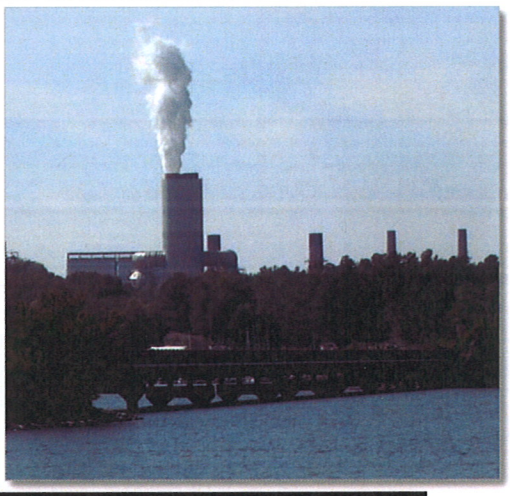

NC 150 IMPROVEMENTS
FROM THE NC 16 BYPASS TO JUST WEST OF THE US 21/NC 150 INTERCHANGE IN MOORESVILLE CATAWBA AND IREDELL COUNTIES NORTH CAROLINA

TIP PROJECT NOS. R-2307 AND I-5717
WBS NO. 37944.1.1
FEDERAL AID NO. STP-150(19)

ADMINISTRATIVE ACTION
Environmental Assessment

Submitted Pursuant to the
National Environmental Policy Act
42 U.S.C. 4332 (2)(c)

United States Department of Transportation
Federal Highway Administration
and
North Carolina Department of Transportation
Division of Highways

3-8-16
Date of Approval

for John F. Sullivan, III, PE
Division Administrator
Federal Highway Administration

2/26/16
Date of Approval

FOR Richard Hancock, PE, Manager
North Carolina Department of Transportation
Project Development and Environmental Analysis Unit

NC 150 IMPROVEMENTS
FROM THE NC 16 BYPASS TO JUST WEST OF THE US 21/NC 150 INTERCHANGE IN MOORESVILLE
CATAWBA AND IREDELL COUNTIES
NORTH CAROLINA

TIP PROJECT NOS. R-2307 AND I-5717
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Administrative Action
Environmental Assessment

February 2016

Documentation Prepared By:
STANTEC CONSULTING SERVICES INC.
RALEIGH, NORTH CAROLINA

For The:
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

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NC 150 Widening
From the NC 16 Bypass to just west of the US 21/NC 150 Interchange In Mooresville
Catawba and Iredell Counties
North Carolina

Tip Project NOS. R-2307 AND I-5717
WBS No. 37944.1.1
Federal Aid No. STP-150(19)

PROJECT COMMITMENTS

In addition to conditions and requirements contained in the project's Section 404 and 401 permits, the following special commitments have been agreed to by NCDOT:

Project Development & Environmental Analysis Unit

- Pending selection of a preferred alternative, the NCDOT Historic Architecture Group will continue to work with the NC Historic Preservation Office, FHWA, and other interested parties to resolve any remaining Section 106 and Section 4(f) issues.

Hydraulics and Roadside Environmental Unit

- Due to the proximity of streams with a Best Usage Classification of CA (Critical Area) and the Catawba River Buffer Rules (Lake Norman), sedimentation and erosion control measures shall adhere to the *Design Standards in Sensitive Watersheds* (15A NCAC 4B .0124).

Division 12

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

Project Development & Environmental Analysis Unit, Natural Environment Section

- Construction authorization will not be requested until Endangered Species Act compliance is completed for the Northern long-eared bat.

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EXECUTIVE SUMMARY

S.1 DESCRIPTION OF THE PROPOSED ACTION

The North Carolina Department of Transportation (NCDOT) proposes to improve the NC 150 corridor for a length of approximately 15 miles from the NC 16 Bypass in Catawba County to just west of the US 21/NC 150 Interchange in Iredell County, North Carolina (NCDOT STIP Project No. R-2307). The proposed project also includes improvements to the I-77/NC 150 interchange in Mooresville (NCDOT STIP Project No. I-5717).

To ensure a coordinated design, NCDOT is combining the two STIP projects into one environmental document. NCDOT proposes this approach because the projects are adjacent to each other and it would be practicable to develop the interchange modifications in coordination with the NC 150 widening improvements. Figure 1.1.1 shows the project location.

NCDOT proposes to improve NC 150 to a median-divided 'superstreet' facility. The purpose of a superstreet is to improve vehicular mobility and safety by limiting the number of conflict points between vehicles during traffic maneuvers. Section 3.2.6 contains additional information on superstreet facilities.

In addition to adding an additional travel lane in each direction, the proposed project also includes reconfiguring the I-77/NC 150 interchange, rehabilitating/replacing several bridges, and access management measures.

The proposed improvements include multiple cross-sections to accommodate existing and expected traffic demand. The four to six-lane typical sections, combined with the variable median widths, turn lanes, and U-turn bulbs result in the proposed right-of-way widths ranging from 100 to 260 feet in the rural areas and 100 to 190 feet in the urban areas.

S.2 OTHER GOVERNMENTAL ACTIONS REQUIRED

Due to the size of the project, an Individual Section 404 permit will likely be applicable. The US Army Corps of Engineers (USACE) will determine the type of permit that will be required in order to authorize project construction. If a Section 404 permit is required then a Section 401 Water Quality Certification (WQC) from the NC Department of Water Resources (NCDWR) will be required. The specific permit(s) will be determined once impacts for the build alternatives have been minimized and quantified during the final design phase.

S.3 ALTERNATIVES CONSIDERED

- Alternative Modes of Transportation
- Transportation Demand Management (TDM)
- Transportation System Management (TSM)
- Improve Existing Facility
- New Location Alternatives
- No-Build Alternative

Preliminary Build Alternatives – Four preliminary build alternatives were developed for the proposed project. All four alternatives were identical with the exception of their alignments through the Terrell Historic District. Because existing NC 150 passes through the Terrell Historic District, bypass options were developed to avoid and/or minimize impacts to the historic district. In addition to evaluating widening though the historic district, two new location bypass options were developed to *avoid* impacts to the Terrell Historic District ("avoidance alternatives") and one new location bypass option was developed to *minimize* impacts to the Terrell Historic District ("minimization alternative"). The proposed bypass options would require additional right of way and would create a higher level of impacts to other resources; however, these options were developed for consideration in accordance with Section 4(f) regulations. Additional discussion of Section 4(f) requirements can be found in Sections 4.3 and 5.3.

Four preliminary build alternatives, shown in Figure 3.2.2 were developed and are described as follows:

Alternative 1 proposes to widen NC 150 with a best-fit alignment that that would continue through the Terrell Historic District along existing NC 150.

Alternative 2 proposes to widen NC 150 with a best-fit alignment but includes a northern bypass option to avoid the Terrell Historic District.

Alternative 3 proposes to widen NC 150 with a best-fit alignment but includes a minimization bypass option that would cross through the southern portion of Terrell Historic District, but would not physically impact any structures within the district.

Alternative 4 proposes to widen NC 150 with a best-fit alignment but includes a southern bypass option to avoid the Terrell Historic District.

Alternatives Carried Forward – On August 13, 2014, the NEPA/404 Merger Team eliminated Alternative 3 from further consideration. While, Alternative 3 would not directly impact any structures in the historic district, it would likely change the district's rural character and landscape, resulting in an adverse effect under Section 106 of the National Historic Preservation Act of 1966. The NEPA/404 Merger Team agreed that Alternatives 1, 2, and 4 would be carried forward for detailed study (Concurrence Point 2).

The Concurrence Point 2A meeting was held on June 10, 2015 to discuss bridging and hydraulic structure recommendations, as well as to review the alternatives to be carried forward for detailed study. Due to significant stream impacts, geometric design constraints, and the "Adverse Effect" finding by the State Historic Preservation Office (HPO), the

NEPA/404 Merger Team requested further evaluation of Alternative 4. Upon further review, the NEPA/404 Merger Team revised the Concurrence Point 2 form, agreeing that Alternative 4 would not be carried forward for presentation at the public hearing and would be removed from further consideration due to the "Adverse Effect" finding, significant impacts to stream and riparian buffers, geometrics constraints, and potential safety and operational issues associated with the design.

The alternatives retained for presentation at the public hearing include:

- Alternative 1: Best Fit -Widen Existing NC 150 (No Terrell Bypass Option)
- Alternative 2: Best Fit – Widen Existing NC 150 & Northern Terrell Bypass Option

The alternatives are discussed in more detail in Sections 3.1 and 3.2.

S.4 SUMMARY OF IMPACTS

The impacts for the detailed study alternatives are summarized in Table S.1.

S.5 RECOMMENDED ALTERNATIVE

NCDOT has not selected a recommended alternative. The Recommended Alternative will be identified after the Design Public Hearing and the NEPA/404 Merger Team meeting for Concurrence Point 3 (*Identification of the Least Environmentally Damaging Practicable Alternative*).

S.6 AGENCY COORDINATION

Input was sought from the following federal, state, and local agencies and organizations during the development of this EA:

- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- N.C. Wildlife Resources Commission
- N.C. Department of Agriculture
- N.C. Environmental Review Clearinghouse
- Greater Hickory Metropolitan Planning Agency
- Catawba County Board of Commissioners
- Iredell County Planning Department
- U.S. Environmental Protection Agency
- Federal Energy Regulatory Commission
- N.C. Department of Natural and Cultural Resources
- U.S. Forest Service
- Town of Mooresville
- Charlotte Regional Transportation Planning Organization
- Catawba County Planning Department
- Duke Energy

TABLE S.1
SUMMARY OF IMPACTS FOR THE DETAILED STUDY ALTERNATIVES

ENVIRONMENTAL FEATURES		ALTERNATIVE 1	ALTERNATIVE 2
Length (miles)		15.03	15.42
Relocations[1,2]	Residential	40	40
	Businesses	63	60
	Non-profit	1	1
	Total Relocations	***104***	***101***
Disproportionate Impact to Minority/Low Income Pop.		0	0
Historic Properties (*adverse effect*)		1	0
Community Facilities Impacted		0	0
Section 4(f) Impacts (*de minimus determination*)[3]		1	1
Noise Receptor Impacts [4]		130	124
Prime Farmlands (acres) [5]		148	182
Upland Forested Acres (acres) [6]		Managed Pine: 18.1 Oak-Hickory: 10.7	Managed Pine: 30.9 Oak-Hickory: 14.5
Streams (linear feet)		1,830	1,593
Wetlands (acres) [6]		0.44	0.79
100 Year Floodplain and Floodway Impacts (acres) [7]		5.52	5.52
Federally Protected Species	*(Northern long-eared bat)*	Unresolved	Unresolved
Construction Cost	Without Multi-use Path	$195,833,200	$201,433,200
	With Multiuse Path	$202,238,900	$208,188,900
Utility Relocation Cost	Without Multi-use Path	$9,064,452	$8,628,919
	With Multiuse Path	$9,718,140	$9,259,261
Right-of-Way Cost	Without Multi-use Path	$174,475,000	$172,150,000
	With Multiuse Path	$180,675,000	$178,400,000
Total Cost	***Without Multi-use Path***	***$379,372,652***	***$382,212,119***
	With Multiuse Path	***$392,632,040***	***$395,848,161***

NOTES: The proposed project would not affect any archaeological resources or water supply watersheds. It would not create any impacts to hazardous materials sites.

1. The number of relocations shown above are conservative estimates of a worst-case scenario for each alternative. A smaller number of relocations are likely after the implementation of avoidance and minimization measures developed during final design.
2. Construction of the multi-use path would relocate an additional three residences and three businesses for both alternatives.
3. Because the proposed earthwork at the entrance to the Marshall Steam Plant would not adversely affect the activities, features and attributes that qualify the facility for protection under Section 4(f), FHWA is considering a Section 4(f) de minimis determination.
4. Based on preliminary study, traffic noise abatement is recommended and noise abatement measures are proposed. Four noise barriers are recommended for Alternative 1 and two noise barriers are recommended for Alternative 2. An additional noise analysis will be performed during final design of this project to develop detailed locations and dimensions of the recommended noise barriers.
5. Acreage is based on the proposed right-of-way for each alternative. Actual construction impacts would less than the acreage shown above.
6. Impact quantities are based on construction limits plus an additional 25 feet. Impacts to wetland forest communities are shown separately.
7. Reed Creek, Mountain Creek, and Catawba Creek have delineated regulatory floodplains; however, the creeks are "covered" by Lake Norman; as such, the AE Zone (i.e., 100-year floodplain) boundary is the edge of Lake Norman at full volume (760 feet above mean sea level). Due to this atypical condition, floodplain impacts are actually identical to surface water impacts associated with the causeway construction across Lake Norman.

S.7 ADDITIONAL INFORMATION

The following individuals may be contacted for additional information concerning this Environmental Assessment:

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1.0 DESCRIPTION OF PROPOSED ACTION

The North Carolina Department of Transportation (NCDOT) proposes to improve the NC 150 corridor from the NC 16 Bypass in Catawba County to just west of the US 21/NC 150 Interchange in Iredell County, North Carolina (NCDOT STIP Project No. R-2307). The proposed project also includes improvements to the I-77/NC 150 interchange in Mooresville (NCDOT STIP Project No. I-5717). To ensure a coordinated design, NCDOT is combining the two STIP projects into one environmental document. NCDOT proposes this approach because the projects are adjacent to each other and it would be practicable to develop the interchange modifications in coordination with the NC 150 widening improvements. Figure 1.1.1 shows the project location.

This Environmental Assessment (EA) is prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended, and is intended for use by both decision-makers and the public. It includes the disclosure of relevant environmental information regarding the proposed project and conforms to the methodologies and requirements detailed in North Carolina General Statute 133A, Sections 1 through 13, as well as the Federal Highway Administration's (FHWA) technical advisory, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents*.[1]

1.1 PROJECT SETTING

NC 150 is classified as an arterial and is predominately a two-lane undivided facility that widens to a five-lane facility with a center shared turn-lane through the Town of Mooresville to the eastern terminus of the project at the US 21/ NC 150 interchange.

NC 150 is a major east-west route between Shelby, Lincolnton, and Mooresville. According to the 2013 American Community Survey 5-Year Estimates, 45,383 people live in the project study area. The western portion of the project study area is predominantly rural in nature with single family neighborhoods clustered around Lake Norman. In the eastern portion of the study area, through the Town of Mooresville, extensive commercial development and high density neighborhoods are the predominant features. This section of NC 150 also serves as an important transportation corridor for emergency and disaster response as part of the 10-mile Emergency Planning Zone (EPZ) for the McGuire Nuclear facility in Mecklenburg County.

The project study area contains numerous recreational opportunities and attractions, most notably the Terrell Historic District, Marshall Fishing Area, Pinnacle Access Area, and McCrary Creek Access Area. All of the named lake access areas are owned by the Duke Energy and managed by the North Carolina Wildlife Resources Commission. Other land use in the project study area include subdivisions, commercial properties, and churches.

1 Federal Highway Administration. (1987). *Guidance for Preparing and Processing Environmental and Section 4(f) Documents*. Retrieved from http://environment.fhwa.dot.gov/projdev/impta6640.asp.

1.2 PROPOSED ACTION

NCDOT proposes to improve NC 150 to a four-lane, median-divided 'superstreet' facility. The purpose of a superstreet is to improve vehicular mobility and safety by limiting the number of conflict points between vehicles during traffic maneuvers. A superstreet design reduces the potential for collisions by limiting the number of left-turns and moves traffic through an intersection more efficiently, ultimately translating into shorter travel times. Compared to conventional intersections, the elimination of left turns substantially reduces the number of potential conflict points and the severity of accidents. Section 3.2.6 contains additional information on superstreet facilities.

The proposed project also includes reconfiguring the I-77/NC 150 interchange, replacing several bridges, and access management measures. The proposed roadway cross-section consists of a four-lane, divided facility including curb and gutter. In the rural areas, the median is 46 feet wide with eight-foot shoulders. In the more urban/suburban areas, the median is a 23-foot raised median with ten-foot shoulders. Overall, the project length is 15.0 miles and the proposed right-of-way varies throughout the length of the project.

1.3 CORRIDOR HISTORY

A feasibility study to widen 22.6 miles of NC 150 from Lincolnton to I-77 was prepared in 1988 and the widening was subsequently added to the STIP as an unfunded project. In 2003, the Sherrills Ford Small Area Plan noted the existing and projected congestion along NC 150 in the Lake Norman area. The proposed improvements were also identified in the 2006 Lincoln County Comprehensive Transportation Plan, 2007 Catawba County Thoroughfare Plan, the 2008 Mooresville Comprehensive Transportation Plan, and the 2010 Greater Hickory Long Range Transportation Plan. The NC 150 corridor has also been discussed in detail in the NC 150 Corridor Plan, adopted by Catawba County in September 2014, and the Iredell 2030 Horizon Plan, completed in 2009 and updated in 2013.

1.4 NEPA/404 MERGER PROCESS

In 1997, in an effort to streamline the NEPA process, NCDOT, Federal Highway Administration (FHWA), and the US Army Corps of Engineers (USACE) developed an interagency agreement that merged/combined the NEPA process and the Section 404 permitting process. This "NEPA/404 Merger Process" allows federal and state environmental regulatory and resource agencies to participate in the transportation decision making process. The NEPA/404 Merger Process is structured with milestones called "concurrence points" that occur at key decision points in the NEPA process. The NEPA/404 Merger Team meets and seeks agreement on each of the following concurrence points: 1) Purpose & Need and Project Study Area; 2) Development of Study Alternatives; 2A) Alternative Bridging Decisions & Alignment Review; 3) Selection of the Least Environmentally Damaging Practicable Alternative (LEDPA) which is also referred to as the "Preferred Alternative"; 4A) Section 401/404 Avoidance & Minimization; 4B) 30% Hydraulic Review; and, 4C) Permit Drawings Review.

Concurrence Point 2 has one sub-point: 2A, in which the NEPA/404 Merger Team decides on bridge locations and the approximate bridge lengths for each detailed study alternative. Concurrence Point 4 includes three sub-points, 4A, 4B, and 4C, which focus on the project's alignment, hydraulic design, and permit drawings. Concurrence Points 3 and 4A occur after the distribution of the draft environmental document and the Public Hearing. Concurrence Points 4B and 4C occur during the final design and permitting phases of the project.

The proposed project is being developed through the NEPA/404 Merger Process to ensure systematic evaluation of the project plus avoidance and minimization of all potential impacts. This document contains the signature forms and results of decisions made at meetings for Concurrence Points 1, 2, and 2A. The remaining concurrence points will be discussed prior to the completion of the environmental analysis and permitting phases.

1.5 PROJECT FUNDING

This project is included in the NCDOT STIP as Project Nos. R-2307 and I-5717. The STIP separates the project into two sections for funding purposes. Section A (R-2307A) extends from NC 16 Bypass to SR 1902 (Harvel Road) and Section B (R-2307B) extends from Harvel Road to the US 21/NC 150 interchange. Section B is scheduled for right-of-way acquisition and construction in fiscal years 2017 and 2019, respectively. Right-of-way for Section A is scheduled for 2022. Construction for Section A is currently unfunded. For the purposes of this document, costs associated with the improvements to the I-77 Interchange (STIP Project No. I-5717) are included in Section R-2307B. Table 1.5.1 shows the Project's funding breakdown in the current STIP.

TABLE 1.5.1
STIP FUNDING STRUCTURE

SECTION	RIGHT-OF-WAY COST	UTILITIES COSTS	CONSTRUCTION COST
R-2307A – NC 16 Bypass to SR 1902 (Harvel Road)	$50,000,000	$3,400,000	$88,000,000
R-2307B – SR 1902 (Harvel Road) to US 21 *(excluding the I-77 interchange)*	$86,000,000	$5,600,000	$109,000,000
I-5717 – I-77 Interchange	$900,000	---	$10,200,000

2.0 PURPOSE OF AND NEED FOR PROJECT

2.1 PROJECT PURPOSE

The purpose of the project is to improve traffic capacity and reduce congestion along NC 150 from the NC 16 Bypass the US 21/NC 150 Interchange.

The original project termini were the NC 16 bypass to just west of the I-77/NC 150 interchange. The project limits were revised in August of 2014 based on the project team's determination to prepare a single environmental document for the R-2307 (NC 150 Widening) and I-5717 (I-77 interchange improvements) projects to ensure a coordinated design and assessment of potential impacts. The revised project limits extended from the NC 16 bypass to the US 21/NC 150 interchange in Mooresville. The Merger Team re-vised the original Concurrence Point 1 form to include the revised project limits in the purpose and need statement. The original and revised Concurrence Point 1 forms are included in Appendix A.

2.2 PROJECT NEED

A Traffic Forecast Report was completed for the project in September 2013. The report developed projections based on a 2.3% year-over-year growth rate, consistent with historic trends and related forecasts. Figures 2.2.1 and 2.2.2 show the average annual daily traffic (AADT) volumes for the current year (2015) and design year (2040). Current traffic volumes along NC 150 range from approximately 13,200 vehicles per day (vpd) at NC 16 Bypass to 45,700 vpd at I-77. East of I-77, current traffic volumes range from approximately 41,400 to 36,900 vpd at US 21.

The findings of the report indicated that 2015 NC 150 traffic volumes exceed two-lane capacity (14,300 vpd) between Sherrills Ford Road and the I-77 Interchange commercial district and that west of Sherrills Ford Road, NC 150 traffic volumes are anticipated to exceed capacity between 2015 and 2020. Existing traffic volumes within the I-77 commercial district already exceed the capacity of a five-lane facility (39,800 vpd). Design year (2040) traffic volumes along NC 150 within the project corridor range from approximately 18,000 vpd at NC 16 Bypass to 58,700 vpd at I-77. East of I-77, projected design year traffic volumes range from 53,100 to 45,300 vpd at US 21. Projected traffic volumes along the entire length of NC 150 will exceed two-lane capacity by 2040. Additionally, five-lane capacity will be exceeded from the Mooresville Crossing shopping center entrance to US 21 by 2040.

NC 150 serves traffic demands and travel patterns for commuters and other travelers within and outside of the project study area, and is a major east-west route between Shelby,

Lincolnton, and Mooresville. Currently, heavy traffic occurs during peak periods within the project limits, resulting in frequent congestion and delays. Existing traffic congestion within the NC 150 corridor results in excessive travel times for commuters and travelers. Projected growth in the corridor, particularly around the I-77 interchange, will continue to increase these delays and travel times.

2.3 POPULATION GROWTH

Between 2000 and 2010, Lincoln (22.7%) and Iredell Counties (30%) grew at rates much higher than the average for North Carolina (18.5%), while the more rural Catawba County (8.9%) grew at a lower rate. Local planners identify the portions of Catawba and Iredell Counties within the project study area as areas of slower growth.[1] However, as the City of Charlotte continues to grow in population and add employment opportunities, surrounding communities, including the project study area, will also continue to see growth in population.

2.4 ROADWAY CAPACITY

The adequacy of the existing system was evaluated based on its capacity to handle projected design year traffic volumes. The accepted methodology for this evaluation is to compare projected traffic volumes with roadway capacity and compute the volume-to-capacity ratio (v/c). The v/c ratio, in addition to other indicators such as projected speed and intersection delay, is used to find and report the facility's level-of-service (LOS).

The LOS may range from A to F where LOS A is a low v/c indicating smooth free-flowing traffic and LOS F has a high v/c indicating the worst-case scenario with high congestion and a complete breakdown of traffic flow. Levels-of-service A through C are desired levels, although LOS D is considered acceptable for urban facilities. Traffic conditions exceeding LOS D (E and F) are deemed unacceptable. These undesirable LOS conditions represent substantial travel delay, increased accident potential, and inefficient motor vehicle operation.

Table 2.4.1 shows the intersection LOS and delay along NC 150 within the project corridor based off of the base year (2015) traffic volumes and the No-Build traffic volumes for the design year (2040).

As shown below in Table 2.4.1, without improvement, most intersections along the project corridor will operate at an undesirable level of service in 2040.

1 Community Impact Assessment for the proposed NC 150 Widening. Prepared by Kimley-Horn and Associates. June 2014.

TABLE 2.4.1
INTERSECTION LEVEL OF SERVICE AND DELAY:
EXISTING (2015) AND FUTURE (2040) NO-BUILD CONDITIONS

NC 150 INTERSECTIONS	2015 EXISTING		2040 NO-BUILD	
	AM	PM	AM	PM
NC 16 Bypass SB Ramp	A (5.9)	A (4.9)	C (25.9)	C (21.8)
NC 16 Bypass NB Ramp	B (16.6)	C (23.2)	D (42.4)	E (74.3)
East Maiden Road	C (15.8)	A (5.9)	F (##)	F (##)
NC 16 Business	C (33.4)	C (27.0)	F (190.7)	F (170.0)
Grassy Creek Road	A (3.0)	A (2.8)	F (61.1)	F (50.2)
Mt. Pleasant Road	A (4.2)	A (3.4)	F (##)	F (##)
Little Mountain Road	A (2.5)	A (1.7)	F (##)	E (41.2)
Slanting Bridge Road	C (30.9)	C (23.8)	F (132.5)	F (100.2)
Sherrills Ford Road	C (27.6)	C (24.7)	F (188.5)	F (179.4)
Marshall Steam Station/ Kiser Island Road	B (13.0)	B (14.9)	F (124.1)	F (133.9)
Greenwood Road	A (1.6)	A (1.4)	F (202.8)	F (131.4)
NC150 @ Robinson Road/ Mccrary Road	A (2.4)	A (1.3)	F (##)	F (120.9)
Perth Road/ Doolie Road	D (41.3)	F (83.0)	F (182.1)	F (283.4)
Ervin Road/ Morrison Plantation Park	F (83.7)	E (64.2)	F (228.1)	F (183.0)
Target / Mooresville Crossing Entrance	C (24.3)	C (23.0)	D (37.7)	D (41.0)
Williamson Road/ Bluefield Road	E (78.8)	E (64.6)	F (276.4)	F (229.5)
NC 150@ Lowes /Food Lion Access	B (18.8)	B (17.6)	D (48.2)	E (77.0)
Rolling Hill Road/ Regency Center Drive	E (65.8)	F (83.0)	F (190.7)	F (194.6)
I-77 SB Ramp	D (45.8)	C (31.7)	F (129.1)	F (93.6)
I-77 NB Ramp	B (19.8)	C (23.2)	E (65.2)	E (74.0)
Norman Station Blvd./Driveway	C (29.9)	C (33.0)	E (75.4)	E (76.4)
Corporate Center Drive/ Driveway	A (7.5)	A (6.7)	B (13.1)	B (13.0)
Talbert Road	C (32.1)	D (35.3)	F (109.0)	F (106.2)
Macleod Drive/ Driveway	B (12.7)	B (13.1)	C (31.9)	D (41.8)

NOTES: ## - Synchro indicated an error for the delay for this approach, meaning that the delay is very high. Shaded intersections have undesirable LOS conditions.

2.5 SYSTEM LINKAGE

2.5.1 Description of Existing Conditions

NC 150 serves local and regional traffic and ranges from two to five lanes in width with speed limits varying from 35 mph to 55 mph. The section of NC 150 that lies within the project study area is classified as a principal arterial and carries traffic between NC 16 (principal arterial) to the west and I-77 (interstate) and NC 21 (minor arterial) to the east.

Roadway Cross-Section – NC 150 is predominately a two-lane undivided facility that widens to a five-lane facility with a center shared turn-lane through the Town of Mooresville to the

eastern terminus of the project at the US 21/ NC 150 interchange. In the rural areas west of Ervin Road/Morrison Plantation Park, NC 150 is a two-lane, undivided facility with one 12-foot travel lane in each direction with grass and paved shoulders of varying widths. In the urban areas east of Ervin Road/Morrison Plantation Park, NC 150 is a five-lane curb and gutter section.

Horizontal and Vertical Alignment – In the rural areas, NC 150 follows rolling terrain that limits sight distances, reducing the number of locations were slower traffic can be passed safely. In the suburban/commercial areas, with the exception of the Bluefield Road/Williamson Road intersection, NC 150 is generally flat with no major grade changes or curves

Right-of-Way and Access Control – The existing right-of-way is 60 feet for the two-lane section and 100 feet for the five-lane section. NC 150 currently has no access controls except at the interchange with I-77.

Speed Limit – The posted speed limit on NC 150 within the project study area ranges from 35 to 55 miles per hour (mph).

Intersections/Interchanges – The project study area contains a total of 22 major intersections with sixteen signalized intersections. There is one interchange at I-77 within the project study area.

Railroad Crossings – Just west of SR 1844 (Slanting Bridge Road), NC 150 crosses a bridge over the CSXT railroad line serving the Marshall Steam Station. There are no at-grade rail crossings along the project corridor.

Structures – There are seven bridges at six sites located on this section of NC 150.

Bicycle and Pedestrian Facilities/Greenways – There are currently only very short, isolated segments of sidewalk in front of businesses within the project study area with one longer stretch of sidewalk along NC 150 around the Ervin Road/Morrison Plantation Park intersection.

Utilities – Due to the suburban and urban setting of the project study area, a number of utilities are present within the project study area. Water lines and sewer lines managed by Iredell County and the Town of Mooresville are present along NC 150 for the entire length of the R-2307B project. Overhead power lines with cable TV as well as underground telephone lines, fiber optic, and gas lines are also present along the corridor.

2.5.2 Transportation and Land Use Plans

As stated previously, this project is included in the STIP as Project Nos. R-2307 and I-5717. The eastern portion of the project in Mooresville is identified in the Comprehensive Transportation Plan Study Report for Iredell County.[2] The need is based on growing congestion in the area. Widening NC 150 through Catawba County is recommended in the Catwaba County Thoroughfare Plan[3], Lincoln County Comprehensive Transportation Plan 2006[4], Mooresville Comprehensive Transportation Plan 2007[5] and the Charlotte Regional Transportation Planning Organization (CRTPO) Comprehensive Transportation Plan.[6]

Other Highway Projects in the Area – As shown in Figure 2.5.1, there are a number of NCDOT STIP projects located in proximity to the proposed project.[7]

STIP Project R-3100 is the widening of 9.1 miles of NC 16 from SR 1895 (Tower Road) to SR 1814 (Caldwell Road) in Catawba County. The project is divided into three sections. Section C from SR 1801 (Claremont Road) to SR 1800 (Caleb Setzer Road) is complete. Right-of-way acquisition for the two remaining sections has begun and construction is scheduled to begin in November 2016 (R-3100A) and January 2017 (R-3100B).

STIP Project I-4750 is the widening of I-77 from SR 5544 (West Catawba Avenue) in Cornelius to I-40 in Statesville. Section AA is currently under construction and includes the addition of one High-Occupancy Lane on I-77 from SR 5544 to NC 150. The remaining sections are unfunded.

STIP Project R-4757 would realign SR 1206 (Alcove Road). The project is currently funded for planning and environmental studies only.

STIP Project R-5100 is the widening of SR 1109 (Williamson Road) from I-77 to NC 150 for a distance of 3.2 miles. Right-of-way acquisition is scheduled to begin in 2020 and construction to begin in 2022.

2 NCDOT. Comprehensive Transportation Plan Study Report. Transportation Planning Branch. 2008.
https://connect.ncdot.gov/projects/planning/TPBCTP/Iredell%20County/IredellCo_CTP.pdf
3 Catawba County Thoroughfare Plan.
http://www.catawbacountync.gov/Planning/Plans/Thoroughfare/thoroughfareplan.pdf
4 Lincoln County Comprehensive Transportation Plan 2006
https://connect.ncdot.gov/projects/planning/TPBCTP/Lincoln%20County/LincolnCo_CTP.pdf
5 Mooresville Comprehensive Transportation Plan 2007
https://connect.ncdot.gov/projects/planning/TPBCTP/Mooresville/MooresvilleCTP_2008Report.pdf
6 Greater Hickory Long Range Transportation Plan 2010
http://www.crtpo.org/PDFs/ComprehensiveTransportationPlan/DraftMaps/CRTPO%20Highway%20Map%20Sheet2.pdf
7 NCDOT 2016-2025 State Transportation Improvement Program.
http://ncdot.maps.arcgis.com/home/webmap/viewer.html?webmap=cb02f4f828974670ad01bb83be91b18c

STIP Project U-5816 would widen SR 1305 (Oates Road – Midnight Lane) from US 21 (Charlotte Highway) to SR 1474 (Bluefield Road) for a distance of 1.5 miles. Right-of-way acquisition is scheduled to begin in 2019 and construction to begin in 2021.

STIP Project U-5817 would extend SR 1246 (Fairview Road) for a distance of 0.1 mile over I-77 on a new structure to connect with SR 1206 (Alcove Road). Right-of-way acquisition and construction are scheduled for 2019 and 2021, respectively.

Land Use – Two developments have been approved at the NC 150/NC 16 interchange. Lowe's Home Improvement Center will be built in the northeast quadrant. Crosland Bridgewater, a 97-acre retail, office, and light industrial development, will be built in the southeast quadrant and will be located in both Catawba and Lincoln counties. Three additional sites had been in the planning process in the late 2000s, and have since been put on hold due to economic conditions. These sites include a 40-acre mixed-use site in the northeast quadrant of the intersection of NC 150 and Sherrills Ford Road; a residential development on Sherrills Ford Road near Island Point Road; and, a 200-acre mixed-use development at the intersection of NC 150 and Slanting Bridge Road, which would be adjacent to the historic district in Terrell. This project stalled before construction could begin; however it has recently been revived and land clearing is currently occurring.[8]

2.5.3 System Linkage/Travel Time/Access Need

NC 150 is a principal arterial that runs east-west through the project study area. It serves North Carolina's western piedmont, connecting Lincoln, Gaston, and Cleveland Counties in the south to Rowan, Davidson, Forsyth, Guilford, Rockingham, and Caswell Counties in the central and northern piedmont. Major towns and cities served by this facility include Shelby, Lincolnton, Mooresville, Salisbury, and Winston-Salem.

Local System – NC 150 provides regional connectivity between Lincolnton in the west to Mooresville in the east, crossing Lake Norman in the Sherrills Ford area. Numerous roadways intersect with NC 150 between US 16 and US 21, including Mount Pleasant Road (SR 1849), which begins at NC 150 and extends northward to Sherrills Ford Road. Little Mountain Road (SR 1815) also begins at NC 150 and travels northward to Balls Creek Road (SR 1810). Farther east, Campground Road becomes Slanting Bridge Road (SR 1844) before crossing NC 150 and ultimately terminating at Sherrills Ford Road (SR 1848). Sherrils Ford Road starts at NC 150 and continues north. On the eastern side of Lake Norman, Perth Road (SR 1303) also begins at NC 150 and continues to Troutman for 7.55 miles, terminating at US 21. Morrison Plantation Park provides access between NC 150 to Brawley School Road (SR 1100), while Williamson Road (SR 1109)/Bluefield Road (SR 1467) provides access from I-77 in the south to Cornelius Road (SR 1302) in the north. NC 150 becomes Plaza Drive east of Williamson Road/Bluefield

8 NCDOT. 2014. Community Impact Assessment for the NC 150 Improvements. Human Environment Studies. June 2014.

Road and extends east across I-77 to US 21. Talbert Road, which runs parallel to I-77 and US 21, is another important connector between Brawley School Road (SR 1100) south of NC 150 and Oates Road (SR 1305) to the north of NC 150.

Regional System – US 16 extends northward from Charlotte across NC 150 to Newton/Conover and I-40 in the north. US 16 Business splits from US 16 at Lucia, crossing US 16 north of Lowesville. The roadway eventually becomes one roadway at Tower Road in the north after crossing NC 150. US 21, which runs parallel to I-77, begins in Hunting Island, South Carolina and travels northeast through Columbia and Charlotte before terminating in Wytheville, Virginia.

Interstate System – On the eastern side of Lake Norman, NC 150 crosses I-77, an interstate highway spanning from Columbia, South Carolina to Cleveland, Ohio, via Charleston, West Virginia.

Modal Interrelationships

Bus – The Town of Mooresville is served by the Iredell County Area Transportation System, which operates the Mooresville Main deviated route bus system. This bus route provides access to local destinations, including neighborhoods, shopping destinations, and the local community college. This route provides access to destinations close to the project corridor, including Big Lots, Walmart, Target, and Best Buy, and travels within the project corridor to reach these destinations. Otherwise, fixed route transit is provided in Hickory/Newton by Greenway Transit (Piedmont Wagon Transit System) and Statesville (The Statesville Bloom).

Areas around the project corridor are not otherwise served by a fixed route bus system, though demand-response service is provided through the Iredell County Area Transportation System in Iredell County and through the Greenway Public Transportation service in Catawba County. Service is provided to eligible county residents in various formats. Complementary Paratransit Service is provided to those who are either disabled or otherwise qualify under the American with Disabilities Act, while demand response service is provided to the general public for a small fee. Additionally, contracted Dial-A-Ride service is also provided to contracted agencies.

Air – The Charlotte-Douglas International Airport (CDIA) is approximately 40 miles south of the project study area and is accessible via I-77. CDIA ranks 11th nationwide in passengers carried and 34th nationwide in cargo transported.[9] The Concord Regional Airport, located

9 City of Charlotte. 2011d. Charlotte Douglas International Airport general information. http://charmeck.org/city/charlotte/Airport/AboutCLT/Pages/default.aspx

17 miles southeast of the project study area provides regional air service to Orlando and Tampa/St. Petersburg, Florida.[10]

Rail – CSXT operates a rail lines that cross over a portion of Lake Norman and under NC 150 to serve the Marshall Steam Station. The nearest Amtrak intercity passenger rail station is located in Kannapolis, approximately 19 miles east of the study area.

Pedestrian/Bicycle – There are currently only very short, isolated segments of sidewalk in front of businesses within the project study area with one longer stretch of sidewalk along NC 150 around the Ervin Road/Morrison Plantation Park intersection. Bicycle planning at the county and regional level has been ongoing, most notably with adoption of the Lake Norman Bike Route. The Lake Norman Bike Route plan details a variety of needed bike facility improvements throughout the Lake Norman area. Pedestrian and bicycle system planning has been detailed in several documents including the Greater Hickory Recreation/Tourism Plan (2006), Catawba County Master Parks and Recreation Plan (2007), the Lake Norman Bicycle Route Plan (2010) and the Carolina Thread Trail Master (CTT) Trail Plan for Catawba County Communities (2010). NC 150 is identified as part of the proposed Carolina Thread Trail, a regional network of greenways, trails and blueways that connect to 220 miles of trails thorough 15 counties and across two states.[11]

School Bus Usage – Approximately 58 school buses use NC 150 each school day (30 from Iredell County schools, 20 from Mooresville Graded School District, and eight from Catawba County schools)) to access Lake Norman High School and other area schools.

Other Special Users – Travelers on NC 150 include vehicles traveling to and from the Marshall Steam Station, tractor trailers and vehicles with boat trailers carrying boats to the various marinas along NC 150, and recreational vehicles (RVs) traveling either to or through the area.

2.5.4 Economic Development/Land Use Changes

The proposed project is consistent with the goals and plans for the area as expressed in local land use, transportation, and development plans. Catawba County's Small Area Plan for the Sherrills Ford Area includes a discussion of economic development in the district. The plan notes that economic development for this area historically has been very limited, with just a few large manufacturing facilities (Duke Power's Marshall Steam Station and CommScope's Sherrills Ford Plant) providing Iredell County's largest tax base. Ideal development for this area will be oriented toward smaller projects such as small business parks, light office/institutional, low-impact manufacturing, and service companies on sites of

10 City of Concord, NC Official Website: Concord Regional Airport, 2014. http://www.concordnc.gov/departments/concord-regional-airport
11 Carolina Thread Trail: http://www.carolinathreadtrail.org/

30 acres or less. This type of development would also have the benefit of diversifying job types and reducing travel trips outside of the county.[12]

The 16 South Corridor Development Plan notes that Catawba County has been moving away from its historic reliance on traditional manufacturing industries, and has shifted to a more diversified mix of health care, finance, retail, food, and administration. The plan identifies several goals to continue to strengthen the economy, such as encouraging development at the NC 150/NC 16 Bypass interchange and creating more high quality aesthetically pleasing developments.[13]

Local economic development plans also include recommendations related to transportation and land use along the NC 150 corridor, in particular, goals to make the area more attractive to the retirement community; expand water/sewer infrastructure and transportation networks; and, provide government incentives to attract new businesses.[14]

2.5.5 Benefits of Proposed Project

Primary benefits of the proposed project include improved safety and better connectivity to the Lake Norman area, particularly from points east and south of the project corridor, including Salisbury and Charlotte. The proposed improvements would also help alleviate congestion along NC 150 through Mooresville. The proposed project would provide sidewalks and six-foot paved shoulders, which would accommodate bikes. A multi-use path, which may be funded through other sources, is also proposed.

2.6 CRASH DATA AND SAFETY

An accident study of NC 150 in Iredell and Catawba Counties was conducted to determine the accident potential and relative safety of the existing roadway. A total of 2,391 reported accidents occurred along the studied portion of NC 150 during the period between August 1, 2010 and July 31, 2015. Two crashes (0.08%) involved fatal injuries, 574 (24%) involved non-fatal injury crashes, and 1815 (76%) resulted in property damage-only crashes. The 2,391 reported accidents resulted in an estimated $9,867,680 loss in property damage. Table 2.6.1 is a summary of the recorded accident types along the studied roadway during this period. A comparison of the accidents along the studied route shows the most frequent single type of accident involved a rear-end collision (53.7%). The large percentage of rear-end collisions indicates a congested roadway with numerous driveway access points and at-grade intersections.

12 Catawba County Small Area Plan for the Sherills Ford Road Area.
http://www.catawbacountync.gov/planning/smallarea/sford/SFmain.asp
13 Catawba County NC 16 Corridor Development Plan.
http://www.catawbacountync.gov/Planning/16plan/16plan.asp
14 Catawba County. 2004. Foresight – Jobs and Economy Report.
http://www.catawbacountync.gov/events/4sight2.pdf

TABLE 2.6.1
ACCIDENT TYPES

ACCIDENT TYPE	NUMBER	PERCENT OF TOTAL
Rear-end	1284	53.7%
Turning Movements	377	15.8%
Angle	223	9.3%
Sideswipe	233	9.7%
Ran Off Road	139	5.8%
Animal	75	3.1%
Other	60	2.5%

A significant number of the 2,391 total accidents occurred within 150 feet of signalized intersections. These locations are listed in Table 2.6.2 from west to east along the studied portion of NC 150. The most accidents (135) occurred at the NC 150 intersection with Williamson Road (SR 1109)/Bluefield Road (SR 1474). Figure 2.6.1 shows the locations of the primary accident locations where accident totals are greater than 20. These accidents are concentrated from the SR 1303 (Perth Road)/SR 1180 (Doolie Road) intersection to US 21; the section of the project corridor where it transitions from rural to suburban.

Accident rates are determined by the route length, average daily traffic, and number of reported accidents in a specific time frame. These rates are listed as accidents per 100 million vehicle miles (per 100MVM). The studied section of NC 150 varies in facility type and is as follows: From NC 16 Bypass in Catawba County to the Iredell County line, NC 150 is a two-lane undivided facility. In Iredell County, from the Catawba County line to SR 3013 (Quiet Cove Rd), NC 150 is also a two-lane undivided facility. From SR 3013 (Quiet Cove Rd) to SR 1304/Morrison Plantation Park, NC 150 is a two-lane with a continuous left turn lane facility. From SR 1304/Morrison Plantation Park to US 21, NC 150 is four-lane with a continuous left turn lane. Due to the varying facility types the study section was broken into different segments. The total accident rate for the specific section is shown below in crashes per 100 million vehicle miles (MVM):

Catawba County:
NC 150 from NC 16 Bypass to the Iredell County Line 175.67

Iredell County:
NC 150 from the Catawba County Line to SR 3013 (Quiet Cove Rd) 184.66
NC 150 from SR 3013 (Quiet Cove Rd) to SR 1304/Morrison Plantation Park 557.49
NC 150 from SR 1304/Morrison Plantation Park to US 21 .....1,058.45

TABLE 2.6.2
PRIMARY ACCIDENT LOCATIONS
(August 1, 2010 to July 31, 2015)

LOCATION	NUMBER OF ACCIDENTS
Slanting Bridge Road	19
Perth Road (SR 1303)/Doolie Road (SR 1180)	46
Ervin Road (SR 1304)/Morrison Plantation Park	54
Leisurewood Drive	39
Mooresville Crossing Entrance	47
Williamson Road (SR 1109)/Bluefield Road (SR 1474)	135
Old Bluefield Road (SR 2798)	49
Lowes Entrance	47
Rolling Hill Road/Regency Center Drive	101
I-77 SB Ramp	46
I-77 Overpass	76
I-77 NB Ramp	63
Straightaway Drive	73
Norman Station Boulevard	94
Corporate Center Drive	41
Talbert Road (SR 1116)	78
Macleod Drive	41

Average statewide accident rates are categorized according to the type of facility. The studied section of NC 150 has several different facility types within the study limits. For comparison to statewide accident rates, existing NC 150 is compared to the facility type for each specific section of NC 150. Table 2.6.3 shows a comparison of the accident rates for each specific section of NC 150 to the average North Carolina Statewide Accident rates. All statewide average accident rates are shown for urban NC routes.

As shown in Table 2.6.3, the total accident rates on NC 150 for SR 3013 to SR 1304/Morrison Plantation Park and SR 1304/Morrison Plantation Park to US 21, are higher than the North Carolina Statewide average rates for those particular facility types. The total accident rate on the section from SR 3013 to SR 1304/Morrison Plantation Park is more than two times higher than the statewide average for a urban NC two-lane with a continuous left turn lane facility. The total accident rate on the section from SR 1304 to US 21 is more than four times higher than the statewide average for an urban NC route with 4+-lanes and a continuous left turn lane. In addition, the total accident rates for these sections are also above their corresponding critical crash rates. (Critical crash rates are threshold values that have been statistically adjusted and calculated for the specific study site, based on other roads with similar characteristics throughout the state (i.e. all urban four-lane divided US highways with no control of access) to remove the elements of chance and randomness.)

TABLE 2.6.3
ACCIDENT RATE COMPARISON

Crash Rate Comparison – NC 150 from NC 16 Bypass to Iredell County Line

CATEGORY	CRASHES	CRASH RATE	STATEWIDE AVERAGE CRASH RATE[1]	CRITICAL CRASH RATE[2]
Total	336	175.67	230.09	248.41
Fatal	1	0.52	1.23	2.81
Non-Fatal Injury	114	59.60	73.59	84.06
Night	80	41.83	36.46	43.91
Wet	54	28.23	56.10	65.28

1 2012 – 2014 Statewide Average Crash Rate for Urban NC Routes, 2 lanes undivided
2 Based on the statewide crash rate (95% level of confidence). The critical crash rate (is a statistically derived value against which a calculated rate can be compared to see if the rate is above an average far enough so that something besides chance must be the case) it used to denote statistical significance

Crash Rate Comparison – NC 150 from Catawba County Line to SR 3013 (Quiet Cove Road)

CATEGORY	CRASHES	CRASH RATE	STATEWIDE AVERAGE CRASH RATE[1]	CRITICAL CRASH RATE[2]
Total	89	184.66	230.09	260.77
Fatal	4	2.07	1.23	4.14
Non-Fatal Injury	33	68.47	73.59	91.26
Night	32	66.40	36.46	49.11
Wet	20	41.50	56.10	71.62

1 2012 – 2014 Statewide Average Crash Rate for Urban NC Routes, 2 lanes undivided
2 Based on the statewide crash rate (95% level of confidence). The critical crash rate (is a statistically derived value against which a calculated rate can be compared to see if the rate is above an average far enough so that something besides chance must be the case) it used to denote statistical significance

Crash Rate Comparison – NC 150 from SR 3013 (Quiet Cove Road) to Morrison Plantation Park

CATEGORY	CRASHES	CRASH RATE	STATEWIDE AVERAGE CRASH RATE[1]	CRITICAL CRASH RATE[2]
Total	464	557.49	214.09	230.09
Fatal	0	0.00	0.50	1.23
Non-Fatal Injury	113	135.77	74.10	73.59
Night	59	70.89	30.44	36.46
Wet	66	79.30	41.48	56.10

1 2012 – 2014 Statewide Average Crash Rate for Urban NC Routes, 2 lane with continuous left turn lane
2 Based on the statewide crash rate (95% level of confidence). The critical crash rate (is a statistically derived value against which a calculated rate can be compared to see if the rate is above an average far enough so that something besides chance must be the case) it used to denote statistical significance

Crash Rate Comparison – NC 150 from Morrison Plantation Park to US 21

CATEGORY	CRASHES	CRASH RATE	STATEWIDE AVERAGE CRASH RATE[1]	CRITICAL CRASH RATE[2]
Total	1502	1058.45	262.59	287.21
Fatal	0	0.00	0.99	2.89
Non-Fatal Injury	314	221.27	77.54	91.11
Night	265	186.74	41.30	51.31
Wet	211	148.69	52.26	63.47

1 2012 – 2014 Statewide Average Crash Rate for Urban NC Routes, 4 + lanes with continuous left turn lane
2 Based on the statewide crash rate (95% level of confidence). The critical crash rate (is a statistically derived value against which a calculated rate can be compared to see if the rate is above an average far enough so that something besides chance must be the case) it used to denote statistical significance

Given crash history along NC 150 within the project study area, it stands to reason that the addition of a median-divided, fully access-controlled facility with uninterrupted flow would serve as an attractive option for through traffic. A reduction in traffic volumes on the subject section of NC 150 would reduce congestion and in turn would likely reduce the potential for rear-end collisions. However, due to the nature of the surrounding development and the role that NC 150 plays in the area's transportation network, a fully access controlled facility is not recommended. Also, it is unlikely that traffic volumes will reduce due to the expected continued growth in the Lake Norman area. As such, a median divided facility with partial access control is proposed. A review of driveway access along the corridor to determine if driveways should be closed or combined to reduce conflict points is also recommended.

3.0 ALTERNATIVES

3.1 PRELIMINARY STUDY ALTERNATIVES

3.1.1 Transportation Demand Management (TDM) Alternative

The Transportation Demand Management (TDM) Alternative requires paradigm shifts related to driving habits, patterns, and work schedules, and the use of other modes of transportation as an alternative to driving to work alone. The TDM Alternative includes walking, bicycling, ride-sharing, teleworking, non-standard work schedules, and use of public transportation.

Transportation Demand Management (TDM) alternatives are being used in the demographic study area on an occasional to regular basis. Approximately 15.9 percent of those employed in the demographic study area use some form of alternative transportation, such as carpooling, public transit, bicycling, walking, or work from home. For TDM alternatives to provide viable traffic service, certain characteristics and conditions must exist such as concentrated employment centers, direct routes to desired destinations, and low automobile to household ratios. The only relatively concentrated employment center is at the Marshall Steam Station. There are no large shopping malls, office buildings, or other concentrated employment centers along the majority of existing NC 150. While some TDM strategies are in use in this area, these alternatives would not substantially improve capacity or reduce congestion along the NC 150 corridor. TDM improvements alone do not meet the purpose and need, and therefore were eliminated from further consideration for this project.

3.1.2 Transportation Systems Management (TSM) Alternative

Transportation System Management (TSM) improvements generally involve increasing the available capacity of the facility within the existing right-of-way with minimum capital expenditures and without reconstructing the existing facility. These strategies incorporate intelligent transportation systems (ITS) technologies such as traffic signal and timing optimization, turn lanes, access management, operational modifications, ramp metering, and high-occupancy vehicle lanes on existing highways.

In a roadway network, the intersections are generally the limiting factor when it comes to the movement of traffic. Intersections require vehicles to stop at times and yield to other flows so that different traffic movements can safely cross the same space. Traffic signalization and timing optimization help to move vehicles through an intersection in the most-efficient manner possible. The signalization of an un-signalized intersection can have very positive ramifications for side streets, although that generally comes at the expense of mainline traffic. Timing optimization works to adjust the signal timings at signalized intersections to respond to changing traffic conditions.

TSM Alternatives can be an effective means of maximizing the existing roadway capacity, but the effects of TSM are generally limited. Furthermore, TSM alternatives frequently prioritize one traffic flow or facility type over another. While this prioritization can be superior on a network level, it can have a negative impact on some users potentially resulting in reduced service for some paths for an improvement scenario compared to a scenario with no improvements.

TSM operational measures usually can be implemented easily and require little capital investment. In this case, however, many of these measures, such as signal timing optimization and the addition of turn lanes, are already in place along the existing route and will not be able to acceptably rectify operational deficiencies projected for 2040. Portions of NC 150 in Mooresville have already been modified to include consolidated signals and service roads, but these measures do not eliminate the operational deficiencies caused by high traffic volumes along the roadway. Intersection realignment and the addition of HOV lanes is not feasible in many locations due to development along the NC 150 corridor and side streets. Striping, warning devices, and improved signing may reduce accidents, but will not substantially improve capacity or reduce congestion.

TSM improvements will not improve capacity or reduce congestion. The overall level-of-service would not change dramatically without the addition of through lanes to accommodate the high future traffic volumes. TSM improvements, therefore, do not meet the purpose and need, and were not carried forward for additional study.

3.1.3 Mass Transit/Multimodal Alternative

The Mass Transit/Multi-Modal Alternative includes reasonable and feasible transit options such as bus and rail systems. This alternative is typically considered for all major highway projects in urbanized areas with a population of over 200,000 people, and when mass transit is referenced in regional transportation plans.

As discussed in Section 2.5, there is currently no passenger rail service within the project study area, though commuter rail service in the future is planned to extend to Mooresville.[1] This rail service would also serve southern Iredell County.[2] In addition, the project study area is not currently served by fixed-route mass transit. This is due to the lack of demand, dispersed residential areas, diffused employment centers, and diversity of trip origins and destinations. The project study area has scattered rural residences and small residential communities with only one regional destination, the Marshall Steam Plant. Based on 2013 census estimates, approximately 0.6% of employed residents (120 people) in the census

1 Kimley-Horn and Associates, Inc. 2007. Town of Mooresville Comprehensive Transportation Plan. http://nc-mooresville.civicplus.com/DocumentCenter/View/1124
2 Lake Norman Rural Planning Organization. 2008. Coordinated Comprehensive Public Transportation Plan. http://www.ncdot.gov/nctransit/download/Plans/LakeNormanRPO.pdf

tracts containing the project study area are using public transit to travel to work. Due to these collective factors, the Mass Transit Alternative was not considered a Build Alternative and was eliminated from further consideration.

3.1.4 No-Build Alternative

The No-Build Alternative only includes maintenance activities within the current right-of-way to ensure the safety and continued operation of the existing highway. The No-Build Alternative would avoid any adverse environmental impacts or residential relocations; however adverse social and economic impacts could occur. Future traffic volumes may result in an increased number of collisions and longer delays that would degrade the safety of the transportation system and create an even higher potential for collisions.

The No-Build Alternative was eliminated because it does not meet the transportation goals of the State of North Carolina or the transportation needs of the region. Also, by failing to provide solutions to high traffic volumes in the area and improved connectivity to other traffic corridors, this alternative does not satisfy the purpose and need for this project. The No-Build Alternative does, however, provide a basis for comparing the benefits and adverse impacts of the Build Alternatives.

3.1.5 Improve Existing Alternatives

All three detailed study alternatives involve improving the existing facility; additional discussion of these alternatives can be found below in Section 3.2.

3.2 DETAILED STUDY ALTERNATIVES

3.2.1 Preliminary Build Alternative Development

As noted above, the 'improve existing' alternative would widen NC 150 to a multi-lane divided facility from NC 16 Bypass to US 21. The preliminary build alternatives were developed using a 'best-fit' approach to address geometric and structural deficiencies along the existing NC 150 corridor. The best-fit alignment uses a combination of symmetrical and asymmetrical widening and avoids and/or minimizes impacts to the human and natural environments to the greatest extent possible.

Four preliminary build alternatives, shown in Figure 3.2.1, were developed for the proposed project. All four alternatives were identical with the exception of their alignments through the Terrell Historic District. Because NC 150 passes through the Terrell Historic District, bypass options were developed to avoid and/or minimize impacts to the historic district. In addition to evaluating widening though the historic district along existing NC 150, two new location bypass options were developed to *avoid* impacts to the Terrell Historic District ("avoidance alternatives") and one new location bypass option was developed to

minimize impacts to the Terrell Historic District ("minimization alternative"). The proposed bypass options would require additional right of way and would create a higher level of impacts to other resources; however, these options were developed for consideration in accordance with Section 4(f) regulations. Additional discussion of Section 4(f) requirements and the alternative evaluation process can be found in Section 5.3.

The bypass options were combined with the best-fit alignment to create four preliminary build alternatives described as follows:

Alternative 1 proposes to widen existing NC 150 with a best-fit alignment that that would continue through the Terrell Historic District along existing NC 150.

Alternative 2 proposes to widen existing NC 150 with a best-fit alignment but includes the northern bypass option to avoid the Terrell Historic District.

Alternative 3 proposes to widen existing NC 150 with a best-fit alignment but includes the minimization bypass option that would cross the southern portion of Terrell Historic District, but not physically impact any structures within the district.

Alternative 4 proposes to widen existing NC 150 with a best-fit alignment but includes the southern bypass option to avoid the Terrell Historic District.

The following paragraphs describe design features of the identical sections of the proposed widening (outside the historic district). Detailed information on the bypass options carried forward can be found in Section 3.2.3.

Roadway Typical Section and Alignment – From NC 16 Bypass to just west of Slanting Bridge Road, the project proposes to widen NC 150 to a four-lane divided facility with a 46-foot wide grass median. From west of Slanting Bridge Road, to west of Perth Road/Doolie Road, NC 150 would be widened to a four-lane divided facility with a 23-foot wide, raised median. From west of Perth Road/Doolie Road to the US 21 interchange, NC 150 would be widened to a six-lane divided facility with a variable-width raised concrete median. Figure 3.2.2 presents the proposed typical sections.

Right-of-Way and Access Control – The proposed alignment generally follows the existing NC 150 alignment throughout the project limits. The inclusion of the additional lanes and variable width median in the best-fit widening extends the proposed right-of-way beyond the existing 60-foot wide right-of-way. The roadway would be developed as a superstreet facility. Section 3.2.6 provides a detailed discussion of the superstreet function and design, access changes, traffic operations, and intersection recommendations for the super-street

concept. The four to six-lane typical sections, combined with the variable median widths, turn lanes, and U-turn bulbs result in the proposed right-of-way width ranging from 100 to 260 feet in the rural areas and 100 to 190 feet in the urban areas. Access control is only proposed in the vicinity of the U-turn bulbs and at the I-77 interchange.

Design Speed – The common portions of the detailed study alternatives (outside the Terrell area) have a design speed of 60 miles per hour (mph) in rural areas, decreasing to 45 mph at Waddell Road and continuing through the more urban/suburban area to the eastern terminus. Design speeds for Alternatives 1 and 2 in the Terrell area are discussed in Sections 3.2.3.1 and 3.2.3.2, respectively.

Speed Limit – A final decision has not been made on the posted speed limit. Once a preferred alternative is selected, the Division 12 Traffic Engineer will make a final determination on the posted speed limit(s).

Anticipated Design Exceptions – No exceptions to normal highway design practices are proposed for this alternative.

Major Drainage Structures – Table 3.2.1 shows the proposed major drainage structures.

TABLE 3.2.1
PROPOSED MAJOR STRUCTURES

FEATURE CROSSED	LENGTH	FACILITY CARRIED	FIGURE REFERENCE
Reed Creek (Lake Norman)	241'	NC 150 (both directions)	3.2.3d
Mountain Creek (Lake Norman)	301'	NC 150 (both directions)	3.2.3d
CSXT Railroad Tracks	155'	NC 150 (both directions)	3.2.3e
Marshal Steam Plant Discharge Channel	450' 600'	NC 150 South (westbound) NC 150 North (eastbound)	3.2.3g
Lake Norman	1,166'	NC 150 South (westbound)	3.2.3h
I-77	164'	NC 150 (both directions)	3.2.3l

3.2.2 Preliminary Build Alternative Evaluation

The NEPA/404 Merger Team met on August 13, 2014 to determine which alternatives would be carried forward for detailed study (Concurrence Point 2). It was noted that although Alternative 3 (the southern minimization bypass option) would not directly impact any structures in the historic district, bisecting the southern portion of the district would likely change the district's character, resulting in an adverse effect under Section 106 of the National Historic Preservation Act of 1966.

As such, the **NEPA/404 Merger Team agreed to eliminate Alternative 3** from further detailed study and not carry this alternative through preliminary design. The Concurrence Point 2 form is included in Appendix A.

At the Concurrence Point 2A (Bridging decisions and alignment review) meeting held on June 10, 2015, impacts resulting from the proposed alignment of Alternative 4 were discussed. Impacts related to the bypass portion of Alternative 4 included four residential relocations, four stream crossings (resulting in 1,300 linear feet of jurisdictional impacts, 125 feet of minor stream relocations, and approximately 1,000 linear feet of parallel non-jurisdictional stream impacts. The presence of rock in this area necessitated a tall fill section in this area, a contributing factor in the amount of stream impacts.) This alternative would also impact a church recreational area, a high-voltage transmission tower, and two additional FERC crossings of Lake Norman. The connection to Sherrills Ford Road would result in Sherrills Ford Road being reclassified to a local collector, which would require a larger minimum ditch width along Sherrills Ford. This alternative also impacts the frontage of properties along Sherrills Ford Road that are within the Terrell Historic District.

The NEPA/404 Merger Team concurred that additional evaluation of Alternative 4 was warranted to determine whether this alternative was prudent. During this time, an effects consultation was held with the State Historic Preservation Office (HPO). HPO, NCDOT and FHWA agreed that due to the reasonably foreseeable development in the Hobb Lane area if Alternative 4 is constructed, roadway design changes will impact the historic resources. Therefore, Alternative 4 would impose an "adverse effect" on the Terrell Historic District. In addition to the adverse effect on historic resources, the Alternative 4 evaluation noted that this alternative would create the highest amount of stream and riparian buffer impacts of all the alternatives.

Due to the necessity of avoiding the historic district and the presence of rock, the geometric design of Alternative 4 is extremely challenging, creating potential safety and operational issues. Based on all of these mitigating factors, **the NEPA/404 Merger Team agreed that Alternative 4 would not be carried forward** for presentation at the public hearing and would be removed from further consideration. The revised Concurrence Point 2 form is included in Appendix A.

3.2.3 Alternatives Carried Forward

The alternatives retained for further consideration include:

- Alternative 1: Best Fit -Widen Existing NC 150 (No Terrell Bypass Option)
- Alternative 2: Best Fit – Widen Existing NC 150 & Northern Terrell Bypass Option

Detailed information on the alternatives' alignments in the Terrell area is included in the following sections. The detailed study alternatives are shown in Figure 3.2.3.

3.2.3.1 Alternative 1 – No Terrell Bypass Option

Alternative 1 was developed as the 'improve existing' alternative and proposes to widen NC 150 through the Terrell Historic District.

Roadway Typical Section and Alignment – Alternative 1 was developed using a 'best-fit' approach to minimize impacts to the Terrell Historic District. The widened facility will consist of two parallel roadways with two 12-foot lanes in each direction with ten-foot wide, paved outside shoulders. The roadways will be separated by a 23-foot wide raised median within the Terrell Historic District.

Right-of-Way and Access Control – The proposed alignment of Alternative 1 follows the existing NC 150 alignment throughout the Terrell Historic District. The inclusion of the additional lanes and 17.5 to 23-foot wide median extends the NC 150 right-of-way from 60-feet to 97.5 feet through the Terrell Historic District.

Design Speed – The design speed for Alternative 1 through Terrell is 50 mph.

Speed Limit – A final decision has not been made on the posted speed limit. Once a preferred alternative is selected, the Division 12 Traffic Engineer will make a final determination on the posted speed limit.

Anticipated Design Exceptions – No exceptions to normal highway design practices are proposed for this alternative.

3.2.3.2 Alternative 2 – Northern Terrell Bypass Option

Alternative 2 was developed as 'northern bypass' to avoid impacts to the Terrell Historic District. The alternative proposes to construct a short new location section north of the Terrell Historic District. The alternative will leave the existing NC 150 alignment at the Slanting Bridge Road intersection and tie back into existing NC 150 west of the Marshall Steam Station Discharge Channel.

Roadway Typical Section – The northern Terrell bypass would be constructed as a four-lane divided facility along new location north of the Terrell Historic District. The facility will consist of two parallel roadways with two 12-foot lanes in each direction with eight-foot wide, paved outside shoulders. The roadways will be separated by a 46-foot wide grassed median.

Right-of-Way and Access Control – The northern Terrell bypass is completely along new location, requiring the acquisition of right-of-way along its entire alignment. The right-of-way width is generally 220 to 300 feet wide. Access control along the alternative is limited to the area in the vicinity of the intersection with Sherrills Ford and extends in each direction along the new alignment to include the U-turn bulbs.

Design Speed – The design speed for Alternative 2 north of Terrell is 60 mph.

Speed Limit – A final decision has not been made on the posted speed limit. Once a preferred alternative is selected, the Division 12 Traffic Engineer will make a final determination on the posted speed limit.

Anticipated Design Exceptions – No exceptions to normal highway design practices are proposed for this alternative.

3.2.4 Multi-Use Path

An approximately seven-mile long, 10-foot wide multi-use path is being evaluated from Little Mountain Road to Perth/Dooley Road. The development of the multi-use path option is the result of multiple stakeholder meetings and coordination between NCDOT, Catawba and Iredell Counties and the Town of Mooresville. The proposed multi-use path is in close proximity to existing segments of the Carolina Thread Trail and the adopted Lake Norman Bicycle Plan. The proximity of the proposed multi-use path offers future opportunity for the linkage of the Highway 150 corridor to these other trail networks and expands recreational opportunities in the area. The path would be constructed on the northern side of NC 150 on the curb and gutter berm and outside of the proposed roadside ditch. The multi-use path will be located to the north since the long bridge over the Catawba River near the Marshall Steam Station is currently undergoing rehabilitation and the rehabilitated structure will not accommodate a multi-use path. The path would also cross three other bridge structures.

In addition to the separate multi-use path, NCDOT is providing six-foot paved shoulders which will accommodate bikes and allow for pedestrian use. The eight-foot shoulders are being provided as NC 150 is a signed bicycle route, is part of the Carolina Thread Trail, and is also noted in local MPO regional bicycle plans.

If the multi-use path is included in the project, there would be additional right-of-way and utility impacts as well as additional hydraulic impacts from the extension of currently proposed culvert lengths or other means to cross smaller streams. The multi-use path is included in the alternative analysis as a modular option that can be added or removed based on funding availability.

Funding – NCDOT coordinated extensively with stakeholders to develop a cost-sharing approach for the multi-use path and determine the type of bike and pedestrian facility that would be constructed. NCDOT Division 12 worked with stakeholders to develop a Memorandum of Understanding (MOU) for implementing a multi-use path on this project. All three jurisdictions, Iredell County, Catawba County and the Town of Mooresville signed the MOU agreeing to cost-share on the construction of the multi-use path. The multi-use path will be funded in part by the Bonus Allocation from the I-77 Managed Lanes Project for the portion of the path in Iredell County and Town of Mooresville. For the portion of the multi-use path in Catawba County funds will come from the Greater Hickory MPO Surface Transportation Program – Division Administered funds.

3.2.5 Cost Estimates

Cost estimates for Alternatives 1 and 2 and the multi-use path are provided in Table 3.2.2.

TABLE 3.2.2
COST ESTIMATES FOR THE DETAILED STUDY ALTERNATIVES

	CONSTRUCTION COST	UTILITY RELOCATION COST	RIGHT-OF-WAY COST
Alternative 1 R-2307A	$70,838,450	$3,837,391	$52,150,000
Alternative 1 R-2307A No Bypass	$14,650,000	$887,187	$5,700,000
Alternative 1 R-2307B	$97,829,850	$4,001,357	$106,875,000
Alternative 1 – I-5717	$12,514,900	$338,517	$9,750,000
Total Costs for Alternative 1 w/out multi-use path	**$195,833,200**	**$9,064,452**	**$174,475,000**
Multi-use Path – Alternative 1, Section A	$2,561,550	$210,114	$1,775,000
Multi-use Path – Alternative 1, Section B	$3,844,150	$443,574	$4,425,000
Total Costs for Alternative 1 with multi-use path	**$202,238,900**	**$9,718,140**	**$180,675,000**
Alternative 2 R-2307A	$70,838,450	$3,837,391	$52,150,000
Alternative 2 R-2307A Terrell Bypass	$20,250,000	$451,654	$3,375,000
Alternative 2 R-2307B	$97,829,850	$4,001,357	$106,875,000
Alternative 2 – I-5717	$12,514,900	$338,517	$9,750,000
Total Costs for Alternative 2 w/out multi-use path	**$201,433,200**	**$8,628,919**	**$172,150,000**
Multi-use Path – Alternative 2, Section A	$2,911,550	$186,768	$1,825,000
Multi-use Path – Alternative 2, Section B	$3,844,150	$443,574	$4,425,000
Total Costs for Alternative 2 with multi-use path	**$208,188,900**	**$9,259,261**	**$178,400,000**

NOTE: Construction costs include utility construction costs. Utility relocation costs shown separately. Total costs for each alternative are shown in Table 5.15.1.

3.2.6 Traffic Operations

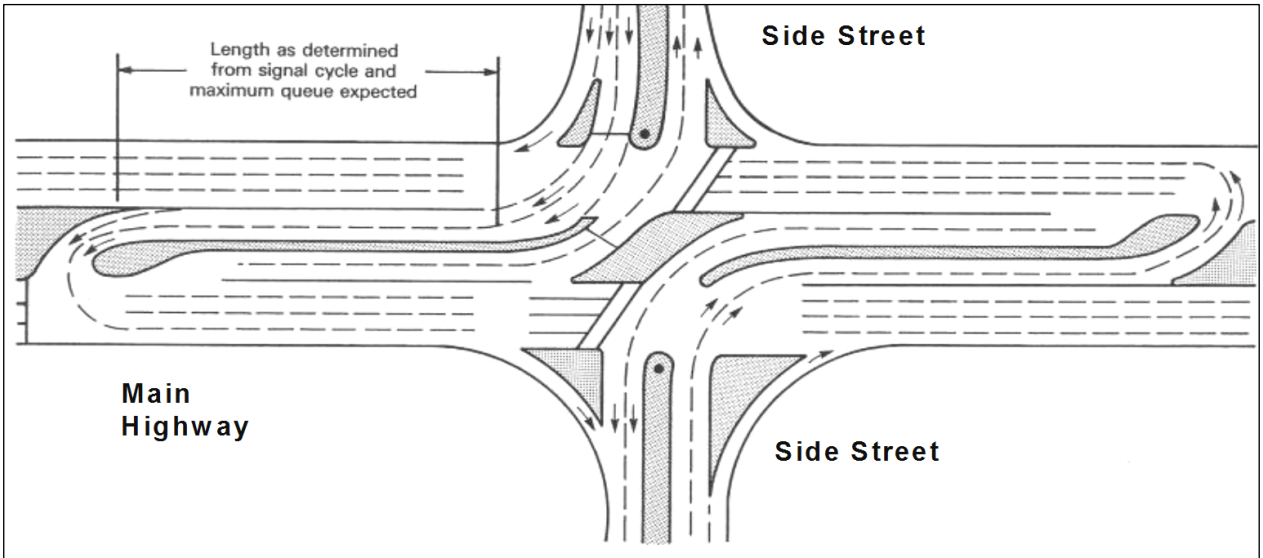
The design year (2040-Build) annual average daily traffic volumes are shown in Figure 3.2.4. As shown in Table 2.4.1, the intersections within the project corridor from NC 16 to Robinson Road (SR 1396) / McCrary Road (SR 1168) currently operate between LOS A and LOS C. From Perth Road (SR 1303) / Doolie Road (SR 1180) eastward toward I-77, LOS and delay increase significantly, with many intersections operating at LOS E or F. East of I-77, delay and level of service improve again to between LOS A and D. In the future year (2040) No-Build scenario, most intersections along the corridor operate at LOS E or F. This is indicative of the need for additional capacity and intersection improvements along NC 150.

Intersection analyses for most of the corridor were completed using Synchro software version 9, which reports LOS, average delay, and queuing information. Due to the complex nature of the proposed Continuous Flow Intersection (CFI) at the intersection of NC 150 and Bluefield Road (SR 1474)/ Williamson Road (SR 1109), that location, along with adjacent related intersections, was evaluated using VISSIM 7.0. The overall intersection LOS and delay results for the entire corridor are summarized in Table 3.2.3.

The traffic capacity analysis was developed to analyze a widened NC 150 under a conventional intersection scenario and under a superstreet scenario in which all intersections but the NC 16 interchange, I-77 interchange; Bluefield Road / Williamson Road and Sherrills Ford Road (SR 1848) were evaluated as superstreet configurations. Alternative 2, which includes the northern Terrell bypass, would have one new superstreet intersection with Sherrills Ford Road. This intersection was not evaluated in the traffic capacity analysis since it is reasonable to infer that the superstreet intersection would perform better than the existing conventional intersection. In general, superstreet intersections typically perform one to two levels-of-service better than conventional intersections. Subsequent analyses of this intersection will include required lane geometry and traffic control in order to achieve an acceptable level of service should Alternative 2 be selected as the Preferred Alternative.

Table 3.2.3 shows future year (2040) conditions under a conventional scenario and a superstreet scenario. The conventional build scenario would widen NC 150 to four lanes west of Perth Road and to six lanes east of Perth Road, along with minor intersection improvements. In this scenario, there are still several intersections operating at LOS D with moderate levels of delay. The traffic analysis was developed based on Alternative 1.

The superstreet scenario utilizes directional crossovers and U-turn bulb outs. Left turns from NC 150 to most side streets will be provided at directional crossovers. Left turn and through movements from most side streets will be redirected for safe and efficient traffic operations to U-turn points located a short distance downstream. As noted in Section 1.2, the purpose of a superstreet is to improve vehicular mobility and safety by limiting the number of points where vehicles can collide when making traffic maneuvers. This design reduces the potential for collisions by limiting the number of left-turns and moves traffic through an intersection more efficiently, ultimately translating into shorter travel times.



A TYPICAL SUPERSTREET CONFIGURATION

Compared to conventional intersections, the elimination of left turns substantially reduces the number of potential conflict points and the severity of accidents. The diagram above shows a typical superstreet design. As shown in Table 3.2.3, the superstreet build scenario provides a LOS D or better at almost all intersections along the corridor. No intersections have a LOS worse than LOS D. Approximately 90% of intersections on the corridor operate at LOS C or better, with many of them operating at LOS A or B. There is very minimal delay at intersections west of Perth Road / Doolie Road, and accommodations were made to optimize the operations in the densely developed area east of Perth Road. The Continuous Flow Intersection (CFI) proposed at Bluefield Road / Williamson Road was evaluated in VISSIM and shows that the configuration operates well with an overall LOS D in both peak hours.

TABLE 3.2.3
INTERSECTION LEVEL OF SERVICE AND DELAY
FUTURE (2040) BUILD SCENARIOS

NC 150 INTERSECTION	2040 LEVEL OF SERVICE/DELAY (in seconds)					
	BUILD CONVENTIONAL		BUILD SUPERSTREET			
			Intersection	U-Turn	Intersection	U-Turn
	AM	PM	AM		PM	
NC 16 Bypass SB Ramp	**B (19.2)**	**B (14.1)**	**C (21.2)**	---	**B (14.9)**	---
NC 16 Bypass NB Ramp	**C (21.0)**	**C (26.2)**	**C (21.4)**	---	**C (27.3)**	---
East Maiden Road	**A (8.6)**	**A (6.5)**	A (2.1)	**B (15.9)**	A (1.1)	**B (12.8)**
NC 16 Business	**D (41.3)**	**D (41.8)**	---	---	---	---
NC 16 Business (north leg)	---	---	**B (13.9)**	---	**B (12.4)**	---
NC 16 Business (south leg)	---	---	**C (22.9)**	**B (12.6)**	**C (21.8)**	**B (18.0)**
Grassy Creek Road	C (16.4)	A (7.1)	A (2.4)	A (3.2)	A (1.7)	A (2.3)
Mt. Pleasant Road	**C (24.3)**	**C (24.6)**	B (10.9)	A (3.0)	A (4.8)	A (8.4)
Little Mountain Road	D (28.8)	C (17.9)	A (2.1)	A (1.5)	A (1.3)	A (1.0)
Little Mountain Rd. (east u-turn)	---	---	---	A (0.4)	---	A (0.4)
Slanting Bridge Road	**D (42.6)**	**C (32.2)**	---	---	---	---
Slanting Bridge Road (north leg)	---	---	**B (12.4)**	A (1.4)	**B (10.9)**	A (0.8)
Slanting Bridge Road (south leg)	---	---	**C (23.0)**	A (1.2)	**B (16.8)**	A (1.5)
Sherrills Ford Road	**D (37.4)**	**C (23.4)**	**C (21.9)**	---	**B (15.4)**	---
Marshall Steam Station/ Kiser Island Road	**B (17.2)**	**C (20.4)**	---	---	---	---
Marshall Steam Station	---	---	**A (9.5)**	A (2.1)	**C (21.1)**	A (4.3)
Kiser Island Road	---	---	**B (18.2)**	A (0.6)	**B (10.1)**	A (0.6)
Greenwood Road	C (23.9)	A (6.8)	---	---	---	---
Greenwood Road (west u-turn)	---	---	---	A (0.3)	---	A (0.5)
Greenwood Road	---	---	A (1.0)	A (0.3)	A (0.5)	A (0.3)
Robinson Road/ Mccrary Road	B (10.7)	B (12.1)	---	---	---	---
Robinson Road (north leg)	---	---	A (0.7)	**B (14.1)**	A (0.8)	**A (7.8)**
Robinson Road (south leg)	---	---	A (0.7)	A (0.2)	A (0.4)	A (0.2)
Perth Road/ Doolie Road	**D (50.2)**	**D (41.3)**	---	---	---	---
Perth Road	---	---	**B (10.6)**	C (22.5)	**B (15.5)**	B (13.1)
Doolie Road	---	---	**A (9.1)**	A (6.2)	**A (7.5)**	B (10.8)
Ervin Road/ Morrison Plantation Park	**D (51.3)**	**D (45.8)**	---	---	---	---
Ervin Road	---	---	**A (8.7)**	B (15.2)	**A (9.7)**	B (13.1)
Morrison Plantation Park	---	---	**B (14.0)**	B (11.2)	**B (16.1)**	B (14.7)

TABLE 3.2.3 cont.
INTERSECTION LEVEL OF SERVICE AND DELAY
FUTURE (2040) BUILD SCENARIOS

NC 150 INTERSECTION	2040 LEVEL OF SERVICE/DELAY (in seconds)					
	BUILD CONVENTIONAL		BUILD SUPERSTREET			
			Intersection	U-Turn	Intersection	U-Turn
	AM	PM	AM		PM	
Target / Mooresville Crossing Entrance	**C (30.3)**	**C (28.2)**	---	---	---	---
Target Driveway	---	---	**B (17.8)**	**B (10.3)**	**B (17.3)**	**B (10.9)**
Mooresville Crossing Driveway	---	---	**A (8.7)**	---	**A (8.3)**	---
Williamson Road/ Bluefield Road	**D (51.3)**	**D (48.5)**	**D (40.6)**	---	**D (38.3)**	---
Lowes Access/Food Lion Access	**C (26.8)**	**C (20.8)**	**B (15.9)**	---	**B (16.1)**	---
Rolling Hill Road/ Regency Center Drive	**D (39.0)**	**D (39.3)**	---	---	---	---
Regency Center Drive	---	---	**C (26.4)**	---	**C (29.5)**	---
Rolling Hill Road	---	---	**B (14.5)**	---	**B (10.9)**	---
I-77 SB Ramp	**D (47.6)**	**C (29.8)**	**B (15.9)**	---	**C (21.8)**	---
I-77 NB Ramp	**C (30.0)**	**C (29.6)**	**C (22.8)**	---	**C (28.5)**	---
Straightaway Drive	---	---	A (0.3)	---	A (0.3)	---
Norman Station / Kohls Driveway	**C (34.2)**	**D (41.1)**	**A (7.8)**	**A (4.9)**	**B (11.1)**	**A (4.0)**
Corporate Center Drive/ Driveway	**A (7.6)**	**A (4.9)**	---	---	---	---
Retail Driveway	---	---	**A (9.0)**	---	**A (8.0)**	---
Corporate Center Drive.	---	---	**A (3.4)**	**A (5.2)**	**A (4.4)**	**A (7.3)**
Car Dealership Driveway	---	---	A (0.2)	---	A (0.2)	---
Talbert Road	**D (50.8)**	**D (43.3)**	---	---	---	---
Talbert Rd. (north leg)	---	---	**B (12.8)**	---	**B (14.7)**	---
Talbert Rd. (south leg)	---	---	**B (13.0)**	**A (6.3)**	**B (11.0)**	**A (5.7)**
Macleod Drive/ Driveway	**C (22.2)**	**C (20.6)**	---	---	---	---
Macleod Dr. / Driveway (north leg)	---	---	**A (2.1)**	**A (7.3)**	**A (2.5)**	**A (7.9)**
Macleod Dr. (south leg)	---	---	**A (13.7)**	**A (10.7)**	**A (12.0)**	**A (8.0)**

NOTES: Signalized intersections shown in bold. "---" denotes no movement at that location under that scenario. The intersection of NC 150 with Williamson Road/ Bluefield Road is proposed as a continuous flow intersection (CFI).

In order for the facilities within the project corridor to operate at an optimal LOS, several improvements are recommended. Signalization was recommended at locations where there was a failing LOS in the design year and where warranted due to high traffic volumes. Diagrams showing the recommended lane configuration for the Build Conventional and Build Superstreet scenarios are included in Figures 3.2.5 and 3.2.6, respectively.

3.3 NCDOT Recommended Alternative

NCDOT has not selected a recommended alternative. The Recommended Alternative will be identified after the Design Public Hearing and the NEPA/404 Merger Team meeting for Concurrence Point 3 (Identification of the Least Environmentally Damaging Practicable Alternative).

4.0 AFFECTED ENVIRONMENT

4.1 NATURAL RESOURCES

4.1.1 Physiology and Soils

The project study area lies within the Southern Outer Piedmont Physiographic Province where topography is characterized by gently sloping to moderately steep landscapes between 0 and 45 percent.[1,2] Elevations range from 760 feet at Lake Norman to 950 feet above sea level. The Catawba and Iredell County Soil Surveys identify 20 soil types within the project study area, as shown in Table 4.1.1.

TABLE 4.1.1
SOILS IN THE PROJECT STUDY AREA

SOIL SERIES	COUNTY	MAPPING UNIT	DRAINAGE CLASS	HYDRIC CLASS[1]
Appling sandy loam [2]	C/I	Ap/As	Well drained	Nonhydric
Cecil sandy loam [2]	C	Ca	Well drained	Nonhydric
Cecil sandy clay loam [2]	I	Ce	Well drained	Nonhydric
Cecil clay loam	C	Ce	Well drained	Nonhydric
Cecil urban-land complex	I	Cg	Well drained	Nonhydric
Chewacla loam [2]	C/I	Ch	Somewhat poorly drained	Predominantly Nonhydric
Lloyd clay loam [2]	I	Lc	Well drained	Nonhydric
Madison gravelly sandy loam [2]	C	Mg	Well drained	Nonhydric
Masada fine sandy loam [2]	I	Md	Well drained	Nonhydric
Madison-Bethlehem complex	C	Mh	Well drained	Nonhydric
Madison-Udorthents complex	C	Mk	Well drained	Nonhydric
Pacolet sandy loam	I	Pa	Well drained	Nonhydric
Pacolet sandy clay loam [2]	I	Pc	Well drained	Nonhydric
Pacolet gravelly fine sandy loam [2]	C	Pc	Well drained	Nonhydric
Pacolet soils	C	Pe	Well drained	Nonhydric
Pacolet-Saw complex	C	Ps	Well drained	Nonhydric
Udorthents, loamy and clayey	C	Ud	Well drained	Nonhydric
Udorthents-Urban land complex	I	Um	Well drained	Nonhydric
Urban land	I	Ur	n/a	Nonhydric
Wedowee sandy loam	C	Wd	Well drained	Nonhydric

NOTES: 1 Nonhydric = <1% hydric components; Predominantly Nonhydric = 1-32% hydric components; Partially Hydric = 33-65% hydric components; Predominantly Hydric = 66-99% hydric components; Hydric = 100% hydric components.
2 Soil types that are farmland of statewide important or prime farmland.

1 United States Department of Agriculture, Natural Resources Conservation Service. 2011. Soil survey of Iredell County, North Carolina. http://soils.usda.gov/survey/printed_surveys/
2 United States Department of Agriculture, Soil Conservation Service. 1975. Soil survey of Catawba County, North Carolina. http://soils.usda.gov/survey/printed_surveys/

4.1.2 Biotic Resources

4.1.2.1 Terrestrial Communities

Seven terrestrial communities were identified in the project study area: maintained/disturbed, beech forest, oak hickory forest, managed pine, bottomland hardwood forest, headwater forest, and non-tidal freshwater swamp. Figure 4.1.1 shows the location and extent of these terrestrial communities in the project study area. Table 4.1.2 shows the amount of land coverage for each community type. A brief description of each community is provided below. Scientific names of all species mentioned below are included in the *Natural Resources Technical Report* prepared for the proposed project.[3]

Maintained/Disturbed includes roads, road shoulders, maintained yards, agricultural activity, and commercial properties. Commercial development is largely concentrated in the eastern portion of the study corridor surrounding the NC 150 intersection with I-77 in Iredell County. The corridor is increasingly residential and rural heading westbound into Catawba County. One industrialized area is the Marshall Steam Station, a four-unit, coal-fired generating facility located on Lake Norman in Catawba County. Vegetation within these maintained and disturbed areas ranges from maintained ornamental landscapes to rural roadside communities. Invasive species such and kudzu and mimosa are common throughout these areas.

The **Beech Forest** community is dominated by American beech, northern red oak, scarlet oak, and mockernut hickory. The lower slopes grading down become more dominated with white oak and understory and herbaceous layers were largely absent due to canopy closure. Vines and herbaceous ground cover included heartleaf, St. John's wort, spotted wintergreen, muscadine grape, Japanese honeysuckle, ebony spleenwort, and hayscented fern.

The **Oak Hickory Forest** community occurs primarily on upper and mid-slopes and is dominated by northern red oak, scarlet oak, white oak, mockernut hickory, pignut hickory, shagbark hickory, southern sugar maple, and red maple. Species in the understory included green ash, southern sugar maple, blueberry, and box elder. Vines and herbaceous ground cover included heartleaf, St. John's wort, spotted wintergreen, muscadine grape, Japanese honeysuckle, and ebony spleenwort.

The upland **Managed Pine** communities are dominated by monocultures of loblolly pine, Virginia pine, shortleaf pine, and white pine. Other species present in the overstory include blackjack oak, red maple, and winged elm. Shrub and herbaceous cover were mostly

3 Natural Resources Technical Report for the proposed NC 150 Widening. Prepared by Stantec Consulting Services Inc., September 2014.

absent due to canopy closure and the intensive silvicultural activities associated with logging activities. Vines and herbaceous ground cover included muscadine grape, Japanese honeysuckle, ebony spleenwort, and poison ivy.

The **Bottomland Hardwood Forest** community occurs in wetland areas along the floodplain of higher order streams in the project study area where periodic overbank flooding occurs. Dominant species include red maple, river birch, tulip poplar, water oak, sycamore, ironwood, wax myrtle, Chinese privet, sparkleberry, and silky dogwood. Herbaceous and vine species include giant cane, netted chain fern, and common greenbrier.

The **Headwater Forest** community occurs in wetland areas along the floodplains of lower order streams in the project study area. Dominant species include red maple, sweet gum, ironwood, river birch, tulip poplar, and silky dogwood. Common herbaceous species include netted chainfern, southern lady fern, Japanese honeysuckle, and common greenbrier.

The **Non-Tidal Freshwater Marsh** community is primarily made up of herbaceous species and occurs in wet areas where disturbance limits the growth of woody shrubs and trees, particularly relic farm ponds and areas with utility rights of way. Dominant species in this community include red maple, river birch, tag alder, and water oak. Dominant herbaceous species include common rush, cattail, common greenbrier, netted chainfern, and sedge.

TABLE 4.1.2
TERRESTRIAL COMMUNITIES IN THE PROJECT STUDY AREA

COMMUNITY	COVERAGE (ACRES)
Maintained/Disturbed	506.6
Managed Pine	78.2
Oak Hickory Forest	79.6
Beech Forest	7.6
Headwater Forest	1.0
Non-Tidal Freshwater Marsh	0.5
Bottomland Hardwood Forest	0.2
Total	**673.7**

4.1.2.2 Terrestrial Wildlife

Terrestrial communities in the project study area are comprised of both natural and disturbed habitats that may support a diversity of wildlife species (those species actually observed are indicated with *). Mammal species that commonly occupy forest and stream corridors as found within the project study area include eastern cottontail, raccoon, Virginia opossum, red fox, eastern gray squirrel*, and white-tailed deer*. Birds that commonly use forest and forest edge habitats include the American crow*, red shouldered hawk*, northern cardinal*, song sparrow, blue jay*, Carolina chickadee, tufted titmouse. Birds that

may use the open habitat or water bodies within the project study area include American kestrel, belted kingfisher, eastern bluebird, eastern meadowlark, and turkey vulture*. Reptile and amphibian species that may use terrestrial communities located in the project study area include the corn snake, black rat snake, Southern copperhead, American toad, spring peeper, garter snake, eastern box turtle*, eastern fence lizard, five-lined skink.

4.1.2.3 Aquatic Communities

Aquatic communities in the project study area consist of both perennial and intermittent piedmont streams, ponds and Lake Norman. Perennial streams in the project study area could support bluehead chub, redlip shiner, northern dusky salamander, and redbreast sunfish. Intermittent streams in the project study area are relatively small in size and would support aquatic communities of spring peeper, crayfish, and various benthic macroinvertebrates. Pond habitats could support bluegill, blue catfish, green treefrog, and banded water snake. Lake Norman supports a variety of species including striped bass, largemouth bass, spotted bass, blue catfish, flathead catfish, channel catfish, crappie, white perch, snapping turtle, various waterfowl and wading birds.

4.1.2.4 Invasive Species

Six species from the NCDOT Invasive Exotic Plant List for North Carolina were found to occur in the project study area. The species identified were kudzu (Threat), Chinese privet (Threat), Chinese lespedeza (Threat), multiflora rose (Threat), mimosa (Moderate Threat), and Japanese honeysuckle (Moderate Threat).

4.1.3 Water Resources and Water Quality

Water resources in the project study area are part of the Catawba River Basin [U.S. Geological Survey (USGS) Hydrologic Unit 03050101]. In addition to Lake Norman (Catawba River), 16 streams and one pond connected to jurisdictional stream features were identified in the project study area, as listed in Table 4.1.3. The location of each water resource is show in Figure 4.1.2. The physical characteristics of these streams are provided in Table 4.1.4.

Lake Norman – Lake Norman was created when the Catawba River was dammed by the creation of the Cowans Ford Dam. NC 150 crosses Lake Norman on bridges in 5 locations within the project study area. The full pond elevation of Lake Norman is 760 feet. According to the Duke Energy website, "*The water of Lake Norman is used in two ways to provide electricity to the Piedmont Carolinas. It is used to power the generators at Cowans Ford Hydroelectric Station and by Marshall Steam Station and McGuire Nuclear Station to cool the steam that drives the turbines. The lake provides a dependable supply of water to Lincoln County, Davidson, Mooresville, Charlotte-Mecklenburg and Huntersville, North Carolina. Duke Energy partnered with the state in the establishment of the Lake Norman State Park. In addition, Duke Energy has built two bank fishing areas and eight public*

boating access areas along the shoreline." For the purposes of this report, Lake Norman is defined, at a minimum, as the area below full pond elevation (760'). For Lake Norman, the FERC boundary is at "full pond" or 760' above mean sea level. Any crossings of this contour require a permit from FERC. Twenty-five acres of the lake are present within the project study area.

TABLE 4.1.3
WATER RESOURCES IN THE PROJECT STUDY AREA

STREAM NAME	MAP ID	NCDWR INDEX NUMBER	BEST USAGE CLASSIFICATION
Lake Norman (Catawba River)	Lake Norman	11-(75)	WS-IV,B;CA
Beaverdam Creek	Beaverdam Creek 1	11-94	WS-IV,B;CA
Beaverdam Creek	Beaverdam Creek 2	11-94	WS-IV,B;CA
Beaverdam Creek	Beaverdam Creek 3	11-94	WS-IV,B;CA
Bettie Creek	Bettie Creek 1	11-95	WS-IV,B;CA
Bettie Creek	Bettie Creek 2	11-95	WS-IV,B;CA
Bettie Creek	Bettie Creek 3	11-95	WS-IV,B;CA
UT Killian Creek	SA	11-119-2-(0.5)	C
UT Killian Creek	SB	11-119-2-(0.5)	C
UT Lake Norman	SC	11-(75)	WS-IV,B;CA
UT Bettie Creek	SD	11-95	WS-IV,B;CA
UT Bettie Creek	SE	11-95	WS-IV,B;CA
UT Bettie Creek	SF	11-95	WS-IV,B;CA
UT Bettie Creek	SG	11-95	WS-IV,B;CA
UT Lake Norman	SH1	11-(75)	WS-IV,B;CA
UT Lake Norman	SH2	11-(75)	WS-IV,B;CA
UT Beaverdam Creek	SI	11-94	WS-IV,B;CA
UT Beaverdam Creek	SJ	11-94	WS-IV,B;CA
UT Lake Norman	SK	11-(75)	WS-IV,B;CA
UT Lake Norman	SL	11-(75)	WS-IV,B;CA
UT Lake Norman	SM	11-(75)	WS-IV,B;CA
UT Lake Norman	SN	11-(75)	WS-IV,B;CA

NOTES: WS-IV: Water Supply IV – Highly Developed; CA: Critical Area; B: Class B – Primary Recreation, Fresh Water; C: Class C – Aquatic Live, Secondary Recreation, Fresh Water; UT: Unnamed Tributary

TABLE 4.1.4
PHYSICAL CHARACTERISTICS OF WATER RESOURCES IN THE PROJECT STUDY AREA

MAP ID	BANK HEIGHT (FT)	BANKFULL WIDTH (FT)	WATER DEPTH (IN)	CHANNEL SUBSTRATE	VELOCITY	CLARITY
Lake Norman*	n/a	n/a	n/a	n/a	n/a	n/a
Beaverdam Creek 1	2.5	5-6	3	Silt/Sand/ Gravel	Moderate	Clear
Beaverdam Creek 2	2.5-9	8-25	3	Clay/Silt	Moderate	Clear
Beaverdam Creek 3	3-5	10-12	3-15	Sand/ Bedrock	Moderate	Clear
Bettie Creek 1	1	2	6	Sand	Slow	Clear
Bettie Creek 2	4	6	2-4	Sand/Gravel	Moderate	Slightly Turbid

TABLE 4.1.4 cont.
PHYSICAL CHARACTERISTICS OF WATER RESOURCES IN THE PROJECT STUDY AREA

MAP ID	BANK HEIGHT (FT)	BANKFULL WIDTH (FT)	WATER DEPTH (IN)	CHANNEL SUBSTRATE	VELOCITY	CLARITY
Bettie Creek 3	4	15	24-36	Silt/Sand/ Gravel/ Cobble/ Bedrock	Slow	Turbid
SA	2	4	4	Sand	Moderate	Slightly Turbid
SB	6	20	6	Sand/ Cobble	Slow	Slightly Turbid
SC	6	4	1-4	Sand/Gravel	Moderate	Clear
SD	4-6	2	6-8	Sand/Gravel	Moderate	Slightly Turbid
SE	2-12	3-4	2-5	Clay/Silt/Sand	Moderate	Clear
SF	3	1	2	Clay/Silt/Sand	Moderate	Clear
SG	2-12	3-4	2-5	Clay/Silt/Sand	Moderate	Clear
SH1	0.5	1	2	Clay/Silt/Sand	Slow	Clear
SH2	2-3	10-15	20	Clay/Silt/Sand	Slow	Clear
SI	2-5	4	0-3	Sand	Slow	Clear
SJ	1	1	0	Clay/Silt	N/A	N/A
SK	0.5-2	1-2	3	Clay/Sand	Fast	Clear
SL	10	15	2-12	Sand/Gravel/ Cobble	Moderate	Slightly Turbid
SM	5-6	7-8	4-7	Sand/Gravel/ Cobble	Moderate	Clear
SN	10-12	10-12	2-12	Sand/ Gravel/ Cobble	Moderate	Clear

* Lake Norman was not assessed for physical water characteristics.

Water Quality

Best Usage Classifications – The NCDWR classifies stream segments according to their highest supportable use. Unless otherwise stated, unnamed tributaries with no designated best usage classification share the classification of their respective receiving waters. Class C waters are protected for aquatic life propagation and survival, fishing, wildlife, secondary recreation, and agriculture. Secondary recreation includes wading, boating, and other uses involving human body contact with water where such activities take place in an infrequent, unorganized, or incidental manner. There are no restrictions on watershed development activities for Class C waters.

There are no High Quality Waters (HQWs), Outstanding Resource Waters (ORWs), trout waters, primary nursery areas, or designated anadromous fish waters, or Primary Nursery Areas (PNA) are present within the project study area. Additionally, there are no HQWs or ORW streams within one mile downstream of the project study area. Lake Norman is a water supply lake and it, and its tributaries, are designated as Water Supply-IV, Class B waters. From Lake Norman to east of Doolie Road/Perth Road, Lake Norman is a WS-IV Critical Area. From Doolie Road/Perth Road to east of I-77 is a WS-IV Protected Area. The project is within the Catawba River Basin, which is managed by NC Division of Water Resources' (NCDWR) Catawba River Basinwide Water Quality Plan (September 2004). The

waterbody that makes up Lake Norman, the Catawba River, is listed within the 2014 303(d) Impaired Waters List4 for a PCB Fish Tissue Advisory based on sampling completed in 2012.

Lake Norman is also subject to Catawba River Basin buffer rules which are discussed in further detail below.

Catawba River Riparian Buffer Rules – Permanent riparian buffer protection rules were enacted by the State for the main stem of the Catawba River and its main stem lakes below Lake James south to the North Carolina/South Carolina border (15 NCAC 02B.0243-0244). Lake Norman is one of the main stem lakes in which the buffer rules apply. The buffer protection rules apply within 50 feet of all riparian shorelines along the Catawba River main stem and the seven main stem lakes. The buffer is 50 feet wide, measured from the water's edge or at full pond in lakes. There are two zones, Zone 1 is the 30 feet nearest the water and Zone 2 is 20 feet landward of Zone 1. Grading and clearing of vegetation in Zone 1 is not allowed except for certain uses. Zone 2 can be cleared and graded but must be re-vegetated to maintain diffuse flow to Zone 1. Certain activities (including road crossings) may be allowable with mitigation but must be approved by the NCDWR. If it can be shown that there are "no practical alternatives" to the proposed activity, a variance may be allowed with mitigation.

4.1.4 Jurisdictional Issues

Section 404 of the Clean Water Act prohibits discharges of dredged or fill material into "Waters of the United States", except in accordance with a permit. The term Waters of the United States has broad meaning and incorporates both wetlands and surface waters. The US Army Corps of Engineers (USACE) is responsible for issuing permits and enforcing permitting requirements under Section 404 of the CWA. The USEPA issues the regulations, known as Section 404(b)(1) Guidelines, that the USACE must follow when issuing Section 404 permits. USEPA also participates in the permitting process. The USACE regulatory program is defined in 33 CFR 321-330. In addition, Executive Order 11990 requires that new construction in wetlands be avoided to the extent possible, and that all practical measure be taken to minimize or mitigate impacts to wetlands.

Rivers, streams, lakes, wetlands and ponds are subject to jurisdictional consideration under the Section 404 Program. The NCDWR also has regulatory input through Section 401 of the CWA, Water Quality Certification. Section 401 requires an applicant for a Section 404 permit to obtain certification from the State that the project complies with State water quality standards.

Clean Water Act Waters of the United States – Sixteen jurisdictional streams and 12 jurisdictional wetland areas were identified within the project study area as shown in Tables 4.1.5 and 4.1.6. The location of these streams is shown in Figure 4.1.2.

4 2014 NC 303(d) List – Category 5 Final December 19, 2014.
http://portal.ncdenr.org/c/document_library/get_file?uuid=28b97405-55da-4b21-aac3-f580ee810593&groupId=38364

TABLE 4.1.5
JURISDICTIONAL CHARACTERISTICS OF WATER RESOURCES IN THE PROJECT STUDY AREA

MAP ID	AREA (AC) OR LENGTH (LF)	CLASSIFICATION	COMPENSATORY MITIGATION REQUIRED	RIVER BASIN BUFFER
Lake Norman*	25.0	n/a	No	Subject
Pond 1	0.03	n/a	No	Not subject
Beaverdam Creek 1	397	Perennial	Yes	Not subject
Beaverdam Creek 2	280	Perennial	Yes	Not subject
Beaverdam Creek 3	743	Perennial	Yes	Not subject
Bettie Creek 1	378	Intermittent	Yes	Not subject
Bettie Creek 2	439	Perennial	Yes	Not subject
Bettie Creek 3	642	Perennial	Yes	Not subject
SA	333	Perennial	Yes	Not subject
SB	324	Perennial	Yes	Not subject
SC	273	Intermittent	Yes	Not subject
SD	268	Perennial	Yes	Not subject
SE	1,164	Perennial	Yes	Not subject
SE	40	Intermittent	Yes	Not subject
SF	33	Intermittent	Yes	Not subject
SG	131	Intermittent	Yes	Not subject
SH1	39	Intermittent	Yes	Not subject
SH2	150	Perennial	Yes	Not subject
SI	53	Intermittent	Yes	Not subject
SJ	45	Intermittent	Yes	Not subject
SK	173	Intermittent	Yes	Not subject
SL	158	Perennial	Yes	Not subject
SM	82	Perennial	Yes	Not subject
SN	192	Perennial	Yes	Not subject

*Lake Norman full pond elevation is 760 feet. All jurisdictional streams in the project study area have been designated as warm water streams for the purposes of stream mitigation.

TABLE 4.1.6
JURISDICTIONAL CHARACTERISTICS OF WETLANDS IN THE PROJECT STUDY AREA

MAP ID	NCWAM CLASSIFICATION	HYDROLOGIC CLASSIFICATION	NCDWR WETLAND RATING	AREA (AC)
WA	Non-Tidal Freshwater Marsh	Riparian	44	0.06
WB	Headwater Forest	Riparian	34	0.57
WC	Bottomland Hardwood Forest	Riparian	39	0.01
WD	Headwater Forest	Riparian	30	0.02
WE	Headwater Forest	Riparian	62	0.30
WF	Headwater Forest	Riparian	28	<0.01
WG	Non-Tidal Freshwater Marsh	Riparian	39	0.06
WH	Headwater Forest	Riparian	28	0.01
WI	Headwater Forest	Riparian	28	0.03
WJ	Headwater Forest	Riparian	28	0.03
WK	Non-Tidal Freshwater Marsh	Riparian	61	0.39
WM	Bottomland Hardwood Forest	Riparian	35	0.17

Endangered Species Act Protected Species – As of April 2, 2015 and July 24, 2015 for Catawba and Iredell Counties, respectively, the United States Fish and Wildlife Service (USFWS) lists three federally protected species for Catawba County and three federally protected species for Iredell County. These species are shown in Table 4.1.7. Following is a brief description of each species' habitat requirements, as well as the Biological Conclusion rendered based on field observation and survey results in the project study area. Habitat requirements for each species are based on best available information from the USFWS.

TABLE 4.1.7
FEDERALLY-PROTECTED SPECIES LISTED FOR CATAWBA AND IREDELL COUNTIES

COUNTY	SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	HABITAT PRESENT
C, I	*Hexastylis naniflora*	Dwarf-flowered heartleaf	T	Yes
C,I	*Myotis septentrionalis*	Northern long-eared bat	T	Yes
C	*Helianthus schweinitzii*	Schweinitz's sunflower	E	Yes
I	*Glyptemys muhlenbergii*	Bog turtle	T(S/A)	No

NOTES: C – Catawba; I – Iredell; E – Endangered; T – Threatened; T(S/A) – Threatened due to similarity of appearance

Dwarf-flowered heartleaf

Dwarf-flowered heartleaf is endemic to the western Piedmont and foothills of North and South Carolina. This herbaceous evergreen is found in moist to rather dry forests along bluffs; boggy areas next to streams and creek heads; and adjacent hillsides, slopes, and ravines. Requiring acidic, sandy loam soils, the species is found in soil series such as Pacolet, Madison, and Musella, among others. Occurrences are generally found on a north facing slope. Undisturbed natural communities such as Piedmont/Coastal Plain Heath Bluff, Dry-Mesic Oak Hickory Forest, and Mesic Mixed Hardwood Forest hold the most viable occurrences. However, less viable remnant occurrences are found in disturbed habitats, including logged, grazed, mown, and residential/commercial developed lands; areas converted to pasture, orchards, and tree plantations; roadside rights-of-way; and on upland slopes surrounding manmade ponds or lakes.

Schweinitz's sunflower

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

others. It is generally found growing on shallow sandy soils with high gravel content; shallow, poor, clayey hardpans; or shallow rocky soils, especially those derived from mafic rocks.

Northern long-eared bat

In North Carolina, the Northern long-eared bat (NLEB) occurs in the mountains, with scattered records in the Piedmont and coastal plain. In western North Carolina, NLEB spend winter hibernating in caves and mines. Since this species is not known to be a long-distance migrant, and caves and subterranean mines are extremely rare in eastern North Carolina, it is uncertain whether or where NLEB hibernate in eastern North Carolina. During the summer, NLEB roost singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees (typically ≥3 inches dbh). Males and non-reproductive females may also roost in cooler places, like caves and mines. This bat also been found, rarely, roosting in structures like barns and sheds, under eaves of buildings, behind window shutters, in bridges, and in bat houses. Foraging occurs on forested hillsides and ridges, and occasionally over forest clearings, over water, and along tree-lined corridors. Mature forests may be an important habitat type for foraging.

Bog turtle

Bog turtle habitat consists of open, groundwater supplied (spring fed), graminoid dominated wetlands along riparian corridors or on seepage slopes. These habitats are designated as mountain bogs by the North Carolina Natural Heritage Program, but they are technically poor, moderate, or rich fens that may be associated with wet pastures and old drainage ditches that have saturated muddy substrates with open canopies. These habitats, found between 700 and 4,500 feet above mean sea level in the western Piedmont and mountain counties of North Carolina, often support sphagnum moss and may contain carnivorous plants. Soil types (poorly drained silt loams) from which bog turtle habitats have been found include Arkaqua, Chewacla, Dellwood, Codorus complex, Hatboro, Nikwasi, Potomac – Iotla complex, Reddies, Rosman, Tate – Cullowhee complex, Toxaway, Tuckasegee – Cullasaja complex, Tusquitee, Watauga, and Wehadkee.

Bald Eagle and Golden Eagle Protection Act – Habitat for the bald eagle primarily consists of mature forest in proximity to large bodies of open water for foraging. Large dominant trees are utilized for nesting sites, typically within 1.0 mile of open water.

The lakeshore of Lake Norman does support bald eagle habitat and a review of NCNHP Natural Heritage Element Occurrences (NHEO) (July 2014 dataset) indicates one known occurrence within 1.0 mile of the project study area. No nests and no known occurrences were detected within the corridor.

A desktop GIS analysis of the project study area, as well as a 1.13-mile radius (1.0 mile plus 660 feet) of the project limits, was performed in May 2013 using 2012 color aerials. Lake

Norman is large enough and sufficiently open to be considered a potential feeding source. A survey of the project study area was conducted in May 2013 and no nests were found. A review of NCNHP Natural Heritage Element Occurrences (NHEO) (July 2014 dataset) revealed one known occurrence of this species within 2.0 miles of the project study area. That occurrence is known as the 'Catawba #2 – Duke Energy Marshall Stream Station' site and had an active nest in 2011. The occurrence is approximately 0.4 miles northwest of the intersection of NC150 and Harvel Road (SR1902).

Endangered Species Candidate and Proposed Species

As of November 22, 2015, the USFWS lists no Candidate species for Iredell or Catawba Counties.

4.2 CULTURAL RESOURCES

Section 106 of the National Historic Preservation Act of 1966, as amended (36 CFR 800) requires federal agencies to consider the effects of their undertakings on historic properties and to allow the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on the proposed action. Historic properties protected under Section 106 include prehistoric [archeological] or historic districts, sites, buildings, structures, or objects included in or eligible for inclusion in the National Register of Historic Places (NRHP).

To address Section 106 requirements, cultural resources investigations were undertaken to identify important historic architectural and archaeological resources within the project study area. Potential impacts to cultural resources are discussed in Section 5.2. Coordination with the North Carolina State Historic Preservation Office (HPO) is contained in Appendix B.

4.2.1 Historic Architectural Resources

A historic architectural resources study[5] was conducted in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended, and guidelines set forth by the NCDOT and HPO.[5] Field surveys of the Area of Potential Effects (APE) were conducted in August 2013 and January 2014. The survey identified 132 resources that were reviewed with HPO on October 1, 2013. The HPO requested additional study of the Terrell Historic District, Marshall Steam Station, Berea Baptist Church, and Johnson-Neel House. The Terrell Historic District and the Johnson-Neel House were reevaluated to determine if their architectural integrity has been compromised since their listing in the NRHP in, respectively, 1986 and 1975. HPO concurred that the Berea Baptist Church and Cemetery are not eligible for listing in the National Register and that the Johnson-Neel House and the Terrell Historic District remained eligible for listing. Additional consultation with HPO confirmed the National

5 Historic Architectural Resources Survey Report for the proposed NC 150 Widening. Prepared by Coastal Carolina Research. April 2014.

Register boundary of the Terrell Historic District and established the eligibility of the Marshall Steam Station.

The **Terrell Historic District** consists of the area surrounding the intersection of Sherrills Ford Road and NC 150. Most of the buildings in the Terrell Historic District date from the late nineteenth and early twentieth century period, during which time Terrell developed into a thriving crossroads community. The following descriptions are paraphrased and summarized from the 1983 National Register of Historic Places nomination form.[6] The district is comprised of structures typical to a rural community of the time, including farm houses, a church and cemetery, a store, a post office, and several industrial buildings. The oldest building is the Coleman-Caldwell-Gabriel Farm at the northwest corner of the district, built circa 1854. It is a typical vernacular farmhouse of the mid-nineteenth century, exhibiting simple details of Greek Revival influence. The Connor Store and Post Office are located at the corner of NC 150 and Sherrills Ford Road. This two-story building was built in the early 1890's and still serves its original functions. An early twentieth century grist mill, the Gabriel Cotton Gin, two buildings for cotton storage, and a cinderblock structure dating from the mid-twentieth century are situated in a row behind the store/post office. The southwest quadrant contains the Sherrill-Gabriel House, a typical two-story late Victorian vernacular house, built in the 1880's. South of the Sherrill-Gabriel House is a ranch-style house built in the 1970's. The Walter Gabriel House and James Gillian House are located in the southeast quadrant of the historic district. On the east side of Sherrills Ford Road is the T. F. Connor House, an asymmetrical Stick style house erected in 1886, designed by Charles H. Lester, Catawba County's earliest known architect. It is one of only three remaining houses built or remodeled by Lester. The Jason Sherrill House, located at the eastern end of the district, is a simple vernacular frame farmhouse. The house's appearance is the result of three periods of growth in the late nineteenth century, early twentieth century, and 1930. Similar to other historic farm houses in the district, the Jason Sherrill House is accompanied by a collection of out-buildings including a smokehouse clad in board-and-batten siding, a former kitchen, two frame sheds, a chicken coop, a wood shed, and a front-gabled, one-car, frame garage.

The Terrell Historic District was originally determined eligible for listing on the National Register in 1986 under the following criteria: Criterion A, due to its association with the postbellum agricultural and commercial development and Criterion B, due to its association with the lives of people who have played a major role in the history of the crossroads and surrounding community.

6 National Register of Historic Places Inventory – Nomination Form. Prepared by the NC Division of Archives and History. June 27, 1983. http://gis.ncdcr.gov/hpoweb/

The **Johnson-Neel House** is a two-story, three-bay, hip-roofed brick house, listed in the National Register in 1975 under Criterion C.

The **Marshall Steam Station** is located on the north side of NC 150, between Marshall Road and Greenwood Road (SR 1840). The Marshall Steam Station is a coal-fired steam generating facility named after former Duke Power president E. C. Marshall, and consists of four power-producing units contained in one rectangular, flat-roofed, multi-story, utilitarian-styled building, constructed between 1965 and 1970. Due to the rapid decommissioning of coal-fired power plants in the State, the Marshall Steam Station is one of the only standing examples. Thus, the Marshall Steam Station is recommended for listing on the National Register under Criterion G, as a property achieving significance in the past fifty years.

Eligibility findings for the three properties are documented in a concurrence form dated October 1, 2013 and correspondence between HPO and NCDOT dated May 12, 2014, August 15, 2014, and August 28, 2014, include in Appendix B. The historic architectural resources technical report (April 2014) is on file at NCDOT.

4.2.2 Archaeological Resources

SHPO correspondence dated December 14, 2012 and October 13, 2015 indicates that there are no known archaeological sites within the project study area and that it is unlikely that the project would affect any archaeological resources that may be eligible for inclusion in the NRHP. No archaeological investigations are recommended for the proposed project.

4.3 SECTION 4(F)/6(F) RESOURCES

Section 4(f) of the US Department of Transportation Act (the Act) provides protection for publicly owned parks, recreation areas, and wildlife and waterfowl refuges as well as significant historic sites. Historic sites protected by this regulation include sites that are eligible for listing or listed on the National Register of Historic Places.

According to United States Code (USC) Title 23 in Section 138 (Section 4(f)), the United States Department of Transportation (USDOT):

> "..... shall not approve any program or project ..... which requires the use of any publicly-owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, State or local significance as determined by the Federal, State, or local officials having jurisdiction thereof, or any land from an historic site of national, State or local significance as so determined by such officials unless (1) there is no feasible and prudent alternative to the use of such land, and (2) such program includes all possible planning to minimize harm to such park, recreational area, wildlife and waterfowl refuge, or historic site resulting from such use."

In addition to the historic properties detailed in Section 4.2, the Marshall Fishing Area, Pinnacle Access Area, and McCrary Access Area are also subject to Section 4(f) regulations as public recreation facilities. There are no refuges subject to Section 4(f) regulations within the project study area. Section 4(f) resources are identified in Figure 4.3.1. Potential impacts to Section 4(f) resources are discussed in Section 5.3.

Section 6(f) of the Land and Water Conservation Fund Act (LWCF) of 1965 (16 USC 4601-4) requires federal agencies to analyze potential impacts to lands acquired or developed with LWCF grants. Section 6(f) prohibits the conversion of these properties to non-recreational use without replacement of land of equivalent value, usefulness, location, and approval of the National Park Service. There are no lands that were acquired or developed with LWCF grants within the project study area; therefore, Section 6(f) of the Land and Water Conservation Act is not applicable to this action.

4.4 HUMAN ENVIRONMENT

The following sections paraphrase and contain excerpts from the *Community Impact Assessment*[7] and the *Indirect and Cumulative Effects Report & Land Use Scenario Assessment*[8] prepared for the proposed project. The evaluation area used in the Community Impact Assessment (CIA) is called the "Direct Community Impact Area" (DCIA). The DCIA is the area surrounding a construction project that may be directly affected in any way during, throughout, and after project completion. The area outlined in purple in in the Community Features Map (Figure 4.4.1) has been identified as the DCIA for the proposed project. The DCIA is primarily located in unincorporated portions of Catawba and Lincoln counties, with the western end of the DCIA in Lincoln County and the eastern end of the DCIA in the Town of Mooresville. It was delineated using parcel boundaries for properties and neighborhoods adjacent to the roadway corridor and those that may experience access-related effects.

The Future Land Use Study Area (FLUSA), shown in Figure 4.4.2, describes the area around the proposed project that may be indirectly affected by the actions of others as a result of the construction of this project and combined projects. This study area identifies the areas that were examined for potential increases in development pressure. The FLUSA boundary follows Lake Norman on the south and the roadway network on the other three sides, bounded generally by Joe Johnson Road/Island Point Road on the north, US 21 on the east, and Anderson Mountain Road on the west. The FLUSA includes land from Catawba, Iredell, and Lincoln Counties and the Town of Mooresville.

7 Community Impact Assessment for the proposed NC 150 Widening. Prepared by Kimley-Horn and Associates. June 2014.
8 Indirect and Cumulative Effects Report & Land Use Scenario Assessment. Prepared by Kimley-Horn and Associates. June 2014.

4.4.1 Population & Land Use

In addition to the study boundaries described above, population and employment projections are also separated by traffic analysis zones (TAZs) within the FLUSA.

4.4.1.1 Population Data

Between 1990 and 2000, the portion of the FLUSA within Iredell County experienced higher growth rates than any other section of the county, with Mooresville annexing several neighborhoods along the NC 150 corridor. Development peaked in 2005, and has slowed in recent years. Between 1990 and 2000, the Sherrills Ford area experienced the highest growth rate of any area of Catawba County. Most of this growth was due to large, single-family developments along Lake Norman. Similar to Iredell County, development in Catawba County peaked in 2005, and there has been very little residential development in the FLUSA in recent years. Table 4.4.1 shows population data for the FLUSA.

TABLE 4.4.1
POPULATION DATA

AREA	2000	2010	% AVERAGE ANNUAL CHANGE (2000-2010)	2025
Mooresville	18,823	32,711	5.7%	
Catawba County	141,685	154,358	0.9%	159,680
Iredell County	122,660	159,437	2.7%	190,496
Lincoln County	63,780	78,265	2.1%	86,889
North Carolina	8,049,313	9,535,483	1.7%	11,095,883

Source: 2000 and 2010 data – U.S. Census Bureau, 2025 data – North Carolina Office of State Budget and Management. Population projections available for county and state levels only.

Local planners for Catawba and Iredell counties have recently worked with their councils of governments to prepare population projections. The five TAZs in the FLUSA in Iredell County have a 2010 population of 9,312 and a projected average population growth rate of 1.0% per year through 2040, which is consistent with the NC Office of State Budget and Management's projections. Most properties along the water are built out, although there are several large properties along NC 150 that are undeveloped. A new 250-unit apartment complex is planned on the north side of NC 150 between Perth Road and Ervin Road, and local planners expect other residential developments in this area. The 12 TAZs in the FLUSA in Catawba County have a 2011 population of 7,021 and a projected average population growth rate of 0.1% per year, less than projections from the NC Office of State Budget and Management. Population levels are expected to essentially be flat except at the NC 150/NC 16 Bypass interchange (19% total growth projected between 2011 and 2040 in the northeast and southeast quadrants). Local planners noted that they expect to see more growth again in the future once water and sewer lines are available on NC 150, although most residences are expected to be as part of mixed-use developments rather than stand-alone neighborhoods. Catawba County supports growth on NC 150 at the identified village

center and planned development nodes, but does not encourage future development off the corridor. Parcels along the water, the more "desirable" locations for residences, are essentially built out.

Employment

Catawba and Iredell planners note that this area is well positioned for future growth because of its proximity to downtown Charlotte (25 minutes along NC 16 Bypass), its direct access to Mooresville (a growing employment center), its position related to NC 16 and I-77, and the relatively low property costs. In addition, water and sewer lines are available along NC 150 in Iredell County, and in Catawba County water lines are available along NC 150 and sewer lines are being constructed. This infrastructure will encourage additional development along the corridor.

Iredell and Lincoln counties are among seven counties comprising the Centralina Workforce Development Board (WDB). The NC Department of Commerce Division of Employment Security projected employment in the Centralina WDB to grow by 11.2% between 2008 and 2018, an average growth of 1.1% per year. The top industries are food services, health care, and educational services. The fastest growing occupation is expected to be personal and home care aides. Iredell County, working with the Centralina Council of Governments (COG), has developed employment projections for the five TAZs within the FLUSA, which project an average growth of 0.7% in employment per year through 2040. Most of the FLUSA within Iredell County is built out, though continued water and sewer expansions through future projects and annexations will support slow growth within the FLUSA.

Catawba County is one of four counties served by the Western Piedmont WDB. Employment in the Western Piedmont WDB is projected by the NC Department of Commerce Division of Employment and Security to grow by 5.2% between 2008 and 2018, an average growth of 0.5% per year. The top industries are healthcare, educational services, and food services. Catawba County and the Western Piedmont COG project an average growth of 0.6% in employment per year through 2040 for the 12 TAZs within the FLUSA. Recent development in the Catawba County portion of the FLUSA has been commercial, and most anticipated development is commercial or mixed-use rather than large residential neighborhoods.

Environmental Justice & Limited English Proficiency

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" (Federal Register Vol. 59, No. 32, February 16, 1994), states that each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health and environmental effects of its program, policies, and activities on minority populations and low-income populations. It also directs agencies to ensure that affected

communities have full and fair participation in the transportation decision-making process and to prevent the denial of, reduction in, or significant delay in the receipts of benefits by minority and low-income populations.[9]

Table 4.4.2 shows race and ethnicity data for the census tracts that contain the project study area. The census tracks are shown in Figure 4.4.3. Census data indicates a notable presence of minority and low-income populations meeting the criteria for Environmental Justice within the census tracts that comprise the project study area, but no minority or low income communities were observed within the DCIA during the site visit. Two census block groups have a minority population more than 10 percentage points above the county totals. Census Tract 613.04 Block Group 1 has 41.0% and Census Tract 614.02 Block Group 2 has 26.2% minority.

TABLE 4.4.2
RACE AND ETHNICITY DATA

Geography	Total Population	White		Black or African American		American Indian and Alaska Native Alone		Asian		Native Hawaiian/ Pacific Islander		Some Other Race		Two or More Races		Total Non-White	
		#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
CT 115.01, BG 2, Catawb CT	1,553	1,465	94.3%	58	3.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	30	1.9%	88	5.7%
115.03, BG 2, Catawba County	1,437	1,414	98.4%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	23	1.6%	23	1.6%
CT 115.04, BG 1, Catawba County	1,460	1,326	90.8%	93	6.4%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	41	2.8%	134	9.2%
CT 115.04, BG 2, Catawba County	2,310	2,148	93.0%	0	0.0%	0	0.0%	138	6.0%	0	0.0%	0	0.0%	24	1.0%	162	7.0%
CT 115.04, BG 3, Catawba County	1,373	1,328	96.7%	0	0.0%	12	0.9%	0	0.0%	0	0.0%	0	0.0%	33	2.4%	45	3.3%
CT 116.02, BG 4, Catawba County	1,577	1,432	90.8%	46	2.9%	0	0.0%	31	2.0%	0	0.0%	0	0.0%	68	4.3%	145	9.2%
CT 612.03, BG 2, Iredell County CT	2,014	1,780	88.4%	50	2.5%	16	0.8%	47	2.3%	0	0.0%	50	2.5%	71	3.5%	234	11.6%
612.04, BG 2, Iredell County CT	1,087	1,087	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
613.04, BG 1, Iredell County	3,411	2,855	83.7%	252	7.4%	0	0.0%	127	3.7%	0	0.0%	0	0.0%	177	5.2%	556	16.3%
CT 614.02, BG 1, Iredell County CT	3,293	3,198	97.1%	77	2.3%	0	0.0%	0	0.0%	0	0.0%	18	0.5%	0	0.0%	95	2.9%
614.02, BG 2, Iredell County CT	1,745	1,540	88.3%	67	3.8%	0	0.0%	138	7.9%	0	0.0%	0	0.0%	0	0.0%	205	11.7%
614.03, BG 1, Iredell County	1,312	1,296	98.8%	16	1.2%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	16	1.2%
CT 614.03, BG 2, Iredell County CT	1,204	1,094	90.9%	110	9.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	110	9.1%
614.03, BG 3, Iredell County CT	884	793	89.7%	70	7.9%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	21	2.4%	91	10.3%
711.01, BG 2, Lincoln County	2,454	2,327	94.8%	118	4.8%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	118	4.8%
DSA	**27,114**	**25,083**	**92.5%**	**957**	**3.5%**	**28**	**0.1%**	**481**	**1.8%**	**0**	**0.0%**	**68**	**0.3%**	**488**	**1.8%**	**2022**	**7.5%**
Catawba County	**153,886**	**126,836**	**82.4%**	**13,058**	**8.5%**	**495**	**0.3%**	**4,880**	**3.2%**	**59**	**0.0%**	**5,343**	**3.5%**	**3,215**	**2.1%**	**27,050**	**17.6%**
Iredell County	**157,501**	**129,679**	**82.3%**	**19,026**	**12.1%**	**374**	**0.2%**	**2,971**	**1.9%**	**50**	**0.0%**	**3,336**	**2.1%**	**2,065**	**1.3%**	**27,822**	**17.7%**
Lincoln County	**77,035**	**69,492**	**90.2%**	**4,113**	**5.3%**	**350**	**0.5%**	**440**	**0.6%**	**0**	**0.0%**	**1,331**	**1.7%**	**1,309**	**1.7%**	**7,543**	**9.8%**

Both block groups are in Iredell County, which has 6.6% minority population. Three census block groups have a low income population more than 5 percentage points above the county totals. Census Tract 614.03 Block Group 2 (23.9% "Near Poor") and Census Tract 613.04 Block Group 1 (17.4% "Near Poor") have more "Near Poor" compared with 9.3% in Iredell County. Census Tract 115.03 Block Group 2 has 18.4% "Below Poverty" and 18.4% "Very Poor" compared with 12.3% "Below Poverty" and 5.5% "Very Poor" in Catawba

9 Federal Highway Administration (FHWA). Environmental Justice Reference Guide. April 1, 2015. http://www.fhwa.dot.gov/environment/environmental_justice/resources/reference_guide_2015/fhwahep15035..pdf

County. Census data does not indicate Limited English Proficiency (LEP) populations meeting the US Department of Justice LEP Safe Harbor threshold.

4.4.1.2 Existing Land Use

Land uses along the corridor are varied. In the western portion of the study area, land uses along NC 150 consist of single-family homes, some agriculture/silviculture, and small businesses as well as some unmanaged forest land. A small node of businesses is present at the intersection of NC 150 and NC 16 Business and at the intersection of Grassy Creek Road and NC 150. Around Lake Norman, much of the adjacent land use is consumed by single-family neighborhoods, while the areas surrounding the Terrell Historic District are a mix of farmland, commercial parcels, and single family neighborhoods. The Marshall Steam Station is also located along NC 150. The land uses on many of the parcels near the lake are in fact related to Lake Norman and include marinas, campgrounds, watersport retail outlets, and public lake access points. In Iredell County, the land uses are similar to areas west until Morrison Plantation Park Road, with some agriculture/silviculture, single family neighborhoods, and small commercial parcels. From Morrison Plantation Park Road to the interchange with I-77 along NC 150, however, land uses are characterized by big box retail with large parking lots and access roads to large single-family developments.

The *Sherrills Ford Small Area Plan* (February 2003) describes land uses in the area; although this plan is now ten years old, the guiding principles are still consistent with the county's current vision according to the local planners. The majority of the Sherrills Ford district is rural, including active farmlands and large, single-family residential lots. This area experienced rapid growth between 1995 and 2005, primarily from small (40 lots or less) stand-alone subdivisions constructed on the Lake Norman "fingers." Because of the geographical nature of these developments, they are generally cul-de-sacs that are not connected with each other. There is one major commercial node in the Catawba County portion of the DCIA, at the intersection of NC 150 and NC 16 Business. Other smaller commercial nodes in the district are at the intersections of NC 150 with Lineberger Road and Sherrills Ford Road.

4.4.1.3 Zoning and Future Land Use

Zoning regulations within the FLUSA are implemented by the jurisdictions of the Town of Mooresville, Iredell County, and Catawba County. In the FLUSA, land uses and zoning in Catawba County are described in the Sherrills Ford Small Area Plan and the 16 South Corridor Development Plan. Land uses are either open space or residential, with small pockets of commercial, office/institutional, and manufacturing. Local planners have noted that although development is allowed on all parcels along NC 150, the county desires development to be clustered at identified nodes rather than spread along the corridor. The *Small Area Plan* lists 11 guiding principles and many associated recommendations related to land use. Guiding principles that may affect transportation and development in the DCIA

include creating a pedestrian oriented village center to serve as a focal point of the Sherrills Ford community in Terrell, ensuring that all new development is designed to accommodate and encourage pedestrian and bicycle traffic, and maintaining an attractive viewshed within the district. Specific recommendations also include designating "regional commercial centers" at the intersections of NC 150/NC 16 Business and NC 150/NC 16 Bypass, and amending the Zoning Ordinance to include a Highway 150 corridor overlay to allow for more office-institutional uses along the corridor and in the new centers.

Catawba County's *Highway 150 Plan* focuses on land use along the NC 150 corridor. Future mixed use, commercial, and multi-family is anticipated along much of the corridor, concentrated between NC 16 Bypass and NC 16 Business, near Mount Pleasant Road, and between Slanting Bridge Road and Sherrills Ford Road. Additional commercial overlay districts are proposed in those areas.

This plan is an update to a report previously completed by Mooresville and Catawba, Iredell, and Lincoln Counties. The purpose of the original plan was to put agreements in place before growth took place to remove barriers for development and to ensure development would be consistent with the region's vision for the corridor. This vision included clustered development in "village centers" rather than sprawl, with restricted and shared driveways, especially in Catawba County. Catawba County planners noted that they have tried to restrict driveway cuts and cluster development as permit applications are submitted as called for in this report. The cooperating agencies have recently begun discussing revisiting that report to reflect current conditions and the economic environment.

In the *16 South Corridor Development Plan* (August 2011), Catawba County studied land uses and economic development opportunities along NC 16 Bypass and NC 16 Business from NC 150 on the south to Airport Road on the north. Current land uses along this corridor within the DCIA are commercial and office-institutional at the intersection of NC 150 and NC 16 Business, with the Martin Marietta Denver Quarry just south of the DCIA on NC 16 Business. Current zoning on NC 150 near NC 16 Bypass and NC 16 Business is primarily highway commercial, with a small amount of office-institutional and rural commercial. Commercial uses have been approved for the land to the east of NC 16 Bypass at its intersection with NC 150, which is now zoned planned development-conditional district (PD-CD). Locations that are approved as PD-CD are more likely to be multi-use developments and are subject to development conditions such as façade treatments, pedestrian mobility and amenities, and specific uses. The remainder of the area near the NC 150/NC 16 Bypass interchange is currently zoned residential in Catawba County.

There are several zoning overlay districts within the Catawba County portion of the DCIA. The Watershed Protection-Overlay applies to all properties within the WS-IV Watershed Protect

Area, which, within Catawba County, extends from NC 16 Business to Lake Norman. This overlay requires that new development follows NC Water Supply Watershed regulations, including lot size minimums and 100-foot setbacks and buffers. The Mixed-Use Corridor Overlay extends approximately 2,000 feet on both sides of the right of way along NC 150. The purpose of the Mixed-Use Corridor Overlay is to establish building form and architectural standards compatible with the historic character of the area; provide a mixture of commercial, office, and residential uses; assure that uses are pedestrian friendly; and promote higher standards along major roadways in the county. Catawba County's *Highway 150 Plan* proposes additional commercial overlay districts in the areas identified for future mixed use, commercial, and multi-family.

The Iredell County *2030 Horizon Plan* (September 2009) presents land use, economic, transportation, and agricultural preservation planning for the unincorporated portions of the county and the municipalities. This plan was an effort to create a comprehensive county plan, which was a different approach than in previous years where the county and each municipality developed their own land use plans. A narrow corridor along NC 150 between Lake Norman and I-77 is within the 2030 Growth/Urban Services Area, also called the Mooresville Short Range Urban Services Area. Most of the area within the Urban Services Area is serviced by public water or sewer, and there are plans for extension through 2030. Future land use in the DCIA within the unincorporated area of Iredell County is a combination of low-density residential and corridor commercial. Current zoning in Iredell County lists the area within the DCIA as residential.

4.4.2 Neighborhoods/Communities

The DCIA comprises many individual neighborhood and several commercial nodes. The communities located at Cross Country Campground, Lake Norman RV Park, and Water Oak Subdivision contained one or more elements potentially indicating cohesiveness, and the campground and RV Park appear to have some permanent residents as well as vacationers. Input from local planners indicated that the pattern of development and 'fingerling' design of residential development has somewhat precluded the development of community cohesion.

4.4.2.1 Bicycle and Pedestrian Facilities

Local planners have noted that bicycling and running/jogging have become more popular in the area recently, and several bicycle clubs are now active. They typically use Sherrills Ford Road and other north-south roads since NC 150 does not have multimodal facilities. The local planners noted that bicyclists and pedestrians are likely to use NC 150 for recreational purposes, which is proposed for future bike lanes in several local plans. Although facilities are currently limited, there are a number of planned bicycle and pedestrian facilities, as discussed in the following paragraphs.

Greenways/Trails

The Carolina Thread Trail winds its way through Catawba, Iredell, and Lincoln Counties and constitutes a proposed pedestrian and bicycle facility of regional significance. The Carolina Thread Trail Master Plan for Catawba County Communities (*2010*) identifies various sections along the proposed trail site, including a portion of the trail that runs along NC 150. Two sections fall within the demographic study area for the NC 150 widening project, entitled Catawba Connections and the Murrays Mill/Sherrills Ford Corridor. Overall, the predominant corridor type on the Carolina Thread Trail is on riparian corridors at 45 percent, while road rights-of-way are also prevalent and account for 23 percent (*Greater Hickory Metropolitan Planning Organization 2013*).

To implement these pedestrian facilities, the Unified Development Ordinance (UDO) for Catawba County mandates sidewalk construction with all new developments with more than 25 lots in districts identified as R-20 or have higher density. In cases of developments with lower density, the UDO stipulates that open space be maintained and a portion of this open space be designated to trails. Irrespective of residential density, sidewalks are required along major thoroughfares in urban areas in the frontage of any new residential or non-residential developments, while major collectors or higher road classifications in rural areas are also subject to this stipulation. Catawba County will allow a fee-in-lieu option to replace the sidewalk construction or open space provision stipulation in some cases, allowing these funds to be used for the installation of sidewalks, bicycle paths, or capital projects. These projects must be identified in the County Master Park and Recreation Plan. (*Catawba County Unified Development Ordinance* as referenced in *Catawba County 16 South Corridor Development Plan 2010*).

The Town of Mooresville contracted with Kimley-Horn and Associates, Inc. to prepare a Comprehensive Transportation Plan in 2007. In conjunction with a Pedestrian Plan prepared by the town (*2006*), these documents detail the existing conditions for walking, identify existing multi-modal nodes, and provide information on best design practices. The Pedestrian Plan also mandates that pedestrian facilities be included around identified Pedestrian Oriented Development Zones, of which the Lakeshore, Winslow Bay, Morrison Plantation, Talbert, and Brawley School Zones are in close proximity to NC 150 (*Kimley-Horn and Associates, Inc. 2007*). Additionally, these plans include policies that support walking. The Pedestrian Plan stipulates that new development must be oriented to the pedestrian, must be interconnected with a few cul-de-sacs as possible, and that all new development include pedestrian accommodations (*Town of Mooresville Pedestrian Plan, 2006*).

Lincoln County updated their UDO in 2009 to include new regulations that require sidewalks on one side of all residential subdivision roads with certain exceptions for low density development. Additionally, the UDO establishes connectivity requirements for subdivisions (*Lincoln County UDO* as referenced in *Lake Norman Bicycle Plan, 2010*).

Bicycling & Bicycle Facilities

In 2009, the NCDOT Division of Bicycle and Pedestrian Transportation contracted with the Centralina Council of Governments to create the *Lake Norman Bicycle Plan* (*2009*). Involving five communities (Cornelius, Davidson, Huntersville, Mooresville, and Troutman), four counties (Mecklenburg, Lincoln, Catawba, and Iredell), and three regional planning organizations (Unifour Rural Planning Organization – now Western Piedmont Council of Governments, Lake Norman Rural Planning Organization, and the Charlotte Regional Transportation Planning Organization). Two types of routes were identified over the course of the plan, the "initial" route and the "ultimate" route. NC 150 is designated in this plan as an ultimate route along with NC 16, indicating that these corridors should be maintained to support safe bicycling into the future.

Recommendations for the designated ultimate corridors range from paved shoulders to bike lanes and multi-use paths, depending on the context. NC 150, as listed in this plan, should be improved by adding bicycle lanes, with funding coming from the Transportation Improvement Program (TIP). The Lake Norman Bicycle Route is supported by the Iredell County, Mooresville, and Troutman Comprehensive Transportation Plans (*Iredell County 2008; Kimley-Horn and Associates, Inc. 2007; Town of Troutman 2009*).

The 16 South Corridor Development Plan, Balls Creak Small Area Plan, and Sherrill's Ford Small Area Plan also recommend bicycle routes in the NC 150 Widening Demographic Study Area. NC 150 is identified as a proposed bike route, while E Maiden Road and Lebanon Road are also noted as other proposed bicycle routes in the area. Little Mountain Road at the far north of the 16 South Corridor Development Plan Study Area is identified as a historical bicycle route (*Catawba County 16 South Corridor Development Plan 2010)*.

The UDO for Catawba County stipulates that bicycle parking must be incorporated in instances where non-residential or multi-family developments are located within 500 feet of bicycle corridors in officially adopted bicycle plans and in the Mixed Use Corridor-Overlay. Additionally, both the MPO (Western Piedmont Council of Governments) and NCDOT have adopted a policy of evaluating any new road construction project for possible pedestrian and bicycle needs and potential accommodations. (*Catawba County Unified Development Ordinance* as referenced in *Catawba County 16 South Corridor Development Plan 2010*).

The Balls Creek Small Area Plan, developed in 2003, suggests that any widening projects be evaluated for the potential to support bicycle lanes. (*Balls Creek Small Area Plan 2003*). The Carolina Thread Trail, discussed in previous paragraphs, is naturally not only designed to accommodate pedestrians, but will also support bicycle transportation.

The Town of Mooresville developed a Bicycle Plan in 2008, which provided specific recommendations for including bicycle lanes on certain roads in the community (*Town of Mooresville Comprehensive Bicycle Plan 2008*). Treatment types, signage, bicycle rack design, and town programs relating to bicycling are also discussed in this document. Bicycle facilities are recommended in the plan, some of which connect to the proposed Lake Norman Bicycle Route along NC 150. The Comprehensive Transportation Plan also provides some insight into bicycling in Mooresville (*Kimley-Horn and Associates, Inc. 2007*).

The UDO in Troutman requires that bicycle ranks be included in developments with over 50 parking spaces (*Town of Troutman Unified Development Ordinance* as referenced in *Lake Norman Regional Bicycle Plan 2010*). The UDO for Lincoln County was adopted in 2009 and included some significant stipulations, including the allowance of bicycle trails in the floodplain, where other development is prohibited and creating a connectivity index.

4.4.2.2 Recreational Facilities

The Marshall Fishing Area, Pinnacle Access Area, and McCrary Access Area are public recreation facilities within the project study area. Throughout the project corridor, there are several recreational resources. Cross County Campground and the Lake Norman RV Park are campgrounds within the project study area. The Marshall Fishing Area, Pinnacle Access Area, and McCrary Access Area are all public recreation facilities within the project study area that are owned by Duke Power Company and open free to the public.

4.4.2.3 Other Public Facilities and Services

Within the project study area, there are several private recreational resources, four churches, one cemetery, and the Lake Norman High School. Marinas in the project study area offer a combination of sales and service, boat rentals, and boat storage.

Traffic generating facilities or nodes include Pinnacle Access Area, Queen's Landing, the Marshall Steam Station, the interchange of NC 150 with I-77, and several other small commercial nodes. The Lake Norman located 0.6 miles north of NC 150 on Perth Road.

4.5 FARMLAND

In accordance with the federal Farmland Protection Policy Act (FPPA) and state Executive Order 96, the impact of the proposed action on prime, unique, and statewide important farmlands has been assessed on the proposed project. As defined by the US Council on Environmental Quality (1976), prime farmland is land having the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. Prime farmland includes cropland, pastureland, rangeland and forestland; but not land converted to urban, industrial, transportation or water uses. Unique farmlands are those whose value is derived from their particular advantages for growing specialty crops.

Statewide and locally important farmlands are defined by the appropriate state or local agency. Farmland soils within the project study area are shown in Table 4.1.1.

As required by the Farmland Protection Act, this project was coordinated with the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). According to the NRCS, the project will involve the use of some lands with prime farmland designation. A discussion of farmland impacts for the detailed study alternatives is contained in Section 5.4. The completed Farmland Conversion Impact Rating forms (Form AD-1006) are included in Appendix C.

4.6 FLOODPLAINS

Both Iredell and Catawba Counties and the City of Mooresville are participants in the regular program of the National Flood Insurance Program (NFIP). The NFIP defines a floodplain as any land area susceptible to being inundated by water. A regulatory floodway is the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water elevation more than a designated height. Lake Norman is bordered on all shores by a Zone AE floodplain that is subject to inundation by the 1-percent-annual-chance flood event. Potential impacts to floodplains are discussed in Section 5.9.

4.7 HAZARDOUS MATERIALS

A hazardous material evaluation found 29 likely petroleum underground storage tanks (USTs) and one automotive repair facility within the project limits. No landfills or hazardous waste sites were identified within the project limits. Potential impacts associated with these sites are discussed in Section 5.13.

4.8 MINERAL AND ENERGY RESOURCES

There are no mines or quarries within the project study area. As shown in Figure 4.4.1, the Marshall Steam Station is located on the north side of NC 150, between Marshall Road and Greenwood Road (SR 1840). The Marshall Steam Station is one of the largest coal facilities owned by Duke Energy in the Carolinas, generating enough electricity to power approximately two million homes. Since it began commercial operation in 1965, Marshall Steam Station has been among the most efficient power plants in the nation.[10] FERC permit coordination is discussed in Section 5.12.

10 Duke Energy Regulated Facilities. https://www.duke-energy.com/power-plants/coal-fired/marshall.asp

5.0 ENVIRONMENTAL CONSEQUENCES

5.1 NATURAL RESOURCES

5.1.1 Biotic Resources

As shown in Table 5.1.1, impacts to upland terrestrial communities are primarily limited to the maintained/disturbed community that occupies the majority of land along NC 150. The new location portion of Alternative 2 would impact more oak hickory and managed pine forest than Alternative 1.

TABLE 5.1.1
IMPACTS TO UPLAND TERRESTRIAL COMMUNITIES

COMMUNITY	ALTERNATIVE 1 (acres)	ALTERNATIVE 2 (acres)
Managed Pine	18.1	30.9
Oak Hickory Forest	10.7	14.5
Beech Forest	0	0
TOTAL IMPACTS TO UPLAND TERRESTRIAL COMMUNITIES	**28.8**	**45.4**

NOTE: Impacts are based on construction limits plus an extended 10-foot boundary to account for mechanized clearing.

Impacts to Aquatic Communities

The aquatic habitat in the project study area will be both directly and indirectly affected by the construction of the project. These impacts include fluctuations in water temperatures, as a result of the loss of riparian vegetation. In consequence, shelter and food resources, both in the aquatic and terrestrial portions of these organisms' life cycles, will be affected by losses in the terrestrial communities. This loss of aquatic plants and animals would affect the terrestrial fauna which rely on them as a food source.

Both temporary and permanent impacts will be inflicted on aquatic organisms residing in the project study area. These impacts may result from increased sedimentation, having the potential to affect fish and other aquatic life in several ways, including the clogging and abrading of gills and other respiratory surfaces, affecting the habitat by scouring and filling of pools and riffles, altering water chemistry, and smothering different life stages. Increased sedimentation may also cause decreased light penetration through an increase in turbidity. The influx of organic materials may also cause dissolved oxygen rates to be lower, and the water temperature to increase. The level of impacts to the aquatic communities can be minimized by a strict level of adherence to best management practices.

Invasive Species

Six species from the NCDOT Invasive Exotic Plant List for North Carolina were found to occur in the project study area. The species identified were kudzu (Threat), Chinese privet (Threat), Chinese lespedeza (Threat), multiflora rose (Threat), mimosa (Moderate Threat), and Japanese honeysuckle (Moderate Threat). NCDOT will manage invasive plant species as appropriate.

5.1.2 Water Resources and Water Quality

Non-point source refers to runoff that enters surface waters through stormwater flow or no defined point of discharge. Stormwater runoff from the surrounding residential, agricultural, and commercial properties as well as the roads in the project study area may reach waterbodies in the project study area and cause water quality degradation through the addition of oil or gas residuals, particulate rubber, fertilizers, fecal coliforms, or other sources of contamination.

Secondary impacts to water resources are likely to result from activities associated with project construction, such as clearing and grubbing, fertilizers and pesticides used in revegetation, and pavement construction. The following secondary impacts to surface water resources are likely to result from the above-mentioned construction activities:

- Increased sedimentation and siltation in waterbodies draining the project and increased erosion in the project study area. This could contribute to increased nutrient loading and changes in dissolved oxygen levels;
- Changes in light incidence and water clarity due to increased sedimentation;
- Alteration of water levels and flows due to interruptions and/or additions to surface and ground water flow from construction;
- Increased concentrations of toxic compounds in roadway runoff;
- Increased potential for release of toxic compounds such as fuel and oil from construction equipment and other vehicles; and,
- Alteration of stream discharge due to silt loading and changes in surface and groundwater drainage patterns.

As discussed in Section 4.1.3, Lake Norman and its tributaries are designated as water supply waters, water supply critical areas (CA) and protected areas. Due to the Best Usage Classification of CA and the Catawba River Buffer rules, sedimentation and erosion control measures shall adhere to the Design Standards for Sensitive Watersheds (15A NCAC 4B .0124). (NCDOT's Best Management Practices for the Protection of Surface Waters would also be adhered to during the construction phase of the project.

In addition, development along the project corridor is subject to Catawba River Basin buffer rules, which requires a 50 foot buffer. This requirement will also help minimize impacts on water quality.

5.1.3 Jurisdictional Issues

As shown in Table 5.1.2, Alternative 1 would impact 1,830 feet of jurisdictional streams and 0.44-acre acres of jurisdictional wetlands. Alternative 2 would impact 1,593 feet of jurisdictional streams and 0.79-acre acres of jurisdictional wetlands. The majority of stream impacts are located at existing stream crossings along NC 150. Alternative 1 would create 767 linear feet of stream impacts through Terrell; comparatively, the northern bypass portion of Alternative 2 would create 529 linear feet of stream impacts for a difference of 237 linear feet. Both build alternatives would create 0.38-acre of wetland impacts at one location (Wetlands WE and WK) along the common alignment west of Terrell and 0.06-acre of wetland impacts at one location (Wetland WM) along the common alignment east of Terrell. The remaining 0.35-acre of wetland impacts for Alternative 2 is located on the Terrell bypass (Wetland WB).

TABLE 5.1.2
IMPACTS TO JURISDICTIONAL STREAMS AND WETLANDS

	ALTERNATIVE 1	ALTERNATIVE 2
Streams (linear feet)	1,830	1,593
Wetlands (acres)	0.44	0.79

NOTE: Impacts are based on construction limits plus an extended 25-foot boundary to account for mechanized clearing.

Avoidance, Minimization, and Mitigation

Avoidance examines all appropriate and practicable possibilities of averting impacts to Waters of the United States. According to a 1990 Memorandum of Agreement (MOA) between the Environmental Protection Agency (EPA) and the USACE, in determining "appropriate and practicable" measures to offset unavoidable impacts, such measures should be appropriate to the scope and degree of those impacts and practicable in terms of cost, existing technology, and logistics in light of overall project purposes.

Minimization includes examination of appropriate and practicable steps to reduce adverse impacts to Waters of the United States. Implementation of these steps is required through project modifications and permit conditions. Minimization typically focuses on decreasing the footprint of the proposed project through reduction of median widths, rights-of-way widths, fill slopes and/or road shoulder widths.

Alternative 1 and 2 share a common "best fit" alignment along a majority of the project. This alignment was developed to avoid and minimize impacts to environmental features along the corridor, including residential development, historic resources, recreational areas, and natural features. Both alternatives avoid stream impacts to Lake Norman by proposing

a number of bridges in lieu of culverts. Opportunities to avoid and minimize jurisdictional impacts will continue to be identified as the project progresses into the final design stage.

Compensatory mitigation is not normally considered until anticipated impacts to Waters of the United States have been avoided and minimized to the maximum extent possible. It is recognized that "no net loss of wetlands" functions and values may not be achieved in each and every permit action. Appropriate and practicable compensatory mitigation is required for unavoidable adverse impacts that remain after all appropriate and practicable minimization has been required. Compensatory actions often include restoration, creation and enhancement of Waters of the United States. As discussed above, compensatory mitigation for wetland and stream losses may be required where avoidance and minimization of impact is not possible. Mitigation requirements will be dependent upon final project plans; however, it is anticipated that mitigation for stream impacts will be required for the construction of either build alternative.

Anticipated Permit Requirements

Due to the size of the project, an Individual Section 404 permit will likely be applicable. The USACE holds the final discretion as to what permit will be required to authorize project construction. If a Section 404 permit is required then a Section 401 Water Quality Certification (WQC) from the NCDWR will be needed. The specific permit(s) will be determined once impacts for the build alternatives have been minimized and quantified based on the final design.

Riparian Buffers

The project study area falls within the Catawba River Basin and is therefore protected under the provisions of the Catawba River Buffer Rules administered by NCDWR. These rules apply to a 50-foot wide riparian buffer along the Catawba River mainstem below Lake James and along the main stem lakes in the Catawba River Basin, excluding wetlands. The shoreline of Lake Norman within the study area is subject to these riparian buffer rules and the buffer area is considered to begin at the most landward limit of the full pond level and extend 50 feet landward. Table 5.1.3 shows anticipated riparian buffer impacts. The Catawba River Buffer Rules do not include waterbodies along Alternative 1 through Terrell or along the northern bypass portion of Alternative 2. As such, riparian buffer impacts are identical for both build alternatives.

TABLE 5.1.3
IMPACTS TO RIPARIAN BUFFERS

	ALTERNATIVE 1	ALTERNATIVE 2
Riparian Buffers (square feet)	52,051	52,051

NOTE: Impacts are based on construction limits.

Protected Species

Plants and animals with federal classifications of Endangered (E), Threatened (T), Proposed Endangered (PE), and Proposed Threatened (PT) are protected under the provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. Biological conclusions regarding potential project impacts are discussed in the following paragraphs.

Dwarf-flowered heartleaf **Biological Conclusion: No Effect**

Suitable habitat for the dwarf-flowered heartleaf is present in the study area along wooded riparian corridors and other natural wooded areas made up of hardwood species. Surveys were conducted by biologists throughout the areas of suitable habitat on May 23-24 and May 30-June 1, 2013. No individuals of dwarf heartleaf were observed. A review of NCNHP Natural Heritage Element Occurrences (NHEO) (July 2014 dataset) indicates one known occurrence of dwarf heartleaf within 2.0 miles of the study area. That occurrence is approximately 0.25 miles northeast of the intersection of NC 16 and NC 150 at the western terminus of the project.

Northern long-eared bat **Biological Conclusion: Unresolved**

Suitable habitat for the northern long-eared bat does exist in the study area. Forests in the study area are comprised of both live and dead trees greater than three inches dbh. NCDOT Biological Surveys Group will be responsible for surveys for the northern long-eared bat.

Schweinitz's sunflower **Biological Conclusion: No Effect**

Suitable habitat for the Schweinitz's sunflower is present in the study area along forest edges and along road, powerline and utility rights-of-way. Surveys were conducted by biologists throughout the areas of suitable habitat on September 27, 30 and October 1, 2013. No individuals of Schweinitz's sunflower were observed. A review of NCNHP Natural Heritage Element Occurrences (NHEO) (July 2014 dataset) indicates no known occurrences of Schweinitz's sunflower within 2.0 miles of the study area.

Bog turtle **Biological Conclusion: Not Required**

Suitable habitat for the bog turtle does not exist in the study area. Wetlands within the Iredell portion of the study area are comprised of a closed hardwood canopy and sub-canopy. Therefore, a survey was not conducted. A review of NCNHP Natural Heritage Element Occurrences (NHEO) (July 2014 dataset) indicates no known occurrences of bog turtle within 2.0 miles of the study area.

Bald Eagle and Golden Eagle Protection Act – The lakeshore of Lake Norman does support bald eagle habitat and a review of NCNHP Natural Heritage Element Occurrences (NHEO) (July 2014 dataset) indicates one known occurrence within 1.0 mile of the study area. No nests and no known occurrences were detected within the corridor.

A desktop GIS analysis of the project study area, as well as a 1.13-mile radius (1.0 mile plus 660 feet) of the project limits, was performed in May 2013 using 2012 color aerials. Lake Norman is large enough and sufficiently open to be considered a potential feeding source. A survey of the project study area was conducted in May 2013 and no nests were found. Additionally, a review of NCNHP Natural Heritage Element Occurrences (NHEO) (July 2014 dataset) revealed one known occurrence of this species within 2.0 miles of the project study area. That occurrence is known as the 'Catawba #2 – Duke Energy Marshall Stream Station' site and had an active nest in 2011. The occurrence is approximately 0.4 miles northwest from the intersection of NC150 and Harvel Road (SR1902). Due to the distance from the study area of the active nest (>660 feet) it has been determined that this project will not affect this species.

Endangered Species Candidate and Proposed Species – As of September 30, 2014, the United States Fish and Wildlife Service (USFWS) lists no Candidate species for Iredell or Catawba Counties. The northern long-eared bat is listed as a Proposed species.

Other Jurisdictional Topics

- Essential Fish Habitat – There is no essential fish habitat within 1.0-mile of the project study area.
- Coastal Area Management Act Areas of Environmental Concern – There are no Areas of Environmental Concern in the project study area that fall under the jurisdiction of the Coastal Area Management Act.
- Construction Moratoria – No construction moratorium is anticipated at this time.
- N.C. River Basin Buffer Rules – Lake Norman and the streams in the project study area are subject to the Catawba River Riparian Buffer Rules.
- Rivers and Harbors Act Section 10 Navigable Waters – There are no Section 10 waters located within the project study area.

5.2 CULTURAL RESOURCES

On August 25, 2015, NCDOT, FHWA, and HPO met for a consultation about project effects on National Register-listed and -eligible resources. Table 5.2.1 summarizes the effects findings for the two detailed study alternatives. A concurrence forms documenting the effects findings are contained in Appendix B.

TABLE 5.2.1
SECTION 106 EFFECTS FINDINGS

	ALTRERNATIVE 1	ALTERNATIVE 2
Johnson – Neel House	No Adverse Effect	No Adverse Effect
Marshall Steam Station	No Adverse Effect	No Adverse Effect
Terrell Historic District	Adverse Effect	No Effect

5.3 SECTION 4(F)/6(F) RESOURCES

As discussed in Section 4.3, there are six Section 4(f) resources within the project study area: the Terrell Historic District, Johnson-Neel House, Marshall Steam Station, Marshall Fishing Area, Pinnacle Access Area, and the McCrary Access Area. Detailed descriptions of the three historic resources are contained in Section 4.2.1. Recreational areas are discussed in Section 4.4.2.2. Figure 4.3.1 shows the locations of these Section 4(f) resources.

Section 4(f) regulations[1] describe direct impacts and other effects that may constitute "use" of a Section 4(f) resource. Section 4(f) uses are summarized as follows: 1) permanent incorporation of land through right-of-way acquisition or a permanent easement; 2) temporary occupancy[2] through short-term arrangements such as a temporary easement; and, 3) constructive use where land within the property boundary is not directly affected, but proximity impacts result in substantial impairment to the property's activities, features, or attributes that qualify it as a Section 4(f) resource.[3]

As discussed in Section 5.2, HPO provides concurrence on the effects of each alternative with respect to Section 106 resources. Each alternative was also evaluated through the NEPA/404 Merger Process, as described in Section 1.4. In consideration of input from HPO and other agencies and consulting parties, FHWA makes every effort to select the "feasible and prudent avoidance alternative" in accordance with Section 4(f) regulations. Feasible and prudent avoidance alternatives are described as those that avoid using any Section 4(f) property and do not cause severe problems of a magnitude that substantially outweigh the importance of protecting the resource. An alternative is not considered prudent if it: 1) does not address the purpose and need of the project; 2) results in unacceptable safety or operational problems; 3) after considering mitigation, still causes severe impacts, severe disruption to established communities, severe or disproportionate impacts to minority or low-income populations, or severe impacts to environmental resources protected under other Federal statutes; 4) results in additional construction, maintenance, or operational costs of extraordinary magnitude; 5) causes other unique problems or unusual factors; or 6) involves multiple factors that, while individually minor, cumulatively cause unique problems or impacts of extraordinary magnitude. In the case where there is no feasible and prudent avoidance alternative, FHWA is directed to select the alternative that causes the least overall harm to Section 4(f) resources. [3]

Both Alternatives 1 and 2 would require 0.47-acre of land from the Marshall Steam Station. While this impact constitutes a Section 4(f) use, the use does not adversely affect the

1 23 CFR 774.17
2 Depending on the type of project and nature of the work involved, temporary occupancy may not constitute a 4(f) use if certain conditions are met (as specified in 23 CFR 774.13(d)).
3 United States Department of Transportation. July 20, 2012. Section 4(f) Policy Paper. Federal Highway Administration. https://www.environment.fhwa.dot.gov/4f/4fpolicy.asp

activities, features, or attributes that qualify the resource for protection under Section 4(f). Although Alternatives 1 and 2 would encroach on the property boundaries of this Section 4(f) resource, the ability to access and use the site is not reduced or its historic character has not been compromised. Under Section 4(f) regulations for historic sites, if HPO reaches a No Effect or No Adverse Effect determination, FHWA can, under these circumstances, reach a "de minimis" determination. Because a de minimis finding is already reached in consideration of avoidance, minimization, mitigation, and enhancement, no additional evaluation for a feasible and prudent avoidance alternative is required.

With respect to the Terrell Historic District, Alternative 2 is the only feasible and prudent avoidance alternative that also meets the purpose of and need for the project. (See Sections 3.1 and 3.2 for discussion of alternatives.) Alternative 2 would not impact the Terrell Historic District, thereby avoiding the Section 4(f) resource. HPO concurrence indicates that Alternative 2 would have No Effect on the district. If Alternative 2 is identified as the Preferred Alternative, there is no Section 4(f) use and no additional documentation is required.

Conversely, Alternative 1 would impact 4.7 acres of land within the Terrell Historic District. Within a National Register listed or eligible historic district, FHWA's long-standing policy is that Section 4(f) applies only to those properties that are considered contributing to the eligibility of the historic district, as well as any individually eligible property within the district. Elements within the boundaries of a historic district are assumed to contribute, unless they are determined by FHWA in consultation with the SHPO/THPO not to contribute. Alternative 1 would result in grading, paving, and additional right-of-way acquisition abutting two contributing structures in the historic district: the Connor Store & Post Office and T.F. Connor House. Therefore, Alternative 1 would result in a direct use of the Terrell Historic District for purposes of Section 4(f). HPO concurrence states that Alternative 1 would have an Adverse Effect on the Terrell Historic District. Should additional study result in Alternative 1 being selected as the Preferred Alternative, an individual Section 4(f) evaluation would be developed per Section 4(f) regulations to document the process used to identify, develop, analyze and evaluate potential avoidance alternatives and the rationale for the conclusion that there is no feasible and prudent avoidance alternative. The evaluation would also document, among other items, the process used to identify how Alternative 1 would cause the least overall harm and how the alternative would mitigate adverse effects.[4]

Based on HPO findings, NEPA/404 Merger Team decisions, and evaluation of the alternatives under Section 4(f) regulations, Alternative 2 is identified as the feasible and prudent avoidance alternative. Table 5.3.1 summarizes HPO findings and NEPA/404 Merger Team decisions as they apply to Section 4(f) resources in the project study area.

4 23 CFR 774.3(c)(1).

TABLE 5.3.1
SUMMARY OF SECTION 4(F) FINDINGS

SECTION 4(F) RESOURCE	ALTERNATIVE [1]	SECTION 106 EFFECTS ASSESSMENT [2]	SECTION 4(F) USE
Terrell Historic District	**Alt. 1:** widen NC 150 through Terrell Historic District.	**Alt 1:** Adverse Effect. Direct effects even with minimization measures currently included in design.	Acquisition of 4.7 acres for additional right-of-way. Not a feasible and prudent avoidance alternative when compared to Alt. 2.
	Alt. 2: widen NC 150 with a bypass option north of Terrell.	**Alt 2:** No Effect. Project is outside historic district.	None. Other impacts associated with Alt. 2 do not cause severe problems of a magnitude that substantially outweigh the importance of protecting the Section 4(f) property.
	Alt 3: widen NC 150 with a "minimization" bypass option south of Terrell.	**Alt. 3** was eliminated from further study by the NEPA/404 Merger Team on August 8, 2014.[3]	Acquisition of 1.7 acres for additional right-of-way. Does not physically impact any structures within the district. Not a feasible and prudent avoidance alternative when compared to Alt. 2.
	Alt. 4: widen NC 150 with a bypass option south of Terrell.	**Alt. 4** Adverse Effect. Reasonably foreseeable development in the Hobbs Road area will necessitate changes in roadway design that would impose impacts to the historic district.	Acquisition of 0.4 acres for additional right-of-way. Highest amount of stream and riparian buffer impacts. Geometric design constraints, safety/operational issues. Requires transmission tower relocation. Would create two new FERC-regulated crossings of Lake Norman. Not a feasible and prudent avoidance alternative when compared to Alt. 2.
Marshall Steam Station	**All Alts:** widen NC 150 with a best-fit alignment.	**All Alts:** No Adverse Effect. No access alternations, direct impacts, or permanent utility easements. Small amount of right-of-way required does not compromise historic resource.	Proposed earthwork would require the acquisition of approximately 0.47 acres of property from the Marshall Steam Station. Level of impact and nature of use allows for a de minimis finding.[4]
Johnson-Neel House	**All Alts:** Widen NC 150 with a best-fit alignment.	**All Alts:** No Adverse Effect. No direct impacts; access preserved but modified by superstreet requirements.	None.
Pinnacle Access Area	**All Alts:** Widen NC 150 with a best-fit alignment.	NA [5]	None. Minimization includes a retaining wall to maintain the existing number of parking spaces, accessibility to and from the boat ramps, and the overall function of the site.
Marshall Fishing Area / McCrary Access Area	**All Alts:** Widen NC 150 with a best-fit alignment.	NA [5]	None.

NOTES: 1 Section 3.1 includes descriptions of all preliminary study alternatives (including no-build, TSM, TDM, mass transit, etc.) and the basis for their elimination from further study. Section 3.2 includes descriptions of the detailed study alternatives.

2 HPO concurrence is contained in Appendix B.

3 The NEPA/404 Merger Team agreed to eliminate Alternative 3 due to adverse effects on the Terrell Historic District as a result of indirect and cumulative effects. See NEPA/404 Merger Team concurrence in Appendix A.

4 A final de minimis determination will be made after the design public hearing and subsequent coordination with HPO and other appropriate parties.

5 HPO does not determine effects on recreational facilities.

5.4 FARMLAND

To determine farmland impacts in rural and/or agricultural areas, the Farmland Protection Policy Act (FPPA) requires the submittal of a Farmland Conversion Impact Rating Form (US Department of Agriculture [USDA] Form AD-1006) to the Natural Resource Conservation Service (NRCS). The relative value of the site's farmland is determined by the NRCS on a scale from 0 to 100. This score is summed with site assessment points which rank non-soil related criteria such as the potential for impact on the local agricultural economy if the land is converted to non-farm use and compatibility with existing agricultural use. These points range from 0 to 160, therefore, a total cumulative rating of 260 points is possible. Sites receiving a total score of 160 or more should be given increasingly higher levels of consideration for protection. Sites receiving a total score less than 160 should be given a minimal level of consideration for protection (7 CFR 658.4).

Because this project crosses county boundaries, two Farmland Conversion Impact Rating Forms were submitted to the NRCS so the project's direct farmland impacts could be evaluated on a county basis. Forms for Alternatives 1 and 2 are included in Appendix C. Table 5.4.1 summarizes the anticipated farmland impacts for each alternative's proposed right-of-way. Based on the construction limits of the proposed project, however, actual impacts to farmlands would be less.

TABLE 5.4.1
FARMLAND CONVERSION IMPACTS

	BUILD ALTERNATIVES			
	Iredell County		Catawba County	
	Alt. 1	Alt. 2	Alt. 1	Alt. 2
Total Farmland Acres in Corridor	36.13	36.13	143.51	182.98
Percent of Farmland in County to be Converted	0.0072	0.0072	0.0677	0.0853
Total Impact Rating (Scale of 0 - 260 Points)	**81**	**81**	**98**	**103**

NOTES: Acreage is based on the proposed right-of-way for each alternative. Actual construction impacts would less than the acreage shown above.

The total scores for the build alternatives range from 81 to 103 and are in compliance with the FPPA. Further, the actual impacts based on construction limits would be less than the total amount of farmland within the proposed right-of-way.

5.5 SOCIAL EFFECTS

5.5.1 Neighborhoods/Communities

Alternative 1 would have a minor impact on the Terrell community and development node, which is within the Terrell Historic District. Alternative 2 would shift NC 150 on new location approximately 2,000 feet north of the existing alignment (at the furthest point), bypassing the historic district.

The project study corridor is experiencing considerable growth. Table 5.5.1 summarizes the proposed or currently under construction developments along NC 150 within the study corridor.

TABLE 5.5.1
PROPOSED DEVELOPMENTS

DEVELOPMENT NAME	DEVELOPMENT TYPE	STATUS	FIGURE 4.4.1 REFERENCE #
Bojangle's Restaurant	Commercial	Proposed	1
Sherrill's Ford Mini Storage	Commercial	Proposed	2
Villages at Sherrills Ford	Commercial/Residential	Under Construction	3
Marshall Road	Commercial	Proposed	4
Midway Marina	Commercial	Proposed	5
NC 150/Doolie Apartments	Residential	Proposed	6
Unnamed Development	Commercial	Proposed	7
Old Iron	Commercial/Residential	Proposed	8
Ervin Apartments	Residential	Under Construction	9
Outback Steakhouse	Commercial	Proposed / Approved	10
Murphy Oil	Commercial	Proposed	11
Randy Marion Side Drive and Vehicle Storage	Commercial	Under Construction	12

5.5.2 Relocation of Residences and Businesses

Table 5.5.2 shows potential relocations associated with the detailed study alternatives. These numbers were developed as a conservative estimate to show the worst-case scenario for relocations. A large number of these potential relocations may be avoided through additional avoidance and minimization measures such as small retaining walls. These measures will be evaluated during final design and implemented where feasible. Construction of the multi-use path would relocate an additional three residences and three businesses for both alternatives.

TABLE 5.5.2
SUMMARY OF RELOCATIONS FOR THE DETAILED STUDY ALTERNATIVES

	ALTERNATIVE 1	ALTERNATIVE 2
Residential	40 (3 minority)	40 (3 minority)
Businesses	63 (3 minority)	60 (3 minority)
Non-profit	1	1
Total Relocations	***104***	***101***

NOTE: This table is a conservative estimate that shows a worst-case scenario for relocations. A smaller number of relocations are likely after the implementation of avoidance and minimization measures developed during final design. Construction of the multi-use path would relocate an additional three residences and three businesses for both alternatives.

Relocation Assistance Program

It is the NCDOT's policy to ensure that comparable replacement housing would be available prior to construction of highway projects. Furthermore, the North Carolina Board of Transportation has approved the following three programs to minimize the inconvenience of relocations:

- Relocation Assistance,
- Relocation Moving Payments, and
- Relocation Replacement Housing Payments or Rent Supplement.

With the Relocation Assistance Program, experienced NCDOT staff will be available to assist relocatees with information such as availability and prices of homes, mobile homes, or businesses for sale or rent, and financing or other housing programs. The relocations Moving Payments Program, in general, provides for payment of actual moving expenses encountered in relocation. Where relocation will force an owner or tenant to purchase or rent property of higher cost or to lose a favorable financing arrangement (in case of ownership), the Relocation Replacement Housing Payments or Rent Supplement Program will compensate up to $22,500 to owners who are eligible and qualify, and up to $5,250 to tenants who are eligible and qualify.

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

The relocation officer will determine the needs of displaced families, individuals, businesses, non-profit organizations, and farm operations for relocation assistance advisory services without regard to race, color, religion, sex, or national origin. NCDOT will so schedule its work to allow ample time, prior to displacement, for negotiations and possession of replacement housing that meets decent, safe, and sanitary standards. The displacees will be given 90 days to vacate from the date that the offer of relocation benefits is made. Relocation of displaced persons will be offered in areas not generally less desirable in regard to public utilities and commercial facilities. Rent and sale prices or replacement housing offered will be within the financial means of the families and individuals displaced, and be reasonably accessible to their places of employment. The relocation officer will also assist owners of displaced businesses, non-profit organizations, and farm operations in searching for and moving to replacement property.

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

The Moving Expense Payments Program is designed to compensate the displacees for the costs of moving personal property from homes, businesses, non-profit organizations, and farm operations acquired for a highway project. Under the Replacement Program for Owners, NCDOT will participate in reasonable incidental purchase payments for replacement dwellings such as attorney's fees, surveys, appraisals, and other closing costs and, if applicable, make a payment for any increased interest expenses for replacement dwellings. Reimbursement to owner-occupants for replacement housing payments, increased interest payments, and incidental purchase expenses may not exceed $22,500 (combined total), except under the Last Resort Housing provision.

A displaced tenant may be eligible to receive a payment, not to exceed $5,250, to rent a replacement dwelling or to make a down payment, including incidental expenses, on the purchase of a replacement dwelling. The down payment is based upon what the state determines is required when the rent supplement exceeds $5,250.

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

Last Resort Housing is a program used when comparable replacement housing is not available, or when it is unavailable within the displacee's financial means, and the replacement payment exceeds the state legal limitation. The purpose of the program is to allow broad latitudes in methods of implementation by the state so that decent, safe, and sanitary replacement housing can be provided. It is not felt that this program will be necessary for this project since there appear to be adequate opportunities for relocation within the area.

5.5.3 Environmental Justice

As described in Section 4.4.1, Executive Order 12898 directs all federal agencies, or those who receive federal funding, to determine whether a proposed action will have a disproportionately high and adverse impact on minority and/or low income populations. Although minority populations were not observed in the DCIA during the site visit, census data indicates that there are minority populations in the eastern portion of the DCIA within Mooresville. As shown in Table 5.5.2, potential relocations include a small number of minority-owned residences (3) and businesses (1). Compared to the total number of potential relocations, these impacts are not considered disproportionately high and adverse to minority and/or low-income populations. Neither detailed study alternative would impact any schools, childcare centers, or senior facilities.

There are no disproportionately high and adverse impacts to minority, low-income or elderly populations. Benefits and burdens resulting from the proposed project are anticipated to be equitably distributed throughout the community. Public involvement and outreach activities, discussed in Section 6.0, were conducted to ensure full and fair participation of all potentially-affected communities in the project decision-making process.

5.5.4 Bicycle and Pedestrian Facilities

The proposed widening would provide new bicycle/pedestrian accommodations and would not hinder the future development of facilities through the area. There are currently only very short, isolated segments of sidewalk in front of businesses within the project study area with one longer stretch of sidewalk along NC 150 around the Ervin Road/Morrison Plantation Park intersection. Both build alternatives include sidewalks from just west of Doolie Road east to the project terminus at the US 21 interchange. Both build alternatives would also accommodate the proposed multiuse path detailed in Section 3.2.4 and 4.4.2.1. The multiuse path is included in the alternative analysis as a modular option that can be added or removed based on funding availability.

In addition to the separate multi-use path, NCDOT is providing six-foot paved shoulders which will accommodate bikes. The six-foot shoulders are being provided since existing NC 150 is a signed bicycle route, is part of the Carolina Thread Trail, and is also noted in local MPO regional bicycle plans. If the multi-use path is included in the project, there would be additional right-of-way and utility impacts as well as additional hydraulic impacts from the extension of currently proposed culvert lengths or other means to cross smaller streams.

5.5.5 Recreational Facilities

The proposed project would not affect the Marshall Fishing Area, Pinnacle Access Area, McCrary Access Area, Cross County Campground, or the Lake Norman RV Park. Preliminary designs have avoided impacts to the Pinnacle Access and McCrory Access

area by modifying the construction limits/slope stakes and/or through the use of retaining walls. No long-term impacts to any recreational sites within the project study area are anticipated.

5.5.6 Other Public Facilities and Services

No impacts to private recreational resources, churches, cemeteries, schools, or marinas are associated with the proposed widening.

5.6 ECONOMIC EFFECTS

As discussed in Section 2.5.4, the proposed project is consistent with the goals and plans for the area as expressed in local land use, transportation, and development plans. The proposed widening would support Catawba County's Small Area Plan for the Sherrills Ford Area by facilitating the development of projects such as small business parks, light office/institutional, low-impact manufacturing, and service companies which would have the benefit of diversifying job types and reducing travel trips outside of the county.[5]

The proposed project supports elements of the 16 South Corridor Development Plan, including encouraging development at the NC 150/NC 16 Bypass interchange and creating more high quality aesthetically pleasing developments.[6]

Local economic development plans also include recommendations related to transportation and land use along the NC 150 corridor, in particular, goals to make the area more attractive to the retirement community; expand water/sewer infrastructure and transportation networks; and, provide government incentives to attract new businesses.[7]

5.7 LAND USE

5.7.1 Existing Land Use and Zoning

The build alternatives would require additional right-of-way along NC 150. Alternative 2 would require right-of-way on new location for the northern bypass around the Terrell Historic District. Construction of either build alternative would create relocations. Although widening along existing NC 150 would not alter current land uses, the Terrell bypass would convert rural land to transportation uses. As discussed in Section 5.5.2, the build alternatives would require residential and business relocations, but would not have a significant impact on land use or zoning as the proposed project is consistent with existing land use plans and local planning documents.

5 Catawba County Small Area Plan for the Sherrills Ford Road Area. http://www.catawbacountync.gov/planning/smallarea/sford/SFmain.asp
6 Catawba County NC 16 Corridor Development Plan. http://www.catawbacountync.gov/Planning/16plan/16plan.asp
7 Catawba County. 2004. Foresight – Jobs and Economy Report. http://www.catawbacountync.gov/events/4sight2.pdf

5.7.2 Future Land Use

As discussed in Section 4.4.1.3, the proposed project is identified in a number of land use planning documents. Widening along NC 150 would be compatible with local land use plans. Alternative 2 would create new highway exposure for properties surrounding the proposed superstreet intersection with Sherrills Ford Road.

5.7.3 Project Compatibility with Local Plans

As discussed in Section 2.5.4, the proposed project is consistent with the goals and plans for the area as expressed in local land use, transportation, and development plans. Development trends and planned future land uses would not be substantially altered by construction of the proposed widening.

5.8 INDIRECT AND CUMULATIVE EFFECTS

Indirect effects are defined as "impacts on the environment which are caused by the action and are later in time or farther removed in distance, but are still reasonable foreseeable" (40 CFR 3 1508.8). Induced development or altered growth patterns are typically the most common forms of indirect impacts. The rate and type of development usually coincide with other factors such as zoning and the availability of electricity and water service. Cumulative impacts are defined as those "…which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions" (40 CFR 3 1508.7).

The following paragraphs summarize the *Indirect and Cumulative Effects Report & Land Use Scenario Assessment* prepared for the NC 150 Widening.[8] The future land use study area (FLUSA), shown in Figure 4.4.2, encompasses all of the areas examined for potential increases in development pressure as a result of the proposed project and other foreseeable projects in the area. The assessment compares likely future land use in the Build and No-Build scenarios. Although data is collected and evaluated for the entire FLUSA, land use effects will not necessarily be felt throughout the entire FLUSA.

Land Use Scenario Assessment Summary – Development in the FLUSA is primarily low density residential along the lake shore; medium density residential along the minor roads; and forest, farmland, and undeveloped property interspersed with individual and small-strip commercial along NC 150. A large commercial node is at the interchange of NC 150 and I-77, and smaller commercial nodes are on NC 150 at NC 16 Business, Sherrills Ford Road, and McCrary Road.

8 Indirect and Cumulative Effects Report & Land Use Scenario Assessment for the NC 150 Widening. Kimley-Horn & Associates. June 2014.

Development in the past few years included redevelopment at the NC 150/NC 16 intersection and continued expansion and infill at the NC 150/I-77 interchange. A new library is under construction in the northeast quadrant of NC 150 and Sherrills Ford Road. An interchange was recently completed at I-77 and Brawley School Road. Local planners expect this area to grow slowly, although water and sewer availability may limit development except along the major roads. Future development is anticipated to be primarily commercial, clustered at several major nodes along the corridor.

There are approximately 25,000 acres of land in the FLUSA. Of this, approximately 10,000 acres (40%) is currently developed. Of the 15,000 acres of undeveloped area, less than 1,000 acres (4% of the total) is considered constrained – protected by ponds, stream buffers and floodway restrictions. The remaining 14,000 acres (56% of the total) of land is classified as undeveloped/unconstrained, which generally represents land within the FLUSA that could be developed in the future.

The Build Scenario is anticipated to result in approximately 500 to 600 acres (depending on alternative) of additional developed land compared with the No-Build Scenario. Some impact to wetlands and streams is likely as part of that future development, but analysis assumed that no development would take place within the stream buffers.

Probable Development Areas (PDAs) are sub-areas that were used to further consider development pressures and future land use nodes in the Build and No-Build Scenarios. The PDA boundaries follow rivers, sub-basins, property lines, and roads where appropriate. Three PDAs were used to discuss future development patterns in the FLUSA, shown in Figure 4.4.2, and described below. Based on input from local staff and approved land use and transportation plans, it is anticipated that there will be approximately 1,100 acres of additional development in the future No-Build Scenario compared with existing land uses.

Most of the area likely to be newly developed in the No-Build Scenario is in the NC 16 and Sherrills Ford Road PDAs, with a moderate amount of development in the I-77 PDA because much of that PDA is already built out. The three (PDAs) identified as part of this study include:

- The NC 16 PDA encompasses approximately 7,200 acres centered around the NC 150/NC 16 Bypass intersection. This PDA is expected to be one of the fastest growing areas of the FLUSA, eventually becoming a regional commercial node with both retail and industry. Widening NC 150 is anticipated to increase the pace of future development in this area because of the perceived benefit of improved access to NC 16 Bypass and mobility through the county. The Build scenario is the same for all six alternatives in this PDA.

- The Sherrills Ford Road PDA encompasses approximately 4,400 acres along Sherrills Ford Road. Developments in this area have been planned in past years, but the economic recession has resulted in most of the projects being put on hold or cancelled. Local planners anticipate that most of those developments will restart, even in the No-Build Scenario, as the economy continues to recover. Widening NC 150 may increase the pace of the commercial and mixed-use development. In addition, improving NC 150 may spur further development. Local planners support an alternative on existing alignment, which they feel would improve the viability of future development at the historic Terrell shopping node. The existing alignment and new alignment alternatives are anticipated to result in approximately the same level of development, although the location of development would likely be different for each alternative.

- The I-77 PDA encompasses approximately 3,700 acres primarily west of and including the NC 150/I-77 interchange. The I-77 PDA has been the fastest growing area within the FLUSA for many years, and development pressure is anticipated to continue to be high in the future No-Build Scenario. Widening the two- and three-lane sections of NC 150 through this PDA would help relieve some traffic congestion, and may increase the pace or intensity of commercial and residential development along the corridor. The Build scenario is the same for all six alternatives in this PDA.

Most of the FLUSA is within a WS-IV Critical Area or a WS-IV Protected Area. All streams in the FLUSA at or below 760 feet elevation ('full pond' of Lake Norman) are subject to Riparian Buffer Protection Rules for the Catawba River Basin. The zoning regulations in Catawba County maintain minimum lot sizes for most new land development, and Iredell County and Mooresville require erosion/sedimentation control within the protected and critical watersheds.

The Catawba River, along with its associated water body Lake Norman, is listed as a 303(d) waterway and is categorized as a WS-IV stream. The FLUSA is in within the Catawba River Basin. Most of the FLUSA between NC 16 and Doolie Road/Perth Road is a WS-IV Critical Area, and the area from Doolie Road/Perth Road to east of I-77 is a WS-IV Protected Area. All streams in the FLUSA are subject to Riparian Buffer Protection Rules for the Catawba River Basin, which require a 50 foot buffer within the FLUSA. Catawba County, Iredell County, and the Town of Mooresville have additional stream buffer, soil erosion and sedimentation control, and stormwater guidelines.

A portion of the FLUSA in Catawba County between Mt. Pleasant Road and east of Slanting Bridge Road, and most of the FLUSA in Iredell County is part of the area designated by the US Census Bureau as the Charlotte Urban Cluster and NCDWQ has designed Catawba County

as a Phase II Tipped county. Therefore development in these areas of the FLUSA is required to obtain NPDES permit coverage for their stormwater discharges.

Indirect Effects Summary – Local planners currently feel that the proposed project is likely to have a minor increase on the pace or intensity of development. Since there are so few roads crossing Lake Norman, widening the road is not expected to change travel patterns, but will improve the level of service for drivers currently using the road and those who will begin using the road in the future because of residential and commercial growth within the FLUSA. A four-lane road may attract new businesses or light industries who desire easier access to an interstate, although this effect is expected to be minor since most anticipated major commercial nodes on the corridor are already at the interchanges of NC 150 with an interstate (I-77) or major highway (NC 16 Bypass). For these reasons, construction of the proposed project is expected to have a minor indirect effect on land use decisions in the FLUSA.

The Build Scenario is likely to have a minor increase on the pace or intensity of development. Widening the road is not expected to change travel patterns, but will improve the level of service for drivers, and may result in some drivers choosing to go west on NC 150 toward NC 16 rather than east on NC 150 toward I-77.

Cumulative Effects Summary – Direct natural environmental impacts by NCDOT projects will be addressed by avoidance, minimization, or mitigation, consistent with programmatic agreements with the natural resource agencies during the Merger and Permitting processes. All developments will be required to follow local, state, and federal guidelines and permitting regulations. Due to the level of protection of environmental resources, the additional development as a result of the Build Scenarios is not anticipated to result in significant cumulative impacts to natural resources.

Local governments in the FLUSA have ordinances for soil and erosion control, watershed protection, and floodplain protection. New developments may be required to obtain a Section 404 permit from the USACE, and a Section 401 Water Quality Certification from NCDWQ. With these regulations, the combination of past, current, and future projects is expected to have a minor impact on notable environmental resources in the FLUSA.

Water Quality Statement – All of the land within the probable development areas is in the Catawba River Basin, which is regulated by NCDWQ. The Build Scenario crosses the Catawba River and its associated water body Lake Norman, which is a 303(d) listed waterway. Induced development is not expected to directly or indirectly affect 303(d) waters because of the 50-foot stream buffers (100-foot buffers for high-density

developments) required for streams in the FLUSA. Neither the project nor induced development is expected to directly or indirectly affect ORWs or HQWs.

All streams in the FLUSA are subject to Riparian Buffer Protection Rules for the Catawba River Basin, which require a 50 foot buffer within the FLUSA. Catawba County and the Town of Mooresville require a minimum 30-foot vegetative buffer for all new development along all perennial streams in the watershed protection areas. High-density developments are required to maintain a 100-foot wide vegetative buffer. New developments may be required to obtain a CWA Section 404 permit from USACE and a concurrent CWA Section 401 Water Quality Certification from NCDWQ. Catawba County, Iredell County, and the Town of Mooresville have additional soil erosion, sedimentation control, and stormwater guidelines.

5.9 HYDRAULIC IMPACTS AND FLOOD HAZARD EVALUATION

Alternative 1 contains eleven major stream crossings, including four crossings of Lake Norman (including the Marshall Steam Station discharge channel). Alternative 2 includes these 11 crossings plus an additional crossing of Beaverdam Creek along the northern Terrell bypass, as shown in Figure 4.1.2f1. The recommended structure types and bridge lengths were determined in consultation with the NEPA/404 Merger Team. Appendix A contains the NEPA/404 Merger Process form for Concurrence Point 2A (Bridging Decisions and Alignment Review). Table 5.9.1 shows the proposed major stream crossings.

TABLE 5.9.1
PROPOSED DRAINAGE STRUCTURES FOR THE BUILD ALTERNATIVES

CROSSING	EXISTING DRAINAGE STRUCTURE	RECOMMENDED STRUCTURE TYPE AND DIMENSIONS [2]
West Fork Killian Creek	5 ft x 5 ft RCBC (90')	7 ft x 7 ft RCBC (197')
East Fork Killian Creek	4 ft x 4 ft RCBC (53')	6 ft x 7 ft RCBC (181')
Reed Creek (Lake Norman)	241 ft Bridge	241 ft Bridge
Mountain Creek (Lake Norman)	301 ft Bridge	301 ft Bridge
Bettie Creek	5 ft x 5 ft RCBC (70')	6 ft x 7 ft RCBC (245')
UT to Beaverdam Creek	8 ft x 9 ft RCBC (45')	10 ft x 10 ft RCBC (154')
Discharge Channel to Lake Norman	455 ft Bridge	450 ft Bridge (N), 600 ft Bridge (S)
Lake Norman	1,162 ft Bridge	1,166 ft Bridge
UT to Reeds Creek	60-in RCP (215')	72-in RCP (300')
UT to Reeds Creek	6 ft x 6 ft RCBC (139')	Extend existing 6 x 6 ft RCBC (80')
Reeds Creek	60-in CMP (169')	72-in RCP (213')
Beaverdam Creek	---	8 x 8 RCBC (178')

Note: "RCBC" denotes reinforced concrete box culvert. "RCP" denotes reinforced concrete pipe. "CMP" denotes corrugated metal pipe. Culvert and pipe lengths are shown in parenthesis above.

Floodplain Management – Within the project study area, Reed Creek, Mountain Creek, and Catawba Creek have delineated regulatory floodplains. These creeks are "covered" by Lake Norman; as such, the AE Zone (i.e., 100-year floodplain) boundary is the edge of Lake

Norman at full volume (760 feet above mean sea level). Due to this atypical condition, floodplain impacts are actually identical to surface water impacts associated with construction of the causeway and total 5.52 acres for both alternatives. There are no floodplains along the northern Terrell bypass (Alternative 2). As such, floodplain impacts are identical for both build alternatives.

Both Iredell and Catawba Counties and the City of Mooresville are participants in the regular program of the National Flood Insurance Program (NFIP). The addition of the proposed major drainage structures is not anticipated to require a floodway revision, and the proposed crossings are not currently in designated flood hazard zones.

5.10 TRAFFIC NOISE ANALYSIS

This section summarizes information contained in the *Noise Impacts Analysis Report* prepared for the proposed NC 150 Widening.[9] In accordance with Title 23 Code of Federal Regulations Part 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise (Title 23 CFR 772) and the North Carolina Department of Transportation Traffic Noise Abatement Policy, each Type I highway project must be analyzed for predicted traffic noise impacts. In general, Type I projects are proposed State or 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 (TNM) approved by the Federal Highway Administration (FHWA) and following procedures detailed in Title 23 CFR 772, the NCDOT Traffic Noise Abatement Policy and the NCDOT Traffic Noise Analysis and Abatement Manual. When traffic noise impacts are predicted, examination and evaluation of alternative noise abatement measures must be considered for reducing or eliminating these impacts. Temporary and localized noise impacts will likely occur as a result of project construction activities. Construction noise control measures will be incorporated into the project plans and specifications.

A copy of the unabridged version of the full technical report entitled *Traffic Noise Analysis-NC 150 Widening from the NC 16 Bypass in Catawba County to US 21 in Iredell County-January 2016* can be viewed in the Project Development & Environmental Analysis Unit, Century Center Building A, 1000 Birch Ridge Drive, Raleigh.

9 Traffic Noise Analysis for the proposed NC 150 Widening. Prepared by Stantec Consulting Services Inc. January 2016.

Traffic Noise Impacts and Noise Contours

The maximum number of receptors in each project alternative predicted to become impacted by future traffic noise is shown in Table 5.10.1. The table includes those receptors expected to experience traffic noise impacts by either approaching or exceeding the FHWA Noise Abatement Criteria or by a substantial increase in exterior noise levels.

The maximum extent of the 71- and 66- dB(A) noise level contours measured from the center of the proposed roadway is approximately 110 feet and 140 feet, respectively.

TABLE 5.10.1
PREDICTED TRAFFIC NOISE IMPACTS

ALT. DESC.	APPROXIMATE # OF IMPACTED RECEPTORS APPROACHING OR EXCEEDING FHWA NAC[2]							SUBST'L NOISE LEVEL INCR.[3]	IMPACTS DUE TO BOTH CRITERIA[4]	TOTAL IMPACTS PER 23 CFR 772
	A	B	C	D	E	F	G			
Existing	0	41	5	0	9	0	0	N/A	N/A	55[5]
No-Build	0	46	5	0	9	0	0	0	0	60[5]
Build Alternative 1	0	113	4	0	10	0	0	3	12	130[5]
Build Alternative 2	0	105	4	0	10	0	0	5	12	124[5]

[1]This table presents the number of build condition traffic noise impacts as predicted for the build condition alternatives and the no-build alternative presently under consideration. Refer to Appendix B for a detailed analysis of traffic noise impacts at each noise sensitive receptor location.
[2] Predicted traffic noise level impact due to approaching or exceeding NAC.
[3] Predicted "substantial increase" traffic noise level impact.
[4] Predicted traffic noise level impact due to exceeding NAC *and* "substantial increase" in build condition noise levels.
[5] The total number of predicted impacts is not duplicated if receptors are predicted to be impacted by more than one criterion.

No Build Alternative – The Traffic Noise Analysis also considered traffic noise impacts for the "no-build" alternative. If the proposed project does not occur, 60 receptors are predicted to experience traffic noise impacts and the future traffic noise levels will increase by approximately one (1) dBA.

Based upon research, humans barely detect noise level changes of 2-3 dBA. A 5-dBA change is more readily noticeable. Therefore, most people working and living near the roadway will not notice this predicted increase.

Traffic Noise Abatement Measures

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

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

Noise Barriers – Noise barriers include two basic types: earthen berms and noise walls. These structures act to diffract, absorb and reflect highway traffic noise. For this project, earthen berms are not found to be a viable abatement measure because the additional right of way, materials and construction costs are estimated to exceed the NCDOT maximum allowable base quantity of 7,000 cubic yards, plus an incremental increase of 100 cubic yards per benefited receptor, as defined in the NCDOT Policy.

A noise barrier evaluation was conducted for this project utilizing the Traffic Noise Model (TNM 2.5) software developed by the FHWA. Table 5.10.2 summarizes the results of the evaluation.

The first potential barrier location evaluated with TNM is the Cross Country Campground on NC 150 just west of Mt. Pleasant Road. The area where Recreational Vehicles (RVs) park between the tennis courts and gazebo was evaluated due to density (especially during the warmer months). Although the carpet golf facilities in front of the RV spaces were impacted, they will be acquired for right of way. The camping spaces themselves were not impacted and a barrier at this location is not preliminarily justified and is not recommended for construction, contingent upon completion of the project design and the public involvement process.

The second potential barrier location evaluated with TNM is at Bach Drive and NC 150 in Noise Study Area (NSA) NSA-2. Based upon criteria defined in the NCDOT Traffic Noise Abatement Policy, this barrier is preliminarily justified and is recommended for construction, contingent upon completion of the project design and the public involvement process (Alternatives 1 and 2).

The third potential barrier location evaluated with TNM is at the Lake Norman Motor Coach resort on NC 150 west of Vinewood Road. The first row of RV spaces will be acquired for right of way. The remaining RV spaces were not impacted and a barrier at this location is not preliminarily justified and is not recommended for construction, contingent upon completion of the project design and the public involvement process (Alternatives 1 and 2).

The fourth potential barrier location evaluated with TNM is at John Deere Drive at Vinewood Road in NSA-4. Based upon criteria defined in the NCDOT Traffic Noise Abatement Policy, this barrier is preliminarily justified and recommended for construction, contingent upon completion of the project design and the public involvement process (Alternatives 1 and 2).

The fifth potential barrier location evaluated with TNM is at Crabapple Lane north of NC 150, east of Harry's Lane in NSA-5. Due to the Catawba River Buffer Zones and criteria defined in the NCDOT Traffic Noise Abatement Policy, this barrier is not preliminarily justified and is not recommended for construction, contingent upon completion of the project design and the public involvement process.

The sixth potential barrier location evaluated with TNM is at Harbor Lane at NC 150 in NSA-6. Based upon criteria defined in the NCDOT Traffic Noise Abatement Policy, this barrier is not preliminarily justified and is not recommended for construction, contingent upon completion of the project design and the public involvement process.

The seventh potential barrier location evaluated with TNM is at Mariner Pointe Lane and NC 150 in NSA-7. Due to sight distance criteria and the Catawba River Buffer Zones a barrier at this location is not preliminarily justified and is not recommended for construction, contingent upon completion of the project design and the public involvement process.

The eighth potential barrier location evaluated with TNM is at Red Brook at Paradise Peninsula Drive in NSA-8. Based upon criteria defined in the NCDOT Traffic Noise Abatement Policy, this barrier is not preliminarily justified and is not recommended for construction, contingent upon completion of the project design and the public involvement process (Alternatives 1 and 2).

The ninth potential barrier location evaluated with TNM is at the River Park Apartments and new apartments under construction on NC 150 in NSA-9. Based upon criteria defined in the NCDOT Traffic Noise Abatement Policy, this barrier is preliminarily justified and is recommended for construction, contingent upon completion of the project design and the public involvement process (Alternatives 1 and 2).

The tenth potential barrier location evaluated with TNM is at the new apartments under construction on Doolie Road in NSA-10. Based upon criteria defined in the NCDOT Traffic Noise Abatement Policy, this barrier is not preliminarily justified and is not recommended for construction, contingent upon completion of the project design and the public involvement process (Alternatives 1 and 2).

The eleventh potential barrier location evaluated with TNM is at Slanting Bridge Road and proposed NC 150 (Alternative 2) in NSA-11. Based upon criteria defined in the NCDOT Traffic

Noise Abatement Policy, this barrier is not preliminarily justified and is not recommended for construction, contingent upon completion of the project design and the public involvement process.

TABLE 5.10.2
PRELIMINARY NOISE BARRIER EVALUATION RESULTS

Alternative (Noise Barrier Location)	Length / Height (feet)	Square Footage	Number of Benefited Receptors	Square Feet per Benefited Receptor / Allowable Square Feet per Benefited Receptor	Preliminarily Recommended for Construction[1]
NSA-1/-NW1- Alternatives 1 and 2	N/A[2]	N/A[2]	N/A[2]	N/A[2]	No
NSA-2/ -NW2- Alternatives 1 and 2	300/18-24	6,720	4	1,680/2,710	Yes
NSA-3/-NW3- Alternatives 1 and 2	N/A[2]	N/A[2]	N/A[2]	N/A[2]	No
NSA-4/ -NW4- Alternatives 1 and 2	820/20-24	17,920	9	1,991/2,774	Yes
NSA-5/-NW5- Alternatives 1 and 2	N/A[3]	N/A[3]	N/A[3]	N/A[3]	No
NSA-6/ -NW6- Alternatives 1 and 2	320/15-21	5,641	2	2,821/2,745	No
NSA-7/-NW7- Alternatives 1 and 2	N/A[4]	N/A[4]	N/A[4]	N/A[4]	No
NSA-8/ -NW8- Alternatives 1 and 2	400/14-22	7,700	2	3,850 / 2,780	No
NSA-9/ -NW9- Alternatives 1 and 2	420/25	10,500	9	1,167 / 2,570	Yes
NSA-10/-NW10- Alternatives 1 and 2	N/A[5]	N/A[5]	N/A[5]	N/A[5]	No
NSA-11/ -NW11- Alternative 2	380/16-17	6,379	2	3,190 / 3,060	No

1 The recommendation for barrier construction is preliminary and subject to change, pending completion of final design and the public involvement process.
2 Due to land use not being impacted by project a noise barrier is not recommended for NSA-1 and NSA-3.
3 Due to the Catawba River Buffer Zones a noise barrier is not feasible for NSA-5.
4 Due to sight distance criteria and the Catawba River Buffer Zones a noise barrier is not feasible for NSA-7.
5 Due to lack of distance between entrance drive on Doolie Road for new apartments and North Point Watersports Dirve a noise barrier is not feasible for NSA-10.

Summary

A preliminary noise evaluation was performed that identified three (3) noise barriers that meet preliminary feasible and reasonable criteria found in the NCDOT Traffic Noise Abatement Policy. A more detailed analysis will be completed during project final design. Noise barriers found to be feasible and reasonable during the preliminary noise analysis may not be found to be feasible and reasonable during the final design noise analysis due to changes in proposed project alignment and other design considerations, surrounding land use development, or utility conflicts, among other factors. Conversely, noise barriers that were not considered feasible and reasonable may meet the established criteria and be

recommended for construction. This evaluation completes the highway traffic noise requirements of Title 23 CFR Part 772.

In accordance with NCDOT Traffic Noise Abatement Policy, the Federal/State governments are not responsible for providing noise abatement measures for new development for which building permits are issued after the Date of Public Knowledge. The Date of Public Knowledge of the proposed highway project will be the approval date of the Finding of No Significant Impact (FONSI). For development occurring after this date, local governing bodies are responsible to insure that noise compatible designs are utilized along the proposed facility.

5.11 AIR QUALITY ANALYSIS

Air pollution originates from various sources. Emissions from industry and internal combustion engines are the most prevalent sources. The impact resulting from highway construction ranges from intensifying existing air pollution problems to improving the ambient air quality. Changing traffic patterns are a primary concern when determining the impact of a new highway facility or the improvement of an existing highway facility. Motor vehicles emit carbon monoxide (CO), nitrogen oxide (NO), hydrocarbons (HC), particulate matter, sulfur dioxide (SO2), and lead (Pb) (listed in order of decreasing emission rate).

The Federal Clean Air Act of 1970 established the NAAQS. These were established in order to protect public health, safety, and welfare from known or anticipated effects of air pollutants. The most recent amendments to the NAAQS contain criteria for sulfur dioxide (SO_2), particulate matter (PM_{10}, 10-micron and smaller, $PM_{2.5}$, 2.5 micron and smaller), carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), and lead (Pb). The primary pollutants from motor vehicles are unburned hydrocarbons, NOx, CO, and particulates. Hydrocarbons (HC) and Nitrogen oxides (NOx) can combine in a complex series of reactions catalyzed by sunlight to produce photochemical oxidants such as ozone and NO_2. Because these reactions take place over a period of several hours, maximum concentrations of photochemical oxidants are often found far downwind of the precursor sources. These pollutants are regional problems.

Iredell County

The project is located in Iredell County, which is within the Charlotte-Gastonia-Rock Hill maintenance area for the 2008 ozone (O_3) standard as defined by the EPA. This area was originally designated marginal nonattainment for O_3 under the 2008 eight-hour ozone standard on July 20, 2012. However, due to improved monitoring data, this area was re-designated maintenance for the 2008 eight hour ozone standard on July 28, 2015 (effective August 27, 2015). Section 176(c) of the CAAA requires that transportation plans, programs, and projects conform to the intent of the state air quality implementation plan (SIP). The

current SIP does not contain any transportation control measures for Iredell County. The Charlotte Region Transportation Planning Organization 2040 Metropolitan Transportation Plan (MTP) and the 2012-2018 Transportation Improvement Program (TIP) conform to the intent of the SIP. The USDOT made a conformity determination on the MTP on May 5, 2014 and the TIP on September 4, 2014. The current conformity determination is consistent with the final conformity rule found in 40 CFR Parts 51and 93. There are no significant changes in the project's design concept or scope, as used in the conformity analyses.

Catawba County

The project is located in Catawba County, which is within the Hickory-Morgan-Lenoir nonattainment area for fine particles PM 2.5 as defined by the EPA. This area was designated nonattainment for the PM2.5 standard in accordance with the Clean Air Act Amendments (CAAA) on April 5, 2005. However, due to improved monitoring data, this area was redesignated maintenance for PM2.5 on December 19, 2011. Section 176(c) of the CAAA requires that transportation plans, programs, and projects conform to the intent of the state air quality implementation plan (SIP). The current SIP does not contain any transportation control measures for Catawba County.

The Greater Hickory Metropolitan Planning Organization (MPO) 1/20/2012 Long Range Transportation Plan (LRTP) and the 2012-2018 State Transportation Improvement Programs (STIPs) conform to the intent of the SIP. The USDOT made a conformity determination on the Greater Hickory MPO LRTP on 1/20/12 and the Greater Hickory MPO TIP on 1/20/2012. For the donut area of Catawba County, the projects from the 2012-2018 STIP conform to the intent of the SIP (or base year emissions, in areas where no SIP is approved or found adequate). The current conformity determinations are consistent with the final conformity rule found in 40 CFR Parts 51 and 93. There are no significant changes in the project's design concept or scope, as used in the conformity analyses.

A quantitative PM2.5 hotspot analysis is not required for this project since it is not an air quality concern. The Clean Air Act and 40 CFR 93.116 requirements were met without a hotspot analysis, since this project has been found not to be of air quality concern under 40 CFR 93.123(b)(1).

Mobile Source Air Toxics (MSAT)

Background – Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the U.S. Environmental Protection Agency (EPA) regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007), and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS) (http://www.epa.gov/iris/). In addition, EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA) (http://www.epa.gov/ttn/atw/nata1999/). These are acrolein, benzene, 1,3-butidiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules. The 2007 EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using EPA's MOBILE6.2 model, even if vehicle activity (vehicle-miles travelled, VMT) increases by 145 percent as assumed, a combined reduction of 72 percent in the total annual emission rate for the priority MSAT is projected from 1999 to 2050.

MSAT analyses are intended to capture the net change in emissions within an affected environment, defined as the transportation network affected by the project. The affected environment for MSATs may be different than the affected environment defined in the NEPA document for other environmental effects, such as noise or wetlands. Analyzing MSATs only within a geographically-defined "study area" will not capture the emissions effects of changes in traffic on roadways outside of that area, which is particularly important where the project creates an alternative route or diverts traffic from one roadway class to another. At the other extreme, analyzing a metropolitan area's entire roadway network will result in emissions estimates for many roadway links not affected by the project, diluting the results of the analysis.

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

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

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

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

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

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (http://pubs.healtheffects.org/view.php?id=282). As a result, there is no national consensus

on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA (www.epa.gov/risk/basicinformation.htm#g) and the HEI (http://pubs.healtheffects.org/getfile.php?u=395) have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine an "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 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.

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.

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. Significant progress has been made in reducing criteria pollutant emissions from motor vehicles and improving air quality, even as vehicle travel has increased rapidly.

5.12 FERC PERMIT COORDINATION

The NC 150 project will impact property regulated by the Federal Energy Regulatory Commission (FERC). Duke Energy is the FERC license holder for the Marshall Steam Station historic resource. NCDOT is in coordination with Duke Energy to determine which impacts and areas may be considered allowable under the conditions of their FERC license, or if modification of their FERC license is necessary. Additionally, and as noted previously, Lake Norman is included in the FERC boundary for the Catawba-Wateree Hydro Project, for which Duke Energy also holds the FERC license. Any non-maintenance activity that encroaches on the Lake Norman FERC boundary (760 feet above mean sea level) requires a permit.

NCDOT has evaluated potential impacts to the Pinnacle Access Area and McCrary Access Area. Because Duke's FERC permit conditions require that they maintain public access at this location, NCDOT would be responsible for impacts to these areas. Preliminary designs have avoided impacts to these access areas by modifying the construction limits/slope stakes and/or through the use of retaining walls. NCDOT will continue to coordinate with Duke Energy regarding these issues.

5.13 HAZARDOUS MATERIALS

An assessment of the project study area found 29 likely petroleum underground storage tanks (USTs) and one automotive repair facility. No landfills or hazardous waste sites were identified within the project limits. A copy of the unabridged version of the full technical report *GeoEnvironmental Report for Planning NC 150 Widening from the NC 16 Bypass in Catawba County to US 21 in Iredell County-October 2014* can be viewed in the Project Development & Environmental Analysis Unit, Century Center Building A, 1000 Birch Ridge Drive, Raleigh.

No impacts to hazardous material sites are associated with the build alternatives. It is anticipated that these properties would create low monetary and scheduling impacts associated with construction in these areas. Table 5.13.1 lists the identified hazardous material sites and notes the geoenvironmental impact of the project on each site.

Soil and groundwater assessments will be performed on any potentially contaminated properties from which right-of-way will be required. This assessment will be performed after the selection of the Preferred Alternative and prior to right-of-way acquisition. In accordance with NCDOT Policy on hazardous materials, if any additional contaminated sites or underground storage tanks are discovered on the project, they will be assessed and recommendations for right-of-way and construction will be provided.

TABLE 5.13.1
HAZARDOUS MATERIAL SITES

PROPERTY NAME	ADDRESS	FACILITY ID	UST/AST (YES/NO)	GEOENV. IMPACT
Vacant Lot	5621 E. NC 150	n/a	No – Removed	Low
Former Tint Shop	5622 E. NC 150	0-021461	Yes – 3	Low
ABC Store	5640 E. NC 150	0-002394	No – Removed	Low
CVS Pharmacy	6050 NC 16 Business	0-004242	No – Removed	Low
KB/s Auto Mobile Detailing	5683 E. NC 150	n/a	No	Low
The General Store of Denver, Inc.	6360 E. NC 150	0-002395	Yes – 4	Low
Vacant Lot	6766 E. NC 150	0-007902	No – Removed	Low
Denver Equipment Company	6778 E. NC 150	n/a	No	Low
Former Don's Place	7566 E. NC 150	0-007636	No – Removed	Low
Closed Business	7914 E. NC 150	n/a	No	Low
Terrell Country Store	9247 Sherrills Ford Rd	n/a	No	Low
U.S. Post Office	7985 E. NC 150	0-014327	No – Removed	Low
Former Terrell Bait Shop – L570	7970 E. NC 150	0-021875	No – Removed	Low
Closed Business	8455 E. NC 150	n/a	No	Low
Lakes Effects Marina	8629 E. NC 150	0-007901	No – Removed	Low
Former Pier Marina & Campground	1479 NC 150 (River Hwy)	n/a	No – Removed	Low
HydroHoist of the Carolinas	1258 NC 150 (River Hwy)	n/a	No	Low
Home Run Markets #3	1228 NC 150 (River Hwy)	0-021566	Yes – 5	Low
Lake Norman BP	1208 NC 150 (River Hwy)	0-035931	Yes – 4	Low
Garden Shed & More	842 NC 150 (River Hwy)	n/a	No – Removed	Low
Just Batteries, Inc.	800 NC 150 (River Hwy)	0-034993	No – Removed	Low
Quik Trip #1009	680 NC 150 (River Hwy)	0-037806	Yes – 3	Low
WilcoHess #360	571 NC 150 (River Hwy)	03-036305	Yes – 4	Low
Circle K #1517	558 NC 150 (River Hwy)	0-036164	Yes – 4	Low
Xpress Stop #2	491 NC 150 (River Hwy)	0-032606	Yes – 4	Low
Shell (I-77 Texaco)	468 NC 150 (River Hwy)	0-010706	Yes – 4	Low
Port City Exxon	358 NC 150 (W. Plaza Dr)	0-032870	Yes – 3	Low
Quality Mart #19	391 NC 150 (W. Plaza Dr)	0-010641	Yes – 3	Low
Circle K	255 NC 150 (W. Plaza Dr)	0-036073	Yes – 4	Low
Quik Trip #1008	1008 NC 150 (W. Plaza Dr)	0-037309	Yes – 4	Low

5.14 TEMPORARY CONSTRUCTION IMPACTS

The construction impacts of this project are expected to be similar to those normally associated with the construction of widening and new location roadways. The construction can be expected to result in borrow sites, contractor staging areas, a temporary increase in noise and air pollution, traffic and utility service disruptions, as well as erosion and siltation. These and other impacts will be minimized through the implementation of the NCDOT Standard Specifications for Roads and Structures.

All possible measures will be taken to ensure that the public's health and safety are not compromised during the movement of any materials to and from the construction site, and that inconveniences to the public are kept to a minimum.

5.14.1 Air Quality

The air quality impacts resulting from the construction of this project include air pollutant emissions from construction equipment and particulate matter (dust) emissions from clearing, demolition, excavation, embankment preparation and other such construction-related activities. Air-borne particulate matter can be minimized by covering hauled and stockpiled material, and applying water to stabilized exposed earth.

Open burning of vegetation and construction debris is also a major air quality concern. Vegetation and other debris from land clearing, and other demolition and construction activities will be disposed of in accordance with applicable air pollution and solid waste regulations. During construction of the proposed project, all materials resulting from clearing and grubbing, demolition or other operations will be removed from the project, burned or otherwise disposed of by the contractor. No burning will be done on National Forest System lands without the written permission from the U.S. Forest Service. Any burning will be done in accordance with applicable local laws and ordinances and regulations of the North Carolina SIP for air quality in compliance with 15 NCAC 2D.0520. Care will be taken to ensure that burning will be done at the greatest practical distance from dwellings and not when atmospheric conditions are such as to create a hazard to the public. Burning will only be done under constant surveillance. Also during construction, measures will be taken to reduce the dust generated by construction when the control of dust is necessary for the protection and comfort of motorists or area residents. This evaluation completes the assessment requirements for air quality of the 1990 Clean Air Act Amendments and the NEPA process. No additional reports are necessary.

5.14.2 Water Quality

Soil erosion and siltation are the most common water quality impacts associated with highway construction activities. The primary source of erosion and sedimentation associated with highway construction is the required heavy earthwork to establish appropriate vertical alignments. The amount of earthwork required for the construction of the project would be higher for Alternative 2 because it includes the Terrell bypass on new location. Alternative 1 adds two lanes to the existing two-lane facility through Terrell, requiring less earthwork. Alternatives 1 and 2 would both require the demolition of five existing bridges.

NCDOT has developed an Erosion and Sedimentation Control Program which has been approved by the N.C. Sedimentation Control Commission. This program consists of the rigorous requirements to minimize erosion and sedimentation. The general requirements concerning erosion and siltation are covered in Article 107-13 of the Standard Specifications for Roads and Structures which is entitled "Control of Erosion, Siltation and Pollution."

Erosion and sedimentation will occur during the construction of this project. For this reason an erosion control schedule will be devised by the contractor before work is started. The schedule will show the time relationship between phases of work which must be coordinated to reduce erosion and shall describe construction practices and temporary erosion control measures which will be used to minimize erosion. In conjunction with the erosion control schedule, the contractor will be required to follow those provisions of the plans and specifications which pertain to erosion and siltation. Erosion will be minimized by providing temporary and permanent seeding and landscaping of exposed areas. Erosion and sedimentation will be mitigated through temporary erosion and sediment control measures such as dikes, dams, sediment catch basins and diversion berms. Inspection of the erosion control devices will be made after each rain to determine if maintenance is needed. Construction activities will be conducted in stages to minimize exposure of cleared earth. Such Best Management Practices will be employed throughout the construction area.

The contractor shall maintain the earth surface of any waste areas in a manner which will effectively control erosion and siltation, both during the work and until the completion of all seeding and mulching, or other specified erosion control measures.

5.14.3 Noise

The predominant construction activities associated with this project are expected to be earth removal, hauling, grading, and paving. Temporary and localized construction noise impacts will likely occur as a result of these activities. During daytime hours, the predicted effects of these impacts will 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 will 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., will be perceived as distinctly louder than the steady-state acoustic environment, and will likely cause impacts to the general peace and usage of noise-sensitive areas – particularly residences, hospitals, and hotels.

Extremely loud construction noise activities such as usage of pile-drivers and impact-hammers (jack hammer, hoe-ram) will provide sporadic and temporary construction noise impacts in the near vicinity of those activities. Table 5.14.1 shows typical noise levels for these activities. Construction activities that will produce extremely loud noises should be scheduled during times of the day when such noises will create as minimal disturbance as possible. 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 "tail gate banging", ambient-sensitive

backup alarms, construction noise complaint mechanisms, and consistent and transparent community communication.

TABLE 5.14.1
CONSTRUCTION EQUIPMENT TYPICAL NOISE LEVEL EMISSIONS[1]

Equipment	Noise Level Emissions (dB(A)) at 50 Feet From Equipment[2]				
	70	80	90	100	
Pile Driver[3]					
Jack Hammer					
Tractor					
Road Grader					
Backhoe					
Truck					
Paver					
Pneumatic Wrench					
Crane					
Concrete Mixer					
Compressor					
Front-End Loader					
Generator					
Saws					
Roller (Compactor)					

1. Adapted from *Noise Construction Equipment and Operations, Building Equipment, and Home Appliances*. U.S. Environmental Protection Agency. Washington D.C. 1971.
2. Cited noise level ranges are typical for the equipment cited. Noise energy dissipates as a function of distance between the source and the receptor. For example, if the noise level from a pile driver at a distance of 50 feet = 100 decibels (dB(A)), then at 400 feet, it might be 82 decibels (dB(A)) or less.
3. Due to project safety and potential construction noise concerns, pile driving activities are typically limited to daytime hours.
4. Some construction activities will create substantial noise impacts for nearby noise-sensitive land uses. For example, pile driving activities will pose a substantial noise impact for distances of up to one-quarter mile. It is the recommendation of this traffic noise analysis that considerations be made for any nearby residences for all evening and/or nighttime periods (7:00 p.m. – 7:00 a.m.) throughout which extremely loud construction activities might occur.

While discrete construction noise level prediction is difficult for a particular receptor or group of receptors, it can be assessed in a general capacity with respect to distance from known or likely project activities. For this project, earth removal, grading, hauling, and paving is anticipated to occur in the vicinity of noise-sensitive receptors. Although construction noise impact mitigation should not place an undue burden upon the financial cost of the project or the project construction schedule, pursuant to the requirements of 23 CFR 772.19, it is the recommendation of this traffic noise analysis that:

- Earth removal, grading, hauling, and paving activities in the vicinity of residences should be limited to weekday daytime hours.

- If meeting the project schedule requires that earth removal, grading, hauling and / or paving must occur during evening, nighttime and / or weekend hours in the vicinity of residences, the Contractor shall notify NCDOT as soon as possible. In such instance(s), all reasonable attempts shall be made to notify and to make appropriate arrangements for the mitigation of the predicted construction noise impacts upon the affected property owners and / or residents.

- If construction noise activities must occur during context-sensitive hours in the vicinity of noise-sensitive areas, discrete construction noise abatement measures including, but not limited to portable noise barriers and / or other equipment-quieting devices shall be considered.

For additional information on construction noise, please refer to the FHWA Construction Noise Handbook (FHWA-HEP-06-015) and the Roadway Construction Noise Model (RCNM), available online at: http://www.fhwa.dot.gov/environment/noise/cnstr_ns.htm.

5.14.4 Construction Waste

All construction waste material generated during clearing, grubbing, and other construction phases will be removed from the project site and burned or disposed of by the contractor in accordance with state and local regulations. Litter and other general trash will be collected and disposed of at local landfill locations. NCDOT will require contractors to conduct historic, archaeological, wetland and threatened and endangered species surveys prior to approval and use of construction waste disposal and/or borrow sites identified for the proposed grade separation.

5.14.5 Maintenance of Traffic

During construction of the proposed Project, all local and through roadway traffic will be adequately and safely accommodated. All construction operations will be scheduled to keep roadway traffic delay minimized, and the contractor will conform to the standards of the *Manual of Uniform Traffic Control Devices for Streets and Highways*.[10]

Construction will be performed to comply with all federal, state, and local laws governing safety, health, and sanitation. Procedures will apply all safeguards, safety devices, protective equipment, and any other action reasonably necessary to protect the life and health of employees on the job, the safety of the public, and the property in connection with the performance of the work.

10 Federal Highway Administration (FHWA). 2012. Manual on Uniform Traffic Control Devices for Streets and Highways. http://mutcd.fhwa.dot.gov/

The following items will be utilized, where necessary, to maintain public safety and the flow of roadway traffic:

- Constructing and maintaining temporary detours, temporary structures, temporary approaches, crossings, and intersections with streets and roads, as well as using aggregates for the maintenance of roadway traffic and water for use as a dust palliative.
- Furnishing flaggers, pilot trucks, and drivers.
- Furnishing, erecting, and maintaining warning devices such as signs, auxiliary barriers, channelizing devices, hazard warning lights, barricades, flares, and reflective markers. If a street must be closed to roadway traffic, traffic control devices will be illuminated during hours of darkness.

5.14.6 Utilities

Coordination during the project design and construction will be necessary to prevent major disruptions to utility service. In most locations, electric and telephone service are the major utility concerns.

Before construction, a preconstruction conference will be held involving the contractor, pertinent local officials, and NCDOT Division of Highways to discuss various construction procedures, including precautionary steps to be taken during construction that will minimize the interruption of public utility and traffic services. Public utility officials may also be involved in the preconstruction conference.

5.14.7 Geodetic Markers

NCDOT will coordinate with the N.C. Geodetic Survey prior to construction to identify any geodetic survey markers that will be impacted by the proposed project. Any affected markers will be relocated before construction.

5.15 SUMMARY OF ENVIRONMENTAL EFFECTS

Table 5.15.1 contains a summary of impacts associated with Alternatives 1 and 2.

TABLE 5.15.1
SUMMARY OF IMPACTS FOR THE DETAILED STUDY ALTERNATIVES

ENVIRONMENTAL FEATURES		ALTERNATIVE 1	ALTERNATIVE 2
Length (miles)		15.03	15.42
Relocations[1,2]	Residential	40	40
	Businesses	63	60
	Non-profit	1	1
	Total Relocations	***104***	***101***
Disproportionate Impact to Minority/Low Income Pop.		0	0
Historic Properties (*adverse effect*)		1	0
Community Facilities Impacted		0	0
Section 4(f) Impacts (*de minimus determination*)[3]		1	1
Noise Receptor Impacts [4]		130	124
Prime Farmlands (acres) [5]		148	182
Upland Forested Acres (acres) [6]		Managed Pine: 18.1 Oak-Hickory: 10.7	Managed Pine: 30.9 Oak-Hickory: 14.5
Streams (linear feet)		1,830	1,593
Wetlands (acres) [6]		0.44	0.79
100 Year Floodplain and Floodway Impacts (acres) [7]		5.52	5.52
Federally Protected Species	*(Northern long-eared bat)*	Unresolved	Unresolved
Construction Cost	Without Multi-use Path	$195,833,200	$201,433,200
	With Multiuse Path	$202,238,900	$208,188,900
Utility Relocation Cost	Without Multi-use Path	$9,064,452	$8,628,919
	With Multiuse Path	$9,718,140	$9,259,261
Right-of-Way Cost	Without Multi-use Path	$174,475,000	$172,150,000
	With Multiuse Path	$180,675,000	$178,400,000
Total Cost	***Without Multi-use Path***	***$379,372,652***	***$382,212,119***
	With Multiuse Path	***$392,632,040***	***$395,848,161***

NOTES: The proposed project would not affect any archaeological resources or water supply watersheds. It would not create any impacts to hazardous materials sites.

1. The number of relocations shown above are conservative estimates of a worst-case scenario for each alternative. A smaller number of relocations are likely after the implementation of avoidance and minimization measures developed during final design.
2. Construction of the multi-use path would relocate an additional three residences and three businesses for both alternatives.
3. Because the proposed earthwork at the entrance to the Marshall Steam Plant would not adversely affect the activities, features and attributes that qualify the facility for protection under Section 4(f), FHWA is considering a Section 4(f) de minimis determination.
4. Based on preliminary study, traffic noise abatement is recommended and noise abatement measures are proposed. Four noise barriers are recommended for Alternative 1 and two noise barriers are recommended for Alternative 2. An additional noise analysis will be performed during final design of this project to develop detailed locations and dimensions of the recommended noise barriers.
5. Acreage is based on the proposed right-of-way for each alternative. Actual construction impacts would less than the acreage shown above.
6. Impact quantities are based on construction limits plus an additional 25 feet. Impacts to wetland forest communities are shown separately.
7. Reed Creek, Mountain Creek, and Catawba Creek have delineated regulatory floodplains; however, the creeks are "covered" by Lake Norman; as such, the AE Zone (i.e., 100-year floodplain) boundary is the edge of Lake Norman at full volume (760 feet above mean sea level). Due to this atypical condition, floodplain impacts are actually identical to surface water impacts associated with the causeway construction across Lake Norman.

6.0 PUBLIC INVOLVEMENT

6.1 AGENCY COORDINATION

NCDOT held a project scoping meeting on June 15, 2011 with resource agencies and local representatives to begin the planning process for this project. At the time of this meeting, the R-2307 project included the widening of NC 150 from NC 27 just East of Lincolnton to I-77 in Mooresville, Lincoln, Catawba and Iredell Counties. The project was divided in to three sections: Section A: from NC 27 to the NC 16 interchange with NC 150; Section B: from the NC 16/NC 150 interchange to the intersection of NC 150 and Harvel Road (SR 1902); and Section C: from Harvel Road to the I-77/NC 150 interchange in Mooresville. The meeting minutes from this meeting are included in Appendix A. In 2012, the project termini were modified and Section A was removed from the project and the STIP. The project was re-initiated and a start of study/scoping letter was sent to resource agencies as part of the Concurrence Point (CP) 1 meeting packet. A joint scoping/CP 1 meeting was held on December 12, 2012 and is discussed on more detail in Section 6.4.

The 2012-2020 NCDOT STIP was amended to include an eastward extension of R-2307 from I-77 to the US 21/NC 150 interchange. The STIP amendment also included the proposed modifications to the I-77/NC 150 interchange (STIP Project No. I-5717). During the CP 2 (Design Options for Detailed Study) Meeting held August 13, 2014, the resource agencies were informed that the project limits would be extended east to the US 21/NC 150 interchange and the project would now include the improvements to the I-77/NC 150 interchange. This was done to ensure a coordinated design along the NC 150 corridor from NC 16 Bypass to US 21.

6.2 PUBLIC INVOLVEMENT PLAN

A public involvement plan was completed for this project on December 11, 2012. The purpose of the plan was to "*promote and provide a variety of meaningful forums for stakeholders to learn about and comment on the proposed recommendations of this project. The outcome of the public involvement will be that businesses, citizens, property owners, institutions, agencies and other stakeholders will have had meaningful opportunities to provide feedback regarding the project recommendations as well as associated impacts*." Public Involvement activities conducted as part of this project include:

Project Website

A project website was established to provide project information to individuals not included on the mailing list. The website address is http://www.ncdot.gov/projects/nc150/. The website will be periodically updated to include announcements to upcoming outreach activities, past newsletters and design graphics, and other relevant information.

Media Relations

Press release information for workshops and the public hearing were/will be provided to local media.

Newsletters

Newsletters are mailed to property owners in the project vicinity to provide project updates and announce upcoming public involvement activities. To date, two newsletters were distributed, one for each of the public meetings.

Meetings

Public Meetings have been used to inform the public on a timely basis regarding the project scope, schedule, findings, and recommendations. The purpose of these meetings is to actively solicit input from the public, local agencies, and stakeholders. This feedback has and will continue to be used by NCDOT, FHWA, and other decision makers (which may include permitting agencies or the full NEPA/404 Merger team). Project meetings/coordination is discussed in further detail below.

6.3 MEETINGS

Public Meetings

Two Public Meetings were held for this project. The first Public Meeting was held on November 21, 2013 at the Berea Baptist Church. Representatives from The Gaston-Cleveland-Lincoln Metropolitan Planning Organization (GCLMPO), The Greater Hickory MPO, Lincoln County Planning, The Town of Mooresville, and Catawba County were in attendance. There were questions regarding the project schedule, the project terminus, the large bridge over Lake Norman near the Marshall Steam Station and the sequence of construction for the project. It was also requested that very thorough discussions regarding the Terrell Historic District be initiated. Generally, all were in agreement surrounding the need for the improvements.

One hundred and eighty (180) citizens attended the first public meeting. Written comments were received either at the workshop or at a later date by mail and email. Forty five comment sheets were received and are summarized below. Topics generating the most comments are identified with an asterisk*.

General Comments

- Could easternmost section be considered for construction first?
- Do not raise the bridge over the lake.
- Need a traffic signal between Kiser Island Road and Perth Road.
- Questions regarding the typical section through different areas along the project.
- Road project is way overdue. *
- In support of the project. *
- Concerns about noise impacts.
- Requesting information on the status of plans for a public park at the end of Island Point Road and adjoining the Marshall Steam Plant.
- Please raise the bridge over the lake.*

- School busses leaving Lake Norman High School cannot turn right and traffic backs up causing huge delays. *
- Consider adjusting school hours or move location of school.
- Concerns for traffic at NC 150 and Erwin Road as a Sam's Club and new apartments are being constructed there.
- Don't forget sidewalks and pedestrian crossings. *
- Move schedule up. We need help now. *
- NC 150 and Water Oak needs a signal now.
- Consider a northern bypass route similar to Hwy 16 near Charlotte.
- Overwhelmingly in favor of widening existing NC 150 through Terrell.
- Businesses in Terrell would be negatively impacted by any bypass option.
- Concerns for noise at property on Mariner Point Lane.

Businesses

- A local real estate agent stated that property values are negatively impacted by the current traffic on NC 150. She states that no one wants to consider purchasing houses in that area due to the traffic delays.
- Nelson Nursery, which has been in business for 55 years, says that a northern bypass around Terrell would take their business.
- Terrell Camping Center says that it would suffer with a bypass around Terrell.
- Lake Norman Motor Coach Resort, LLC requests that design plans consider not impacting the RV Resort and Trailer Park, Denver Equipment Company and Linberger's Restaurant.
- TVD, LLC is the owner of one of the historic homes in Terrell and hopes to have the home moved and NC 150 widened through Terrell.

Government Officials and Organized Groups

Catawba County

- Retain the corridor alignment along existing NC 150 in lieu of an alternate around Terrell.
- Include a minimum 10-foot bicycle path and pedestrian access along one side of the corridor between Doolie Road in Iredell County and Little Mountain Road in Catawba County. In addition, extend the bicycle path and pedestrian access westward to the intersection of the new NC 16 and NC 150 in Catawba County.
- Include a bicycle path and pedestrian access onto one side of the bridge over Lake Norman to allow both pedestrians and bicyclists to cross the bridge.
- Retain the four-foot paved shoulder on the opposite side of the road where the bicycle path and pedestrian access is located.
- Reduce the cross section to a 5-lane urban design with a 45 mph speed limit approaching Sherrills Ford Road and through Slanting Bridge Road due to an approved village plane which incorporates pedestrian crossing at NC 150.

Town of Mooresville

- Include a multi-purpose path along one side of the corridor between Doolie Road in Iredell County and Little Mountain Road in Catawba County.
- Retain the four-foot paved shoulder on the opposite side of the road where the multi-use path is located.
- Include a multi-use path on one side of the bridge over Lake Norman to allow both pedestrians and bicyclists to cross the bridge.
- Include standard sidewalks and corresponding crosswalks on the north side of the road between I-77 and Doolie Road.
- Incorporate a cross section that will adequately accommodate existing and future traffic between I-77 and Perth Road.

Lake Norman Bicycle Route Task Force

- Include a multi-purpose path along one side of the corridor between Doolie Road in Iredell County and Little Mountain Road in Catawba County.
- Retain the four-foot paved shoulder on the opposite side of the road where the multi-use path is located.
- Include a multi-use path on one side of the bridge over Lake Norman to allow both pedestrians and bicyclists to cross the bridge.

Mooresville South Iredell Developers Council

- Petition requesting that "no commitment of resources be made to the NC Highway 150 bridge design before an entity, such as a UNC branch, has analyzed the economic development impact of blocking passage of fireboats, sailboats, marine construction vessels, tourist boats and other relatively tall river craft". Signed by five residents.

A **second** public meeting was held on February 25, 2014 at the Living Waters Baptist Church in Mooresville specifically for the Chamber of Commerce and business owners in the project study area to provide information on the proposed designs for the project which included both a conventional widening option and a superstreet option. Eighty six (86) citizens attended the public meeting. During the question and answer period, citizens expressed concerns about the project including the impact of the proposed designs on businesses, including access issues, traffic congestion in the project area due to ongoing development and traffic safety issues with existing NC 150 especially around the high school at the intersection of NC 150 with Perth and Doolie Roads. Several citizens also commented on the traffic congestion particularly, during morning and evening commuting times, and the inability to make left turns out of many of the subdivisions located along NC 150 in the urban areas.

Public Hearings

The Public Hearing(s) will take place after the Environmental Assessment has been signed. It is anticipated that 2 Public Hearings will be held, one in Catawba County and one in Iredell

County. These are formal hearings which will provide the public an opportunity to make a verbal statement on the record in addition to the standard written comment.

Small Group Meetings

NCDOT held several small group meetings to discuss specific issues related to the project. These meeting are summarized below:

Bike/Pedestrian Accommodations Meeting (July 22, 2014) – The project team met with representatives from CRTPO, Town of Troutman, Iredell County, Catawba County, Town of Mooresville, CCOG, Carolina Thread Trail, and the Greater Hickory MPO to discuss the bicycle and pedestrian options for the project. The goals of the meeting were to review the bike and pedestrian requests received from the different groups, discuss the origin and destination of the multi-use path and the reason behind the requests and to discuss cost sharing on the project, since NCDOT typically likes to cost share on these types of facilities.

NCDOT agreed to develop options and pricing for the stakeholders and the stakeholders agreed to determine the amount of cost sharing they could participate in and develop a unified request to present to NCDOT.

Bike/Pedestrian Accommodations Meeting (October 30, 2014) – A meeting was held in Mooresville on October 30, 2014 to discuss the bicycle and pedestrian provisions and cost sharing approach for the multi-use path. It was noted that the multi-use path is included on both the Charlotte and Hickory MPO's future plans. It was discussed that in order to be able to meet the current schedule for the environmental document, the stakeholders would need to act quickly. NCDOT agreed to provide graphics and cost-share calculations to the meeting attendees for each section (R-2307A and R-2307B) of the project.

The stakeholders agreed to present this information to their respective councils for discussion. NCDOT noted that they would need a written cost-sharing commitment from the stakeholders requesting the multi-use path in order to expand the cost estimate to include additional R/W and Utility costs for the multi-use path.

FERC Meeting with Duke Energy (March 23, 2015) - The project team met with representatives from Duke Energy to review the proposed design options and discuss the FERC permit process in relation to the project. Duke noted that NCDOT would need to mitigate any impacts within the "Project Boundary" which includes the Marshall Steam Station property and public boat access areas.

NCDOT agreed to provide all information needed by Duke for their conveyance application and would meet with Duke as needed to provide information and make decisions regarding the steam station and Lake Norman.

Coordination follow-up: Duke Energy has reviewed the latest proposed plan for NC 150 with regards to Pinnacle and McCrary Creek Access Areas. Based on the plans provided, Duke

did not have any issues with the proposed plans as they relate to the two access areas. Duke noted the following:

Pinnacle Access Area:

- The current plan to install a retaining wall will allow Duke to maintain the current footprint of the access area including the number of parking spaces, accessibility to and from the ramps and the overall function of the site. This is important point since Duke will need to ensure compliance with their federal license.
- The current plan shows slope stakes only slightly affects the navigable channel to the existing boat ramps but does not seem to adversely affect the function.

McCrary Creek Access Area:

- The current plan does not affect the existing number of parking spaces or function of the site.

6.4 NEPA/404 MERGER PROCESS

In an effort to streamline the environmental planning and permitting process, the North Carolina Department of Transportation (NCDOT), Federal Highway Administration (FHWA), and the US Army Corps of Engineers (USACE) developed an interagency agreement integrating the environmental screening requirements of NEPA and the USACE Section 404 permitting process. This process is known as the NEPA/404 Merger Process.

The NEPA/404 Merger Process was designed to apply to transportation projects that would likely require an individual Permit under Section 404 of the CWA. If impacts are anticipated to be low, the NCDOT initiates a screening process to determine the applicability of the NEPA/404 Merger Process for the project.

Given the potential stream and wetland impacts, historic resources located within the project study area, and citizen interest in the project, it was determined by NCDOT, FHWA, USACE, and NCDWR that this project would follow the NEPA/404 Merger Process. Concurrence Points are defining points in the Section 404/NEPA Merger Process. Concurrence implies that project team members and the agencies they represent agree to decisions made at these defining points in the project development process and in doing so agree to abide by the decisions made unless there is a profound changed condition.

There are seven concurrence points (CP) in the Merger Process:

Scoping and Concurrence Point 1: Purpose and Need and Study Area Defined – this is the basis upon which justification of the project is established. As discussed in Section 6.1 the original termini for this project changed as the A portion of the project was dropped. For the scoping/CP 1 meeting, a start of study letter was sent to agency representatives in addition to the CP1 packet which included the new project description, design and traffic data as well as the proposed purpose and need statement. The minutes to the original project initiation meeting and the scoping/CP 1 meeting are included in Appendix A. The scoping/CP1 meeting was held on December 12, 2012, at which time the Merger Team

agreed to the project purpose as follows: "The purpose and need for this project is to improve capacity and reduce congestion along NC 150 from the NC 16 Bypass to just west of the I-77 interchange."

Concurrence Point 2: Detailed Study Alternatives Carried Forward (DSA) - Alternatives which satisfy the purpose and need for the project and concurred upon by the Merger Team are carried forward for further study and evaluated in sufficient detail to ensure good transportation and permit decision-making. At the CP2 meeting held on August 13, 2014, the Merger Team met to 1) revise Concurrence Point 1 to reflect a single environmental document for the R-2307 and I-5717 projects; and 2) reach Concurrence Point 2 to determine which alternatives to carry forward for detailed study.

The Merger Team also reviewed the project limits and decided to extend the eastern terminus of the project to just west of the US 21/NC 150 interchange in Mooresville to allow for access management solutions on both sides of the NC 150/I-77 interchange. The merger team also considered the no-build alternative, TDM and TSM improvements, mass transit alternative, and a range of build alternatives that would widen existing NC 150. It was noted that the minimization alternative, Alternative 3, crosses the southernmost portion of the historic district. The SHPO noted that although this alternative would not impact any structures, it would potentially change the district's character, resulting in an adverse effect and Section 4(f) impacts. The Merger Team agreed to eliminate Alternative 3 from further study. The Merger Team agreed to carry three alternatives forward for detailed study:

- Alternative1: Best Fit -Widen Existing NC 150 (No Terrell Bypass Option),
- Alternative 2: Best Fit – Widen Existing NC 150 & Northern Terrell Bypass Option, and
- Alternative 4: Best Fit – Widen Existing NC 150 & Southern Terrell Bypass Option

Concurrence Point 2A: Bridging Decisions and Alignment Review - The purpose of this meeting is to review the preliminary alignment of each alternative and make bridging and alignment decisions. The existing structures, recommended structures, and environmental considerations for each major drainage structure location were presented to the Merger Team.

Based on input from the Merger Team, NCDOT agreed to evaluate potential modifications to the culvert dimensions and vertical alignments to reduce culvert lengths. Additionally, the Merger Team requested that Alternative 4 be evaluated further since detailed studies revealed critical issues with this alternative. These included:

Environmental Considerations:

- Due to the location of the southern Terrell Historic Boundary, the impacts to streams are significantly higher compared to Alternatives 1 and 2.
- 4 stream crossings
- 125 linear feet of stream relocations

- 2,361 linear feet of stream impacts
- Additional FERC regulated crossings of Lake Norman

Historic Resource Considerations:
- Sherrills Road - Alternative 4 changes the road classification resulting in a larger minimum ditch which impacts property in southern portion of the historic district (if local road ditch upgraded to collector road ditch).
- Visual integrity of the district is likely to be impacted by Alternative 4 due to no control of access along the facility.

Design Considerations:
- Superstreet intersection at Hobb Lane is in a minimum radius curve.
- Geotechnical issues: Several rock outcroppings are identified in proposed cut areas will be impacted.
- Dual 175' curved bridges over the West Fork of Beaverdam Creek which would need to be 40 feet high over this finger of Lake Norman.
- Minimum radius curves are located throughout this roadway section.

Other Considerations:
- Rehoboth United Methodist Church recreational area will be impacted.
- High-voltage transmission tower will be impacted.

23 CFR (Code of Federal Regulations) 774.17 notes that an alternative may be rejected as not prudent for the following reasons:

(i) It compromises the project to a degree that it is unreasonable to proceed with the project in light of its stated purpose and need;
(ii) It results in unacceptable safety or operational problems;
(iii) After reasonable mitigation, it still causes:
(A) Severe social, economic, or environmental impacts;
(B) Severe disruption to established communities;
(C) Severe disproportionate impacts to minority or low income populations; or
(D) Severe impacts to environmental resources protected under other Federal statutes;
(iv) It results in additional construction, maintenance, or operational costs of an extraordinary magnitude;
(v) It causes other unique problems or unusual factors; or
(vi) It involves multiple factors in paragraphs (3)(i) through (3)(v) of this definition, that while individually minor, cumulatively cause unique problems or impacts of extraordinary magnitude.

A comparison between Alternatives 1, 2 and 4 shows that:

- Alternative 4 has higher stream impacts (2361 lf) than either Alternative 1 (766 lf) or Alternative 2 (527 lf);

- Alternative 4 has two additional FERC crossings in the area around Terrell as compared to Alternatives 1 and 2;
- Alternative 4, like Alternative 1, has an adverse effect on the Terrell Historic District. Alternative 2, however, does not have an adverse effect on historic properties or the historic boundary in Terrell;
- Alternative 4 impacts Zone 1 riparian buffers (51,989 sf) and Zone 2 riparian buffers (47,891 sf); whereas, Alternatives 1 and 2 do not; and finally,
- Alternative 4 has geometric design constraints, as mentioned previously, that would make the constructability of this alternative challenging as well as costly.

Based upon the accumulation of factors and the above considerations, Alternative 4 was recommended as not "prudent". NCDOT requested that the Merger Team concur to eliminate Alternative 4 from further consideration and not carry this alternative through to the Public Hearing. The Merger Team concurred and the CP 2 form was revised accordingly. The revised form is included in Appendix A.

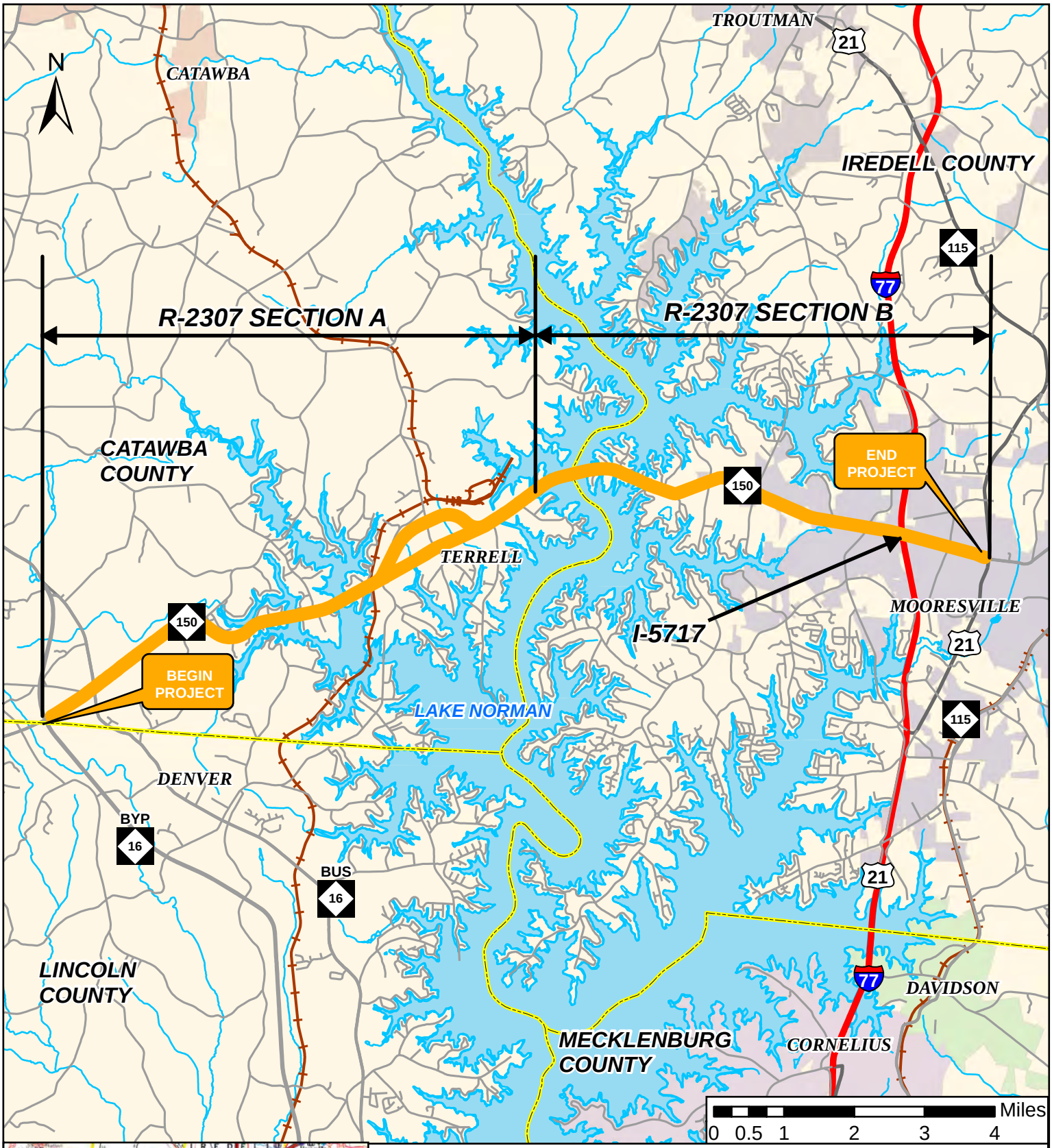
Concurrence Point 3: LEDPA/Preferred Alternative Selection - The alternative selected as the "least environmentally damaging practicable alternative" or LEDPA (NEPA preferred alternative), through the project development and permitting process. This meeting will be held after the Environmental Assessment has been signed and the public hearings have been held.

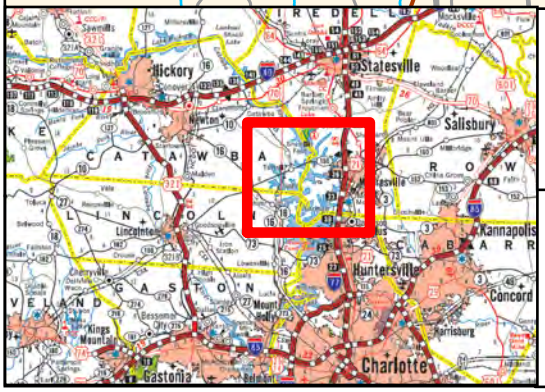
Concurrence Point 4A: Avoidance and Minimization - A detailed, interdisciplinary and interagency review to optimize the design and benefits of the project while reducing environmental impacts to both the human and natural environment. This meeting will take place before the final environmental document has been approved for this project.

Concurrence Point 4B: 30 Percent Hydraulic Review - A review of the development of the drainage design. This meeting will take place following approval of the final environmental document.

Concurrence Point 4C: Permit Drawings Review - A review of the completed permit drawings after the hydraulic design is complete and prior to the permit application. This meeting will take place following approval of the final environmental document. Copies of the NEPA/404 merger process concurrence forms approved so far for the project are included in Appendix A.

Figures



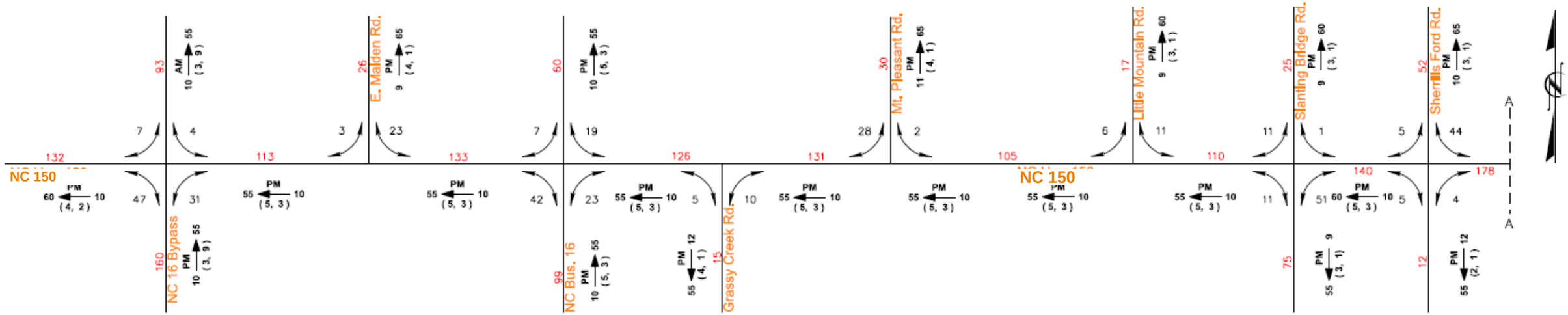


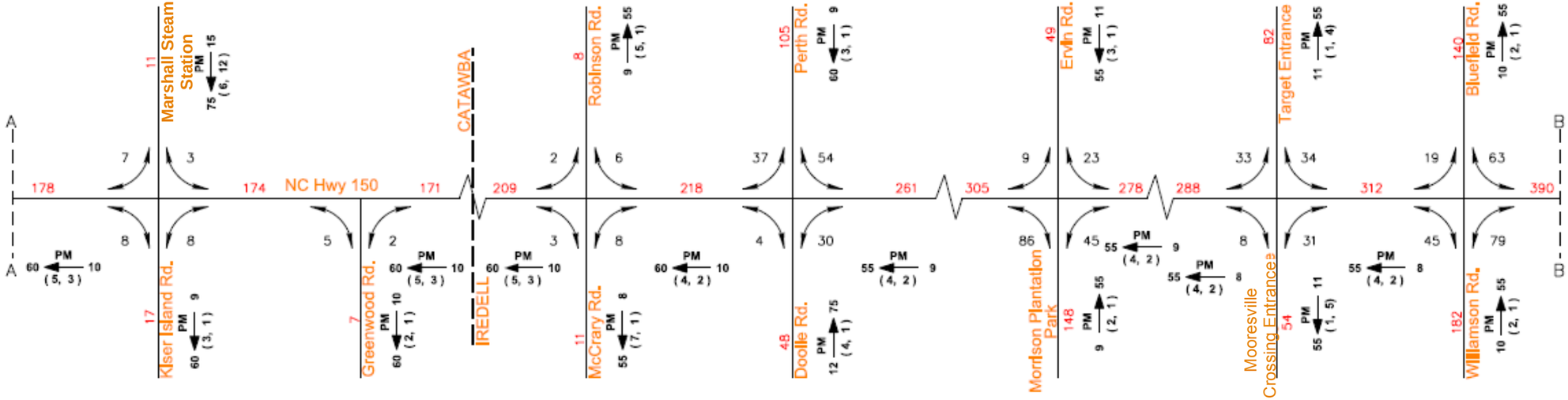
Project Location Map
NC 150 Improvements
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 1.1.1





DATE: MAY 2015

Legend

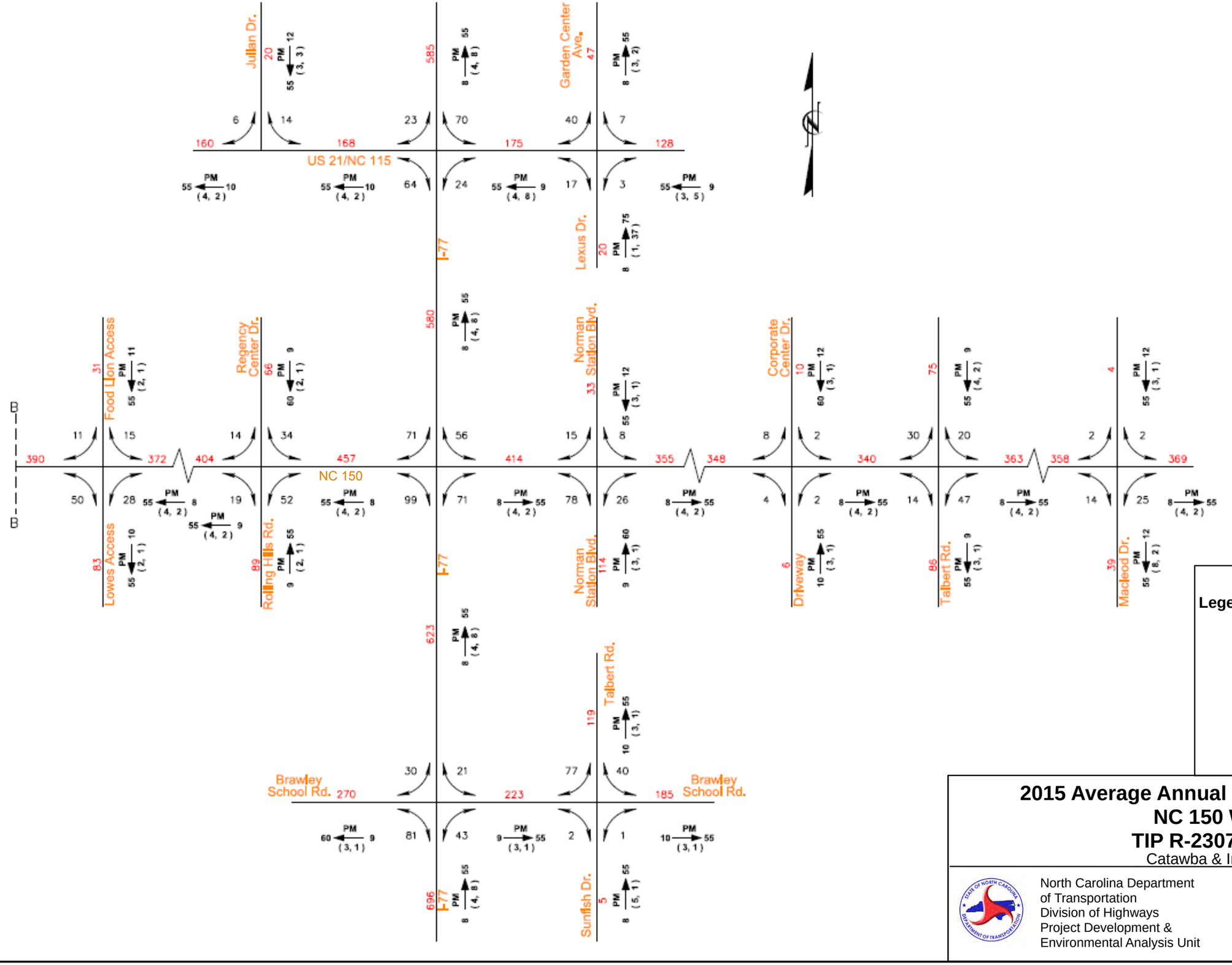
###	No. Vehicles per Day (VPD) in 100s
1-	Less than 50 VPD
x	Movement Prohibited
-----	Proposed Roadway
K PM (d , t) D	
K	Peak Hour volume as % of ADT
PM	PM Peak Period
D	Peak Hour Directional Split (%)
→	Indicates Direction of D
(d, t)	Duals, TT-STs (%)

2015 Average Annual Daily Traffic (Existing)
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department of Transportation
Division of Highways
Project Development & Environmental Analysis Unit

Figure 2.2.1a



DATE: MAY 2015

Legend

###	No. Vehicles per Day (VPD) in 100s
1-	Less than 50 VPD
x	Movement Prohibited
-----	Proposed Roadway

K PM (d , t) D

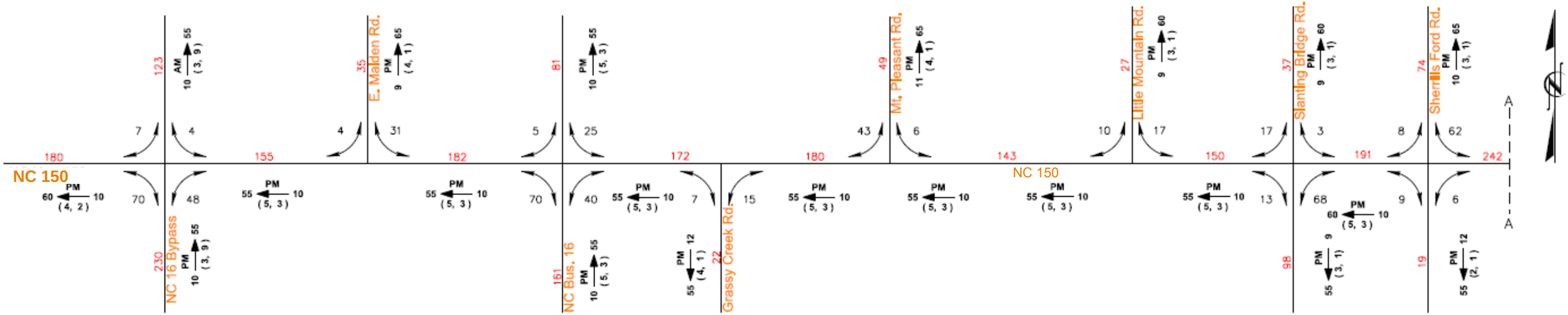
K	Peak Hour volume as % of ADT
PM	PM Peak Period
D	Peak Hour Directional Split (%)
→	Indicates Direction of D
(d, t)	Duals, TT-STs (%)

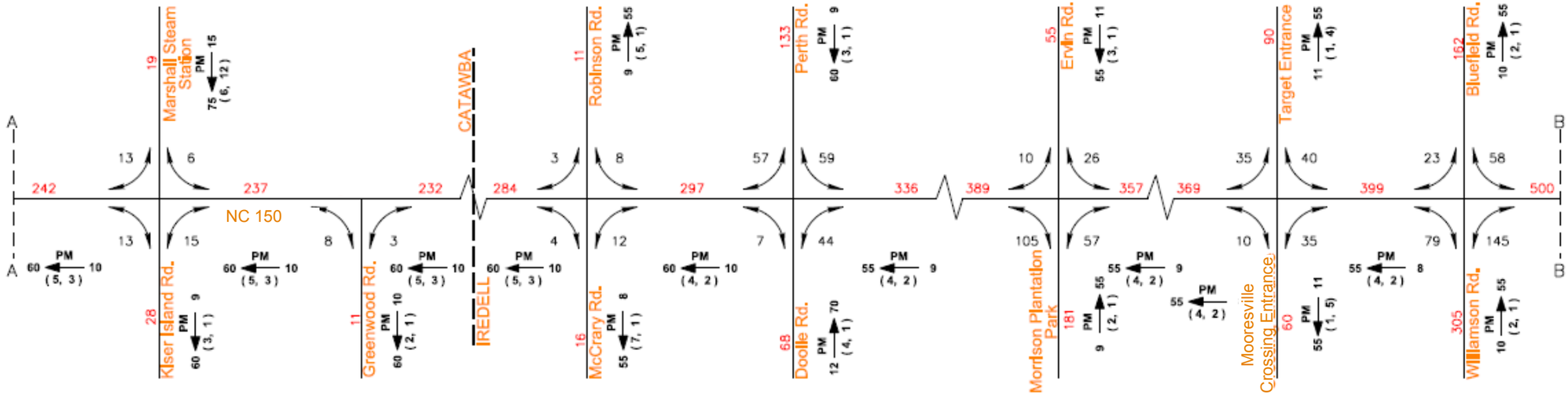
2015 Average Annual Daily Traffic (Existing)
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 2.2.1b





DATE: MAY 2015

Legend

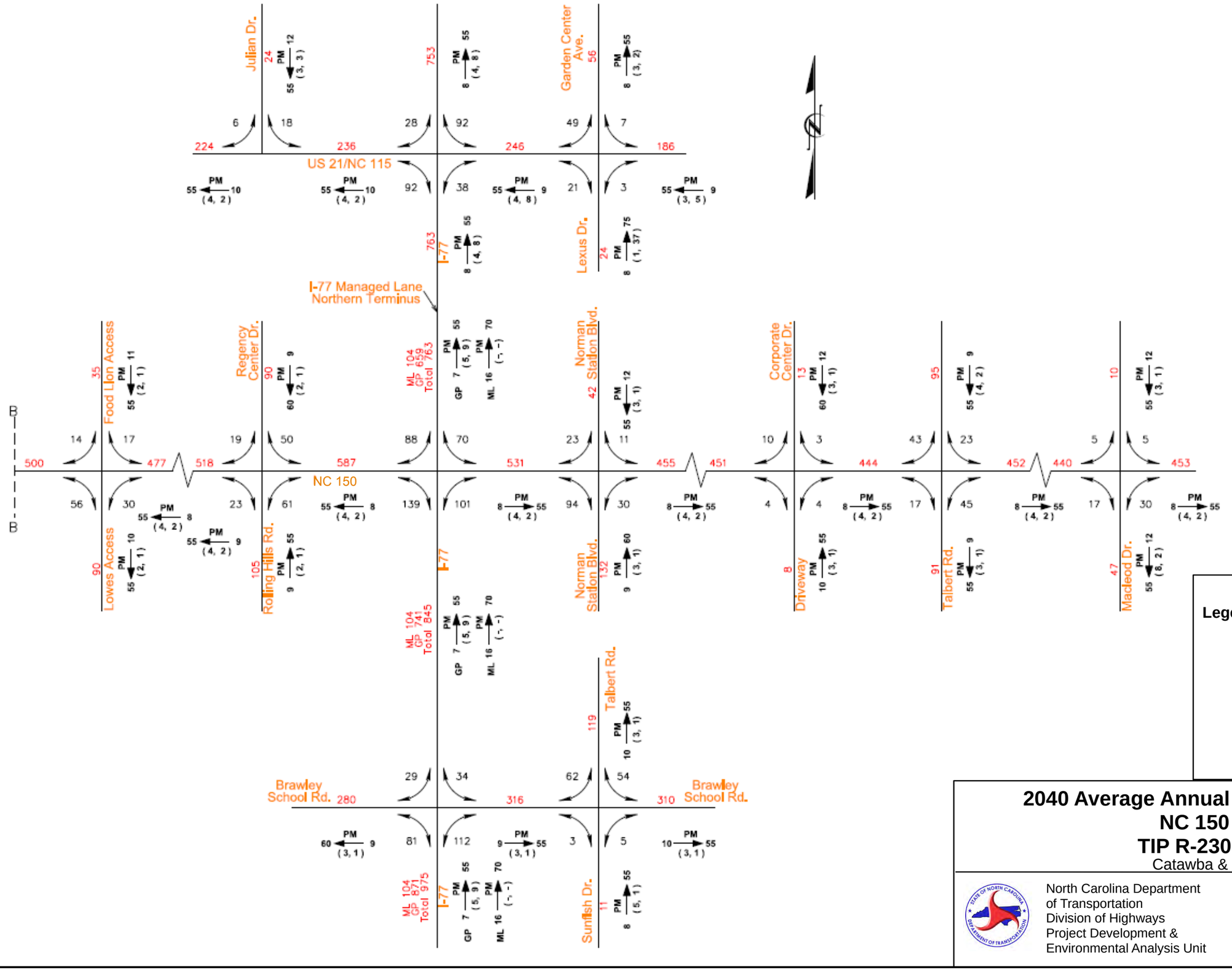
###	No. Vehicles per Day (VPD) in 100s
1-	Less than 50 VPD
x	Movement Prohibited
-----	Proposed Roadway
K PM (d , t) → D	
K	Peak Hour volume as % of ADT
PM	PM Peak Period
D	Peak Hour Directional Split (%)
→	Indicates Direction of D
(d, t)	Duals, TT-STs (%)

2040 Average Annual Daily Traffic (No Build)
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department of Transportation
Division of Highways
Project Development & Environmental Analysis Unit

Figure 2.2.2a



DATE: MAY 2015

Legend

###	No. Vehicles per Day (VPD) in 100s
1-	Less than 50 VPD
x	Movement Prohibited
-----	Proposed Roadway

K PM → D
(d , t)

K	Peak Hour volume as % of ADT
PM	PM Peak Period
D	Peak Hour Directional Split (%)
→	Indicates Direction of D
(d, t)	Duals, TT-STs (%)

2040 Average Annual Daily Traffic (No-Build)
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department of Transportation
Division of Highways
Project Development & Environmental Analysis Unit

Figure 2.2.2b

N

NEWTON

CATAWBA

CATAWBA COUNTY

TROUTMAN

IREDELL COUNTY

MAIDEN

TERRELL

MOORESVILLE

DENVER

LINCOLN COUNTY

R-3100

R-2307

I-4750

R-5816

I-5717

R-5100

SEE INSET A

Miles
0 1 2 4

INSET A

R-3833C

R-5100

I-4750

R-4757

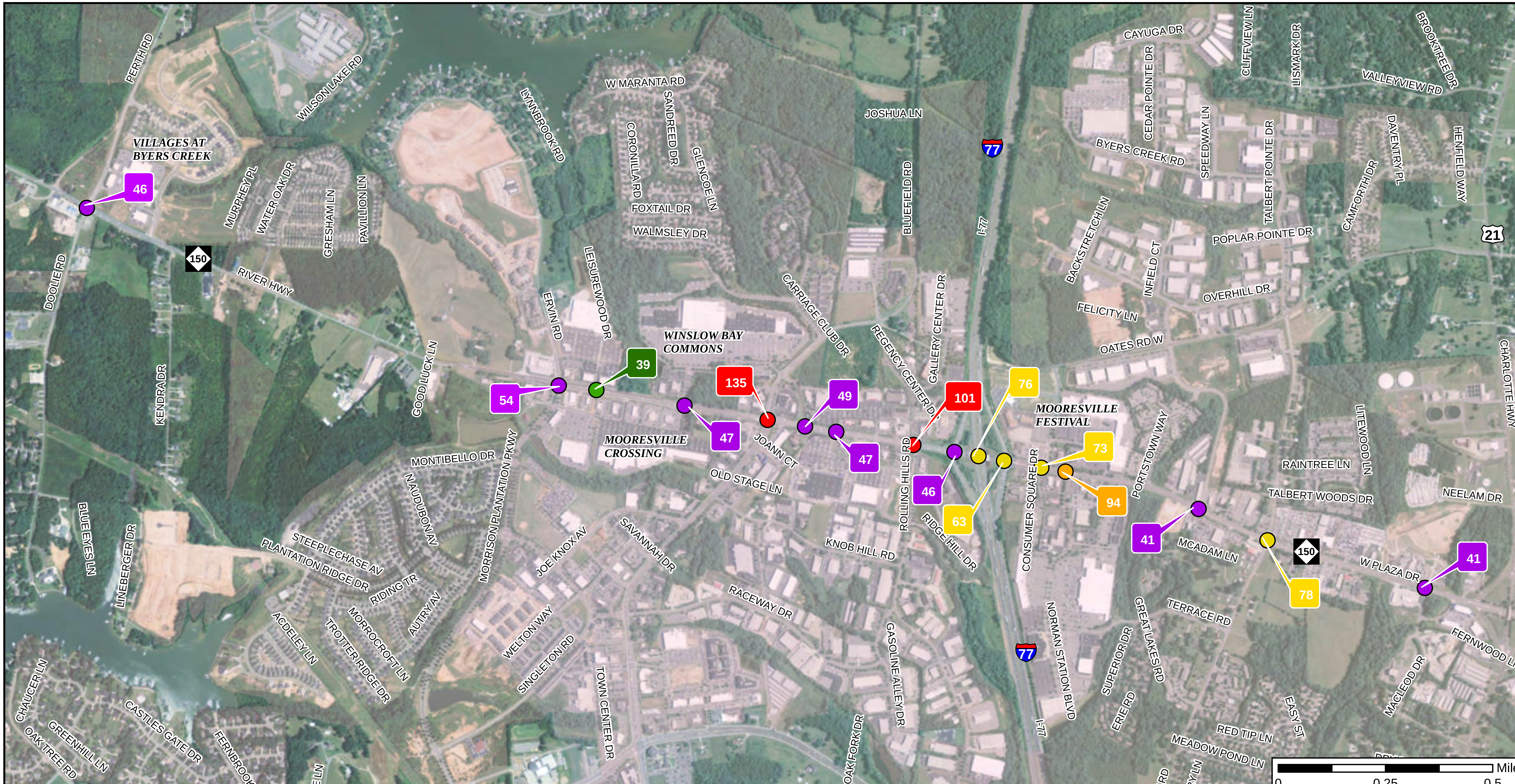
U-5817

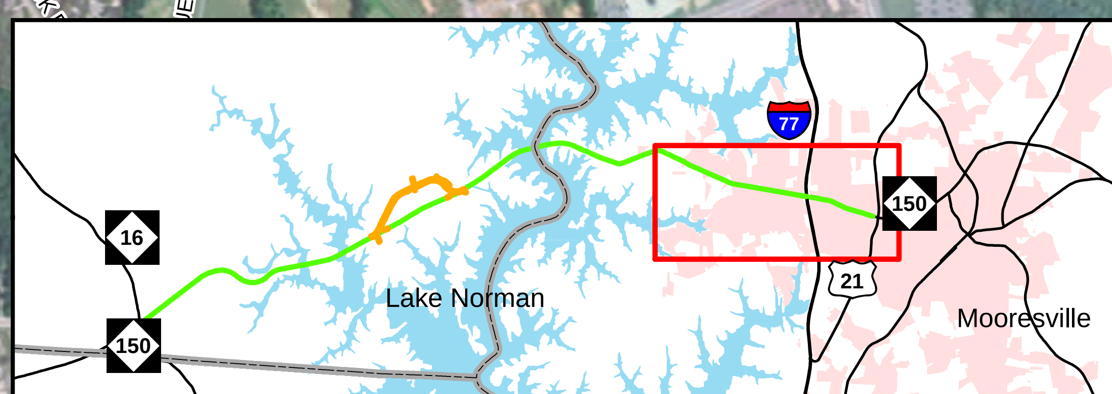
Miles
0 0.25 0.5 1

Adjacent STIP Projects Map
NC 150 Widening
TIP R-2307 and I-5717
Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 2.5.1


VILLAGES AT BYERS CREEK
WINSLOW BAY COMMONS
MOORESVILLE CROSSING
MOORESVILLE FESTIVAL
46
54
39
135
47
49
47
101
46
76
63
73
94
41
78
41
150
77
21
PERTH RD
WILSON LAKE RD
LYNNBROOK RD
W MARANTA RD
SANDREED DR
CORONILLA RD
GLENCOE LN
FOXTAIL DR
WALMSLEY DR
JOSHUA LN
BLUEFIELD RD
I-77
CAYUGA DR
CLIFFVIEW LN
LISMARK DR
BROOKTREE DR
VALLEYVIEW RD
CEDAR POINTE DR
BYERS CREEK RD
SPEEDWAY LN
TALBERT POINTE DR
DAVENTRY PL
HENFIELD WAY
CAMFORTH DR
POPLAR POINTE DR
BACKSTRETCH LN
INFIELD CT
OVERHILL DR
FELICITY LN
OATES RD W
CHARLOTTE HWY
DOOLIE RD
MURPHEY PL
WATER OAK DR
GRESHAM LN
PAVILLION LN
RIVER HWY
ERVIN RD
LEISUREWOOD DR
CARRIAGE CLUB DR
REGENCY CENTER DR
GALLERY CENTER DR
GOOD LUCK LN
KENDRA DR
JOANN CT
OLD STAGE LN
ROLLING HILLS RD
RIDGE HILL DR
CONSUMER SQUARE DR
PORTSTOWN WAY
LITEWOOD LN
RAINTREE LN
TALBERT WOODS DR
NEELAM DR
MCADAM LN
W PLAZA DR
MONTIBELLO DR
N AUDUBON AV
MORRISON PLANTATION PKWY
STEEPLECHASE AV
PLANTATION RIDGE DR
RIDING TR
AUTRY AV
JOE KNOX AV
SAVANNAH DR
KNOB HILL RD
BLUE EYES LN
LINEBERGER DR
ACDELEY LN
TROTTER RIDGE DR
MORROCROFT LN
WELTON WAY
SINGLETON RD
RACEWAY DR
GASOLINE ALLEY DR
NORMAN STATION BLVD
GREAT LAKES RD
TERRACE RD
FERNWOOD LN
SUPERIOR DR
TOWN CENTER DR
OAK FORK DR
ERIE RD
EASY ST
MACLEOD DR
RED TIP LN
MEADOW POND LN
CHAUCER LN
OAK TREE RD
GREENHILL LN
CASTLES GATE DR
FERNBROOK
MATLEN DR
HARBORCREST LN
LONGBOAT RD
ASHWOOD LN
Miles
0
0.25
0.5



Legend

Number of Crashes

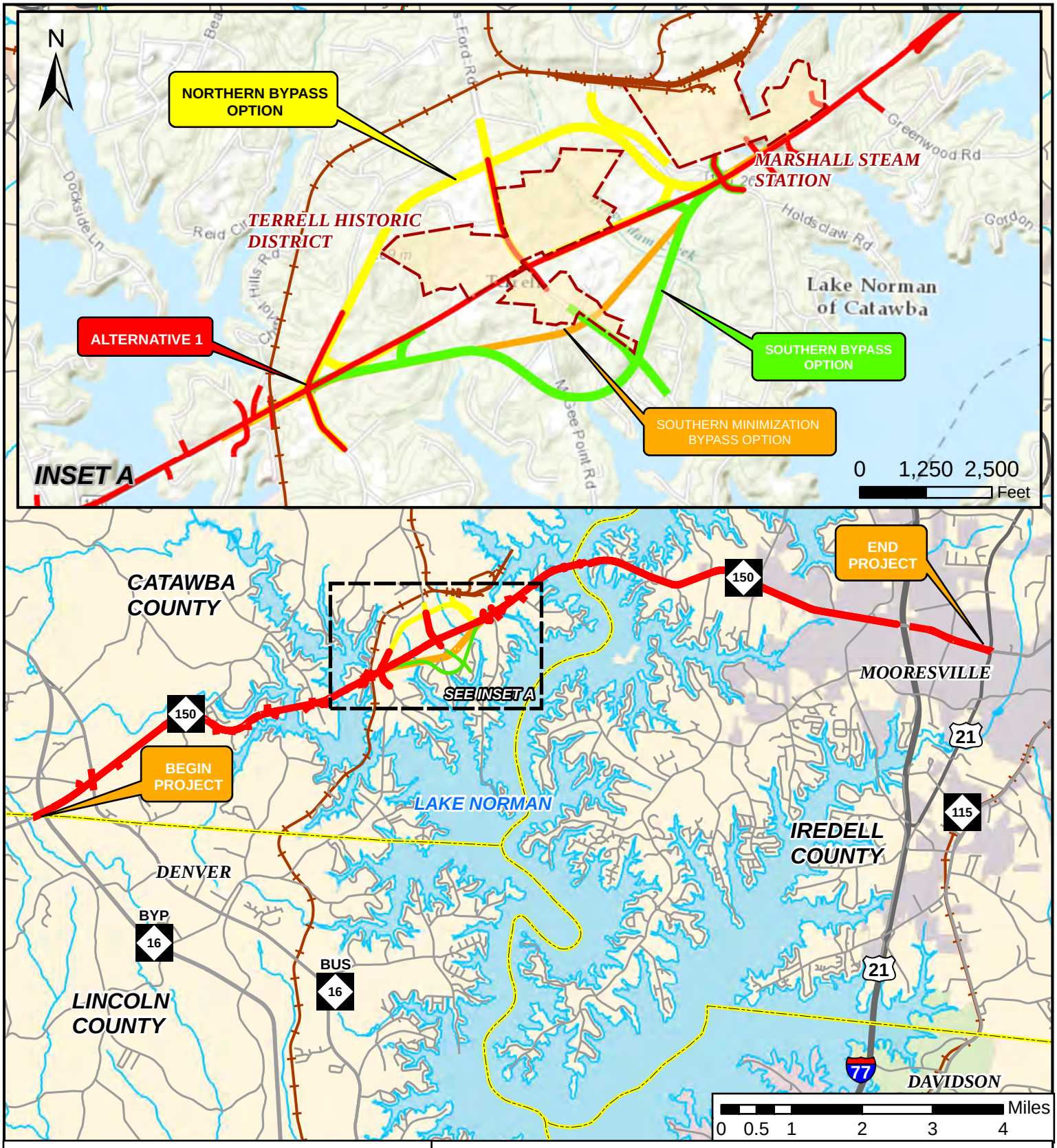
- 20 - 40
- 41 - 60
- 61 - 80
- 81 - 100
- > 100

Primary Accident Locations (8/1/2010 - 7/31/2015)
NC 150 Improvements
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department of Transportation
Division of Highways
Project Development & Environmental Analysis Unit

Figure 2.6.1



Legend

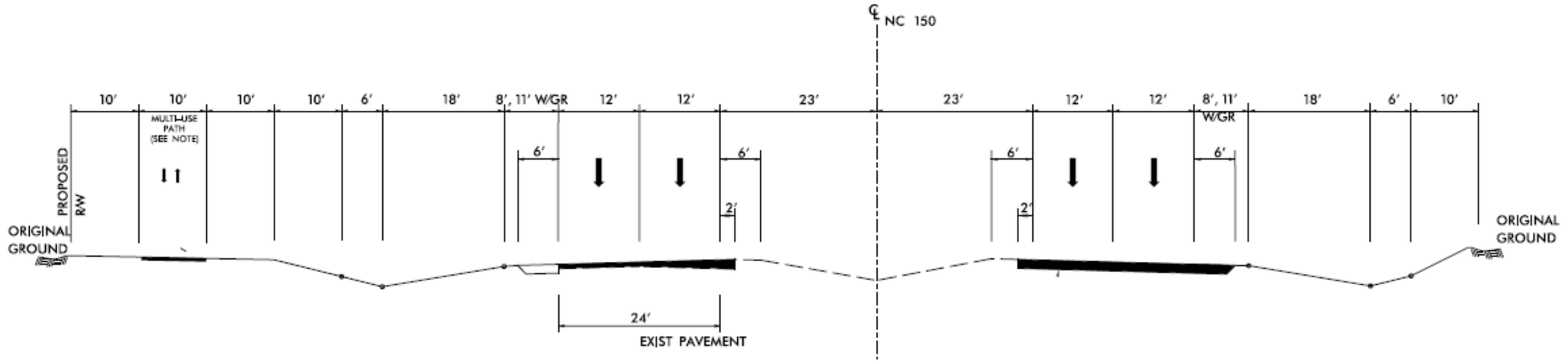
- Alternative 1 No Terrell Bypass Option
- Alternative 2 Terrell Northern Bypass Option
- Alternative 3 Minimization Southern Bypass Option
- Alternative 4 Terrell Southern Bypass Option
- Historic District Boundary

Preliminary Alternatives
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department of Transportation
Division of Highways
Project Development & Environmental Analysis Unit

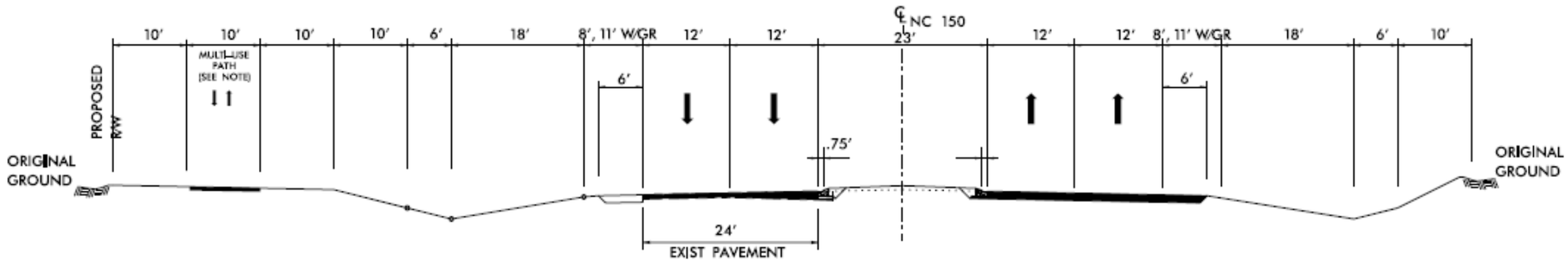
Figure 3.2.1



TYPICAL SECTION NO. 1

FROM NC 16 BYPASS TO WEST OF TERRELL HISTORIC DISTRICT
–LALT1– STA. 22+88.26 TO 324+13.72
FROM SLANTING BRIDGE ROAD TO KISER ISLAND ROAD (NORTHERN BYPASS)
–LALT2– STA. 10+00.00 TO 124+67.43
FROM SLANTING BRIDGE ROAD TO KISER ISLAND ROAD (SOUTHERN BYPASS)
–LALT4– STA. 10+00.00 TO 116+83.58

NOTE – A seperate bicycle and pedestrian multi-use path is being considered but the construction limits do not reflect the addition of this path



TYPICAL SECTION NO. 2

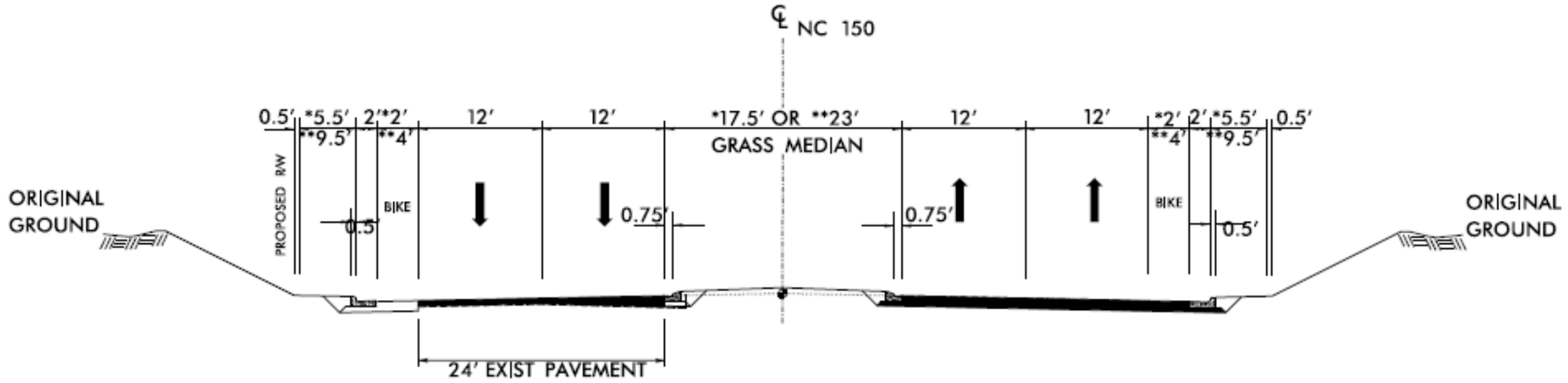
FROM JUST WEST OF TERRELL HISTORIC DISTRICT
TO TERRRELL HISTORIC DISTRICT
FROM TERRILL HISTORIC DISTRICT
TO JUST EAST OF PERTH /DOOLIE ROAD
–LALT1– STA. 324+13.72 TO 341+75.53
–LALT1– STA. 372+13.50 TO 602+00.00

NOTE – A seperate bicycle and pedestrian multi-use path is being considered but the construction limits do not reflect the addition of this path

Proposed Typical Sections
NC 150 Improvements
TIP R-2307 and I-5717
Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

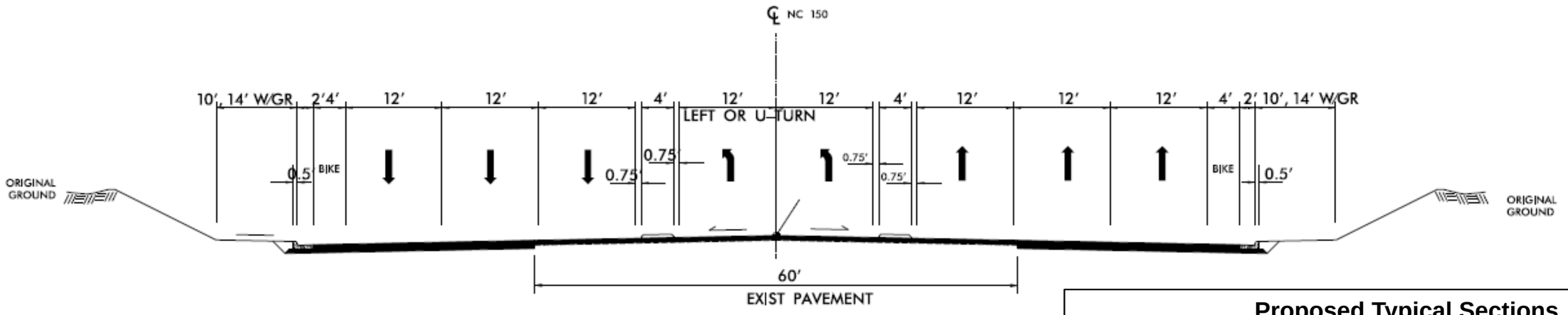
Figure 3.2.2a



TYPICAL SECTION NO. 3

THROUGH TERRELL HISTORIC DISTRICT
*–LALT1– STA. 341+75.53 TO 372+13.50
FROM JUST EAST OF WADDELL ROAD
TO JUST WEST OF PERTH /DOOLIE ROAD
**–LALT1– STA. 545+75.43 TO 601+92.72

NOTE – A seperate bicycle and pedestrian multi–use path is being considered but the construction limits do not reflect the addition of this path



TYPICAL SECTION NO. 4

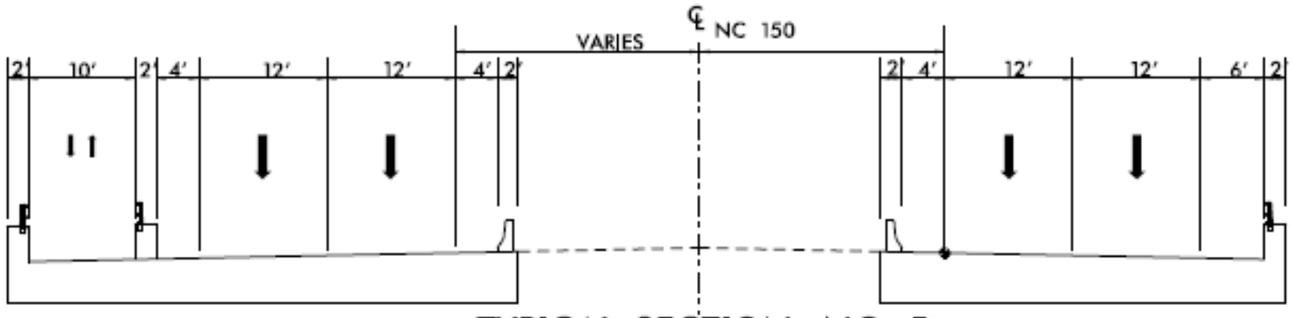
FROM JUST WEST OF PERTH /DOOLIE ROAD
TO US 21

–LALT1– STA. 601+92.72 TO 798+83.34

Proposed Typical Sections
NC 150 Improvements
TIP R-2307 and I-5717
Catawba & Iredell Counties

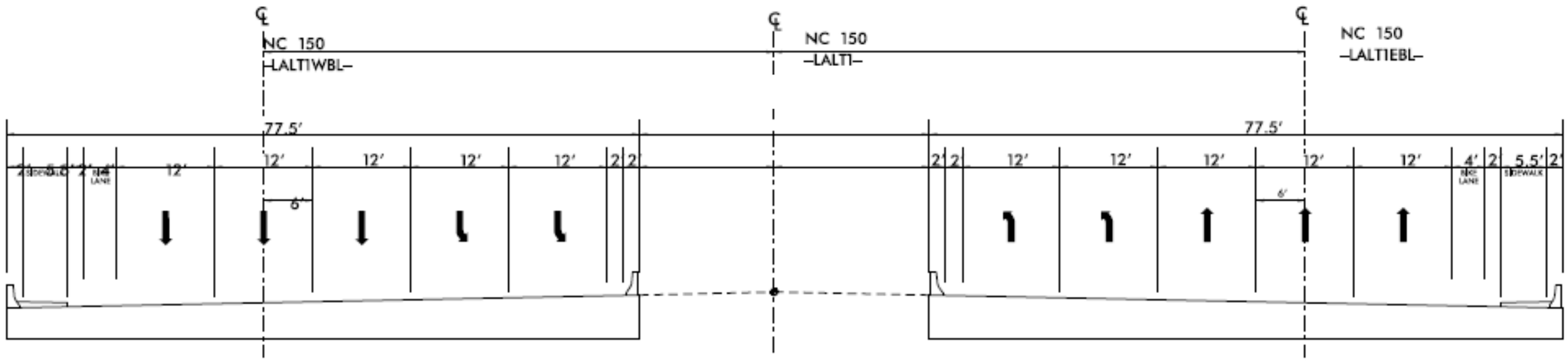
North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 3.2.2b



TYPICAL SECTION NO. 5

BRIDGE TYPICAL



FINAL BUILDOUT

TYPICAL SECTION NO. 6

NC 150 BRIDGES OVER I–77

Proposed Typical Sections
NC 150 Improvements
TIP R-2307 and I-5717
Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 3.2.2c

N

KILLIAN'S CROSSROADS

BUS 16

BUS 16

BYP 16

150

BEGIN ALTS 1, 2

E MAIDEN RD

STATE RD 1855

HEARTLAND DR

STATE HWY 16

COMMONS DR

BUD RD

JUPITER CT

SAGITTARIUS CIR

NEPTUNE DR

TAURUS DR

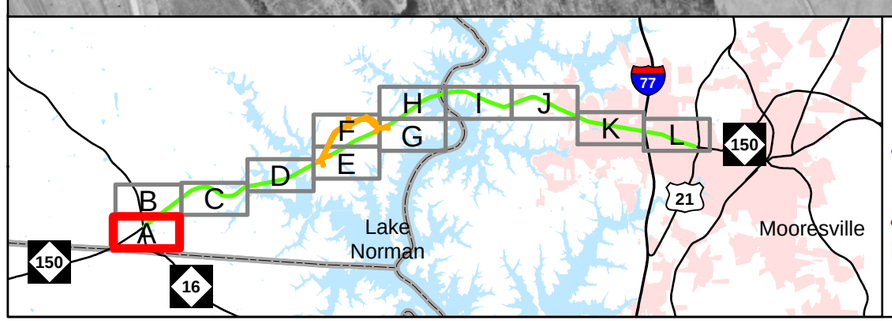
SAGITTARIUS DR

HICKS DR

KILLIAN ST

WRENN DR

Feet
0 250 500



Legend

- Proposed Widening
- Proposed Sidewalk
- Proposed Right of Way
- Proposed Roadway Culvert/Extension
- Proposed Roadway Bridge
- Proposed Construction Limits
- New Traffic Signal
- Upgraded Traffic Signal

Detailed Study Alternatives
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
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Division of Highways
Project Development &
Environmental Analysis Unit

Figure 3.2.3a

N

BYP 16

BUS 16

CAPOTE RD

WILLOW DR

WILLOW DR

BUCKS GARAGE RD

WOEBEGONE TRL

BLUE RIDGE RD

STATE RD 1888

STATE HWY 16

BOS DR

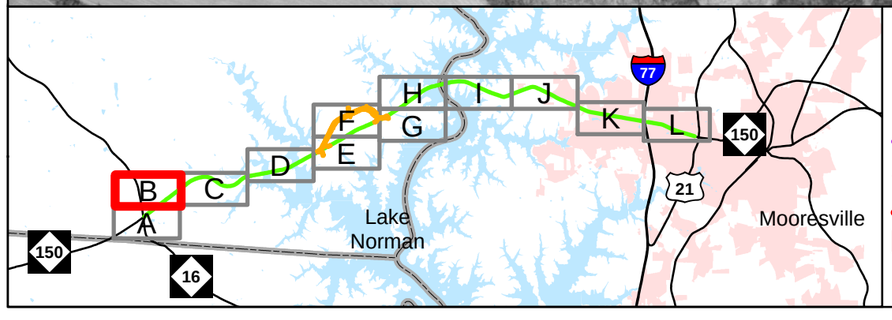
HAWKS NEST DR

ZEB LITTLE RD

MTN CREEK AVE

STONE DR

0 250 500 Feet



Legend

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Catawba & Iredell Counties

North Carolina Department
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Division of Highways
Project Development &
Environmental Analysis Unit

Figure 3.2.3b

N

CROSS COUNTRY CAMPGROUNDS

MOUNT PLEASANT RD

STATE RD 1849

BACH DR

STATE RD 1979

STATE RD 1977

NAVAJO TRL

JOHN DEERE DR

LAKE NORMAN

LAKE NORMAN MOTORCOACH RESORT

HILL ST

POWER DR

TUTTLEWOOD DR

STATE RD 1988

EMERALD ISLE DR

GRASSY CREEK RD

SPRUCE ST

STATE RD 1853

BEAVER BLVD

MCCORKLE LN

PARADISE COVE

COVE LN

PEBBLE BAY DR

QUAIL TRL

DOVE DR

TURKEY TRL

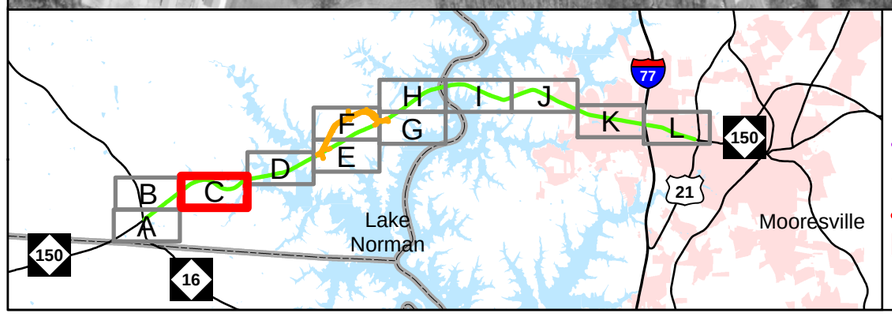
DEER LN

GROUSE RD

CATFISH CORNER

LAKE NORMAN

Feet
0 250 500



Legend

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NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

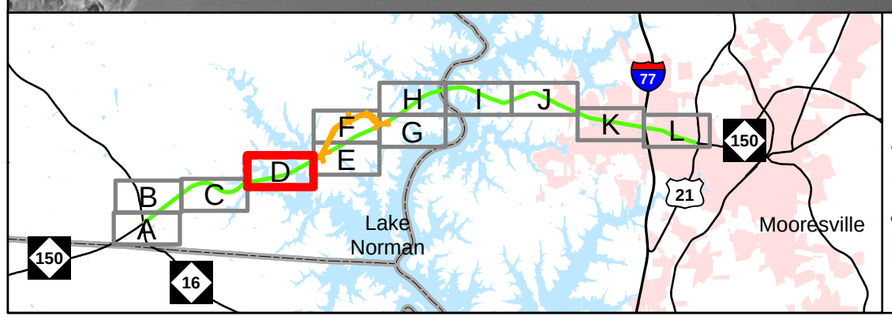
North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 3.2.3c

N

BUTLER DR
HIDDEN HARBOR LN
STATE RD 1918
WATEREDGE DR
STATE RD 1919
ROLLING HILLS DR
SHASTA LN
BARBRICK ST
GABRIEL ST
LITTLE MOUNTAIN RD
FALLEN PINE RD
NORMAN DR
STATE RD 1964
STATE RD 1815
SOARING CT
STATE RD 1965
HARRY LN
HARRYS LN
CRABAPPLE DR
STATE RD 2640
RHYNLAND DR
STATE RD 1985
TODD ST
HARBOR LN
POINTE NORMAN DR
VINEWOOD RD
LAKE NORMAN
STATE RD 1949
LAKE NORMAN MARINA
WORTH ST
HILL ST
SCALYBARK LN
STATE RD 1898
FIGHTING CREEK RD
DEER HOLLOW
STATE RD 1951
STONEWALL ST
BRANTLEY ST
LAKE NORMAN

Feet
0 250 500



Legend

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Detailed Study Alternatives
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 3.2.3d

ALTERNATIVE 2
(TERRELL NORTH)

ALTERNATIVE 1
(TERRELL)

TERRELL HISTORIC DISTRICT

SHERRILL'S FORD - TERRELL FIRE & RESCUE

TILLWATER RD

STATE RD 1985

CSXT

SLANTING BRIDGE RD

STATE RD 1844

MOCASSIN DR

SAL POINTE DR

LEOTA DR

DRENA RD

CYPRESS ST

STATE RD 1948

CANDLEWOOD DR

STATE RD 1917

HOB LN

STATE RD 1906

CASCADE ST

STATE RD 1848

STONE LN

MAYFLOWER CT

FLAT ROCK RD

SLATE ST

STATE RD 1843

MCGEE POINT RD

EDITHS LN

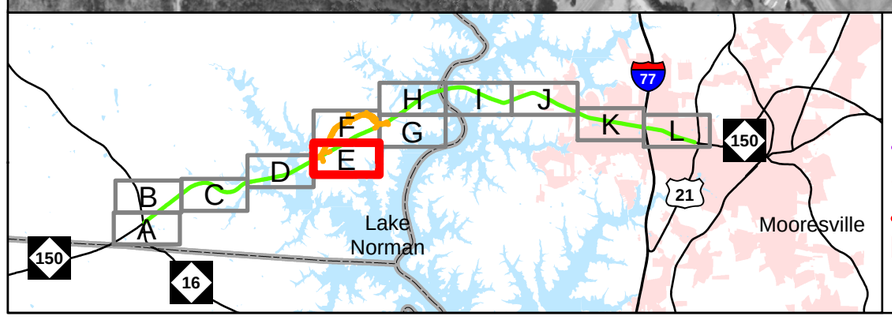
SHERRILLS FORD RD

GRANITE ST

JABS DR

BABE DR

Feet
0 250 500



Legend

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NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 3.2.3e

N

MARSHALL STEAM STATION

MCDONALD DR

STATE RD 1896

STATE RD 1844

STATE RD 1848

TIMBER DR

REID CIR

LITTLE RD

STILLWATER DR

STILL KNOLL LN

MARSHALL RD

STATE RD 1985

CHEVLOT HILL RD

SHERRILLS FORD RD

SALLIE GABRIEL LN

SLANTING BRIDGE RD

ALTERNATIVE 2
(TERRELL NORTH)

ALTERNATIVE 1
(TERRELL)

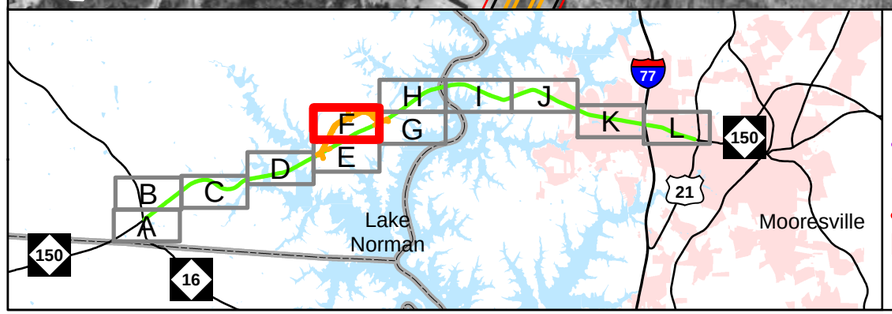
TERRELL HISTORIC DISTRICT

LITTLE RD STILLWATER RD

STILLWATER RD

GRANITE ST

Feet
0 250 500



Legend

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Detailed Study Alternatives
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
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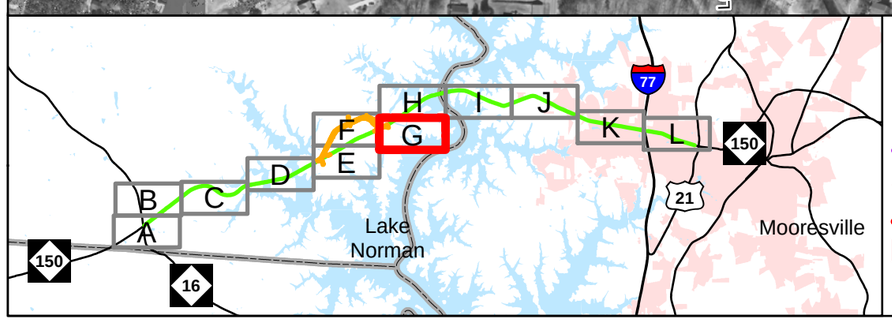
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 3.2.3f

N

MELICA DR
GREENWOOD RD
ELINA LN
FAMILY CIR
STATE RD 1840
ANDOVER PL
LIVE OAKS AVE
STATE RD 1961
LEGRAND DR
STATE RD 1958
STATE RD 1961
HOLDSCLAW RD
DOYLE CIR
GORDON ST
KINGFISHER LN
STATE RD 1962
FORDS ST
KISER ISLAND RD
HARDIN CT
RIVERWOOD RD
MILL RUN RD
CEDAR WOOD TRL
LONGVIEW COVE
STATE RD 1841
SHERRILLS CREEK DR
MILL RUN RD
LAKE NORMAN

Feet
0 250 500



Legend

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Detailed Study Alternatives
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 3.2.3g

N

R-2307 SECTION A

R-2307 SECTION B

LAKE NORMAN

HARVELL RD

MIDWAY MARINA

GREENWOOD RD

STUTTS ST

STATE RD 1944

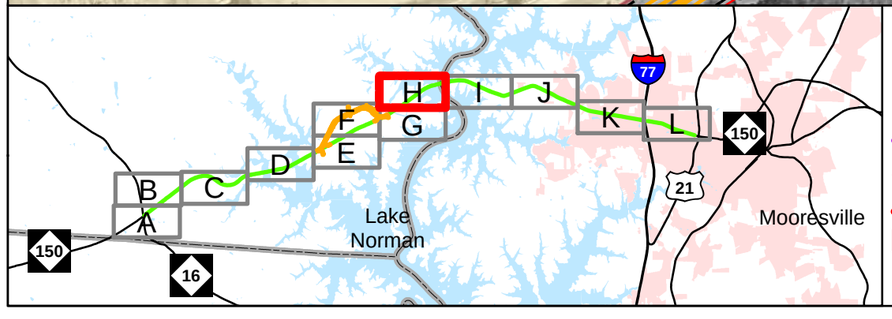
STATE RD 1840

CLEMENT CIR

FAMILY CIR

MARSHALL STEAM STATION

Feet
0 250 500



Legend

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NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 3.2.3h

N

PINNACLE BOAT ACCESS

PINNACLE LN

OLD TIMBER LN

SIENNA LN

BIG DUKES LN

HIGH HILLS LN

MARINER POINTE LN

RIVER HWY

McCRARY BOAT ACCESS

QUEEN'S LANDING

LONG COVE LN

INDIGO LN

CLOVER HILL RD

HOLLYCOCK LN

HOLLYHOCK LN

SAWYER LN

HERMANCE LN

ROSS RD

WADDELL RD

GREENBAY RD

SUMMERSONG LN

PARADISE PENINSULA DR

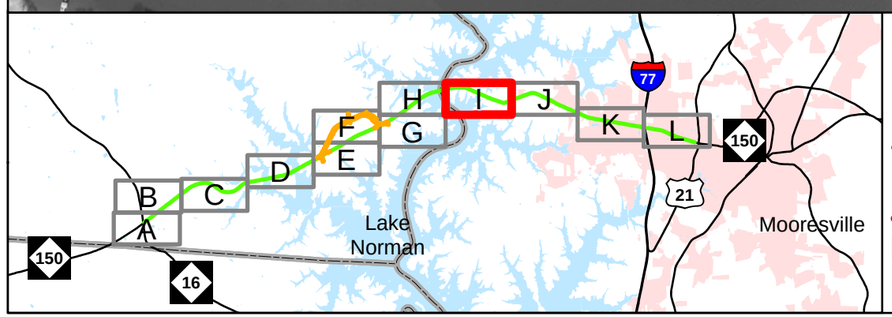
MILLEDGE DR

QUIET COVE RD

RIDGETOP RD

LAKE NORMAN

Feet
0 250 500



Legend

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Detailed Study Alternatives
NC 150 Widening
TIP R-2307 and I-5717
Catawba & Iredell Counties

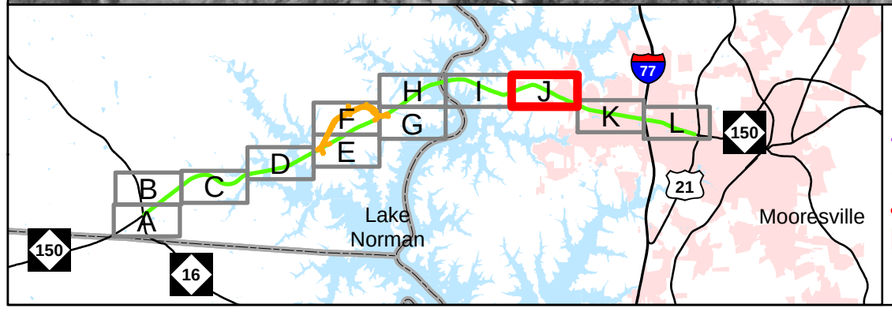
North Carolina Department of Transportation
Division of Highways
Project Development & Environmental Analysis Unit

Figure 3.2.3i

N

RUSTIC WAY LN
BARKLAND LN
CRUSOE DR
ROBINSON RD
PERTH RD
RIVER PARK RD
NILE CIR
BARINGTON DR
RIVER HWY
VILLAGE AT BYERS CREEK
GRESHAM LN
MURPHEY PL
KENSINGTON ST
HEMBREE PL
WATER OAK DR
RAGINE PL
WATER OAK
BERGEN WAY
E MOREHOUSE AV
BOATERS DR
MCCRARY RD
TIGRIS CT
MAGNOLIA PARK DR
BYERS VILLAGE DR
DOOLIE RD
KENDRA DR
LAKE NORMAN HIGH SCHOOL

Feet
0 250 500



Legend

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Detailed Study Alternatives
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
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Division of Highways
Project Development &
Environmental Analysis Unit

Figure 3.2.3j

N

JOHNSON-NEEL HOUSE

GOOD LUCK LN

ERVIN RD

MYRTLEWOOD LN

LEISUREWOOD DR

WINSLOW BAY COMMONS

GLENCOE LN

CARRIAGE CLUB DR

BLUEFIELD RD

MIDNIGHT LN

GALLERY CENTER DR

PORT VILLAGE

MOORESVILLE CROSSING

RIVER HWY

REGENCY CENTER DR

JOANN CT

LAKESIDE BUSINESS PARK

ROLLING HILLS RD

OLD STAGE LN

MEADOW HILL CT

RIDGE HILL DR

MONTIBELLO DR

MIDDLETON PL

MORRISON PLANTATION PKWY

CLOISTER LN

N AUDUBON AV

N WENDOVER TRACE AV

RUNNINGDEER DR

AUTRY AV

S AUDUBON AV

JOE KNOX AV

PLANTATION RIDGE DR

WELTON WAY

LEANING OAK DR

SAVANNAH DR

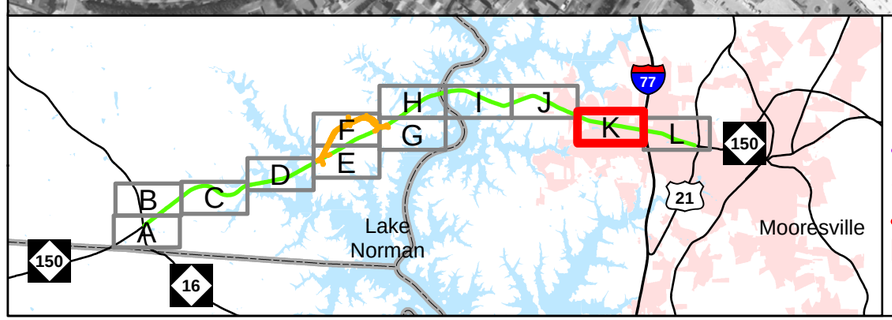
WILLIAMSON RD

CROSSLAKE PARK DR

KNOB HILL RD

LOMA H

Feet
0 250 500



Legend

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NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 3.2.3k

N

OATES RD W

LYNCH CIR

DELARGY CIR

FORESTER ST

MOORESVILLE FESTIVAL

BROOKHAVEN

DAYS INN DR

77

NORMAN STATION BLVD

PORTSTOWN WAY

RAINTREE LN

RUSTWOOD DR

ACORN LN

LITEWOOD LN

ROSEWOOD LN

TALBERT WOODS

TALBERT WOODS DR

21

CHARLOTTE HWY

NEELAM DR

BANDIT LN

CONSUMER SQUARE DR

COBBLESTONE LN

MCADAM LN

TALBERT RD

W PLAZA DR

MACLEOD DR

END ALTS 1,2

MOORESVILLE COMMONS

E PLAZA DR

150

ONTARIO RD

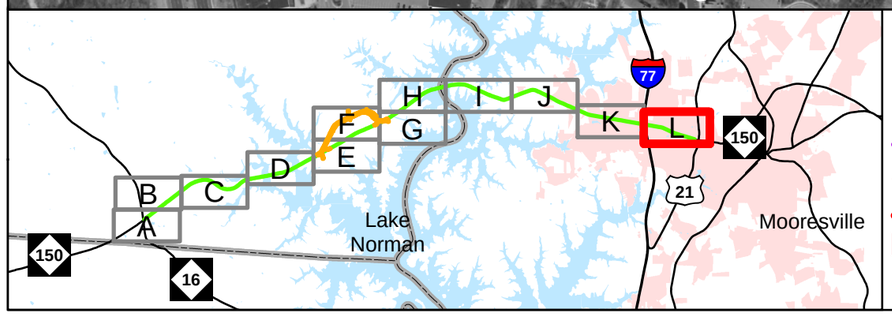
TERRACE RD

GREAT LAKES RD

FLAGSTONE LN

Feet

0 250 500



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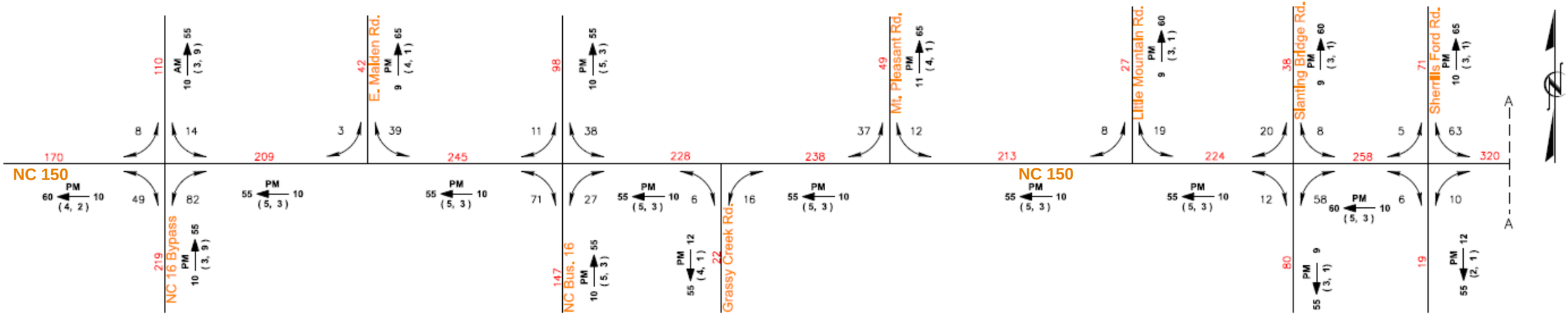
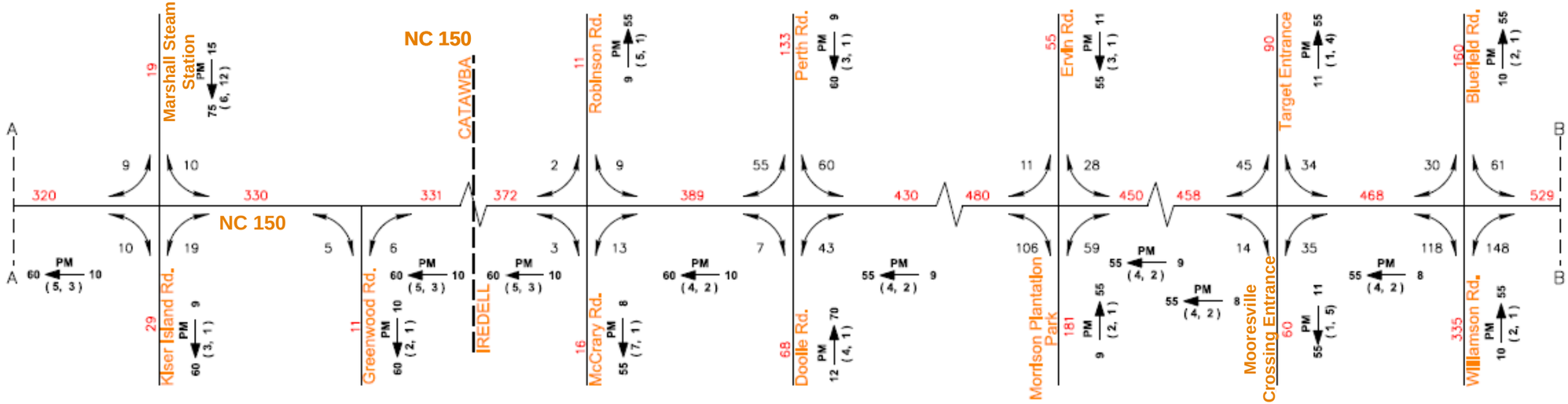
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department of Transportation
Division of Highways
Project Development & Environmental Analysis Unit

Figure 3.2.3I





DATE: MAY 2015

Legend

###	No. Vehicles per Day (VPD) in 100s
1-	Less than 50 VPD
x	Movement Prohibited
-----	Proposed Roadway

K PM (d , t) → D

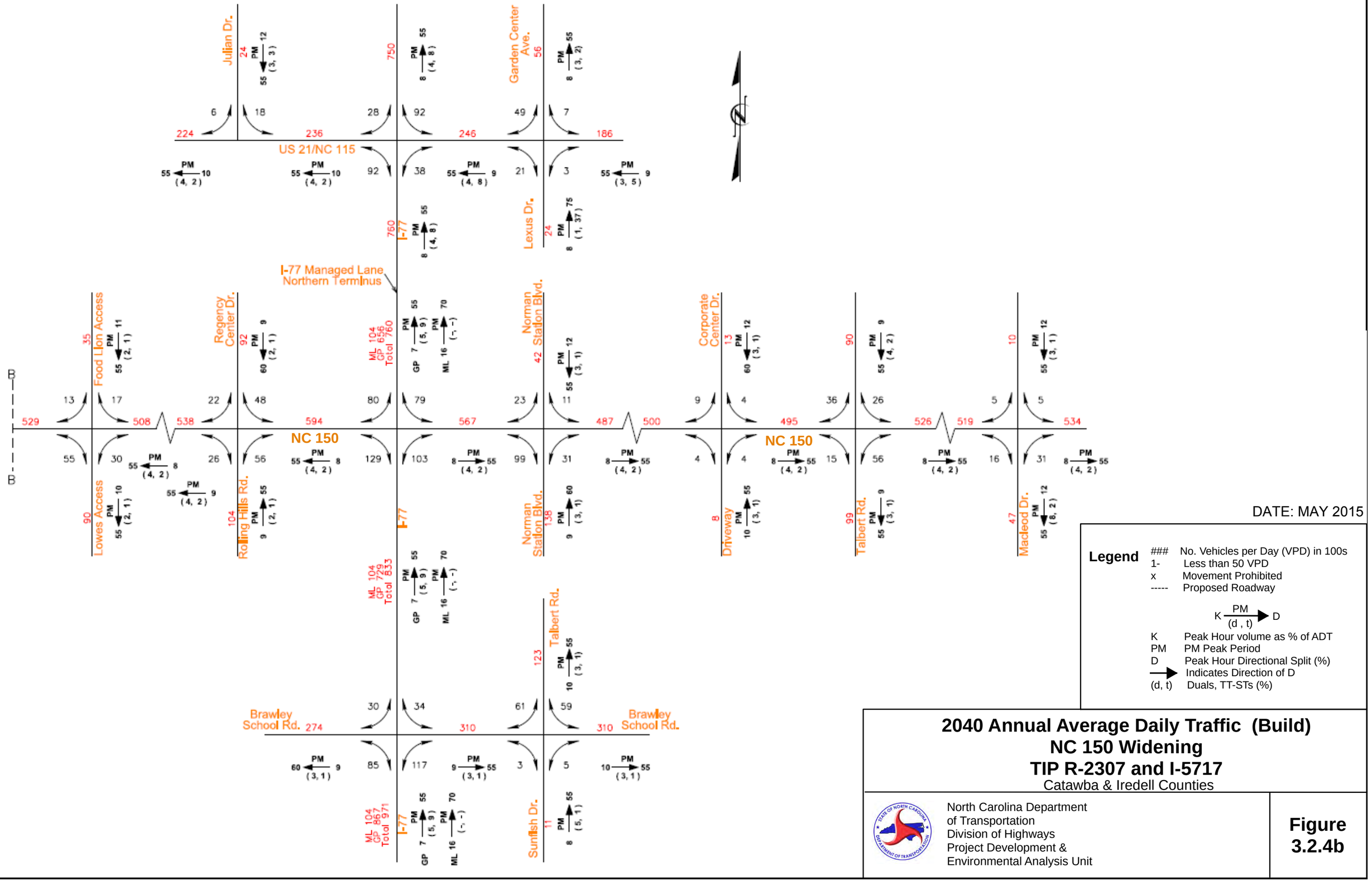
K	Peak Hour volume as % of ADT
PM	PM Peak Period
D	Peak Hour Directional Split (%)
→	Indicates Direction of D
(d, t)	Duals, TT-STs (%)

2040 Annual Average Daily Traffic (Build)
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department of Transportation
Division of Highways
Project Development & Environmental Analysis Unit

Figure 3.2.4a



DATE: MAY 2015

Legend

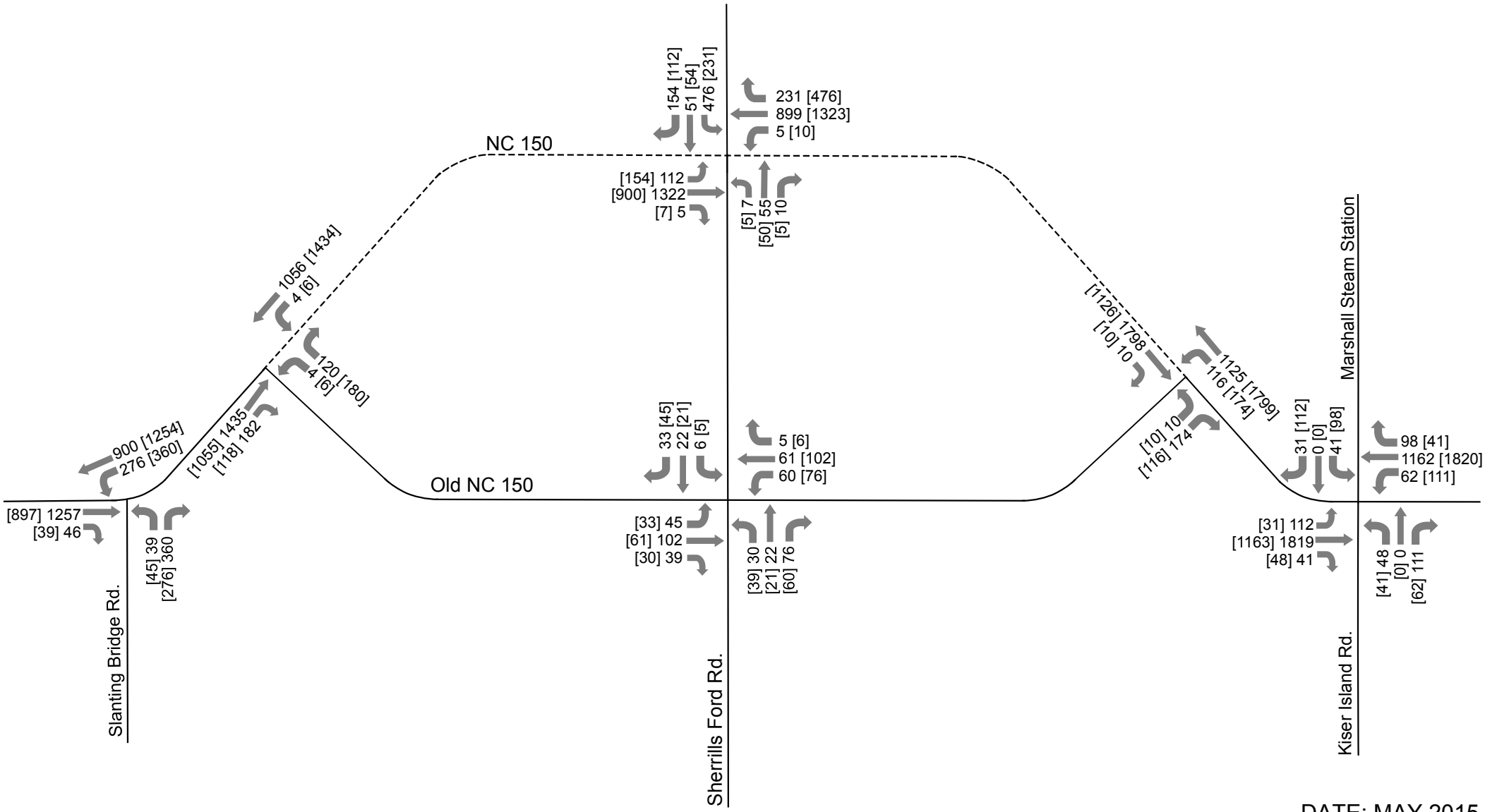
###	No. Vehicles per Day (VPD) in 100s
1-	Less than 50 VPD
x	Movement Prohibited
-----	Proposed Roadway
K PM (d , t) D	
K	Peak Hour volume as % of ADT
PM	PM Peak Period
D	Peak Hour Directional Split (%)
→	Indicates Direction of D
(d, t)	Duals, TT-STs (%)

2040 Annual Average Daily Traffic (Build)
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department of Transportation
Division of Highways
Project Development & Environmental Analysis Unit

Figure 3.2.4b



DATE: MAY 2015

Peak Hour Volumes

XX [XX] AM [PM] Peak Hour Traffic Volumes

Directional Movement

N

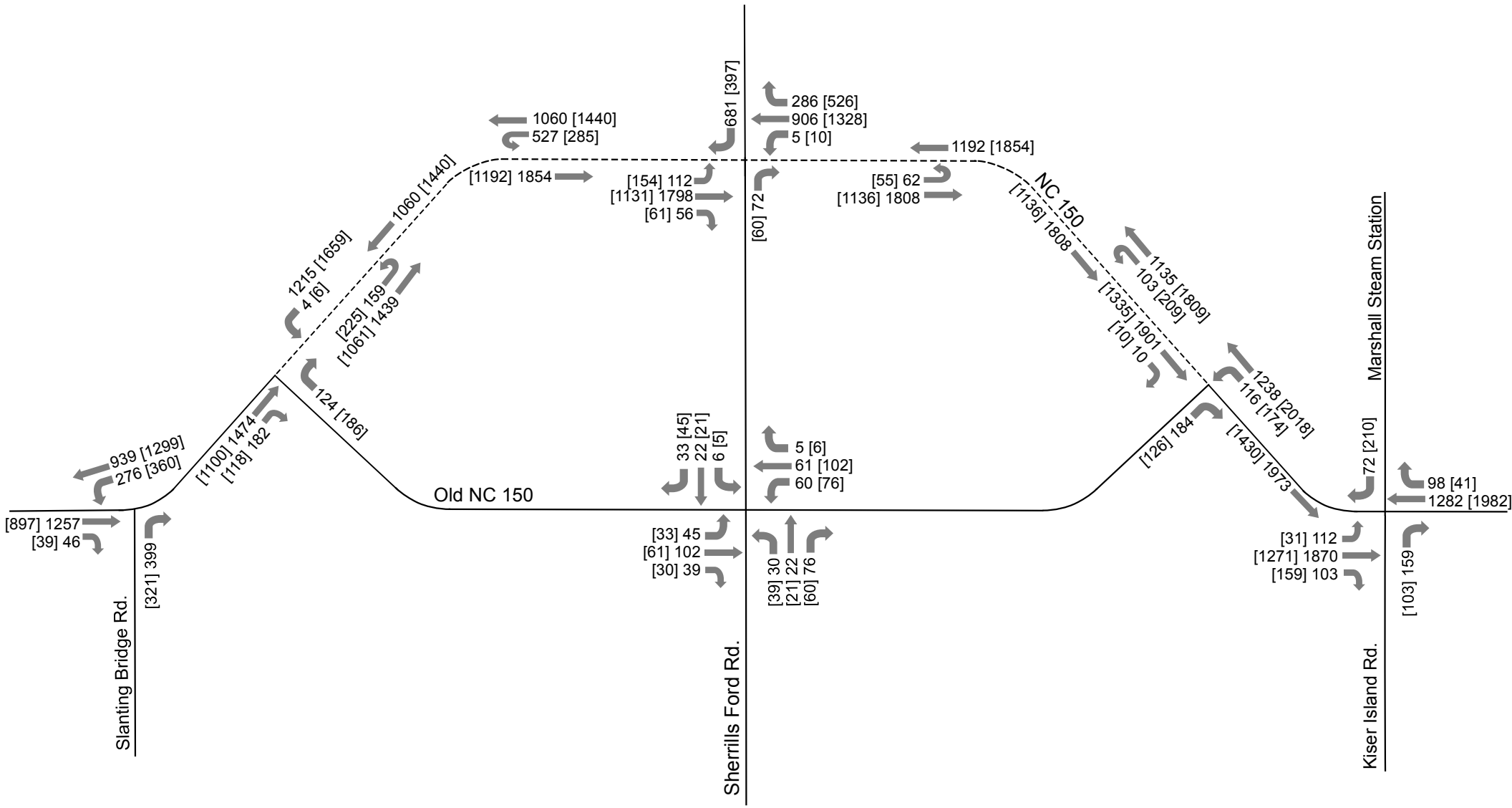
TIP No. R-2307 / I-5717

NC 150 from Slanting Bridge Road to
Kiser Island Road/Marshall Steam Station
Catawba Co. & Iredell Co., North Carolina

Stantec

Figure 3.2.4c

2040 BUILD CONVENTIONAL ALT 2 TRAFFIC VOLUMES



Peak Hour Volumes

XX [XX] AM [PM] Peak Hour Traffic Volumes

Directional Movement

N

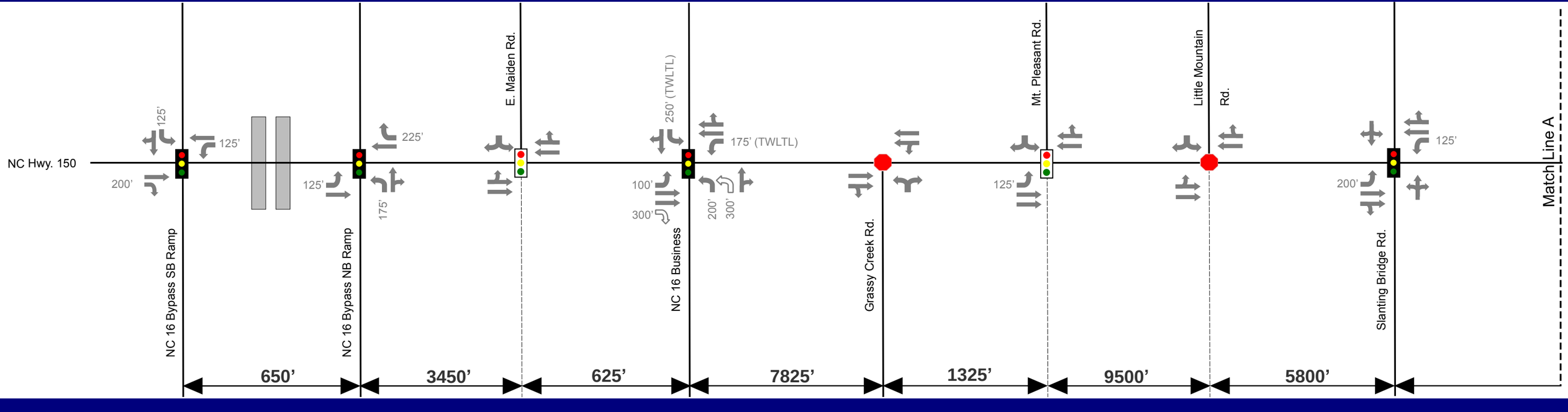
TIP No. R-2307 / I-5717

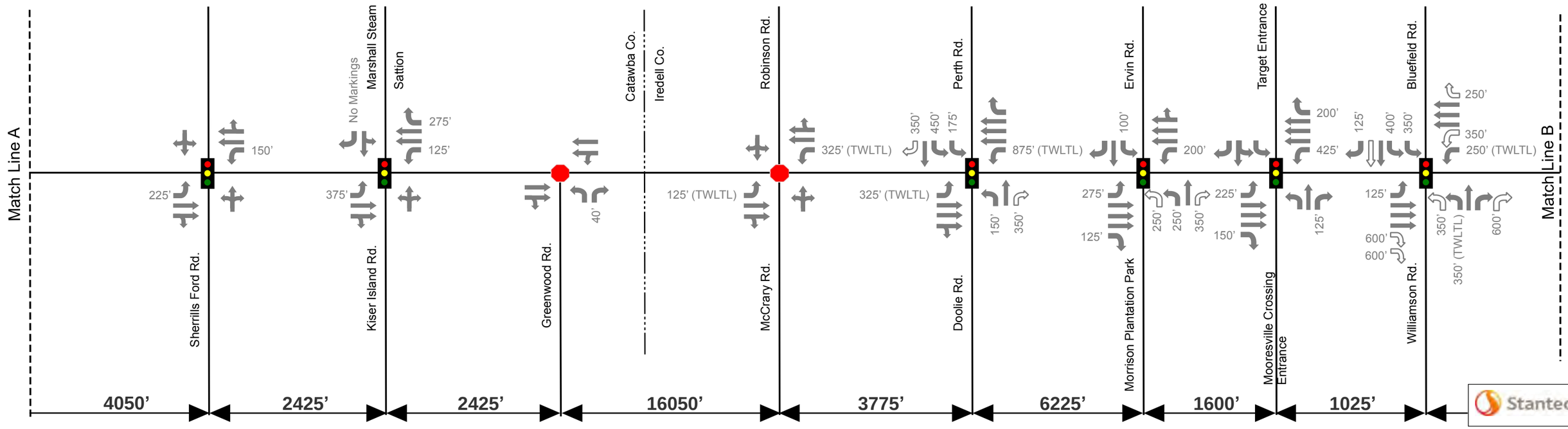
NC 150 from Slanting Bridge Road to
Kiser Island Road/Marshall Steam Station
Catawba Co. & Iredell Co., North Carolina

Stantec

Figure 3.2.4d

2040 BUILD SUPERSTREET ALT 2 TRAFFIC VOLUMES





Lane Configuration and Traffic Control

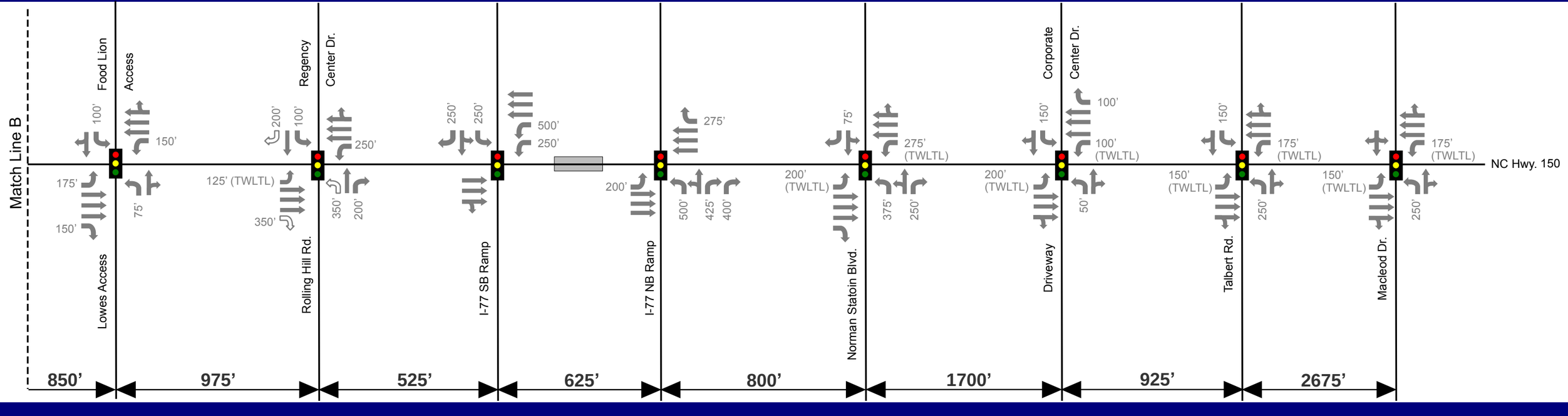
Unsignalized Intersection | Existing Travel Lane | Existing Traffic Signal

XX' Storage Length | Proposed Travel Lane | New Traffic Signal

N

TIP No. R-2307 / I-5717
NC 150 from NC 16 Bypass to Macleod Dr.
Catawba Co. & Iredell Co., North Carolina

Figure 3.2.5a
Sheet 1 of 3
BUILD CONVENTIONAL LANE GEOMETRY



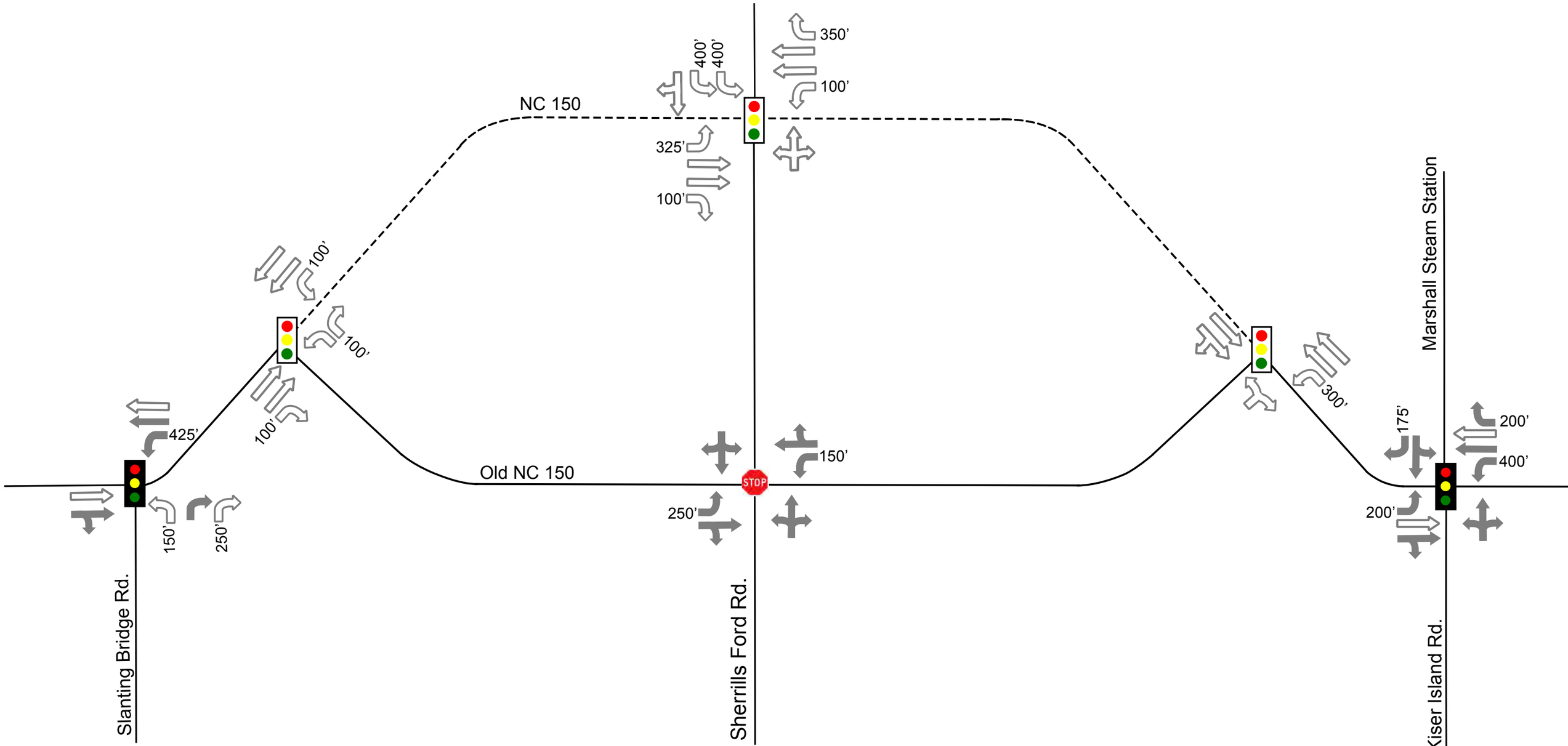
Lane Configuration and Traffic Control

Unsignalized Intersection
XX' Storage Length
Existing Travel Lane
Proposed Travel Lane
Existing Traffic Signal
New Traffic Signal

N

TIP No. R-2307 / I-5717
NC 150 from NC 16 Bypass to Macleod Dr.
Catawba Co. & Iredell Co., North Carolina

Figure 3.2.5b
Sheet 2 of 3
BUILD CONVENTIONAL LANE GEOMETRY



Stantec

Lane Configuration and Traffic Control

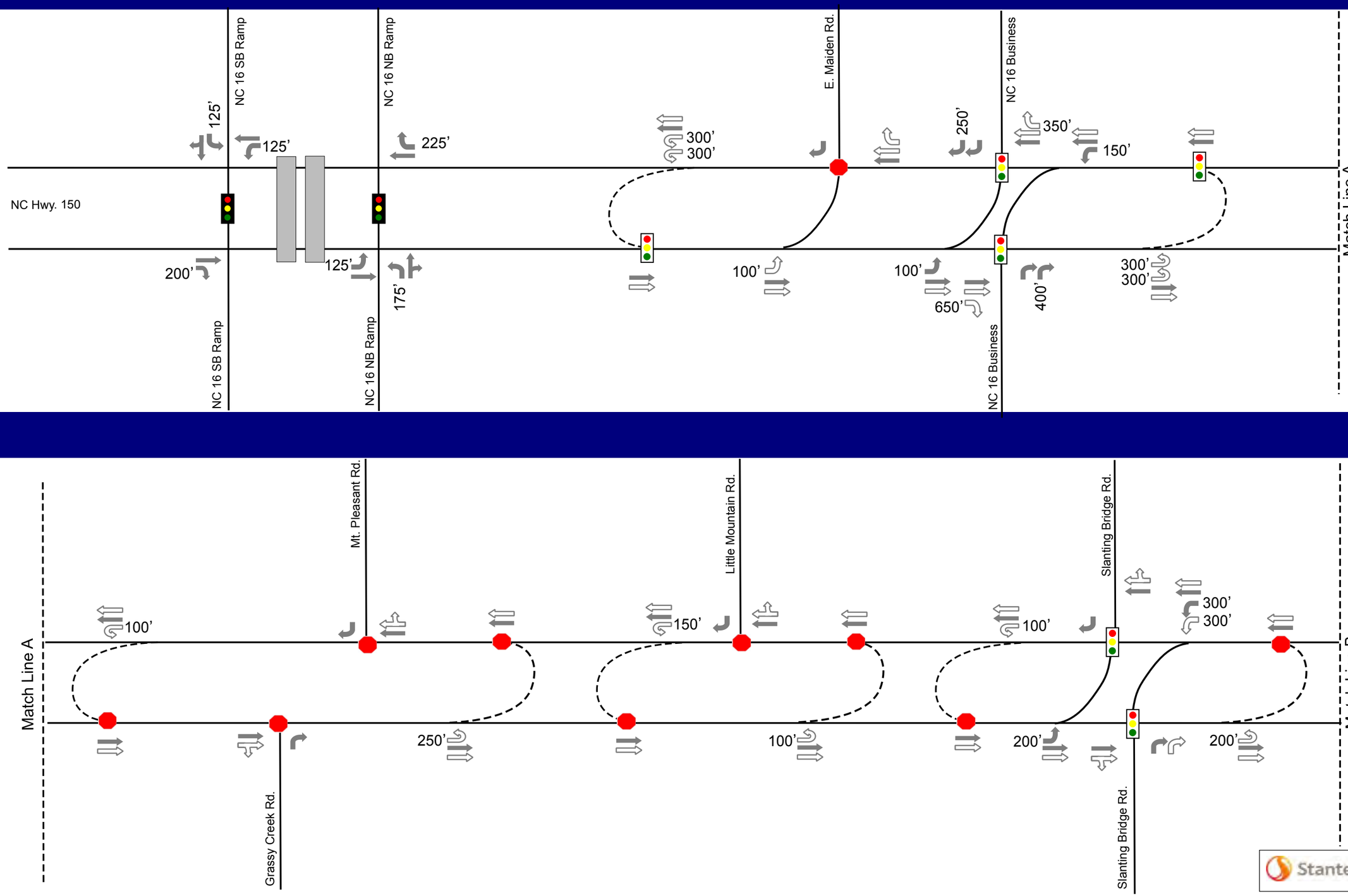
- Unsignalized Intersection
- XX' Storage Length
- Existing Roadway
- Existing Travel Lane
- Proposed Travel Lane
- New Roadway
- Existing Traffic Signal
- New Traffic Signal

N

TIP No. R-2307 / I-5717
NC 150 from Slanting Bridge Road to
Kiser Island Road/Marshall Steam Station
Catawba Co. & Iredell Co., North Carolina

Figure 3.2.5c
Sheet 3 of 3
2040 BUILD CONVENTIONAL ALT 2 LANE GEOMETRY

2040 Proposed Lane Geometry - Superstreet (Alternative 1)



Stantec

Lane Configuration and Traffic Control

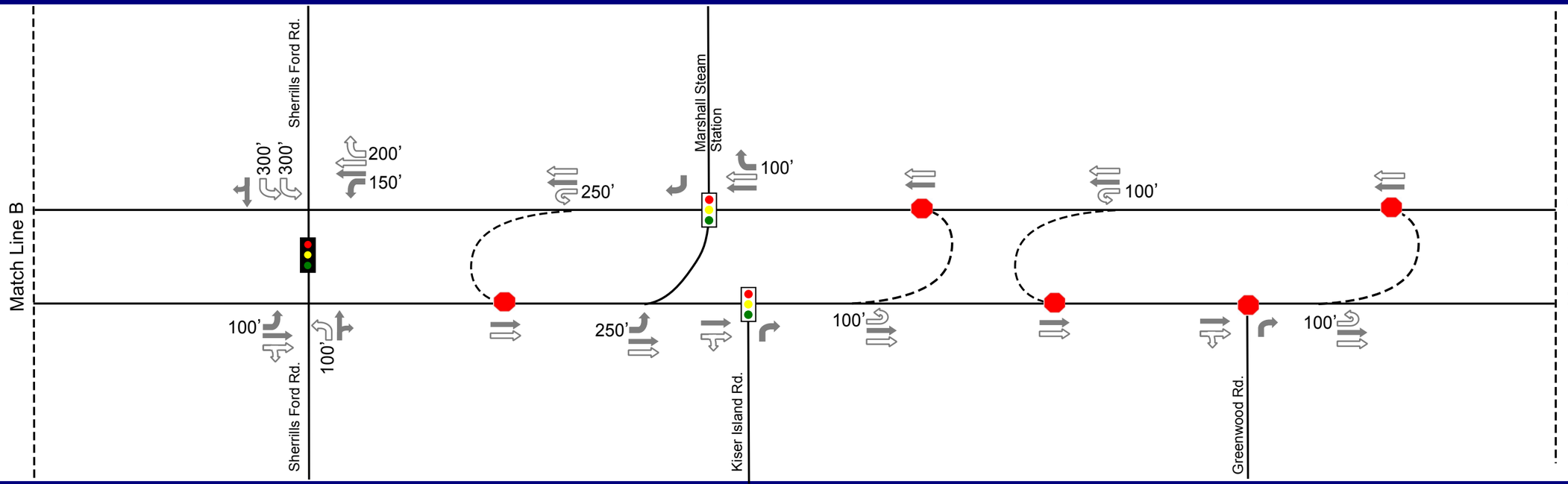
- Unsignalized Intersection
- XX’ Storage Length
- Existing Roadway
- Existing Travel Lane
- Proposed Travel Lane
- New Roadway
- Existing Traffic Signal
- New Traffic Signal

N

TIP No. R-2307 / I-5717
NC 150 from NC 16 Bypass to Macleod Drive
Catawba Co. & Iredell Co., North Carolina

Figure 3.2.6a
Sheet 1 of 5
2040 BUILD SUPERSTREET LANE GEOMETRY

2040 Proposed (Alternative 1) Lane Geometry - Superstreet (cont'd)



Lane Configuration and Traffic Control

- Unsignalized Intersection
- XX' Storage Length
- Existing Roadway
- Existing Travel Lane
- Proposed Travel Lane
- New Roadway
- Existing Traffic Signal
- New Traffic Signal

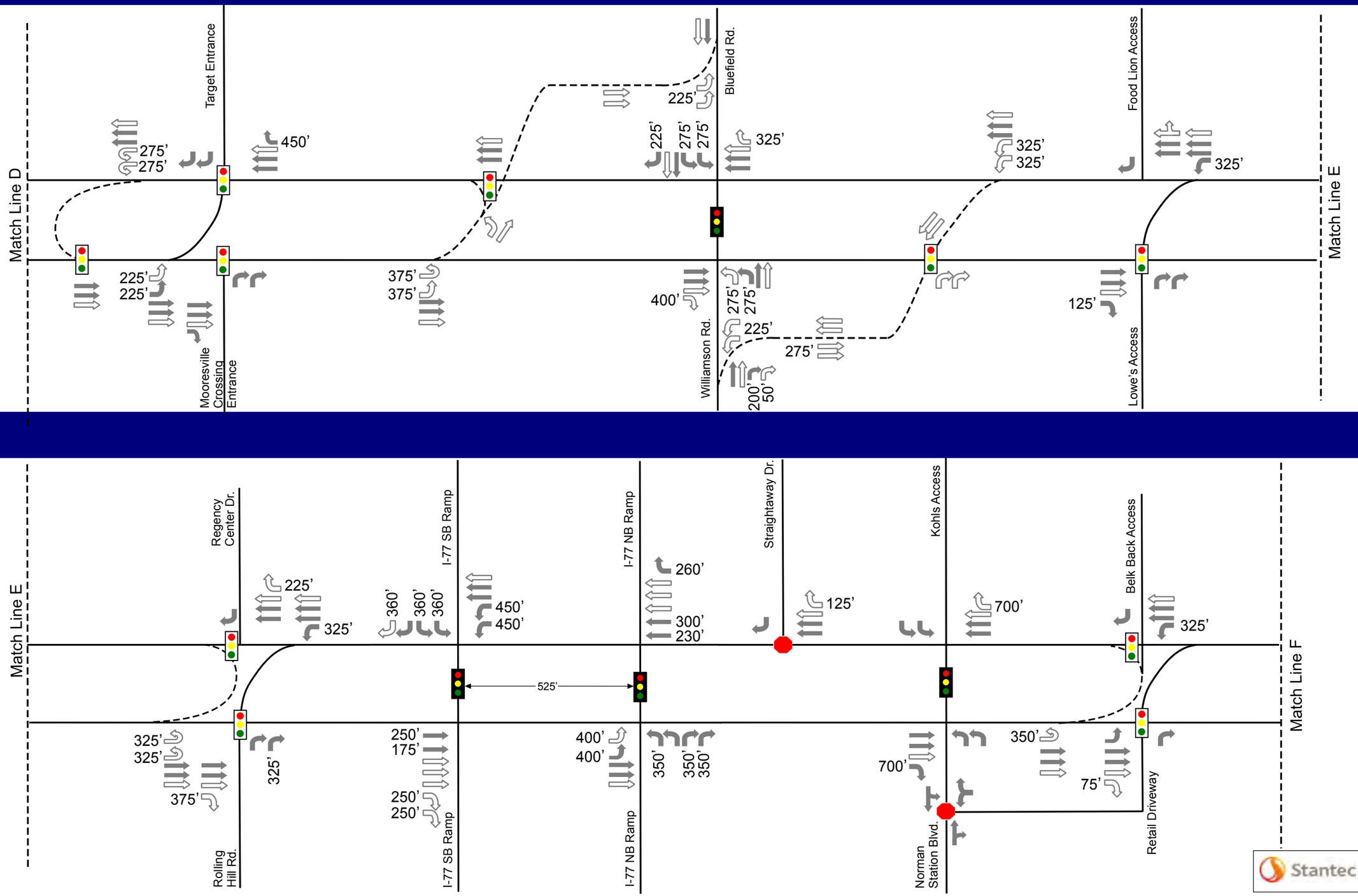
N

TIP No. R-2307 / I-5717
NC 150 from NC 16 Bypass to Macleod Drive
Catawba Co. & Iredell Co., North Carolina

FIGURE 3.2.6b
Sheet 2 of 5
2040 BUILD SUPERSTREET LANE GEOMETRY

Stantec

2040 Proposed Lane Geometry - Superstreet (cont'd)



Lane Configuration and Traffic Control

- Unsignalized Intersection
- XX' Storage Length
- Existing Roadway
- Existing Travel Lane
- Proposed Travel Lane
- New Roadway
- Existing Traffic Signal
- New Traffic Signal

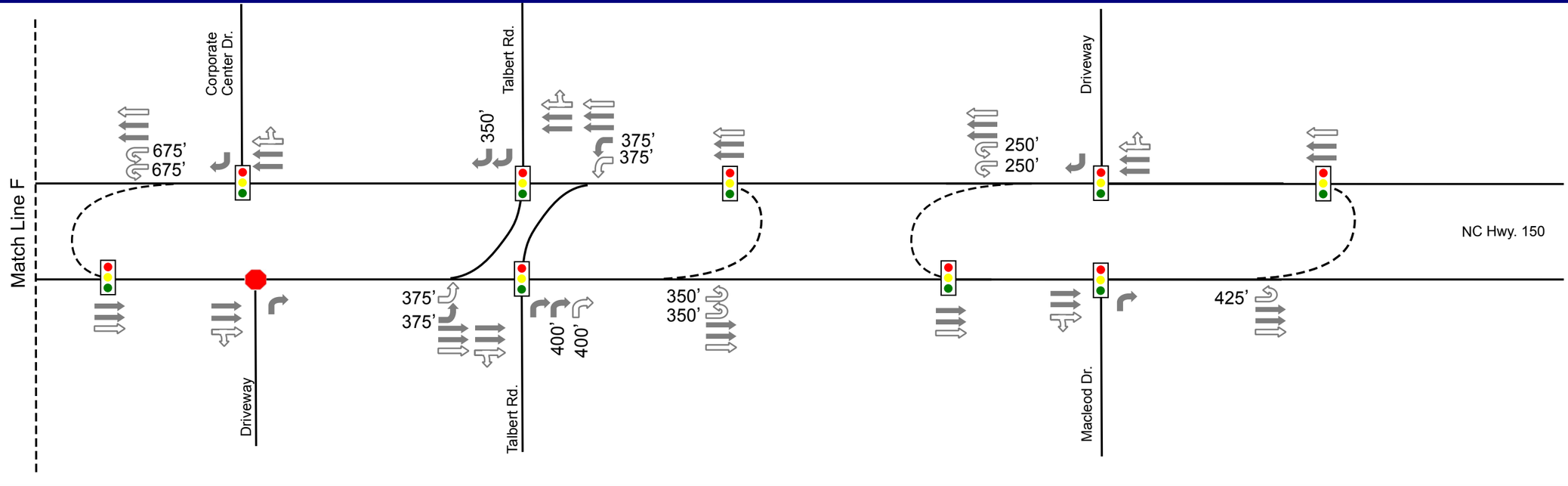
N

TIP No. R-2307 / I-5717
NC 150 from NC 16 Bypass to Macleod Drive
Catawba Co. & Iredell Co., North Carolina

Figure 3.2.6c
Sheet 3 of 5
2040 BUILD SUPERSTREET LANE GEOMETRY

Stantec

2040 Proposed Lane Geometry - Superstreet (cont'd)



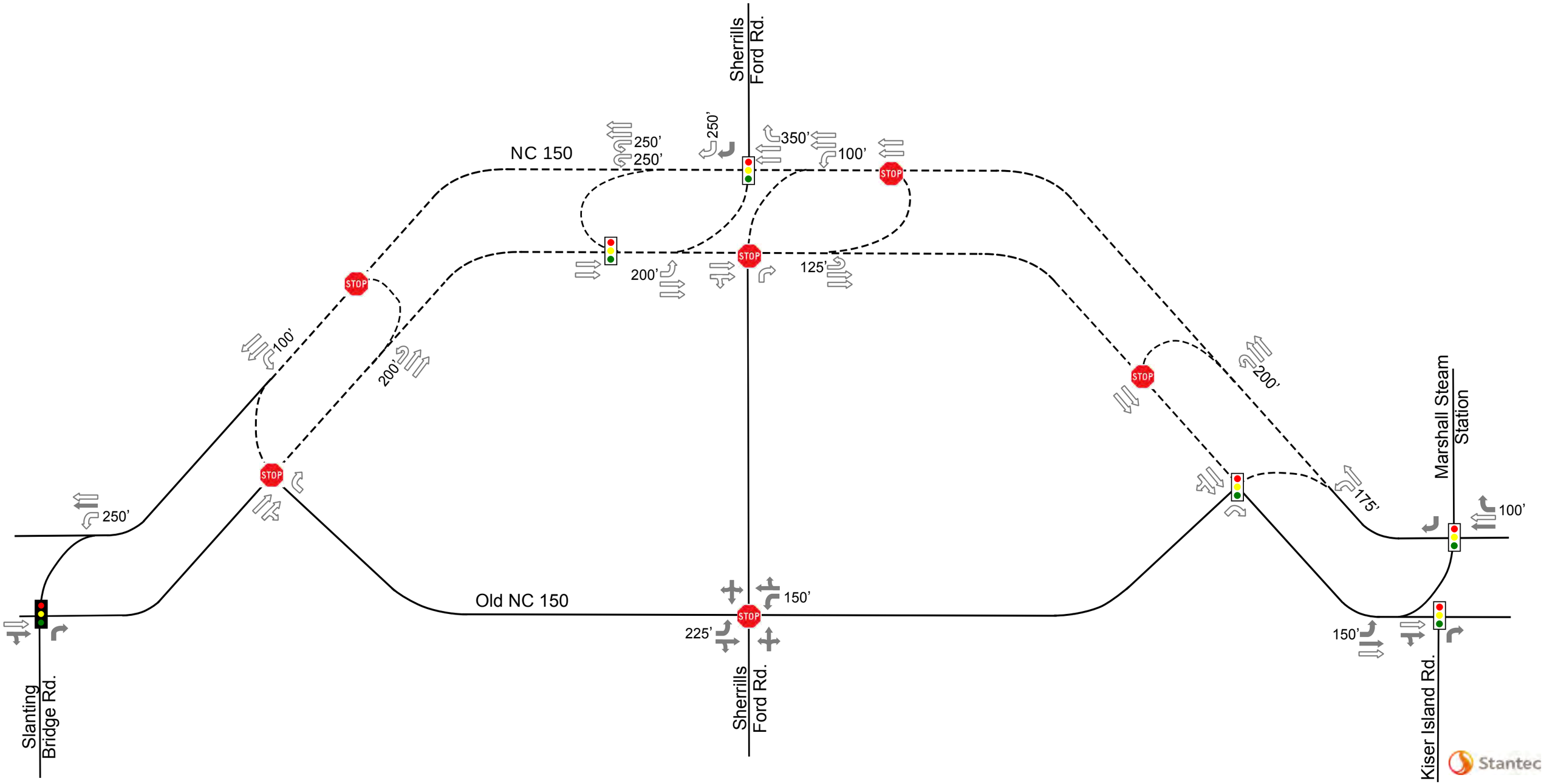
Lane Configuration and Traffic Control

- Unsignalized Intersection
- XX' Storage Length
- Existing Roadway
- Existing Travel Lane
- Proposed Travel Lane
- New Roadway
- Existing Traffic Signal
- New Traffic Signal

N

TIP No. R-2307 / I-5717
NC 150 from NC 16 Bypass to Macleod Drive
Catawba Co. & Iredell Co., North Carolina

Figure 3.2.6d
Sheet 4 of 5
2040 BUILD SUPERSTREET LANE GEOMETRY



Lane Configuration and Traffic Control

- Unsignalized Intersection
- XX' Storage Length
- Existing Roadway
- Existing Travel Lane
- Proposed Travel Lane
- New Roadway
- Existing Traffic Signal
- New Traffic Signal

N

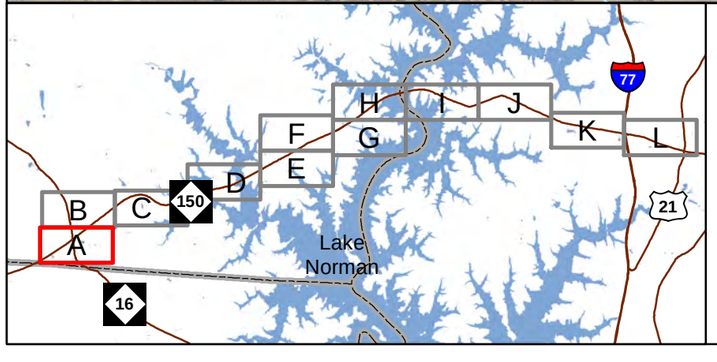
TIP No. R-2307 / I-5717
NC 150 from Slanting Bridge Road to
Kiser Island Road/Marshall Steam Station
Catawba Co. & Iredell Co., North Carolina

Figure 3.2.6e
Sheet 5 of 5
2040 BUILD SUPERSTREET ALT 2 LANE GEOMETRY

N

COMMONS DR
BUD RD
STATE HWY 150
E MAIDEN RD
STATE RD 1855
HEARTLAND DR
STATE HWY 16
JUPITER CT
SAGITTARIUS CIR
NEPTUNE DR
HICKS DR
TAURUS DR
SAGITTARIUS DR
WRENN DR
E NC 150 HWY

0 250 500 1,000 Feet



- Forest - Beech
- Forest - Managed Pine
- Forest - Oak Hickory
- Maintained/Disturbed
- Open Water
- Wetland - BHF*
- Wetland - Headwater Forest
- Wetland - NTFM**
- Intermittent Streams
- Perennial Streams
- Hydrography (outside study area)
- Study Area
- County Boundary
- Map Sheet Limits

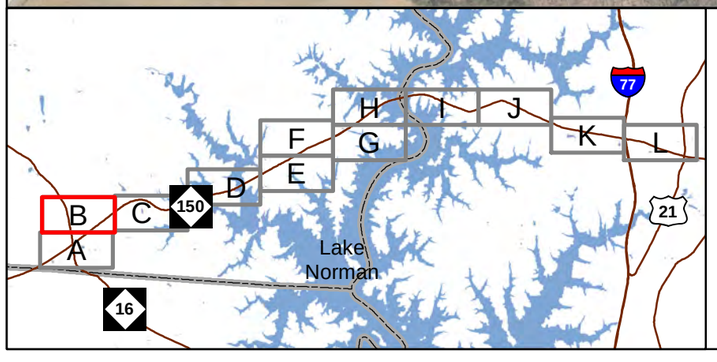
* Bottomland Hardwood Forest
**Non-tidal Freshwater Marsh

Terrestrial Communities
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 4.1.1a



- Forest - Beech
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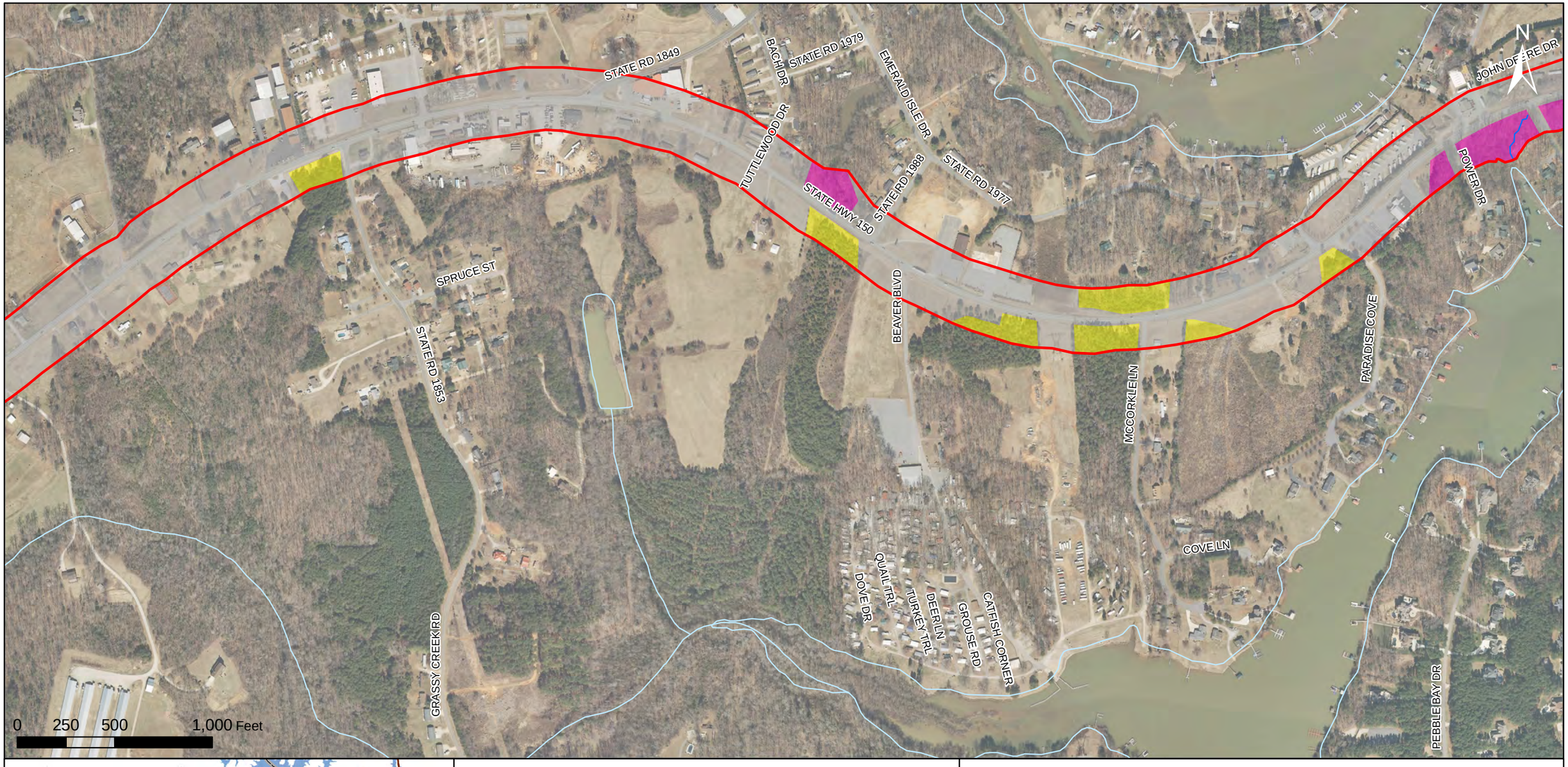
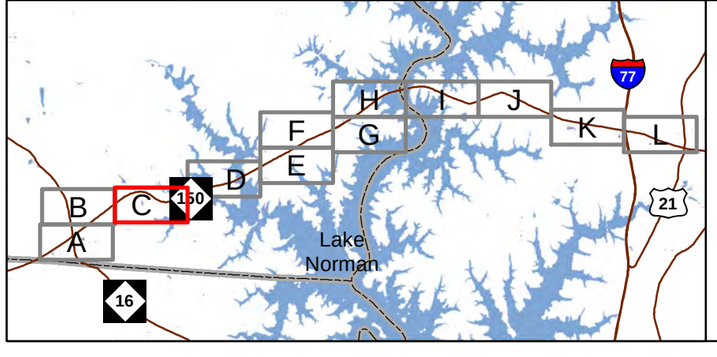
Terrestrial Communities
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 4.1.1b





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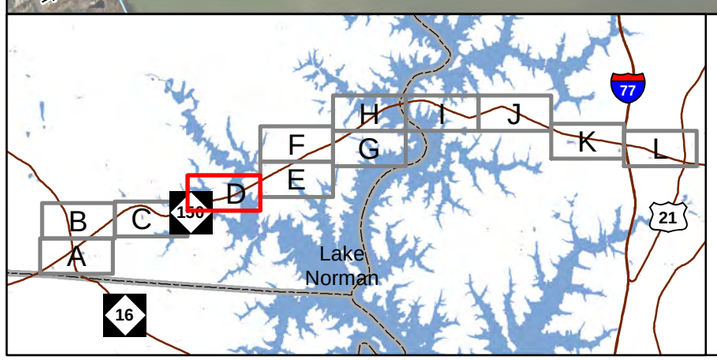
Terrestrial Communities
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 4.1.1c



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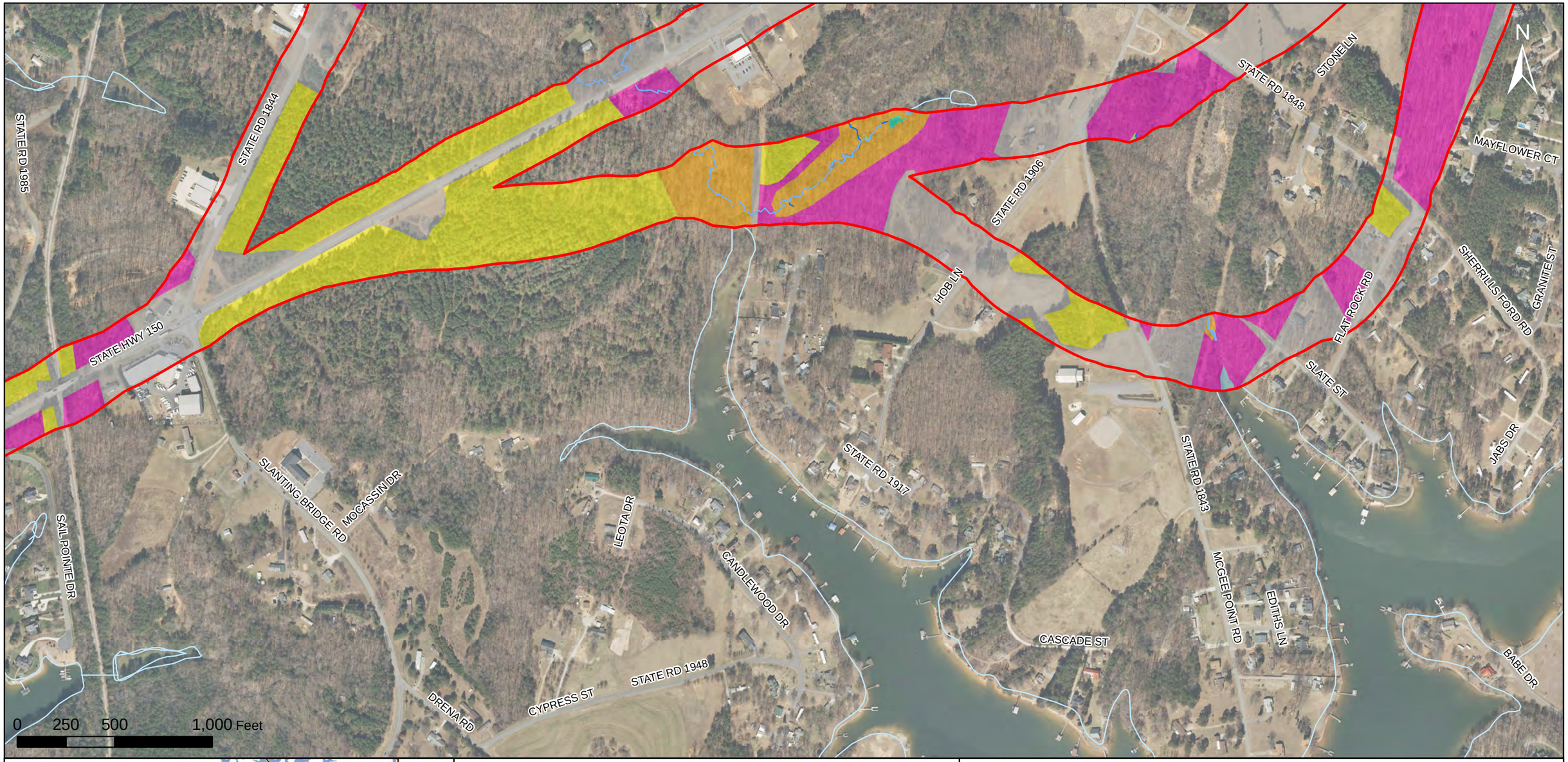
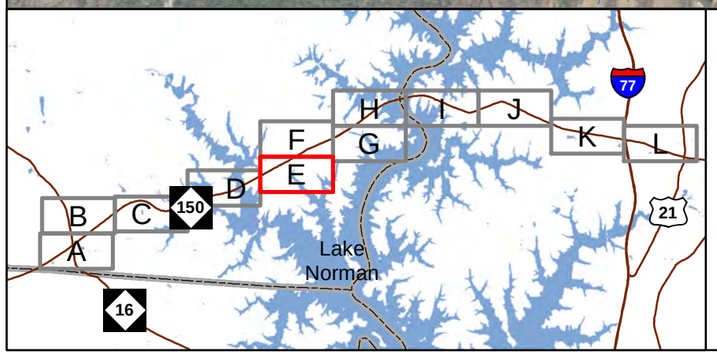
Terrestrial Communities
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 4.1.1d





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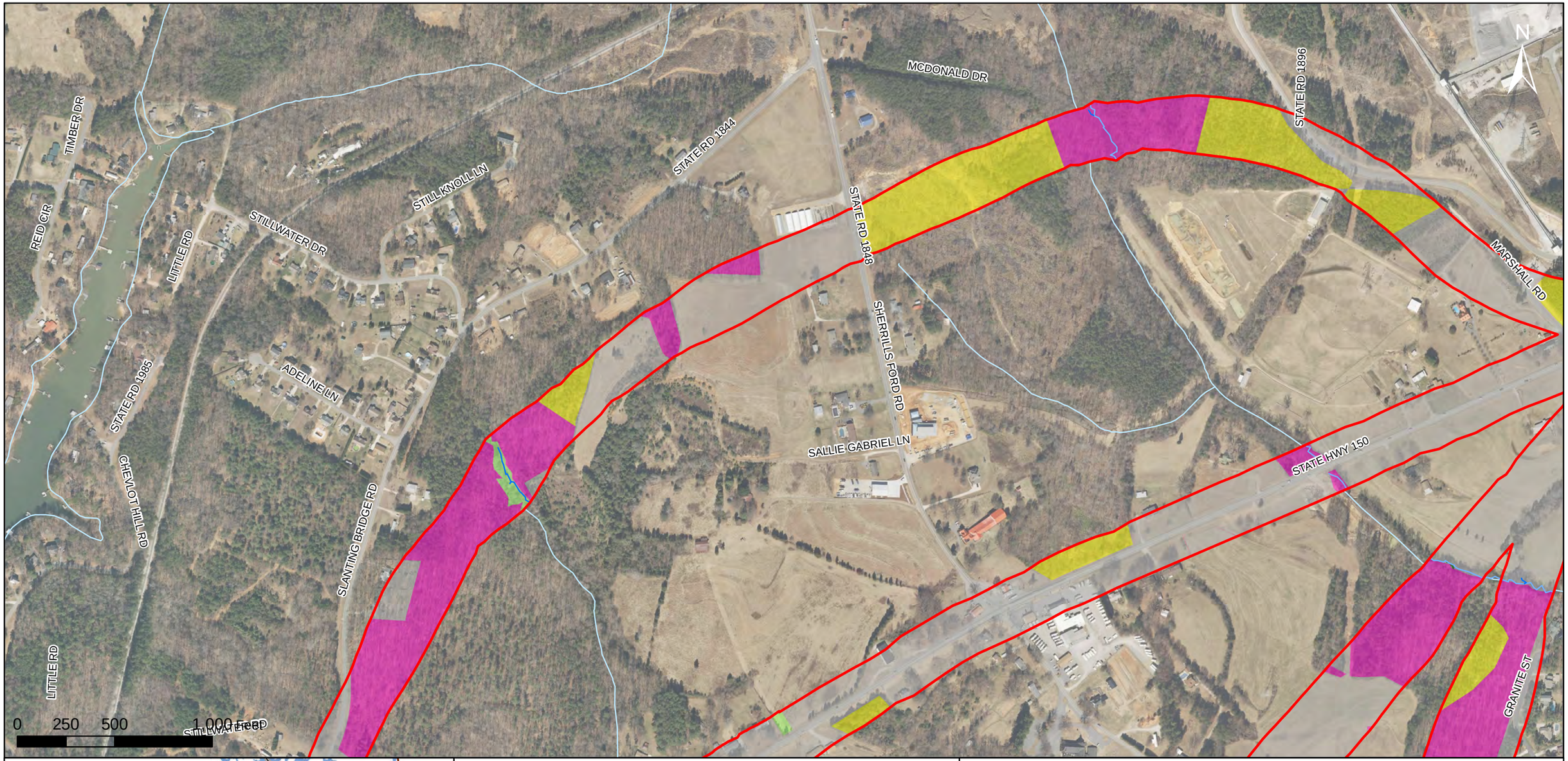
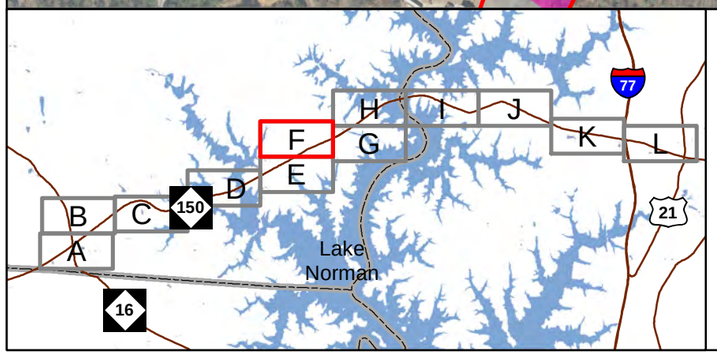
Terrestrial Communities
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 4.1.1e





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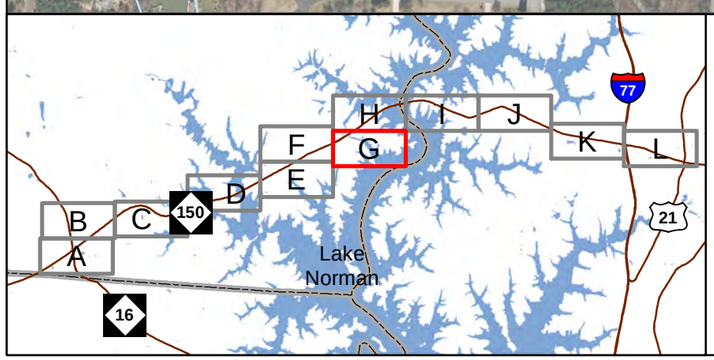
**Non-tidal Freshwater Marsh

Terrestrial Communities
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 4.1.1f



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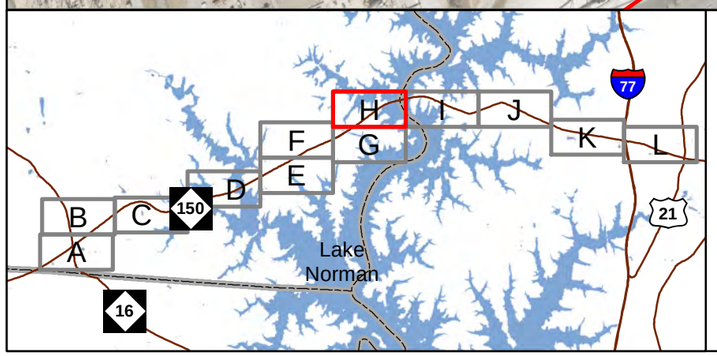
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 4.1.1g



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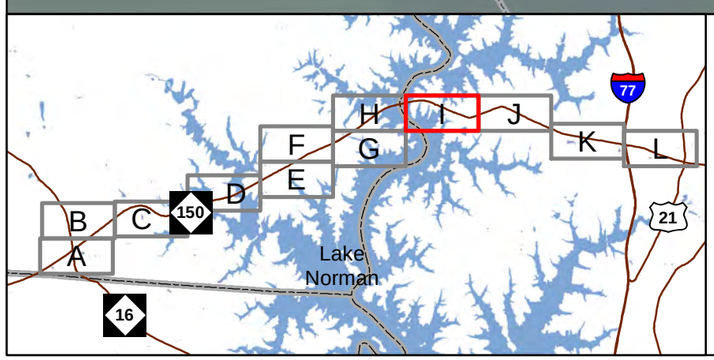
**Non-tidal Freshwater Marsh

Terrestrial Communities
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 4.1.1h



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**Non-tidal Freshwater Marsh

Terrestrial Communities
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

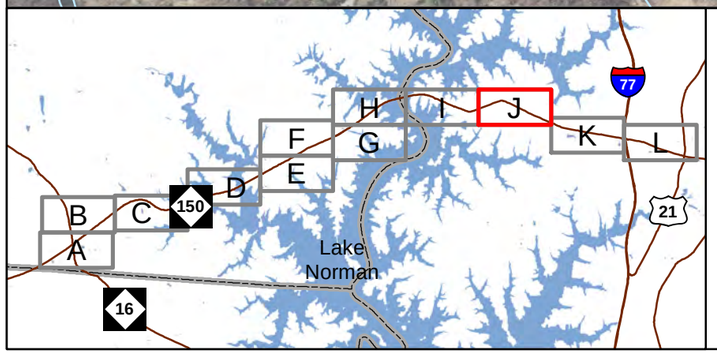
North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 4.1.1i

RUSTIC WAY LN
CRUSOE DR
ROBINSON RD
PERTH RD
RIVER PARK RD
BARINGTON DR
RIVER HWY
BOATERS DR
NILE CIR
MAGNOLIA PARK DR
MCCRARY RD
BYERS VILLAGE DR
DOOLIE RD
KENDRA DR
MURPHEY PL
KENSINGTON ST
HEMBREE PL
WATER OAK DR
RACINE PL
GRESHAM LN
BERGEN WAY
E MOREHOUSE AV

N

0 250 500 1,000 Feet



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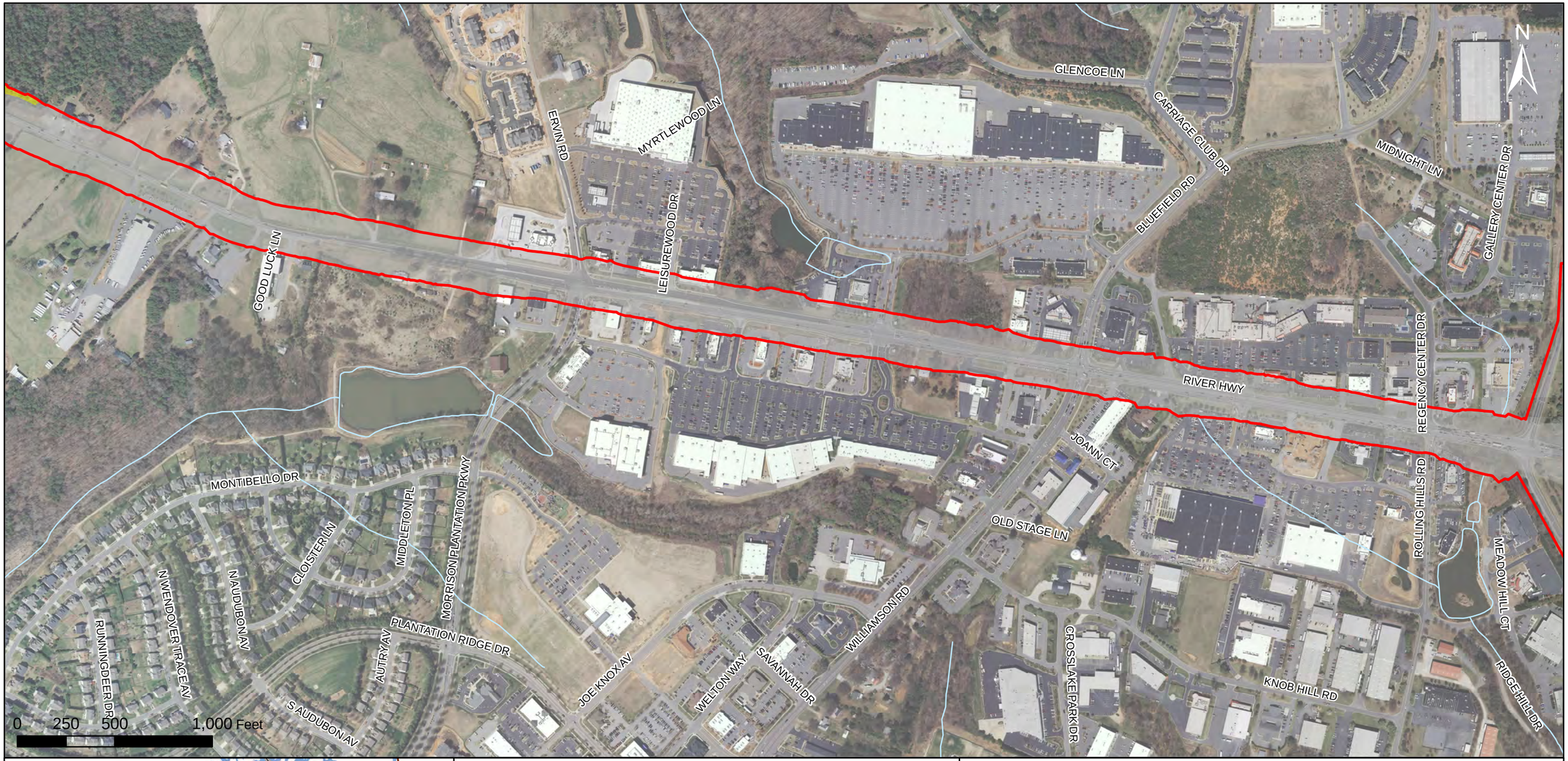
* Bottomland Hardwood Forest
**Non-tidal Freshwater Marsh

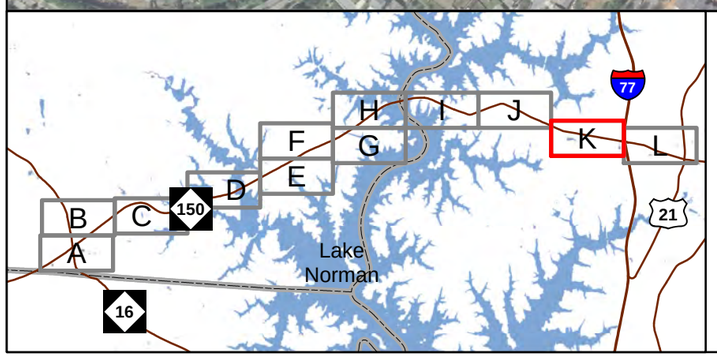
Terrestrial Communities Map
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 4.1.1j





- Edited_Study_Area
- Forest - Beech
- Forest - Managed Pine
- Forest - Oak Hickory
- Maintained/Disturbed
- Open Water
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- Wetland - Headwater Forest
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- Intermittent Streams
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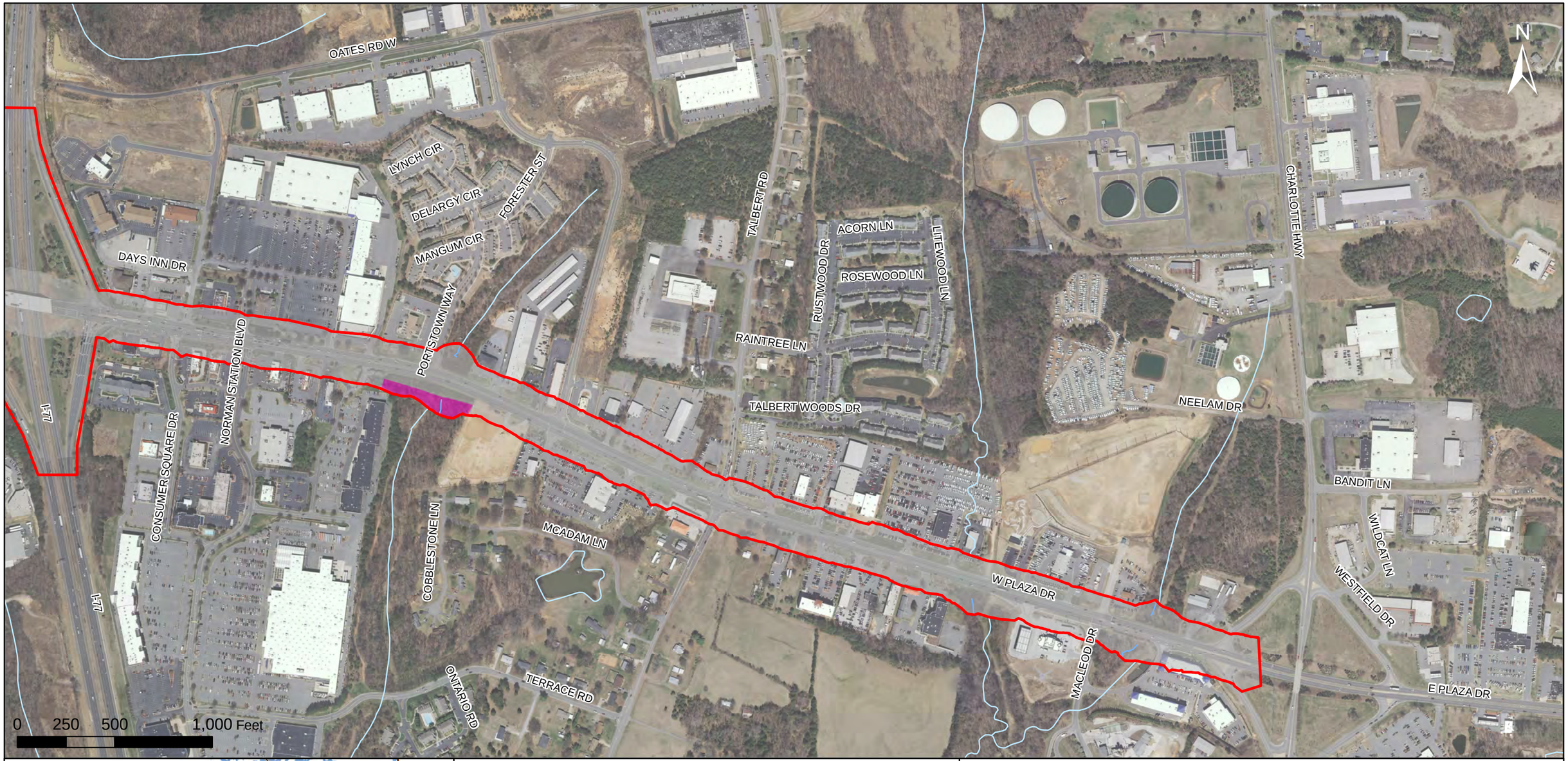
* Bottomland Hardwood Forest
**Non-tidal Freshwater Marsh

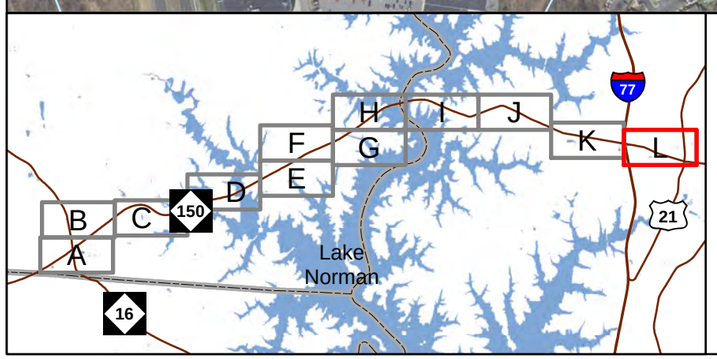
Terrestrial Communities
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 4.1.1k





- Edited_Study_Area
- Forest - Beech
- Forest - Managed Pine
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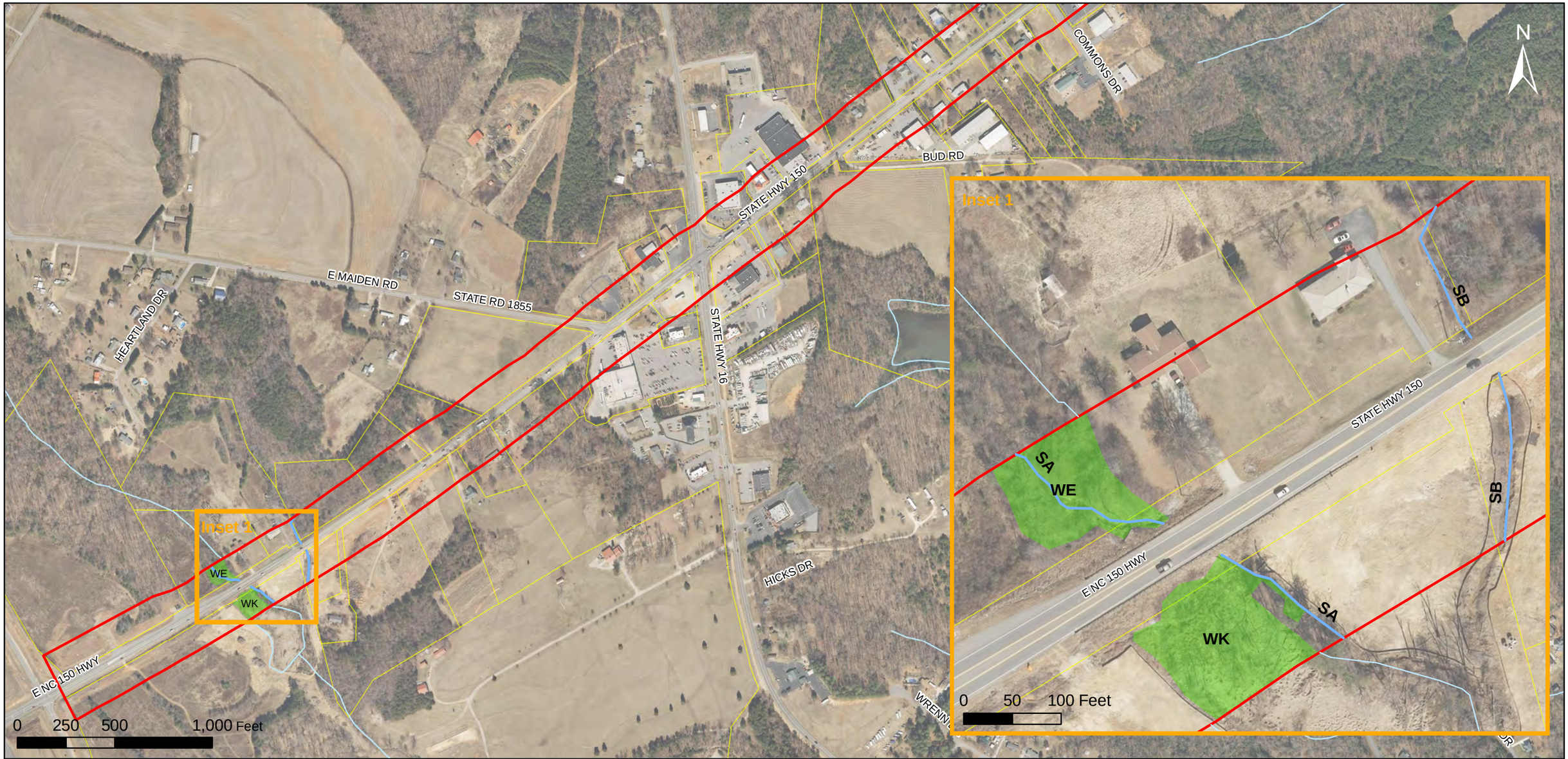
* Bottomland Hardwood Forest
**Non-tidal Freshwater Marsh

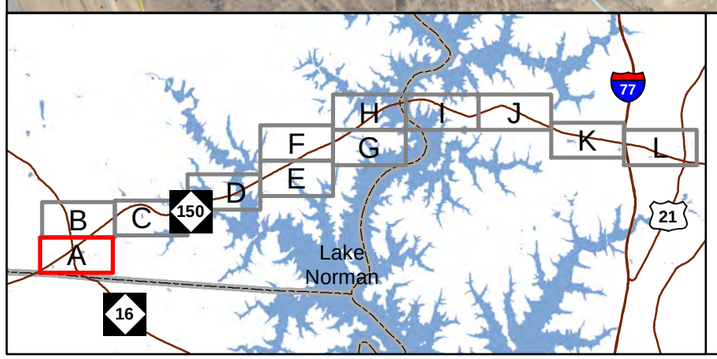
Terrestrial Communities
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 4.1.1l





- Intermittent Streams
- Perennial Streams
- Hydrography (outside study area)
- Wetlands
- Lake Norman (760' AMSL)
- Pond
- Study Area
- Adjacent Parcels
- County Boundary
- Map Sheet Limits

Jurisdictional Features
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
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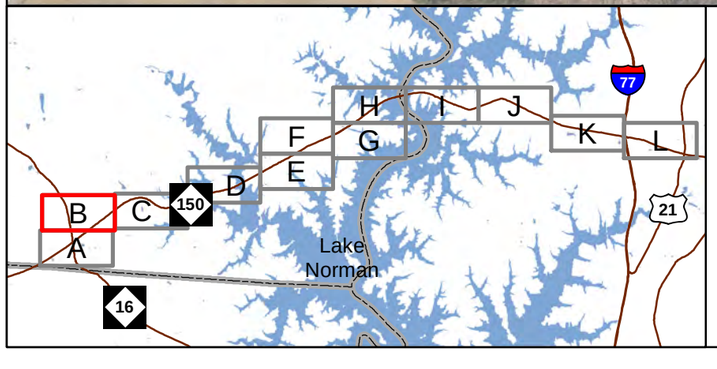
Division of Highways
Project Development &
Environmental Analysis Branch

Figure 4.1.2a



- Intermittent Streams
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- Pond
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Jurisdictional Features
NC 150 Widening
TIP R-2307

Catawba & Iredell Counties

North Carolina Department
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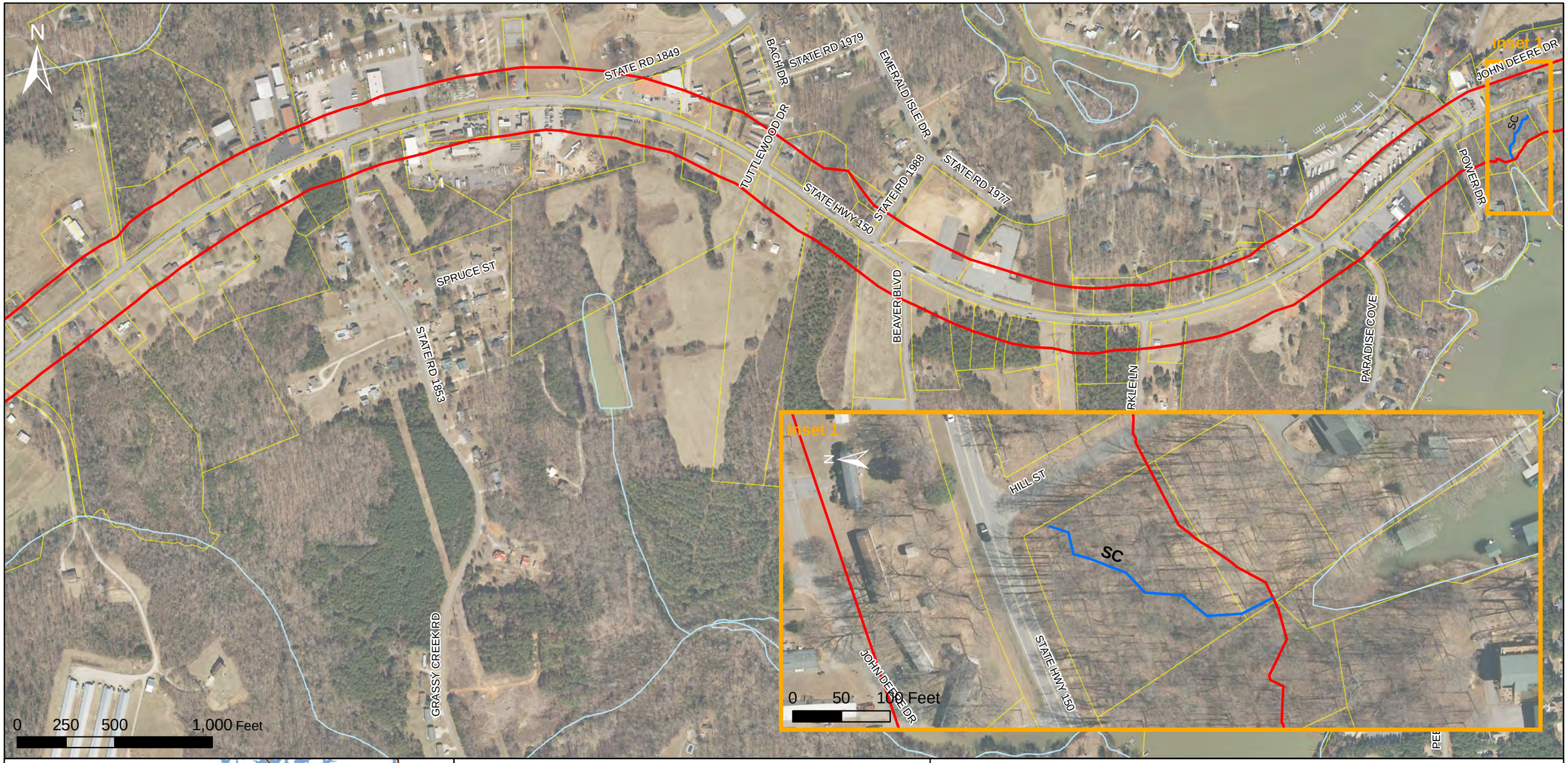
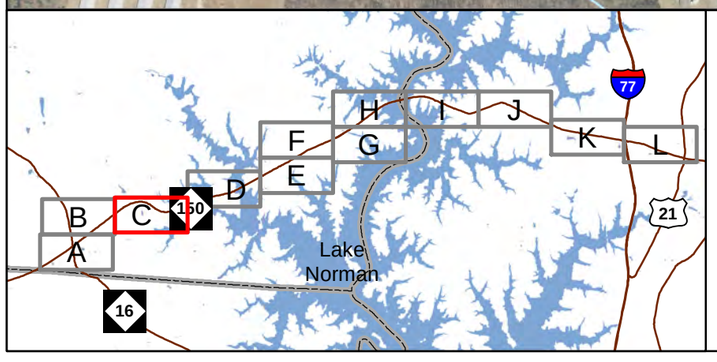
Division of Highways
Project Development &
Environmental Analysis Branch

Figure 4.1.2b





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Jurisdictional Features
NC 150 Widening
TIP R-2307

Catawba & Iredell Counties

North Carolina Department
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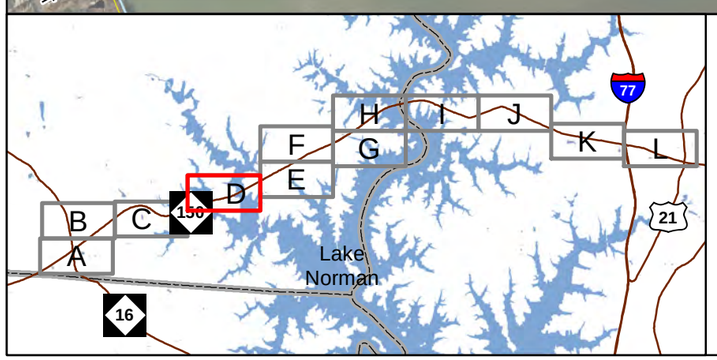
Division of Highways
Project Development &
Environmental Analysis Branch

Figure 4.1.2c



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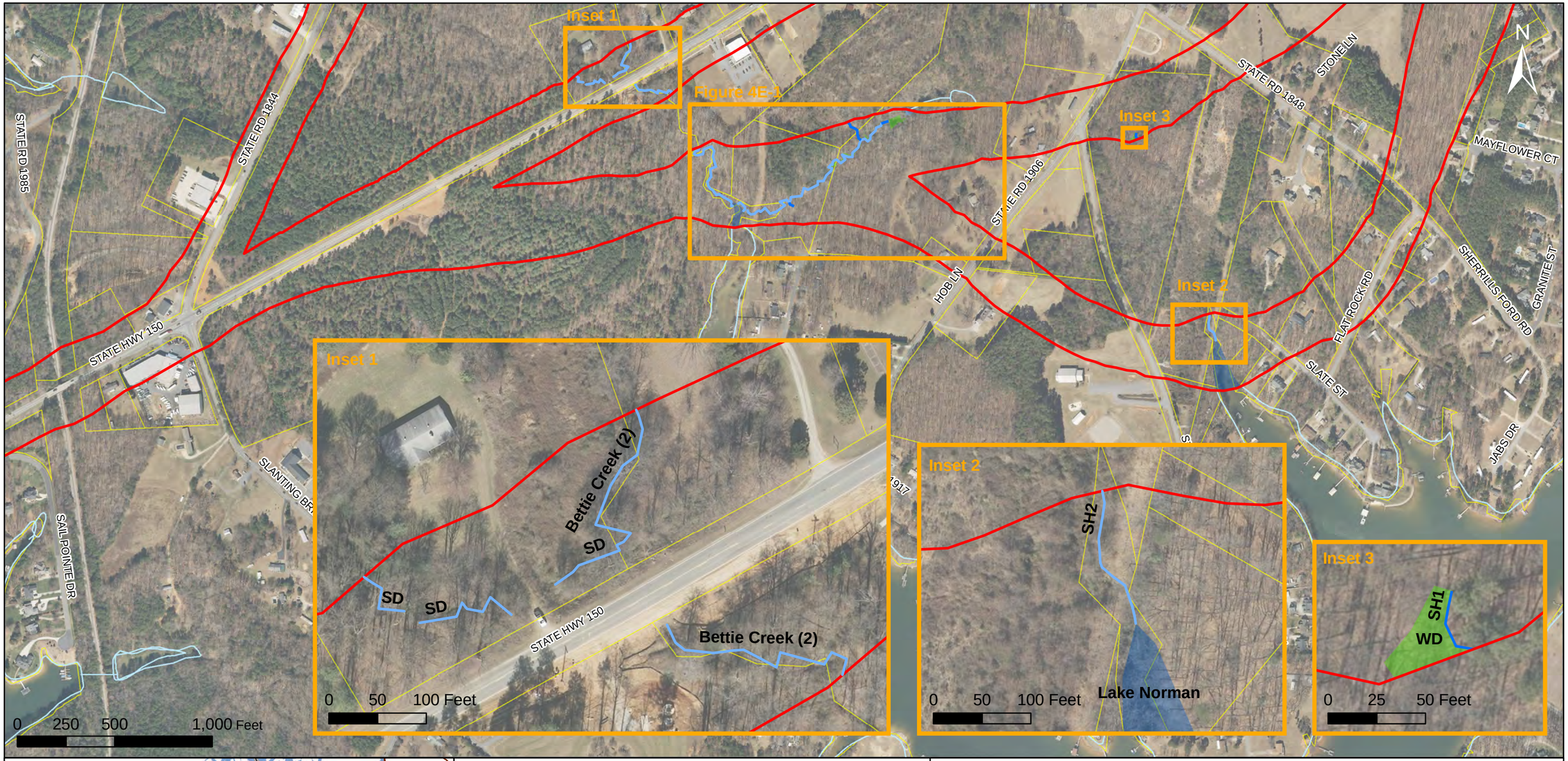
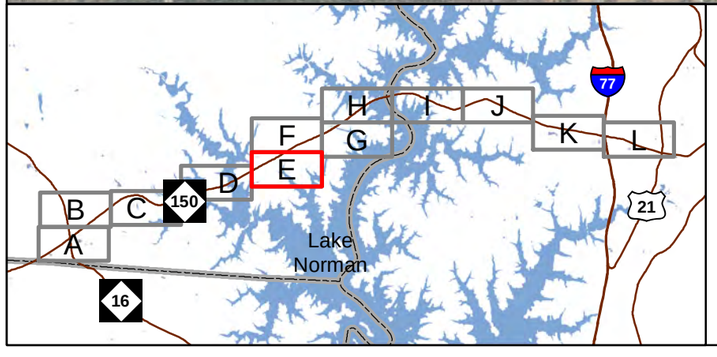
Environmental Analysis Branch

Figure 4.1.2d





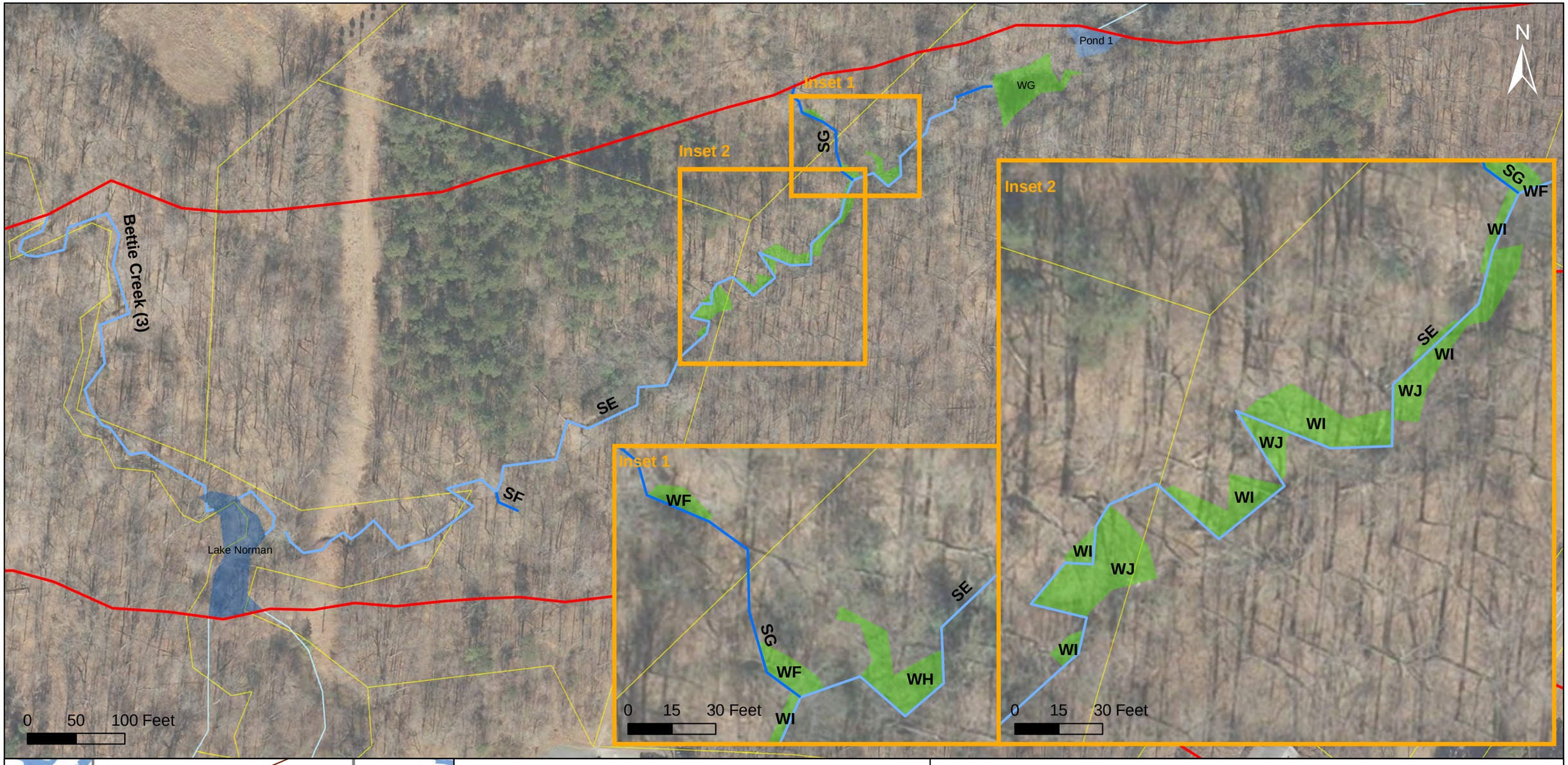
- Intermittent Streams
- Perennial Streams
- Hydrography (outside study area)
- Wetlands
- Lake Norman (760' AMSL)
- Pond
- Study Area
- Adjacent Parcels
- County Boundary
- Map Sheet Limits

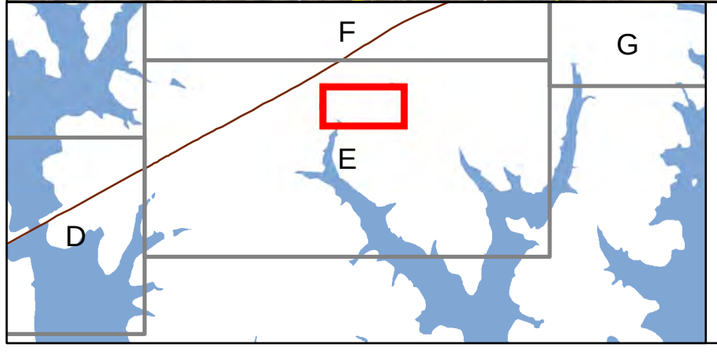
Jurisdictional Features
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Branch

Figure 4.1.2e1





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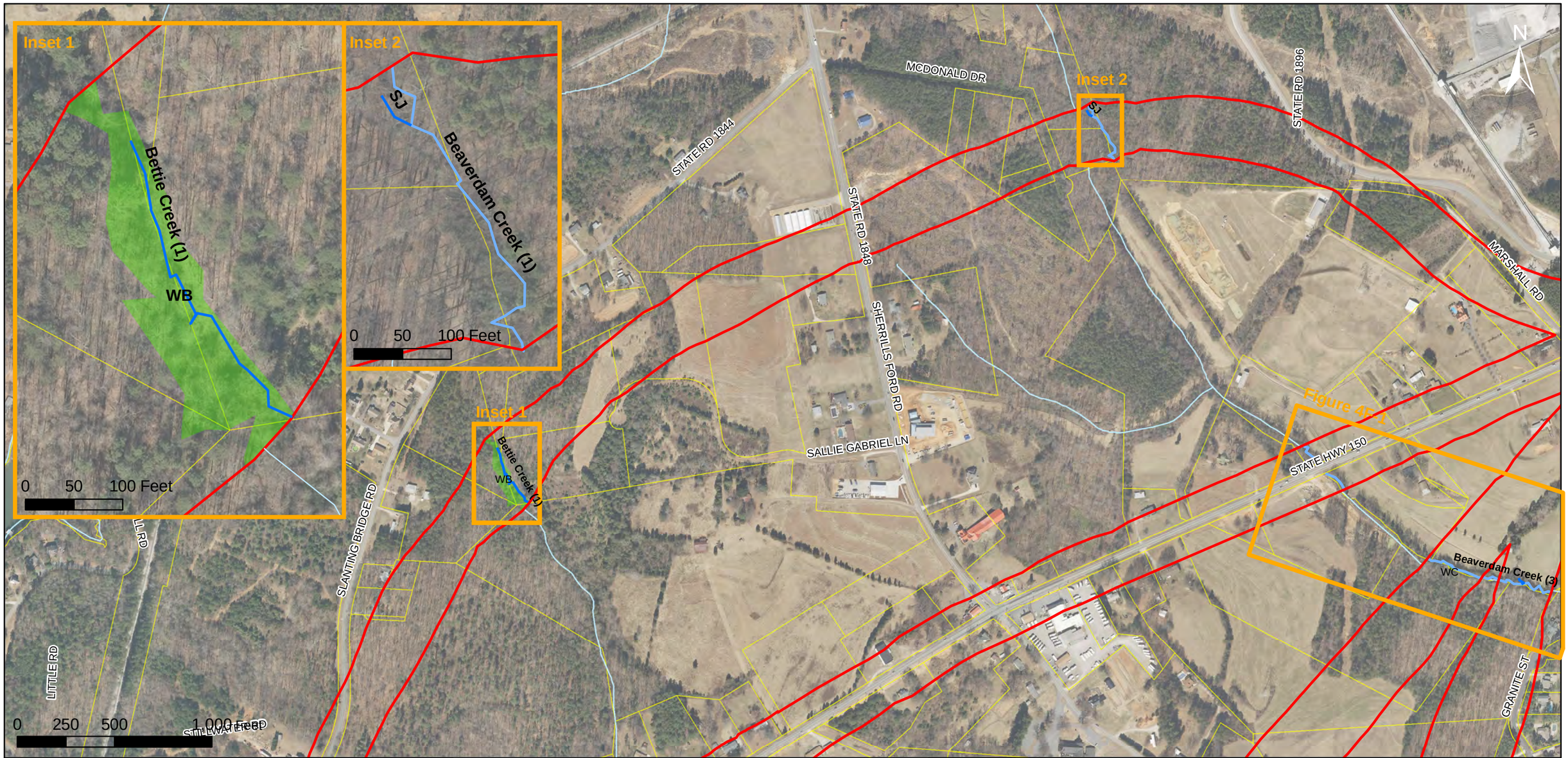
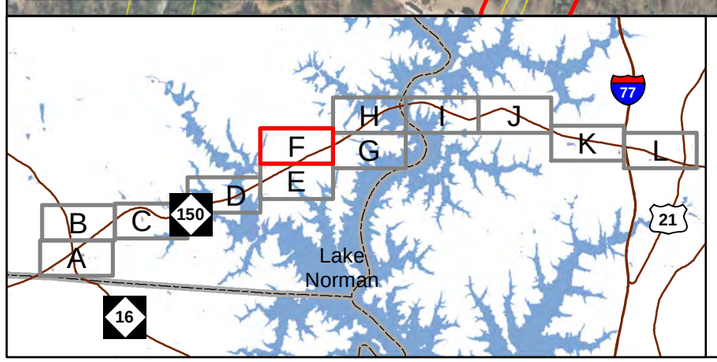
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Branch

Figure 4.1.2e2





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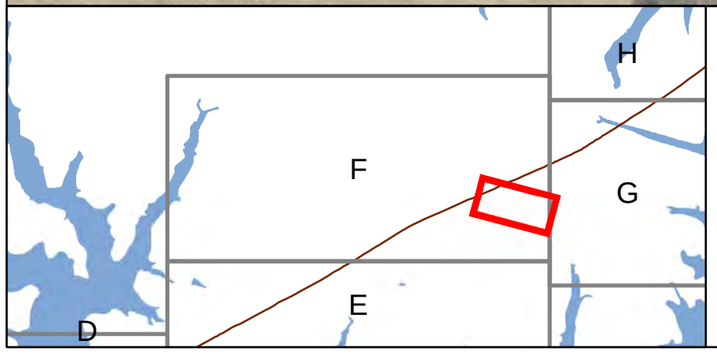
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Branch

Figure 4.1.2f1



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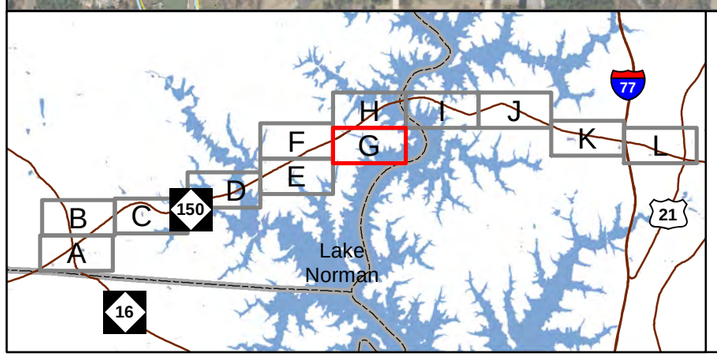
Jurisdictional Features
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Branch

Figure 4.1.2f2



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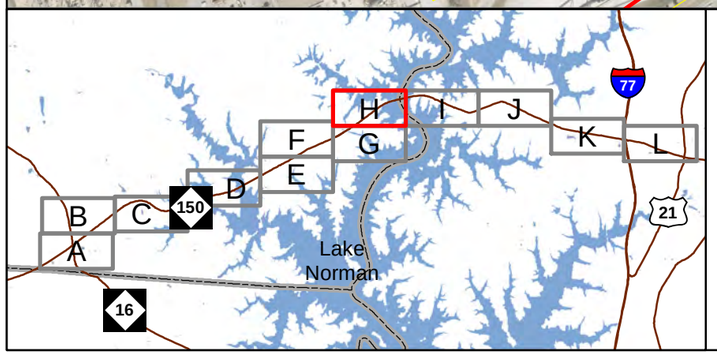
Jurisdictional Features
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Branch

Figure 4.1.2g



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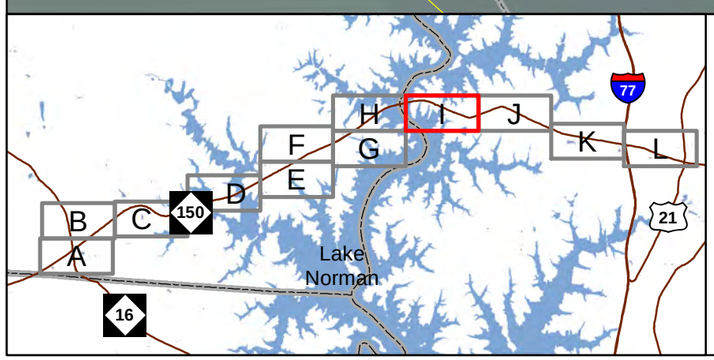
Jurisdictional Features
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Branch

Figure 4.1.2h



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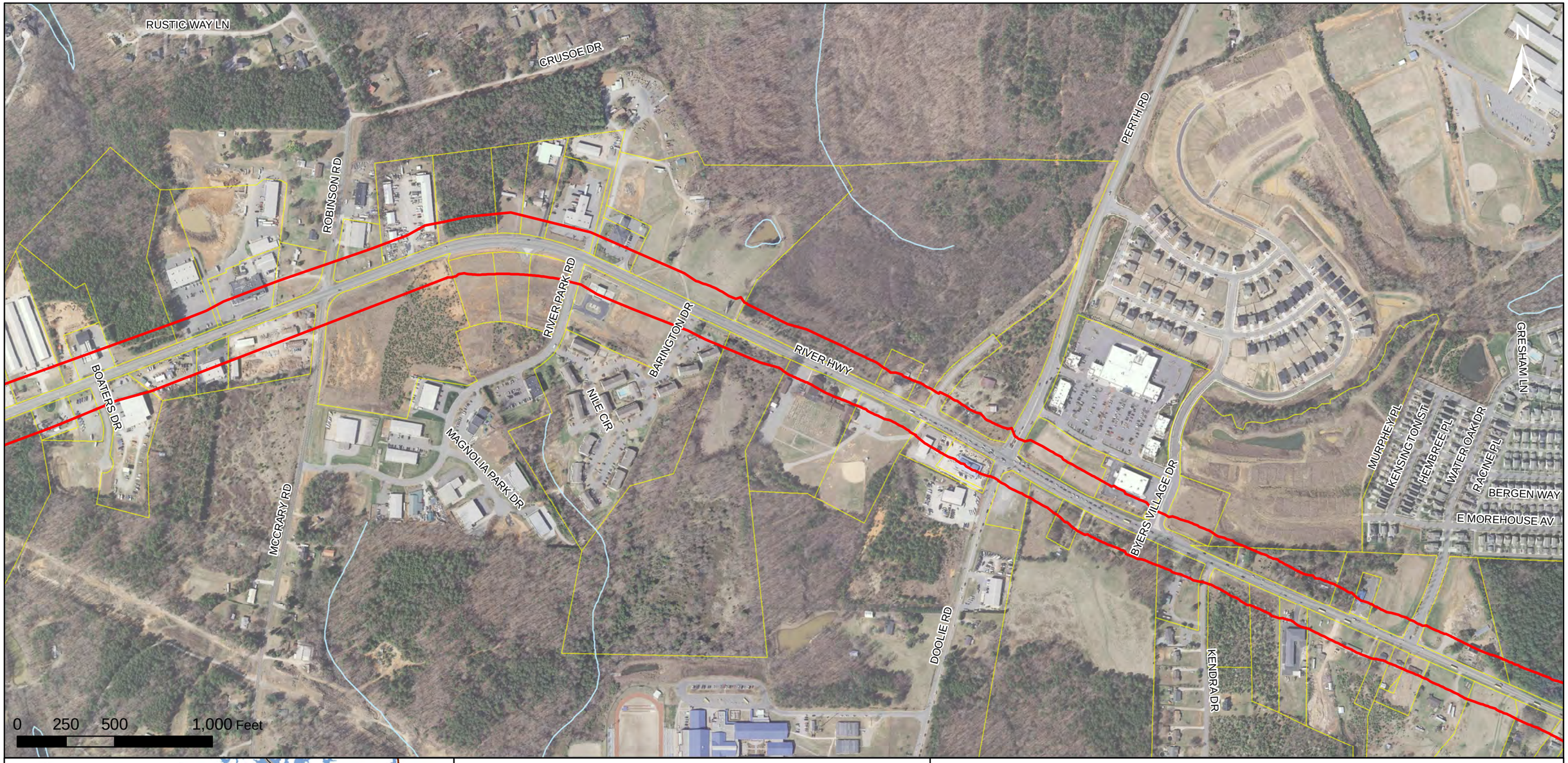
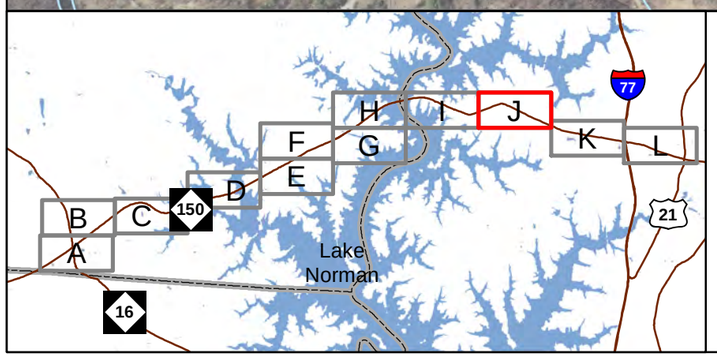
Jurisdictional Features
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Branch

Figure 4.1.2i





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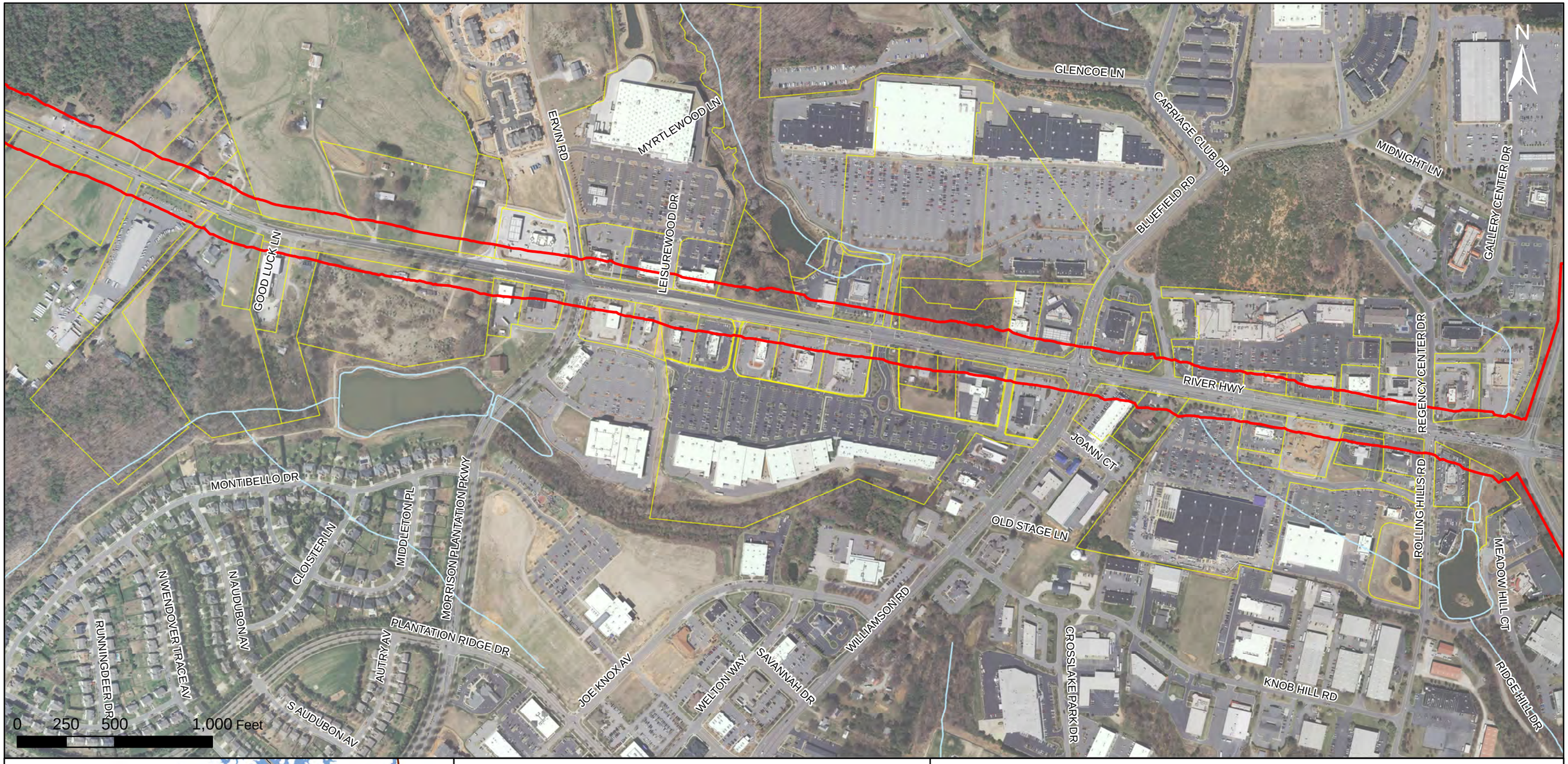
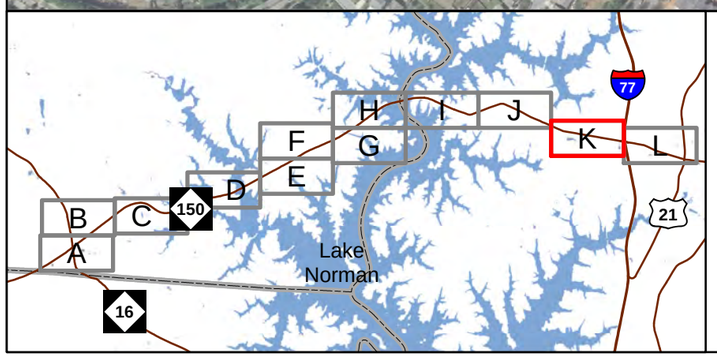
Jurisdictional Features
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Branch

Figure 4.1.2j





- Intermittent Streams
- Perennial Streams
- Hydrography (outside study area)
- Wetlands
- Lake Norman (760' AMSL)
- Pond
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- Adjacent Parcels
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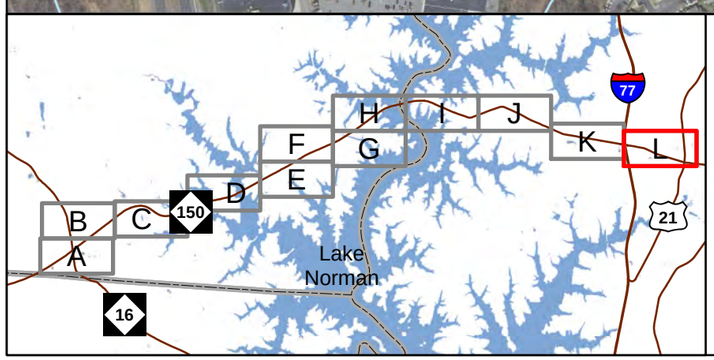
Jurisdictional Features
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Branch

Figure 4.1.2k



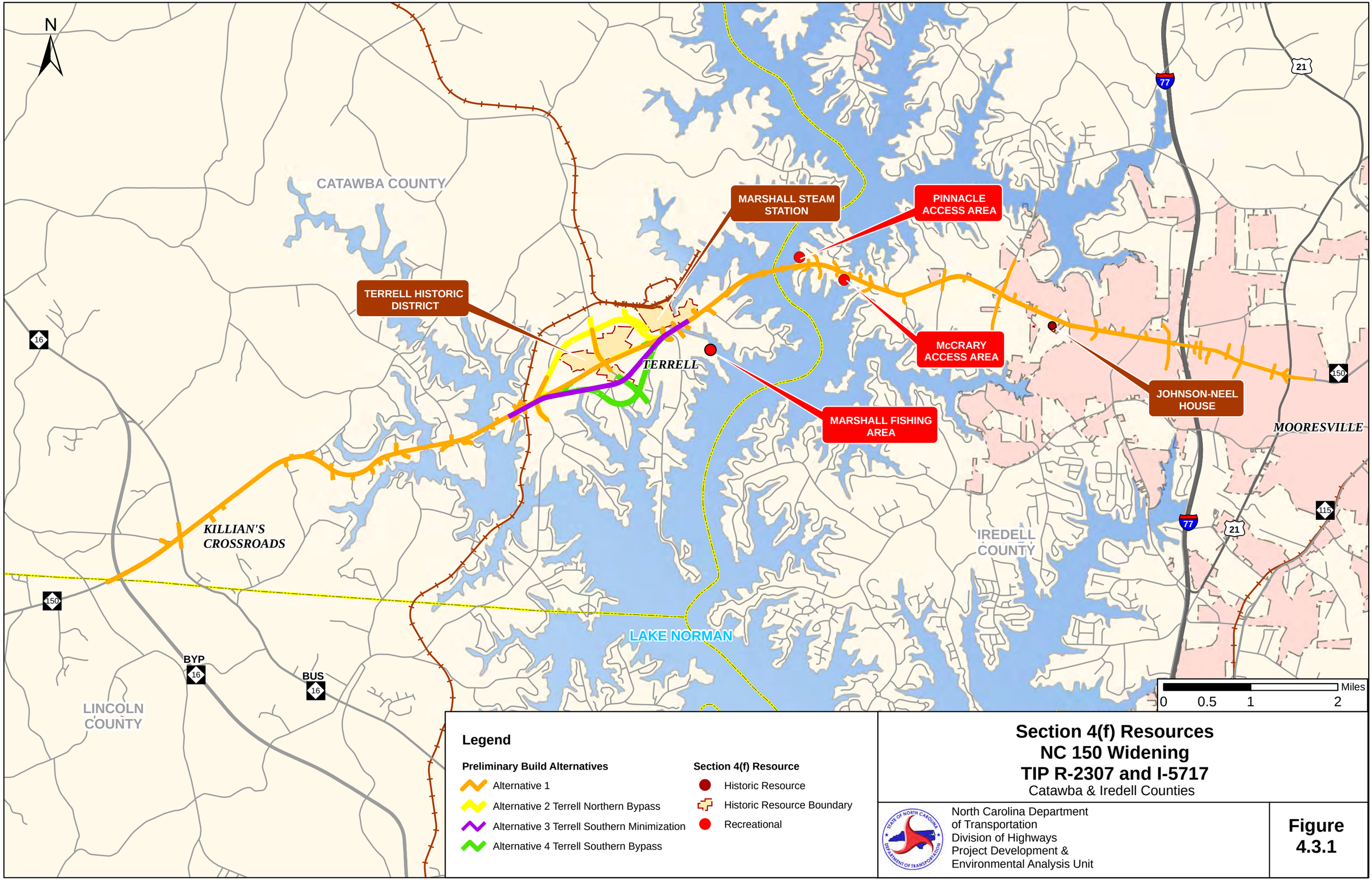
- Intermittent Streams
- Perennial Streams
- Hydrography (outside study area)
- Wetlands
- Lake Norman (760' AMSL)
- Pond
- Study Area
- Adjacent Parcels
- County Boundary
- Map Sheet Limits

Jurisdictional Features
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 4.1.2l



Legend

Preliminary Build Alternatives

- Alternative 1
- Alternative 2 Terrell Northern Bypass
- Alternative 3 Terrell Southern Minimization
- Alternative 4 Terrell Southern Bypass

Section 4(f) Resource

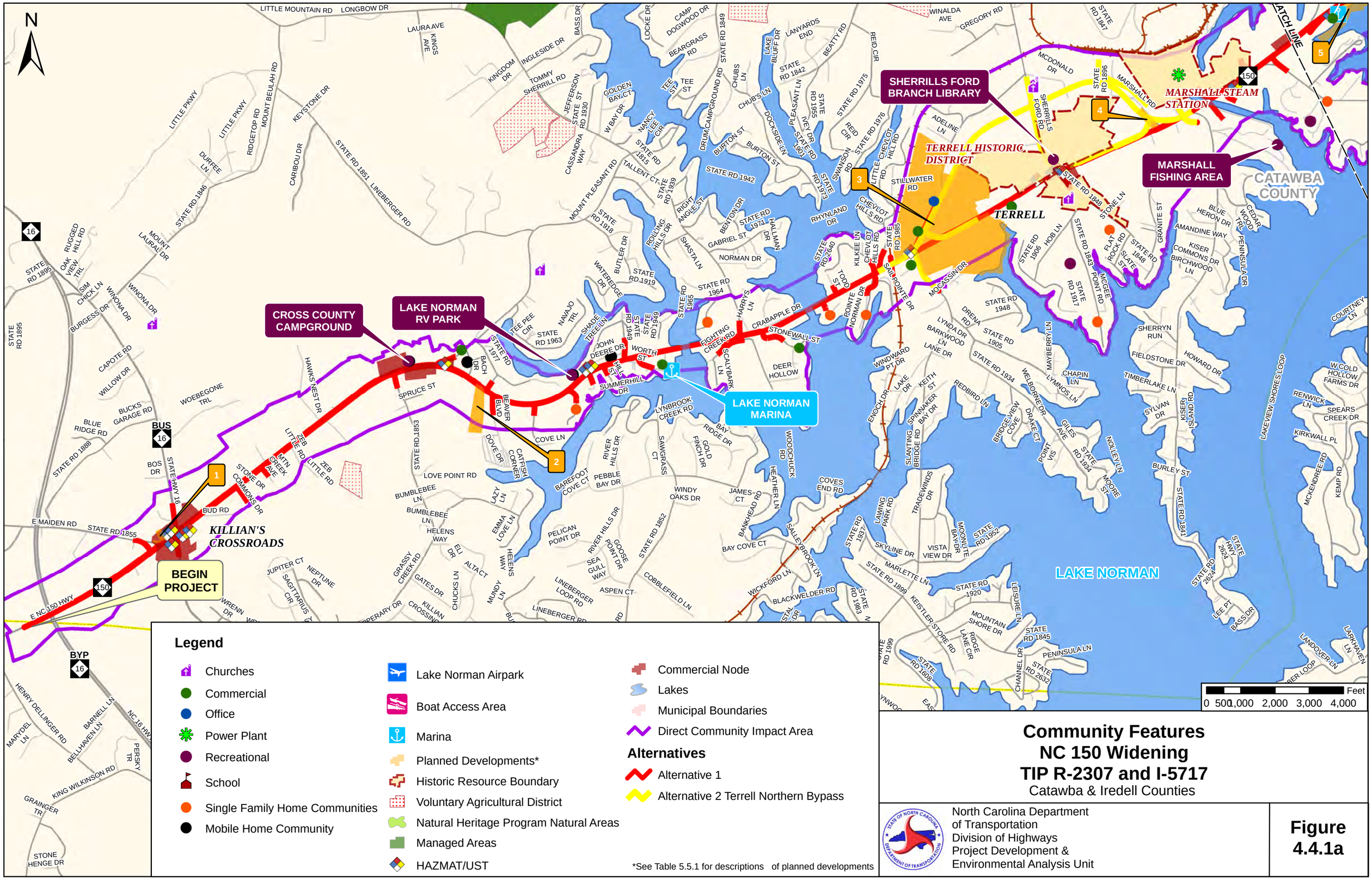
- Historic Resource
- Historic Resource Boundary
- Recreational

Section 4(f) Resources
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 4.3.1



Legend

- Churches
- Commercial
- Office
- Power Plant
- Recreational
- School
- Single Family Home Communities
- Mobile Home Community
- Lake Norman Airpark
- Boat Access Area
- Marina
- Planned Developments*
- Historic Resource Boundary
- Voluntary Agricultural District
- Natural Heritage Program Natural Areas
- Managed Areas
- HAZMAT/UST
- Commercial Node
- Lakes
- Municipal Boundaries
- Direct Community Impact Area

Alternatives

- Alternative 1
- Alternative 2 Terrell Northern Bypass

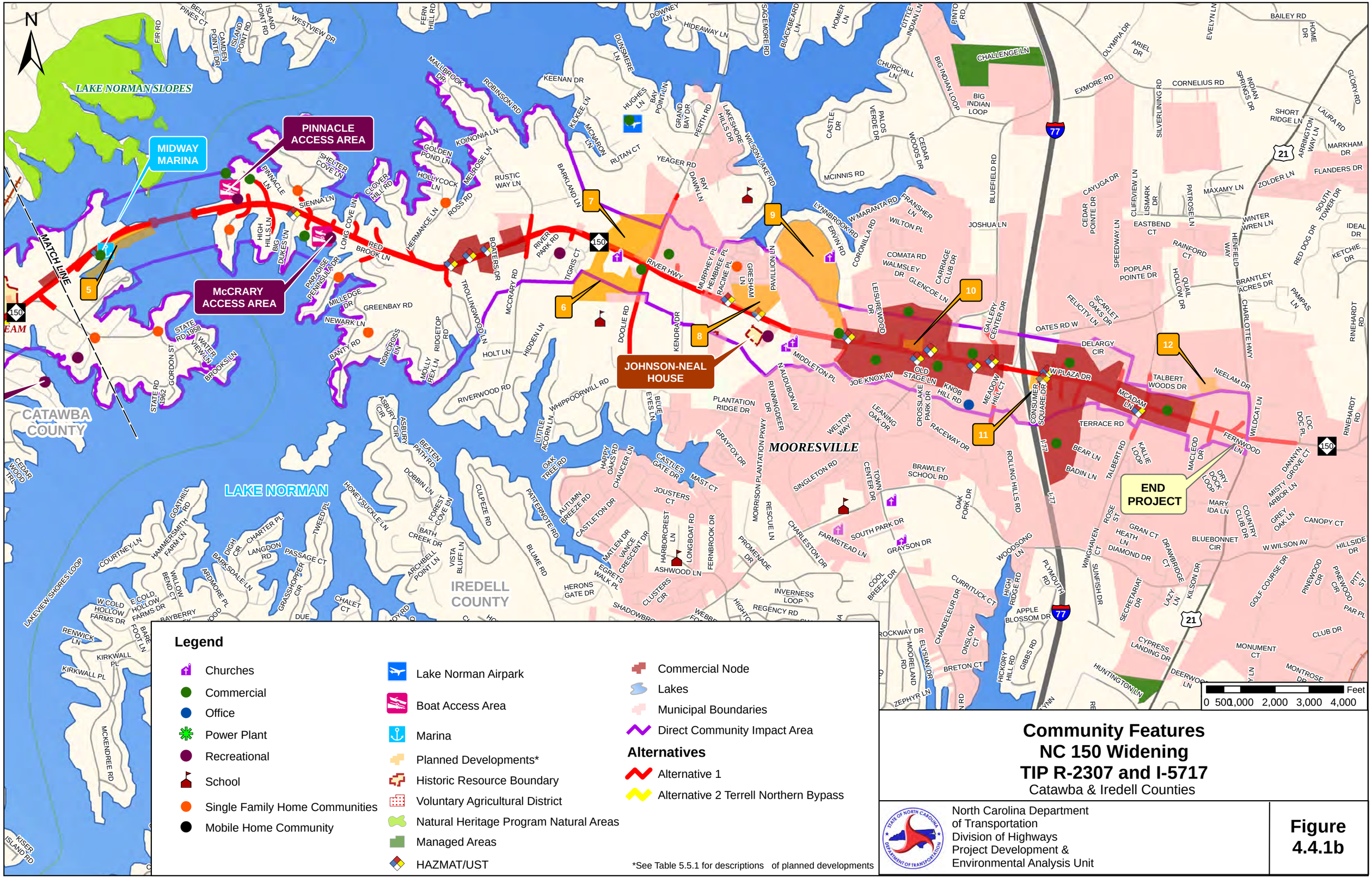
*See Table 5.5.1 for descriptions of planned developments

Community Features
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department of Transportation
Division of Highways
Project Development & Environmental Analysis Unit

Figure 4.4.1a



Community Features
NC 150 Widening
TIP R-2307 and I-5717
Catawba & Iredell Counties

North Carolina Department of Transportation
Division of Highways
Project Development & Environmental Analysis Unit

Figure 4.4.1b

Sherrills Ford Road Area

NC 16 Area

I-77 Area

CATAWBA COUNTY

IREDELL COUNTY

LINCOLN COUNTY

TERRELL

MOORESVILLE

KILLIAN'S CROSSROADS

LAKE NORMAN

1 in = 1 miles

0 0.5 1 2 Miles

Legend

- Municipal Boundaries
- County Boundary
- R-2307 Location
- Probable Development Area (PDA)
- Future Land Use Study Area (FLUSA)
- Existing Developed
- Future Developed - Build and No Build
- Future Developed - Build Only
- Undeveloped Unconstrained
- Undeveloped Constrained

Future Land Use Map
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department of Transportation
Division of Highways
Project Development & Environmental Analysis Unit

Figure 4.4.2

N

CATAWBA COUNTY

CENSUS TRACT 115.03
BLOCK GROUP 2

CENSUS TRACT 115.01
BLOCK GROUP 2

CENSUS TRACT 115.04
BLOCK GROUP 1

CENSUS TRACT 614.02
BLOCK GROUP 2

CENSUS TRACT 612.03
BLOCK GROUP 2

CENSUS TRACT 614.03
BLOCK GROUP 1

CENSUS TRACT 614.02
BLOCK GROUP 1

CENSUS TRACT 614.02
BLOCK GROUP 2

TERRELL

CENSUS TRACT 614.03
BLOCK GROUP 3

CENSUS TRACT 614.03
BLOCK GROUP 1

MOORESVILLE

CENSUS TRACT 116.02
BLOCK GROUP 4

CENSUS TRACT 115.04
BLOCK GROUP 3

CENSUS TRACT 614.03
BLOCK GROUP 2

KILLIAN'S
CROSSROADS

CENSUS TRACT 115.04
BLOCK GROUP 2

IREDELL
COUNTY

LAKE NORMAN

BYP
16

BUS
16

LINCOLN
COUNTY

CENSUS TRACT 711.01
BLOCK GROUP 2

16 150 77 21 115

Miles
0 0.5 1 2

Legend

- Direct Community Impact Area
- Alternative 1
- Alternative 2 Terrell Northern Bypass

Demographic Study Area Map
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 4.4.3

MCDONALD DR
STATE RD 1896
MARSHALL STEAM STATION
LITTLE RD
STILLWATER DR
STILL KNOLL LN
SLANTING BRIDGE RD
SHERRILLS FORD RD
MARSHALL RD
STATE RD 1961
TERRELL HISTORIC DISTRICT
ADELINE LN
SALLIE GABRIEL LN
HOLDSCLAW RD
KISER ISLAND RD
MILL RUN RD
STILLWATER RD
STATE RD 1844
STATE RD 1848
STONE LN
GRANITE ST
BLUE HERON DR
STATE RD 1841
CEDAR WOOD TRL
MAYFLOWER CT
STATE RD 1906
AMANDINE WAY
MOCASSIN DR
CANDLEWOO

Feet
0 500 1,000 2,000

Legend

- Alternative 1 No Terrell Bypass Option
- Alternative 2 Terrell Northern Bypass Option
- Alternative 3 Minimization Southern Bypass Option *
- Alternative 4 Terrell Southern Bypass Option
- Proposed Construction Limits
- Proposed Right of Way
- Historic District Boundary
- Contributing Resources
- Property Required from Section 4(f) Resource

** Preliminary Right of Way was not developed for Alternative 3. Section 4(f) impacts based off of construction limits.*

Section 4(f) Impacts
NC 150 Improvements
TIP R-2307 and I-5717
Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 5.3.1

N

NSA - 1

NSA - 2

MOUNT PLEASANT RD

STATE RD 1849

BACH DR

STATE RD 1977

STATE RD 1978

STATE RD 1988

BEAVER BLVD

HAWKS NEST DR

SPRUCE ST

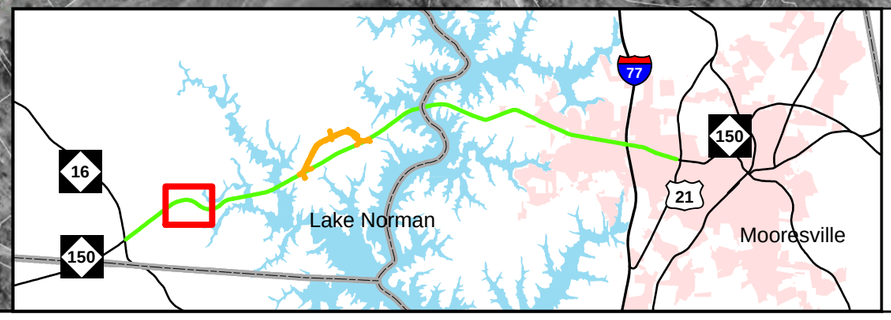
STATE RD 1853

ZEB LITTLE RD

150

Feet

0 250 500 1,000



Legend

- Proposed Widening
- Proposed Roadway Bridge
- Proposed Right of Way
- Proposed Construction Limits
- Noise Study Area (NSA)
- Property Boundary

Noise Study Areas
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 5.10.1a

N

NSA - 2

NSA - 3

NSA - 4

MOUNT PLEASANT RD

STATE RD 1849

NAVAJO TRL

TEE PEE CIR

STATE RD 1963

SHADE TREE LN

VINEWOOD RD

VINEWOOD RD

JOHN DEERE DR

STATE RD 1949

150

WORTH ST

BACH DR

STATE RD 1977

STATE RD 1978

LAKE NORMAN

EMERALD ISLE DR

STATE RD 1988

POWER DR

HILL ST

150

BEAVER BLVD

MCCORKLE LN

PARADISE COVE

LAKE NORMAN

RED HILL CIR

SUMMERHILL DR

Feet

0 250 500 1,000

16

150

Lake Norman

77

150

21

Mooresville

Legend

- Proposed Widening
- Proposed Roadway Bridge
- Proposed Right of Way
- Proposed Construction Limits
- Noise Study Area (NSA)
- Property Boundary

Noise Study Areas
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 5.10.1b

N

HALLMAN DR

NORMAN DR

LAKE NORMAN

STATE RD 2640

KILKEE LN

RHYNLAND DR

TODD ST

150

NSA - 6

NSA - 5

HARRY LN

HARRYS LN

HARBOR LN

POINTE NORMAN DR

STONEWALL ST

STATE RD 1951

BRANTLEY ST

DEER HOLLOW

STILLWATER DR

LITTLE RD

STILL KNOLL LN

STATE RD 1985

ADELINE LN

CHEVLOT HILL RD

NSA - 11

TERRELL HISTORIC DISTRICT

STILLWATER RD

1844

150

Feet

0 250 500 1,000

16

150

77

21

150

Lake Norman

Mooresville

Legend

- Proposed Widening
- Proposed Roadway Bridge
- Proposed Right of Way
- Proposed Construction Limits
- Noise Study Area (NSA)
- Parcel Boundary
- Historic Resource

Noise Study Areas
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 5.10.1c

N

PINNACLE LN

MANITOBA LN

PINNACLE SHORES DR

SIENNA LN

WADDELL RD

CLOVER HILL RD

150

BIG DUKES LN

HIGH HILLS LN

RIVER HWY

LONG COVE LN

INDIGO LN

HERMANCE LN

MARINER POINTE LN

NSA - 7

NSA - 8

RED BROOK LN

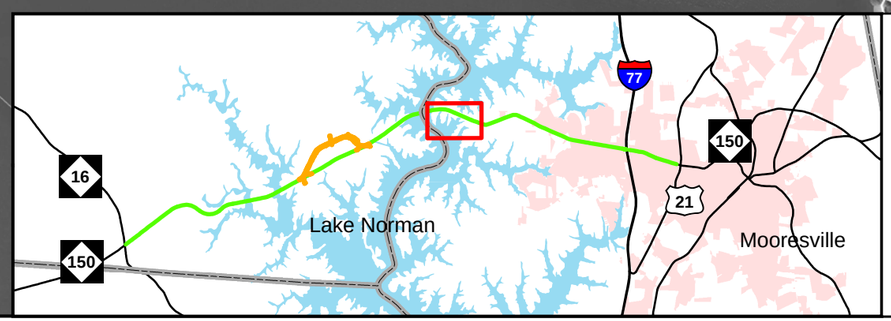
GREENBAY RD

SUMMERSONG LN

DISE PENINSULA DR

LAKE NORMAN

Feet
0 250 500 1,000



Legend

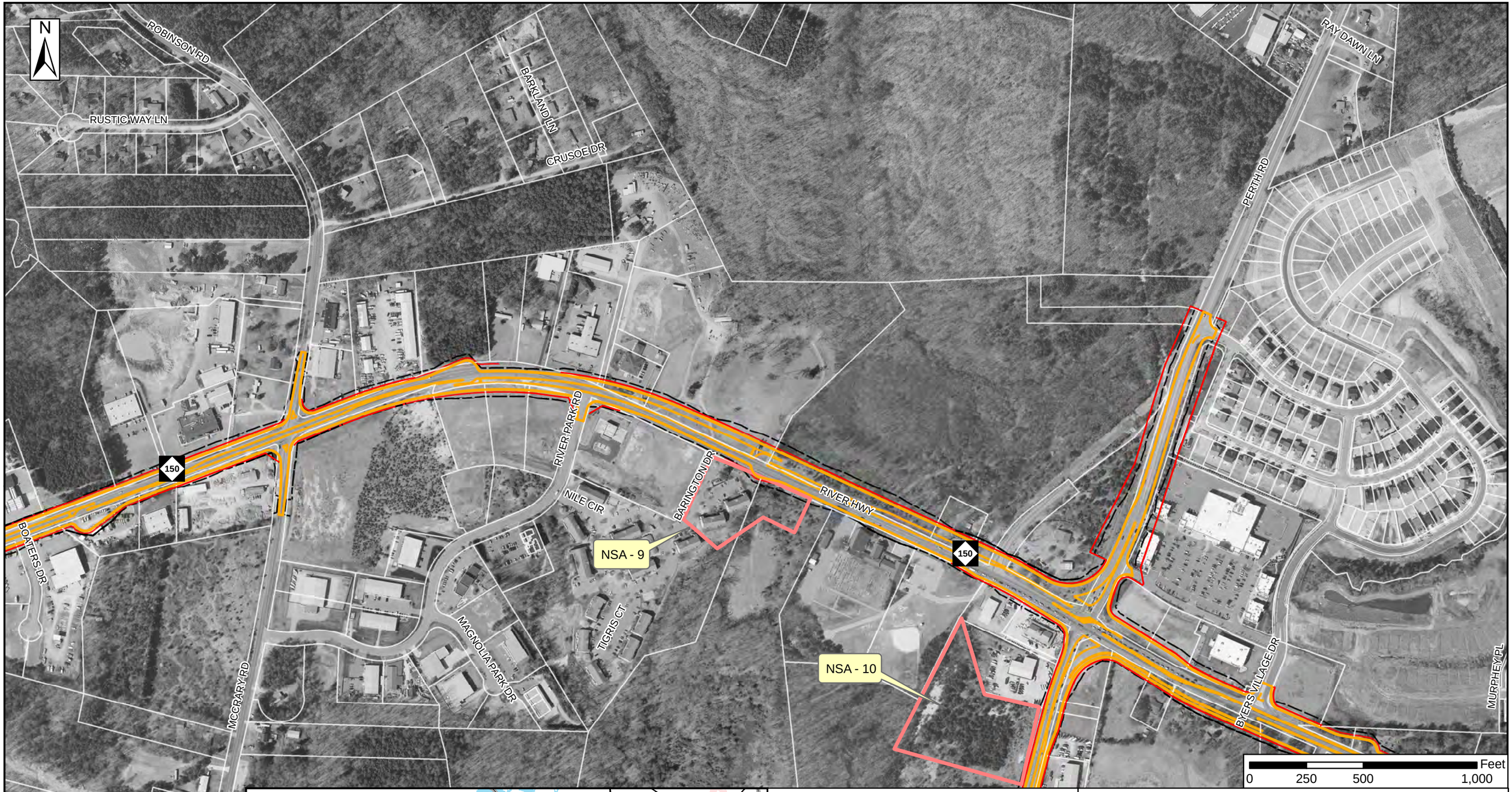
- Proposed Widening
- Proposed Roadway Bridge
- Proposed Right of Way
- Proposed Construction Limits
- Noise Study Area (NSA)
- Property Boundary

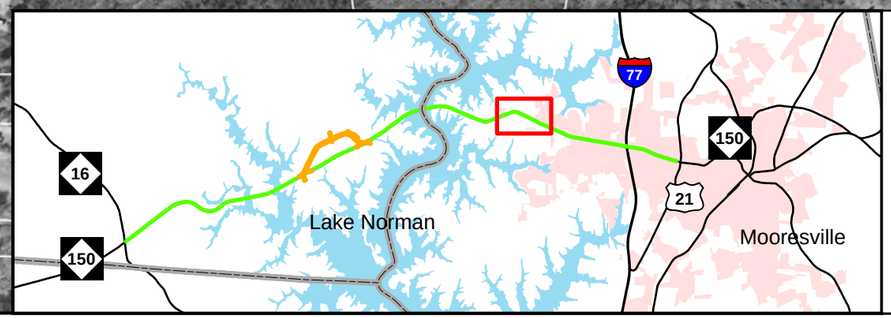
Noise Study Areas
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 5.10.1d





Legend

- Proposed Widening
- Proposed Roadway Bridge
- Proposed Right of Way
- Proposed Construction Limits
- Noise Study Area (NSA)
- Property Boundary

Noise Study Areas
NC 150 Widening
TIP R-2307 and I-5717

Catawba & Iredell Counties

North Carolina Department
of Transportation
Division of Highways
Project Development &
Environmental Analysis Unit

Figure 5.10.1e

Appendix A

Agency Coordination

GREATER HICKORY
METROPOLITAN PLANNING ORGANIZATION (MPO)
1880 2nd Avenue NW, PO Box 9026
Hickory, NC 28603

December 18, 2013

Mr. Michael Wray, PE
Project Development Engineer
Project Development and Environmental Analysis
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, NC 27699-1548

RE: Design Comments for Widening NC 150 (R-2307)

Dear Mr. Wray,

The Greater Hickory MPO fully supports the Lake Norman Bicycle Route, which has been adopted by all affected municipalities, counties, and MPOs along the corridor, as well as by the NCDOT. The portion of NC 150 between Doolie Road and Little Mountain Road is affected by the Route and part of this route is included in the Greater Hickory MPO Planning Area. The MPO has reviewed the TIP No. R-2307 public meeting materials and have the following comments for consideration in environmental permitting and design of the widening of NC 150:

1. Include a multi-purpose path along one side of the corridor between Doolie Road (SR 1180) in Iredell County and Little Mountain Road (SR 1815) in Catawba County;
2. Retain the four-foot paved shoulder on the opposite side of the road where the multi-purpose path is located; and,
3. Include a multi-purpose path on one side of the bridge over Lake Norman to allow both pedestrians and bicyclists to cross the bridge.

The MPO also supports Catawba County's submitted comments to NCDOT:

1. Retain the corridor alignment along existing Hwy. 150 in lieu of an alternate around the Terrell Historic District.
2. In addition to a multi-purpose path along the corridor between Doolie Road (SR 1180) and Little Mountain Road (SR 1815) extend the multi-purpose path westward to the intersection of the new Hwy 16 and Hwy. 150 in Catawba County;
3. Include a multi-purpose path on one side of the bridge over Lake Norman to allow both pedestrians and bicyclists to cross the bridge;

4. Retain the four-foot paved shoulder on the opposite side of the road where the multi-purpose path is located;
5. Reduce the cross section to a 5-lane urban design with a 45 mph speed limit approaching Sherrills Ford Road (SR 1848) and through Slanting Bridge Road (SR 1844) due to an approved village plan which incorporates pedestrian crossing at Hwy 150.

Please let me know if you have any questions.

Sincerely,

Bruce Meisner

Bruce Meisner, Chair
Greater Hickory MPO TAC

Attachment III

GREATER HICKORY
METROPOLITAN PLANNING ORGANIZATION (MPO)
1880 2nd Avenue NW, PO Box 9026
Hickory, NC 28603

A RESOLUTION OF SUPPORT FOR ACCOMODATING BICYCLISTS AND PEDESTRIANS ALONG IMPROVEMENTS TO NC 150 (R-2307)

WHEREAS, the Unifour Rural Planning Organization (RPO) is the state-designated organization to represent the transportation needs of its member governments to the North Carolina Department of Transportation (NCDOT); and

WHEREAS, the NCDOT requests RPO input on project development for transportation projects in the RPO's Study Area; and

WHEREAS, Catawba County has adopted the Carolina Thread Trail and Lake Norman Bicycle Route, as well as other land use, bicycle and pedestrian plans that reference these accommodations; and

WHEREAS, NCDOT is currently developing plans for R-2307 to widen NC 150 between Harvel Road (SR 1902) and I-77 in Catawba and Iredell Counties; and

WHEREAS, the ultimate implementation of these adopted plans will be impeded without bicycle and pedestrian considerations as a part of the project's design.

NOW, THEREFORE BE IT RESOLVED that the Unifour RPO TAC requests that the NCDOT includes design and construction of sidewalks and bike lanes on both sides of the widened road; and a multi-purpose path on one side of the bridge or a sidewalk on one side of the road, a multi-purpose path on one side, and a multi-purpose path on the bridge.

A motion was made by Ms. Beatty and seconded by Mr. Hamer for the endorsement of the resolution, and upon being put to a vote was duly adopted, on this, the 28th day of March, 2013.

Barbara Beatty, TAC Chair
Unifour RPO

Kelly Larkins, TAC Secretary
Unifour RPO

PO Box 389
100A Southwest Boulevard
Newton, NC 28658
828.465.8201
Fax: 828.465.8392
www.catawbacountync.gov/

December 19, 2013

Mr. Michael Wray, P.E.
Project Development Engineer
Project Development and Environmental Analysis
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, NC 27699-1548

In Re: Design Comments for NC Hwy. 150 Widening (R-2307)

Dear Mr. Wray:

Thank you for providing maps of the Highway 150 corridor design for Catawba County's planning meeting in the Sherrills Ford community on November 21. We had a great turnout at our meeting with over 250 people in attendance and actively engaged in providing input, which demonstrates the clear priority and significance of this issue to the citizens of our community. Many of those in attendance were interested in the Highway 150 corridor design and had questions for Mr. Keilson, so we appreciate you arranging to have him attend our meeting. (Further, there was similar turn-out of Catawba County residents at the NCDOT meeting in Mooresville held that same evening, with some citizens attending both meetings to ensure they accessed all relevant information and let their opinions be known.)

Catawba County has reviewed the TIP #R-2307 public meeting materials and has the following comments for consideration in the environmental permitting and design of the widening of NC Highway 150:

1. Retain the corridor alignment along existing Highway 150 in lieu of an alternate around the Terrell Historic District. Based upon comments received at our community meeting on November 21, 2013, the County requests to have the corridor remain on the existing Highway 150 location based upon the following:

    a. Additional cost to the project for the construction of any of the alternate routes;
    b. Economic development opportunities at the existing Sherrills Ford Road (SR 1848) and Highway 150 intersection where several development plans have been approved;
    c. The dilapidated condition of the existing historic home on the south side of Highway 150 and the willingness of the property owner to work with NCDOT for removal of the structure; and
    d. Possible reduced cross-section width at the Highway 150/Sherrills Ford Road (SR 1848) crossroad due to the short linear distance of the impacted area;

2. Include a minimum 10-foot bicycle path and pedestrian access along one side of the corridor between Doolie Road (SR 1180) in Iredell County and Little Mountain Road (SR 1815) in Catawba

County. In addition, extend the bicycle path and pedestrian access westward to the intersection of the new Highway 16 and Highway 150 in Catawba County;

3. Include a bicycle path and pedestrian access on one side of the bridge over Lake Norman to allow both pedestrians and bicyclists to cross the bridge;

4. Retain the four-foot paved shoulder on the opposite side of the road where the bicycle path and pedestrian access is located; and

5. Reduce the cross section to a 5-lane urban design with a 45 mph speed limit approaching Sherrills Ford Road (SR 1848) and through Slanting Bridge Road (SR 1844) due to an approved village plan which incorporates pedestrian crossing at Highway 150.

Through the widening of Highway 150, there is great opportunity to enhance the existing multi-modal transportation network, as the preferred route alignment is in close proximity to existing segments of the Carolina Thread Trail and also the adopted Lake Norman Bicycle Plan. This proximity offers future opportunity for the potential linkage of the Highway 150 corridor to these trail networks, an amenity that would undoubtedly have extremely positive impacts through expanding recreational opportunities for active living on behalf of our citizens. Further, Catawba County would be most supportive of a design that minimizes any potential impacts to existing businesses located at any point along the Hwy 150 corridor, as businesses of all sizes are integral components of Catawba County's economy.

For your information, Catawba County owns water and sewer lines along the Highway 150 corridor. Specific information about these lines can be obtained from Jack Chandler, Assistant Director of Utilities and Engineering. He can be reached at (828) 465-8940 or jchandler@catawbacountync.gov.

Thank you for giving us the opportunity to comment on the NC Highway 150 corridor design. Should you have any questions, feel free to contact Mary George, Assistant Planning Director, at (828) 465-8264.

Sincerely,

Barbara G. Beatty, County Commissioner/RPO Board Chair
Catawba County Board of Commissioners

amw

pc: Lou Wetmore, NCDOT Board Member
Catawba County Board of Commissioners
Randy Williams, Lake Norman Route Task Force Chair and Lincoln County Planner
John Marshall, Greater Hickory MPO
Bob Cook, AICP, Charlotte Regional Transportation Planning Organization
Allison Kraft, Senior Engineer, Town of Mooresville
Bob Mosher, Transportation Planner, NCDOT DBPT
Randi Gates, AICP, Carolina Thread Trail
Scott Jolley, Duke Energy
Mike Holder, NCDOT Division Engineer

NEPA/404 MERGER TEAM MEETING AGREEMENT

Concurrence Point No. 1: *Purpose and Need & Study Area Defined*

PROJECT NO./TIP NO./ NAME/DESCRIPTION:

Federal Aid Project Number:	STP-150(19)
State Project Number:	WBS Element 37944.1.1
TIP Project Number:	R-2307
TIP Description:	NC 150 Widening (from the NC 16 Bypass to just west of I-77 Interchange), Catawba and Iredell Counties.

The Project Team concurred on this date of December 12, 2012 with the purpose of and need for the proposed project as stated below and the project study area as described below and shown in the attached exhibit.

Purpose and Need of Proposed Project
The purpose and need for this project is to improve capacity and reduce congestion along NC 150 from the NC 16 Bypass to just west of the I-77 Interchange.

Project Study Area
The preliminary project study area boundaries are shown in the attached exhibit.

US Federal Highway Administration	[signature] 12-12-12
US Army Corps of Engineers	[signature] 12/12/12
US Environmental Protection Agency	[signature] 12/17/12
US Fish and Wildlife Service	[signature] 12/12/12
NC Wildlife Resources Commission	Marla Chambers 12/13/12
NC Department of Cultural Resources	Renee Gledhill-Earley 12/12/12
NCDENR, Division of Water Quality	[signature] 12/17/12
NC Department of Transportation, PD & EA Branch	[signature] 12/12/12
~~NC Department of Transportation, Division 12~~ NOT REQUIRED	

NEPA/404 MERGER TEAM MEETING AGREEMENT

REVISED Concurrence Point No. 1: *Purpose and Need & Project Limits Defined*

PROJECT NO./TIP NO./ NAME/DESCRIPTION:

Federal Aid Project Number:	STP-150(19)
State Project Number:	WBS Element 37944.1.1
TIP Project Number:	R-2307, I-5717
TIP Description:	NC 150 Widening from the NC 16 Bypass to just west of the NC 150/US 21 Interchange, Catawba and Iredell Counties.

A single environmental document for the R-2307 and I-5717 projects will be prepared resulting in the revised project limits on NC 150 from the NC 16 Bypass to just west of the US 21 interchange, as shown in the attached exhibit.

The Project Team concurred on this date of August 13, 2014 with the revised limits incorporated into the original purpose and need as follows:

The purpose and need for these projects is to improve capacity and reduce congestion along NC 150 from the NC 16 Bypass to just west of the US 21 interchange.

Federal Highway Administration	8-13-14
US Army Corps of Engineers	13th Aug 2014
US Environmental Protection Agency	Cynthia J. VanDerWiele 8.13.2014
US Fish and Wildlife Service	13 August 14
NC Wildlife Resources Commission	8/13/2014
NC Department of Cultural Resources	8-19-14
NCDENR, Division of Water Resources	
NC Department of Transportation	08/13/2014
Charlotte Regional Transportation Planning Organization (CRTPO)	
Greater Hickory MPO	8/13/2014

NEPA/404 MERGER TEAM MEETING AGREEMENT

REVISED Concurrence Point No. 1: *Purpose and Need & Project Limits Defined*

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Federal Aid Project Number:	STP-150(19)
State Project Number:	WBS Element 37944.1.1
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US Army Corps of Engineers	13th Aug 2014
US Environmental Protection Agency	Cynthia J. VanDerWiele 8.13.2014
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NC Wildlife Resources Commission	8/13/2014
NC Department of Cultural Resources	
NCDENR, Division of Water Resources	
NC Department of Transportation	08/13/2014
Charlotte Regional Transportation Planning Organization (CRTPO)	
Greater Hickory MPO	8/13/2014

NEPA/404 MERGER TEAM MEETING AGREEMENT

REVISED Concurrence Point No. 1: *Purpose and Need & Project Limits Defined*

PROJECT NO./TIP NO./ NAME/DESCRIPTION:

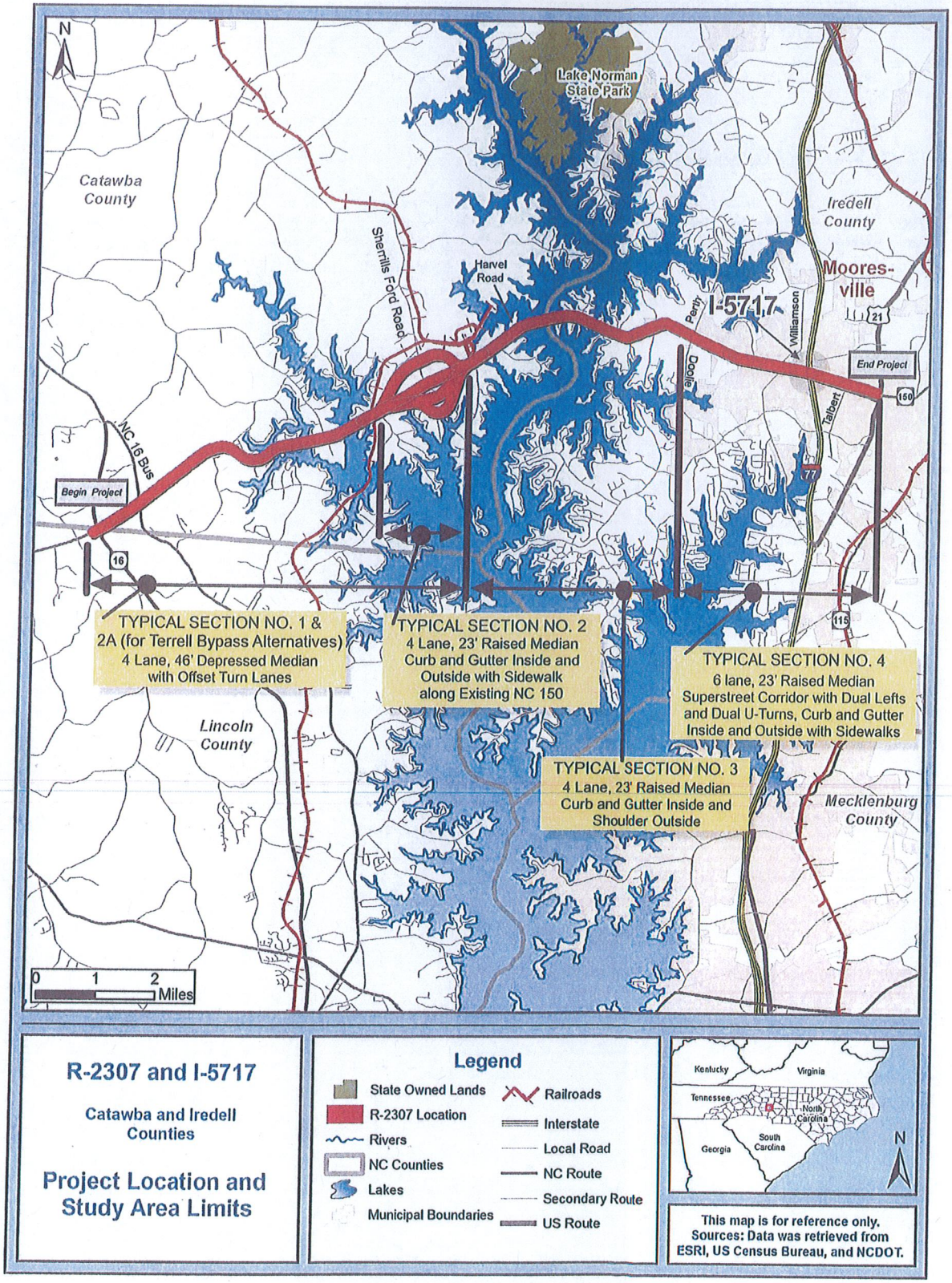
Federal Aid Project Number:	STP-150(19)
State Project Number:	WBS Element 37944.1.1
TIP Project Number:	R-2307, I-5717
TIP Description:	NC 150 Widening from the NC 16 Bypass to just west of the NC 150/US 21 Interchange, Catawba and Iredell Counties.

A single environmental document for the R-2307 and I-5717 projects will be prepared resulting in the revised project limits on NC 150 from the NC 16 Bypass to just west of the US 21 interchange, as shown in the attached exhibit.

The Project Team concurred on this date of August 13, 2014 with the revised limits incorporated into the original purpose and need as follows:

The purpose and need for these projects is to improve capacity and reduce congestion along NC 150 from the NC 16 Bypass to just west of the US 21 interchange.

Federal Highway Administration	Michael Stanyar 8-13-14
US Army Corps of Engineers	13th August 2014
US Environmental Protection Agency	Cynthia J. VanDerWiele 8.13.2014
US Fish and Wildlife Service	13 August 14
NC Wildlife Resources Commission	Marla Chambers 8/13/2014
NC Department of Cultural Resources	
NCDENR, Division of Water Resources	8/14/14
NC Department of Transportation	08/13/2014
Charlotte Regional Transportation Planning Organization (CRTPO)	
Greater Hickory MPO	John Marshall 8/13/2014


N
Lake Norman State Park
Catawba County
Iredell County
Shemills Ford Road
Harvel Road
Moores-ville
I-5717
Perth
Williamson
Dooley
Talbert
End Project
150
21
NC 16 Bus
Begin Project
16
115
TYPICAL SECTION NO. 1 & 2A (for Terrell Bypass Alternatives)
4 Lane, 46' Depressed Median with Offset Turn Lanes
TYPICAL SECTION NO. 2
4 Lane, 23' Raised Median Curb and Gutter Inside and Outside with Sidewalk along Existing NC 150
TYPICAL SECTION NO. 4
6 lane, 23' Raised Median Superstreet Corridor with Dual Lefts and Dual U-Turns, Curb and Gutter Inside and Outside with Sidewalks
TYPICAL SECTION NO. 3
4 Lane, 23' Raised Median Curb and Gutter Inside and Shoulder Outside
Lincoln County
Mecklenburg County
0 1 2 Miles
R-2307 and I-5717
Catawba and Iredell Counties
Project Location and Study Area Limits
Legend
State Owned Lands
R-2307 Location
Rivers
NC Counties
Lakes
Municipal Boundaries
Railroads
Interstate
Local Road
NC Route
Secondary Route
US Route
Kentucky
Virginia
Tennessee
North Carolina
South Carolina
Georgia
N
This map is for reference only.
Sources: Data was retrieved from ESRI, US Census Bureau, and NCDOT.

NEPA/404 MERGER TEAM MEETING AGREEMENT

Concurrence Point No. 2: *Design Options for Detailed Study*

PROJECT NO./TIP NO./ NAME/DESCRIPTION:

Federal Aid Project Number:	STP-150(19)
State Project Number:	WBS Element 37944.1.1
TIP Project Number:	R-2307, I-5717
TIP Description:	NC 150 Widening from the NC 16 Bypass to just west of the NC 150/US 21 Interchange, Catawba and Iredell Counties.

The Project Team concurred on this date of August 13, 2014 that the Best Fit (Widen Existing NC 150) Build Alternative with the following options for the Terrell Historic District will be carried forward for detailed study.

Option 1: Best Fit -Widen Existing NC 150 (No Terrell Bypass Option)

Option 2: Best Fit – Widen Existing NC 150 & Northern Terrell Bypass Option

~~Option 3: Best Fit – Widen Existing NC 150 & Southern Terrell Minimization Bypass Option~~

Option 4: Best Fit – Widen Existing NC 150 & Southern Terrell Bypass Option

Federal Highway Administration	8-13-14
US Army Corps of Engineers	8/13/2014
US Environmental Protection Agency	Cynthia J. VanDerWiele 8.13.2014
US Fish and Wildlife Service	8/13/14
NC Wildlife Resources Commission	8/13/2014
NC Department of Cultural Resources	
NCDENR, Division of Water Resources	
NC Department of Transportation	08/13/2014
Charlotte Regional Transportation Planning Organization (CRTPO)	
Greater Hickory MPO	8/13/2014

NEPA/404 MERGER TEAM MEETING AGREEMENT

Concurrence Point No. 2: *Design Options for Detailed Study*

PROJECT NO./TIP NO./ NAME/DESCRIPTION:

Federal Aid Project Number:	STP-150(19)
State Project Number:	WBS Element 37944.1.1
TIP Project Number:	R-2307, I-5717
TIP Description:	NC 150 Widening from the NC 16 Bypass to just west of the NC 150/US 21 Interchange, Catawba and Iredell Counties.

The Project Team concurred on this date of August 13, 2014 that the Best Fit (Widen Existing NC 150) Build Alternative with the following options for the Terrell Historic District will be carried forward for detailed study.

Option 1: Best Fit -Widen Existing NC 150 (No Terrell Bypass Option)

Option 2: Best Fit – Widen Existing NC 150 & Northern Terrell Bypass Option

~~Option 3: Best Fit – Widen Existing NC 150 & Southern Terrell Minimization Bypass Option~~

Option 4: Best Fit – Widen Existing NC 150 & Southern Terrell Bypass Option

Federal Highway Administration	8-13-14
US Army Corps of Engineers	8/13/2014
US Environmental Protection Agency	Cynthia J. VanDerWiele 8.13.2014
US Fish and Wildlife Service	8/13/14
NC Wildlife Resources Commission	Marla Chambers 8/13/2014
NC Department of Cultural Resources	Renee Gledhill-Earley 8-19-14
NCDENR, Division of Water Resources	
NC Department of Transportation	Zahid Ayaz 08/13/2014
Charlotte Regional Transportation Planning Organization (CRTPO)	
Greater Hickory MPO	John Marshall 8/13/2014

NEPA/404 MERGER TEAM MEETING AGREEMENT

Concurrence Point No. 2: *Design Options for Detailed Study*

PROJECT NO./TIP NO./ NAME/DESCRIPTION:

Federal Aid Project Number:	STP-150(19)
State Project Number:	WBS Element 37944.1.1
TIP Project Number:	R-2307, I-5717
TIP Description:	NC 150 Widening from the NC 16 Bypass to just west of the NC 150/US 21 Interchange, Catawba and Iredell Counties.

The Project Team concurred on this date of August 13, 2014 that the Best Fit (Widen Existing NC 150) Build Alternative with the following options for the Terrell Historic District will be carried forward for detailed study.

Option 1: Best Fit -Widen Existing NC 150 (No Terrell Bypass Option)

Option 2: Best Fit – Widen Existing NC 150 & Northern Terrell Bypass Option

~~Option 3: Best Fit – Widen Existing NC 150 & Southern Terrell Minimization Bypass Option~~

Option 4: Best Fit – Widen Existing NC 150 & Southern Terrell Bypass Option

Federal Highway Administration	8-13-14
US Army Corps of Engineers	8/13/2014
US Environmental Protection Agency	Cynthia J. VanderWiele 8.13.2014
US Fish and Wildlife Service	8/13/14
NC Wildlife Resources Commission	8/13/2014
NC Department of Cultural Resources	
NCDENR, Division of Water Resources	8/14/14
NC Department of Transportation	08/13/2014
Charlotte Regional Transportation Planning Organization (CRTPO)	
Greater Hickory MPO	8/13/2014

NEPA/404 MERGER TEAM MEETING AGREEMENT

Revised Concurrence Point No. 2: *Design Options for Detailed Study*

PROJECT NO./TIP NO./ NAME/DESCRIPTION:

Federal Aid Project Number:	STP-150(19)
State Project Number:	WBS Element 37944.1.1
TIP Project Number:	R-2307, I-5717
TIP Description:	NC 150 Widening from the NC 16 Bypass to just west of the NC 150/US 21 Interchange, Catawba and Iredell Counties.

The Merger Team concurred on this date, October 8, 2015, to eliminate Alternative 4 *(Best Fit – Widen Existing NC 150 & Southern Terrell Bypass Option)* from further consideration and carry forward the following 2 build alternatives for presentation at the public hearing.

Alternative 1: Best Fit -Widen Existing NC 150 (No Terrell Bypass Option)

Alternative 2: Best Fit – Widen Existing NC 150 & Northern Terrell Bypass Option

Note:

Alternative 3 (Best Fit –Widening Existing NC 150 & Southern Terrell Minimization Bypass Option) was eliminated during the CP2 Meeting held on August 8, 2014 due to the adverse effect on the Terrell Historic District. Indirect and cumulative effects associated with Alternative 3 would be greater than the "take" impacts associated with Alternative 1.

Alternative 4 (Best Fit – Widen Existing NC 150 & Southern Terrell Bypass Option) is proposed for elimination due to the significant stream impacts, geometric design constraints, additional FERC regulated crossings of Lake Norman and Indirect and cumulative effects on the Terrell Historic District which has resulted in an adverse effects call by the SHPO and Section 4(f) impacts.

Federal Highway Administration	Michael Batuzich	DocuSigned by: Michael Batuzich 98CBE89EC69B4C3... 10/9/2015
US Army Corps of Engineers	Steve Kichefski	DocuSigned by: Steve Kichefski 730224FBC5524DF... 10/13/2015
US Environmental Protection Agency	Dr. Cynthia Van Der Wiele	DocuSigned by: Dr. Cynthia Van Der Wiele 7ECF19B3FF8144D... 10/13/2015
US Fish and Wildlife Service	Marella Buncick	DocuSigned by: Marella Buncick A39FFFDDE1E74BB... 10/9/2015
NC Wildlife Resources Commission	Marla Chambers	DocuSigned by: Marla Chambers B1D3DCA076AD4C9... 10/15/2015
NC Department of Cultural Resources	Renee Gledhill-Earley	DocuSigned by: Renee Gledhill-Earley C26A1556A275464... 10/9/2015
NCDENR, Division of Water Resources	Donna Hood	DocuSigned by: Donna Hood BF9F8AAB2F04440... 10/9/2015
NC Department of Transportation	Zahid Baloch	DocuSigned by: Zahid Baloch 5F9297F958C0481... 10/9/2015
Charlotte Regional Transportation Planning Organization (CRTPO)	Robert Cook	DocuSigned by: Robert Cook 95B1DADFB9DD4D0... 10/9/2015
Greater Hickory MPO	John Marshall	DocuSigned by: John Marshall 8A0C0E8AB4894FD... 10/13/2015

NEPA/404 MERGER TEAM MEETING AGREEMENT

Concurrence Point No. 2A: Bridging Decisions and Alignment Review

PROJECT NO./TIP NO./ NAME/DESCRIPTION:

Federal Aid Project Number:	STP-150(19)
State Project Number:	WBS Element 37944.1.1
TIP Project Number:	R-2307, I-5717
TIP Description:	NC 150 Widening from the NC 16 Bypass to just west of the US 21/NC 150 Interchange in Catawba and Iredell Counties.

Site ID	Recommended Structure Type and Preliminary Dimensions
1	7 ft x 7 ft RCBC
2	6 ft x 7 ft RCBC
3	241 ft Bridge
4	301 ft Bridge
5	6 ft x 7 ft RCBC
6	10 ft x 10 ft RCBC
7	450 ft Bridge (N); 600 ft Bridge (S)
8	1,166 ft Bridge
9	72-in RCP
10	Extend existing 6 x 6 ft RCBC
11	72-in RCP
12	8 x 8 RCBC
13	7 x 7 RCBC
14	175 ft Bridge
15	10 x 10 RCBC

Note: Dimensions are subject to change based on refined designs or avoidance and minimization measures.

FHWA Michael V Fitzgerald

USACE [signature]

USEPA DocuSigned by: Dr. Cynthia Van Der Wiele 6/11/2015
7ECF19B3FF8144D...

USFWS [signature]

NCWRC Marla Chambers

SHPO DocuSigned by: Renee Gledhill-Earley 6/11/2015
C26A1556A275464...

NCDWR [signature]

NCDOT Zahid [signature] 06-10-2015

NCDOT Div. 12 David Keilson for Reuben Chandler

Charlotte Regional Transportation Planning Organization (CRPTO) DocuSigned by: Robert Cook 6/16/2015
95B1DADFB9DD4D0...

Greater Hickory MPO DocuSigned by: John Marshall 6/11/2015
8A0C0E8AB4894FD...

Appendix B

State Historic Preservation Office (HPO) Concurrence

Federal Aid # **STP-150(19)** *TIP #* **R-2307** *County*: **Catawba, Iredell, and Lincoln**

CONCURRENCE FORM FOR PROPERTIES NOT ELIGIBLE FOR THE NATIONAL REGISTER OF HISTORIC PLACES

Project Description: **Widen NC 150 to multi-lanes from east of the NC 16 Bypass to just west of the I-77 interchange in Mooresville**

On **October 1, 2013** representatives of the

- [X] North Carolina Department of Transportation (NCDOT)
- [X] North Carolina State Historic Preservation Office (NC-HPO)
- [ ] Federal Agency
- [ ] Other

Reviewed the subject project at historic architectural resources photograph review session/consultation and

All parties present agreed

- [ ] There are no properties over fifty years old within the project's Area of Potential Effects (APE).
- [ ] There are no properties less than fifty years old which are considered to meet Criteria Consideration G within the project's APE.
- [X] There are properties over fifty years old within the project's APE, but based on the historical information available and the photographs of each property, the properties identified as 1-62; 65-69; 73-87; 95-97; 100-110; 112-122; 124-130. are considered not eligible for the National Register and no further evaluation of them is necessary. Photographs of these properties are attached.
- [ ] There are no National Register-listed or Study Listed properties within the project's APE.
- [ ] All properties greater than 50 years of age located in the APE have been considered at this consultation, and based upon the above concurrence, all compliance for historic architecture with Section 106 of the National Historic Preservation Act and GS 121-12(a) has been completed for this project.
- [X] More information is requested on properties 99, 111, 123; 63, 64, 70, 71, 72, 88, 89, 90, 91, 92, 93, 94, 98

Signed:

Vanessa E. Patrick — 1 October 2013

Representative, NCDOT — Date

Renee Gledhill-Earley — Oct 1, 2013

Representative, NC-HPO — Date

—

Representative, Federal Agency — Date

If a survey report is prepared, a final copy of this form and the attached list will be included.

Federal Aid #: **STP-150(19)** *TIP#:* **R-2307** *County:* **Lincoln, Catawba, and Iredell**

CONCURRENCE FORM FOR ASSESSMENT OF EFFECTS

Project Description: **Widen NC 150 from NC 16 Bypass to I-77**

On **August 25, 2015** representatives of the

- **X** North Carolina Department of Transporation (NCDOT)
- **X** Federal Highway Administration (FHWA)
- **X** North Carolina State Historic Preservation Office (HPO)
- ☐ Other

Reviewed the subject project and agreed on the effects findings listed within the table on the reverse of this signature page.

Signed:

Vanessa C. Patrick — 25 August 2015

Representative, NCDOT — Date

Michael A. Dawson — 8/25/15

FHWA, for the Division Administrator, or other Federal Agency — Date

Renee Gledhill-Early — 8-25-15

Representative, HPO — Date

Federal Aid #: **STP-150(19)** *TIP#:* **R-2307** *County:* **Lincoln, Catawba, and Iredell**

Property and Status	Alternative	Effect Finding	Reasons
Johnson-Neel House (ID0004) NR	1 2 4	No Adverse for all alternatives	No direct impacts to component resources of property. Access preserved, though rendered more distant (about 500 feet) by superstreet requirements.
Marshall Steam Station (CT1303) DE	1 2 4	No Adverse for all alternatives	No access alterations, no impacts to buildings or other property components, no permanent utility easements anticipated. Small amount of ROW to be acquired (does not compromise resource) – see "de minimis" statement below.
Terrell Historic District (CT0378) NR	1 2 4	**Adverse** No Effect **Adverse**	Direct effects to contributing resources (minimization already in place – elimination of superstreet in historic district). Outside historic district. Reasonably forseeable development in Hobbs Road area will necessitate changes in roadway design and hence impose impacts to district resources.

Initialed: NCDOT VEP FHWA MD HPO

FHWA Intends to use the HPO's concurrence as a basis for a "de minimis" finding for the following properties, pursuant to Section 4(f):
Marshall Steam Station (CT1303 – DE)

North Carolina Department of Cultural Resources

State Historic Preservation Office

Ramona M. Bartos, Administrator

Beverly Eaves Perdue, Governor
Linda A. Carlisle, Secretary
Kevin Cherry, Deputy Secretary

Office of Archives and History
Division of Historical Resources
David Brook, Director

December 14, 2012

MEMORANDUM

TO: Greg Thorpe, Ph.D., Director
Project Development and Environmental Analysis Branch
NCDOT Division of Highways

FROM: Ramona M. Bartos RMB for Ramona M. Bartos

SUBJECT: NC 150 Widening, R-2307, Catawba and Iredell Counties, ER 12-2211

Thank you for your memorandum of November 27, 2012, transmitting the Project Data Sheet for the above project.

There are no known archaeological sites within the proposed project area. Based on our knowledge of the area, it is unlikely that any archaeological resources that may be eligible for inclusion in the National Register of Historic Places will be affected by the project. We, therefore, recommend that no archaeological investigation be conducted in connection with this project.

We have conducted a search of our maps and files and located the following structures of historical or architectural importance within the general area of this project:

- Terrell Historic District (CT 0378), National Register;
- Johnson-Neel House (ID 0004), National Register;
- M. M. Bagriel House (CT 0659), surveyed in 1977 but now believed to be gone; and
- Springdale School (ID 0847), surveyed in 1976-77 but now believed to be gone.

The locations of these properties are available on our GIS website: http://gis.ncdcr.gov/hpoweb/.

We recommend that a Department of Transportation architectural historian identify and evaluate any structures over fifty (50) years of age within the project area, and report the findings to us. The most recent surveys in Catawba and Iredell Counties were in 1977 and 1976-77 respectively.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, please contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579. In all future communication concerning this project, please cite the above-referenced tracking number.

cc: Mary Pope Furr, NC DOT, mfurr@ncdot.gov
Matt Wilkerson, NCDOT
State Clearinghouse

North Carolina Department of Cultural Resources

State Historic Preservation Office

Ramona M. Bartos, Administrator

Governor Pat McCrory
Secretary Susan Kluttz

Office of Archives and History
Deputy Secretary Kevin Cherry

May 12, 2014

MEMORANDUM

TO: Vanessa Patrick
Human Environment Unit
NC Department of Transportation

FROM: Ramona M. Bartos RMB for Ramona M. Bartos

SUBJECT: Historic Structures Survey Report for the Widening of NC 150 from NC 16 Bypass to I-77, R-2307, Multi County, ER 12-2211

Thank you for your April 4, 2014, memorandum transmitting the above-referenced report. We have reviewed the report and offer the following comments.

We do not agree with the recommendation to reduce the boundaries of the National Register-listed **Terrell Historic District (CT0378)** due to new construction within the district. Our reasoning is:

- The Walter Gabriel House and the James Gillin House have not lost sufficient integrity to be re-evaluated as non-contributing. The houses essentially look the way they did when the district was listed. The loss of outbuildings does not have a direct impact on the contributing status of the house.

- There is no reason to remove any part of a district that has buildings and other resources standing on it when the district was listed, whether they were contributing, non-contributing, or not recorded in the nomination form unless a building has been subsequently significantly altered. If this has happened, they do warrant re-study. If, however, they essentially look the way they did when the district was listed, they warrant continued designation in the district -- as we stand by the decision made in 1985 to include them in the boundaries of the district. This includes the buildings along NC 150 -- the cotton warehouse and the Kermit Lee Howard House, in addition to the Rehobeth Church, Cemetery and Parsonage.

- It is not clear in the report which buildings now identified by a red square were standing in the district in 1985 or if they were constructed later. Please provide a photograph and construction date for all these resources. In addition, please provide further information about and photographs showing how the post-1985 buildings have impacted the rural character and streetscapes of the district. New construction does not necessarily mean that the area no longer has enough integrity of setting, feeling, or association to warrant removal from the Register. If the new buildings are relatively small and if they are well set-back from the road, then their impact on the district may be fairly minimal. They appear to be stand alone, single houses (and the library) and spaced well apart.

- The large rear addition and the small side addition on the Connor House have significantly lessened the integrity of the house, and it is appropriate to re-evaluate it as a non-contributing resource.

- The loss of the grist mill, cotton gin and cotton storage building on NC 150 is acknowledged, however, we do not recommend carving that individual piece of property out of the district. The property has not been re-developed, and the farm streetscape along NC 150 still conveys the rural historic character of the district.

We do not concur that the **Marshall Steam Station (CT1303)** is not eligible for listing in the National Register of Historic Place, because it does not meet Criterion Consideration G. It is acknowledged that the 1965-1970 resources still have excellent integrity. The fact that there is a similar, and slightly older, steam plant in Gaston County does not mean that this steam plant is ineligible for the Register. More than one steam plant, especially if it is one of the older ones in the state, can qualify for the Register. To make an informed assessment, one needs to know what/where the other steam plants from 1940 to 1974 are, when they were constructed, their design, and their general level of historic integrity. If the Marshall Steam Station is one of the oldest, then it would be of exceptional significance as a source of power needed for the growing state in the early 1960s.

We concur that the **Berea Baptist Church and Cemetery ((ID1090)** is not eligible for listing in the National Register of Historic Places for the reasons outlined in the report.

We concur that the National Register-listed **Johnson-Neel House (ID0004) remains eligible** for listing.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579 or renee.gledhill-earley@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

cc: Mary Pope Furr, NCDOT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAT MCCRORY
GOVERNOR

ANTHONY J. TATA
SECRETARY

MEMORANDUM

To: Renee Gledhill-Earley

From: Vanessa E. Patrick

Date: August 15, 2014

Subject: Historic Architectural Resources Survey Report Review, T.I.P No. R-2307, Lincoln, Catawba, and Iredell Counties. ER 12-2211.

Thank you for your recent review of the R-2307 historic architectural resources survey report conveyed in your memorandum of May 12, 2014. We are pleased that you concur with our recommendations that the **Johnson Neel House** (ID0004) remains eligible for listing in the National Register of Historic Places and the **Berea Baptist Church and Cemetery** (ID1090) does not meet the criteria for eligibility. We have considered your comments about a proposed boundary reduction for the National Register-listed **Terrell Historic District** (CT0378) and the eligibility of the **Marshall Steam Station** (CT1303) and offer the following observations.

We accept that the case for reducing the National Register boundary of the **Historic Terrell District** is, as yet, not sufficiently proven. We feel compelled to emphasize that our argument for reducing the boundary is grounded in the undermining of visual, spatial, and functional connectivity through demolition of contributing resources and addition of intrusive elements, rather than the diminishing of individual building integrity. It seems precisely the loss of the outbuildings associated with the Walter Gabriel House and the James Gillin House, as well as other resources like the grist mill and cotton gin, coupled with the imposition of more recent construction that has compromised the settings of the properties and created discontinuities within the historic district. Please note that the construction dates for the "red-square" buildings are provided in the final paragraph of page 55 of the report. In future, we shall insure that any resources proposed for removal from or addition to an established historic district are fully represented photographically. Since the completion of the report, we have become acquainted with the range of design alternatives now under

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT & ENVIRONMENTAL ANALYSIS UNIT
1598 MAIL SERVICE CENTER
RALEIGH NC 27699-1548

TELEPHONE: 919-707-6000
FAX: 919-212-5785

WEBSITE:NCDOT.GOV

LOCATION:
CENTURY CENTER, BUILDING B
1020 BIRCH RIDGE DRIVE
RALEIGH NC 27610

consideration and can state that, with or without a boundary reduction, the Terrell Historic District likely will be affected by the R-2307 project. As is customary, we shall schedule a consultation with you if the selected alternative presents an effects situation.

The eligibility assessment of the **Marshall Steam Station** presented in the report is based not only on chrononology, but also rarity. Several other steam plants are identified on page 67, and the Allen Steam Station is specifically cited because it is the most similar to the Marshall structure in design and age. The recent decommissioning of coal-fired power facilities by Duke Energy is also noted and, admittedly, should have been more carefully considered when formulating the eligibility recommendation. We agree that a stronger context is needed and, to that end, we have revisited some of the relevant sources and assembled a brief, preliminary framework for evaluation.

The attached table presents fourteen coal-fired power plants owned by Duke Energy in North Carolina. Since 2011, eight have ceased operation and five of the eight have been demolished. The Marshall Steam Station is now one of the six remaining Duke Energy facilities and one of four built prior to 1966. The Global Energy Observatory databases (http://globalenergyobservatory.org) currently list a total of twenty-eight coal-fired power plants in North Carolina, including the Duke Energy fourteen. Ten of the "non-Duke" structures date to the 1970s-1990s, suggesting that the significance of the Marshall Steam Station is greater than initially calculated. The retrofitting, closure, and demolition of coal-fired power plants is intensifying both in North Carolina and nationally, thus insuring diminishing numbers of this particular industrial building type. Only a handful of steam plants and other power generating structures are represented in the state survey (Cape Fear (CH0676), Cliffside (CL0015), and Allen (GS1452) are minimally recorded) and elsewhere, including the Historic American Engineering Record, and they are virtually absent from the scholarly literature. Indeed, the industrial archaeology of the twentieth century is an increasingly urgent subject for historical investigation.

Given the imminent transformation, if not total disappearance of a building type of which the Marshall Steam Station is one of only a few standing examples, we wish to revise our recommendation and consider the resource eligible for the National Register. In the absence of a fully developed context for the building type, we nevertheless believe that the current decommissioning program adopted by Duke Energy provides adequate justification for recognizing a facility that also remains essentially intact, continues to fulfill its original function, and is one of the earliest such structures built in North Carolina. We agree with the

statement in your memorandum that "if the Marshall Steam Station is one of the oldest, then it would be of exceptional significance as a source of power needed for the growing state in the early 1960s." We suggest that the National Register boundary contain that part of the current tax parcel delineated on the survey map section in Figure 3 (page 4) of the report and follow the existing right-of-way along NC 150. Several of the proposed alternatives for the R-2307 project are located near the Marshall Steam Station. While it appears that the resource can be avoided, we shall, of course, discuss any possible effects with you when an alternative is selected.

Should you have any questions, please do not hesistate to contact me at 919-707-6082 or vepatrick@ncdot.gov. Thank you.

V. E. P.

Copy to: Zahid M. Baloch
John G. Conforti
Jennifer Harris

Duke Energy Coal-Fired Power Plants in North Carolina

ONLINE	NAME	COUNTY	RETIRED	DEMOLISHED
1923	Cape Fear Plant*	Chatham	2012	Pending
1926	Buck Steam Station*	Rowan	2011-2013	Pending
1929	Riverbend Steam Station	Gaston	2013	2013
1940	Cliffside Steam Station*	Cleveland	2011	2013
1949	Dan River Steam Station*	Rockingham	2012	2013
1949	W. H. Weatherspoon Plant	Robeson	2011	2013
1951	H. F. Lee Steam Station*	Wayne	2012	2013-2014
1954	Sutton Steam Station*	New Hanover	2013	
1957	Allen Steam Station	Gaston		
1964	Asheville Plant	Buncombe		
1965	Marshall Steam Station	Catawba		
1966	Roxboro Steam Plant	Person		
1974	Belews Creek Steam Station	Stokes		
1983	Mayo Plant	Person		

*replaced on-site by later, oil- or gas-fueled facilities retaining original name

Source: www.duke-energy.com/power-plants/frachised.asp and www.duke-energy.com/about-us/decommissioningprogram.asp, viewed August 2014

North Carolina Department of Cultural Resources

State Historic Preservation Office

Ramona M. Bartos, Administrator

Governor Pat McCrory
Secretary Susan Kluttz

Office of Archives and History
Deputy Secretary Kevin Cherry

August 28, 2014

MEMORANDUM

TO: Vanessa Patrick
Human Environment Unit
NC Department of Transportation

FROM: Renee Gledhill-Earley
Environmental Review Coordinator

SUBJECT: Historic Structures Survey Report, Improve NC 150 from NC 16 Bypass to I-77, R-2307, Multi County, ER 12-2211

Thank you for your August 15, 2014, memorandum concerning the above-referenced undertaking and Historic Structures Survey Report. We are pleased that our agencies concur on the historical and architectural significance of the Marshall Steam Plant and its eligibility for listing in the National Register of Historic Places. We will add this information to our files and update the GIS to indicate the property's being determined eligible for listing.

We appreciate your comments about the Terrell Historic District and will note them in our records. As with the review of all such reports, our staff is charged with not considering the potential effects of an undertaking on properties when evaluating their eligibility. Rather, their charge is to consider the information provided about specific properties, in accordance with the applicable regulations and guidance provided by the National Park Service in reaching a conclusion. Thus, as noted, we continue in our belief that the Terrell Historic District retains its integrity and adjusting the boundaries at this time is unwarranted.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579 or renee.gledhill-earley@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

cc: Mary Pope Furr, NCDOT mfurr@ncdot.gov

Correspondence specifically regarding archaeological resources.

State Historic Preservation Office
NATURAL AND CULTURAL RESOURCES

Ramona M. Bartos
Administrator

October 13, 2015

MEMORANDUM

TO: Zahid Baloch
Project Development and Environmental Analysis Unit
NCDOT Department of Transportation

FROM: Ramona M. Bartos RMB for Ramona M. Bartos

SUBJECT: Re-Evaluation of NC 150 Improvements, R-2307/I-5717, Iredell and Catawba Counties, ER 12-2211

Thank you for your email of September14, 2015, concerning the above project.

We have conducted a review of the project and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the project as proposed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, please contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579. In all future communication concerning this project, please cite the above-referenced tracking number.

cc: Matt Wilkerson, NCDOT

Appendix C

NRCS Farmland Impact Rating Form

U.S. DEPARTMENT OF AGRICULTURE
Natural Resources Conservation Service

NRCS-CPA-106
(Rev. 1-91)

FARMLAND CONVERSION IMPACT RATING FOR CORRIDOR TYPE PROJECTS

PART I *(To be completed by Federal Agency)*	3. Date of Land Evaluation Request **11/6/15**	4. Sheet 1 of **1**
1. Name of Project **NCDOT TIP R-2307/NC 150**	5. Federal Agency Involved **FHWA**	
2. Type of Project **Widening**	6. County and State **Iredell Co., North Carolina**	
PART II *(To be completed by NRCS)*	1. Date Request Received by NRCS **12/2/15**	2. Person Completing Form **Milton Cortes NRCS Raleigh, NC**
3. Does the corridor contain prime, unique statewide or local important farmland? (If no, the FPPA does not apply - Do not complete additional parts of this form). YES ☑ NO ☐	4. Acres Irrigated **none**	Average Farm Size 115 acres
5. Major Crop(s) **CORN**	6. Farmable Land in Government Jurisdiction Acres: **320,629** % **84**	7. Amount of Farmland As Defined in FPPA Acres: 249,310 % **66**
8. Name Of Land Evaluation System Used **Iredelle Co. NC LESA**	9. Name of Local Site Assessment System **N/A**	10. Date Land Evaluation Returned by NRCS **December 8, 2015 by email**

PART III *(To be completed by Federal Agency)*	Alternative Corridor For Segment 2			
	Corridor A	**Corridor B**	**Corridor C**	**Corridor D**
A. Total Acres To Be Converted Directly	**36.13**	**36.13**		
B. Total Acres To Be Converted Indirectly, Or To Receive Services				
C. Total Acres In Corridor	**36.13**	**36.13**		
PART IV *(To be completed by NRCS) Land Evaluation Information*				
A. Total Acres Prime And Unique Farmland	**7.23**	**7.23**		
B. Total Acres Statewide And Local Important Farmland	**10.77**	**10.77**		
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted	**0.0072**	**0.0072**		
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value	**56 %**	**56**		
PART V *(To be completed by NRCS) Land Evaluation Information Criterion Relative value of Farmland to Be Serviced or Converted (Scale of 0 - 100 Points)*	69	69		

PART VI *(To be completed by Federal Agency) Corridor Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))*	**Maximum Points**				
1. Area in Nonurban Use	**15**	**2**	**2**		
2. Perimeter in Nonurban Use	**10**	**0**	**0**		
3. Percent Of Corridor Being Farmed	**20**	**0**	**0**		
4. Protection Provided By State And Local Government	**20**	**0**	**0**		
5. Size of Present Farm Unit Compared To Average	**10**	**0**	**0**		
6. Creation Of Nonfarmable Farmland	**25**	**0**	**0**		
7. Availablility Of Farm Support Services	**5**	**5**	**5**		
8. On-Farm Investments	**20**	**0**	**0**		
9. Effects Of Conversion On Farm Support Services	**25**	**0**	**0**		
10. Compatibility With Existing Agricultural Use	**10**	**5**	**5**		
TOTAL CORRIDOR ASSESSMENT POINTS	**160**	**12**	**12**	**0**	**0**
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland (From Part V)	**100**	**69**	**69**	**0**	**0**
Total Corridor Assessment (From Part VI above or a local site assessment)	**160**	**12**	**12**	**0**	**0**
TOTAL POINTS *(Total of above 2 lines)*	**260**	**81**	**81**	**0**	**0**

1. Corridor Selected:	2. Total Acres of Farmlands to be Converted by Project:	3. Date Of Selection:	4. Was A Local Site Assessment Used?
TBD	**36.13**		YES ☐ NO ☐

5. Reason For Selection:

The selected alternative will be identified by the NEPA/404 Merger Team at a future date.

Amy C. Sackaroff

Signature of Person Completing this Part: **Amy C. Sackaroff, AICP**

DATE **12/14/15**

NOTE: Complete a form for each segment with more than one Alternate Corridor

U.S. DEPARTMENT OF AGRICULTURE
Natural Resources Conservation Service

NRCS-CPA-106
(Rev. 1-91)

FARMLAND CONVERSION IMPACT RATING FOR CORRIDOR TYPE PROJECTS

PART I *(To be completed by Federal Agency)*	3. Date of Land Evaluation Request **11/6/15**	4. Sheet 1 of **1**
1. Name of Project **NCDOT TIP R-2307/NC 150**	5. Federal Agency Involved **FHWA**	
2. Type of Project **Widening**	6. County and State **Catawba Co., North Carolina**	
PART II *(To be completed by NRCS)*	1. Date Request Received by NRCS **12/2/15**	2. Person Completing Form **Milton Cortes NRCS Raleigh, NC**
3. Does the corridor contain prime, unique statewide or local important farmland? (If no, the FPPA does not apply - Do not complete additional parts of this form). YES ☑ NO ☐	4. Acres Irrigated **none**	Average Farm Size 98 acres
5. Major Crop(s) **CORN**	6. Farmable Land in Government Jurisdiction Acres: **229,021** % **86.6**	7. Amount of Farmland As Defined in FPPA Acres: 191,761 % **76.5**
8. Name Of Land Evaluation System Used **Catawba Co. NC LESA**	9. Name of Local Site Assessment System **N/A**	10. Date Land Evaluation Returned by NRCS **December 09, 2015 by email**

PART III *(To be completed by Federal Agency)*	Alternative Corridor For Segment 2			
	Corridor A	**Corridor B**	**Corridor C**	**Corridor D**
A. Total Acres To Be Converted Directly	**143.51**	**182.98**		
B. Total Acres To Be Converted Indirectly, Or To Receive Services				
C. Total Acres In Corridor	**143.51**	**182.98**		
PART IV *(To be completed by NRCS) Land Evaluation Information*				
A. Total Acres Prime And Unique Farmland	**92**	**116.47**		
B. Total Acres Statewide And Local Important Farmland	**37.79**	**47.18**		
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted	**0.0677**	**0.0853**		
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value	**55 %**	**55 %**		
PART V *(To be completed by NRCS) Land Evaluation Information Criterion Relative value of Farmland to Be Serviced or Converted (Scale of 0 - 100 Points)*	74	75		
PART VI *(To be completed by Federal Agency) Corridor Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))* — **Maximum Points**				
1. Area in Nonurban Use — 15	**8**	**9**		
2. Perimeter in Nonurban Use — 10	**6**	**7**		
3. Percent Of Corridor Being Farmed — 20	**0**	**0**		
4. Protection Provided By State And Local Government — 20	**0**	**0**		
5. Size of Present Farm Unit Compared To Average — 10	**0**	**0**		
6. Creation Of Nonfarmable Farmland — 25	**0**	**0**		
7. Availablility Of Farm Support Services — 5	**5**	**5**		
8. On-Farm Investments — 20	**0**	**0**		
9. Effects Of Conversion On Farm Support Services — 25	**0**	**0**		
10. Compatibility With Existing Agricultural Use — 10	**5**	**7**		
TOTAL CORRIDOR ASSESSMENT POINTS — 160	**24**	**28**	**0**	**0**
PART VII *(To be completed by Federal Agency)*				
Relative Value Of Farmland (From Part V) — 100	**74**	**75**	**0**	**0**
Total Corridor Assessment (From Part VI above or a local site assessment) — 160	**24**	**28**	**0**	**0**
TOTAL POINTS *(Total of above 2 lines)* — 260	**98**	**103**	**0**	**0**

1. Corridor Selected:	2. Total Acres of Farmlands to be Converted by Project:	3. Date Of Selection:	4. Was A Local Site Assessment Used?
TBD	**TBD**		YES ☐ NO ☐

5. Reason For Selection:

The selected alternative will be identified by the NEPA/404 Merger Team at a future date.

Signature of Person Completing this Part: **Amy C. Sackaroff, AICP** Amy C. Sackaroff DATE **12/14/15**

NOTE: Complete a form for each s[illegible]nate Corridor

Appendix D

Relocation Report

EIS RELOCATION REPORT

North Carolina Department of Transportation
RELOCATION ASSISTANCE PROGRAM

☒ E.I.S. ☐ CORRIDOR ☐ DESIGN

WBS ELEMENT:	37944.1.1	COUNTY	Catawba/Iredell	Alternate	R-2307 A Terrell North Alt. 2
T.I.P. NO.:	R-2307 A		PLAN SHEETS 5A (300+21.49 TO 400+54.00)		
DESCRIPTION OF PROJECT:	NC 150 Widening from NC 16 Bypass to US 21				

ESTIMATED DISPLACEES

Type of Displacees	Owners	Tenants	Total	Minorities
Residential	0	2	2	0
Businesses	0	0	0	0
Farms	0	0	0	0
Non-Profit	0	0	0	0

INCOME LEVEL

0-15M	15-25M	25-35M	35-50M	50 UP
0	0	0	2	0

VALUE OF DWELLING

Owners		Tenants	
0-20M	0	$ 0-150	0
20-40M	0	150-250	0
40-70M	0	250-400	0
70-100M	0	400-600	0
100 UP	0	600 UP	2
TOTAL	0		2

DSS DWELLING AVAILABLE

For Sale		For Rent	
0-20M	15	$ 0-150	0
20-40M	1269	150-250	0
40-70M	119	250-400	0
70-100M	1134	400-600	3
100 UP	1071	600 UP	134
	3608		137

ANSWER ALL QUESTIONS

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

REMARKS (Respond by Number)

3) Business Services will remain available as much of the project area is commercial/industrial

6) Available housing and commercial property availability was compiled from local visual survey, internet data, newspapers Data was drawn from the Hickory, Granite Falls, Lenoir Corridor.

8) Last Resort Housing should be a consideration. Where warranted, Last Resort housing will be applied in accordance with the Uniform Relocation Act.

11) Public housing is available through local agencies.

12) Based on the availability of DSS housing available on the market, it is not felt there will be a shortage of DSS housing

* Any deficiency in housing not within financial means will be addressed within the guidelines of the Last Resort Housing Section of the Uniform Act.

14) Based on local survey and current real estate listings suitable business sites will be available. It should be noted that there exists a moderate amount of commercial property vacant or for rent throughout the project area. Commercial/Businesses are heavily affected in this alternate.

NOTE: Large development going in West end of this Alternate. Appears Entrance planned where Access is now showing control

Bradley D Bowers	11/10/5		2/3/16
Right of Way Agent	Date	Relocation Coordinator	Date

FRM15-E

EIS RELOCATION REPORT

North Carolina Department of Transportation
RELOCATION ASSISTANCE PROGRAM

☒ E.I.S. ☐ CORRIDOR ☐ DESIGN

WBS ELEMENT:	37944.1.1	COUNTY	Catawba/Iredell	Alternate	R-2307 A East
T.I.P. NO.:	R-2307 A		PLAN SHEETS 5 AND 6 (STA.400+54.00 TO 438+00.00)		
DESCRIPTION OF PROJECT:	NC 150 Widening from NC 16 Bypass to US 21				

ESTIMATED DISPLACEES

Type of Displacees	Owners	Tenants	Total	Minorities
Residential	0	0	0	0
Businesses	0	0	0	0
Farms	0	0	0	0
Non-Profit	1 ~~0~~	0	1 ~~0~~	0

INCOME LEVEL

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

VALUE OF DWELLING

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

DSS DWELLING AVAILABLE

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

ANSWER ALL QUESTIONS

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

REMARKS (Respond by Number)

2. Part Time Church - Medium sized church

~~NEGATIVE STUDY NO RELOCATION~~

3. Other businesses are available in the area

4. Just the church mentioned above

14. MLS, Realtor.com, Local Realtors

Bradley D Bowers	11/10/5		2/3/16
Right of Way Agent	Date	Relocation Coordinator	Date

FRM15-E

EIS RELOCATION REPORT

North Carolina Department of Transportation
RELOCATION ASSISTANCE PROGRAM

☒ E.I.S. ☐ CORRIDOR ☐ DESIGN

WBS ELEMENT:	37944.1.1	COUNTY	Catawba/Iredell	Alternate	R-2307 A West
T.I.P. NO.:	R-2307 A		PLAN SHEETS 1 THROUGH 4 (UP TO STA. 300+21.49)		
DESCRIPTION OF PROJECT:	NC 150 Widening from NC 16 Bypass to US 21				

ESTIMATED DISPLACEES

Type of Displacees	Owners	Tenants	Total	Minorities
Residential	27	7	34	1
Businesses	14	12	26	2
Farms	0	0	0	0
Non-Profit	0	0	0	0

INCOME LEVEL

0-15M	15-25M	25-35M	35-50M	50 UP
0	0	2	12	20

VALUE OF DWELLING

Owners		Tenants	
0-20M	0	$ 0-150	0
20-40M	0	150-250	0
40-70M	0	250-400	0
70-100M	5	400-600	4
100 UP	22	600 UP	3
TOTAL	27		7

DSS DWELLING AVAILABLE

For Sale		For Rent	
0-20M	15	$ 0-150	0
20-40M	1269	150-250	0
40-70M	119	250-400	0
70-100M	1134	400-600	3
100 UP	1071	600 UP	134
	3608		137

ANSWER ALL QUESTIONS

Yes	No	Explain all "YES" answers.
	X	1. Will special relocation services be necessary?
	X	2. Will schools or churches be affected by displacement?
X		3. Will business services still be available after project?
X		4. Will any business be displaced? If so, indicate size, type, estimated number of employees, minorities, etc.
	X	5. Will relocation cause a housing shortage?
		6. Source for available housing (list). Multiple listing Service, local survey, Internet searches.
	X	7. Will additional housing programs be needed?
X		8. Should Last Resort Housing be considered?
	X	9. Are there large, disabled, elderly, etc. families?
	X	10. Will public housing be needed for project?
X		11. Is public housing available?
X		12. Is it felt there will be adequate DSS housing housing available during relocation period?
	X *	13. Will there be a problem of housing within financial means?
X		14. Are suitable business sites available (list source).
		15. Number months estimated to complete RELOCATION? 18-24

REMARKS (Respond by Number)

3) Business Services will remain available as much of the project area is commercial/industrial
4) Please see attached spreadsheet for business relocatees
6) Available housing and commercial property availability was compiled from local visual survey, internet data, newspapers.
Data was drawn from the Terell and Mooresville area
8) Last Resort Housing should be a consideration. Where warranted, Last Resort housing will be applied in accordance with the Uniform Relocation Act.
11) Public housing is available through local agencies.
12) Based on the availability of DSS housing available on the market, it is not felt there will be a shortage of DSS housing
* Any deficiency in housing not within financial means will be addressed within the guidelines of the Last Resort Housing Section of the Uniform Act.
14) Based on local survey and current real estate listings suitable business sites will be available. It should be noted that there exists a moderate amount of commercial property vacant or for rent throughout the project area. Commercial/Businesses are heavily affected in this alternate.
Notes: Many on premise signs and outdoor advertising signs will be affected. Some businesses counted due to impacts on parking areas (Noted on spreadsheet).

Bradley D Bowers	11/10/15		2/3/16
Right of Way Agent	Date	Relocation Coordinator	Date

FRM15-E

EIS RELOCATION REPORT

North Carolina Department of Transportation
RELOCATION ASSISTANCE PROGRAM

☒ E.I.S. ☐ CORRIDOR ☐ DESIGN

WBS ELEMENT:	37944.1.1	COUNTY	Catawba/Iredell	Alternate	R-2307 A Terrell Alt. 1
T.I.P. NO.:	R-2307 A		PLAN SHEETS 4 THROUGH 5 (300+21.49 TO 400+54.00)		
DESCRIPTION OF PROJECT:	NC 150 Widening from NC 16 Bypass to US 21				

ESTIMATED DISPLACEES

Type of Displacees	Owners	Tenants	Total	Minorities
Residential	1	1	2	0
Businesses	2	1	3	0
Farms	0	0	0	0
Non-Profit	0	0	0	0

INCOME LEVEL

0-15M	15-25M	25-35M	35-50M	50 UP
0	0	0	0	2

ANSWER ALL QUESTIONS

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

VALUE OF DWELLING / DSS DWELLING AVAILABLE

Owners		Tenants		For Sale		For Rent	
0-20M	0	$ 0-150	0	0-20M	15	$ 0-150	0
20-40M	0	150-250	0	20-40M	1269	150-250	0
40-70M	0	250-400	0	40-70M	119	250-400	0
70-100M	0	400-600	0	70-100M	1134	400-600	3
100 UP	1	600 UP	1	100 UP	1071	600 UP	134
TOTAL	1		1		3608		137

REMARKS (Respond by Number)

3) Business Services will remain available as much of the project area is commercial/industrial
4) Please see attached spreadsheet for business relocatees
6) Available housing and commercial property availability was compiled from local visual survey, internet data, newspapers Data was drawn from the Terrell and Mooresville area.

8) Last Resort Housing should be a consideration. Where warranted, Last Resort housing will be applied in accordance with the Uniform Relocation Act.
11) Public housing is available through local agencies.
12) Based on the availability of DSS housing available on the market, it is not felt there will be a shortage of DSS housing
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14) Based on local survey and current real estate listings suitable business sites will be available. It should be noted that there exists a moderate amount of commercial property vacant or for rent throughout the project area. Commercial/Businesses are heavily affected in this alternate.
Notes: On premise signs and outdoor advertising will be affected

Bradley D Bowers	11/10/5		2/3/16
Right of Way Agent	Date	Relocation Coordinator	Date

FRM15-E

R-2307 A Terrell Alt. 1 Plan Sheets 4 and 5
East of CSX RR to Outlet Canal
Stations 300+21.49 to 400+54.00

NO.	T	O	NAME	EMPLOYEES	P	TYPE	M
1		X	The Boat Rack	8	5	Boat Sales/Service/Storage	
2		X	Boss Hogs Barbeque	3	2	Restaurant	
3	X		US Post office	2	2	Postal Service	

R-2307 A West Plan Sheets 1 through 4
NC 16 Bypass to Just East of CSX RR
Up To Sta. 300+21.49

T	O	NAME	EMPLOYEES	P	TYPE	M
X		Subway	2	3	Restaurant	
X		Smokies Unlimited	1	2	Smoke Shop	
X		Golden Coast	2	3	Restaurant	X
X		Healms Cleaners	2	1	Cleaners	
X		Majestic Nails	3	2	Nail Care	X
X		Boost Mobile	2	3	Mobile Phone Sales	
X		Joes Jewelry	2	1	Jewelry sales/repair	
	X	ABC (counted due to parking)	2	2	Liquor Sales	
	X	Walgreens (counted due to parking)	6	5	Drug Store	
	X	CVS (counted due to parking)	6	5	Drug Store	
	X	Fifth Third Bank (counted due to parking)	5	3	Bank	
X		Untouchables Restaurant (will req. cutoff)	4	6	Restaurant	
	X	Cooke Rentals	3	3	Equipment sales/Service	
X		CR Special Events	2	2	Special Event Planner/Provider	
	X	West Lake Auto Tire	3	2	Auto Service	
	X	Little Mountain Vet	5	3	Vet	
	X	Marc 1 Realty	4	2	Real Estate	
	X	CodyCo	3	2	MH/Outbuilding Sales	
	X	Cross Country Campground	2	2	Miniature golf course only	
	X	Speedy Suds	2	2	Carwash/Laundry/Dogwash	
X		Absolutely Fabulous Hair Salon	1	1	Hair Salon	
X		H&R Block	2	1	Tax Prep.	
	X	Butcher Boys Restaurant	5	2	Restaurant	
X		Keys and Strings	1	1	Music Instrument sales/rental	
	X	The General Store	4	3	General Store/Hardware/Gas	
	X	Linebergers Cattle Company	4	6	Restaurant	

EIS RELOCATION REPORT

North Carolina Department of Transportation
RELOCATION ASSISTANCE PROGRAM

☒ E.I.S. ☐ CORRIDOR ☐ DESIGN

WBS ELEMENT:	37944.1.1	COUNTY	Catawba/Iredell	Alternate	R-2307B East
T.I.P. NO.:	R-2307 B				
DESCRIPTION OF PROJECT:	NC 150 Widening from NC 16 to US 21				

ESTIMATED DISPLACEES

Type of Displacees	Owners	Tenants	Total	Minorities
Residential	0	0	0	0
Businesses	2	2	~~2~~ 4	1
Farms	0	0	0	0
Non-Profit	0	0	0	0

INCOME LEVEL

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

ANSWER ALL QUESTIONS

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

VALUE OF DWELLING

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

DSS DWELLING AVAILABLE

For Sale		For Rent	
0-20M	15	$ 0-150	0
20-40M	1269	150-250	0
40-70M	119	250-400	0
70-100M	1134	400-600	3
100 UP	1071	600 UP	134
	3608		137

REMARKS (Respond by Number)

3) Business Services will remain available as much of the project area is commercial/industrial
4) Please see attached spreadsheet for business relocatees
6) Available housing and commercial property availability was compiled from local visual survey, internet data, newspapers Data was drawn from the Terrell and Mooresville area

8) Last Resort Housing should be a consideration. Where warranted, Last Resort housing will be applied in accordance with the Uniform Relocation Act.
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12) Based on the availability of DSS housing available on the market, it is not felt there will be a shortage of DSS housing
* Any deficiency in housing not within financial means will be addressed within the guidelines of the Last Resort Housing Section of the Uniform Act.
14) Based on local survey and current real estate listings suitable business sites will be available. It should be noted that there exists a moderate amount of commercial property vacant or for rent throughout the project area. Commercial/Businesses are heavily affected in this alternate.
NOTE: Outdoor advertising will be impacted as well as multiple On Premise signs

Bradley D Bowers	12/18/15		2/3/16
Right of Way Agent	Date	Relocation Coordinator	Date

FRM15-E

EIS RELOCATION REPORT

North Carolina Department of Transportation
RELOCATION ASSISTANCE PROGRAM

☒ E.I.S. ☐ CORRIDOR ☐ DESIGN

WBS ELEMENT:	37944.1.1	COUNTY	Catawba/Iredell	Alternate	R-2307 B Multi Use
T.I.P. NO.:	R-2307 B		STA. 438+00.00 TO STA. 602+00.00		
DESCRIPTION OF PROJECT:	NC 150 Widening from NC 16 to US 21				

ESTIMATED DISPLACEES

Type of Displacees	Owners	Tenants	Total	Minorities
Residential	0	0	0	0
Businesses	3	0	3	0
Farms	0	0	0	0
Non-Profit	0	0	0	0

INCOME LEVEL

0-15M	15-25M	25-35M	35-50M	50 UP
0	0	0	3	0

ANSWER ALL QUESTIONS

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

VALUE OF DWELLING / DSS DWELLING AVAILABLE

Owners		Tenants		For Sale		For Rent	
0-20M	0	$ 0-150	0	0-20M	15	$ 0-150	0
20-40M	0	150-250	0	20-40M	1269	150-250	0
40-70M	0	250-400	0	40-70M	119	250-400	0
70-100M	0	400-600	0	70-100M	1134	400-600	3
100 UP	0	600 UP	0	100 UP	1071	600 UP	134
TOTAL	0		0		3608		137

REMARKS (Respond by Number)

3) Business Services will remain available as much of the project area is commercial/industrial
4) Please see attached spreadsheet for business relocatees
6) Available housing and commercial property availability was compiled from local visual survey, internet data, newspapers Data was drawn from the Terrell and Mooresville area

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14) Based on local survey and current real estate listings suitable business sites will be available. It should be noted that there exists a moderate amount of commercial property vacant or for rent throughout the project area. Commercial/Businesses are heavily affected in this alternate.
NOTE: Will be impacts to outdoor advertising and multiple on Premise signs.

Bradley D Bowers	12/18/15		2/3/16
Right of Way Agent	Date	Relocation Coordinator	Date

FRM15-E

EIS RELOCATION REPORT

North Carolina Department of Transportation
RELOCATION ASSISTANCE PROGRAM

☒ E.I.S. ☐ CORRIDOR ☐ DESIGN

WBS ELEMENT:	37944.1.1	COUNTY	Catawba/Iredell	Alternate	R-2307B West
T.I.P. NO.:	R-2307 B				
DESCRIPTION OF PROJECT:	NC 150 Widening from NC 16 to US 21				

ESTIMATED DISPLACEES

Type of Displacees	Owners	Tenants	Total	Minorities
Residential	4	0	4	0
Businesses	16	10	26	0
Farms	0	0	0	0
Non-Profit	0	0	0	0

INCOME LEVEL

0-15M	15-25M	25-35M	35-50M	50 UP
0	0	0	3	1

VALUE OF DWELLING / DSS DWELLING AVAILABLE

Owners		Tenants		For Sale		For Rent	
0-20M	0	$ 0-150	0	0-20M	15	$ 0-150	0
20-40M	0	150-250	0	20-40M	1269	150-250	0
40-70M	1	250-400	0	40-70M	119	250-400	0
70-100M	2	400-600	0	70-100M	1134	400-600	3
100 UP	1	600 UP	0	100 UP	1071	600 UP	134
TOTAL	4		0		3608		137

ANSWER ALL QUESTIONS

Yes	No	Explain all "YES" answers.
	X	1. Will special relocation services be necessary?
	X	2. Will schools or churches be affected by displacement?
X		3. Will business services still be available after project?
X		4. Will any business be displaced? If so, indicate size, type, estimated number of employees, minorities, etc.
	X	5. Will relocation cause a housing shortage?
		6. Source for available housing (list). Multiple listing Service, local survey, Internet searches.
	X	7. Will additional housing programs be needed?
X		8. Should Last Resort Housing be considered?
	X	9. Are there large, disabled, elderly, etc. families?
	X	10. Will public housing be needed for project?
X		11. Is public housing available?
X		12. Is it felt there will be adequate DSS housing housing available during relocation period?
	X *	13. Will there be a problem of housing within financial means?
X		14. Are suitable business sites available (list source).
		15. Number months estimated to complete RELOCATION? 18-24

REMARKS (Respond by Number)

3) Business Services will remain available as much of the project area is commercial/industrial
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14) Based on local survey and current real estate listings suitable business sites will be available. It should be noted that there exists a moderate amount of commercial property vacant or for rent throughout the project area. Commercial/Businesses are heavily affected in this alternate.
NOTE: Will be impacts to outdoor advertising and multiple on Premise signs.

Bradley D Bowers	12/18/15		2/3/16
Right of Way Agent	Date	Relocation Coordinator	Date

FRM15-E

I-2307 B East
Sta. 737+00 to US 21

NO.	T	O	**NAME**	EMPLOYEES	P	TYPE	M
1	X		Taco Bell	3	8	Restaurant	
2	X		Lake Norman Dentistry	3	2	Dentist Office	X
3		X	Lake Norman Urgent care	8	3	Dr. Office/Urgent Care	
4		X	Exxon	4	2	Convenience Store/Gas	

EIS RELOCATION REPORT

North Carolina Department of Transportation
RELOCATION ASSISTANCE PROGRAM

☒ E.I.S. ☐ CORRIDOR ☐ DESIGN

WBS ELEMENT:	37944.1.1	COUNTY	Catawba/Iredell	Alternate	R-2307A West Multi Use
T.I.P. NO.:	R-2307 A		STA. 250+00.00 TO STA. 300+21.49		
DESCRIPTION OF PROJECT:	NC 150 Widening from NC 16 to US 21				

ESTIMATED DISPLACEES

Type of Displacees	Owners	Tenants	Total	Minorities
Residential	3	0	3	0
Businesses	0	0	0	0
Farms	0	0	0	0
Non-Profit	0	0	0	0

INCOME LEVEL

0-15M	15-25M	25-35M	35-50M	50 UP
0	0	0	0	3

ANSWER ALL QUESTIONS

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

VALUE OF DWELLING

Owners		Tenants	
0-20M	0	$ 0-150	0
20-40M	0	150-250	0
40-70M	0	250-400	0
70-100M	0	400-600	0
100 UP	3	600 UP	0
TOTAL	3		0

DSS DWELLING AVAILABLE

For Sale		For Rent	
0-20M	15	$ 0-150	0
20-40M	1269	150-250	0
40-70M	119	250-400	0
70-100M	1134	400-600	3
100 UP	1071	600 UP	134
	3608		137

REMARKS (Respond by Number)

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Bradley D Bowers	12/18/15		2/3/16
Right of Way Agent	Date	Relocation Coordinator	Date

FRM15-E

I-2307 B West
Sta. 438+00 to Sta. 729+00

NO.	T	O	**NAME**	EMPLOYEES	P	TYPE	M
1		X	HydroHoist	2	1	Boat Lifts	
2		X	Leonard Truck Acessories	4	2	Truck Accessories/Outbuildings	
3		X	Fired Broad Pottery	1	1	Pottery Studio	
4	X		Sports Page	3	5	Restaurant	
5	X		Martinizing Dry Cleaners	2	2	Dry Cleaners	
6	X		Primary Care Associates	4	2	Dr. Office	
7	X		Saks Orthodontics	4	2	Orthodontists	
8	X		Direct TV	2	1	TV/ Sattellite	
9	X		Chad Goodin Signature Homes	2	2	Home Sales	
10		X	Serendipity Aquatic Plants	2	1	Plants	
11		X	Mattress Express	5	3	Mattress Sales	
12		X	Advance Auto Parts	3	3	Auto Parts Sales	
13		X	AutoZone	3	3	Auto Parts Sales	
14		X	Lonestar Steakhouse	4	#	Restaurant	
15		X	Duckworth Grill	4	6	Restaurant	
16		X	Walgreens	6	6	Drug Store	
17	X		AT&T	4	4	Phone Sales	
18		X	Lake Norman Realty	6	2	Real Estate	
19		X	Circle K	4	2	Convenience Store/ Gas	
20		X	Valvolene	3	2	Auto Service	
21	X		FedEx Office	3	2	Shipping/Packaging	
22	X		Health Nutz	2	3	Nutrition/Retail	
23	X		Cell Phone Repair	2	2	Cell Phone Repair	
24		X	Lake Norman Animal Hospital	8	2	Vet	
25		X	5/3 Bank	6	4	Bank	
26		X	Shell	4	2	Convenience Store/ Gas	

B West Multi Use
8+00 to Sta. 602+00.00

	O	NAME	EMPLOYEES	P	TYPE	M
	X	HydroHoist	2	1	Boat Lifts	
	X	Leonard Truck Acessories	4	2	Truck Accessories/Outbuildings	
	X	Fired Broad Pottery	1	1	Pottery Studio	

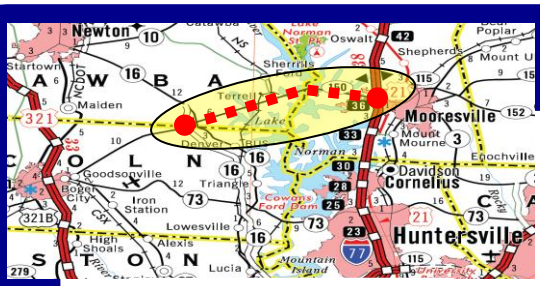
Appendix E

Public Involvement

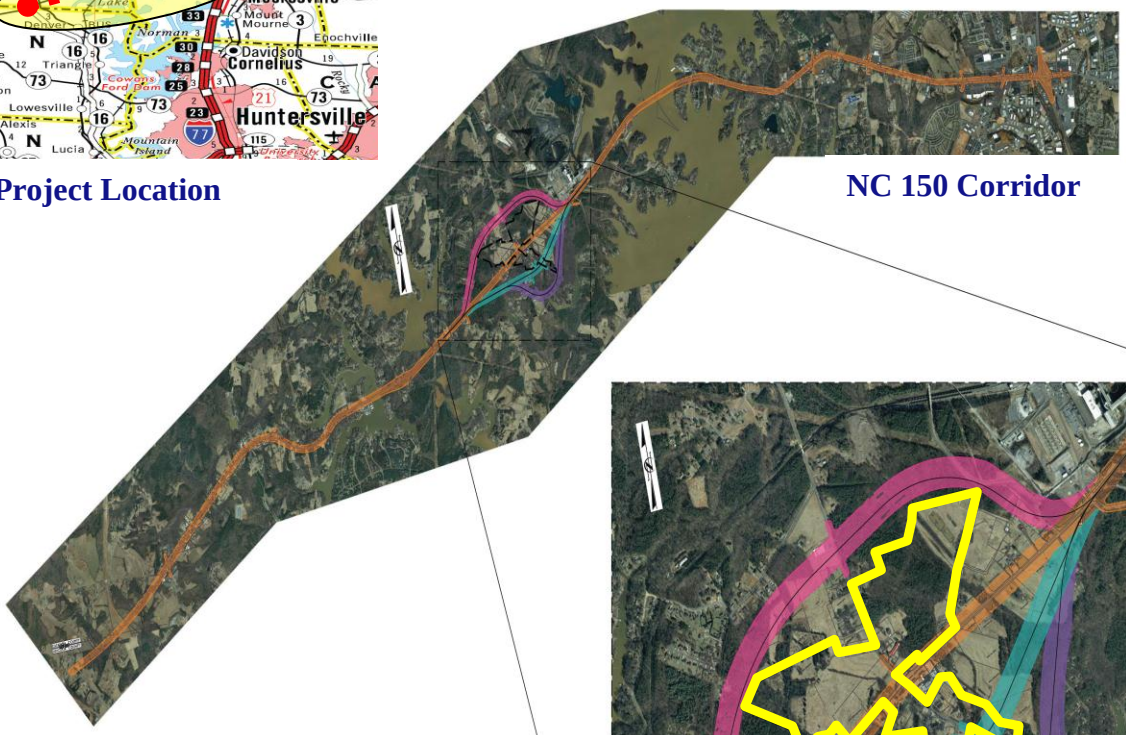
North Carolina Department of Transportation

Project Development and Environmental Analysis Branch

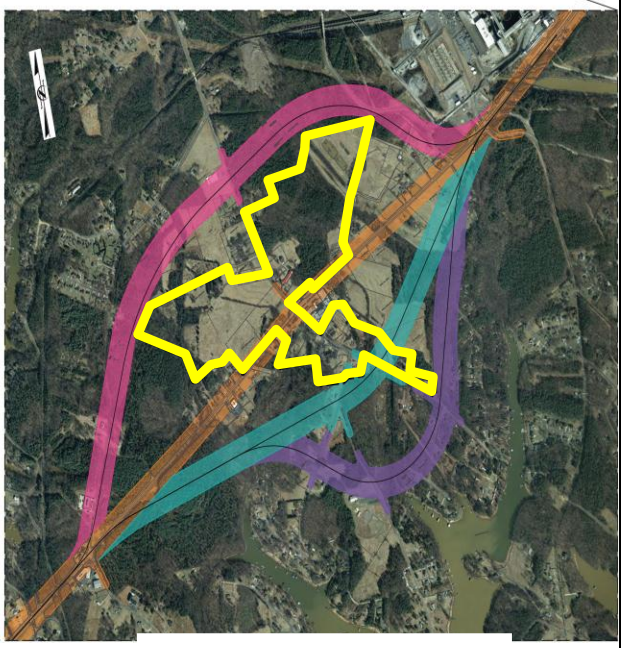
Public Meeting



Project Location



NC 150 Corridor



Terrell Historic District

NC 150 Widening
From I-77 in Iredell County to the NC 16 Bypass in Catawba County

November 21, 2013

TIP No. R-2307
FIRST PUBLIC MEETING

PURPOSE OF THE PUBLIC MEETING

The purpose of this meeting is to involve the public in the project development process and to inform citizens that the North Carolina Department of Transportation (NCDOT) is planning to widen NC 150 from I-77 in Iredell County to the NC 16 Bypass in Catawba County. Public involvement is an integral part of the NCDOT's project development process. The concerns of citizens and interest groups are considered during project development studies. Often, additional project alternatives are studied or recommended alternatives are changed based on comments received from the public and/or local officials.

NCDOT realizes individuals living close to a proposed project want to be informed of the possible effects of the project on their homes and businesses. However, exact information may not be available at this stage of the project development process. For example, design work is necessary before the actual right of way limits can be established. This type of detailed information will be available at a later date. The purpose of this workshop is to receive your comments *before* final design decisions are made.

Written comments on this project may be left with NCDOT representatives at the workshop or mailed to the address below. If additional information is needed or you would like to submit comments after the workshop, please address requests and comments to:

Contact:

Mr. Michael Wray, PE
NC Department of Transportation
Project Development & Environmental Analysis Branch
1548 Mail Service Center
Raleigh, NC 27699-1548
(919) 707-6050
mgwray@ncdot.gov

Andrea Dvorak-Grantz, AICP
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(800) 349-3721
andrea.dvorakgrantz@stantec.com

THE PROJECT DEVELOPMENT PROCESS

Planning and environmental studies for federally funded highway projects are conducted in order to comply with the National Environmental Policy Act (NEPA). The type of document published following the planning study depends on the magnitude of the project and its expected environmental impact. NCDOT is preparing an Environmental Assessment (EA) for this project.

The EA will discuss the purpose and need for the proposed improvements, evaluate alternatives, and analyze the project's impact on both the human and natural environment. The document will address the following areas of concern:

- Efficiency and safety of travel
- Neighborhoods and communities
- Relocation of homes and businesses
- Economy of project area
- Land use plans
- Historic properties
- Wetlands
- Endangered species
- Wildlife and plant communities
- Water quality
- Floodplains and streams
- Farmland
- Archaeological sites
- Hazardous materials
- Traffic noise
- Air quality

NCDOT is in the very early planning stages with this project. Study corridors, as shown on the exhibit on the front page, have been developed for the project and detailed studies will be conducted in these corridors in the future. The results of these studies will aid in developing the preliminary alternatives to carry forward in to the preliminary design phase of the planning process.

OPPORTUNITIES FOR PUBLIC INVOLEMENT

SCOPING LETTER - Published in the NC Environmental Bulletin. This letter notifies agencies and groups on the State Clearinghouse mailing list that a project study has been initiated and solicits comments from them.

PUBLIC MEETING – NCDOT conducts these workshops to speak one-on-one with citizens about projects. Comment sheets are provided for citizens to write down their questions, comments, and concerns.

DOCUMENT DISTRIBUTION – Copies of environmental documents are submitted to the State Clearinghouse for distribution and a notice is published in the NC Environmental Bulletin. Upon request, NCDOT will provide copies of the document to the public. Copies are available for public viewing at NCDOT Raleigh and Division offices, the State Clearinghouse office, local government offices, including the local council of government office, and local public libraries.

CITIZEN LETTER – Citizens are encouraged to write NCDOT and provide information and express concerns regarding proposed improvements at anytime during the process. Correspondence from citizens and interest groups is considered during the course of planning study and is included in the project file.

PROJECT DESCRIPTION

NCDOT proposes to widen NC 150 from I-77 in Iredell County to the NC 16 Bypass in Catawba County from a two-lane facility to a four-lane facility.

PROJECT PURPOSE

The purpose and need for this project is to improve capacity and reduce congestion along NC 150 from the NC 16 Bypass to the I-77 Interchange. The need for project is based on:

- Traffic volumes
  - The existing capacity is 12,700 vehicles per day (in the two-lane segment). Today over 20,000 cars traverse the two-lane stretch of NC 150 daily.
- Existing & projected LOS
  - The current year volume-to-capacity ratio is 1.57 (in the two-lane segment), well over a LOS F. In 2035, the volume to capacity ratio is expected to exceed 2.19, and could be as high as 3.29.
- Safety
  - This stretch of NC 150 exceeds the statewide and critical rates. Rear-end crashes were the largest percentage of crashes.

Current Project Schedule

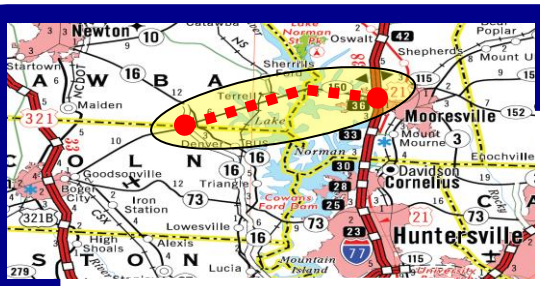
Description	Schedule
Environmental Document (EA)	Fall/Winter 2015
Right of Way	2017
Let date	2019

THANK YOU FOR ATTENDING THE WORKSHOP.
YOUR COMMENTS ARE VERY IMPORTANT IN THE PLANNING PROCESS.

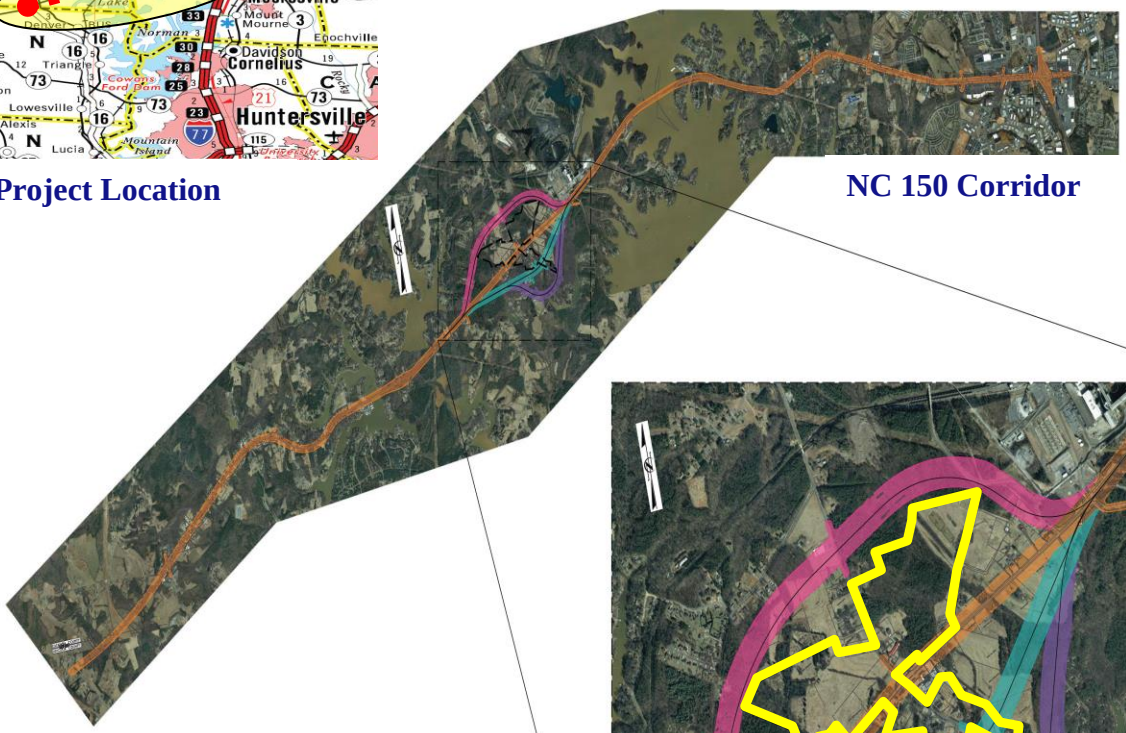
North Carolina Department of Transportation

Project Development and Environmental Analysis Branch

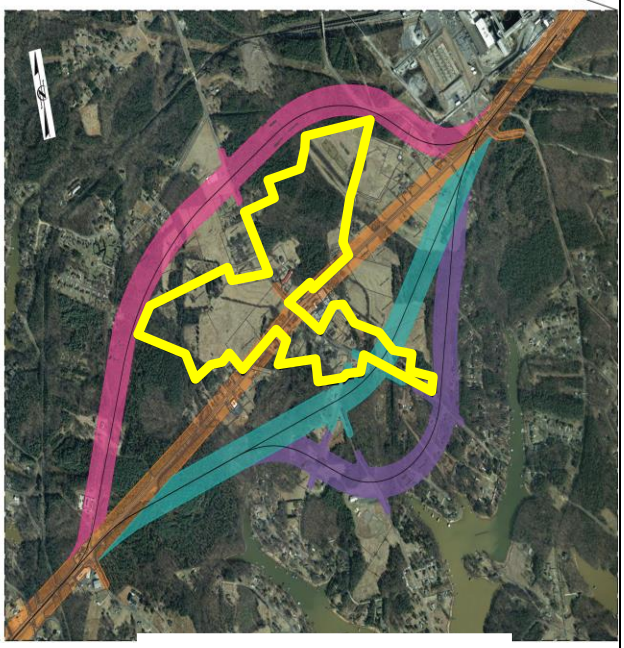
Public Meeting



Project Location



NC 150 Corridor



Terrell Historic District

NC 150 Widening
From I-77 in Iredell County to the NC 16 Bypass in Catawba County

November 21, 2013

TIP No. R-2307
FIRST PUBLIC MEETING

PURPOSE OF THE PUBLIC MEETING

The purpose of this meeting is to involve the public in the project development process and to inform citizens that the North Carolina Department of Transportation (NCDOT) is planning to widen NC 150 from I-77 in Iredell County to the NC 16 Bypass in Catawba County. Public involvement is an integral part of the NCDOT's project development process. The concerns of citizens and interest groups are considered during project development studies. Often, additional project alternatives are studied or recommended alternatives are changed based on comments received from the public and/or local officials.

NCDOT realizes individuals living close to a proposed project want to be informed of the possible effects of the project on their homes and businesses. However, exact information may not be available at this stage of the project development process. For example, design work is necessary before the actual right of way limits can be established. This type of detailed information will be available at a later date. The purpose of this workshop is to receive your comments *before* final design decisions are made.

Written comments on this project may be left with NCDOT representatives at the meeting or mailed to the address below. If additional information is needed or you would like to submit comments after the workshop, please address requests and comments to:

Contact:

Mr. Zahid Baloch, PE
NC Department of Transportation
Project Development & Environmental Analysis Branch
1548 Mail Service Center
Raleigh, NC 27699-1548
919-707-6012
zbaloch@ncdot.gov

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PROJECT DESCRIPTION

NCDOT proposes to widen existing NC 150 to a multi-lane facility from I-77 in Iredell County to the NC 16 Bypass in Catawba County.

PROJECT PURPOSE

The purpose and need for this project is to improve capacity and reduce congestion along NC 150 from the NC 16 Bypass to the I-77 Interchange. The need for project is based on:

- Traffic volumes
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- Safety
  - This stretch of NC 150 exceeds the statewide and critical rates. Rear-end crashes were the largest percentage of crashes.

Current Project Schedule

Description	Schedule
Environmental Document (EA)	Winter 2015
Right of Way	Section A: 2020; Section B: 2017
Let date	Section A: 2023; Section B: 2019

THANK YOU FOR ATTENDING THE MEETING.
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