquired and just compensation provided.*
- A representative of Wake County government was concerned about access to the Wake County-owned landfill. Long term plans are to convert the landfill to another public use once the landfill is closed.  
*Response: Based on the preliminary designs, the proposed project would not prevent access to the landfill.*

The majority of comments related to access and right-of-way issues. No opposition to the Access 540 project was noted.

#### Summary of Written Comments

One comment form was left during the Public Meeting. The citizen stated the project would benefit the surrounding area and assist in relieving traffic congestion on Highway 55.

An additional comment form was mailed to NCDOT after the Public Meeting. The citizen expressed concern about impacts to an existing well on property located at 3137 Old Holly Springs-Apex Road (on the east side of Old Holly Springs-Apex Road and north of the proposed interchange). The citizen requested that the widening of Old Holly Springs-Apex Road be shifted to the west to avoid impacting “established property. “

*Response [Note: this is the same property discussed in the verbal comments above]: If project construction or right-of-way acquisition would result in displacement of the existing well, this would be handled during right-of-way negotiations between NCDOT and the property owner. The property owner would be compensated for any damages resulting from the project. The widening of Old Holly Springs-Apex Road in this location is generally symmetrical, so moving all widening to the other side of the road would simply be shifting impacts from one property owner to the other. Shifting the alignment to the other side would also result in an asymmetrical widening and extend the project construction to the north.*

No other written comments, including letters and email, were provided during the comment period which ended on January 12, 2015.

The postcard notice, handout, comment form and presentation slides are included in **Appendix B**.

## **7.0 Basis for Finding of No Significant Impact**

Based upon a study of the proposed project documented in this assessment and upon comments received from federal, state, and local agencies, and the public, it is the finding of the NCDOT that this project would not have a significant adverse impact upon the human or natural environment. The proposed project is consistent with local plans and would not disrupt communities. Per this evaluation, a Finding of No Significant Impact is applicable for this project. Therefore, no further environmental analysis will be required.

## 8.0 References

Town of Apex, [www.apexnc.org/](http://www.apexnc.org/)

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