FEASIBILITY STUDY

NC 211
FROM SR 1500 (MIDWAY ROAD) TO US 17 AT SUPPLY

Brunswick County

Division 3

WS-40814

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Date

Improvements to NC 211
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I. General Description

This feasibility study addresses the proposed improvements to NC 211 from SR 1500 (Midway Road) to US 17 in Brunswick County (Figure 1). The study will describe the proposed project and provide a general overview of the environmental and design issues. This study is the initial step in the planning and design process for this project and is not to be considered the product of exhaustive environmental or design investigations. The purpose of the study is to identify project challenges, describe the project challenges, and recommend potential treatment(s) that deserve consideration in the planning and design phases. Estimated project costs are also included.

The existing typical cross section for the majority of this 9.24 mile corridor consists of two 12-foot lanes with paved shoulders. The paved shoulders vary from 1-foot to 3-foot width. In some areas of the project corridor, NC 211 has been widened to provide for left and right turn lane approaches to various facilities along this route. In these instances, each lane is 11-feet wide with 2-foot paved shoulders. The roadway cross section for the approach to US 17 consists of five 11-foot lanes with 1-foot paved shoulders.

II. Need for Project

The primary purpose of this project is to identify and study improvements for traffic safety and operation of NC 211 by widening the existing 2-lane section to a divided multilane facility.

This area of the state is experiencing a tremendous amount of growth. Consequently, improvements to this corridor will be critical for the operation of NC 211 and the safety of the motoring and bicycling public.

III. Background

NC 211 is designated as a major collector in the North Carolina Statewide Functional Classification System and in the 2001 Brunswick County Transportation Plan.

This project was requested by Brunswick County and the Brunswick County Commissioners. The 2001 Brunswick County Transportation Plan recommends that this section of NC 211 be upgraded to a five-lane facility. As a part of this recommendation, the bridge over Lockwood Folly River, Bridge No. 69, would either require widening or construction of a second crossing parallel to the existing structure.

NC 211 is primarily a two-lane shoulder section with a pavement width of 28 feet. Additional widening has occurred at various locations along the project with the intent of providing left turn and/or right turn lane(s).

At the time of the field investigation for this project, the study area has approximately 16 unsignalized intersections, 3 signalized intersections and numerous residential and commercial driveways along NC 211. The unsignalized intersections are: Woodedge Way; Horizon Way; SR 1111 (Mosquito Branch Road); Whispering Trail; Woodside Trail; SR 1112 (Sunset Harbor Road); SR 1193 (Smithtown Road); SR 1505 (Clemmons Road); Deer Trot Road; Crossroads Trail; SR 1178 (Hewettown Road); River Sea Loop East; River Sea Loop West; SR 1115 (Stone Chimney Road); Country Side Street; and, SR 1535 (Blanton Road). The signalized intersections include; SR 1500 (Midway Rd); SR 1114-1504 (Zion Hill Road/Lennon Road); and US 17.

The land uses surrounding the project area are best described as a mix of agricultural and residential uses with scattered commercial development. Towards the eastern project termini, the tracts are forested, farm land, and residential developments. The residential properties consist of scattered single-family homes, and there are three existing housing developments with varying combinations of densely located single- and multiple-family homes. Towards the western project termini, there is a mix of commercial and industrial developments with some single-family homes.

There is one existing bridge located along the project route. Bridge No. 69 is located approximately 0.6 mile east of US 17 and carries NC 211 over Lockwood Folly River. This structure has a clear roadway width of 40-feet from curb to curb and is 268-feet long. It was constructed in 1975 and received a sufficiency rating of 75.6 points (out of a possible 100.0 points) in the May 2005 Bridge Inspection Report.

There are three churches along this corridor within the project limits. The churches are Midway Apostolic Tabernacle, Jehovah's Witnesses Kingdom Hall, and Concord United Methodist Church. Concord United Methodist Church has a graveyard behind the church.

The Supply Fire Department is located within the study area on NC 211. The building is located approximately 0.1 mile east of the intersection with US 17.

There are approximately 162 concrete power poles along NC 211. These poles support the Coastal Power & Electric power lines. The pole line lies on the south side of NC 211 from Midway Road to approximately 1000-feet east of Lockwood Folly River. At this location and to the existing US 17 intersection, the power line crosses NC 211 and continues along the north side of NC 211 to US 17. The distance from the poles to the edge of the travelway ranges from 20 to 45. The exception of this distance is in proximity of Midway Road. At this location, the power poles have been relocated to provide sufficient clearance distance for the future widening and expansion of Midway Road (TIP R-2245).

NC 211 is designated by the NCDOT Bicycle and Pedestrian Division as a Bicycling Highway. Though designated as a bike route, it currently is indicated on the South Brunswick Islands D-1 map to be "hazardous" due to heavy seasonal traffic.

Several Traffic Impact Analyses (TIA) have been completed along NC 211. Some of these TIAs noted that US 17 will be designed to a super-street at the US 17/ NC 211 intersection. This option has not been selected as the preferred alternative for this area. The option of designing the intersection to a super-street is included in this feasibility study.

IV. Adjacent Projects

This project intersects two TIP projects. Figure 2 notes the location of these TIPs in regard to NC 211 Feasibility Study.

Currently under construction is TIP R-2245, otherwise known as the second bridge to Oak Island. This roadway lies on new location connecting SR 1104 (Beach Drive) to NC 211. It includes the widening of SR 1105 (Middleton Avenue) from SR 1104 to SR 1190, the replacement of Bridge No. 206 over Davis Creek, and the construction of a multilane facility on new location from SR 1190 (Oak Island Drive) to the NC 211/Midway Road intersection.

TIP R-3434 involves widening of SR 1500 (Midway Road) and SR 1401 (Galloway Road) from NC 211 to US 17 Bypass. It includes upgrading the roadway to twenty-four feet and constructing paved shoulders.

TIP R-5021 involves widening of NC 211 from SR 1500 (Midway Road) to NC 133 north of Southpoint. This project widens NC 211 to a four lane divided section with a raised median.

TIP R-3436 entails the construction of I-74 from SR 1585 (Union Valley Road) in Columbus County to the South Carolina State Line in Brunswick County. This TIP project is in the feasibility stage of planning with no alignment established.

In addition to these TIP projects, there are a large number of developments which have been approved by the Brunswick County Planning Department for this portion of NC 211 or that will directly affect this portion of NC 211. There are also a number of projects which are in the planning stages, not yet approved, and therefore, are not included in this report. These are the Williamson Tract development, Mariner's Reach development, and Exum Tract development.

V. Traffic Operations

The base year 2007 Average Daily Traffic (ADT) volumes along the study section of NC 211 range between 9,000 vehicles per day (vpd) and 13,700 vpd. The future 2035 design year traffic volumes are projected to range from 20,600 vpd to 31,300 vpd, using an

annual growth rate of 3% along the NC 211 corridor. The collected tube count data provided truck traffic percentages of 6% duals and 3% TTSTs within the project limits.

A traffic capacity analysis was conducted for the study area section of NC 211 using 2035 projected traffic volumes. The capacity analysis assumed a four-lane cross-section with exclusive left-turn lanes at each Secondary Route. Each Secondary Route intersection with NC 211 was assumed to include full movement access. A superstreet design was assumed at the intersection of NC 211 and US 17.

Based on the described parameters, the intersection of NC 211 at US 17 (Ocean Highway) will require signal modifications to accommodate the proposed superstreet mitigation. The superstreet design will not provide an adequate level of service based on the projected traffic volumes at the intersection of NC 211 and US 17 (Ocean Highway). Additional widening along US 17 is necessary in order to allow this intersection to operate acceptably during 2035. The intersection of NC 211 at SR 1500 (Midway Road) will require signalization and geometric modifications to accommodate the anticipated fourth leg extension and additional projected traffic along SR 1500 (Midway Road). The intersections of NC 211 at SR 1505 (Clemmons Road) and SR 1193 (Smithtown Road) will need to be realigned to allow each movement to operate sufficiently. The intersection of NC 211 and SR 1115 (Stone Chimney Road) will require signalization and further geometric improvements to operate acceptably during the 2035 build-out year.

During the three-year period from April 1, 2004 to March 31, 2007, there were 161 crashes reported within the project limits. Of the 161 reported crashes, there were 112 property damage only crashes, 49 injury crashes and no fatal crashes. There were two prevalent crash types along this corridor. Rear end, slow or stop crashes comprised 24.84 % of the total with animal crashes closely following with 24.22 %. All other crash types account for the remaining 50.94 %. The crash rate for the project limits was 163.60 crashes per 100 million vehicle miles of travel (acc/100mvm), which was less than the 2003-2005 statewide crash rate of 191.04 acc/100mvm for two-lane undivided rural North Carolina routes.

VI. Environmental Screening

The following information represents a preliminary review of environmental issues that have a potential impact to the project. The information obtained for the environmental screening is from readily available environmental database information only. No survey work has been performed other than a general field inspection. The environmental screening is not a substitute for the project planning/environmental documentation process. The purpose of the environmental screening is to identify potential environmental issues early in the process.

Historic Properties

As part of the environmental screening process, the NC State Historic Preservation Office was contacted to determine if any historic resources on the National Register of Historic Places or state lists exists in the project study corridor. For the purposes of this

screening, a cursory field inspection was conducted to identify properties within the study corridor that had the potential to be older than 50 years. Based on the field review, no structures were identified as being 50 years or older. If this project is programmed into the TIP, it is recommended that a survey of the corridors be conducted by an architectural historian to identify potentially eligible properties.

Floodplains

Brunswick County is a regular participant in the national Flood Insurance Program. Federal Emergency Management Act (FEMA) flood plain panels from the NC Flood Plain Mapping were reviewed. Panels of note include: 2029, 2039, 2038, 2048, 2058 and 2068. The proposed project crosses the 100 year floodplain at Lockwood Folly River.

Stream Classification

The proposed project lies in the Lumber River Basin (8 digit hydrologic unit 03030005). The following table notes the named streams that are crossed by the project and their respective best usage classification.

Stream Name	Index #	Best Usage Classification
Lockwood Folly River	15-25-1-(11)	SC HWQ
Scott's Branch	15-25-1-10	C Sw
Mill Creek	15-25-1-18(1)	C Sw

SC refers to tidal salt waters.
HQW refers to High Quality Waters, a supplemental usage classification noting that the water's quality is excellent based on biological and physical/chemical characteristics through NCDWQ monitoring or special studies.
Sw is a supplemental classification noting streams with low velocities.
C refers to waters protected for secondary recreation fishing, wildlife, fish consumption, aquatic life including propagation, survival and maintenance of biological integrity, and agriculture.

Wetlands

The National Wetlands Inventory (NWI) maps for Supply and Lockwood Folly quadrangle maps (USGS) were reviewed to determine whether the proposed corridor would impact any potential wetlands. These maps note the presence of wetlands in the project study corridor (Figure 3a, 3b and 3c). During the preparation of any environmental assessment, it is recommended that these wetlands be delineated and surveyed. Coordination with the US Army Corps of Engineers should be conducted early in the planning stages so avoidance and minimization measure of any impacts to waters of the United States can be implemented.

Federally Protected Species

The databases of the NC Natural Heritage Program (NCNHP) and the US Fish and Wildlife Service (USFWS) were reviewed to determine the presence of any threatened or endangered species within the project study corridor. Table 1 notes the current species listed for Brunswick County.

Table 1 . Threatened and Endangered Species Found within Project Study Corridor

Common name	Scientific name	Federal status
American alligator	*Alligator mississippiensis*	T (S/A)
Bald eagle	*Haliaeetus leucocephalus*	BGPA
Eastern puma (cougar)	*Puma concolor couguar*	E
Green sea turtle	*Chelonia mydas*	T
Kemp's (Atlantic) Ridley sea turtle	*Lepidochelys kempii*	E
Leatherback sea turtle	*Dermochelys coriacea*	E
Loggerhead sea turtle	*Caretta caretta*	T
Piping plover	*Charadrius melodus*	T
Red-cockaded woodpecker	*Picoides borealis*	E
Shortnose sturgeon	*Acipenser brevirostrum*	E
West Indian manatee	*Trichechus manatus*	E
Wood stork	*Mycteria americana*	E
Cooley's meadowrue	*Thalictrum cooleyi*	E
Rough-leaved loosestrife	*Lysimachia asperulaefolia*	E
Seabeach amaranth	*Amaranthus pumilus*	T

Species Status: E refers to Endangered; T refers to Threatened; T (S/A) refers to Threatened due to Similarity of Appearance; and, BGPA refers to the Bald Eagle Protection Act which replaced the Eagle's Endangered status.

Note: all occurrences are current except the eastern puma which is historic.

A review of Natural Heritage Element Occurrence GIS Data (July 2007) from the NC Natural Heritage Program and NC Center for Geographic Information and Analysis was conducted to determine if any federally listed species were within the NC 211 feasibility study area. Upon review, it was noted that no federally listed species were depicted within 1 mile of the study area. However, three (3) Federal Species of Concern (FSC) were noted as existing within ½ mile of the feasibility study review area. FSC listings included (2) sites where a population of rain lilies was last observed in 2005 and (1) area where there was a population of northern pine snakes last observed in 1984. Although FSC species are not protected under the 1973 Endangered Species Act, it is

recommended that staff review the study area for these species when future studies are conducted to improve NC 211.

Habitat along the proposed corridor exists for several of the species noted in Table 1. Surveys will most likely be required during the detailed planning stages to evaluate the presence of these species in the project study area.

Environmental Justice

Executive Order 12898 requires that Federal agencies identify and address disproportionately high and adverse effects of federally funded projects on minority and low-income populations, commonly referred to as environmental justice. A review of the US Environmental Protection Agency Environmental Justice Geographic Assessment Tool noted that there are minority population blocks (40-100%) along parts of the project study corridor and that there are low-income population (below poverty) blocks (10-20%) along segments of the project study corridor. If this project is programmed into the TIP, it is recommended that a detailed review of environmental justice be implemented as it relates to the proposed project.

Hazardous Materials

A review of listed State Hazardous Waste Sites from NCDENR was conducted in May 2009. Data reviewed included GIS shapefiles of NC State listed Hazardous Waste Sites. No listed sites were depicted within 5 miles of the NC 211 feasibility study area. The database review did not include a review of state listed above ground (AST)'s or underground storage tanks (UST)'s. It is recommended that additional studies be included in future planning work.

VII. Alternatives

There is only one alternative currently being considered. Widening will be symmetrical about NC 211 centerline and the proposed right-of way along the project corridor is 150-feet. One bridge over Lockwood Folly River will be widened to accommodate the proposed multilane improvements. The proposed segment is a four-lane divided shoulder section, 79-feet wide edge to edge of pavement with a 23-foot raised grass median and 10-foot paved shoulders. Additional widening at some locations along the project is provided to accommodate left turn and right turn lane(s).

This alternative will result in the relocation of eleven (11) residences and three (3) businesses. The total cost of this alternative, including construction and right-of-way is estimated to be $64,000,000.

Relocations

Residences 11

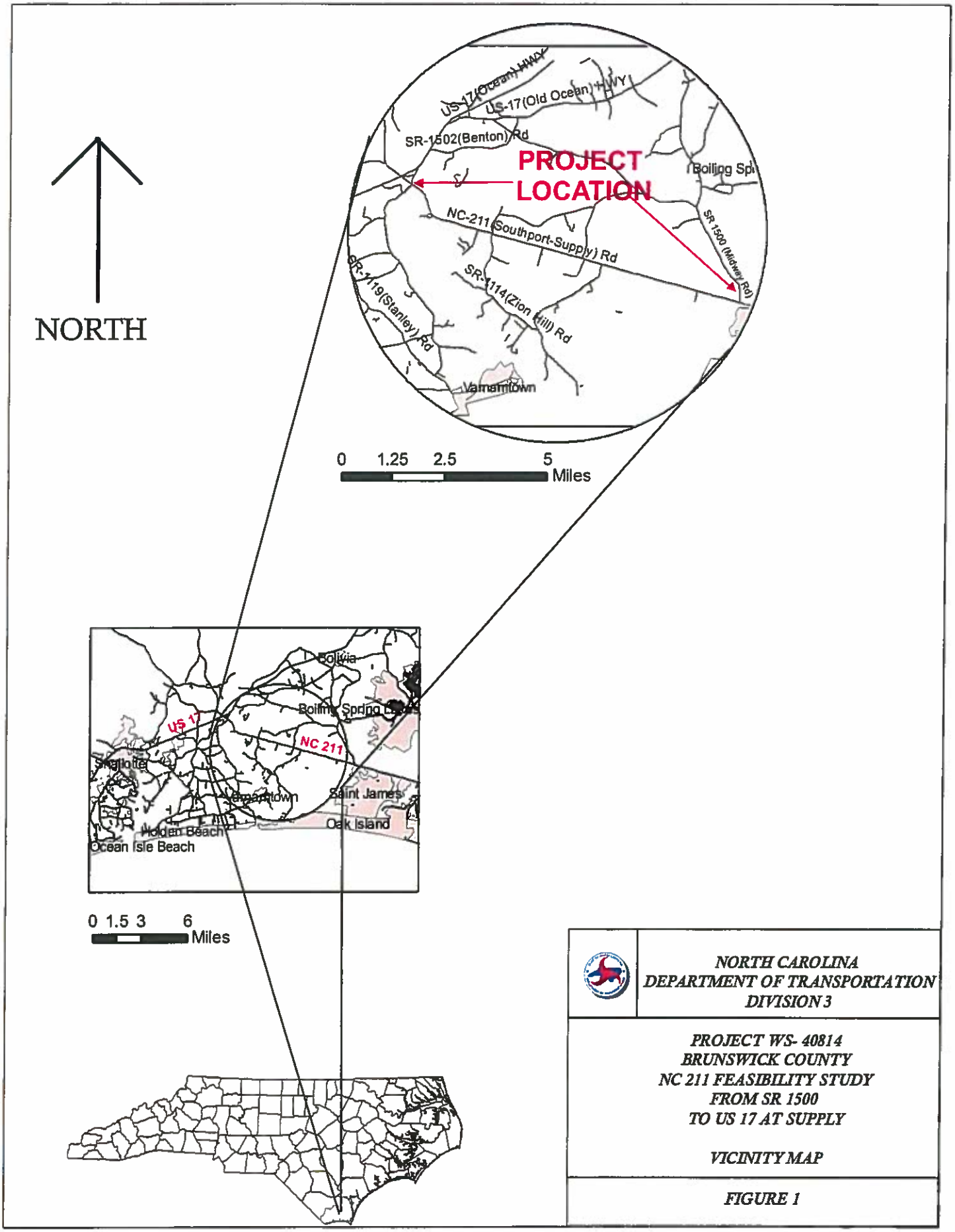
Businesses 3

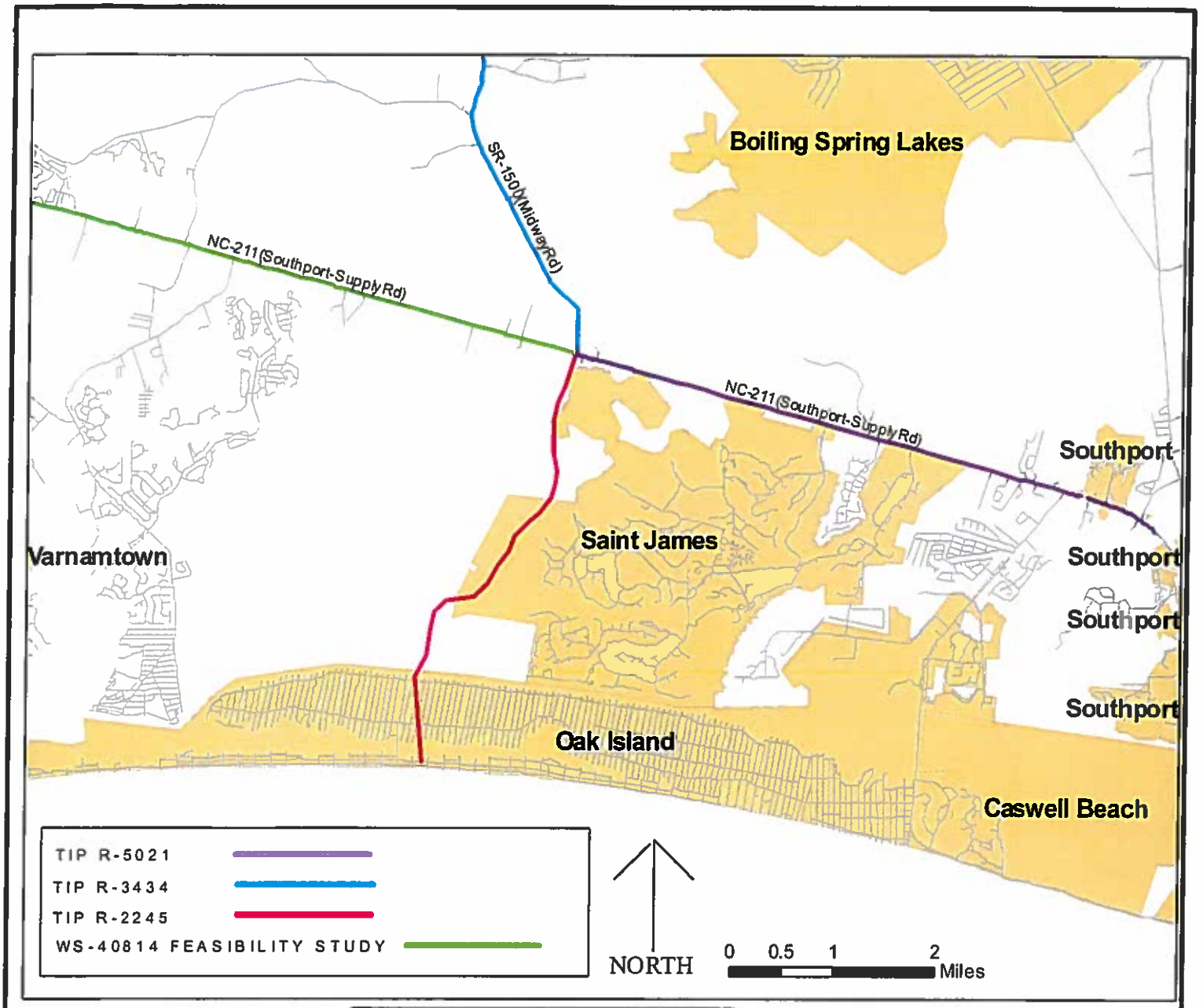
Construction (including Utility Construction) $45,800,000
Right-of Way and Utility $18,200,000
Total Project Cost $64,000,000

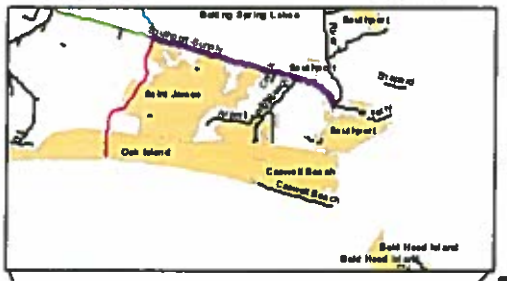
VIII. Recommendations

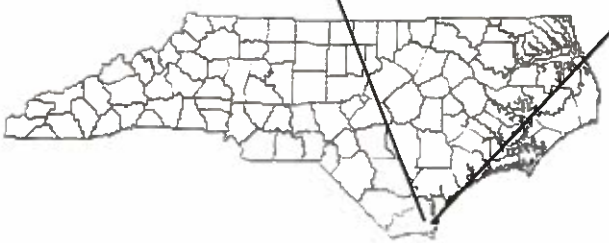
It is recommended that NC 211 be symmetrically widened to a multilane four-lane divided highway along the existing alignment and that the existing bridge over Lockwood Folly be widened to accommodate the additional lanes. Traffic signals at the three (3) signalized intersections should be revised to accommodate traffic pattern changes.

It is further recommended at the intersection of US 17 with NC 211 and other areas where widening has been provided for left turn and right turn lanes, that the additional pavement is utilized and other alternative designs be considered.


NORTH
US-17(Ocean) HWY
US-17(Old Ocean) HWY
SR-1502(Benton) Rd
PROJECT LOCATION
NC-211(Southport-Supply) Rd
SR-1119(Stanley) Rd
SR-1114(Zion Hill) Rd
SR 1500 (Midway Rd)
Varnamtown
0 1.25 2.5 5 Miles
Bolivia
US 17
NC 211
Saint James
Oak Island
Holden Beach
Ocean Isle Beach
0 1.5 3 6 Miles
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION 3
PROJECT WS- 40814
BRUNSWICK COUNTY
NC 211 FEASIBILITY STUDY
FROM SR 1500
TO US 17 AT SUPPLY
VICINITY MAP
FIGURE 1







NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION 3

PROJECT WS-40814
TIP R-2245 (SR 1104 TO NC 211)
TIP R-3434 (SR 1500 AND SR 1401)
TIP R-5021 (SR 1500 to NC 87) &
(NC 211 TO US 17 BYPASS)
BRUNSWICK COUNTY

VICINITY MAP SHOWING ADJACENT TIP'S

FIGURE 2

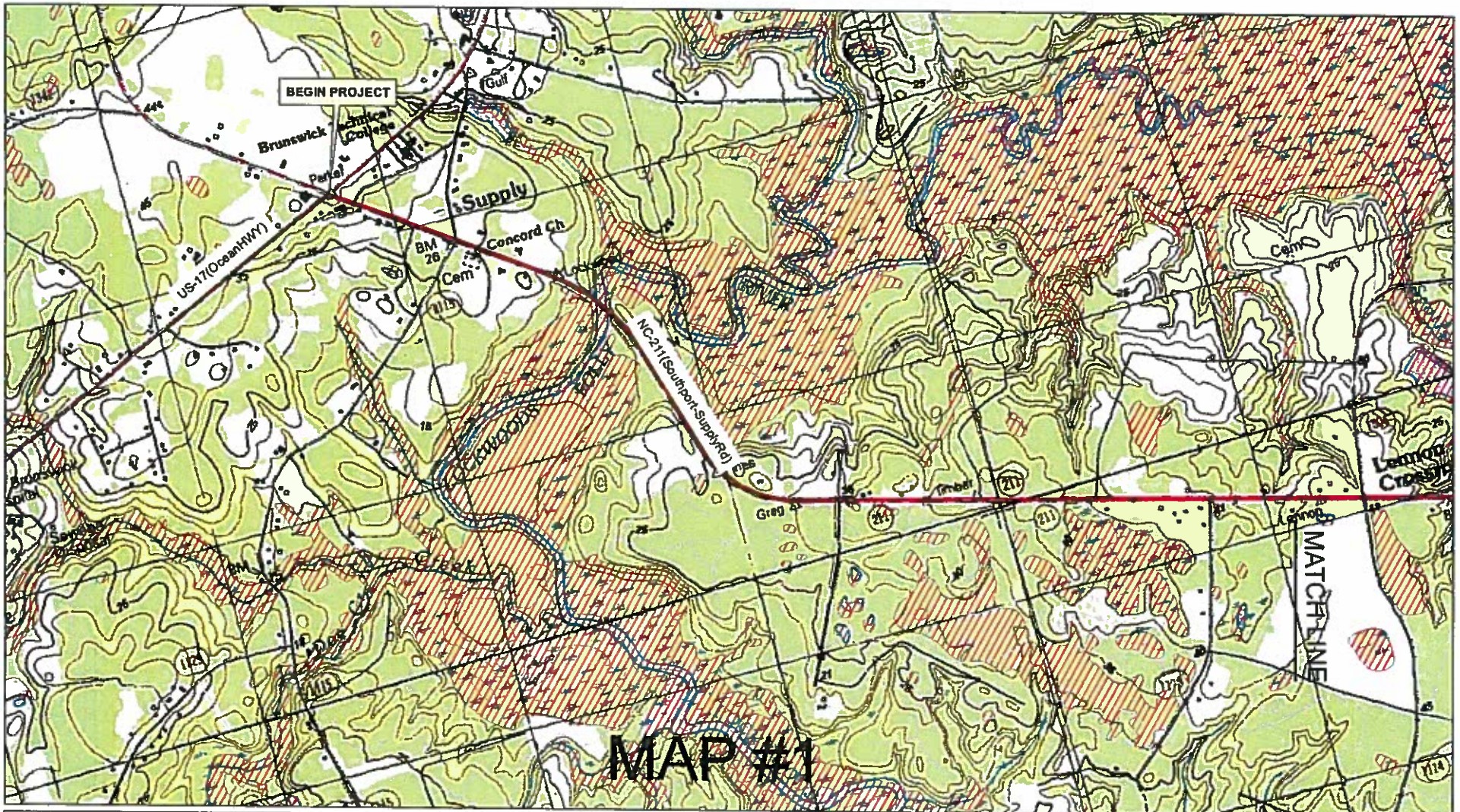


FIGURE 3(a)	***USGS MAP WITH NATIONAL WETLANDS INVENTORY*** ***PROJECT WS- 40814 (NC 211 FROM US 17 BYPASS TO SR 1500 (MIDWAY RD)*** BRUNSWICK COUNTY, NC	Feasibility Study Area NWI Wetlands	Data Source: FWS NWI Data 2008 NCDOT USGS Shallotte Quad 0 0.15 0.3 0.6 Miles

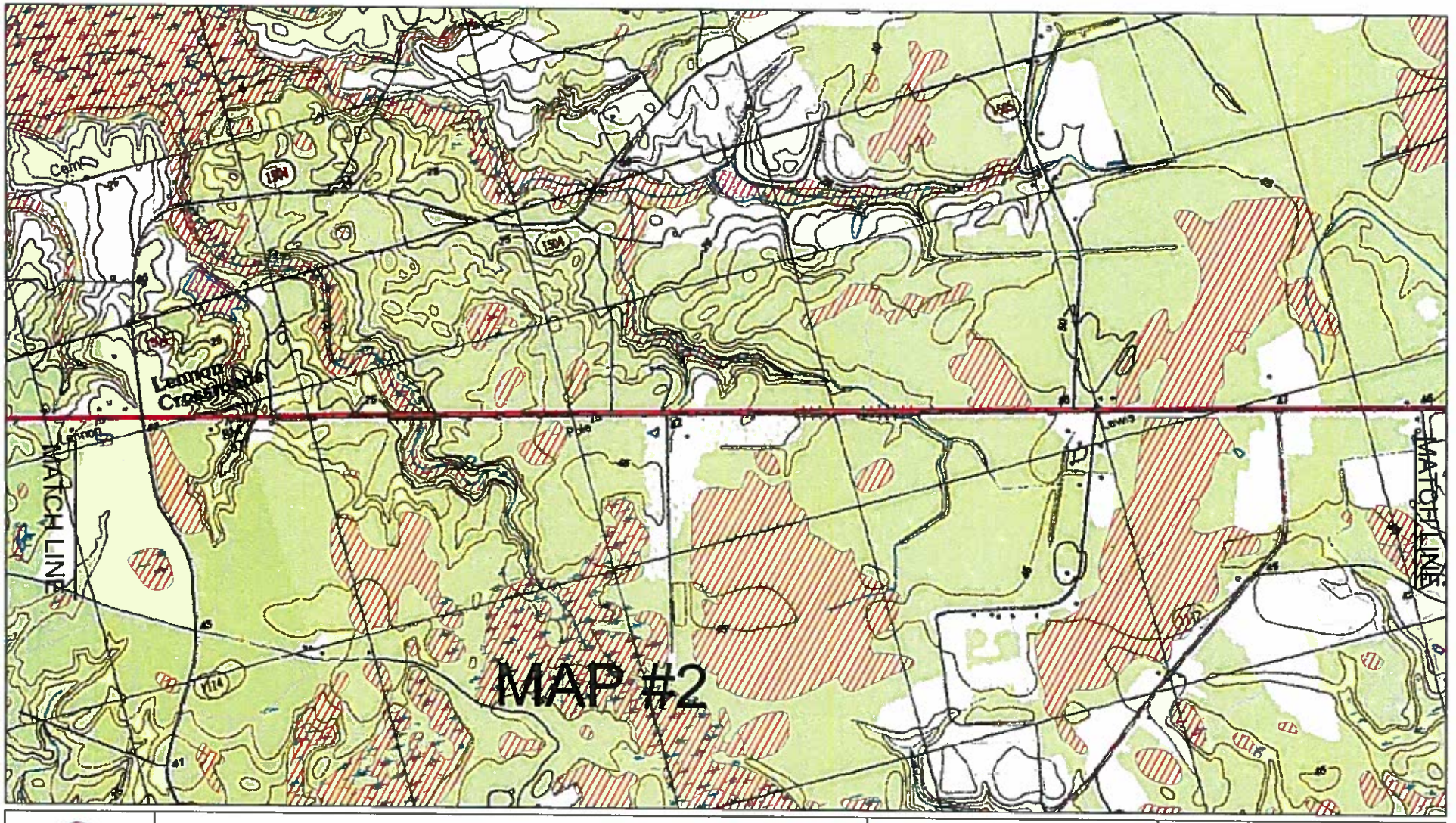


FIGURE 3(b)

USGS MAP WITH NATIONAL WETLANDS INVENTORY
PROJECT WS- 40814 (NC 211 FROM US 17 BYPASS TO SR 1500 (MIDWAY RD)
BRUNSWICK COUNTY, NC

Feasibility Study Area
NWI Wetlands

Data Source:
FWS NWI Data 2008
NCDOT USGS Shallotte Quad

0 0.15 0.3 0.6 Miles

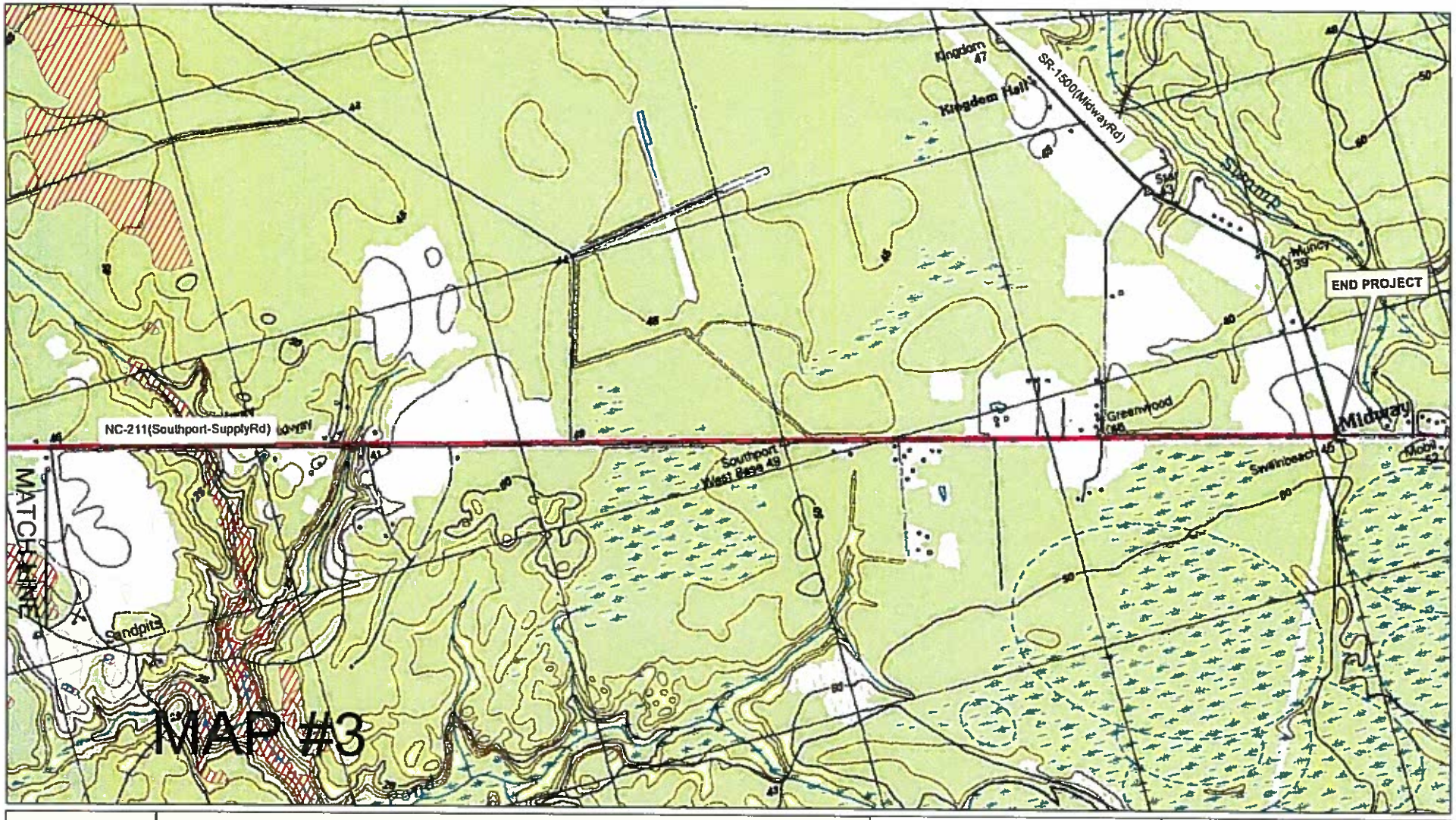


FIGURE 3(c)

USGS MAP WITH NATIONAL WETLANDS INVENTORY

PROJECT WS- 40814 (NC 211 FROM US 17 BYPASS TO SR 1500 (MIDWAY RD)

BRUNSWICK COUNTY, NC

Feasibility Study Area

NWI Wetlands

Data Source:
FWS NWI Data 2008
NCDOT USGS Shallotte Quad

0 0.15 0.3 0.6 Miles