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PURPOSE AND NEED AND STUDY AREA DEFINED

I-85 Widening Improvements from US 321 in Gastonia to
NC 273 in Mount Holly
and
NC 7 Minor Improvements from I-85 to US 29/74

Gaston County

STIP Project Nos. I-5719/U-3608

North Carolina Department of Transportation

MERGER CONCURRENCE POINT 1

May 16, 2018

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Following the External Scoping Meeting on July 20, 2016, additional coordination among NCDOT and the primary signatories to the Section 404/NEPA Merger Process resulted in a decision to proceed with the project in the Merger Process. This document is intended to include the information necessary for Merger Team members to make a determination for Concurrence Point No. 1, Project Purpose and Need.

1. INTRODUCTION

1.1 PROPOSED ACTION

North Carolina Department of Transportation (NCDOT) State Transportation Improvement Program (STIP) Project No. I-5719 is located on I-85 in Gaston County. FHWA is the lead federal agency for the proposed action. The project is programmed to widen I-85 from the US 321 interchange (Exit #17) in Gastonia to the NC 273 interchange (Exit #27) in Belmont/Mt. Holly, about 9.8 miles. The project connects "logical termini", including the eight-lane section beginning at NC 273, and the vital US 321 highway. The proposed project would include widening the existing interstate from six to eight lanes, with the majority of the mainline widening occurring within existing right of way. The proposed project would also include upgrading interchanges and relocating/replacing railroad bridges. **Figure 1** shows the project location.

There are eight interchanges, six roadway bridges, and four railroad bridges over I-85 within the project limits. Since there is not enough clearance to widen I-85 under the existing bridges and interchanges, NCDOT will evaluate different design options to accommodate the widening. STIP Project No. U-3608 will be included in the environmental review and study for I-5719, as it would not be constructed independently of I-5719 and is predicated on the I-85 widening. U-3608 would improve NC 7 from I-85 to US 29 in Belmont, approximately one quarter of a mile. The proposed project would consist of improvements, including design modifications and tie-ins for associated interchange modifications at Exit #26.

The proposed projects are included in the NCDOT 2018-2027 STIP and in the 2040 Gaston-Cleveland-Lincoln Metropolitan Planning Organization (GCLMPO) 2040 Metropolitan Transportation Plan (adopted March 2014, amended August 2015).

The project study area is in central Gaston County. The proposed project study area boundaries consist of a generally 1000-feet wide swath that follows existing I-85 along its footprint from west of US 321 to east of NC 273. The project study area includes the municipalities of Gastonia, Lowell, McAdenville, Belmont, and Mt. Holly. Expanded study areas were outlined around interchanges and incorporated into the I-85 project study area. **Figure 2a, 2b,** and **2c** depict the proposed project study area.

2. MERGER CONCURRENCE POINT 1 – PURPOSE AND NEED AND STUDY AREA DEFINED

2.1 SUMMARY OF NEED

I-85 is a critical controlled-access north-south interstate that traverses Gaston County in the east-west direction. I-85 is a major provider of travel for central and southern North Carolina and the southeastern United States for the movement of both people and goods. Locally, it serves as the main

facility for residents and business as well as providing direct access to the region's major airport, Charlotte-Douglas International. Northeast of the project corridor, I-85 combines with I 40 to become the major east-west corridor for the region as well as North Carolina. With its current traffic demand, I-85 is at or approaching capacity and is anticipated to operate over capacity by design year 2040.

The needs for the project are described below and supported by existing and predicted project study area conditions discussed in **Section 2.3** through **Section 2.6**.

- **(Primary Need) Existing and Projected Capacity Deficiencies and Mobility** – Heavy traffic conditions occur daily along I-85 within the project study area, resulting in frequent congestion and delays that hinder east-west mobility within central/eastern Gaston County.

  Currently, the approximately 10-mile section of I-85 in the project study area is a six-lane divided controlled-access freeway with eight existing interchanges, six grade-separated crossings, and four railroad bridges. Motorists on I-85 in the project study area frequently experience congestion, which is projected to worsen through 2040. Traffic volumes within the project study area are projected to increase by 15 to 24 percent between 2016 and 2040. By 2040, all segments in both directions are projected to be LOS F during one or both peak periods.

- **(Secondary Need) Roadway Deficiencies** – The freeway mainline segments and interchanges in the project study area have physical or geometric condition issues and substandard design elements.

  Congestion experienced along I-85 in the project study area is not only a function of capacity deficiencies, but also roadway deficiencies. The freeway and interchanges in this section of I-85 have substandard design elements such as poor sight distances, narrow median shoulders, and poor entrance/exit ramp designs.

  Several bridges are classified as functionally obsolete, and nearly all the bridges that cross over I-85 within the project study area do not have the horizontal or vertical clearance required to accommodate widening improvements.

- **(Secondary Need) Inability to Serve High-Speed Regional Travel Consistent with the Designations and Goals of State and Local Transportation Plans** – Congestion and frequent incidents on I-85 inhibit regional travel and diminish the ability of I-85 to function as a Strategic Highway Corridor and Intrastate Corridor. Due to its statewide and regional importance, I-85 has been designated as a Strategic Highway Corridor (SHC) by NCDOT and is part of the North Carolina Intrastate System. Both designations call for this corridor to serve high-speed regional travel. The existing study area corridor of I-85 is designated as part of the National Highway System's (NHS) Strategic Highway Network (STRAHNET). Existing and projected poor LOS along the I-85 project study corridor diminish the roadway's ability to function as part of the STRAHNET.

  GCLMPO, as documented in their *2040 Metropolitan Transportation Plan (MTP)*, has identified improvements to I-85 as a top priority project.

- **Increased Crash Incidents** – Traffic congestion occurs daily, with I-85 travelers experiencing a high number of incidents that cause delays and augment congested conditions. This portion of I-85 exceeds the NCDOT 2012-2014 statewide urban interstates critical crash rates for non-fatal injury crashes. The total number of crashes increased by 62% between 2012 (432) and 2015 (700).

2.2 SUMMARY OF PURPOSE

The purpose of the proposed improvements to I-85 is to reduce congestion and improve mobility in this growing area of Gaston County. The project purpose is based on the following needs identified within the project study area:

- Primary need to address capacity deficiencies and improve east-west mobility in central/eastern Gaston County.
- Need to address roadway deficiencies, including substandard design elements.
- Need to improve traffic flow on I-85 for high-speed, regional travel.
- Another desirable outcome for the project is to enhance the overall travel safety in the project study area.

2.3 EXISTING TRANSPORTATION SYSTEM

2.3.1 Regional Network and Project Setting

I-85 is a major northeast-southwest interstate that serves five southeastern states, beginning in Alabama and terminating in Virginia. I-85 is the second longest interstate in the state after I-40. I-85 is a critical link for the three largest NC metropolitan areas: Metrolina, Piedmont Triad, and Research Triangle. The project is within the Piedmont region of North Carolina. **Figure 3** depicts the I-85 corridor in relation to the larger regional interstate network.

West of the project, I-85 connects to South Carolina and east of the project it connects Gaston County with Mecklenburg County. I-85 enters the State near Kings Mountain before traversing Gastonia and sections east/south. In Charlotte, I-85 provides access to the international airport before turning northeast towards center city Charlotte. To the north of center city Charlotte, I-85 intersects with I-77, then goes on to traverse near Concord, Salisbury, Lexington, High Point, and Greensboro. East of downtown Greensboro, I-85 intersects and joins I-40 through Burlington, Graham, and Mebane before heading into Durham then northeast through Virginia.

2.3.2 Existing I-85 in Project Study Area

I-85 in the project study area provides connection to the municipalities of Gastonia, Lowell, McAdenville, Belmont, and Mt. Holly. The surrounding areas are heavily developed, especially in Gastonia and Belmont. Growth within the municipalities surrounding I-85 has included new residential and employment development, as well as downtown and neighborhood revitalization and redevelopment.

The project study area continues to experience growth and development pressure due to its proximity to the Charlotte metro area, connection to other interstates, and relatively low cost of living. There are widespread community resources and commercial retail and services that includes restaurants, hotels, convenience/gas stations that serve the booming residential development market.

Major traffic generators in the project study area include US 321 (Exit #17), which is the sole north-south US highway in Gaston County. US 321 connects to I-40, Hickory and Boone to the north and to South Carolina to the south. Through downtown Gastonia, US 321 is a one-way pair of streets (Chester Street is southbound and York Road is northbound). Exits #19 and #20 generate traffic due to the presence of several retail shopping establishments. Other activity centers include Pharr Yarns, which is a manufacturing facility accessed from NC 7 (Exit #23) and Oaks Commerce Center, a 280-acre privately owned business and industrial park that has frontage along I-85 and is accessed from Belmont Mt. Holly Road (Exit #26).

According to the GCLMPO *2040 MTP*, in Gaston County approximately one-third of all travel occurs on I-85. The Catawba River is a constraint to the expansion of the region's transportation network, making parallel alternative routes and grid patterns challenging or not practicable to develop. This lack of transportation options causes I-85 to serve as a major bottleneck during peak travel periods.

The I-85 corridor in the project study area also experiences seasonal increases as Mecklenburg County residents and other travelers head west to the mountain region via I-85 and US 321 for recreational activities (i.e. spring through summer and fall foliage viewing). In addition, McAdenville hosts "Christmas Town USA" each December, drawing hundreds of thousands of visitors annually from across the region and country.

2.3.3 Modal Relationships

Information on modal options was obtained from the GCLMPO *2040 MTP* and summarized below. I-85 within and just beyond the project study area accommodates and connects several modes of transportation, adding to the regional economic significance of the corridor.

Public Transportation – Gaston County (ACCESS) and Gastonia Transit provide demand response service within the City of Gastonia during the same hours as its fixed-route service. Curb-to-curb van service is for non-commuting, transit-dependent passengers that cannot utilize the fixed-route bus system due to a physical or mental disability. Gastonia Transit operates eight fixed-routes within the City, with all buses coming to a central location ("pulse" system). Bus ridership provided by the County and City have dropped significantly since the early 2000s, but existing routes have been restricted and coverage extended to new areas.

The Charlotte Area Transit (CATS) operates a van pool program for commuters into Mecklenburg County. As of January 2014, there are 15 van pools originating from the MPO's Planning Area and terminating in Mecklenburg County, with three of these originating in Gaston County. CATS operates express bus routes in counties surrounding Mecklenburg, including the 85X – Gastonia Express, which is the only express route in the GCLMPO Planning Area. It provides weekday service for commuters between Downtown Gastonia and Uptown Charlotte, including a stop in Belmont. Gastonia and Belmont share the operating costs of the route with CATS.

GCLMPO and the City of Gastonia are evaluating options for expansion of public transportation in Gaston County, including bus rapid transit along I-85 and alignment options along the rail routes in Gaston County.

Inter-City bus service in the GCLMPO is provided by Greyhound Bus Lines and Coach America seven days a week with two round trips each day. Most of the trips originate or terminate in Charlotte, but there is some utilization of the stops in Lincolnton and Gastonia.

Air Service – Gastonia Municipal Airport is a publicly-owned general aviation airport, but does not offer scheduled, passenger air service. Charlotte-Douglas International Airport is located less than five miles east of Gaston County and is the second largest airport hub on the East Coast. Recent airport expansion activities include a new intermodal facility with the goal to facilitate direct transfer of cargo between air, train, and truck movements.

Rail Service – Amtrak operates one daily route, the Crescent, through Gastonia. Relative to other cities served by Amtrak, including neighboring Charlotte, it is extremely low ridership.
Norfolk Southern Railway and NCDOT (Owner)/Piedmont and Northern Railway (Operator) each have two railroad bridges over I-85 in the project study area. Norfolk Southern runs 78 trains a day on the line roughly paralleling I-85 from both the east and west. The NCDOT/Piedmont Northern Railroad bridge east of Exit #26 is part of a spur line that is currently inactive ("Belmont Spur"). Studies are underway for the Belmont Rail to Trail project and how the Belmont spur bridge will be incorporated into that proposed project.

Motor Freight Service – The movement of goods is essential to fueling regional and domestic economic economies. According to information contained in the GCLMPO *2040 MTP*, the most important freight-related roads within the GCLMPO Metropolitan Planning Area are found on NCDOT Strategic Highway Corridor network, and include the highest truck volume routes. Several sections of NC, US, and Interstate routes, score among the most congested sections of road in NC, specifically I-85 through Gaston County and the US 321 and I-85 interchange, which each carry substantial truck volumes and have high congestion. The existing truck percentage (2015 %TTST flow) along the project study area ranges from 12-14 percent.

2.4 PROJECT STUDY AREA CONDITIONS AND OPERATIONS

2.4.1 Existing Roadway Characteristics and Conditions

I-85 is a 6-lane, concrete median divided, full-control access facility from US 321 (Exit# 17) to I-85 mile-marker 26 and is an 8-lane, concrete median divided facility from just east of I-85 mile-marker 26. There are eight interchanges, six roadway bridges, and four railroad bridges over I-85 within the project limits. The posted speed limit of the facility is 60 miles per hour (mph).

With limited alternative routes, automobile and truck-freight through traffic utilizing I-85 are forced to share the facility with local traffic, creating several areas of congestion during peak travel periods on I-85. The impact of freight movement along I-85 contributes greatly to capacity issues as well as congestion.

Table 1 lists the 2016 annual average daily traffic (AADT) and projected (2040) volumes along the project section of I-85. Year 2016 volumes on I-85 range from 113,300 to 135,100 vehicles per day (vpd), with the highest traffic volumes along the segment between Exit #23 (NC 7) and Exit #27 (NC 273). By 2040, with no improvements to the project corridor, traffic volumes are projected to increase 15-24 percent, to 140,500 to 153,600.

Table 1: Existing and Projected No-Build Traffic Volumes on I-85

I-85 Segment	2016 BYNB AADT	2040 FYNB AADT	Percent Change (2016 BYNB to 2040 FYNB)
West of NC 274 (Exit #14)*	86,900	107,700	24%
NC 274 (Exit #14) to US 321 (Exit #17)*	93,700	113,400	21%
US 321 (Exit #17) to NC 7 (Exit #19)	113,300	140,500	24%
NC 7 (Exit #19) to New Hope Rd. (NC 279) (Exit #20)	122,500	148,300	21%
NC 279 (Exit #20) to (SR 2200) Cox Rd. (Exit #21)	122,500	144,800	18%
Cox Rd. (Exit #21) to SR 2329 (S. Main St.) (Exit #22)	126,300	145,800	15%
S. Main St. (Exit #22) to NC 7 (McAdenville Rd.) (Exit #23)	134,500	155,300	15%
NC 7 (Exit #23) to Belmont Mt. Holly Rd. (Exit #26)	135,100	156,000	15%
Belmont Mt. Holly Rd. (Exit #26) to NC 273 (Exit #27)	133,100	153,600	15%
NC 273 (Exit #27) to Sam Wilson Rd. (Exit #29)*	143,200	165,400	16%
Sam Wilson Rd. (Exit #29) to I-485 (Exit #30) *	144,200	170,600	18%
East of I-485*	120,800	153,400	27%

Source: *I-5719 Project Level Traffic Forecast (HNTB, March 2017)*; AADT = Annual Average Daily Traffic Volumes (vehicles per day); BYNB = Base Year No-Build; FYNB = Future Year No-Build; *Traffic Analysis study area includes these segments.

2.4.2 Existing and Projected No-Build Traffic Conditions

Table 2 presents existing (2016) and future (2040) no-build morning and evening peak hour levels of service for segments along the corridor. Traffic flow is heaviest in the northbound direction in the mornings, then switching to the southbound direction in the evenings.

Under existing conditions (2016), the most congestion occurs on the corridor segments between NC 7 and NC 273, and as shown in the table, congestion is expected to worsen by 2040 in all segments.

Table 2: Existing and Projected No-Build Segment Level of Service on I-85

I-85 Segment	# of Lanes	2016 (Existing)				2040 (Future No-Build)			
		Northbound Peak 1-Hour		Southbound Peak 1-Hour		Northbound Peak 1-Hour		Southbound Peak 1-Hour	
		AM	PM	AM	PM	AM	PM	AM	PM
US 321 to NC 7 (E. Ozark Ave.)	3	C	C	C	D	F	D	D	F
NC 7 (E. Ozark Ave.) to NC 279 (New Hope Rd.)	3	C	C	C	D	F	C	C	F
NC 279 to Cox Rd.	3	D	D	D	D	F	D	D	F
Cox Rd. to S. Main St.	3	C	D	D	D	F	D	D	F
S. Main St. to NC 7 (McAdenville Rd.)	3	D	D	D	D	F	D	D	F
NC 7 (McAdenville Rd.) to SR 2093 (Belmont-Mt Holly Rd.)	3	D	D	D	D	F	D	D	F
SR 2093 (Belmont-Mt. Holly Rd.) to NC 273 (Beatty Dr./Park St.)	3	E	D	D	D	F	D	D	F
	4	D	C	C	C	C	C	D	F
Direction of Travel		↓ NB ends here		↑ SB starts here		↓ NB ends here		↑ SB starts here	

Source: *Highway Capacity Software (HCS7), Freeways Facilities module, Version 7.4 (HNTB (PRELIMINARY RESULTS), March 2018)*

Table 3 presents the peak hour average travel speeds along the I-85 corridor (obtained from the microsimulation traffic analysis). In the northbound direction, existing (2016) average travel speeds are close to the 60 miles per hour (mph) posted speed limit in both the morning and evening peak hour (58-59 mph), and are expected to slow well below the posted speed limit in the mornings (the main commuting direction) by 2040 (42 mph). In the southbound direction, existing average travel speeds are just below the posted speed limit in both the morning and evening peak hour (55-58 mph), and are anticipated to be below the posted speed limit in the evenings (the main commuting direction) in 2040 (48 mph).

Table 3 also presents VMT through the corridor limits during the morning and evening peak 1-hour periods. Compared to the existing (2016) VMTs, the 2040 peak hour corridor VMTs are predicted to decrease because less traffic can get through the corridor during the peak period due to estimated increased congestion.

Table 3: Average Travel Speeds and Vehicle Miles Traveled (VMT) Along I-85

I-85 Direction	AM Peak 1-Hour Period				PM Peak 1-Hour Period			
	Speed (mph)		VMT		Speed (mph)		VMT	
	2016	2040	2016	2040	2016	2040	2016	2040
Northbound	58.2	41.9	21,527	20,986	58.9	58.0	19,469	12,735
Southbound	57.6	55.0	17,003	10,777	55.1	47.6	29,735	21,580

Source: *TransModeler Version 4.0, Build 6275 (HNTB (PRELIMINARY RESULTS), April 2018)*

2.4.3 Roadway Deficiencies

2.4.3.1 *Physical Conditions*

NCDOT evaluated existing conditions of the mainline and overpass bridges along I-85 by reviewing *Bridge Inspection Reports*. Several factors were reviewed to provide insight of the overall condition of bridges, including overall rating, sufficiency ratings (used to determine eligibility for federal funding), estimated remaining life, and structural/functional deficiencies. In addition to the bridge condition, the *Bridge Inspection Reports* also provided key geometric data such as existing horizontal clearance on both sides of the roadway and the minimum vertical clearance. Field measurements were taken for bridges that did not have NCDOT *Bridge Inspection Reports*.

As seen in **Table 4**, the general condition ratings of the bridges are primarily "GOOD", but further data analysis indicates that the general condition and sufficiency ratings vary significantly. None of the bridges are categorized as structurally deficient but 10 are classified as functionally obsolete. The average estimated remaining life of the I-85 bridges over I-85 is about 25 years, but significant repairs/rehabilitation will be necessary over the next 20 years.

A structurally deficient bridge typically needs maintenance and repair and eventual rehabilitation or replacement to address deficiencies.

Table 4: Condition Rating of Bridges Over I-85

Bridge No.	Location	General Condition Rating	Sufficiency Rating	Estimated Remaining Life (yrs.)	Deficiencies
350125	SR 2278 (Dr. MLK Jr. Way/Marietta St.) Bridge	FAIR	80.47	20	N/A
350126	Modena St. Bridge	GOOD	78.57	35	Functionally Obsolete
350129	Railroad Bridge (NCDOT-Owner/Piedmont & Northern Railway-Operator)	N/A	N/A	N/A	N/A
350059	NC 7 (E. Ozark Ave.) Interchange – **Exit #19**	GOOD	90.88	19	Functionally Obsolete
350132	Railroad Bridge (Norfolk Southern)	N/A	N/A	N/A	N/A
350002	NC 279 Interchange - **Exit #20** (N. New Hope Rd.)	GOOD	64	16	Functionally Obsolete
350133	Aberdeen Rd. Bridge	GOOD	81.5	30	Functionally Obsolete
350134	Cox Rd. (SR 2200) Interchange - **Exit #21**	GOOD	74.32	40	Functionally Obsolete
350136	SR 2339 (S. Church St.) Bridge	GOOD	76	21	Functionally Obsolete
350137	S. Main St. (SR 2329) Interchange - **Exit #22**	GOOD	80.75	40	Not Deficient
350142	Railroad Bridge (Norfolk Southern)	FAIR	82	18	Functionally Obsolete
350138	Groves St. (SR 2213) Bridge	FAIR	0	20	Functionally Obsolete
350073	McAdenville Rd. (Main St./NC 7) Interchange - **Exit #23**	FAIR	93	16	Functionally Obsolete
350146	Hickory Grove Rd. (SR 2000) Bridge	FAIR	73.13	15	Not Deficient
350149	Belmont-Mount Holly Rd. (SR 2093) Interchange - **Exit #26**	FAIR	66	12	Functionally Obsolete
350150	Railroad Bridge (NCDOT-Owner/Piedmont & Northern Railway-Operator)	N/A	N/A	N/A	N/A
350034	NC 273 (Beatty Dr./Park St.) Interchange - **Exit #27**	GOOD	97	44	N/A

Source: *I-5719 Physical Conditions Technical Memorandum (HNTB, February 2016)*

A functionally obsolete bridge is one that was built to standards that do not meet the minimal federal clearance requirements for a new bridge. Functionally obsolete bridges include those that have substandard geometric features such as narrow lanes, narrow shoulders, poor approach alignment, or inadequate vertical under clearance.

The general condition rating only applies to the structural and functional deficiencies of the bridges, and does not consider limited horizontal and vertical clearance deficiencies that may affect the ability to widen I-85. As shown below in **Table 5**, most of the bridges that cross over I-85 within the limits of the roadway widening project do not have the horizontal or vertical clearance required to accommodate widening to an eight-lane or wider section. Only two of the bridges over I-85 are wide enough to accommodate an eight-lane section. Therefore, it's anticipated that bridges will need reconstruction to accommodate an eight-lane or wider I-85.

Table 5: Clearance Findings for Bridges Over I-85

Bridge No.	Location	Min. Existing Horizontal Clearance (ft.)	Min. Existing Vertical Clearance (ft.)	Finding
350120	US 321 Interchange - **Exit #17**	58.33	N/A	N/A – Widen Bridge
350125	SR 2278 (Dr. MLK Jr. Way/Marietta St.) Bridge	63.67	16.5	Horizontal Clearance Insufficient for Widening
350126	Modena St. Bridge	48.75	15.833	Vertical and Horizontal Clearance Insufficient for Widening
350129	Railroad Bridge (NCDOT-Owner/Piedmont & Northern Railway-Operator)	48.75	15.775	Vertical and Horizontal Clearance Insufficient for Widening
350059	NC 7 Interchange - **Exit #19** (E. Ozark Ave.)	61.00	15.67	Vertical and Horizontal Clearance Insufficient for Widening
350132	Railroad Bridge (Norfolk Southern)	50	15.833	Vertical and Horizontal Clearance Insufficient for Widening
350002	NC 279 Interchange - **Exit #20** (N. New Hope Rd.)	50.92	15.75	Vertical and Horizontal Clearance Insufficient for Widening
350133	Aberdeen Rd. Bridge	49.33	15.75	Vertical and Horizontal Clearance Insufficient for Widening
350134	Cox Rd. (SR 2200) Interchange - **Exit #21**	51.75	16.75	Horizontal Clearance Insufficient for Widening
350136	SR 2339 (S. Church St.) Bridge	51.75	17.83	Horizontal Clearance Insufficient for Widening
350137	S. Main St. (SR 2329) Interchange - **Exit #22**	62	18.17	Horizontal Clearance Insufficient for Widening
350142	Railroad Bridge (Norfolk Southern)	45.913	16.17	Horizontal Clearance Insufficient for Widening
350138	Groves St. (SR 2213) Bridge	51.92	18.17	Horizontal Clearance Insufficient for Widening
350073	McAdenville Rd. (Main St./NC 7) Interchange - **Exit #23**	48.5	15.58	Vertical and Horizontal Clearance Insufficient for Widening
350143	I-85 (across South Fork Catawba River)	51	N/A	N/A – Widen Bridge
350146	Hickory Grove Rd. (SR 2000) Bridge	54.83	15.8	Vertical and Horizontal Clearance Insufficient for Widening
350149	Belmont-Mount Holly Rd. (SR 2093) Interchange - **Exit #26**	49.5	15	Vertical and Horizontal Clearance Insufficient for Widening
350150	Railroad Bridge (NCDOT-Owner/Piedmont & Northern Railway-Operator)	48.333	16.33	Vertical and Horizontal Clearance Insufficient for Widening
350034	NC 273 (Beatty Dr.) Interchange - **Exit #27**	68.83	16.33	Sufficient for 8-lane section

Source: *I-5719 Physical Conditions Technical Memo (HNTB, February 2016)*

2.4.3.2 *Geometric Conditions*

Stopping sight distance – The rates of vertical curvature for the stopping sight distance (depicted as K values) are "Good" for a majority of the corridor. There are two locations on the I-85 corridor that do not meet the design speed of 65 mph. These two locations provide "Fair" stopping sight distance and are in the following locations.

- Sag vertical curve between the US 321 and NC 7 (E. Ozark Avenue) interchanges
- Crest vertical curve just north of the SR 2093 (Belmont Mount Holly Road) interchange

Decision sight distance – There are eight locations where a driver has less than the optimal 2,000 feet for decision sight distance. Of these eight locations, four are "Poor" because they have less than 1,000 feet of decision sight distance and four are "Fair." They are included in **Table 6**.

Decision sight distance is the distance a motorist needs to visually recognize an exit ramp and then decide on what action to take while traveling at highway speed. The decision sight distance is identified by an analysis of both the horizontal and vertical sight lines and how they affect a motorist's ability to identify the ramp locations.

Table 6: Locations with Fair or Poor Decision Sight Distance

Location	Direction	Distance (feet)	Fair/ Poor
Exit 17 - South of US 321 Interchange	Northbound	1675	Fair
Exit 17 - North of US 321 Interchange	Southbound	1550	Fair
Exit 19 - South of NC 7 (E. Ozark Ave.) Interchange	Northbound	500	Poor
Exit 19 - North of NC 7 (E. Ozark Ave.) Interchange	Southbound	500	Poor
Exit 20 - South of NC 279 (New Hope Rd.) Interchange	Northbound	1245	Fair
Exit 22 - North of SR 2329 (Main St.) Interchange	Southbound	1330	Fair
Exit 22 - South of the SR 2329 (Main St.) Interchange	Northbound	320	Poor
Exit 26 - South of SR 2093 (Belmont Mount Holly Rd.) Interchange	Northbound	700	Poor

Source: *I-5719 Geometric Conditions Technical Memorandum (HNTB, February 2016)*

2.4.3.3 *Exit and Entrance Ramp Design*

There are 15 locations on the corridor where a motorist has less than the optimal distance for accelerating onto or decelerating off I-85. Of these 15 locations, seven have a distance that would rank them as "Poor", and eight are ranked as "Fair." They are included in **Table 7**.

Table 7: Locations with Fair or Poor Exit and Entrance Ramp Design

Location	Direction	Ramp	Fair/ Poor
Exit 17 - At US 321 Interchange	Southbound	On-ramp	Poor
Exit 17 - At US 321 Interchange	Northbound	Loop on-ramp	Fair
Exit 19 - At NC 7 (E. Ozark Avenue) Interchange	Northbound	Loop off-ramp	Poor
Exit 20 - At NC 279 Interchange	Southbound	Off-ramp	Fair
Exit 20 - At NC 279 Interchange	Northbound	On-ramp	Poor
Exit 21 - At SR 2200 (Cox Road) Interchange	Southbound	On-ramp	Poor
Exit 22 - At SR 2329 (Main Street) Interchange	Southbound	Loop on-ramp	Poor
Exit 22 - At SR 2329 (Main Street) Interchange	Northbound	Loop off-ramp	Fair
Exit 22 - At SR 2329 (Main Street) Interchange	Northbound	On-ramp	Poor
Exit 23 - At NC 7 (McAdenville Road) Interchange	Northbound	Off-ramp	Fair
Exit 23 - At NC 7 (McAdenville Road) Interchange	Northbound	On-ramp	Fair
Exit 23 - At NC 7 (McAdenville Road) Interchange	Southbound	On-ramp	Fair
Exit 23 - At NC 7 (McAdenville Road) Interchange	Southbound	Off-ramp	Fair
Exit 26 - At SR 2093 (Belmont Mount Holly Road) Interchange	Southbound	On-ramp	Fair
Exit 26 - At SR 2093 (Belmont Mount Holly Road) Interchange	Northbound	Loop on-ramp	Poor

Source: *I-5719 Geometric Conditions Technical Memorandum (HNTB, February 2016)*

2.4.4 Crash Data

With I-85 currently carrying a substantial traffic volume, and projected to carry higher traffic volumes in the future, safety is an important consideration for the project. Without improvements, the number of

crashes in this area is expected to grow. Traffic crashes are often the result of deficiencies in the capacity of a transportation facility.

The following provides a cursory assessment and general observations of the strip crash analysis report for I-85. The report contains data from US 321 to I-485 provided by the NCDOT Transportation Mobility and Safety Division Traffic Safety Unit because a former ITS project (STIP Project C-5600G or I-5869) for improvements between Exit 22 (Main Street in Lowell) and Exit 29 (Sam Wilson Road) in Mecklenburg County was subsequently accelerated and removed from concurrent analysis with STIP Project I-5719 following the crash analysis request. Data for both STIP Projects is included in this analysis over a five-year period from 12/01/2010 to 11/30/2015 and the current available NCDOT statewide crash rates used for comparison are for a three-year period from 2012 to 2014.

- Of the total crashes reported (2,846), 71% were Property Damage Only Crashes (2,028) while 0.35% were Fatal Crashes (10).
- As indicated in **Table 8**, one of the five listed crash rate categories (non-fatal injury crashes) along I-85 from US 321 to I-485 exceed the NCDOT 2012-2014 statewide urban interstates critical crash rates. The critical crash rate is statistically adjusted to remove the elements of chance and randomness to determine if the "rate at a particular location (or strip) is significantly higher than a predetermined average rate for the locations of similar characteristics, based on Poisson's distribution".

Table 8: I-85 Crash Data

Crash Rate	STIP I-5719 / C-5600G Crash Rate*	Statewide Urban Interstates Crash Rate*	Critical Crash Rate*
Total Crash Rate	97.68	94.94	97.93
Fatal Crash Rate	0.34	0.30	0.48
Non-Fatal Injury Crash Rate	**27.73**	23.10	24.58
Night Crash Rate	24.85	24.24	25.76
Wet Crash Rate	20.90	22.08	23.53

Source: NCDOT Transportation Mobility and Safety Division Traffic Safety Unit

- Of the total crashes reported, most were *Rear-end, Slow* or *Stop Crashes* (48%) and *Sideswipe, Same Direction Crashes* (21%).
- Of the total injuries reported (1,321), 99% were non-fatal injuries (1,310), 83% of which were Class C (possible) injuries (1,097).
- The total number of crashes increased by 62% between 2012 (432) and 2015 (700).
- Based on a cursory review of the strip diagram in the strip crash analysis report, the highest number of crashes occurred between Exit 26 (Belmont-Mt. Holly Rd) and Exit 27 (NC 273). Of the 482 crashes between these two interchanges, approximately 52% (250 crashes) occurred along I-85 WB/SB in proximity to the inside lane drop where the number of lanes are reduced from four to three. Most of these crashes were *Rear-end, Slow* or *Stop Crashes* (89%).
- One other location with a large amount of crashes occurred at milepost 15.14 (74 crashes). Milepost 15.14 is located between Exit 23 (NC 7) and the Hickory Grove Road (SR 2000) overpass. Although it's uncertain if specific roadway characteristics contributed to crashes at this location, the NC 7 eastbound/northbound on-ramp merge and westbound/southbound off-ramp diverge points are located within a curve.

2.5 Social and Economic Conditions

2.5.1 Population and Employment

US Census Bureau population data indicates that Gaston County experienced about nine percent growth between 2000 and 2010. Additionally, neighboring Mecklenburg County experienced substantial growth during this time, with its population rising by 32.5 percent.

The GCLMPO *2040 MTP* noted the following trends for population and employment relative to the region and project study area through 2040:

- GCLMPO's population is expected to increase by 36 percent between 2010 and 2040. This growth is not expected to be evenly distributed throughout the metropolitan planning area. Gaston County's and Gastonia's populations are both projected to grow 30 percent between 2010 and 2040, and Eastern Gaston County is projected to grow by 41 percent during that same period. Central and eastern portions of Gaston County are projected to see most growth in the form of single-family suburban and exurban development.
- All three counties within the metropolitan planning area have seen significant changes over the past decades as factories have closed and commercial centers have shifted. Central and eastern Gaston County is expected to experience the highest absolute increase in jobs.
- Job growth projections in the indicate a 36 percent increase in Gaston County, 53 percent in Eastern Gaston County, and 30 percent in Gastonia.
- Employment growth along major corridors such as I-85 and US 321 is expected to continue.

2.5.2 Growth and Development Patterns

According to the GCLMPO *2040 MTP,* Eastern Gaston County has experienced a significant increase in development pressures from Charlotte over the past decade, primarily due to its proximity, access, and lower housing costs. This area has for decades been characterized by small town development around textile and other manufacturing plants. Many of these plants have closed over the past decade, which has changed commuting patterns and resulted in lower traffic on some local roads.

Gastonia maintains its status as the economic heart for the county. It is the County seat and the largest city. Growth pressures are evident as the city continues to see development, including redevelopment of former textile mills and factories into residential redevelopment. Much of the retail and service employment in the city is located at interchanges along I-85 and workers in Gastonia travel from surrounding counties, but many live in the area. Gastonia is expected to grow in population and jobs in equal proportions, with growth being a mix of downtown and neighborhood revitalization, and new development along the city's edges and nearby municipalities as well as redevelopment of former mills as residential and employment centers and associated infill activity. (GCLMPO *2040 MTP*).

2.5.3 Major Destinations and Commuting Patterns

According to the GCLMPO *2040 MTP*, residents of Eastern Gaston County do not have a predominant commuting pattern. Many do commute to Mecklenburg County, as well as to Gastonia, but a considerable number also work nearby. The region houses a range of retail, manufacturing, professional, and service job centers, and projections for employment show that the number of jobs will grow slightly faster than the population, which should reduce commuting pressures for some residents.

Commuting data available from the US Census Bureau's 2012-2016 American Community Survey 5-Year Estimates for Gaston County supports the MPO's assessment, showing that approximately 91,608 of workers 16 years and older commute to work. Of those workers, it is estimated that 94.9% utilized roadway facilities by car, truck, or van. This data set also indicates that 57.6% of these commuters work in Gaston County and 38.2% work in another county, indicating that interstate travel is likely common.

2.6 RELEVANT PLANS

Numerous local or regional plans to guide land use and transportation planning decisions have been developed in the last 15 years. Many of those plans emphasize the importance and challenge of the I-85 corridor to their future. Recent plans (since 2010) with a focus or discussion of the entire corridor or portion of the project study area are listed/summarized below.

2.6.1 State Plans

The project is in the current NCDOT *2018-2027 STIP* (March 2018). Other STIP projects in the vicinity, are shown in **Figure 4**.

2.6.2 Regional and Local Plans

- *GCLMPO 2040 MTP* (Adopted March 2014, updated 2016) – The MTP identifies improvements to I-85 in the project study area and considers it a top-priority project.
- *GCLMPO CTP* (Adopted March 2017) – The CTP identifies improvements to I-85 within the project study area (and beyond) as "needs improvement".
- *Franklin Boulevard Corridor Access and Alternative Development Mobility Strategy* (Adopted August 2016) – This plan was developed to guide through future city projects, small area plans, capital projects, and the communities of Gastonia and Lowell as well as the MPO to accommodate future growth and changes in the roadway network. The I-85 corridor and interchanges in the project study area were a focal point of the study. The plan indicates that during stakeholder interviews "Reducing congestion around I-85 interchanges" was a key theme uncovered when assessing existing conditions and local desires. This plan also included scenarios and access recommendations for the undeveloped 300-acre Lineberger property that is located along the I-85 corridor within the project study area.
- *Build a Better Boulevard – The Wilkinson Boulevard Corridor Study* (Adopted 2015) – This plan was a joint study by the City of Belmont, Town of Cramerton, and Town of McAdenville to assess the Wilkinson Boulevard Corridor (US 29/US 74). The plan proposed various improvements to the visioning and planning of the transportation network in the region of three towns. This plan proposes several improvements related to I-85, including the interchanges of Park Street/NC 273 (Exit #27) and N. Main Street (Exit #26), as well as rebuilding existing NC 7 (Exit #23) and creating a new interchange at Hickory Grove Road.
- *Greater Charlotte Regional Freight Mobility Plan* (2015) – This plan identifies I-85 as one of the two most critical freight corridors throughout the region. In the section that covers trucking-related recommendations, the plan stipulates that the I-85 through Gaston County needs improvements to capacity, operations and geometric design and that evaluation is needed to address safety, capacity and operational improvements.

There are also numerous bicycle and pedestrian plans developed by municipalities that the project traverses, including Mount Holly, McAdenville, Belmont, and Gastonia. I-85 is a full control access freeway, but local communities' bicycle and pedestrian plans (as well as GCLMPO *CTP*) recommends inclusion of bicycle/pedestrian accommodations be incorporated into right of way/bridge designs associated with future I-85 improvements.

3. PROJECT SCHEDULE

The following bullets outline the tentative project schedule. These major milestone target dates are preliminary and subject to change.

- Project Technical Studies/Reports 2016 – 2019
- Environmental Assessment Spring 2019
- Public Hearing Summer/Fall 2019
- Finding of No Significant Impact (Anticipated) Early 2020
- Design-Build Let 2020

4. MERGER PROJECT TEAM MEETING AGREEMENT SIGNATURE FORM

Merger Project Team Meeting Agreement

Concurrence Point Number 1: Project Purpose and Need and Study Area Defined

Project Name/Description: STIP Project No. I-5719: Widen existing interstate (I-85) from six to eight lanes, upgrade interchanges, and relocate/replace railroad bridges from US 321 to NC 273 in Gaston County
STIP Project No. U-3608: Improve NC 7 from I-85 to US 29/74
(Proposed study area boundary depicted on **Figures 2a-2c**)

The primary need to be addressed by this project in the study area include:

- Improve existing and projected roadway capacity deficiencies and mobility within central/eastern Gaston County.

The purpose of the proposed improvements to I-85, from US 321 to NC 273 in Gaston County, is to reduce congestion, with a goal of achieving an overall LOS D (mainline) in the design year (2040).

The secondary needs and other desirable outcome to be addressed by this project in the study area include:

- Improve roadway deficiencies, including poor physical and geometric conditions.
- Improve traffic flow on I-85 for high-speed, regional travel consistent with plans.
- Improve safety (desirable outcome).

The Project Team has concurred on this date of **May 16, 2018**, on the above-mentioned project purpose and need and the study area for STIP Project Nos. I-5719/U-3608.

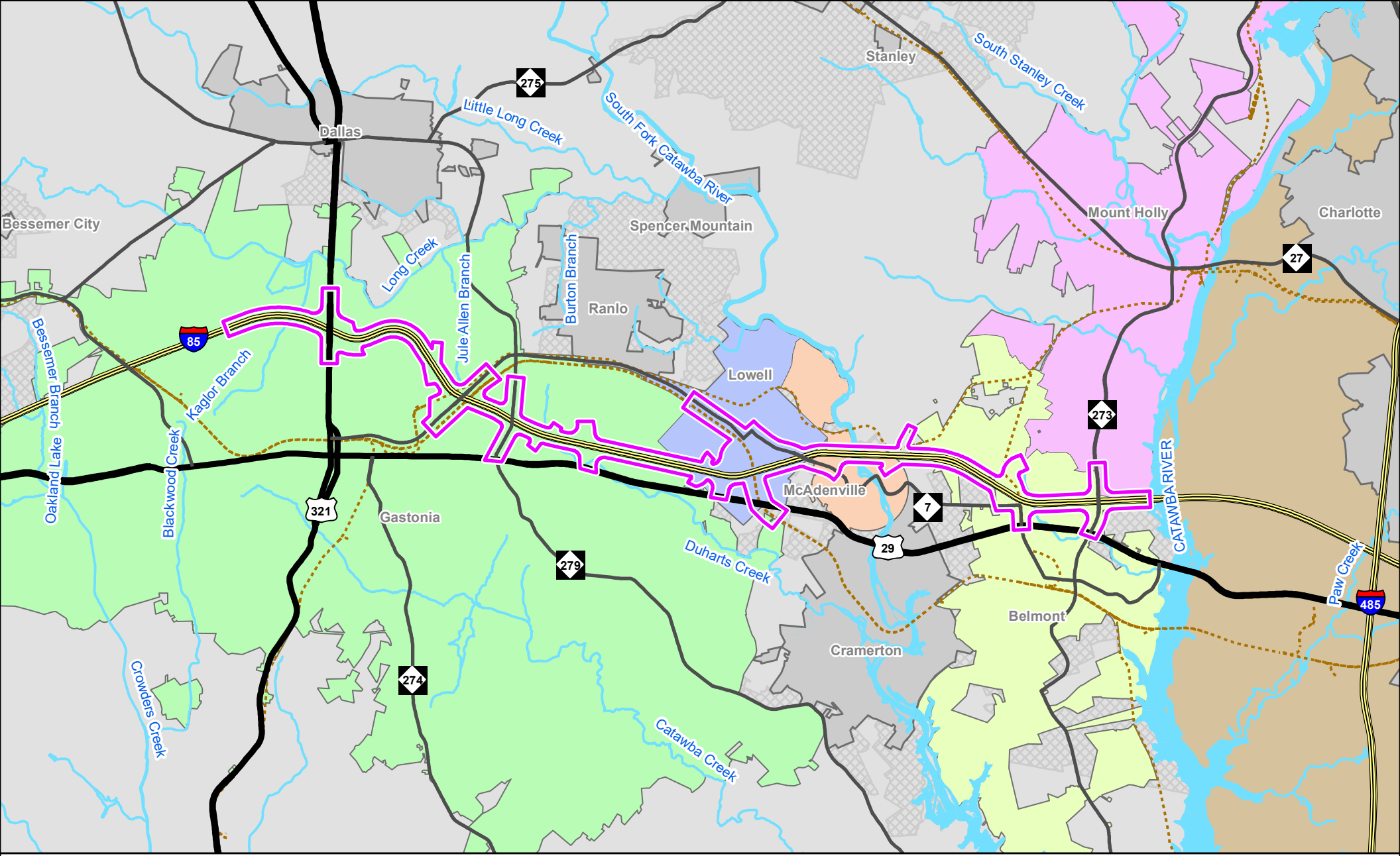
USACE_____ NCDOT_____

USEPA_____ USFWS_____

NCWRC_____ FHWA_____

NCDWR_____ SHPO_____

GCLMPO_____



Legend

- Study Area
- ETJ
- Gaston County
- Mecklenburg County
- Stream
- Interstate
- US Route
- NC Route
- Railroad
- Belmont
- Gastonia
- Lowell
- McAdenville
- Mount Holly
- Other Municipality

N

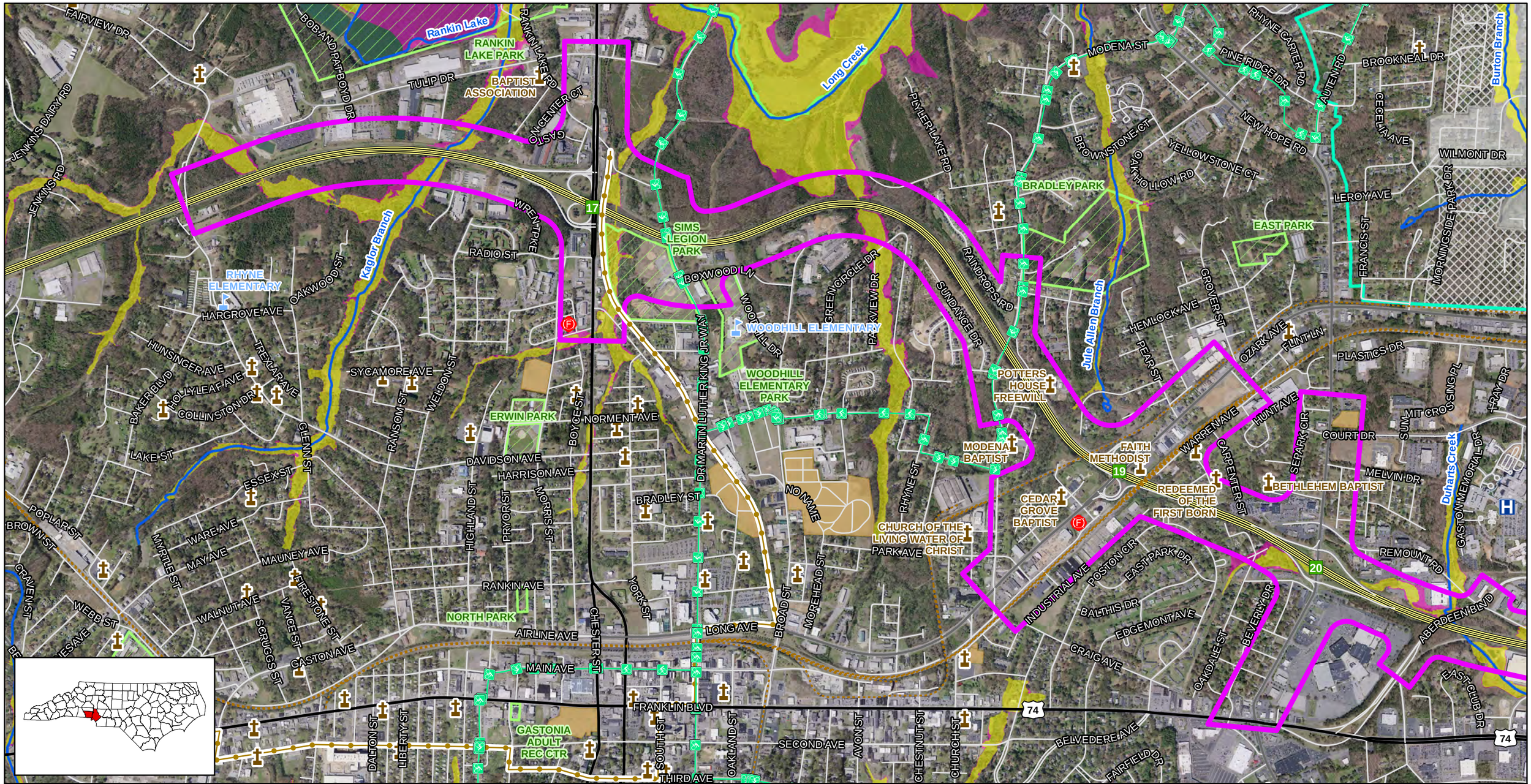
0 0.5 1 2 3 Miles

Figure 1: Project Location

STIP Project Nos. I-5719 and U-3608
I-85 Widening and NC 7 Improvements

Gaston & Mecklenburg Counties

April 2018



Study Area
Exit
Church
Fire Station
Hospital
Elementary School
Middle School
High School
Bike Route
Highland Rail Trail with Downtown Connector
Interstate
US Highway
NC Highway
Local Road
Railroad
Belmont
Gastonia
Lowell
McAdenville
Mount Holly
ETJ
County Boundary
Cemetery
Park
Voluntary Agriculture District
Water Feature

N

0 0.25 0.5 1 Mile

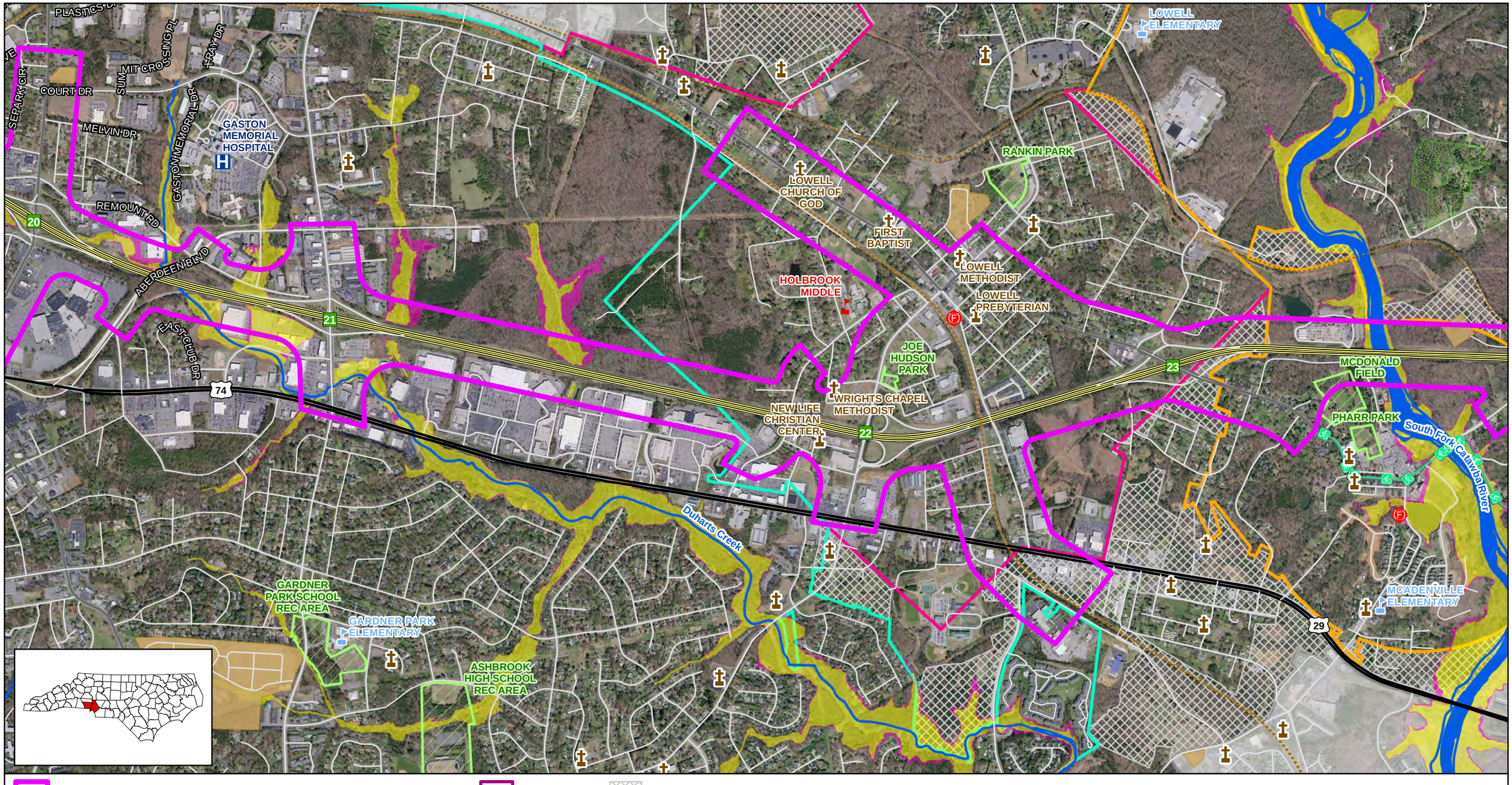
Figure 2a: Project Study Area

STIP Project Nos. I-5719 and U-3608
I-85 Widening and NC 7 Improvements

Gaston & Mecklenburg Counties

April 2018

Sources: NC OneMap, NCDOT, Gaston County GIS, Mecklenburg County GIS, HNTB North Carolina, P.C.



Study Area
Exit
Church
Fire Station
Hospital
Elementary School
Middle School
High School
Bike Route
Highland Rail Trail with Downtown Connector
Interstate
US Highway
NC Highway
Local Road
Railroad
Belmont
Gastonia
Lowell
McAdenville
Mount Holly
ETJ
County Boundary
Cemetery
Park
Voluntary Agriculture District
Water Feature

N

0 0.25 0.5 1 Mile

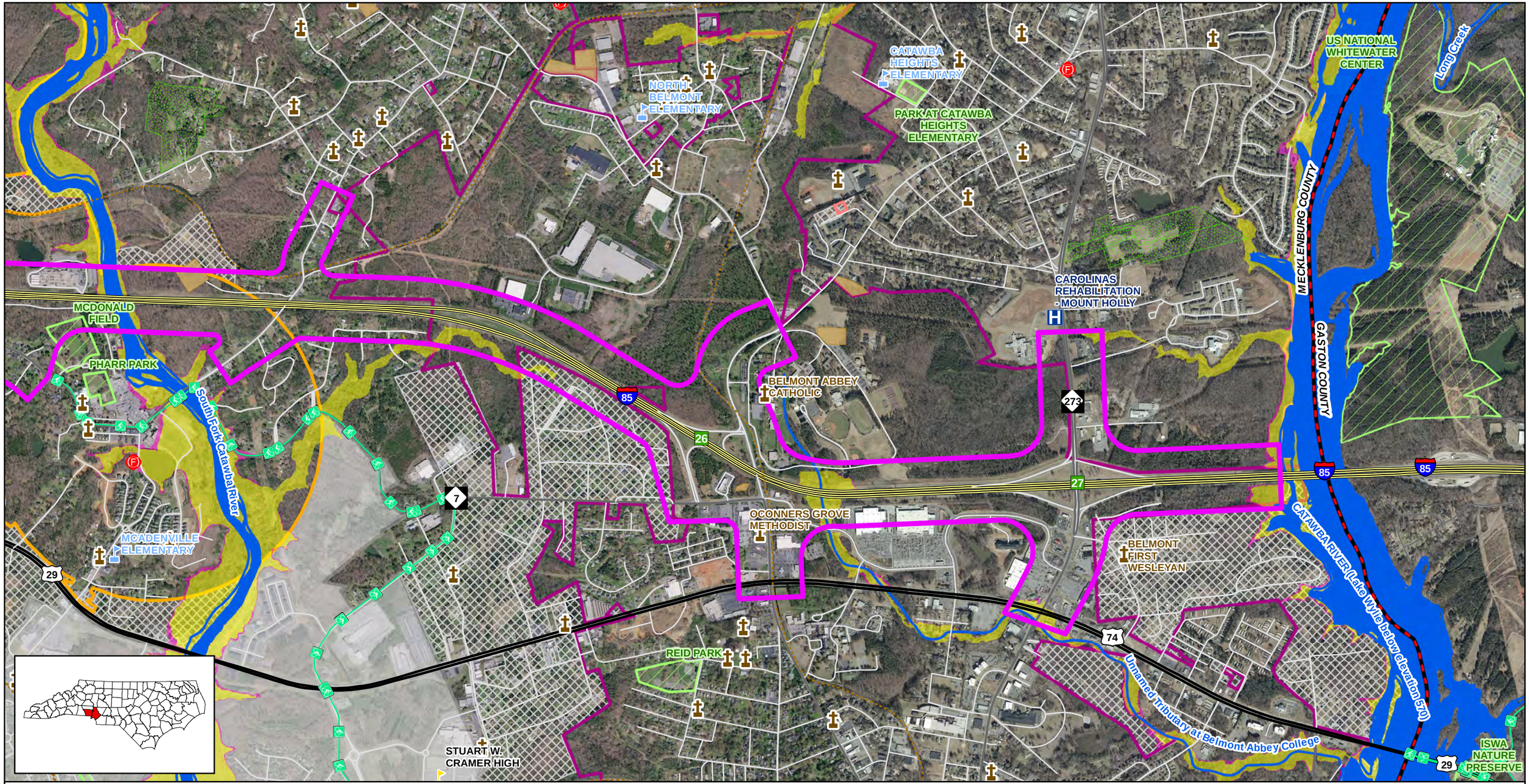
Figure 2b: Project Study Area

STIP Project Nos. I-5719 and U-3608
I-85 Widening and NC 7 Improvements

Gaston & Mecklenburg Counties

April 2018

Sources: NC OneMap, NCDOT, Gaston County GIS, Mecklenburg County GIS, HNTB North Carolina, P.C.



Study Area
Exit
Church
Fire Station
Hospital
Elementary School
Middle School
High School
Bike Route
Highland Rail Trail with Downtown Connector
Interstate
US Highway
NC Highway
Local Road
Railroad
Belmont
Gastonia
Lowell
McAdenville
Mount Holly
ETJ
County Boundary
Cemetery
Park
Voluntary Agriculture District
Water Feature

N

0 0.25 0.5 1 Mile

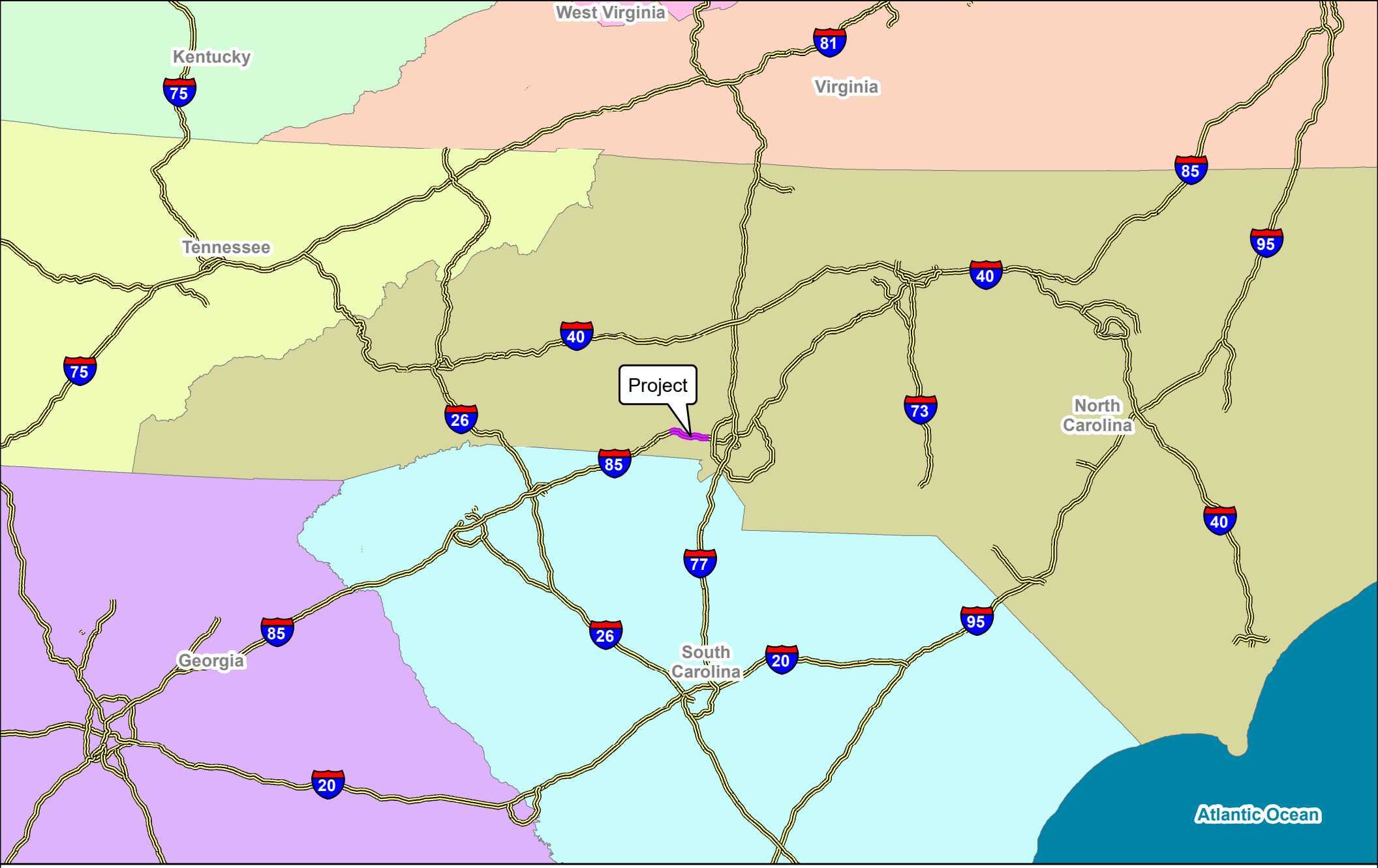
Figure 2c: Project Study Area

STIP Project Nos. I-5719 and U-3608
I-85 Widening and NC 7 Improvements

Gaston & Mecklenburg Counties

April 2018

Sources: NC OneMap, NCDOT, Gaston County GIS, Mecklenburg County GIS, HNTB North Carolina, P.C.



Legend

Project Corridor

Interstate Route

N

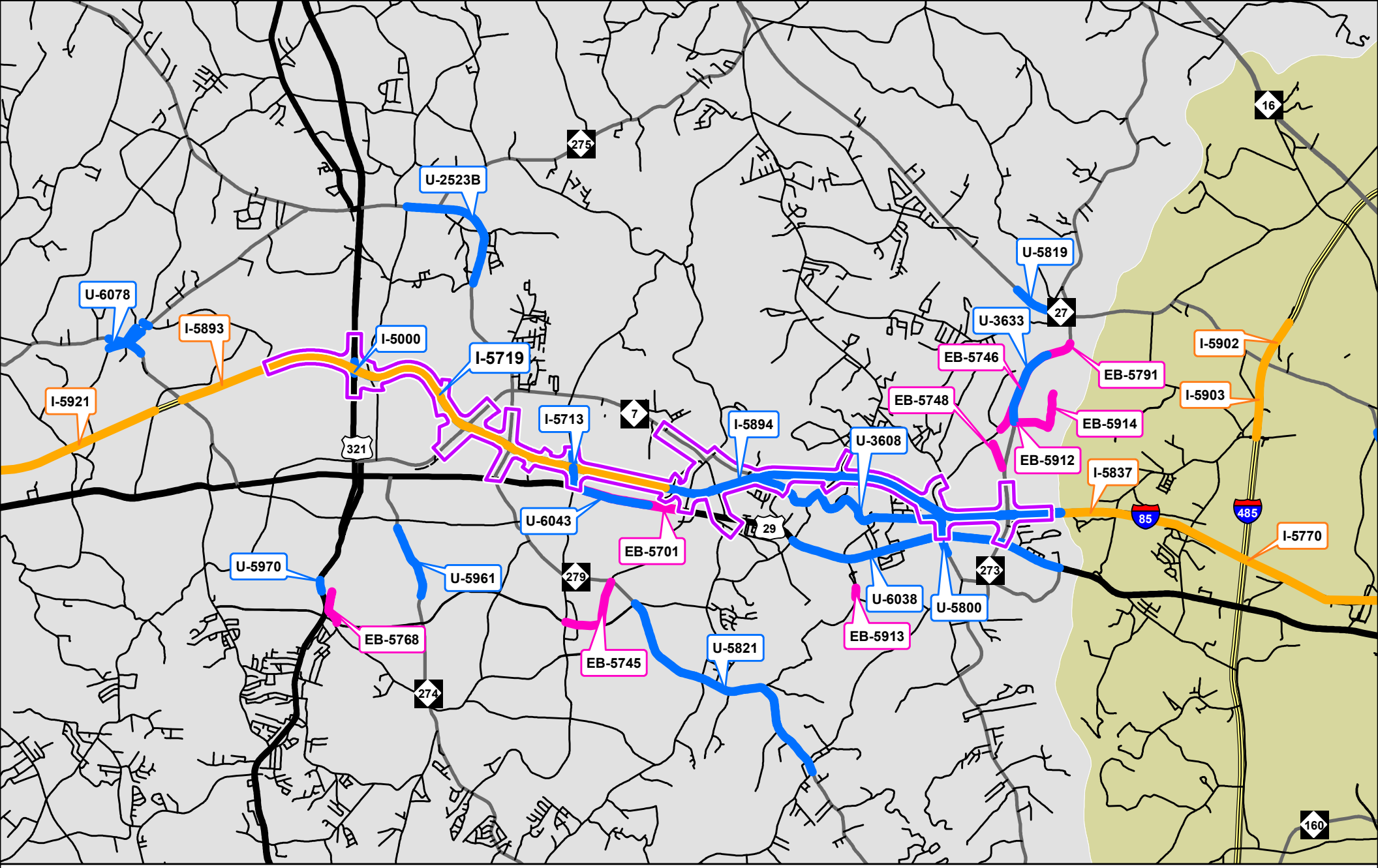
0 25 50 100 Miles

Figure 3: I-85 Larger Regional Interstate Network

STIP Project Nos. I-5719 and U-3608
I-85 Widening and NC 7 Improvements

Gaston & Mecklenburg Counties

April 2018



Legend

- Study Area
- Gaston County
- Mecklenburg County
- Interstate
- US Route
- NC Route
- Secondary Route

STIP Project by Mode

- Bike/Ped
- Highway
- Interstate Maintenance

N

0 0.5 1 2 3 Miles

Figure 4: Nearby STIP Projects

STIP Project Nos. I-5719 and U-3608
I-85 Widening and NC 7 Improvements
Gaston & Mecklenburg Counties
April 2018

Sources: NC OneMap, NCDOT, HNTB North Carolina, P.C.