Feasibility Study

Improvements to US 1 Business/US 15-501
From Winfield Street to Brown Road (SR 1462)

Sanford, Lee County

Division 8
FS-0208A

Feasibility Studies Unit
Program Development Branch
N.C. Department of Transportation

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Date

Improvements to US 1 Business/US 15-501 (Hawkins Avenue)
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I. General Description

This feasibility study addresses the proposed improvements to US 1 Business/US 15-501 from Winfield Street to Brown Road (SR 1462) in Lee County. The current cross-section of this existing 2.6 mile segment varies from two-lanes to a four-lane section with a four-foot painted median. Exhibit 1 shows the project location.

The roadway traverses relatively flat terrain and is lined with scattered commercial and industrial development. A limited amount of low density residential development is adjacent to the roadway. A major interchange with the US 1 Bypass is located approximately in the center of the project limits. Substantial growth is projected for this corridor and future traffic projections exceed existing capacity. The improvements discussed in this report are intended to increase safety and capacity by providing additional lanes and improved intersection configurations.

This feasibility study is the initial step in the planning and design process for this project and is not the product of exhaustive environmental or design investigations. The purpose of this study is to describe the proposed project, including costs, and to identify potential problems that may require consideration in the planning and design process.

II. Need for Project

The purpose of the project is to increase safety and traffic capacity of US 1 Business/ US 15-501 from Winfield Street to Brown Road (SR 1462). This segment of US 1 Business/ US 15-501 is classified as a minor arterial according to the North Carolina Statewide Functional Classified System. It is also shown on the City of Sanford Thoroughfare Plan as a major thoroughfare.

The majority of the study section is currently a two-lane shoulder facility that transitions to a four-lane roadway with a four-foot painted median north of the US 1 Bypass. The project also has one grade-separated crossing with the Norfolk Southern Railroad approximately 1,200 feet from the terminus of the project. The posted speed limit along the majority of the section is 50 mph.

There are currently eighteen unsignalized intersections and one signalized intersection along this segment, as well as several commercial and residential driveway access points and the US 1 Bypass interchange.

The unsignalized intersections along the study segment include: Winfield Street, Burns Drive, Wayne Drive, McNeil Road (SR 1405), Café Jasmine Drive, Hampton Place, Fairway Drive, Old Town Drive, Amos Bridges Road, Charleston Drive (SR 1445), Beechtree Road (SR 1444), Perkinson Road (SR 1467), Northview Drive (SR 1471), Deep River Road (SR 1446), and Brown Road (SR 1462).

Land use along the corridor is composed of a mixture of isolated residences, industry and commercial properties. Commercial development at the interchange with the US 1 Bypass has begun to fill the surrounding area. There is a large cemetery (Lee Memorial Gardens) approximately 1,000 feet south of the US 1 Bypass interchange.

There is one programmed project in the 2006-2012 TIP in the immediate vicinity of this project. The Sanford Bypass (TIP No. R-2417) is a proposed multi-lane freeway that extends from west of SR 1400 to NC 87 west of SR 1138. A section of the proposed bypass is crossed by US 1 Business just north of McNeill Road (SR 1405). To accommodate the proposed bypass, a new two-lane bridge is currently under construction at this location which will carry US 1 Business over the US 421 Sanford Bypass.

An accident analysis was conducted for the study section of US 1 Business for the period of December 1, 2000 through November 30, 2003. The results for this three year period included 107 reported crashes consisting of one fatal crash, 35 non-fatal injury crashes, and 71 property damage only crashes. The total crash rate for the studied section of roadway is 217.73 crashes per 100 million vehicle miles compared to the 2000-2002 Statewide crash rates of 171.66 for a two-lane rural US route and 125.46 for a four-lane rural US Routes with no control of access.

The predominant crash types were rear-end/slow/stop followed by left turn from different roadways and angle collisions. The rear-end/slow/stop collision was by far the most frequent and is indicative of a lack of turn lanes to separate vehicles waiting to make left turns from those moving through the corridor. Considering the fact that this corridor is lined with access points and that both the traffic volumes and amount of access are anticipated to increase substantially through the design period, continued high accident rates can be expected to occur. Provision of additional lanes and storage for left and right turning movements should substantially decrease the potential for accidents along this corridor.

III. Traffic Operations

The base year (2003) Average Annual Daily Traffic (AADT) along US 1 Business is estimated to be between 11,400 vehicles per day (vpd) and 17,400 vpd. For the future year 2030, the estimated traffic volumes will range from 21,200 vpd to 31,700 vpd. Truck traffic is estimated to make up between nine and eleven percent of daily traffic.

A traffic analysis was conducted to analyze the intersections for the base year (2003) and future year (2030). Level-of-service (LOS) and average delay for signalized and unsignalized intersections, respectively, were evaluated for the intersections along US 1 Business.

For the 2030 No-Build scenario with existing geometry, it is predicted that at least one movement at all study area signalized intersections, as well as the overall intersection of US 1 Business at McNeil Road, will operate at unacceptable levels of service in one or both of the peak hour periods.

Evaluation of the 2030 traffic shows that to achieve acceptable LOS, the proposed improvements will need to provide two through-lanes in each direction with geometric improvements (exclusive turn lanes) at specific intersections. Exhibit 2 shows the proposed cross sections and Exhibits 3A through 3H show the proposed widening and intersection configurations.

In addition to the conventional intersection improvements, the south terminus begins with a proposed roundabout at Burns Drive. The roundabout configuration was proposed because it provides an effective means to transition from four-lanes back down to two-lanes without the necessity to extend the proposed widening south of Winfield Street.

IV. Alternatives

Based on the design year 2030 traffic analysis, two through lanes in each direction with accommodations for turning vehicles are warranted. Because the existing alignment is relatively straight and lined with development, reasonable alternatives were constrained to improvements along the existing alignment. Two alternatives, a four-lane divided section and a five-lane section, were therefore studied. Descriptions of these alternatives are provided below.

Alternative A (four-lane divided) - This alternative begins at Winfield Street south of the US 1 Bypass and includes a proposed single-lane roundabout at Burns Drive. Just north of Burns Drive the roadway will transition to a four-lane divided section with a 23-foot median and outside shoulders and will continue to south of Old Towne Drive. This section will have a 150-foot right-of-way width and will be constructed by asymmetrical widening to the right of the existing two-lane section.

From south of Old Towne Drive to Northview Drive (SR 1471), a four-lane divided section with a 23-foot median and outside curb and gutter is proposed. Curb and gutter is proposed as a means to reduce the necessary right-of-way through this section which is constrained by adjacent development including a golf course, residences, businesses, and a cemetery. The narrower proposed width for this section of US 1 will allow the US 1 Bypass bridges, under which it passes, to be maintained. This section will have a 115-foot right-of-way width and will be constructed by asymmetrical widening to the left of the existing two-lane section.

The section from Northview Drive (SR 1471) to Brown Road (SR 1462) is proposed as a four-lane divided section with a 23-foot median and outside shoulders and a 150-foot right-of-way width. This section will be constructed by symmetrical widening about the centerline of the existing four-lane section.

This alternative will require construction of dual two-lane bridges over the Norfolk Southern railroad and removal of the existing two-lane bridge.

A two-lane bridge is currently under construction to carry existing US 1 Business over the Sanford Bypass. For Alternative A, an additional two-lane bridge will be constructed east of this bridge. The proposed structure will carry northbound traffic and the existing structure will carry southbound traffic.

At the existing interchange with the US 1 Bypass, US 1 Business currently travels beneath the bypass. The proposed widening of US 1 Business will allow the existing US 1 Bypass bridges to be maintained.

Alternative B (five-lane) - This alternative begins at Winfield Street south of the US 1 Bypass and includes a proposed single-lane roundabout at Burns Drive. Just north of Burns Drive the roadway will transition to a five-lane section with shoulder and will continue to south of Old Towne Drive. This section will have a 150-foot right-of-way width and will be constructed by asymmetrical widening to the right of the existing two-lane section.

From south of Old Towne Drive to Northview Drive (SR 1471), a five-lane section with curb and gutter is proposed. Curb and gutter is proposed as a means to reduce the necessary right-of-way through this section which is constrained by adjacent development including a golf course, residences, businesses, and a cemetery. The narrower proposed width for this section of US 1 will allow the US 1 Bypass bridges, under which it passes, to be maintained. This section will have a 115-foot right-of-way width and will be constructed by asymmetrical widening to the left of the existing two-lane section.

The section from Northview Drive (SR 1471) to Brown Road (SR 1462) is proposed as a five-lane section with shoulder and a 150-foot right-of-way width. This section will be constructed by symmetrical widening about the centerline of the existing four-lane section.

This alternative will require construction of dual two-lane bridges over the Norfolk Southern railroad and removal of the existing two-lane bridge.

A two-lane bridge is currently under construction to carry existing US 1 Business over the Sanford Bypass. For Alternative B, an additional two-lane bridge will be constructed east of this bridge. The proposed structure will carry northbound traffic and the existing structure will carry southbound traffic.

At the existing interchange with the US 1 Bypass, US 1 Business currently travels beneath the bypass. The proposed widening of US 1 Business will allow the existing US 1 Bypass bridges to be maintained.

V. Recommendations

As described in Section IV, there are two alternatives for this project. Both alternatives are improvements to the existing alignment to provide a consistent two-lanes in each direction. Alternative A is a four-lane divided facility and Alternative B is a five-lane cross section. A cost comparison of the two alternatives is shown below.

TABLE: COST COMPARISON OF ALTERNATIVES

		Alternative A 4-Lane Divided (Recommended)	Alternative B 5-Lane
Relocations			
	Residences	**5**	4
	Businesses	**15**	9
Cost Estimates			
	Construction	**$ 17,600,000**	$ 15,500,000
	Right-of-way	**$ 7,900,000**	$ 7,900,000
	TOTAL COST	**$ 25,500,000**	$ 23,400,000

Alternative A, the four-lane divided section, was selected as the recommended alternative because the inclusion of a median will provide a safer facility with better traffic flow in comparison to the five-lane facility. As discussed in Section I, there were 107 accidents along the study section of US 1 Business over a recent three year period. The majority of the accidents were indicative of a lack of storage for turning vehicles and an abundance of potential conflict points. Provision of a median and exclusive turn lanes at intersections will reduce conflict points and provide positive guidance and exclusive storage for turning vehicles.

Alternative B, the five-lane section, was not recommended because it does not provide the access management benefits of a median. It will, therefore, not reduce potential conflict points, decrease accidents, nor improve design year traffic flow to the same degree as a divided roadway.

The recommended Improvements (Alternative A) have a total estimated cost for construction and right-of-way of $25,500,000. In summary the recommended improvements and associated cost estimate include:

- a single-lane roundabout at the Burns Drive intersection;
- asymmetrical widening to the right from north of Burns Drive to south of Old Towne Drive to obtain a four-lane divided, 23-foot median section with outside shoulders and a 150-foot right-of-way width;
- asymmetrical widening to the left from south of Old Towne Drive to Northview Drive (SR 1471) to obtain a four-lane divided, 23-foot median section with outside curb and gutter and a 115-foor right-of-way width;
- symmetrical widening from Northview Drive (SR 1471) to Brown Road (SR 1462) to obtain a four-lane divided, 23-foot median section with outside shoulders and a 150-foot right-of-way width;
- replacement of the existing two-lane bridge over the Norfolk Southern railroad with dual two-lane bridges; and
- a two-lane structure to carry northbound lanes over the Sanford Bypass.

It should also be noted that new structures are not required at the US 1 Bypass interchange. The proposed widening can be accomplished within the existing physical confines beneath the existing structures. Therefore, the existing US 1 Bypass bridges will be maintained.

VI. Additional Comments

An exhaustive environmental screening was not conducted for this study. However, the following information summarizes conclusions about the project study area based on existing data.

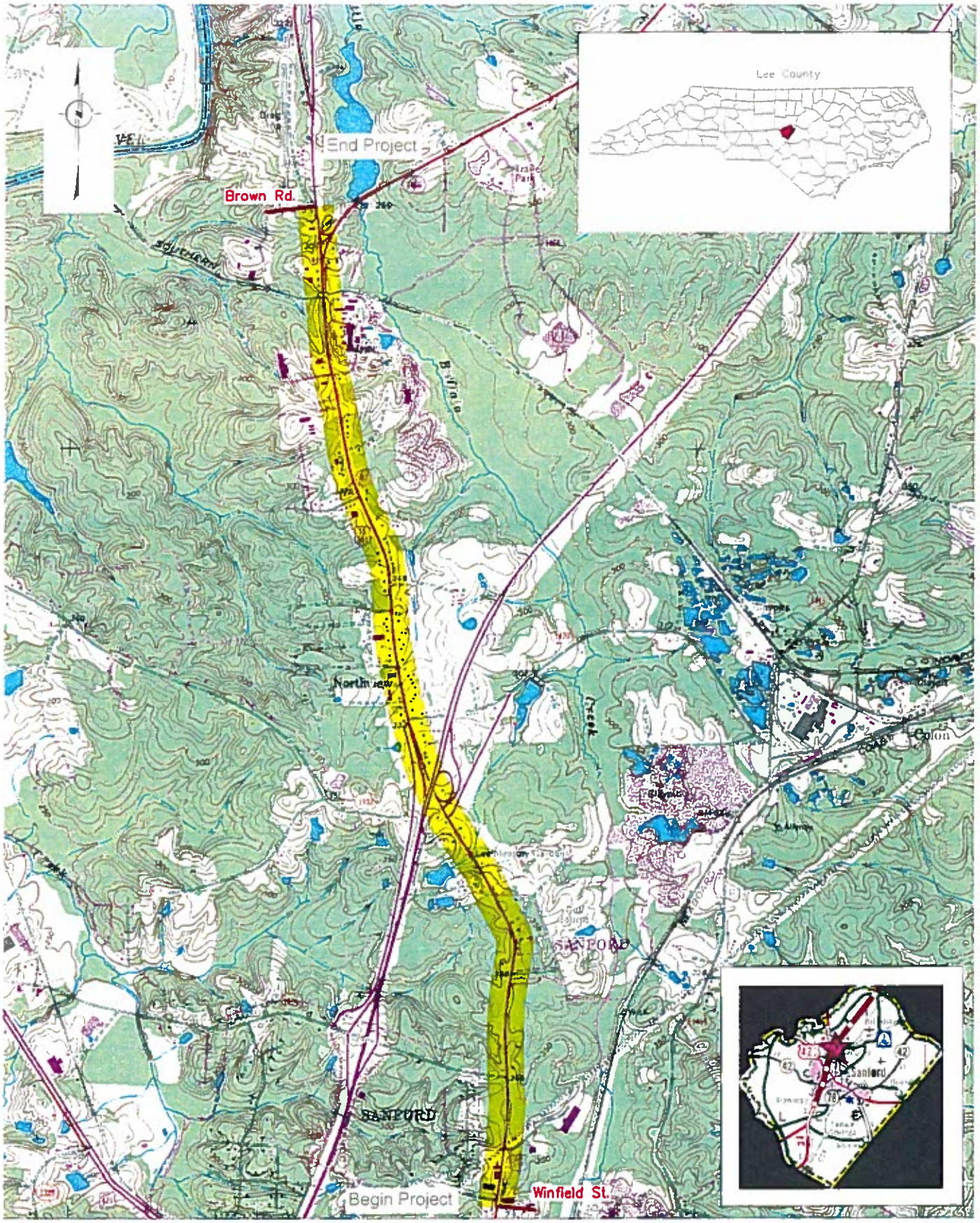
There no known historic properties or archaeological sites within the project study area.

According to the Natural Heritage Program (NHP) GIS database, there are ten federally protected species listed for Lee County. Due to their required suitable habitat (e.g. rivers, bogs,

or savannas), six of these species would not be found in the study area. The remaining four species (Georgia Indigo-bush, Carolina Redhorse, Cape Fear Shiner, and Red-cockaded woodpecker) are also not anticipated to be present due to the disturbed and developed condition of the project study area. The NHP database does not contain any recorded occurrences of threatened or endangered species within the project study area, therefore no impacts to threatened or endangered species are anticipated.

National Wetlands Inventory (NWI) mapping shows that in the general vicinity of the project, wetlands exist along Buffalo Creek east of US 15-501. However, there are no wetlands along the roadway corridor, so no substantial direct impacts to wetlands are anticipated with the proposed improvements.

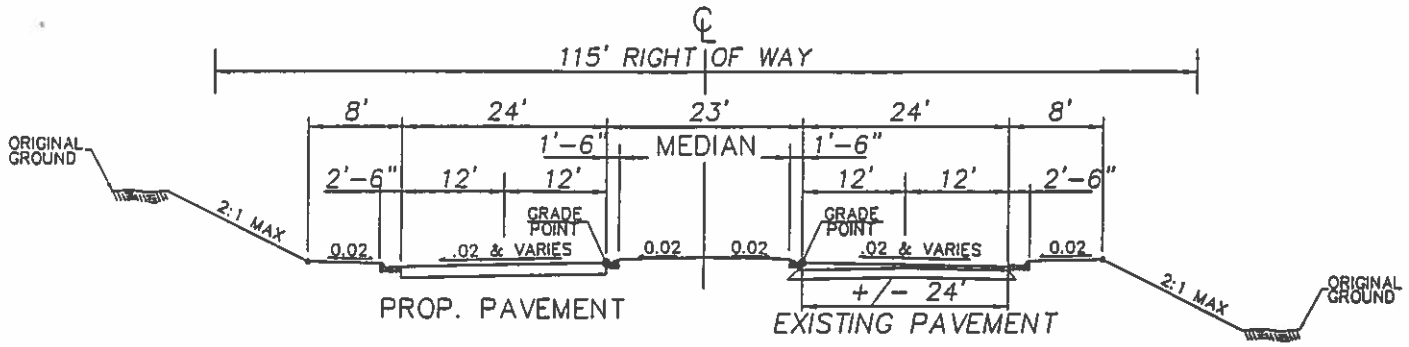
The proposed improvements include one crossing of an unnamed tributary to Buffalo Creek north of Beechtree Road (SR 1444). This location is an existing crossing where the culvert would be extended on both sides to accommodate the widening. The location is already urbanized and no substantial impacts to water quality are anticipated.



Feasibility Study
US 1 Business/US 15-501

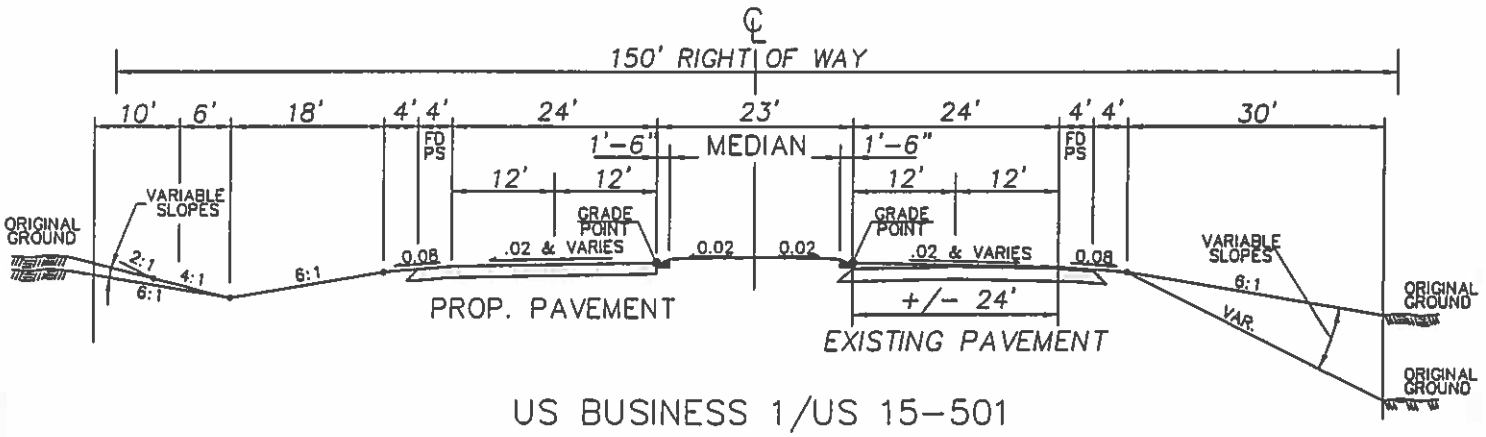
Hawkins Ave., Winfield St. to Brown Rd. (SR 1462) -FS-0208A
Lee County, North Carolina

Project Location
NTS
Exhibit 1



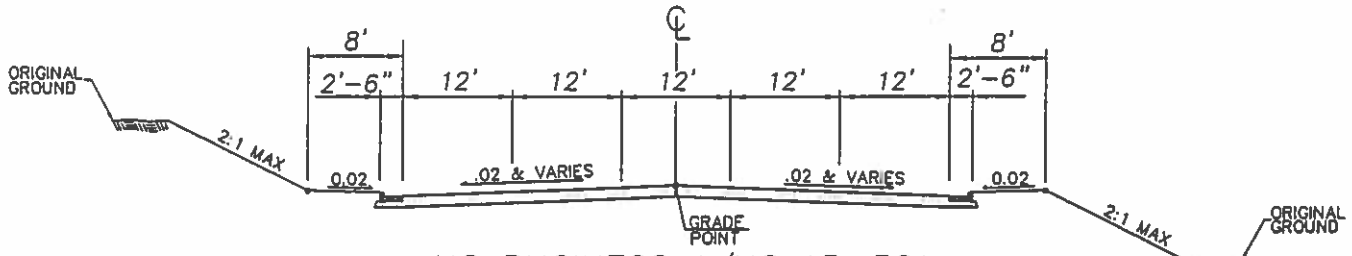
US BUSINESS 1/US 15-501

FOUR LANE DIVIDED SECTION
23' RAISED MEDIAN, CURB AND GUTTER



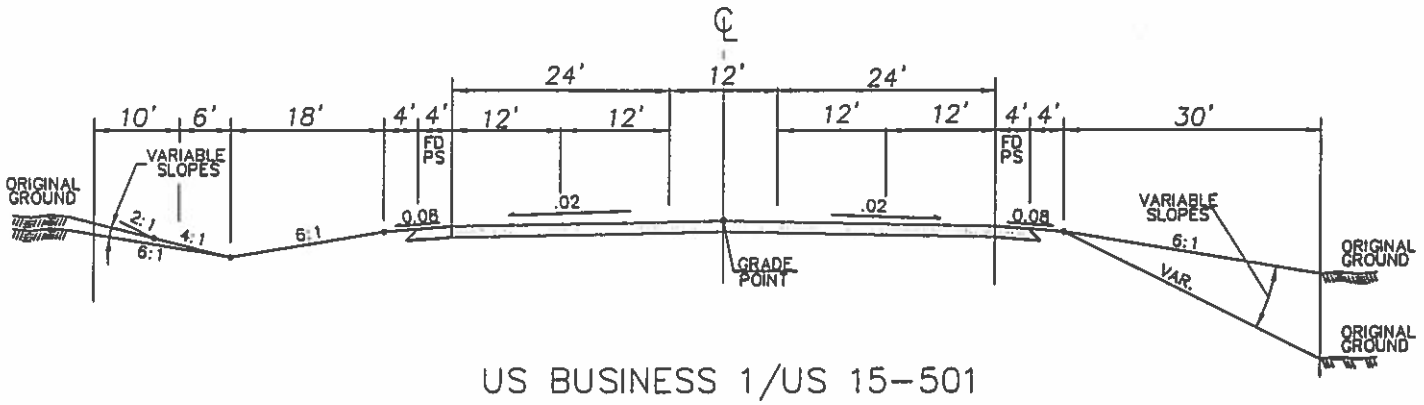
US BUSINESS 1/US 15-501

FOUR LANE DIVIDED SECTION
23' RAISED MEDIAN, SHOULDER SECTION



US BUSINESS 1/US 15-501

FIVE LANE CURB AND GUTTER SECTION



US BUSINESS 1/US 15-501

FIVE LANE SHOULDER SECTION

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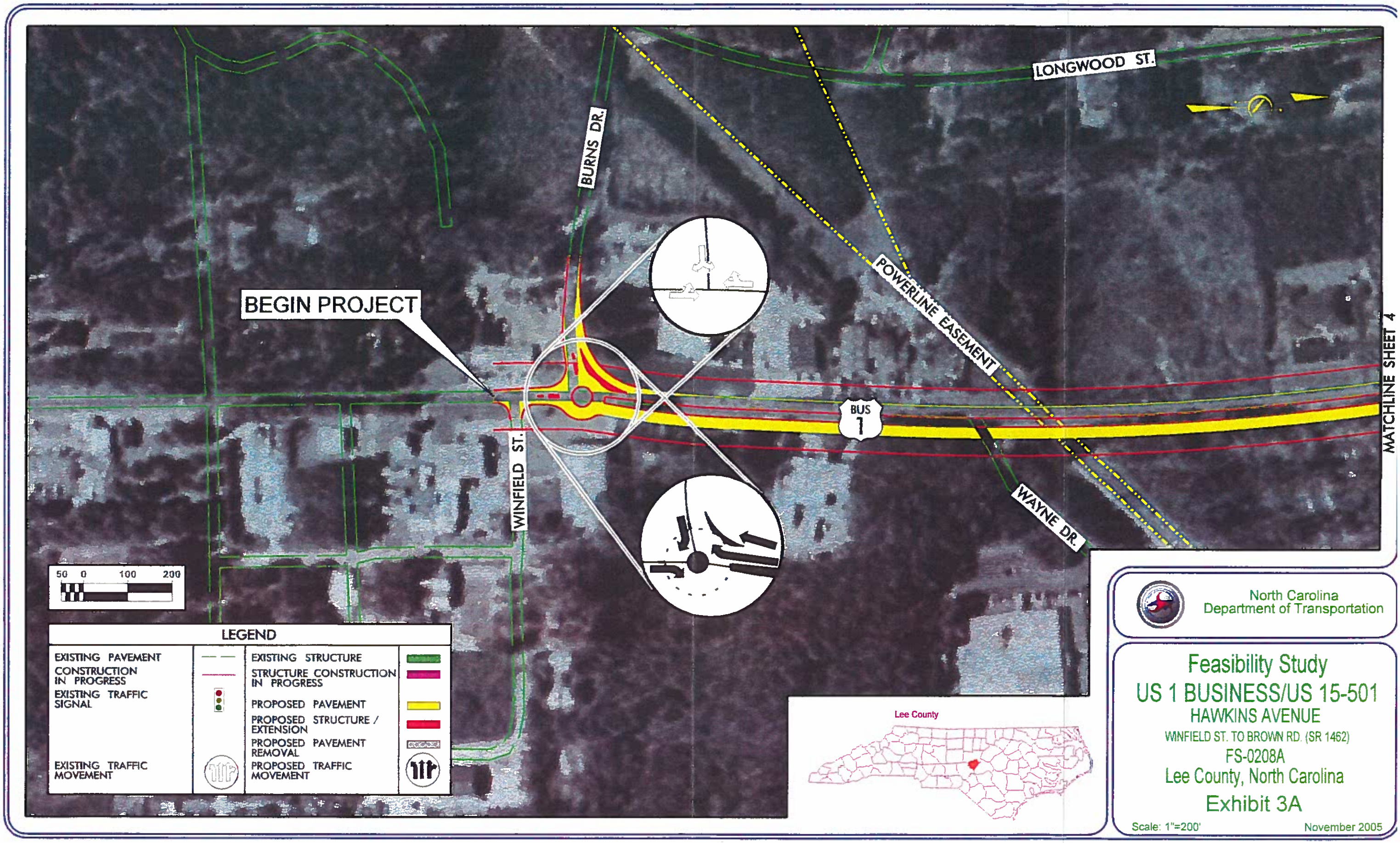
Typical Sections
NTS
Exhibit 2



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WINFIELD ST. TO BROWN RD. (SR 1462)

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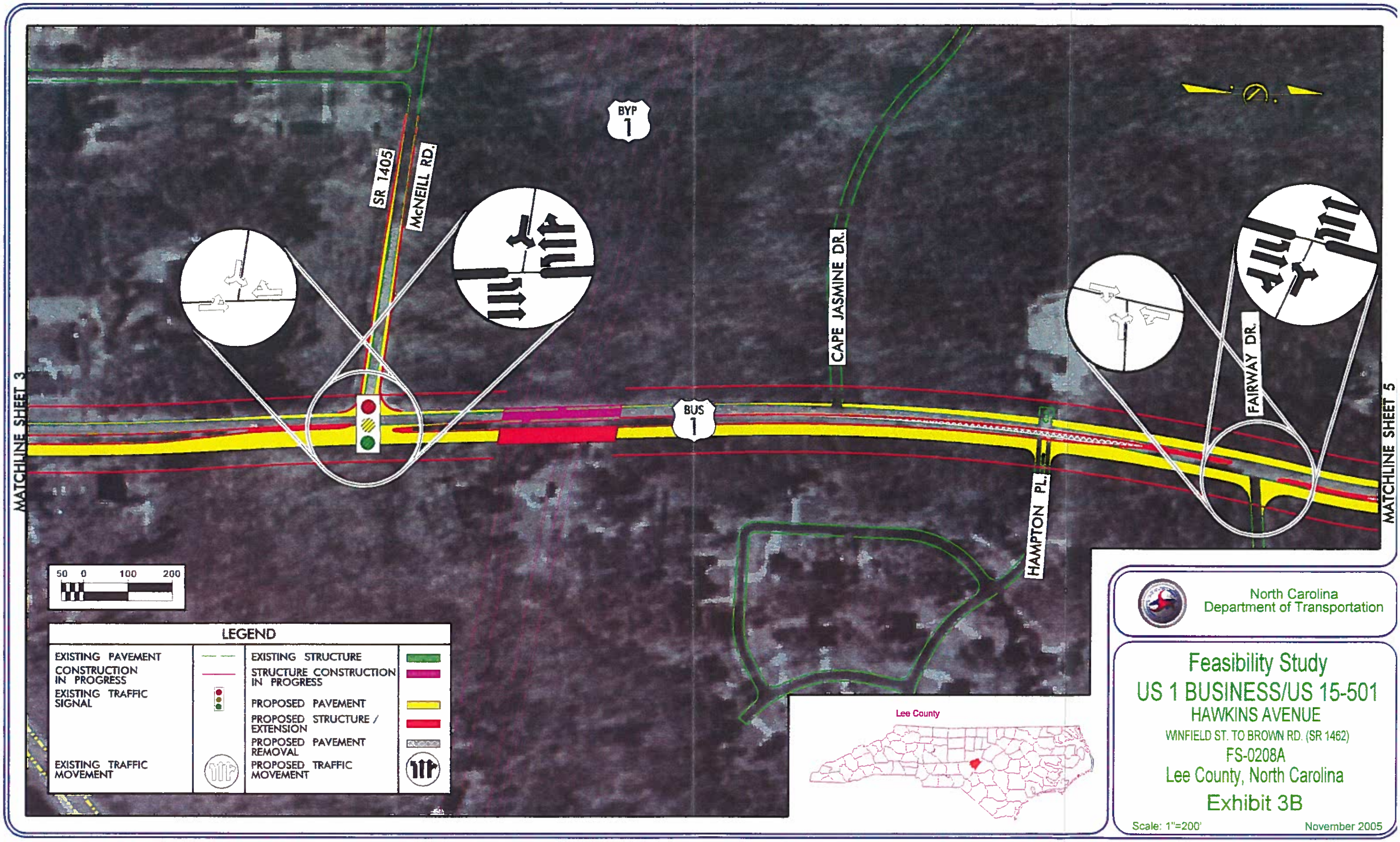
Exhibit 3A

Scale: 1"=200'

November 2005



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WINFIELD ST. TO BROWN RD. (SR 1462)
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Exhibit 3B

Scale: 1"=200'

November 2005

MATCHLINE SHEET 4

MATCHLINE SHEET 6

FAIRWAY DR.

OLDE TOWNE DR.

BUS 1

AMOS BRIDGES RD.

LEE MEMORIAL GARDENS CEMETARY

50 0 100 200

LEGEND

EXISTING PAVEMENT		EXISTING STRUCTURE	
CONSTRUCTION IN PROGRESS		STRUCTURE CONSTRUCTION IN PROGRESS	
EXISTING TRAFFIC SIGNAL		PROPOSED PAVEMENT	
		PROPOSED STRUCTURE / EXTENSION	
		PROPOSED PAVEMENT REMOVAL	
EXISTING TRAFFIC MOVEMENT		PROPOSED TRAFFIC MOVEMENT	

Lee County

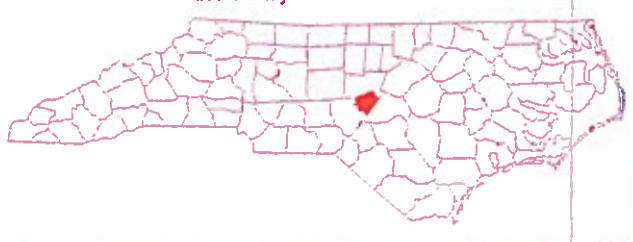

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Exhibit 3C

Scale: 1"=200'

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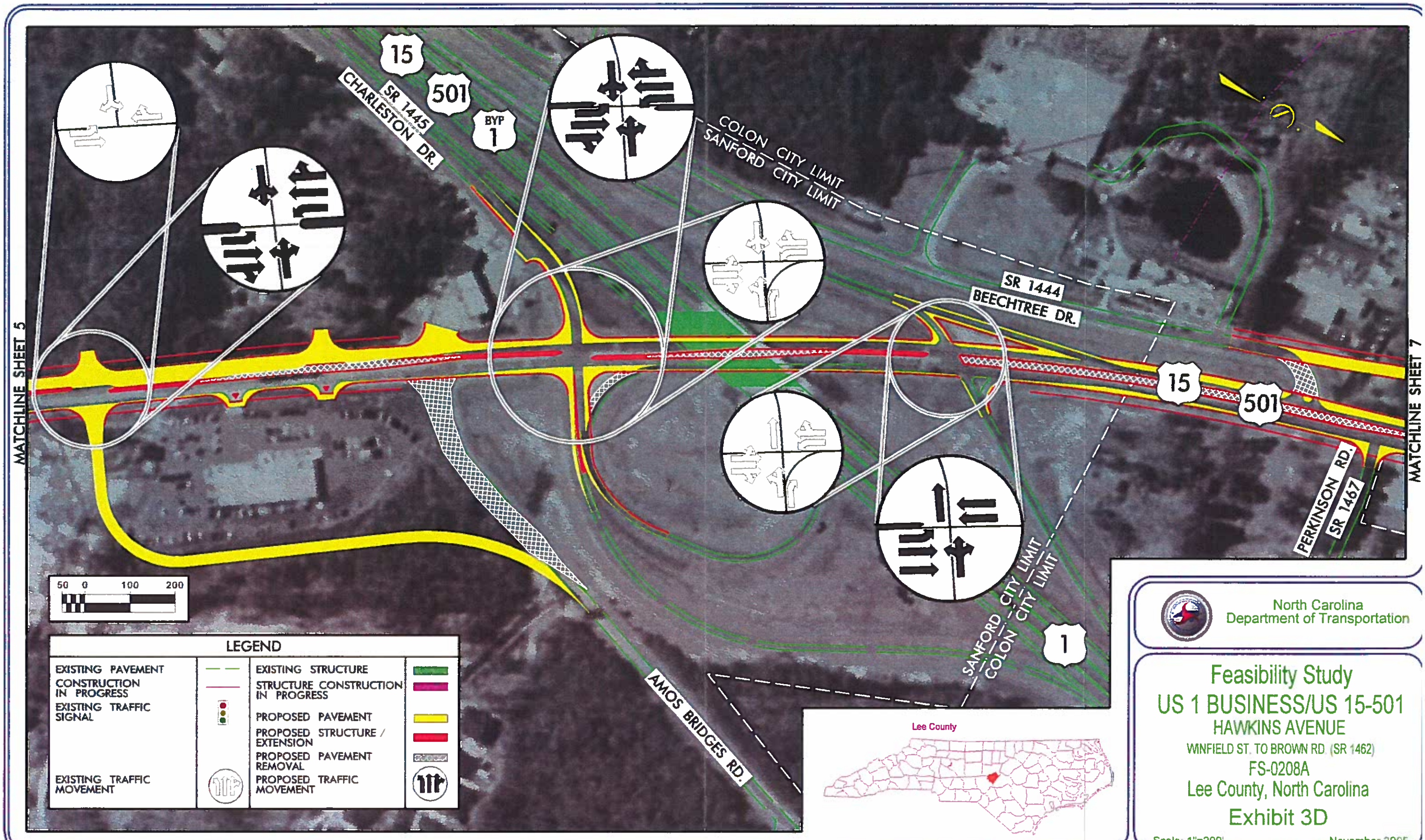

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HAWKINS AVENUE
WINFIELD ST. TO BROWN RD. (SR 1462)

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Exhibit 3D

Scale: 1"=200'

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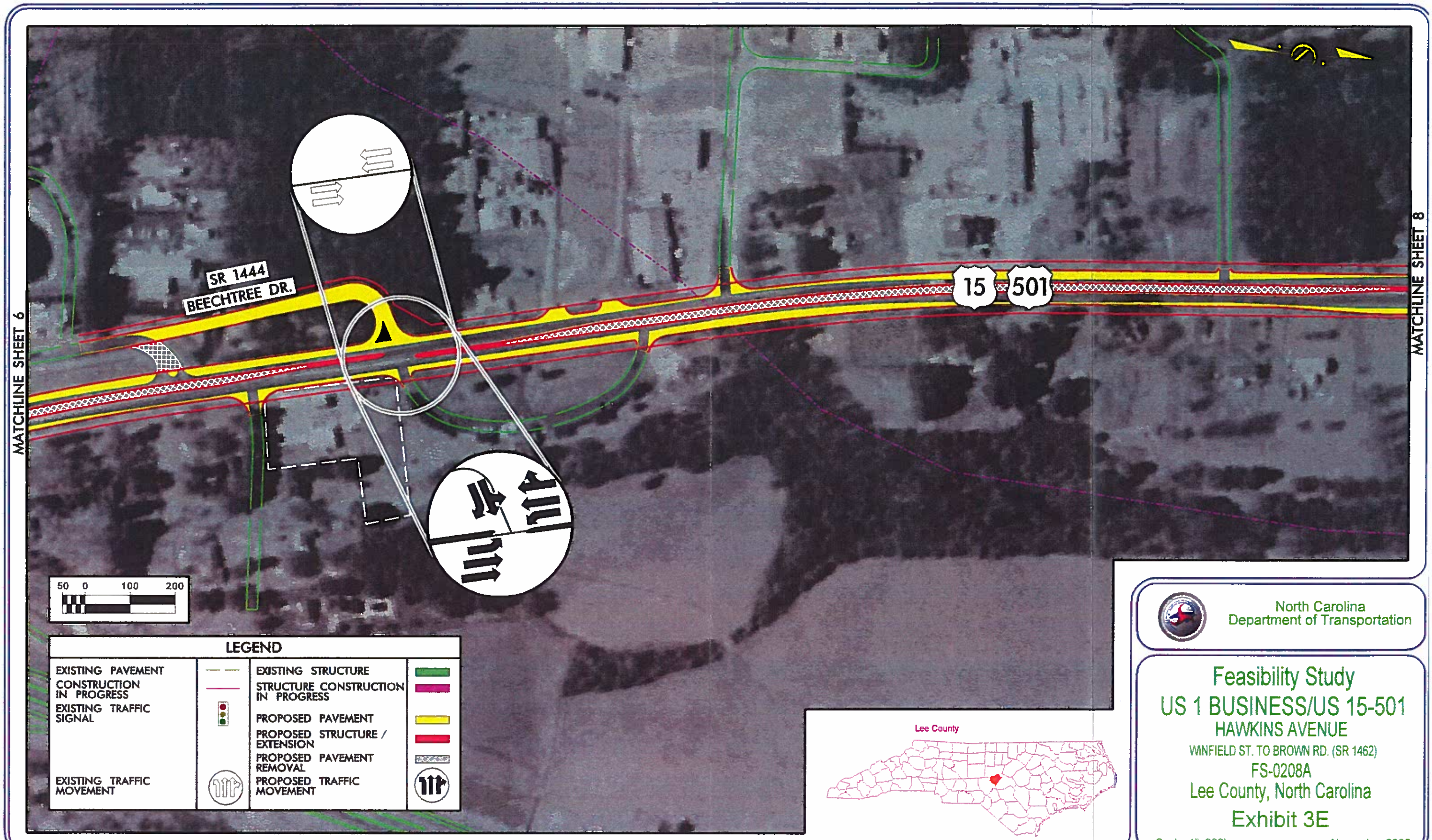

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HAWKINS AVENUE
WINFIELD ST. TO BROWN RD. (SR 1462)

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Exhibit 3E

Scale: 1"=200'

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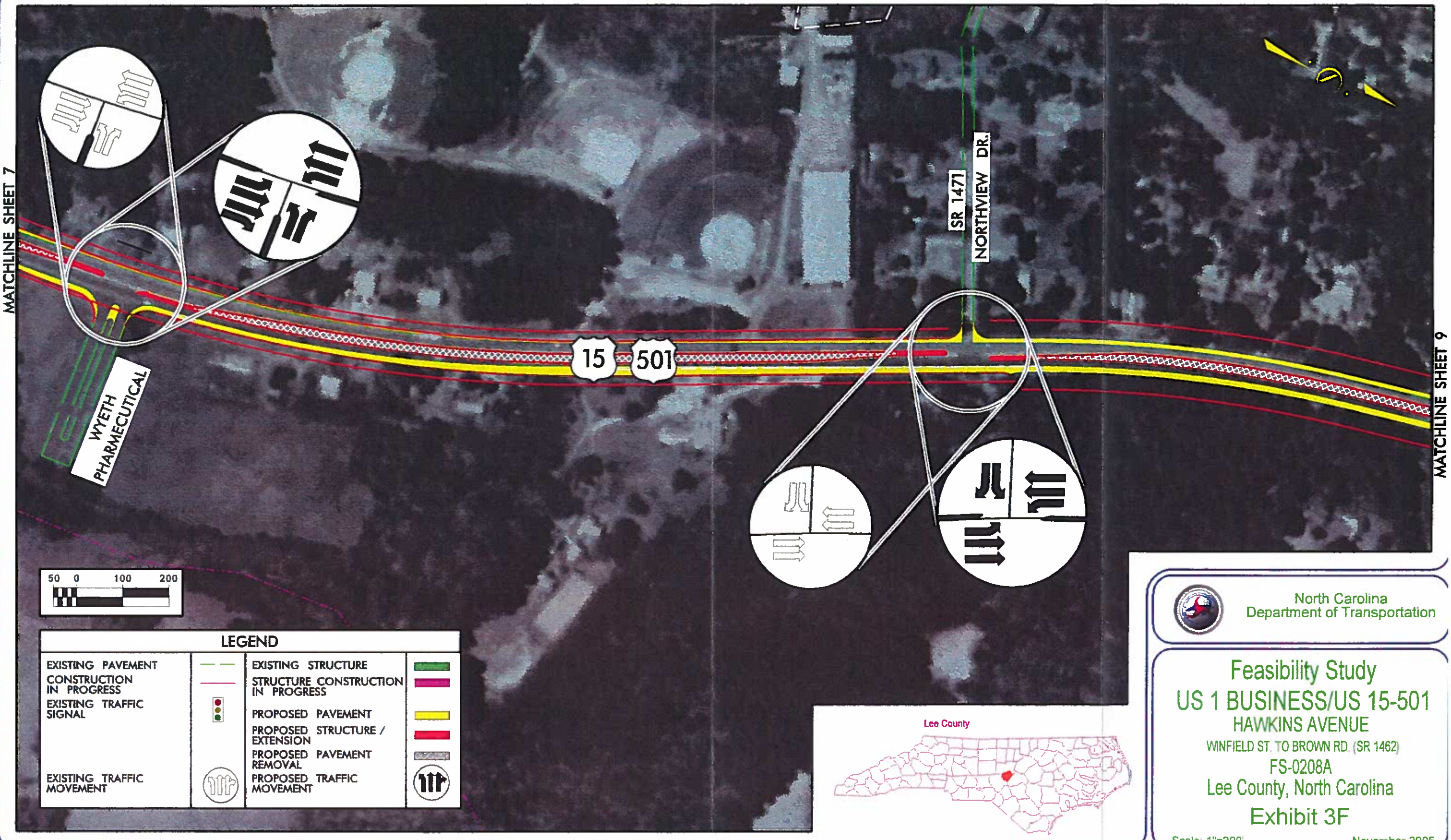

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HAWKINS AVENUE
WINFIELD ST. TO BROWN RD. (SR 1462)

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Exhibit 3F

Scale: 1"=200'

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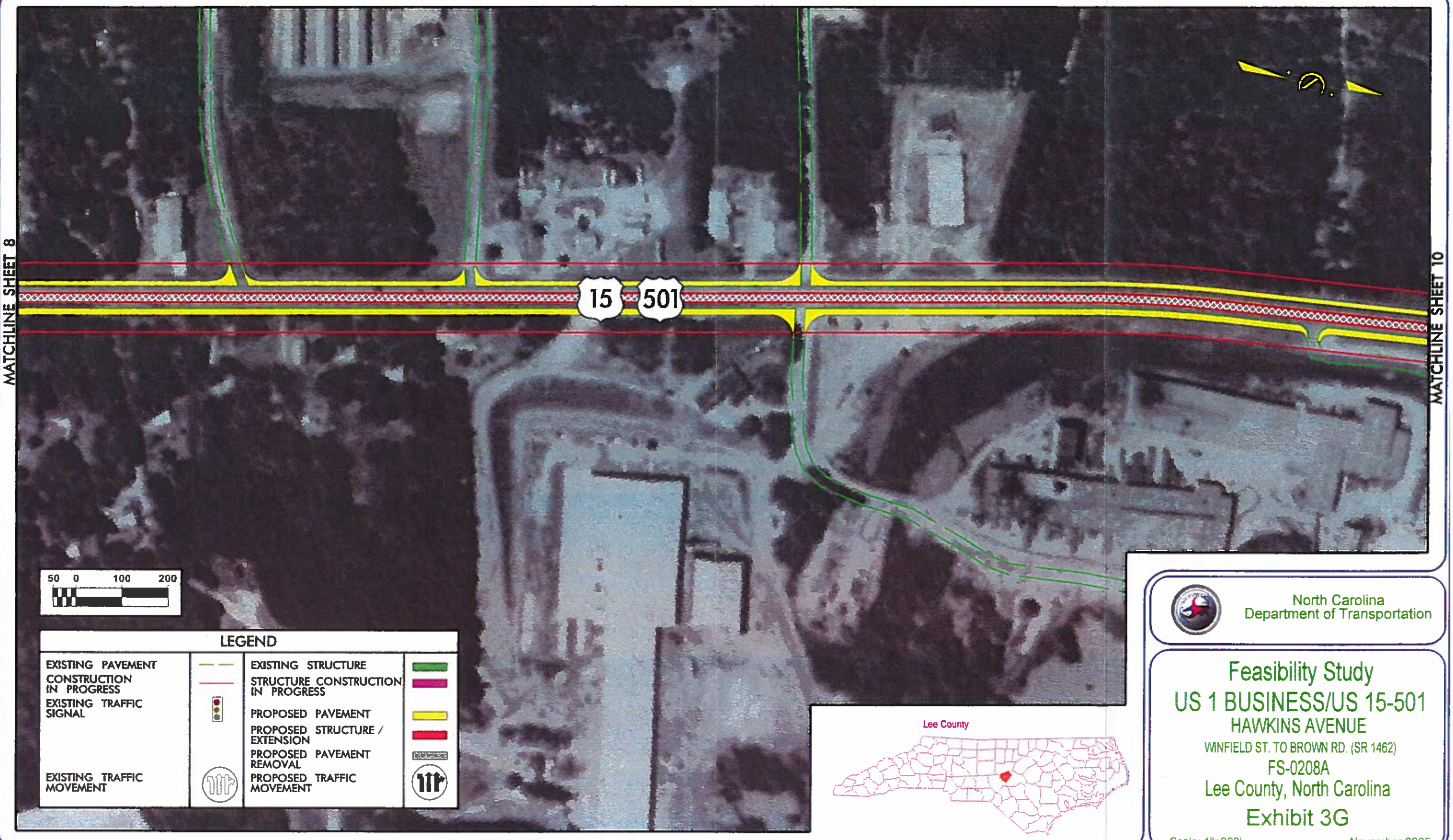

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HAWKINS AVENUE
WINFIELD ST. TO BROWN RD. (SR 1462)
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Exhibit 3G

Scale: 1"=200'
November 2005

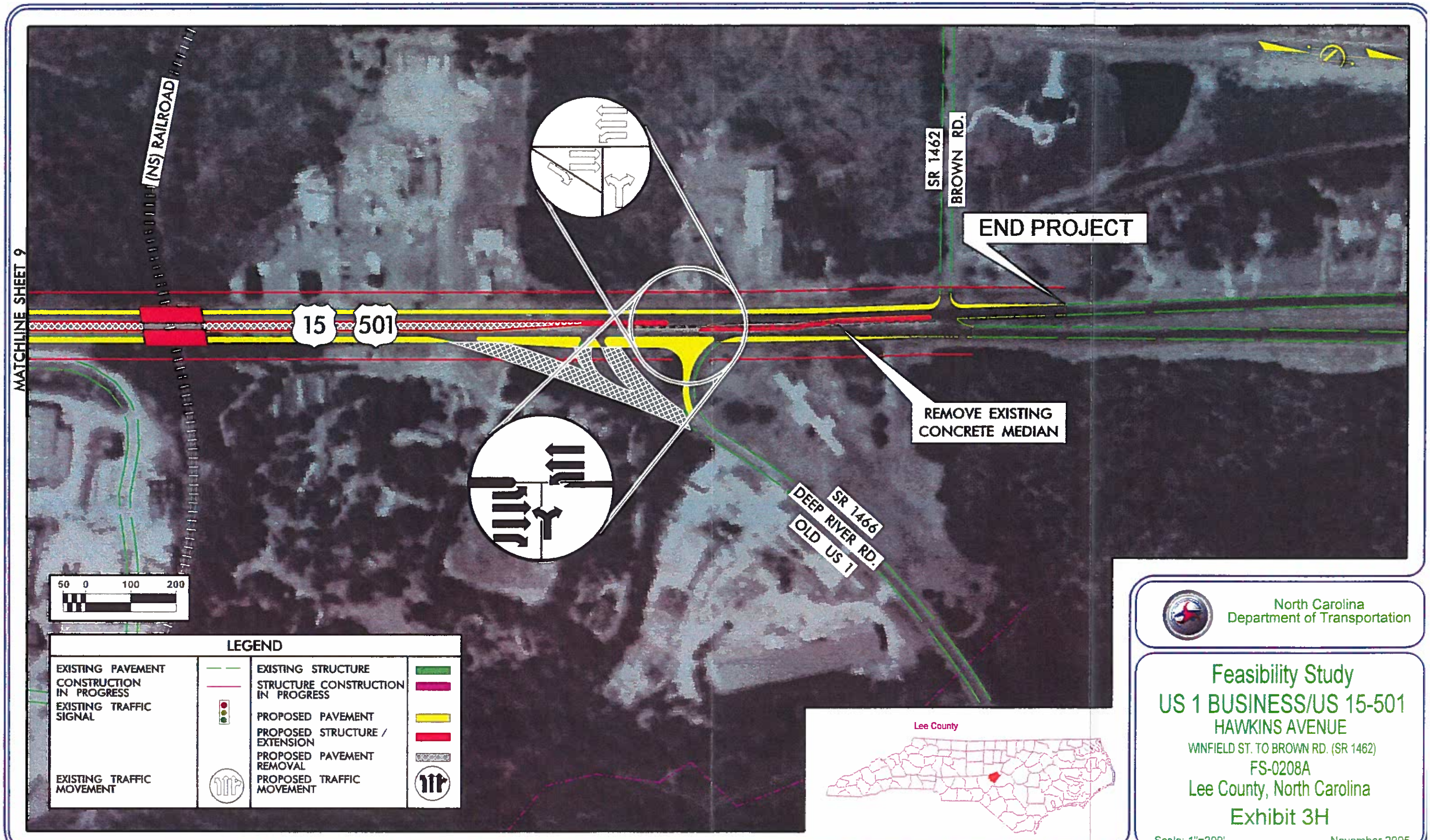

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Exhibit 3H

Scale: 1"=200'

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