



# Chapter 6: Environmental Analysis



Jordan Lake  
(October 2009)



## CHAPTER 6. ENVIRONMENTAL ANALYSIS

The human, cultural and natural environments are analyzed in this chapter of the Corridor Study Report. The section will detail the notable features along the US 64 Corridor and determine the possible effects on these features resulting from the implementation of the Short-term and Long-term Solutions for the Study.

### 6.1 EXISTING ENVIRONMENTS

This section describes the existing environments for the human and natural environments and the cultural resources within the Study Area for the US 64 Corridor. The information included in this section is shown on Figure 6.1

#### 6.1.1 HUMAN ENVIRONMENTS

The human environment is where people live, what they use and everything around them and includes the demographics of the people in the area as well as the community services that support the people.

##### 6.1.1.1 Community Facilities and Services

The existing community facilities within the Study Area are included in this section and consist of schools, churches, community centers, cemeteries and hospitals.

#### Schools

The public schools within the study area are a part of the Wake County and Chatham County Public School Systems. The Chatham County School System operates 16 schools within Chatham County and Wake County School System operates 195 schools throughout Wake County. There are currently no Chatham County Schools along the US 64 Corridor within the Study Area. There are six Wake County Schools along the corridor including the following:

- Olive Chapel Elementary School – 0.7 miles south of US 64 on Kelly Road
- Baucom Elementary School – 0.7 miles south of US 64 on Hunter Street
- Salem Elementary School – 0.5 miles north of US 64 on Old Jenks Road
- Salem Middle School – 0.5 miles north of US 64 on Old Jenks Road
- Laurel Park Elementary – 0.7 miles north of US 64 on Laura Duncan Road
- Apex High School – Southwest corner of the intersection of US 64 and Laura Duncan Road

#### Churches

The following churches are located within the study area:

- Ebenezer United Methodist Church – 0.7 miles south of US 64 on Beaver Creek Road
- Olive Chapel Baptist Church – 0.7 mile south of US 64 on New Hill Road
- Crossway Community Church – on the south side of US 64, 0.1 miles east of Jenks Road
- Hope Chapel – 0.3 miles north of US 64 on Old Jenks Road
- Prince of Peace Episcopal Church – 0.4 miles south of US 64 on North Salem Street
- Salem Baptist Church – 0.3 miles north of US 64 on Salem Church Road
- Faith Baptist Church – at the corner of US 64 and Shepherd's Vineyard Drive, north of US 64
- St. Andrews Catholic Church – 0.1 miles south of US 64 on Old Raleigh Road

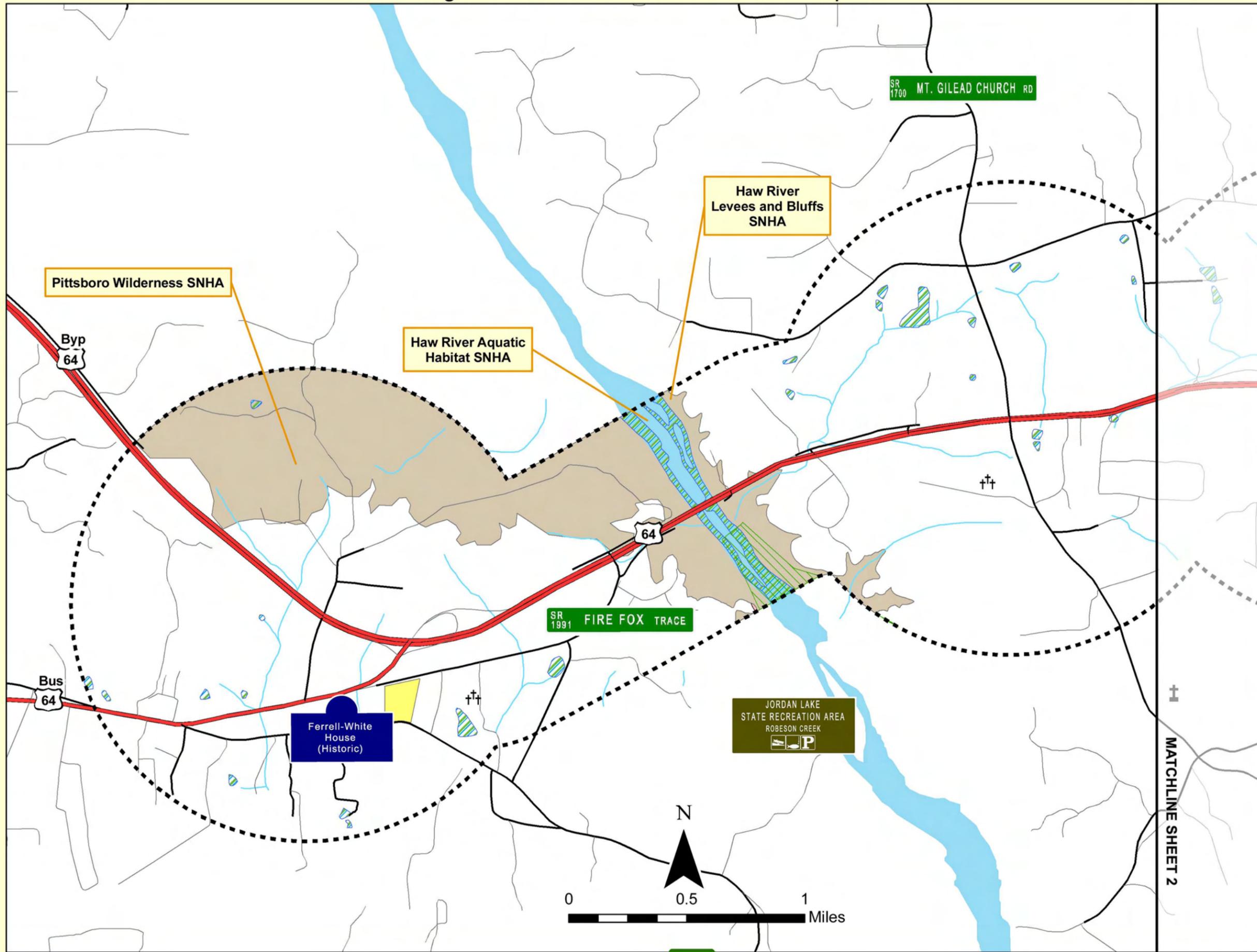
#### Community Facilities and Parks

Throughout the study area of the US 64 corridor study there are several community facilities and parks. A description of these facilities is included as follows:

- Jordan Lake State Recreational Area, including the following facilities:
  - Robeson Creek - boat ramp and fishing

- Vista Point - boat ramp, camping, dump station fishing, picnic facilities, restrooms, swimming and trails
- Parkers Creek - boat ramp, camping, dump station, fishing, picnic facilities, restrooms, swimming and trails
- Seaforth boat ramp, fishing, picnic facilities, restrooms, swimming and trails
- Poplar Point - boat ramp, camping, dump station, fishing, restrooms, swimming and trails
- Ebenezer - boat ramp, fishing, picnic facilities, restrooms, swimming and trails
- White Oak - boat ramp, fishing, picnic facilities, restrooms, and swimming
- Crosswinds Marina - boat ramp, boat rentals, fishing and restrooms
- Crosswinds Campground - boat ramp, camping, dump station, fishing, restrooms, swimming and trails
- North Carolina Forest Service Educational State Forest
  - Designed to teach the public (especially school children) about the forest environment and feature self-guided trails that include exhibits, tree identification signs, a forest education center and a talking tree trail
  - Located in the northeast quadrant of the US 64 intersection with Big Woods Road
- American Tobacco Trail
  - 22-mile long rails to trails project
  - Crosses under US 64 between Jenks Road and NC 751
- Eva Perry Regional Library –
  - Part of Wake County Library System
  - Located on Shepherd's Vineyard Drive
- Apex Community Park –
  - 160-acre park including baseball fields, soccer fields, sand volleyball courts, tennis courts, basketball courts, playground, restrooms, picnic areas, fishing dock, 50-acre lake and 3-miles of developed nature and fitness trails.
  - Located north of US 64 between Laura Duncan Road and Lake Pine Drive.
- Regency Park/Koka Booth Amphitheatre –
  - 14 acre site situated next to Symphony Lake
  - Includes a 7,000 person capacity outdoor amphitheatre owned by the Town of Cary
  - Located at the eastern edge of the study area along Regency Parkway
- Hemlock Bluffs State Nature Area
  - 92 acre nature area owned by the North Carolina Parks System
  - Includes the Stevens Nature Center that provides guests with unique opportunities to learn more about wildlife, conservation, and natural history
  - Located at the eastern edge of the study area along Regency Parkway
- Greenways and Trails, including the following:
  - North Beaver Creek Greenway – partially completed, located between Kelly Road and NC 55
  - Beckett's Crossing Greenway – partially completed
  - Haddon Hall Greenway – partially completed, located between NC 55 and South Salem Street
  - Shepherd's Vineyard Greenway – completed
  - Apex Community Park Greenway - completed
  - Swift Creek Greenway – 0.9 mile greenway near Hemlock Bluffs Nature Area

Figure 6.1: Environmental Features Map



**LEGEND**

- Study Area
- Church
- Hospital
- School
- Cemetery
- Fire Station
- Wetlands (NWI)
- Historic Property
- Significant Natural Heritage Area
- Parks
- Gamelands
- Flood Zone
- Water
- Federal Lands
- River Basin
- Boundary
- County Boundary
- Roads
  - Minor Road
  - Interstate
  - State Highway
  - State Route
  - US Highway

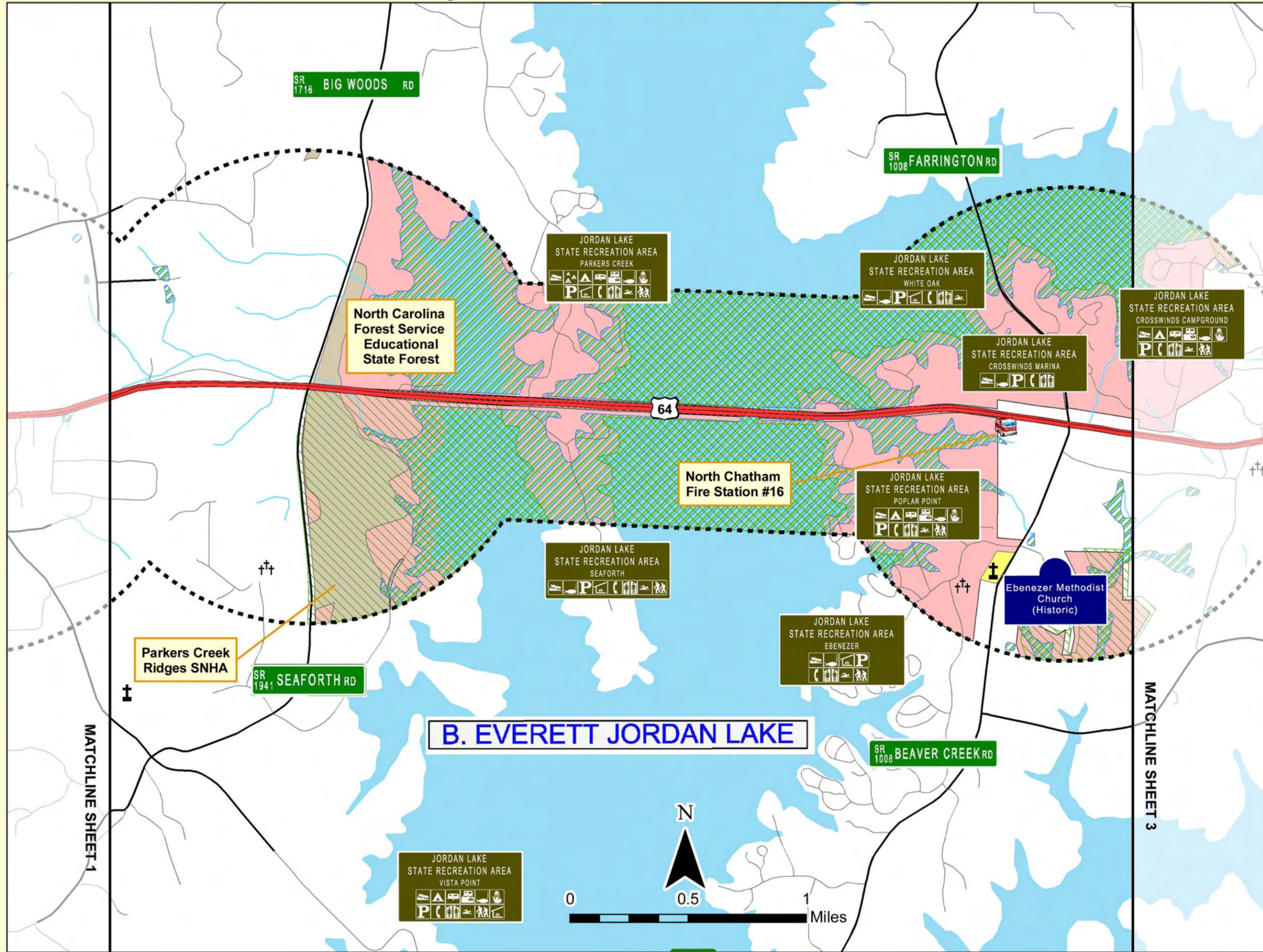
**Environmental Features Map**

Sheet 1 of 5

**US 64 Corridor Study  
Wake & Chatham Counties**



Figure 6.1: Environmental Features Map



LEGEND

- Study Area:** Dashed line
- Wetlands (NWI):** Blue hatched pattern
- Historic Property:** Yellow
- Significant Natural Heritage Area:** Brown
- Parks:** Green
- Camelands:** Green hatched pattern
- Church:** Blue icon
- Hospital:** Blue icon
- School:** Red icon
- Cemetery:** Red icon
- Fire Station:** Red icon
- Flood Zone:** Blue hatched pattern
- Water:** Light blue
- Federal Lands:** Pink
- River Basin Boundary:** Dashed line
- County Boundary:** Dotted line

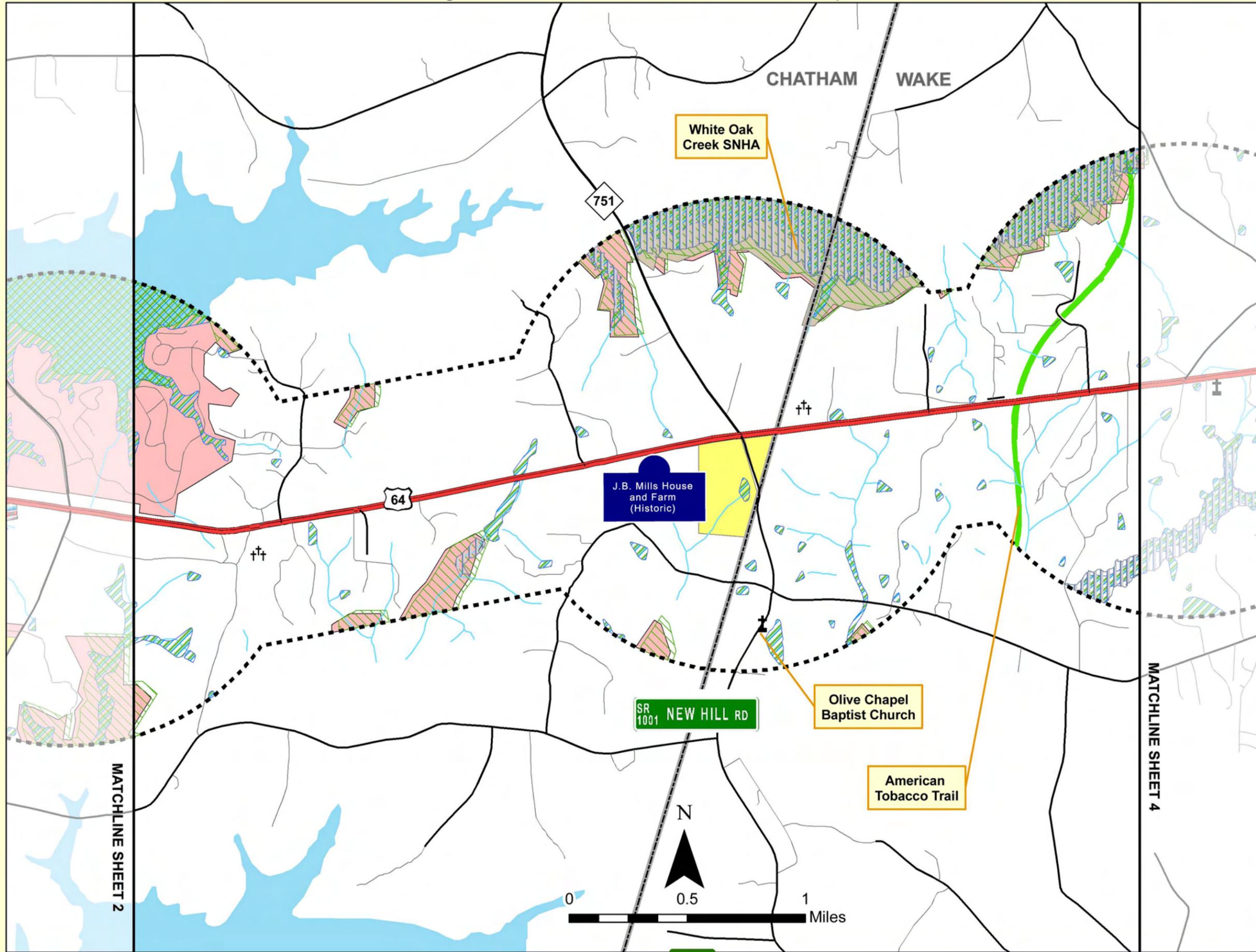
Environmental Features Map

Sheet 2 of 5

US 64 Corridor Study  
Wake & Chatham Counties



Figure 6.1: Environmental Features Map



**LEGEND**

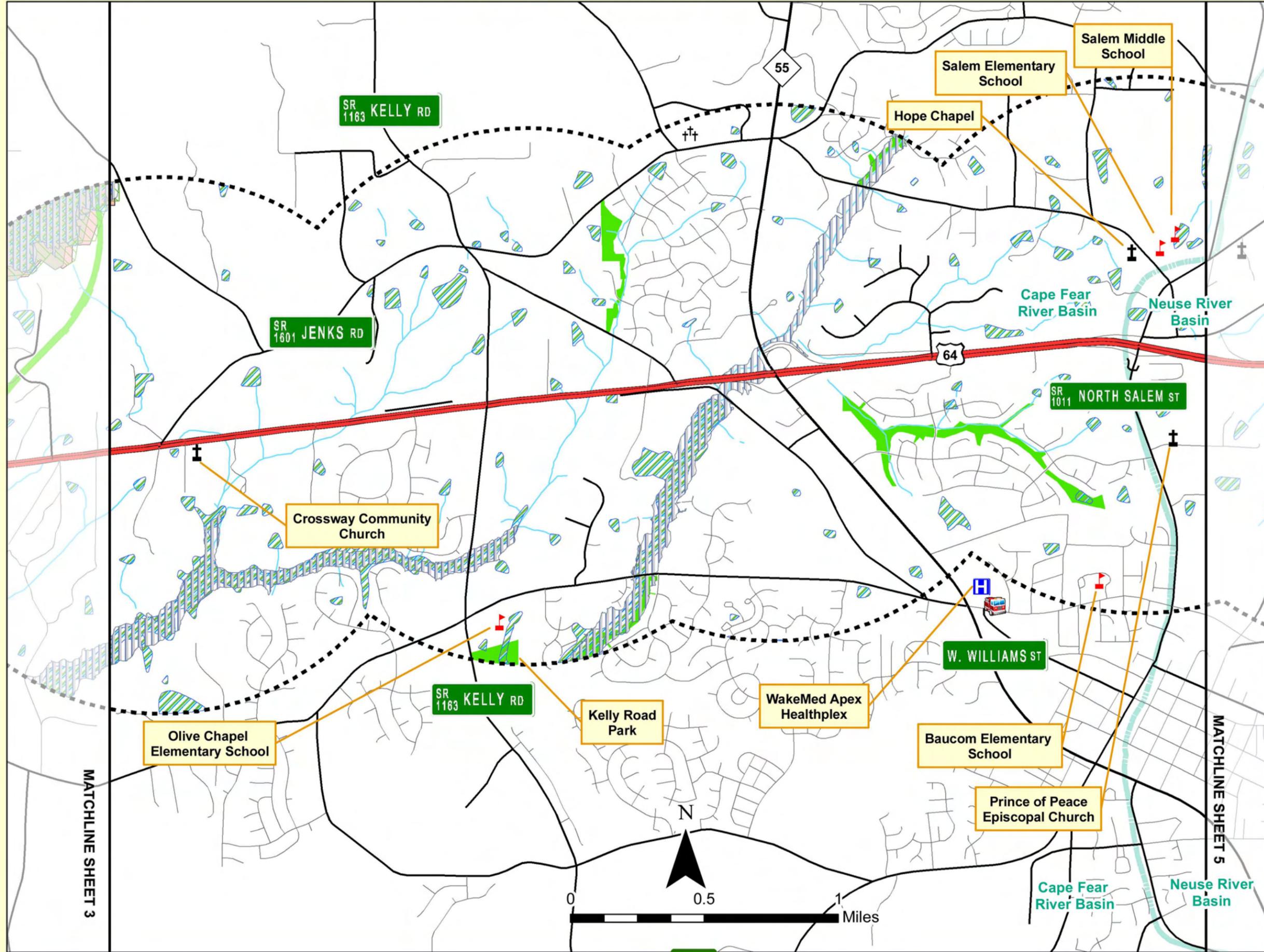
- Study Area
- Church
- Hospital
- School
- Cemetery
- Fire Station
- Wetlands (NWI)
- Historic Property
- Significant Natural Heritage Area
- Parks
- Gamelands
- Flood Zone
- Water
- Federal Lands
- River Basin Boundary
- County Boundary
- Boundary
- Minor Road
- Interstate
- State Highway
- State Route
- US Highway

Environmental Features Map  
Sheet 3 of 5

US 64 Corridor Study  
Wake & Chatham Counties



Figure 6.1: Environmental Features Map



**LEGEND**

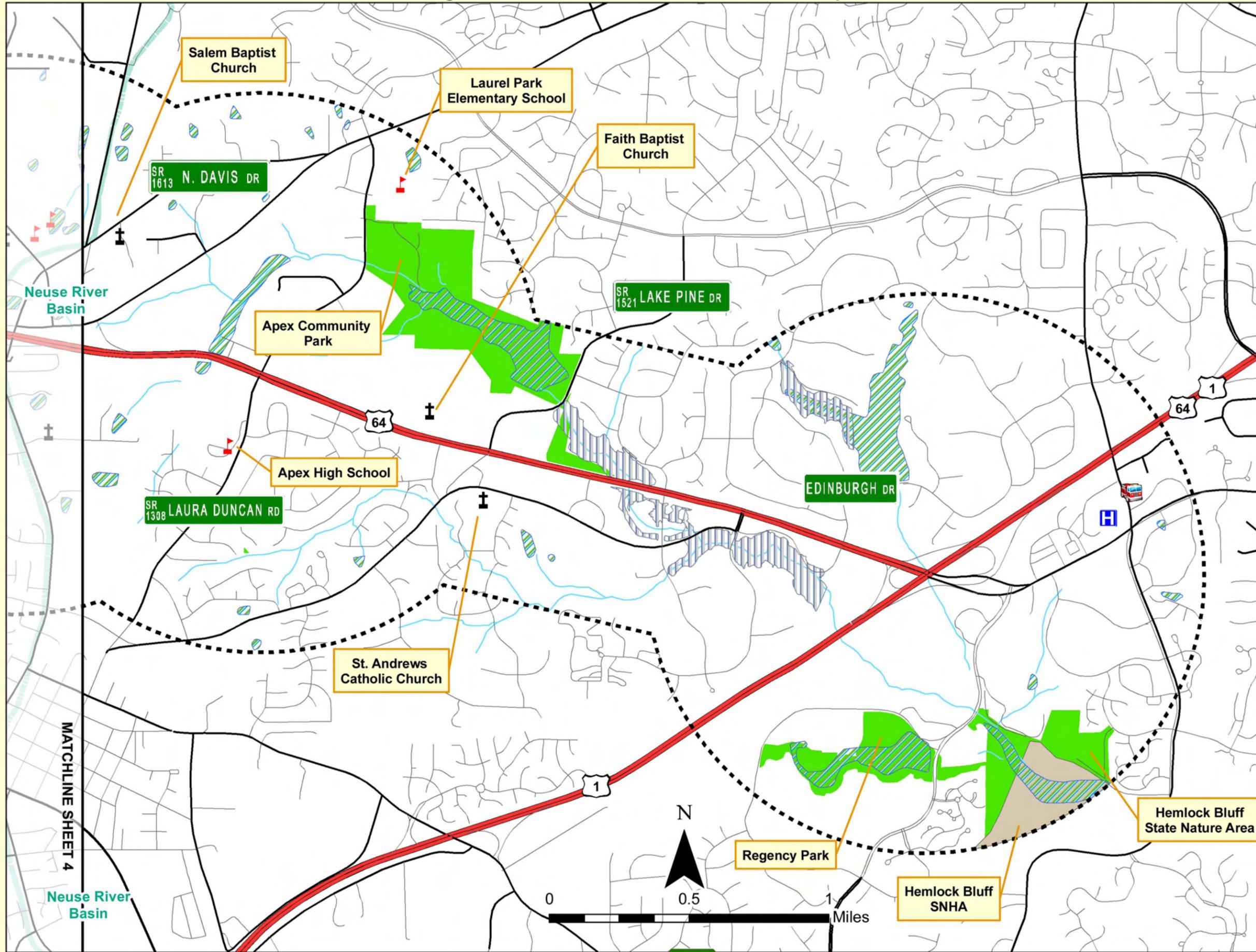
Study Area	Wetlands (NW1)	Flood Zone	Minor Road
Church	Historic Property	Water	Interstate
Hospital	Significant Natural Heritage Area	Federal Lands	State Highway
School	Parks	River Basin	State Route
Cemetery	Camelands	Boundary	US Highway
Fire Station		County Boundary	

Environmental Features Map

Sheet 4 of 5

US 64 Corridor Study  
Wake & Chatham Counties

Figure 6.1: Environmental Features Map



**LEGEND**

- Study Area
- Church
- Hospital
- School
- Cemetery
- Fire Station
- Wetlands (NWI)
- Historic Property
- Significant Natural Heritage Area
- Parks
- Gamelands
- Flood Zone
- Water
- Federal Lands
- River Basin
- Boundary
- County Boundary
- Roads**
- Minor Road
- Interstate
- State Highway
- State Route
- US Highway

**Environmental Features Map**

Sheet 5 of 5

**US 64 Corridor Study  
Wake & Chatham Counties**



MATCHLINE SHEET 4

### 6.1.1.2 Emergency Services

#### Police

Police protection is provided for the Chatham County portion of the study area by the Chatham County Sheriff's Office, which is located outside the study area, in downtown Pittsboro. Police service in the unincorporated areas of Wake County is provided by the Wake County Sheriff's Department. The Wake County Sheriff also provides support throughout the incorporated areas of Wake County, with the study area being located in Sheriff's districts 132, 134 and 136. Police protection within the town limits of Apex is provided by the Apex Police Department, located on Saunders Street approximately 1.1 miles south of US 64. Police service in the Town of Cary is provided by the Cary Police Department. The Cary Police Department has three districts, with the US 64 study area being located in the district that is served from the Cary Town Center Mall location on Walnut Street.

#### Fire

Fire protection in the Chatham County portion of the study area is provided by the North Chatham Station #16 located along US 64 approximately 0.3 miles west of Farrington Road. Fire protection for the study area in the western portion Wake County is provided by the Apex Fire Department. The Apex Fire Department has three response districts as follows:

- District #1 – portion of study area from Davis Drive to east of Lake Pine Drive is served by a station on South Salem Street, approximately 1.1 miles south of US 64
- District #2 – a small portion of the study area south of US 64, between the Chatham County Line and Hattie Road, is served by a station on New Hill-Olive Chapel Road, approximately 5 miles south of US 64
- District #3 – portion of the study area from Chatham County Line to Davis Drive (with the exception of the District #2 area) is served by a station on Hunter Street, approximately 1.2 miles south of US 64

Fire protection within the limits of the Town of Cary is provided by the Cary Fire Department out of Station #3 located on Kildaire Farm Road.

#### Emergency Medical Service

Emergency Medical Services (EMS) in Chatham County is contracted to First Health of Chatham which is a division of First Health of the Carolinas. The study area is served from an EMS station located on East Street in Pittsboro, approximately 1.8 miles west of the US 64 Bypass/US 64 Business interchange. EMS in Wake County is overseen by Wake County EMS whose system is comprised of five contracted, not-for-profit providers: Apex EMS, Cary EMS, Eastern Wake EMS, Garner EMS and Six Forks EMS. Within the study area, EMS services in the Apex area (from the Chatham County line to Laura Duncan Road) are provided by Apex EMS, located on West Williams Street, approximately 1.7 miles south of US 64. EMS services in the Cary area (from Laura Duncan Road to US 1) are provided by Cary Area EMS, located on Asheville Avenue, just north of Tryon Road.

#### Hospitals

Chatham County residents are served by three main hospitals, with only one being located in Chatham County. Chatham Community Hospital, located in Siler City is approximately 18 miles west of the study area. The other two hospitals that serve Chatham County residents are Central Carolina Hospital (in Sanford, 22 miles south of the study area) and University of North Carolina Hospital (in Chapel Hill, 17 miles north of the study area). The primary hospital for the Wake County portion of the study area is WakeMed Cary Hospital, located on Kildaire Farm Road, on the eastern edge of the study area. WakeMed also recently opened the WakeMed Apex Healthplex, located 0.8 miles south of US 64 on NC 55.

### 6.1.1.3 Cemeteries

There are several known cemeteries in close proximity to the US 64 corridor, many of which are small private cemeteries that are mostly family cemeteries. Cemeteries identified within the study area are as follows:

- South of Firefox Trace, slightly west of Dee Farrell Road
- South of US 64 on Ridgeview Road
- South of US 64 on Seaforth Road
- South of US 64 on Beaver Creek Road, behind Ebenezer Methodist Church
- South side of US 64, slightly west of John Horton Road
- North side of US 64, slightly west of Two Ponds Road
- North of US 64 on Jenks Road

### 6.1.1.4 Noise

Noise can be defined as any sound that is undesirable. The magnitude of noise is defined by its sound pressure level (SPL). The resulting quantities from the ratio equation are expressed in terms of decibels (dB) on the SPL scale. A dB is an interval on the SPL scale, with 0 dB as the threshold of hearing and 130 dB as the level which causes pain. A-weighted sound level quantities often correlate well with the subjective response of people to the magnitude of a sound level. For example, A-weighting takes into account the fact that humans are more sensitive to higher frequency sounds than lower frequency sounds. The term decibel is often abbreviated as dBA, meaning the sound, or noise, levels are A-weighted.

Noise descriptors have been developed to more fully describe the noise environment and its effects on human activities. The most commonly used descriptor for vehicular traffic noise is the equivalent sound level (Leq), which is defined as the steady state sound level which contains the same acoustic energy as the actual time-varying sound level occurring over the same time period.

There have not been any recent traffic noise readings taken along the US 64 corridor; however, throughout the public involvement process, numerous residents stated that noise was an existing problem along the corridor.

### 6.1.1.5 Air Quality

A portion of the study is located in Chatham County, which is within the Raleigh-Durham-Chapel Hill nonattainment area for ozone (O<sub>3</sub>) as defined by the EPA. This area was designated nonattainment for O<sub>3</sub> under the eight-hour O<sub>3</sub> standard effective June 15, 2004. Section 176(c) of the 1990 Clean Air Act Amendments (CAAA) requires that transportation plans, programs, and projects conform to the intent of the state air quality implementation plan (SIP). The current SIP does not contain any transportation control measures for Chatham County.

A portion of this study is located in Wake County, which is within the Raleigh-Durham-Chapel Hill nonattainment area for ozone (O<sub>3</sub>) and the Raleigh Durham nonattainment area for carbon monoxide (CO) as defined by the EPA. The CAAA designated this area as moderate nonattainment area for CO. However, due to improved monitoring data, this area was redesignated as maintenance for CO on September 18, 1995. This area was designated nonattainment for O<sub>3</sub> under the eight-hour ozone standard effective June 15, 2004. Section 176(c) of the CAAA requires that transportation plans, programs, and projects conform to the intent of the SIP. The current SIP does not contain any transportation control measures for Wake County.

### 6.1.1.6 Utilities

There are numerous utilities located along the US 64 corridor including electric, water, wastewater, telephone and natural gas. The only major utilities along the corridor are water mains that connect to Jordan Lake and a major gas pipeline in the vicinity of Jenks Road.

### 6.1.1.7 Transit Dependent Populations

An evaluation was completed for the U.S. Census block groups within the project study area to determine if any portion of the study area had populations that were heavily dependent on transit. The analysis was completed based on the population 16 years or older that is not living in group quarters compared to the aggregate number of vehicles available. This determined locations where there is a limitation on the number of vehicles available and provides indicators that the area may be dependent on transit. Based on the analysis 13 of the 19 census block groups had more vehicles than drivers. One block group, located at the eastern edge of the study area near Regency Parkway showed that nearly 12% of the driver age population did not have a vehicle. This location is currently served by the Cary Transit Route 5.

### 6.1.1.8 Environmental Justice Areas

An environmental justice evaluation was completed for the U.S. Census block groups within the project study area. Since the study area covers two counties, the average of the percent minority and percent below poverty were calculated to develop the thresholds for the environmental justice calculations. The threshold for minority populations is 29.3%. The threshold for individuals below poverty is 8.75%. Based on this threshold, there are no block groups that had minority populations greater than the threshold; however, there was one block group (located near the western edge of the study area in Chatham County) that had a population living below poverty that was higher than the threshold at 10.4%.

### 6.1.1.9 Hazardous Material

The study area along the corridor was reviewed and no superfund sites or hazardous waste facilities were found within the project study area.

## 6.1.2 NATURAL ENVIRONMENT

### 6.1.2.1 Significant Natural Heritage Areas

The North Carolina Natural Heritage Program compiles the N.C. Department of Environment and Natural Resources' list of significant "Natural Heritage Areas" (SNHA) as required by the Nature Preserves Act. The list is based on the program's inventory of the natural diversity in the state. Natural areas (sites) are evaluated on the basis of the occurrences of rare plant and animal species, rare or high quality natural communities and special animal habitats. The global and statewide rarity of these elements and the quality of their occurrence at a site relative to other occurrences determine a site's significance rating. The sites included on this list are the best representatives known of the natural diversity of the state and therefore deserve priority for protection. Inclusion on this list does not directly confer protection to a site; however, the ecological significance of a site may be taken into consideration by state or federal agencies as part of their normal operations. The list includes both protected and unprotected areas. Inclusion on this list does not mean that public access exists or is appropriate and permission of the land owner is needed for all lands not open to the public.

Natural areas are rated for their significance to protection of biodiversity. The most significant sites are those that make up a balanced set containing the best sites for all elements. North Carolina's natural areas are rated based on the value of the element occurrences – rare species and high quality natural communities – that they contain. Their significance is rated based on comparison with other sites for those same elements with a letter grading as follows:

A = Nationally significant natural areas contain examples of natural communities, rare plant or animal populations, or geologic features that are among the highest quality, most viable, or best of their kind in the nation, or clusters of such elements that are among the best in the nation.

B = Statewide significant natural areas contain similar ecological resources that are among the best occurrences in North Carolina. There are a few better quality representatives or larger populations on nationally significant sites elsewhere in the nation or possibly within the state.

C = Regionally significant natural areas contain natural elements that may be represented elsewhere in the state by better quality examples, but which are among the outstanding examples in their geographic region of the state. A few better examples may occur in nationally or state significant natural areas.

D = Other areas included in SNHA dataset

The US 64 corridor study includes six SNHA's as follows:

- Haw River Aquatic Habitat (Category A) – Chatham County
- Haw River Levees and Bluffs (Category B) – Chatham County
- Pittsboro Wilderness (Category D) – Chatham County
- Parkers Creek Ridges (Category D) – Chatham County
- White Oak Creek (Category B) – Chatham County
- Hemlock Bluffs (Category B) – Wake County

### 6.1.2.2 Floodplains

The Town of Pittsboro, Town of Apex, Town of Cary and Chatham and Wake Counties participate in the National Flood Insurance Program. A Flood Insurance Study (FIS) was developed for Chatham County, including the Town of Pittsboro and approved on February 2, 2007. A FIS for Wake County, including the Towns of Apex and Cary was approved on May 2, 2007.

Floodplains are present along several water bodies within the study area for the US 64 corridor including along the following locations:

- Haw River – Chatham County
- Windfall Branch – Chatham County
- B. Everett Jordan Lake – Chatham County
- Beaver Creek Tributary 1 – Chatham County
- Beaver Creek Tributary 2 – Chatham County
- White Oak Creek – Chatham and Wake Counties
- Reedy Branch – Wake County
- Reedy Branch Tributary – Wake County
- Beaver Creek – Wake County
- Swift Creek – Wake County
- Swift Creek Tributary 7 – Wake County

### 6.1.2.3 Wetlands

Wetland information within the study area along US 64 was taken from the National Wetlands Inventory (NWI) maps developed by the US Fish and Wildlife Service (USFWS). The USFWS is the principal Federal agency that provides information to the public on the extent and status of the Nation's wetlands. The agency has developed a series of topical maps to show wetlands and deepwater habitats. This geospatial information is used by Federal, State, and local agencies, academic institutions, and private industry for management, research, policy development, education and planning activities. Wetlands provide a multitude of ecological, economic and social benefits. They provide habitat for fish, wildlife and a variety of plants. Wetlands are nurseries for many saltwater and freshwater fishes and shellfish of commercial and recreational importance. Wetlands are also important landscape features because they hold and slowly release flood water and snow melt, recharge groundwater, act as filters to cleanse water of impurities, recycle nutrients, and provide recreation and wildlife viewing opportunities for millions of people.

The wetlands throughout the study area include numerous freshwater ponds that are typical of rural agricultural areas. There are also several more substantial wetland systems along the corridor including the following:

- Haw River (Riverine Wetland) - Chatham County
- B. Everett Jordan Lake (Lake ) - Chatham County
- Beaver Creek Tributary (Freshwater Forested/Shrub Wetland) – Chatham County
- US 64 between Farrington Road and NC 751 (Freshwater Forested/Shrub Wetland) – Chatham County
- White Oak Creek (Freshwater Forested/Shrub Wetland) – Chatham and Wake Counties
- Reedy Branch (Freshwater Forested/Shrub Wetland) – Wake County
- Beaver Creek (Freshwater Forested/Shrub Wetland) – Wake County
- US 64 between Davis Drive and Laura Duncan Road (Freshwater Forested/Shrub Wetland) – Wake County

### 6.1.2.4 Creeks and Streams

Creeks and streams within the study area were taken from maps prepared by the United States Geological Survey (USGS). Numerous unnamed streams were shown on the map throughout the study area and seven named streams were designated within the study area as follows:

- Haw River – Chatham County
- B. Everett Jordan Lake – Chatham County
- Beaver Creek – Chatham County
- White Oak Creek – Chatham and Wake Counties
- Reedy Branch – Wake County
- Williams Creek – Wake County
- Swift Creek – Wake County

### 6.1.2.5 Water Supply and Critical Watersheds

Surface Water Classifications are designations applied to surface water bodies, such as streams, rivers and lakes, which define the best uses to be protected within these waters (for example swimming, fishing, drinking water supply). Classifications are developed by the North Carolina Department of Environmental and Natural Resources (NCDENR) Division of Water Quality (DWQ). Each classification has an associated set of water

quality standards to protect those uses. Surface water classifications are one tool that state and federal agencies use to manage and protect all streams, rivers, lakes, and other surface waters in North Carolina. Classifications and their associated protection rules may be designed to protect water quality, fish and wildlife, the free flowing nature of a stream or river, or other special characteristics.

Water Supply Watersheds are those waters used as sources of water supply for drinking, culinary, or food processing purposes. Water Supply Watersheds that have the WS-IV designation also include protected areas. A protected area is defined as land within five miles and draining to the normal pool elevation of water supplies/reservoirs or within ten miles upstream and draining to a river intake. The Critical Area is the land adjacent to a water supply intake where risk associated with pollution is greater than from remaining portions of the watershed. Critical Area is defined as land within one-half mile upstream and draining to a river intake or within one-half mile and draining to the normal pool elevation of water supply reservoirs. Critical areas are more restrictive than areas outside this area.

The study area for the US 64 Corridor Study includes a substantial area located within water supply watersheds. The area surrounding B. Everett Jordan Lake is classified as a WS-IV watershed from beyond the western edge of the study area in Chatham County to NC 55 in Wake County. Additionally, the area along US 64 from Big Woods Road/Seaforth Road to slightly east of Farrington Road/Beaver Creek Road is designated as a Critical Area. In the Wake County portion of the study area the Water Supply Watershed associated with Swift Creek is classified as a WS-III watershed and begins slightly west of the Davis Drive interchange and continues beyond the eastern edge of the study area.

### 6.1.2.6 High Quality Waters and Outstanding Resource Water Management Zones

High Quality Waters (HQW) is a supplemental classification defined by the North Carolina NCDENR DWQ that are intended to protect waters which are rated excellent based on biological and physical/chemical characteristics through Division monitoring or special studies, primary nursery areas designated by the Marine Fisheries Commission, and other functional nursery areas designated by the Marine Fisheries Commission.

Outstanding Resource Waters (ORW) is a supplemental classification intended to protect unique and special waters having excellent water quality and being of exceptional state or national ecological or recreational significance. To qualify, waters must be rated Excellent by DWQ, and have one of the following outstanding resource values:

- Outstanding fish habitat or fisheries
- Unusually high level of water based recreation or potential for such kind of recreation
- Some special designation such as N.C. Scenic/Natural River or National Wildlife Refuge
- Important component of state or national park or forest
- Special ecological or scientific significance (rare or endangered species habitat, research or educational areas)

All ORWs are HQW by supplemental classification.

The study area for the US 64 Corridor Study does not include any designated HQW or ORW zones.

### 6.1.2.7 Major Water Bodies

As described in the proceeding sections, there are several major water bodies within the study area. For the intents of this section, a major water body is one that requires that any roadway crossings require a bridge over the water body. The following major water bodies are located within the study area:

- Haw River – Chatham County

- B. Everett Jordan Lake – Chatham County

### 6.1.2.8 River Basins and Stream Buffers

The study area for the US 64 Corridor Study is located in both the Cape Fear River and Neuse River basins. The western portion of the study area, including the entire Chatham County portion is located within the Cape Fear River basin. The eastern portion of the study area, beginning slightly west of the Davis Drive interchange, is located within the Neuse River basin. The entire study area is subject to stream buffers. The purpose of a buffer is to provide a vegetated area along streams through which stormwater runoff can flow in a diffuse manner, infiltrate into the soil, and allow filtration of pollutants.

The B. Everett Jordan Reservoir Water Supply Nutrient Strategy is a comprehensive set of rules approved in 2009, designed to address excess nutrients in Jordan Lake that can lead to algae blooms and other water quality problems. Jordan Lake is an impoundment in the central Piedmont that drains a mixture of agricultural and urbanized lands forming the upper Cape Fear River Basin, including the west side of the Triangle and much of the Triad region. The lake serves as a water supply for the Town of Apex and the Town of Cary and also has significant recreational use. The rules are similar to those already in place in the Neuse and Tar-Pamlico River Basins. The rules would require all major sources of nutrients to reduce their loading to the three arms of Jordan Lake to meet specific percent reduction goals, established through modeling, that are needed to restore water quality standards and full uses of the lake. One of the rules requires local governments to implement programs to protect existing vegetated riparian areas within 50 feet of and adjacent to intermittent and perennial streams, lakes, and ponds in the Jordan watershed. The first 30 feet adjacent to waters is largely undisturbed forest, while the outer 20 feet may be managed vegetation. Chatham County has enacted a local watershed ordinance that has requirements that are often more restrictive than the State. The Haw River is a locally designated River Corridor Watershed District. Chatham County is in the process of amending their buffer regulations to comply with the Lake Jordan rules.

The Neuse River Nutrient Sensitive Waters Management Strategy was approved in 1998 and 1999 by the NC General Assembly and established riparian buffers within the Neuse River basin. The purpose of the buffer rule was to protect and preserve existing riparian buffers in the Neuse River Basin to maintain their nutrient removal functions. The buffer rule applies 50-foot wide riparian buffers directly adjacent to surface waters in the Neuse River Basin (intermittent streams, perennial streams, lakes, ponds, and estuaries), excluding wetlands. The buffer rules enforce two zones, with Zone 1 being a 30-foot wide undisturbed vegetated area and Zone 2 being a 20-foot wide stable vegetated area.

### 6.1.2.9 Impaired Water/Water Quality

Section 303(d) of the Clean Water Act (CWA) requires states to develop a list of waters not meeting water quality standards or which have impaired uses. Listed waters must be prioritized, and a management strategy or total maximum daily load (TMDL) must subsequently be developed for all listed waters. In North Carolina the list is developed by NCDENR DWQ. The most recently approved list is from 2006 and includes the following:

- Haw River from 0.5 miles downstream of US 64 to 1.0 miles downstream of US 64 - Chlorophyll a and high pH
- New Hope River Arm of B. Everett Jordan Lake from Chatham County SR 1008 to Haw River Arm of B. Everett Jordan Lake – Chlorophyll a
- Williams Creek from source to Swift Creek - Impaired biological integrity
- Swift Creek from source to backwaters of Lake Wheeler - Impaired biological integrity

### 6.1.2.10 Wildlife Refuges and Game Lands

There are no wildlife refuges designated by the United States Fish and Wildlife Service within the study area.

The study area does include the Jordan Game Land designated by the North Carolina Wildlife Resources Commission in the vicinity of Jordan Lake State Park and along the Haw River, south of US 64.

### 6.1.2.11 Threatened and Endangered Species

Federally listed endangered and threatened species are legally protected under the provisions of Section 7 of the Endangered Species Act (ESA) of 1973, as amended, and any action likely to adversely affect a species afforded federal protection is subject to review by the USFWS and/or the National Marine Fisheries Service (NMFS). Species classified as Federal Species of Concern (FSC) are not protected under the provisions of Section 7 of the ESA, but are defined as species under consideration for listing as threatened or endangered. North Carolina provides limited protection to "at risk" species under the North Carolina Endangered Species Act and the North Carolina Plant Protection and Conservation Act of 1979. The NCWRC and the North Carolina Department of Agriculture (NCDA) are responsible for enforcing and administering species protection. The USFWS and the NCNHP maintain lists and location data of known occurrences of endangered, threatened, and rare species for North Carolina. The following species are included on the USFWS listing for Chatham County:

#### Vertebrate:

- American eel (*Anguilla rostrata*) - Federal Species of Concern - Current Listing
- Bachman's sparrow (*Aimophila aestivalis*) - Federal Species of Concern - Current Listing
- Bald eagle (*Haliaeetus leucocephalus*) - Bald and Golden Eagle Protection Act - Current Listing;
- Cape Fear shiner (*Notropis mekistocholas*) - Endangered - Current Listing
- Carolina darter (*Etheostoma collis lepidinion*) - Federal Species of Concern - Current Listing
- Carolina redhorse (*Moxostoma sp. 2*) - Federal Species of Concern - Current Listing
- Red-cockaded woodpecker (*Picoides borealis*) – Endangered – Historic Record

#### Invertebrate:

- Atlantic pigtoe (*Fusconaia masoni*) - Federal Species of Concern - Current Listing
- Brook floater (*Alasmidonta varicose*) - Federal Species of Concern - Current Listing
- Carolina creekshell (*Villosa vaughaniana*) - Federal Species of Concern - Current Listing
- Septima's clubtail (*Gomphus septima*) - Federal Species of Concern - Current Listing
- yellow lampmussel (*Lampsilis cariosa*) - Federal Species of Concern - Current Listing

#### Vascular Plant:

- Buttercup phacelia (*Phacelia covillei*) - Federal Species of Concern - Current Listing
- Harperella (*Ptilimnium nodosum*) - Endangered - Current Listing
- Sweet pinesap (*Monotropsis odorata*) - Federal Species of Concern - Current Listing
- Virginia quillwort (*Isoetes virginica*)- Federal Species of Concern – Historic Record

The following species are included on the USFWS listing for Wake County:

#### Vertebrate:

- American eel (*Anguilla rostrata*) - Federal Species of Concern - Current Listing
- Bachman's sparrow (*Aimophila aestivalis*) - Federal Species of Concern - Current Listing

- Bald eagle (*Haliaeetus leucocephalus*) - Bald and Golden Eagle Protection Act - Current Listing
- Carolina darter (*Etheostoma collis lepidinion*) - Federal Species of Concern - Current Listing
- Carolina madtom (*Noturus furiosus*) - Federal Species of Concern - Current Listing
- Pinewoods shiner (*Lythrurus matutinus*) - Federal Species of Concern - Current Listing
- Roanoke bass (*Ambloplites cavifrons*) - Federal Species of Concern - Current Listing
- Southeastern myotis (*Myotis austroriparius*) - Federal Species of Concern – Historic Record
- Southern hognose snake (*Heterodon simus*) - Federal Species of Concern – Obscure Record
- Red-cockaded woodpecker (*Picoides borealis*) – Endangered – Historic Record

Invertebrate:

- Atlantic pigtoe (*Fusconaia masoni*) - Federal Species of Concern - Current Listing
- Diana fritillary (butterfly) (*Speyeria Diana*) - Federal Species of Concern - Current Listing
- Dwarf wedgemussel (*Alasmidonta heterodon*) – Endangered - Current Listing
- Green floater (*Lasmigona subviridis*) - Federal Species of Concern - Current Listing
- Yellow lance (*Elliptio lanceolata*) - Federal Species of Concern - Current Listing

Vascular Plant:

- Bog spicebush (*Lindera subcoriacea*) - Federal Species of Concern - Current Listing
- Grassleaf arrowhead (*Sagittaria weatherbiana*) - Federal Species of Concern – Historic Record
- Michaux's sumac (*Rhus michauxii*) – Endangered - Current Listing
- Sweet pinesap (*Monotropis odorata*) - Federal Species of Concern – Historic Record
- Virginia least trillium (*Trillium pusillum* var. *virginianum*) - Federal Species of Concern - Current Listing

**6.1.2.12 Federal Emergency Management Agency Buyout Properties**

As a means of mitigation to reduce the future losses due to flooding, the Federal Emergency Management Agency (FEMA) developed a program that would purchase properties in flood prone area to eliminate the future risk. Acquisition or Buyout projects, while 75% funded by FEMA, are administered by the State and local communities. The State and local communities work together to identify areas where buyouts make the most sense.

There are currently no known FEMA buyout sites located within the study area for the US 64 corridor study.

**6.1.2.13 Federally Owned Land**

When highways cross lands owned by the United States and administered by Federal Agencies (Controlling Agency), a property interest, generally by highway easement, can be conveyed to a State Department of Transportation (State DOT) or its nominee (i.e. city, county, town, public-private partnership) to grant the rights necessary to construct, operate and maintain the roadway. Authority is provided to the Secretary of Transportation, who has further delegated the authority to the FHWA to effectuate the transfer. The process is referred to as a Federal Land Transfer. Due to the complexity of the Federal Land Transfer process it is critical that federally owned land be identified as early in the planning stages as possible.

The only known federally owned property within the study area of the US 64 corridor study is the B. Everett Jordan Lake, which includes 46,768 acres, is owned by the U.S. Army Corp of Engineers.

**6.1.3 CULTURAL RESOURCES**

**6.1.3.1 Historic Districts**

There is one district designated on the National Register of Historic Places within the study area for the US 64 corridor study. The 11,450 acre New Hope Rural Historical Archeological District is located in Chatham County from west of Big Woods Road across B. Everett Jordan Lake.

**6.1.3.2 Historic Properties**

There is one historic property designated on the National Register of Historic Places within the study area for the US 64 corridor study and two properties that have been determined to be eligible for the National Register. For purposes of planning transportation projects, properties determined to be eligible for the National Register as considered the same as a property listed on the National Register.

Ebenezer Methodist Church, located on Beaver Creek Drive, south of US 64 was added to the Federal Register in 1985 and is constructed in the Gothic Revival style popular in the late 1800's. There is a cemetery behind the church and it is historically significant due to an event, due to its architecture and for its religious significance.

The following two properties have been determined to be eligible for listing on the National Register based on previous studies along the corridor:

- Farrell-White House, located on Hanks Chapel Road south of US 64 in Chatham County
- J.B Mills House and Farm, located on US 64 at the intersection with New Hill Road

**6.2 SUMMARY OF ENVIRONMENTAL EFFECTS FOR SHORT-TERM SOLUTION**

The effects on the human, cultural and natural environments for the short-term solution are relatively minimal as the recommended solutions typically utilize the existing footprint, with most of the construction occurring within the median of US 64. The following sections describe the effects for elements that are evaluated qualitatively, while the quantitative effects are included in Table 6.1.

**6.2.1 HUMAN ENVIRONMENT EFFECTS**

The effects on the human environment would be relatively minimal. None of the proposed short-term solutions would require the relocation of any residences, churches or schools. One business would potentially be relocated at the intersection Beaver Creek Road to accommodate the additional turning lanes; however, it is possible that during the detailed design phase the business could be avoided and allowed to remain.

None of the short-term solutions would impact any community facilities, parks or cemeteries and would result in a negligible change in noise levels from what would occur under the existing conditions. The disruption to traffic during construction would be minimal. The effect on emergency services would minimal, with some movements requiring the re-routing of left-turn movements causing minor delays for vehicles turning left onto US 64. A majority of the movements for emergency response currently occurs from US 64 to the side street, which will remain unchanged for all of the short-term solution designs with the exception of at Lake Pine Drive. The Lake Pine Drive intersection would require emergency vehicles to use the U-turn locations or make a left turn movement at the intersection that is not allowed during normal traffic operations. Conversely, the improved traffic flow will allow for less congestion along the corridor and may improve response times for emergency services. The short-term solution will also have a positive effect on air quality, as the higher the speed the lower the emissions produced by cars and trucks. There would be a minimal impact on utilities in the area as a result of constructing the short-term solutions and it is anticipated that only minor utility modifications would be needed.

**Table 6.1: Summary of Impacts for Short-term Solution**

Resource	Implementation Plan Intersection														Total
	1-Firefox Trace	2-Mt. Gilead Church/North Pea Ridge Road	3-Big Woods Road/Seaforth Road	4-Farrington Road/Beaver Creek Road	5-NC 751/New Hill Road	6-Jenks Road Interchange	7-Kellyridge Road	8-Knollwood Road	9-Shepherds Vineyard Drive	10-Lake Pine Drive	11-Autopark Boulevard	12-Mackenan Drive/Chalon Drive	13-Gregson Drive	14-Edinburgh Drive	
Relocations															
Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Business	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Church	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schools	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Community Facilities/Parks (number)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cemeteries (number)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Significant Natural Heritage Area (acres)	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Floodplains (acres)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1
Wetlands (acres)															
Freshwater Ponds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Freshwater Forested/Shrub Wetland	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Streams (linear feet)	0	70	200	70	0	250	0	0	0	0	0	0	0	0	590
River Basin	Cape Fear	Cape Fear	Cape Fear	Cape Fear	Cape Fear	Cape Fear	Cape Fear	Neuse	Neuse	Neuse	Neuse	Neuse	Neuse	Neuse	
Wildlife Refuges (acres)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Game lands (acres)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Federally Owned Land (acres)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Historic Archeological District (acres)	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9
Historic Properties (acres)	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3
Construction Cost	\$1,700,000	\$2,200,000	\$2,100,000	\$2,900,000	\$3,400,000	\$2,300,000	\$1,000,000	\$625,000	\$75,000	\$3,600,000	\$500,000	\$2,200,000	\$1,550,000	\$2,450,000	\$26,600,000
Right-of-way Cost	\$0	\$927,000	\$613,500	\$1,940,500	\$913,500	\$786,000	\$309,000	\$0	\$313,500	\$318,000	\$313,500	\$313,500	\$313,500	\$313,500	\$7,375,000
Total Cost	\$1,170,000	\$3,127,000	\$2,713,500	\$4,840,500	\$4,313,500	\$3,086,000	\$1,309,000	\$625,000	\$388,500	\$3,918,000+	\$813,500	\$2,513,500	\$1,863,500	\$2,763,500	\$33,975,000

**6.2.2 NATURAL ENVIRONMENT EFFECTS**

The effects on the natural environment would also be very minimal with no wetlands being impacted and no individual stream having an impact greater than 250 linear feet. Due to the minimal increase in footprint it is likely that all of the short-term solutions could be constructed utilizing a Nationwide Permit 14 to comply with Section 404 of the Clean Water Act. The effects on floodplains would be minimal with only one intersection having a minor encroachment into a floodplain. The effect on water quality would be very similar to the existing conditions, with only minor increases in impervious area to accommodate the U-turn movements being included in the construction.

**6.2.3 CULTURAL RESOURCES IMPACTS**

The effects on cultural resources are likely to be the most substantial obstacle to implementing the short-term solutions at the Big Woods Road/Seaforth Road intersection and the NC 751/New Hill Road intersection. Preliminary evaluation by NCDOT determined that the additional property required at Big Woods Road/Seaforth Road would not constitute the taking of land subject to protection under Section 4(f) of the US Code Title 23 Section 138 that protects historic resources. The impacts to the historic property at the NC 751/New Hill Road intersection will require additional design to determine if the impacts to the property can be eliminated or reduced to a level where a *De Minimis* finding could be made under Section 4(f) of the US Code Title 23 Section 138 that protects historic resources.

**6.3 SUMMARY OF ENVIRONMENTAL EFFECTS FOR LONG-TERM SOLUTION**

The effects on the human, cultural and natural environments for the long-term solution are more substantial than those for the short-term solution and reflect the effects on the study area that will occur if the long-term solution is implemented. The following sections describe the effects for elements that are evaluated qualitatively, while the quantitative effects are included in Table 6.2.

**6.3.1 HUMAN ENVIRONMENT EFFECTS**

The following sections describe the effects on the human environment as a result of the implementation of the long-term solution.

**6.3.1.1 Community Facilities and Services**

The long-term solution would not impact any schools, community facilities or parks within the study area; however it would potentially require the relocation of 11 residences, 12 businesses and one church.

**Table 6.2: Summary of Impacts for Long-term Solution**

Resource	Implementation Plan Segment												Total
	A- West of Haw River	B- Mt. Gilead Church/North Pea Ridge Interchange	C- Big Woods Road/Seaforth Road Interchange	D- Jordan Lake Area	E- Farrington Road/Beaver Creek Road Interchange	F- NC 751/New Hill Road Interchange	G- Jenks Road Interchange	H- Kelly Road/NC 540/Green Level Church/NC 55 Area	I- Davis Drive Interchange Area	J- Laura Duncan Road/CSX Railroad Crossing Area	K- Lake Pine Drive Interchange	L- East of Lake Pine Drive to US 1 Interchange	
Length (miles)	1.4	2.0	1.1	2.4	1.1	3.5	1.2	2.4	1.4	0.8	0.9	1.2	<b>19.4</b>
Relocations													
Residential	0	2	0	0	2	1	4	0	2	0	0	0	<b>11</b>
Business	0	5	0	0	3	0	1	0	0	1	2	0	<b>12</b>
Church	0	0	0	0	0	0	1	0	0	0	0	0	<b>1</b>
Schools	0	0	0	0	0	0	0	0	0	0	0	0	<b>0</b>
Community Facilities/Parks (number)	0	0	0	0	0	0	0	0	0	0	0	0	<b>0</b>
Cemeteries (number)	0	0	0	0	0	1	0	0	0	0	0	0	<b>1</b>
Potential Noise Impacts (number of receptors)	0	7	0	0	2	15	8	13	14	19	7	6	<b>91</b>
Significant Natural Heritage Area (acres)	0	2.0	0	0	0	0	0	0	0	0	0	0	<b>2.0</b>
Floodplains (acres)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.5	<b>1.9</b>
Wetlands (acres)													
Freshwater Ponds	0.0	0.1	0.0	0.0	0.0	1.3	0.4	0.4	0.0	0.0	0.0	0.0	<b>2.2</b>
Freshwater Forested/Shrub Wetland	0.0	0.0	0.0	0.0	0.6	1.1	0.3	0.0	0.0	0.1	0.0	0.0	<b>2.1</b>
Streams (linear feet)	340	2,050	2,260	0	410	880	1,560	1,190	80	210	0	150	<b>9,130</b>
Stream Buffers (square feet)													
Jordan Lake – Zone 1	20,400	78,600	135,600	0	24,600	52,800	81,700	71,400	0	0	0	0	<b>465,100</b>
Jordan Lake – Zone 2	13,600	42,400	90,400	0	16,400	35,200	53,200	47,600	0	0	0	0	<b>298,800</b>
Neuse River – Zone 1	0	0	0	0	0	0	0	0	4,800	12,600	0	3,000	<b>20,400</b>
Neuse River – Zone 2	0	0	0	0	0	0	0	0	3,200	8,400	0	2,000	<b>13,600</b>
River Basin	Cape Fear	Cape Fear	Cape Fear	Cape Fear	Cape Fear	Cape Fear	Cape Fear	Cape Fear	Cape Fear/Neuse	Neuse	Neuse	Neuse	
Wildlife Refuges (acres)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<b>0.0</b>
Game lands (acres)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<b>0.0</b>
Federally Owned Land (acres)	0.0	0.0	0.0	0.0	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<b>3.1</b>
Historic Archeological District (acres)	0.0	0.0	36.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<b>36.5</b>
Historic Properties (acres)	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	<b>1.3</b>
Construction Cost	\$3,300,000	\$27,600,000	\$14,800,000	\$15,000,000	\$19,800,000	\$72,000,000	\$25,900,000	\$41,500,000	\$23,800,000	\$33,300,000	\$33,900,000	\$11,800,000	<b>\$322,700,000</b>
Right-of-way Cost	\$1,115,000	\$11,030,000	\$5,055,000	\$155,000	\$9,250,000	\$9,760,000	\$12,350,000	\$6,555,000	\$6,970,000	\$4,335,000	\$4,745,000	795,000	<b>\$72,115,000</b>
Total Cost	\$4,415,000	\$38,630,000	\$19,855,000	\$15,155,000	\$29,050,000	\$81,760,000	\$38,250,000	\$48,055,000	\$30,770,000	\$37,635,000	\$38,645,000	\$12,595,000	<b>\$394,815,000</b>

**6.3.1.2 Emergency Services**

Police

Police protection would remain nearly unchanged from the existing condition as the changes in access would improve response time for police; however the additional access control may require longer travel distances.

Fire

Fire protection in the Chatham County portion of the study area would be affected to the greatest extent by the recommended long-term solution. The North Chatham Station #16 currently connects directly to US 64, but will connect to a service road that accesses US 64 via the interchange at Farrington Road/Beaver Creek Road.

The Chatham County Fire Marshall has raised concerns that the re-routing may cause some homes to lose their fire rating for insurance purposes. The improved traffic operation may also improve response times for fire trucks and for volunteer firefighters, as the department is staffed by career and volunteer fire fighters. Chatham County and the Town of Pittsboro should consider the recommendations in this report as they evaluate emergency response times and provide additional fire stations as needed to accommodate the population growth.

Due to the locations of the fire stations in Apex and Cary it is unlikely that any negative effects will occur as a result of the implementation of the long-term solution and the improvement in traffic operations may improve response times.

### Emergency Medical Service

Due to the locations of the EMS facilities in relation to the study area it is unlikely that any negative effects will occur as a result of the implementation of the long-term solution and the improvement in traffic operations may improve response times.

### Hospitals

Due to the locations of the Hospital facilities in relation to the study area it is unlikely that any negative effects will occur as a result of the implementation of the long-term solution and the improvement in traffic operations may improve response times.

#### **6.3.1.3 Cemeteries**

The recommended long-term solution will impact one cemetery along the US 64 corridor: north side of US 64, slightly west of Two Ponds Road.

#### **6.3.1.4 Noise**

The implementation of the long-term solution will result in increased noise levels along the US 64 corridor due to the increased speed of traffic resulting from the increased control of access along the highway. Noise impacts as a result of the implementation of the long-term solution are anticipated for 91 receptors along the corridor. Noise abatement in the form of noise walls would be considered for impacted receptors along the corridor from US 64 Business to east of Lake Pine Drive during a future phase of planning for the corridor. Noise abatement would not be considered feasible from east of Lake Pine Drive to US 1 due to the breaks in control of access to allow for the at-grade signalized intersections.

#### **6.3.1.5 Air Quality**

The implementation of the long-term solution will result in improved air quality compared to the no-build condition as it would allow for traffic to travel at higher speeds and make fewer stops, both of which have a positive effect on air quality and emissions.

#### **6.3.1.6 Utilities**

The implementation of the long-term solution is not likely to result in any significant negative effects to utilities; however the design will need to be coordinated with the major utilities in the area, especially the major water mains that connect to Jordan Lake and the gas pipeline in the vicinity of Jenks Road.

#### **6.3.1.7 Transit Dependent Populations**

The long-term solution would not result in any substantial impact to transit in the area and would not negatively affect the existing transit operations.

#### **6.3.1.8 Environmental Justice Areas**

The long-term solution would not disproportionately affect any minority or low-income population.

#### **6.3.1.9 Hazardous Material**

The implementation of the long-term solution is not likely to result in any significant negative effects to hazardous materials.

#### **6.3.1.10 Construction Effects**

The construction of the long-term solution will likely result in some negative effects during construction due to temporary reductions in capacity or access along US 64 and the side streets. Due to the high traffic volumes

along US 64 the construction of improvements would be categorized as a Level 1 Significant project during construction according to the *NC DOT Work Zone Safety and Mobility Policy*. A Level 1 or 2 project is required to have complete Transportation Management Plan (TMP) that includes a Traffic Operations Plan, Temporary Traffic Control Plan, and a Public Information Plan, per the Policy.

Traffic on US 64 will most likely need to be maintained onsite during construction due to the traffic volumes. If the road is lowered any amount or raised more than several feet, it is not possible to maintain traffic in the existing location by conventional practices. Therefore, other options, such as temporary pavement, temporary shoring, additional right of way for onsite detours, road closures, etc. will have to be considered, resulting in temporary impacts. It is recommended that temporary impacts need to be addressed early in the planning phase, as the consequences of waiting to determine how to handle traffic in the design phase could result in an increase in construction cost, traffic impacts, and construction duration.

### **6.3.2 NATURAL ENVIRONMENT**

#### **6.3.2.1 Significant Natural Heritage Areas**

The implementation of the long-term solution is likely to impact approximately 2 acres of the Haw River Levees and Bluffs SHNA adjacent to US 64. The impact is due to the construction of a service road to access the Haw River and recreational facilities along the river. Additional evaluation of options to provide this access without impacting the SNHA should be undertaken in future planning studies to potentially avoid or minimize the impact.

#### **6.3.2.2 Floodplains**

The implementation of the long-term solution will likely result in impacts to designated floodplains at two locations along the corridor. The first floodplain impact will occur as a result of adding the C-D roadway in the westbound direction of US 64 through the NC 55 interchange. The additional widening required for the C-D roadway will place additional fill within the floodplain of Beaver Creek. The second floodplain impact will be the result of adding an additional lane to the ramp from US 1 southbound to US 64 westbound. The additional widening needed for the ramp lane will place additional fill within the floodplain to Swift Creek Tributary No. 7. A total of 1.0 acres of fill is anticipated to be placed within the existing floodplain limits under the recommended long-term solution.

#### **6.3.2.3 Wetlands**

The implementation of the long-term solution will result in impacts to designated wetlands along the US 64 corridor. The recommended long-term solutions will impact a total of 10 freshwater ponds with an impact area of approximately 2.2 acres being filled. The long-term solution is also anticipated to impact four Freshwater Forested/Shrub Wetlands with an impacted area of approximately 2.1 acres being filled. Additional measures to avoid and minimize these impacts will be undertaken in future phases of planning.

#### **6.3.2.4 Creeks and Streams**

Creeks and streams within the study area will be impacted by the construction of the recommended long-term solution. A total of 9,130 linear feet of streams shown on USGS map as perennial or intermittent will be impacted by the long-term solution. Additional measures to avoid and minimize these impacts will be undertaken in future phases of planning.

#### **6.3.2.5 Water Supply and Critical Watersheds**

The study area for the US 64 Corridor Study includes a substantial area located within water supply watersheds. The implementation of the long-term solution will require construction within these water supply and critical watersheds and will increase the impervious area. Measures should be undertaken to minimize the effects on water quality during construction through the effective use of erosion and sediment control devices

and the design should incorporate Best Management Practices (BMPs) to improve water quality after the construction is complete and minimize runoff into the water supply and critical watershed areas.

#### 6.3.2.6 High Quality Waters and Outstanding Resource Water Management Zones

The study area for the US 64 Corridor Study does not include any designated HQW or ORW zones; therefore there will be no impact to these resources.

#### 6.3.2.7 Major Water Bodies

The only major water bodies along the corridor are the bridge crossings of the Haw River and B. Everett Jordan Lake. To accommodate the multi-use path both of these bridges will be widened (in the median) to accommodate the additional width required for the path.

#### 6.3.2.8 River Basins and Stream Buffers

Stream buffers along the streams within the study area will be impacted as a result of the implementation of the long-term solution. The recommended long-term solution will impact 465,100 square feet of Zone 1 and 298,800 square feet of Zone 2 buffers that are subject to the B. Everett Jordan Reservoir Water Supply buffers and 20,400 square feet of Zone 1 and 13,600 square feet of Zone 2 buffers subject to the Neuse River Riparian Buffer Rules.

#### 6.3.2.9 Wildlife Refuges and Game Lands

There are no wildlife refuges designated by the United States Fish and Wildlife Service within the study area and no game lands will be impacted by the recommended long-term solution.

#### 6.3.2.10 Threatened and Endangered Species

Detailed investigations for threatened and endangered species were not conducted for this study. The evaluation of potential effects to threatened and endangered species will occur in future phases of the planning for the long-term solution.

#### 6.3.2.11 Federal Emergency Management Agency Buyout Properties

There are currently no known FEMA buyout sites located within the study area for the US 64 corridor study.

#### 6.3.2.12 Federally Owned Land

The recommended long-term solution currently shows the need to acquire property from the US Army Corp of Engineers property at B. Everett Jordan Lake. Additional steps will be taken during the more detailed design phase to determine if it is possible to avoid or minimize the impacts to the federally owned land. If it is not possible to fully avoid the property then coordination with the Corp will be initiated to determine if an easement can be acquired for a transportation use.

### 6.3.3 CULTURAL RESOURCES

#### 6.3.3.1 Historic Districts

The long-term solution will impact approximately 36.5 acres of the 11,450 acre New Hope Rural Historical Archeological District. Preliminary evaluation by NCDOT determined that the additional property required at Big Woods Road/Seaforth Road for the construction of the interchange recommended for the long-term solution would not constitute the taking of land subject to protection under Section 4(f) of the US Code Title 23 Section 138 that protects historic resources.

#### 6.3.3.2 Historic Properties

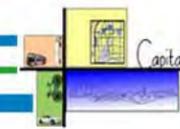
There is one historic property that has been determined to be eligible for the National Register that will be impacted by the long-term solution. The J.B Mills House and Farm, located on US 64 at the intersection with New Hill Road currently will require approximately 1.3 acres of property to construct the proposed interchange and will not directly impact the farm house located on the property. The impacts to the historic property will require additional design to determine if the impacts to the property can be eliminated or reduced to a level where a *De Minimis* finding could be made under Section 4(f) of the US Code Title 23 Section 138 that protects historic resources.

#### 6.3.4 DESCRIPTION OF POTENTIALLY SIGNIFICANT ENVIRONMENTAL IMPACTS

The next step in developing the recommendations for the long-term solution is to proceed to the detailed environmental documentation stage. The recommended long-term solution may be processed as a single environmental document for the entire study area or as a series of individual environmental documents for individual segments of the corridor. The environmental documents will likely be developed to satisfy the requirements of the National Environmental Policy Act (NEPA). The first step in the NEPA process is to determine if the proposed project is likely to have a significant impact. If a project is determined to have a significant impact then an Environmental Impact Statement would be required. If a project is determined to not have a significant impact then an Environmental Assessment (EA)/Finding of No Significant Impact (FONSI) would be prepared.

Based on the information gathered as a part of this study the potential exists for an EIS being required. Once the improvements proposed in this study are carried forward, additional study coordination with regulatory agencies should be conducted to determine if an EIS will be required. Items identified as a part of this study that should be considered when determining if an EIS is appropriate are as follows:

- Stream and buffer Impacts within the water supply and critical watershed for Jordan Lake will need to be addressed in a manner that does not impair the water quality of this vital resource
- Impacts to federally owned land at B. Everett Jordan Lake
- Impacts to J.B Mills House and Farm that is eligible for the National Register of Historic places
- Impacts to the New Hope New Hope Rural Historical Archeological District
- Public controversy relating to the section from NC 540 to US 1



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