FEASIBILITY STUDY

US 70
From SR 1003 (Buffalo Road) near Selma to SR 2372 (Edwards Road) in Princeton

Johnston County, Division 4
FS-1604A

Prepared for:

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1.0 INTRODUCTION

The proposed project is planned to improve the existing US 70 facility between SR 1003 (Buffalo Road) near Selma to SR 2372 (Edwards Road) in Princeton. This report evaluates upgrading the existing US 70 facility to interstate design standards considering eight interchanges and five grade separation locations and frontage road system for access. The project study area is in Johnston County between the Towns of Selma and Princeton. The purpose of the project is to improve regional mobility and provide better connectivity between Raleigh and Morehead City. This report provides an examination of the feasibility of this proposed project for the improvement alternatives.

This 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 cost and to identify potential problems that may require consideration in the planning and design phases. Once a candidate project is identified for funding in the STIP, the Feasibility Study is followed by a rigorous planning and design process that meets the requirements of the National Environmental Policy Act (NEPA), where either an Environmental Impact Statement (EIS) or an Environmental Assessment (EA) is done.

1.1 BACKGROUND

US 70 is an important regional facility in the eastern part of North Carolina as it serves to connect many municipalities of all sizes including Raleigh, Goldsboro, New Bern and Morehead City. There are a number of improvement projects along the US 70 corridor between Raleigh and Morehead City in various stages of planning, construction and completion. The US 70 Corridor Commission was formed to provide a central location for the multiple US 70 projects to be discussed and provide ongoing updates to planning studies and construction schedules. The intent of the US 70 Corridor Commission is "to partner with local, regional and state government agencies to effectively support initiatives enhancing safety, mobility and economic vitality along the Highway 70 corridor through land use planning, transportation improvement and economic development strategies."

1.2 STUDY AREA

The scope of the study area for this project includes approximately 1,000 feet on either side of existing US 70 and extends approximately 1.6 miles from Buffalo Road on the western end, to SR 2815 (Turnage Road/Bear Farm Road) and approximately 1,000 feet from Edwards Road on the eastern end so as to include an area large enough for all potential improvement solutions.

The study area widens variably near the I-95 interchange and extends along I-95 approximately 2 miles north and 2.5 miles south from the I-95/US 70 interchange (Figure 1-1).

The study area also includes existing intersections along US 70, grade separation locations and frontage road system for access considerations. These intersections are included as part of the traffic capacity evaluation to determine the impact that a freeway facility may have on the existing infrastructure.

The following are the major intersections included in the study area, as shown in Figure 1-1:

- US 70 and SR 1003 (Buffalo Road)
- US 70 and I-95
- US 70 Bypass and I-95
- US 70 and US 70 Business/SR 2308 (Peedin Road Extension)
- US 70 and SR 2310 (Davis Mill Road)
- US 70 and SR 2312 (Country Store Road)/SR 2519 (Braswell Road)
- US 70 and US 70 Alt
- US 70 and SR 1002 (Rains Mill Road)
- US 70 and SR 2372 (Edwards Road)
- SR 2305 (Firetower Road)
- SR 2309 (Creech's Mill Road)
- SR 2556 (Dr. Donnie H. Jones Jr. Boulevard)
- SR 2316 (Old Rock Quarry Road/Barden Street)

These locations were evaluated for upgrade or alternation to support the interstate design. Some are proposed for interchange locations and/or grade separations, while others will not access US 70, but will be serviced by a frontage road system.

Figure 1-1 Project Study Area

1.3 PROJECT ALTERNATIVES

This study analyzed various base year and future year scenarios. These scenarios are based on multiple design alternatives and present traffic projections for each condition, as described below.

- **Base Year (2016) – No-Build:** This scenario represents existing roadway conditions and accounts for base year volumes.
- **Base Year (2016) – Improve Existing Alternative:** This scenario includes upgrading the existing facility to interstate design standards considering eight interchange locations, five grade separation locations and frontage road systems for access; it accounts for base year volumes.
- **Base Year (2016) – US70/US 70 Bypass/I-95 System Interchange:** This scenario includes a new location, fully directional interchange between US 70 and I-95; it accounts for base year volumes.
- **Design Year (2040) – No-Build:** This scenario projects the traffic conditions along the study corridor with forecasted volumes; future roadway conditions excluding the proposed project are reflected.
- **Design Year (2040) – Improve Existing Alternative:** This scenario includes upgrading the existing facility, primarily on existing location with the exception of the US 70/I-95 interchange system, which is proposed to shift to the east. There are two options for the US 70 alignment in the Princeton area (A and B).
    - Option A includes an interchange with US 70 Alternate at SR 2556 (Dr. Donnie H. Jones Jr. Boulevard). Under this Option, US 70 would remain at grade, on existing alignment, with grade separations taking SR 2316 (Old Rock Quarry Road/Barden Street and SR 1002 (Rains Mill Road) over US 70.
    - Option B includes an interchange with US 70 Alternate near its existing location, west of SR 2556 (Dr. Donnie H. Jones Jr. Boulevard). In this Option, a frontage road would connect the interchange to SR 2556 (Dr. Donnie H. Jones Jr. Boulevard). To minimize right-of-way impacts along US 70, the mainline would be elevated and shifted slightly to the north with grade separations taking US 70 over SR 2316 (Old Rock Quarry Road/Barden Street and SR 1002 (Rains Mill Road).
    - In both Options, there are proposed improvements to Ginger Drive/Boon Hill Drive to improve access to SR 2316 (Old Rock Quarry Road).
- **Design Year (2040) – Upgrade Existing Shoulders Alternative:** This scenario includes only the improvements needed to upgrade the existing shoulders along US 70 such that the corridor can be designated as an interstate. Improvements include upgrading shoulders from the project start, just east of SR 2815 (Bear Farm Road) to west of SR 2309 (Creech's Mill Road/Peedin Road). Also included in this alternative are the improvements

required for a grade separation at SR 2305 (Fire Tower Road) and at SR 2309 (Creech's Mill Road/Peedin Road).

2.0 EXISTING CONDITIONS

2.1 EXISTING ROADWAY AND TRAFFIC CONDITIONS

2.1.1 Existing Roadway

Based on the functional class assigned by the North Carolina Department of Transportation (NCDOT), US 70 is classified as "Other Principal Arterial." It provides connectivity between Raleigh and Morehead City as well as regional mobility in the Goldsboro area. It is a median divided, four-lane highway with grassy median and exclusive turn lanes present at major intersections.

2.1.2 Existing Traffic

The traffic volumes utilized in the traffic capacity analysis were taken from the forecasts completed by NCDOT in September 2016 for purpose and use in this report. A forecast from August 2015 for a previously delivered project, U-5795A was also applicable. A portion of that forecast was directly applicable to this project, therefore used in this report. The volumes utilized for the existing conditions analysis are derived from the Base Year (2016) volumes provided in the September 2016 forecast.

The 2016 daily volumes vary within the study area from between 7,400 – 20,900 vehicles per day (vpd) between the US 70 Bypass intersections on the western end of the US 70 project corridor to 17,900 – 26,000 vpd at the eastern end of the US 70 project corridor after the US 70 Bypass intersection. Side streets within the study area are relatively minor in volume, and range from 200 – 8,000 vpd with the exception of S. Pollack Street which has daily volumes of 13,300 – 23,400 vpd.

Because traffic capacity and congestion are not the driving force behind the need for this project, and projected traffic volumes are within the ranges of generally acceptable operations for four-lane interstate facilities, a formal peak hour capacity analysis was not completed. Interchange ramp intersection designs were based on standard turning lane width and tapers for low volume roadways.

2.2 ENVIRONMENTAL FEATURES

An environmental screening was completed for the project study area utilizing existing GIS resources. This screening analysis indicated areas of possible environmental concern, including stream and wetland areas, protected species, historic resources, and locations of active and

inactive hazardous material sites. These data were obtained from a variety of sources including the GIS sources listed below:

- Johnston County GIS
- NC Center for Geographic Information and Analysis – NC One Map Geospatial Portal
- NC Conservation Planning Tool (CPT)
- NC Flood Risk Information System
- NC Department of Cultural Resources – State Historic Preservation Office (NCSHPO)
- NCDEQ Division of Water Resources (DWR)
- NCDEQ Division of Coastal Management (DCM)
- NCDEQ-Division of Waste Management (DWM)
- NCDOT GIS Unit
- NC Natural Heritage Program (NHP)
- NC Wildlife Resources Commission (WRC)
- US Fish and Wildlife Services (USFWS)
- US National Park Service

Figure 2-1 illustrates the known environmental features present within the project study area as indicated by the environmental screening process.

2.2.1 Historic and Cultural Resources

There are no properties located in the study area that are currently listed on the National Register of Historic Places (NRHP). However, the Smithfield Fire Lookout Tower was determined eligible for the NRHP in 2017 and is located on the west side of SR 2305 (Fire Tower Road), north of US 70. While this property falls within the study area, the project as evaluated in this report is not expected to have a direct impact to this resource.

Additionally, two surveyed houses are located near the US 70 project study area, the Howard Oliver House and the Waverly H. Edwards House, but the project as evaluated in this report is not expected to have a direct impact to these potential resources.

2.2.2 Streams, Wetlands, and Flood Plains

The Division of Water Resources (DWR), a subset of the NC Department of the Environment Quality, is responsible for the protection, classification and enhancement of all streams and water bodies within North Carolina. The project study area is located within the Neuse River Basin of North Carolina. The Neuse River Basin is divided into four sections: The Upper, Middle and

Figure 2-1 Environmental Features

Lower Neuse, and Contentnea Creek sub basins. The project study area lies in the Upper Neuse sub basin. There are five named streams that drain water from the study area. Only Moccosin Creek is classified as impaired as of the 2014 Final 303(d) list. Four streams are classified as Class C waters protected for secondary recreation and one stream is classified as WS-IV waters used as a drinking water supply and are found in moderately to highly developed watersheds. All streams are nutrient sensitive waters (NSW):

- Mill Creek (WS-IV; NSW) – Walnut Creek watershed
- Buffalo Creek (C; NSW) – Walnut Creek watershed
- Bawdy Swamp (C; NSW) – Moccasin Creek watershed
- Quicosin Swamp (C; NSW) – Moccasin Creek watershed
- Moccosin Creek (C; NSW) – Moccasin Creek watershed

According to DWR datasets there several stream crossings throughout the project study area along US 70 and on secondary roads. Four stream crossings of US 70 are within the project limits. Mill Creek crosses US 70 through a culvert at the western end of the project study area near the intersection with Buffalo Road (SR 1003). Bawdy Swamp crosses US 70 through a culvert near the US 70 Business intersection. Quicosin Swamp crosses US 70 just east of Davis Mill Road. This crossing is not included in the NCDOT inventory but is visible on aerial imagery. Just west of Pondfield Road (SR 2314) are two bridges along US 70 that cross Moccasin Creek (Holts Pond), one on westbound and one on eastbound US 70.

Johnston is a Coastal Plain county of North Carolina and is included within the Division of Coastal Management's wetland dataset collection (NC-CREWS). Available wetland GIS datasets include numerous wetland features located within the project study area, including features along the existing roadway. A higher density of wetlands is located between Buffalo Road in Selma and Peedin Road. The existing US 70 roadway crosses several wetland features, with some being in the same area as stream crossings.

There are areas of designated 100-year and 500-year floodplain within the project study area, along Moccasin Creek. Additionally, areas of designated 100-year floodplains are present along Bawdy Swamp and Mill Creek within the project study area.

2.2.3 Water Supply Watersheds and Public Water Sources

The project study area lies between three public supply watersheds with intakes located downstream from the project study area on the Neuse River. Each is classified as protected water supply watersheds (WS-IV NSW). These watersheds are the Neuse River (Smithfield) to the north and both Neuse River (Goldsboro) and Little River, to the south. These watersheds flow into the Neuse River. One ground water well, Smithfield Moose Lodge, is located within the project study

area along the US 70 service road near I-95. There are also various Ground Water Community wells adjacent to the US 70 corridor study area in the Town of Selma. There are no other groundwater sources that will be affected in the study area.

2.2.4 Protected Species

The United States Fish and Wildlife (USFWS) lists federally protected species for Johnston County (Table 2-1). Four species are protected under the Endangered Species Act (ESA) and are listed as either threatened or endangered. Species listed as endangered, E, are in danger of extinction throughout all or a significant portion of its range. The bald eagle was delisted from the Endangered Species Act in August 2007 but is still protected under the Bald and Golden Eagle Protection Act. There are several federal species of concern (FSC) listed for Johnston County by the USFWS. These species are not protected by the ESA, but appear to be in decline or otherwise in need of conservation and are under consideration for listing or currently, there is insufficient information to support the listing.

Table 2-1
Federally Protected Species Listed for Johnston County

	Scientific Name	Common Name	Federal Status
Vertebrate:			
	Anguilla rostrata	American eel	FSC
	Haliaeetus leucocephalus	Bald eagle	BGPA
	Noturus furiosus	Carolina madtom	FSC
	Dendroica cerulea	Cerulean warbler	FSC
	Lythrurus matutinus	Pinewoods shiner	FSC
	Picoides borealis	Red-cockaded woodpecker	E
	Ambloplites cavifrons	Roanoke bass	FSC
Invertebrate:			
	Fusconaia masoni	Atlantic pigtoe	FSC
	Alasmidonta heterodon	Dwarf wedgemussel	E
	Lasmigona subviridis	Green floater	FSC
	Parvaspina steinstansana	Tar River spinymussel	E
	Lampsilis cariosa	Yellow lampmussel	FSC
	Elliptio lanceolata	Yellow lance	P
Vascular Plant:			
	Lindera subcoriacea	Bog spicebush	FSC
	Macbridea caroliniana	Carolina bogmint	FSC
	Rhus michauxii	Michaux's sumac	E

	Solidago verna	Spring-flowering goldenrod	FSC
	Trillium pusillum var. *virginianum*	Virginia least trillium	FSC

FSC= Federal Species of Concern
E = Endangered
P = Proposed
BGPA = Bald and Golden Eagle Protection Act

While it is not expected that the project would directly impact these species, caution should be taken to protect the habitats of these species within the project study area. A formal screening of federally protected species was not completed as part of this report but should be completed during later stages of project planning and design.

2.2.5 Conservation Areas

There is one managed area within the project study area. This site is NCDOT Mitigation Site Points 051-005, STIP ID R-0084BA, and is located within the gore area of the US 70 and US 70 Business ramps. This area is a wetland that is part of the Neuse River Basin; it currently has a closed-out status. There are no dedicated nature preserves, or federally owned lands within the project study area.

2.2.6 Hazardous Materials and NPDES Sites

According to the most recently available NCDENR Division of Waste Management GIS data, there is one active hazardous material substance disposal site located within the project study area. This site is Skyware Global and is located in the Smithfield Business Park along SR 2398 (Outlet Center Drive) approximately one-half mile southwest from US 70 and is currently in compliance with all regulations.

There are two inactive hazardous waste sites, GTE Sylvania and Eaton Manufacturing. GTE Sylvania is located approximately 0.2 miles south of US 70, along US 301. Eaton Manufacturing is located approximately 1 mile north of the US 70 and I-95 interchange along East Preston Street. Eaton Manufacturing is located directly in the project study area, while GTE Sylvania is slightly outside the study area.

There are no NPDES facilities located within the project study area.

Numerous gas stations are located throughout the project study area that actively operate underground storage tanks. Two gas stations are located directly adjacent to US 70, a BP at Peedin Road intersection and a Citgo at Country Store Road. However, there is no current

indication that these tanks pose an environmental threat nor are they expected to be impacted by the proposed project.

2.2.7 Animal Operations

There are no animal farm operations located within the project study area.

2.2.8 Community Resources

There are six identified churches located within the project study area. Only two churches, Hephzibah Baptist Church and Princeton Church of God are located adjacent to US 70; however, the proposed project is not expected to directly impact any of the church buildings or result in any significant acquisition of the church properties. There are two identified cemeteries within the project study area; both are in Selma with one located off W Noble St and the other adjacent to S Pollock St and US 70. Various schools have been identified, however, none of these schools are within the study area of the project. One fire department in Princeton has been identified as being in the project vicinity, however it is not within the project study area. There are no hospitals, golf courses or community parks within the project study area.

2.3 CRASH ANALYSIS

The crash analysis was derived from five years of available collision data obtained from the NCDOT Safety Planning Group. The data covered the period from June 1, 2011 to May 31, 2016. The summary includes collisions that were reported along the 12-mile stretch of US 70 from Buffalo Road (SR 1003) to Edwards Road (SR 2372) in Johnston County.

The main type of collision in the study area was fixed object collisions, which constituted 22 percent of the overall collisions during the study period; rear-end, side-swipe, angle, and animal collisions were also common, composing 18 percent, 12 percent, 12 percent, and 10 percent of the total collisions in the area, respectively. Table 2-2 summarizes severity of crashes and Table 2-3 shows crash totals by location in the study area.

The Safety Planning Group provides calculated rates for facility types based on data collected statewide. For comparison purposes, the analyzed corridor is classified as a Rural US Route with 4 or more lanes (divided, no access control). As shown in Table 2-4, the crash rates for the facility are higher than the statewide averages for similar facilities across the state, except in the category of fatalities and wet crashes. The total crash rate is only slightly higher than similar facilities across the state, while the Non-Fatal Injury and Night crash rates are notably higher than similar facilities.

Table 2-2
Crash Severity and Totals

Intersection	Fatal	Injury	PDO	Total
Buffalo Rd	0	0	1	**1**
Between Intersections	0	3	15	**18**
70 Bypass (diverge)	0	1	4	**5**
Between Intersections	0	9	43	**52**
70 Bypass (merge)	0	0	1	**1**
Between Intersections	0	3	9	**12**
Firetower Rd	0	4	5	**9**
Between Intersections	0	9	18	**27**
US 70 Bus / Peedin Exd / SR 2307	1	18	19	**38**
Between Intersections	0	10	16	**26**
Peedin Rd	0	14	10	**24**
Between Intersections	0	6	20	**26**
Davis Mill Rd	0	8	3	**11**
Between Intersections	0	6	18	**24**
Braswell Rd / Country Store Rd	0	9	10	**19**
Between Intersections	0	3	12	**15**
Wc Braswell Rd	0	1	0	**1**
Between Intersections	0	1	0	**1**
Howell Rd	0	1	1	**2**
Between Intersections	0	4	2	**6**
Lisa Dr	0	0	1	**1**
Between Intersections	0	0	14	**14**
Martin Livestock Rd	0	6	2	**8**
Between Intersections	0	3	17	**20**
Pondfield Rd	0	2	2	**4**
Between Intersections	0	2	0	**2**
W Edwards St / US 70 Alt	0	4	9	**13**
Between Intersections	0	1	8	**9**
New Barbour Rd / DDH Jones Jr Blvd	0	1	1	**2**
Between Intersections	0	0	2	**2**
Old Rock Quarry Rd	0	0	3	**3**
Between Intersections	0	2	6	**8**
N Pine St / Rains Mill Rd	0	14	15	**29**
Between Intersections	0	3	3	**6**
Edwards Rd / N Pearl St	0	5	6	**11**
Totals	*1*	*153*	*296*	*450*

Table 2-3
Crash Totals by Location

Intersection	Total
Buffalo Rd	**1**
Between Intersections	**18**
70 Bypass (diverge)	**5**
Between Intersections	**52**
70 Bypass (merge)	**1**
Between Intersections	**12**
Firetower Rd	**9**
Between Intersections	**27**
US 70 Bus / Peedin Exd / SR 2307	**38**
Between Intersections	**26**
Peedin Rd	**24**
Between Intersections	**26**
Davis Mill Rd	**11**
Between Intersections	**24**
Braswell Rd / Country Store Rd	**19**
Between Intersections	**15**
Wc Braswell Rd	**1**
Between Intersections	**1**
Howell Rd	**2**
Between Intersections	**6**
Lisa Dr	**1**
Between Intersections	**14**
Martin Livestock Rd	**8**
Between Intersections	**20**
Pondfield Rd	**4**
Between Intersections	**2**
W Edwards St / US 70 Alt	**13**
Between Intersections	**9**
New Barbour Rd / DDH Jones Jr Blvd	**2**
Between Intersections	**2**
Old Rock Quarry Rd	**3**
Between Intersections	**8**
N Pine St / Rains Mill Rd	**29**
Between Intersections	**6**
Edwards Rd / N Pearl St	**11**
Total	*450*

Table 2-4

Crash Rate* Comparison of Study Area to Statewide Averages

Rural US Routes	Total Crash Rate	Fatal Crash Rate	Non-Fatal Injury Crash Rate	Night Crash Rate	Wet Crash Rate
US 70	92.82	0.21	31.56	29.91	17.12
4+ Lanes (Divided, No Access Control)	87.01	0.76	24.42	15.33	32.38
Exceeds Statewide Average?	*Y*	*N*	*Y*	*Y*	*N*

**All crash rates per 100 Million Vehicle Miles Traveled (VMT)*

3.0 BACKGROUND TRANSPORTATION AND LAND USE PLANS

This section presents an overview of published and adopted transportation and land use plans that include the project study area. A review of these plans builds the framework for the project need and gives insight into the history of the vision for the proposed project.

3.1 TRANSPORTATION PLANS

A review of existing transportation plans that influence the future of the US 70 corridor was completed; each document and recommendations pertinent to the project study area are summarized below.

3.1.1 NCDOT State Transportation Improvement Plan

The North Carolina Department of Transportation (NCDOT) has established a multi-year schedule for all its transportation projects called the State Transportation Improvement Program (STIP). This project is not listed in the currently adopted 2018-2027 STIP (August 2017).

3.1.2 North Carolina Transportation Network and Strategic Transportation Corridors Framework

The most recent *North Carolina Transportation Network and Strategic Transportation Corridors Framework* was published in August 2015. The report identifies transportation system links and nodes that are considered critical for achieving the state's Strategic Transportation Corridor (STC) goals of system connectivity, mobility (including multimodal facilities), and economic prosperity (i.e. access to activity centers). These facilities, which are grouped into corridors, are intended to facilitate the movement of high volumes of people and goods over long distances. Maintenance and improvement of these corridors is given high priority by NCDOT. The stretch of US 70 between I-440 in Wake County and the Morehead City Port is listed as a STC corridor, specifically corridor P (US 70E / NCRR). The report recommends upgrading US-70 to freeway standards and making safety improvements through rural sections that currently have uncontrolled access.

3.1.3 Johnston County Comprehensive Transportation Plan

Johnston County's *Comprehensive Transportation Plan* (CTP) was published in December 2014 and most recently revised in September 2015. The document provides recommendations for improving highway, rail, public transit, bicycle, and pedestrian transportation networks through the year 2035, and a number of these recommendations impact the FS-1604A study corridor. Between the bypass merge in Selma and the Wayne County line, the plan recommends converting

US 70 to a 4-lane continuous freeway; constructing interchanges near where US 70-Business and US 70 merge and near the intersection of US 70 and Stevens Chapel Hill Rd.; and implementing the state's plan for safety improvements to US 70 near Pine Level (STIP project W-5107).

3.1.4 Thoroughfare Plan Report for the Town of Princeton

The *Thoroughfare Plan Report* for the Town of Princeton was published in January 1999. The document evaluates the need for constructing new or improving existing transportation facilities within the Town, based on projected future traffic volumes and development patterns through 2025. The plan recommends that US 70 be widened to six lanes and have controlled access (access via interchanges only). It also notes that there will be commercial development (a grocery store and strip mall shops) at the eastern terminus of the FS-1604A study corridor.

3.1.5 Resolution in Support for a Feasibility Study to Improve US 70 from I-95 to the Wayne County Line in Johnston County, NC

In January 2016, the Upper Coastal Plain Rural Planning Organization (UCPRPO) Transportation Advisory Committee endorsed upgrading the US 70 corridor to interstate standards and called upon the state to undertake a project feasibility study for improving the segment between I-95 and the Wayne County Line. The UCPRPO believes the upgrading of US 70 will improve mobility and safety for its users and promote economic development for surrounding communities. The project is also perceived to be aligned with the intentions of the federal Fixing America's Surface Transportation Act.

3.1.6 US 70 Access Management Study

The *US 70 Access Management Study*, published in July 2005, examines the US 70 corridor between Clayton and Morehead City. The report makes recommendations that further the aims of the state's Strategic Transportation Corridors vision, particularly with regard to reducing travel time and enhancing safety for motorists using US 70 to access regional destinations. A couple of the priority segments identified in the document coincide with the FS-1604A study corridor, namely: the corridor between Peedin Rd Ext and Davis Mill Rd (with particular attention to safety issues at the Peedin Rd intersection), and the corridor between Old Rock Quarry Rd and N Pearl St/Edwards Rd in Princeton (with particular attention to safety issues at the Pearl St intersection). The report's recommendations include numerous mainline directional crossovers and median closures, some signal removals, and an array of other intersection improvements.

3.2 LAND USE AND ZONING

3.2.1 Town of Smithfield Comprehensive Growth Management Plan

Smithfield's *Comprehensive Growth Management Plan* was adopted in May 2003. The document inventories existing land use patterns and establishes guidelines for future development patterns that will preserve the Town's character. The FS-1604A study corridor is not addressed in the text of the plan, but two small sections of the corridor are visible in the plan's Future Land Use Map. The surrounding land uses have been designated as open space and low density residential, with small pockets of conservation districts or wetlands.

3.2.2 Town of Selma Land Use Plan

The *Town of Selma Land Use Plan*, adopted in October 2009, lays out policies to guide future development in the Town through 2030. The plan is intended to be supported by the area's transportation network and associated planning efforts. The Town aims to achieve a gradient of land uses along the FS-1604A study corridor, the general pattern being: industrial uses in the north (Buffalo Rd to just north of Pollock St), commercial uses along most of the US 70 Bypass, and residential uses south of the US 70 Bypass and east of Yelverton Grove Rd. The commercial stretch of the corridor is expected to pass through parts of two distinct activity centers, one along S Pollock St and the other surrounding the US 70 / I-95 interchange (Exit 97).

3.2.3 Johnston County 2030 Comprehensive Plan

The *Johnston County 2030 Comprehensive Plan*, adopted in 2009, establishes a framework for decision-making about growth management in the county. The plan states that a median barrier will be installed along the northern half of the FS-1604A study corridor. The document also projects that the Clayton Bypass will stimulate development in Wilson's Mills and east along the study corridor. The County favors concentrating development there, as the area has a supply of available and suitable land, pre-existing development (residential and non-residential), and good connectivity with the Raleigh-Durham-RTP area. The County's Land Use Plan (map update, March 2009) indicates that most of the land lying along the FS-1604A study corridor and within the County's planning jurisdiction is designated as a primary growth area, with the exception of a small stretch of land (south of US 70, between New King Rd and Lisa Dr), which is designated as an agricultural / rural conservation area. Where US 70 Business and US 70 merge, the County anticipates there being a Community Commercial Activity Center that could include grocery stores. Further east along the study corridor, near Steven's Chapel Rd, there will be a Neighborhood Commercial Activity Center with smaller businesses like convenience stores.

3.3 OTHER STIP PROJECTS

3.3.1 W-5107

Safety improvements on US 70 from SR 2305 (Firetower Road) to east of SR 2310 (Davis Mill Road/Stevens Chapel Road). Total length of the project is 2.7 miles. Interchanges at SR 2308 (Peedin Road Extension) and SR 2310 (Davis Mill Road) will be improved, and median breaks will be closed. This project is currently under construction and will have a total cost of $25.7 million.

3.3.2 I-5786, I-5784 and I-3318

I-3318 is an interstate project on I-95, spanning a total length of 10.2 miles, from US 70 (exit 97) to US 301 (exit 107). This project consists of both bridge and pavement rehabilitation. Section A of this project, which spans from US 70 (exit 97) to north of SR 1001 (mile marker 100) has been completed. Replacement of bridge number 116 and approaches over Little River are currently under construction. Section BA, north of SR 1001 (mile marker 100) to US 301 (exit 107), is listed as unfunded, future years. The total cost for this project is $32.7 million. All funding for this project is from NHPIM (National Highway Performance Program Interstate Management).

I-5784 is a pavement rehabilitation project on I-95 from mile marker 84 (end of I-5803) to 0.4 mile north of US 70 bypass (mile marker 84), spanning a total of 12.5 miles. The total cost of this project is $12.6 million and was completed in September 2017.

I-5786 is a pavement rehabilitation project on I-95 from south of SR 1001 (Lizzie Mill Road) to the Johnston/Wilson county line north of NC 222. Part of this project will also include replacing bridge number 108 on SR 1001 and bridge number 111 on SR 2141 (Bizzell Grove Road). The project length is 8.5 miles with a total cost of $76.6 million. Funding for this project is from NHPIM (National Highway Performance Program Interstate Management). This project is currently under construction.

3.3.3 U-5726

Access management improvements are planned for the stretch of US 301 between Booker Dairy Road and Ricks Rd, for a total of 1.6 miles. Right of way and utilities are anticipated to start in 2023. Construction is expected to start in 2025. This project is listed in the currently adopted 2018-2027 STIP as U-5726. Total project cost is $15.1 million. Funding for this project is from the State Highway Trust Funds.

3.3.4 R-5718

Buffalo Rd, between SR 1934 (Old Beulah Rd) and US 70, will be widened to three lanes. The length of this project is 1.3 miles. Planning/design is currently in progress. Right of way and utilities are planned for 2018 and construction is anticipated to start in 2019. This project is listed in the currently adopted 2018-2027 STIP as R-5718. Total cost for this project is $7.7 million, with funding from the State Highway Trust Funds.

3.3.5 U-5795 and U-3334B

U-5795 widens Ricks Road, from US 70 to US 301, to three lanes. The total length of this project is 0.8 miles and has a total cost of $4.7 million. Right of way is currently in progress, with construction starting in 2018. Funding for this project is from the State Highway Trust Funds.

U-3334 widens SR 1923 (Booker Dairy Road Extension), between US 70 business west of Smithfield to US 301 (Bright Leaf Boulevard) in Smithfield, to multi-lanes. Section A, US 70 Business to SR 1003 (Buffalo Road) is complete. Right of way is currently in progress for Section B, SR 1003 (Buffalo Road) to US 301 (Bright Leaf Boulevard). Construction for section B is scheduled to begin in 2018. The total length of this project is 3.7 miles, with a total cost of $40.9 million. Funding for this project is through the State Highway Trust Funds.

3.3.6 I-5972

I-5972 modifies exit 95, the interchange for I-95 and US 70 Business in Smithfield. The total length of this project is 4 miles and has a total cost of $15.7 million. Right of way and utilities are planned for 2019, with construction programmed for 2020. Funding for this project is from the National Highway Performance Program.

3.3.7 R-5829

R-5829 upgrades US 70 to freeway standards, between US 70 Bypass to east of SR 2314 (Pondfield Rd). The total length of this project is 6.8 miles and has a total cost of $130.5 million. This project is split into two sections, A and B. Section A is from US 70 Bypass to west of SR 1229 (Luby Smith Rd). Right-of-way, utilities and construction are planned to start in 2023 for section A. Section B, from west of SR 1229 (Luby Smith Rd) to east of SR 2314 (Pondfield Rd) is currently unfunded, but planned for future years. Funding for this project is from the National Highway Performance Program. Section 4 of FS-1604A is included in Part B of this STIP project.

4.0 EVALUATED ALTERNATIVES

There are two build alternatives that were developed for evaluation. This section presents each alternative and describes the design criteria used to develop the conceptual designs. Plots of the conceptual designs are provided as an attachment to this report.

4.1 DESIGN CRITERIA

The design criteria for this project include upgrading the facility to a principal arterial with a 75-mph design speed and 70-mph posted speed. The proposed future right-of-way would be between 180 and 200 feet. The facility was designed with full control of access, with no sidewalks or bicycle lanes. The same design criteria, summarized in Table 4-1, applies to all alternatives.

4.2 TYPICAL SECTIONS

The proposed typical section for this project includes a 50-foot depressed grass median, two 12- foot lanes in each direction, and a 12-foot paved inner and outer shoulder. This typical section is applicable to all freeway segments of the proposed project.

4.3 DESIGN YEAR (2040) NO-BUILD

This scenario projects the traffic conditions along the study corridor with forecasted volumes; future roadway conditions excluding the proposed project are reflected. Under the No-Build Alternative, the project corridor would maintain the partial control of access it is operates under today. Major cross streets would have direct access to US 70 with full movement intersections or superstreet configurations as are present today; minor side streets and driveways would access US 70 as right-in/right-out intersections.

4.4 IMPROVE EXISTING ALTERNATIVE

Traffic volumes utilized in the traffic capacity analysis were taken from the forecasts completed by Kimley Horn and Associates for NCDOT in September 2016 for this project (Appendix A). Since the project falls primarily outside of the MPO area, the STIP is the primary source for project information. Forecasts were developed with output from the Triangle Regional Model (TRM) and the North Carolina Statewide Travel Model (NCSTM) utilizing a Horizon Year (2040) while considering future population and growth projections.

In an effort to upgrade the current US 70 facility to freeway standards from Raleigh to Morehead City, improving the facility, primarily on existing location was evaluated. The locations of proposed interchanges and grade separations were determined based on expected traffic demand and interchange spacing requirements. Two versions of interchange locations were initially evaluated; however, in an effort to maintain interchange locations currently under construction, the following locations were established as interchange locations:

- US 70 and SR 1003 (Buffalo Road)
- US 70 and I-95
- US 70 and US 70 Business/SR 2308 (Peedin Road Extension)
- US 70 and SR 2310 (Davis Mill Road)
- US 70 and SR 2312 (Country Store Road)/SR 2519 (Braswell Road)
- US 70 and US 70 Alt or SR 2556 (Dr. Donnie H. Jones Jr. Boulevard)

In addition to these interchange locations along US 70, this study incorporated designs for the purpose of cost estimations for the interchange of I-95 and SR 1927 (Pine Level Selma Road).

Table 4-1 Design Criteria

ROUTE	US 70	I-95	REFERENCE
LINE	-L-	-Y-	OR REMARKS
TRAFFIC DATA			
ADT LET YR = 2016	23,300 vpd	42,100	September 15, 2016 Traffic Forecast
ADT DESIGN YR = 2040	45,000 vpd	67,900 vpd	
TTST	8%	24%	
DUALS	5%	5%	
K (DHF)	8%	7%	
DIR	55%	55%	
CLASSIFICATION	Interstate	Interstate	
TERRAIN TYPE	Rolling	Rolling	
DESIGN SPEED km/hr or mph	75 MPH	75 MPH	
POSTED SPEED km/hr or mph	70 MPH	70 MPH	
PROP. R/W WIDTH m or ft	Variable	Variable	
CONTROL OF ACCESS	Full	Full	
RUMBLE STRIPS (Y/N)	Y	Y	
TYPICAL SECTION TYPE	4 Lane Med. Div.	6 Lane Med. Div.	
LANE WIDTH m or ft	12 ft.	12 ft.	
SIDEWALKS (Y/N)	N	N	
BICYCLE LANES (Y/N)	N	N	
MEDIAN WIDTH m or ft	50 ft.	50 ft.	
MED. PROTECT. (GR/BARRIER)	Cable Barrier	GR	
SHOULDER WIDTH (total)			
MEDIAN m or ft	6 ft.	14 ft.	Rdy. Dsn. Man. 1-2B, Fig. 2B
OUTSIDE w/o GR m or ft	14 ft.	14 ft.	Rdy. Dsn. Man. 1-2B, Fig. 2B
OUTSIDE w/ GR m or ft	17 ft.	17 ft.	Rdy. Dsn. Man. 1-2B, Fig. 2B
PAVED SHOULDER			
OUTSIDE TOTAL/FDPS m or ft	12 ft. / 12 ft.	12 ft. / 12 ft.	Rdy. Des. Man. Pvd. Shlder. Policy 1-4O
MEDIAN TOTAL/FDPS m or ft	6 ft. / 4 ft.	12 ft. / 12 ft.	Rdy. Des. Man. Pvd. Shlder. Policy 1-4O
GRADE			
MAX.	4%	4%	AASHTO Design Standards Interstate
MIN. (DESIRABLE)	0.5%	0.5%	Hydraulic Minimum 0.3%
K VALUE			
SAG	206	206	AASHTO pg. 3-161 TABLE 3-36
CREST	312	312	AASHTO pg. 3-155 TABLE 3-34
HORIZ. ALIGN.			
MAX. SUPER.	0.10	0.10	Rdy. Des. Man. 1-15
MIN. RADIUS m or ft	1970 ft.	1970 ft.	AASHTO pg. 3-49 Table 3-11b
SPIRAL (Y/N)	Y	Y	Rdy. Dsn. Man. 1-11
CROSS SLOPES			
PAVEMENT	0.02	0.02	Rdy. Des. Man. 1-3B
PAVED SHOULDER	0.04	0.04	RSD. 560.02 SHEET 3 OF 3
TURF SHOULDER	0.04	0.04	RSD. 560.02 SHEET 3 OF 3
MEDIAN DITCH	6:1	6:1	
DITCH TYPICAL (A,B,C)	A	A	Rdwy. Design Manual 1-2A, F-1
CLEAR ZONE m or ft	30-34 ft.	30-34 ft.	Rdwy. Des. Man. 1-4M "A" & 1-4N

The following locations are proposed as grade separations with US 70 without direct access to US 70:

- US 70 and US 70 Bypass
- US 70 and SR 2035 (Firetower Road)
- US 70 and SR 2309 (Creech's Mill Road)
- US 70 and SR 2316 (Old Rock Quarry Road/Barden Street)
- US 70 and SR 1002 (Rains Mill Road)

To address such a long corridor in manageable pieces, the corridor was split into 4 Sections:

- Section 1: Project start to US 301
- Section 2: US 301 to west of SR 2309 (Creech's Mill Road)
    - Includes the I-95 realignment and I-95 interchange with US 70, US 70 Alt and Pine Level Selma Road
- Section 3: west of SR 2309 (Creech's Mill Road) to SR 2314 (Pondfield Drive)
- Section 4: SR 2314 (Pondfield Drive) to Project end

Section 4, which encompasses the Princeton area, is currently being accelerated as part of the STIP R-5829 project, currently in the planning and design stage, which improves US 70 to interstate standards from SR 2314 (Pondfield Drive) to US 70 Bypass in Goldsboro. During the early stages of this study, two design options, detailed below, were evaluated for Section 4, and the project team requested cost estimates each.

Section 4, Option A

This option includes an interchange between US 70 Alternate and US 70 that would incorporate SR 2556 (Dr. Donnie H. Jones Jr. Boulevard). This option would require the realignment of US 70 Alternate from its existing tie in point with US 70 toward the east approximately 3,000 feet, including a new grade separated crossing of the existing rail line. Under this option, SR 2316 (Old Rock Quarry Road/Barden Street) and SR 1002 (Rains Mill Road) would become grade separated crossings, going over US 70. US 70 would stay primarily on existing alignment.

Section 4, Option B

Due to potentially high right-of-way implications expected in Option A, Option B was developed. This option includes an interchange between US 70 Alternate and US 70 near its existing location, with a new frontage road along the south side of US 70, connecting to Commercial Drive. With this option, US 70 is realigned slightly north of existing alignment and US 70 would go over SR 2316 (Old Rock Quarry Road/Barden Street) and SR 1002 (Rains Mill Road) as grade separations. This was developed in an effort to minimize potential Y-line impacts in Princeton.

Section 4, Option C

In addition to Options A and B, Option C would be constructed regardless of the interchange location and includes the upgrade to Ginger Drive/Boon Hill Drive to at least subdivision standards. This connection is needed to provide adequate access to SR 2316 (Old Rock Quarry Road/Barden Street) from New Barbour Road.

A capacity analysis was not performed for each of the alternative scenarios as the purpose and need for this project is not capacity driven but focuses on improving regional mobility and providing better connectivity between Raleigh and Morehead City. Thus, a high-level evaluation of freeway operations was completed for the segments along the main corridor to ensure that the proposed number of through lanes on the interstate facility would be sufficient to handle future demand.

Per methodologies laid out in the Highway Capacity Manual (HCM), 6th Edition, a level of service (LOS) was estimated for the proposed freeway segments along the facility, as well as a weighted average LOS for the facility. This method utilizes the projected segment flow rate, accounting for the expected peak hour volume, as well as the proposed speed along the facility. Using Exhibit 12-16 in the HCM, the plotted result indicates that under Build 2040 conditions, all segments, as well as the weighted average of segments, is expected to operate at LOS B.

4.5 UPGRADE EXISTING SHOULDERS ALTERNATIVE

The Upgrade Existing Shoulders Alternative proposes to only construct shoulders as needed to bring the existing facility to interstate standards for shielding purposes between the Project Start and just west of SR 2309 (Creech's Mill Road), in Sections 1 and 2.

4.6 STRUCTURES AND HYDROLOGY

According to the NCDOT Bridge Inventory, there are thirteen existing bridge locations (some with dual structures) and four culverts (72" pipe or greater) within the feasibility study area. There are existing bridges over roadways, the railroad, and a water body. In addition, there are bridges under construction as part of the interchanges of W-5107. The proposed interchanges will also involve new bridge structures.

4.6.1 Hydraulic Structures

The Improve Existing Alternative would require the lengthening of two existing culverts at the Buffalo Road interchange. It may also require lengthening of two culverts at the US 70 Business/Peedin St Extension interchange, that is currently under construction as part of W-5107. As part of W-5107, the existing culverts are being extended. None of the existing culverts are

structurally deficient or functionally obsolete. Details of these existing hydraulic structures are shown in Table 4-2.

Table 4-2
Potentially Impacted Existing Hydraulic Structures

Bridge Number	General Location	Structure Type
500508	Along US 70, within Buffalo Rd interchange area	Double 8'X7' RCBC inlet Double 10'X6' outlet
500518	US 70 WB Off-Ramp at Buffalo Road interchange	Double 10'X10' RCBC
500511	Along US 70, just west of US 70 Business/Peedin St Extension (W-5107)	Single 8'X10' RCBC
500531	Along US 70 Business/Peedin St Extension (W-5107), near US 70	Triple 9'X9' RCBC

The Upgrade Existing Shoulders Alternative would only affect the hydraulic structures along US 70, not those on the y-lines.

4.6.2 Bridge Structures

For the purposes of this feasibility study, the existing bridges are assumed to be replaced due to realignment of the mainline and/or structural degradation expected over time. The exception is the eastbound US 70 bridge over the railroad just west of Princeton, as it was recently replaced. Details of these existing bridge structures are shown in Table 4-3.

Table 4-3
Potentially Impacted Existing Bridge Structures

Bridge Number	General Location	Existing Structure Description
500002/500505	Dual bridge over Neuse River	Dual 38'X266'
500005/500506	Dual overflow bridge for Neuse River	Dual 38'X168'
500517	Buffalo Road Interchange Overpass	Single 78'X205'
500507	US 70 Bus Flyover	Single 38'X385'
500519/500520	Dual Bridge over US 301 at Selma	Dual 40'X150'
500521/500522	Dual Bridge over Railroad along US 70	Dual 40'X160'
500523/500524	Dual Bridge over I-95 at Selma	Dual 40'X360'
500509	US 70 Business Flyover (to be removed)	Single 37'X270'
500042	US 70 Alt over I-95 (to be removed)	Single 88'X310'
500106/500107	Dual Bridge over Railroad and Pine Level Selma Rd	Dual 46'X390'
500087/500465	Dual Bridge over Holts Pond	Dual 42'X150'
500097/500103	Dual Bridge over Railroad west of Princeton	Dual 42'X270'

In addition to the existing bridge structures there would be new bridges built at/near the following locations:

- I-95 Cloverleaf (US 70 over I-95)
- I-95 access interchange (US 70 Alternate over I-95)
- SR 2035 (Firetower Road) overpass over US 70
- US 70 Business/SR 2308 (Peedin Road Extension) interchange overpass over US 70; under construction, to remain
- SR 2309 (Creech's Mill Road) overpass over US 70
- SR 2310 (Davis Mill Road) interchange overpass over US 70; under construction, to remain
- SR 2312 (Country Store Road)/SR 2519 (Braswell Road) interchange overpass over US 70
- US 70 Alt interchange overpass over US 70
- US 70 Alt bridge over railroad
- SR 2316 (Old Rock Quarry Road/Barden Street) overpass over US 70 (Section 4, Option A)
- SR 1002 (Rains Mill Road) overpass over US 70 (Section 4, Option A)
- US 70 overpass over SR 2316 (Old Rock Quarry Road/Barden Street) (Section 4, Option B)
- US 70 overpass over SR 1002 (Rains Mill Road) (Section 4, Option B)

The Upgrade Existing Shoulders Alternative is not expected to affect any existing bridges over roadways; however, the project would replace an existing bridge over the Neuse River and an existing overflow bridge and would include an overpass along SR 2035 (Firetower Road) over US 70 for control of access purposes.

5.0 OPINION OF PROBABLE COST

5.1 COST ESTIMATES

Cost estimates for construction, utility relocation, and right-of-way were completed for each build alternative. These estimates are based on the conceptual designs prepared for the improvements. Tables 5-1 and 5-2 summarize the cost estimates for each component of each alternative and provides a total of estimated cost per alternative.

Table 5-1
Estimated Costs for Each Alternative, Sections 1 Through 3

Description		Construction	Utility Relocation	Right of Way	*Total*
Alternative 1 Improve Existing	Section 1	$48,800,000	$700,000	$2,600,000	$52,100,000
	Section 2	$148,300,000	$0	$28,800,000	$177,100,000
	Section 3	$66,500,000	$400,000	$41,000,000	$107,900,000
Total Alternative 1		**$263,600,000**	**$1,100,000**	**$72,400,000**	**$337,100,000**
Alternative 2 Upgrade Shoulders	Section 1	$17,200,000	n/a	n/a	$17,200,000
	Section 2	$24,300,000	$200,000	$3,400,000	$27,900,000
	Section 3	n/a	n/a	n/a	n/a
Total Alternative 2		**$41,500,000**	**$200,000**	**$3,400,000**	**$45,100,000**

Table 5-2
Estimated Costs for Section 4

Description		Construction	Utility Relocation	Right of Way	*Total*
Alternative 1 Improve Existing	Section 4A	$38,800,000	$300,000	$20,900,000	***$60,000,000***
	Section 4B	$36,200,000	$100,000	$13,600,000	***$49,900,000***
	Section 4C	$1,500,000	$100,000	$300,000	***$1,900,000***

6.0 ALTERNATIVES EVALUATION AND RECOMMENDATIONS

This section details and evaluates the quantitative impacts of the presented alternatives such as stream impacts, relocations and cost estimates. It also includes a discussion comparing the alternatives, resulting in the recommendation of a preferred alternative.

6.1 IMPACTS OF ALTERNATIVES

Tables 6-1 and 6-2 provide a comparison of the quantitative impacts to each resource for each alternative.

The environmental features, including impacted wetland acreage, floodplain acreage and linear feet of stream impact estimates are derived from data publicly available through NC Department of Environment and Natural Resources, Division of Coastal Management (NCDENR-DCM) and Wayne County and Johnston County GIS resources. Other reported impacts, such as USTs and historic properties are also based on available GIS and not the result of extensive geotechnical or cultural resource surveys.

Parcel information was obtained through the Wayne and Johnston Counties' GIS resources and are not the product of project specific surveys. Estimated relocations and impacted parcel totals are taken from the relocation estimate reports completed by NCDOT.

6.2 CONCLUSIONS AND RECOMMENDATIONS

Based on the data presented in this study, it is recommended that Alternative 1 - Improve Existing ultimately be implemented for the US 70 corridor. This alternative accounts for the ultimate needs of the corridor that bring the facility to interstate standards while accounting for access and connectivity needs for the area. This alternative has been evaluated from a cost perspective in four sections; those sections should be considered for implementation on separate schedules to have the improvements constructed in a meaningful, efficient way. Further break down of each segment for planning, design and construction purposes may be warranted and should be evaluated in future phases of the project.

As a shorter-term improvement, Alternative 2 – Upgrade Existing Shoulders may be considered to provide interstate designation for Sections 1 and 2.

Table 6-1
Alternatives Major Impact Comparison Sections 1 Through 3

Description		Alternative 1 Improve Existing	Alternative 2 Upgrade Shoulders
Relocations	Section 1	1 Res, 0 Bus	0 Res, 0 Bus
	Section 2	16 Res, 6 Bus	8 Res, 0 Bus
	Section 3	49 Res, 25 Bus	n/a
	Total	66 Res, 31 Bus	8 Res, 0 Bus
Wetlands (acres)	Section 1	19 acres	4 acres
	Section 2	44 acres	14 acres
	Section 3	4 acres	n/a
	Subtotal	67 acres	18 acres
Stream Crossings (linear feet)	Section 1	1,830 ft	854 ft
	Section 2	2,231 ft	697 ft
	Section 3	1,785 ft	n/a
	Subtotal	5,846 ft	1,551 ft
USTs	Section 1	0	0
	Section 2	0	0
	Section 3	0	n/a
	Subtotal	0	0
National Register of Historic Places Sites	Section 1	0	0
	Section 2	0	0
	Section 3	0	n/a
	Subtotal	0	0
Right of Way (impacted parcels)	Section 1	20	n/a
	Section 2	111	62
	Section 3	191	n/a
	Subtotal	322	62

Table 6-2
Alternatives Major Impact Comparison Section 4

Description		Alternative 1 Improve Existing	Alternative 2 Upgrade Shoulders
Relocations	Section 4A	23 Res, 10 Bus	n/a
	Section 4B	14 Res, 2 Bus	n/a
	Section 4C	0 Res, 0 Bus	n/a
	Total	37 Res, 12 Bus	n/a
Wetlands (acres)	Section 4A	0 acres	n/a
	Section 4B	0 acres	n/a
	Section 4C	0 acres	n/a
	Subtotal	0 acres	n/a
Stream Crossings (linear feet)	Section 4A	0,000 ft	n/a
	Section 4B	0,000 ft	n/a
	Section 4C	0,000 ft	n/a
	Subtotal	0,000 ft	n/a
USTs	Section 4A	0	n/a
	Section 4B	0	n/a
	Section 4C	0	n/a
	Subtotal	0	n/a
National Register of Historic Places Sites	Section 4A	0	n/a
	Section 4B	0	n/a
	Section 4C	0	n/a
	Subtotal	0	n/a
Right of Way (impacted parcels)	Section 4A	132	n/a
	Section 4B	79	n/a
	Section 4C	22	n/a
	Subtotal	233	n/a

APPENDICES

APPENDIX A

Traffic Forecast

Kimley»Horn

421 Fayetteville Street,
Suite 600
Raleigh, North Carolina
27601

September 15, 2016

Memorandum To: Lynnise Hawes, PE
Feasibility Studies Engineer
Feasibility Studies Unit

From: Tim Padgett, PE
Kimley-Horn and Associates, Inc.

Subject: Traffic Forecast for FS-1604A, Upgrade US 70 to Interstate Standards, WBS 34263.1.1, Johnston County, NC

Please find attached the 2016 Traffic Estimates and 2040 Traffic Forecasts for the above mentioned project. Project FS-1604A is defined as the study of upgrading US 70 to interstate standards from SR 1003 (Buffalo Road) to SR 2372 (N. Pearl Street/Edwards Road). The following scenarios are provided:

- Base Year 2016 No Build
- Base Year 2016 Build
- Future Year 2040 No Build
- Future Year 2040 Build

A Forecast for project U-5795 was previously delivered in August 2015. A portion of this forecast was directly applicable to the FS-1604A forecast and was reviewed and used as part of the forecasting process.

Certain assumptions were made in the development of the forecast:

Fiscal Constraint. Within the Metropolitan Planning Organization (MPO) area, future forecasts are based on projects included in the Financial Plan for the 2040 Capital Area Metropolitan Planning Organization (CAMPO) Metropolitan Transportation Plan (MTP). This information, along with the same for the Durham - Chapel Hill – Carrboro Metropolitan Planning Organization (DCHC MPO) is included in the official version of the TRM. Since this project falls primarily outside the MPO area, the State Transportation Improvement Program (STIP) is the primary source for project information.

Future Conditions and Development Activity. The forecast was developed using output from the Triangle Regional Model (TRM) along with the North Carolina Statewide Travel Model (NCSTM). Future population and growth projections were also considered.

Forecast Methodology. Horizon Year 2040 estimates provided in the attached forecast were developed using a method under which observed traffic data as well as 2010 and 2040 model output were considered, along with historic and projected growth.

If it is determined that any of these assumptions have become inconsistent with the project and surrounding area activity, please request updated projections at this location.

This forecast was reviewed and approved by TPB on September 13, 2016.

Cc: Brian Wert, PE, Transportation Planning Branch
Karen Roberson, Transportation Planning Branch
Scott Walston, PE, Transportation Planning Branch
Doumit Y. Ishak, Congestion Management Section
Clark Morrison, PhD, PE, Pavement Management Unit
Glenn Mumford, PE, Roadway Design Unit
Chris Lukasina, Planning Manager, Capital Area MPO
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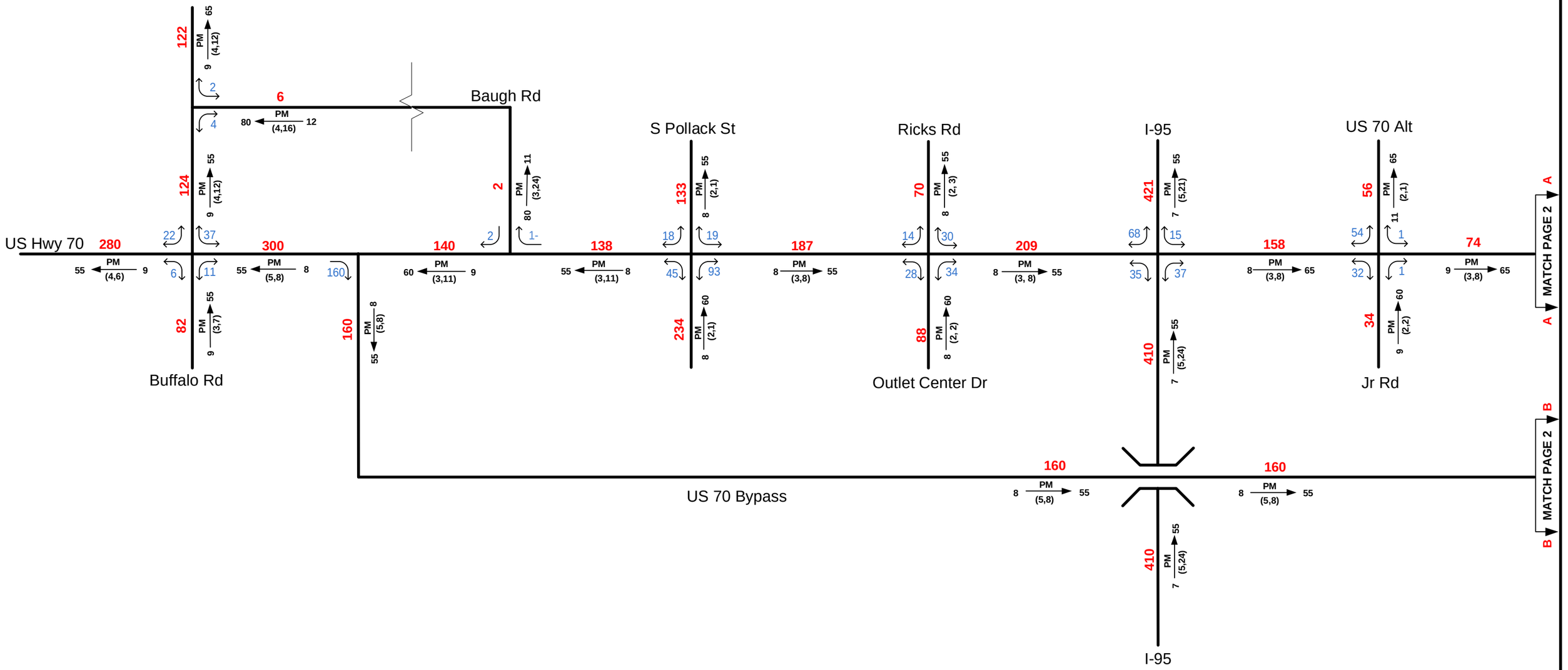
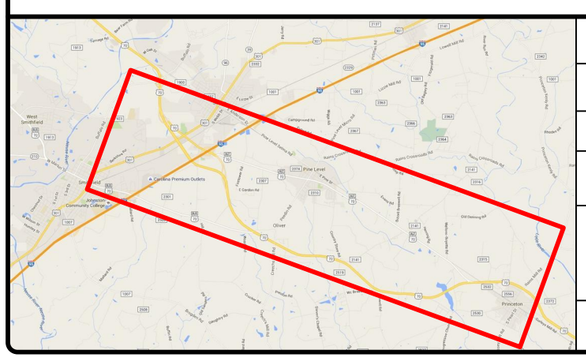




TIP: FS-1064A	**WBS: 34263.1.1**
COUNTY: Johnston	**DIVISION: 4**
DATE: 9/15/2016	
PREPARED BY: Kimley-Horn and Associates	
LOCATION: US - 70 from SR 1003 (Buffalo Rd) to SR 2372 (N Pearl St/Edwards Rd)	
PROJECT: US – 70 Improvements	

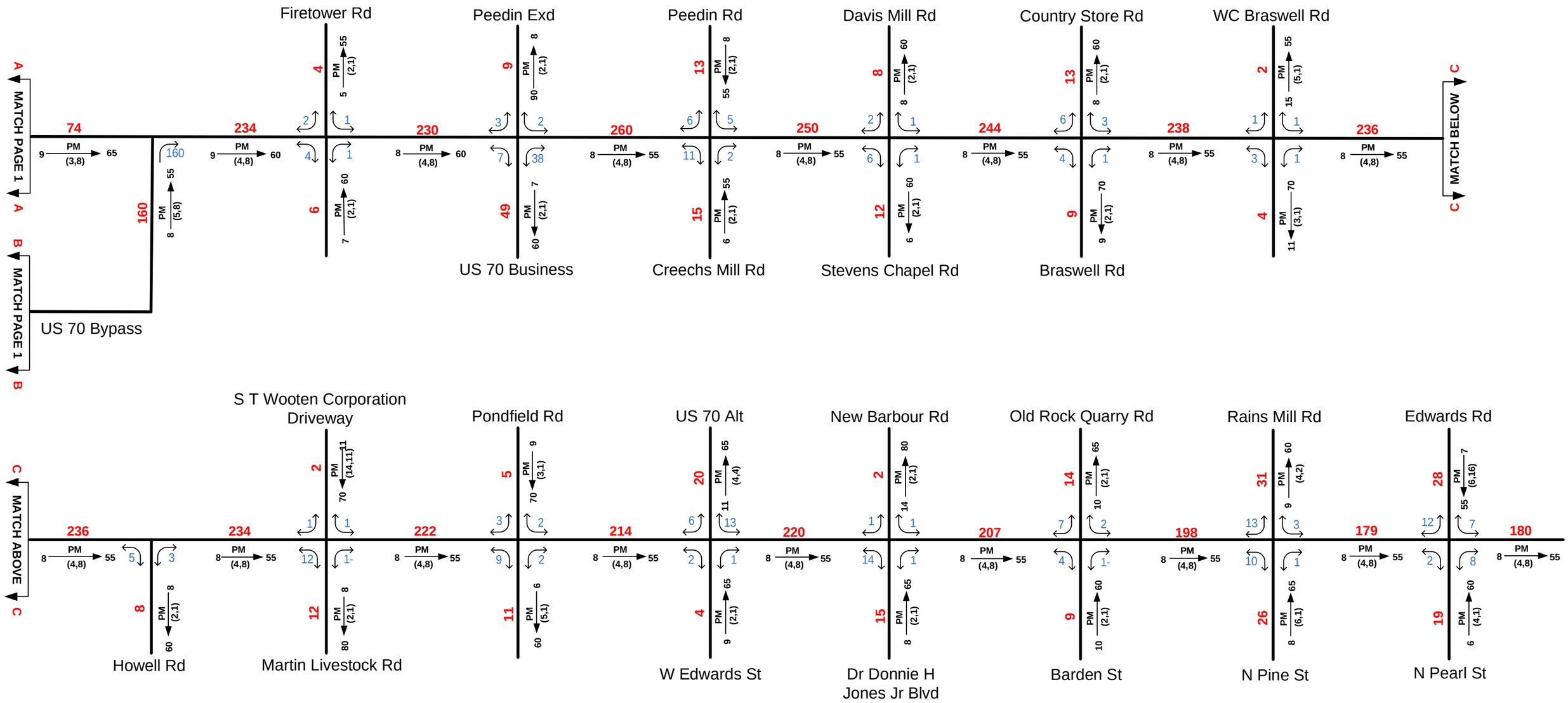
2016

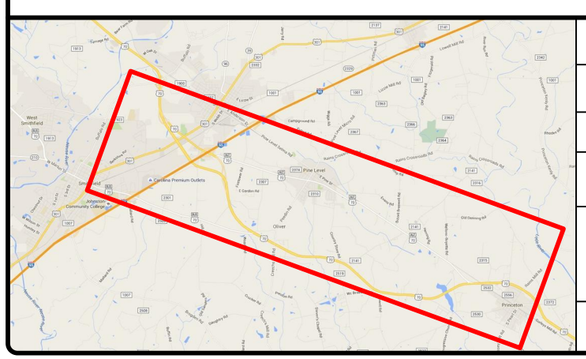
AVERAGE ANNUAL DAILY TRAFFIC

2016 No-Build
Sheet 1 of 8

LEGEND

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





TIP: FS-1064A	**WBS: 34263.1.1**
COUNTY: Johnston	**DIVISION: 4**
DATE: 9/15/2016	
PREPARED BY: Kimley-Horn and Associates	
LOCATION: US - 70 from SR 1003 (Buffalo Rd) to SR 2372 (N Pearl St/Edwards Rd)	
PROJECT: US – 70 Improvements	

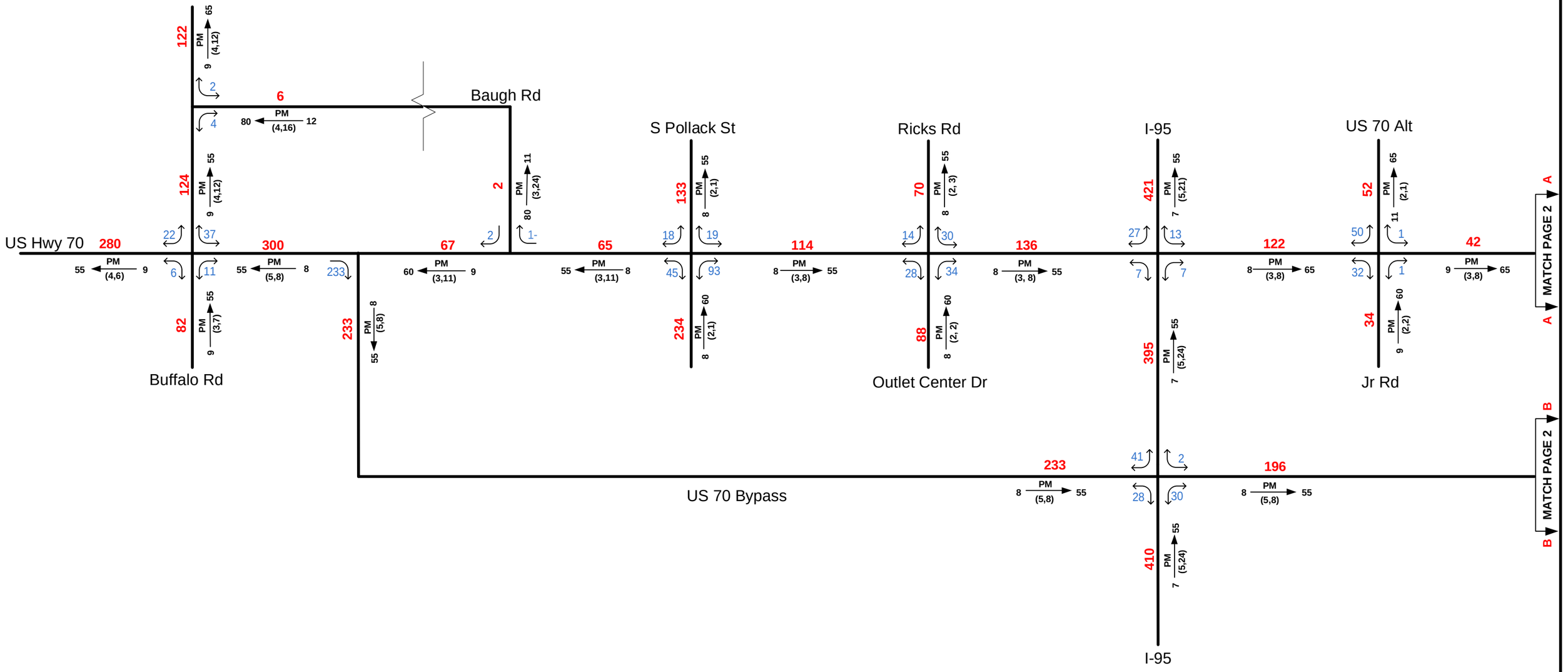
2016

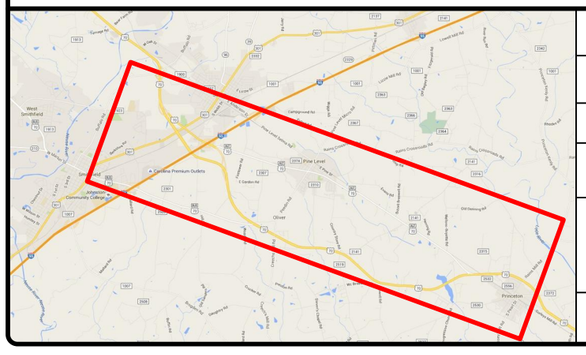
AVERAGE ANNUAL DAILY TRAFFIC

2016 No-Build
Sheet 2 of 8

LEGEND

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





TIP: FS-1064A	**WBS: 34263.1.1**
COUNTY: Johnston	**DIVISION: 4**
DATE: 9/15/2016	
PREPARED BY: Kimley-Horn and Associates	
LOCATION: US - 70 from SR 1003 (Buffalo Rd) to SR 2372 (N Pearl St/Edwards Rd)	
PROJECT: US – 70 Improvements	

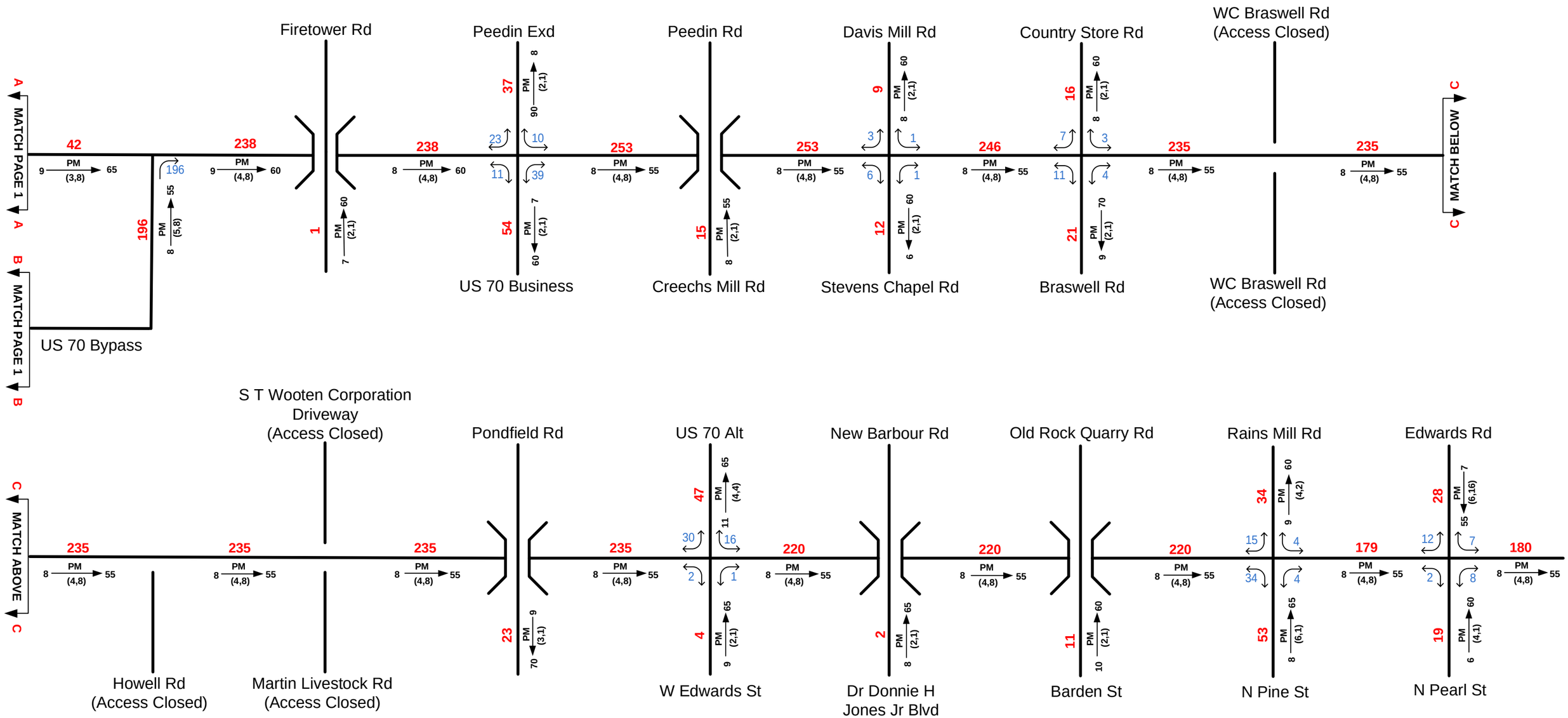
2016

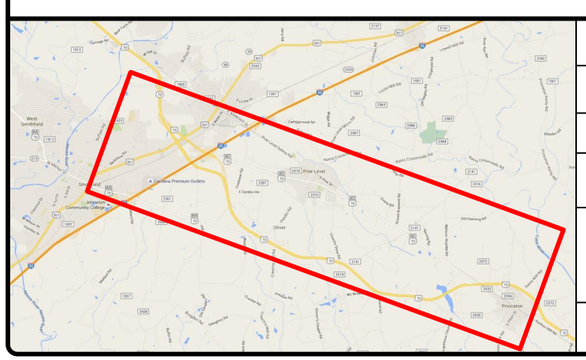
AVERAGE ANNUAL DAILY TRAFFIC

2016 Build 1
Sheet 3 of 8

LEGEND

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





TIP: FS-1064A	**WBS: 34263.1.1**
COUNTY: Johnston	**DIVISION: 4**
DATE: 9/15/2016	
PREPARED BY: Kimley-Horn and Associates	
LOCATION: US - 70 from SR 1003 (Buffalo Rd) to SR 2372 (N Pearl St/Edwards Rd)	
PROJECT: US – 70 Improvements	

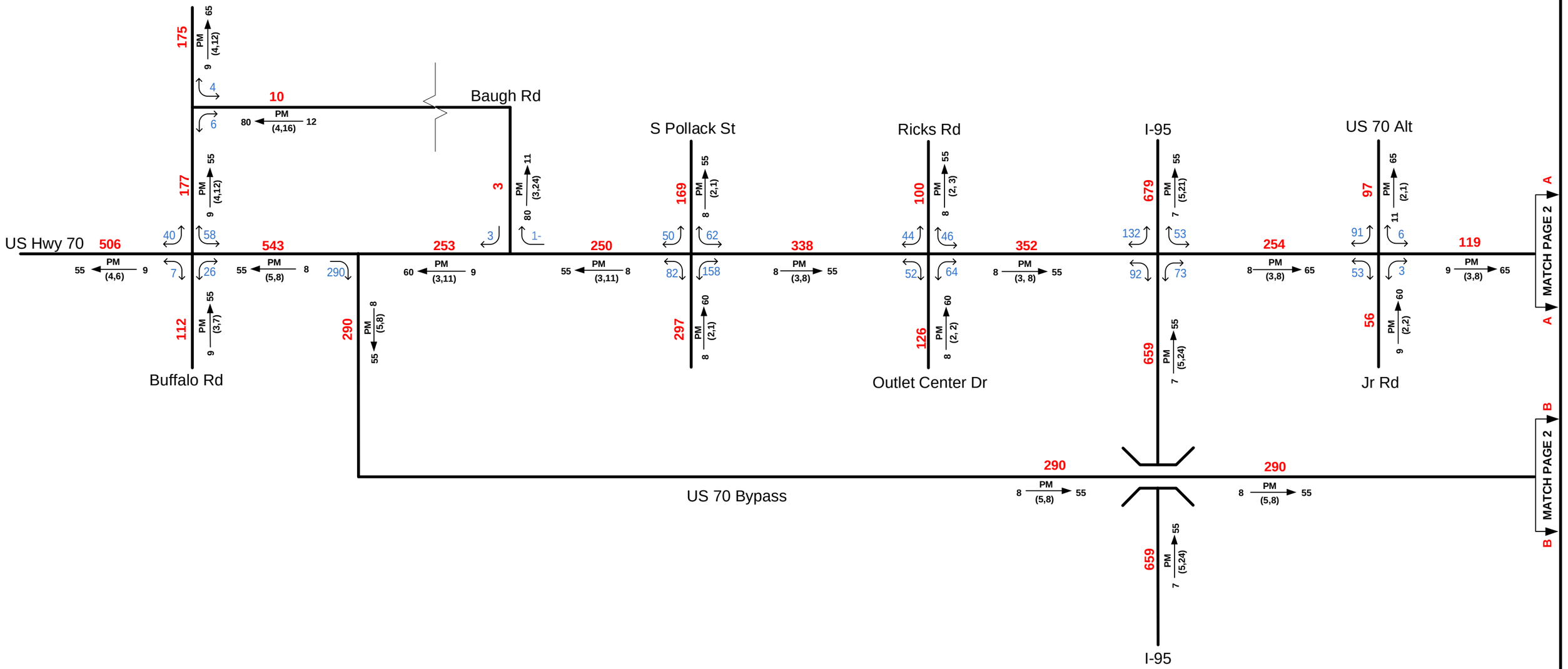
2016

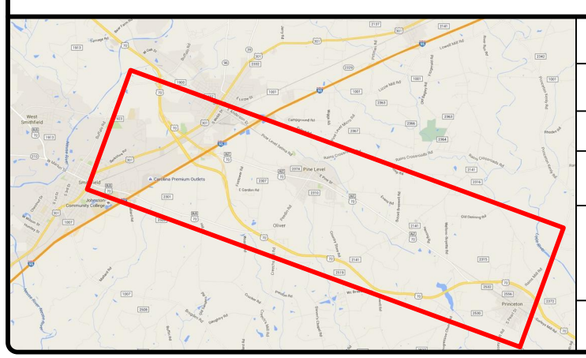
AVERAGE ANNUAL
DAILY TRAFFIC

2016 Build 1
Sheet 4 of 8

LEGEND

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





TIP: FS-1064A	**WBS: 34263.1.1**
COUNTY: Johnston	**DIVISION: 4**
DATE: 9/15/2016	
PREPARED BY: Kimley-Horn and Associates	
LOCATION: US - 70 from SR 1003 (Buffalo Rd) to SR 2372 (N Pearl St/Edwards Rd)	
PROJECT: US – 70 Improvements	

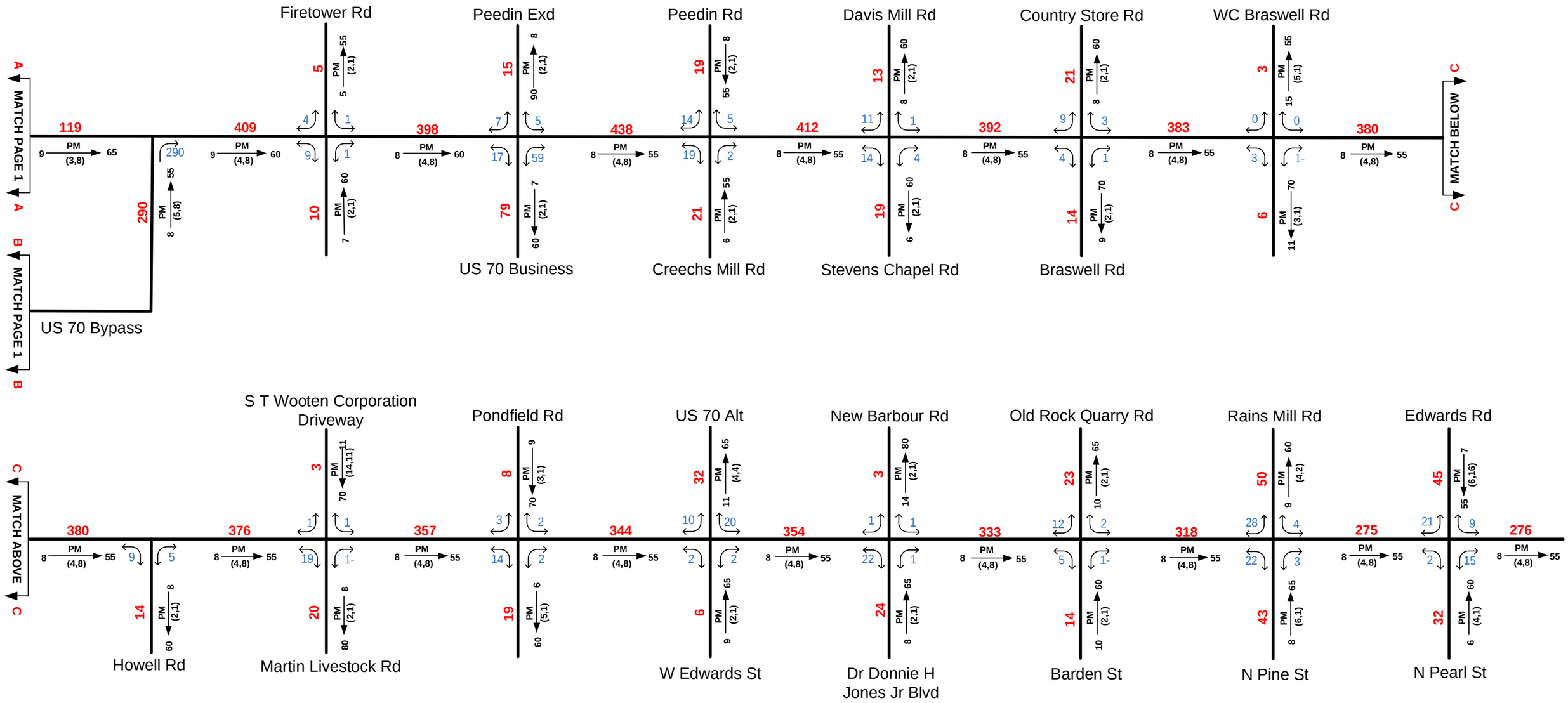
2040

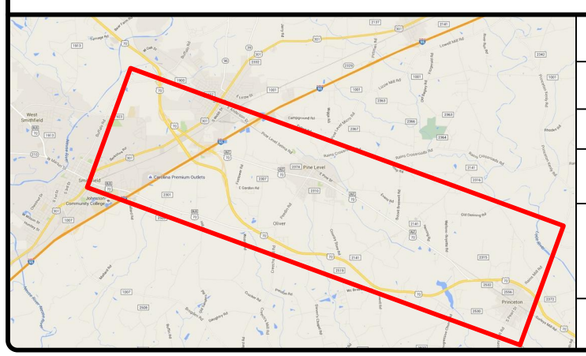
AVERAGE ANNUAL DAILY TRAFFIC

2040 No-Build
Sheet 5 of 8

LEGEND

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





TIP: FS-1064A	**WBS: 34263.1.1**
COUNTY: Johnston	**DIVISION: 4**
DATE: 9/15/2016	
PREPARED BY: Kimley-Horn and Associates	
LOCATION: US - 70 from SR 1003 (Buffalo Rd) to SR 2372 (N Pearl St/Edwards Rd)	
PROJECT: US – 70 Improvements	

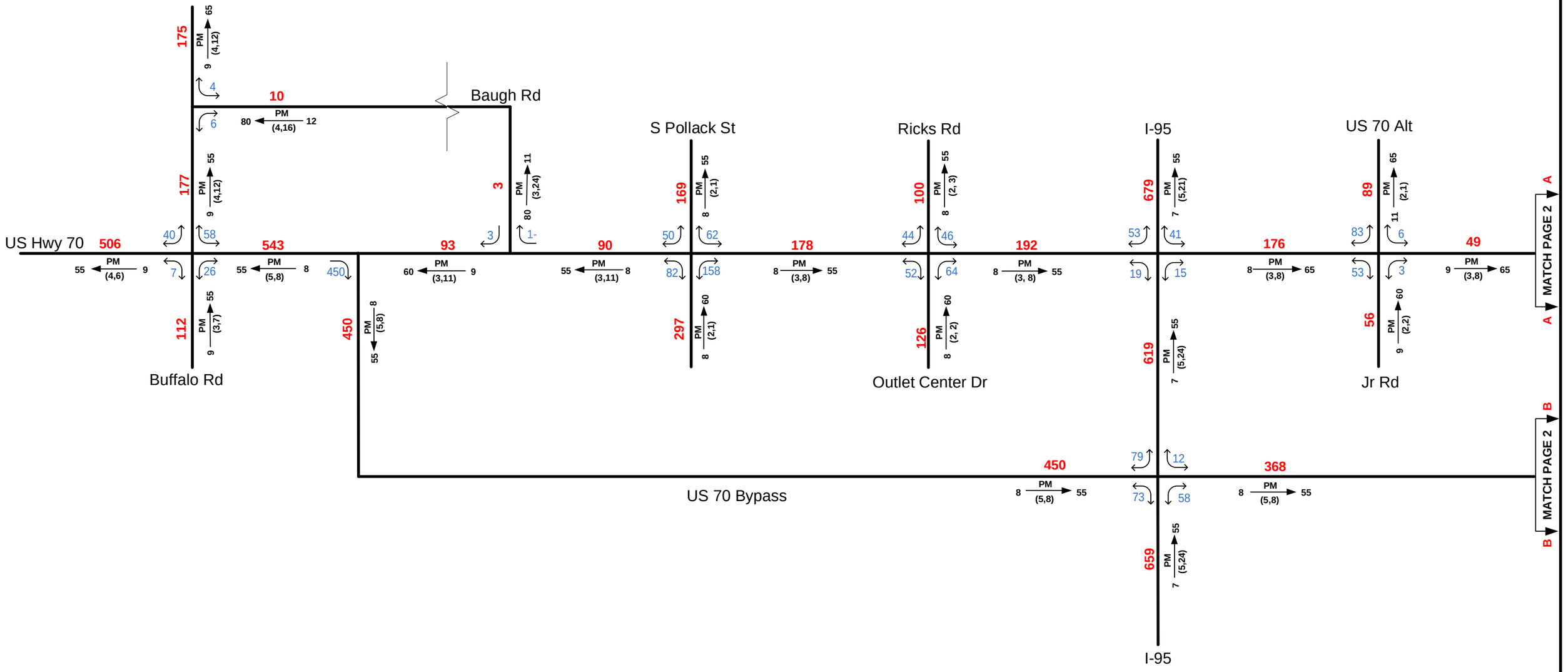
2040

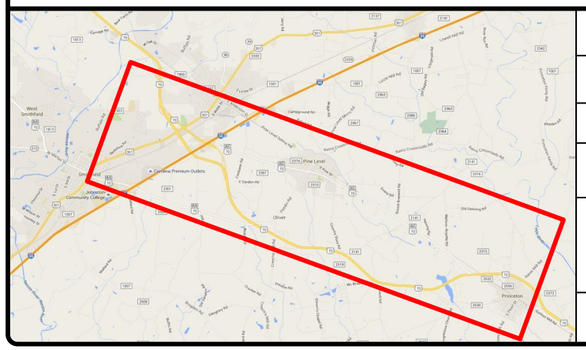
AVERAGE ANNUAL DAILY TRAFFIC

2040 No-Build
Sheet 6 of 8

LEGEND

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





TIP: FS-1064A	**WBS: 34263.1.1**
COUNTY: Johnston	**DIVISION: 4**
DATE: 9/15/2016	
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PROJECT: US – 70 Improvements	

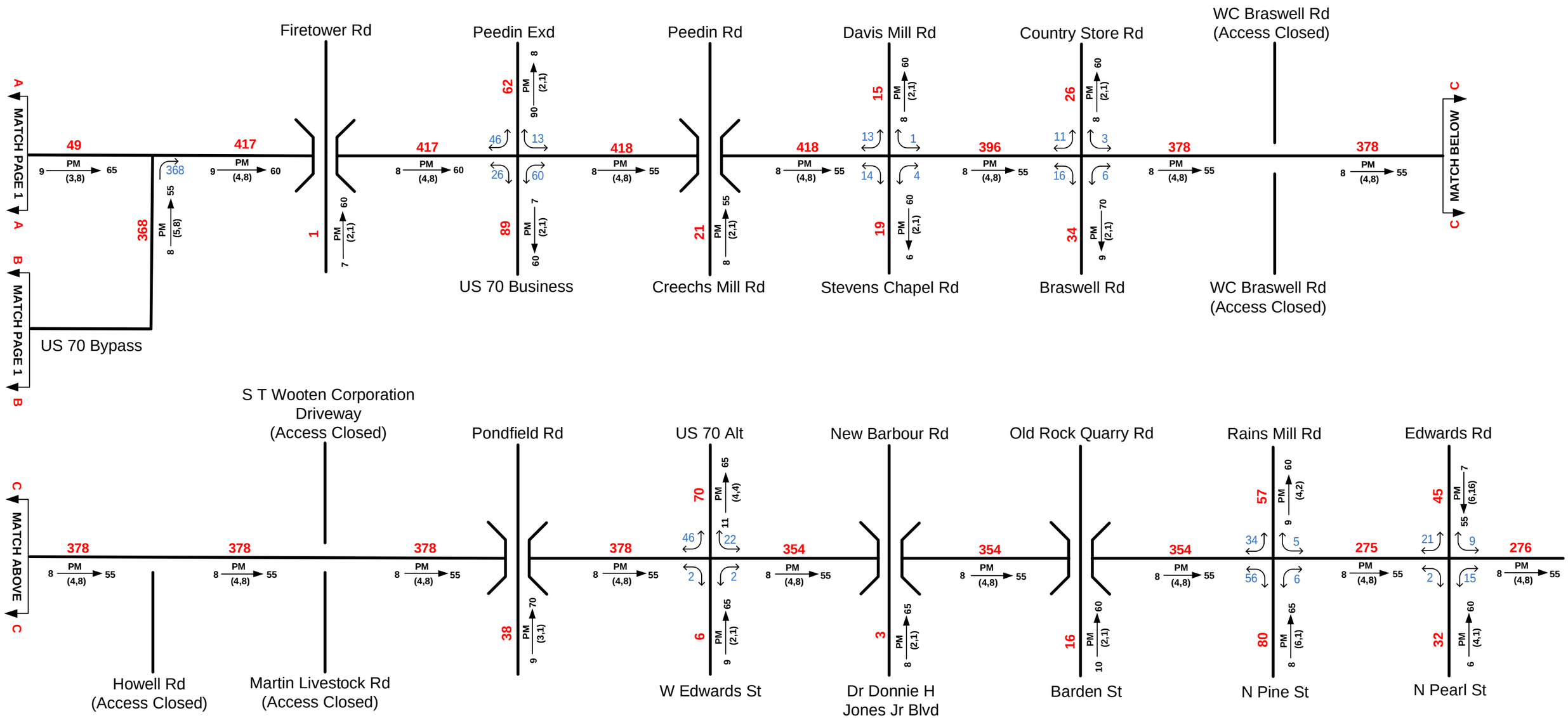
2040

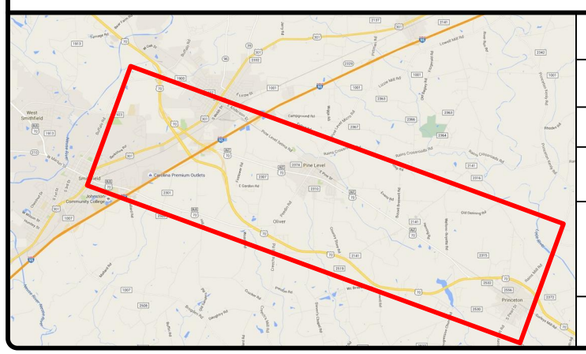
AVERAGE ANNUAL DAILY TRAFFIC

2040 Build 1
Sheet 7 of 8

LEGEND

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





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DATE: 9/15/2016	
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2040

AVERAGE ANNUAL DAILY TRAFFIC

2040 Build 1
Sheet 8 of 8

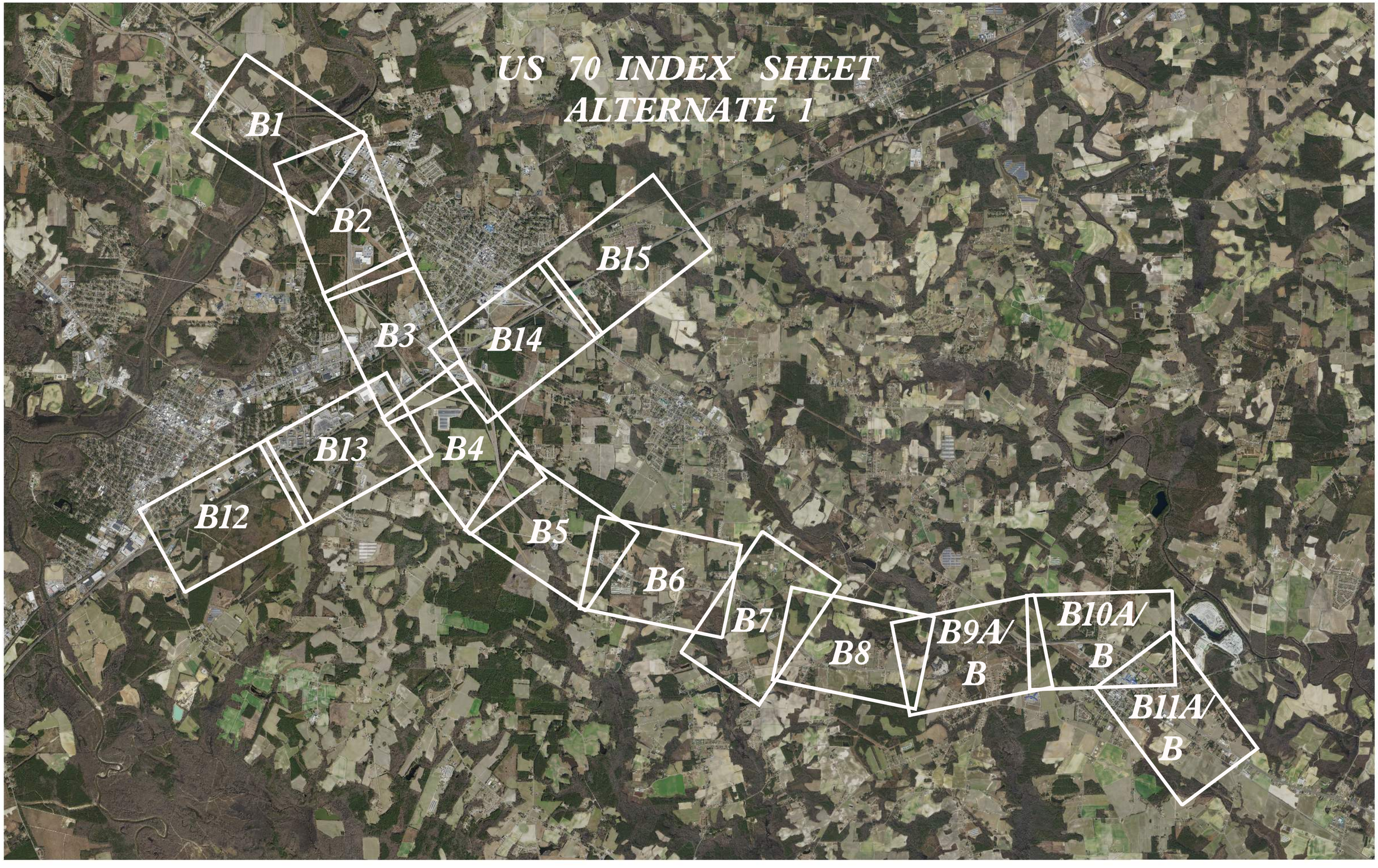
LEGEND

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

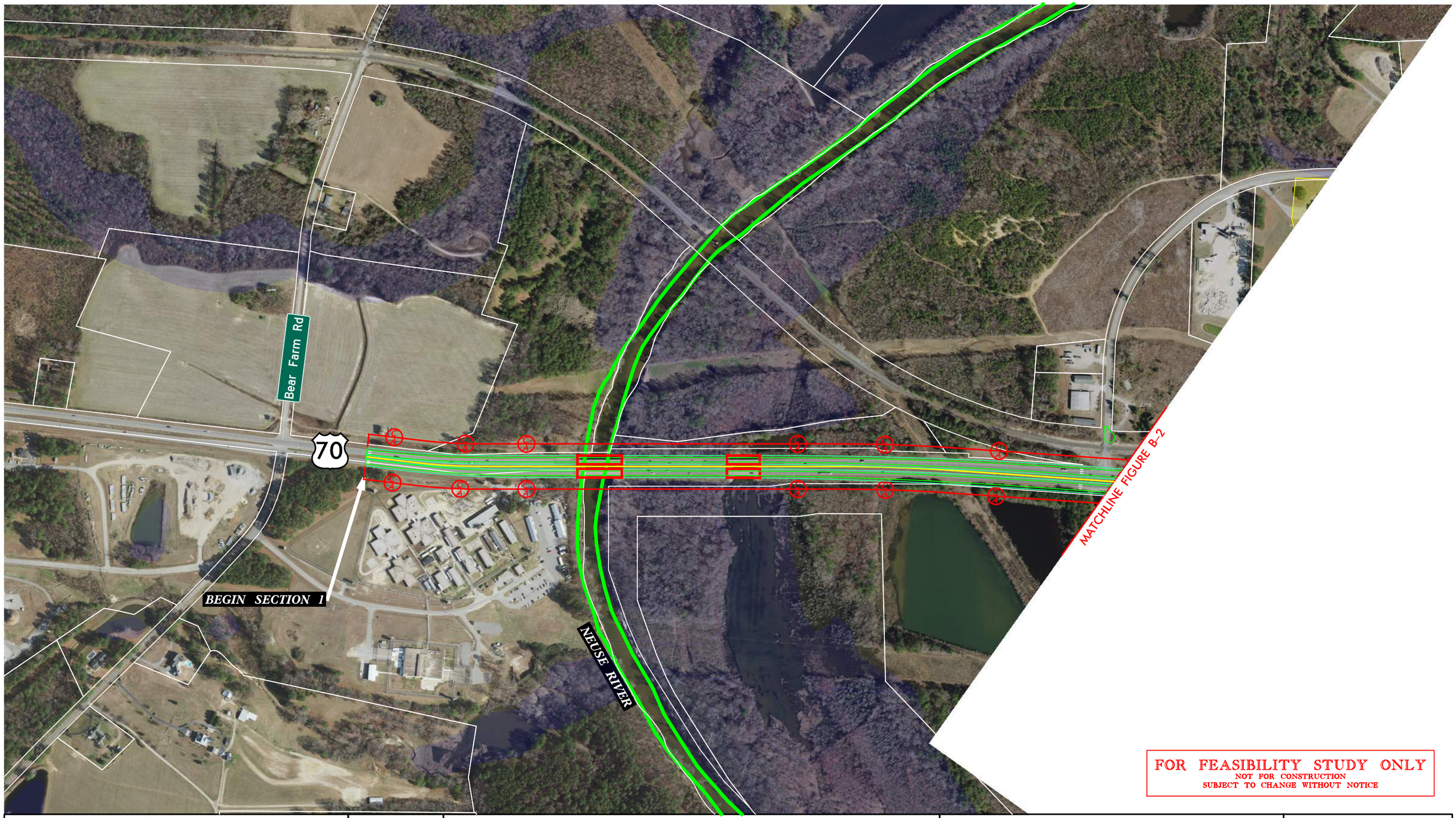
APPENDIX B

Conceptual Designs

US 70 INDEX SHEET
ALTERNATE 1



US 70 INDEX SHEET
ALTERNATE 2



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SUBJECT TO CHANGE WITHOUT NOTICE

500′ 0′ 500′ 1000′
250′

WETLANDS & STREAMS
HISTORIC
HAZARDOUS
NATURAL AREA

FIGURE B–1
CONCEPTUAL ROADWAY PLAN
ALTERNATE 1

UPGRADE US 70 TO INTERSTATE STANDARDS FROM SR 1003 (BUFFALO Rd.) NEAR SELMA TO SR 2372 (EDWARDS Rd.) IN PRINCETON JOHNSTON COUNTY

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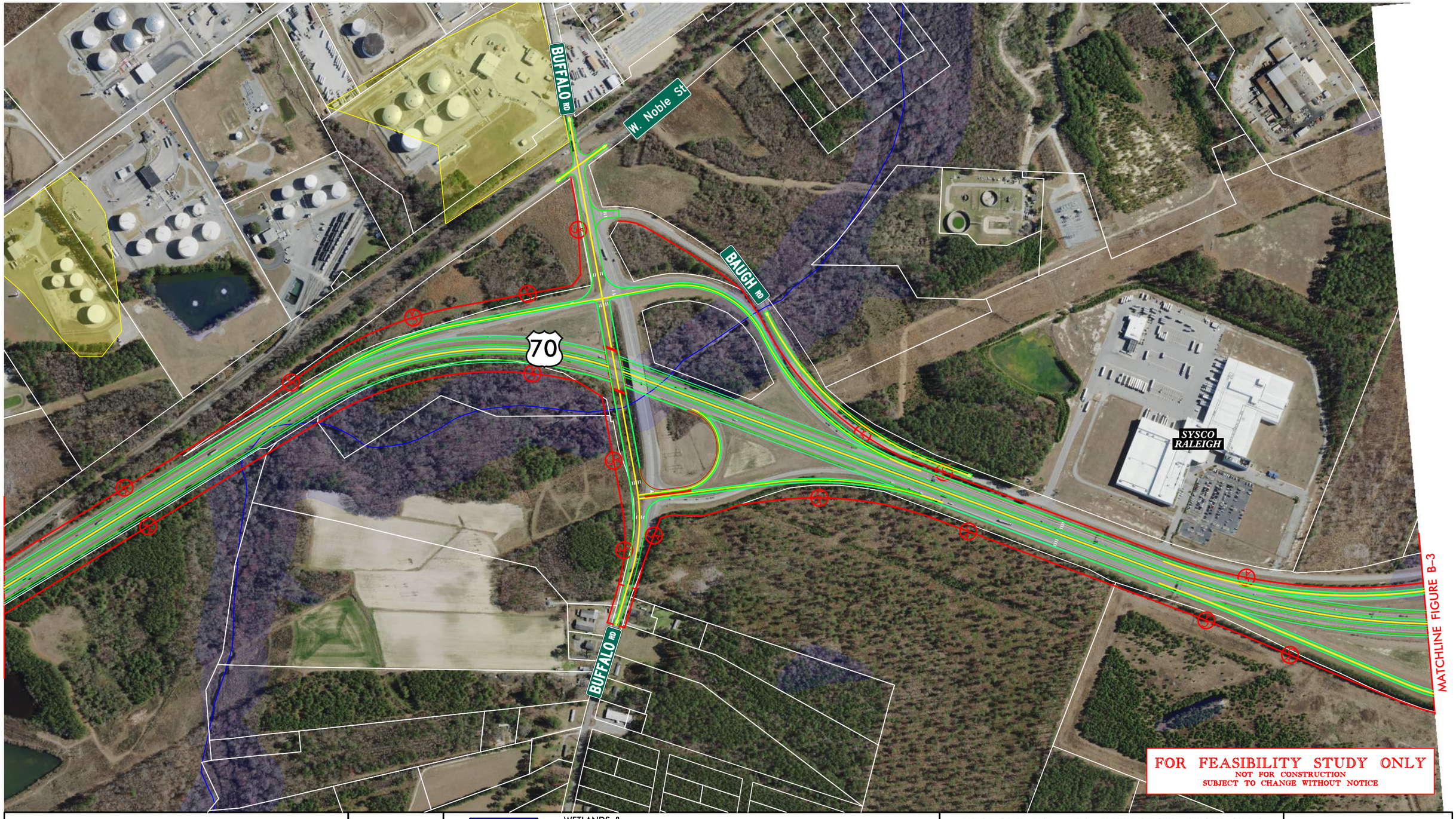
Raleigh, NC 27606



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250′

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HISTORIC

HAZARDOUS

NATURAL AREA

FIGURE B–2
CONCEPTUAL ROADWAY PLAN
ALTERNATE 1

UPGRADE US 70 TO INTERSTATE STANDARDS FROM SR 1003 (BUFFALO Rd.) NEAR SELMA TO SR 2372 (EDWARDS Rd.) IN PRINCETON JOHNSTON COUNTY

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SELMA MEMORIAL GARDENS

Ricks Rd

70

MASTERS INN

QUALITY INN

HAMPTON INN SELMA

FAMILY DOLLAR

PIZZA INN

FOOD LION

S POLLOCK ST

LEONARD BUILDINGS & TRUCK ACCESSORIES

DeWAYNE'S

Outlet Center Dr

LIBERTY USED MOTORS

CROOKED ROW PRODUCE

CAMPERS INN RV OF RALEIGH

BYP 70

END SECTION 1/ BEGIN SECTION 2

MATCHLINE FIGURE B–2

MATCHLINE FIGURE B–4

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250′

WETLANDS & STREAMS
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HAZARDOUS
NATURAL AREA

FIGURE B–3
CONCEPTUAL ROADWAY PLAN
ALTERNATE 1

UPGRADE US 70 TO INTERSTATE STANDARDS FROM SR 1003 (BUFFALO Rd.) NEAR SELMA TO SR 2372 (EDWARDS Rd.) IN PRINCETON JOHNSTON COUNTY

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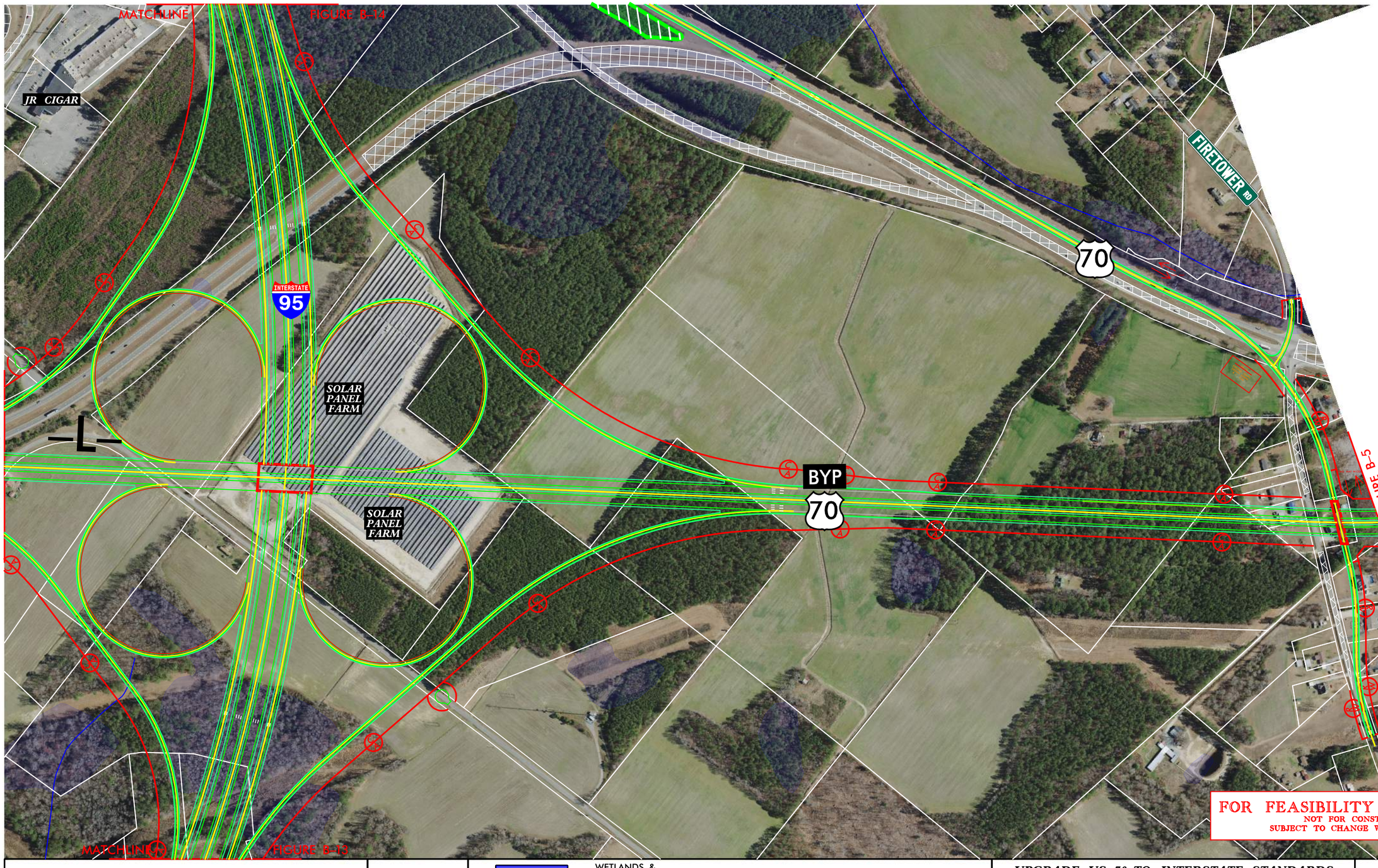

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250′

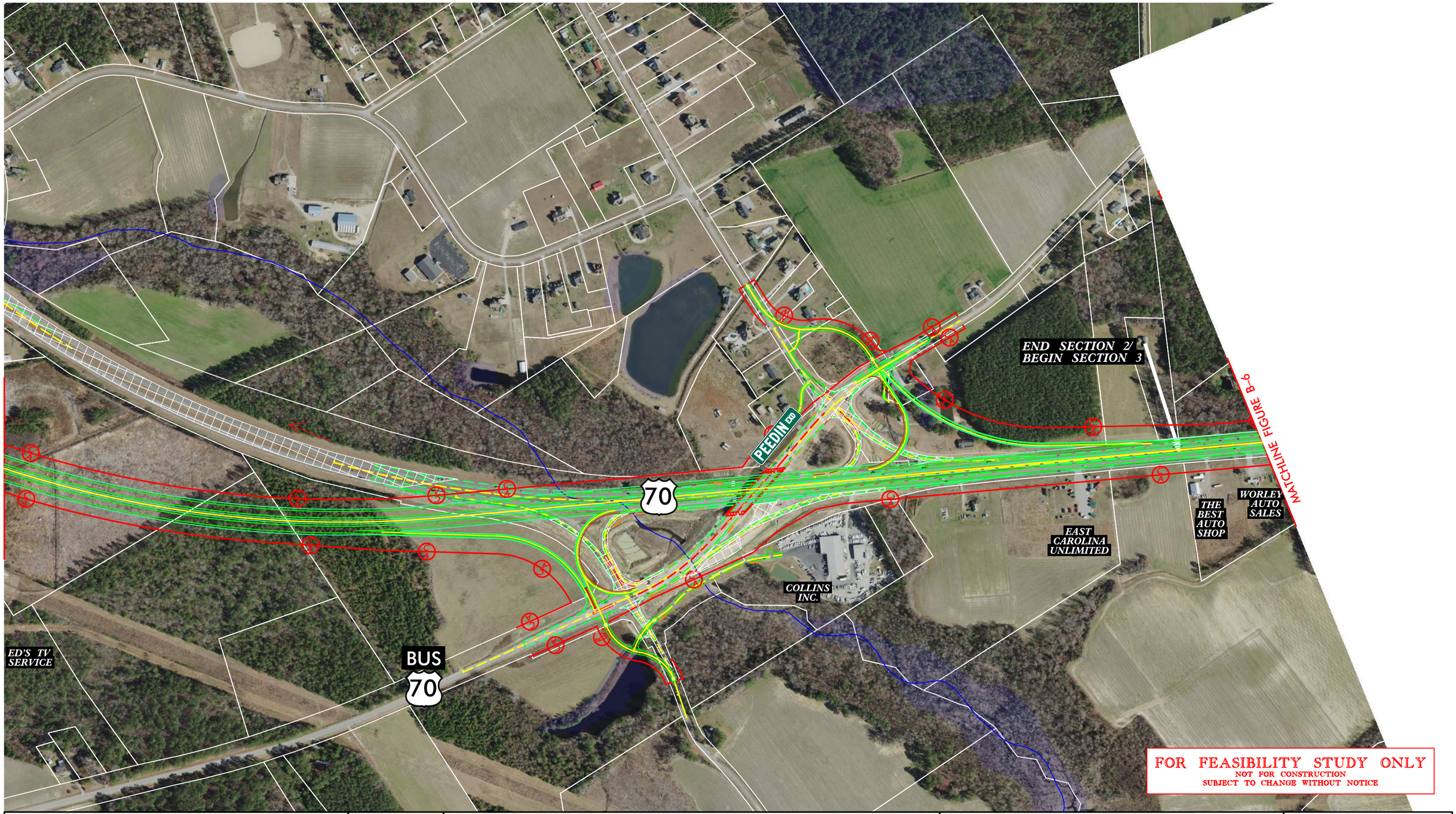
WETLANDS & STREAMS
HISTORIC
HAZARDOUS
NATURAL AREA

FIGURE B–4
CONCEPTUAL ROADWAY PLAN
ALTERNATE 1

UPGRADE US 70 TO INTERSTATE STANDARDS FROM SR 1003 (BUFFALO Rd.) NEAR SELMA TO SR 2372 (EDWARDS Rd.) IN PRINCETON JOHNSTON COUNTY

STIP# FS–1604A

vhb
VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606



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SUBJECT TO CHANGE WITHOUT NOTICE

500′ 0′ 500′ 1000′

250′

WETLANDS & STREAMS
HISTORIC
HAZARDOUS
NATURAL AREA

FIGURE B–5
CONCEPTUAL ROADWAY PLAN
ALTERNATE 1

UPGRADE US 70 TO INTERSTATE STANDARDS FROM SR 1003 (BUFFALO Rd.) NEAR SELMA TO SR 2372 (EDWARDS Rd.) IN PRINCETON JOHNSTON COUNTY

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MATCHLINE FIGURE B–5

MATCHLINE FIGURE B–7

PEEDIN RD

Service Road

BP/HASTY MART

PINE VALLEY COMMERCE CENTER (STRIP MALL)

PINE ST

GEORGE'S USED TIRES & UHAUL

IDEAL STORAGE SOLUTIONS

Service Road

70

PINE ST

Service Road

TARHEEL TOOLING & PRECISION MACHINING

EAGLE HOMES OF SMITHFIELD

GREENS MILL RD

DAVIS MILL RD

CHEM–STATION

JYMCO DEVELOP–MENT

STEVENS CHAPEL RD

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NOT FOR CONSTRUCTION
SUBJECT TO CHANGE WITHOUT NOTICE

500′ 0′ 500′ 1000′

250′

WETLANDS & STREAMS

HISTORIC

HAZARDOUS

NATURAL AREA

FIGURE B–6
CONCEPTUAL ROADWAY PLAN
ALTERNATE 1

UPGRADE US 70 TO INTERSTATE STANDARDS FROM SR 1003 (BUFFALO Rd.) NEAR SELMA TO SR 2372 (EDWARDS Rd.) IN PRINCETON JOHNSTON COUNTY

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MATCHLINE FIGURE B–6

CHARLIE SNIPES TRUCK BROKERS

BRADY MOTOR

MYERS COMM–UNITY MART/ SHELL

HEPHZIBAH BAPTIST CHURCH/ CEMETARY

BIZZELL GROVE CHURCH RD

BRASWELL RD

HEPHZIBAH BAPTIST CHURCH/ CEMETARY

70

CLASSIC STONE SUPPLY

PARTNERS COMMERCIAL REALTY, LLC

MATCHLINE FIGURE B–8

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500′ 0′ 500′ 1000′
250′

WETLANDS & STREAMS
HISTORIC
HAZARDOUS
NATURAL AREA

FIGURE B–7
CONCEPTUAL ROADWAY PLAN
ALTERNATE 1

UPGRADE US 70 TO INTERSTATE STANDARDS FROM SR 1003 (BUFFALO Rd.) NEAR SELMA TO SR 2372 (EDWARDS Rd.) IN PRINCETON JOHNSTON COUNTY

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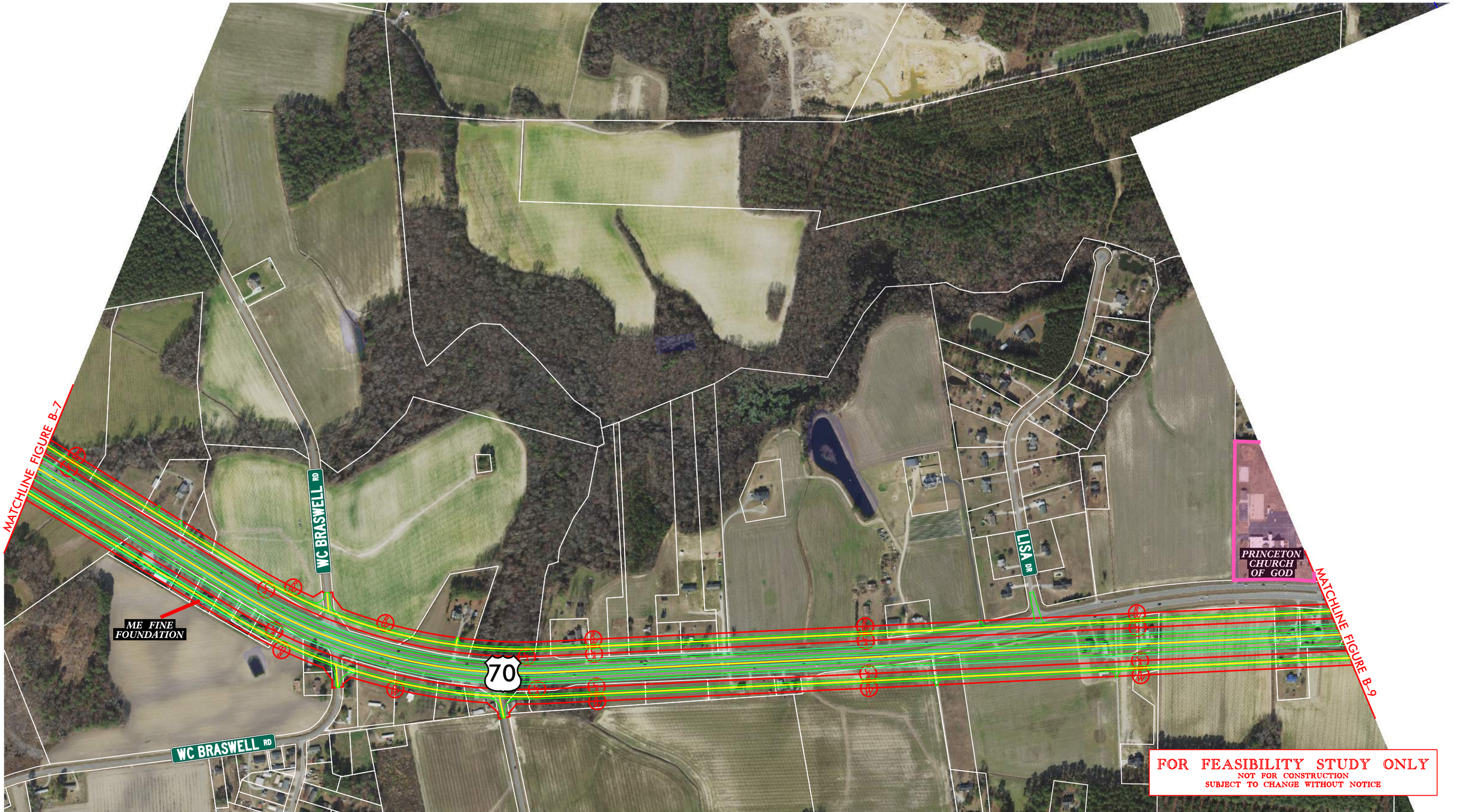
Raleigh, NC 27606



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500′ 0′ 500′ 1000′
250′

WETLANDS & STREAMS
HISTORIC
HAZARDOUS
NATURAL AREA

FIGURE B–8
CONCEPTUAL ROADWAY PLAN
ALTERNATE 1

UPGRADE US 70 TO INTERSTATE STANDARDS FROM SR 1003 (BUFFALO Rd.) NEAR SELMA TO SR 2372 (EDWARDS Rd.) IN PRINCETON JOHNSTON COUNTY

STIP# FS–1604A

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MATCHLINE FIGURE B–8

MATCHLINE FIGURE B–10A

ALT 70

PONDFIELD RD

GOLDSBORO PAVING

S T WOOTEN CORPORATION

PRINCETON TIRE SERVICES

70

PONDFIELD RD

AMITT DR

MARTIN LIVESTOCK RD

END SECTION 3/
BEGIN SECTION 4A

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500′ 0′ 500′ 1000′

250′

WETLANDS & STREAMS

HISTORIC

HAZARDOUS

NATURAL AREA

FIGURE B–9A
CONCEPTUAL ROADWAY PLAN
ALTERNATE 1

UPGRADE US 70 TO INTERSTATE STANDARDS FROM SR 1003 (BUFFALO Rd.) NEAR SELMA TO SR 2372 (EDWARDS Rd.) IN PRINCETON JOHNSTON COUNTY

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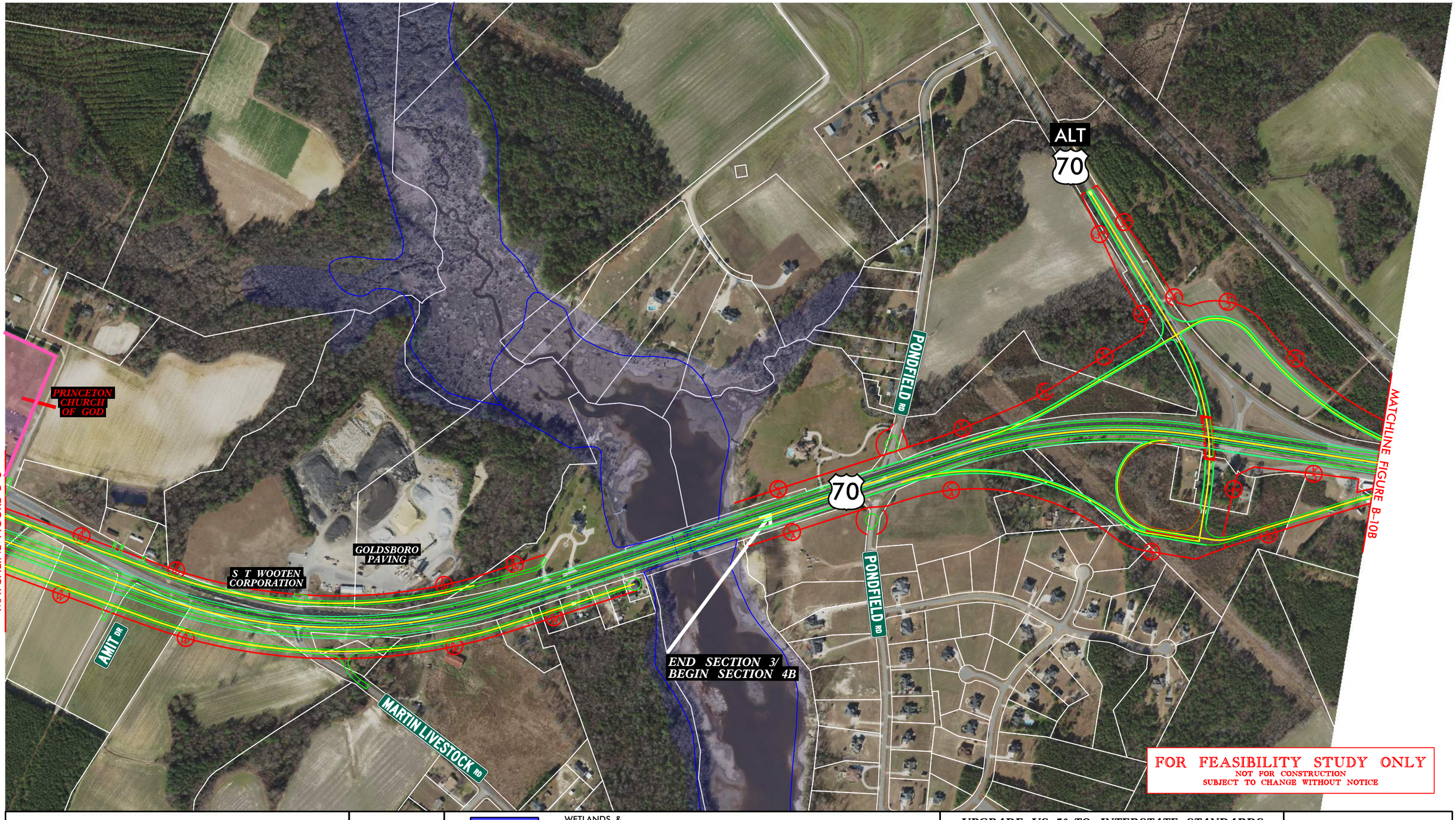

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250′

WETLANDS & STREAMS
HISTORIC
HAZARDOUS
NATURAL AREA

FIGURE B–9B
CONCEPTUAL ROADWAY PLAN
ALTERNATE 1

UPGRADE US 70 TO INTERSTATE STANDARDS FROM SR 1003 (BUFFALO Rd.) NEAR SELMA TO SR 2372 (EDWARDS Rd.) IN PRINCETON JOHNSTON COUNTY

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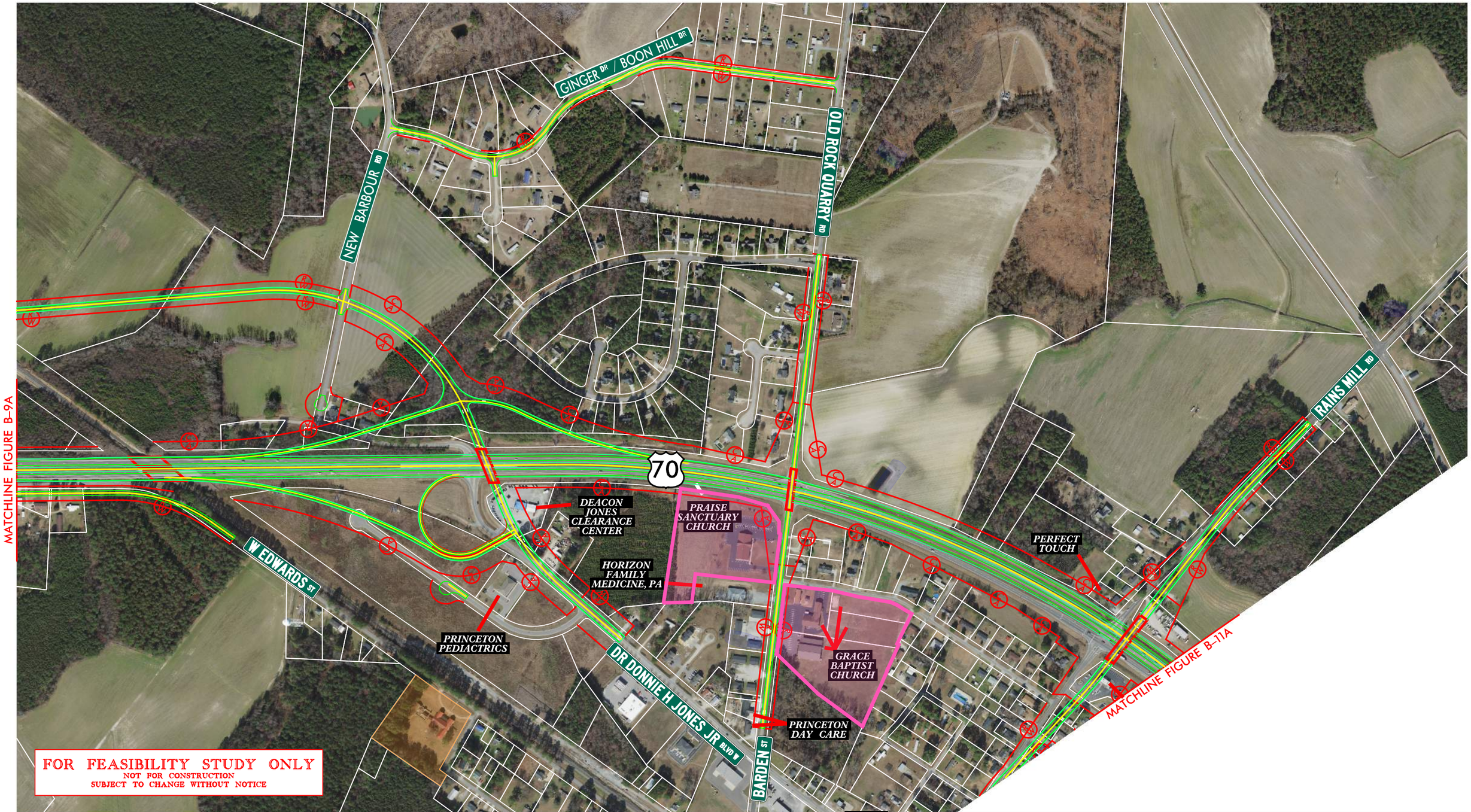

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250′

WETLANDS & STREAMS

HISTORIC

HAZARDOUS

NATURAL AREA

FIGURE B–10A
CONCEPTUAL ROADWAY PLAN
ALTERNATE 1

UPGRADE US 70 TO INTERSTATE STANDARDS FROM SR 1003 (BUFFALO Rd.) NEAR SELMA TO SR 2372 (EDWARDS Rd.) IN PRINCETON JOHNSTON COUNTY

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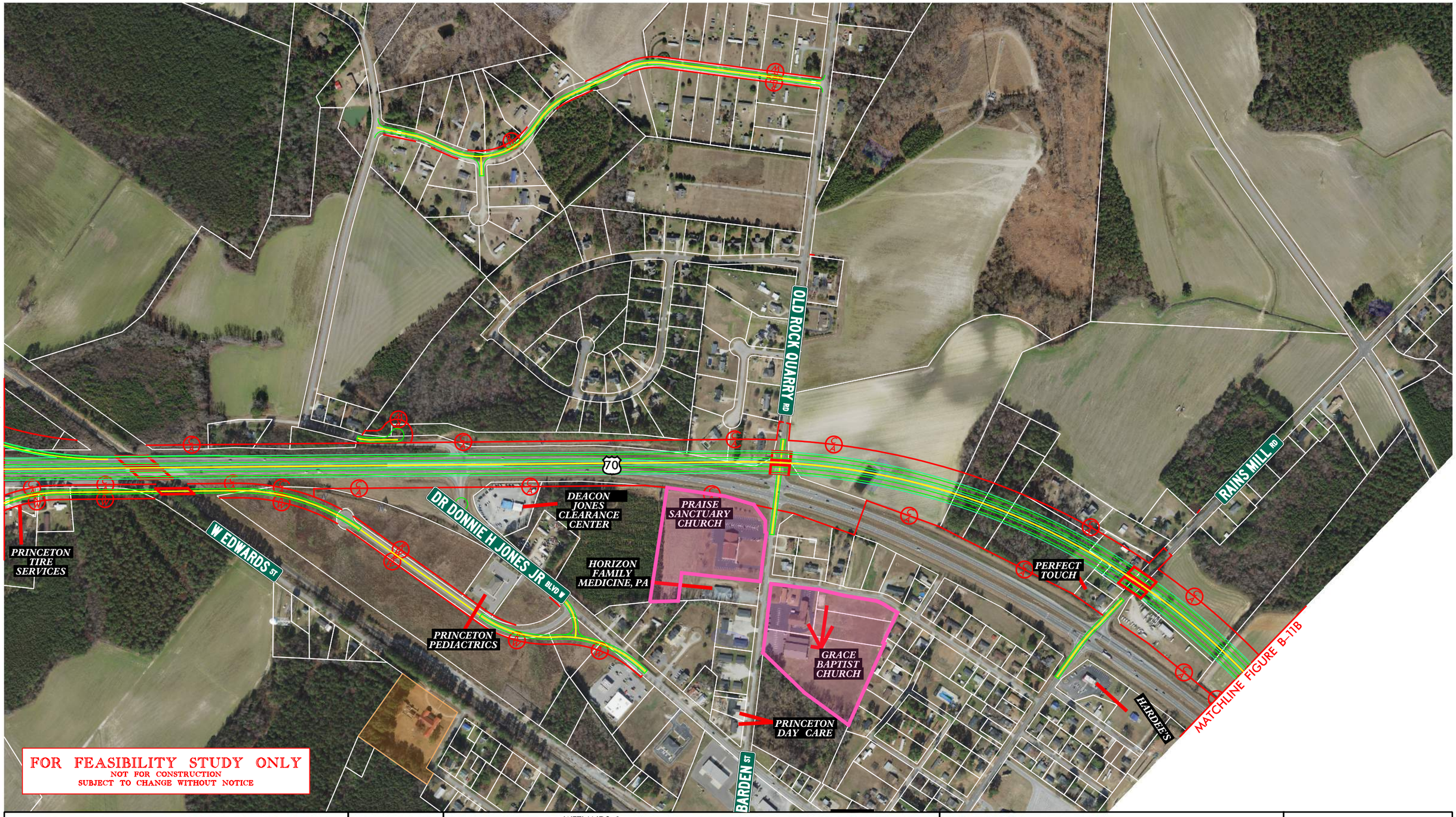

500′ 0′ 500′ 1000′

250′

WETLANDS & STREAMS
HISTORIC
HAZARDOUS
NATURAL AREA

FIGURE B–10B
CONCEPTUAL ROADWAY PLAN
ALTERNATE 1

UPGRADE US 70 TO INTERSTATE STANDARDS FROM SR 1003 (BUFFALO Rd.) NEAR SELMA TO SR 2372 (EDWARDS Rd.) IN PRINCETON JOHNSTON COUNTY

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MATCHLINE FIGURE B–10A

HANDY MART

MASSEY AUTO SALES

HWY 55 BURGERS SHAKES & FRIES

EDWARDS DR

AJ's DIAGNOSTICS AND AUTO REPAIR

70

HARDEE'S

BOJANGLES' FAMOUS CHICKEN 'N BISCUITS

N PEARL ST

PRINCETON HIGH SCHOOL

END SECTION 4A

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500′ 0′ 500′ 1000′

250′

WETLANDS & STREAMS

HISTORIC

HAZARDOUS

NATURAL AREA

FIGURE B–11A
CONCEPTUAL ROADWAY PLAN
ALTERNATE 1

UPGRADE US 70 TO INTERSTATE STANDARDS FROM SR 1003 (BUFFALO Rd.) NEAR SELMA TO SR 2372 (EDWARDS Rd.) IN PRINCETON JOHNSTON COUNTY

STIP# FS–1604A

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MATCHLINE FIGURE B–10B

MASSEY AUTO SALES

HANDY MART

EDWARDS DR

HWY 55 BURGERS SHAKES & FRIES

AJ's DIAGNOSTICS AND AUTO REPAIR

70

HARDEE'S

BOJANGLES' FAMOUS CHICKEN 'N BISCUITS

N PEARL ST

END SECTION 4B

PRINCETON HIGH SCHOOL

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500′ 0′ 500′ 1000′

250′

WETLANDS & STREAMS

HISTORIC

HAZARDOUS

NATURAL AREA

FIGURE B–11B
CONCEPTUAL ROADWAY PLAN
ALTERNATE 1

UPGRADE US 70 TO INTERSTATE STANDARDS FROM SR 1003 (BUFFALO Rd.) NEAR SELMA TO SR 2372 (EDWARDS Rd.) IN PRINCETON JOHNSTON COUNTY

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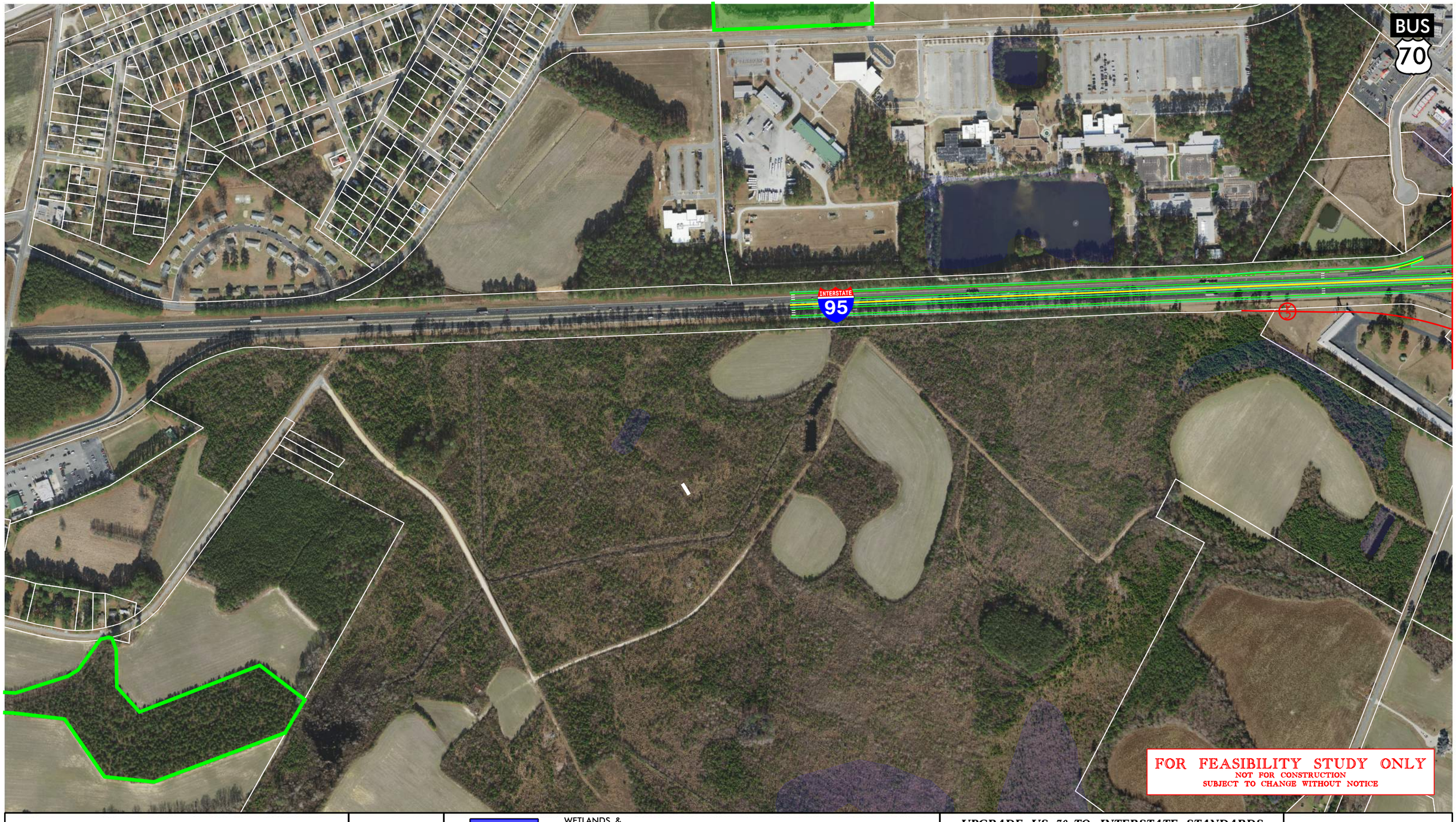

500′ 0′ 500′ 1000′

250′

WETLANDS & STREAMS

HISTORIC

HAZARDOUS

NATURAL AREA

FIGURE B–12
CONCEPTUAL ROADWAY PLAN
ALTERNATE 1

UPGRADE US 70 TO INTERSTATE STANDARDS FROM SR 1003 (BUFFALO Rd.) NEAR SELMA TO SR 2372 (EDWARDS Rd.) IN PRINCETON JOHNSTON COUNTY

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Raleigh, NC 27606

MATCHLINE FIGURE B–12

SKYWARE GLOBAL

US LUMBER GROUP

BUS 70

YELVERTON GROVE CHURCH

MATCHLINE FIGURE B–4

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500′ 0′ 500′ 1000′

250′

WETLANDS & STREAMS
HISTORIC
HAZARDOUS
NATURAL AREA

FIGURE B–13
CONCEPTUAL ROADWAY PLAN
ALTERNATE 1

UPGRADE US 70 TO INTERSTATE STANDARDS FROM SR 1003 (BUFFALO Rd.) NEAR SELMA TO SR 2372 (EDWARDS Rd.) IN PRINCETON JOHNSTON COUNTY

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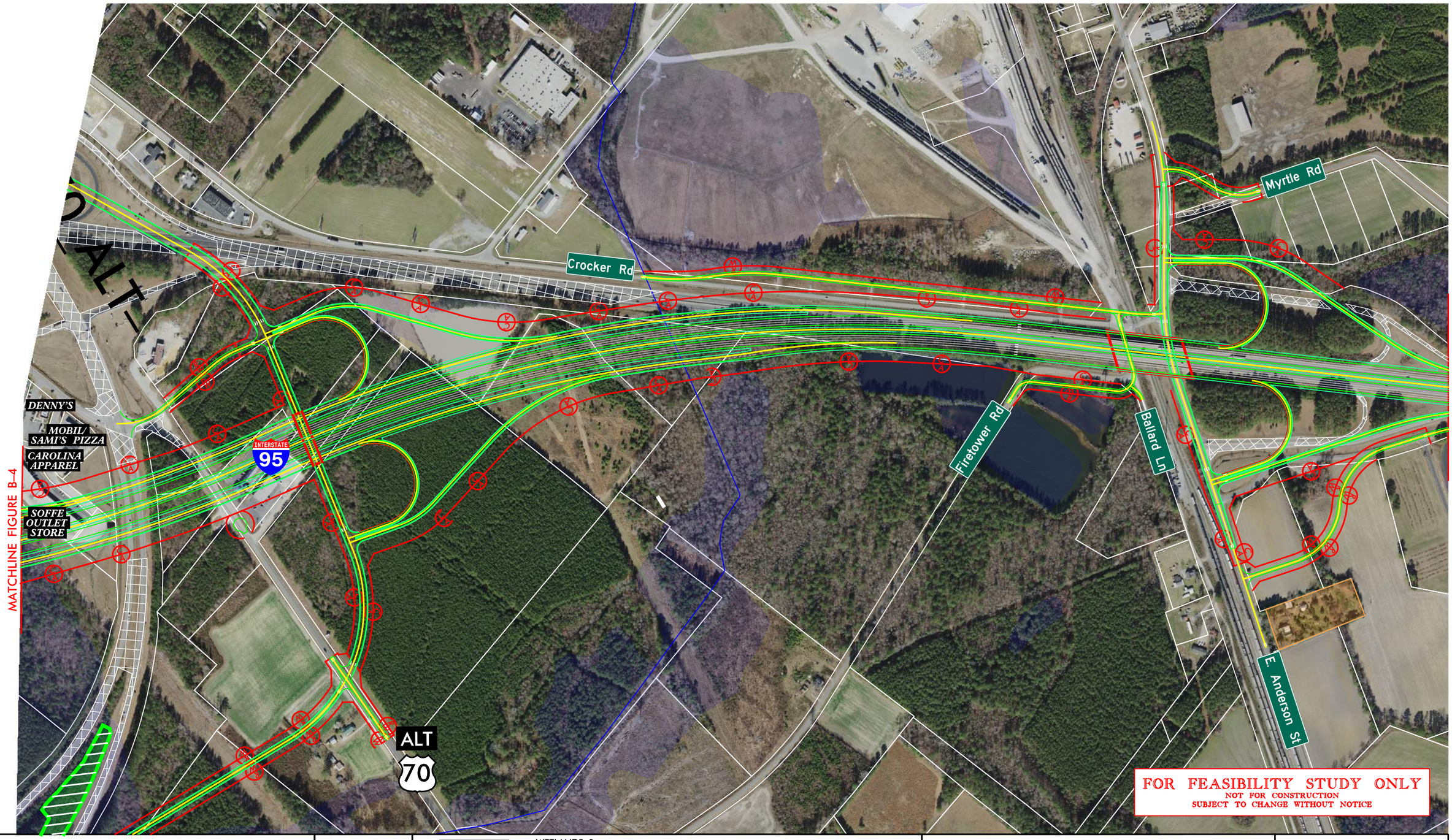

500′ 0′ 500′ 1000′

250′

WETLANDS & STREAMS
HISTORIC
HAZARDOUS
NATURAL AREA

FIGURE B–14
CONCEPTUAL ROADWAY PLAN
ALTERNATE 1

UPGRADE US 70 TO INTERSTATE STANDARDS FROM SR 1003 (BUFFALO Rd.) NEAR SELMA TO SR 2372 (EDWARDS Rd.) IN PRINCETON JOHNSTON COUNTY

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940 Main Campus Drive, Suite 500
Raleigh, NC 27606

500′ 0′ 500′ 1000′

250′

WETLANDS & STREAMS

HISTORIC

HAZARDOUS

NATURAL AREA

FIGURE B–15
CONCEPTUAL ROADWAY PLAN
ALTERNATE 1

UPGRADE US 70 TO INTERSTATE STANDARDS FROM SR 1003 (BUFFALO Rd.) NEAR SELMA TO SR 2372 (EDWARDS Rd.) IN PRINCETON JOHNSTON COUNTY

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Bear Farm Rd

70

BEGIN SECTION 1

NEUSE RIVER

MATCHLINE FIGURE B-17

FOR FEASIBILITY STUDY ONLY
NOT FOR CONSTRUCTION
SUBJECT TO CHANGE WITHOUT NOTICE

500′ 0′ 500′ 1000′

250′

WETLANDS & STREAMS
HISTORIC
HAZARDOUS
NATURAL AREA

FIGURE B–16
CONCEPTUAL ROADWAY PLAN
ALTERNATE 2

UPGRADE US 70 TO INTERSTATE STANDARDS FROM SR 1003 (BUFFALO Rd.) NEAR SELMA TO SR 2372 (EDWARDS Rd.) IN PRINCETON JOHNSTON COUNTY

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Raleigh, NC 27606

500′ 0′ 500′ 1000′

250′

WETLANDS & STREAMS

HISTORIC

HAZARDOUS

NATURAL AREA

FIGURE B–17
CONCEPTUAL ROADWAY PLAN
ALTERNATE 2

UPGRADE US 70 TO INTERSTATE STANDARDS FROM SR 1003 (BUFFALO Rd.) NEAR SELMA TO SR 2372 (EDWARDS Rd.) IN PRINCETON JOHNSTON COUNTY

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500′ 0′ 500′ 1000′
250′

WETLANDS & STREAMS
HISTORIC
HAZARDOUS
NATURAL AREA

FIGURE B–18
CONCEPTUAL ROADWAY PLAN
ALTERNATE 2

UPGRADE US 70 TO INTERSTATE STANDARDS FROM SR 1003 (BUFFALO Rd.) NEAR SELMA TO SR 2372 (EDWARDS Rd.) IN PRINCETON JOHNSTON COUNTY

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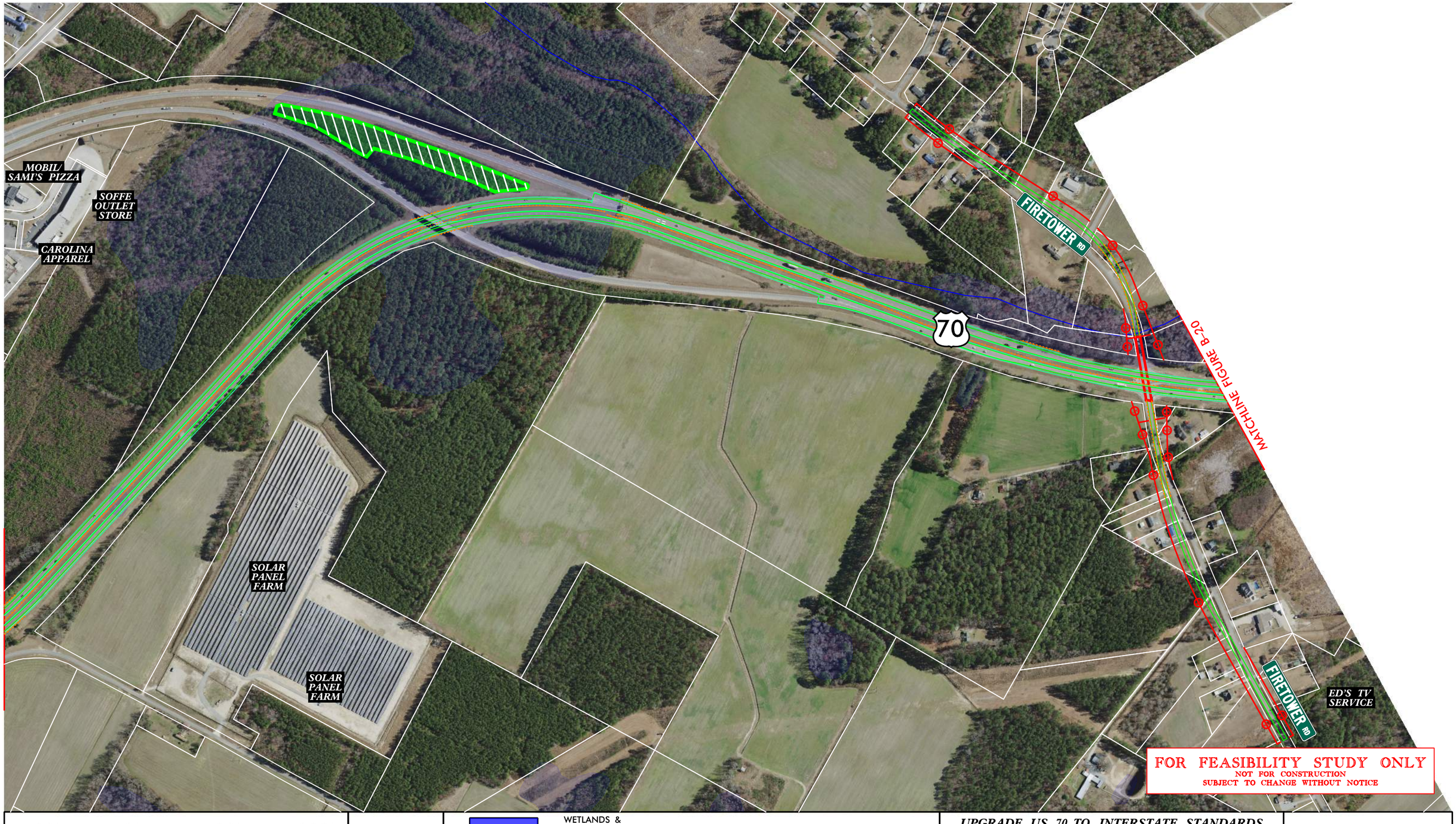
Raleigh, NC 27606



500′ 0′ 500′ 1000′

250′

WETLANDS & STREAMS

HISTORIC

HAZARDOUS

NATURAL AREA

FIGURE B–19
CONCEPTUAL ROADWAY PLAN
ALTERNATE 2

UPGRADE US 70 TO INTERSTATE STANDARDS FROM SR 1003 (BUFFALO Rd.) NEAR SELMA TO SR 2372 (EDWARDS Rd.) IN PRINCETON JOHNSTON COUNTY

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