I-40

From West of NC 801 in
Davie County to
East of SR 1101 (Harper Road/Tanglewood Business Park Road) in
Forsyth County

Federal Aid No. NHIMF-40-3(112)180
State Project No. 8.1610401
WBS No. 34147.1.2

T.I.P. PROJECT NO. I-0911 A

Administrative Action

ENVIRONMENTAL ASSESSMENT

U. S. Department of Transportation
Federal Highway Administration
And
N. C. Department of Transportation
submitted pursuant to 42 U.S.C. 4332(2) (c)
and 49 U. S. C. 303

APPROVED:

6/15/11 _____
Date FOR Gregory J. Thorpe, Ph.D., Manager
Project Development and Environmental Analysis Branch

6/22/11 for _____
Date John F. Sullivan, III, P. E., Division Administrator
Federal Highway Administration

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ENVIRONMENTAL ASSESSMENT

June 2011

Documentation prepared in the Project Development and Environmental Analysis Branch by:

Beverly Robinson
Project Development Group Supervisor

6/15/11
S. Eric Midkiff, P.E.
Project Development Unit Head

PROJECT COMMITMENTS

I-40

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TIP PROJECT NO. I-0911 A

Project Development & Environmental Analysis Branch, Roadway Design Unit

NCDOT will use a steeper slope 1.5:1 with rock plating to stabilize soil at the historic Win-Mock Farm to further minimize impact to the historic property. Additional design is needed prior to final design.

Project Development & Environmental Analysis Branch, Roadway Design Unit

The proposed preliminary design for the project currently requires a permanent construction easement at the Win-Mock Farm Property. A no adverse effect determination was rendered for this impact. A de minimis conclusion was rendered for this impact.

Project Development & Environmental Analysis Branch- Human Environmental Unit/ Traffic Noise Section, Roadway Design Unit

Preliminary consideration for noise abatement measures was given to all impacted receptors. Based upon the presently unavailable project design, the recommendation of this Traffic Noise Analysis is that a detailed study of potential mitigation measures for three noise sensitive areas (NSAs) that meet preliminary feasibility and reasonableness criteria shall be conducted during project Final Design.

An updated traffic noise analysis will be conducted on any area that may be developed before the date of public knowledge.

Division 9 Construction

The I-40 bridge across the Yadkin River is approximately 4 miles above the City of Winston-Salem's primary water intake. Best Management Practices for sedimentation and erosion control (including devices such as silt fences, sediment basins, matting, etc.) will be implemented to keep sediment and other pollutants out of the Yadkin River during construction. This project involves construction activities on or adjacent to the Federal Emergency Management Agency (FEMA) regulated stream. Therefore, the Division shall submit sealed as-built construction plans to the Hydraulics Unit upon completion of project construction, certifying that the drainage structures and roadway embankment that are located within the 100-year floodplain were built as shown in the construction plans, both horizontally and vertically.

Hydraulics

The Hydraulics Unit will coordinate with the Floodplain Mapping Program (FMP), the delegated state agency for administering FEMA's National Flood Insurance Program, to determine the status of the project with regard to applicability of NCDOT'S Memorandum of Agreement with FMP, or approval of a Conditional Letter of Map Revision (CLOMR) and subsequent final Letter of Map Revision (LOMR).

Geotechnical Unit

A soil and groundwater assessment of the three identified properties will be provided before right of way acquisition.

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I-40

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Federal Aid No. NHIMF-40-3(112)180
State Project No. 8.1610401
WBS No. 34147.1.2

TIP PROJECT NO. I-0911 A

SUMMARY

A. Type of Action

This is a Federal Highway Administration (FHWA) Administrative Action, Environmental Assessment (EA).

B. Description of Action

The North Carolina Department of Transportation (NCDOT), in accordance with the Federal Highway Administration (FHWA), proposes to widen I-40 from west of NC 801 in Davie County to east of SR 1101 (Harper Road/Tanglewood Business Park Road) in Forsyth County, see Vicinity Map, Figure 1.

I-40 is recommended to be widened to a six-lane divided facility with a 36-foot wide median, and ten-foot shoulders for the entire length of the project. The project will include replacing the existing bridges over the Yadkin River to improve safety and increase capacity along I-40. The total project length is approximately 2.6 miles long and is shown in Figures 1, 2a and 2b.

The cost estimate for the proposed project as shown in the approved 2009-2015 Transportation Improvement Program (TIP) is $65,873,000, which includes $ 650,000 for right of way acquisition, $38,000,000 for construction and $27,223,000 for prior years cost. The cost estimate for the proposed project as shown in the Draft 2011-2020 Transportation Improvement Program (TIP) is $74,873,000, which includes $ 650,000 for right of way acquisition, $47,000,000 for construction and $27,223,000 prior years cost.

The current estimated cost for the proposed improvements is as follows:

Table S1: Project Cost Estimate

	Preferred Alternative
Right of Way Cost	$ 18, 300
Construction	$ 48,200,000
Total Cost	**$ 48,218,300**

C. Summary of Purpose and Need

The primary purpose of this project is to increase the traffic carrying capacity and enhance transportation safety along I-40 within the project limits. Capacity analysis indicate that the existing 4 lane divided facility operated at Level of Service (LOS D) in 2009 and will operate at a Level of Service (LOS F) in 2035 under the no build conditions. The 2035 Build scenario capacity analysis results indicate that this segment of I-40 is expected to operate at a LOS E. In addition, as part of transportation safety requirements, the existing bridges over the Yadkin River were inspected and determined to be structurally deficient and must be replaced due to age and wear.

D. Alternatives Considered

1. "No Build" Alternative

The No-Build alternative would avoid the adverse human and natural environmental impacts that are anticipated as a result of this project. However, there would be no positive effect on the congestion or safety problems of this roadway. Therefore, this alternative is not recommended.

2. Best-Fit Build Alternative

One (best fit) build alternative with three design options were proposed in the vicinity of the historic property, the Win-Mock Farm. The best fit alternative includes widening I-40 to a six-lane divided facility with a 36-foot wide median, and ten-foot shoulders for the entire length of the project.

a. Alternative Design Options

A retaining wall, 1.5:1 slopes with rock plating, and 2:1 slopes were studied as design options in the vicinity of the historic Win-Mock farm to reduce impacts to this property. These options were reviewed by the Historic Preservation Office and the 1.5:1 slope reduction was chosen as the preferred design option in the vicinity of Win-Mock Farm to reduce impacts to the property.

E. **Table S2: Summary of Environmental Impacts***

IMPACT CATEGORY	1.5:1 SLOPE (PREFERRED ALTERNATIVE)	RETAINING WALL	2:1 SLOPE
Project Description			
Project Length (miles)	2.6	2.6	2.6
Traffic Volume (vehicles/ day in thousands)	48.4 to 55.6 (2009) 86.3 to 91.2 (2035)	48.4 to 55.6 (2009) 86.3 to 91.2 (2035)	48.4 to 55.6 (2009) 86.3 to 91.2 (2035)
Natural Resources Impacts			
Federal Listed Species Habitat	No	No	No
100-Year Flood Plain and Floodway Impacts	Yes	Yes	Yes
Wetlands (number of crossings/acres)	**4/ 0.2 ac**	**4/ 0.2 ac**	**4/ 0.2 ac**
Stream Crossings (number/linear feet)	**5/ 821 lf**	**5/ 821 lf**	**5/ 821 lf**
Potential Riparian Buffers (acres)	0	0	0
Water Supply Critical Areas	0	0	0
Potential 4f Impacts	YES (de minimis)	NO	YES
Human Environment Impacts			
Residential Relocations (number)	0	0	0
Business Relocations (number)	0	0	0
Low Income/Minority Population	0	0	0
Churches/Church Office (number)	0	0	0
Cemeteries/Gravesites (number)	0	0	0
Recorded Historic Sites/Districts	1 (Historic Property)	1 (Historic Property)	1 (Historic Property)
Physical Environment Impacts			
Railroad Crossings	0	0	0
Underground Storage Tanks (number)	0	0	0
Costs			
Right-of-Way Costs ($ M 2010)	$ 18, 300	$ 18, 300	$ 18, 300
Construction Costs ($ M 2010)	$48,200, 000	$48,600, 000	$48,200, 000
Total Construction Cost	**$ 48, 218, 300**	**$48, 718, 300**	**$ 48, 218, 300**

* *Impacts were calculated based on a* 25-foot clearing limits outside slope stake lines

F. Permits Required

Impacts to jurisdictional surface waters are anticipated. In accordance with provisions of Section 404 of the Clean Water Act, a permit will be required from the U.S. Army Corps of Engineers (USACE) for the discharge of dredged or fill material into "Waters of the United States." A Nationwide Permit (NWP) is likely to be applicable for all impacts to Waters of the United States resulting from the proposed project.

If greater than 0.5 acres of wetland impacts or 300 linear feet of stream impacts occur, then an Individual Permit will be necessary. Final permitting decisions rest with the USACE. Since this project is located in the Yadkin-Pee Dee River Basin, a Buffer Certification will not be required from NC Department of Environment and Natural Resources Division of Water Quality (NCDENR-DWQ) for this project.

G. Coordination

The following federal, state, and local agencies were consulted during the preparation of this Environmental Assessment.

U. S. Army Corps of Engineers- Wilmington Region
U. S. Environmental Protection Agency – Region IV
U. S. Department of Interior, Fish and Wildlife Service – Raleigh
*N. C. Department of Public Instruction – School Planning
*N. C. Department of Cultural Resources – Division of Archives and History
*N. C. Department of Environment and Natural Resources
Division of Water Quality
Division of Environmental Health
*N. C. Wildlife Resources Commission
*Winston-Salem Planning Organization
*Town of Bermuda Run

Written comments were received from agencies noted with an asterisk (*). Copies of the comments received are included in Appendix A.

H. Contact Information

The following persons can be contacted for additional information concerning the proposal and assessment:

John F. Sullivan, III, P. E.
Division Administrator
Federal Highway Administration
310 New Bern Avenue, Suite 410
Raleigh, North Carolina 27601
Telephone (919) 856-4346

Gregory J. Thorpe, Ph.D., Manager
Project Development and Environmental Analysis Branch
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1548
Telephone (919) 707-6001

I-40

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TIP PROJECT NO. I-0911 A

I. DESCRIPTION OF PROPOSED ACTION

A. General Description

The North Carolina Department of Transportation (NCDOT), in accordance with the Federal Highway Administration (FHWA), proposes to widen I-40 from west of NC 801 in Davie County to east of SR 1101 (Harper Road/Tanglewood Business Park Road) in Forsyth County. The proposed improvements are funded as Project I-0911A in the approved 2009-2015 State Transportation Improvement Program (STIP) and draft 2011-2020 STIP. The proposed project would widen I-40 to a six-lane divided facility with a 36-foot wide median, and ten-foot shoulders for the entire length of the project. The existing structures over the Yadkin River will be replaced by two 1121 feet long bridges (See Figures 2a and 2b).

The proposed project is approximately 2.6 miles long. The study area for the proposed improvements begins just west of NC 801 in Davie County and ends just east of SR 1101 (Harper Road) (see Figures 2a and 2b).

B. Historic Resume and Project Status

The project is located in the Village of Clemmons, Forsyth County and the Town of Bermuda Run, Davie County, North Carolina. The proposed project is included in the draft 2011-2020 State Transportation Improvement Program (STIP) with right of way acquisition scheduled beyond 2020.

C. Cost Estimates

The cost estimate for the proposed project as shown in the draft 2011-2020 Transportation Improvement Program (TIP) is $74,873,000, which includes $ 650,000 for right of way acquisition, $47,000,000 for construction and $27,223,000 prior years cost. The current estimated cost for the proposed improvements is as follows:

Table 1: Project Cost Estimate

	1.5:1 Slope (Preferred Alternative)
Right of Way Cost	$ 18, 300
Construction	$ 48, 200, 000
Total Cost	**$ 48, 218, 300**

II. PURPOSE AND NEED FOR THE PROJECT

A. Purpose of Project

The purpose of the proposed is to:

- Improve roadway capacity and
- Enhance transportation safety along I-40 from west of the SR 1101 and I-40 interchange to west of the NC 801 and I-40 interchange.

B. Need of Project

The needs to be addressed by this project include:

- Growing traffic volumes on I-40 reducing the level of service of the facility;
- Continuity of the six-lane sections from east of the SR 1101 and I-40 interchange to west of NC 801 and I-40 interchange.
- Replacing the existing bridges over the Yadkin River in an effort to improve safety and increase capacity along I-40.

The 2009 No Build volumes are 48,400 vehicles/day and operate at a Level of Service (LOS D) with a density of 31.4 pc/mi/ln. The 2035 volumes on this segment of I-40 in the No Build scenario are expected to be 82,200 vehicles/day and operate at LOS F.

I-40 is a 6-lane median divided facility beginning at the project eastern terminal near SR 1101. Currently, both eastbound and westbound of I-40 at the Harper Road interchange are two lane sections. However, a section of westbound I-40 at NC 801 is a three lane section while the eastbound I-40 is a two lane section. The proposed improvements under this project will complete the 6-lane section through the project limit to match the westbound section of NC 801.

Bridge Numbers 85 and 86 over the Yadkin River were built in 1959, and currently have a sufficiency rating of 65.3% out of 100% respectively and are designated as "structurally deficient". These bridges will be replaced.

C. Description of Existing Conditions

1. Functional Classification

I-40 is classified as an interstate in the North Carolina functional Classification System.

2. Physical Description of Existing Facility and Roadway Cross-Section

I-40 is a major thoroughfare that transects the Winston Salem-metro region. It is a vital transportation link between Winston Salem and other major cities such as Greensboro and Raleigh. It stretches from the east shores of North Carolina westward to Nashville/ Memphis Tennessee and ends in California. Currently, the section of I-40 within the project limits consists of a four-lane divided facility with a 36-foot grassed median. Photos showing existing conditions are presented in Figure 3.

3. Horizontal and Vertical Alignment

The existing horizontal and vertical alignment of I-40 is suitable for the posted speed limit of that facility, 70 mph.

4. Right of Way and Access Control

The existing right of way width along I-40 within the project area varies between 260 to 325 feet. The access along this section of I-40 is fully controlled with ingress and egress at existing interchanges.

5. Speed Limits

The existing speed limit along I-40 within the proposed project is 70 mph. The posted speed across the Yadkin River Bridges is 65 mph.

6. Existing Intersections

There are no at grade intersections within the project limits.

7. Railroad Crossings

There are no railroad crossings within the project limits.

8. Structures

There are four structures within the project area. See Table 2.

Table 2: Existing Structures

Bridge #	Length (ft)	Year Built	Suff. Rating
85 (EB)	1121	1959	65.3%
86 (WB)	1121	1959	65.3%
84	227	1959	48.1%
127*	16	1959	81%

*Underpass culvert

9. Bicycle and Pedestrian Facilities/Greenways

North Carolina Bicycle Route 2 (Mountain to Sea) passes in the vicinity of the project. This bicycle route runs along Lancaster Road north of the project, turns south onto Harper Road, and turns east onto US 158.

No sidewalks were observed on US 158, NC 801 or Harper Road.

10. Utilities:

Utility involvement along the proposed project is moderately heavy. Utilities in the project area include natural gas, water, electric, sewer, telephone, and cable television.

11. School Bus Usage

Currently, there are no school buses traveling through the project area in Davie or Forsyth Counties.

12. Accident Data and Analysis

The crash analysis consisted of a total of 144 crashes reported along this section of I-40 between March 1, 2007 and February 28, 2010. For crash rate purposes, this section can be classified as an Urban Interstate Route in North Carolina. Table 3 shows the comparison of the crash rates for the analyzed section of I-40 versus the 2005-2007 statewide crash rates and the calculated critical rate with a 95% level of confidence for a comparable route type and configuration. The current fatal and non-fatal crash rates are above the average statewide crash rates for similar type facilities. None of the crash rates are above the critical crash rates for similar type facilities.

Table 3: Summary of the Crash Data within the Project Area

Rate	Crashes	I-40 Crash Rate	MVM Statewide Rate [1]	Critical Rate [2]
Total	144	99.41	109.33	123.97
Fatal	1	0.69	0.51	1.83
Non-Fatal	46	31.76	31.41	39.42
Night	36	24.85	26.89	34.32
Wet	23	15.88	22.49	29.32

[1] 2005-2007 Statewide Crash rate for Urban Interstate Route in North Carolina. MVM (Rates were provided in *terms* of crashes per 100 million vehicle-miles. (C/100 *MVM*) where *traffic* volumes could be determined.

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 cause.

13. Airports

There is no airport in the project area.

14. Other Highway Projects in the Area

The location and status of other Highway Projects located in the vicinity of this project are described below:

- I-2102: Modification of the I-40/Harper Road interchange. *Right of Way: Completed: Construction: Completed;*
- B-3637: Replacement of NC 801 bridge over I-40. *Right of Way: Completed, Construction: Completed, and;*
- B-3835: Replacement of Bridge #35 on US 158 over the Yadkin River. *Right of Way: Completed, Construction: Completed.*

D. Traffic Data

1. Traffic Volumes

Estimated average daily traffic volumes were developed for the proposed project. The traffic forecast 2009 base volumes range from 48,400 to 55,600 vpd from NC 801 to Lewisville-Clemmons Road. Traffic estimates along the existing I-40 in 2035 range from 86,300 to 91,200 vpd from NC 801 to Lewisville-Clemmons Road. See Figures 4a through 4c.

2. Mainline/Intersection Capacity Analysis

A mainline analyses was performed using the 2009 base volumes and 2035 design year traffic projections provided by the Transportation Planning Branch (August, 2009) to determine the levels of service (LOS). Analysis was based on the assumption that the current plans for this project are to construct six-lane sections from east of the SR 1101 and I-40 interchange to west of the NC 801 and I-40 interchange. Capacity analysis indicate that the existing 4 lane divided facility operated at a Level of Service (LOS D) in 2009 and will operate at a Level of Service (LOS F) in 2035 under the no build conditions. The 2035 Build scenario capacity analysis results indicate that this segment of I-40 is expected to operate at a LOS E.

E. Transportation and Land Use Plans

1. Local Area/Plans Goals/Communities

The western portion of the project lies in Davie County, and the eastern portion, in Forsyth County.

Town of Bermuda Run

Bermuda Run is situated just off I-40 on the eastern end of Davie County with a population of 1420; the town enjoys the benefits of a small town atmosphere while being conveniently located within minutes of Winston-Salem. Restrictions in the gated community and zoning regulations for NC 801 and US 158 guide the Town of Bermuda Run toward systematic and controlled growth. Land immediately surrounding the I-40 corridor is zoned commercial, residential, and open space. Land use and zoning are not expected to substantially deviate from current uses or plans but growth could accelerate if sewer capacity is increased.

Bermuda Run's planning and zoning jurisdiction extends beyond the town limits to include the Kinderton residential area (north of I-40). This area is delineated on the Town of Bermuda Run Zoning Map as Residential Mixed Use. The community is upper middle income and under construction with builders' sales offices and model homes open. At build-out, Kinderton will have over 700 single- and multi-family homes. Between the residential area and NC 801 is an emergency medical service and neighborhood strip shopping center (grocery, bank, restaurant and small shops).

A request for rezoning of the undeveloped land between the Kinderton residential area and the soccer park, north of I-40 is eminent. That land is currently zoned as Residential/Mixed Use, but retail, restaurants, and a hotel are proposed.

The Town of Bermuda Run is located in the northeastern portion of Davie County. As of the2000 Census the Town's population was 1,470. Bermuda Run has adopted both zoning and subdivision ordinances. Starting in January 2011 the Town began the process to develop their first Comprehensive Plan. The plan is expected to be completed in late 2011 or early 2012.

Village of Clemmons

The village of Clemmons is located 10 miles southwest of Winston-Salem along I-40. Clemmons has a population of 17,912 and encompasses 12 square miles. The Village Point Small Area Plan adopted by the Village of Clemmons recommends an office campus along the east side of Harper Road and north of I-40 with a "substantial, undisturbed tree buffer of at least fifty (50) feet for noise mitigation." The area is anticipated to be built over a 15-year period. Village Point is considered new urbanism design with mixed-use areas. Land to the west of the Harper Road interchange is planned and zoned for single family residential and open space.

The Village of Clemmons is located in the southwestern portion of Forsyth County. The Village has a population of 18,627 and is bisected by I-40. The Village has adopted a multitude of local regulation and ordnances addressing land use and growth including zoning regulations and a subdivision ordinance. In 2008 Clemmons adopted the Village Transportation Plan (VTP) and their first 20 year Comprehensive Plan in 2010 both of which discuss congestion on I-40 and needed improvements.

2. Transportation Plans

a. Winston-Salem Urban Area 2035 Long Range Transportation Plan and Air Quality Conformity Analysis Report (LRTP)

The Winston-Salem Urban Area 2035 Long Range Transportation Plan and Air Quality Conformity Analysis Report (LRTP) was adopted by the Winston-Salem Urban Area Transportation Advisory Committee (TAC) on January 29, 2009 and approved by FHWA on March 6, 2009. The 2035 LPTP includes a fiscally constrained plan that identifies projects and priorities for the Winston-Salem Metropolitan Planning Organization (MPO). This project is the first listed project on the 2016-2025 Street and Highway Project List of the 2035 LRTP.

b. Winston-Salem Urban Area Comprehensive Transportation Plan 2009 (CTP)

The Winston-Salem Urban Area Comprehensive Transportation Plan 2009 (CTP) Street and Highway Map was adopted by the TAC in August 2008 with all other components adopted on January 29, 2009. NCDOT adopted the final CTP on March 6, 2009. This project is listed on both the Highway Map and the Street and Highway Table of the CTP as recommended for improvement.

F. System Linkage

a. Existing Roadway Network

I-40 is six lanes wide just east of Harper Road. I-40 is important for daily commuters traveling to and from Winston-Salem for long distant travel. The additional lanes continue through most of the Winston-Salem area. The existing I-40 bridges are large structures spanning both the Yadkin River and the Yadkin River's floodplain. The existing bridges provide 10-20 feet of clearance along the floodplain on the west side of the river. An access road currently passes under the bridge in this location. The access road connects US 158 with the BB&T Soccer Park.

When the original I-40 project was constructed in this area, two unique features were constructed. The first feature is the Bert's Way Bridge, a narrow bridge that crosses I-40 providing access from one side of a farm to the other. The second feature is an underpass culvert that crosses under I-40. One side of this crossing location is located at the end of Lakeside Crossing and Pinewood Lane Road in the Village Homes section of the Kinderton residential area. The other side of the passage connects to vacant property west of the Kinderton Town Center.

US 158

US 158, a two lane roadway, runs parallel to and about 0.3 mile south of I-40. It connects Winston-Salem with Clemmons and Bermuda Run. US 158 provides motorists with an alternate route to I-40 and with local access in Clemmons and Bermuda Run. US 158 is functionally classified as a Minor Arterial by NCDOT. At the time of the site visit, this portion of US 158 appeared to be heavily traveled. The US 158 crossing of the Yadkin River bridge replacement is completed.

Harper Road (SR 1101)

Harper Road (SR 1101) runs north from US 158, through Clemmons and into the Lewisville Area. The majority of the roadway is two lanes wide. The interchange of Harper Road and I-40 is currently completed. Two roundabouts were proposed to be constructed on Harper Road. One roundabout would be north of I-40, at the intersection of the westbound on- and off-ramps with Harper Road. The other roundabout would be south of I-40, at the intersection of the eastbound on- and off-ramps with Harper Road.

NC 801

NC 801 provides access to and from Bermuda Run and I-40. The NC 801/I-40 interchange in Davie County is near the west end of the project. NC 801 is functionally classified as a Minor Arterial by NCDOT.

G. Safety

The current total crash rate is above the average statewide rates for similar type facilities for fatal and non-fatal crashes.

H. Benefits of Proposed Project

The 2009 mainline base volumes along I-40 in the project area range from 48,400 to 55,600 vehicles per day. The analysis indicated that the existing facility *was* operating at a **LOS D** or better in the 2009 No Build scenario. Traffic volumes are anticipated to increase and range from 86,300 to 91,200 vehicles per day in the design year 2035. The capacity analysis results indicate that this segment of I-40 is expected to operate at a **LOS F** in the peak hour of the 2035 No Build scenario. In the 2035 Build scenario, this volume is expected to increase to be 86,300 vehicles per day. For the 2035 Build scenario, capacity analysis results indicate that this segment of I-40 is expected to operate at a **LOS E** or better between NC 801 and SR 1101 (Harper Road) interchange and a LOS F or better east of SR 1101 (Harper Road) interchange in the peak hour.

If improvements are not made to the I-40 corridor, safety conditions are likely to further deteriorate in the future. The proposed improvements will help capacity along the segment of I-40 and help enhance transportation safety by completing the six-lane section between the NC 801 and Harper Road interchanges. However, in order to achieve a mainline LOS of D or better for the 2035 design year, an eight lane freeway facility would be required. Increasing the typical section to 8 lanes is not feasible because I-40 east of SR 1101(Harper Road) is 6 lanes and west of NC 801 is 4 lanes. Constructing 8 lanes between the 4 and 6 lane section will not help the overall capacity of I-40.

Currently, there are no future plans to widen I-40 east or west of the project area to 8 lanes; therefore 8 lanes along this section of I-40 would create inconsistency in the typical section.

III. ALTERNATIVES

A. Preliminary Study Alternatives

1. "No Build" Alternative

The majority of the existing facility is already operating at level of service D or E. The No-Build Alternative would not provide relief from existing traffic congestion and would result in the further deterioration of traffic conditions as volumes increase, nor will it enhance transportation safety along this segment of I-40. In addition, lane continuity would not be provided with the existing six-lane cross sections on the eastern portion of the roadway. Therefore, the "No Build" Alternative would not meet the purpose and need of the project and is not recommended.

2. Build Alternative

The proposed project would provide a six lane freeway from west of NC 801 in Davie County to east of SR 1101 (Harper Road) in Forsyth County. One (best fit) build alternative with two design options were proposed in the vicinity of a historic property, the Win-Mock Farm. The best fit alternative includes widening I-40 to a six-lane divided facility with a 36-foot wide median, and ten-foot shoulders for the entire length of the project. A retaining wall, 1.5:1 slopes with rock plating and 2:1 slopes were studied as design options for the proposed project. The existing structures over the Yadkin River will be replaced by two 1121 foot long bridges. See Table 4 for summary of impacts.

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Table 4: Alternative Comparison Impacts*

IMPACT CATEGORY	1.5:1 SLOPE PREFERRED ALTERNATIVE	RETAINING WALL	2:1 SLOPE
Project Description			
Project Length (miles)	2.6	2.6	2.6
Traffic Volume (vehicles/ day in thousands)	48.4 to 55.6 (2009) 86.3 to 91.2 (2035)	48.4 to 55.6 (2009) 86.3 to 91.2 (2035)	48.4 to 55.6 (2009) 86.3 to 91.2 (2035)
Natural Resources Impacts			
Federal Listed Species Habitat	No	No	No
100-Year Flood Plain and Floodway Impacts	Yes	Yes	Yes
Wetlands (number of crossings/acres)	**4/ 0.2 ac**	**4/ 0.2 ac**	**4/ 0.2 ac**
Stream Crossings (number/linear feet)	**5/ 821 lf**	**5/ 821 lf**	**5/ 821 lf**
Potential Riparian Buffers (acres)	0	0	0
Water Supply Critical Areas	0	0	0
Potential 4f Impacts	YES (De Minimis)	NO	YES
Human Environment Impacts			
Residential Relocations (number)	0	0	0
Business Relocations (number)	0	0	0
Low Income/Minority Population	0	0	0
Churches/Church Office (number)	0	0	0
Cemeteries/Gravesites (number)	0	0	0
Recorded Historic Sites/Districts	1 (Historic Property)	1 (Historic Property)	1 (Historic Property)
Physical Environment Impacts			
Railroad Crossings	0	0	0
Underground Storage Tanks (number)	0	0	0
Costs			
Right-of-Way Costs ($ M 2010)	$ 18, 300	$ 18, 300	$ 18, 300
Construction Costs ($ M 2010)	$48,200, 000	$48,600, 000	$48,200, 000
Total Construction Cost	**$ 48, 218, 300**	**$48, 718, 300**	**$ 48, 218, 300**

* *Impacts were calculated based on a* 25-foot clearing limits outside slope stake lines

B. NCDOT Preferred Alternative

Based on results and findings of comprehensive studies of the natural and human environments impacted by the project, NCDOT has selected the 1.5:1 slope with rock plating alternative at the Win-Mock Farm as the preferred design option to avoid or minimize impacts to the historic property. See Table 4 for impacts.

IV. PROPOSED IMPROVEMENTS

The North Carolina Department of Transportation (NCDOT) proposes to widen I-40 to a six-lane median divided freeway from west of NC 801 in Davie County to east of SR 1101 (Harper Road/Tanglewood Business Park Road) in Forsyth County. A 36-foot wide median and ten-foot shoulders is proposed for the entire length of the project. To avoid and/or minimize impacts to the historic Win-Mock Farm property, 1.5:1 slopes with rock plating will be used in the vicinity of the historic property. A 2:1 slope will be used for the remaining of the project. Impacts for the preferred alternative are listed in Table 4.

The proposed project is approximately 2.6 miles long. The cost estimate for the proposed project as shown in the draft 2011-2020 Transportation Improvement Program (TIP) is $74,873,000, which includes $ 650,000 for right of way acquisition, $47,000,000 for construction and $27,223,000 prior years cost. The current estimated cost for the proposed improvements is as follows:

Table 5: Project Cost Estimate

	Preferred Alternative
Right of Way Cost	$ 18, 300
Construction	$ 48, 200, 000
Total Cost	**$ 48, 218, 300**

A. Roadway Cross-section and Alignment

A 6 lane median divided typical section was developed for this project. A wider typical section is required along the proposed bridge to accommodate traffic control measures. Only one of the proposed Yadkin River Bridges will be constructed with a wider typical section. Figure 5 illustrates the typical section.

B. Right of Way and Access Control

The existing right of way width of 260 to 325 feet can accommodate the proposed improvements. No additional right of way will be acquired along the proposed segment of I-40. Construction easements may be required. Drainage easements may also be required along the proposed project. Full control of access will be maintained in the project area.

C. Speed Limit

The anticipated posted speed limit will be 65 miles per hour (mph).

D. Design Speed

The proposed design speed for the project is 70 mph.

E. Anticipated Design Exceptions

It is anticipated no design exceptions will be required for this project.

F. Intersections

There is no at grade intersection located along the proposed project.

G. Structures

There are two major hydraulic structures for river crossings associated with the proposed project. Below are the proposed crossings. The Bert's Way Bridge is functionally obsolete and is not recommended for replacement. The widening of I-40 cannot be accommodated with this structure in place. The underpass culvert accommodates Cattle Crossing a dirt path in the project area. This culvert will be retained and extended. See Figure 2a and 2b for the location of the bridges.

Table 6: Hydraulic Structure Recommendation

Bridge #	Length (ft)	Yr. Built	Suff. Rating	Recommendation
85 (EB)	1121	1959	65.3%	Replace with new bridge of same length and elevation.
86 (WB)	1121	1959	65.3%	Replace with new bridge of same length and elevation.
84	227	1959	48.1	Remove bridge, not recommended for replacement.
127*	16	1959	81	Retain and extend.

*Underpass culvert

H. Bicycle and Pedestrian Facilities/Greenways

There are no recommendations for the bicycle and pedestrian accommodations along this section of I-40.

I. Utilities

The proposed improvements will have no impact on the existing utilities. No relocations of utilities are anticipated.

J. Landscaping

In accordance with the NCDOT Highway Landscape Planting policy, funding for landscaping is typically included in all TIP highway improvement projects. Details of specific landscaping for this project will not be known until final construction plans have been approved. The project will also include standard landscaping as needed for erosion control purposes. Davie and Forsyth counties have not requested special landscaping for the proposed project.

V. ENVIRONMENTAL EFFECTS OF PROPOSED ACTION

A. Natural Resources

1. Physical Resources

The project study area is located in the southwestern part of the piedmont physiographic province of North Carolina. Topography in the project vicinity is characterized as gently sloping to steep. Elevation averages approximately 670 ft above mean sea level.

a. Water Resources

Jurisdictional surface waters are located within the project area. The project is located in the Yadkin-Pee Dee River Basin (USGS Hydrologic Units 03040101, DWQ Subbasin 03-07-02). Water quality within this subbasin is generally good, although most waters do display notable impacts. In addition to the Yadkin River, there are13 jurisdictional streams that may possibly be affected by the proposed project, see Table 7. All unnamed streams crossed by I-40 in the project study area utilize culverts, except for the Yadkin River which flows under bridges.

b. Water Supply/Watershed

The Yadkin River classification according to the North Carolina Division of Water Quality is WS-IV Protected Area with waters used as sources of water supply for drinking, culinary, or food processing purposes. The WS-IV Protected Area classification allows two dwelling units per acre or 24% built-upon area under the low density option and 24-70% built-upon area under the high density option. The I-40 bridge across the Yadkin River is approximately 4 miles above the City of Winston-Salem's primary water supply intake. Best Management Practices for sediment and erosion control, (including devices such as silt fences, sediment basins, matting, etc.) will be implemented to keep sediment and other pollutants out of the Yadkin River during construction.

Table 7. Surface Waters Located within the Project Study Area

Map Number/ Name[1]	Receiving Body	Width (ft.)	Depth (in)	Substrate[2]	Classification	DWQ Index[3]	Best Use Classification
Stream 1	Blanket Creek	1	1-4	Sd, St	Intermittent	12-90-(2)	WS-IV
UT-A	Blanket Creek	1-3	1-6	Sd,St	Perennial	12-90-(2)	WS-IV
Yadkin River	Yadkin River	200-250	NA	B, C, Gr, Sd	Perennial	12-(86.7)	WS-IV
Stream A	Yadkin River	1-6	1-12	Gr, Sd, St	Perennial	12-(86.7)	WS-IV
UT-SA	Yadkin River	2-3	1-6	St	Perennial	12-(86.7)	WS-IV
Stream 1a	Yadkin River	1-3	1-12	Gr, Sd, St	Perennial	12-(86.7)	WS-IV
Stream FH	Yadkin River	1-2	2-12	Gr, Sd, St	Perennial	12-(86.7)	WS-IV
Stream JS	Yadkin River	1-2	2-8	Gr, Sd, St	Perennial	12-(86.7)	WS-IV
Stream CB	Yadkin River	2-4	2-12	C, Gr, Sd	Perennial	12-(86.7)	WS-IV
Stream CBZ	Yadkin River	1-3	1-4	C, Gr, Sd	Intermittent	12-(86.7)	WS-IV
Stream SP	Yadkin River	1-3	6-24	C, Gr, Sd, St	Perennial	12-(86.7)	WS-IV
Stream SCA	Smith Creek	1-2	1-6	Gr, Sd, St	Intermittent	12-93-1	C
Stream SC	Smith Creek	2-3	6-24	Gr, Sd	Perennial	12-93-1	C
Stream SS	Smith Creek	1-2	1-6	Gr, Sd	Intermittent	12-93-1	C

[1] UT- Unnamed Tributary

[2] B- Boulder, C- Cobble, Gr- Gravel, Sd- Sand, St- Silt

[3] DWQ Index number for unnamed tributaries is the index number for the named body of water into which the UT flows.

Stream 1 and UT-A are located at the northeastern most corner of the project corridor. Stream 1 progressed from an ephemeral channel to intermittent and perennial stretches. A reach of about 50 feet of UT-A was evaluated and using both the DWQ Stream Identification form as well as a Stream Quality Assessment Worksheet from the US Army Corps of Engineers (USACE). Both of these tributaries flow into the first of a series of three ponds located to the north of the project study area, before emptying into Lasater Lake. Lasater Lake ultimately flows into the Yadkin River upstream of the project corridor by way of Blanket Creek. This reach of Blanket Creek has been given a Stream Index Number of 12-90-(2) by the NCDENR- Division of Water Quality.

At the western end of the project, west of the NC 801/I-40 interchange, three streams were identified. Streams SCA, SC, and SS flow southward exiting the project study area and emptying into Smith Creek, Stream Index Number 12-93-1. Streams SCA and SS are intermittent tributaries

to Stream SC. Smith Creek flows into Carter's Creek and ultimately empties into the Yadkin River, several miles downstream of the project corridor. The remaining eight streams identified in the project study area flow into the Yadkin River, by way of a network of unnamed tributaries. The Yadkin River is a high-order river, with well-defined banks and levees, within a watershed primarily characterized by suburban residential and agricultural uses.

During site investigations flow has been moderate to swift. The substrate is composed of sand, gravel, cobble, and boulders. Several large boulders are exposed in the channel of the river inside of the study area. The section of the Yadkin River crossed by the subject bridge has been assigned Stream Index Number 12-(86.7) by the NCDENR- Division of Water Quality (DWQ 2003).

c. Biotic Resources

Three dominant terrestrial plant communities were identified during field investigations (Figures 6a and 6b). The terrestrial communities identified in the project study area include: Mixed Upland Hardwood-Forest, Piedmont Levee Forest, and Maintained/Disturbed Areas. Community boundaries within the study area are fairly well defined without a significant transition zone between them and terrestrial faunal species likely to occur within the study area may exploit all communities for shelter and foraging opportunities or as movement corridors.

i. Mixed Upland Hardwood Forest

One of the major terrestrial ecotypes in the project region is described as mixed upland hardwood forest. This community occurs throughout the project area and includes Mesic Mixed Hardwood Forest and Dry-Mesic Oak-Hickory Forest at higher elevations and along ridges. The canopy is dominated by white oak, scarlet oak, southern red oak, northern red oak, and pignut hickory. Pines, typically loblolly, are often an important component and may occasionally even be dominant in the more recently disturbed areas. Understory vegetation includes red maple, sweetgum, tulip poplar, Eastern red cedar, sourwood, and flowering dogwood. Vines proliferate in sunny areas and edges and include poison ivy, Japanese honeysuckle, trumpet creeper, and Virginia creeper.

ii. Piedmont Levee Forest

This community exists in a riparian fringe along the banks of the Yadkin River. The community naturally grades into Mesic Mixed Hardwood Forest along the toe of slope where maintained and disturbed areas are not presently established. The canopy is comprised of red maple, tulip poplar, sweetgum, river birch, and sycamore. A dense shrub layer is composed of downy arrowwood, box elder, Chinese privet, and winged elm. Typical vines include greenbrier, poison ivy, Japanese honeysuckle, and muscadine grape. Herbs on the forest floor include Japanese grass, Japanese honeysuckle, giant cane, and false nettle.

iii. Maintained/Disturbed

Several forms of the maintained/disturbed community are present, including frequently maintained road shoulders and utility easements, residential communities, agricultural fields and

commercial complexes. Successional stage of maintained and disturbed areas is determined by the frequency and severity of perturbation.

The roadside shoulder consists of a low-growing community of grasses and herbs, adapted to frequent disturbances. Flora found in the frequently mowed road shoulder includes fescue, dandelion, goldenrod, horse nettle, field violet and wild onion. Vegetation along utility easements is primarily composed of weedy hardwoods such as red maple, sweet gum, and tulip poplar. Other species included blackberry, false nettle, Japanese grass, and jewelweed in wetland areas.

More frequently maintained areas such as residential communities and commercial developments are planted with grasses, including fescues and Bermuda grass. They also contain weedy species such as goldenrod, dandelion, and white clover.

Table 8. Terrestrial Community Impacts

Community ID	**Area (Acres)***	**% of Study Area**
Maintained/Disturbed	214.4	61.75
Mixed Upland Hardwood Forest	127.9	36.84
Piedmont Levee Forest	4.92	1.42
Total	**347.22**	100

* Values were calculated using ArcGIS software.

2. Jurisdictional Issues

a. Clean Water Act/Waters of the U.S.

Section 303(d) of the Clean Water Act (CWA) requires states to develop a list of waters not meeting water quality standards or which have impaired uses. A review of the draft 2010 303(d) list for North Carolina indicates that no waterbodies within 1.0 mile of the study area are listed as being impaired.

i. Streams

Thirteen streams and the Yadkin River were identified in the project study area. Stream locations are shown on Figures 7 through 12. The water quality designations of each jurisdictional stream and the Yadkin River within the project study area are detailed in Section V. A.1.a. Table 9 lists the lengths and impacts of each of those streams and the Yadkin River.

Table 9: Stream Crossings and Impacts in Project Area

Map Number/ Name[1]	Receiving Body	Width (ft.)	Depth (in)	Substrate[2]	Classification	DWQ Index[3]	Length within Study Area (ft)	Impacts Within Construction Limits (ft)*
Stream 1	Blanket Creek	1	1-4	Sd, St	Intermittent	12-90-(2)	280	0
UT-A	Blanket Creek	1-3	1-6	Sd,St	Perennial	12-90-(2)	170	0
Yadkin River	Yadkin River	200-250	NA	B, C, Gr, Sd	Perennial	12-(86.7)	900	0
Stream A	Yadkin River	1-6	1-12	Gr, Sd, St	Perennial	12-(86.7)	1600	157
UT-SA	Yadkin River	2-3	1-6	St	Perennial	12-(86.7)	85	0
Stream 1a	Yadkin River	1-3	1-12	Gr, Sd, St	Perennial	12-(86.7)	895	0
Stream FH	Yadkin River	1-2	2-12	Gr, Sd, St	Perennial	12-(86.7)	740	190
Stream JS	Yadkin River	1-2	2-8	Gr, Sd, St	Perennial	12-(86.7)	415	196
Stream CB	Yadkin River	2-4	2-12	C, Gr, Sd	Perennial	12-(86.7)	1260	261
Stream CBZ	Yadkin River	1-3	1-4	C, Gr, Sd	Intermittent	12-(86.7)	80	0
Stream SP	Yadkin River	1-3	6-24	C, Gr, Sd, St	Perennial	12-(86.7)	1450	17
Stream SCA	Smith Creek	1-2	1-6	Gr, Sd, St	Intermittent	12-93-1	170	0
Stream SC	Smith Creek	2-3	6-24	Gr, Sd	Perennial	12-93-1	1725	0
Stream SS	Smith Creek	1-2	1-6	Gr, Sd	Intermittent	12-93-1	275	0
						Total	**10, 035**	**821**

[1] UT- Unnamed Tributary

[2] B- Boulder, C- Cobble, Gr- Gravel, Sd- Sand, St- Silt

[3] DWQ Index number for unnamed tributaries is the index number for the named body of water into which the UT flows.

* Stream impacts were computed *based on a* 25-foot clearing limits outside slope stake lines.

ii. Wetlands

Twelve wetlands were identified in the project study area. Wetlands locations are shown on Figures 7 through 12. Table 10 lists the lengths and impacts of each of those wetlands within the study corridor. The project study area is in the Yadkin-Pee Dee River Basin. There are no NCDWQ Riparian Buffer Rules implemented in this basin as are required in other basins.

Table 10: Jurisdictional Wetlands and Impacts within Project Area

Wetland	Cowardin Classification*	Wetland Type	Wetland Rating	Wetland Size In Study Area (AC)	Impacts Within Construction Limits (AC) **
Wetland 1	PFO1A	Riverine	24	0.003	0
Wetland A	PFO1A	Riverine	33	0.016	0.01
Wetland B	PFO1A	Non-Riverine	15	0.009	0
Wetland AC	PFO1A	Riverine	37	0.08	0.05 ac
Wetland AJ	PFO1A	Riverine	53	0.08	0
Wetland SP	PFO1A	Riverine	54	0.23	0.1
Wetland G	PFO1A	Riverine	38	0.009	0
Wetland FH	PFO1A	Riverine	53	0.05	0
Wetland BS	PFO1A	Non-Riverine	13	0.017	0
Wetland J	PFO1A	Riverine	28	0.01	0.01
Wetland CB	PFO1A	Riverine	36	0.19	0
Wetland P	PFO1A	Riverine	NA	0.009	0
			Total	**0.70 acres**	**0. 2 acres**

*Palustrine (P) Forested (FO) system. Subclass 1 indicates that the forest is broad-leaved deciduous, and the A modifier indicates a temporarily flooded water regime.

**Wetland impacts were computed *based on a* 25-foot clearing limits outside slope stake lines

b. Permit Issues

Impacts to jurisdictional surface waters are anticipated. In accordance with provisions of Section 404 of the Clean Water Act, a permit will be required from the USACE for the discharge of dredged or fill material into "Waters of the United States." A Nationwide Permit (NWP) No. 14 [33 CFR 330.5 (a) (14)] is likely to be applicable for all impacts to Waters of the United States resulting from the proposed project. If greater than 0.5 acres of wetland impacts or 300 linear feet of stream impacts occur, then an Individual Permit will be necessary. Final permitting decisions rest with the USACE.

A Water Quality General Certification (401) is required. Section 401 Certification allows surface waters to be impacted for the duration of the construction and insures compliance with the state's water quality standards. Since this project is located in the Yadkin-Pee Dee River Basin, a Buffer Certification will not be required from NCDENR-Division of Water Quality (DWQ) for this project.

c. Avoidance, Minimization and Mitigation

Approximately 0.2 acres of wetlands and 821 linear feet of streams may be impacted by the proposed improvements to I-40. Avoidance and minimization measures have been applied to this project to lessen the impacts to the wetland and stream in the project area. Final decisions regarding wetland and stream mitigation requirements will be made by the US Army Corps of Engineers and the NCDENR-Division of Water Quality.

3. Rare and Protected Species

The Endangered Species Act of 1973, as amended requires that any action likely to adversely affect a species classified as federally protected be subject to review by the United States Fish and Wildlife Service (USFWS). Other species may receive additional protection under separate state laws.

a. Federally-Protected Species

Plants and animals with federal classifications of Endangered, Threatened, Proposed Endangered and Proposed Threatened are protected under provisions of Section 7 and Section 9 of the Endangered Species Act (ESA) of 1973, as amended. As of September 22, 2010 the USFWS lists the following federally protected species for Davie and Forsyth Counties (Table 11). A brief description of each species' characteristics and habitat requirements follows.

Table 11. Federally-Protected Species for Davie and Forsyth Counties

Common Name	Scientific Name	Federal Status	Biological Conclusion	Habitat	County
Michaux's Sumac	*Rhus michauxii*	E	MANLAA	Yes	Davie
Red-cockaded woodpecker	*Picoides borealis*	E	No Effect	No	Forsyth
Bog Turtle	*Glyptemys muhlenbergii*	T(S/A)	N/A	No	Forsyth
Small-anthered Bittercress	*Cardamine micranthera*	E	No Effect	No	Forsyth

E-Endangered is defined as a species that is in danger of extinction throughout all or a significant portion of its range.

T(S/A)-Threatened due to similarity of appearance. These species are not biologically endangered or threatened and are not subject to Section 7 consultation.
MANLAA- May affect, not likely to adversely affect.

Michaux's sumac

USFWS optimal survey window: April-October

Habitat Description: Michaux's sumac, endemic to the inner Coastal Plain and lower Piedmont, grows in sandy or rocky, open, upland woods on acidic or circumneutral, well-drained sands or sandy loam soils with low cation exchange capacities.

The species is also found on sandy or submesic loamy swales and depressions in the fall line Sandhills region as well as in openings along the rim of Carolina bays; maintained railroad, roadside, power line, and utility rights-of-way; areas where forest canopies have been opened up by blowdowns and/or storm damage; small wildlife food plots; abandoned building sites; under sparse to moderately dense pine or pine/hardwood canopies; and in and along edges of other artificially maintained clearings undergoing natural succession. In the central Piedmont, it occurs on clayey soils derived from mafic rocks.

The plant is shade intolerant and, therefore, grows best where disturbance (*e.g.*, mowing, clearing, grazing, and periodic fire) maintains its open habitat.

BIOLOGICAL CONCLUSION **May Affect, Not Likely to Adversely Affect**

Suitable habitat for Michaux's sumac is present in the project study area along roadside shoulders and utility easements. Plant by plant surveys were conducted by NCDOT biologists along areas containing suitable habitat on March 23 and 24, April 2 and 16, and May 23, 29, and 30, 2007. No individual Michaux's sumac was observed during field investigations. A review of the NCNHP database of rare species and unique habitats, updated March 1, 2007, revealed no Michaux's sumac occurrences within 1 mile of the project region.

Red-cockaded woodpecker **Endangered**

USFWS optimal survey window: year round; November-early March (optimal)

Habitat Description: The red-cockaded woodpecker (RCW) typically occupies open, mature stands of southern pines, particularly longleaf pine for foraging and nesting/roosting habitat.

BIOLOGICAL CONCLUSION **No Effect**

The project study area supports hardwood forests with only scattered pines. The forest is dominated by a hardwood canopy and sub-canopy; therefore, no suitable foraging or nesting habitat for RCW occurs in the project study area. A review of the NCNHP database revealed no occurrence of RCW within 1.0 miles of the project corridor. Based on NCNHP records, field observations, and lack of suitable habitat, this project will have No Effect on red-cockaded woodpeckers.

Bog turtle **Threatened (S/A)**

The bog turtle has drastically declined in the northern portion of its range due to over collection and habitat alteration. The USFWS has listed the bog turtle as threatened due to similarity of appearance to the northern population, throughout the bog turtle's southern range.

The bog turtle is typically found in bogs, freshwater marshes, and wet pastures, usually in association with aquatic or semi-aquatic vegetation and small, shallow, streams over soft bottoms. Bog turtles are distributed throughout the mountains and western piedmont of North Carolina.

BIOLOGICAL CONCLUSION **N/A**

Species listed as Threatened due to similarity of appearance do not require a biological conclusion, nor are they subject to Section 7 consultation. However, this project is not expected to affect the bog turtle as no suitable habitat exists in the project corridor. A review of NCNHP records, updated March 1, 2007, indicate no bog turtle occurrence within 1.0 miles of the study area and no bog turtles were observed during site investigations.

Small-anthered bittercress **Endangered**

USFWS optimal survey window: April-May

The species is endemic to the Dan River sub-basin within the Roanoke River Basin, and is known to occur in Forsyth and Stokes Counties. Suitable habitat includes open sunny stream banks, low moist wooded areas, seepages, wet rock crevices, and sand bars. Threats to the small-anthered bittercress include disturbances from agriculture and residential development, encroachment by invasive species, and stream channelization.

BIOLOGICAL CONCLUSION **No Effect**

The study area is located within the Yadkin-Pee Dee River Basin, and favorable habitat is not present in the project study area. The majority of known sites are in upper, central Stokes County, with one historic site from Forsyth County recorded in 1955. The Forsyth County population was extirpated in the 1960s when the site was converted to pasture. Based on the species' range and available information, it is anticipated that this project warrants a Biological Conclusion of No Effect for small-anthered bittercress.

b. Federal Species of Concern and State Listed Species

Six Federal Species of Concern (FSC) are listed for Davie and Forsyth Counties as of January 30, 2008. Federal Species of Concern are not afforded federal protection under the Endangered Species Act (ESA) and are not subject to any of its provisions, including Section 7, until they are formally proposed or listed as Threatened or Endangered. Organisms which are listed as Endangered, Threatened, or Special Concern by the North Carolina Natural Heritage Program list of rare plant and animal species are afforded state protection under the State Endangered Species Act and the North Carolina Plant Protection and Conservation Act of 1979.

Table 12 lists Federal Species of Concern, the state status and the presence of suitable habitat for each species in the study area. This species list is provided for information purposes as the status of these species may be upgraded in the future.

Table 12. Federal Species of Concern and State Listed Species for Davie and Forsyth Counties.

Scientific Name	Common Name	State Status	Habitat Present	County
*Moxostoma robustum**	Robust Redhorse	SR (PE)	Yes	Davie
Lampsilis cariosa	Yellow Lampmussel	E	Yes	Davie
*Gomphus consanguis**	Cherokee Clubtail	SR	Yes	Davie
*Desmodium ochroleucum**	Creamy Tick-trefoil	SR-T	No	Davie
Lotus unifoliolatus helleri	Prairie Birdfoot-Trefoil	SR-T	Yes	Davie
Alasmidonta varicosa	Brook Floater	E	Yes	Forsyth

"E"--An Endangered species is one whose continued existence as a viable component of the State's flora or fauna is determined to be in jeopardy.
"T"--A Threatened species is one which is likely to become endangered species within the foreseeable future throughout all or a significant portion of its range.
"SR"--A Significantly Rare species is one which is very rare in North Carolina, generally with 1-20 populations in the state, generally substantially reduced in numbers by habitat destruction, direct exploitation or disease. The species is generally more common elsewhere in its range, occurring peripherally in North Carolina.
"/PE"--denotes a species which has been formally proposed for listing as Endangered, Threatened, or Special Concern, but has not yet completed the listing process.
* -- Historic record - the species was last observed in the county more than 50 years ago.
Surveys for these species were not conducted during the site visits, nor were any of these species incidentally observed. A review of the NC Natural Heritage Program database of rare species and unique habitats (March 1, 2007) revealed no records of Federal Species of Concern in or near the project study area.

4. Soils

Based on the soil survey data for Davie County, there are 13 soil series and 17 soil mapping units located in the project area. The Forsyth county soil survey lists 5 soil series and 10 soil mapping units. Table B-1, found in Appendix B, provides an inventory of these soils including percent slope, drainage classification, and hydric class, detailed by county. A brief description of each soil type is also provided in Appendix B.

5. Flood Hazard Evaluation

The Yadkin River, at this location, is the boundary between Davie and Forsyth Counties. Both counties are participants in the National Flood Insurance Regular Program, which is administered by the Federal Emergency Management Agency (FEMA). Based on the most current information available from the NC Floodplain Mapping Program (FMP), this river crossing is in a designated flood hazard zone which is within a detailed flood study reach, having a regulated 100-year floodway.

The proposed bridge replacement will provide equivalent or greater conveyance than that of the existing bridges. Figure 13a and 13b depict the Flood Insurance Rate Map (FIRM) in the vicinity of this crossing, the limits of the 100-year floodplain and floodway in the project vicinity. It is anticipated that the proposed roadway and associated drainage accommodations will not have any significant adverse impact on the affected existing floodplain areas.

The NCDOT Hydraulics Unit will coordinate with the FMP, the delegated state agency for administering FEMA's National Flood Insurance Program, to determine the status of the project with regard to applicability of NCDOT'S Memorandum of Agreement with FMP, or approval of a

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

B. Cultural Resources

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

1. Historic Architecture

A Final Identification and Evaluation survey was conducted to determine the Area of Potential Effects (APE), and to identify and evaluate all structures over fifty years of age within the APE according to the Criteria of Evaluation for the National Register of Historic Places. On March 7, 2007, surveys were conducted by automobile and on foot, covering 100% of the APE, to identify those properties over fifty years of age. In addition to fieldwork, Davie and Forsyth county survey files were consulted in the North Carolina State Historic Preservation Office (HPO) in Raleigh, as were HPO's National Register of Historic Places (NRHP) and the North Carolina State Study List (NCSL) files.

Eight properties were identified in this survey. Of these, the Win-Mock Farm (see Appendix C) had been previously determined eligible for the NRHP. These findings were presented at an April 18, 2008 consultation meeting between NCDOT and HPO, of which six were determined not eligible and not worthy of further evaluation for this project. One remaining property, Hickory Grove A.M.E. Zion Church was evaluated and determined not eligible for listing to the NRHP.

Win-Mock Farm

Win-Mock Farm is a handsome twentieth-century dairy farm complex near the Yadkin River. This property was determined eligible for listing on the NRHP in a November 2002 evaluation undertaken by NCDOT's Historic Architecture Group for TIP project B-3835. "The barns and outbuildings of Win-Mock Farm (formerly Arden Farms) demonstrate the plan, layout, and functions of a second-quarter, twentieth-century dairy operation. With the financial support of owner S. Clay Williams, a president of R. J. Reynolds Tobacco Company, this dairy complex is demonstrative of the important role of mechanization and modernization of dairy farming in North Carolina during the twentieth century." Summary of the findings from surveys and evaluation along with photos of the Win-Mock Farm are included in Appendix C.

On March 30, 2010 and May 3, 2011 HPO and FHWA met with NCDOT staff to determine the effects of the I-40 improvements on the Win-Mock Farm. It was agreed that the proposed project would have **no adverse effect** upon the property provided that the following conditions were met:

- A 1.5:1 slope with rock plating to stabilize soil at the Win-Mock Farm property would be incorporated into the design.

A copy of the signed concurrence forms from the March 30, 2010 and May 3, 2011 meetings are included in Appendix C.

2. Archaeology

An archaeological survey was completed on August 25, 1993. No archaeological sites were located within the project area. No further archaeological investigation is needed in conjunction with this project. (See Appendix C).

C. Section 4(F) Resources

Section 4(f) of the US Department of Transportation Act of 1966 specifies that publicly owned land from a public park, recreation area, wildlife and waterfowl refuge, and all historic sites of national, state, and local significance may be used for federal projects only if there is no feasible and prudent alternative to the use of such land and the project includes all possible planning to minimize impacts to 4(f) land resulting from such use.

One Section 4(f) resource, an individual historic property, is located in the project area. The project will require use of land from this Section 4(f) resource. The project involves widening along existing alignment. There is no feasible alternative that will avoid this resource.

The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) amendment to the Section 4(f) requirements allows the U.S. Department of Transportation (DOT) to determine that certain uses of Section 4(f) land will have no adverse effect on the protected resource. When this is the case, and the responsible official(s) with jurisdiction over the resource agrees in writing, compliance with Section 4(f) is greatly simplified.

This project is being planned and designed to minimize harm to the historic farm property. The SHPO concur that the proposed project with the planned mitigation will not substantially impair the use of the Section 4(f) resource; therefore, a Section 4(f) analysis of the avoidance alternatives is not required under the SAFETEA-LU amendment. Mitigation will include a 1.5:1 slope with rock plating in the vicinity of the Win-Mock Farm.

Federal Highway Administration finding is that the proposed use of land from the Win-Mock Farm is considered a de minimus impact because the project will have "no adverse" effect on the historic property . The State Historic Preservation office has concurred with this de minimus finding under Section 4(f) (See concurrence form in Appendix C of this document).

Approximately 0.407 acres will be used from the Win Mock Farm to accommodate this project.

D. Social Effects

1. Relocation Impacts

There is no relocation impacts associated with the proposed improvement.

2. Environmental Justice

Title VI of the Civil Rights Act of 1964, protects individuals from discrimination on the grounds of race, age, color, religion, disability, sex, and national origin. Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," provides that each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects on minority and low-income populations. Special populations may include the elderly, children, the disabled, low-income areas, American Indians and other minority groups. Executive Order 12898 requires that environmental justice principles be incorporated into all transportation studies, programs, policies and activities.

The three environmental justice principles are: 1) to ensure the full and fair participation of all potentially affected communities in the transportation decision-making process. 2) to avoid, minimize or mitigate disproportionately high and adverse human health or environmental effects, including social and economic effects, on minority or low income populations. 3) to fully evaluate the benefits and burdens of transportation programs, policies, and activities upon low-income and minority populations.

Census data does not reveal the presence of any populations that meet the criteria for environmental justice. Impacts to minority and low income populations do not appear to be disproportionately high and adverse. Benefits and burdens resulting from the project are anticipated to be equitably distributed throughout the community. No residential or business relocations are anticipated with this project.

a. Racial Makeup

Census data reveals that between 1990 and 2000, the population of the demographic study area increased by 32.6%, to 10,756. The growth rate was faster than that of either Davie County, whose population increased by 25.0%, to 34,835, or Forsyth County, whose population increased by 15.1%, to 306,067. Population growth, however, was not consistent across the study area. Between 1990 and 2000, the fastest growing areas within the demographic study area were the Town of Bermuda Run (Census Tract 803 Block Group 2), which grew by 105.9%, and the Village of Clemmons (Census Tract 40.06 Block Group 3, Table D-2, Appendix D), which grew by 43.6%.

The slowest growing areas within the demographic study area were the area north of I-40 and west of NC 801 (Census Tract 802 Block Group 2, Table D-1, Appendix D), which grew by 3.6%, and the Kinderton area (Census Tract 802 Block Group 1, Table D-1, Appendix D), which grew by 10.1%. The Kinderton residential area is likely not reflected in a comparison of 1990 and 2000 Census data, as residents started moving in during 2000 or 2001. According to the 2000 Census, 96.5% of the residents in the demographic study area identified themselves as White and 1.9% identified themselves as Black or African American. Davie County as a whole had a

somewhat lower percentage of White residents (90.4%) and a somewhat higher percentage of Black/African-American residents (6.8%). Forsyth County as a whole had a much lower percentage of White residents (68.5%) and a much higher percentage of Black/African-American residents (25.6%).

Within the demographic study area, one area had a notably high percentage of Black/African-American residents: the area north of I-40 and west of NC 801 (Census Tract 802 Block Group 2, Table D-1, Appendix D) had 8.1% of residents who identified themselves as Black/African-American. For Block Group details, please see Table D-1 and D-2, Appendix D.

b. Ethnic Makeup

According to the 2000 Census, 2.1% of the residents in the demographic study area identified themselves as Hispanic or Latino (can be of any race). This was somewhat less than the 3.6% reported in Davie County as a whole and the 6.4% reported in Forsyth County as a whole. The highest percentage of Hispanic or Latino residents was found in the Tanglewood Park area (4.2%) (Census Tract 40.05 Block Group 2, Table D-2, Appendix D).

Executive Order 13166 "Improving Access to Services for Persons with Limited English Proficiency" requires all recipients of federal funds to provide meaningful access to persons who are limited in their English proficiency (LEP). The US Department of Justice defines LEP individuals as those "who do not speak English as their primary language and who have a limited ability to read, write, speak, or understand English" (67 FR 41459). Data about LEP populations was gathered in the 2000 Census.

Table D-2, Appendix D, shows the percentages of adults (18 years of age or older) who speak English less than "Very Well" by language category.

The Direct Community Impact Area (DCIA) data indicate there are no language groups within the DCIA in which more than 5% of the adult population or 1,000 persons speak English less than "Very Well." Therefore, demographic assessment does not indicate the presence of LEP language groups that exceed the Department of Justice's Safe Harbor threshold. However, NCDOT will include notice of Right of Language Access for future meetings for this project. Thus, the requirements of Executive Order 13166 appear to be satisfied.

c. Age

16.4% of demographic study area residents were ages 65 and older. As a whole, 13.9% of Davie County residents and 12.7% of Forsyth County residents were ages 64 and older. The highest percentage of residents ages 65 and older were found in the area south of I-40 and west of NC 801 (Census Tract 803 Block Group 1, Table D-1, Appendix D) (30.2%). The high percentage suggests that many retirees live in this portion of the demographic study area.

3. Recreational Centers

A regional soccer facility is located just north I-40 in Davie County. The 90-acre facility was developed with a lighted stadium and 11 lighted fields, a multi-use clubhouse with offices,

meeting rooms, restrooms and storage for the organization. Also on the site there is a concession area, a playground, walking and jogging paths and parking. The remaining 30 acres is a joint effort between Bermuda Run and Davie County in a River Park.

Town of Bermuda Run staff indicated (April 1, 2010) that: (1) the soccer facility is privately-owned and is not open for public use; and (2) the proposed riverfront park is on land that is currently privately-owned. Land will not be acquired from this property. Therefore, Section 4(f) is not applicable to the soccer facility. This project will not impact the soccer facility.

4. Public Facilities and Religious Institutions

The demographic study area does not have public schools or churches but a preschool is located in the Bermuda Quay Shopping center on US 158. There are no hospitals or health centers in the study area but within 10 miles are major medical facility in Winston-Salem. The future site of the Davie County Hospital is located on the north side of I-40 in the project area.

5. Public Transportation

Public transportation is not available in this area.

6. Community Services

Public Safety

Fire protection in Davie County is provided by twelve volunteer fire departments located in the county and by four out-of-county departments with districts in Davie County. Davie County Sheriff's Department, Advance Fire and Rescue, Clemmons Fire and Rescue, and Smith-Grove Fire and Rescue provide other emergency needs in Bermuda Run. Police protection in Clemmons is provided by Forsyth County Sheriff's Department. Clemmons' two fire stations cover approximately 56 square miles.

E. Economic Effects

No impacts to businesses are anticipated as a result of the project. Therefore, the tax base should not change unless businesses close due to proximity impacts. If this occurred, then the tax base would be reduced. Any loss of business in the area would reduce employment. The number of businesses, however, that could potentially be harmed by the proposed project should not hurt the overall tax base for Bermuda Run and Clemmons.

F. Land Use

1. Existing/Proposed Land Use and Zoning

TIP I-0911A crosses the Yadkin River and connects the Town of Bermuda Run (in Davie County) with the Village of Clemmons (in Forsyth County). See Figure D-2, Appendix D.

Bermuda Run and Clemmons are both growing bedroom communities of Winston-Salem. On the south side of I-40, the project vicinity includes an upscale gated residential area, several other residential areas, the Kinderton commercial area, a shopping center, and Tanglewood Park. The north side of I-40 includes the Kinderton residential area, the future site of Davie Hospital, a shopping center, and a soccer park. Much of the development has occurred since 2000 and development is continuing in the project vicinity.

Land immediately surrounding the I-40 corridor in Davie County is zoned commercial, residential, and open space. The developer plans to request a rezoning of 100 acres on the north side of I-40 from residential to commercial for planned retail, restaurants and a hotel. In Forsyth County, land to the west of the I-40/Harper Road interchange is planned and zoned for single family residential and open space.

G. Indirect and Cumulative Effects

The Future Land Use Study Area (FLUSA) for this project includes the Town of Bermuda Run and adjacent portions of unincorporated Davie (Figure D-1, Appendix D). The total amount of available land (undeveloped parcels less stream and road buffers) in the FLUSA is about 1,400 acres. Population is expected to grow by about 2.0% annually. Employment is expected to grow by about 1.5% annually. The time horizon for this report is 2030: Davie County's Land Development Plan pertains to the period 2004-2024, and the Winston-Salem Urban Area MPO has issued its 2035 Long Range Transportation Plan.

Notable community features include two gated residential areas (Bermuda Run Country Club and Bermuda Run West), the Kinderton commercial and residential areas, and the Win-Mock farm site. The principal natural feature within the FLUSA is the Yadkin River, a 303(d) listed stream. Most of the study area is located in a WS-IV Protected Area. There are no High Quality Waters or Outstanding Resource Waters in the study area. The FLUSA is within the Town of Bermuda Run's planning and zoning jurisdiction. Local zoning regulations restrict the density and location of development and also include specific open space and pervious surface requirements. The regulations also address stream buffers, storm water, and floodplains and floodways. Land immediately surrounding the I-40 corridor is zoned commercial, residential, and open space (Figure D-3, Appendix D). Based on the information gathered pertaining to project scope, annual population and employment growth, etc., the majority of the categories on the indirect and cumulative effects screening tool indicated lower (not low) to higher (not high) concern for indirect and cumulative effects potential. The overall result suggests that an "indirect scenario assessment is not likely."

This project will not affect access to nearby parcels. Little or no exposure increase is expected. No new transportation/land use nodes will be created by this project. Consequently, the proposed project alone is unlikely to influence intraregional land development-location decisions. Instead, residential and commercial developments are likely to continue in the FLUSA with or without the project. Since indirect effects as a result of this proposed project alone are expected to be low or minimal, impacts on storm water runoff, downstream water quality, and the historic Win-Mock farm are not expected as a result of this project.

Direct natural environmental impacts by NCDOT projects would be addressed by avoidance, minimization, or mitigation and would be further evaluated by NCDOT Natural Environment Unit during project permitting. Because no indirect impacts are anticipated, the cumulative effects of this project, when considered in the context of other past, present, and future actions, and the resulting impact on notable human and natural features should be minimal. Therefore, any contributions of the project to cumulative impacts resulting from current and planned development patterns are expected to be minimal.

H. Traffic Noise Analysis

In accordance with Title 23 Code of Federal Regulations Part 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise* (Title 23 CFR 772), each Type I highway project must be analyzed for predicted traffic noise impacts. Type I projects are proposed federal or federal-aid highway projects for construction of a highway on new location or improvements to an existing highway which substantially changes the horizontal or vertical alignment or increases the vehicle capacity. Traffic noise impacts are determined from the current procedures for the abatement of highway traffic noise and construction noise found in Title 23 CFR 772, which also includes provisions for traffic noise abatement measures. When traffic noise impacts are predicted, examination and evaluation of alternative noise abatement measures must be considered for reducing or eliminating these impacts. A copy of the unabridged version of the full technical report entitled Highway Traffic Noise/Construction Noise Analysis can be viewed at the Century Center Complex, Building A, Project Development and Environmental Analysis Branch, 1000 Birch Ridge Drive, Raleigh, NC 27610

1. Traffic Noise Impact and Noise Contours

The maximum number of receptors along the project predicted to be impacted by future traffic noise is shown in Table E-1 in Appendix E. 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. All of the predicted impacts are a result of predicted design year 2035 build-condition noise levels that will approach or exceed FHWA noise abatement criteria. See Table E-2 for Noise Sensitive Receptors and Hourly Equivalent Noise Levels for the Build Alternative.

The maximum extent of the 71 dB(A) and 66 dB(A) noise levels contours, measured approximately 274 and 416 feet respectively, proposed from the center of the I-40 alignment.

2. Noise Abatement Alternatives

Measures for reducing or eliminating traffic noise impacts were considered for all impacted receptors in each alternative. For each of these measures, benefits versus costs, engineering feasibility, effectiveness and practicability, land use issues and other factors were considered. Benefits versus costs are evaluated based on cost per benefitted receptor. The cost of noise abatement is considered reasonable if it does not exceed $35,000 per benefited receptor plus an incremental increase of $500 per dBA average increase in the predicted exterior noise levels of the impacted receptors in the area.

a. Traffic System Management Measures

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.

b. Highway Alignment Changes

Substantially changing the highway alignment to minimize noise impacts is not considered to be a viable option for this project due to engineering and environmental factors.

c. Noise Barriers

Noise barriers can be earthen berms or noise walls. These structures act to diffract, absorb and reflect highway traffic noise.

Passive noise abatement measures are effective because they absorb sound energy, extend the source-to-receptor sound transmission path, or both. Sound absorption is a function of abatement medium (e.g. earth berms absorb more sound energy than comparably tall concrete sound barriers because earth berms are significantly more massive). The source-to-receptor path is extended by placement of an obstacle - such as a concrete wall – that blocks the transmission of sound waves except for those waves that travel from the source, over the obstacle, and to the receptor.

Highway sound barriers are primarily constructed as earth berms or solid-mass walls adjacent to limited-access freeways that are in close proximity to noise-sensitive land use(s). To be effective, a sound barrier must be long enough and tall enough to shield the impacted receptor(s). Generally, the noise wall length must be eight times the distance from the barrier to the receptor. For example, if a receptor is 200 feet from the roadway, an effective barrier would be approximately 1,600 feet long – with the receptor in the horizontal center. Due to the requisite lengths for effectiveness, sound barriers are typically not economical for isolated or most low-density area. On facilities where access is allowed for driveways, openings will be needed in the walls. An access opening of 40 feet in a 400-foot wall will make the wall ineffective.

Noise barriers were investigated for three noise sensitive areas (NSAs) in the vicinity of the I-40 widening project. The approximate lengths, locations and potential numbers of benefited receptors for each of these three barriers are presented below. See Figures 14a-e for locations. See Tables E-3 through E-6 for Noise Assessment Information.

- NSA 1- Approximately 1,600 feet, adjacent to I-40 westbound west of NC 801, for the potential benefit of 30 predicted build-condition traffic noise impacts to residences on Pinewood Lane.

- NSA 2- Approximately 3,400 feet, adjacent to I-40 eastbound east of the Yadkin River,

for the potential benefit of 73 predicted build-condition traffic noise impacts to residences on Riverview Knoll Court, River Oaks Court, Thoroughbred Lane, Whirlaway Court, and Westridge Meadow Circle.

- NSA 3- Approximately 1,900 feet, adjacent to I-40 westbound, east of the Yadkin River, for the potential benefit of 2 predicted build-condition traffic noise impacts to residences on Lake Cliff Drive and Fair Oaks Drive.

Based upon the preliminary project design currently available, each of the three noise barriers meets preliminary feasibility and reasonableness criteria. Consequently, the recommendation of this Traffic Noise Analysis is that a detailed study of potential mitigation measures shall be conducted for each of the above three noise sensitive areas (NSAs) during project Final Design.

d. Other Mitigation Measures

Costs to acquire buffer zones for impacted receptors will exceed the NCDOT abatement cost threshold. Therefore, this abatement measure is unreasonable.

The use of vegetation for noise mitigation is not considered reasonable for this project, due to the substantial amount of right of way required to provide an effective vegetative barrier. The cost of acquiring additional right of way and planting sufficient vegetation is estimated to exceed the NCDOT abatement threshold.

3. Construction Noise

The major construction elements of this project are expected to be earth removal, hauling, grading, and paving. General construction noise impacts, such as temporary speech interference for passers-by and those individuals living or working near the project, can be expected particularly from paving operation and from the earth moving equipment during grading operations. However, considering the relatively short-term nature of construction noise, these impacts are not expected to be substantial. The transmission loss characteristics of nearby natural elements and name-made structures are believed to be sufficient to moderate the effects of intrusive construction noise.

4. Summary of Noise Impacts

Traffic noise impacts are an unavoidable consequence of transportation projects especially in areas where there are no previous traffic noise sources. A Traffic Noise Analysis was performed utilizing validated computer models created with the FHWA Traffic Noise Model software (TNM 2.5) to predict future noise levels and impacted receptors along the proposed alignments. Preliminary consideration for noise abatement measures was given to all impacted receptors. Based upon the presently available project design, the recommendation of this Traffic Noise Analysis is that a detailed study of potential mitigation measures for three noise sensitive areas (NSAs) that meet preliminary feasibility and reasonableness criteria shall be conducted during project Final Design.

This assessment is based upon preliminary design criteria, and is not an expressed commitment or recommendation to construct traffic noise impact abatement measures. A final decision on the recommendation for provision of traffic noise impact abatement measures will be made upon the completion of the project design and the public involvement process.

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 this proposed highway project will be the approval date of the Finding of No Significant Impact (FONSI). For development occurring after that date, local governing bodies are responsible for insuring noise compatible designs are utilized along the proposed facility.

I. Air Quality Analysis

1. Air Quality Analysis and Results

Automobiles are considered to be the major source of carbon monoxide (CO) in the project area. For this reason, most of the analysis presented is concerned with determining expected CO levels in the vicinity of the project due to automobile traffic. A microscale air quality analysis was performed to determine future CO concentrations resulting from the proposed highway improvements. "CAL3QHC - A Modeling Methodology For Predicting Pollutant Concentrations Near Roadway Intersections" was used to predict the CO concentration at the nearest sensitive receptor to the project.

2. Attainment Status

The project is located in Forsyth County, which is within the Winston-Salem nonattainment area for carbon monoxide (CO) as defined by the EPA. The 1990 Clean Air Act Amendments (CAAA) designated this area as moderate nonattainment area for CO. However, due to improved monitoring data, this area was redesignated as maintenance for CO on November 7, 1994. 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 Forsyth County. The Winston-Salem Metropolitan Planning Organization (MPO) 2035 Long Range Transportation Plan (LRTP), the High Point MPO 2035 LRTP and the 2009-2015 Transportation Improvement Programs (TIPs) conform to the intent of the SIP. The USDOT made a conformity determination on the Winston-Salem MPO LRTP on March 6, 2009, the High Point MPO LRTP on March 6, 2009, the Winston Salem MPO TIP on March 6, 2009 and the High Point MPO TIP on March 6, 2009. The current conformity determination is consistent with the final conformity rule found in 40 CFR Parts 51 and 93. There are no significant changes in the project's design concept or scope, as used in the conformity analyses.

3. Background CO Concentrations

The background CO concentration used for the project area was 2.7 parts per million (ppm). Consultation with the Air Quality Section of the North Carolina Department of Environment and Natural Resources' Division of Environmental Management suggests this is an appropriate CO background concentration for use in most suburban and rural areas.

a. Mobile Source Air Toxics

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/ncea/iris/index.html). 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-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules.

The 2007 EPA rule mentioned above requires controls that will dramatically decrease Mobile Source Air Toxics (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 % as assumed, a combined reduction of 72 % in the total annual emission rate for the priority MSAT is projected from 1999 to 2050, as shown Appendix F.

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

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

b. The National Environmental Policy Act (*NEPA*) Context

The NEPA requires, to the fullest extent possible, that the policies, regulations, and laws of the Federal Government be interpreted and administered in accordance with its environmental protection goals. The NEPA also requires Federal agencies to use an interdisciplinary approach in planning and decision-making for any action that adversely impacts the environment. The NEPA requires and FHWA is committed to the examination and avoidance of potential impacts to the natural and human environment when considering approval of proposed transportation projects. In addition to evaluating the potential environmental effects, we must also take into account the need for safe and efficient transportation in reaching a decision that is in the best

overall public interest. The FHWA policies and procedures for implementing NEPA is prescribed by regulation in 23 CFR § 771.

c. Analysis of MSAT in NEPA Documents

The FHWA developed a tiered approach for analyzing MSAT in NEPA documents, depending on specific project circumstances. The FHWA has identified three levels of analysis:

1. No analysis for projects with no potential for meaningful MSAT effects;
2. Qualitative analysis for projects with low potential MSAT effects; or
3. Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

For projects warranting MSAT analysis, the seven priority MSAT should be analyzed. This project is included in level 2 above.

d. Qualitative MSAT Analysis

For this project, the amount of MSAT emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix remain constant. The VMT estimated for the Build Alternative is slightly higher than that for the No Build Alternative, because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network. This increase in VMT would lead to higher MSAT emissions for the Build Alternative along the highway corridor, along with a corresponding decrease in MSAT emissions along the parallel routes. The emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds; according to EPA's MOBILE6.2 model, emissions of all of the priority MSAT except for diesel particulate matter decrease as speed increases. The extent to which these speed-related emissions decreases will offset VMT-related emissions increases cannot be reliably projected due to the inherent deficiencies of technical models. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by 72 percent between 1999 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

The additional travel lanes contemplated as part of the Build Alternative will have the effect of moving some traffic closer to nearby homes, schools, and businesses; therefore, there may be localized areas where ambient concentrations of MSAT could be higher under certain Build Alternatives than the No Build Alternative. The localized increases in MSAT concentrations would likely be approximately equal throughout the project since symmetrical widening is proposed. However, the magnitude and the duration of these potential increases compared to the No-Build alternative cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health impacts. In sum, when a highway is widened, the localized level of MSAT emissions for the Build Alternative could be higher relative to the No Build Alternative, but this could be offset due to increases in speeds and

reductions in congestion (which are associated with lower MSAT emissions). Also, MSAT will be lower in other locations when traffic shifts away from them. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

e. Incomplete or Unavailable Information for Project-Specific MSAT Health Impacts 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 U.S. Environmental Protection Agency (EPA) is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, www.epa.gov/ncea/iris/index.html). 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. The results produced by the EPA's

MOBILE6.2 model, the California EPA's Emfac2007 model, and the EPA's DraftMOVES2009 model in forecasting MSAT emissions are highly inconsistent. Indications from the development of the MOVES model are that MOBILE6.2 significantly underestimates diesel particulate matter (PM) emissions and significantly overestimates benzene emissions.

Regarding air dispersion modeling, an extensive evaluation of EPA's guideline CAL3QHC model was conducted in an NCHRP study (www.epa.gov/scram001/dispersion_alt.htm#hyroad), which documents poor model performance at ten sites across the country - three where intensive monitoring was conducted plus an additional seven with less intensive monitoring. The study indicates a bias of the CAL3QHC model to overestimate concentrations near highly congested intersections and underestimate concentrations near uncongested intersections. The consequence of this is a tendency to overstate the air quality benefits of mitigating congestion at intersections. Such poor model performance is less difficult to manage for demonstrating compliance with National Ambient Air Quality Standards for relatively short time frames than it is for forecasting individual exposure over an entire lifetime, especially given that some information needed for estimating 70-year lifetime exposure is unavailable. It is particularly difficult to reliably forecast MSAT exposure near roadways, and to determine the portion of time that people are actually exposed at a specific location.

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

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine a "safe" or "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 safe or 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.

What we know about mobile source air toxics is still evolving. As the science progresses FHWA will continue to revise and update this guidance. To that end we expect that a number of significant improvements in model forecasting and air pollution analysis guidance are forthcoming in the EPA's release of the final MOVES model and the issuance of the PM 2.5 Hot Spot Modeling Guidance.

f. 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.

The project is located in Forsyth and Davie Counties, which complies with the National Ambient Air Quality Standards. This project will not add substantial new capacity or creating a facility that is likely to meaningfully increase emissions. Therefore, it is not anticipated to create any adverse effects on the air quality of this nonattainment and attainment areas.

J. Hazardous Materials Evaluation

A field reconnaissance survey along the project corridor was conducted on March 29, 2006. Three possible Underground Storage Tank (UST) facilities were identified within the proposed project corridor. Low to non-existent monetary and scheduling impacts is anticipated to result from these sites.

No additional contaminated properties were observed during the field reconnaissance or from regulatory agencies' records search. A soil and groundwater assessment on the three identified properties will be provided prior to right of way acquisition. Please note that discovery of additional sites not recorded by regulatory agencies and not reasonably discernable during the project reconnaissance may occur. The GeoEnvironmental Section should be notified immediately after discovery of such sites so their potential impact(s) may be assessed.

Potential contaminated properties within the project area are presented in Figure G-1, and Table G-1 in Appendix G.

VI. COMMENTS AND COORDINATION

A. Public Involvement

1. Citizens Informational Workshop

A Citizens Informational Workshop (CIW) for the subject project was held on November 9, 2006 between 4:00 and 7:00 pm, at the Kinderton subdivision clubhouse. Representatives of the Project Development and Environmental Analysis Branch, the Roadway Design Unit, the Division 9 Office, and the Right of Way Branch of NCDOT were available to explain the project, answer questions, and receive comments. The CIW was advertised in the local newspapers for about 30 days prior to the workshop. A mailing list of citizens in the project study area was developed from county tax records and a notice/newsletter was sent to citizens on the list inviting them to the workshop.

Approximately 40 citizens attended the meeting. Detailed information regarding the impact to properties along the proposed project was not available at the time of the workshop. Appendix H contains a copy of the newsletter advertising the workshop.

The following is a summary of the comments and suggestions, received before and during the workshop, either via direct communication at the work shop or via telephone/e-mail correspondence:

Some citizens living in apartments alongside the project expressed their concerns regarding noise impacts to their property as a result of the proposed improvements. Four citizens submitted comments regarding the proposed project.

2. Local Officials Meeting

A Local Officials Meeting for the subject project was held on November 9, 2006 at 2:00 p.m. at the Kinderton subdivision clubhouse. This meeting preceded the Citizens Informational Workshop that was held at the same location and same day as the CIW. The meeting participants included staff from Davie County, Town of Bermuda Run and Village of Clemmons. The following comments and questions were received from meetings attendees:

- A Town of Bermuda Run official mentioned that there are Native American ruins located under the Yadkin River near the existing structures that carry I-40 over the river.
    - *A letter dated 11/12/1993 documents that no archaeological sites were located within the project area. No further archeological investigations were recommended.*
- The Davie County/Bermuda Run River Park is planned to extend on either side of the bridges over the Yadkin River.

- *No impacts are anticipated to the proposed Davie County/ Bermuda Run River Park.*

- Comments were received prior to the meeting from the town of Bermuda Run. The town reminded NCDOT that part of the project area is included in the Winston Salem area IV watershed which is a major intake for the Winston Salem water supply.

  - *Comment noted.*

- One Town of Bermuda Run official mentioned that the town would like a traffic signal in front of the entrance to Bermuda Run Country Club where the entrance to the soccer park is proposed.

  - *A signal will not be provided under this project. Adding a signal at this location is outside of the scope for this project.*

- Comments were received from the City of Winston Salem prior to the meeting. The City encourages coordination of this project with bridge projects B-3835 (US 158 over the Yadkin River) and B-3637 (NC 801 over I-40). Also, project I-3600 which ties in near NC 801 is scheduled to be let May 2008. B-3835 and B-3637 both have April 2007 let dates. The city of Winston Salem also noted that the Tanglewood park, a county-wide golfing and park facility, is adjacent to the project and that park functions can sometimes cause congestion on I-40 at both Harper Road and the NC 801 interchanges throughout the year.

  - *Comment noted.*

- It was suggested that a list of area projects and their descriptions be included in these minutes. These projects include the following: B-3835 which is the replacement of the US 158 bridge over the Yadkin River, B-3637 which is the replacement of the NC 801 bridge over I-40, I-3600 which involves pavement rehabilitation along I-40 from SR 1436 (milepost 175) to south of NC 801 (milepost 180), and I-2102 which involves the modification of I-40 and SR 1101 and is presently under construction.

  - *Page 4 and 5 of this document lists area projects and the status and descriptions of these projects.*

B. Public Hearing

A public hearing will be held following approval of this document to provide more detailed information to the public and to receive additional comments regarding the proposed project. Comments received at the hearing will be reviewed by the NCDOT and will be incorporated into the project, as feasible and practicable.

C. NEPA/404 Merger Process

This project has followed the NEPA/404 Merger process. The Merger process is an interagency procedure integrating the regulatory requirements of Section 404 of the Clean Water Act into the National Environmental Policy Act decision making process.

The NEPA/404 Merger process is a process to streamline the project development and permitting processes agreed to by the United States Army Corps of Engineers, the North Carolina Department of Environment and Natural Resources (Divisions of Water Quality and Coastal Management), the Federal Highway Administration, and NCDOT and supported by other stakeholder agencies and local units of government. To this effect, the NEPA/404 Merger process provides a forum for appropriate agency representatives to discuss and reach consensus on ways to facilitate meeting the regulatory requirements of Section 404 of the Clean Water Act during the NEPA/SEPA decision-making phase of transportation projects.

A merger screening meeting was held for the subject project on September 14, 2006. It was agreed that in lieu of holding meetings for Concurrence Points 1, 2, 2A, 3 and 4A the full merger team would convene after preliminary plans were available. It was decided that this meeting would be scheduled after environmental field studies were completed, but prior to completion of the Environmental Assessment. At that time, NCDOT would conduct a combined Concurrence Point 2A /4A meeting where bridging and alignment information would be presented and measures of minimization and avoidance would be discussed.

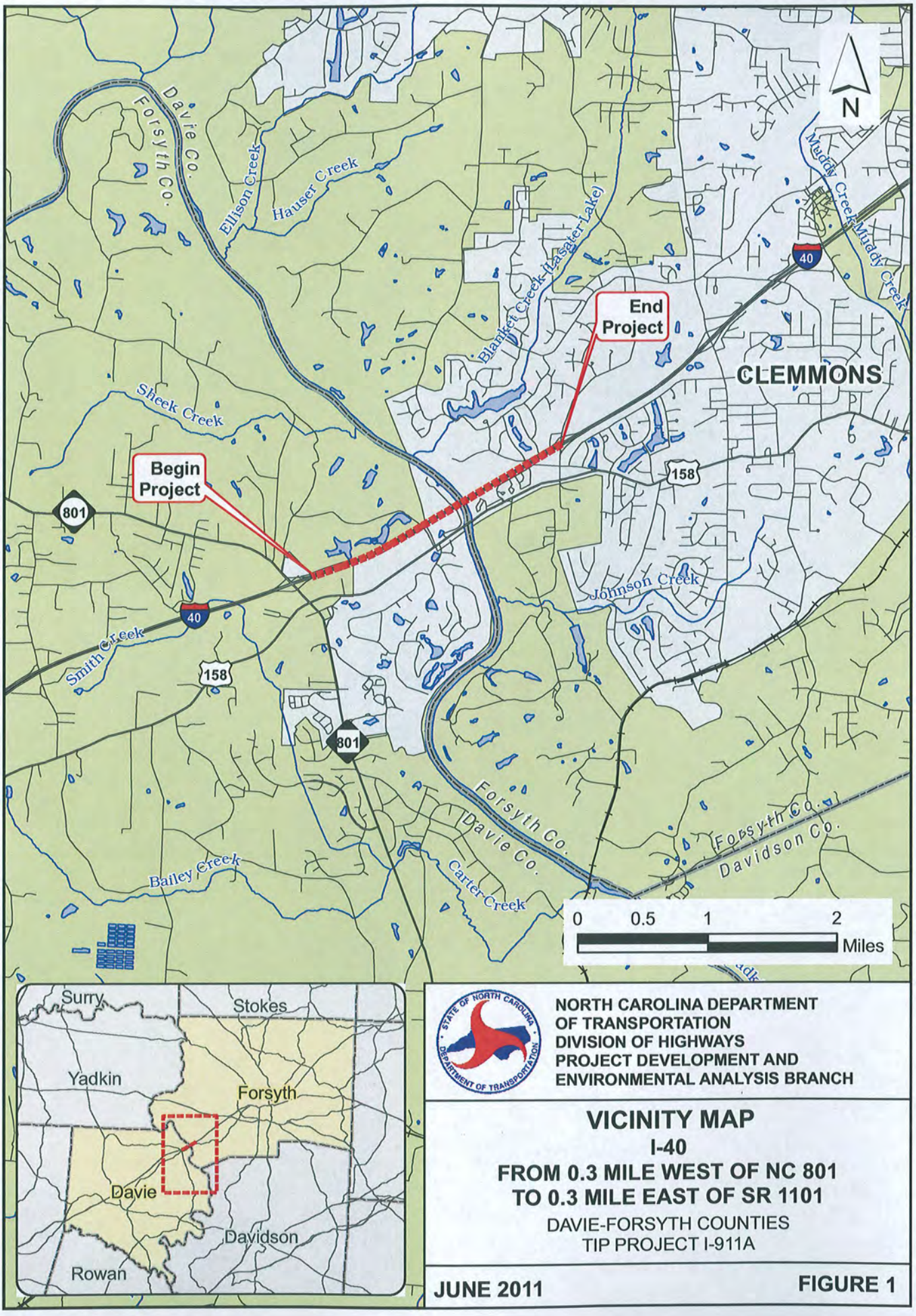
Merger concurrence was reached on Concurrence Point 2A (Bridging Decisions and Alignment Review) and Concurrence Point 4A (Avoidance and Minimization of impacts) on April 20, 2010. Copies of the signed concurrence forms are included in Appendix I.

D. Additional Agency Comments

Letters were sent to the following federal and state environmental agencies and regional and local Government at the beginning of project studies:

Written comments were received from agencies noted with an asterisk (*).

U. S. Army Corps of Engineers- Wilmington Region
U. S. Environmental Protection Agency – Region IV
U. S. Department of Interior, Fish and Wildlife Service – Raleigh
N. C. Department of Public Instruction – School Planning*
N. C. Department of Cultural Resources – Division of Archives and History*
N. C. Department of Environment and Natural Resources*
    Division of Water Quality*
    Division of Environmental Health*
N. C. Wildlife Resources Commission*
Winston-Salem Planning Organization*
Town of Bermuda Run*



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS BRANCH

VICINITY MAP

I-40
FROM 0.3 MILE WEST OF NC 801 TO 0.3 MILE EAST OF SR 1101

DAVIE-FORSYTH COUNTIES
TIP PROJECT I-911A

JUNE 2011 **FIGURE 1**

Yadkin Valley Rd.

NC 801

Kinderton Pl. Shopping Center

Kinderton Village

Charles N. Taylor House

BEGIN PROJECT

MATCHLINE - FIGURE 2b

Burt's Way Bridge

PEO1Ah

Smith Creek

PEO1A

Tanglewood Crossing

Shell Gas

Keystone Marketing

40

Former G&B Oil Company Station

Beroth Oil Station

Hodges-Wood House

City of Bermuda Run

Win-Mock Farm

US West Highway 158

Hillsdale

Legend

- Study Limits
- Historic Study List Structures
- NWI Wetland
- Water Body
- Stream
- Win-Mock Farm

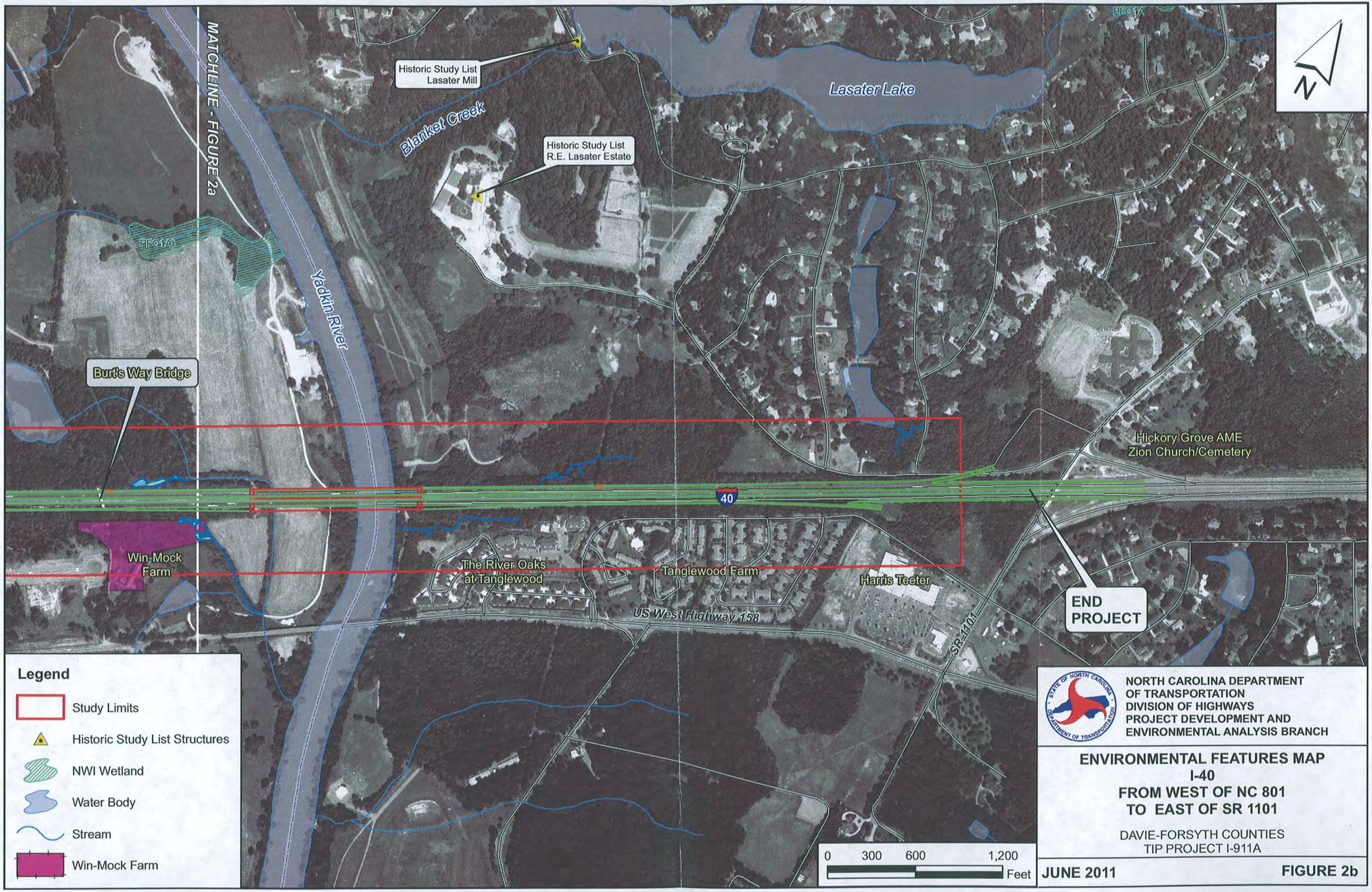
0 300 600 1,200 Feet

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS BRANCH

ENVIRONMENTAL FEATURES MAP
I-40
FROM WEST OF NC 801 TO EAST OF SR 1101

DAVIE-FORSYTH COUNTIES
TIP PROJECT I-911A

JUNE 2011 **FIGURE 2a**



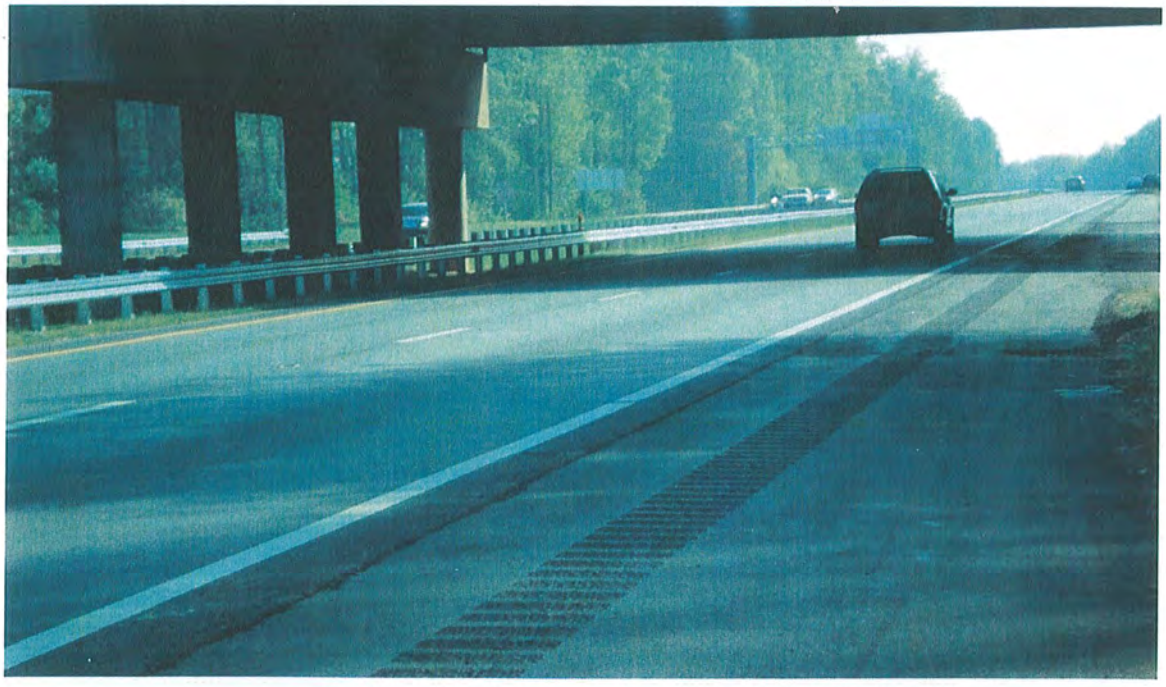
NORTH CAROLINA DEPARTMENT
OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND
ENVIRONMENTAL ANALYSIS BRANCH

ENVIRONMENTAL FEATURES MAP
I-40
FROM WEST OF NC 801
TO EAST OF SR 1101

DAVIE-FORSYTH COUNTIES
TIP PROJECT I-911A

JUNE 2011 **FIGURE 2b**

Looking East along I-40 @ NC 801 (WB) Bridge



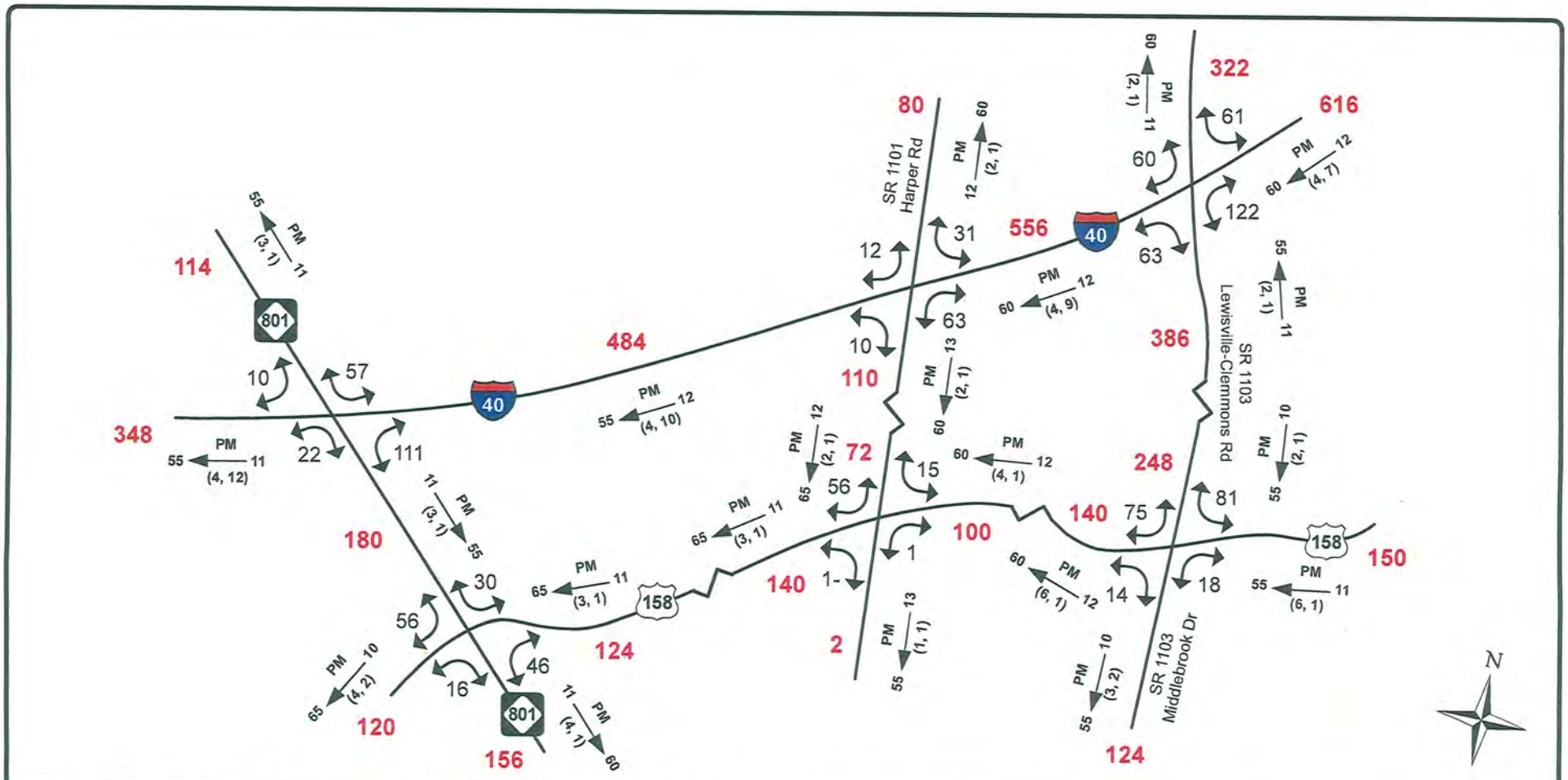
Looking East along I-40 @ NC 801 (EB) Bridge

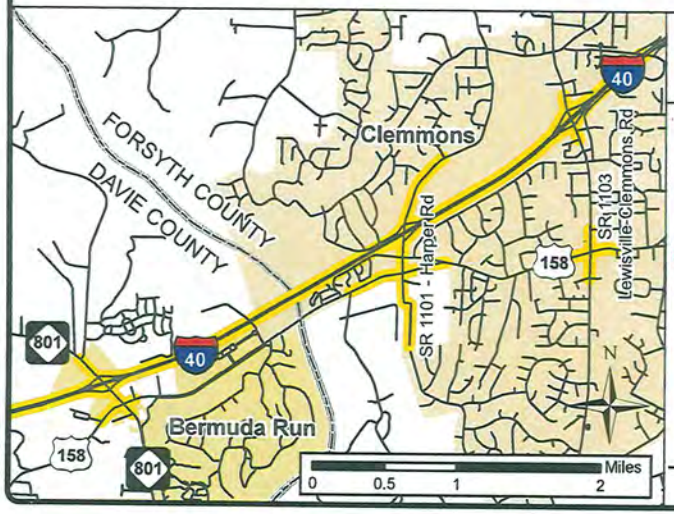
Figure 3
Sheet 1 of 2

Looking East along I-40 @ Harper Road (EB) Bridge

Looking East along I-40 @ Harper Road (WB)Bridge

Figure 3
Sheet 2 of 2





2009 ANNUAL AVERAGE DAILY TRAFFIC

No Build

SHEET 1 - 1

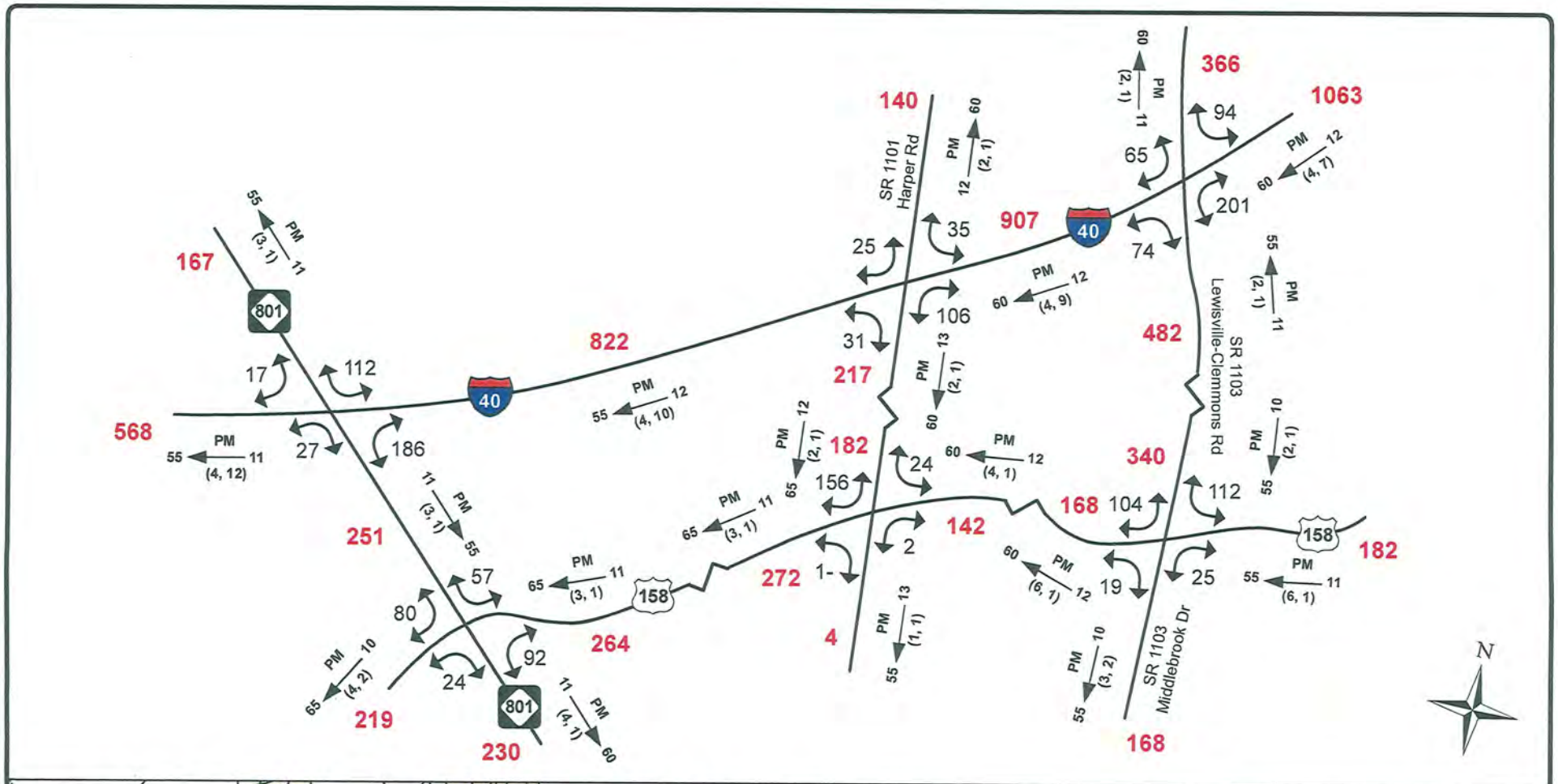
LEGEND

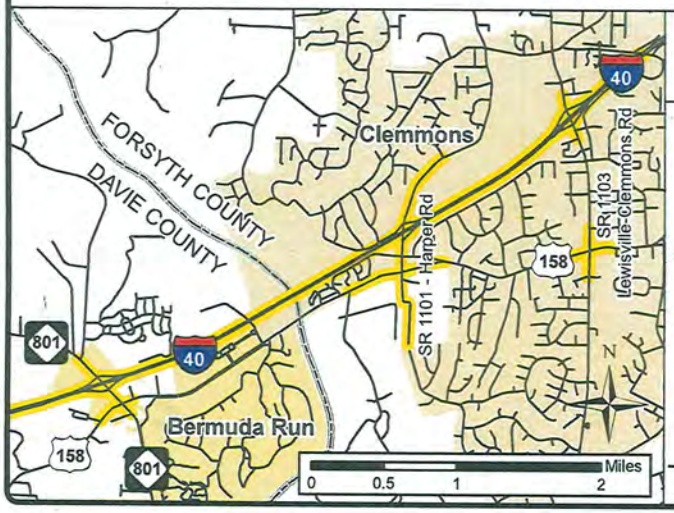
DHV PM D (d, t)

###	No. of Vehicles Per Day (VPD) in 100s	DHV	Design Hourly Volume
		PM	PM Peak Period
1-	Less than 50 VPD	D	Peak Hour Directional Split
X	Movement Prohibited		Indicates Direction of D
——	Roadway	(d,t)	Duals, TT-STs (%)

TIP: I-0911A	**WBS:** 34147.12
COUNTY: Davie Forsyth	**DIVISION:** 9
DATE: 08-18-2009	
PREPARED BY: Keith Dixon	
LOCATION: I-40 west of NC 801 to SR 1101-Harper Rd	
PROJECT: Pavement rehabilitation and construct fifth and sixth lanes	

FIGURE 4a





2035 ANNUAL AVERAGE DAILY TRAFFIC

No Build

SHEET 2 - 1

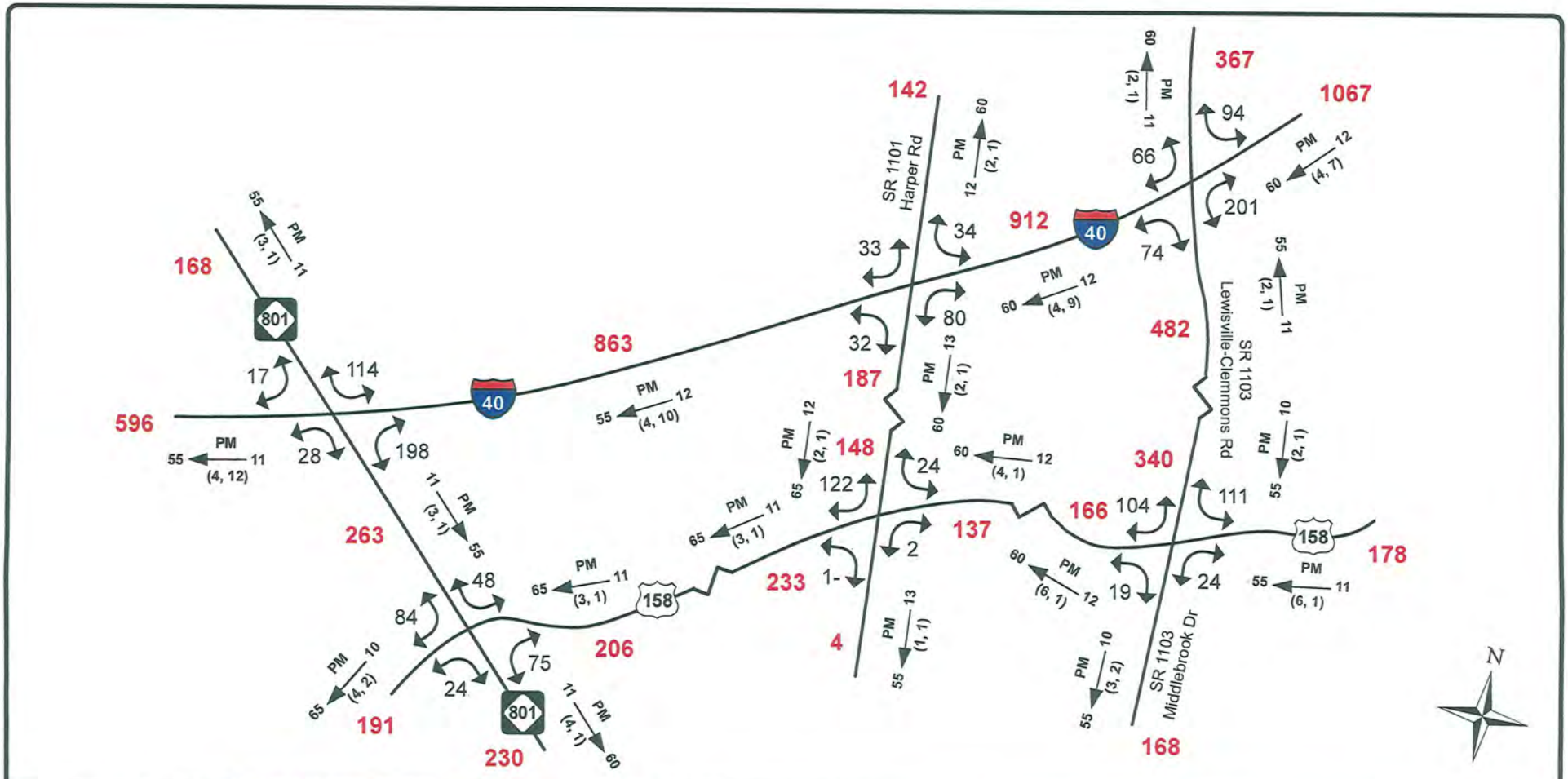
LEGEND

DHV PM (d, t) D

###	No. of Vehicles Per Day (VPD) in 100s	DHV	Design Hourly Volume
		PM	PM Peak Period
1-	Less than 50 VPD	D	Peak Hour Directional Split
X	Movement Prohibited		Indicates Direction of D
——	Roadway	(d,t)	Duals, TT-STs (%)

TIP: I-0911A	**WBS:** 34147.12
COUNTY: Davie Forsyth	**DIVISION:** 9
DATE: 08-18-2009	
PREPARED BY: Keith Dixon	
LOCATION:	I-40 west of NC 801 to SR 1101-Harper Rd
PROJECT:	Pavement rehabilitation and construct fifth and sixth lanes

FIGURE 4b



2035 ANNUAL AVERAGE DAILY TRAFFIC

Build

SHEET 3 - 1

LEGEND

DHV PM (d, t) D

###	No. of Vehicles Per Day (VPD) in 100s	DHV	Design Hourly Volume
		PM	PM Peak Period
1-	Less than 50 VPD	D	Peak Hour Directional Split
X	Movement Prohibited		Indicates Direction of D
——	Roadway	(d,t)	Duals, TT-STs (%)

TIP: I-0911A **WBS:** 34147.12

COUNTY: Davie Forsyth **DIVISION:** 9

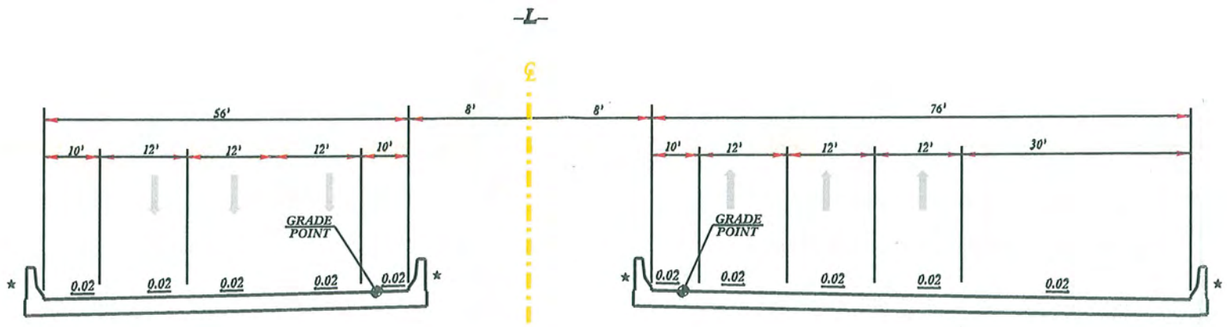
DATE: 08-18-2009

PREPARED BY: Keith Dixon

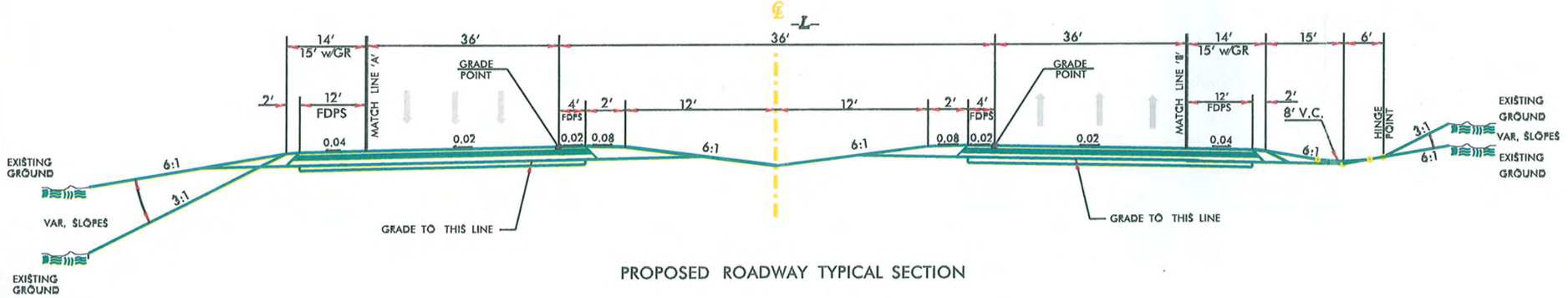
LOCATION: I-40 west of NC 801 to SR 1101-Harper Rd

PROJECT: Pavement rehabilitation and construct fifth and sixth lanes

FIGURE 4c



STRUCTURE TYPICAL SECTION



PROPOSED ROADWAY TYPICAL SECTION

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

PROPOSED TYPICAL SECTION
I-40 FROM WEST OF NC 801
TO EAST OF SR 1101
Davie and Forsyth Counties
TIP Project I-0911A

County:	Davie & Forsyth
Div. 10	TIP # I-0911 A
WBS	34147.1.2
Date:	March 2010

Figure 5

Legend

Corridor

Community

- Maintained/Disturbed
- Mixed Upland Hardwood Forest
- Piedmont Levee Forest
- Water Body

0 300 600 1,200 Feet

NORTH CAROLINA DEPARTMENT
OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND
ENVIRONMENTAL ANALYSIS BRANCH

Natural Communities

WEST OF NC 801
TO EAST OF SR 1101
Davie and Forsyth Counties
TIP Project I-0911A

FIGURE 6a

Legend

Corridor

Community

- Maintained/Disturbed
- Mixed Upland Hardwood Forest
- Piedmont Levee Forest
- Water Body

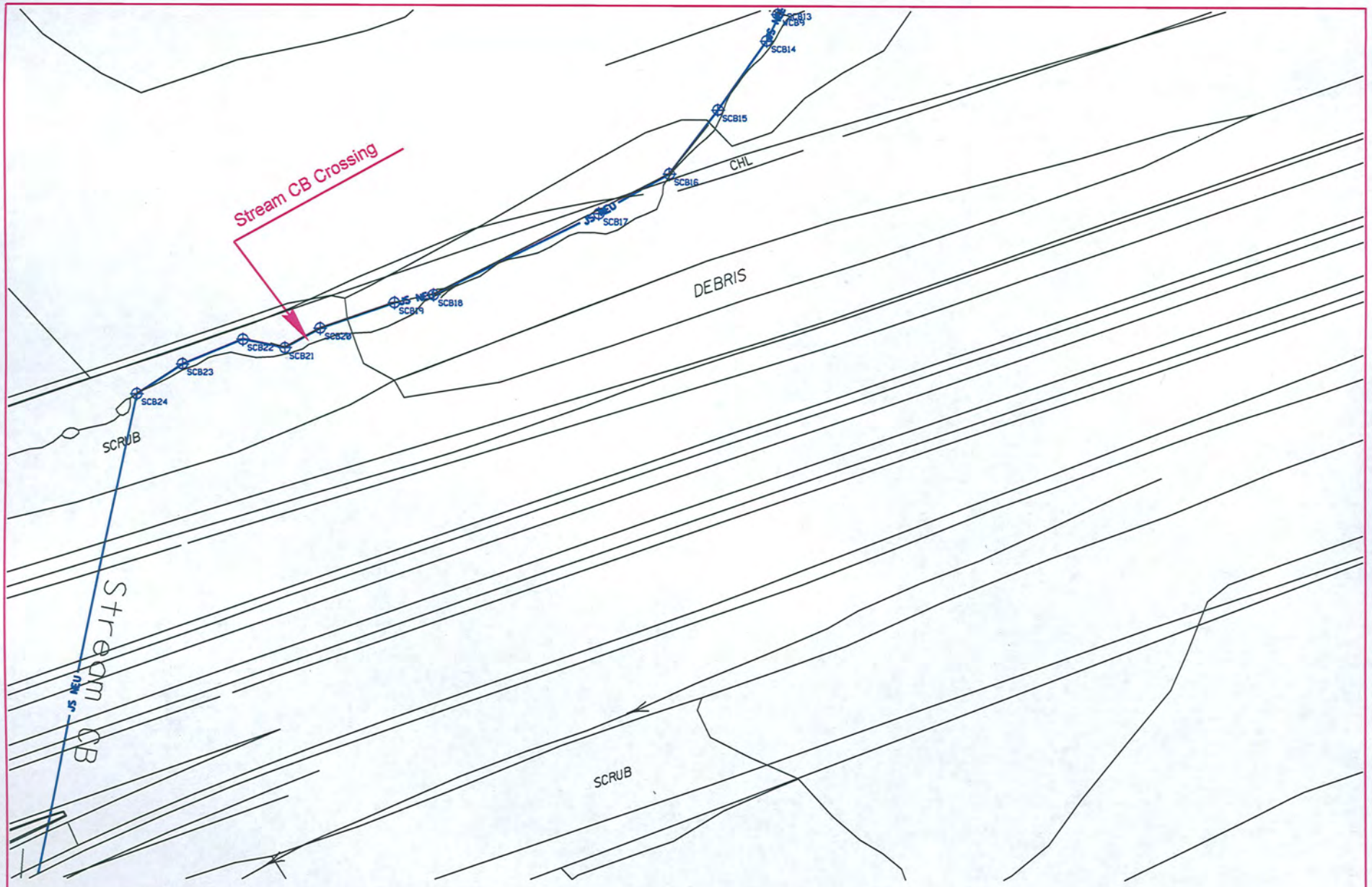
0 300 600 1,200 Feet

NORTH CAROLINA DEPARTMENT
OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND
ENVIRONMENTAL ANALYSIS BRANCH

Natural Communities

WEST OF NC 801
TO EAST OF SR 1101
Davie and Forsyth Counties
TIP Project I-0911A

FIGURE 6b



Legend

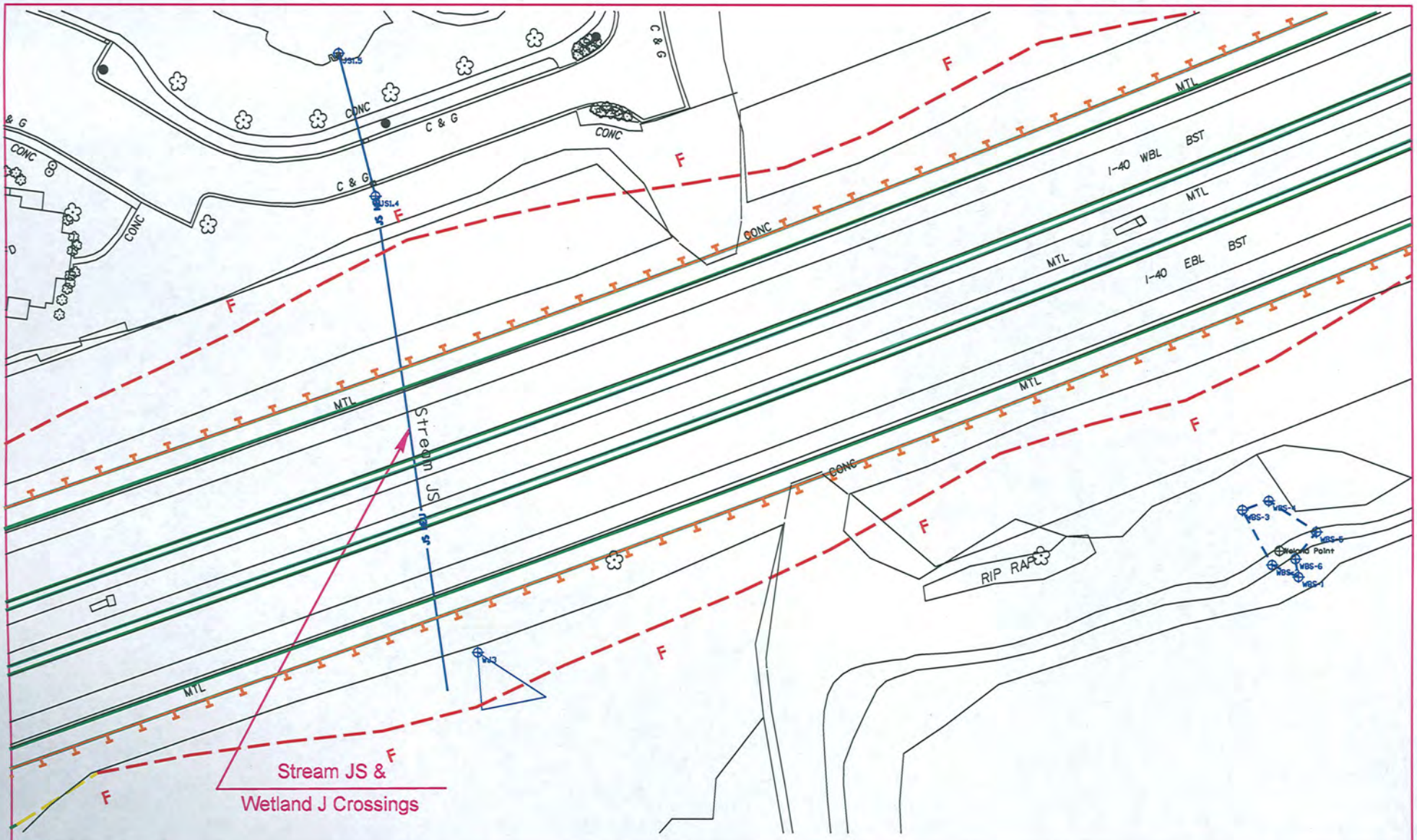
- Stream Crossing
- Rdwy Alignments
- ROW Limit
- Property Line

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

MAJOR STREAM CROSSING
WEST OF NC 801
TO EAST OF SR 1101
Davie and Forsyth Counties
TIP Project I-0911A

County:	Davie & Forsyth
Div. 10	TIP # I-0911 A
WBS	34147.1.2
Date:	March 2010

Figure 7



Legend

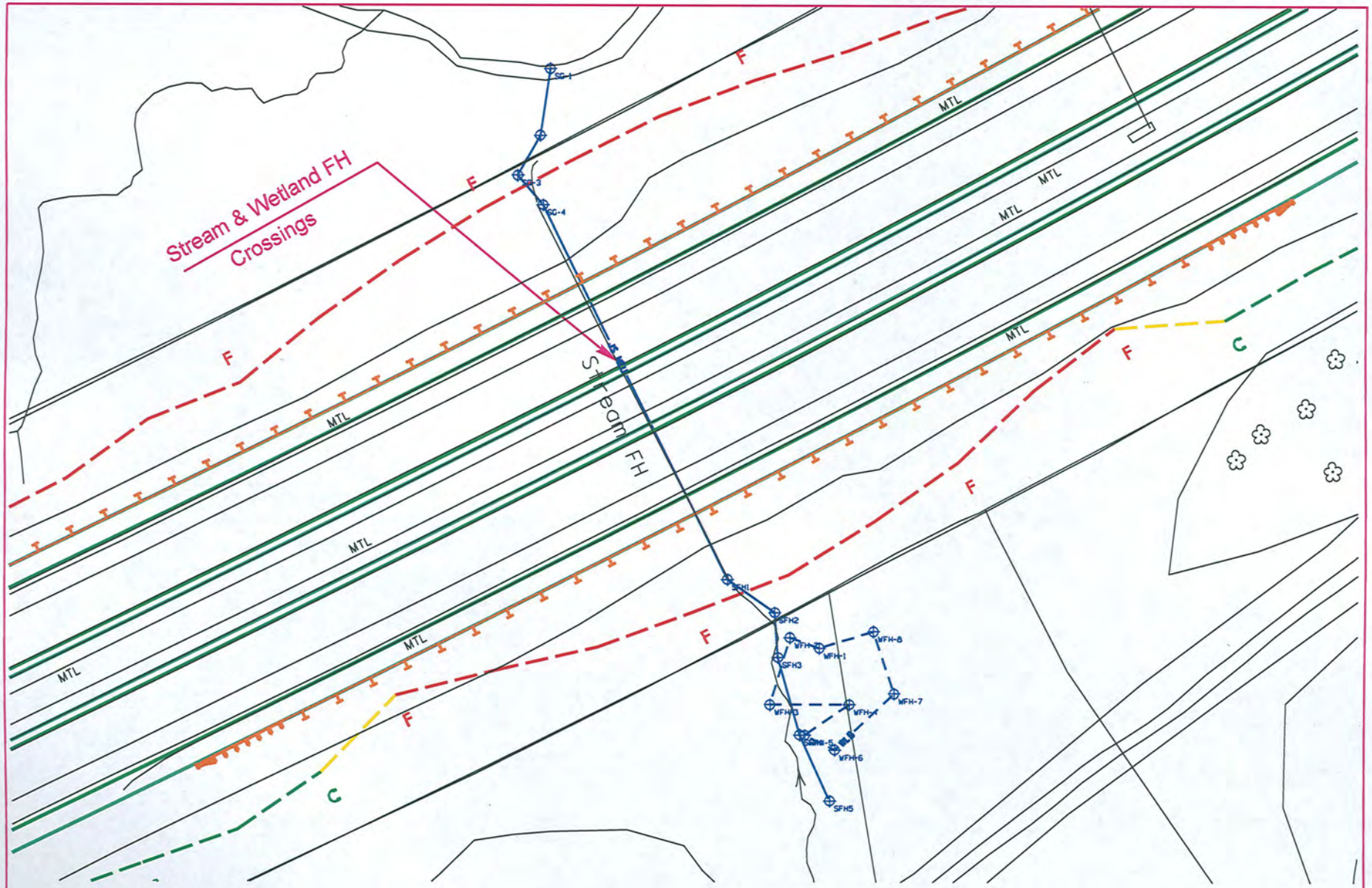
- Stream Crossing
- Rdwy Alignments
- ROW Limit
- Property Line

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

MAJOR STREAM CROSSING
WEST OF NC 801
TO EAST OF SR 1101
Davie and Forsyth Counties
TIP Project I-0911A

County:	Davie & Forsyth
Div. 10	TIP # I-0911 A
WBS	34147.1.2
Date:	March 2010

Figure 8



Legend

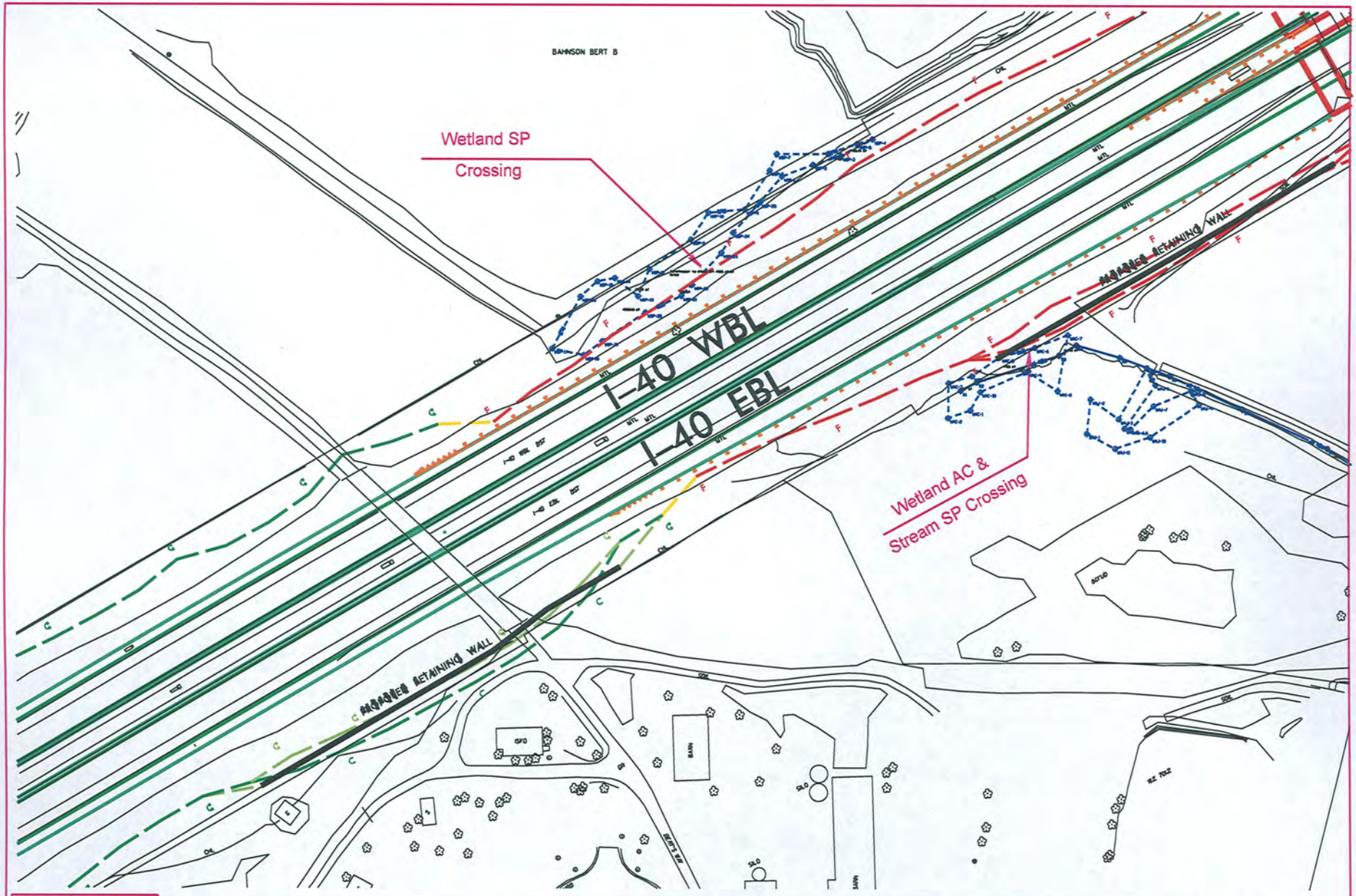
- Stream Crossing
- Rdwy Alignments
- ROW Limit
- Property Line

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

MAJOR STREAM CROSSING
WEST OF NC 801
TO EAST OF SR 1101
Davie and Forsyth Counties
TIP Project I-0911A

County:	Davie & Forsyth
Div. 10	TIP # I-0911 A
WBS	34147.1.2
Date:	March 2010

Figure 9



Legend

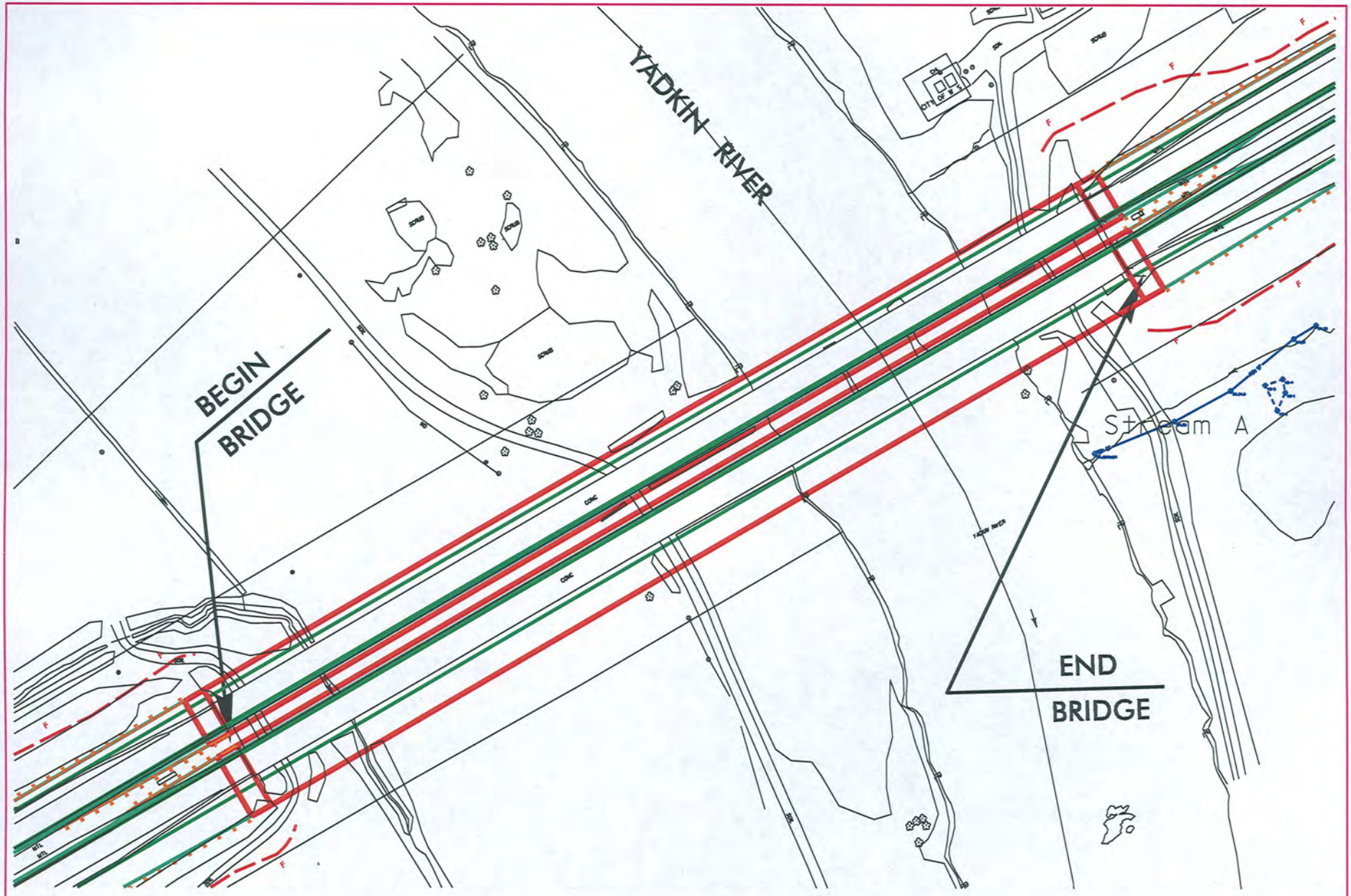
- Stream Crossing
- Rdwy Alignments
- ROW Limit
- Property Line

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

MAJOR STREAM CROSSING
WEST OF NC 801
TO EAST OF SR 1101
Davie and Forsyth Counties
TIP Project I-0911A

County:	Davie & Forsyth
Div. 10	TIP # I-0911 A
WBS	34147.1.2
Date:	March 2010

Figure 10



Legend

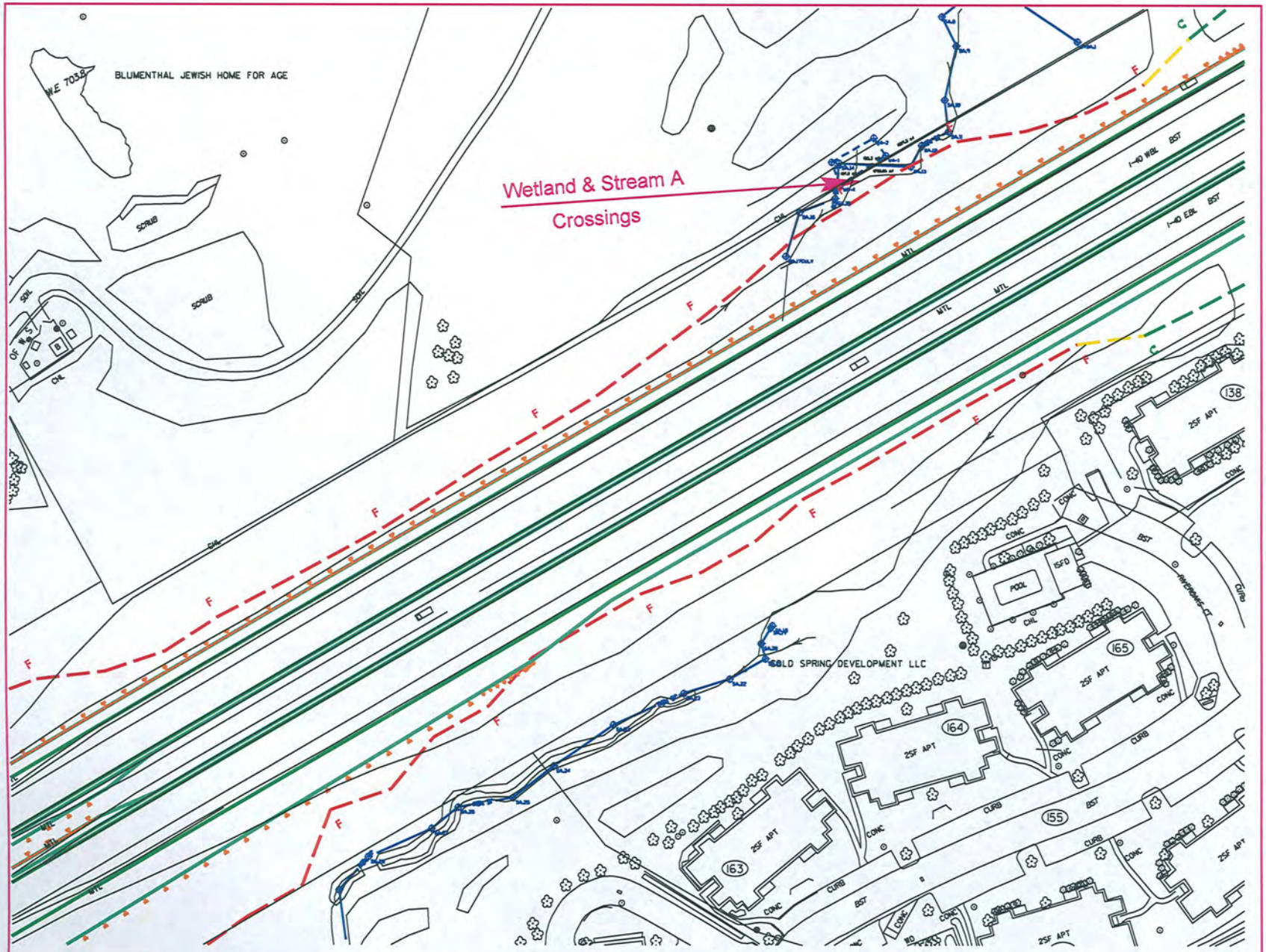
- Stream Crossing
- Rdwy Alignments
- ROW Limit
- Property Line

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

MAJOR STREAM CROSSING
WEST OF NC 801
TO EAST OF SR 1101
Davie and Forsyth Counties
TIP Project I-0911A

County:	Davie & Forsyth
Div. 10	TIP # I-0911 A
WBS	34147.1.2
Date:	March 2010

Figure 11



Legend

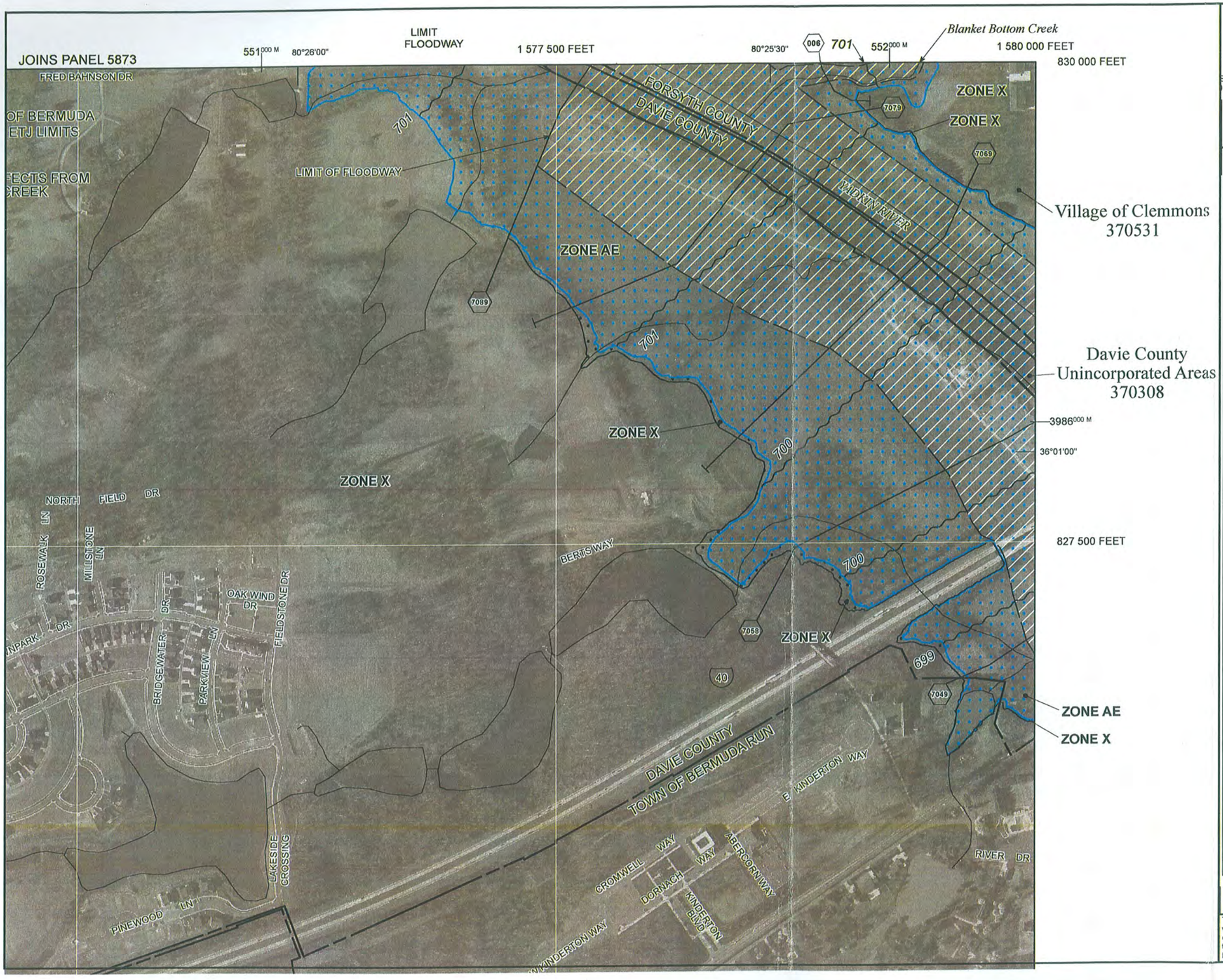
- Stream Crossing
- Rdwy Alignments
- ROW Limit
- Property Line

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

MAJOR STREAM CROSSING
WEST OF NC 801
TO EAST OF SR 1101
Davie and Forsyth Counties
TIP Project I-0911A

County:	Davie & Forsyth
Div. 10	TIP # I-0911 A
WBS	34147.1.2
Date:	March 2010

Figure 12



GRID NORTH

MAP SCALE 1" = 500' (1 : 6,000)

250 0 250 500 750 1,000 FEE

0 150 30(

PANEL 5872K

FIRM

FLOOD INSURANCE RATE MAP

NORTH CAROLINA

PANEL 5872

(SEE LOCATOR DIAGRAM OR MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	CID No.	PANEL	SUFFIX
BERMUDA RUN, TOWN OF	370685	5872	K
CLEMMONS, VILLAGE OF	370531	5872	K
DAVIE COUNTY	370308	5872	K
FORSYTH COUNTY	375349	5872	K

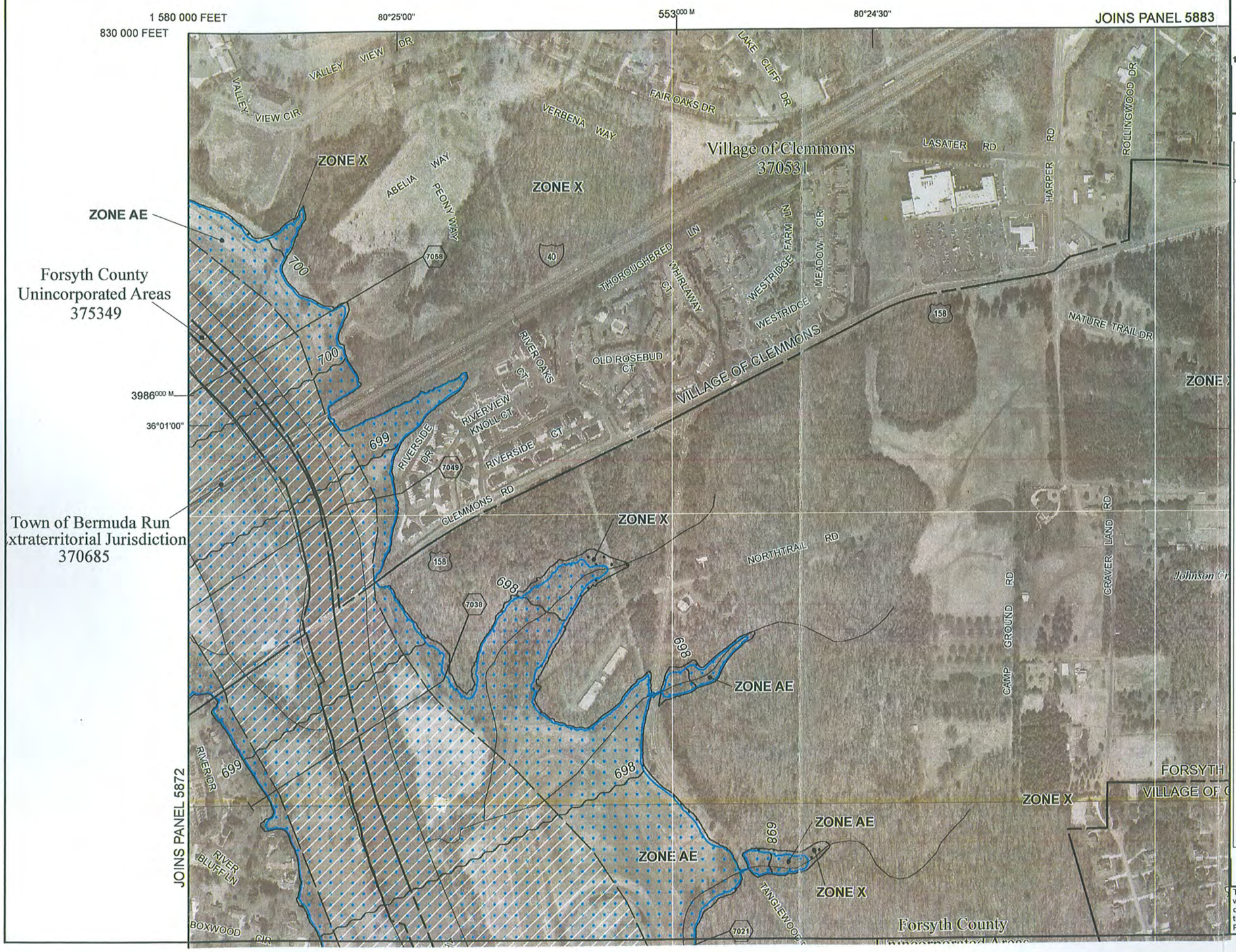
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP REVISED
JANUARY 2, 2009

MAP NUMBER
3710587200K

State of North Carolina
Federal Emergency Management Agency

FIGUR 13a



GRID NORTH

MAP SCALE 1" = 500' (1 : 6,000)

250 0 250 500 750 1,0

150 0 150

PANEL 5882K

FIRM

FLOOD INSURANCE RATE MAP

NORTH CAROLINA

PANEL 5882

(SEE LOCATOR DIAGRAM OR MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	CID No.	PANEL	SUFFIX
BERMUDA RUN, TOWN OF	370685	5882	K
CLEMMONS, VILLAGE OF	370531	5882	K
DAVIE COUNTY	370308	5882	K
FORSYTH COUNTY	375349	5882	K

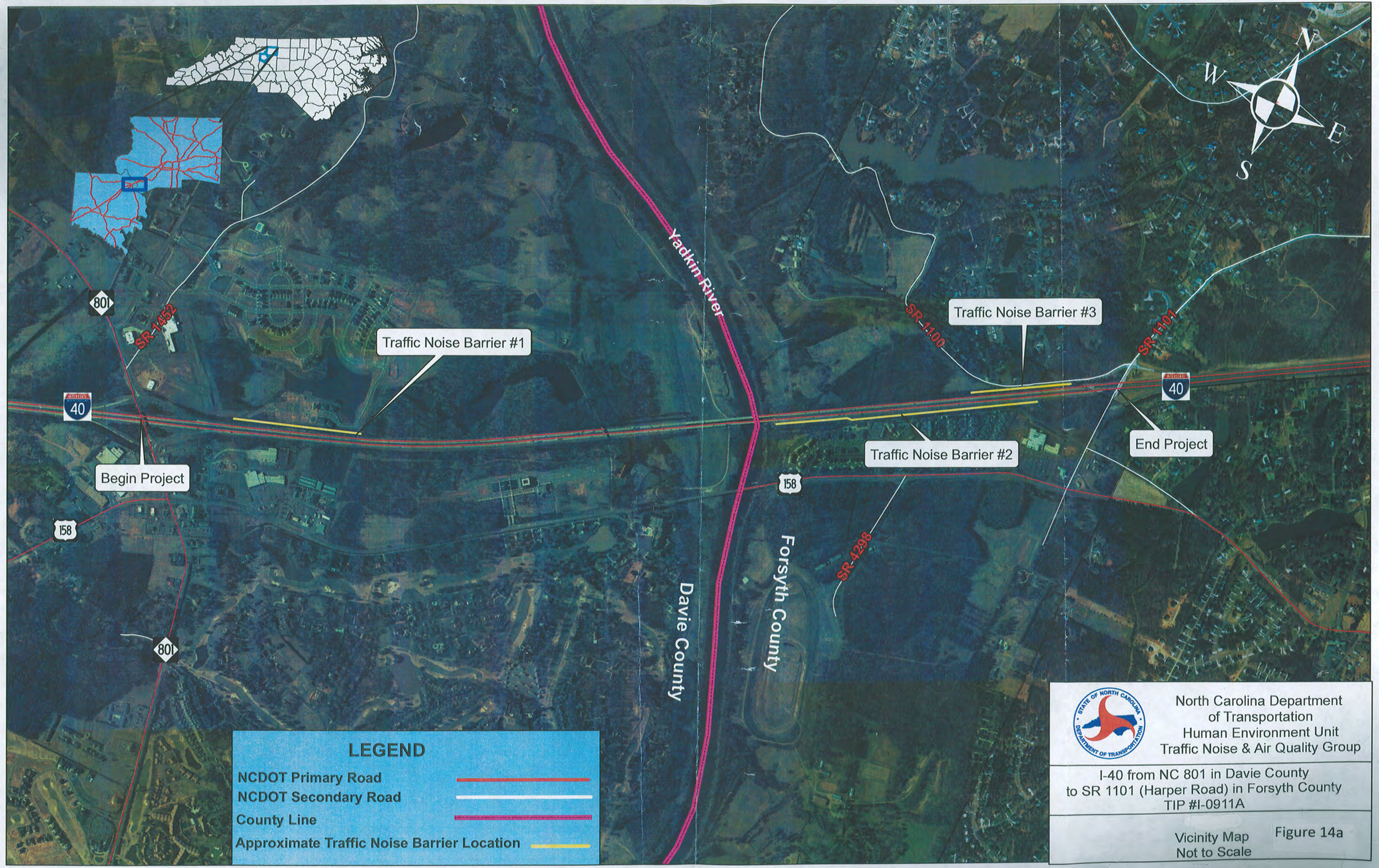
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP REVISED
JANUARY 2, 2009

MAP NUMBER
3710588200K

State of North Carolina
Federal Emergency Management Agency

FIGURE 13b



North Carolina Department
of Transportation
Human Environment Unit
Traffic Noise & Air Quality Group

I-40 from NC 801 in Davie County
to SR 1101 (Harper Road) in Forsyth County
TIP #I-0911A

Vicinity Map
Not to Scale

Figure 14a

LEGEND

- Property Boundaries
- Traffic Noise Barrier #1
- Not Impacted or Benefited Traffic Noise Receptor
- Impacted but Not Benefited Traffic Noise Receptor
- Impacted and Benefited Traffic Noise Receptor
- Not Impacted but Benefited Traffic Noise Receptor
- New Structure

Note: Placement and Size of New Structures are Approximate.

N W E S

801

INTERSTATE NORTH CAROLINA 40

R-01 R-02 R-03 R-04 R-05 R-05A R-06 R-07

R-8A R-8B R-8C R-8D R-9A R-9B R-9C R-9D R-10A R-10B R-10C R-10D R-11A R-11B R-11C R-11D R-12A R-12B R-12C R-12D R-13A R-13B R-13C R-13D R-14A R-14B R-14C R-14D R-15A R-15B R-15C R-15D R-16A R-16B R-16C R-16D R-17A R-17B R-17C R-17D R-18A R-18B R-18C R-18D R-19A R-19B R-19C R-19D

Pinewood Lane

Traffic Noise Barrier #1

Begin Project

Medical Drive

Commerce Drive

158

0 200 400 600 Feet

North Carolina Department of Transportation
Human Environment Unit
Traffic Noise & Air Quality Group

I-40 from NC 801 in Davie County
to SR 1101 (Harper Road) in Forsyth County
TIP #I-0911A

Traffic Noise Barrier #1 Figure 14b
Scale: 1" = 200'

North Carolina Department of Transportation
Human Environment Unit
Traffic Noise & Air Quality Group

I-40 from NC 801 in Davie County
to SR 1101 (Harper Road) in Forsyth County
TIP #I-0911A

Traffic Noise Barrier #2 Figure 14c
Scale: 1" = 200'

LEGEND

- Property Boundaries
- Traffic Noise Barrier
- County Line
- Impacated and Benefited Traffic Noise Receptor
- Not Impacated but Benefited Traffic Noise Receptor
- Not Impacated or Benefited Traffic Noise Receptor

Fair Oaks Drive

Lake Cliff Drive

Match to Figure 3

Match to Figure 5

Traffic Noise Barrier #2

INTERSTATE 40

Thoroughbred Lane

River Oaks Court

Old Rosebud Court

Whirlaway Court

Westridge Meadow Circle

Westridge Farm Lane

Westridge Meadow Circle

US 158

0 200 400 600

Feet

North Carolina Department of Transportation
Human Environment Unit
Traffic Noise & Air Quality Group

I-40 from NC 801 in Davie County
to SR 1101 (Harper Road) in Forsyth County
TIP #I-0911A

Traffic Noise Barrier #2 Figure 14d
Scale: 1" = 200'

LEGEND

Property Boundaries

Traffic Nosie Barrier

Impacted and Benefited Traffic Noise Receptor

Not Impacted but Benefited Traffic Noise Receptor

Not Impacted or Benefited Traffic Noise Receptor

N

W

E

S

R-49A
R-49B
R-49C
R-49
R-51A
R-51
R-50
R-52
R-53
R-54
R-55
R-56
R-57

Lake Cliff Drive

Gardensprings DRive

Fair Oaks Drive

Traffic Nosie Barrier #3

Continuation of Traffic Nosie Barrier #2
See Figure 4

INTERSTATE 40

Thoroughbred Lane

Old Rosebud Court

Whirlaway Court

Westridge Meadow Circle

Westridge Farm Lane

Meadow Circle

R-30A R-30B R-30C R-30D R-31A R-31B R-32A R-32B R-32C R-32D R-32E R-32F R-33A R-33B R-33C R-33D R-34A R-34B R-34C R-34D R-35A R-35B R-35C R-35D R-35E R-35F R-36A R-36B R-36C R-36D R-37A R-37B R-37C R-37D R-38A R-38B R-38C R-38D R-39A R-39B R-39C R-40A R-40B R-40C R-40D R-41A R-41B R-41C R-41D R-42A R-42B R-42C R-42D R-43A R-43B R-43C R-43D R-44A R-44B R-44C R-44D R-45A R-45B R-45C R-45D R-46A R-46B R-46C R-46D R-47A R-47B R-47C R-47D R-48A R-48B R-48C R-48D R-29A R-29B R-29C R-29D R-29E R-29F R-28B R-28C

0 200 400 600

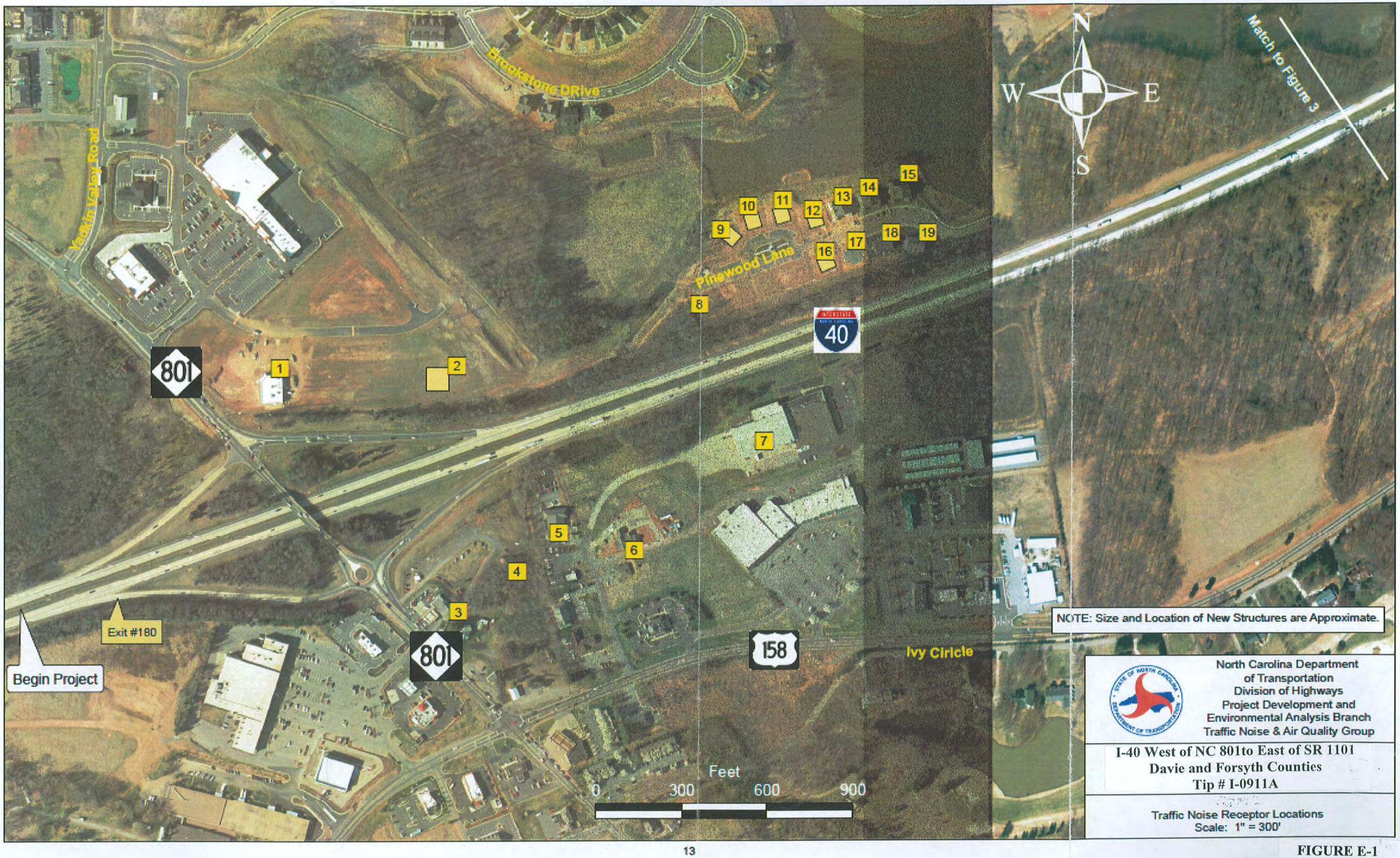
Feet

North Carolina Department
of Transportation
Human Environment Unit
Traffic Noise & Air Quality Group

I-40 from NC 801 in Davie County
to SR 1101 (Harper Road) in Forsyth County
TIP #I-0911A

Traffic Noise Barrier #3
Scale: 1" = 200'

Figure 14e



NOTE: Size and Location of New Structures are Approximate.

North Carolina Department
of Transportation
Division of Highways
Project Development and
Environmental Analysis Branch
Traffic Noise & Air Quality Group

I-40 West of NC 801to East of SR 1101
Davie and Forsyth Counties
Tip # I-0911A

Traffic Noise Receptor Locations
Scale: 1" = 300'

FIGURE E-1

NOTE: Size and Location of New Structures are Approximate.

North Carolina Department of Transportation
Division of Highways
Project Development and Environmental Analysis Branch
Traffic Noise & Air Quality Group

I-40 West of NC 801to East of SR 1101
Davie and Forsyth Counties
Tip # I-0911A

Traffic Noise Receptor Locations
Scale: 1" = 300'

FIGURE E-2

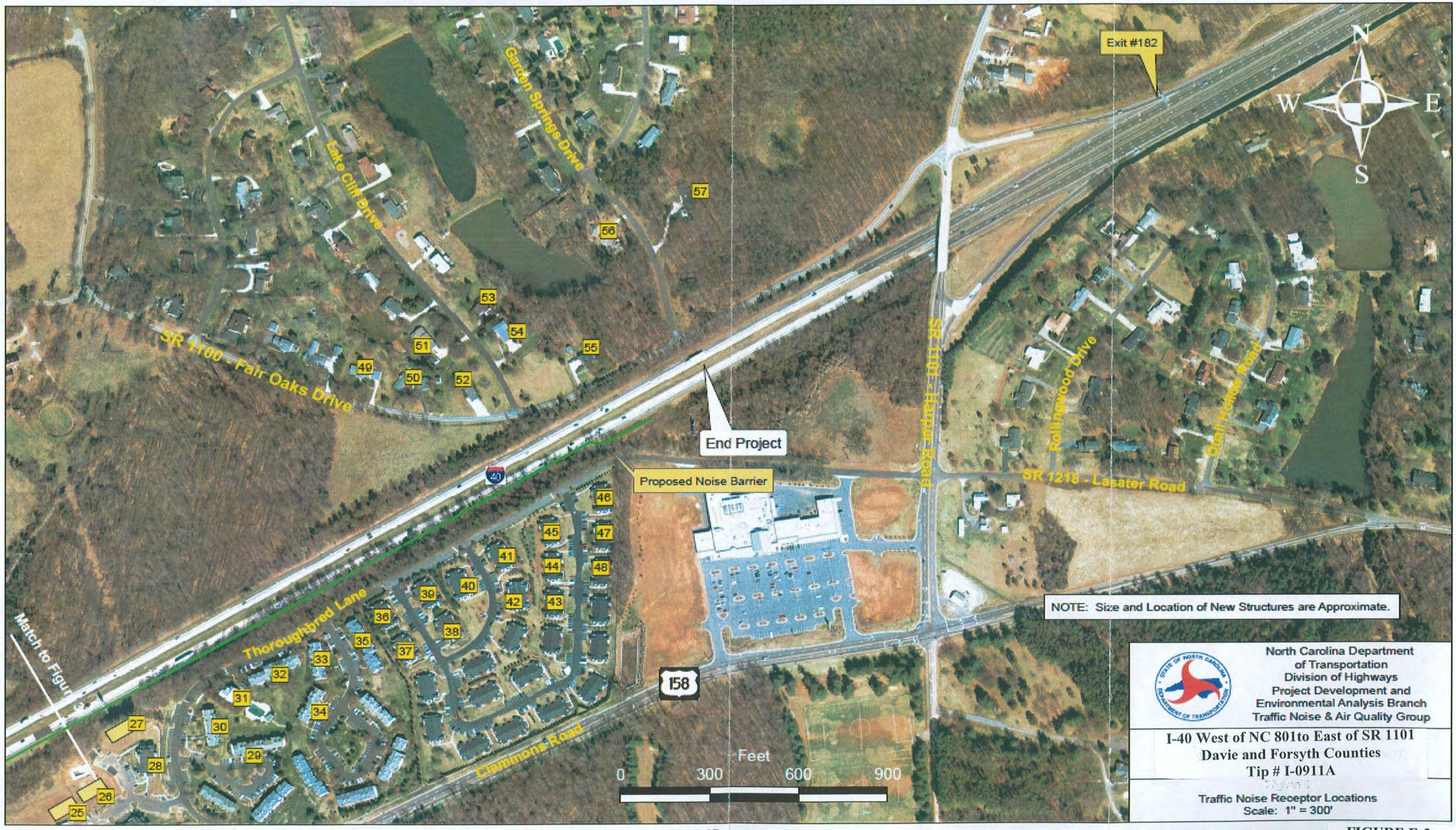

Exit #182
N
W
E
S
Garden Springs Drive
Lake Cliff Drive
SR 1100 - Fair Oaks Drive
SR 1101 - Harper Road
Rollingwood Drive
Quail Hollow Road
SR 1218 - Lasater Road
End Project
Proposed Noise Barrier
Thoroughbred Lane
Clemmons Road
158
Match to Figure 3
49
50
51
52
53
54
55
56
57
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
0
300
600
900
Feet
NOTE: Size and Location of New Structures are Approximate.
North Carolina Department of Transportation
Division of Highways
Project Development and Environmental Analysis Branch
Traffic Noise & Air Quality Group
I-40 West of NC 801to East of SR 1101
Davie and Forsyth Counties
Tip # I-0911A
Traffic Noise Receptor Locations
Scale: 1" = 300'

FIGURE E-3

APPENDIX A

COMMENTS RECEIVED FROM FEDERAL, STATE, AND LOCAL AGENCIES

TIP Project No. I-0911 A

North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

November 23, 2005

MEMORANDUM

TO: Stephanie Caudill; NCDOT Project Development and Environmental Analysis Branch

FROM: Harry LeGrand, Natural Heritage Program

SUBJECT: Proposed Widening Improvements to I-40, from 0.3 mile west of NC 801 to 0.3 mile west of SR 1101; Davie and Forsyth counties

REFERENCE: TIP Project I-911A, WBS No. 34147

The Natural Heritage Program has no record of rare species, significant natural communities, or priority natural areas at the site nor within a mile of the project area. Although our maps do not show records of such natural heritage elements in the project area, it does not necessarily mean that they are not present. It may simply mean that the area has not been surveyed. The use of Natural Heritage Program data should not be substituted for actual field surveys, particularly if the project area contains suitable habitat for rare species, significant natural communities, or priority natural areas.

You may wish to check the Natural Heritage Program database website at <www.ncsparks.net/nhp/search.html> for a listing of rare plants and animals and significant natural communities in the county and on the topographic quad map. Please do not hesitate to contact me at 919-715-8697 if you have questions or need further information.

1601 Mail Service Center, Raleigh, North Carolina 27699-1601
Phone: 919-733-4984 • FAX: 919-715-3060 • Internet: www.enr.state.nc.us

I-911A

North Carolina
Department of Administration

Michael F. Easley, Governor

Gwynn T. Swinson, Secretary

November 23, 2005

Ms. Stephanie Caudill
NCDOT - Project Development
1548 Mail Service Center
Raleigh NC 27699-1548

Dear Ms. Caudill:

Subject: Scoping - Widening of I-40 from 0.3 mile west of NC 801 to 0.3 mile west of SR 1101 in Davie and Forsyth counties

The N. C. State Clearinghouse has received the above project for intergovernmental review. This project has been assigned State Application Number 06-E-4220-0172. Please use this number with all inquiries or correspondence with this office.

Review of this project should be completed on or before 12/23/2005. Should you have any questions, please call (919)807-2425.

Sincerely,

Chrys Baggett

Ms. Chrys Baggett
Environmental Policy Act Coordinator

Mailing Address:
1301 Mail Service Center
Raleigh, NC 27699-1301

Telephone: (919)807-2425
Fax (919)733-9571
State Courier #51-01-00
e-mail: Chrys.Baggett@ncmail.net

Location Address:
116 West Jones Street
Raleigh, North Carolina

North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

MEMORANDUM

TO: Chrys Baggett
State Clearinghouse

FROM: Melba McGee
Environmental Review Coordinator

SUBJECT: 06-0172 Scoping,Widening Improvements to I-40 Davie and Forsyth Counties

DATE: December 20, 2005

The Department of Environment and Natural Resources has reviewed the proposed information. The attached comments are for the applicant's information.

Thank you for the opportunity to review.

Attachments

1601 Mail Service Center, Raleigh, North Carolina 27699-1601
Phone: 919-733-4984 \ FAX: 919-715-3060 \ Internet: www.enr.state.nc.us/ENR/

State of North Carolina
NCDENR Department of Environment and Natural Resources

Reviewing Office: WSRO

Project Number: 06-0172 Due Date: / /

INTERGOVERNMENTAL REVIEW - PROJECT COMMENTS

After review of this project it has been determined that the DENR permit(s) and/or approvals indicated may need to be obtained in order for this proje to comply with North Carolina Law. Questions regarding these permits should be addressed to the Regional Office indicated on the reverse of this for All applications, information and guidelines relative to these plans and permits are available from the same Regional Office.

	PERMITS	SPECIAL APPLICATION PROCEDURES or REQUIREMENTS	Normal Process Ti (Statutory Time Lir
☐	Permit to construct & operate wastewater treatment facilities, sewer system extensions & sewer systems not discharging into state surface waters.	Application 90 days before begin construction or award of construction contracts. On-site inspection. Post-application technical conference usual.	30 days (90 days)
☐	NPDES-permit to discharge into surface water and/or permit to operate and construct wastewater facilities discharging into state surface waters.	Application 180 days before begin activity. On-site inspection preapplication conference usual. Additionally, obtain permit to construct wastewater treatment facility-granted after NPDES. Reply time 30 days after receipt of plans or issue of NPDES permit-whichever is later.	90 - 120 days (N/A)
☐	Water Use Permit	Preapplication technical conference usually necessary.	30 days (N/A)
☐	Well Construction Permit	Complete application must be received and permit issued prior to the installation of a well.	7 days (15 days)
☐	Dredge and Fill Permit	Application copy must be served on each adjacent riparian property owner. On-site inspection. Preapplication conference usual. Filling may require Easement to Fill from N.C. Department of Administration and Federal Dredge and Fill Permit.	55 days (90 days)
☐	Permit to construct & operate Air Pollution Abatement facilities and/or Emission Sources as per 15 A NCAC (2Q.0100, 2Q.0300, 2H.0600)	N/A	60 days
(3) ☑	Any open burning associated with subject proposal must be in compliance with 15 A NCAC 2D.1900	N/A	60 days (90 days)
(3) ☑	Demolition or renovations of structures containing asbestos material must be in compliance with 15 A NCAC 2D.1110 (a) (1) which requires notification and removal prior to demolition. Contact Asbestos Control Group 919-733-0820.		
☐	Complex Source Permit required under 15 A NCAC 2D.0800		
☐	The Sedimentation Pollution Control Act of 1973 must be properly addressed for any land disturbing activity. An erosion & sedimentation control plan will be required if one or more acres to be disturbed. Plan filed with proper Regional Office (Land Quality Section) at least 30 days before beginning activity. A fee of $50 for the first acre or any part of an acre.		20 days (30 days)
(1) ☑	The Sedimentation Pollution Control Act of 1973 must be addressed with respect to the referenced Local Ordinance.		30 days
☐	Sedimentation and erosion control must be addressed in accordance with NCDOT's approved program. Particular attention should be given to design and installation of appropriate perimeter sediment trapping devices as well as stable stormwater conveyances and outlets.		
☐	Mining Permit	On-site inspection usual. Surety bond filed with DENR. Bond amount varies with type mine and number of acres of affected land. Any are mined greater than one acre must be permitted. The appropriate bond must be received before the permit can be issued.	30 days (60 days)
☐	North Carolina Burning permit	On-site inspection by N.C. Division of Forest Resources if permit exceeds 4 days	1 day (N/A)
☐	Special Ground Clearance Burning Permit-22 counties in coastal N.C. with organic soils.	On-site inspection by N.C. Division of Forest Resources required "if more than five acres of ground clearing activities are involved. Inspections should be requested at least ten days before actual burn is planned."	1 day (N/A)
☐	Oil Refining Facilities	N/A	90 - 120 days (N/A)

	PERMITS	SPECIAL APPLICATION PROCEDURES or REQUIREMENTS	Normal Process (Statutory Time)
☐	Dam Safety Permit	If permit required, application 60 days before begin construction. Applicant must hire N.C. qualified engineer to: prepare plans, inspect construction, certify construction is according to DENR approved plans. May also require permit under mosquito control program, and a 404 permit from Corps of Engineers. An inspection of site is necessary to verify Hazard Classification. A minimum fee of $200.00 must accompany the application. An additional processing fee based on a percentage or the total project cost will be required upon completion.	30 days (60 days)
☐	Permit to drill exploratory oil or gas well	File surety bond of $5,000 with DENR running to State of N.C. conditional that any well opened by drill operator shall, upon abandonment, be plugged according to DENR rules and regulations.	10 days (N/A)
☐	Geophysical Exploration Permit	Application filed with DENR at least 10 days prior to issue of permit. Application by letter. No standard application form.	10 days (N/A)
☐	State Lakes Construction Permit	Application fees based on structure size is charged. Must include descriptions & drawings of structure & proof of ownership of riparian property.	15 - 20 days (N/A)
☑ (2)	401 Water Quality Certification	N/A	55 days (130 days)
☐	CAMA Permit for MAJOR development	$250.00 fee must accompany application	60 days (130 days)
☐	CAMA Permit for MINOR development	$50.00 fee must accompany application	22 days (25 days)
☐	Several geodetic monuments are located in or near the project area. If any monument needs to be moved or destroyed, please notify: N.C. Geodetic Survey, Box 27687 Raleigh, N.C. 27611		
☐	Abandonment of any wells, if required must be in accordance with Title 15A. Subchapter 2C.0100.		
☑	Notification of the proper regional office is requested if "orphan" underground storage tanks (USTS) are discovered during any excavation operation.		
☐	Compliance with 15A NCAC 2H 1000 (Coastal Stormwater Rules) is required.		
*	Other comments (attach additional pages as necessary, being certain to cite comment authority)		45 days (N/A)

(1) NCDOT has a delegated erosion and sediment control program.
(2) DWQ — [signature]
(3) [signature] DAQ 8/12/05
(4) [signature] UST - DWM 12/05/05
[signature] [illegible] 12/1/05

REGIONAL OFFICES

Questions regarding these permits should be addressed to the Regional Office marked below.

☐ **Asheville Regional Office**
59 Woodfin Place
Asheville, N.C. 28801
(828) 251-6208

☐ **Mooresville Regional Office**
919 North Main Street
Mooresville, N.C. 28115
(704) 663-1699

☐ **Wilmington Regional Office**
127 Cardinal Drive Extension
Wilmington, N.C. 28405
(910) 395-3900

☐ **Fayetteville Regional Office**
225 Green Street, Suite 714
Fayetteville, N.C. 28301
(910) 486-1541

☐ **Raleigh Regional Office**
3800 Barrett Drive, P.O. Box 27687
Raleigh, N.C. 27611
(919) 571-4700

☐ **Winston-Salem Regional Office**
585 Waughtown Street
Winston-Salem, N.C. 27107
(336) 771-4600

☐ **Washington Regional Office**
943 Washington Square Mall
Washington, N.C. 27889
(252) 946-6481

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL HEALTH

Project Number
06-0172
County
Forsyth

Inter-Agency Project Review Response

Project Name NC DOT Type of Project I-40 from 0.3 miles west of NC 801 in Davie County to 0.3 miles west of SR 1101 in Forsyth County

☐ The applicant should be advised that plans and specifications for all water system improvements must be approved by the Division of Environmental Health prior to the award of a contract or the initiation of construction (as required by 15A NCAC 18C .0300et. seq.). For information, contact the Public Water Supply Section, (919) 733-2321.

☐ This project will be classified as a non-community public water supply and must comply with state and federal drinking water monitoring requirements. For more information the applicant should contact the Public Water Supply Section, (919) 733-2321.

☐ If this project is constructed as proposed, we will recommend closure of _____ feet of adjacent waters to the harvest of shellfish. For information regarding the shellfish sanitation program, the applicant should contact the Shellfish Sanitation Section at (252) 726-6827.

☐ The soil disposal area(s) proposed for this project may produce a mosquito breeding problem. For information concerning appropriate mosquito control measures, the applicant should contact the Public Health Pest Management Section at (919) 733-6407.

☐ The applicant should be advised that prior to the removal or demolition of dilapidated structures, a extensive rodent control program may be necessary in order to prevent the migration of the rodents to adjacent areas. For information concerning rodent control, contact the local health department or the Public Health Pest Management Section at (919) 733-6407.

☐ The applicant should be advised to contact the local health department regarding their requirements for septic tank installations (as required under 15A NCAC 18A. 1900 et. sep.). For information concerning septic tank and other on-site waste disposal methods, contact the On-Site Wastewater Section at (919) 733-2895.

☐ The applicant should be advised to contact the local health department regarding the sanitary facilities required for this project.

☐ If existing water lines will be relocated during the construction, plans for the water line relocation must be submitted to the Division of Environmental Health, Public Water Supply Section, Technical Services Branch, 1634 Mail Service Center, Raleigh, North Carolina 27699-1634, (919) 733-2321.

☒ For Regional and Central Office comments, see the reverse side of this form.

Reviewer _____ Section/Branch _____ Date _____

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL HEALTH

Inter-Agency Project Review Response

Project Number
06-0172
County
Forsyth

Project Name NC DOT Type of Project I-40 from 0.3 miles west of NC 801 in Davie County to 0.3 miles west of SR 1101 in Forsyth County

Comments provided by:

- ☐ Regional Program Person
- ☒ Regional Supervisor for Public Water Supply Section
- ☐ Central Office program person

12/8/05

Name Lee Spencer-Winston-Salem RO Date 12/06/05

Telephone number: 336-771-4600

Program within Division of Environmental Health:

- ☒ Public Water Supply
- ☐ Other, Name of Program: _____

Response (check all applicable):

- ☐ No objection to project as proposed
- ☐ No comment
- ☐ Insufficient information to complete review
- ☒ Comments attached
- ☒ See comments below

I-40 BRIDGE ACROSS YADKIN RIVER IS ~4 MILES ABOVE WINSTON-SALEM'S PRIMARY WATER SUPPLY INTAKE. EXTREME CARE MUST BE TAKEN TO KEEP SEDIMENT AND OTHER POLLUTANTS OUT OF THE YADKIN RIVER DURING CONSTRUCTION.

Return to:
Public Water Supply Section
Environmental Review Coordinator
for the
Division of Environmental Health

Michael F. Easley, Governor

William G. Ross Jr., Secretary
North Carolina Department of Environment and Natural Resources

Alan W. Klimek, P.E. Director
Division of Water Quality

December 6, 2005

MEMORANDUM

To: Melba McGee, Environmental Coordinator
Office of Legislative & Intergovernmental Affairs

From: Sue Homewood
DWQ, Winston-Salem Regional Office

Subject: Scoping comments on proposed improvements to I-40 from 0.3 miles west of NC 801 in Davie County to 0.3 miles west of SR 1101 in Forsyth County County, TIP Project No. I-911A, DENR Project No. 06-0172

Reference your correspondence dated November 28, 2005 in which you requested comments for the referenced project. Preliminary analysis of the project reveals the potential for multiple impacts to perennial streams and jurisdictional wetlands in the project area. More specifically, impacts to:

Stream Name	River Basin	Stream Classification(s)	Stream Index Number
Smith Creek	Yadkin	C	12-93-1
Yadkin River	Yadkin	WS-IV	12-(86.7)

Further investigations at a higher resolution should be undertaken to verify the presence of other streams and/or jurisdictional wetlands in the area. In the event that any jurisdictional areas are identified, the Division of Water Quality requests that NCDOT consider the following environmental issues for the proposed project:

Project Specific Comments:

Smith Creek are class C waters of the State. DWQ has no specific comments regarding this project.

The Yadkin River are class WS-IV waters of the State. DWQ has no specific comments regarding this project.

General Project Comments:

1. The environmental document should provide a detailed and itemized presentation of the proposed impacts to wetlands and streams with corresponding mapping. If mitigation is necessary as required by 15A NCAC 2H.0506(b)(6), it is preferable to present a conceptual (if not finalized) mitigation plan with the environmental documentation. Appropriate mitigation plans will be required prior to issuance of a 401 Water Quality Certification.

2. Environmental assessment alternatives should consider design criteria that reduce the impacts to streams and wetlands from storm water runoff. These alternatives should include road designs that allow for treatment of the storm water runoff through best management practices as detailed in *Best Management Practices for the Protection of Surface Waters*, such as grassed swales, buffer areas, preformed scour holes, retention basins, etc.

North Carolina Division of Water Quality
Internet: h2o.enr.state.nc.us

585 Waughtown Street
Winston-Salem, NC 27107

Phone (336) 771-4600
FAX (336) 771-4630

Customer Service
1-877-623-6748

3. After the selection of the preferred alternative and prior to an issuance of the 401 Water Quality Certification, the NCDOT is respectfully reminded that they will need to demonstrate the avoidance and minimization of impacts to wetlands (and streams) to the maximum extent practical. Based on the impacts described in the document, wetland mitigation will be required for this project in accordance with Environmental Management Commission's Wetland Rules {15A NCAC 2H.0506 (h)(2)}.

4. In accordance with the Environmental Management Commission's Rules {15A NCAC 2H.0506(b)(6)}, mitigation will be required for impacts of greater than 150 linear feet to any single perennial stream. In the event that mitigation is required, the mitigation plan should be designed to replace appropriate lost functions and values. In accordance with the Environmental Management Commission's Rules {15A NCAC 2H.0506 (h)(3)}, the NC Ecosystem Enhancement Program may be available for use as stream mitigation.

5. The 401 Water Quality Certification application will need to specifically address the proposed methods for storm water management. More specifically, storm water will not be permitted to discharge directly into the creek. Instead, storm water should be designed to drain to a properly designed storm water detention facility/apparatus to achieve diffuse flow and nutrient treatment.

6. For watersheds subject to riparian buffer rules, riparian buffer impacts should be avoided and minimized to the greatest extent possible. Refer to 15A NCAC 2B .0233 for a table of allowable uses.

7. If applicable, DOT should not install the bridge bents in the creek, to the maximum extent practicable.

8. Any new culverts must be countersunk to allow unimpeded fish and other aquatic organisms passage through the crossing.

9. If foundation test borings are necessary; it should be noted in the document. Geotechnical work is approved under General 401 Certification Number 3027/Nationwide Permit No. 6 for Survey Activities.

10. Sedimentation and erosion control measures sufficient to protect water resources must be implemented prior to any ground disturbing activities. Structures should be *maintained regularly*, especially following rainfall events.

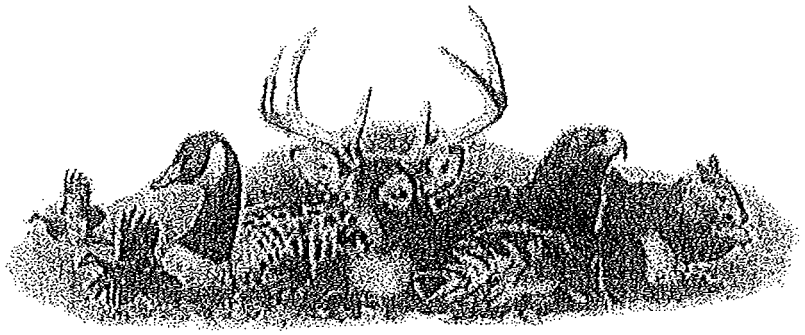
11. Sediment and erosion control measures should not be placed in wetlands.

12. Borrow/waste areas should avoid wetlands to the maximum extent practicable. Impacts to wetlands in borrow/waste areas could precipitate compensatory mitigation.

13. While the use of National Wetland Inventory (NWI) maps and soil surveys is a useful office tool, their inherent inaccuracies require that qualified personnel perform onsite wetland delineations prior to permit approval.

Thank you for requesting our input at this time. The DOT is reminded that issuance of a 401 Water Quality Certification requires that appropriate measures be instituted to ensure that water quality standards are met and designated uses are not degraded or lost. If you have any questions or require additional information, please contact Sue Homewood at 336-771-4600.

cc: John Thomas, US Army Corps of Engineers, Raleigh Field Office
DWQ WSRO Regional Office
DWQ Central Files
DWQ Wetlands/401 Transportation Unit File Copy



North Carolina Wildlife Resources Commission

Richard B. Hamilton, Executive Director

TO: Melba McGee, Environmental Coordinator
Office of Legislative and Intergovernmental Affairs, DENR

FROM: Marla Chambers, Western NCDOT Permit Coordinator Marla Chambers
Habitat Conservation Program, NCWRC

DATE: December 14, 2005

SUBJECT: Scoping review of NCDOT's proposed project for widening improvements to I-40 from 0.3 miles west of NC 801 (Exit 180) to 0.3 miles west of SR 1101, Davie and Forsyth Counties. TIP No. I-911A.

North Carolina Department of Transportation (NCDOT) is requesting comments from the North Carolina Wildlife Resources Commission (NCWRC) regarding impacts to fish and wildlife resources resulting from the subject project. Staff biologists have reviewed the information provided and have the following preliminary comments. These comments are provided in accordance with the provisions of the National Environmental Policy Act (42 U.S.C. 4332(2)(c)) and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-667d).

The NCDOT proposes to make widening improvements to I-40 from 0.3 miles west of NC 801 (Exit 180) in Davie County to 0.3 miles west of SR 1101 in Forsyth County. The project appears to cross the Yadkin River and at least one unnamed tributary, both classified as WS-IV. The NCWRC has no specific concerns at this time regarding this project; however sampling for listed species has not occurred in the project vicinity. To help facilitate document preparation and the review process, our general information needs are outlined below:

1. Description of fishery and wildlife resources within the project area, including a listing of federally or state designated threatened, endangered, or special concern species. Potential borrow areas to be used for project construction should be included in the inventories. A listing of designated plant species can be developed through consultation with the following programs:

Mailing Address: Division of Inland Fisheries • 1721 Mail Service Center • Raleigh, NC 27699-1721
Telephone: (919) 707-0220 • **Fax:** (919) 707-0028

The Natural Heritage Program
http://www.ncsparks.net/nhp
1601 Mail Service Center
Raleigh, N. C. 27699-1601

and,

NCDA Plant Conservation Program
P. O. Box 27647
Raleigh, N. C. 27611
(919) 733-3610

2. Description of any streams or wetlands affected by the project. If applicable, include the linear feet of stream that will be channelized or relocated.

3. Cover type maps showing wetland acreage impacted by the project. Wetland acreage should include all project-related areas that may undergo hydrologic change as a result of ditching, other drainage, or filling for project construction. Wetland identification may be accomplished through coordination with the U. S. Army Corps of Engineers (USACE). If the USACE is not consulted, the person delineating wetlands should be identified and criteria listed.

4. Cover type maps showing acreage of upland wildlife habitat impacted by the proposed project. Potential borrow sites and waste areas should be included.

5. Show the extent to which the project will result in loss, degradation, or fragmentation of wildlife habitat (wetlands or uplands).

6. Include the mitigation plan for avoiding, minimizing or compensating for direct and indirect degradation in habitat quality as well as quantitative losses.

7. Address the overall environmental effects of the project construction and quantify the contribution of this individual project to environmental degradation.

8. Provide a discussion of the probable impacts on natural resources, which will result from secondary development, facilitated by the improved road access.

9. If construction of this facility is to be coordinated with other state, municipal, or private development projects, a description of these projects should be included in the environmental document, and all project sponsors should be identified.

Thank you for the opportunity to provide input in the early planning stages of this project. If you have any questions regarding these comments, please contact me at (704) 545-3841.

cc: Marella Buncick, USFWS
Sue Homewood, NCDWQ

North Carolina
Division of Environmental Health

Division of Environmental Health
Terry L. Pierce, Director

Public Water Supply Section
Jessica G. Miles, Section Chief

State of North Carolina
Michael F. Easley, Governor

Department of Environment and Natural Resources
William G. Ross, Secretary

December 8, 2005

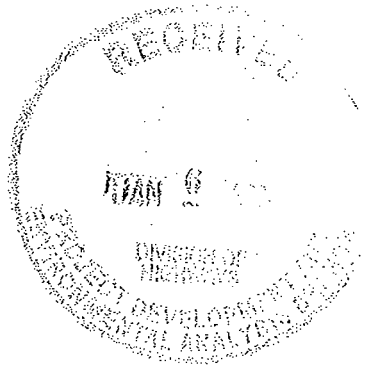
To: Melba McGee, Environmental Coordinator
Office of Legislative & Intergovernmental Affairs

From: Lee G. Spencer, Regional Engineer
Public Water Supply Section
Division of Environmental Health

Re: Project Number 06-0172
I-40 Improvements in Forsyth and Davie Counties

I-40 bridge across the Yadkin River is ~4 miles above the City of Winston-Salem's primary water supply intake. Extreme care must be taken to keep sediment and other pollutants out of the Yadkin River during construction. NC DOT and the contractor must notify the Neilson Water Treatment Plant immediately in the event of a spill or other problem.

585 Waughtown Street, Winston-Salem, North Carolina 27107
Telephone 336-771-4600 ▲ Fax 336-771-4631 ▲ Lab Form Fax 919-715-6637
http://ncdrinkingwater.state.nc.us/



North Carolina Department of Cultural Resources

State Historic Preservation Office

Peter B. Sandbeck, Administrator

Michael F. Easley, Governor
Lisbeth C. Evans, Secretary
Jeffrey J. Crow, Deputy Secretary

Office of Archives and History
Division of Historical Resources
David Brook, Director

January 4, 2006

MEMORANDUM

TO: Greg Thorpe, Ph.D., Director
Project Development and Environmental Analysis Branch
NCDOT Division of Highways

FROM: Peter Sandbeck per/for Peter Sandbeck

SUBJECT: I-40 From 0.3 miles west of NC 801 (Exit 180) in Davie County to 0.3 miles west of SR 1101 in Forsyth County, I-911A, ER 05-2699

Thank you for your letter of November 16, 2005, concerning the above project.

We have conducted a review of the proposed undertaking and are aware of no historic resources, which would be affected by the project. Therefore, we have no comment on the undertaking 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 919/733-4763. In all future communication concerning this project, please cite the above-referenced tracking number.

cc: Mary Pope Furr, NCDOT
Matt Wilkerson, NCDOT

ADMINISTRATION
RESTORATION
SURVEY & PLANNING

Location
507 N. Blount Street, Raleigh NC
515 N. Blount Street, Raleigh NC
515 N. Blount Street, Raleigh, NC

Mailing Address
4617 Mail Service Center, Raleigh NC 27699-4617
4617 Mail Service Center, Raleigh NC 27699-4617
4617 Mail Service Center, Raleigh NC 27699-4617

Telephone/Fax
(919)733-4763/733-8653
(919)733-6547/715-4801
(919)733-6545/715-4801

North Carolina
Department of Administration

Michael F. Easley, Governor

Gwynn T. Swinson, Secretary

January 6, 2006

Ms. Stephanie Caudill
NCDOT - Project Development
1548 Mail Service Center
Raleigh, NC 27699-1548

Dear Ms. Caudill:

Re: SCH File # 06-E-4220-0172; Scoping; Widening of I-40 from 0.3 mile west of NC 801 to 0.3 mile west of SR 1101 in Davie and Forsyth counties

The above referenced environmental impact information has been submitted to the State Clearinghouse under the provisions of the National Environmental Policy Act. According to G.S. 113A-10, when a state agency is required to prepare an environmental document under the provisions of federal law, the environmental document meets the provisions of the State Environmental Policy Act. Attached to this letter for your consideration are the comments made by agencies in the course of this review.

If any further environmental review documents are prepared for this project, they should be forwarded to this office for intergovernmental review.

Should you have any questions, please do not hesitate to call.

Sincerely,

Chrys Baggett / SJG

Ms. Chrys Baggett
Environmental Policy Act Coordinator

Attachments

cc: Region 1

Mailing Address:
1301 Mail Service Center
Raleigh, NC 27699-1301

Telephone: (919)807-2425
Fax (919)733-9571
State Courier #51-01-00
e-mail Chrys.Baggett@ncmail.net

Location Address:
116 West Jones Street
Raleigh, North Carolina

Winston-Salem

Department of Transportation

City of Winston-Salem
P.O. Box 2511
Winston-Salem, NC 27102
Tel 336.727.2707
Fax 336.748.3370
www.cityofws.org/dot/

February 28, 2006

Gregory J. Thorpe, Ph.D., Director
Project Development and Environmental Analysis Branch
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, NC 27699-1548

Subject: I-40 from 0.3 miles west of NC 801 (Exit 180) in Davie County to 0.3 miles west of SR 1101 in Forsyth County, WBS No. 34147, TIP Project No. I-911A

Dear Dr. Thorpe:

Thank you for the opportunity to comment on TIP Project No. I-911A – the widening of I-40 in Forsyth and Davie Counties.

We encourage close coordination of this project and the two bridge widening projects in the vicinity – B-3825, US 158 over the Yadkin River and B-3637, NC 801 over I-40 to prevent potential incident management difficulties and peak hour congestion that overwhelms the local street system. Tanglewood Park, a county-wide park and golfing facility, is adjacent to the project and should be given special consideration during the environmental analysis. The Park programs large scale events throughout the year that often create back-ups on I-40 at both the Harper Road and NC 801 interchanges.

Forsyth County has established a Yadkin River overlay zoning district that regulates uses and densities adjacent to the river. More importantly, the Yadkin River is a WS4 regulated water supply/watershed river with all accompanying regulations and restrictions. We recommend contacting the City-County Planning Board for Winston-Salem and Forsyth County and the Davie County Planning Department for applicable plans and to provide comments during the Environmental Assessment.

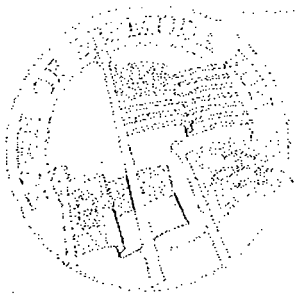
We would appreciate being involved in the scoping meeting for this project and being kept informed during the Environmental Assessment process.

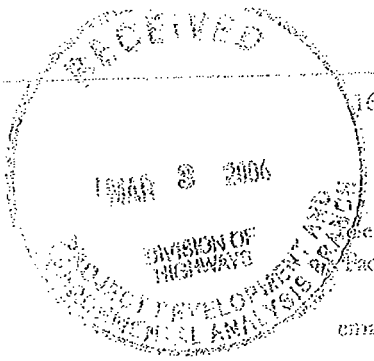
Sincerely,

Greg Errett

Gregory L. Errett, AICP
Planning Development Coordinator

Cc: James Upchurch, Statewide Coordinator, Transportation Planning Branch
Margaret Bessette, Principal Planner, City-County Planning Board
John Gallimore, Planning Director, Davie County





169 Yadkin Valley Road
Suite 100
Advance, NC 27006

Telephone: 336-998-0906
Facsimile: 336-998-7209

email: townofbr@aol.com

February 28, 2006

Gregory J. Thorpe, PhD., Director
NC Department of Transportation
Project Development and Environmental Affairs
1548 Mail Service Center
Raleigh, NC 27699-1548

Dear Dr. Thorpe:

SUBJECT: I-40 from 0.3 miles west of NC 801 (Exit 180) in Davie County to 0.3 miles west of SR 1101 in Forsyth County, WBS No. 34147, TIP Project No. I-911A.

We appreciate the request for information in evaluating potential environmental impacts on our area in relation to the scheduled project I-911A. This project will have an impact on our community, and we appreciate the opportunity to provide input.

As you are aware, the area included in the construction is in the Winston-Salem Area IV Water Shed, which is a major intake for the Winston-Salem water supply. This is the only environmental issue that the Town of Bermuda Run is currently aware of which could be impacted by the I-40 widening project.

Again, we appreciate your contact with our office. We would appreciate being included in any future correspondence or updates on the project.

Sincerely,

Joan Carter

Joan Carter
Town Manager

PUBLIC SCHOOLS OF NORTH CAROLINA
STATE BOARD OF EDUCATION Howard N. Lee, *Chairman*
DEPARTMENT OF PUBLIC INSTRUCTION June St. Clair Atkinson, ED.D., *State Superintendent*
WWW.NCPUBLICSCHOOLS.ORG

December 19, 2005

MEMORANDUM

TO: Gregory J. Thorpe, Director
NC Department of Transportation
Project Development and Environmental Analysis Branch

FROM: Steven M. Taynton, Section Chief, School Planning

SUBJECT: I-40 from 0.3 miles west of NC 801 (Exit 180) in Davie County to 0.3 miles west of SR 1101 in Forsyth County, WBS No. 34147, TIP Project No. I-911-A

Enclosed is a response from Davie County Schools in regard to the above referenced inquiry.

ST/pr
Enclosure

SCHOOL PLANNING - DIVISION OF SCHOOL SUPPORT :: www.schoolclearinghouse.org
6319 Mail Service Center :: Raleigh, North Carolina 27699-6319 :: 919.807.3554 :: Fax 919.807.3558
An Equal Opportunity/Affirmative Action Employer

PUBLIC SCHOOLS OF NORTH CAROLINA
STATE BOARD OF EDUCATION Howard N. Lee, *Chairman*
DEPARTMENT OF PUBLIC INSTRUCTION June St. Clair Atkinson, Ed.D., *State Superintendent*
WWW.NCPUBLICSCHOOLS.ORG

November 28, 2005

Mr. W.G. Potts
Superintendent
Davie County Schools
Mocksville

SUBJECT: National Environmental Policy Act

Dear Mr. Potts:

Please find enclosed information from the Department of Transportation regarding proposed improvements to roads. We have been asked to assist with these studies and ask that you review this proposal and provide us with your response. Please indicate if there is any impact on an existing or proposed school site or your school bus routes. Your response will be forwarded to the Department of Transportation.

Thank you for your attention to this matter.

Sincerely,

Steven M. Taynton
Section Chief
School Planning

SMT/pr
Enclosures

Steve:
Presents little
No problem
with Davie
County Schools
W. Potts,
Supt.
12/15/05

APPENDIX B

NATURAL RESOURCES AND SOIL DATA

TIP Project No. I-0911 A

Table B-1 Study Area Soils and Characteristics

Map Unit Series	% Slope	Drainage Class	Hydric Class
Davie County			
Altavista			
AaA - fine sandy loam	0-2%	moderately well drained	hydric inclusions
Chewacla			
ChA - loam	0-2%	somewhat poorly drained	hydric inclusions
Enon			
EnB - fine sandy loam	2-8%	well drained	non-hydric
Gaston			
GnB2 - clay loam, eroded	2-8%	well drained	non-hydric
GnC2 - clay loam, eroded	8-15%	well drained	non-hydric
Masada			
MaB - fine sandy loam	2-6%	well drained	non-hydric
Mecklenburg			
MrB2 - clay loam, eroded	2-8%	well drained	non-hydric
MrC2 - clay loam, eroded	8-15%	well drained	non-hydric
Map Unit Series	**% Slope**	**Drainage Class**	**Hydric Class**
Mocksvile			
MsB - sandy loam	2-8%	well drained	non-hydric
MsC - sandy loam	8-15%	well drained	non-hydric
Pacolet			
PcB2 - sandy clay loam, eroded	2-8%	well drained	non-hydric
PcC2 - sandy clay loam, eroded	8-15%	well drained	non-hydric
Riverview			
RvA - loam	0-2%	well drained	non-hydric
Sedgefield			
SeB - sandy loam	1-6%	somewhat poorly drained	hydric inclusions
Udorthents			
Ud - loam	NA	NA	NA
Urban			
Ur	NA	NA	NA
Wedowee			
WeC - sandy loam	8-15%	well drained	non-hydric
Forsyth County			
Chewacla			
Ch - loam	nearly level	somewhat poorly drained	hydric
Hiwassee			
HlB - loam	2-6%	well drained	non-hydric
HlC - loam	6-10%	well drained	non-hydric
Mecklenburg			
MeB - loam (dark variant)	2-6%	well drained	non-hydric
MeC - loam (dark variant)	6-10%	well drained	non-hydric

MeD - loam (dark variant)	10-15%	well drained	non-hydric
Pacolet			
PcD2 - clay loam, eroded	10-15%	well drained	non-hydric
Wilkes			
WlC - fine sandy loam to clay	6-10%	well drained	non-hydric
WlD - fine sandy loam to clay	10-15%	well drained	non-hydric
WlF - fine sandy loam to clay	15-45%	well drained	non-hydric

Altavista – Soils tending to be moderately well drained on flood plains along creeks and rivers. Present in the piedmont and coastal plain of the state, soils are occasionally flooded for brief periods throughout the year.

Chewacla – Found on flood plains along creeks and rivers, these frequently flooded soils are mainly covered by forest stands with the remaining tracts being used as pasture or cropland.

Enon – This fine sandy loam is predominantly located on gently sloping ridgetops and side slopes of piedmont uplands.

Gaston – Sandy clay loam usually found along ridges and on side slopes of the piedmont region. These units are occasionally dissected by intermittent drainageways. A majority of the time, the topsoil of this series has experienced moderate amounts of erosion.

Hiwassee – Loamy soils situated on gently sloping to moderately steep uplands, as well as high stream terraces in the southern piedmont. Soils are low in natural fertility and organic content.

Masada – Soils are a fine sandy loam located along low ridges on stream terraces of larger streams in the piedmont and coastal plain regions.

Mecklenburg – Series consists of soils located on broad ridges typically dissected by intermittent drainageways and narrow side slopes in piedmont uplands. This soil series is moderately eroded.

Mocksville – Sandy loam is mainly found on broad to narrow ridges in the uplands of the piedmont. Individual units are typically found along diabase dikes.

Pacolet – This series is commonly found on ridges of gently sloping to very steep uplands. In the study area, the soils are moderately eroded.

Riverview – Typically situated on high areas of flood plains along creeks and rivers draining the coastal plain and piedmont.

Sedgefield – These soils are on nearly level to gently sloping ridges or depressions and in concave areas of drainageways in the piedmont. Generally, they are on located on lower parts of the slope, but can also occur in broad flat areas.

Urdothents – These loamy soils are in areas where natural soil characteristics have been severely altered. Areas comprising this series would include cut and fill sites as well as borrow pits.

Urban – This unit consists of areas where over 85% of the surface is covered by roads, buildings, parking lots, or other impervious materials. Landscape, topography, and drainage have all been changed and slopes are gentle between 0 to 10 percent.

Wedowee – Situated on narrow ridges and side slopes of sloping to steep uplands in the piedmont.

Wilkes – Soils are located on narrow side slopes and ridge tops of uplands. Occasionally on sloping to steep sides of ridges along intermittent and perennial streams in the southern piedmont.

APPENDIX C

HISTORIC ARCHITECTURE DATA, PHOTOS AND RELATED CORRESPONDENCES

TIP Project No. I-0911 A

North Carolina Department of Cultural Resources

State Historic Preservation Office

Peter B. Sandbeck, Administrator

Michael F. Easley, Governor
Lisbeth C. Evans, Secretary
Jeffrey J. Crow, Deputy Secretary

Office of Archives and History
Division of Historical Resources
David Brook, Director

January 18, 2008

MEMORANDUM

To: Mary Pope Furr
Historic Architecture Group
Department of Transportation

From: Renee Gledhill-Earley
Environmental Review Coordinator

Re: Historic Architectural Structures Report, Widening of I-40, 0.3 mile W of NC 801 to 0.3 mile E of SR 1101, I-911A, Forsyth/Davie Counties, ER05-2699

Thank you for your letter of November 26, 2008, transmitting the above-referenced document. We have reviewed the report and offer the following comments.

We concur with the finding that the Win-Mock Farm, with its recently revised boundaries, remains eligible for listing in the National Register of Historic Places.

The report does an excellent job of presenting the historic context for the Hickory Grove A.M.E. Zion Church (FY155) and of arguing that it is not eligible for listing in the National Register. We concur with this finding.

We have no reservations about five of the six properties found to be not eligible for listing and unworthy of additional evaluation in the report. However, given the State Study List status of the R. E. Lasater House (FY 34), we believe that additional photographs of the property are needed in our files to support our concurrence in the property's ineligibility for listing. Copies of the photographs, presented at the review meeting by Ms. Sandbeck, that show the new development around the building and changes to the exterior would be sufficient for our files.

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 919/733-4763. In all future communication concerning this project, please cite the above referenced tracking number.

cc: HPC

Location: 109 East Jones Street, Raleigh NC 27601 Mailing Address: 4617 Mail Service Center, Raleigh NC 27699-4617 Telephone/Fax: (919) 807-6570/807-6599

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

August 6, 2007

Mr. Peter B. Sandbeck
Deputy State Historic Preservation Officer
North Carolina Department of Cultural Resources
4617 Mail Service Center
Raleigh, North Carolina 27699-4617

Dear Mr. Sandbeck:

RE: *Win-Mock Farm – B-3835, Davie/Forsyth Counties*
State Project No. 8.1611401, Federal Aid No. BRSTP-158(12)
ER 01-8193

In 2002 the North Carolina Department of Transportation (NCDOT) and your office agreed that Win-Mock Farm, located on US 158 in the Town of Bermuda Run in Davie County, is eligible for listing in the National Register of Historic Places (NR) under Criterion A for agriculture and Criterion C for architecture. The property also is included on the North Carolina State Study list.

Sale and development of the adjacent properties since the mid-twentieth century greatly reduced the farm in size. The National Register boundary proposed in 2002 encompassed those parts of four parcels (according to Davie County tax maps for 2007) containing the principle barns, the foreman's house, and auxiliary buildings, as well as the attendant pond and bottom-lands along the Yadkin River. Just as recent construction dictated the "west" boundary line, current and imminent development of the pond area, bottom-lands, and barn vicinity now suggest an adjustment of the "eastern" and "southern" extent of the historic property to best reflect NR eligibility.

The Twin City Youth Soccer Association, owner of most of the land between the Win-Mock structures and the Yadkin River, has completed initial development of its property as an athletic complex (see attached tax map). Twin City Youth Soccer obtained a grading/erosion control permit for additional site work, which

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
OFFICE OF HUMAN ENVIRONMENT
1583 MAIL SERVICE CENTER
RALEIGH NC 27699-1583

TELEPHONE: 919-715-1500
FAX: 919-715-1522

WEBSITE: WWW.NCDOT.ORG

LOCATION:
PARKER LINCOLN BUILDING
2728 CAPITAL BOULEVARD, SUITE 168
RALEIGH, NC 27604

includes the construction of a new road within the property connecting it to NC 158. The original permit expired, Twin City Youth Soccer applied for a renewal, and approval is certain. The existing soccer fields and the imminent road and landscape work have and will alter the historic character of the pond area and most of the bottom-lands that supported the NR eligibility of Win-Mock Farm under Criterion A for agriculture. Now non-contributing elements of the NR-eligible Win-Mock property as defined in 2002, the Twin City Youth Soccer parcels may be excluded by adopting a new "eastern" boundary. The area immediately surrounding the Win-Mock structures, as well as a small amount of bottom-land adjacent to I-40, are part of two parcels immediately adjacent to the Twin City Youth Soccer property. The "eastern" property lines of the two parcels, owned by The Hillsdale Group, effectively mark the "eastern" extent of the NR-eligible remnant of the Win-Mock Farm. Similarly, site work presently underway just south of the barns on the Hillsdale Group property suggests moving the "southernmost" boundary line closer to the buildings.

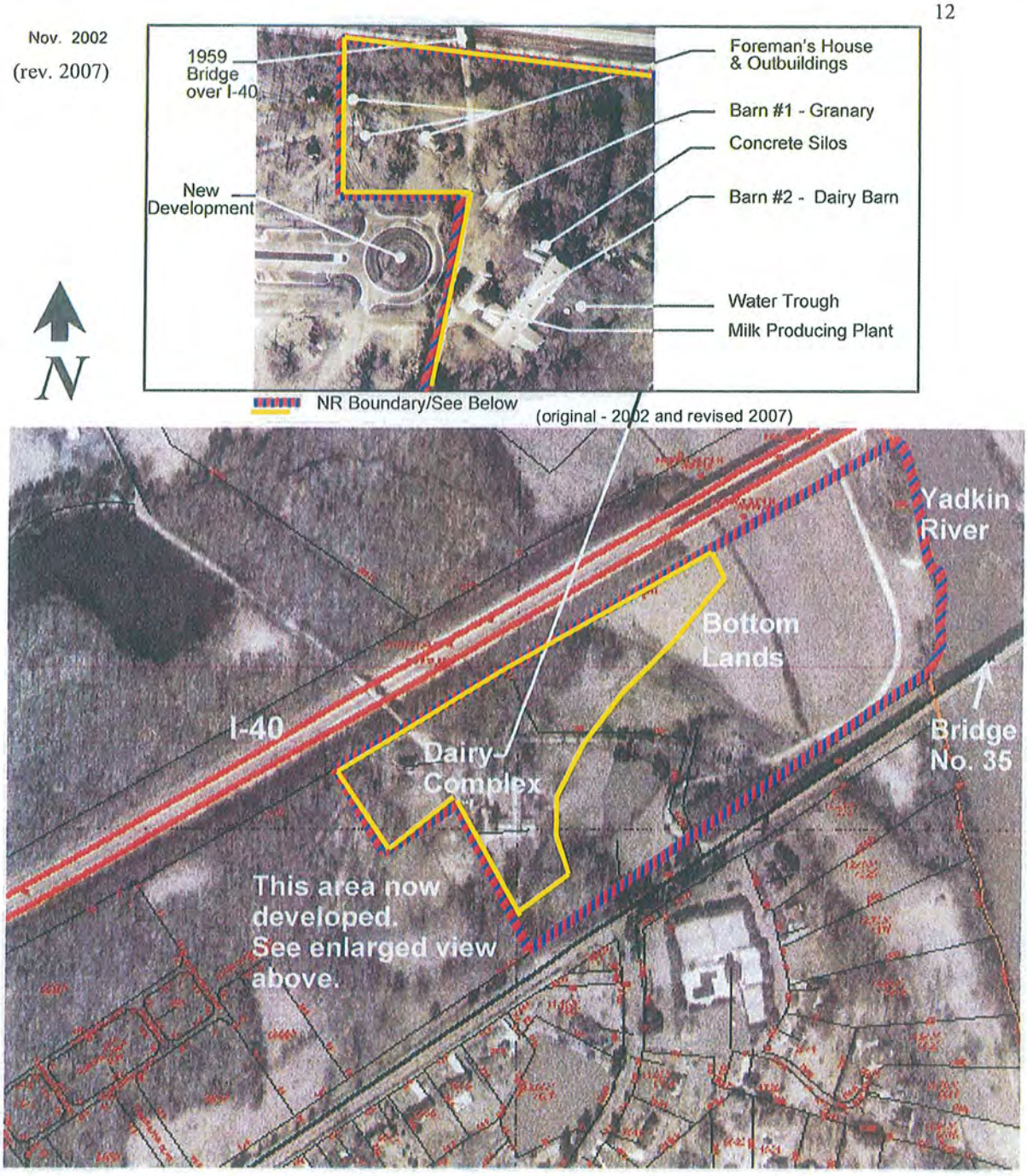
On July 27, 2007 NCDOT architectural historians and engineers met with environmental review staff of the State Historic Preservation Office and the Federal Highways Administration to discuss the possibility of reducing the proposed NR boundary for Win-Mock Farm. They reviewed the conditions summarized above and agreed that the boundary can be relocated at the "east" and "south" along US 158 and remain as originally defined at the interior "south," the "west," and the "north." Specifically, the new boundary conforms to the lines of the parcels owned by The Hillsdale Group at the "east," to a point approximately 125 feet "north" of the existing US 158 centerline. It then runs "west" to Bert's Way ("western" side), follows Bert's Way to a point approximately 50 feet "north" of the E. Kinderton Way terminus, continues "west" for approximately 175 feet, then runs "north" to the I-40 right-of-way and along the same to the "eastern" parcel line (see attached NR boundary map).

Should questions arise or if you need additional information, please contact me at 919-715-1617 or vepatrick@dot.state.nc.us. Thank you.

Sincerely,

Vanessa E. Patrick
Architectural Historian

Attachment
Copy: John Wadsworth, P.E., NCDOT



Win-Mock Farm Complex

(2007 Boundaries from TIP B-3835)

Original 2002
Revised 2007

Proposed NR Boundary

Photo of Win-Mock Farm (Property No. 2, DV 493), Main Barn, W and S elevations

Photo of Win-Mock Farm, Dairy, S and W elevations

North Carolina Department of Cultural Resources
State Historic Preservation Office
Peter B. Sandbeck, Administrator

Michael F. Easley, Governor
Lisbeth C. Evans, Secretary
Jeffrey J. Crow, Deputy Secretary

Office of Archives and History
Division of Historical Resources
David Brook, Director

January 4, 2006

MEMORANDUM

TO: Greg Thorpe, Ph.D., Director
Project Development and Environmental Analysis Branch
NCDOT Division of Highways

FROM: Peter Sandbeck RSR for Peter Sandbeck

SUBJECT: I-40 From 0.3 miles west of NC 801 (Exit 180) in Davie County to 0.3 miles west of SR 1101 in Forsyth County, I-911A, ER 05-2699

Thank you for your letter of November 16, 2005, concerning the above project.

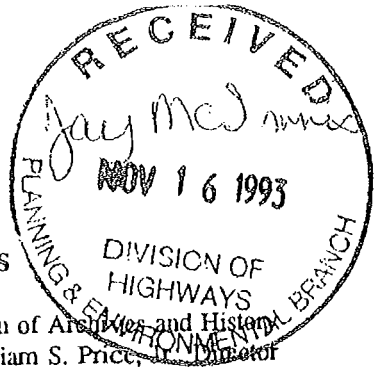
We have conducted a review of the proposed undertaking and are aware of no historic resources, which would be affected by the project. Therefore, we have no comment on the undertaking as proposed.

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 919/733-4763. In all future communication concerning this project, please cite the above-referenced tracking number.

cc: Mary Pope Furr, NCDOT
Matt Wilkerson, NCDOT

	Location	Mailing Address	Telephone/Fax
ADMINISTRATION	507 N. Blount Street, Raleigh NC	4617 Mail Service Center, Raleigh NC 27699-4617	(919)733-4763/733-8653
RESTORATION	515 N. Blount Street, Raleigh NC	4617 Mail Service Center, Raleigh NC 27699-4617	(919)733-6547/715-4801
SURVEY & PLANNING	515 N. Blount Street, Raleigh, NC	4617 Mail Service Center, Raleigh NC 27699-4617	(919)733-6545/715-4801



North Carolina Department of Cultural Resources

James B. Hunt, Jr., Governor
Betty Ray McCain, Secretary

Division of Archives and History
William S. Price, Jr., Director

November 12, 1993

Nicholas L. Graf
Division Administrator
Federal Highway Administration
Department of Transportation
310 New Bern Avenue
Raleigh, N.C. 27601-1442

Re: I-40 from east of SR 1103 to west of SR 1122, I-911, A, B, & C, Forsyth County, ER 94-7716

Dear Mr. Graf:

Thank you for your letter of October 20, 1993, transmitting the archaeological survey report concerning the above project.

During the course of the survey no archaeological sites were located within the project area. Mr. Glover has recommended that no further archaeological investigation be conducted in connection with this project. We concur with this recommendation since this project will not involve significant archaeological resources.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act of 1966 and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106, codified at 36 CFR Part 800.

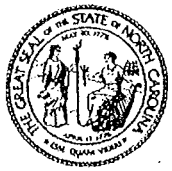
Thank you for your cooperation and consideration. If you have questions concerning the above comment, please contact Renee Gledhill-Earley, environmental review coordinator, at 919/733-4763.

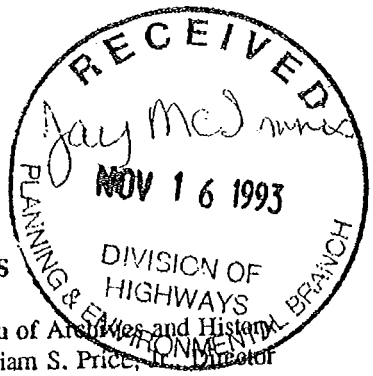
Sincerely,

David Brook
Deputy State Historic Preservation Officer

DB:slw

cc: H. F. Vick
T. Padgett





North Carolina Department of Cultural Resources

James B. Hunt, Jr., Governor
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Dear Mr. Graf:

Thank you for your letter of October 20, 1993, transmitting the archaeological survey report concerning the above project.

During the course of the survey no archaeological sites were located within the project area. Mr. Glover has recommended that no further archaeological investigation be conducted in connection with this project. We concur with this recommendation since this project will not involve significant archaeological resources.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act of 1966 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 919/733-4763.

Sincerely,

David Brook
Deputy State Historic Preservation Officer

DB:slw

cc: H. F. Vick
T. Padgett

Federal Aid #: IR-40-3(60)180 *TIP#:* I-911A *County*: Davie-Forsyth

CONCURRENCE FORM FOR ASSESSMENT OF EFFECTS

Project Description: Widening Interstate 40 (I-40), .3 miles W of NC 801 to .3 miles E of SR 1101, Clemmons vic: *Alteration of slope/stakes on S side I-40, adjacent to Win-Mock Farm (NR), Davie County*

On March 30, 2009, representatives of the

- [x] North Carolina Department of Transportation (NCDOT)
- [x] Federal Highway Administration (FHWA)
- [ ] 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:

Mary Pope Furr — 3·30·2010
Representative, NCDOT — Date

Michael C. Dawson — 3/30/10
FHWA, for the Division Administrator, or other Federal Agency — Date

Representative, HPO — Date

Renee Gledhill-Earley — 3·30·10
State Historic Preservation Officer — Date

Federal Aid #: IR-40-3(60)180 *TIP # :* I-911A *County*: Davie/Forsyth

Property and Status	Alternative	Effect Finding	Reasons
Win-Mock Farm (NR, DE)	Alteration of ROW/slope stakes	No adverse effect	If 1.5:1 slopes are used (which may require rock plating for stabilization of the slope) it will have no adverse effect to the property. - No Retaining Walls -

Initialed: NCDOT MPA FHWA _____ HPO RGE

Federal Aid #: I-40-3(60)180 *TIP#:*I-0911A *County*: Davie and Forsyth

CONCURRENCE FORM FOR ASSESSMENT OF EFFECTS

Project Description: Widen I-40 from west of NC 801 to west of SR 1101

On May 3, 2011, representatives of the

- [x] North Carolina Department of Transportation (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:

Mary Pope Furr 5.3.2011

Representative, NCDOT Date

David W Brown 5-3-11

FHWA, for the Division Administrator, or other Federal Agency Date

Representative, HPO Date

Renee Gledhill-Earley 5/3/11

State Historic Preservation Officer Date

Federal Aid #: I-40-3(60)180 *TIP#:*I-0911A *County*: Forsyth & Davie

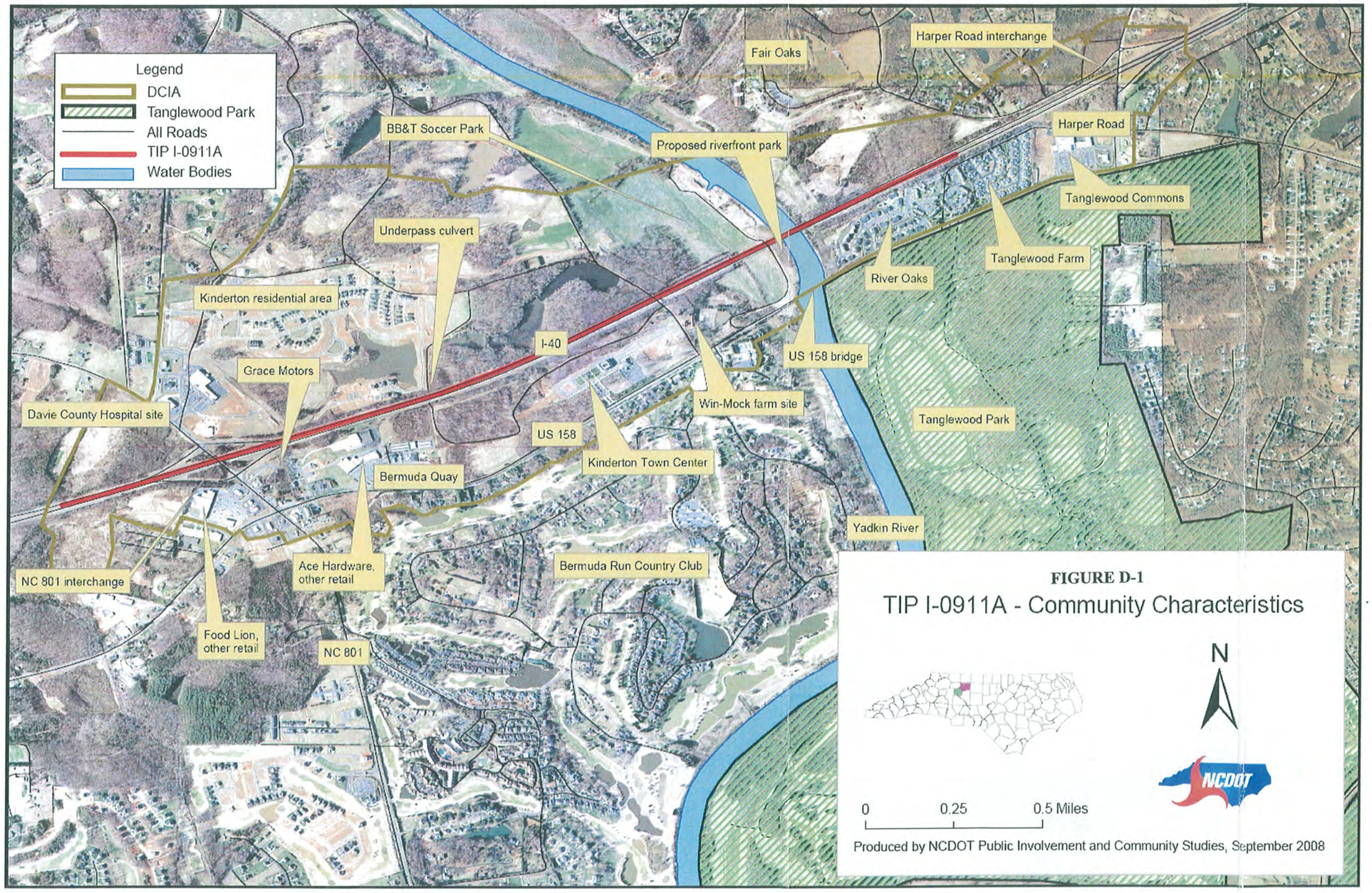
Property and Status	Effect Finding	Alternative	Reasons
Win-Mock Farm (DE)	No Adverse Effect		1½:1 slope with rock plaiting & ditch w/ 25' easement - some of which within historic boundary but not impacting contributing resources

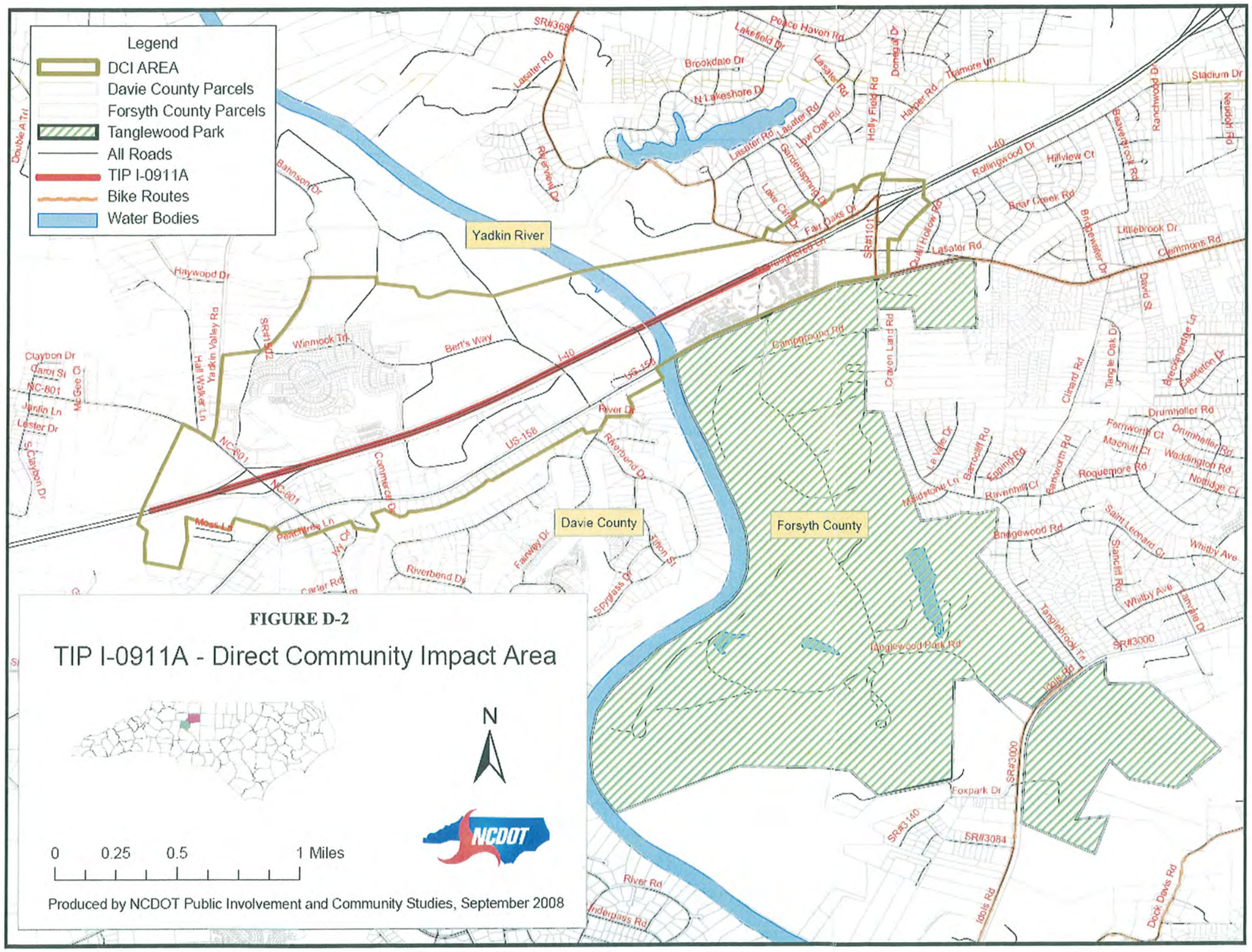
Initialed: NCDOT MPA FHWA DB HPO Rest

☑ FHWA intends to use HPO's call of "No Adverse Effect" as the basis of a "de minimis" finding for the following properties, pursuant to Section 4(f): FHWA initials DB

APPENDIX D

COMMUNITY IMPACTS ASSESTMENTS DATA


Legend
DCIA
Tanglewood Park
All Roads
TIP I-0911A
Water Bodies
Fair Oaks
Harper Road interchange
Harper Road
BB&T Soccer Park
Proposed riverfront park
Tanglewood Commons
Underpass culvert
Tanglewood Farm
River Oaks
Kinderton residential area
I-40
US 158 bridge
Grace Motors
Win-Mock farm site
Tanglewood Park
Davie County Hospital site
US 158
Kinderton Town Center
Bermuda Quay
Yadkin River
Ace Hardware, other retail
Bermuda Run Country Club
NC 801 interchange
Food Lion, other retail
NC 801
FIGURE D-1
TIP I-0911A - Community Characteristics
N
0
0.25
0.5 Miles
NCDOT
Produced by NCDOT Public Involvement and Community Studies, September 2008


Legend
DCI AREA
Davie County Parcels
Forsyth County Parcels
Tanglewood Park
All Roads
TIP I-0911A
Bike Routes
Water Bodies
Yadkin River
Davie County
Forsyth County
FIGURE D-2
TIP I-0911A - Direct Community Impact Area
N
0 0.25 0.5 1 Miles
NCDOT
Produced by NCDOT Public Involvement and Community Studies, September 2008

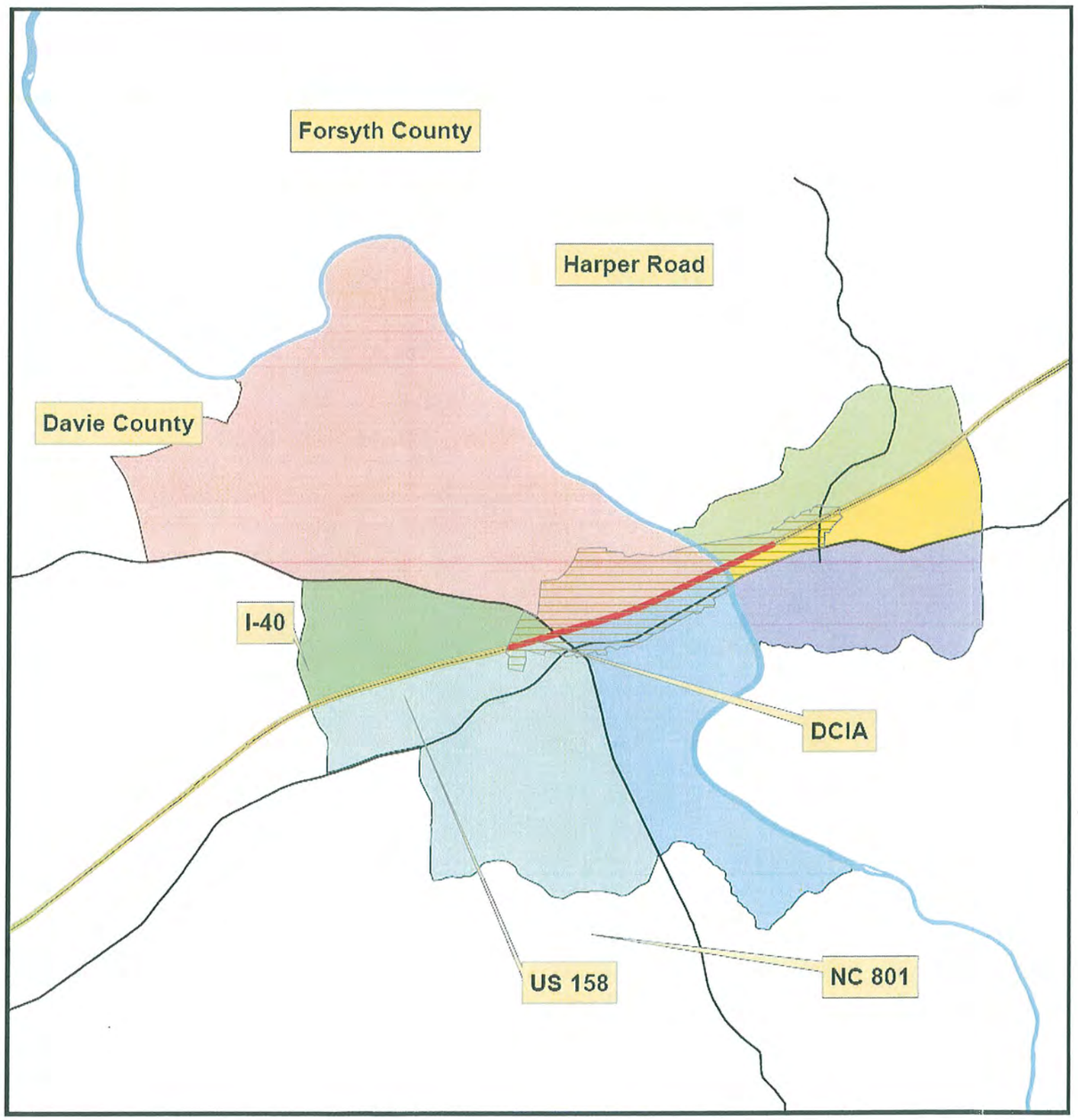


FIGURE D-3

TIP I-0911A - Demographic Study Area

N

0 0.5 1 2 Miles

Produced by NCDOT Public Involvement and Community Studies, September 2008

Legend

- DCIA
- TIP No. I-0911A
- Main Roads in DCIA
- I-40
- Yadkin River
- CT 802 BG 1
- CT 802 BG 2
- CT 803 BG 1
- CT 803 BG 2
- CT 40.05 BG 1
- CT 40.05 BG 2
- CT 40.06 BG 3

TABLE 1 - DAVIE COUNTY POPULATION & HOUSING CHARACTERISTICS														
***Geographical Changes within Spatial Data	Demographic Study Area		Block Group 1, Census Tract 802, Davie County, North Carolina		Block Group 2, Census Tract 802, Davie County, North Carolina		Block Group 1, Census Tract 803, Davie County, North Carolina		Block Group 2, Census Tract 803, Davie County, North Carolina		Davie County, North Carolina		North Carolina	
	Total	Percent	Total	Percent	Total	Percent	Total	Percent	Total	Percent	Total	Percent	Total	Percent
Population Trends														
Total Population 2000***	10,756		1,224		1,006		2,196		1,732		34,835		8,049,313	
Total Population 1990***	8,111		1,112		971		1,861		841		27,859		6,628,637	
Percent Change***	2,645	32.6%	112	10.1%	35	3.6%	335	18.0%	891	105.9%	6,976	25.0%	1,420,676	21.4%
Race / Ethnicity														
White	10,379	96.5%	1,213	99.1%	925	91.9%	2,178	99.2%	1,660	95.8%	31,493	90.4%	5,802,165	72.1%
Black or African American	203	1.9%	11	0.9%	81	8.1%	10	0.5%	18	1.0%	2,366	6.8%	1,734,154	21.5%
American Indian and Alaska Native	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	79	0.2%	100,956	1.3%
Asian	87	0.8%	0	0.0%	0	0.0%	0	0.0%	22	1.3%	48	0.1%	111,292	1.4%
Native Hawaiian and Other Pacific Islander	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	3,699	0.0%
Some other race	32	0.3%	0	0.0%	0	0.0%	0	0.0%	20	1.2%	608	1.7%	185,138	2.3%
Two or more races	55	0.5%	0	0.0%	0	0.0%	8	0.4%	12	0.7%	241	0.7%	111,909	1.4%
Total	10,756	100.0%	1,224	100.0%	1,006	100.0%	2,196	100.0%	1,732	100.0%	34,835	100.0%	8,049,313	100.0%
Total in Sample	10,756		1,224		1,006		2,196		1,732		34,835		8,049,313	
Hispanic or Latino:	231	2.1%	0	0.0%	8	0.8%	76	3.5%	34	2.0%	1,238	3.6%	372,964	4.6%
Age Distribution														
19 years and under	2,687	25.0%	303	24.8%	348	34.6%	397	18.1%	483	27.9%	9,193	26.4%	2,187,079	27.2%
20-44 years	3,064	28.5%	431	35.2%	338	33.6%	462	21.0%	633	36.5%	11,968	34.4%	3,089,585	38.4%
45-54 years	1,904	17.7%	240	19.6%	214	21.3%	301	13.7%	297	17.1%	5,220	15.0%	1,082,089	13.4%
55-64 years	1,337	12.4%	133	10.9%	89	8.8%	372	16.9%	166	9.6%	3,596	10.3%	720,738	9.0%
65 years and over	1,764	16.4%	117	9.6%	17	1.7%	664	30.2%	153	8.8%	4,858	13.9%	969,822	12.0%
Total in List	10,756	100.0%	1,224	100.0%	1,006	100.0%	2,196	100.0%	1,732	100.0%	34,835	100.0%	8,049,313	100.0%
Income														
Median Household Income	$67,995		$41,125		$61,167		$85,503		$59,839		$40,174		$39,184	
Per Capita Income	$31,619		$19,669		$20,779		$46,423		$28,059		$21,359		$20,307	
Employment														
Civilian Labor Force:	5,263	100.0%	608	100.0%	591	100.0%	939	100.0%	896	100.0%	17,601	100.0%	4,039,732	100.0%
Employed	5,139	97.6%	599	98.5%	562	95.1%	910	96.9%	888	99.1%	16,947	96.3%	3,824,741	94.7%
Unemployed	124	2.4%	9	1.5%	29	4.9%	29	3.1%	8	0.9%	654	3.7%	214,991	5.3%
Educational Attainment														
< High School	836	10.8%	170	20.0%	64	10.3%	76	4.3%	177	15.7%	5,223	21.9%	1,154,724	21.9%
High School	1,548	20.1%	290	34.0%	208	33.6%	285	16.1%	224	19.8%	8,279	34.7%	1,502,978	28.4%
Some College	1,508	19.5%	182	21.4%	148	23.9%	428	24.1%	147	13.0%	4,535	19.0%	1,080,504	20.5%
Associates Degree	646	8.4%	90	10.6%	80	12.9%	93	5.2%	74	6.5%	1,606	6.7%	358,075	6.8%
Bachelors Degree	2,127	27.6%	72	8.5%	94	15.2%	578	32.6%	351	31.1%	3,002	12.6%	808,070	15.3%
Graduate Professional Degree	1,052	13.6%	48	5.6%	25	4.0%	313	17.7%	157	13.9%	1,195	5.0%	378,643	7.2%
Total in List	7,717	100.0%	852	100.0%	619	100.0%	1,773	100.0%	1,130	100.0%	23,840	100.0%	5,282,994	100.0%
Total in Sample	7,717	100.0%	852	100.0%	619	100.0%	1,773	100.0%	1,130	100.0%	23,840	100.0%	5,282,994	100.0%
Income Status / Poverty														
Persons with income below poverty level	376	3.5%	47	3.8%	85	8.4%	20	0.9%	95	5.5%	2952	8.5%	958,667	11.9%
Person with income 50% below poverty level	120	1.1%	19	1.6%	23	2.3%	0	0.0%	51	2.9%	1216	3.5%	431,894	5.4%

TABLE D-1 DAVIE COUNTY POPULATION & HOUSING CHARACTERISTICS														
***Geographical Changes within Spatial Data	Demographic Study Area		Block Group 1, Census Tract 802, Davie County, North Carolina		Block Group 2, Census Tract 802, Davie County, North Carolina		Block Group 1, Census Tract 803, Davie County, North Carolina		Block Group 2, Census Tract 803, Davie County, North Carolina		Davie County, North Carolina		North Carolina	
	Total	Percent	Total	Percent	Total	Percent	Total	Percent	Total	Percent	Total	Percent	Total	Percent
Total Housing Units	4,403		507		382		1,058		692		14,953		3,523,944	
Occupancy Status														
Occupied	4,135	93.9%	472	93.1%	376	98.4%	967	91.4%	629	90.9%	13,750	92.0%	3,132,013	88.9%
Vacant	268	6.1%	35	6.9%	6	1.6%	91	8.6%	63	9.1%	1,203	8.0%	391,931	11.1%
Tenure														
Owner Occupied	3,788	91.6%	414	87.7%	341	90.7%	929	96.1%	517	82.2%	11,454	83.3%	2,172,270	69.4%
Renter Occupied	347	8.4%	58	12.3%	35	9.3%	38	3.9%	112	17.8%	2,296	16.7%	959,743	30.6%
Median Home Value														
Owner-Occupied Units	$180,783		$121,600		$121,700		$238,300		$251,700		$116,200		$108,300	
Age of Housing Stock														
1999 or after	152	3.5%	13	2.6%	7	1.8%	8	0.8%	70	10.1%	652	4.4%	144,500	4.1%
1990 - 1998	1,208	27.4%	83	16.4%	51	13.4%	162	15.3%	395	57.1%	3,349	22.4%	805,485	22.9%
1980 - 1989	1,222	27.8%	146	28.8%	78	20.4%	439	41.5%	112	16.2%	2,891	19.3%	692,633	19.7%
1960 - 1979	1,634	37.1%	199	39.3%	218	57.1%	434	41.0%	101	14.6%	4,521	30.2%	1,089,105	30.9%
1959 or before	187	4.2%	66	13.0%	28	7.3%	15	1.4%	14	2.0%	3,540	23.7%	792,221	22.5%
Total in List	4,403	100.0%	507	100.0%	382	100.0%	1058	100.0%	692	100.0%	14,953	100.0%	3,523,944	100.0%
Total in Sample	4,403	100.0%	507	100.0%	382	100.0%	1058	100.0%	692	100.0%	14,953	100.0%	3,523,944	100.0%

TABLE D-2 FORSYTH COUNTY POPULATION & HOUSING CHARACTERISTICS

***Geographical Changes within Spatial Data	Demographic Study Area		Block Group 1, Census Tract 40.05, Forsyth County, North Carolina		Block Group 2, Census Tract 40.05, Forsyth County, North Carolina		Block Group 3, Census Tract 40.06, Forsyth County, North Carolina		Forsyth County, North Carolina		North Carolina	
	Total	Percent	Total	Percent	Total	Percent	Total	Percent	Total	Percent	Total	Percent
Population Trends												
Total Population 2000***	10,756		1,133		2,358		1,107		306,067		8,049,313	
Total Population 1990***	8,111		842		1,714		771		265,878		6,628,637	
Percent Change***	2,645	32.6%	291	34.6%	644	37.6%	336	43.6%	40,189	15.1%	1,420,676	21.4%
Race / Ethnicity												
White	10,379	96.5%	1,049	92.6%	2,305	97.8%	1,049	94.8%	209,748	68.5%	5,802,165	72.1%
Black or African American	203	1.9%	16	1.4%	53	2.2%	14	1.3%	78,270	25.6%	1,734,154	21.5%
American Indian and Alaska Native	0	0.0%	0	0.0%	0	0.0%	0	0.0%	919	0.3%	100,956	1.3%
Asian	87	0.8%	48	4.2%	0	0.0%	17	1.5%	3,227	1.1%	111,292	1.4%
Native Hawaiian and Other Pacific Islander	0	0.0%	0	0.0%	0	0.0%	0	0.0%	84	0.0%	3,699	0.0%
Some other race	32	0.3%	3	0.3%	0	0.0%	9	0.8%	9,488	3.1%	185,138	2.3%
Two or more races	55	0.5%	17	1.5%	0	0.0%	18	1.6%	4,331	1.4%	111,909	1.4%
Total	10,756	100.0%	1,133	100.0%	2,358	100.0%	1,107	100.0%	306,067	100.0%	8,049,313	100.0%
Total in Sample	10,756		1,133		2,358		1,107		306,067		8,049,313	
Hispanic or Latino:	231	2.1%	15	1.3%	98	4.2%	0	0.0%	19,687	6.4%	372,964	4.6%
Age Distribution												
19 years and under	2,687	25.0%	174	15.4%	727	30.8%	255	23.0%	81429.00	26.6%	2,187,079	27.2%
20-44 years	3,064	28.5%	322	28.4%	673	28.5%	205	18.5%	116620.00	38.1%	3,089,585	38.4%
45-54 years	1,904	17.7%	200	17.7%	425	18.0%	227	20.5%	42344.00	13.8%	1,082,089	13.4%
55-64 years	1,337	12.4%	128	11.3%	281	11.9%	168	15.2%	26652.00	8.7%	720,738	9.0%
65 years and over	1,764	16.4%	309	27.3%	252	10.7%	252	22.8%	39022.00	12.7%	969,822	12.0%
Total in List	10,756	100.0%	1,133	100.0%	2,358	100.0%	1,107	100.0%	306,067	100.0%	8,049,313	100.0%
Income												
Median Household Income	$67,995		$46,000		$87,648		$72,708		$42,097		$39,184	
Per Capita Income	$31,619		$30,900		$32,276		$30,217		$23,023		$20,307	
Employment												
Civilian Labor Force:	5,263	100.0%	579	100.0%	1,135	100.0%	515	100.0%	158,091	100.0%	4,039,732	100.0%
Employed	5,139	97.6%	571	98.6%	1,111	97.9%	498	96.7%	150,831	95.4%	3,824,741	94.7%
Unemployed	124	2.4%	8	1.4%	24	2.1%	17	3.3%	7,260	4.6%	214,991	5.3%
Educational Attainment												
< High School	836	10.8%	101	10.9%	146	9.2%	102	12.4%	36,748	18.0%	1,154,724	21.9%
High School	1,548	20.1%	161	17.3%	179	11.3%	201	24.4%	55,000	27.0%	1,502,978	28.4%
Some College	1,508	19.5%	180	19.4%	265	16.7%	158	19.2%	41,327	20.3%	1,080,504	20.5%
Associates Degree	646	8.4%	115	12.4%	157	9.9%	37	4.5%	12,482	6.1%	358,075	6.8%
Bachelors Degree	2,127	27.6%	290	31.2%	543	34.2%	199	24.2%	39,146	19.2%	808,070	15.3%
Graduate Professional Degree	1,052	13.6%	83	8.9%	300	18.9%	126	15.3%	19,378	9.5%	378,643	7.2%
Total in List	7,717	100.0%	930	100.0%	1,590	100.0%	823	100.0%	204,081	100.0%	5,282,994	100.0%
Total in Sample	7,717	100.0%	930	100.0%	1,590	100.0%	823	100.0%	204,081	100.0%	5,282,994	100.0%
Income Status / Poverty												
Persons with income below poverty level	376	3.5%	62	5.5%	27	1.1%	40	3.6%	32,699	10.7%	958,667	11.9%
Person with income 50% below poverty level	120	1.1%	7	0.6%	14	0.6%	6	0.5%	16,344	5.3%	431,894	5.4%

TABLE D-2 FORSYTH COUNTY POPULATION & HOUSING CHARACTERISTICS

***Geographical Changes within Spatial Data	Demographic Study Area		Block Group 1, Census Tract 40.05, Forsyth County, North Carolina		Block Group 2, Census Tract 40.05, Forsyth County, North Carolina		Block Group 3, Census Tract 40.06, Forsyth County, North Carolina		Forsyth County, North Carolina		North Carolina	
	Total	Percent	Total	Percent	Total	Percent	Total	Percent	Total	Percent	Total	Percent
Total Housing Units	4,403		608		790		366		133,093		3,523,944	
Occupancy Status												
Occupied	4,135	93.9%	578	95.1%	766	97.0%	347	94.8%	123,851	93.1%	3,132,013	88.9%
Vacant	268	6.1%	30	4.9%	24	3.0%	19	5.2%	9,242	6.9%	391,931	11.1%
Tenure												
Owner Occupied	3,788	91.6%	518	89.6%	733	95.7%	336	96.8%	81,252	65.6%	2,172,270	69.4%
Renter Occupied	347	8.4%	60	10.4%	33	4.3%	11	3.2%	42,599	34.4%	959,743	30.6%
Median Home Value												
Owner-Occupied Units	$180,783		$145,900		$185,200		$215,600		$114,000		$108,300	
Age of Housing Stock												
1999 or after	152	3.5%	29	4.8%	25	3.2%	0	0.0%	4,223	3.2%	144,500	4.1%
1990 - 1998	1,208	27.4%	243	40.0%	268	33.9%	6	1.6%	21,484	16.1%	805,485	22.9%
1980 - 1989	1,222	27.8%	107	17.6%	196	24.8%	144	39.3%	24,834	18.7%	692,633	19.7%
1960 - 1979	1,634	37.1%	210	34.5%	263	33.3%	209	57.1%	46,225	34.7%	1,089,105	30.9%
1959 or before	187	4.2%	19	3.1%	38	4.8%	7	1.9%	36,327	27.3%	792,221	22.5%
Total in List	4,403	100.0%	608	100.0%	790	100.0%	366	100.0%	133,093	100.0%	3,523,944	100.0%
Total in Sample	4,403	100.0%	608	100.0%	790	100.0%	366	100.0%	133,093	100.0%	3,523,944	100.0%

APPENDIX E

PRELIMINARY TRAFFIC NOISE ANALYSIS INFORMATION

TIP Project No. I-0911 A

Table E-1: Traffic Noise Impact Summary[1]								
ALTERNATIVE DESCRIPTION	APPROXIMATE # OF IMPACTED RECEPTORS APPROACHING OR EXCEEDING FHWA NAC[2]					SUBSTANTIAL NOISE LEVEL INCREASE[3]	IMPACTS DUE TO BOTH CRITERIA[4]	TOTAL IMPACTS PER 23 CFR 772
	A	B	C	D	E			
Build[1]	0	107	4	0	62[5]	0	0	117[5]
No-Build	0	80	2	0	59[5]	0	0	84[5]

1. This table presents the number of build-condition traffic noise impacts as predicted for the build-condition I-40 widening alternative and 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 (refer to Table 3, pg 6).
3. Predicted "substantial increase" traffic noise level impact (refer to Table 4, pg 7).
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.

Table E-2: Noise Sensitive Receptors and Hourly Equivalent Noise Levels – Build Alternative							
Receptors					Predicted Noise Levels, $L_{eq(h)}$ (dB(A))		
ID#	Use	NAC	D.U.s	Address	Ex.	Build	Δ
R-01	Bus.	C	1	218 NC 801 Hwy N	65	67	2
R-02	Bus.	C	1	190 NC 801 Hwy N	68	73	5
R-03	Bus.	C	1	1 Lot NC 801 Hwy S	67	69	2
R-04	Res.	B	1	3846 NC 801 Hwy S	65	69	4
R-05	Bus.	C	1	135 Medical Dr #201	70	74	4
R-5A	Bus.	C	1	135 Medical Dr #101	67	71	4
R-06	Bus.	C	1	134 Medical Dr	65	69	4
R-07	Bus.	C	1	155 Commerce Dr	74	78	4
R-08A	Res.	B	1	189 Pinewood Ln	64	69	5
R-08B	Res.	B	1	189 Pinewood Ln	62	66	4
R-08C	Res.	B	1	189 Pinewood Ln	62	66	4
R-08D	Res.	B	1	189 Pinewood Ln	64	69	5
R-09A	Res.	B	1	178 Pinewood Ln	63	67	4
R-09B	Res.	B	1	178 Pinewood Ln	62	66	4
R-09C	Res.	B	1	178 Pinewood Ln	54	59	5
R-09D	Res.	B	1	178 Pinewood Ln	62	66	4
R-10A	Res.	B	1	172 Pinewood Ln	62	66	4
R-10B	Res.	B	1	172 Pinewood Ln	56	60	4
R-10C	Res.	B	1	172 Pinewood Ln	57	62	5
R-10D	Res.	B	1	172 Pinewood Ln	62	66	4
R-11A	Res.	B	1	164 Pinewood Ln	62	65	3
R-11B	Res.	B	1	164 Pinewood Ln	57	62	5
R-11C	Res.	B	1	164 Pinewood Ln	56	61	5
R-11D	Res.	B	1	164 Pinewood Ln	62	66	4
R-12A	Res.	B	1	156 Pinewood Ln	62	66	4
R-12B	Res.	B	1	156 Pinewood Ln	60	65	5
R-12C	Res.	B	1	156 Pinewood Ln	57	61	4
R-12D	Res.	B	1	156 Pinewood Ln	62	66	4
R-13A	Res.	B	1	148 Pinewood Ln	62	66	4
R-13B	Res.	B	1	148 Pinewood Ln	56	60	4
R-13C	Res.	B	1	148 Pinewood Ln	60	64	4
R-13D	Res.	B	1	148 Pinewood Ln	62	65	3
R-14A	Res.	B	1	140 Pinewood Ln	61	65	4
R-14B	Res.	B	1	140 Pinewood Ln	61	64	3
R-14C	Res.	B	1	140 Pinewood Ln	60	64	4
R-14D	Res.	B	1	140 Pinewood Ln	62	65	3
R-15A	Res.	B	1	132 Pinewood Ln	62	65	3
R-15B	Res.	B	1	132 Pinewood Ln	57	61	4
R-15C	Res.	B	1	132 Pinewood Ln	63	66	3
R-15D	Res.	B	1	132 Pinewood Ln	64	67	3
R-16A	Res.	B	1	157 Pinewood Ln	65	69	4
R-16B	Res.	B	1	157 Pinewood Ln	63	66	3
R-16C	Res.	B	1	157 Pinewood Ln	63	67	4
R-16D	Res.	B	1	157 Pinewood Ln	65	69	4
R-17A	Res.	B	1	149 Pinewood Ln	65	69	4
R-17B	Res.	B	1	149 Pinewood Ln	63	66	3

Table E-2: Noise Sensitive Receptors and Hourly Equivalent Noise Levels – Build Alternative							
Receptors					Predicted Noise Levels, $L_{eq(h)}$ (dB(A))		
ID#	Use	NAC	D.U.s	Address	Ex.	Build	Δ
R-17C	Res.	B	1	149 Pinewood Ln	64	67	3
R-17D	Res.	B	1	149 Pinewood Ln	65	69	4
R-18A	Res.	B	1	141 Pinewood Ln	65	69	4
R-18B	Res.	B	1	141 Pinewood Ln	63	67	4
R-18C	Res.	B	1	141 Pinewood Ln	62	66	4
R-18D	Res.	B	1	141 Pinewood Ln	65	70	5
R-19A	Res.	B	1	127 Pinewood Ln	66	69	3
R-19B	Res.	B	1	127 Pinewood Ln	61	65	4
R-19C	Res.	B	1	127 Pinewood Ln	66	70	4
R-19D	Res.	B	1	127 Pinewood Ln	67	69	2
R-20	Bus.	C	1	106 York Way	57	62	5
R-21A	Res.	B	1	7645 Rivervw Knoll Court	62	62	0
R-21B	Res.	B	1	7641 Rivervw Knoll Court	63	64	1
R-21C	Res.	B	1	7637 Rivervw Knoll Court	64	65	1
R-21D	Res.	B	1	7633 Rivervw Knoll Court	66	67	1
R-22A	Res.	B	1	7629 Rivervw Knoll Court	68	69	1
R-22B	Res.	B	1	7625 Rivervw Knoll Court	69	70	1
R-22C	Res.	B	1	7621 Rivervw Knoll Court	69	70	1
R-22D	Res.	B	1	7617 Rivervw Knoll Court	68	69	1
R-23A	Res.	B	1	7613 Rivervw Knoll Court	68	69	1
R-23B	Res.	B	1	7609 Rivervw Knoll Court	68	70	2
R-23C	Res.	B	1	7605 Rivervw Knoll Court	67	70	3
R-23D	Res.	B	1	7601 Rivervw Knoll Court	68	70	2
R-24A	Res.	B / E	2	7506 / 08 Rivervw Knoll Ct	72 / 62	73 / 63	1
R-24B	Res.	B / E	2	7502 / 04 Rivervw Knoll Ct	72 / 62	73 / 63	1
R-24C	Res.	B / E	2	7522 / 24 Rivervw Knoll Ct	69 / 59	70 / 60	1
R-24D	Res.	B / E	2	7526 / 28 Rivervw Knoll Ct	68 / 58	70 / 60	2
R-25A	Res.	B / E	2	7306 / 08 Rivervw Knoll Ct	71 / 61	73 / 63	2
R-25B	Res.	B / E	2	7302 / 04 Rivervw Knoll Ct	71 / 61	72 / 62	1
R-25C	Res.	B / E	2	7322 / 24 Rivervw Knoll Ct	65 / 55	68 / 58	3
R-25D	Res.	B / E	2	7326 / 28 Rivervw Knoll Ct	69 / 59	71 / 61	2
R-26A	Res.	B / E	2	7106 / 08 Rivervw Knoll Ct	70 / 60	72 / 62	2
R-26B	Res.	B / E	2	7102 / 04 Rivervw Knoll Ct	69 / 59	71 / 61	2
R-26C	Res.	B / E	2	7122 / 24 Rivervw Knoll Ct	64 / 54	67 / 57	3
R-26D	Res.	B / E	2	7126 / 28 Rivervw Knoll Ct	66 / 56	68 / 58	2
R-27A	Res.	B	1	208 River Oaks Court	73	76	3
R-27B	Res.	B	1	204 River Oaks Court	68	74	6
R-27C	Res.	B	1	202 River Oaks Court	62	70	8
R-27D	Res.	B	1	206 River Oaks Court	71	74	3
R-28A	Res.	B / E	2	106 / 126 River Oaks Ct	64 / 54	65 / 55	1
R-28B	Res.	B / E	2	108 / 128 River Oaks Ct	63 / 53	66 / 56	3
R-28C	Res.	B / E	2	104 / 124 River Oaks Ct	56 / 46	59 / 49	3
R-28D	Res.	B / E	2	102 / 122 River Oaks Ct	66 / 56	68 / 58	2
R-29A	Res.	B / E	2	3801 Old Rosebud Ct-F,M	56 / 46	58 / 48	2
R-29B	Res.	B / E	2	3801 Old Rosebud Ct-E,L	55 / 45	58 / 48	3
R-29C	Res.	B / E	2	3801 Old Rosebud Ct-D,K	55 / 45	58 / 48	3

Table E-2: Noise Sensitive Receptors and Hourly Equivalent Noise Levels – Build Alternative							
Receptors					Predicted Noise Levels, $L_{eq(h)}$ (dB(A))		
ID#	Use	NAC	D.U.s	Address	Ex.	Build	Δ
R-29D	Res.	B / E	2	3801 Old Rosebud Ct-C,J	54 / 44	57 / 47	3
R-29E	Res.	B / E	2	3801 Old Rosebud Ct-B,H	54 / 44	57 / 47	3
R-29F	Res.	B / E	2	3801 Old Rosebud Ct-A,G	53 / 43	56 / 46	3
R-30A	Res.	B / E	2	5000 Th'bred Ln-D,H	66 / 56	68 / 57	2
R-30B	Res.	B / E	2	5000 Th'bred Ln-C,G	67 / 57	69 / 59	2
R-30C	Res.	B / E	2	5000 Th'bred Ln-B,F	68 / 58	71 / 61	3
R-30D	Res.	B / E	2	5000 Th'bred Ln-A,E	69 / 59	73 / 63	4
R-31A	Res.	B	1	(Club Hse) Th'bred Ln	69	72	3
R-31B	Res.	B	1	(Pool) Thoroughbred Lane	59	61	2
R-32A	Res.	B / E	2	5020 Th'bred Ln-M,F	68 / 58	71 / 61	3
R-32B	Res.	B / E	2	5020 Th'bred Ln-L,E	67 / 57	70 / 60	3
R-32C	Res.	B / E	2	5020 Th'bred Ln-K,D	67 / 57	70 / 60	3
R-32D	Res.	B / E	2	5020 Th'bred Ln-J,C	66 / 56	70 / 60	4
R-32E	Res.	B / E	2	5020 Th'bred Ln-B,H	65 / 55	69 / 59	4
R-32F	Res.	B / E	2	5020 Th'bred Ln-A,G	64 / 54	68 / 58	4
R-33A	Res.	B / E	2	4000 Whirlaway Ct-D,H	64 / 54	68 / 58	4
R-33B	Res.	B / E	2	4000 Whirlaway Ct-C,G	59 / 49	63 / 53	4
R-33C	Res.	B / E	2	4000 Whirlaway Ct-B,F	55 / 45	59 / 49	4
R-33D	Res.	B / E	2	4000 Whirlaway Ct-A,E	55 / 45	58 / 48	3
R-34A	Res.	B / E	2	4010 Whirlaway Ct-D,H	55 / 45	58 / 48	3
R-34B	Res.	B / E	2	4010 Whirlaway Ct-C,G	54 / 44	57 / 47	3
R-34C	Res.	B / E	2	4010 Whirlaway Ct-B,F	54 / 44	57 / 47	3
R-34D	Res.	B / E	2	4010 Whirlaway Ct-A,E	55 / 45	58 / 48	3
R-35A	Res.	B / E	2	4001 Whirlaway Ct-A,G	64 / 54	67 / 57	3
R-35B	Res.	B / E	2	4001 Whirlaway Ct-B,H	59 / 49	62 / 52	3
R-35C	Res.	B / E	2	4001 Whirlaway Ct-C,J	56 / 46	59 / 49	3
R-35D	Res.	B / E	2	4001 Whirlaway Ct-D,K	54 / 44	57 / 47	3
R-35E	Res.	B / E	2	4001 Whirlaway Ct-E,L	53 / 43	56 / 46	3
R-35F	Res.	B / E	2	4001 Whirlaway Ct-F,M	52 / 42	54 / 44	2
R-36A	Res.	B	1	3904 Westridge Mdw Cir	65	69	4
R-36B	Res.	B	1	3902 Westridge Mdw Cir	64	68	4
R-36C	Res.	B	1	3900 Westridge Mdw Cir	56	60	4
R-36D	Res.	B	1	3906 Westridge Mdw Cir	56	59	3
R-37A	Res.	B	1	3912 Westridge Mdw Cir	52	55	3
R-37B	Res.	B	1	3908 Westridge Mdw Cir	53	56	3
R-37C	Res.	B	1	3910 Westridge Mdw Cir	50	54	4
R-37D	Res.	B	1	3914 Westridge Mdw Cir	48	51	3
R-38A	Res.	B	1	3909 Westridge Mdw Cir	53	56	3
R-38B	Res.	B	1	3913 Westridge Mdw Cir	51	55	4
R-38C	Res.	B	1	3915 Westridge Mdw Cir	48	52	4
R-38D	Res.	B	1	3911 Westridge Mdw Cir	49	54	5
R-39A	Res.	B	1	3901 Westridge Mdw Cir	63	67	4
R-39B	Res.	B	1	3905 Westridge Mdw Cir	63	66	3
R-39C	Res.	B	1	3907 Westridge Mdw Cir	56	59	3
R-39D	Res.	B	1	3903 Westridge Mdw Cir	56	60	4
R-40A	Res.	B	1	3804 Westridge Farm Lane	62	65	3

Table E-2: Noise Sensitive Receptors and Hourly Equivalent Noise Levels – Build Alternative							
Receptors					Predicted Noise Levels, $L_{eq(h)}$ (dB(A))		
ID#	Use	NAC	D.U.s	Address	Ex.	Build	Δ
R-40B	Res.	B	1	3800 Westridge Farm Lane	61	64	3
R-40C	Res.	B	1	3802 Westridge Farm Lane	53	57	4
R-40D	Res.	B	1	3806 Westridge Farm Lane	54	57	3
R-41A	Res.	B	1	3801 Westridge Farm Lane	61	65	4
R-41B	Res.	B	1	3805 Westridge Farm Lane	60	63	3
R-41C	Res.	B	1	3807 Westridge Farm Lane	54	57	3
R-41D	Res.	B	1	3803 Westridge Farm Lane	56	60	4
R-42A	Res.	B	1	3809 Westridge Farm Lane	52	56	4
R-42B	Res.	B	1	3813 Westridge Farm Lane	50	53	3
R-42C	Res.	B	1	3815 Westridge Farm Lane	44	48	4
R-42D	Res.	B	1	3811 Westridge Farm Lane	49	53	4
R-43A	Res.	B	1	3947 Westridge Mdw Cir	46	50	4
R-43B	Res.	B	1	3943 Westridge Mdw Cir	47	51	4
R-43C	Res.	B	1	3941 Westridge Mdw Cir	44	48	4
R-43D	Res.	B	1	3945 Westridge Mdw Cir	45	48	3
R-44A	Res.	B	1	3955 Westridge Mdw Cir	49	53	4
R-44B	Res.	B	1	3951 Westridge Mdw Cir	51	55	4
R-44C	Res.	B	1	3949 Westridge Mdw Cir	47	50	3
R-44D	Res.	B	1	3953 Westridge Mdw Cir	47	51	4
R-45A	Res.	B	1	3963 Westridge Mdw Cir	61	65	4
R-45B	Res.	B	1	3959 Westridge Mdw Cir	58	63	5
R-45C	Res.	B	1	3957 Westridge Mdw Cir	52	56	4
R-45D	Res.	B	1	3961 Westridge Mdw Cir	55	59	4
R-46A	Res.	B	1	3998 Westridge Mdw Cir	68	71	3
R-46B	Res.	B	1	4002 Westridge Mdw Cir	66	69	3
R-46C	Res.	B	1	4000 Westridge Mdw Cir	62	66	4
R-46D	Res.	B	1	3996 Westridge Mdw Cir	60	63	3
R-47A	Res.	B	1	3990 Westridge Mdw Cir	55	59	4
R-47B	Res.	B	1	3994 Westridge Mdw Cir	60	63	3
R-47C	Res.	B	1	3992 Westridge Mdw Cir	57	60	3
R-47D	Res.	B	1	3988 Westridge Mdw Cir	52	56	4
R-48A	Res.	B	1	3982 Westridge Mdw Cir	49	53	4
R-48B	Res.	B	1	3986 Westridge Mdw Cir	55	59	4
R-48C	Res.	B	1	3984 Westridge Mdw Cir	54	57	3
R-48D	Res.	B	1	3980 Westridge Mdw Cir	48	52	4
R-49A	Res.	B	1	7750 Whitehorse Dr	54	58	4
R-49B	Res.	B	1	7745 Fair Oaks Drive	56	59	3
R-49C	Res.	B	1	7735 Fair Oaks Drive	58	62	4
R-49	Res.	B	1	7725 Fair Oaks Drive	59	63	4
R-50	Res.	B	1	7715 Fair Oaks Drive	61	64	3
R-51A	Res.	B	1	4264 Lake Cliff Drive	57	60	3
R-51	Res.	B	1	4272 Lake Cliff Drive	59	62	3
R-52	Res.	B	1	4280 Lake Cliff Drive	64	67	3
R-53	Res.	B	1	4271 Lake Cliff Drive	59	63	4
R-54	Res.	B	1	4279 Lake Cliff Drive	62	65	3
R-55	Res.	B	1	7685 Fair Oaks Drive	71	74	3

Table E-2: Noise Sensitive Receptors and Hourly Equivalent Noise Levels – Build Alternative

Receptors					Predicted Noise Levels, $L_{eq(h)}$ (dB(A))		
ID#	**Use**	**NAC**	**D.U.s**	**Address**	**Ex.**	**Build**	**Δ**
R-56	Res.	B	1	4260 Gardensprings Drive	55	59	4
R-57	Res.	B	1	4267 Gardensprings Drive	56	60	4
Predicted "Build" Alternative Design Year 2035 Traffic Noise Impacts:[3,4]						116[1]	0[2]

1. Predicted traffic noise level impact due to approaching or exceeding NAC (refer to Table 3, pg 6).
2. Predicted "substantial increase" traffic noise level impact (refer to Table 4, pg 7).
3. The number of predicted impacts is not duplicated if receptors are predicted to be impacted by more than one criterion (e.g. if a receptor is impacted by NAC "B" and NAC "E", it is counted as only one impact).
4. Total number of predicted traffic noise impacts under the Build I-40 alignment alternative = 116.

Table E-3: I-40 Widening (I-0911A) Noise Barrier Reasonableness Assessment[1]

NSA	Description / Street Name(s)	Length (ft)	Impacts	Benefits	Cost / Benefit[2]
1	I-40 Westbound, east of NC 801 / Pinewood Lane	1,597	30	45	$5,190
2	I-40 Eastbound, east of the Yadkin River / Riverview Knoll Court, River Oaks Court, Thoroughbred Lane, Whirlaway Court, Westridge Meadow Circle	3,381	73	87	$8,287
3	I-40 Westbound, east of the Yadkin River / Lake Cliff Drive, Fair Oaks Drive	1,867	2	11	$35,796[3]

1. This assessment is based upon preliminary design criteria, and is not a commitment or recommendation to construct traffic noise impact abatement measures.
2. The mitigation measures assessed in conjunction with this Traffic Noise Analysis preliminarily meet NCDOT Traffic Noise Abatement Policy cost reasonableness criteria. A final assessment of mitigation measure cost reasonableness will be made subsequent to final selection of the I-40 Highway widening project alignment.
3. The average noise level increase for the impacted receptors in NSA 3 is predicted to be 3 dB(A). Per NCDOT Traffic Noise Abatement Policy, the maximum reasonable sound barrier cost per benefit for NSA 3 is $36,500 ($35,000 + ($500 per decibel x 3 decibels)).

Table E-4: NSA 1 Noise Barrier Performance Assessment

I-40 Westbound, East of NC 801:
(Pinewood Lane)

Receptors					Predicted Noise Levels, $L_{eq(h)}$ (dB(A))		
ID#	Use	NAC	D.U.s	Address	No Barrier	W/Barrier	NLR[1]
R-08A	Res.	B	1	189 Pinewood Ln	69	63	6
R-08B	Res.	B	1	189 Pinewood Ln	66	61	5
R-08C	Res.	B	1	189 Pinewood Ln	66	60	6
R-08D	Res.	B	1	189 Pinewood Ln	69	63	6
R-09A	Res.	B	1	178 Pinewood Ln	67	61	6
R-09B	Res.	B	1	178 Pinewood Ln	66	61	5
R-09C	Res.	B	1	178 Pinewood Ln	59	52	7
R-09D	Res.	B	1	178 Pinewood Ln	66	60	6
R-10A	Res.	B	1	172 Pinewood Ln	66	60	6
R-10B	Res.	B	1	172 Pinewood Ln	60	55	5
R-10C	Res.	B	1	172 Pinewood Ln	62	54	8
R-10D	Res.	B	1	172 Pinewood Ln	66	60	6
R-11A	Res.	B	1	164 Pinewood Ln	65	60	5
R-11B	Res.	B	1	164 Pinewood Ln	62	55	7
R-11C	Res.	B	1	164 Pinewood Ln	61	55	6
R-11D	Res.	B	1	164 Pinewood Ln	66	60	6
R-12A	Res.	B	1	156 Pinewood Ln	66	61	5
R-12B	Res.	B	1	156 Pinewood Ln	65	59	6
R-12C	Res.	B	1	156 Pinewood Ln	61	55	6
R-12D	Res.	B	1	156 Pinewood Ln	66	60	6
R-13A	Res.	B	1	148 Pinewood Ln	66	60	6
R-13B	Res.	B	1	148 Pinewood Ln	60	54	6
R-13C	Res.	B	1	148 Pinewood Ln	64	60	4
R-13D	Res.	B	1	148 Pinewood Ln	65	60	5
R-14A	Res.	B	1	140 Pinewood Ln	65	60	5
R-14B	Res.	B	1	140 Pinewood Ln	64	60	4
R-14C	Res.	B	1	140 Pinewood Ln	64	58	6
R-14D	Res.	B	1	140 Pinewood Ln	65	60	5
R-15A	Res.	B	1	132 Pinewood Ln	65	61	4
R-15B	Res.	B	1	132 Pinewood Ln	61	55	6
R-15C	Res.	B	1	132 Pinewood Ln	66	61	5
R-15D	Res.	B	1	132 Pinewood Ln	67	62	5
R-16A	Res.	B	1	157 Pinewood Ln	69	63	6
R-16B	Res.	B	1	157 Pinewood Ln	66	60	6
R-16C	Res.	B	1	157 Pinewood Ln	67	59	8
R-16D	Res.	B	1	157 Pinewood Ln	69	63	6
R-17A	Res.	B	1	149 Pinewood Ln	69	62	7
R-17B	Res.	B	1	149 Pinewood Ln	66	59	7
R-17C	Res.	B	1	149 Pinewood Ln	67	59	8
R-17D	Res.	B	1	149 Pinewood Ln	69	63	6
R-18A	Res.	B	1	141 Pinewood Ln	69	62	7
R-18B	Res.	B	1	141 Pinewood Ln	67	59	8
R-18C	Res.	B	1	141 Pinewood Ln	66	58	8
R-18D	Res.	B	1	141 Pinewood Ln	70	62	8

Table E-4: NSA 1 Noise Barrier Performance Assessment

I-40 Westbound, East of NC 801:
(Pinewood Lane)

Receptors					Predicted Noise Levels, $L_{eq(h)}$ (dB(A))		
ID#	Use	NAC	D.U.s	Address	No Barrier	W/Barrier	NLR[1]
R-19A	Res.	B	1	127 Pinewood Ln	69	62	7
R-19B	Res.	B	1	127 Pinewood Ln	65	58	7
R-19C	Res.	B	1	127 Pinewood Ln	70	62	8
R-19D	Res.	B	1	127 Pinewood Ln	69	63	6
Predicted "Build" Alternative With-Barrier Noise Level Reduction Benefits:[2]							45[2]

1. Noise Level Reduction, NLR, is calculated as the reduction in traffic noise levels resulting from the insertion of the sound barrier, or "Insertion Loss", screened against existing ambient noise levels from non-traffic noise sources. Since ambient noise levels were not obtained in conjunction with this traffic noise analysis, the NLR = Insertion Loss
2. NCDOT Traffic Noise Abatement Policy defines a "Benefit" as any receptor for which the predicted NLR = 5 dB(A) or more. Since NLR is overwhelmingly a function of roadway, sound barrier, and receptor geometry, the reduction in traffic noise levels will be realized immediately after the project is completed (i.e., "Benefits" will be realized well before the 2035 design year).

Table E-5: NSA 2 Noise Barrier Performance Assessment

I-40 Eastbound, East of the Yadkin River:
(Riverview Knoll Court, River Oaks Court, Old Rosebud Court, Thoroughbred Lane, Whirlaway Court, Westridge Farm Lane, Westridge Meadow Circle)

Receptors					Receptors		
ID#	Use	NAC[1]	D.U.s	Address	No Barrier	W/Barrier	NLR[2]
R-21A	Res.	B	1	7645 Rivervw Knoll Court	62	60	2
R-21B	Res.	B	1	7641 Rivervw Knoll Court	64	62	2
R-21C	Res.	B	1	7637 Rivervw Knoll Court	65	63	2
R-21D	Res.	B	1	7633 Rivervw Knoll Court	67	64	3
R-22A	Res.	B	1	7629 Rivervw Knoll Court	69	64	5
R-22B	Res.	B	1	7625 Rivervw Knoll Court	70	64	6
R-22C	Res.	B	1	7621 Rivervw Knoll Court	70	63	7
R-22D	Res.	B	1	7617 Rivervw Knoll Court	69	63	6
R-23A	Res.	B	1	7613 Rivervw Knoll Court	69	62	7
R-23B	Res.	B	1	7609 Rivervw Knoll Court	70	62	8
R-23C	Res.	B	1	7605 Rivervw Knoll Court	70	62	8
R-23D	Res.	B	1	7601 Rivervw Knoll Court	70	62	8
R-24A	Res.	B	2	7506 / 08 Rivervw Knoll Ct	73	62	11
R-24B	Res.	B	2	7502 / 04 Rivervw Knoll Ct	73	62	11
R-24C	Res.	B	2	7522 / 24 Rivervw Knoll Ct	70	58	12
R-24D	Res.	B	2	7526 / 28 Rivervw Knoll Ct	70	61	9
R-25A	Res.	B	2	7306 / 08 Rivervw Knoll Ct	73	62	11
R-25B	Res.	B	2	7302 / 04 Rivervw Knoll Ct	72	61	11

Table E-5: NSA 2 Noise Barrier Performance Assessment

I-40 Eastbound, East of the Yadkin River:
(Riverview Knoll Court, River Oaks Court, Old Rosebud Court, Thoroughbred Lane, Whirlaway Court, Westridge Farm Lane, Westridge Meadow Circle)

Receptors					Receptors		
ID#	Use	NAC[1]	D.U.s	Address	No Barrier	W/Barrier	NLR[2]
R-25C	Res.	B	2	7322 / 24 Rivervw Knoll Ct	68	56	12
R-25D	Res.	B	2	7326 / 28 Rivervw Knoll Ct	71	59	12
R-26A	Res.	B	2	7106 / 08 Rivervw Knoll Ct	72	61	11
R-26B	Res.	B	2	7102 / 04 Rivervw Knoll Ct	71	61	10
R-26C	Res.	B	2	7122 / 24 Rivervw Knoll Ct	67	56	11
R-26D	Res.	B	2	7126 / 28 Rivervw Knoll Ct	68	56	12
R-27A	Res.	B	1	208 River Oaks Court	76	63	13
R-27B	Res.	B	1	204 River Oaks Court	74	63	11
R-27C	Res.	B	1	202 River Oaks Court	70	59	11
R-27D	Res.	B	1	206 River Oaks Court	74	61	13
R-28A	Res.	B	2	106 / 126 River Oaks Ct	65	58	7
R-28B	Res.	B	2	108 / 128 River Oaks Ct	66	58	8
R-28C	Res.	B	2	104 / 124 River Oaks Ct	59	55	4
R-28D	Res.	B	2	102 / 122 River Oaks Ct	68	59	9
R-29A	Res.	B	2	3801 Old Rosebud Ct-F,M	58	55	3
R-29B	Res.	B	2	3801 Old Rosebud Ct-E,L	58	53	5
R-29C	Res.	B	2	3801 Old Rosebud Ct-D,K	58	53	5
R-29D	Res.	B	2	3801 Old Rosebud Ct-C,J	57	53	4
R-29E	Res.	B	2	3801 Old Rosebud Ct-B,H	57	53	4
R-29F	Res.	B	2	3801 Old Rosebud Ct-A,G	56	52	4
R-30A	Res.	B	2	5000 Th'bred Ln-D,H	68	61	7
R-30B	Res.	B	2	5000 Th'bred Ln-C,G	69	61	8
R-30C	Res.	B	2	5000 Th'bred Ln-B,F	71	62	9
R-30D	Res.	B	2	5000 Th'bred Ln-A,E	73	64	9
R-31A	Res.	B	1	(Club Hse) Th'bred Ln	72	64	8
R-31B	Res.	B	1	(Pool) Thoroughbred Lane	61	56	5
R-32A	Res.	B	2	5020 Th'bred Ln-M,F	71	64	7
R-32B	Res.	B	2	5020 Th'bred Ln-L,E	70	63	7
R-32C	Res.	B	2	5020 Th'bred Ln-K,D	70	63	7
R-32D	Res.	B	2	5020 Th'bred Ln-J,C	70	63	7
R-32E	Res.	B	2	5020 Th'bred Ln-B,H	69	62	7
R-32F	Res.	B	2	5020 Th'bred Ln-A,G	68	62	6
R-33A	Res.	B	2	4000 Whirlaway Ct-D,H	68	62	6
R-33B	Res.	B	2	4000 Whirlaway Ct-C,G	63	58	5
R-33C	Res.	B	2	4000 Whirlaway Ct-B,F	59	55	4
R-33D	Res.	B	2	4000 Whirlaway Ct-A,E	58	54	4
R-34A	Res.	B	2	4010 Whirlaway Ct-D,H	58	54	4
R-34B	Res.	B	2	4010 Whirlaway Ct-C,G	57	53	4
R-34C	Res.	B	2	4010 Whirlaway Ct-B,F	57	53	4
R-34D	Res.	B	2	4010 Whirlaway Ct-A,E	58	54	4
R-35A	Res.	B	2	4001 Whirlaway Ct-A,G	67	61	6
R-35B	Res.	B	2	4001 Whirlaway Ct-B,H	62	57	5
R-35C	Res.	B	2	4001 Whirlaway Ct-C,J	59	55	4
R-35D	Res.	B	2	4001 Whirlaway Ct-D,K	57	54	3
R-35E	Res.	B	2	4001 Whirlaway Ct-E,L	56	53	3
R-35F	Res.	B	2	4001 Whirlaway Ct-F,M	54	52	2

Table E-5: NSA 2 Noise Barrier Performance Assessment

I-40 Eastbound, East of the Yadkin River:
(Riverview Knoll Court, River Oaks Court, Old Rosebud Court, Thoroughbred Lane, Whirlaway Court, Westridge Farm Lane, Westridge Meadow Circle)

Receptors					Receptors		
ID#	Use	NAC[1]	D.U.s	Address	No Barrier	W/Barrier	NLR[2]
R-36A	Res.	B	1	3904 Westridge Mdw Cir	69	62	7
R-36B	Res.	B	1	3902 Westridge Mdw Cir	68	62	6
R-36C	Res.	B	1	3900 Westridge Mdw Cir	60	56	4
R-36D	Res.	B	1	3906 Westridge Mdw Cir	59	55	4
R-37A	Res.	B	1	3912 Westridge Mdw Cir	55	52	3
R-37B	Res.	B	1	3908 Westridge Mdw Cir	56	53	3
R-37C	Res.	B	1	3910 Westridge Mdw Cir	54	51	3
R-37D	Res.	B	1	3914 Westridge Mdw Cir	51	49	2
R-38A	Res.	B	1	3909 Westridge Mdw Cir	56	53	3
R-38B	Res.	B	1	3913 Westridge Mdw Cir	55	51	4
R-38C	Res.	B	1	3915 Westridge Mdw Cir	52	49	3
R-38D	Res.	B	1	3911 Westridge Mdw Cir	54	52	2
R-39A	Res.	B	1	3901 Westridge Mdw Cir	67	61	6
R-39B	Res.	B	1	3905 Westridge Mdw Cir	66	61	5
R-39C	Res.	B	1	3907 Westridge Mdw Cir	59	55	4
R-39D	Res.	B	1	3903 Westridge Mdw Cir	60	56	4
R-40A	Res.	B	1	3804 Westridge Farm Lane	65	60	5
R-40B	Res.	B	1	3800 Westridge Farm Lane	64	59	5
R-40C	Res.	B	1	3802 Westridge Farm Lane	57	54	3
R-40D	Res.	B	1	3806 Westridge Farm Lane	57	53	4
R-41A	Res.	B	1	3801 Westridge Farm Lane	65	61	4
R-41B	Res.	B	1	3805 Westridge Farm Lane	63	60	3
R-41C	Res.	B	1	3807 Westridge Farm Lane	57	55	2
R-41D	Res.	B	1	3803 Westridge Farm Lane	60	56	4
R-42A	Res.	B	1	3809 Westridge Farm Lane	56	52	4
R-42B	Res.	B	1	3813 Westridge Farm Lane	53	52	1
R-42C	Res.	B	1	3815 Westridge Farm Lane	48	48	0
R-42D	Res.	B	1	3811 Westridge Farm Lane	53	50	3
R-43A	Res.	B	1	3947 Westridge Mdw Cir	50	50	0
R-43B	Res.	B	1	3943 Westridge Mdw Cir	51	49	2
R-43C	Res.	B	1	3941 Westridge Mdw Cir	48	48	0
R-43D	Res.	B	1	3945 Westridge Mdw Cir	48	48	0
R-44A	Res.	B	1	3955 Westridge Mdw Cir	53	53	0
R-44B	Res.	B	1	3951 Westridge Mdw Cir	55	52	3
R-44C	Res.	B	1	3949 Westridge Mdw Cir	50	49	1
R-44D	Res.	B	1	3953 Westridge Mdw Cir	51	51	0
R-45A	Res.	B	1	3963 Westridge Mdw Cir	65	60	5
R-45B	Res.	B	1	3959 Westridge Mdw Cir	63	59	4
R-45C	Res.	B	1	3957 Westridge Mdw Cir	56	53	3
R-45D	Res.	B	1	3961 Westridge Mdw Cir	59	56	3
R-46A	Res.	B	1	3998 Westridge Mdw Cir	71	62	9
R-46B	Res.	B	1	4002 Westridge Mdw Cir	69	62	7
R-46C	Res.	B	1	4000 Westridge Mdw Cir	66	61	5
R-46D	Res.	B	1	3996 Westridge Mdw Cir	63	57	6
R-47A	Res.	B	1	3990 Westridge Mdw Cir	59	55	4
R-47B	Res.	B	1	3994 Westridge Mdw Cir	63	60	3

Table E-5: NSA 2 Noise Barrier Performance Assessment

I-40 Eastbound, East of the Yadkin River:
(Riverview Knoll Court, River Oaks Court, Old Rosebud Court, Thoroughbred Lane, Whirlaway Court, Westridge Farm Lane, Westridge Meadow Circle)

Receptors					Receptors		
ID#	Use	NAC[1]	D.U.s	Address	No Barrier	W/Barrier	NLR[2]
R-47C	Res.	B	1	3992 Westridge Mdw Cir	60	58	2
R-47D	Res.	B	1	3988 Westridge Mdw Cir	56	53	3
R-48A	Res.	B	1	3982 Westridge Mdw Cir	53	52	1
R-48B	Res.	B	1	3986 Westridge Mdw Cir	59	57	2
R-48C	Res.	B	1	3984 Westridge Mdw Cir	57	56	1
R-48D	Res.	B	1	3980 Westridge Mdw Cir	52	51	1
Predicted "Build" Alternative With-Barrier Noise Level Reduction Benefits:[3]							87[3]

1. Per NCDOT Traffic Noise Abatement Policy, several NAC Category "E" impacts were identified within NSA 2. However, since TNM cannot accurately assess interior noise levels, sound barrier performance is assessed as the reduction in exterior noise levels (e.g., for NAC "B" and NAC "C" land uses).
2. Noise Level Reduction, NLR, is calculated as the reduction in traffic noise levels resulting from the insertion of the sound barrier, or "Insertion Loss", screened against existing ambient noise levels from non-traffic noise sources. Since ambient noise levels were not obtained in conjunction with this traffic noise analysis, the NLR = Insertion Loss
3. NCDOT Traffic Noise Abatement Policy defines a "Benefit" as any receptor for which the predicted NLR = 5 dB(A) or more. Since NLR is overwhelmingly a function of roadway, sound barrier, and receptor geometry, the reduction in traffic noise levels will be realized immediately after the project is completed (i.e., "Benefits" will be realized well before the 2035 design year).

Table E-6: NSA 3 Noise Barrier Performance Assessment

I-40 Westbound, East of the Yadkin River:
(Whitehorse Drive, Fair Oaks Drive, Lake Cliff Drive, Gardensprings Drive)

Receptors					Receptors		
ID#	Use	NAC	D.U.s	Address	No Barrier	W/Barrier	NLR[1]
R-49A	Res.	B	1	7750 Whitehorse Dr	58	55	3
R-49B	Res.	B	1	7745 Fair Oaks Drive	59	56	3
R-49C	Res.	B	1	7735 Fair Oaks Drive	62	57	5
R-49	Res.	B	1	7725 Fair Oaks Drive	63	57	6
R-50	Res.	B	1	7715 Fair Oaks Drive	64	58	6
R-51A	Res.	B	1	4264 Lake Cliff Drive	60	53	7
R-51	Res.	B	1	4272 Lake Cliff Drive	62	55	7
R-52	Res.	B	1	4280 Lake Cliff Drive	67	59	8
R-53	Res.	B	1	4271 Lake Cliff Drive	63	54	9
R-54	Res.	B	1	4279 Lake Cliff Drive	65	57	8
R-55	Res.	B	1	7685 Fair Oaks Drive	74	60	14
R-56	Res.	B	1	4260 Gardensprings Drive	59	53	6
R-57	Res.	B	1	4267 Gardensprings Drive	60	54	6
Predicted "Build" Alternative With-Barrier Noise Level Reduction Benefits:[2]							11[2]

1. Noise Level Reduction, NLR, is calculated as the reduction in traffic noise levels resulting from the insertion of the sound barrier, or "Insertion Loss", screened against existing ambient noise levels from non-traffic noise sources. Since ambient noise levels were not obtained in conjunction with this traffic noise analysis, the NLR = Insertion Loss
2. NCDOT Traffic Noise Abatement Policy defines a "Benefit" as any receptor for which the predicted NLR = 5 dB(A) or more. Since NLR is overwhelmingly a function of roadway, sound barrier, and receptor geometry, the reduction in traffic noise levels will be realized immediately after the project is completed (i.e., "Benefits" will be realized well before the 2035 design year).

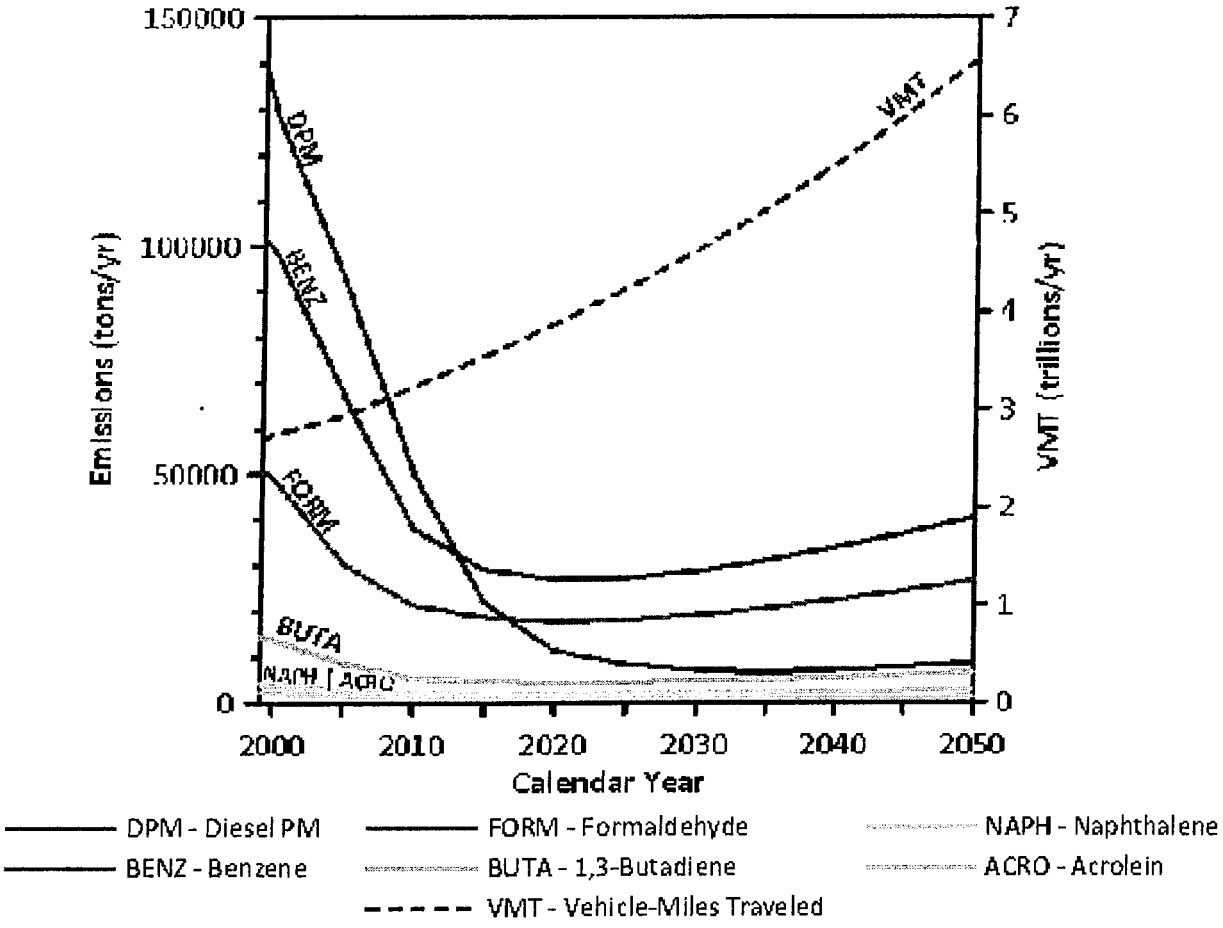
APPENDIX F

AIR QUALITY ANALYSIS INFORMATION

TIP Project No. I-0911 A

Figure F-1:

NATIONAL MSAT EMISSION TRENDS 1999 - 2050
FOR VEHICLES OPERATING ON ROADWAYS
USING EPA's MOBILE6.2 MODEL



Note:

(1) Annual emissions of polycyclic organic matter are projected to be 561 tons/yr for 1999, decreasing to 373 tons/yr for 2050.

(2) Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors

Source: U.S. Environmental Protection Agency. MOBILE6.2 Model run 20 August 2009.

Table F-1 - Year 2015 Line Source Dispersion Model

CAL3QHC: LINE SOURCE DISPERSION MODEL - VERSION 2.0, JANUARY 1992

CAL3QHC: LINE SOURCE DISPERSION MODEL - VERSION 2.0, JANUARY 1992

JOB: I911AY15 I-40 DAVIE AND FORSYTH COUNTIES RUN: I911AY15 I-40 DAVIE AND FORSYTH COUNTIES

SITE & METEOROLOGICAL VARIABLES

VS = .0 CM/S VD = .0 CM/S Z0 = 108. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 1000. M AMB = 2.7 PPM BRG = 0. DEGREES

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	LENGTH (FT)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)	V/C	QUEUE (VEH)
1. EB LANE	-2640.0	.0	2640.0	.0	5280.	90.	AG	3429.	12.6	.0	56.0		
2. WB LANE	2640.0	-72.0	-2640.0	-72.0	5280.	270.	AG	3429.	12.6	.0	56.0		

ADDITIONAL QUEUE LINK PARAMETERS

LINK DESCRIPTION	CYCLE LENGTH (SEC)	RED TIME (SEC)	CLEARANCE LOST TIME (SEC)	APPROACH VOL (VPH)	SATURATION FLOW RATE (VPH)	IDLE EM FAC (gm/hr)	SIGNAL TYPE	ARRIVAL RATE

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. REC-1	-400.0	-225.0	5.9
2. REC-2	-320.0	200.0	5.9
3. REC-3	-1210.0	-180.0	5.9
4. REC-4	-2000.0	130.0	5.9
5. REC-5	-4600.0	-460.0	5.9
6. REC-6	-5630.0	-370.0	5.9
7. REC-7	-8000.0	-270.0	5.9
8. REC-8	-8600.0	-120.0	5.9
9. REC-9	-9750.0	-170.0	5.9
10. REC-10	-10750.0	-370.0	5.9
11. REC-11	-10600.0	170.0	5.9
12. REC-12	-12500.0	-250.0	5.9

Table F-1 (Cont'd)

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MODEL RESULTS
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REMARKS: In search of the angle corresponding to
         The maximum concentration, only the first
         Angle, of the angles with same maximum
         Concentrations, is indicated as maximum.

WIND ANGLE RANGE:   0.-360.

WIND  * CONCENTRATION
ANGLE *      (PPM)
(DEGR)* REC1 REC2 REC3 REC4 REC5 REC6 REC7 REC8 REC9 REC10 REC11 REC12
------*-------------------------------------------------------------------

THE HIGHEST CONCENTRATION IS    4.20 PPM AT   71 DEGREES FROM REC3.
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Table F-2 - Year 2020 Line Source Dispersion Model

CAL3QHC: LINE SOURCE DISPERSION MODEL - VERSION 2.0, JANUARY 1992

CAL3QHC: LINE SOURCE DISPERSION MODEL - VERSION 2.0, JANUARY 1992

JOB: I911AY20 I-40 DAVIE AND FORSYTH COUNTIES RUN: I911AY20 I-40 DAVIE AND FORSYTH COUNTIES

SITE & METEOROLOGICAL VARIABLES

VS = .0 CM/S VD = .0 CM/S Z0 = 108. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 1000. M AMB = 2.7 PPM BRG = 0. DEGREES

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	LENGTH (FT)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)	V/C	QUEUE (VEH)
1. EB LANE	-2640.0	.0	2640.0	.0	5280.	90.	AG	3866.	10.8	.0	56.0		
2. WB LANE	2640.0	-72.0	-2640.0	-72.0	5280.	270.	AG	3866.	10.8	.0	56.0		

ADDITIONAL QUEUE LINK PARAMETERS

LINK DESCRIPTION	CYCLE LENGTH (SEC)	RED TIME (SEC)	CLEARANCE LOST TIME (SEC)	APPROACH VOL (VPH)	SATURATION FLOW RATE (VPH)	IDLE EM FAC (gm/hr)	SIGNAL TYPE	ARRIVAL RATE

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. REC 1	-400.0	-260.0	5.9
2. REC 2	-320.0	200.0	5.9
3. REC 3	-1210.0	-180.0	5.9
4. REC 4	-2000.0	130.0	5.9
5. REC 5	-4600.0	-460.0	5.9
6. REC 6	-5630.0	-370.0	5.9
7. REC 7	-8000.0	-270.0	5.9
8. REC 8	-8600.0	-120.0	5.9
9. REC 9	-9750.0	-170.0	5.9
10. REC 10	-10750.0	-420.0	5.9
11. REC 11	-10600.0	170.0	5.9
12. REC 12	-12500.0	-250.0	5.9

Table F-2 (Cont'd)

```
MODEL RESULTS
-------------

REMARKS: In search of the angle corresponding to
         The maximum concentration, only the first
         Angle, of the angles with same maximum
         Concentrations, is indicated as maximum.

WIND ANGLE RANGE:   0.-360.

WIND  * CONCENTRATION
ANGLE *      (PPM)
(DEGR)* REC1 REC2 REC3 REC4 REC5 REC6 REC7 REC8 REC9 REC10 REC11 REC12
------*-------------------------------------------------------------------

THE HIGHEST CONCENTRATION IS    4.20 PPM AT   75 DEGREES FROM REC3.
```

Table F-3 - Year 2035 Line Source Dispersion Model

CAL3QHC: LINE SOURCE DISPERSION MODEL - VERSION 2.0, JANUARY 1992

JOB: I911AY35 I-40 DAVIE AND FORSYTH COUNTIES RUN: I911AY35 I-40 DAVIE AND FORSYTH COUNTIES

SITE & METEOROLOGICAL VARIABLES

VS = .0 CM/S VD = .0 CM/S Z0 = 108. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 1000. M AMB = 2.7 PPM BRG = 0. DEGREES

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	LENGTH (FT)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)	V/C	QUEUE (VEH)
1. EB LANE	-2640.0	.0	2640.0	.0	5280.	90.	AG	5178.	9.9	.0	56.0		
2. WB LANE	2640.0	-72.0	-2640.0	-72.0	5280.	270.	AG	5178.	9.9	.0	56.0		

ADDITIONAL QUEUE LINK PARAMETERS

LINK DESCRIPTION	CYCLE LENGTH (SEC)	RED TIME (SEC)	CLEARANCE LOST TIME (SEC)	APPROACH VOL (VPH)	SATURATION FLOW RATE (VPH)	IDLE EM FAC (gm/hr)	SIGNAL TYPE	ARRIVAL RATE

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. REC 1	-400.0	-260.0	5.9
2. REC 2	-320.0	200.0	5.9
3. REC 3	-1210.0	-180.0	5.9
4. REC 4	-2000.0	130.0	5.9
5. REC 5	-4600.0	-460.0	5.9
6. REC 6	-5630.0	-370.0	5.9
7. REC 7	-8000.0	-270.0	5.9
8. REC 8	-8600.0	-120.0	5.9
9. REC 9	-9750.0	-170.0	5.9
10. REC 10	-10750.0	-420.0	5.9
11. REC 11	-10600.0	170.0	5.9
12. REC 12	-12500.0	-250.0	5.9

Table F.3 (Cont'd)

```
MODEL RESULTS
-------------

REMARKS: In search of the angle corresponding to
         The maximum concentration, only the first
         Angle, of the angles with same maximum
         Concentrations, is indicated as maximum.

WIND ANGLE RANGE:   0.-360.

WIND  * CONCENTRATION
ANGLE *      (PPM)
(DEGR)* REC1 REC2 REC3 REC4 REC5 REC6 REC7 REC8 REC9 REC10 REC11 REC12
------*-------------------------------------------------------------------

THE HIGHEST CONCENTRATION IS    4.40 PPM AT   66 DEGREES FROM REC3.
```

APPENDIX G

USTS, LANDFILLS, AND OTHER POTENTIALLY CONTAMINATED SITES

TIP Project No. I-0911 A

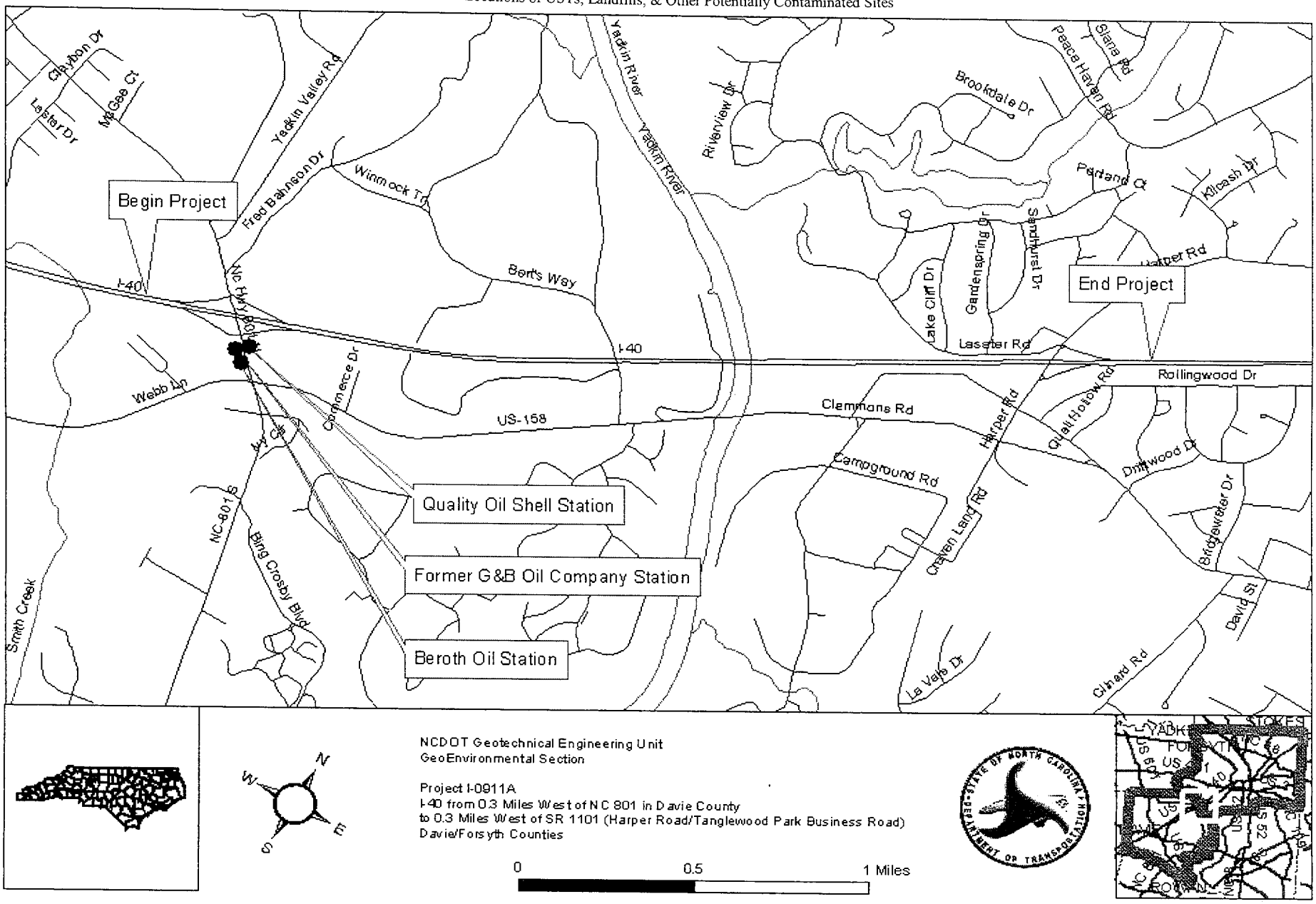
Table G-1

USTs, Landfills & Other Potentially Contaminated Sites

Site #	Type	Location	UST Facility ID #	Property Owner	UST Owner	Anticipated Impacts	Anticipated Severity	Comments
1	UST	I-40 and NC 801	0-011990	WenStar Properties	G&B Oil Co	Petroleum contaminated soils	Low	Quick Pix Food Mart #3
2	UST	136 NC 801	0-012847	Quality Oil Co.	Quality Oil Co.	Petroleum contaminated soils	Low	801 Shell Service Quick
3	UST	117 NC 801	0-035925	JB Harrison	Beroth Oil	Petroleum contaminated soils	Low	4 Brothers Food Store # 310

Figure G-1

Locations of USTs, Landfills, & Other Potentially Contaminated Sites



APPENDIX H

CITIZENS INFORMATIONAL WORKSHOP NOTICE AND HANDOUT

TIP Project No. I-0911 A

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

I-40 WIDENING DAVIE/FORSYTH COUNTIES

TIP #I-0911A

JOIN US

The N.C. Department of Transportation is proposing to widen and modify the section of I-40 from 0.3 miles west of NC 801 in Davie County to 0.3 miles east of SR 1101 in Forsyth County to improve safety and reduce traffic congestion. On November 9th, 2006 from 4 to 7 p.m., a Citizen's Informational Workshop will be held at the Kinderton Subdivision Clubhouse.

The project team hopes you will attend to learn more about the project and provide us with your thoughts and ideas about the proposed project. You are an important team member and your participation is an essential part of the project.

Please note that there will be no formal presentation. You are welcome to drop by any time between 4 and 7 p.m. Project team members will be available to explain the project process in more detail, answer your questions, and take your comments and suggestions. Maps of the proposed study corridor will also be available.

Most importantly, your comments and ideas will be used to help in the decision-making process. If you are not able to attend the community meeting and would like to comment on the proposed project, please contact or send your comments to Stephanie Caudill (see page 4 for contact information).

OVERVIEW

In an effort to improve safety and increase capacity along the section of I-40 from NC 801 to SR 1101(Harper Rd), the N.C. Department of Transportation (NCDOT) proposes to widen the existing four lanes to six lanes. The project will also involve: the rehabilitation or replacement of the existing structures over the Yadkin River, pavement rehabilitation, and safety improvements. The project will begin west of NC 801 and end east of SR 1101 (See map on pages 2 and 3).

RIGHT OF WAY

It is too early in the development process to determine exactly what right of way (property purchased from property owners for the roadway) may be needed for the project. NCDOT will provide the community and affected property owners with additional information when it becomes available.

ENVIRONMENTAL STUDIES

Over the next few months, you can expect to see different project team members visit the area. Team members may take photographs, make notes, take measurements, or mark important locations. However, these markers are only surveying and documentation guides and they do not necessarily indicate that your property will be impacted by the project.

As representatives of the State of North Carolina, we strive to treat you and your land, home, or business with respect and courtesy. NCDOT kindly asks that you allow our staff on your property to conduct necessary studies. If the highest possible standards of customer service are not observed or if you have questions please contact Stephanie Caudill.

SPECIAL ACCOMMODATIONS

In compliance with the American with Disabilities Act, NCDOT will provide auxiliary aids and services for people with special needs or disabilities that wish to participate. Please Contact Stephanie Caudill for any special accommodations.

PROJECT MILESTONES AND PUBLIC INVOLVEMENT OPPORTUNITIES

Below is a summary of the project milestones and opportunities that you will have to participate in the development of the project.

Initial Environmental Investigations and Data Collection

- Begin Study
- Perform Environmental Field and Engineering Design Studies

WE ARE HERE

- Hold Citizens Informational Workshop regarding selected study area

Impacts Assessment and Corridor Selection

- Evaluate Study Alternatives
- Select Recommended Alternative
- Complete Environmental Assessment (EA)

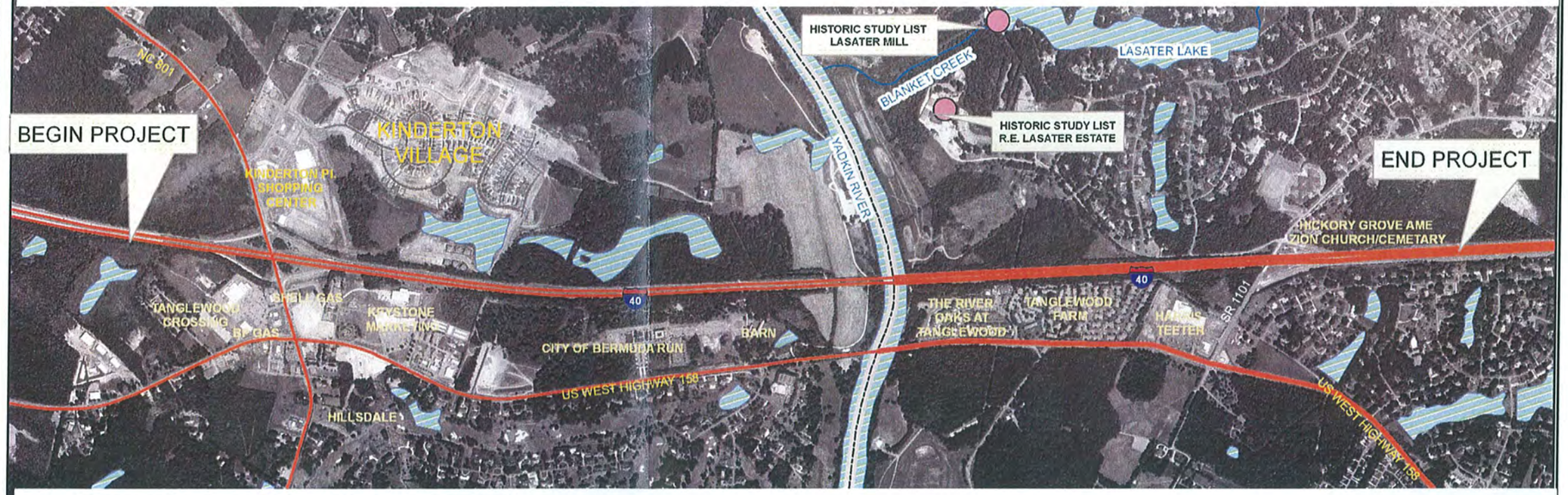
Alternative Refinement and Study Completion

- Hold Public Hearing regarding EA findings and Recommended Alternatives
- Review Comments from Public Hearing and EA
- Make Needed Changes Based on Comments
- Complete Final Environmental Document

Community Involvement Opportunities shown in red

PROJECT SCHEDULE

Complete Environmental Assessment	Late 2008
Hold Public Hearing	Late 2006
Complete Final Environmental Document	Late 2009
Begin Right of Way Acquisition	2011
Begin Construction	Not Funded Currently



Legend

- Historic Study List Structures
- Streams
- CountyBoundary
- Water Bodies
- Primary Roads

0 950 1,900 3,800 5,700 7,600 Feet

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS BRANCH

I-40
FROM 0.3 MILE WEST OF NC 801
TO 0.3 MILE EAST OF SR 1101
DAVIE-FORSYTH COUNTIES
TIP PROJECT I-0911A

N

County: DAVIE/FORSYTH
Div: 9
TIP# I-911A
WBS: 34147.1.1
Date: August 2006

Figure 1

I-40 Widening Project Newsletter

TIP #I-0911A

North Carolina Department of Transportation
Project Development and Environmental Analysis Branch
Attn: Stephanie Caudill
1548 Mail Service Center • Raleigh, NC 27699-1548

I-40 WIDENING (DAVIE/FORSYTH COUNTIES) PROJECT NEWSLETTER

I-40 Widening Davie/Forsyth Counties
Citizens Informational Workshop
November 9, 2006

4 to 7 p.m.
Kinderton Subdivision Clubhouse

DIRECTIONS:

- Take Exit 180 (NC 801) off of I-40
- North on NC 801
- Right on Yadkin Valley Road
- Right on Glen Arbor
- Left on North Forke
- Left on Bellhaven – end at clubhouse

CONTACT US:

The public involvement program provides interested citizens the opportunity to gain information about the project and participate in the planning process. Questions and comments regarding the project may be directed to:

Stephanie Caudill
Project Development and
Environmental Analysis Branch
NCDOT
1548 Mail Service Center
Raleigh, NC 27699-1548
Phone: (919) 733-3141
E-mail: slcaudill@dot.state.nc.us100100100

100 copies of this public document were printed at a cost of 34¢ each. (10/06)

APPENDIX I

NEPA/SECTION 404 MERGER TEAM CONCURRENCE FORMS

TIP Project No. I-0911 A

Widening of I-40

Davie and Forsyth Counties, NC
T.I.P. No. I-0911 A

Merger Project Team Meeting Agreement

Concurrence Point No. 2A: **Bridging Decisions and Alignment Review**

A. Project Name/Description: **Widening of I-40, from east of NC 801 in Davie County to east of SR 1101 (Harper Road/Tanglewood Park Business Road) in Forsyth County.**

B. TIP Project No.: **I-911 A**
WBS No. **34147.1.2**

The Project Team has concurred that the following locations have bridge or culvert crossings

Hydraulic Structure Recommendation

Bridge #	Length (ft)	Yr. Built	Suff. Rating	Recommendation
85 (EB)	1121	1959	65.3%	Replace with new bridge of same length and elevation.
86 (WB)	1121	1959	65.3%	Replace with new bridge of same length and elevation.

USACOE _____ NCDOT _____

USEPA _____ 4/20/10 USFWS _____ 4/26/10

DWQ _____ WRC _____

SHPO _____ MPO _____

FHWA _____ 4/28/10

April 20, 2010

Widening of I-40

Davie and Forsyth Counties, NC
T.I.P. No. I-0911 A

Concurrence Point No. 4A: **Avoidance & Minimization for the Widening of I-40.**

C. Project Name/Description: **Widening of I-40, from east of NC 801 in Davie County to east of SR 1101 (Harper Road/Tanglewood Park Business Road) in Forsyth County.**

D. TIP Project No.: **I-911 A**
WBS No. **34147.1.2**

The initial design includes 2:1 slopes along the entire project. The initial proposed slope was reduced from 2:1 to 1.5:1 at the Win-Mock Farm to further minimize impact to the historic property (the Win-Mock Farm).

404 Avoidance and Minimization Measures:

- Steeper Side slopes (2:1) in jurisdictional areas.
- No impacts to the Yadkin River

Other Measures to Avoid and Minimize Impacts to the Human and Natural Environment.

- Steeper slope (1.5:1) from Sta. 82+50.00 to Sta. 98+75.00 @ the Win-Mock Farm Property.
- Total impacts (in Acres) by using steeper slope @ the Win-Mock Farm property is =0.176 ac.
- No impacts to the Riverside Park and Soccer facility.

The Project Team has concurred on this date of April 20, 2010, on Concurrence Point 4A (Avoidance and Minimization) for the Widening of I-40 Project for TIP Projects I-0911 A.

USACOE _____ 4/20/10

NCDOT _____

USEPA _____

USFWS _____ 4/26/10

DWQ _____ 4/20/10

WRC _____

SHPO _____

MPO _____

FHWA _____ 4/20/10

April 20, 2010