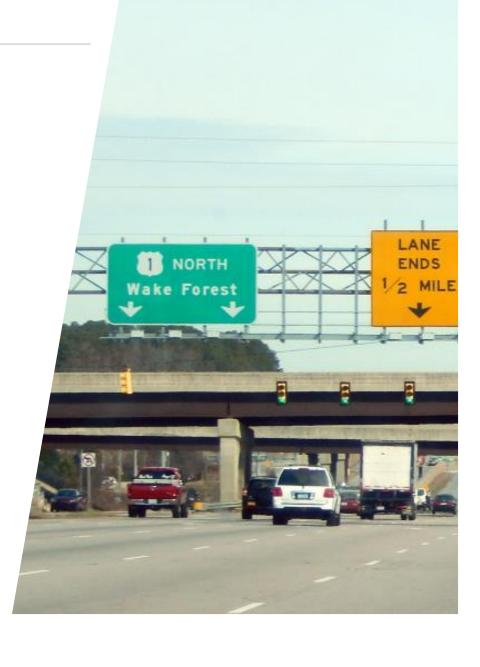
# US 1 (CAPITAL BOULEVARD) FREEWAY UPGRADE

CONCURRENCE POINT 1
STIP PROJECT U-5307

June 2018 Wake County, NC







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### 1.0 INTRODUCTION

### 1.1 Meeting Purpose

The North Carolina Department of Transportation (NCDOT) proposes to improve US 1 (Capital Boulevard) to a freeway from I-540 to the intersection of SR 1931 (Harris Road) and SR 1909 (Purnell Road) in Wake County (**Figure 1**). The project is included in NCDOT's current *State Transportation Improvement Program* (STIP) as Project U-5307 (Sections A through D). In accordance with the National Environmental Policy Act (NEPA)/Section 404 Merger Process, NCDOT is seeking consensus from the NEPA/404 Merger Team (Merger Team) on the following:

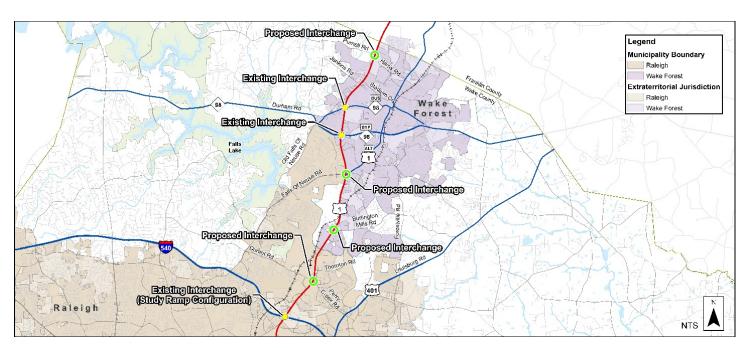
• Concurrence Point 1 – Purpose and Need and Study Area Defined

For Concurrence Point 1, this report provides a brief description of the existing conditions, defines the project study area, explains the project's need, and defines the project's purpose.

### 1.2 Project Description

NCDOT proposes to upgrade US 1 (Capital Boulevard) to a freeway from I-540 to the intersection of SR 1931 (Harris Road) and SR 1909 (Purnell Road) in Wake County (STIP No. U-5307). As part of this project, NCDOT proposes removing signals from the mainline of US 1 in place of a fully controlled freeway mainline with new interchanges at Durant/Perry Creek Road, Burlington Mills Road, Falls of Neuse/US 1A (Main Street), and Harris/Purnell Road. NCDOT also proposes the addition of the third westbound lane at I-540/US 1 (which is dropped at the US 1 interchange) as part of this project. Service road locations will be studied further as the project progresses.

US 1 was named Capital Boulevard because it connects several capitals (Washington, DC to Richmond to Raleigh to Columbia). US 1 is a Strategic Transportation Corridor and serves as a principal north/south route for moving people and goods throughout the east coast. It is a major route between Raleigh and major suburban areas, including the Town of Wake Forest.



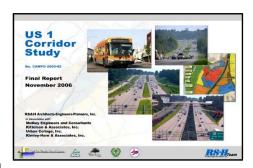


### 1.3 Project History

The Capital Area Metropolitan Planning Organization (CAMPO) has previously initiated several studies along the US 1 Corridor, in coordination with NCDOT, City of Raleigh, GoTriangle (formerly Triangle Transit), and the Town of Wake Forest. The Corridor Studies and updates covered a wider area than is included in the project limits of U-5307, which could possibly be future phases of another project.

CAMPO's previous studies are referred to as Phase I (2006) and Phase II (2012). The Phase I study limits extended from I-540 in Raleigh to US 1A (Park Avenue) in Youngsville. The Phase II study extended the Phase I study from US 1A in Youngsville to the Vance County line.

STIP Project U-5307 is included in the area called "Phase I" of the Corridor Study. Several updates were completed in 2014, one to reevaluate the US 1/US 1A/Main Street/Falls of Neuse intersection and another to update overall recommendations and service road analyses based on recent development (since 2006). US 1 is a primary north-



US 1 Corridor Study, 2006

south corridor serving rapidly growing areas, and the vision and character of the roadway are very similar to conditions in 2006 when the first Corridor Study was completed. Much of the work and outreach was included in the efforts to complete these plans and will be referenced and used in ongoing work as needed/appropriate. The Corridor Studies recommended bicycle, pedestrian, and transit accommodations on the service roads, which will be considered as U-5307 progresses through the planning and design process.

The typical section recommended in the Corridor Study was a median-divided highway with a transit option and two-way service roads with a turn-lane as needed and bicycle/pedestrian accommodations. The current NCDOT STIP has programmed this project to be constructed via Design-Build and indicates a right-of-way and construction date in Fiscal Year (FY) 2021. However, a STIP update is needed to change the right-of-way and construction date to February 2020.

The full versions of CAMPO's studies are available online at <a href="http://www.us-1corridornorth.com/">http://www.us-1corridornorth.com/</a>.

### 1.4 Public Involvement

To date, there have not been any formal public involvement activities as part of Project U-5307. The project team has met and/or held conference calls with various small groups, including the South Forest Business Park, Southeastern Baptist Theological Seminary, Duke Energy, and representatives for several property owners along the corridor. A public workshop is anticipated following Concurrence Point 1, prior to Concurrence Point 2 (estimated Fall 2018). Extensive public involvement for the Corridor Study was conducted previously and is summarized on CAMPO's website.

### 2.0 **EXISTING CONDITIONS**

US 1 (Capital Boulevard) is a primary north-south corridor serving a rapidly growing area within the Raleigh – Durham Metropolitan Region. The route carries interstate travel linking Raleigh



with I-85 while also acting as a regional link for commuters traveling between downtown Raleigh and the surrounding suburban areas. It is designated a Strategic Highway Corridor by NCDOT. Existing natural and human environmental features are shown on **Figure 2** (multiple sheets).

### 2.1 Transportation Features

US 1 is a principal arterial divided highway with four lanes of through traffic in each direction near I-540, three lanes of through traffic in each direction north of I-540 to the intersection of Durant/Perry Creek Rd, and two lanes of through traffic in each direction for the remainder of the project study area. The median along US 1 is predominately a grass depression with paved shoulders along the interior edge of travel but transitions to raised concrete islands at intersections. The road currently carries a range of 40,000 vehicles per day (vpd) north of NC 98 Business (Durham Highway) to 65,000 vpd near I-540.

The current structure inventory is as follows:

- Bridge #911004 carrying I-540 flyover over US 1
- Bridge #911000 carrying I-540 inner loop over US 1
- Bridge #910999 carrying I-540 outer loop over US 1
- Bridge #911003 carrying I-540 on-loop over US 1
- Culvert #910304 carrying Perry Creek under US 1
- Bridge #910305 carrying US 1N over Neuse River
- Bridge #910306 carrying US 1S over Neuse River
- Bridge #910312 carrying US 1N over CSX Railroad
- Bridge #910560 carrying US 1S over CSX Railroad
- Culvert #910672 carrying Richland Creek under US 1
- Bridge #911083 carrying NC 98 Bypass over US 1
- Bridge #910314 carrying US 1N over NC 98 Business
- Bridge #910671 carrying US 1S over NC 98 Business

Multimodal means of transportation are present throughout the project study area. GoTriangle and GoRaleigh operate bus routes along and crossing US 1. The Wake Forest/Raleigh Express Bus (WRX) makes no stops on US 1 but travels between Raleigh and Wake Forest during AM and PM peak hours. The Neuse River Greenway, part of the Capital Area Greenway System as well as North Carolina's Mountains to Sea Trail, passes underneath US 1. Several other existing and proposed greenways are located in the project study area (**Figure 2**). CSX Railroad maintains tracks that pass under US 1 and is part of the Southeast Corridor (Raleigh to Richmond) Tier II Study.



Neuse River Greenway (Photo: City of Raleigh)



### 2.2 Historic Properties

Three properties along US 1 are listed on the National Register of Historic Places: the Powell House, Purefoy-Dunn Plantation (House), and Wakefields (also known as Home Acres). Though not named as such on the State Historic Preservation's website, Wakefields is also known as The Sutherland. There is also a potential cemetery south of Jacqueline Drive which could not be verified in the field recently by the RS&H Team. RS&H will submit historic resource survey requests to PDEA via ETRACS. Known resources are shown on **Figure 2**.

### 2.3 Natural Resources & Environmental Features

A Natural Resources Technical Report (NRTR) was prepared in April 2016 for the original study area (I-540 to NC 98 Bypass), and an addendum (to be completed in 2018) will cover the remaining project study area from NC 98 Bypass to Harris/Purnell Road. The following is a summary of the findings of the 2016 report.

Fifty-two jurisdictional streams, 42 jurisdictional wetlands, five jurisdictional ponds, and 11 non-jurisdictional ponds are within the study area between I-540 and NC 98 Bypass. There were no designated anadromous fish waters or Primary Nursery Areas (PNA) within the study area at the time of the NRTR. However, since then, deconstruction of the Milburnie Dam began in November 2017. The scoping letter response from the North Carolina Wildlife Resources Commission (NCWRC) states that "this portion of the Neuse River will be opened to passage for anadromous fish and will be subject to an in-water work moratorium." There are no designated High Quality Waters (HQW) or water supply watersheds (WS-I or WS-II) within or 1.0 mile downstream of the study area. No streams within the study area or 1.0 mile downstream are listed on the 2014 303(d) list of impaired waters due to sedimentation or turbidity.

Four federally protected species were identified for Wake County (**Table 1**), as of the NRTR publication (April 2016, indicated below in blue). The biological conclusions for two out of these four species (Michaux's sumac and red-cockaded woodpecker) were categorized as No Effect. The biological conclusion for the northern long-eared bat (NLEB) is May Affect, Likely to Adversely Affect. The biological conclusion for the dwarf wedgemussel is unresolved. Suitable habitat may be present in the study area within the Neuse River. A review of the July 2015 NCNHP database indicated no known occurrences within 1.0 mile of the study area. Surveys will be conducted by NCDOT biologists, and NHP data re-checked.

Following completion of the original NRTR, one species was added but later deleted (rusty-patched bumble bee, shown in gray in Table 1), and three additional species were added (Cape Fear shiner, Tar River spinymussel, and yellow lance, shown in orange in Table 1). Additional natural resources surveys and an NRTR addendum will be completed in 2018.

Unknown

Unknown

Unknown

Unknown



steinstansana

Elliptio lanceolata

Scientific Name	Common Name	Federal Status	Habitat Present	Biological Conclusion
Myotis septenrionalis	Northern long-eared bat	Т	Yes	MA-LAA
Rhus michauxii	Michaux's sumac	Е	Yes	No Effect
Picoides borealis	Red-cockaded woodpecker	Е	Yes	No Effect
Alasmidonta heterodon	Dwarf wedgemussel	Е	Undetermined	Unresolved
Bombus Affinis	Rusty-patched bumble bee	E (Historic)	Undetermined	Unresolved
Notropis mekistocholas	Cape Fear shiner	Е	Unknown	Unknown
Parvaspina	Tor Diver eninymuseel	Е	Linknown	Linknown

Table 1: Federally Protected Species Listed for Wake County

E – Endangered; T – Threatened; MA-LAA – May Affect – Likely to Adversely Affect Blue highlight = original (2016) NRTR

Tar River spinymussel

Yellow lance

Gray highlight = once listed by USFWS for Wake County during the 2016-2018 study period, but no longer listed Orange highlight = species added / to be studied in 2018

Е

Т

On August 17, 2017, the National Marine Fisheries Service designated critical habitat for Atlantic Sturgeon in the Neuse River (Carolina Unit 3), which includes a portion of the river in Wake County. The project's potential effects on the Atlantic Sturgeon or its designated critical habitat will be evaluated in 2018.

### 2.4 Community Facilities

Community facilities in and around the project study area are shown on **Figure 2**. There are several different demographic groups ranging in income levels and English-speaking abilities. Hispanic communities are located along the corridor, and several churches nearby hold services in Spanish. School buses were observed using US 1 throughout the afternoon, as there are many residential areas and schools between Raleigh and Wake Forest that rely on this corridor. Public involvement activities will be tailored to reach the various communities along US 1.

Several specialty medical offices and wellness centers are located along US 1 as well as Rex Healthcare of Wakefield, located in the northwestern quadrant of the interchange of US 1/Falls of Neuse Road/US 1A (S Main Street). Several schools are nearby, including Richland Creek Elementary School, Wakefield 9<sup>th</sup> Grade Center, Forest Pines Elementary School, Endeavor Charter School, preschools, and private schools associated with churches.

### 2.5 Land Use

Current land uses in the project area consist of residential and commercial development as well as industrial complexes. Major industries in the project area include Eaton, Xelia Pharmaceuticals, Hanson Aggregates, Mallinckrodt Inc., and U-Haul. Car dealerships, car and equipment rentals, auto repair and auto specialty shops, storage centers, shopping centers, restaurants, and smaller retailers are located throughout the U-5307 corridor. Major retailers include Target, Lowes, Home Depot, Kohl's, Sam's Club, Super Walmart, and Triangle Town



Center Mall. Utilities along the corridor include power (substations, high and low-voltage lines), fiber optic (multiple owners), natural gas, monitoring wells, cell towers, a nitrogen line, and water/sewer.



Businesses along US 1 at Paragon Park Rd

### 3.0 STUDY AREA

The U-5307 project study area (**Figure 1**) extends from the US 1/I-540 interchange to just north of Harris/Purnell Road along US 1. Originally, the project limits extended from I-540 to NC 98 Bypass. In August 2016, NCDOT extended the limits of this project to Harris/Purnell Road, as development and growth continue well north of NC 98 Bypass. Wake Forest has consistently ranked in the top 10 fastest-growing municipalities in North Carolina over the last decade, and population and traffic growth are expected to continue beyond 2018. The original study area was extended along side streets in anticipation of needing additional distance to tie into those roadways, and another extension included distance along I-540 to allow for the addition of the dropped third lane (I-540 westbound). Photos of the US 1 corridor throughout the study area are included on **Figure 3**.

### 4.0 NEED FOR PROPOSED ACTION

The overall need for this project is to relieve traffic congestion, thereby improving travel times. As an additional benefit, the proposed project may reduce or eliminate certain crash scenarios. These needs are described in greater detail in the following sections.

### 4.1 Traffic Congestion

The *U-5307 Combined Traffic Forecast Report (Volume I & II)* for existing and future (2040) No Build and Build conditions was approved in June 2017. Current volumes along US 1 range from approximately 40,000 vehicles per day (vpd) north of NC 98 Business (Durham Highway) to 65,000 vpd near I-540. Future projected volumes (No Build scenario) could range from 50,000 vpd north of NC 98 Business to more than 80,000 vpd near I-540. These volumes are portrayed in **Chart 1,** seen below.



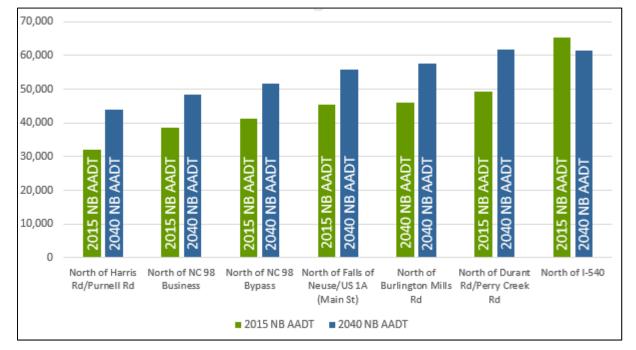


Chart 1: 2015 (Existing Conditions) and 2040 (No Build) Traffic Forecast

Forecasted traffic volumes in the 2040 Build conditions scenario range from approximately 55,000 vpd north of the interchange at Harris and Purnell Road to more than 100,000 vpd on US 1 near I-540. This is primarily due to the increase in capacity afforded to the corridor by converting US 1 to a freeway.

The *U-5307 Traffic Operations Report* for existing and future (2040) No Build conditions from I-540 to NC 98 Bypass was approved in January 2017. The *U-5307 Traffic Operations Report* for existing and future (2040) No Build conditions for the entire study area, including the extended project area (NC 98 Bypass to Harris/Purnell Road) was completed in April 2018.

Congestion along US 1 for the 2040 No Build condition is anticipated to increase greatly from the 2015 Existing condition, showing that the current capacity of the existing roadway configuration would not be able to accommodate the future volumes.



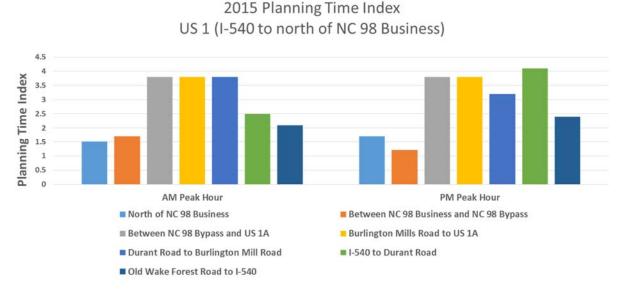


<sup>\*</sup> Note: The No Build 2040 scenario assumes a connector from Gresham Lake Road to Triangle Town Boulevard would be in place. If this roadway is not built, volumes on US 1 at I-540 are anticipated to reach approximately 80,000 in 2040.



Trip times along US 1 are highly variable, making it difficult for drivers to plan trips. A trip in the PM peak on at least one segment of the U-5307 corridor can take up to four times longer than regular trips (non-peak times). Planning time index (**Chart 2**) is the ratio of the 95<sup>th</sup> percentile travel time of a given period compared to the time required to make the same trip at free-flow speeds. A value of 2, for example, means that a 15 minute free flow trip requires 30 minutes during the peak. (The average non-peak trip through the project study area usually takes approximately 15 minutes.)

**Chart 2: Planning Time Index** 



The 2040 No Build condition travel time analysis indicates that travel times during the AM and PM peak hours for 14 miles along US 1 would be 33 and 34 minutes, respectively (both for the southbound direction, which is the most congested). This converts to an average speed of approximately 25 miles per hour. Similarly, in the northbound direction, travel times in both AM and PM peak hours are anticipated to degrade by approximately 30 percent between 2015 and 2040 if no improvements are made.

Speed maps based on 2015 INRIX Data, seen in **Tables 2 and 3**, show slowdowns in both directions during both peak hours. (INRIX is a company that provides real-time traffic data using GPS-enabled devices, cell phones, and road sensors. This allows users to map and understand travel times and congestion. For more information, see www.inrix.com.)



Table 2: September 2015 Actual Speed (mph) – US 1 Southbound
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Location	Length (Miles)	6:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM
NC 98 Bypass Interchange	0.65	58.5	45.8	57.3	60.0	59.2	59.7	59.3	57.4	59.4	58.2	57.9
North of Falls of Neuse Rd/US 1 Alt (S. Main St)	1.07	43.5	24.7	39.8	40.5	40.3	41.0	39.7	38.4	39.8	44.2	44.4
Falls of Neuse Rd/US 1 Alt (S. Main St) Intersection	0.02	36.4	26.2	30.3	28.1	26.3	30.2	28.8	30.9	29.7	33.5	29.4
North of Burlington Mills Rd	1.94	52.2	29.1	33.0	49.3	51.1	47.1	49.2	47.8	49.8	51.2	52.1
North of Perry Creek Rd/Durant Rd	1.94	47.5	22.1	21.7	40.4	45.7	42.8	41.9	42.3	45.6	46.4	46.4
Perry Creek Rd/Durant Rd Intersection	0.02	40.1	27.9	28.8	29.8	31.0	28.5	32.9	33.5	32.4	32.3	31.1
North of I-540	1.28	45.1	38.8	37.1	42.1	42.4	37.6	39.1	39.6	39.8	40.5	42.9

Table 3: September 2015 Actual Speed (mph) – US 1 Northbound

Location	Length											
Location	(Miles)	6:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM
I-540 Interchange	0.55	43.6	43.3	40.2	44.0	46.8	39.8	37.7	33.4	35.5	45.9	45.5
South of Perry Creek Rd/Durant Rd	1.12	46.2	39.4	38.3	39.8	42.9	26.4	24.1	21.7	21.0	40.4	42.3
Perry Creek Rd/Durant Rd Intersection	0.02	32.1	27.1	25.2	21.9	24.0	24.2	23.7	22.1	22.9	23.8	26.1
South of Burlington Mills Rd	1.94	48.1	43.0	43.2	43.8	46.4	35.7	33.0	28.0	34.4	43.0	46.2
South of Falls of Neuse Rd/US 1 Alt (S. Main St)	1.92	49.9	48.1	46.0	48.4	47.9	45.5	45.4	42.5	46.1	47.4	48.6
Falls of Neuse Rd/US 1 Alt (S. Main St) Intersection	0.06	34.3	34.6	28.0	26.4	19.0	26.9	25.7	23.0	28.4	22.7	22.8
South of NC 98 Bypass	1.12	50.9	51.2	50.2	49.4	49.5	49.3	50.4	48.7	50.6	48.0	46.5



Interchange analyses have not yet been completed but will be initiated upon further direction from the Merger Team at future Concurrence Point(s). Measures of Effectiveness related to the need for the project will be used to evaluate interchange configuration options, among other factors such as geometry/constructability, environmental features, residential and business impacts, etc.

### 4.2 Secondary Benefit: Reduced Crash Potential

Crash data was collected for the project corridor between I-540 Eastbound Ramps and NC 98 Business (Durham Road) Northern Ramps for the five-year period spanning June 1, 2011 through May 31, 2016. There were 1,870 collisions, seven of which were fatal, over the five-year period. **Table 4** shows a summary of crash types along the corridor. As shown in the table, 1,207 crashes (approximately 65% of all collisions) were rear-end collisions. These are typically associated with stop-and-go conditions along congested corridors.



Table 4: Roadway Segment Crash Type Summary: 06/01/2011 to 05/31/2016

				Type of	Crash			
Roadway Segment	Rear End	Side- swipe	Angle	Ran Off Road	Left Turn	Right Turn	Head- On	Other*
US 1 from I-540 EB Ramps to NC 98 Business (Durham Rd) Northern Ramps	1,207	213	119	84	71	34	4	138

<sup>\*</sup>Other types of crashes include collisions with fixed and movable objects, crashes caused by backing up, and collisions with animals.

Approximately 50% of rear-end collisions, the most prevalent crash type in the study area, were concentrated at signalized intersections. Signalized intersections are typically associated with stop-and-go traffic; however this condition becomes more dangerous when traveling at higher speeds. At 55 mph (the posted speed limit along US 1), drivers must react quickly to stopped vehicles and collisions can prove to be more fatal than collisions at lower speeds. Approximately 40% of all rear-end collisions (472) occurred within 0.50 mile of the intersection of US 1 and Durant Road/Perry Creek Road. In addition, approximately 11.5% of all rear-end collisions (139) took place within 0.50 mile of the intersection of US 1 and New Falls of Neuse Rd/US 1A (Main Street).

### 5.0 PURPOSE OF PROPOSED ACTION

To address the needs described above, the purpose of the proposed project is to improve traffic congestion and travel times along the corridor by upgrading US 1 to a freeway.

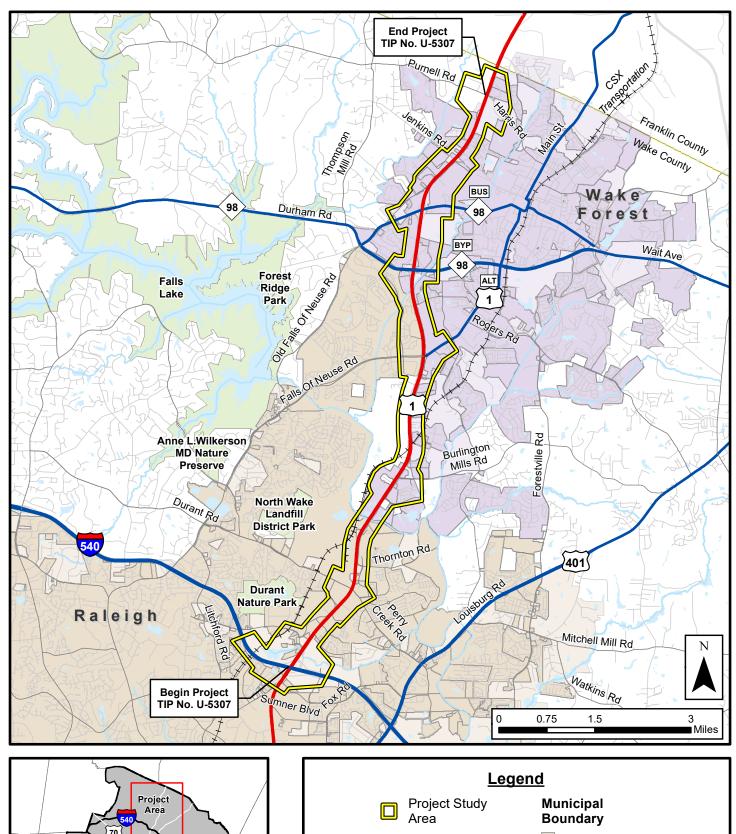
### 6.0 PROJECT SCHEDULE

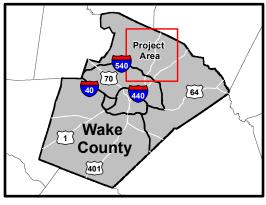
The proposed project schedule is as follows:

- Public Meeting Anticipated Fall 2018, following CP 1 and prior to CP 2
- Categorical Exclusion (CE) Late 2019
- Right-of-Way and Construction Funds Available (Design/Build) February 2020



# **FIGURES**





# Legend Project Study Municipal Boundary H Railroad Raleigh Creek/Stream Wake Forest Park/Public Extraterritorial Space Jurisdiction County Boundary Raleigh Wake Forest Wake Forest

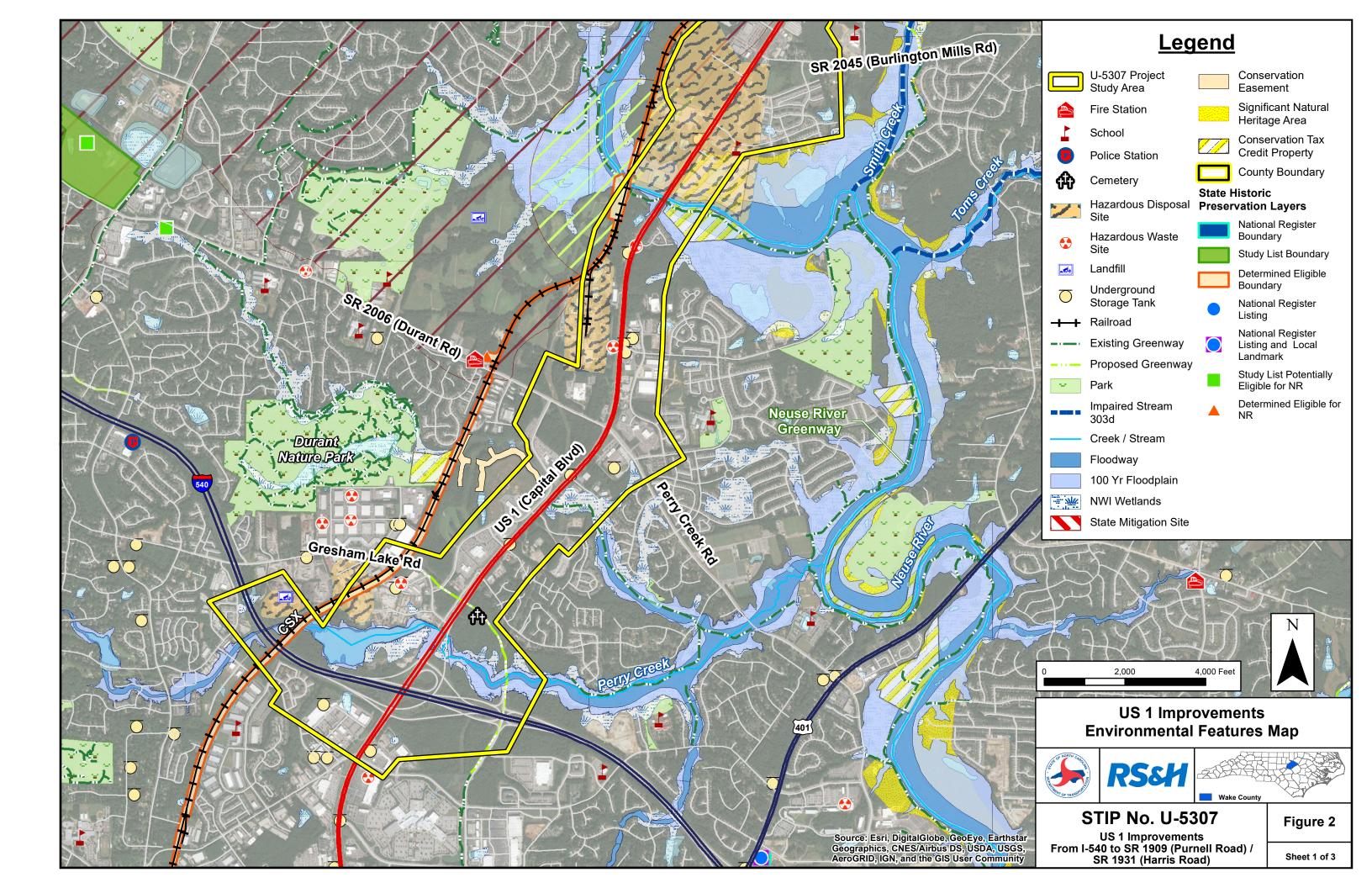


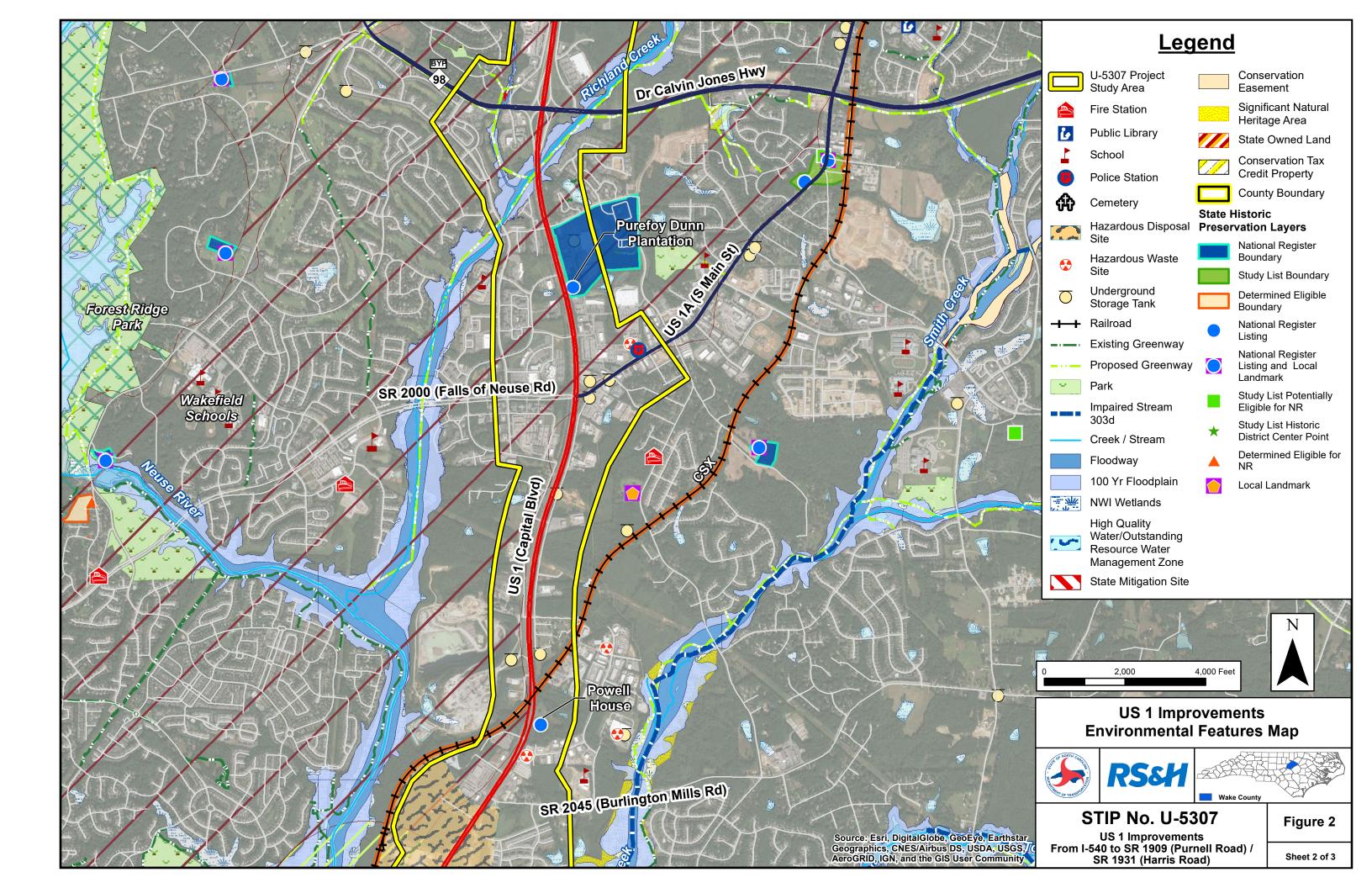
**RS&H** 

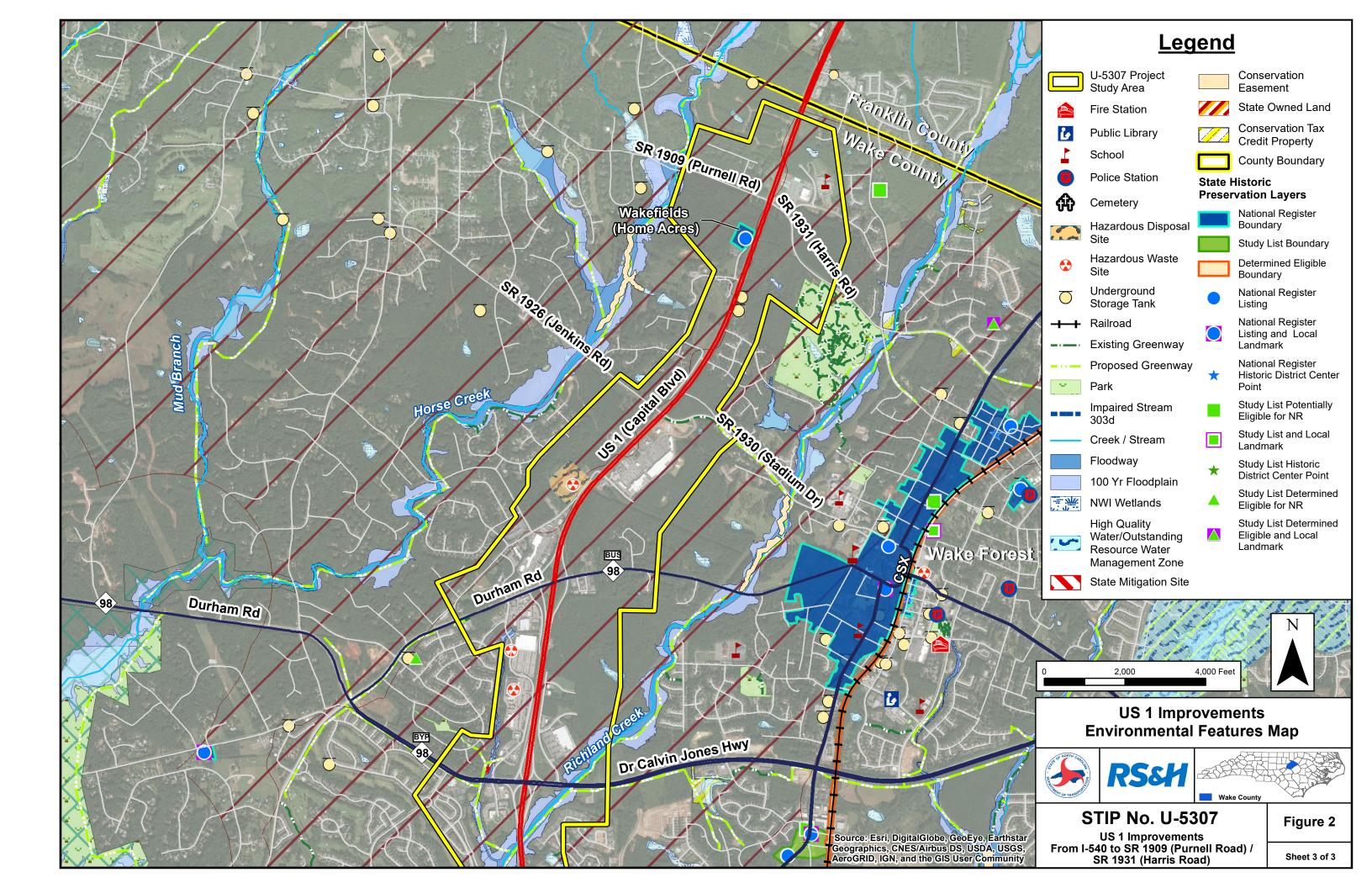
## **US 1 Improvements**

From I-540 to SR 1909 (Purnell Rd) / SR 1931 (Harris Rd)

TIP No. U-5307 Division: 5 **Figure:** 1 Vicinity Map









US 1 (Capital Blvd) SB approaching I-540



US 1 (Capital Blvd) SB at Capital Hills Connector



US 1 (Capital Blvd) NB at Paragon Park Rd



US 1 (Capital Blvd) NB at Perry Creek Rd



US 1 (Capital Blvd) SB at Durant Rd



US 1 (Capital Blvd) NB at Thornton Rd







**US 1 Improvements** 

From I-540 to SR 1909 (Purnell Rd) / SR 1931 (Harris Rd)

TIP No: U-5307 Division: 5 Figure: 3 Project Area Photos Sheet 1 of 3



US 1 (Capital Blvd) NB approaching Neuse River



US 1 (Capital Blvd) NB north of Neuse River



US 1 (Capital Blvd) SB approaching Shearon Farms Ave



US 1 (Capital Blvd) NB at Burlington Mills Rd



US 1 (Capital Blvd) NB at Falls of Neuse Rd/US 1A (S Main St)



US 1 (Capital Blvd) SB at Falls of Neuse Rd/US 1A (S Main St)







**US 1 Improvements** 

From I-540 to SR 1909 (Purnell Rd) / SR 1931 (Harris Rd)

TIP No: U-5307

Figure: 3 Project Area Photos Sheet 2 of 3

Division: 5



US 1 (Capital Blvd) SB approaching Caveness Farms Ave/Corona Blvd



US 1 (Capital Blvd) SB approaching NC 98 Business interchange



US 1 (Capital Blvd) SB approaching NC 98 Bypass interchange



US 1 (Capital Blvd) NB at Harris Rd



GoTriangle Bus on US 1 (Capital Blvd)



Traffic along US 1 (Capital Blvd)







**US 1 Improvements** 

From I-540 to SR 1909 (Purnell Rd)/ SR 1931 (Harris Rd) TIP No: U-5307

Division: 5 She

Figure: 3
Project Area
Photos
Sheet 3 of 3



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