

---

# FEASIBILITY STUDY

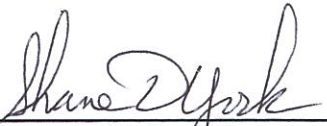
## I-77 RECONSTRUCTION FROM NC/SC STATE LINE TO LASALLE STREET MECKLENBURG COUNTY, NORTH CAROLINA

DIVISION 10

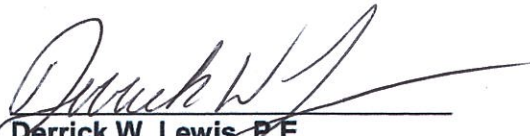
FS-0810A



Prepared for the  
Program Development Branch  
North Carolina Department of Transportation

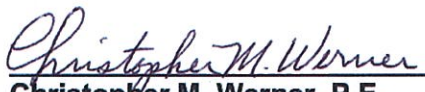
  
Shane D. York, P.E.  
Feasibility Studies Engineer

1/09/15  
Date

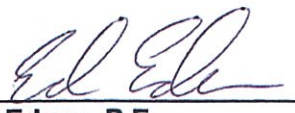
  
Derrick W. Lewis, P.E.  
Feasibility Studies Unit Head

1/9/15  
Date

Documentation Prepared by URS Corporation – North Carolina

  
Christopher M. Werner, P.E.  
Project Manager

1/9/2015  
Date

  
Ed Edens, P.E.  
Project Engineer

1/9/15  
Date

---

JANUARY 2015



## Table of Contents

1.0	Introduction .....	1
1.1	General Description .....	1
2.0	Background .....	1
2.1	Purpose and Need .....	1
2.2	Existing Conditions .....	1
2.3	Existing Land Use .....	2
3.0	Previous Studies .....	3
4.0	Adjacent Projects .....	3
5.0	Crash Analysis Summary .....	4
6.0	Description of Alternatives Analyzed .....	4
6.1	2009 No-Build Conditions .....	5
6.2	2035 No-Build Conditions .....	5
6.3	2035 Build Conditions .....	5
6.3.1	I-77 & I-485 Interchange System Area .....	5
6.3.2	I-77 & Nations Ford Road Interchange Area .....	6
6.3.3	I-77 & Tyvola Road Interchange Area .....	7
6.3.4	I-77 & Billy Graham Parkway/Woodlawn Road/Tryon Road Interchange Area ....	7
6.3.5	I-77 & Clanton Road Interchange Area .....	7
6.3.6	I-77 & Remount Road Interchange Area .....	8
6.3.7	I-77 & I-277 Interchange System Area .....	8
6.4	Potential Managed Lane Ingress/Egress Locations .....	9
7.0	Traffic Operations .....	10
8.0	Build Alternative Impacts and Cost Estimates .....	12
9.0	Community Issues .....	14
9.1	Notable Community Features .....	14
9.2	Schools and Facilities .....	14
9.3	Historic Resources .....	14
9.4	Archaeological Resources .....	15
10.0	Natural Environment Issues .....	15
10.1	Water Quality Resources .....	15
10.2	Jurisdictional Features .....	16
10.3	Protected Species .....	16
10.4	Existing NCDOT Mitigation Sites .....	17
10.5	FEMA Hazard Mitigation Grant Program Properties .....	17
10.6	United States Army Corps of Engineers .....	17
10.7	NCDENR, Division of Water Resources .....	17
10.8	NCDENR, Division of Land Resources .....	18
10.9	NCDENR, Division of Forest Resources .....	18
11.0	Conclusions .....	18
12.0	Coordination .....	19
13.0	Reference Material .....	20

## **List of Appendices**

### **Appendix A: Figures**

Figure 1: Project Vicinity  
Figure 2: Typical Section  
Figure 3: Conceptual Designs

### **Appendix B: Tables**

Table 1: Existing Bridge Structures along I-77  
Table 2: I-77 from SC State Line to North of Arrowood Dr (Exit 3)  
Table 3: I-77 from north of Arrowood Dr (Exit 3) to north of Nations Ford Road (Exit 4)  
Table 4: I-77 from north of Nations Ford Road (Exit 4) to north of Tyvola Road (Exit 5)  
Table 5: I-77 from north of Tyvola Rd (Exit 5) to north of Tryon/Billy Graham Pkwy (Exit 6)  
Table 6: I-77 from north of Tryon/Billy Graham Pkwy (Exit 6) to north of Clanton Rd (Exit 7)  
Table 7: I-77 from north of Clanton Road (Exit 7) to north of Remount Road (Exit 8)  
Table 8: I-77 from Remount Road (Exit 8) to north of NC16/I-277 (Exit 11)

### **Appendix C: Volume to Capacity Ratio Graphics (electronic copy only)**

2009 No-Build Scenario Peak Hour Volume/Capacity Ratios  
2009 No-Build Scenario 3 Hour Peak Volume/Capacity Ratios  
  
2035 No-Build Scenario Peak Hour Volume/Capacity Ratios  
2035 No-Build Scenario 3 Hour Peak Volume/Capacity Ratios  
  
2035 Build 3-2-2-3 Alternative Peak Hour Volume/Capacity Ratios  
2035 Build 3-2-2-3 Alternative 3 Hour Peak Volume/Capacity Ratios  
  
2035 Build 4-2-2-4 Alternative Peak Hour Volume/Capacity Ratios  
2035 Build 4-2-2-4 Alternative 3 Hour Peak Volume/Capacity Ratios  
  
2035 Build 4-2-2-5 Alternative Peak Hour Volume/Capacity Ratios  
2035 Build 5-2-2-5 Alternative 3 Hour Peak Volume/Capacity Ratios

### **Appendix D: Major Coordination**

Scoping Meeting #1 Record of Meeting  
Scoping Meeting #2 Record of Meeting  
CRTPO Comments on the Draft FS  
NCDOT response to CRTPO Comments on the Draft FS



## **1.0 INTRODUCTION**

### **1.1 GENERAL DESCRIPTION**

This Feasibility Study describes improvements to Interstate 77 from the South Carolina/North Carolina state line to Lasalle Street/Atando Avenue in Mecklenburg County, a distance of approximately 13.12 miles. The project vicinity map is shown on Figure 1 located in the Appendix.

This study is a preliminary document that is the initial step in the planning and design process for a candidate project and not the product of exhaustive environmental or design investigations. The purpose of this feasibility study is to describe the proposed project, including preliminary costs, and identify any potential problems that may require consideration in the planning and design phases.

## **2.0 BACKGROUND**

### **2.1 PURPOSE AND NEED**

I-77 is a major north-south interstate facility with full control of access approximately 610 miles long having a southern terminus in Columbia, South Carolina, crossing North Carolina, Virginia, West Virginia, and ending at its northern terminus in Cleveland, Ohio. I-77 in North Carolina, beginning at the state line at Pineville, has become a major thoroughfare through Mecklenburg County, providing a route to and from major commercial and tourist destinations. This includes major commuter traffic destined to Center City Charlotte and I-277, which loops around Center City, and tourist traffic destined for locations such as Carowinds Theme Park, Bank of America Stadium, Charlotte/Douglas International Airport, and the Charlotte Motor Speedway.

One influence for this project is the population growth that has existed within Mecklenburg County. According to the NC Demographic Center, between 2010 and 2013, the population growth of Mecklenburg County was 7.9 percent. Continued growth for Mecklenburg County is projected over the next 20 years, with an expected population of 1,447,850 by 2034; representing an annualized growth rate of 1.9 percent. In addition, as an employment center, Mecklenburg County has approximately 573,205 workers based on the 2010 American Community Survey (ACS) data released by the Census Transportation Planning Products (CTPP). Approximately 25 percent of these workers reside outside of Mecklenburg County including 29,015 daily commuters from York County, SC who are linked to Mecklenburg County by I-77.

As part of this study, the following will be evaluated based on the ability to increase reliability and maintenance of travel times along the I-77 corridor by adding general purpose and managed lanes between the NC/SC state line to Lasalle Street/Atando Avenue. Improvements include all interchanges along I-77 within project limits, and managing potential ingress/egress locations for the managed lanes.

*It should be noted that this Feasibility Study is a preliminary document that includes a high level evaluation of adding general purpose and managed lanes to I-77. A variety of technologies and full range of alternatives will be evaluated in the NEPA phase.*

### **2.2 EXISTING CONDITIONS**

Within the project study area, existing I-77 varies from a six lane facility (three travel lanes in each direction) with a 46 foot depressed median to an eight lane facility (four travel lanes in each direction) with a 17 foot, paved, barrier-separated median. Within the project study area shown on Figure 1, the posted speed limit along I-77 is 55 miles per hour (MPH).

I-77 is classified as a “freeway-expressway” according to the Mecklenburg-Union Metropolitan Planning Organization (MUMPO) Thoroughfare Plan, and as a “freeway” according to the MUMPO 2035 Long Range Transportation Plan (LRTP) and to the North Carolina Department of Transportation (NCDOT)

Strategic Highway Corridor description for Division 10. As referred to in Table 1 which is included in the Appendix, the NCDOT Bridge Location Maps for Mecklenburg County lists existing structures along or immediately adjacent to the I-77 corridor within the project study area.

### 2.3 EXISTING LAND USE

Land uses along I-77 from the South Carolina/North Carolina state line to just north of Arrowood Road consist of business and industrial services including office parks, manufacturing facilities, industrial plants, and the North Carolina Visitors Center. The following section provides a more detailed description of the general land uses found along the corridor, starting from the southern terminus of the project.

- The dominant land use to the south of the South Carolina/North Carolina state line near the US 21 interchange is the Carowinds Amusement Park. Other land uses near this interchange include hotels, restaurants, and office buildings.
- North of the South Carolina/North Carolina state line up through the interchange with I-485 is industrial and includes both warehouses and a quarry. This industrial area is bisected by the interchange with Westinghouse Boulevard.
- North of the I-485 interchange up to the Arrowood Road interchange is office space and highway oriented commercial properties such as hotels and restaurants. Further away from the I-77 corridor, the land use transitions to residential development.
- The area near the Nations Ford Road interchange is a mix of land uses including residential, commercial, and office. Waddell Language Academy (formerly Waddell High School) is located to the west of the Nations Ford Road interchange.
- Further north, the next interchange with I-77 is Tyvola Road. The area near this interchange includes open space, retail, institutional, office, and residential. A large business office park is located along the west side of I-77, north of Billy Graham Parkway/Woodlawn Road/Tryon Road interchange.
- At the Clanton Road interchange there is a large scale residential community on the west side of I-77. Immediately adjacent to the interchange is a mix of commercial properties, business offices, and retail establishments. Northeast of the interchange is a Marie G. Davis Military and Global Leadership Academy.
- The next interchange along I-77 is the Remount Road interchange, which is bordered by a golf course on the southwest side of the interchange and two community parks: one on the southeast side and one on the northwest side. There are also a number of residential communities, including several apartment complexes adjacent to this area.
- The West Boulevard/NC 160 interchange is adjacent to several large residential developments. Revolution Community Park is located on the southwest side of the interchange, Southside Park is located on the southeast side of the interchange and Abbott Neighborhood Park is located on the northeast side of the interchange.
- To the north of the West Boulevard/NC 160 interchange is the I-77 interchange with I-277 (John Belk Freeway)/US 74, which includes adjacent industrial development with warehouses. To the northeast of this interchange is the urban core of Charlotte that includes the Bank of America Stadium (home to the Carolina Panthers) which is served by a partial I-77 interchange with US 29/NC 27 (W. Morehead Street). Northwest of the US 29/NC 27 (W. Morehead Street) interchange is the historic neighborhood of Wesley Heights. Several parks are located adjacent to this interchange including: Irwin Creek Greenway to the southwest, Wilmore Neighborhood Park to the southeast, and Bryan Neighborhood Park to the northwest. The Wesley Heights

Greenway is located to the northwest of the US 29/NC 27 (W. Morehead Street) interchange, with the Frazier Neighborhood Park to the northeast.

- The next interchange with I-77 is West Trade Street/West 5<sup>th</sup> Street, which is bordered by more residential development to the south and west of the interchange. This area includes the Frazier Neighborhood Park and the Third Ward Neighborhood Park to the east. Johnson and Wales Culinary School and Irwin Academic Center are also located near this interchange. Other land uses include commercial offices and retail.
- North of the West Trade Street/West 5<sup>th</sup> Street interchange is the NC 16 (Brookshire Freeway)/I-277 interchange. The surrounding area includes cemeteries, several single family residential developments, the Music Factory to the southeast, Biddleville Neighborhood Park to the southwest, Greenville Park and Walter G. Byers Elementary School to the northeast, and Irwin Creek Greenway to the northwest. The residential development continues as you move north to the project end point just south of the Lasalle Street/Atando Avenue interchange, near the Anita Stroud Neighborhood Park.

### 3.0 PREVIOUS STUDIES

The Charlotte Regional Transportation Planning Organization adopted Phase 2 of the *Charlotte Region Fast Lanes Study Final Report* in July 2009, whose purpose “showed that a successful implementation requires a thorough analysis of the technical, financial, and institutional feasibility of a managed lanes strategy.” The Charlotte Department of Transportation (CDOT), the North Carolina Department of Transportation (NCDOT), the South Carolina Department of Transportation (SCDOT), and other agencies in the Charlotte region began an investigation of existing and planned major highways throughout a 10-county region to distinguish where managed lanes could improve capacity and mobility. I-77 from Center City Charlotte to south of I-485 was only conditionally recommended to Phase II criteria because “although this corridor has the highest traffic volume and meets the congestion criteria, there is limited right of way and major improvements would require reconstruction of existing I-77. Without reconstruction of this freeway, this segment could develop into a bottleneck diminishing gains for other *Fast Lanes* projects”. According to the Phase III Results Summary Report, this corridor was dropped from the study “because it would be very costly to add *Fast Lanes* to the existing cross-section due to the physical attributes”.

### 4.0 ADJACENT PROJECTS

Other proposed NCDOT Statewide Transportation Improvement Program (STIP) projects adjacent or within the project vicinity include the following:

- **I-3311:** I-277 (Brookshire Freeway) to Catawba Avenue – Construct High Occupancy Toll (HOT) lanes and convert High Occupancy Vehicle Lanes (HOV) to HOT. Congestion Mitigation project.
- **B-5792:** NC16 southbound – Bridge replacement
- **I-5405:** I-77, I-277 (Brookshire Freeway) to West Catawba Avenue (exit 28). Construct High Occupancy Toll (HOT) lanes and convert existing High Occupancy Vehicle (HOV) lanes to High Occupancy Toll (HOT) lanes.
- **I-5317:** I-77 – From mile marker 10.4 to 13. Pavement rehabilitation. Interstate preventative maintenance project.
- **I-5368:** I-77 – From mile marker 13 to 24. Pavement rehabilitation. Interstate preventative maintenance project.
- **I-5345:** I-77 – From SC/NC state line to mile marker 10. Pavement rehabilitation on ramps only. Interstate preventative maintenance project.
- **I-5381:** I-77 – From SC/NC state line to mile marker 9.9. Pavement rehabilitation. Interstate preventative maintenance project.
- **I-4720:** I-77 – From exit 9 to SC/NC state line. Resurface with NovaChip. Interstate preventative maintenance project.

- **R-4902:** I-485 – From I-77 south of Charlotte to Rea Road. Widen to six lanes. National highway system project.
- **I-5507:** I-485 – From I-77 south of Charlotte to US74. Add one express lane in each direction.
- **I-5383:** I-485 – From I-77 south of Charlotte to mile marker 3. Pavement rehabilitation. Interstate preventative maintenance project.

## 5.0 CRASH ANALYSIS SUMMARY

A crash analysis of the existing I-77 corridor within the project study area was conducted utilizing crash data provided by the NCDOT for a five-year period from December 1, 2008 to November 30, 2013. The Total Crash Rates included in the data along the interstate analyzed, were compared to the Statewide Average Rates for similar routes to determine if the segment exceeded the statewide average. However, a more appropriate method is the Critical Crash Rate method, which is a statistically derived number that can be used to identify locations where crash occurrence is higher than expected for a given facility type. The Critical Crash Rate is beneficial as it accounts for exposure (traffic volumes) and varying segment lengths. If a segment has an Actual Crash Rate higher than the Critical Crash Rate, the location may have a potential highway safety deficiency and should receive additional analysis. Exhibit 1 shows a comparison of the Total Crash Rates versus the Statewide Average (for similar routes) and the calculated Critical Crash Rate for each roadway segment. Table 2 through Table 8 located in the Appendix show individual segment crash rate comparisons.

**Exhibit 1: I- 77 Crash Rate Comparison**

Segment	Total Crashes per 100 MVM	Statewide Average Rate <sup>1</sup>	Critical Rate <sup>2</sup>	Exceeds Statewide Rate	Exceeds Critical Rate
I-485 System from Mile Post 0.0 to 3.3	113.04	116.04	123.06	No	No
Nations Ford Road from Mile Post 3.3 to 4.25	106.73	116.04	127.32	No	No
Tyvola Road from Mile Post 4.25 to 5.38	186.47	116.04	126.23	Yes	Yes
Billy Graham PKWY/ Tryon St from Mile Post 5.38 to 6.80	142.29	116.04	125.26	Yes	Yes
Clanton Road from Mile Post 6.80 to 7.75	114.98	116.04	127.02	No	No
Remount Road from Mile Post 7.75 to 8.83	188.92	116.04	126.35	Yes	Yes
I-277 System from Mile Post 8.83 to 11.18	121.56	116.04	122.07	Yes	No
<sup>1</sup> 2009-2011 Statewide Average Crash Rate, Urban Interstate Routes					
<sup>2</sup> Based on Statewide Crash Rate (95% Level of Confidence)					

## 6.0 DESCRIPTION OF ALTERNATIVES ANALYZED

A total of 5 different typical section alternatives, shown in Figure 2, were analyzed when creating the cost estimates, including evaluating human and environmental impacts:

- 5-2-2-5 (5 general purpose lanes in each direction, with 2 managed lanes in each direction)
- 4-2-2-4 (4 general purpose lanes in each direction, with 2 managed lanes in each direction)
- 3-2-2-3 (3 general purpose lanes in each direction, with 2 managed lanes in each direction)
- 3-2-2-3 C-D System (3 general purpose lanes in each direction with 2 managed lanes in each direction and 2 Collector-Distributor lanes in each direction between the two I-277 interchanges)

- 5-2-2-5 Elevated (5 general purpose lanes in each direction, with 2 managed lanes in each direction on elevated structures)

However, for the purposes of this feasibility study, conceptual designs as described in the 2035 Build Conditions section were created only for the 5-2-2-5 typical section alternative. For high-level comparison purposes, the 5-2-2-5 conceptual designs were utilized with a reduced or increased width for developing construction and right of way cost estimates for the other alternatives.

*It should be noted this Feasibility Study is a preliminary document that is the initial step in the planning and design process. Alternatives developed are potential alternatives to meet the purpose and need for the project; not the alternative which will be constructed. More robust alternatives development and evaluation, combined with extensive public and stakeholder involvement will be included during the National Environmental Policy Act (NEPA) phase of this project. Therefore, for the purposes of this study, general managed lanes were assumed for developing the conceptual designs as the determination of HOV/HOT lanes are beyond the scope of this study and will need to be further evaluated during the next phase of this project.*

## **6.1 2009 NO-BUILD CONDITIONS**

The 2009 No-Build conditions along existing I-77 from the South Carolina/North Carolina state line to Lasalle Street/Atando Avenue consists of closely spaced service and system interchanges.

## **6.2 2035 NO-BUILD CONDITIONS**

The 2035 No-Build Conditions includes the 2009 No-Build Conditions and assumes the local transportation system would evolve as currently planned, but without implementation of the proposed project. With the exception of routine maintenance, no change would take place along the existing corridor within the project study area.

## **6.3 2035 BUILD CONDITIONS**

As previously mentioned, the conceptual design description below applies only for the 5-2-2-5 typical section alternative. For the purpose of implementing improvements as funding becomes available, the Build Conditions were split into seven sections, which include improvements to I-77 and its corresponding interchanges:

- I-485 Interchange System Area includes interchanges at Westinghouse Boulevard, I-485, and Arrowood Road
- Nations Ford Road Interchange Area
- Tyvola Road Interchange Area
- Billy Graham Parkway/Woodlawn Road/Tryon Road Interchange Area
- Clanton Road Interchange Area
- Remount Road Interchange Area
- I-277 Interchange System Area includes interchanges at West Boulevard/NC 160, I-277(John Belk Freeway)/US 74, US 29/NC 27 (W. Morehead Street), West Trade Street/West 5th Street, and NC 16 (Brookshire Freeway)/I-277

### **6.3.1 I-77 & I-485 INTERCHANGE SYSTEM AREA**

Shown in Figure 3 (Sheet 2-5 of 11), the I-485 system is approximately 3.4 miles long and includes interchange improvements to Westinghouse Boulevard, I-485, and Arrowood Road. Improvements also consist of converting a depressed, 46 foot grass median to accommodate four managed lanes, two in each direction, providing Direct Connect (DC) managed lanes at the I-485 interchange, and widening of the existing I-77.

Due to closely spaced interchanges between Westinghouse Boulevard, I-485, and Arrowood Road, the I-485 System was analyzed as one system. According to the typical section shown in Figure 2, the

proposed location of the managed lanes will be in the median. However, to accommodate DC managed lanes from southbound I-77 to future westbound and eastbound managed lanes on I-485 and future westbound and eastbound managed lanes on I-485 to northbound I-77, the DC managed lanes were designed on the outside within the I-485 interchange, as shown in Figure 3 (Sheet 2-5 of 11). This allows retaining the existing I-485 bridge over I-77 and the three existing flyovers, whose support columns are located within the median along I-77. As a result of these support columns and the proximity to the recently updated North Carolina Visitors Welcome Center (located on the southeast quadrant of the I-485 interchange), eight general purpose lanes, four in each direction, are proposed along I-77, which transitions to existing conditions towards the southern terminus of the project study area. Consequently, the full 5-2-2-5 typical section is introduced just north of the I-485 interchange. The DC managed lane flyovers to and from I-485 and I-77 are designed to be adjacent to the existing general purpose traffic flyovers, with the exception of aligning them outside of the existing, centrally located support columns along the I-77 median.

Considering the travel demand and the proximity to each interchange, barrier-separated collector distributor (CD) roads were designed to minimize weaving. On the southwest and northwest quadrant of the Westinghouse Boulevard interchange, a two lane barrier-separated CD was introduced to improve safety by increasing the distance between entrance and exit ramps from traffic entering southbound I-77 and traffic exiting towards Westinghouse Boulevard. Similarly, a barrier-separated CD was designed on the east side of I-77 for traffic originating from eastbound and westbound I-485 towards northbound I-77. A design speed of 50 MPH was utilized to design the DC flyovers, as well as the managed lanes in the median ramping to the outside within the I-485 interchange.

Improvements to the I-485 System would require the purchase of additional right of way along the west side of the Westinghouse and Arrowood interchange, and the northwest, southwest, and northeast quadrants of the I-485 interchange. As a result of additional right of way required on the west side of I-77 between I-485 and Arrowood Road, access to the business park along Southern Pine Boulevard will be closed with a new service road provided off of Arrowpoint Boulevard. The increase right of way will also require the existing railroad bridge located south of the Westinghouse interchange to be lengthened.

*Being this Feasibility Study is not the product of an exhaustive environmental or design effort, but rather an initial step to this process, it was concluded that a more detailed analysis could be performed during the NEPA phase to evaluate the potential for keeping the managed lanes together on one facility within the I-485 interchange limits, either to the east or west, rather than separating as presented in the proposed interchange configuration. In order to simplify this system configuration, it was also suggested that additional analysis could be performed during the NEPA phase to determine if Arrowood Road interchange could be eliminated because of existing adjacent access which could be combined providing additional service road connections.*

### **6.3.2 I-77 & NATIONS FORD ROAD INTERCHANGE AREA**

The Nations Ford Road section, approximately 0.9 miles long, consists of widening the existing six lanes along I-77 to sixteen lanes, five general purpose and one auxiliary lane in each direction, and four managed lanes in the median. As a result, Nations Ford Road Bridge over I-77 will need to be widened to accommodate the additional lanes. Currently, the interchange is configured as a diamond interchange and will remain as such with design modifications to all four quadrant ramps to accommodate the extra lanes.

Improvements to the Nations Ford Road interchange would require the purchase of additional right of way along the northwest, southwest, and northeast quadrant of the interchange. In addition, local roads Greenwood Drive and Ann Marie Drive, located to the west of I-77 will need to be cul-de-sac due to their proximity to I-77. The MUMPO Draft Comprehensive Transportation Plan includes recommended improvements which would realign and extend Archdale Drive to the west side of I-77 near the vicinity of Wanda Lane.

*It should be noted that while a diamond interchange configuration is shown, a more detailed analysis will be performed during the NEPA phase which will identify the most appropriate interchange configuration to handle the traffic demand at this location.*

### **6.3.3 I-77 & TYVOLA ROAD INTERCHANGE AREA**

Tyvola Road, shown in Figure 3 (Sheet 6-7 of 11), is approximately 1.1 miles long and includes improvements to the interchange. Similar to the Nations Ford Road section, the Tyvola Road section also has a 5-2-2-5 typical section and auxiliary lanes on the outside, but with the exception of having a 2 lane exit/entrance on all four quadrant ramps. Currently, the interchange is configured as a Single Point Urban Interchange (SPUI). Consequently, due to the wider footprint of the general purpose lanes, the bridge will need to be reconstructed. As shown, improvements to the interchange would require the purchase of additional right of way along all four quadrants of the interchange.

*It should be noted that while a SPUI configuration is shown, a more detailed analysis will be performed during the NEPA phase which will identify the most appropriate interchange configuration to handle the traffic demand at this location.*

### **6.3.4 I-77 & BILLY GRAHAM PARKWAY/WOODLAWN ROAD/TRYON ROAD INTERCHANGE AREA**

The Billy Graham Parkway/Woodlawn Road/Tryon Road section is approximately 1.4 miles long. The existing interchange is composed of modified cloverleaf interchange without CD roads, as shown in Figure 3 (Sheet 7 of 11). Similar to the previous interchanges; this section also includes auxiliary lanes on the outside, one in each direction, in addition to the 5-2-2-5 typical section.

To minimize environmental impacts, increase traffic mobility, while minimizing driver confusion, and maintain the same typical section, the four loop ramps were eliminated. In the southeast quadrant of Billy Graham Parkway/Woodlawn Road, a one lane exit ramp was introduced for northbound I-77 traffic. This ramp ties into the existing Woodlawn Road and Nations Crossing Road signalized intersection. Given the existing alignment of Billy Graham Parkway and Tryon Road and its proximity to the interchange, an entrance ramp, adjacent to the exit ramp aforementioned, was proposed. For southbound I-77, a similar idea was proposed on the northwest quadrant of Tryon Road by proposing an entrance and exit ramp that tie into Billy Graham Parkway, approximately a quarter of a mile west from the Billy Graham Parkway/Tryon Road signalized intersection. This ramp would require a new bridge over an existing railroad.

The existing railroad bridge over I-77 located south of the interchange, both existing bridges within the interchange, and the existing Pressley Road bridge will need to be improved. For connectivity purposes, consideration was requested by CDOT to keep the Pressley Road bridge over I-77 or that a new connection be developed which would extend Stuart Andrew Boulevard south to Billy Graham Parkway. It was also recommended, should the Billy Graham Parkway/Tryon Road signalized intersection become congested in the future, to grade separate the intersection with a connector road on the west side of I-77, between south Tryon Road and Billy Graham Parkway. Improvements to the interchange would require the purchase of additional right of way in the quadrants where ramps are being proposed, as well as along I-77.

*It should be noted that while a revised interchange configuration is shown, a more detailed analysis will be performed during the NEPA phase which will identify the most appropriate interchange configuration to handle the traffic demand at this location.*

### **6.3.5 I-77 & CLANTON ROAD INTERCHANGE AREA**

The Clanton Road section is approximately 0.9 miles long consisting of widening I-77 to the proposed 5-2-2-5 typical section. Shown in Figure 3 (Sheet 8 of 11), the Clanton Road bridge over I-77 will need to be widened to accommodate the additional lanes. Currently, the interchange is configured as a diamond interchange which will remain with minor modifications to the existing ramps due to the widening of I-77. The purchase of additional right of way is anticipated along I-77 to accommodate the additional lanes.

*It should be noted that while a diamond interchange configuration is shown, a more detailed analysis will be performed during the NEPA phase which will identify the most appropriate interchange configuration to handle the traffic demand at this location.*

### **6.3.6 I-77 & REMOUNT ROAD INTERCHANGE AREA**

The Remount Road section, approximately 1.1 miles long, consists of modifying the existing interchange and widening I-77, as shown in Figure 3 (Sheet 8-9 of 11). As a result of the proximity of the West Boulevard/NC 160 partial interchange to both the Remount Road interchange (to the south) and the I-277 (John Belk Freeway)/US 74 system interchange to the north, it was proposed to close the northbound entrance and southbound exit ramps to/from I-77 at West Blvd/NC 160 and convert the Remount Road partial interchange to a diamond interchange. Similar to the previous interchanges, mainly because of insufficient space to add and drop lanes, the 5-2-2-5 typical section has two auxiliary lanes on the outside, one in each direction. In addition, the bridge over I-77 will need to be widened. Improvements to the Remount Road section would require the purchase of additional right of way along I-77 and in all four quadrants of the interchange.

### **6.3.7 I-77 & I-277 INTERCHANGE SYSTEM AREA**

Similarly to how the I-485 Interchange System Area was analyzed, the I-277 Interchange System Area, composed of the I-277 (John Belk Freeway)/US 74 interchange, the US 29/NC 27 (W. Morehead Street) interchange, the West Boulevard/NC 160 interchange, the West Trade Street/West 5th Street interchange, and NC 16 (Brookshire Freeway)/I-277 interchange were developed as one system. Shown in Figure 3 (Sheet 9-11 of 11), the I-277 Interchange System Area is approximately 3.3 miles long. Improvements consist of I-77 widening to the 5-2-2-5 typical section, managed lanes direct connections to and from the I-277 (John Belk Freeway) portion of the I-277 (John Belk Freeway)/US 74 interchange and to and from the I-277 portion of the NC 16 (Brookshire Freeway)/I-277 interchange.

*The need for maintaining a 5-2-2-5 typical section along I-77 between I-277 (John Belk Freeway)/US 74 and NC 16 (Brookshire Freeway)/I-277 was reviewed. General thought was that the mainline potentially could transition to four general purpose lanes and one managed lane in each direction; however, concern was mentioned over this reduction as it would not maintain a consistent facility for the duration of the corridor. It was also suggested that caution should be exercised with reducing the number of managed lanes in this area as this reduction in capacity could potentially become a future bottleneck which could have an effect on the congestion toll pricing should the project be constructed as HOT lanes. It was discussed this level of analysis as well as consideration of closing the West Boulevard/NC 160 interchange could potentially be performed during the NEPA phase.*

The I-277 (John Belk Freeway)/US 74 system interchange possessed a challenge to accommodate managed lane direct connections to future managed lanes on I-277 (John Belk Freeway)/, which loops around Center City Charlotte, while still maintaining the majority of traffic movements, minimizing impacts to the natural environment and adjacent business. To eliminate the amount of grade separations condensed in one interchange and increase accessibility, the Freedom Drive bridge over I-77 was proposed to be removed. Currently, traffic headed eastbound on Freedom Drive, which was recently upgraded, cannot access either direction on I-77. By realigning Freedom Drive, as shown in Figure 3 (Sheet 9 of 11), traffic will have the opportunity to enter southbound I-77 or eastbound I-277. Realigning I-277 westbound and introducing an exit ramp on the northwest quadrant of the interchange, the two exit loop ramps on the west side of I-77 were eliminated. On the east side of I-77, a barrier-separated CD road was introduced to enhance safety for vehicles exiting and entering I-77 on proposed loop ramps within the limits of the interchange.

As a result of the proposed exit and entrance ramps on I-77 just north of the I-277 (John Belk Freeway)/US 74 interchange, the existing US 29/NC 27 (W. Morehead Street) interchange exit and entrance ramps were proposed to be removed. CDOT expressed general concern with the closure of this partial interchange as it is one of the primary access points to northbound I-77 after events are held at the



Bank of America Stadium. It was requested further consideration be given to developing a concept which would allow for this partial interchange to remain open. Should this not be possible, it was noted a new special event traffic management plan could be prepared to identify alternative traffic routing to I-77.

*It is suggested further consideration be performed during the NEPA phase with regard to the potential closure of the US 29/NC 27 (W. Morehead Street) interchange and the potential for special event traffic management plan should this partial interchange be closed.*

The proposed design shows the West Trade Street/West 5th Street interchanges combined into one diamond interchange. This was accomplished by realigning West Trade Street to be more perpendicular with I-77, minimizing the impacts caused by the proposed ramp to adjacent neighborhoods to the south. As shown in Figure 3 (Sheet 10 of 11), West 5th Street will bridge over the widened I-77 and the northwest exit ramp from southbound I-77. This approach created general concern with CDOT because although it was agreed that neither West Trade Street nor West 5th Street are major thoroughfares, consolidating both roadways into one interchange has the potential to result in the concentration of high volumes at one location. It was explained that this configuration was developed to minimize impacts to the adjacent neighborhoods/historic district, accommodate both the projected travel demand of the two interchanges while improving interchange spacing, improving off-ramp lengths to prevent potential queuing onto I-77, and reduce the amount of entrance/exit ramp locations on I-77.

*It is suggested further consideration be performed during the NEPA phase with regard to the potential consolidation of the West Trade Street/West 5th Street interchanges and to the specific interchange configuration required to accommodate the travel demand.*

The NC 16 (Brookshire Freeway)/I-277 system interchange also presented challenges with the bifurcated I-77 alignment within the limits of the interchange. In addition, TIP project I-3311E includes direct connects between I-77 and the I-277 portion of the NC 16 (Brookshire Freeway)/I-277 interchange which had to be accounted for when designing the I-77 managed lanes. Shown in Figure 3 (Sheet 10 of 11), the proposed managed lanes along the median follow southbound I-77 when the mainline bifurcation begins. Within the limits of the interchange, the northbound managed lanes diverge underneath the I-3311E project until they merge north of the interchange. The existing left exit ramp on northbound I-77 to westbound NC16/I-277 was modified to accommodate the 50 MPH design speed. To avoid a four level structure within the interchange, a loop ramp was designed on the northwest quadrant of the interchange.

Improvements to the I-277 system would require the purchase of additional right of way to accommodate the proposed interchange configurations mentioned above and the 5-2-2-5 typical section along I-77. Due to the proximity of adjacent natural systems along existing I-77, stream relocations have been proposed as potential options, specifically within the existing West Blvd/NC 160 interchange, along the proposed southbound I-77 exit to Freedom Drive, and within the NC16/I-277 interchange.

*It is suggested further consideration be performed during the NEPA phase with regard to the specific interchange configuration required to accommodate the travel demand and with regard to the potential for stream relocations.*

#### **6.4 POTENTIAL MANAGED LANE INGRESS/EGRESS LOCATIONS**

Major emphasis was not to evaluate ingress/egress locations; however, utilizing Federal Highway Administration's (FHWA) *Priced Managed Lane Guide* ingress/egress, T-Ramps, and DCs concepts were developed. As shown on Figure 3, these preliminary locations were determined by using a Typical Combined Ingress/Egress Weave Zone criterion of 2000 feet, while providing a minimum weave distance of 800 feet per lane between the upstream/downstream ramps and openings.

*It is suggested further consideration be performed during the NEPA phase with regard to ingress/egress, T-Ramps, and DCs locations.*

## 7.0 TRAFFIC OPERATIONS

Traffic volumes for the 2009 No-Build Conditions and the 2035 No-Build and Build Conditions were obtained from the NCDOT Transportation Planning Branch in a memorandum dated August 24, 2009. Given the limits of the project northern terminus was extended, the traffic forecast was supplemented with the adjacent TIP project I-3311E traffic forecast. It should be noted a more detailed traffic forecast and traffic operations analysis will be performed during the NEPA phase. Within the project study area the Average Annual Daily Traffic (AADT) along I-77 ranges from 102,000 to 163,600 in 2009 No-Build Conditions and increases to between 152,600 to 196,600 for the 2035 No-Build Conditions. AADT along I-77 for the 2035 Build Conditions (5-2-2-5 Alternative) ranges from 158,400 to 216,800. The AADT volumes provided in the forecasts were converted to peak hour volumes utilizing the NCDOT Congestion Management Section's Intersection Analysis Utility (IAU) spreadsheet).

To accommodate both CDOT and NCDOT Measure of Effectiveness (MOE) preference, it was determined Volume to Capacity (V/C) Ratios would be prepared for various peak spreading such as peak hour and 3 hour peak spreading. This was also chosen to provide a high-level traffic operations analysis corresponding to the size of the project study area and the analysis limitations associated with this being a feasibility study. The overall goal while developing the approach was to provide MOE's preferred by both CDOT and NCDOT and to ultimately allow for relative high-level comparison, while using the current traffic forecast and being consistent with a feasibility study this size and with this level of congestion. Exhibit 2 shows a summary of I-77 V/C ratios for the AM and PM Peak Hour and 3 Hour Peak for the 5-2-2-5 Alternative, the 4-2-2-4 Alternative, and the 3-2-2-3 Alternative (detailed V/C ratio figures are located in the Appendix). V/C ratio calculations were not prepared for the 5-2-2-5 Elevated Alternative or the 3-2-2-3 C-D System Alternatives given ingress and egress locations would most likely be in very different locations than those shown in the Conceptual Designs. Exhibit 2 shows the V/C ratios for the various peak hours evaluated for the 2009 No-Build Conditions and the 2035 No-Build and Build Conditions.

*Evaluation of this complexity could not be performed as a part of this feasibility study level due to limitations associated with the traffic forecast and uncertainty of the design requirements such as the required interchange configurations, managed lanes components (ingress/egress) locations, direct connect locations, or ramp locations. As such, the methodology utilized within this feasibility study was developed to provide an order of magnitude comparison of alternatives considered, utilizing the available traffic forecast and providing MOEs for both CDOT and NCDOT. Information or feasible components identified within this feasibility study should provide an initial concept to begin this type of investigation during the NEPA phase, which will include the preparation of an updated traffic forecast and detailed traffic operations analysis will be prepared during the NEPA phase.*

## Exhibit 2: I-77 V/C Ratio Evaluation for Build Alternatives

Condition	V/C Ratio Range	Peak Hour				3 Hour Peak			
		AM Segments w/i range	AM Segment Lengths (miles)	PM Segments w/i range	PM Segment Lengths (miles)	AM Segments w/i range	AM Segment Lengths (miles)	PM Segments w/i range	PM Segment Lengths (miles)
2009 No Build	0.00-0.01	0	0.0	0	0.0	0	0.0	0	0.0
	0.02-0.80	28	10.2	28	9.6	52	21.6	51	20.6
	0.81-1.00	13	5.7	13	5.8	4	2.3	5	3.4
	< 1.01	15	8.1	15	8.5	0	0.0	0	0.0
		56	23.9	56	23.9	56	23.9	56	23.9
	Length of road segment approaching or over capacity		13.8		14.3		2.3		3.4
	Percent of road segment approaching or over capacity		58%		60%		10%		14%
2035 No Build	0.00-0.01	0	0.0	0	0.0	0	0.0	0	0.0
	0.02-0.80	16	6.7	17	6.6	45	18.0	45	17.3
	0.81-1.00	17	6.0	12	3.3	9	5.1	9	5.4
	< 1.01	23	11.2	27	14.0	2	0.9	2	1.3
		56	23.9	56	23.9	56	23.9	56	23.9
	Length of road segment approaching or over capacity		17.2		17.3		6.0		6.6
	Percent of road segment approaching or over capacity		72%		72%		25%		28%
2035 Build 5-2-2-5 Alternative	0.00-0.01	0	0.0		0.0	0	0.0	0	0.0
	0.02-0.80	37	18.1	34	17.4	47	24.0	46	23.3
	0.81-1.00	9	5.5	11	5.6	1	0.2	2	0.9
	< 1.01	2	0.7	3	1.2	0	0.0	0	0.0
		48	24.2	48	24.2	48	24.2	48	24.2
	Length of road segment approaching or over capacity		6.2		6.8		0.2		0.9
	Percent of road segment approaching or over capacity		25%		28%		1%		4%
2035 Build 4-2-2-4 Alternative	0.00-0.01	0	0.0	0	0.0	0	0.0	0	0.0
	0.02-0.80	28	14.9	21	12.6	47	24.0	44	22.6
	0.81-1.00	9	3.2	12	4.3	1	0.2	3	0.9
	< 1.01	11	6.2	15	7.4	0	0.0	1	0.7
		48	24.2	48	24.2	48	24.2	48	24.2
	Length of road segment approaching or over capacity		9.3		11.7		0.2		1.7
	Percent of road segment approaching or over capacity		38%		48%		1%		7%
2035 Build 3-2-2-3 Alternative	0.00-0.01	0	0.0	0	0.0	0	0.0	0	0.0
	0.02-0.80	12	6.7	9	5.6	42	20.5	39	20.0
	0.81-1.00	10	4.2	9	5.6	4	3.0	7	3.3
	< 1.01	26	13.3	30	13.0	2	0.7	2	0.9
		48	24.2	48	24.2	48	24.2	48	24.2
	Length of road segment approaching or over capacity		17.5		18.6		3.7		4.2
	Percent of road segment approaching or over capacity		72%		77%		15%		17%

Note: Segments report above correspond to only northbound and southbound segments of I-77 for comparison purposes only. Also, V/C ratio calculations were not prepared for the 5-2-2-5 Elevated Alternative or the 3-2-2-3 C-D System Alternatives given ingress and egress locations would most likely be in very different locations than those shown in the Conceptual Designs. It is suggested further consideration be performed during the NEPA phase with regard to ingress/egress, T-Ramps, and Direct Connect locations.

Total segment lengths differ between No Build Alternatives and Build Alternatives because of differences in design geometry.

The 2009 No-Build Conditions result with 13.8 miles out of the 23.9 miles (58%) of the I-77 roadway approaching or over capacity for the AM Peak Hour; with 14.3 miles out of 23.9 miles (60%) in the PM. For the 2009 No-Build AM 3 Hour Peak, 2.3 miles out of 23.9 miles (10%) of the I-77 roadway is approaching or over capacity; with 3.4 miles out of 23.9 miles (14%) in the PM.

The 2035 No-Build Conditions result with 17.2 miles out of the 23.9 miles (72%) of the I-77 roadway approaching or over capacity for the AM Peak Hour; with 17.3 miles out of 23.9 miles (72%) in the PM. For the 2035 No-Build AM 3 Hour Peak, 6.0 miles out of 23.9 miles (25%) of the I-77 roadway is approaching or over capacity; with 6.6 miles out of 23.9 miles (28%) in the PM.

The 5-2-2-5 Alternative will have 6.2 miles out of 24.2 miles (25%) of the I-77 roadway approaching or over capacity for the 2035 Build AM Peak Hour; with 6.8 miles out of 24.7 miles (28%) in the PM. For the 2035 Build AM 3 Hour Peak, 0.2 miles out of 24.2 miles (1%) of the I-77 roadway is approaching or over capacity; with 0.9 miles out of 24.2 miles (4%) in the PM.

The 4-2-2-4 Alternative will have 9.3 miles out of 24.2 miles (38%) of the I-77 roadway approaching or over capacity for the 2035 Build AM Peak Hour; with 11.7 miles out of 24.2 miles (48%) in the PM. For the 2035 Build AM 3 Hour Peak, 0.2 miles out of 24.2 miles (1%) of the I-77 roadway is approaching or over capacity; with 1.7 miles out of 24.2 miles (7%) in the PM.

The 3-2-2-3 Alternative will have 17.5 miles out of 24.2 miles (72%) of the I-77 roadway approaching or over capacity for the 2035 Build AM Peak Hour; with 18.6 miles out of 24.2 miles (77%) in the PM. For the 2035 Build AM 3 Hour Peak, 3.7 miles out of 24.2 miles (15%) of the I-77 roadway is approaching or over capacity; with 4.2 miles out of 24.2 miles (17%) in the PM.

## **8.0 BUILD ALTERNATIVE IMPACTS AND COST ESTIMATES**

Impacts and cost estimates have been developed for the Build Alternatives based upon the conceptual designs created for the 5-2-2-5 Alternative. Right of way limits for the various alternatives were reduced or increased according to the various typical section dimensions of each alternative.

- It is anticipated the 5-2-2-5 Alternative will require 122 residential relocations and 187 business relocations, with a total cost of \$1,028,000,000, which includes \$310,100,000 in right of way, \$3,250,000 for Intelligent Transportation Systems (ITS), \$26,250,000 for potential toll equipment, \$686,800,000 in construction costs, and \$1,600,000 in utility costs.
- It is anticipated the 4-2-2-4 Alternative will require 110 residential relocations and 136 business relocations, with a total cost of \$970,800,000, which includes \$283,900,000 in right of way, \$3,250,000 for ITS, \$26,250,000 for potential toll equipment, \$655,800,000 in construction costs, and \$1,600,000 in utility costs.
- It is anticipated the 3-2-2-3 Alternative will require 107 residential relocations and 135 business relocations, with a total cost of \$925,400,000, which includes \$262,500,000 in right of way, \$3,250,000 for ITS, \$26,250,000 for potential toll equipment, \$631,800,000 in construction costs, and \$1,600,000 in utility costs.
- It is anticipated the 5-2-2-5 Elevated Alternative will require 112 residential relocations and 142 business relocations, with a total cost of \$2,160,900,000, which includes \$288,600,000 in right of way, \$3,250,000 for ITS, \$26,250,000 for potential toll equipment, \$1,841,200,000 in construction costs, and \$1,600,000 in utility costs.
- It is anticipated the 3-2-2-3 C-D System Alternative will require 122 residential relocations and 187 business relocations, with a total cost of \$1,130,600,000, which includes \$357,700,000 in right of way, \$3,250,000 for ITS, \$26,250,000 for potential toll equipment, \$741,800,000 in construction costs, and \$1,600,000 in utility costs.

A summary of impacts and cost estimates associated with each alternative is shown in Exhibit 3.

## Exhibit 3: Build Alternative Impacts and Cost Estimates

Alternative	Length (miles)	Number of Parcels	Residential Relocations	Business Relocations	Total Right of Way Cost	ITS	Toll Equipment	Construction	Utilities	Total Cost
5-2-2-5	I-485 System	3.43	72	0	66	\$ 119,000,000			\$ 227,100,000	
	Nations Ford	0.95	32	24	11	\$ 33,900,000			\$ 29,750,000	
	Tyvola	1.14	26	0	1	\$ 17,400,000			\$ 31,700,000	
	Tryon/Billy Graham	1.42	47	5	73	\$ 52,700,000			\$ 63,630,000	
	Clanton	0.95	35	11	8	\$ 13,400,000			\$ 22,750,000	
	Remount	1.08	46	21	10	\$ 23,500,000			\$ 44,720,000	
	I-277 System	3.24	188	61	18	\$ 50,200,000	\$ 3,250,000	\$ 26,250,000	\$ 267,150,000	\$ 1,600,000
	<b>12.20</b>	<b>446</b>	<b>122</b>	<b>187</b>	<b>\$ 310,100,000</b>	<b>\$ 3,250,000</b>	<b>\$ 26,250,000</b>	<b>\$ 686,800,000</b>	<b>\$ 1,600,000</b>	<b>\$ 1,028,000,000</b>
4-2-2-4	I-485 System	3.43	68	0	66	\$ 109,300,000			\$ 225,100,000	
	Nations Ford	0.95	32	24	10	\$ 31,100,000			\$ 27,750,000	
	Tyvola	1.14	26	0	1	\$ 16,000,000			\$ 28,700,000	
	Tryon/Billy Graham	1.42	44	5	30	\$ 49,000,000			\$ 59,630,000	
	Clanton	0.95	34	6	3	\$ 12,300,000			\$ 20,750,000	
	Remount	1.08	45	19	11	\$ 20,800,000			\$ 40,720,000	
	I-277 System	3.24	180	56	15	\$ 45,400,000	\$ 3,250,000	\$ 26,250,000	\$ 253,150,000	\$ 1,600,000
	<b>12.20</b>	<b>429</b>	<b>110</b>	<b>136</b>	<b>\$ 283,900,000</b>	<b>\$ 3,250,000</b>	<b>\$ 26,250,000</b>	<b>\$ 655,800,000</b>	<b>\$ 1,600,000</b>	<b>\$ 970,800,000</b>
3-2-2-3	I-485 System	3.43	69	0	66	\$ 102,900,000			\$ 218,100,000	
	Nations Ford	0.95	31	21	11	\$ 28,100,000			\$ 25,750,000	
	Tyvola	1.14	24	0	1	\$ 14,800,000			\$ 25,700,000	
	Tryon/Billy Graham	1.42	45	5	30	\$ 46,400,000			\$ 59,630,000	
	Clanton	0.95	34	6	3	\$ 11,500,000			\$ 18,750,000	
	Remount	1.08	41	19	9	\$ 18,000,000			\$ 36,720,000	
	I-277 System	3.24	169	56	15	\$ 40,800,000	\$ 3,250,000	\$ 26,250,000	\$ 247,150,000	\$ 1,600,000
	<b>12.20</b>	<b>413</b>	<b>107</b>	<b>135</b>	<b>\$ 262,500,000</b>	<b>\$ 3,250,000</b>	<b>\$ 26,250,000</b>	<b>\$ 631,800,000</b>	<b>\$ 1,600,000</b>	<b>\$ 925,400,000</b>
5-2-2-5 Elevated	I-485 System	3.43	69	0	64	\$ 114,000,000			\$ 518,100,000	
	Nations Ford	0.95	31	24	11	\$ 32,000,000			\$ 120,750,000	
	Tyvola	1.14	24	0	1	\$ 16,500,000			\$ 139,700,000	
	Tryon/Billy Graham	1.42	43	5	30	\$ 49,900,000			\$ 199,000,000	
	Clanton	0.95	32	11	8	\$ 12,000,000			\$ 113,750,000	
	Remount	1.08	40	20	10	\$ 18,400,000			\$ 147,750,000	
	I-277 System	3.24	173	52	18	\$ 45,800,000	\$ 3,250,000	\$ 26,250,000	\$ 602,150,000	\$ 1,600,000
	<b>12.20</b>	<b>412</b>	<b>112</b>	<b>142</b>	<b>\$ 288,600,000</b>	<b>\$ 3,250,000</b>	<b>\$ 26,250,000</b>	<b>\$ 1,841,200,000</b>	<b>\$ 1,600,000</b>	<b>\$ 2,160,900,000</b>
3-2-2-3 C-D System	I-485 System	3.43	72	0	66	\$ 135,100,000			\$ 236,100,000	
	Nations Ford	0.95	32	24	11	\$ 39,700,000			\$ 33,750,000	
	Tyvola	1.14	26	0	1	\$ 20,000,000			\$ 37,700,000	
	Tryon/Billy Graham	1.42	47	5	73	\$ 59,000,000			\$ 67,630,000	
	Clanton	0.95	35	11	8	\$ 15,300,000			\$ 26,750,000	
	Remount	1.08	46	21	10	\$ 29,000,000			\$ 52,720,000	
	I-277 System	3.24	188	61	18	\$ 59,600,000	\$ 3,250,000	\$ 26,250,000	\$ 287,150,000	\$ 1,600,000
	<b>12.20</b>	<b>446</b>	<b>122</b>	<b>187</b>	<b>\$ 357,700,000</b>	<b>\$ 3,250,000</b>	<b>\$ 26,250,000</b>	<b>\$ 741,800,000</b>	<b>\$ 1,600,000</b>	<b>\$ 1,130,600,000</b>

Note, for the purposes of this study, ITS, Toll Equipment and Utility cost estimates were prepared for the project and assumed to be the same for each alternative. Number of parcels, residential relocations and business relocations reported for the 3-2-2-3 C-D System Alternative were assumed to be the same as the 5-2-2-5 alternative given the two alternatives are anticipated to have similar construction limits.

## **9.0 COMMUNITY ISSUES**

### **9.1 NOTABLE COMMUNITY FEATURES**

There are several parks along the corridor, including Ramblewood, Clanton, Southside, Revolution Community, Abbott, Bryant, Frazier, Biddleville, Greenville, Anita Stroud, and Double Oaks parks, which are all located on either side of I-77 from Clanton Road to NC 16 (Brookshire Freeway)/I-277 interchange.

Greenways are also located within the project study area, including Irwin Creek and Stewart Creek Greenway.

Several designated bicycle lanes are within the project study area including portions of Arrowood Road, Forest Point Boulevard, Nations Ford Road, Clanton Road, Remount Road, West Morehead Street, West 4<sup>th</sup> Street, and Oaklawn Avenue.

Parallel and east of the I-77 corridor is Charlotte's light rail corridor – the Blue Line. The Blue Line has several transit stops and park and ride lots located in the general vicinity of the interchanges with I-77.

There are four public housing complexes that are operated by the Charlotte Housing Authority and are within the project study area. Between the interchanges with Clanton Road and Remount Road is the Southside Homes complex. Tarlton Hills and Victoria Square are both located off of the West 5<sup>th</sup> Street interchange. The Park at Oaklawn is located north of the Brookshire Freeway and south of the Lasalle Street/Atando Avenue interchange.

Within the Center City, the area of land within the I-77/I-277 loop is the central business district of the City of Charlotte. This area contains multiple major destinations for both employment and entertainment that includes the Charlotte Transportation Center, Bank of America Corporate Center, Johnson & Wales University, City and County government centers, the Time Warner Cable Arena (home to a NBA team), Central Piedmont Community College, the Bank of America Stadium (home to a NFL team), and the NASCAR Hall of Fame.

### **9.2 SCHOOLS AND FACILITIES**

Military and Global Leadership Academy at Marie G. Davis is a kindergarten through twelfth grade magnet school. It is approximately 27 acres and is located north of Clanton Road on the east side of I-77. Irwin Academic Center, formerly known as Villa Heights, is a kindergarten through sixth grade elementary school. Its enrollment is approximately 550 students and is located on the east side of I-77, just south of the NC16/I-277 interchange. The Johnson & Wales University is located off of West 5<sup>th</sup> Street. The Charlotte Campus opened in 2004 as a regional campus. The Charlotte campus has approximately 2,300 students. Johnson C. Smith University was founded in 1867 and is a private liberal arts university with an enrollment of approximately 1,600 students. It is located on the west side of I-77 just south of the NC16/I-277 interchange.

### **9.3 HISTORIC RESOURCES**

Records and maps of the North Carolina State Historic Preservation Office (HPO) were reviewed at the HPO's website for historic architectural resources that had been identified in previous survey or that were listed in or had been determined eligible for listing in the National Register of Historic Places. Exhibit 3 provides a list of previously identified historic resources found within the vicinity of the project study area.

**Exhibit 3: Historic Properties/Boundaries**

Segment	HPO Site ID	Status <sup>1</sup>	Description
I-485 System	MK2491	SO	Dinkins Property Cemetery
	MK007	NR-listed 1975; NR-delisted 1995	Dinkins House (Original Site)
I-277 System	MK3252	DOE 2011	Wilmore Historic District
	MK2643	NR-listed 2003	Grinnell Company-General Fire Extinguisher Co. Complex
	MK1819	NR-listed 1998	Charlotte Coca Cola Bottling Company Plant
	MK2247	NR-listed 2001	Crane Company Building
	MK2655	NR-listed 2001	Carolina School Supply Company Building
	MK2657	NR-listed 2001	Union Storage and Warehouse Company Building
	MK1852	NR-listed 1999	Carolina Transfer and Storage Company Building
	MK1793	NR-listed 1995	Wesley Heights Historic District
	MK0072	SL-2003; DOE 2011	Elmwood and Pinewood Cemetery
	MK2715	NR-listed 2008	Southern Asbestos Company Mills
	MK3221	DOE 2013	McCrorey Heights Historic District
	MK3220	DOE 2013	Oaklawn Park Historic District

<sup>1</sup> SO = Surveyed Only, DOE = Determination of Eligibility, NR = National Register, SL = North Carolina Study List

**9.4 ARCHAEOLOGICAL RESOURCES**

An archaeological site files check performed on May 23, 2014 identified one previously recorded archaeological site within the project study area. This site, 31MK131, has been destroyed by construction of the I-485 and I-77 interchange. Review of aerial photographs of the project area indicates the project has a low potential to contain significant unrecorded archaeological resources. Construction of I-77, coupled with the commercial, industrial, and residential sprawl on either side of it (along with associated infrastructure like streets and buried utilities) has likely resulted in excessive impacts to the landscape. The developed and densely urban nature of the corridor has likely compromised archaeological resources, destroying or severely damaging any that might exist such that eligibility for the National Register of Historic Places is not possible. Natural Resources Conservation Service soils data corroborates the low potential for intact archaeological resources in the project area. The Web Soil Survey tool (<http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>) indicates much of the project study area consists of disturbed soil types including Urban, Urban complexes, and Udorthents soil types. These soil types reflect the impact of urbanization, and variably describe the soils as clearly disturbed through a variety of cut and/or fill activities. It is unlikely archaeological resources studies (e.g., field survey) will be required in conjunction with planned improvements to I-77.

**10.0 NATURAL ENVIRONMENT ISSUES**

A detailed environmental study was not conducted for this feasibility study. Geographic Information System (GIS) level research and a preliminary site review were completed. Figure 3 shows the location of documented natural resources within and near the project study area.

**10.1 WATER QUALITY RESOURCES**

The project is located in the Catawba River Basin (six digit hydrologic unit code (HUC) 030501), in the Lower Catawba River Sub-Basin (eight digit HUC 03050103), and in the Sugar Creek Watershed (ten digit HUC 0305010306). The main water courses running through the project study area are Sugar Creek (assessment unit (AU) # 11-137c) and Irwin Creek (AU # 11-137-1). Sugar Creek is approximately 14 miles long, crossing underneath I-77 just north of the I-485 interchange, and it drains highly populated urban areas. Irwin Creek is approximately 12 miles long and it drains dense residential urban areas as well as industrial parks upstream, crossing and running parallel along I-77 from north of Remount Road to the northern terminus of the project study area.

Section 303(d) of the Clean Water Act (CWA), requires states to develop a list of waters meeting water quality standards or which have impaired uses. The North Carolina Department of Environment and Natural Resources - Division of Water Resources (NC DWR) monitors water quality in North Carolina and has a water quality monitoring station for Sugar Creek (C9050000) and for Irwin Creek (C8896500) located just outside the project study area. Both creeks are listed on the Water Quality Assessment and Impaired Waters List (NCDWQ, 2013) due to levels of Copper.

All streams within the project study area are classified as C (*Waters protected for uses such as secondary recreation, fishing, wildlife, fish consumption, aquatic life including propagation, survival and maintenance of biological integrity, and agriculture. Secondary recreation includes wading, boating, and other uses involving human body contact with water where such activities take place in an infrequent, unorganized, or incidental manner*).

## **10.2 JURISDICTIONAL FEATURES**

Jurisdictional streams identified in the project study area include Sugar Creek, Irwin Creek, Stewart Creek, and Kings Branch, and total approximately 5,936 linear feet. According to the National Wetland Inventory data, seven wetlands are identified within the project study area totally approximately 8.85 acres.

"Waters of the United States" include surface waters and wetlands (inundated or saturated areas that support vegetation typically adapted to wet conditions) as defined in 33 CFR Part 328.3. Impacts to waters of the United States fall under the jurisdiction of the USACE through Section 404 of the Clean Water Act (33 U.S.C. 1344) and under the jurisdiction of the NCDWQ through the Section 401 Water Quality Certification Process (NC General Statutes Chapter 143 Article 21, Part 1).

## **10.3 PROTECTED SPECIES**

Species with the federal status of endangered (E), threatened (T) are protected under provisions of the Endangered Species Act (ESA) of 1973 as amended (16 USC 1531 et. seq.). Any action likely to adversely affect a species classified as federally protected will be subject to review by the United States Fish and Wildlife Service (USFWS). The USFWS online database was reviewed for federally listed species potentially occurring in Mecklenburg County (USFWS 2012). The federally protected species listed for Mecklenburg County as of December 26, 2012 are listed in Exhibit 4.

North Carolina National Heritage Program (NCNHP) species occurrence coverage (NCNHP 2014) were also reviewed. One federally listed species, Carolina heelsplitter, has been documented within the project study area.



**Exhibit 4: Federally Protected Species within the Project Study Area**

Common Name	Scientific Name	Federal Status	Record Status
<b>Vertebrate:</b>			
American eel	Anguilla rostrata	FSC	Current
Bald eagle	Haliaeetus leucocephalus	BGPA	Current
Carolina darter	Etheostoma collis collis	FSC	Current
<b>Invertebrate:</b>			
Carolina creekshell	Villosa vaughaniana	FSC	Current
Carolina heelsplitter	Lasmigona decorata	E	Current
<b>Vascular Plant:</b>			
Dwarf aster	Eurybia mirabilis	FSC	Current
Georgia aster	Symphyotrichum georgianum	C	Current
Michaux's sumac	Rhus michauxii	E	Current
Prairie birdsfoot-trefoil	Lotus unifoliolatus var. helleri	FSC	Current
Schweinitz's sunflower	Helianthus schweinitzii	E	Current
Shoals spiderlily	Hymenocallis coronaria	FSC	Probable/potential
Smooth coneflower	Echinacea laevigata	E	Current
Tall larkspur	Delphinium exaltatum	FSC	Historic
Source: Endangered and Threatened Species and Species of Concern by County for North Carolina (USFWS 2012) E = endangered T = threatened C = candidate BGPA =Bald and Golden Eagle Protection Act. See below. FSC = federal species of concern. Current - the species has been observed in the county within the last 50 years. Historic - the species was last observed in the county more than 50 years ago. Probable/potential - the species is considered likely to occur in this county based on the proximity of known records (in adjacent counties), the presence of potentially suitable habitat, or both.			

**10.4 EXISTING NCDOT MITIGATION SITES**

There are no existing NCDOT mitigation sites within the project study area. One mitigation area, Whitehall Reserve, TIP R-0211DC, is located approximately 1.5 miles west of the project study area.

**10.5 FEMA HAZARD MITIGATION GRANT PROGRAM PROPERTIES**

There are a total of nine Federal Emergency Management Agency (FEMA) Hazard Mitigation Grant Program (HMGP) Properties which total 1.15 acres within the project study area. They are located in the northern section of the project study area on the west side of I-77, north of the NC 16 (Brookshire Freeway)/I-277 interchange.

**10.6 UNITED STATES ARMY CORPS OF ENGINEERS**

Section 404 Permit: any action that proposes to place fill into "Waters of the United States" falls under the jurisdiction of the United States Army Corps of Engineers (USACE) under Section 404 of the CWA (33 U.S.C 1344). The CWA provides for public notice and review of pending Section 404 permit applications. Encroachments into areas determined as subject under CWA must be reviewed and approved by the USACE through the Section 404 program.

**10.7 NCDENR, DIVISION OF WATER RESOURCES**

Section 401 Water Quality Certification: any activity which may result in discharge to navigable waters and requires a federal permit must obtain a certification through the NCDWR that such discharge would

be in compliance with applicable state water quality standards. Usually this permit is required in association with the Section 404 permitting process and is required prior to Section 404 authorization.

The city of Charlotte is subject to the requirements of the National Pollutant Discharge Elimination Systems (NPDES) storm water permitting program for roadway construction and material storage facilities. The permit requirements include implementing a comprehensive storm water management program, monitoring the program, and annual reports of the program's effectiveness and direction.

## **10.8 NCDENR, DIVISION OF LAND RESOURCES**

Erosion and Sedimentation Control Plan: in accordance with the North Carolina Sedimentation Pollution Control Act of 1973, projects disturbing more than one acre of land must submit an Erosion and Sedimentation Control Plan to the NCDENR Division of Land Resources (NCDLR). The plan must include erosion control measures and be approved by the DLR prior to construction.

## **10.9 NCDENR, DIVISION OF FOREST RESOURCES**

Open Burning Permit: a permit is required to start a fire in woodlands or within 500 feet of woodlands under the protection of the Division of Forest Resources. Thirty day permits can be issued for highway construction.

## **11.0 CONCLUSIONS**

Developing alternatives to improve north-south mobility along the heavily developed I-77 corridor between the NC/SC state line and Lasalle Street/Atando Avenue results with many challenges. Based upon the projected growth within the region, major infrastructure improvements will be required in order to accommodate the future travel demand. As such, alternatives developed in efforts to meet this demand would result with complex interchange configurations, closure and/or consolidation of existing interchanges, and potential reconfiguration of existing interchanges. Alternatives developed would also have the potential to result with impacts to overhead and underground utilities, impacts to HMGP Properties, impacts to streams and wetlands (and possibly include stream relocations), a high number of residential and business relocations, impacts to housing authority complexes, impacts to multiple parks, greenways, and bicycle routes, as well as impacts to cultural resources and various activity centers along I-77 and within Uptown Charlotte. It should be noted that indirect and cumulative effects of the project were not evaluated within this feasibility study.

A review of cost estimates from least expensive to most expensive show the 3-2-2-3 Alternative would be the least expensive with a total cost of \$925,400,000, followed by the 4-2-2-4 Alternative at \$970,800,000, followed by the 5-2-2-5 Alternative at \$1,028,000,000, followed by the 3-2-2-3 C-D System Alternative \$1,130,600,000, leaving the 5-2-2-5 Elevated Alternative as the most expensive alternative with a total cost of \$2,160,900,000. While replacement costs of these alternatives at the end of their lifespan are not evaluated within this feasibility study, the 5-2-2-5 Elevated Alternative is expected to be the most expensive alternative to replace due to the large amount of elevated (or bridged) structures. It should be noted that the increased costs of providing the general purpose lanes in the 4-2-2-4 and 5-2-2-5 alternatives is not significant when compared to the initial costs of the managed lanes in the comparable 3-2-2-3 alternative. As previously noted, the 3-2-2-3 C-D System Alternative would include C-Ds along I-77 between the two I-277 interchanges.

I-77 AADT in 2009 ranges between 102,000 and 163,600, increases to between 152,600 and 196,600 in 2035 without this project in place, and increases to between 158,400 and 216,800 in 2035 should additional capacity (as proposed in the 5-2-2-5 Alternative) be provided. The high-level traffic operations analysis methodology utilized for this study was not intended to be a detailed analysis, but rather a methodology to determine the feasibility of potential alternatives to improve I-77 north-south mobility and to provide a basis for relative comparison of the alternatives evaluated. As such, care should be given when reviewing the V/C ratio calculations and corresponding lengths of roadway segments. It should be noted that when an individual roadway segment is reported to be approaching or over capacity, the effects do not simply occur for the segment alone; rather the slowing or stopped traffic have a ripple effect

upstream from the subject segment. Review of the V/C ratios show all alternatives evaluated will continue to have roadway segments either approaching or at capacity, in the Peak Hour. Review of the 3 Hour Peak, shows the 3-2-2-3 Alternative will continue with a large percentage of roadway segments either approaching or at capacity; whereas the roadway segments either approaching or at capacity for the 5-2-2-5 Alternative and the 4-2-2-4 Alternative is reduced to a low level.

From this review, the 3-2-2-3 Alternative has a large percentage of roadway segments either approaching or at capacity for all peak hours evaluated. While V/C ratios were not prepared for the 3-2-2-3 C-D System Alternative, this alternative is similar to the 3-2-2-3 Alternative with regard to the number of lanes along I-77 and therefore is expected to result with very similar V/C ratios along I-77 as the 3-2-2-3 Alternative.

While V/C ratio calculations were not prepared for the 5-2-2-5 Elevated Alternative, this alternative is similar to the 5-2-2-5 Alternative with regard to the number of lanes along I-77 and therefore is expected to result with very similar V/C ratios along I-77 as the 5-2-2-5 Alternative. However, upon comparison of the total costs for alternatives evaluated, construction of a 5-2-2-5 Elevated Alternative would be a significant financial commitment as it is over twice as expensive as all other alternatives.

Conclusions as a result of this feasibility study include the following:

- Perform system level analysis prior to preparing traffic forecasts for the next phase of the project
  - Confirm alternatives with a 3-2-2-3 typical section will not adequately meet the future travel demand
  - Evaluate the potential of existing interchange closures and/or consolidations as proposed in the conceptual designs
  - Using the conceptual designs, evaluate the potential for the 4-2-2-4 and 5-2-2-5 typical sections to meet the future travel demand
  - As a managed lane facility locations of direct connects, T-ramps, and ingress/egress will need to be further evaluated and incorporated into the traffic forecast for use in the NEPA phase
  - Coordinate with the North Carolina Turnpike Authority
- Coordinate with FHWA to determine appropriate MOEs and analysis methodology for evaluation of alternatives during the NEPA phase and discuss appropriate project design years
- Implement an extensive and rigorous stakeholder involvement plan during the NEPA phase

## 12.0 COORDINATION

The Feasibility Study process was prepared with input, direction, and feedback provided by various representatives from CDOT and NCDOT. Additionally, the Charlotte Regional Transportation Planning Organization (CRTPO) has reviewed the draft version of this feasibility study and provided comments to be addressed within this document as well as comments which should be considered during future phases of this project. Copies of the project scoping meetings minutes, the CRTPO comments, as well as NCDOT's responses to the CRTPO comments are included in Appendix D.

### 13.0 REFERENCE MATERIAL

- <sup>1</sup> Mecklenburg-Union Metropolitan Planning Organization. "Mecklenburg-Union Metropolitan Planning Organization Thoroughfare Plan." Adopted November 17, 2004 (Updated March 21, 2012). Available: <http://www.crtpo.org/plans-programs/thoroughfare-plan>
- <sup>2</sup> Mecklenburg-Union Metropolitan Planning Organization. "2035 Long Range Transportation Plan Mecklenburg-Union Metropolitan Planning Organization." Adopted March 24, 2010. Available: <http://www.crtpo.org/2035-long-range-transportation-plan>
- <sup>3</sup> North Carolina Department of Transportation. "Strategic Highway Corridor Vision Plan-Division 10." Adopted September 2, 2004 (Revised July 10, 2008). Available: <https://connect.ncdot.gov/projects/planning/Pages/StrategicHighwayCorridors.aspx>
- <sup>4</sup> North Carolina Department of Transportation. "Bridge Location Maps." Available: <http://www.ncdot.gov/travel/statemapping/#Mecklenburg>
- <sup>5</sup> Mecklenburg-Union Metropolitan Planning Organization. "Charlotte Region *Fast Lanes* Study Final Report." Available: <http://www.charmeck.org/fastlanes/>
- <sup>6</sup> Mecklenburg-Union Metropolitan Planning Organization. "Charlotte Region *Fast Lanes* Study Phase III Results Summary." Available: <http://www.charmeck.org/fastlanes/>
- <sup>7</sup> North Carolina Department of Transportation. "NCDOT Current STIP January 2014." Accessed January 2014. Available: <https://connect.ncdot.gov/projects/planning/Pages/default.aspx>
- <sup>8</sup> Federal Highway Administration. "Priced Managed Lane Guide." Report Date: October 2012. Available: [http://www.ops.fhwa.dot.gov/publications/fhwahop13007/doc\\_page.htm](http://www.ops.fhwa.dot.gov/publications/fhwahop13007/doc_page.htm)
- <sup>9</sup> North Carolina Department of Transportation, Traffic Engineering and Safety Systems Branch, Traffic Safety Systems Management Unit. Traffic Engineering Accident Analysis System Strip Analysis Report (2008-2013 Five Year Statewide Crash Rates).
- <sup>10</sup> North Carolina State Historic Preservation Office. "National Register" and "HPOWEB Map Service." Accessed May 2014. Available: <http://www.hpo.ncdcr.gov/>
- <sup>11</sup> N.C. Department of Environment and Natural Resources, Division of Water Quality. 2013. Water Quality Assessment and Impaired Waters List (2013 Integrated 305(b) and 303(d) Report).
- <sup>12</sup> N.C. Department of Environment and Natural Resource, Division of Water Quality. 1999. Internal Guidance Manual - N.C. Division of Water Quality Stream Classification Method.
- <sup>13</sup> "Definitions of Waters of the United States." Code of Federal Regulations Title 33, Pt. 328.3, Revised 2004.
- <sup>14</sup> "Endangered Species Act." Title 16 U.S. Code, Pts. 1531 et seq. 1973.
- <sup>15</sup> United States Fish and Wildlife Service. 2012. Threatened and Endangered Species in North Carolina: Mecklenburg County. Updated December 26, 2012.
- <sup>16</sup> N.C. Department of Environment and Natural Resources, Natural Heritage Program. 2014. Natural Heritage Element Occurrence. Nheo.shp, updated May 2014.

# APPENDICES



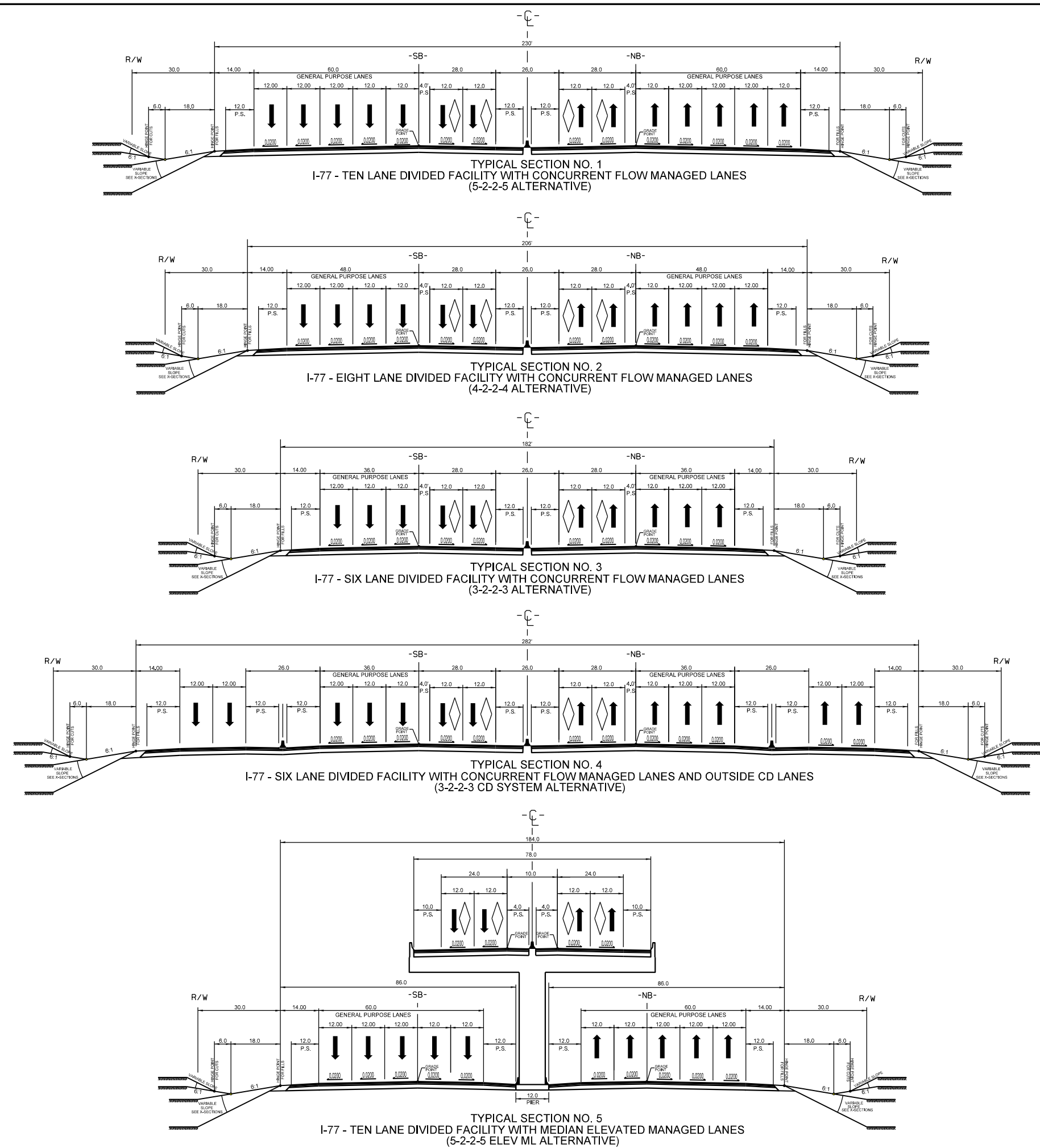
# APPENDIX A: FIGURES




































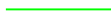



I-77 RECONSTRUCTION FEASIBILITY STUDY  
PROJECT NO.FS-0810A  
TYPICAL SECTIONS  
JULY 2014  
PRELIMINARY PLANS

FIGURE 2

I-77 RECONSTRUCTION  
FEASIBILITY STUDY  
PROJECT NO. FS-0810A

CONCEPTUAL DESIGN  
(5-2-2-5 ALTERNATIVE ONLY)  
JULY 2014

LEGEND	
 FIRE STATION	 HAZARDOUS MATERIALS SITE
 POLICE STATION	 HISTORIC RESOURCE
 LIGHT RAIL STATION	 LANDS MANAGED CONSERVATION
 COMMUNITY CENTER	 PARK
 COLLEGE	 STATE / COUNTY BOUNDARY
 SCHOOL	 MUNICIPAL BOUNDARY
 CHURCH / WORSHIP CENTER	 POTENTIAL MANAGED LANES INGRESS/EGRESS AREAS
 CEMETARY	 MANAGED LANES
 CELL PHONE TOWER / RADIO TOWER	 ROAD CLOSED
 RAILROAD/LIGHT RAIL	 PROPERTY LINE
 AIRPORT / HELIPAD	 STREAM / RIVER
 EMS	 BICYCLE ROUTE
 GOLF COURSE	 PROPOSED STREETCAR ROUTE
 FLOODPLAIN	 WETLAND
 CONSERVATION TAX CREDIT PROPERTY	

I-77 RECONSTRUCTION FEASIBILITY STUDY  
PROJECT NO.FS-0810A  
CONCEPTUAL DESIGN (5-2-2-5 ALTERNATIVE ONLY)  
JULY 2014

PRELIMINARY PLANS



PREPARED FOR  
NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH, NORTH CAROLINA

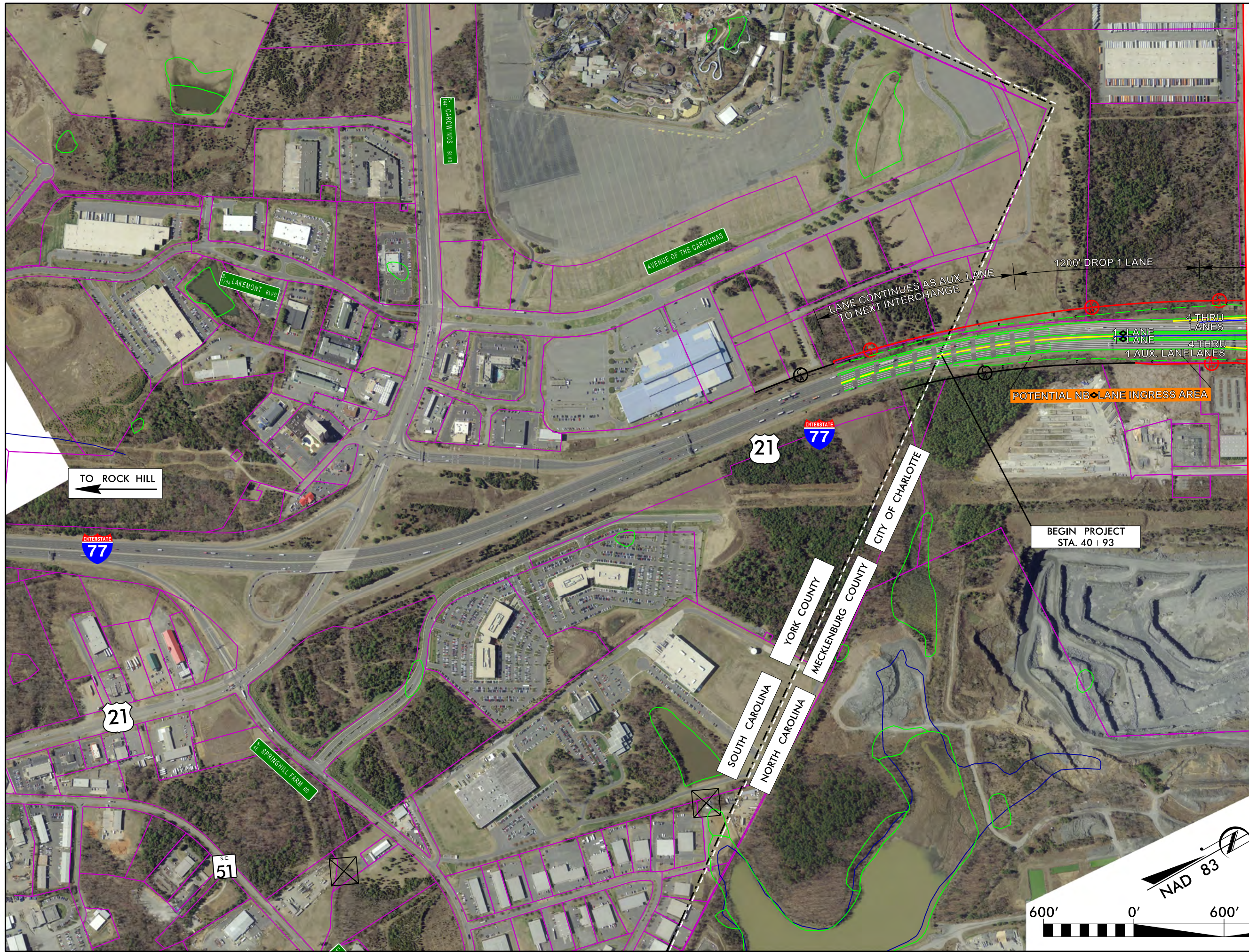
NOTE: THESE PLANS ARE PRELIMINARY AND  
SUBJECT TO CHANGE WITHOUT NOTICE.  
THIS STUDY IS NOT THE PRODUCT OF  
EXTENSIVE DESIGN OR ENVIRONMENTAL ANALYSIS.

DATA FOR THIS MAP WAS RECEIVED FROM:  
- MECKLENBURG COUNTY, NORTH CAROLINA  
- CHARLOTTE, NORTH CAROLINA  
- YORK COUNTY, SOUTH CAROLINA



FIGURE 3  
(SHEET 1 OF 11)





MATCHLINE TO SHEET 3

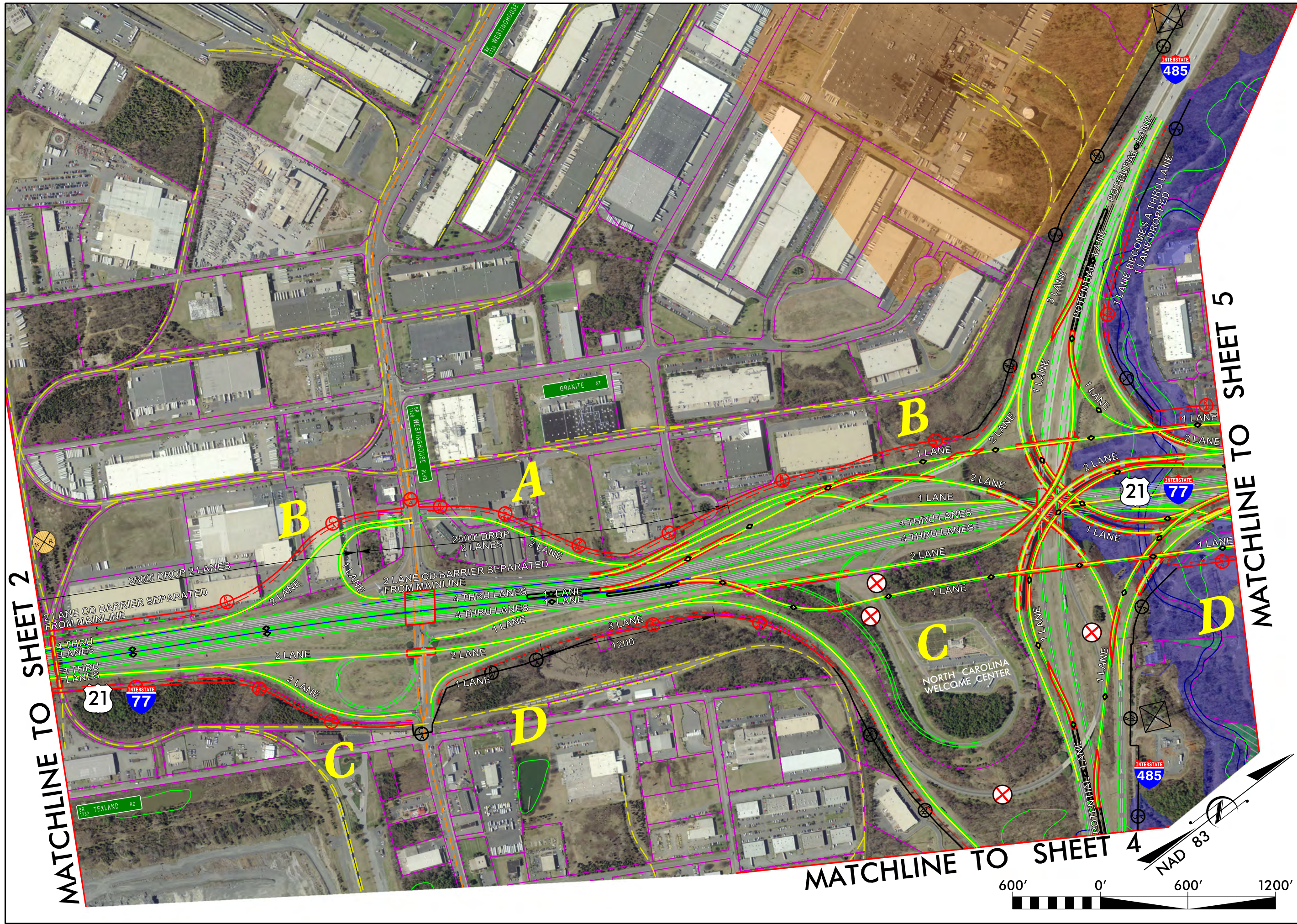
I-77 RECONSTRUCTION FEASIBILITY STUDY  
PROJECT NO.FS-0810A  
CONCEPTUAL DESIGN (5-2-2-5 ALTERNATIVE ONLY)

JULY 2014

PRELIMINARY PLANS

FIGURE 3  
(SHEET 2 OF 11)





I-77 RECONSTRUCTION FEASIBILITY STUDY  
PROJECT NO.FS-0810A  
CONCEPTUAL DESIGN (5-2-2-5 ALTERNATIVE ONLY)

JULY 2014

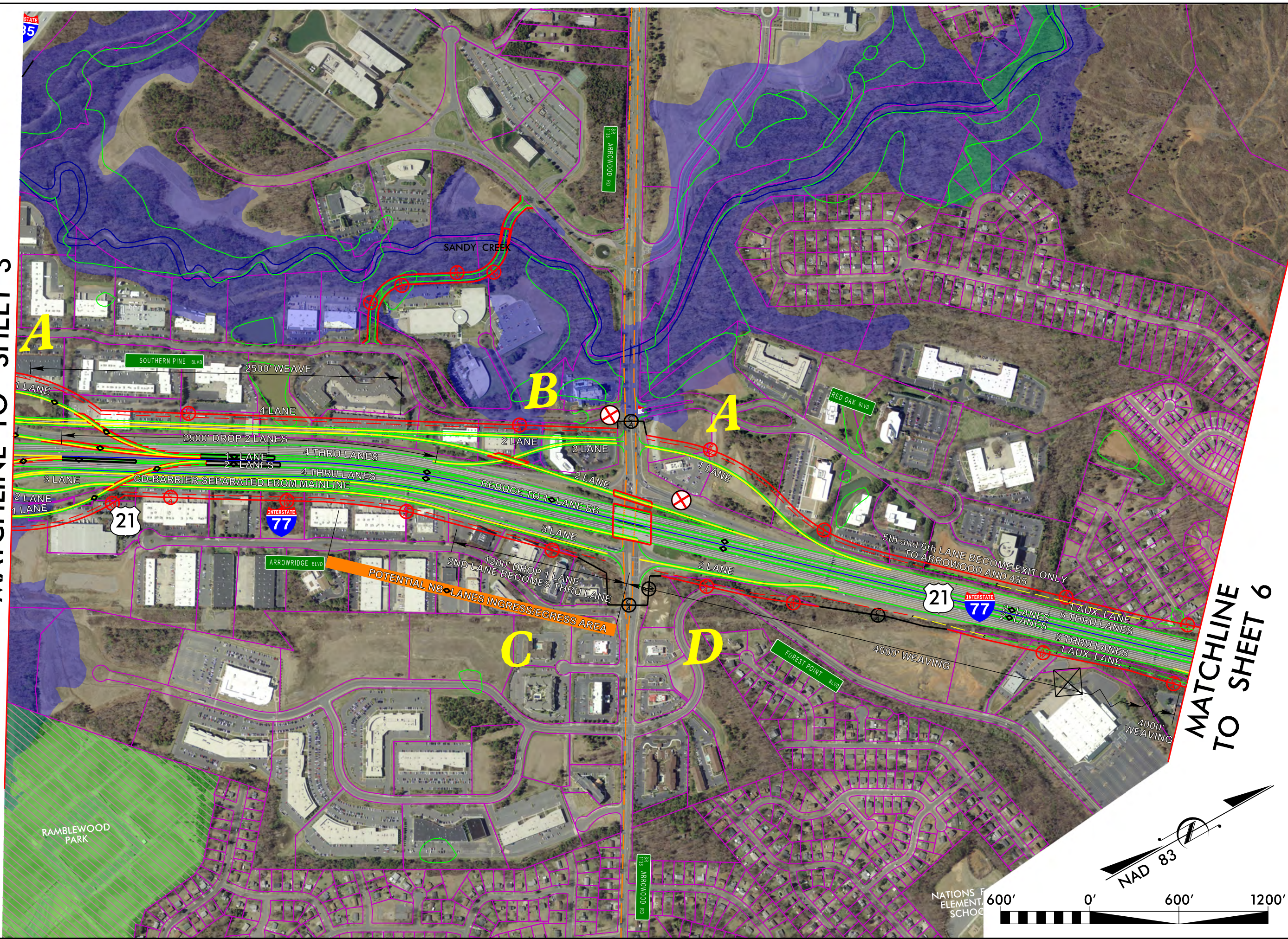
PRELIMINARY PLANS







MATCHLINE TO SHEET 3

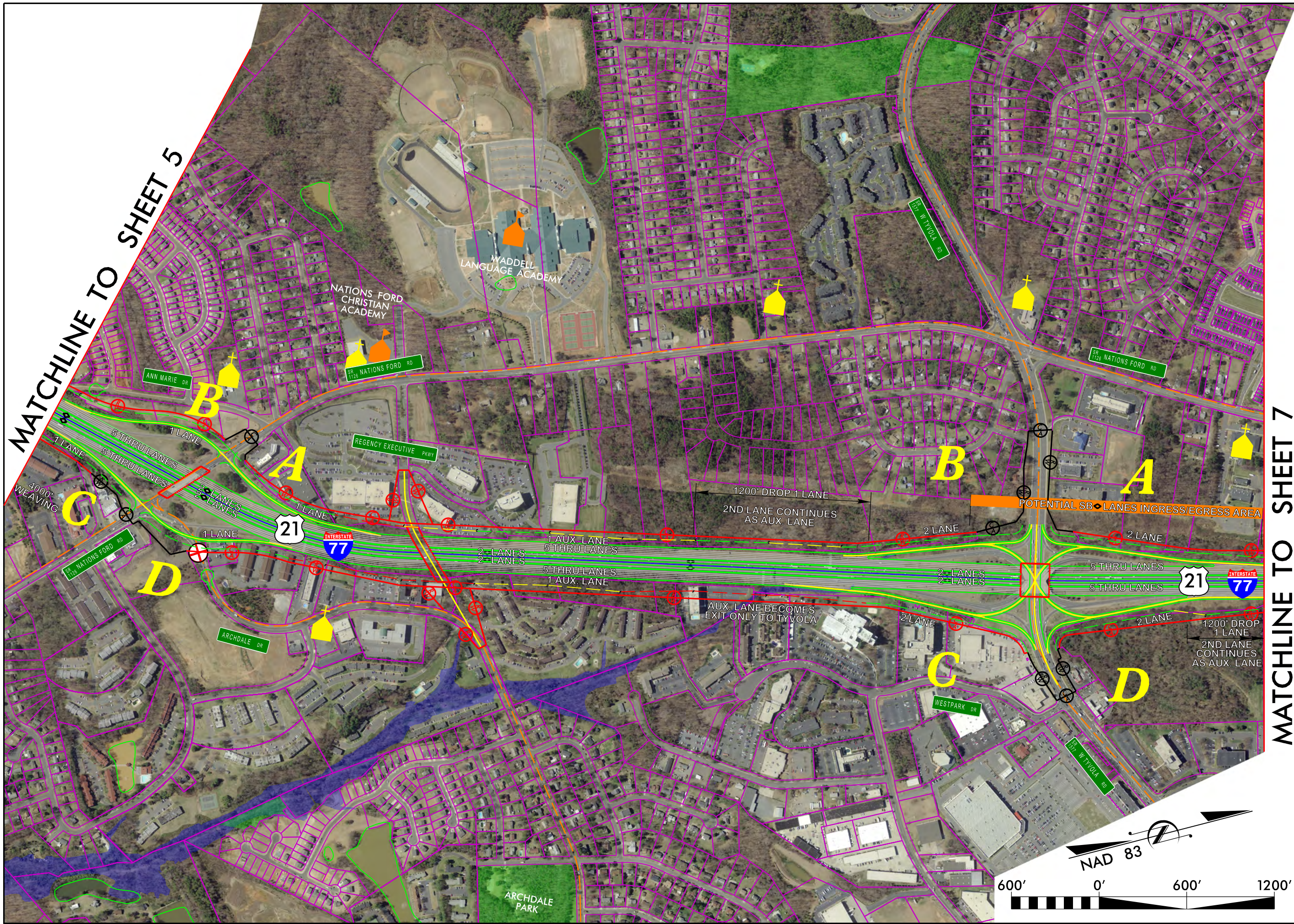


I-77 RECONSTRUCTION FEASIBILITY STUDY  
PROJECT NO.FS-0810A  
CONCEPTUAL DESIGN (5-2-2-5 ALTERNATIVE ONLY)

JULY 2014

PRELIMINARY PLANS





MATCHLINE TO SHEET 7

I-77 RECONSTRUCTION FEASIBILITY STUDY  
PROJECT NO.FS-0810A  
CONCEPTUAL DESIGN (5-2-2-5 ALTERNATIVE ONLY)

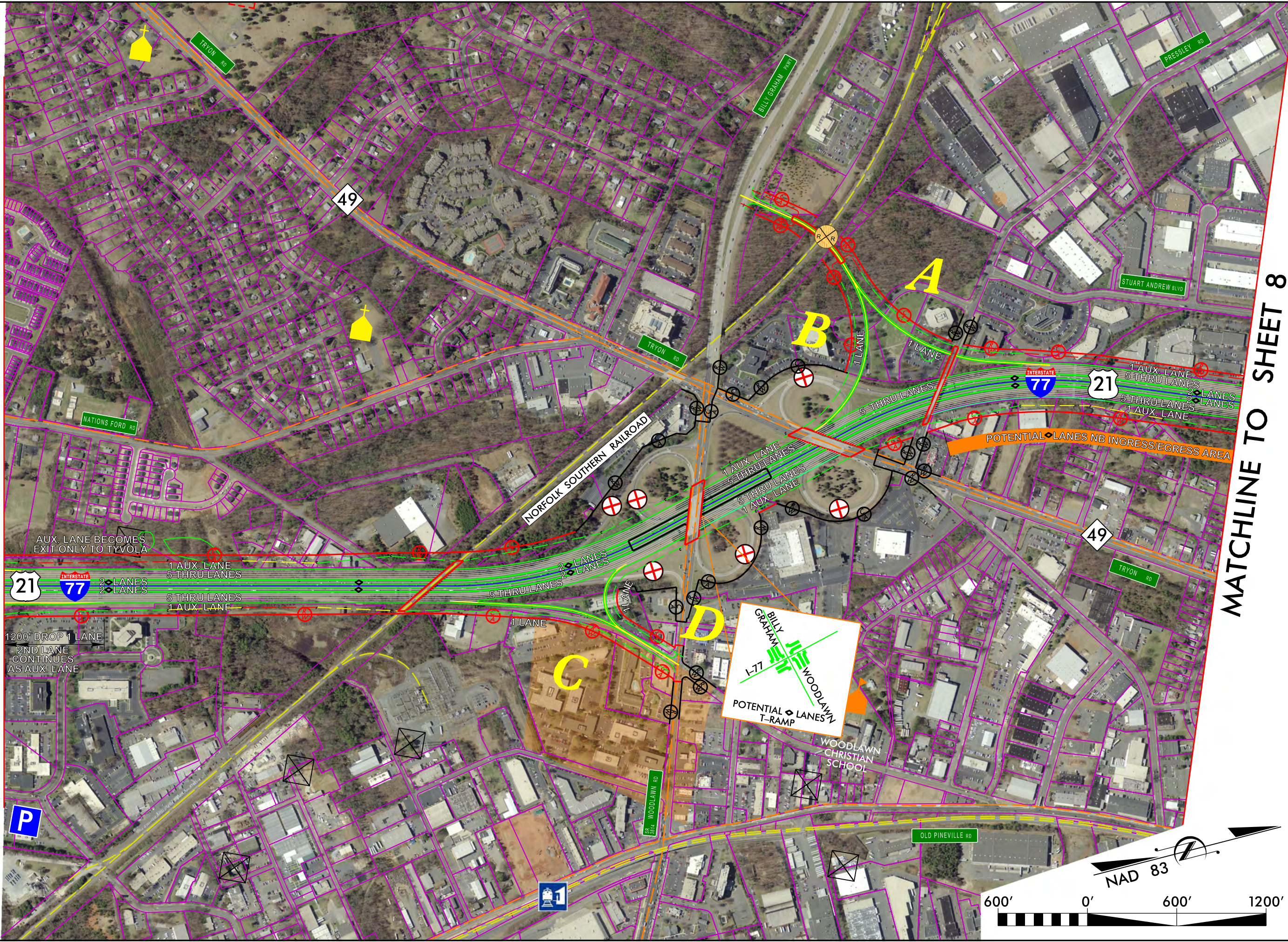
JULY 2014

PRELIMINARY PLANS

FIGURE 3  
(SHEET 6 OF 11)



MATCHLINE TO SHEET 6



MATCHLINE TO SHEET 8

I-77 RECONSTRUCTION FEASIBILITY STUDY  
PROJECT NO.FS-0810A  
CONCEPTUAL DESIGN (5-2-2-5 ALTERNATIVE ONLY)

JULY 2014

PRELIMINARY PLANS

FIGURE 3  
(SHEET 7 OF 11)





# I-77 RECONSTRUCTION FEASIBILITY STUDY

PROJECT NO.FS-0810A

CONCEPTUAL DESIGN (5-2-2-5 ALTERNATIVE ONLY)

JULY 2014

## PRELIMINARY PLANS

FIGURE 3  
(SHEET 8 OF 11)



MATCHLINE TO SHEET 8



MATCHLINE TO SHEET 10

I-77 RECONSTRUCTION FEASIBILITY STUDY  
PROJECT NO.FS-0810A  
CONCEPTUAL DESIGN (5-2-2-5 ALTERNATIVE ONLY)

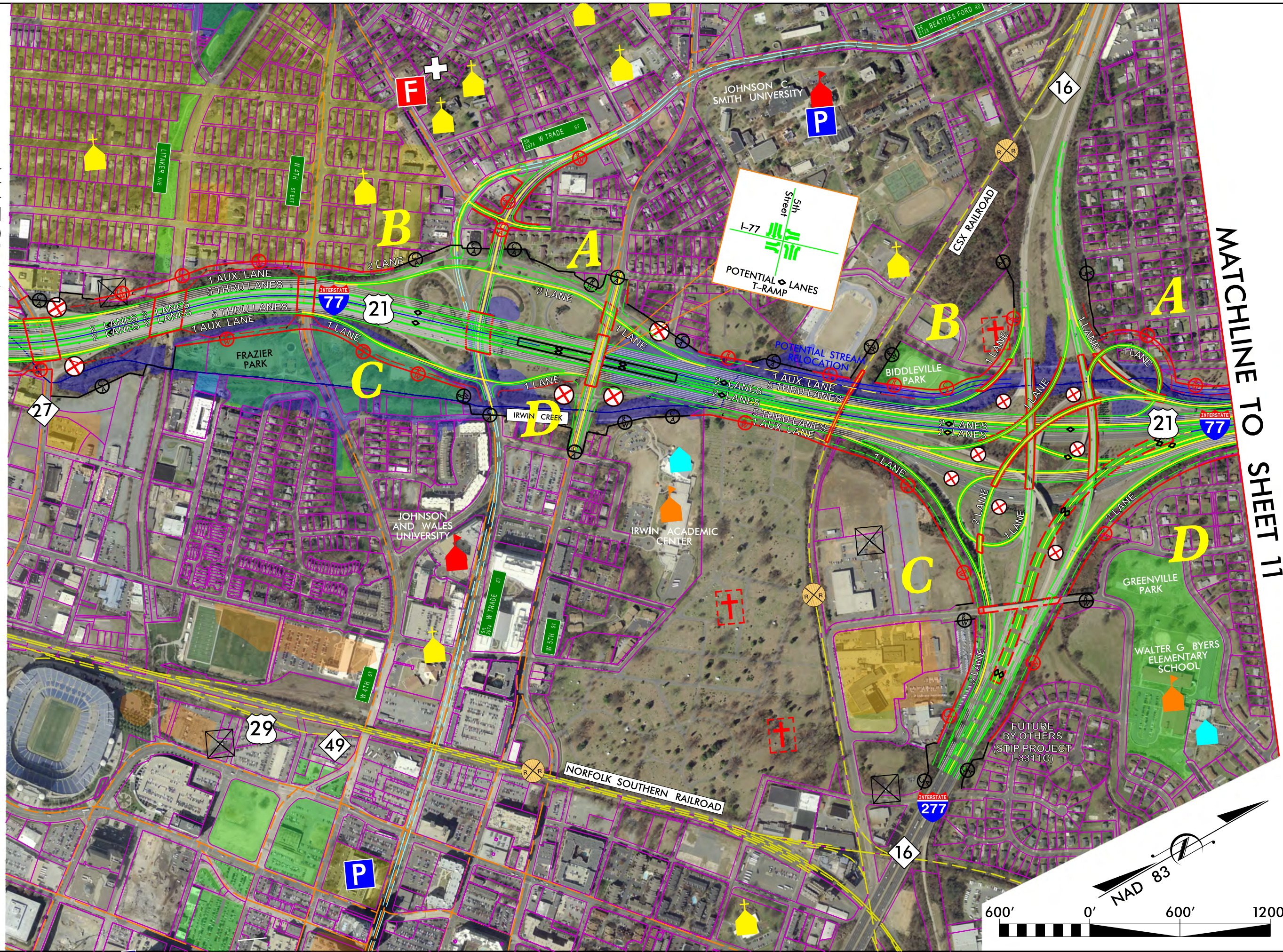
JULY 2014

PRELIMINARY PLANS

FIGURE 3  
(SHEET 9 OF 11)



MATCHLINE TO SHEET 9



MATCHLINE TO SHEET 11

I-77 RECONSTRUCTION FEASIBILITY STUDY  
PROJECT NO.FS-0810A  
CONCEPTUAL DESIGN (5-2-2-5 ALTERNATIVE ONLY)  
JULY 2014

PRELIMINARY PLANS

FIGURE 3  
(SHEET 10 OF 11)



MATCHLINE TO SHEET 10



I-77 RECONSTRUCTION FEASIBILITY STUDY  
PROJECT NO.FS-0810A  
CONCEPTUAL DESIGN (5-2-2-5 ALTERNATIVE ONLY)

JULY 2014

PRELIMINARY PLANS



# **APPENDIX B:**

## **TABLES**





**Table 1: Existing Bridge Structures along I-77**

Structure #	Description
<b>I-77 and 485 System Interchange</b>	
	(railroad bridge over I-77)
590045	northbound I-77 over Westinghouse Blvd.
590046	southbound I-77 over Westinghouse Blvd.
590070	northbound I-77 over Sugar Creek
590075	southbound I-77 over Sugar Creek
590114	northbound I-77 over Arrowood Rd.
590116	southbound I-77 over Arrowood Rd.
590601	northbound I-77 ramp over Westinghouse Blvd.
590602	Nations Ford Rd. over I-485
590638	westbound I-485 over Sugar Creek
590639	eastbound I-485 over Sugar Creek
590643	eastbound I-485 over I-77
590657	eastbound I-485 ramp over southbound I-77 ramp
590658	northbound I-77 ramp over southbound I-77 ramp and I-485
590659	westbound I-485 ramp over Sugar Creek
590660	westbound I-485 ramp over northbound I-77 ramp
590661	westbound I-485 over I-77
590662	eastbound I-485 flyover ramp over I-77, I-485, and Sugar Creek
590663	westbound I-485 flyover ramp over I-77 and I-485
590664	southbound I-77 flyover ramp over I-77, I-485, and Sugar Creek
590805	southbound I-77 ramp over Sugar Creek
<b>I-77 and Nations Ford Road</b>	
590136	Nations Ford Rd. over I-77
<b>I-77 and Tyvola Road</b>	
590150	Tyvola Rd. over I-77
<b>I-77 and Billy Graham Parkway/Tryon St.</b>	
	railroad over I-77
3	Billy Graham Parkway over railroad
85	Woodlawn Rd. over I-77
88	Tryon St. railroad
120	Tryon St. over I-77
	Pressley Rd. over I-77
<b>I-77 and Clanton Road</b>	
	Clanton Rd. over I-77
<b>I-77 and Remount Road</b>	
	Remount Rd. over I-77
590089	West Blvd. over Irwin Creek
590207	northbound I-77 over West Blvd.
590213	southbound I-77 over West Blvd.
590215	southbound I-77 ramp over Irwin Creek

I-77 and I-277 System Interchange	
	railroad over I-77
590035	US74 over Irwin Creek
590044	northbound I-277 over I-77
590048	southbound I-277 over I-77
590078	I-277 over Clarkson St.
590126	Freedom Dr. over I-77
590122	Freedom Dr. over I-277
590118	northbound I-277 ramp over railroad
590221	northbound I-77 over Morehead St.
590222	southbound I-77 over Morehead St.
590227	I-77 over abandoned railroad
590230	northbound I-77 over 4th St.
590231	southbound I-77 over 4th St.
590241	northbound I-77 over Trade St.
590243	southbound I-77 over Trade St.
590281	northbound I-77 ramp over southbound I-77
590282	southbound I-77 ramp over southbound I-77
590283	southbound I-77 ramp over Andrill Terrace and Irwin Creek
590337	northbound NC16/I-277 over northbound I-77
590338	northbound NC16/I-277 over southbound I-77
590339	southbound NC16/I-277 over northbound I-77 and northbound I-77 ramp
590340	northbound NC16/I-277 flyover ramp over southbound NC16/I-277) and northbound I-77 ramp
590341	southbound NC16/I-277 over southbound I-77
590342	southbound NC16/I-277 over Andrill Terrace and Irwin Creek
590345	northbound NC16/I-277 over southbound I-77 ramp, Irwin Creek, and Andrill Terrace
590505	northbound I-277 over railroad
590506	southbound I-277 over railroad
	5th St. over I-77
	railroad over I-77
	Oaklawn Ave. over I-77

**Table 2: I-77, from SC State Line to North of Arrowood Dr (Exit 3)**

Rate	Crashes	Crashes per 100 MVM	Statewide Average Rate <sup>1</sup>	Critical Rate <sup>2</sup>	Exceeds Statewide Rate	Exceeds Critical Rate
Total	737	113.04	116.04	123.06	No	No
Fatal	3	0.46	0.43	0.93	Yes	No
Non-Fatal	155	23.77	30.06	33.67	No	No
Night	182	27.91	29.94	33.54	No	No
Wet	152	23.31	28.97	32.51	No	No

<sup>1</sup> 2009-2011 Statewide Average Crash Rate, Urban Interstate Routes<sup>2</sup> Based on Statewide Crash Rate (95% Level of Confidence)**Table 3: I-77, from north of Arrowood Dr (Exit 3) to north of Nations Ford Road (Exit 4)**

Rate	Crashes	Crashes per 100 MVM	Statewide Average Rate <sup>1</sup>	Critical Rate <sup>2</sup>	Exceeds Statewide Rate	Exceeds Critical Rate
Total	273	106.73	116.04	127.32	No	No
Fatal	0	0.00	0.43	1.30	No	No
Non-Fatal	71	27.76	30.06	35.89	No	No
Night	47	18.38	29.94	35.76	No	No
Wet	43	16.81	28.97	34.70	No	No

<sup>1</sup> 2009-2011 Statewide Average Crash Rate, Urban Interstate Routes<sup>2</sup> Based on Statewide Crash Rate (95% Level of Confidence)**Table 4: I-77, from north of Nations Ford Road (Exit 4) to north of Tyvola Road (Exit 5)**

Rate	Crashes	Crashes per 100 MVM	Statewide Average Rate <sup>1</sup>	Critical Rate <sup>2</sup>	Exceeds Statewide Rate	Exceeds Critical Rate
Total	582	186.47	116.04	126.23	Yes	Yes
Fatal	0	0.00	0.43	1.20	No	No
Non-Fatal	162	51.90	30.06	35.33	Yes	Yes
Night	120	38.45	29.94	35.20	Yes	Yes
Wet	106	33.96	28.97	34.14	Yes	No

<sup>1</sup> 2009-2011 Statewide Average Crash Rate, Urban Interstate Routes<sup>2</sup> Based on Statewide Crash Rate (95% Level of Confidence)**Table 5: I-77, from north of Tyvola Road (Exit 5) to north of Tryon/Billy Graham Pkwy (Exit 6)**

Rate	Crashes	Crashes per 100 MVM	Statewide Average Rate <sup>1</sup>	Critical Rate <sup>2</sup>	Exceeds Statewide Rate	Exceeds Critical Rate
Total	541	142.29	116.04	125.26	Yes	Yes
Fatal	0	0.00	0.43	1.11	No	No
Non-Fatal	162	42.61	30.06	34.82	Yes	Yes
Night	157	41.29	29.94	34.69	Yes	Yes
Wet	131	34.45	28.97	33.64	Yes	Yes

<sup>1</sup> 2009-2011 Statewide Average Crash Rate, Urban Interstate Routes<sup>2</sup> Based on Statewide Crash Rate (95% Level of Confidence)

**Table 6: I-77 from north of Tryon/Billy Graham Pkwy (Exit 6) to north of Clanton Road (Exit 7)**

Rate	Crashes	Crashes per 100 MVM	Statewide Average Rate <sup>1</sup>	Critical Rate <sup>2</sup>	Exceeds Statewide Rate	Exceeds Critical Rate
Total	310	114.98	116.04	127.02	No	No
Fatal	0	0.00	0.43	1.27	No	No
Non-Fatal	90	33.38	30.06	35.74	Yes	No
Night	72	26.71	29.94	35.61	No	No
Wet	67	24.85	28.97	34.55	No	No
<sup>1</sup> 2009-2011 Statewide Average Crash Rate, Urban Interstate Routes						
<sup>2</sup> Based on Statewide Crash Rate (95% Level of Confidence)						

**Table 7: I-77, from north of Clanton Road (Exit 7) to north of Remount Road (Exit 8)**

Rate	Crashes	Crashes per 100 MVM	Statewide Average Rate <sup>1</sup>	Critical Rate <sup>2</sup>	Exceeds Statewide Rate	Exceeds Critical Rate
Total	576	188.92	116.04	126.35	Yes	Yes
Fatal	1	0.33	0.43	1.21	No	No
Non-Fatal	153	50.18	30.06	35.39	Yes	Yes
Night	152	49.86	29.94	35.26	Yes	Yes
Wet	116	38.05	28.97	34.20	Yes	Yes
<sup>1</sup> 2009-2011 Statewide Average Crash Rate, Urban Interstate Routes						
<sup>2</sup> Based on Statewide Crash Rate (95% Level of Confidence)						

**Table 8: I-77, from Remount Road (Exit 8) to north of NC16/I-277 (Exit 11)**

Rate	Crashes	Crashes per 100 MVM	Statewide Average Rate <sup>1</sup>	Critical Rate <sup>2</sup>	Exceeds Statewide Rate	Exceeds Critical Rate
Total	1071	121.56	116.04	122.07	Yes	No
Fatal	1	0.11	0.43	0.85	No	No
Non-Fatal	285	32.35	30.06	33.16	Yes	No
Night	273	30.99	29.94	33.03	Yes	No
Wet	266	30.19	28.97	32.01	Yes	No
<sup>1</sup> 2009-2011 Statewide Average Crash Rate, Urban Interstate Routes						
<sup>2</sup> Based on Statewide Crash Rate (95% Level of Confidence)						

APPENDIX C:  
VOLUME TO CAPACITY  
RATIO GRAPHICS  
(electronic copy only)



# 2009 No-Build Scenario Peak Hour Volume/Capacity Ratios

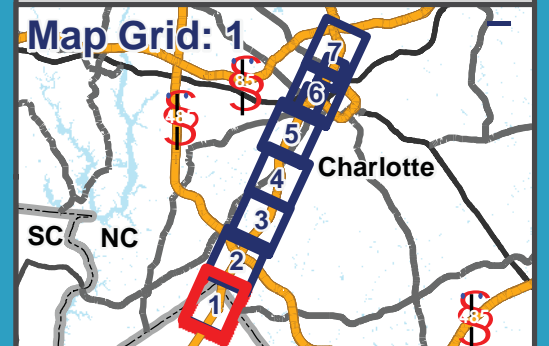
## I-77 Feasibility Study Project No. FS-0810A

August 2014

### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
i	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⊙	EMS	1.01 - 1.25
⊙	Fire Station	<b>Adjusted PM V/C</b>
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
a	Police Station	1.01 - 1.25
O	Post Office	— Railroad
—	Recreation Center	— Lynx Blue Line
4	School	— Transmission Line
⌘	Solid Waste Facility	— Map Grid
—	Utility Pole	— Conservation Tax Credit Property
—	Bike Route	— Federal Land Ownership
		— Hazardous Materials Site
		— Historic Resource
		— Lands Managed Conservation
		— Parcel
		— Park
		— State Boundary
		— State Owned Land
		— Waterbody
		— Wetland
		— 100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2009 No-Build Scenario Peak Hour Volume/Capacity Ratios

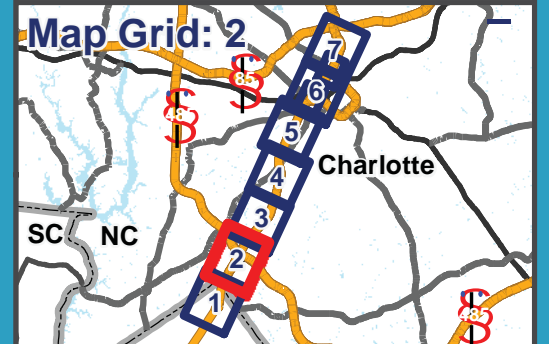
## I-77 Feasibility Study Project No. FS-0810A

August 2014

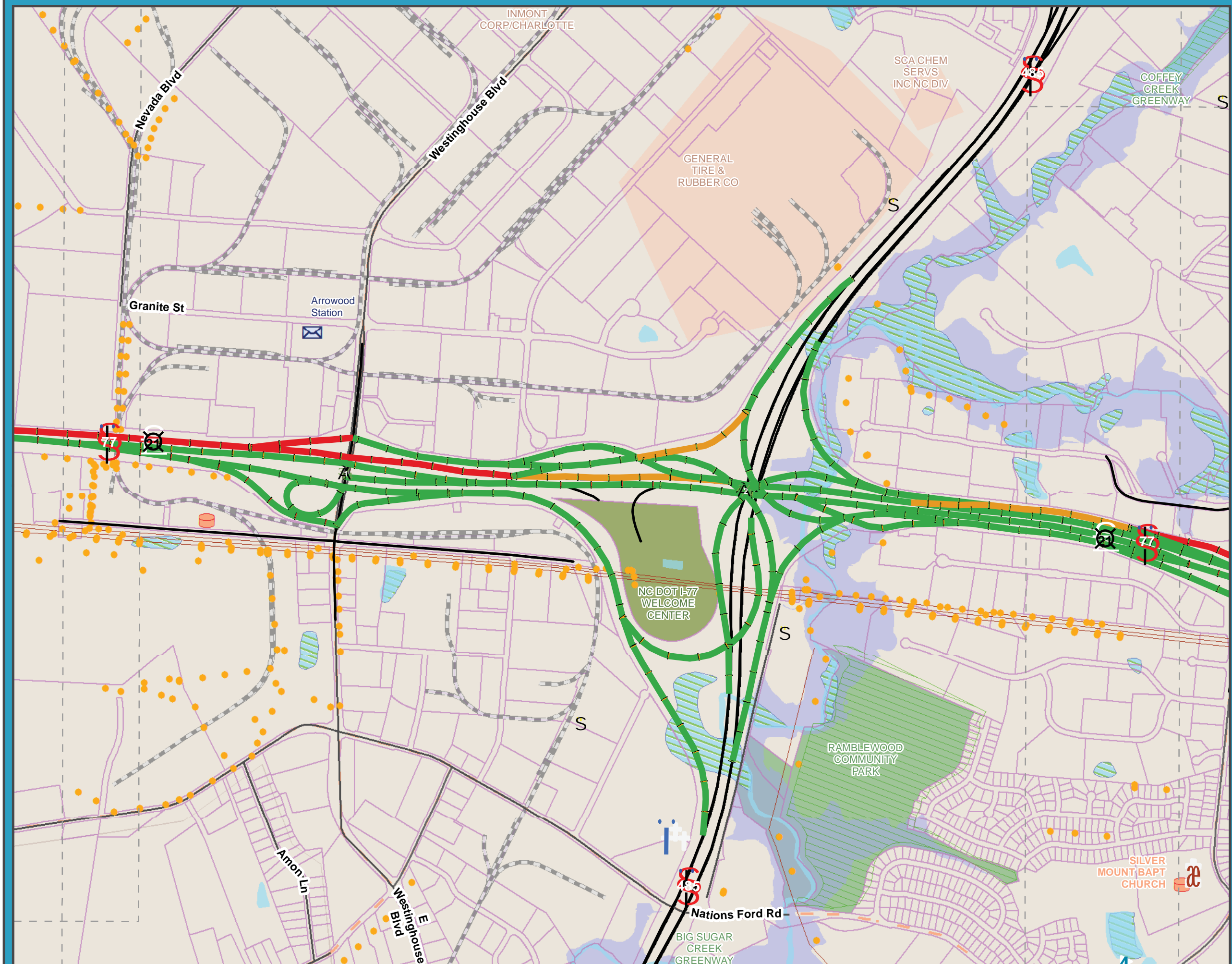
### Legend

S	Cell Tower	Adjusted AM V/C
C	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⦿	EMS	1.01 - 1.25
⦿	Fire Station	Adjusted PM V/C
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
a	Police Station	1.01 - 1.25
O	Post Office	Railroad
4	Recreation Center	Lynx Blue Line
4	School	Transmission Line
T	Solid Waste Facility	Map Grid
⦿	Utility Pole	Conservation Tax Credit Property
⦿	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2009 No-Build Scenario Peak Hour Volume/Capacity Ratios

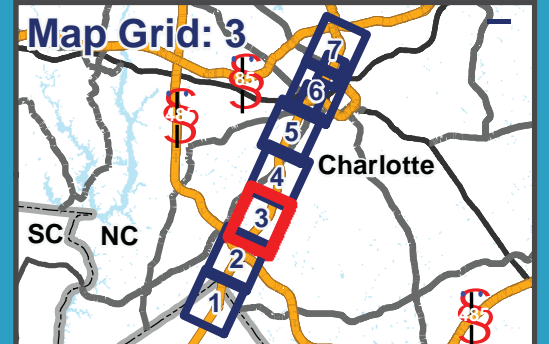
I-77 Feasibility Study  
Project No. FS-0810A

August 2014

## Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
☠	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
⌘	Church	0.81 - 1.00
⌘	Church	1.01 - 1.25
4	College/Universities	<b>Adjusted PM V/C</b>
⦿	EMS	0.00 - 0.01
⦿	Fire Station	0.02 - 0.80
⦿	Fire Station	0.81 - 1.00
⦿	Fire Station	1.01 - 1.25
K	Hospital	— Railroad
H	Library	— Lynx Blue Line
b	Lynx Station	— Transmission Line
a	Police Station	— Map Grid
O	Post Office	— Conservation Tax Credit Property
⌘	Recreation Center	— Federal Land Ownership
4	School	— Hazardous Materials Site
⌘	Solid Waste Facility	— Historic Resource
⌘	Utility Pole	— Lands Managed Conservation
⌘	Bike Route	— Park
		— Parcel
		— State Boundary
		— State Owned Land
		— Waterbody
		— Wetland
		— 100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2009 No-Build Scenario Peak Hour Volume/Capacity Ratios

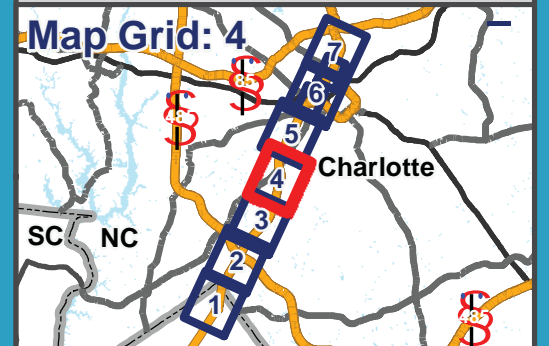
## I-77 Feasibility Study Project No. FS-0810A

August 2014

### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
⌂	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
⌘	Church	0.81 - 1.00
⌘	Church	1.01 - 1.25
4	College/Universities	<b>Adjusted PM V/C</b>
⌘	EMS	0.00 - 0.01
⌘	Fire Station	0.02 - 0.80
⌘	Fire Station	0.81 - 1.00
⌘	Fire Station	1.01 - 1.25
K	Hospital	Railroad
H	Library	Lynx Blue Line
b	Lynx Station	Transmission Line
a	Police Station	Map Grid
O	Post Office	Conservation Tax Credit Property
⌘	Recreation Center	Federal Land Ownership
4	School	Hazardous Materials Site
⌘	Solid Waste Facility	Historic Resource
⌘	Utility Pole	Lands Managed Conservation
⌘	Bike Route	Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2009 No-Build Scenario Peak Hour Volume/Capacity Ratios

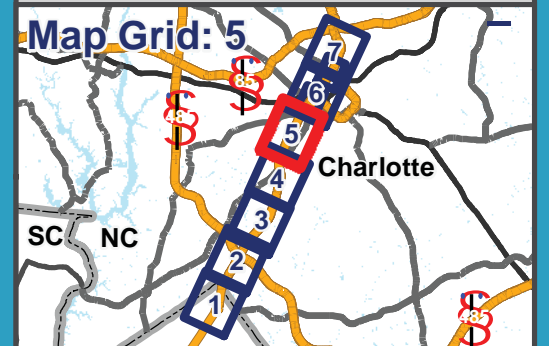
## I-77 Feasibility Study Project No. FS-0810A

August 2014

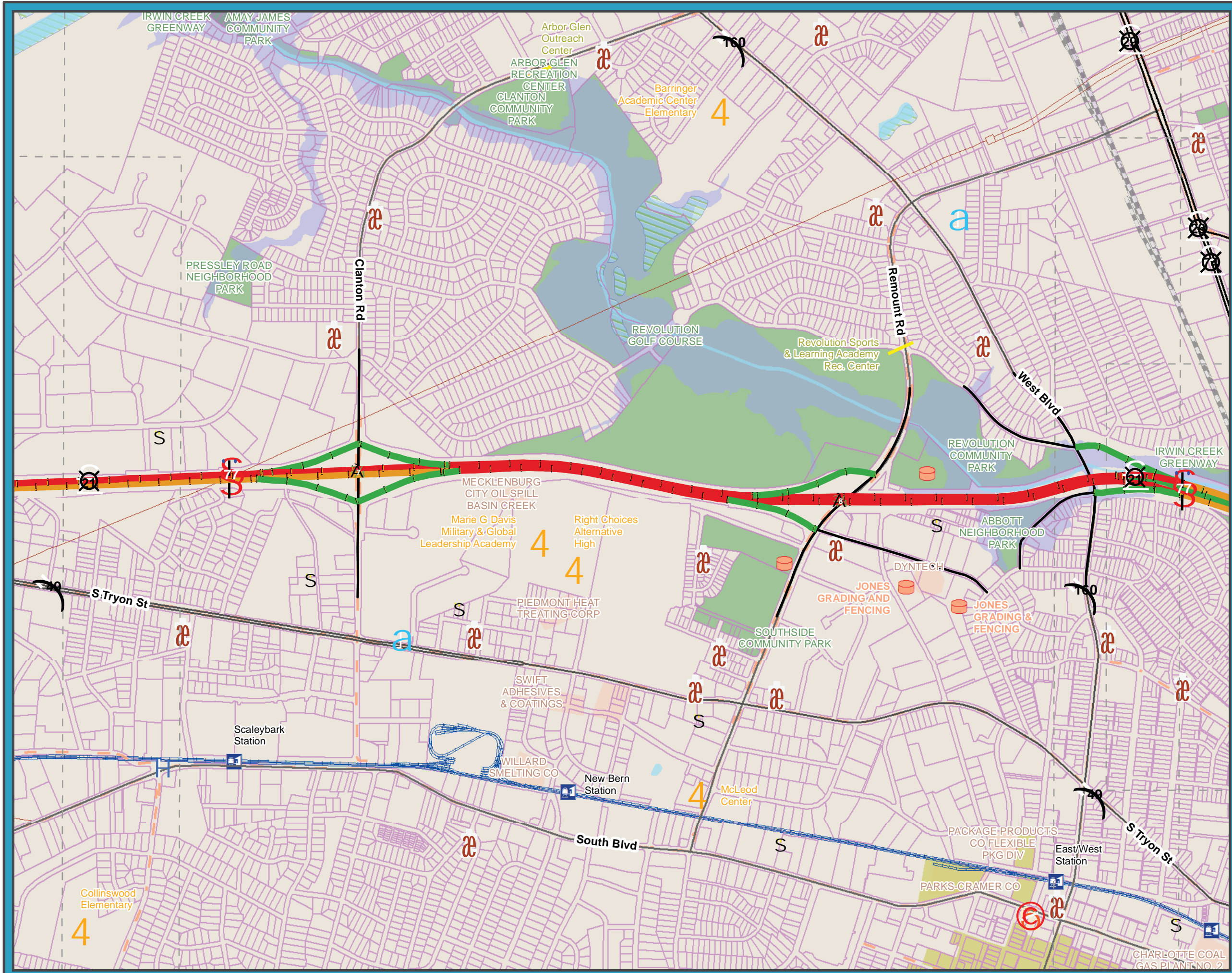
### Legend

S	Cell Tower	Adjusted AM V/C
☠	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⦿	EMS	1.01 - 1.25
⦿	Fire Station	Adjusted PM V/C
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
a	Police Station	1.01 - 1.25
O	Post Office	0.00 - 0.01
⌘	Recreation Center	0.02 - 0.80
4	School	0.81 - 1.00
T	Solid Waste Facility	1.01 - 1.25
⌘	Utility Pole	0.00 - 0.01
⌘	Bike Route	0.02 - 0.80
		0.81 - 1.00
		1.01 - 1.25
		Railroad
		Lynx Blue Line
		Transmission Line
		Map Grid
		Conservation Tax Credit Property
		Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2009 No-Build Scenario Peak Hour Volume/Capacity Ratios

I-77 Feasibility Study  
Project No. FS-0810A

August 2014

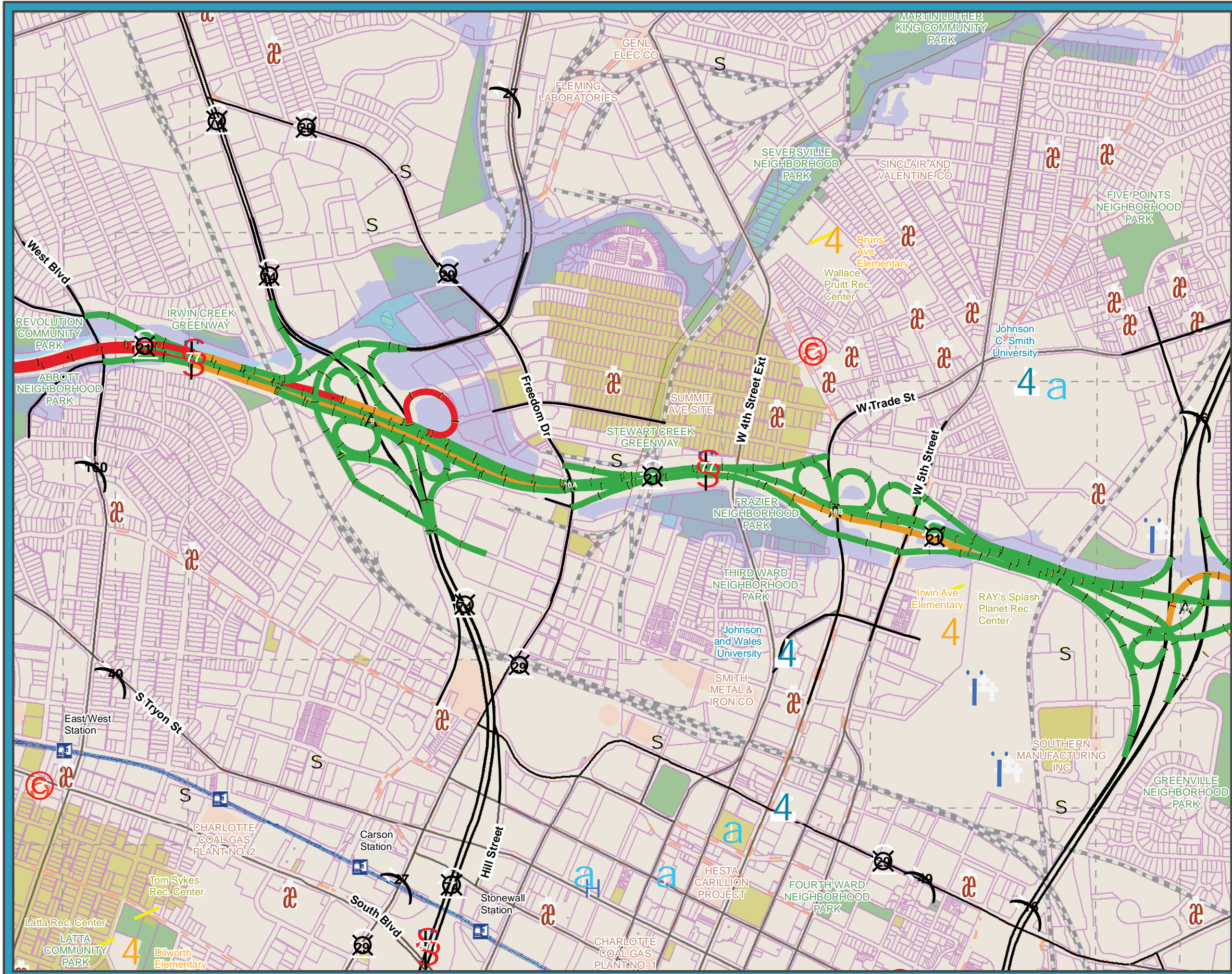
## Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
☠	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⓪	EMS	1.01 - 1.25
Ⓢ	Fire Station	<b>Adjusted PM V/C</b>
Ⓚ	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
a	Police Station	1.01 - 1.25
o	Post Office	— Railroad
—	Recreation Center	— Lynx Blue Line
4	School	— Transmission Line
Ⓢ	Solid Waste Facility	— Map Grid
Ⓢ	Utility Pole	— Conservation Tax Credit Property
—	Bike Route	— Federal Land Ownership
		— Hazardous Materials Site
		— Historic Resource
		— Lands Managed Conservation
		— Parcel
		— Park
		— State Boundary
		— State Owned Land
		— Waterbody
		— Wetland
		— 100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2009 No-Build Scenario Peak Hour Volume/Capacity Ratios

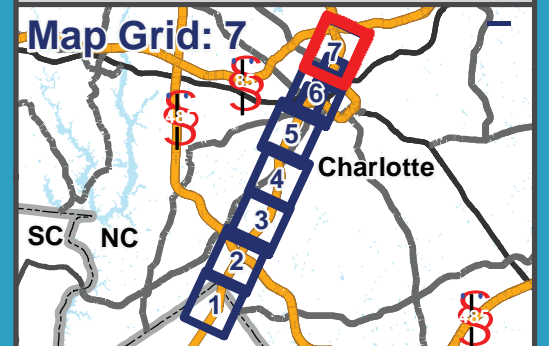
I-77 Feasibility Study  
Project No. FS-0810A

August 2014

## Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
i	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⦿	EMS	1.01 - 1.25
⊙	Fire Station	<b>Adjusted PM V/C</b>
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
a	Police Station	1.01 - 1.25
O	Post Office	— Railroad
—	Recreation Center	— Lynx Blue Line
—	School	— Transmission Line
⌘	Solid Waste Facility	— Map Grid
—	Utility Pole	— Conservation Tax Credit Property
—	Bike Route	— Federal Land Ownership
		— Hazardous Materials Site
		— Historic Resource
		— Lands Managed Conservation
		— Parcel
		— Park
		— State Boundary
		— State Owned Land
		— Waterbody
		— Wetland
		— 100 Year Floodplain

0 1,000  
Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2009 No-Build Scenario Peak Hour Volume/Capacity Ratios

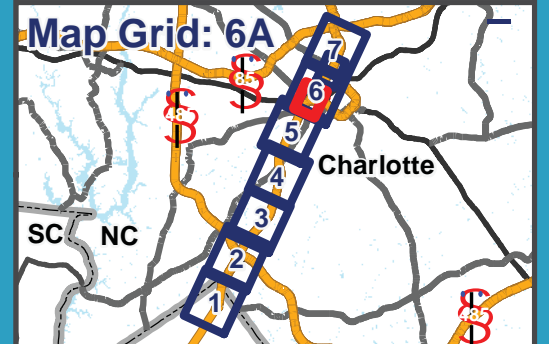
## I-77 Feasibility Study Project No. FS-0810A

August 2014

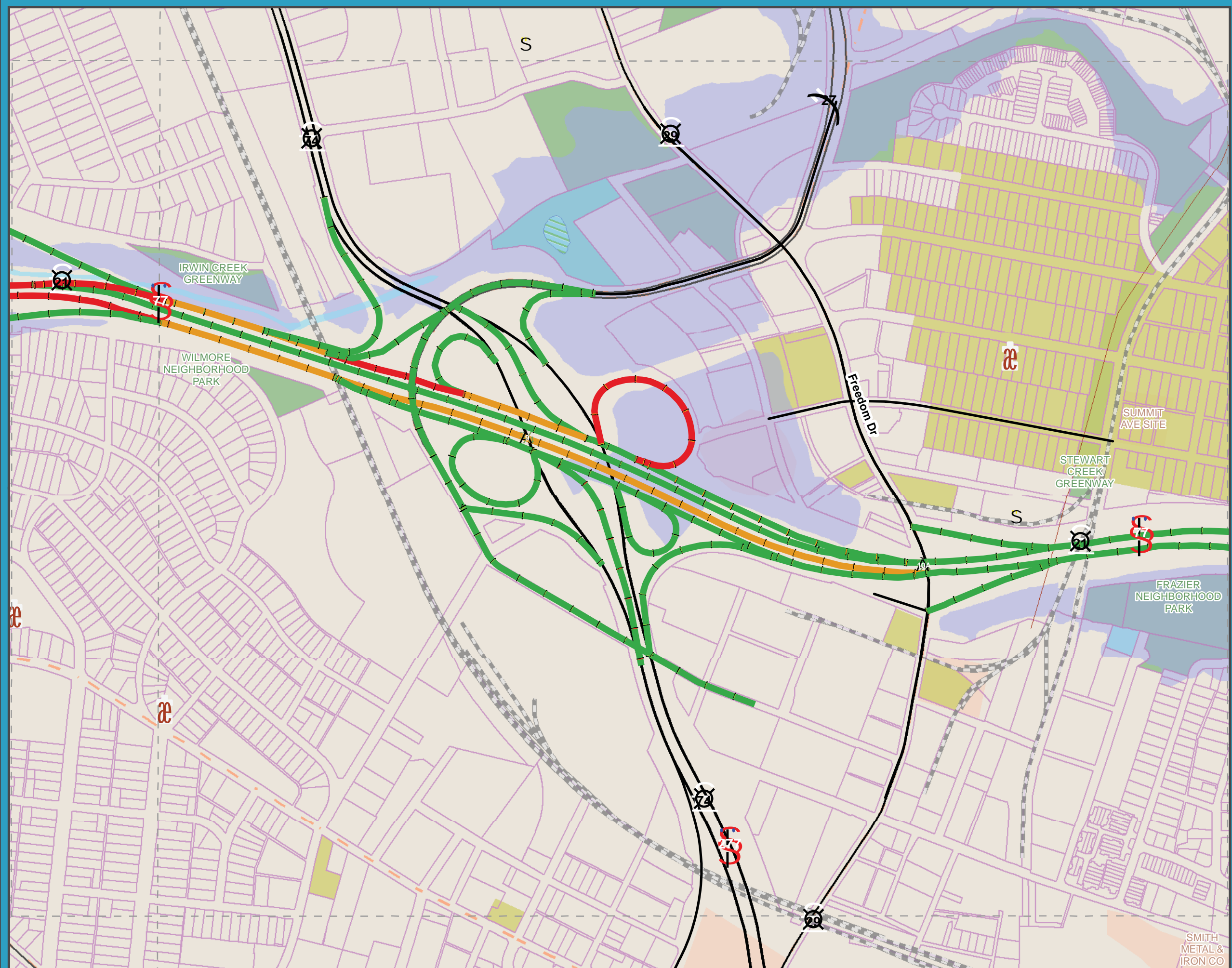
### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
	Cemetery	0.00 - 0.01
	Church	0.02 - 0.80
	College/Universities	0.81 - 1.00
	EMS	1.01 - 1.25
	Fire Station	
	Hospital	<b>Adjusted PM V/C</b>
	Library	0.00 - 0.01
	Lynx Station	0.02 - 0.80
	Police Station	0.81 - 1.00
	Post Office	1.01 - 1.25
	Recreation Center	
	School	— Railroad
	Solid Waste Facility	— Lynx Blue Line
	Utility Pole	— Transmission Line
	Bike Route	— Map Grid
		— Conservation Tax Credit Property
		— Federal Land Ownership
		— Hazardous Materials Site
		— Historic Resource
		— Lands Managed Conservation
		— Parcel
		— Park
		— State Boundary
		— State Owned Land
		— Waterbody
		— Wetland
		— 100 Year Floodplain

0 500 Feet  
1 inch = 500 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC



SMITH  
METAL &  
IRON CO

# 2009 No-Build Scenario Peak Hour Volume/Capacity Ratios

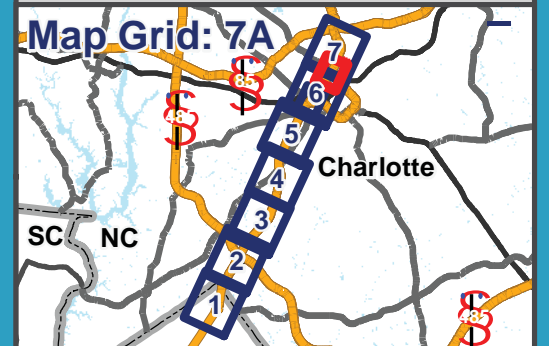
## I-77 Feasibility Study Project No. FS-0810A

August 2014

### Legend

S	Cell Tower	Adjusted AM V/C
⌵	Cemetery	0.00 - 0.01
⌵	Church	0.02 - 0.80
⌵	College/Universities	0.81 - 1.00
⌵	EMS	1.01 - 1.25
⌵	Fire Station	Adjusted PM V/C
⌵	Hospital	0.00 - 0.01
⌵	Library	0.02 - 0.80
⌵	Lynx Station	0.81 - 1.00
⌵	Police Station	1.01 - 1.25
⌵	Post Office	Railroad
⌵	Recreation Center	Lynx Blue Line
⌵	School	Transmission Line
⌵	Solid Waste Facility	Map Grid
⌵	Utility Pole	Conservation Tax Credit Property
⌵	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 500 Feet  
1 inch = 500 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2009 No-Build Scenario 3 Hour Peak Volume/Capacity Ratios

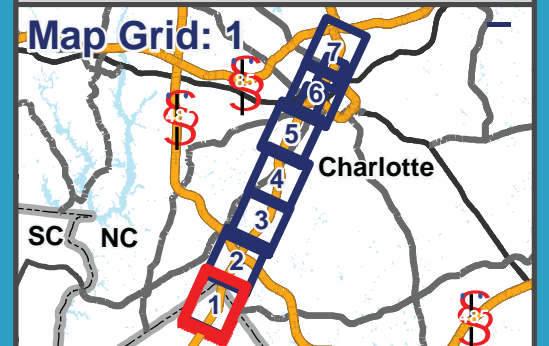
## I-77 Feasibility Study Project No. FS-0810A

August 2014

### Legend

S	Cell Tower	Adjusted AM V/C
i	Cemetery	0.00 - 0.01
⛔	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⦿	EMS	1.01 - 1.25
⦿	Fire Station	Adjusted PM V/C
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
a	Police Station	1.01 - 1.25
O	Post Office	Railroad
⦿	Recreation Center	Lynx Blue Line
4	School	Transmission Line
⦿	Solid Waste Facility	Map Grid
⦿	Utility Pole	Conservation Tax Credit Property
⦿	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2009 No-Build Scenario 3 Hour Peak Volume/Capacity Ratios

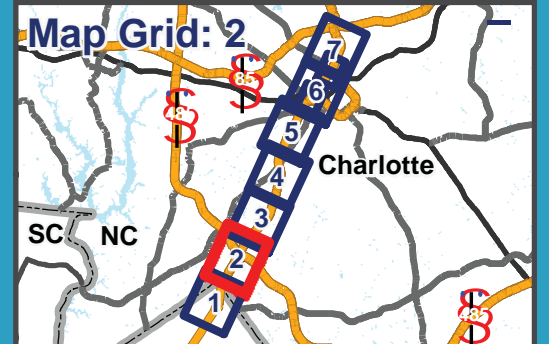
## I-77 Feasibility Study Project No. FS-0810A

August 2014

### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
	Cemetery	0.00 - 0.01
	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
	EMS	1.01 - 1.25
	Fire Station	<b>Adjusted PM V/C</b>
	Hospital	0.00 - 0.01
	Library	0.02 - 0.80
	Lynx Station	0.81 - 1.00
	Police Station	1.01 - 1.25
	Post Office	Railroad
	Recreation Center	Lynx Blue Line
4	School	Transmission Line
	Solid Waste Facility	Map Grid
	Utility Pole	Conservation Tax Credit Property
	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2009 No-Build Scenario 3 Hour Peak Volume/Capacity Ratios

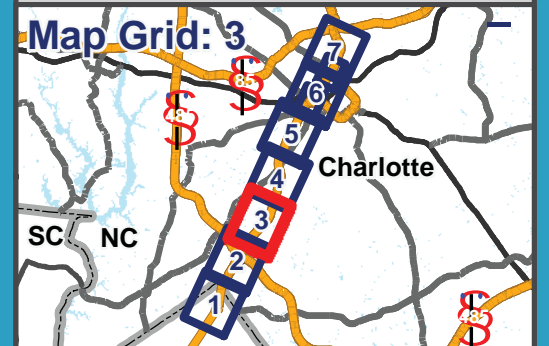
I-77 Feasibility Study  
Project No. FS-0810A

August 2014

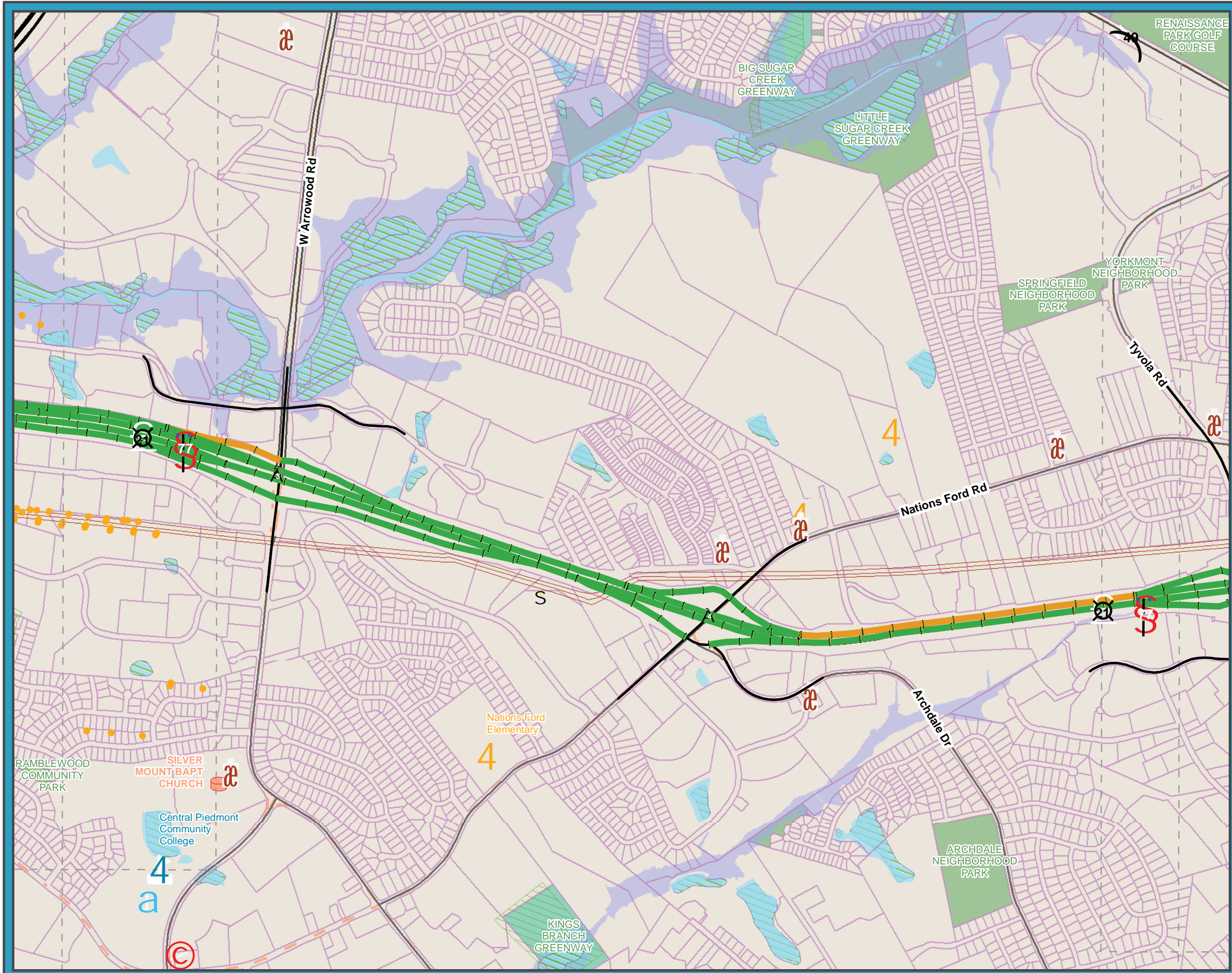
## Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
⌂	Cemetery	0.00 - 0.01
⌂	Church	0.02 - 0.80
⌂	Church	0.81 - 1.00
⌂	Church	1.01 - 1.25
4	College/Universities	<b>Adjusted PM V/C</b>
⌂	EMS	0.00 - 0.01
⌂	Fire Station	0.02 - 0.80
⌂	Fire Station	0.81 - 1.00
⌂	Fire Station	1.01 - 1.25
K	Hospital	— Railroad
H	Library	— Lynx Blue Line
b	Lynx Station	— Transmission Line
a	Police Station	— Map Grid
O	Post Office	— Conservation Tax Credit Property
⌂	Recreation Center	— Federal Land Ownership
4	School	— Hazardous Materials Site
⌂	Solid Waste Facility	— Historic Resource
⌂	Utility Pole	— Lands Managed Conservation
⌂	Bike Route	— Parcel
		— Park
		— State Boundary
		— State Owned Land
		— Waterbody
		— Wetland
		— 100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2009 No-Build Scenario 3 Hour Peak Volume/Capacity Ratios

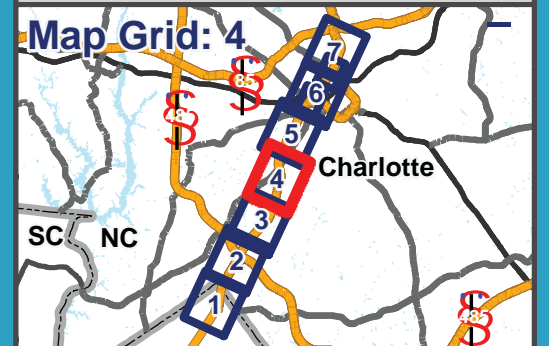
## I-77 Feasibility Study Project No. FS-0810A

August 2014

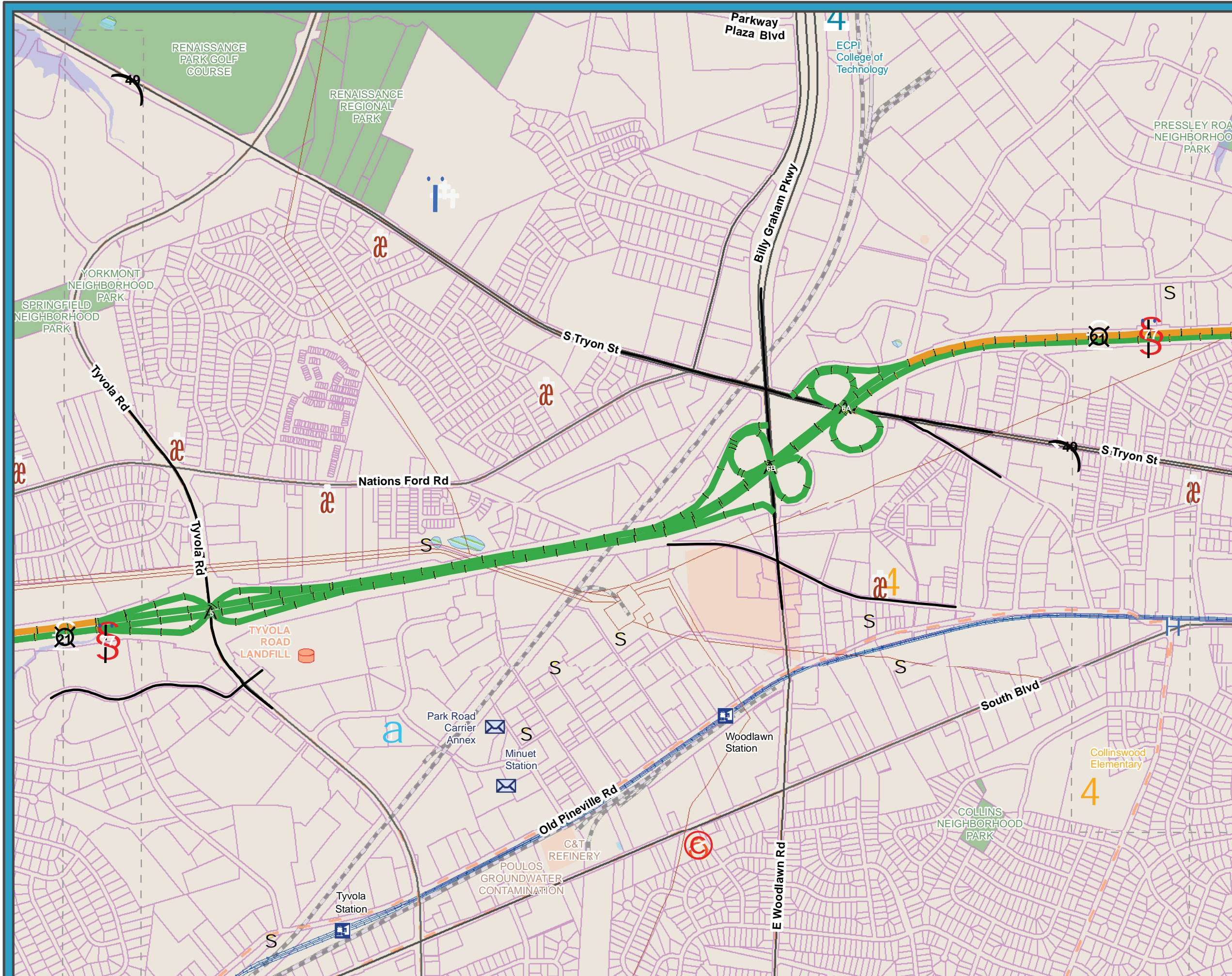
### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
⌂	Cemetery	0.00 - 0.01
⌂	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⚡	EMS	1.01 - 1.25
🚒	Fire Station	
🏥	Hospital	<b>Adjusted PM V/C</b>
📖	Library	0.00 - 0.01
🚏	Lynx Station	0.02 - 0.80
🚓	Police Station	0.81 - 1.00
📬	Post Office	1.01 - 1.25
🏠	Recreation Center	— Railroad
4	School	— Lynx Blue Line
🗑️	Solid Waste Facility	— Transmission Line
📶	Utility Pole	— Map Grid
🚲	Bike Route	— Conservation Tax Credit Property
		— Federal Land Ownership
		— Hazardous Materials Site
		— Historic Resource
		— Lands Managed Conservation
		— Parcel
		— Park
		— State Boundary
		— State Owned Land
		— Waterbody
		— Wetland
		— 100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC










































# 2009 No-Build Scenario 3 Hour Peak Volume/Capacity Ratios

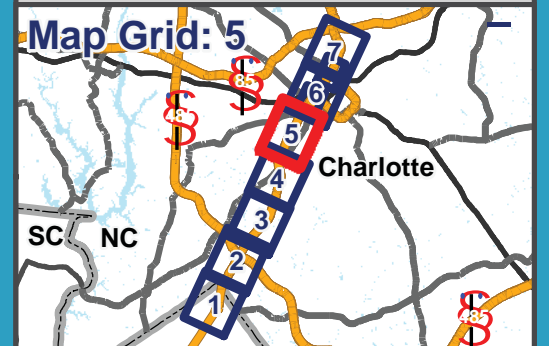
I-77 Feasibility Study  
Project No. FS-0810A

August 2014

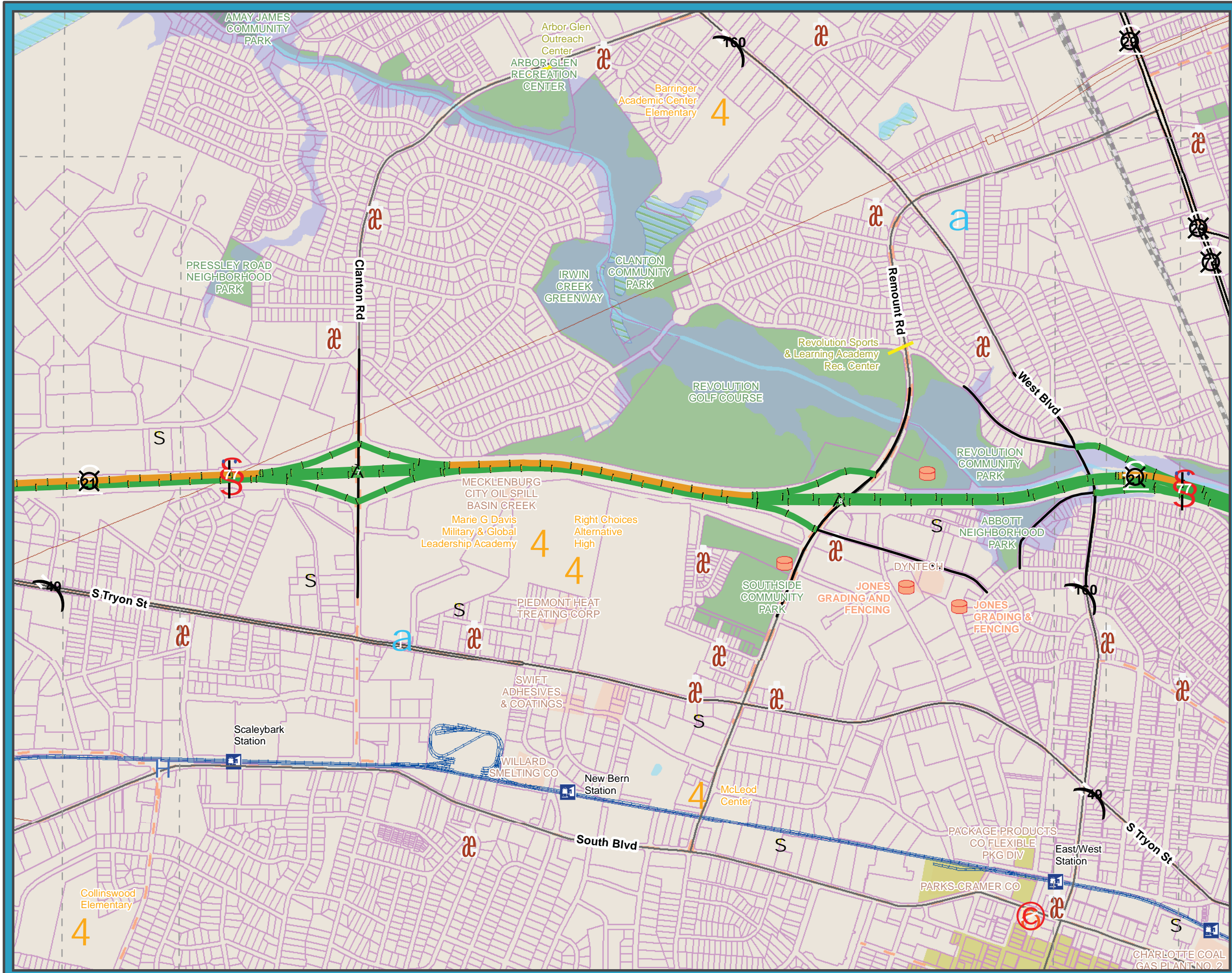
## Legend

S	Cell Tower	<b>Adjusted AM V/C</b>	
	Cemetery	!	0.00 - 0.01
	Church	!	0.02 - 0.80
		!	0.81 - 1.00
		!	1.01 - 1.25
4	College\Universities	<b>Adjusted PM V/C</b>	
	EMS		0.00 - 0.01
			0.02 - 0.80
	Fire Station		0.81 - 1.00
			1.01 - 1.25
K	Hospital		Railroad
H	Library		Lynx Blue Line
	Lynx Station		Transmission Line
	Map Grid		Map Grid
	Conservation Tax Credit Property		Conservation Tax Credit Property
	Federal Land Ownership		Federal Land Ownership
	Hazardous Materials Site		Hazardous Materials Site
	Historic Resource		Historic Resource
	Lands Managed Conservation		Lands Managed Conservation
4	School		Parcel
	Park		Park
	State Boundary		State Boundary
	State Owned Land		State Owned Land
	Waterbody		Waterbody
	Wetland		Wetland
	100 Year Floodplain		100 Year Floodplain

0 1,000  
Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was retrieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2009 No-Build Scenario 3 Hour Peak Volume/Capacity Ratios

I-77 Feasibility Study  
Project No. FS-0810A

August 2014

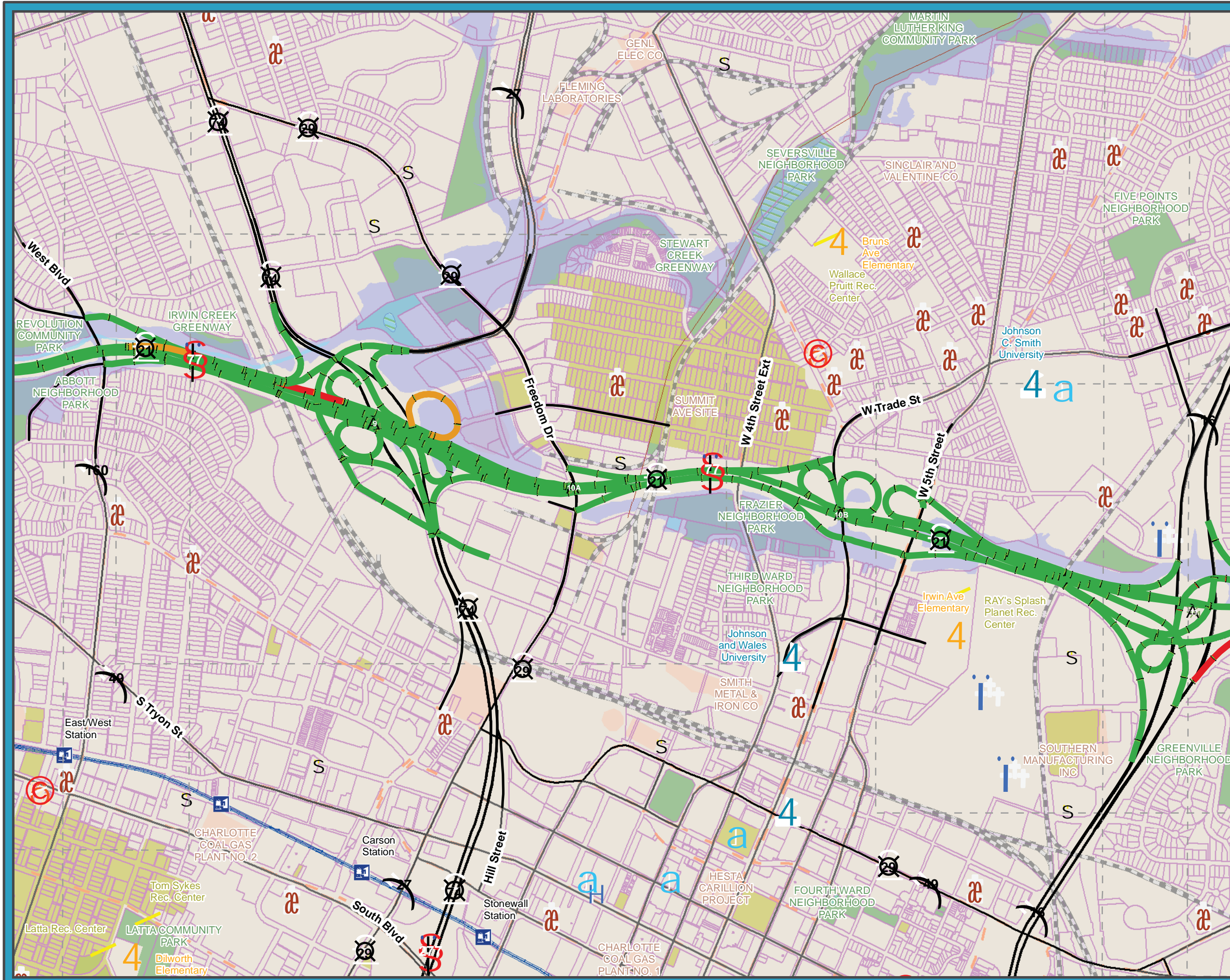
## Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
i	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⊙	EMS	1.01 - 1.25
⊙	Fire Station	<b>Adjusted PM V/C</b>
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
a	Police Station	1.01 - 1.25
o	Post Office	— Railroad
—	Recreation Center	— Lynx Blue Line
4	School	— Transmission Line
T	Solid Waste Facility	— Map Grid
—	Utility Pole	— Conservation Tax Credit Property
—	Bike Route	— Federal Land Ownership
		— Hazardous Materials Site
		— Historic Resource
		— Lands Managed Conservation
		— Parcel
		— Park
		— State Boundary
		— State Owned Land
		— Waterbody
		— Wetland
		— 100 Year Floodplain

0 1,000  
Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





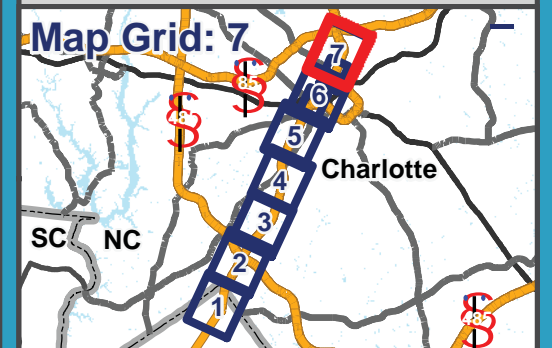
# 2009 No-Build Scenario 3 Hour Peak Volume/Capacity Ratios

I-77 Feasibility Study  
Project No. FS-0810A

August 2014

Legend	
	Cell Tower
	Cemetery
	Church
	College/Universities
	EMS
	Fire Station
	Hospital
	Library
	Lynx Station
	Police Station
	Post Office
	Recreation Center
	School
	Solid Waste Facility
	Utility Pole
	Bike Route
<b>Adjusted AM V/C</b>	
	0.00 - 0.01
	0.02 - 0.80
	0.81 - 1.00
	1.01 - 1.25
<b>Adjusted PM V/C</b>	
	0.00 - 0.01
	0.02 - 0.80
	0.81 - 1.00
	1.01 - 1.25
	Railroad
	Lynx Blue Line
	Transmission Line
	Map Grid
	Conservation Tax Credit Property
	Federal Land Ownership
	Hazardous Materials Site
	Historic Resource
	Lands Managed Conservation
	Parcel
	Park
	State Boundary
	State Owned Land
	Waterbody
	Wetland
	100 Year Floodplain

0 1,000  
Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2009 No-Build Scenario 3 Hour Peak Volume/Capacity Ratios

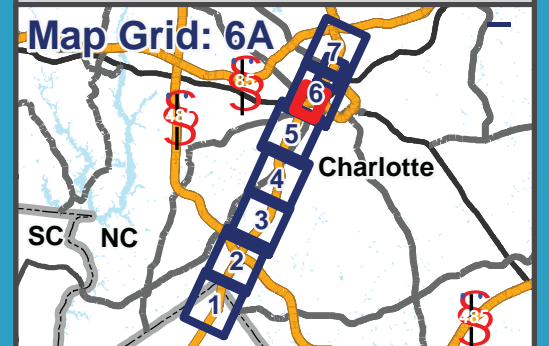
## I-77 Feasibility Study Project No. FS-0810A

August 2014

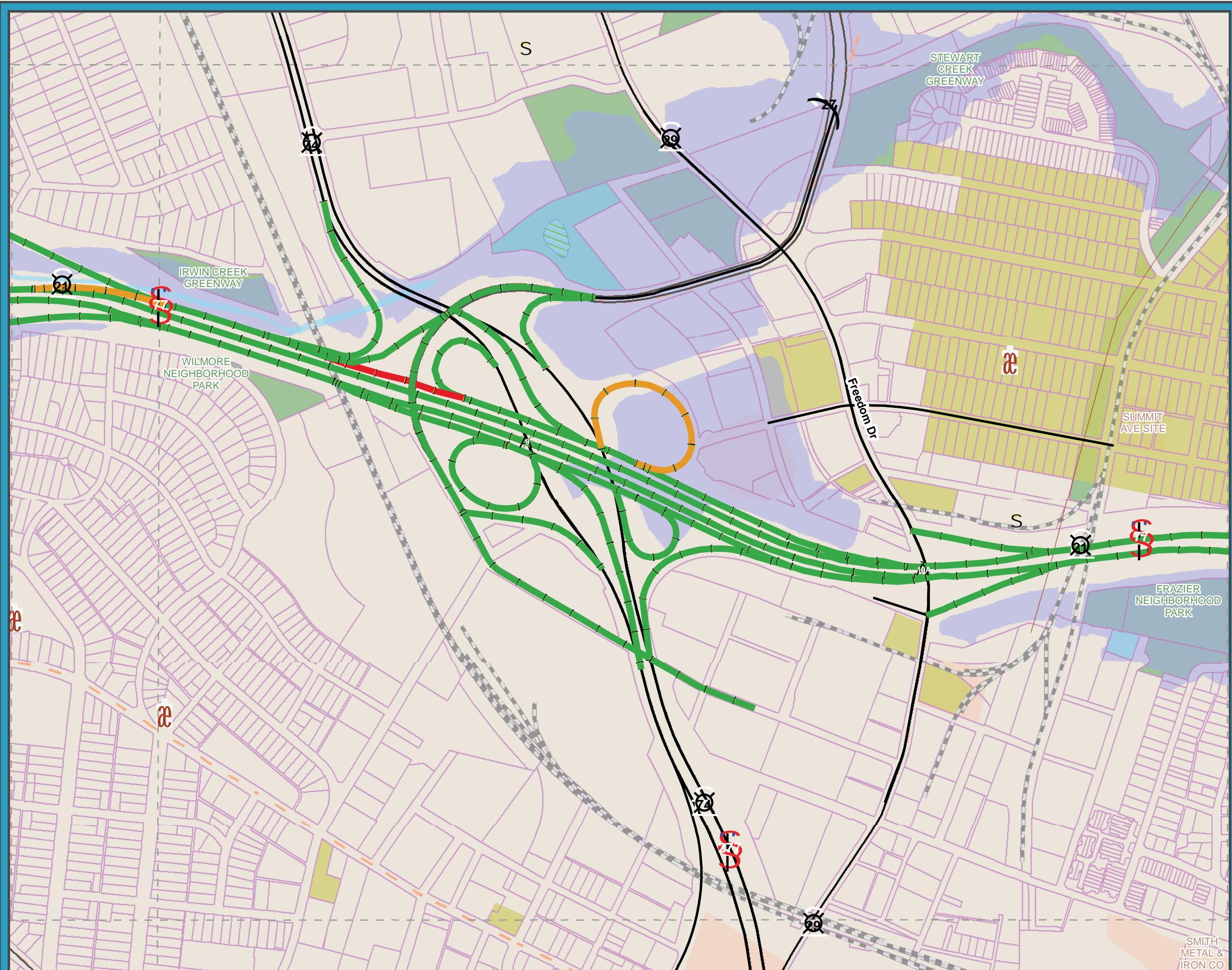
### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
⌂	Cemetery	0.00 - 0.01
⌂	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⚡	EMS	1.01 - 1.25
⚡	Fire Station	<b>Adjusted PM V/C</b>
⚡	Hospital	0.00 - 0.01
⚡	Library	0.02 - 0.80
⚡	Lynx Station	0.81 - 1.00
⚡	Police Station	1.01 - 1.25
⚡	Post Office	— Railroad
⚡	Recreation Center	— Lynx Blue Line
4	School	— Transmission Line
⚡	Solid Waste Facility	— Map Grid
⚡	Utility Pole	— Conservation Tax Credit Property
⚡	Bike Route	— Federal Land Ownership
		— Hazardous Materials Site
		— Historic Resource
		— Lands Managed Conservation
		— Parcel
		— Park
		— State Boundary
		— State Owned Land
		— Waterbody
		— Wetland
		— 100 Year Floodplain

0 500 Feet  
1 inch = 500 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC



# 2009 No-Build Scenario 3 Hour Peak Volume/Capacity Ratios

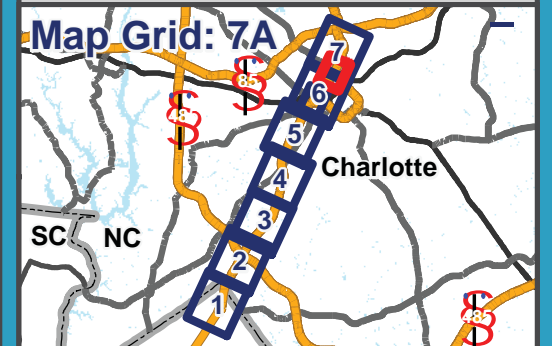
## I-77 Feasibility Study Project No. FS-0810A

August 2014

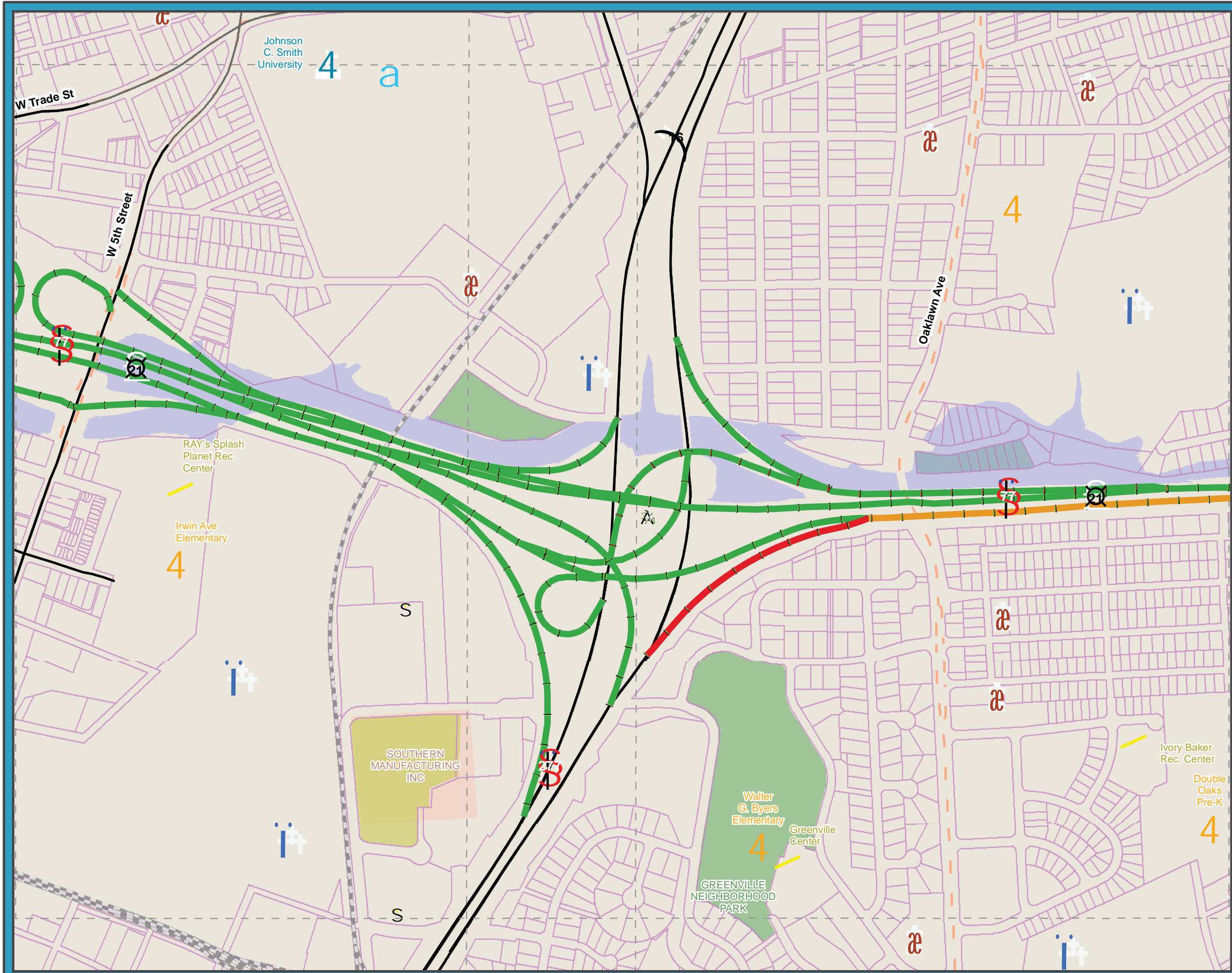
### Legend

S	Cell Tower	Adjusted AM V/C
⌵	Cemetery	0.00 - 0.01
⌵	Church	0.02 - 0.80
⌵	College/Universities	0.81 - 1.00
⌵	EMS	1.01 - 1.25
⌵	Fire Station	Adjusted PM V/C
⌵	Hospital	0.00 - 0.01
⌵	Library	0.02 - 0.80
⌵	Lynx Station	0.81 - 1.00
⌵	Police Station	1.01 - 1.25
⌵	Post Office	Railroad
⌵	Recreation Center	Lynx Blue Line
⌵	School	Transmission Line
⌵	Solid Waste Facility	Map Grid
⌵	Utility Pole	Conservation Tax Credit Property
⌵	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 500 Feet  
1 inch = 500 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 No-Build Scenario Peak Hour Volume/Capacity Ratios

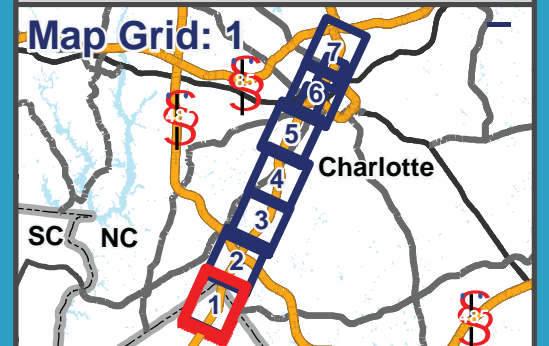
## I-77 Feasibility Study Project No. FS-0810A

August 2014

### Legend

S	Cell Tower	Adjusted AM V/C
i	Cemetery	0.00 - 0.01
⛔	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⚡	EMS	1.01 - 1.25
🚒	Fire Station	Adjusted PM V/C
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
a	Police Station	1.01 - 1.25
O	Post Office	— Railroad
🏠	Recreation Center	— Lynx Blue Line
4	School	— Transmission Line
🗑️	Solid Waste Facility	— Map Grid
🏠	Utility Pole	— Conservation Tax Credit Property
🚲	Bike Route	— Federal Land Ownership
		— Hazardous Materials Site
		— Historic Resource
		— Lands Managed Conservation
		— Parcel
		— Park
		— State Boundary
		— State Owned Land
		— Waterbody
		— Wetland
		— 100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 No-Build Scenario Peak Hour Volume/Capacity Ratios

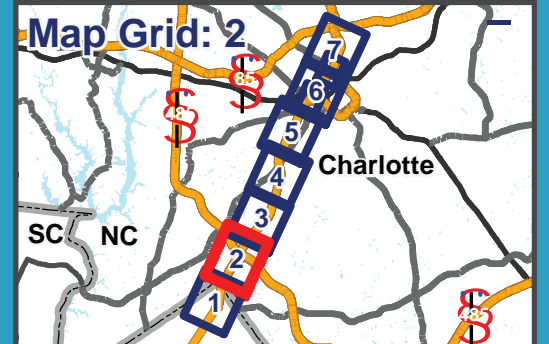
## I-77 Feasibility Study Project No. FS-0810A

August 2014

### Legend

S	Cell Tower	Adjusted AM V/C
☠	Cemetery	0.00 - 0.01
⛔	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
🚑	EMS	1.01 - 1.25
🚒	Fire Station	Adjusted PM V/C
🏥	Hospital	0.00 - 0.01
📖	Library	0.02 - 0.80
🚏	Lynx Station	0.81 - 1.00
🚓	Police Station	1.01 - 1.25
📮	Post Office	Railroad
🏟	Recreation Center	Lynx Blue Line
🎓	School	Transmission Line
🗑	Solid Waste Facility	Map Grid
📶	Utility Pole	Conservation Tax Credit Property
🚴	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 No-Build Scenario Peak Hour Volume/Capacity Ratios

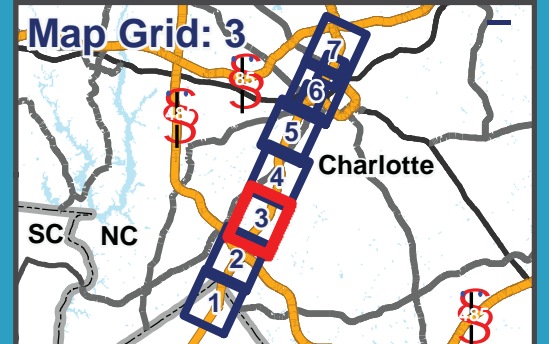
I-77 Feasibility Study  
Project No. FS-0810A

August 2014

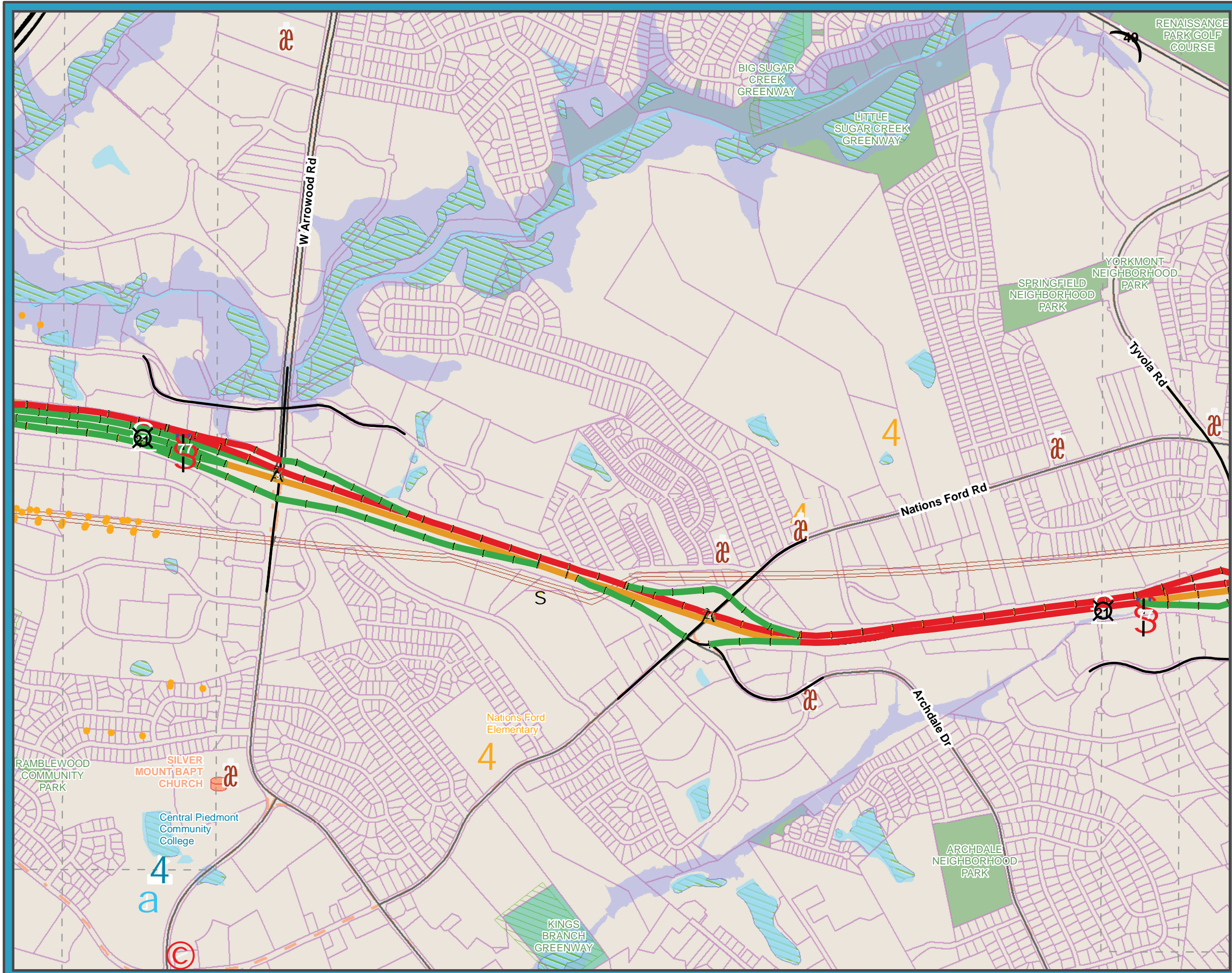
## Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
☠	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⦿	EMS	1.01 - 1.25
⦿	Fire Station	<b>Adjusted PM V/C</b>
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
a	Police Station	1.01 - 1.25
O	Post Office	— Railroad
—	Recreation Center	— Lynx Blue Line
4	School	— Transmission Line
⌘	Solid Waste Facility	— Map Grid
⌘	Utility Pole	— Conservation Tax Credit Property
—	Bike Route	— Federal Land Ownership
		— Hazardous Materials Site
		— Historic Resource
		— Lands Managed Conservation
		— Parcel
		— Park
		— State Boundary
		— State Owned Land
		— Waterbody
		— Wetland
		— 100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 No-Build Scenario Peak Hour Volume/Capacity Ratios

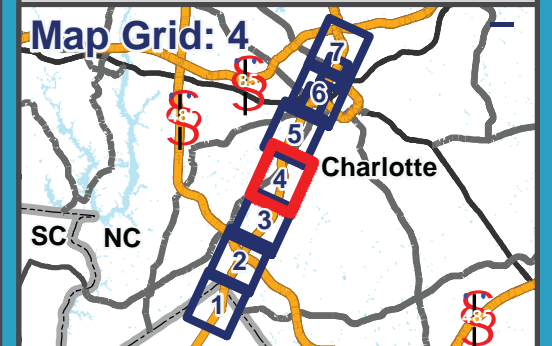
## I-77 Feasibility Study Project No. FS-0810A

August 2014

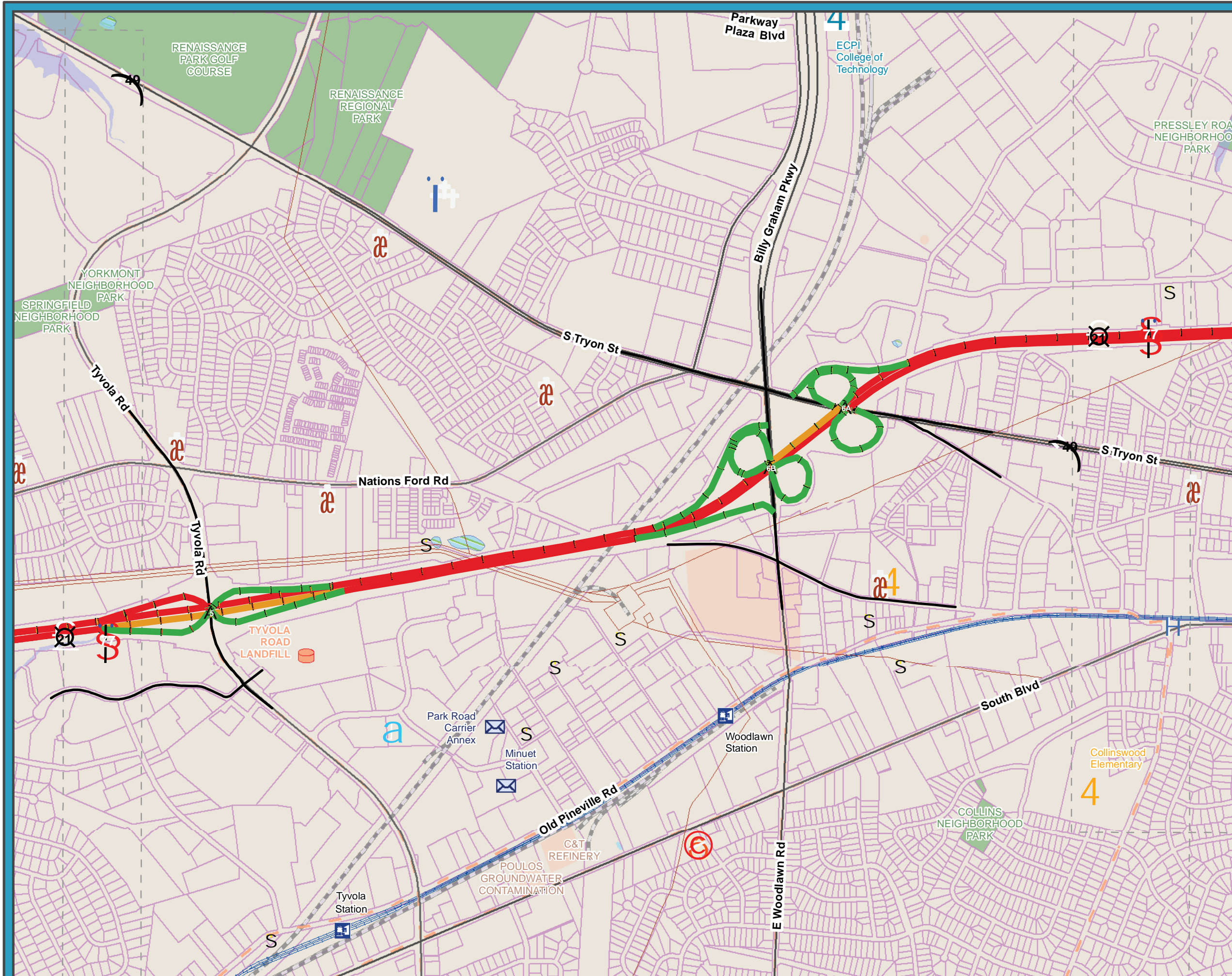
### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
⌂	Cemetery	0.00 - 0.01
⌂	Church	0.02 - 0.80
⌂	Church	0.81 - 1.00
⌂	Church	1.01 - 1.25
4	College/Universities	<b>Adjusted PM V/C</b>
⌂	EMS	0.00 - 0.01
⌂	Fire Station	0.02 - 0.80
⌂	Fire Station	0.81 - 1.00
⌂	Fire Station	1.01 - 1.25
K	Hospital	Railroad
H	Library	Lynx Blue Line
b	Lynx Station	Transmission Line
a	Police Station	Map Grid
O	Post Office	Conservation Tax Credit Property
⌂	Recreation Center	Federal Land Ownership
4	School	Hazardous Materials Site
⌂	Solid Waste Facility	Historic Resource
⌂	Utility Pole	Lands Managed Conservation
⌂	Bike Route	Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 No-Build Scenario Peak Hour Volume/Capacity Ratios

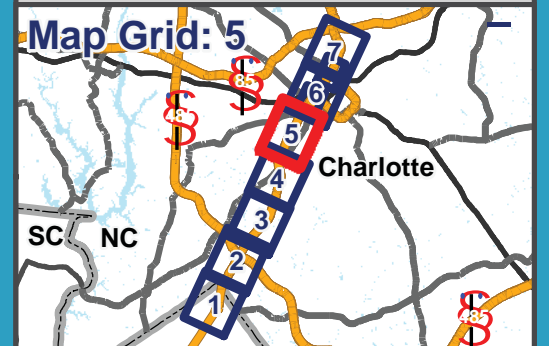
## I-77 Feasibility Study Project No. FS-0810A

August 2014

### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
☠	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⦿	EMS	1.01 - 1.25
⦿	Fire Station	<b>Adjusted PM V/C</b>
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
a	Police Station	1.01 - 1.25
O	Post Office	— Railroad
⦿	Recreation Center	— Lynx Blue Line
4	School	— Transmission Line
⦿	Solid Waste Facility	— Map Grid
⦿	Utility Pole	— Conservation Tax Credit Property
⦿	Bike Route	— Federal Land Ownership
		— Hazardous Materials Site
		— Historic Resource
		— Lands Managed Conservation
		— Parcel
		— Park
		— State Boundary
		— State Owned Land
		— Waterbody
		— Wetland
		— 100 Year Floodplain

0 1,000  
Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was retrieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 No-Build Scenario Peak Hour Volume/Capacity Ratios

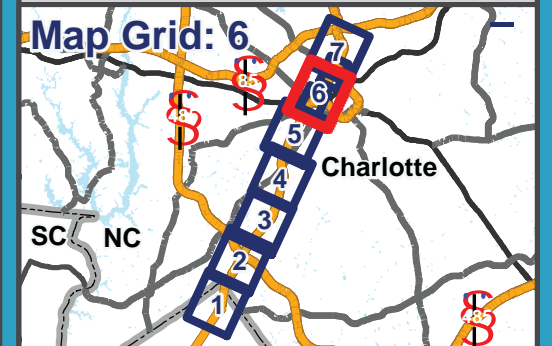
I-77 Feasibility Study  
Project No. FS-0810A

August 2014

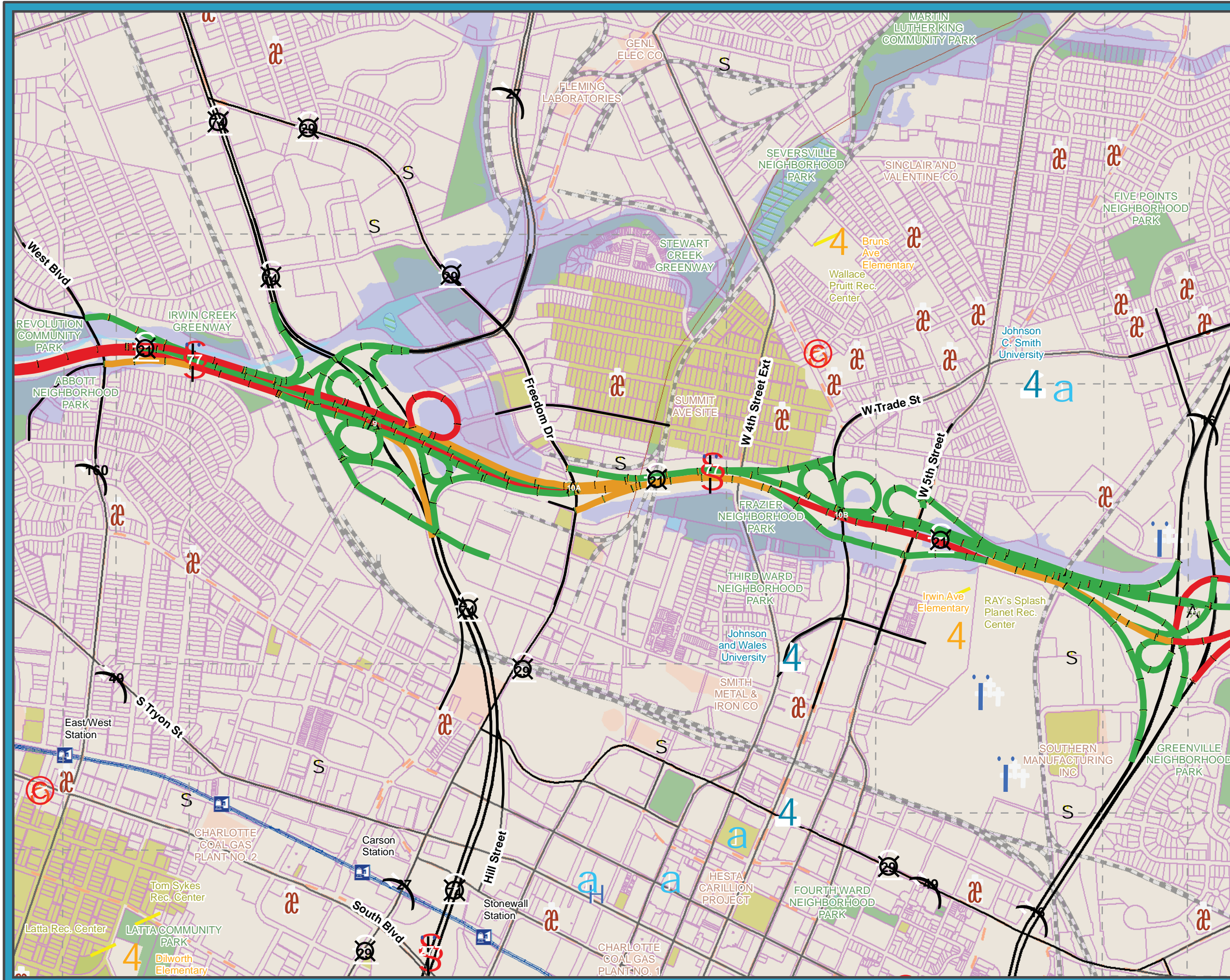
## Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
i	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⊙	EMS	1.01 - 1.25
⊙	Fire Station	<b>Adjusted PM V/C</b>
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
a	Police Station	1.01 - 1.25
O	Post Office	— Railroad
—	Recreation Center	— Lynx Blue Line
4	School	— Transmission Line
T	Solid Waste Facility	— Map Grid
—	Utility Pole	— Conservation Tax Credit Property
—	Bike Route	— Federal Land Ownership
		— Hazardous Materials Site
		— Historic Resource
		— Lands Managed Conservation
		— Parcel
		— Park
		— State Boundary
		— State Owned Land
		— Waterbody
		— Wetland
		— 100 Year Floodplain

0 1,000  
Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





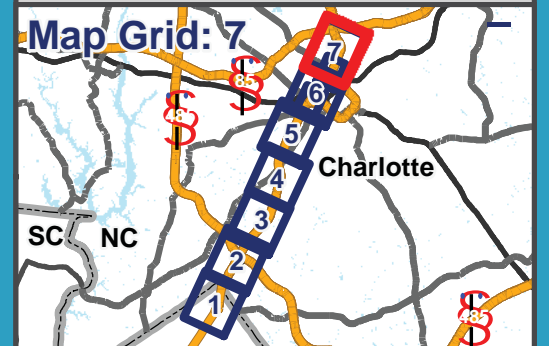
# 2035 No-Build Scenario Peak Hour Volume/Capacity Ratios

I-77 Feasibility Study  
Project No. FS-0810A

August 2014

Legend	
S	Cell Tower
i	Cemetery
⌘	Church
4	College/Universities
⦿	EMS
⦿	Fire Station
K	Hospital
H	Library
b	Lynx Station
a	Police Station
O	Post Office
⦿	Recreation Center
4	School
T	Solid Waste Facility
⦿	Utility Pole
⦿	Bike Route
Adjusted AM V/C	
0.00 - 0.01	
0.02 - 0.80	
0.81 - 1.00	
1.01 - 1.25	
Adjusted PM V/C	
0.00 - 0.01	
0.02 - 0.80	
0.81 - 1.00	
1.01 - 1.25	
⦿	Railroad
⦿	Lynx Blue Line
⦿	Transmission Line
⦿	Map Grid
⦿	Conservation Tax Credit Property
⦿	Federal Land Ownership
⦿	Hazardous Materials Site
⦿	Historic Resource
⦿	Lands Managed Conservation
⦿	Parcel
⦿	Park
⦿	State Boundary
⦿	State Owned Land
⦿	Waterbody
⦿	Wetland
⦿	100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 No-Build Scenario Peak Hour Volume/Capacity Ratios

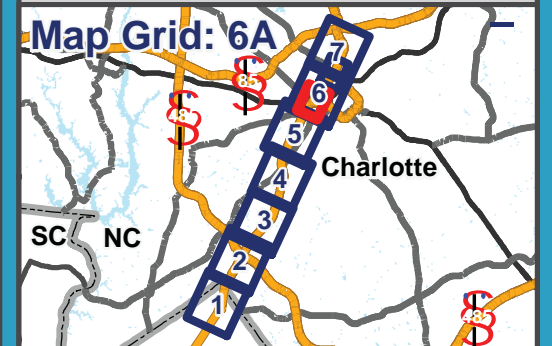
## I-77 Feasibility Study Project No. FS-0810A

August 2014

### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
☠	Cemetery	0.00 - 0.01
⛔	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⚡	EMS	1.01 - 1.25
🚒	Fire Station	<b>Adjusted PM V/C</b>
🏥	Hospital	0.00 - 0.01
📖	Library	0.02 - 0.80
🚏	Lynx Station	0.81 - 1.00
🚓	Police Station	1.01 - 1.25
📬	Post Office	— Railroad
🏟	Recreation Center	— Lynx Blue Line
4	School	— Transmission Line
🗑	Solid Waste Facility	— Map Grid
📶	Utility Pole	— Conservation Tax Credit Property
🚴	Bike Route	— Federal Land Ownership
		— Hazardous Materials Site
		— Historic Resource
		— Lands Managed Conservation
		— Parcel
		— Park
		— State Boundary
		— State Owned Land
		— Waterbody
		— Wetland
		— 100 Year Floodplain

0 500 Feet  
1 inch = 500 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 No-Build Scenario Peak Hour Volume/Capacity Ratios

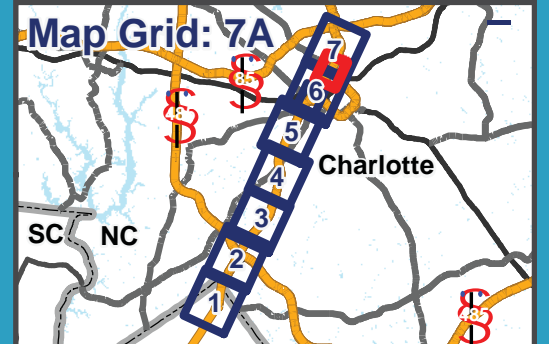
## I-77 Feasibility Study Project No. FS-0810A

August 2014

### Legend

S	Cell Tower	Adjusted AM V/C
⌵	Cemetery	0.00 - 0.01
⌵	Church	0.02 - 0.80
⌵	College/Universities	0.81 - 1.00
⌵	EMS	1.01 - 1.25
⌵	Fire Station	Adjusted PM V/C
⌵	Hospital	0.00 - 0.01
⌵	Library	0.02 - 0.80
⌵	Lynx Station	0.81 - 1.00
⌵	Police Station	1.01 - 1.25
⌵	Post Office	Railroad
⌵	Recreation Center	Lynx Blue Line
⌵	School	Transmission Line
⌵	Solid Waste Facility	Map Grid
⌵	Utility Pole	Conservation Tax Credit Property
⌵	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 500 Feet  
1 inch = 500 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 No-Build Scenario 3 Hour Peak Volume/Capacity Ratios

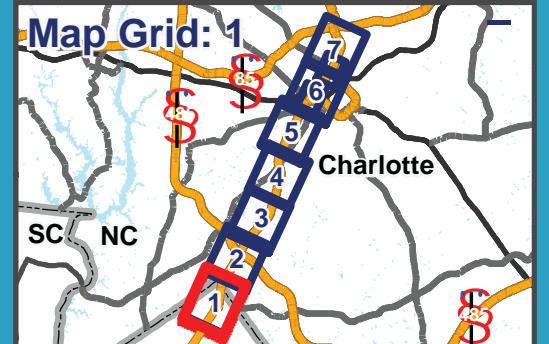
## I-77 Feasibility Study Project No. FS-0810A

August 2014

### Legend

S	Cell Tower	Adjusted AM V/C
i	Cemetery	0.00 - 0.01
⛔	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⦿	EMS	1.01 - 1.25
⦿	Fire Station	Adjusted PM V/C
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
a	Police Station	1.01 - 1.25
O	Post Office	0.00 - 0.01
⦿	Recreation Center	0.02 - 0.80
4	School	0.81 - 1.00
⦿	Solid Waste Facility	1.01 - 1.25
⦿	Utility Pole	0.00 - 0.01
⦿	Bike Route	0.02 - 0.80
		0.81 - 1.00
		1.01 - 1.25
		Railroad
		Lynx Blue Line
		Transmission Line
		Map Grid
		Conservation Tax Credit Property
		Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 No-Build Scenario 3 Hour Peak Volume/Capacity Ratios

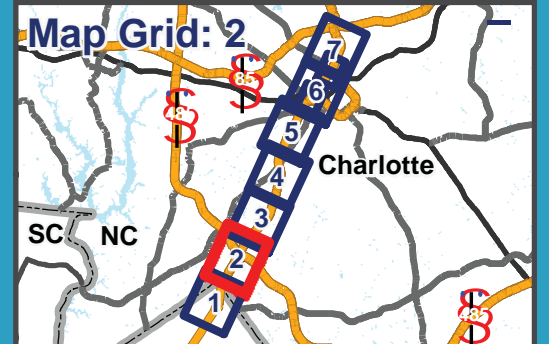
## I-77 Feasibility Study Project No. FS-0810A

August 2014

### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
	Cemetery	0.00 - 0.01
	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
	EMS	1.01 - 1.25
	Fire Station	<b>Adjusted PM V/C</b>
	Hospital	0.00 - 0.01
	Library	0.02 - 0.80
	Lynx Station	0.81 - 1.00
	Police Station	1.01 - 1.25
	Post Office	Railroad
	Recreation Center	Lynx Blue Line
4	School	Transmission Line
	Solid Waste Facility	Map Grid
	Utility Pole	Conservation Tax Credit Property
	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 No-Build Scenario 3 Hour Peak Volume/Capacity Ratios

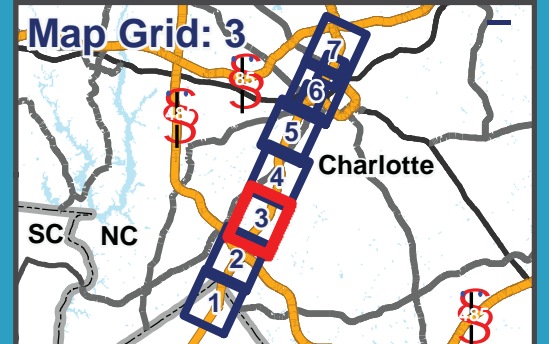
## I-77 Feasibility Study Project No. FS-0810A

August 2014

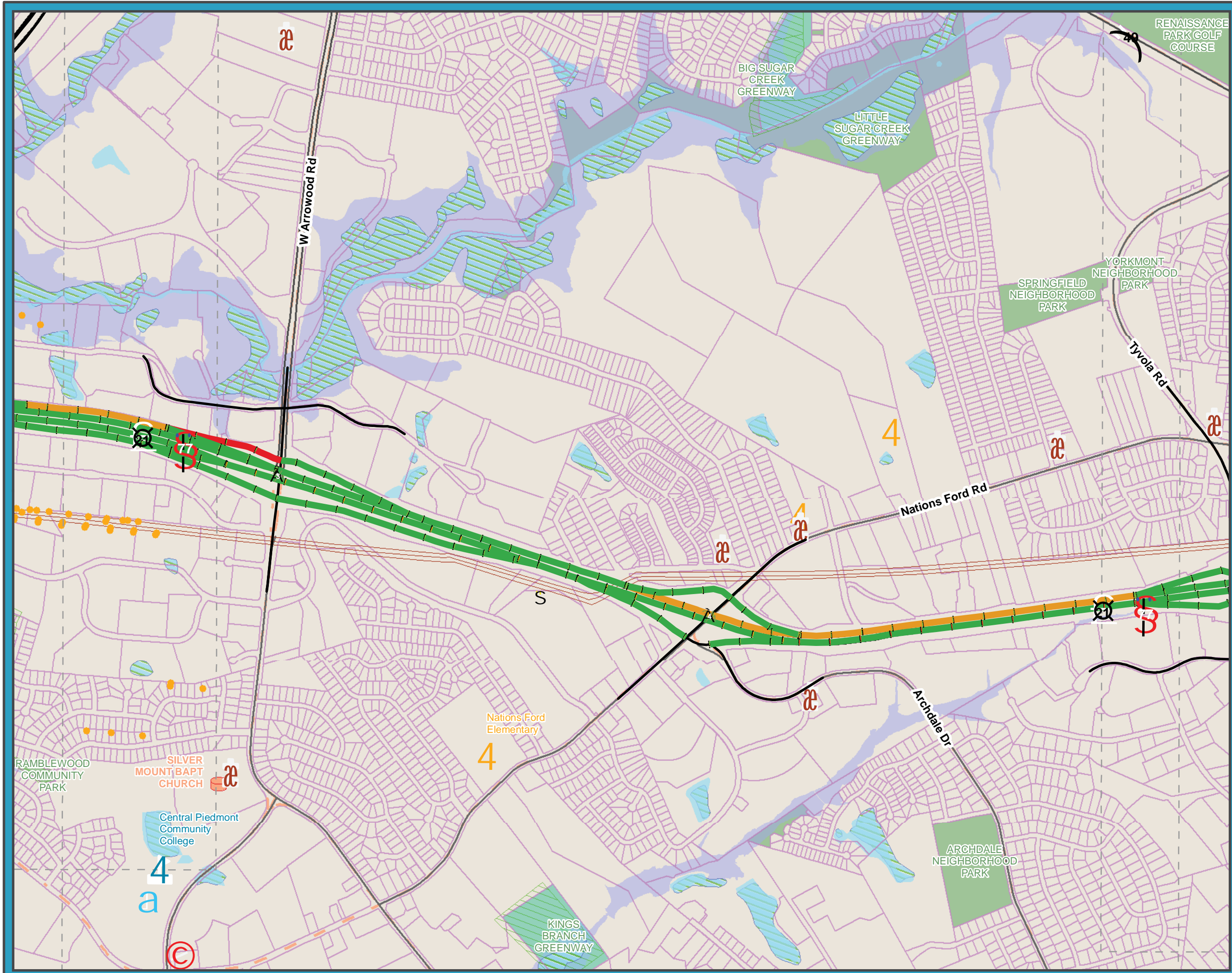
### Legend

S	Cell Tower	Adjusted AM V/C
⌂	Cemetery	0.00 - 0.01
⌂	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⌂	EMS	1.01 - 1.25
⌂	Fire Station	Adjusted PM V/C
⌂	Hospital	0.00 - 0.01
⌂	Library	0.02 - 0.80
⌂	Lynx Station	0.81 - 1.00
⌂	Police Station	1.01 - 1.25
⌂	Post Office	Railroad
⌂	Recreation Center	Lynx Blue Line
4	School	Transmission Line
⌂	Solid Waste Facility	Map Grid
⌂	Utility Pole	Conservation Tax Credit Property
⌂	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 No-Build Scenario 3 Hour Peak Volume/Capacity Ratios

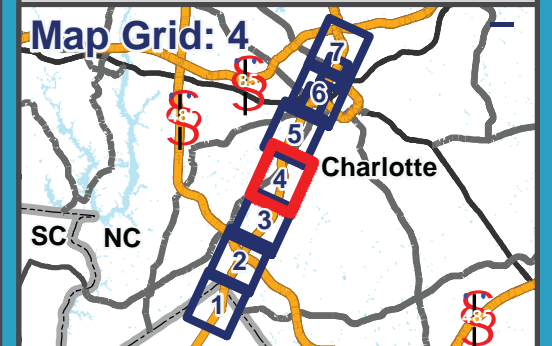
## I-77 Feasibility Study Project No. FS-0810A

August 2014

### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
⚰	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⚡	EMS	1.01 - 1.25
⦿	Fire Station	
K	Hospital	<b>Adjusted PM V/C</b>
H	Library	0.00 - 0.01
b	Lynx Station	0.02 - 0.80
a	Police Station	0.81 - 1.00
O	Post Office	1.01 - 1.25
⌘	Recreation Center	Railroad
4	School	Lynx Blue Line
T	Solid Waste Facility	Transmission Line
⚡	Utility Pole	Map Grid
⚡	Bike Route	Conservation Tax Credit Property
		Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 No-Build Scenario 3 Hour Peak Volume/Capacity Ratios

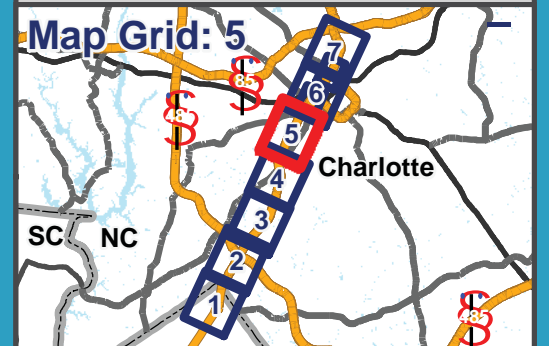
## I-77 Feasibility Study Project No. FS-0810A

August 2014

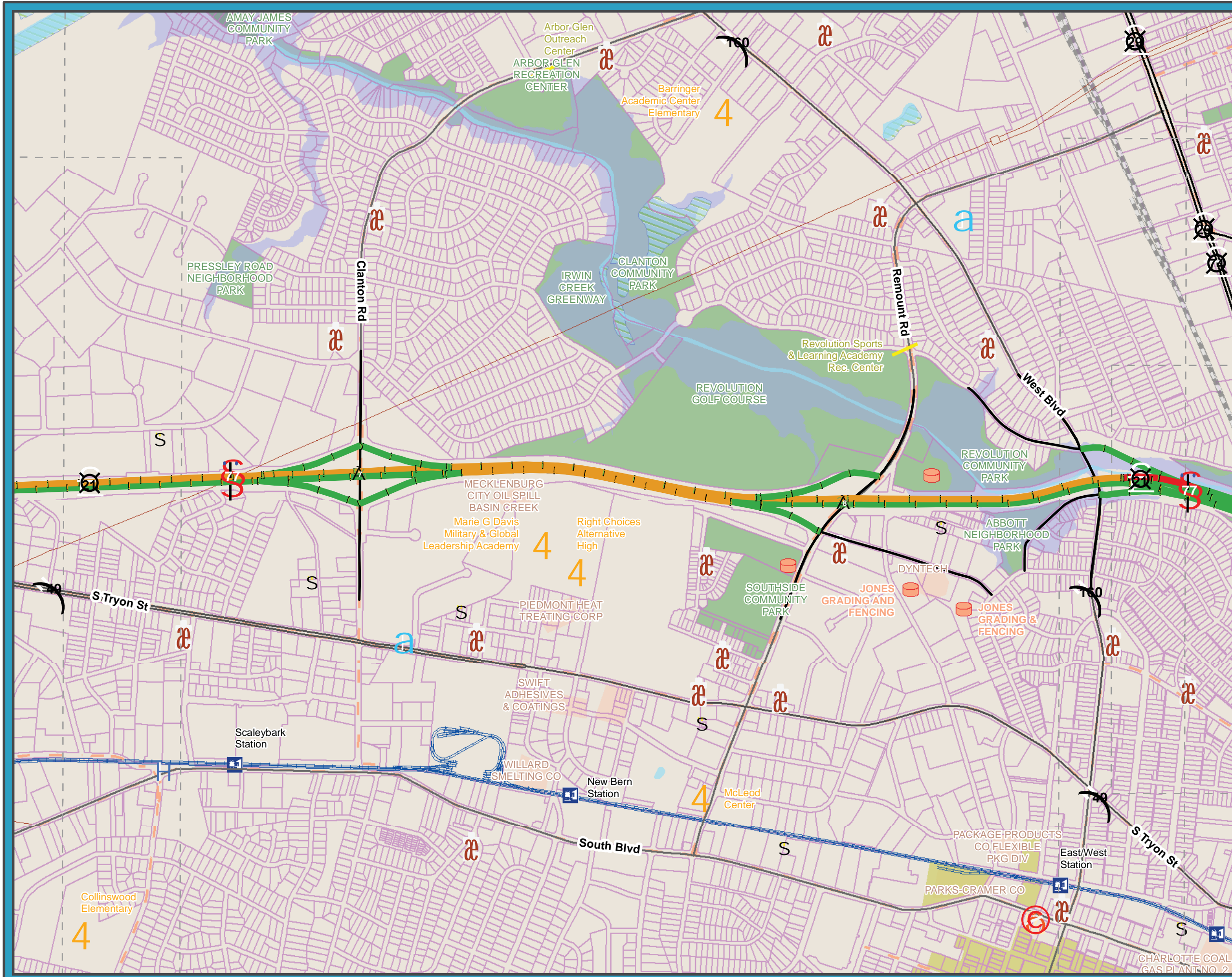
### Legend

S	Cell Tower	Adjusted AM V/C
☠	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⦿	EMS	1.01 - 1.25
⦿	Fire Station	Adjusted PM V/C
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
a	Police Station	1.01 - 1.25
O	Post Office	Railroad
⦿	Recreation Center	Lynx Blue Line
4	School	Transmission Line
⦿	Solid Waste Facility	Map Grid
⦿	Utility Pole	Conservation Tax Credit Property
⦿	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 No-Build Scenario 3 Hour Peak Volume/Capacity Ratios

## I-77 Feasibility Study Project No. FS-0810A

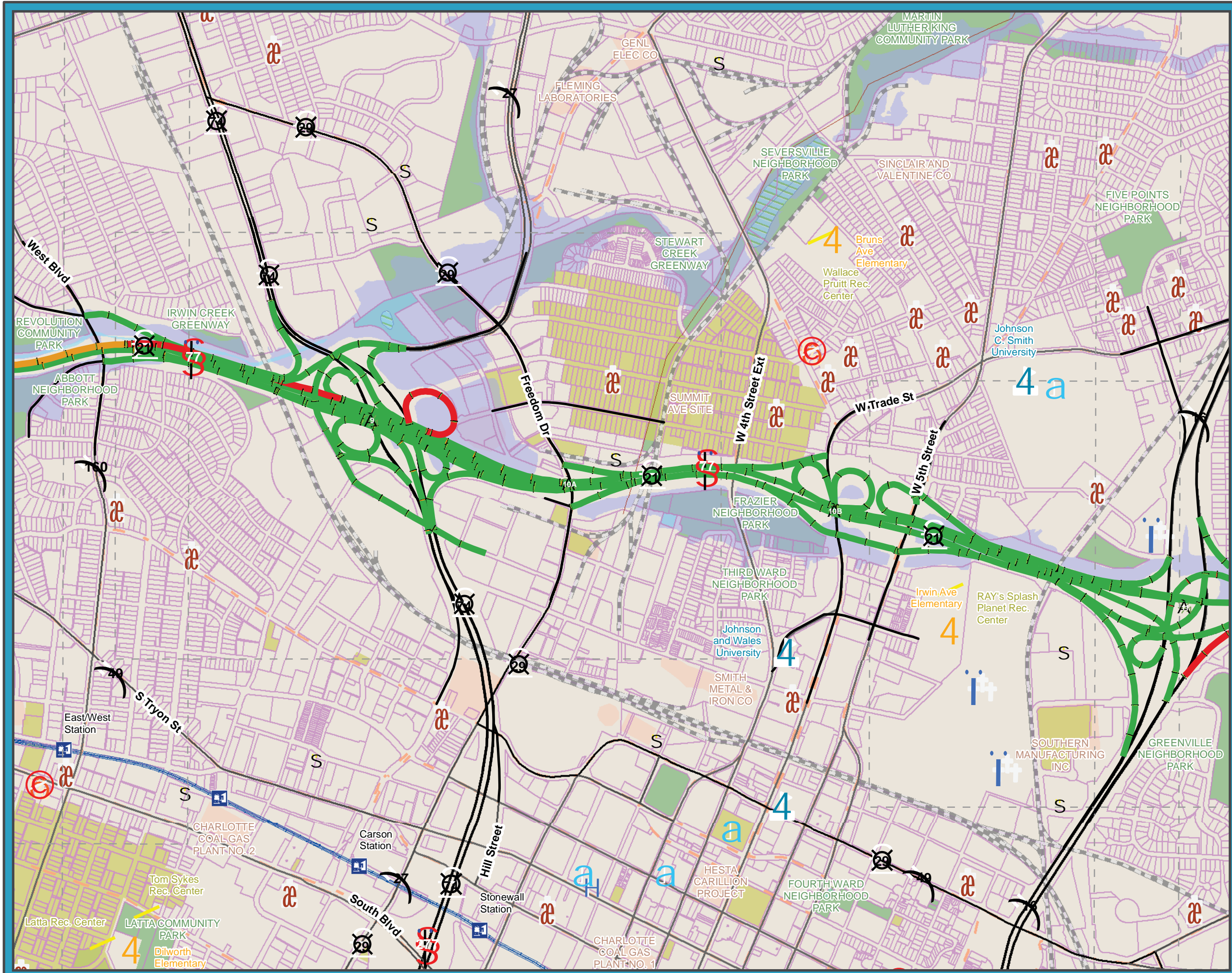
August 2014

Legend	
S	Cell Tower
i	Cemetery
⌘	Church
4	College/Universities
⓪	EMS
Ⓢ	Fire Station
K	Hospital
H	Library
b	Lynx Station
a	Police Station
O	Post Office
Ⓜ	Recreation Center
4	School
T	Solid Waste Facility
Ⓜ	Utility Pole
Ⓜ	Bike Route
Adjusted AM V/C	
0.00 - 0.01	
0.02 - 0.80	
0.81 - 1.00	
1.01 - 1.25	
Adjusted PM V/C	
0.00 - 0.01	
0.02 - 0.80	
0.81 - 1.00	
1.01 - 1.25	
Ⓜ	Railroad
Ⓜ	Lynx Blue Line
Ⓜ	Transmission Line
Ⓜ	Map Grid
Ⓜ	Conservation Tax Credit Property
Ⓜ	Federal Land Ownership
Ⓜ	Hazardous Materials Site
Ⓜ	Historic Resource
Ⓜ	Lands Managed Conservation
Ⓜ	Parcel
Ⓜ	Park
Ⓜ	State Boundary
Ⓜ	State Owned Land
Ⓜ	Waterbody
Ⓜ	Wetland
Ⓜ	100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





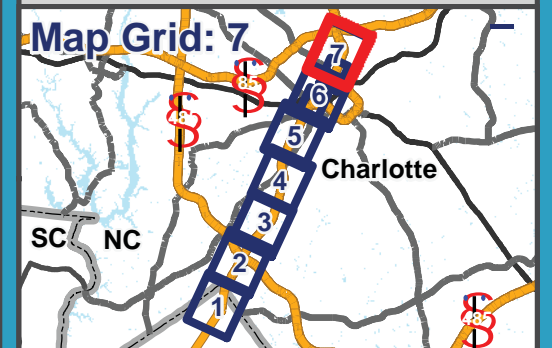
# 2035 No-Build Scenario 3 Hour Peak Volume/Capacity Ratios

## I-77 Feasibility Study Project No. FS-0810A

August 2014

Legend	
	Cell Tower
	Cemetery
	Church
	College/Universities
	EMS
	Fire Station
	Hospital
	Library
	Lynx Station
	Police Station
	Post Office
	Recreation Center
	School
	Solid Waste Facility
	Utility Pole
	Bike Route
<b>Adjusted AM V/C</b>	
	0.00 - 0.01
	0.02 - 0.80
	0.81 - 1.00
	1.01 - 1.25
<b>Adjusted PM V/C</b>	
	0.00 - 0.01
	0.02 - 0.80
	0.81 - 1.00
	1.01 - 1.25
	Railroad
	Lynx Blue Line
	Transmission Line
	Map Grid
	Conservation Tax Credit Property
	Federal Land Ownership
	Hazardous Materials Site
	Historic Resource
	Lands Managed Conservation
	Parcel
	Park
	State Boundary
	State Owned Land
	Waterbody
	Wetland
	100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 No-Build Scenario 3 Hour Peak Volume/Capacity Ratios

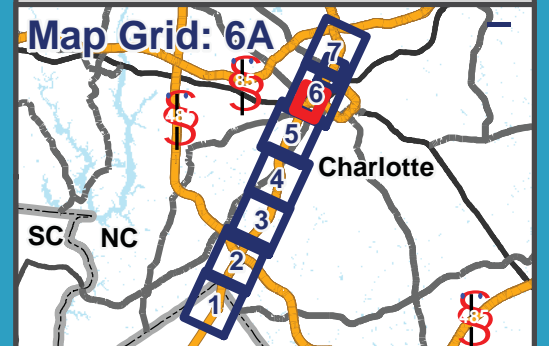
## I-77 Feasibility Study Project No. FS-0810A

August 2014

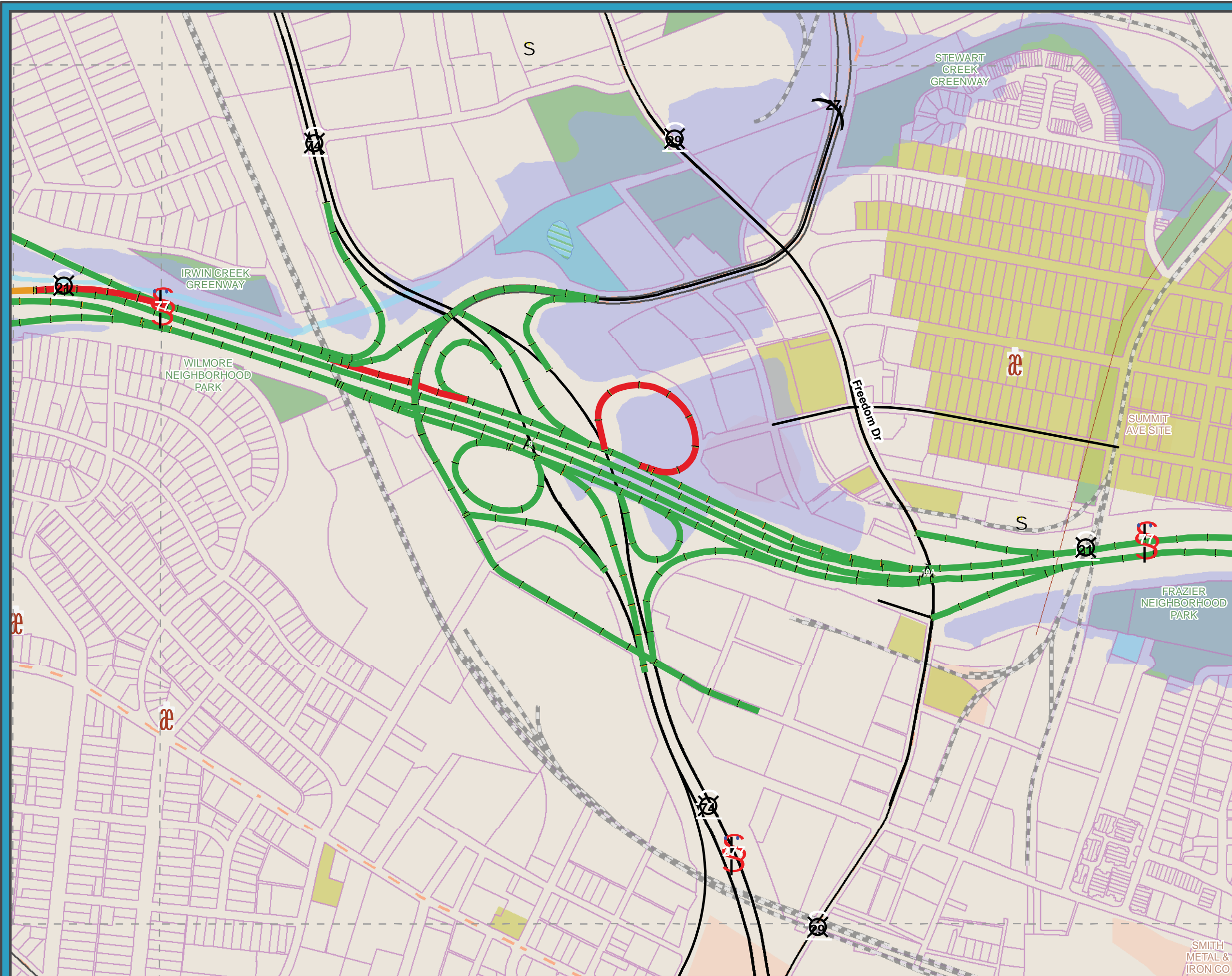
### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
⌂	Cemetery	0.00 - 0.01
⌂	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⚡	EMS	1.01 - 1.25
⚡	Fire Station	<b>Adjusted PM V/C</b>
⚡	Hospital	0.00 - 0.01
⚡	Library	0.02 - 0.80
⚡	Lynx Station	0.81 - 1.00
⚡	Police Station	1.01 - 1.25
⚡	Post Office	Railroad
⚡	Recreation Center	Lynx Blue Line
4	School	Transmission Line
⚡	Solid Waste Facility	Map Grid
⚡	Utility Pole	Conservation Tax Credit Property
⚡	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 500 Feet  
1 inch = 500 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC



SMITH  
METAL &  
IRON CO



# 2035 No-Build Scenario 3 Hour Peak Volume/Capacity Ratios

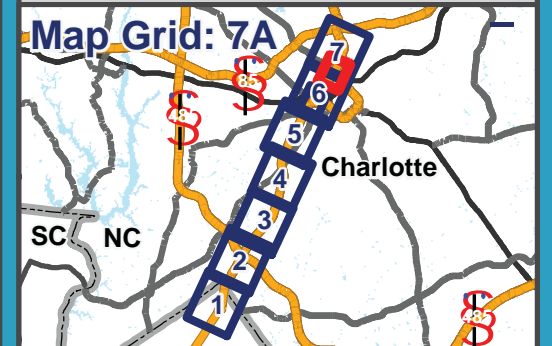
## I-77 Feasibility Study Project No. FS-0810A

August 2014

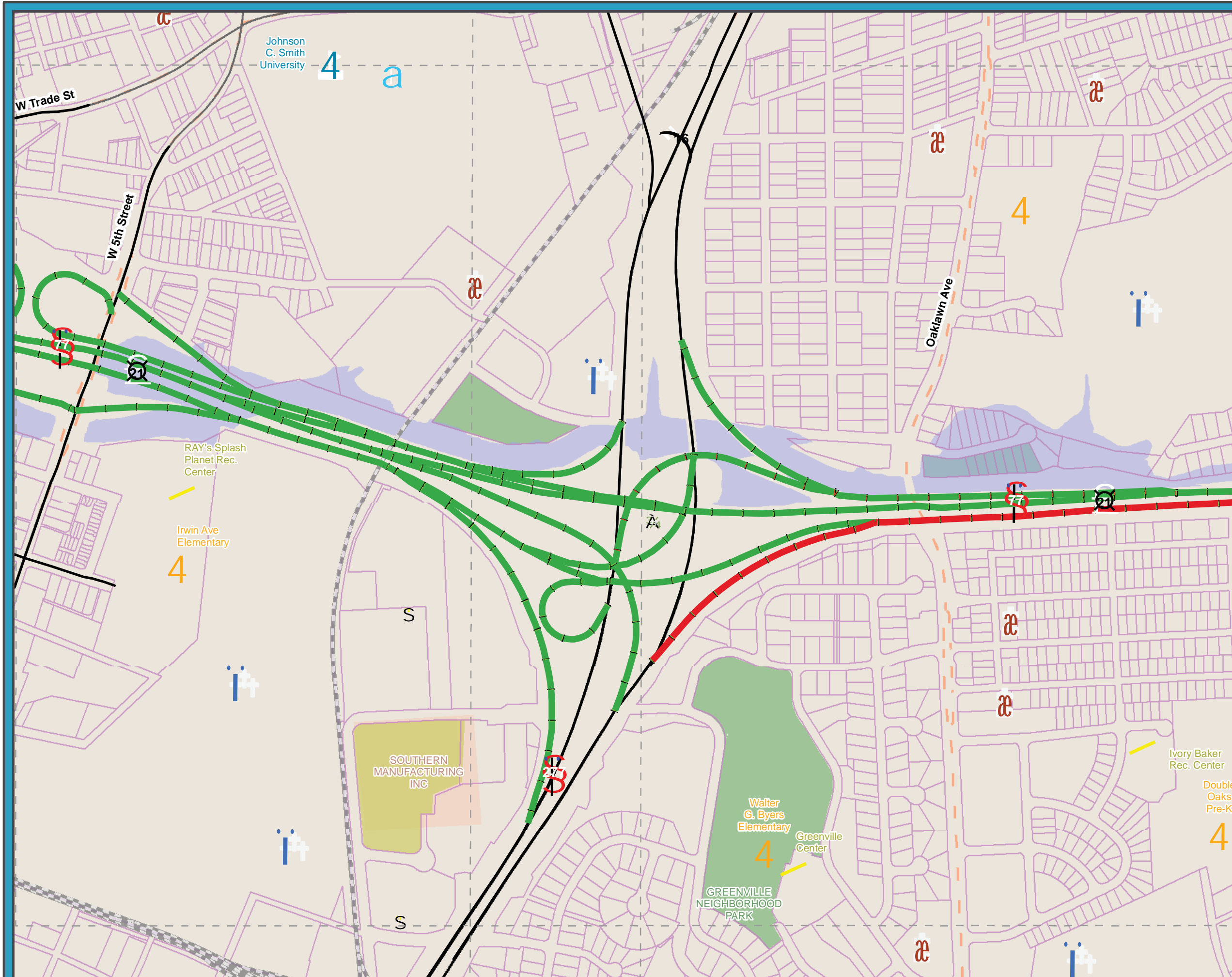
### Legend

S	Cell Tower	Adjusted AM V/C
⌋	Cemetery	0.00 - 0.01
⌋	Church	0.02 - 0.80
⌋	College/Universities	0.81 - 1.00
⌋	EMS	1.01 - 1.25
⌋	Fire Station	Adjusted PM V/C
⌋	Hospital	0.00 - 0.01
⌋	Library	0.02 - 0.80
⌋	Lynx Station	0.81 - 1.00
⌋	Police Station	1.01 - 1.25
⌋	Post Office	Railroad
⌋	Recreation Center	Lynx Blue Line
⌋	School	Transmission Line
⌋	Solid Waste Facility	Map Grid
⌋	Utility Pole	Conservation Tax Credit Property
⌋	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 500 Feet  
1 inch = 500 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 3-2-2-3 Alternative Peak Hour Volume/Capacity Ratios

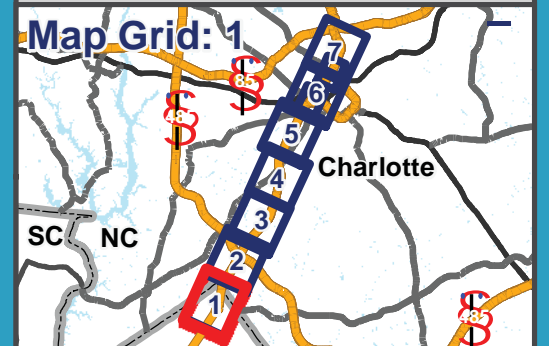
## I-77 Feasibility Study Project No. FS-0810A

August 2014

### Legend

S	Cell Tower	Adjusted AM V/C
i	Cemetery	0.00 - 0.01
⛔	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⚡	EMS	1.01 - 1.25
🔥	Fire Station	Adjusted PM V/C
🏥	Hospital	0.00 - 0.01
📖	Library	0.02 - 0.80
🚊	Lynx Station	0.81 - 1.00
🚓	Police Station	1.01 - 1.25
📬	Post Office	Railroad
🏠	Recreation Center	Lynx Blue Line
🎓	School	Transmission Line
🗑️	Solid Waste Facility	Map Grid
🌳	Utility Pole	Conservation Tax Credit Property
🚲	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 3-2-2-3 Alternative Peak Hour Volume/Capacity Ratios

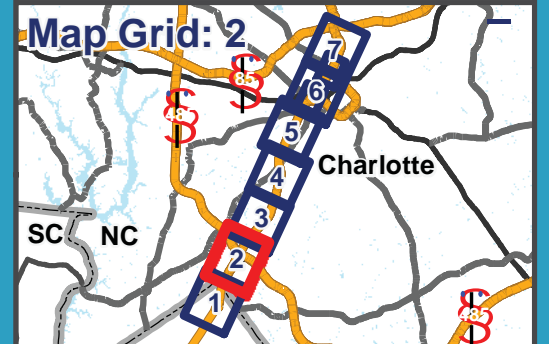
## I-77 Feasibility Study Project No. FS-0810A

August 2014

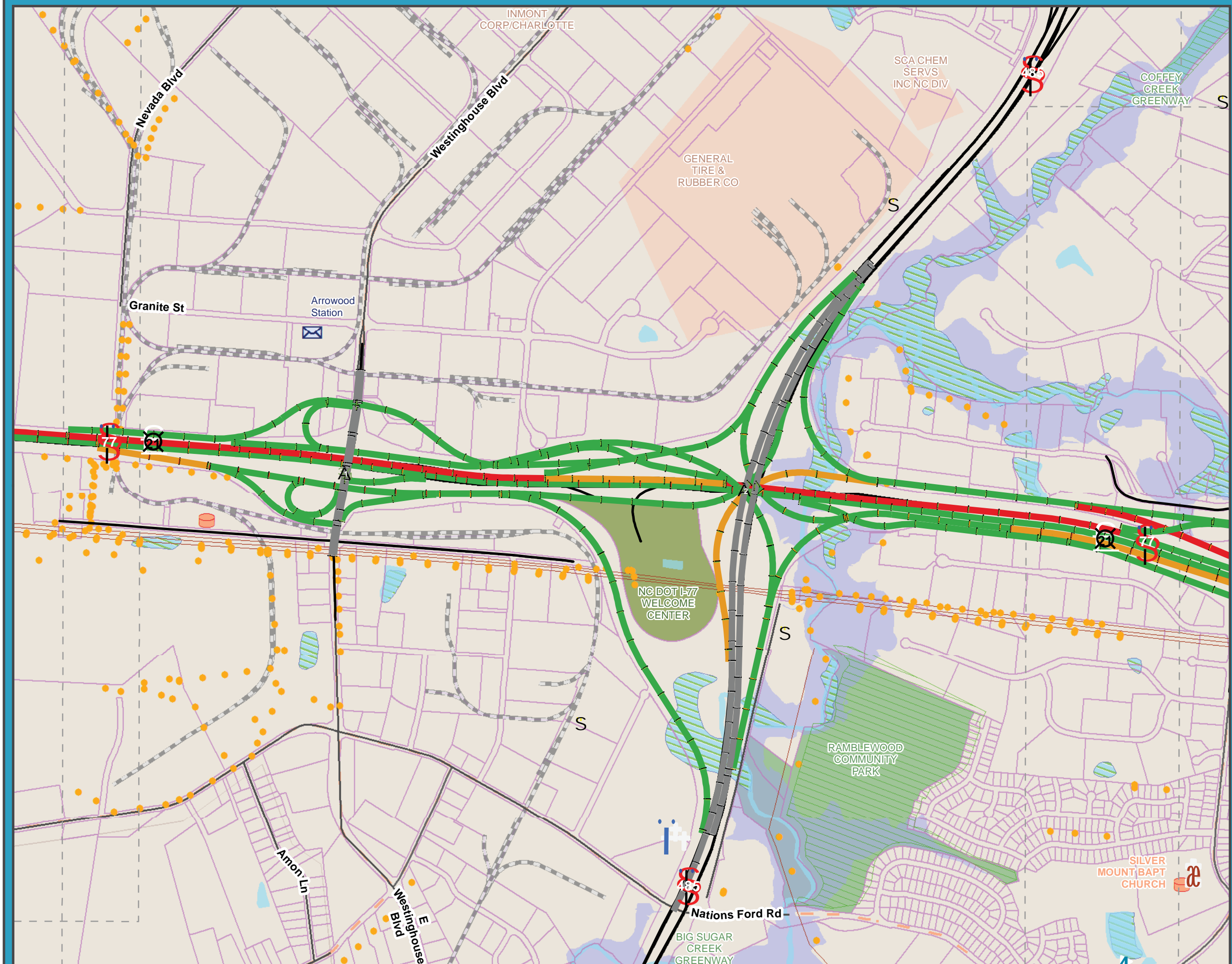
### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
	Cemetery	0.00 - 0.01
	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
	EMS	1.01 - 1.25
	Fire Station	<b>Adjusted PM V/C</b>
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
	Police Station	1.01 - 1.25
O	Post Office	Railroad
	Recreation Center	Lynx Blue Line
4	School	Transmission Line
	Solid Waste Facility	Map Grid
	Utility Pole	Conservation Tax Credit Property
	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 3-2-2-3 Alternative Peak Hour Volume/Capacity Ratios

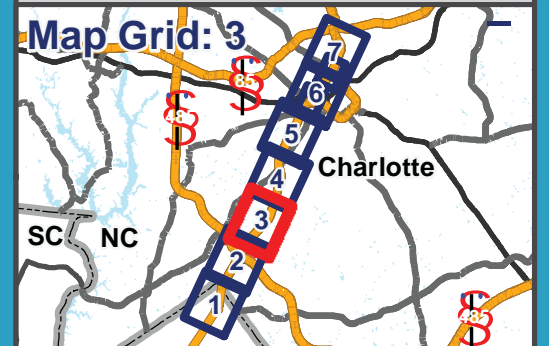
## I-77 Feasibility Study Project No. FS-0810A

August 2014

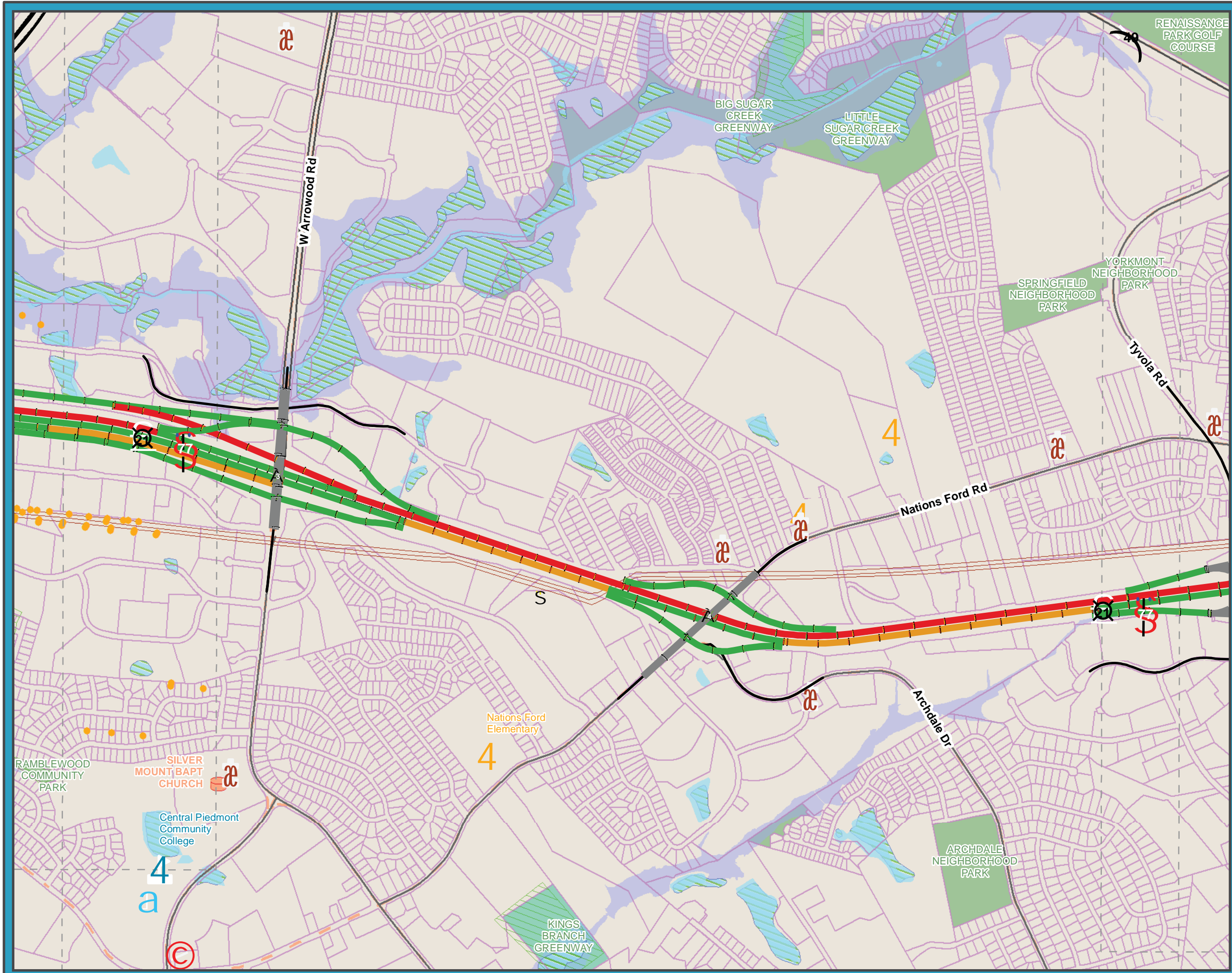
### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
C	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⊙	EMS	1.01 - 1.25
⊙	Fire Station	<b>Adjusted PM V/C</b>
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
o	Police Station	1.01 - 1.25
O	Post Office	Railroad
Y	Recreation Center	Lynx Blue Line
4	School	Transmission Line
⌘	Solid Waste Facility	Map Grid
⌘	Utility Pole	Conservation Tax Credit Property
⌘	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 3-2-2-3 Alternative Peak Hour Volume/Capacity Ratios

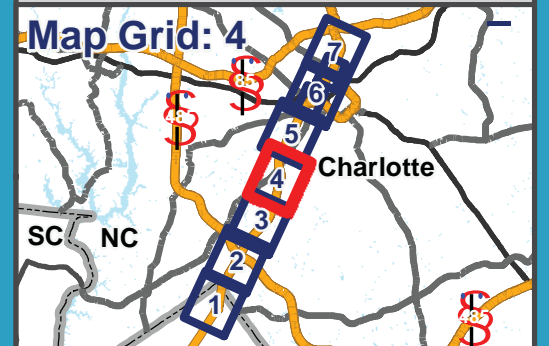
## I-77 Feasibility Study Project No. FS-0810A

August 2014

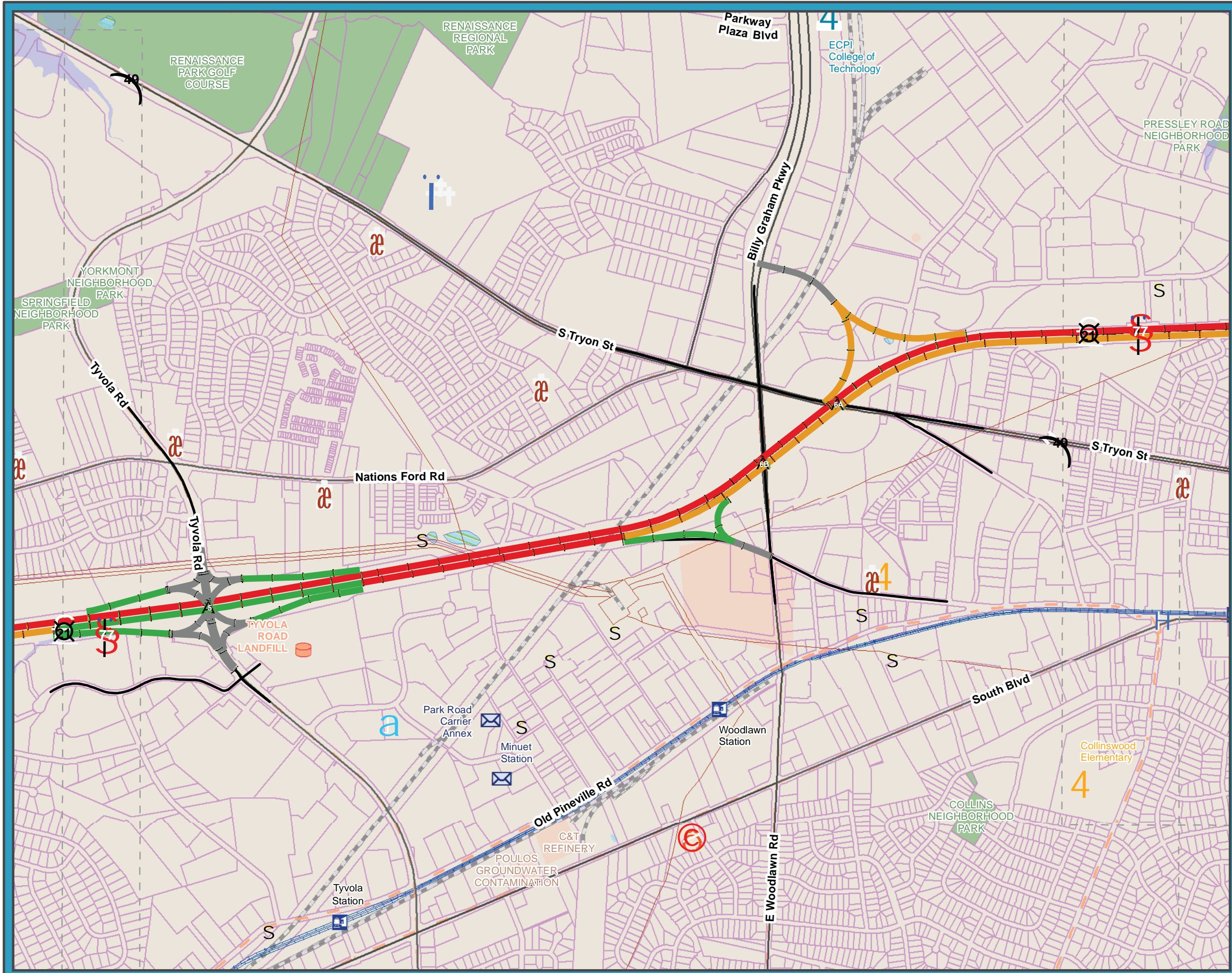
### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
⌂	Cemetery	0.00 - 0.01
⌂	Church	0.02 - 0.80
⌂	Church	0.81 - 1.00
⌂	Church	1.01 - 1.25
4	College/Universities	<b>Adjusted PM V/C</b>
⌂	EMS	0.00 - 0.01
⌂	Fire Station	0.02 - 0.80
⌂	Fire Station	0.81 - 1.00
⌂	Fire Station	1.01 - 1.25
⌂	Hospital	Railroad
⌂	Library	Lynx Blue Line
⌂	Lynx Station	Transmission Line
⌂	Police Station	Map Grid
⌂	Post Office	Conservation Tax Credit Property
⌂	Recreation Center	Federal Land Ownership
⌂	School	Hazardous Materials Site
⌂	Solid Waste Facility	Historic Resource
⌂	Utility Pole	Lands Managed Conservation
⌂	Bike Route	Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 3-2-2-3 Alternative Peak Hour Volume/Capacity Ratios

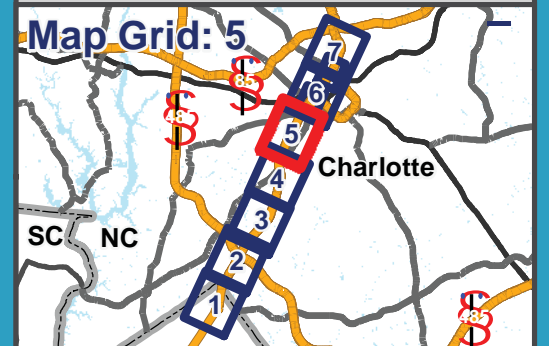
## I-77 Feasibility Study Project No. FS-0810A

August 2014

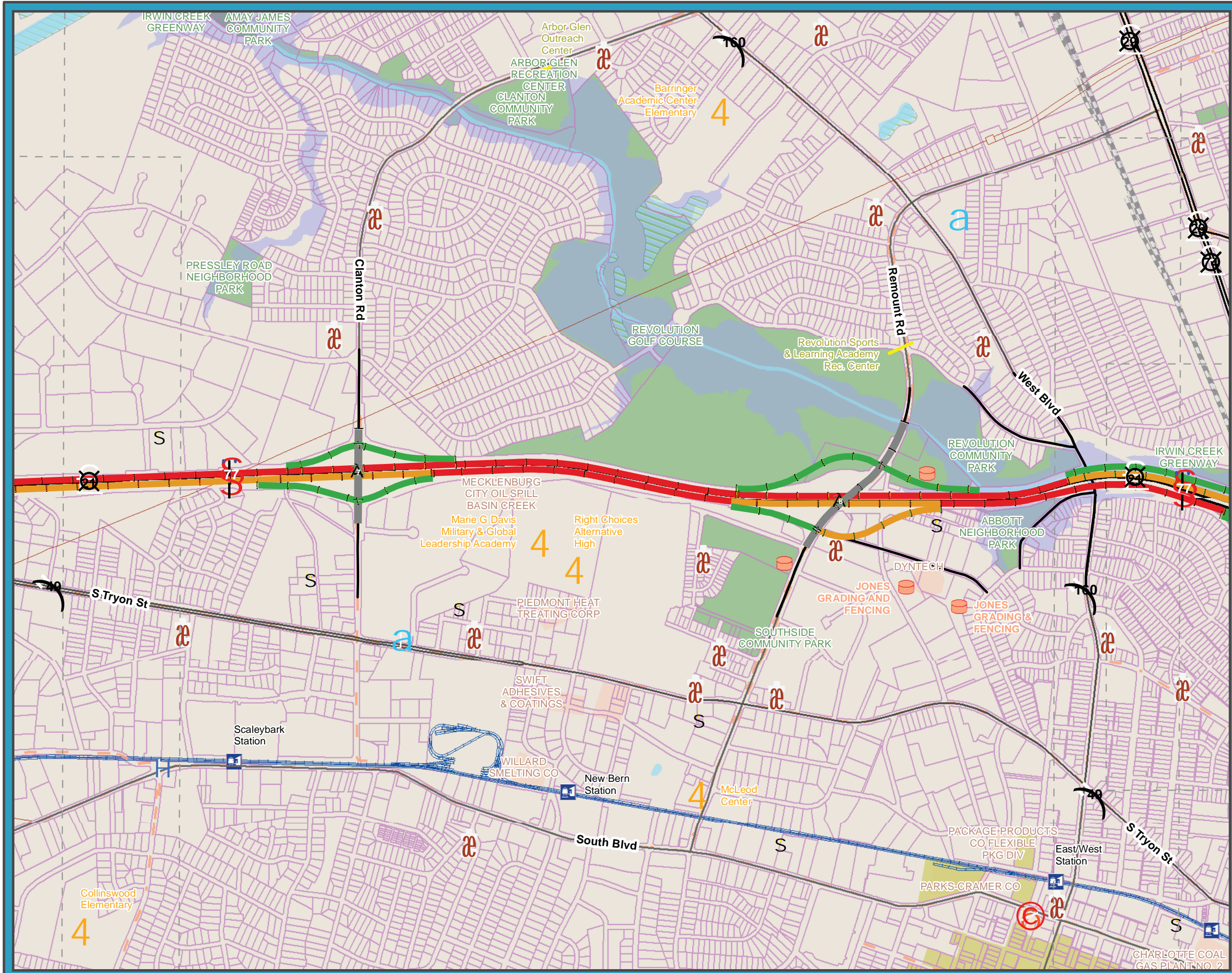
### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
	Cemetery	0.00 - 0.01
	Church	0.02 - 0.80
	College/Universities	0.81 - 1.00
	EMS	1.01 - 1.25
	Fire Station	<b>Adjusted PM V/C</b>
	Hospital	0.00 - 0.01
	Library	0.02 - 0.80
	Lynx Station	0.81 - 1.00
	Police Station	1.01 - 1.25
	Post Office	Railroad
	Recreation Center	Lynx Blue Line
	School	Transmission Line
	Solid Waste Facility	Map Grid
	Utility Pole	Conservation Tax Credit Property
	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Park
		Parcel
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 3-2-2-3 Alternative Peak Hour Volume/Capacity Ratios

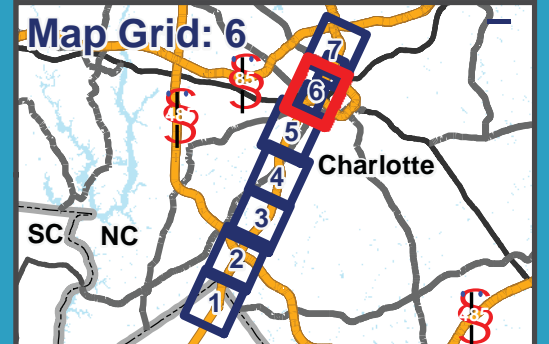
## I-77 Feasibility Study Project No. FS-0810A

August 2014

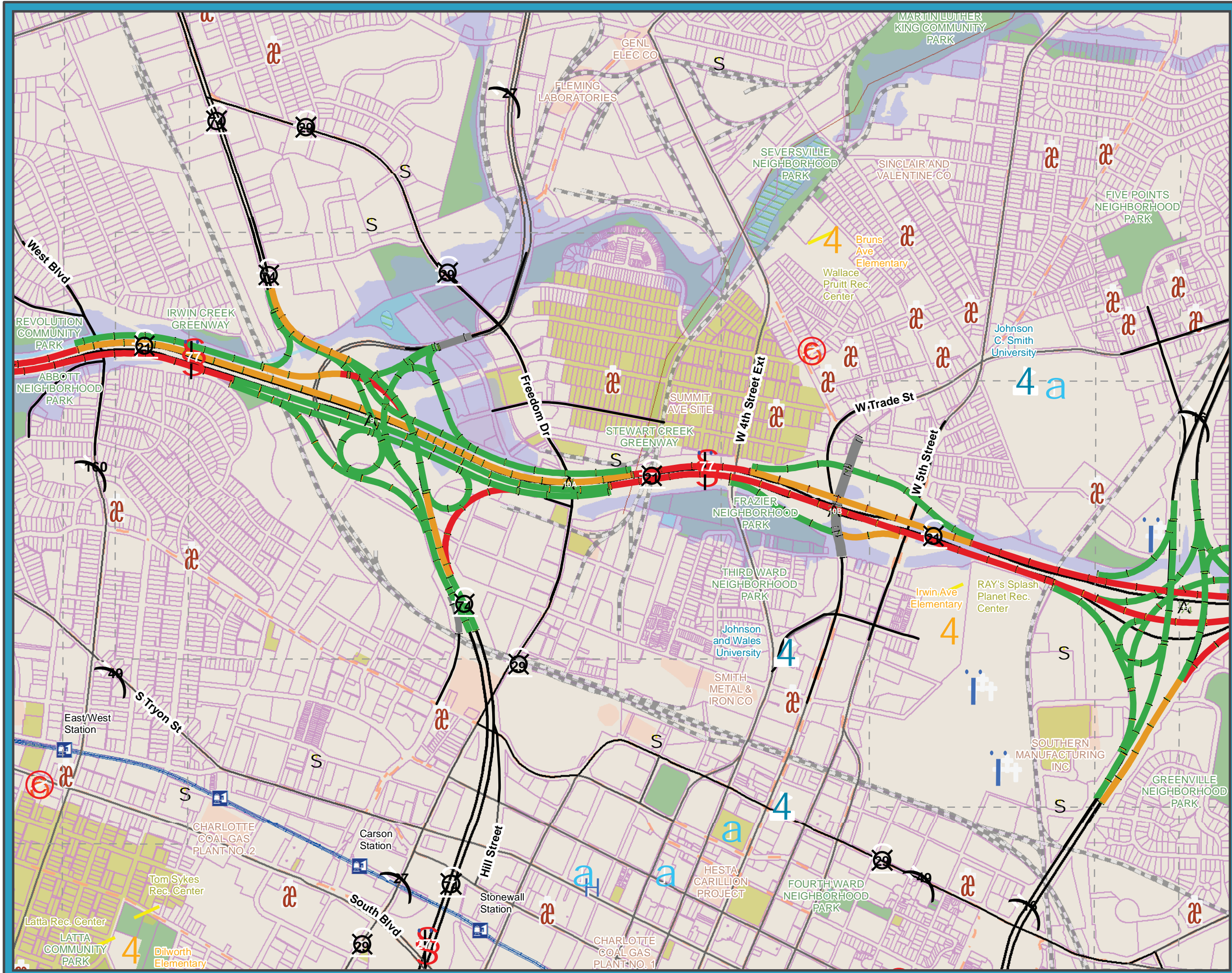
### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
☠	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⊕	EMS	1.01 - 1.25
⊙	Fire Station	<b>Adjusted PM V/C</b>
Ⓚ	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
o	Police Station	1.01 - 1.25
⓪	Post Office	— Railroad
—	Recreation Center	— Lynx Blue Line
4	School	— Transmission Line
Ⓣ	Solid Waste Facility	— Map Grid
⌚	Utility Pole	— Conservation Tax Credit Property
—	Bike Route	— Federal Land Ownership
		— Hazardous Materials Site
		— Historic Resource
		— Lands Managed Conservation
		— Parcel
		— Park
		— State Boundary
		— State Owned Land
		— Waterbody
		— Wetland
		— 100 Year Floodplain

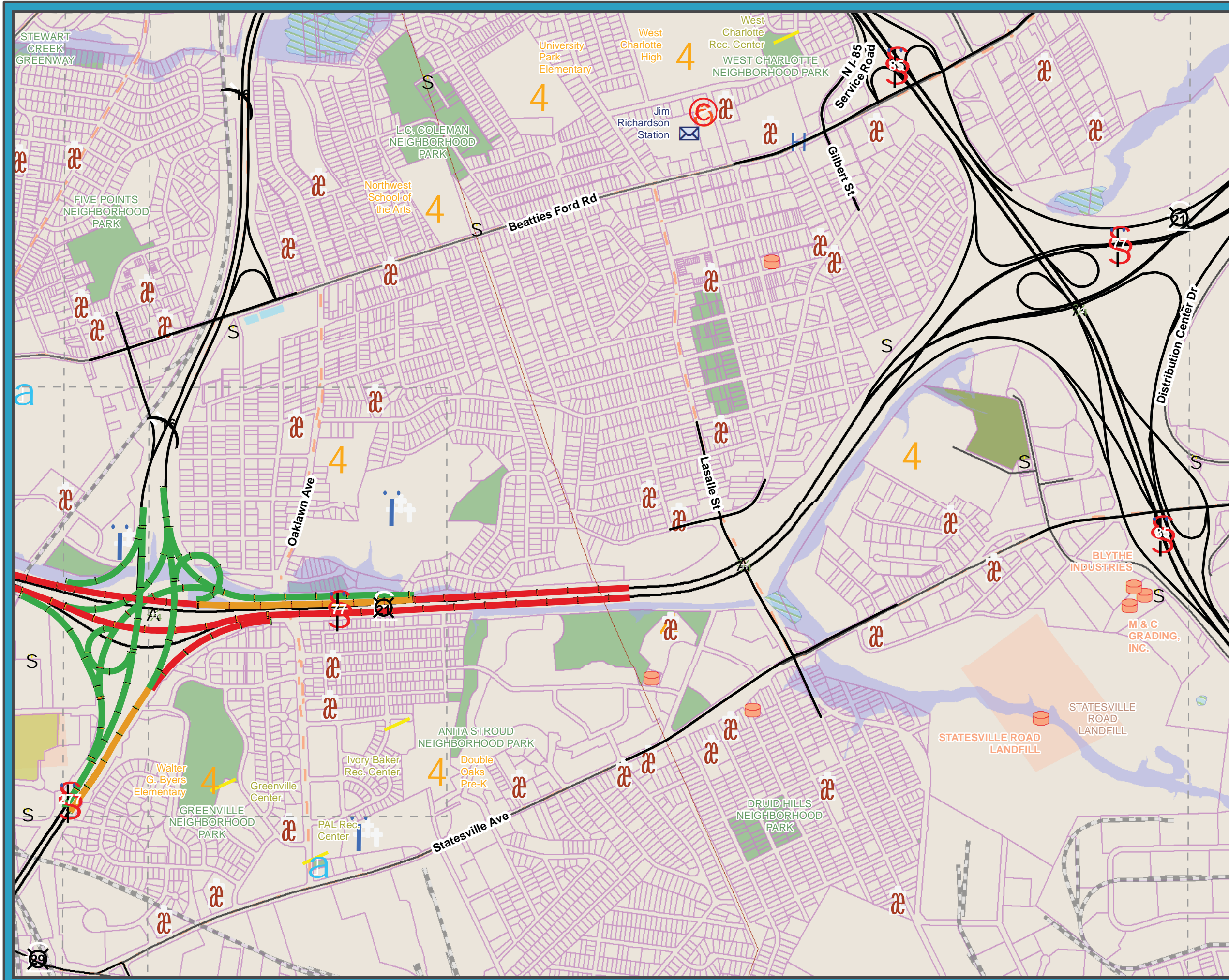
0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC







# 2035 Build 3-2-2-3 Alternative Peak Hour Volume/Capacity Ratios

I-77 Feasibility Study  
Project No. FS-0810A

August 2014

S

Cell Tower

i

Cemetery

⌘

Church

4

College/Universities

⦿

EMS

⦿

Fire Station

K

Hospital

H

Library

b

Lynx Station

⦿

Police Station

⦿

Post Office

⦿

Recreation Center

4

School

⦿

Solid Waste Facility

⦿

Utility Pole

⦿

Bike Route

Adjusted AM V/C

0.00 - 0.01

0.02 - 0.80

0.81 - 1.00

1.01 - 1.25

Adjusted PM V/C

0.00 - 0.01

0.02 - 0.80

0.81 - 1.00

1.01 - 1.25

Railroad

Lynx Blue Line

Transmission Line

Map Grid

Conservation Tax Credit Property

Federal Land Ownership

Hazardous Materials Site

Historic Resource

Lands Managed Conservation

Parcel

Park

State Boundary

State Owned Land

Waterbody

Wetland

100 Year Floodplain

This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC



**2035 Build 3-2-2-3  
Alternative Peak Hour  
Volume/Capacity Ratios**

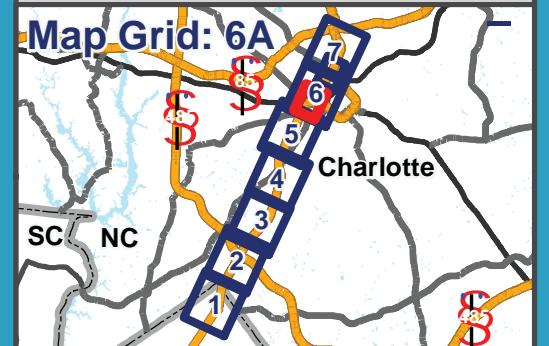
**I-77 Feasibility Study  
Project No. FS-0810A**

August 2014

**Legend**

S	Cell Tower	<b>Adjusted AM V/C</b>
	Cemetery	0.00 - 0.01
	Church	0.02 - 0.80
	College/Universities	0.81 - 1.00
	EMS	1.01 - 1.25
	Fire Station	<b>Adjusted PM V/C</b>
	Hospital	0.00 - 0.01
	Library	0.02 - 0.80
	Lynx Station	0.81 - 1.00
	Police Station	1.01 - 1.25
	Post Office	Railroad
	Recreation Center	Lynx Blue Line
	School	Transmission Line
	Solid Waste Facility	Map Grid
	Utility Pole	Conservation Tax Credit Property
	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 500 Feet  
1 inch = 500 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 3-2-2-3 Alternative Peak Hour Volume/Capacity Ratios

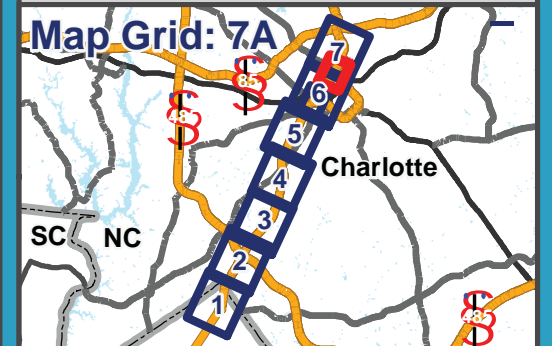
## I-77 Feasibility Study Project No. FS-0810A

August 2014

### Legend

S	Cell Tower	Adjusted AM V/C
⌘	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
⌘	College/Universities	0.81 - 1.00
⌘	EMS	1.01 - 1.25
⌘	Fire Station	Adjusted PM V/C
⌘	Hospital	0.00 - 0.01
⌘	Library	0.02 - 0.80
⌘	Lynx Station	0.81 - 1.00
⌘	Police Station	1.01 - 1.25
⌘	Post Office	Railroad
⌘	Recreation Center	Lynx Blue Line
⌘	School	Transmission Line
⌘	Solid Waste Facility	Map Grid
⌘	Utility Pole	Conservation Tax Credit Property
⌘	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 500 Feet  
1 inch = 500 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 3-2-2-3 Alternative 3 Hour Peak Volume/Capacity Ratios

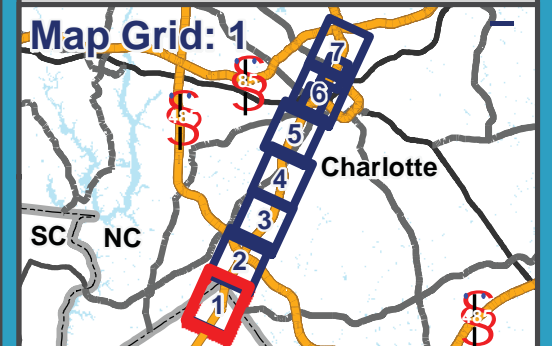
## I-77 Feasibility Study Project No. FS-0810A

August 2014

### Legend

S	Cell Tower	Adjusted AM V/C
i	Cemetery	0.00 - 0.01
⛔	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⦿	EMS	1.01 - 1.25
⦿	Fire Station	Adjusted PM V/C
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
⦿	Police Station	1.01 - 1.25
⦿	Post Office	Railroad
⦿	Recreation Center	Lynx Blue Line
4	School	Transmission Line
⦿	Solid Waste Facility	Map Grid
⦿	Utility Pole	Conservation Tax Credit Property
⦿	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 3-2-2-3 Alternative 3 Hour Peak Volume/Capacity Ratios

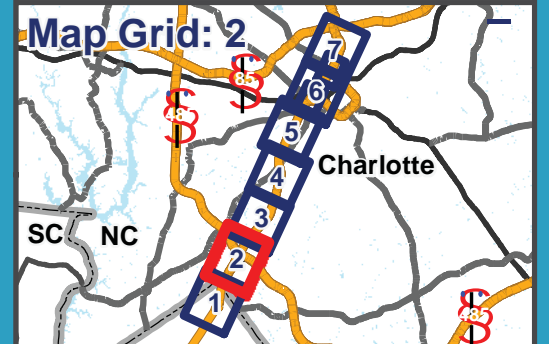
## I-77 Feasibility Study Project No. FS-0810A

August 2014

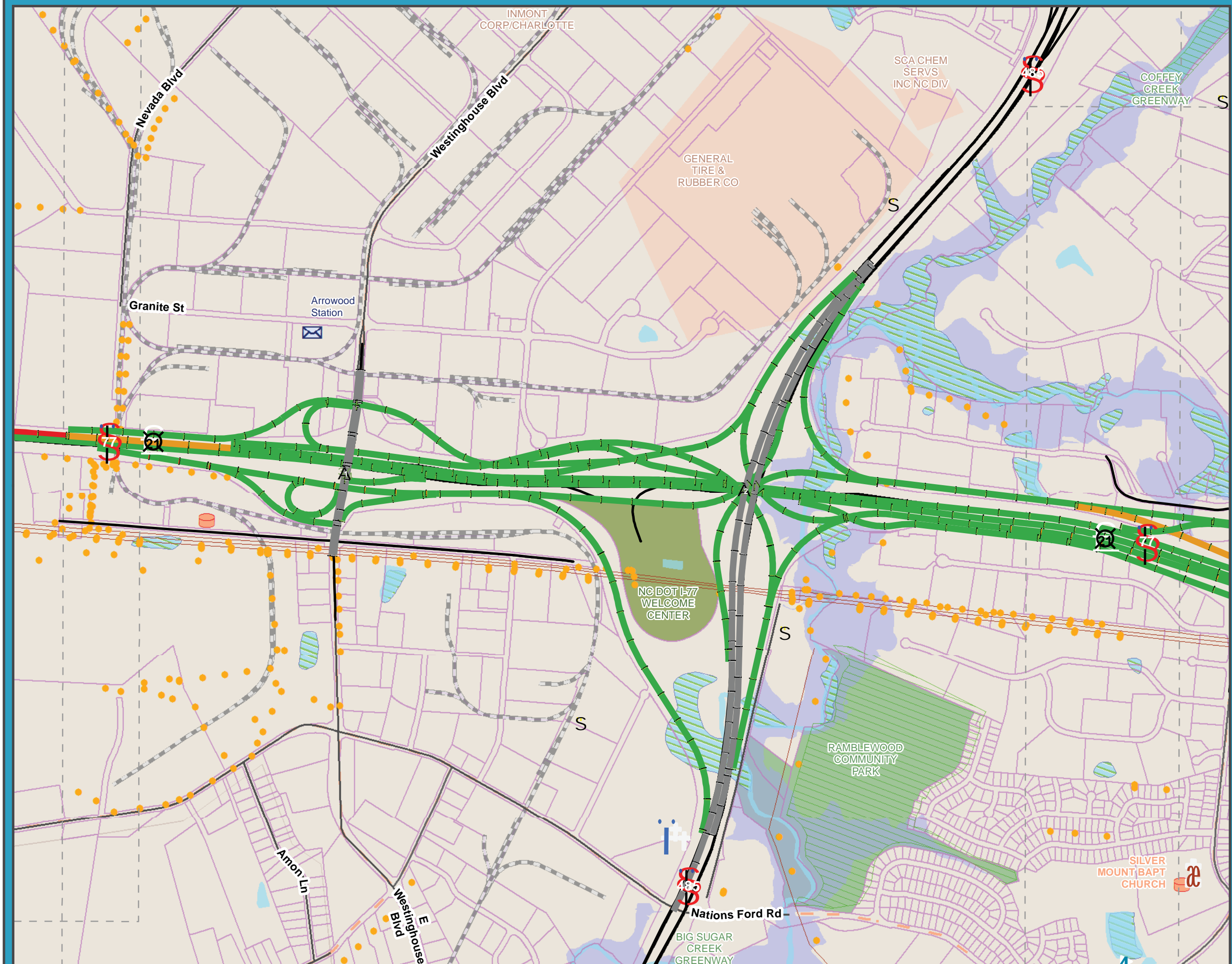
### Legend

S	Cell Tower	Adjusted AM V/C
Cemetery		0.00 - 0.01
Church		0.02 - 0.80
College/Universities		0.81 - 1.00
EMS		1.01 - 1.25
Fire Station		Adjusted PM V/C
Hospital		0.00 - 0.01
Library		0.02 - 0.80
Lynx Station		0.81 - 1.00
Police Station		1.01 - 1.25
Post Office		Railroad
Recreation Center		Lynx Blue Line
School		Transmission Line
Solid Waste Facility		Map Grid
Utility Pole		Conservation Tax Credit Property
Bike Route		Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 3-2-2-3 Alternative 3 Hour Peak Volume/Capacity Ratios

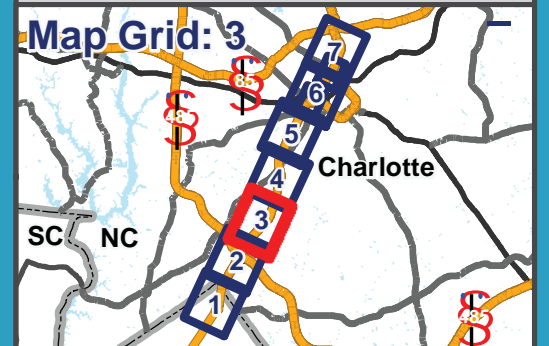
## I-77 Feasibility Study Project No. FS-0810A

August 2014

### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
C	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⦿	EMS	1.01 - 1.25
⦿	Fire Station	<b>Adjusted PM V/C</b>
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
o	Police Station	1.01 - 1.25
O	Post Office	Railroad
Y	Recreation Center	Lynx Blue Line
4	School	Transmission Line
T	Solid Waste Facility	Map Grid
⌘	Utility Pole	Conservation Tax Credit Property
⋯	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Park
		Parcel
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC









# 2035 Build 3-2-2-3 Alternative 3 Hour Peak Volume/Capacity Ratios

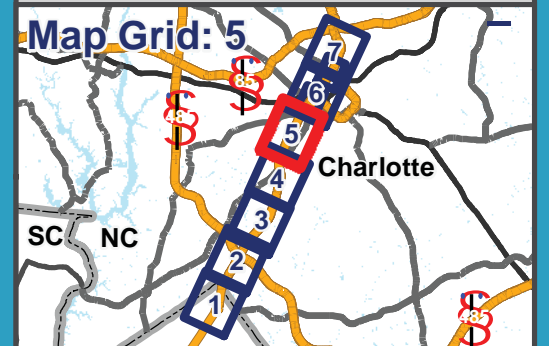
## I-77 Feasibility Study Project No. FS-0810A

August 2014

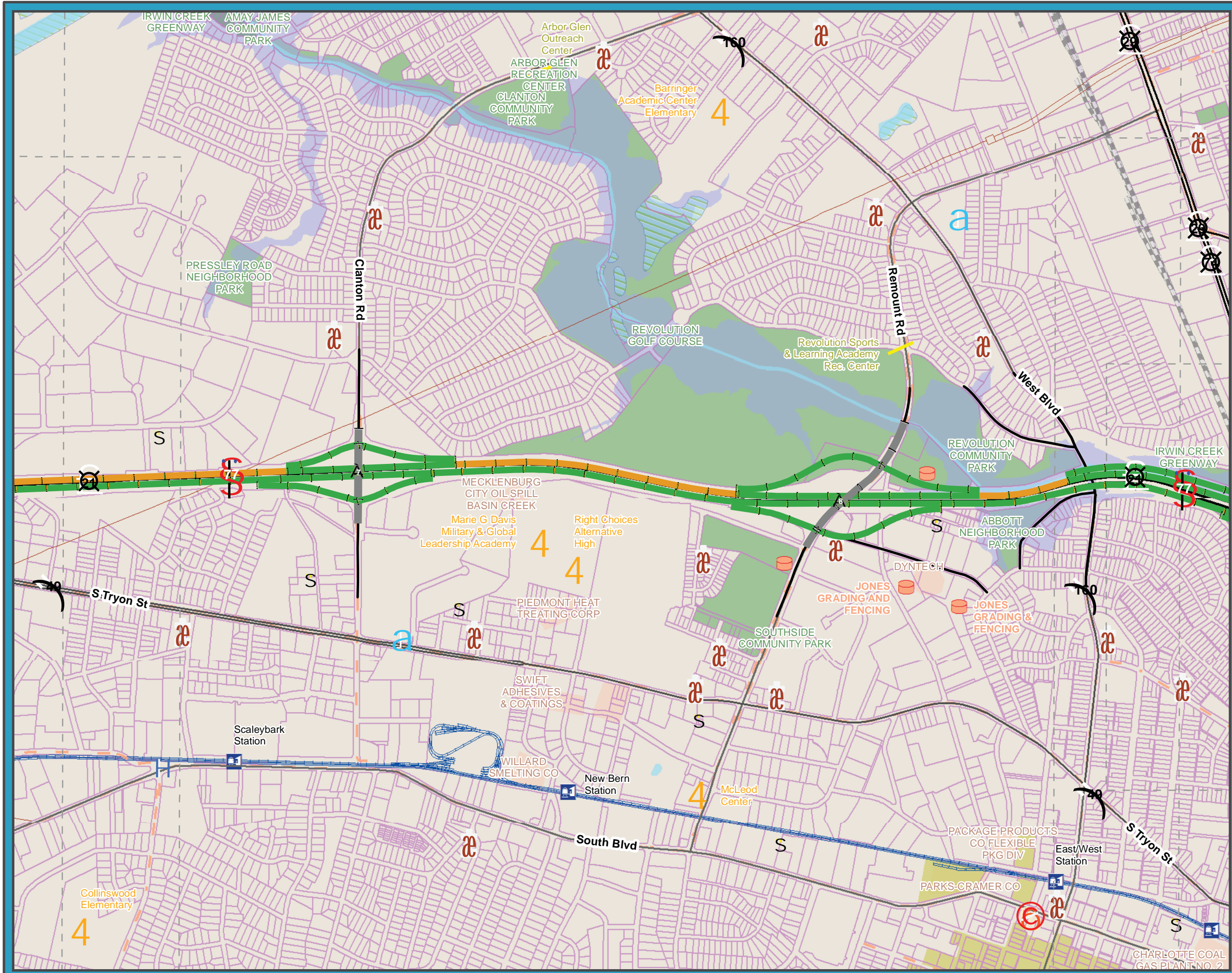
### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
	Cemetery	0.00 - 0.01
	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
	EMS	1.01 - 1.25
	Fire Station	<b>Adjusted PM V/C</b>
	Hospital	0.00 - 0.01
	Library	0.02 - 0.80
	Lynx Station	0.81 - 1.00
	Police Station	1.01 - 1.25
	Post Office	Railroad
	Recreation Center	Lynx Blue Line
	School	Transmission Line
	Solid Waste Facility	Map Grid
	Utility Pole	Conservation Tax Credit Property
	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Park
		Parcel
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 3-2-2-3 Alternative 3 Hour Peak Volume/Capacity Ratios

I-77 Feasibility Study  
Project No. FS-0810A

August 2014

S

Cell Tower

Cemetery

Church

College/Universities

EMS

Fire Station

Hospital

Library

Lynx Station

Police Station

Post Office

Recreation Center

School

Solid Waste Facility

Utility Pole

Bike Route

Adjusted AM V/C

Adjusted PM V/C

0.00 - 0.01

0.02 - 0.80

0.81 - 1.00

1.01 - 1.25

Railroad

Lynx Blue Line

Transmission Line

Map Grid

Conservation Tax Credit Property

Federal Land Ownership

Hazardous Materials Site

Historic Resource

Lands Managed Conservation

Parcel

Park

State Boundary

State Owned Land

Waterbody

Wetland

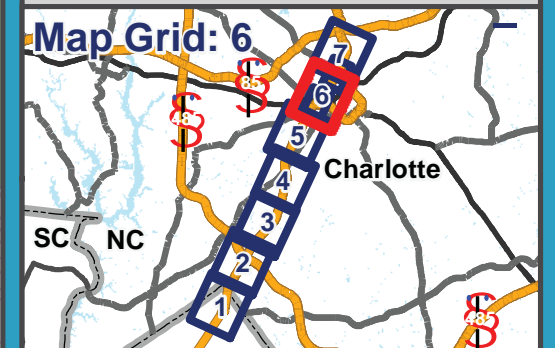
100 Year Floodplain

0

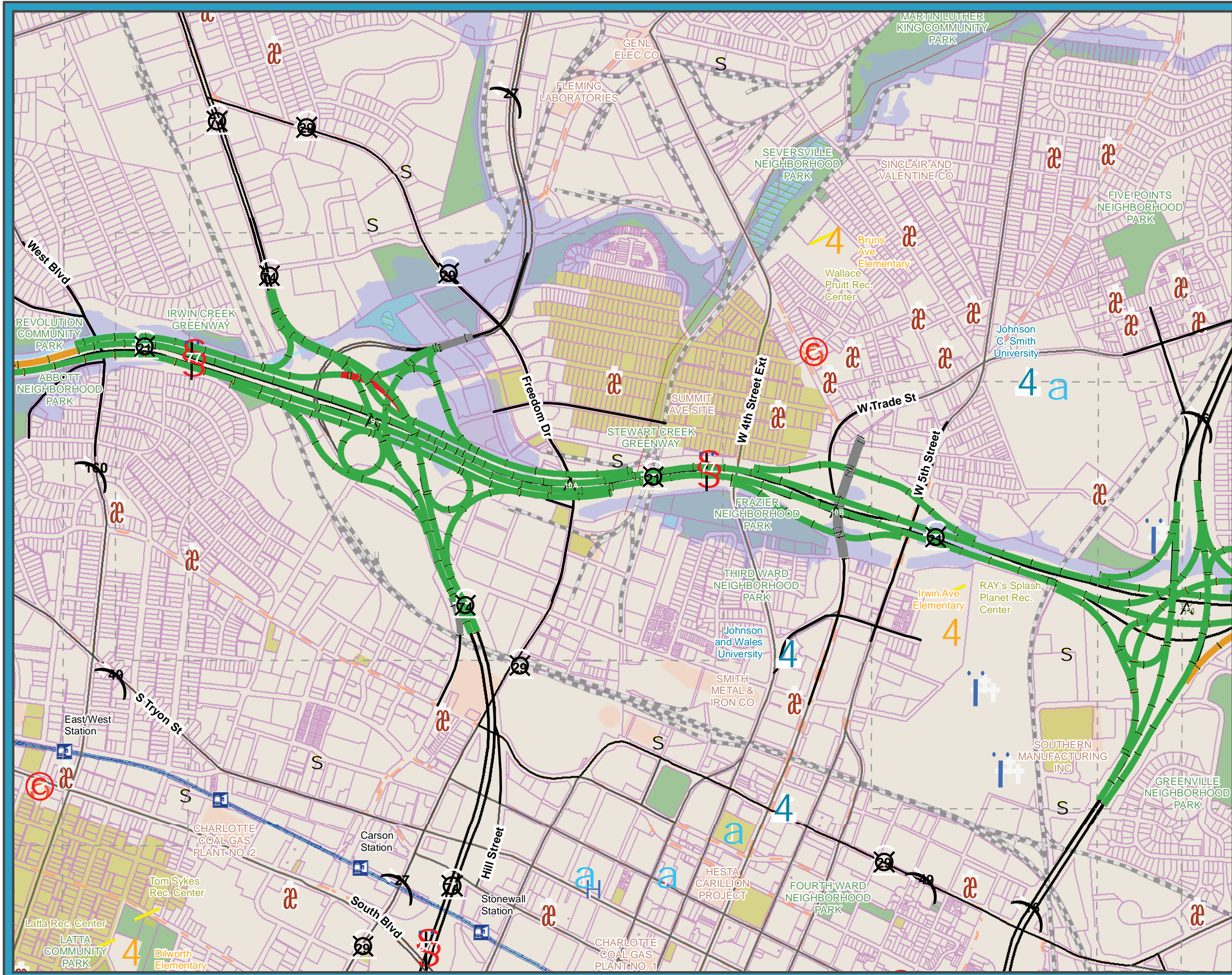
1,000

Feet

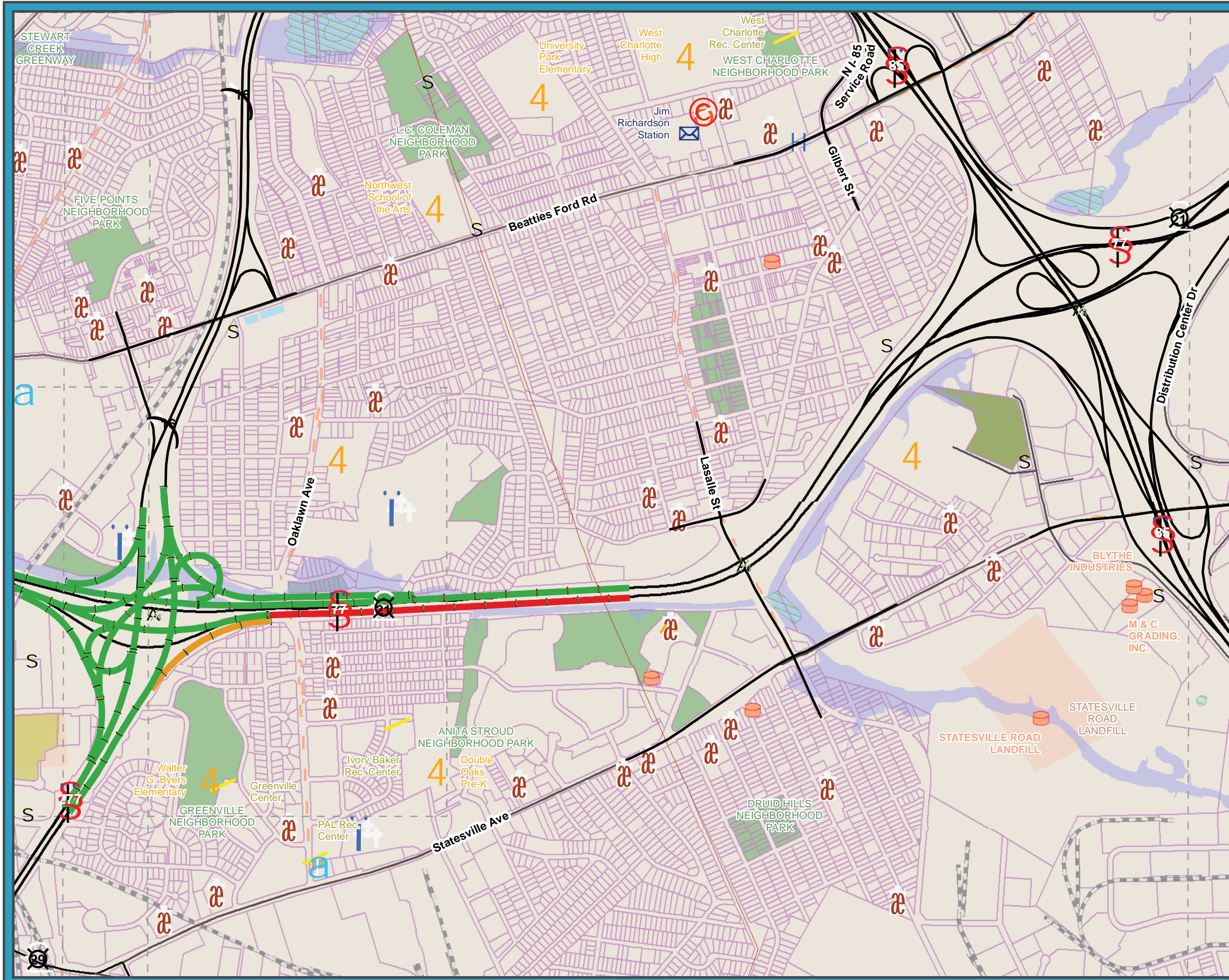
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC







### 2035 Build 3-2-2-3 Alternative 3 Hour Peak Volume/Capacity Ratios

#### I-77 Feasibility Study Project No. FS-0810A

August 2014

**Legend**

S	Cell Tower	<b>Adjusted AM V/C</b>
i	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⦿	EMS	1.01 - 1.25
⦿	Fire Station	<b>Adjusted PM V/C</b>
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
a	Police Station	1.01 - 1.25
O	Post Office	— Railroad
—	Recreation Center	— Lynx Blue Line
—	School	— Transmission Line
⦿	Solid Waste Facility	— Map Grid
—	Utility Pole	— Conservation Tax Credit Property
—	Bike Route	— Federal Land Ownership
		— Hazardous Materials Site
		— Historic Resource
		— Lands Managed Conservation
		— Parcel
		— Park
		— State Boundary
		— State Owned Land
		— Waterbody
		— Wetland
		— 100 Year Floodplain

0 1,000 Feet

1 inch = 1,000 feet

**Map Grid: 7**

This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC



# 2035 Build 3-2-2-3 Alternative 3 Hour Peak Volume/Capacity Ratios

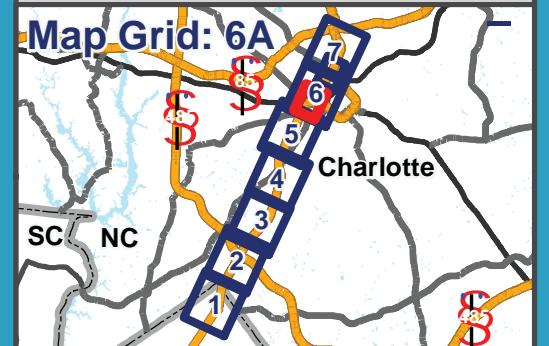
## I-77 Feasibility Study Project No. FS-0810A

August 2014

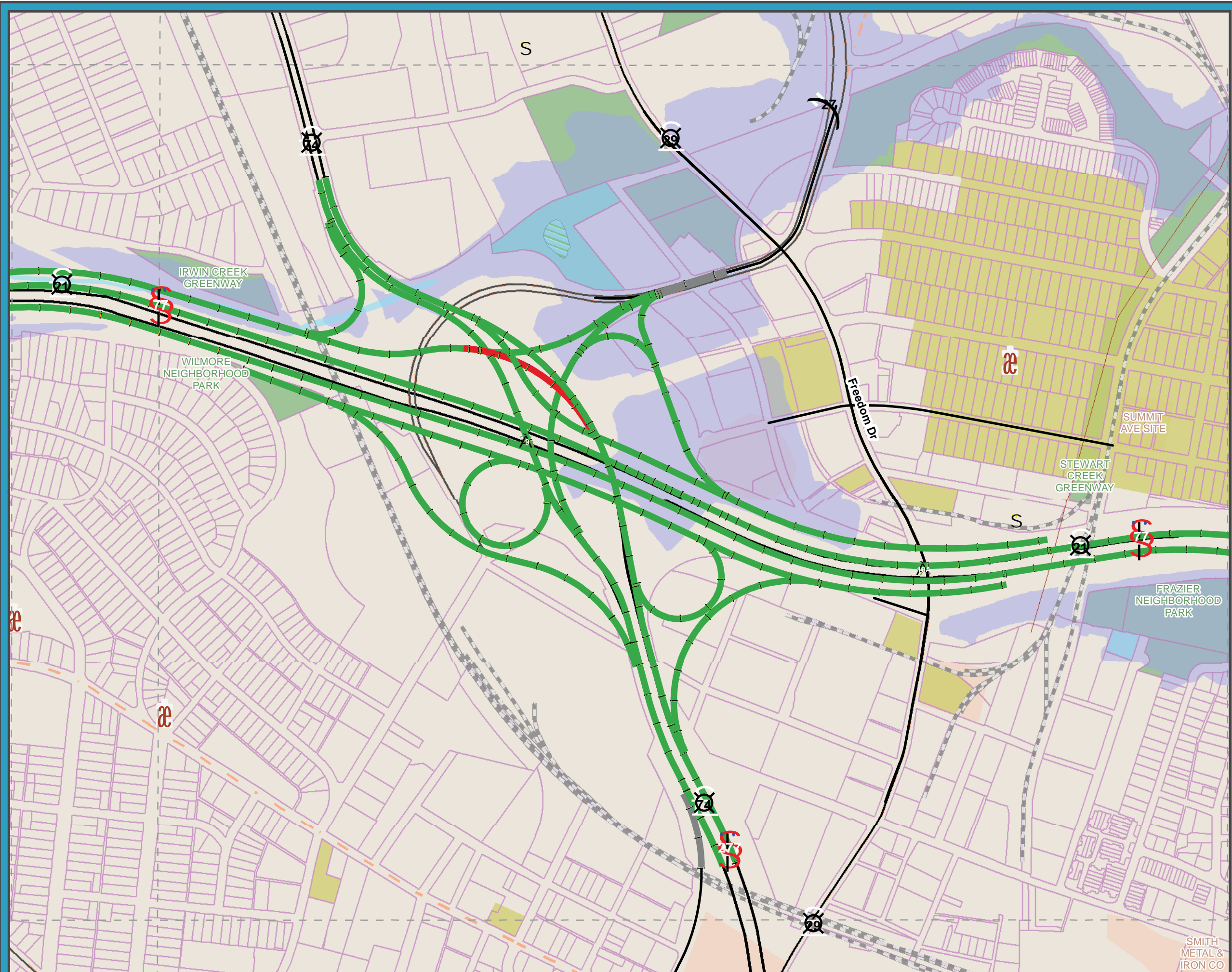
### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
	Cemetery	0.00 - 0.01
	Church	0.02 - 0.80
	College/Universities	0.81 - 1.00
	EMS	1.01 - 1.25
	Fire Station	<b>Adjusted PM V/C</b>
	Hospital	0.00 - 0.01
	Library	0.02 - 0.80
	Lynx Station	0.81 - 1.00
	Police Station	1.01 - 1.25
	Post Office	Railroad
	Recreation Center	Lynx Blue Line
	School	Transmission Line
	Solid Waste Facility	Map Grid
	Utility Pole	Conservation Tax Credit Property
	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 500 Feet  
1 inch = 500 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC



SMITH  
METAL &  
IRON CO



# 2035 Build 3-2-2-3 Alternative 3 Hour Peak Volume/Capacity Ratios

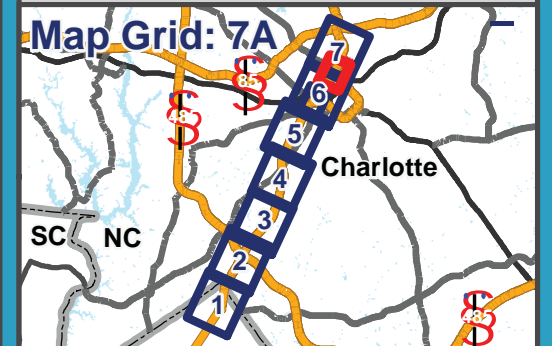
## I-77 Feasibility Study Project No. FS-0810A

August 2014

### Legend

S	Cell Tower	Adjusted AM V/C
⌘	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
⌘	College/Universities	0.81 - 1.00
⌘	EMS	1.01 - 1.25
⌘	Fire Station	Adjusted PM V/C
⌘	Hospital	0.00 - 0.01
⌘	Library	0.02 - 0.80
⌘	Lynx Station	0.81 - 1.00
⌘	Police Station	1.01 - 1.25
⌘	Post Office	Railroad
⌘	Recreation Center	Lynx Blue Line
⌘	School	Transmission Line
⌘	Solid Waste Facility	Map Grid
⌘	Utility Pole	Conservation Tax Credit Property
⌘	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 500 Feet  
1 inch = 500 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 4-2-2-4 Alternative Peak Hour Volume/Capacity Ratios

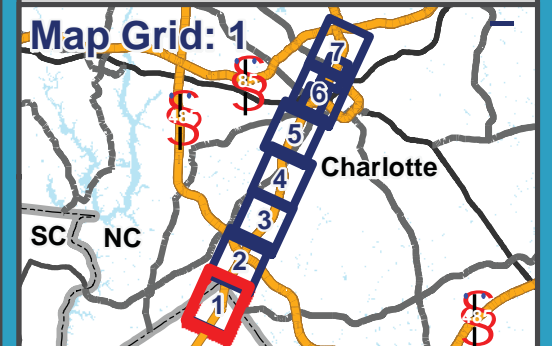
## I-77 Feasibility Study Project No. FS-0810A

August 2014

### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
i	Cemetery	0.00 - 0.01
⛔	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⦿	EMS	1.01 - 1.25
⦿	Fire Station	<b>Adjusted PM V/C</b>
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
⦿	Police Station	1.01 - 1.25
⦿	Post Office	— Railroad
⦿	Recreation Center	— Lynx Blue Line
4	School	— Transmission Line
⦿	Solid Waste Facility	— Map Grid
⦿	Utility Pole	— Conservation Tax Credit Property
—	Bike Route	— Federal Land Ownership
		— Hazardous Materials Site
		— Historic Resource
		— Lands Managed Conservation
		— Parcel
		— Park
		— State Boundary
		— State Owned Land
		— Waterbody
		— Wetland
		— 100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 4-2-2-4 Alternative Peak Hour Volume/Capacity Ratios

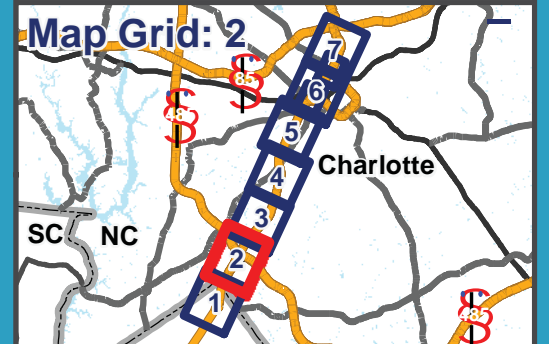
## I-77 Feasibility Study Project No. FS-0810A

August 2014

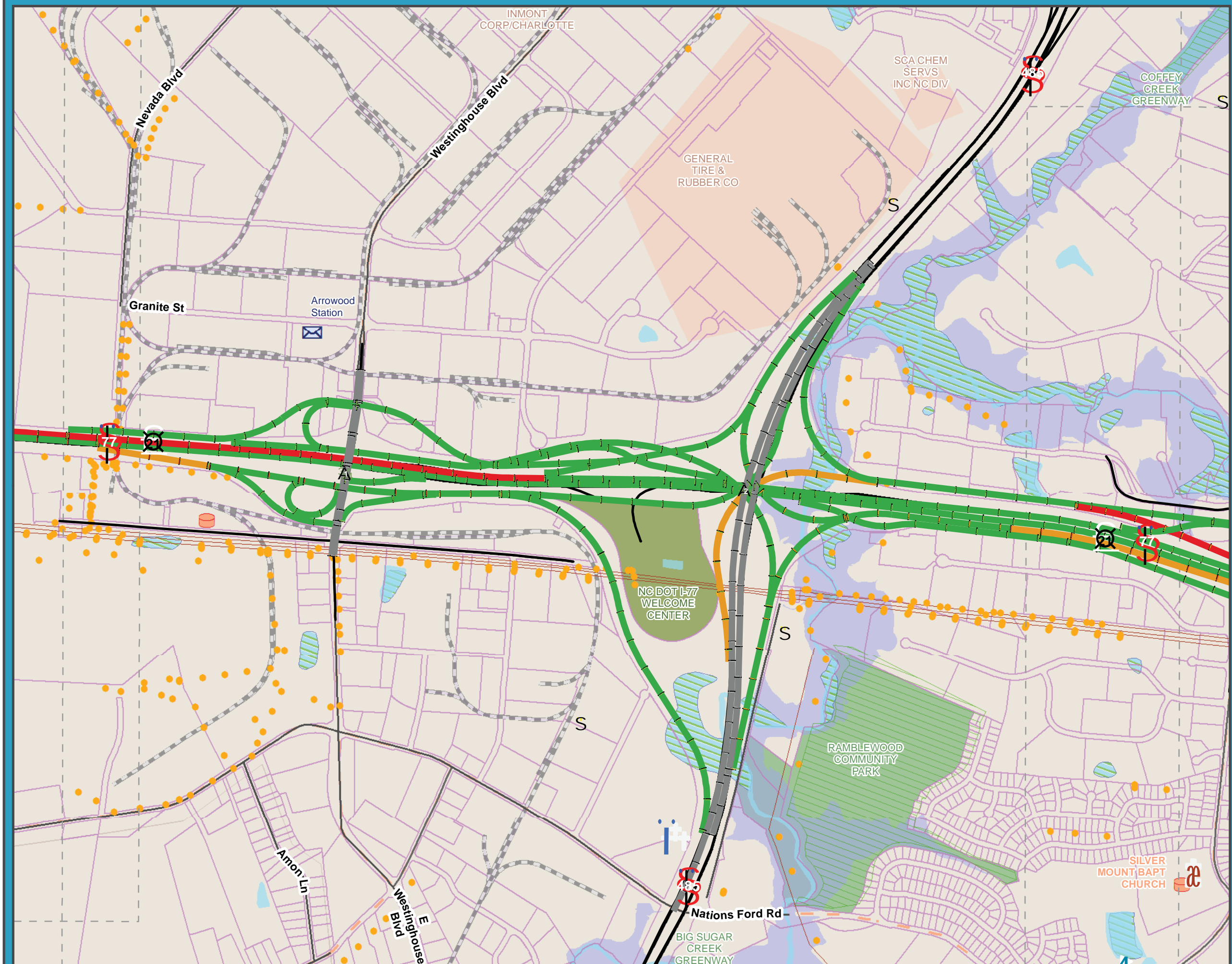
### Legend

S	Cell Tower	Adjusted AM V/C
Cemetery		0.00 - 0.01
Church		0.02 - 0.80
College/Universities		0.81 - 1.00
EMS		1.01 - 1.25
Fire Station		Adjusted PM V/C
Hospital		0.00 - 0.01
Library		0.02 - 0.80
Lynx Station		0.81 - 1.00
Police Station		1.01 - 1.25
Post Office		Railroad
Recreation Center		Lynx Blue Line
School		Transmission Line
Solid Waste Facility		Map Grid
Utility Pole		Conservation Tax Credit Property
Bike Route		Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 4-2-2-4 Alternative Peak Hour Volume/Capacity Ratios

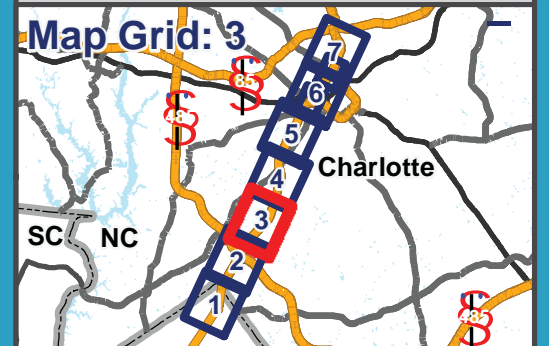
## I-77 Feasibility Study Project No. FS-0810A

August 2014

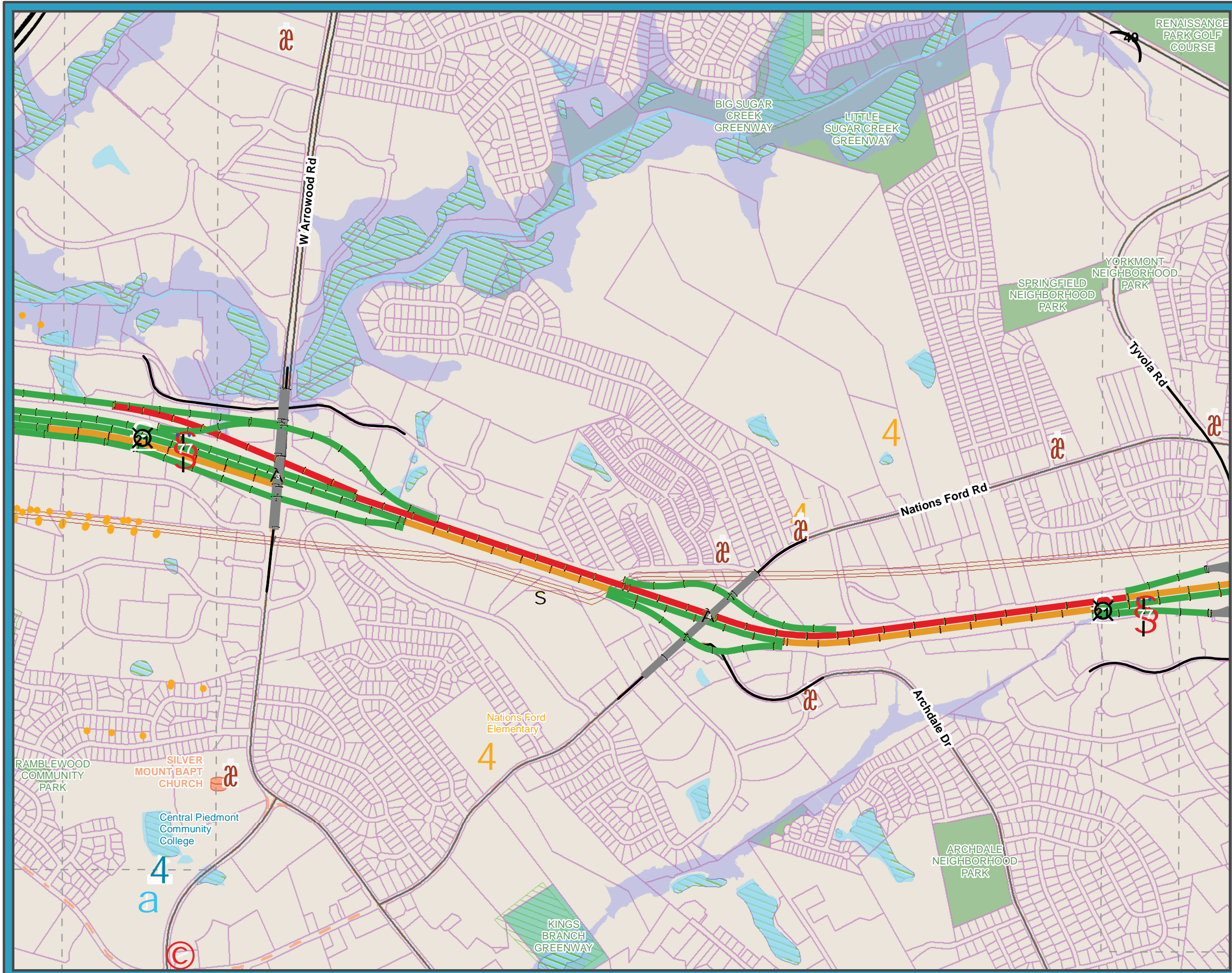
### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
C	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⊙	EMS	1.01 - 1.25
⊙	Fire Station	<b>Adjusted PM V/C</b>
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
o	Police Station	1.01 - 1.25
O	Post Office	Railroad
Y	Recreation Center	Lynx Blue Line
4	School	Transmission Line
T	Solid Waste Facility	Map Grid
⌘	Utility Pole	Conservation Tax Credit Property
⋯	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 4-2-2-4 Alternative Peak Hour Volume/Capacity Ratios

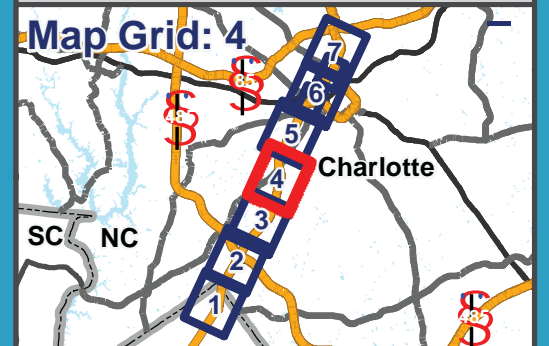
## I-77 Feasibility Study Project No. FS-0810A

August 2014

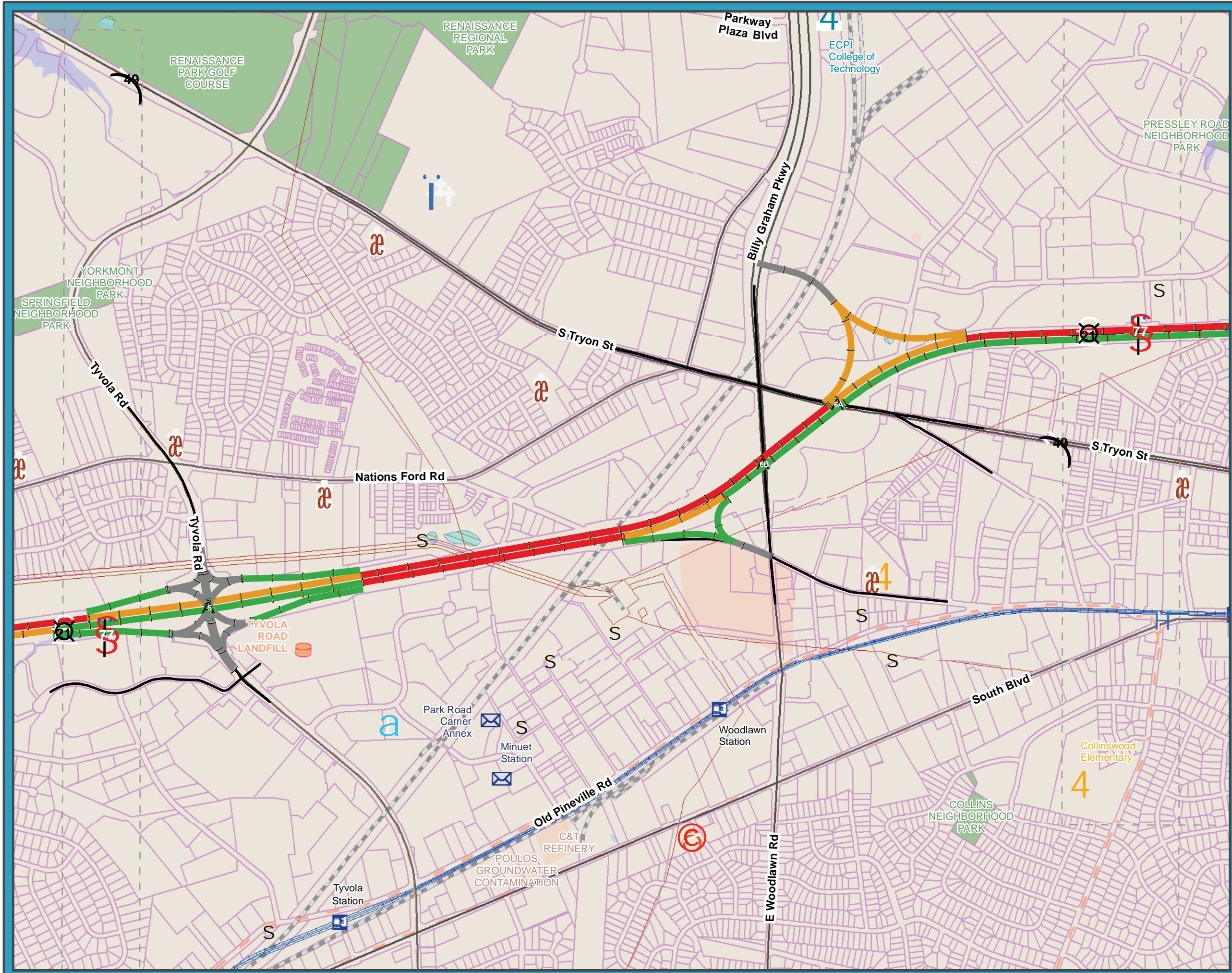
### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
⌂	Cemetery	0.00 - 0.01
⌂	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⚡	EMS	1.01 - 1.25
🚒	Fire Station	<b>Adjusted PM V/C</b>
🏥	Hospital	0.00 - 0.01
📖	Library	0.02 - 0.80
🚏	Lynx Station	0.81 - 1.00
🚓	Police Station	1.01 - 1.25
📬	Post Office	— Railroad
🏠	Recreation Center	— Lynx Blue Line
🎓	School	— Transmission Line
🗑️	Solid Waste Facility	— Map Grid
🔌	Utility Pole	— Conservation Tax Credit Property
🚲	Bike Route	— Federal Land Ownership
		— Hazardous Materials Site
		— Historic Resource
		— Lands Managed Conservation
		— Parcel
		— Park
		— State Boundary
		— State Owned Land
		— Waterbody
		— Wetland
		— 100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC
































# 2035 Build 4-2-2-4 Alternative Peak Hour Volume/Capacity Ratios

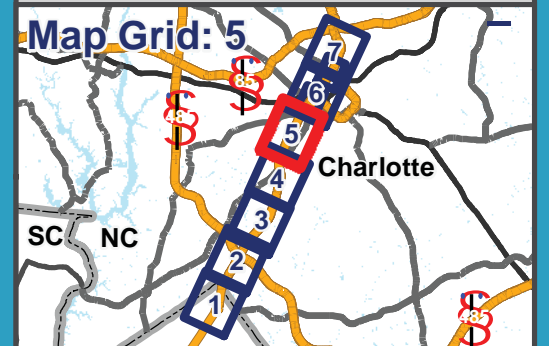
I-77 Feasibility Study  
Project No. FS-0810A

August 2014

## Legend

S	Cell Tower	<b>Adjusted AM V/C</b>	
	Cemetery		0.00 - 0.01
	Church		0.02 - 0.80
			0.81 - 1.00
			1.01 - 1.25
4	College/Universities	<b>Adjusted PM V/C</b>	
	EMS		0.00 - 0.01
			0.02 - 0.80
	Fire Station		0.81 - 1.00
			1.01 - 1.25
K	Hospital		Railroad
H	Library		Lynx Blue Line
b	Lynx Station		Transmission Line
	Police Station		Map Grid
	Post Office		Conservation Tax Credit Property
			Federal Land Ownership
			Hazardous Materials Site
			Historic Resource
			Lands Managed Conservation
4	School		Parcel
			Park
	Solid Waste Facility		State Boundary
	Utility Pole		State Owned Land
	Bike Route		Waterbody
			Wetland
			100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 4-2-2-4 Alternative Peak Hour Volume/Capacity Ratios

I-77 Feasibility Study  
Project No. FS-0810A

August 2014

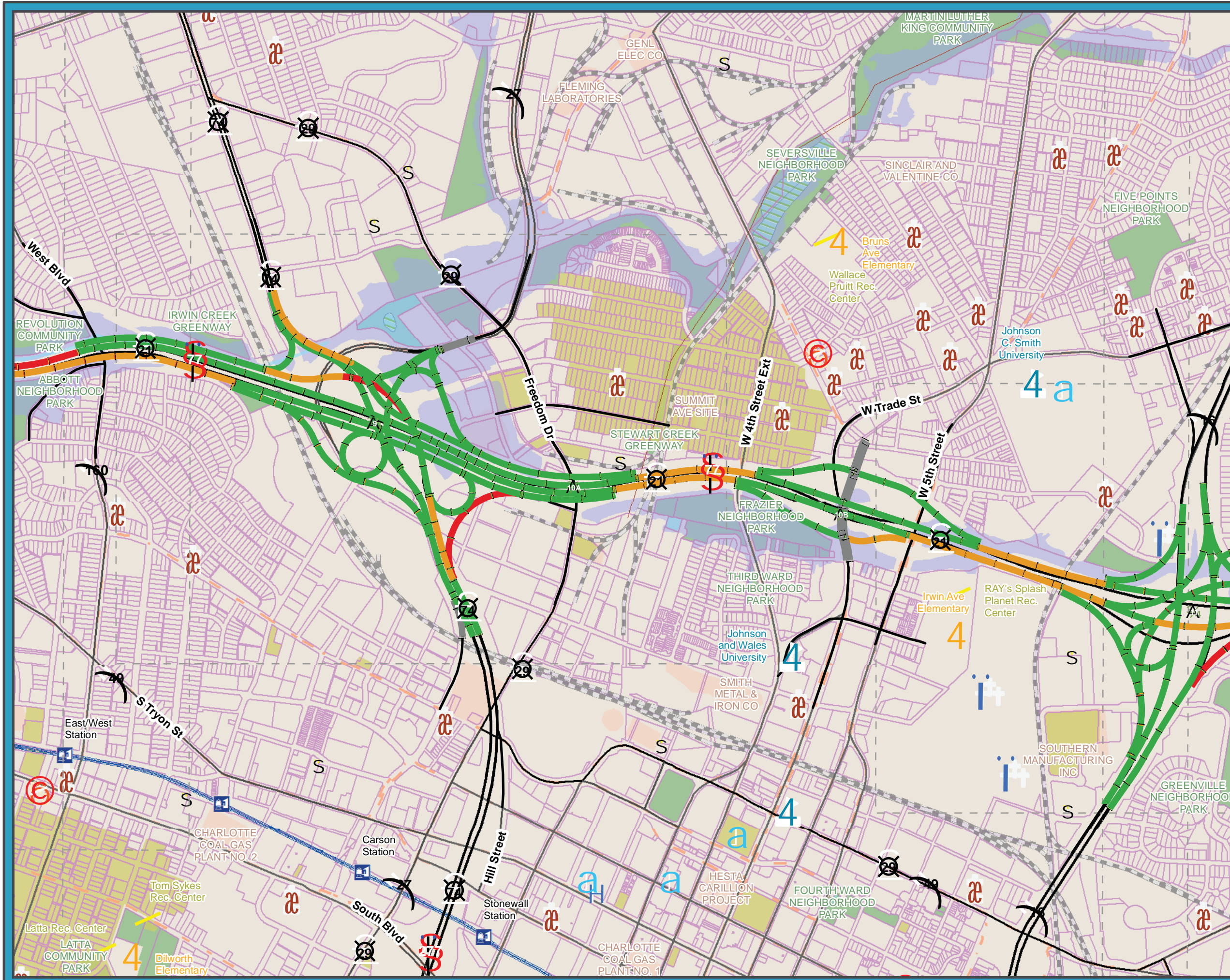
## Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
☠	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⊕	EMS	1.01 - 1.25
⊙	Fire Station	<b>Adjusted PM V/C</b>
Ⓚ	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
o	Police Station	1.01 - 1.25
⓪	Post Office	— Railroad
Ⓜ	Recreation Center	— Lynx Blue Line
4	School	— Transmission Line
Ⓜ	Solid Waste Facility	— Map Grid
Ⓜ	Utility Pole	— Conservation Tax Credit Property
—	Bike Route	— Federal Land Ownership
		— Hazardous Materials Site
		— Historic Resource
		— Lands Managed Conservation
		— Parcel
		— Park
		— State Boundary
		— State Owned Land
		— Waterbody
		— Wetland
		— 100 Year Floodplain

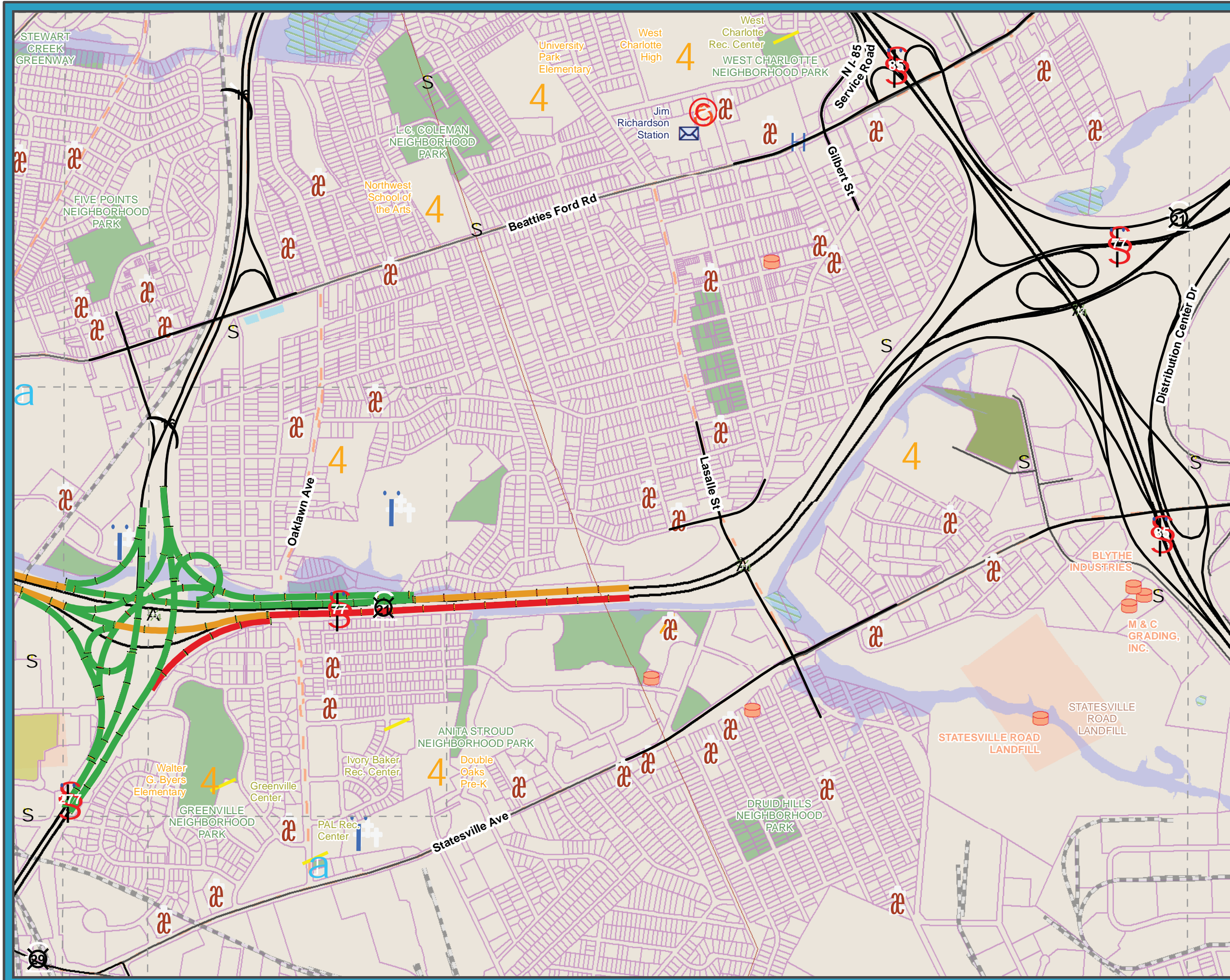
0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





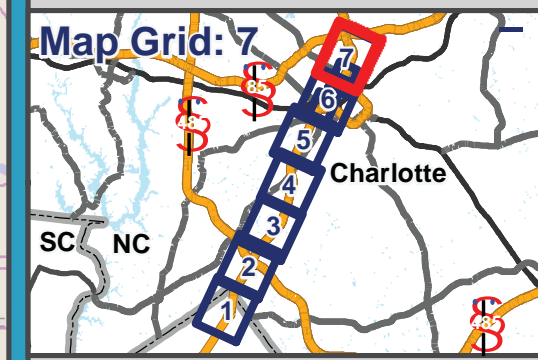
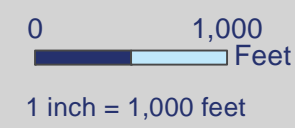


# 2035 Build 4-2-2-4 Alternative Peak Hour Volume/Capacity Ratios

I-77 Feasibility Study  
Project No. FS-0810A

August 2014

Legend	
S	Cell Tower
i	Cemetery
⌘	Church
4	College/Universities
⦿	EMS
⦿	Fire Station
K	Hospital
H	Library
b	Lynx Station
⦿	Police Station
⦿	Post Office
⦿	Recreation Center
4	School
⦿	Solid Waste Facility
⦿	Utility Pole
⦿	Bike Route
Adjusted AM V/C	
0.00 - 0.01	
0.02 - 0.80	
0.81 - 1.00	
1.01 - 1.25	
Adjusted PM V/C	
0.00 - 0.01	
0.02 - 0.80	
0.81 - 1.00	
1.01 - 1.25	
⦿	Railroad
⦿	Lynx Blue Line
⦿	Transmission Line
⦿	Map Grid
⦿	Conservation Tax Credit Property
⦿	Federal Land Ownership
⦿	Hazardous Materials Site
⦿	Historic Resource
⦿	Lands Managed Conservation
⦿	Parcel
⦿	Park
⦿	State Boundary
⦿	State Owned Land
⦿	Waterbody
⦿	Wetland
⦿	100 Year Floodplain



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 4-2-2-4 Alternative Peak Hour Volume/Capacity Ratios

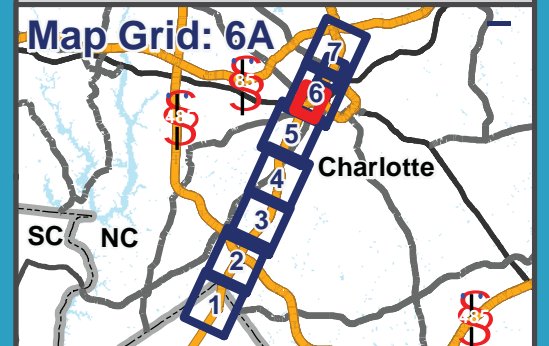
## I-77 Feasibility Study Project No. FS-0810A

August 2014

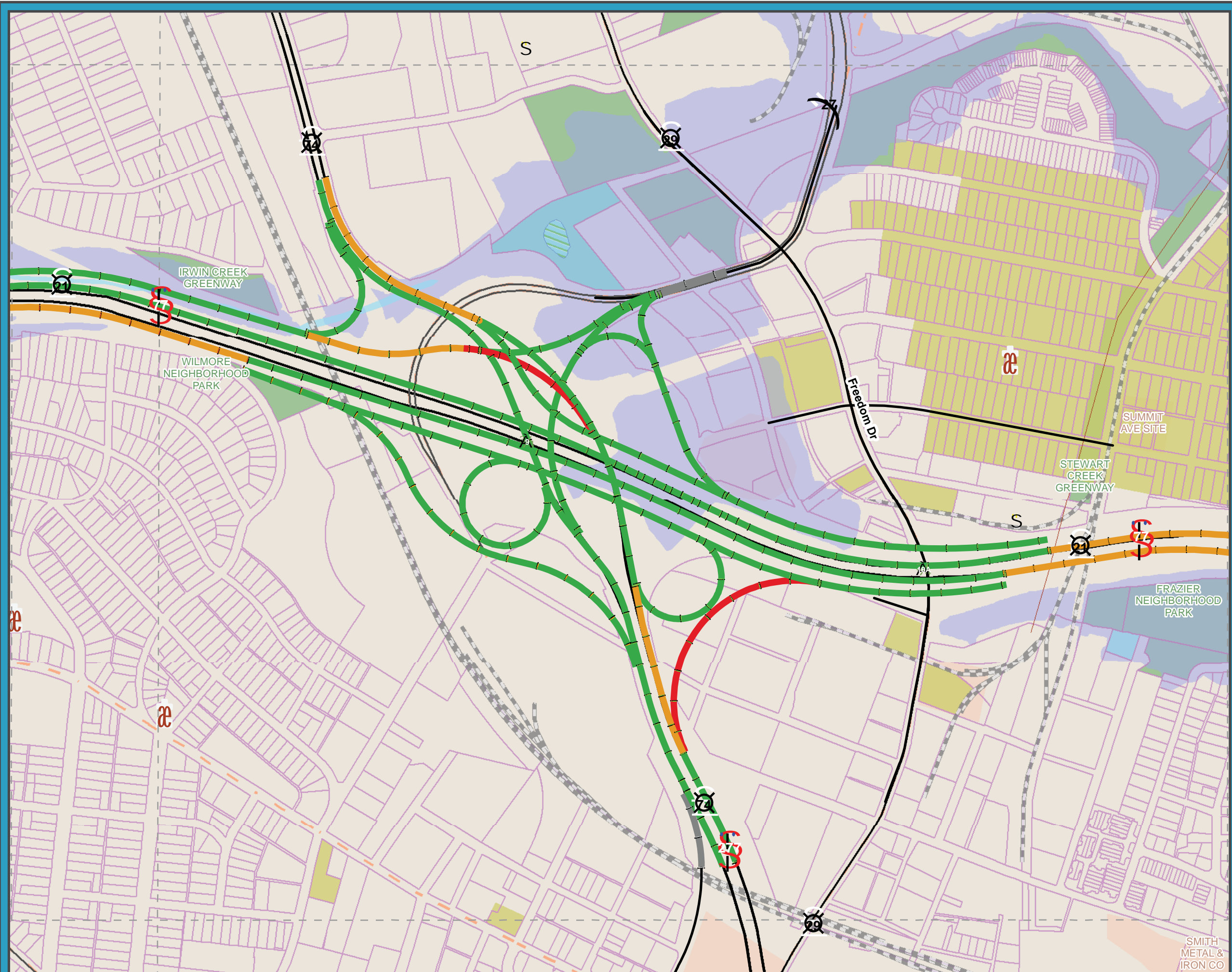
### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
	Cemetery	0.00 - 0.01
	Church	0.02 - 0.80
	College/Universities	0.81 - 1.00
	EMS	1.01 - 1.25
	Fire Station	
	Hospital	<b>Adjusted PM V/C</b>
	Library	0.00 - 0.01
	Lynx Station	0.02 - 0.80
	Police Station	0.81 - 1.00
	Post Office	1.01 - 1.25
	Recreation Center	
	School	Railroad
	Solid Waste Facility	Lynx Blue Line
	Utility Pole	Transmission Line
	Bike Route	Map Grid
		Conservation Tax Credit Property
		Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 500 Feet  
1 inch = 500 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC



SMITH  
METAL &  
IRON CO



# 2035 Build 4-2-2-4 Alternative Peak Hour Volume/Capacity Ratios

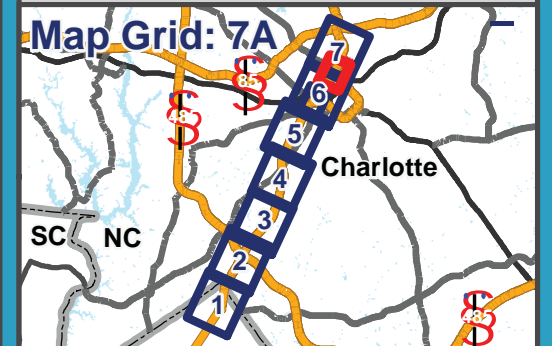
## I-77 Feasibility Study Project No. FS-0810A

August 2014

### Legend

S	Cell Tower	Adjusted AM V/C
⌘	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
⌘	College/Universities	0.81 - 1.00
⌘	EMS	1.01 - 1.25
⌘	Fire Station	Adjusted PM V/C
⌘	Hospital	0.00 - 0.01
⌘	Library	0.02 - 0.80
⌘	Lynx Station	0.81 - 1.00
⌘	Police Station	1.01 - 1.25
⌘	Post Office	Railroad
⌘	Recreation Center	Lynx Blue Line
⌘	School	Transmission Line
⌘	Solid Waste Facility	Map Grid
⌘	Utility Pole	Conservation Tax Credit Property
⌘	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 500 Feet  
1 inch = 500 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





**2035 Build 4-2-2-4  
Alternative 3 Hour Peak  
Volume/Capacity Ratios**

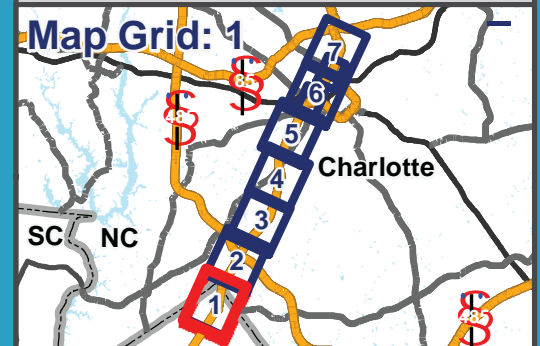
**I-77 Feasibility Study  
Project No. FS-0810A**

August 2014

**Legend**

S	Cell Tower	<b>Adjusted AM V/C</b>
i	Cemetery	0.00 - 0.01
⛔	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⦿	EMS	1.01 - 1.25
⦿	Fire Station	<b>Adjusted PM V/C</b>
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
⦿	Police Station	1.01 - 1.25
⦿	Post Office	— Railroad
⦿	Recreation Center	— Lynx Blue Line
4	School	— Transmission Line
⦿	Solid Waste Facility	— Map Grid
⦿	Utility Pole	— Conservation Tax Credit Property
—	Bike Route	— Federal Land Ownership
		— Hazardous Materials Site
		— Historic Resource
		— Lands Managed Conservation
		— Parcel
		— Park
		— State Boundary
		— State Owned Land
		— Waterbody
		— Wetland
		— 100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 4-2-2-4 Alternative 3 Hour Peak Volume/Capacity Ratios

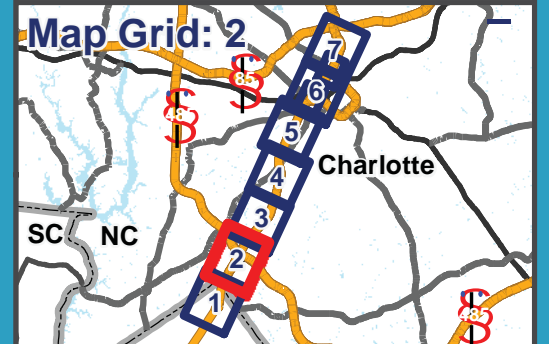
## I-77 Feasibility Study Project No. FS-0810A

August 2014

### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
	Cemetery	0.00 - 0.01
	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
	EMS	1.01 - 1.25
	Fire Station	<b>Adjusted PM V/C</b>
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
	Police Station	1.01 - 1.25
O	Post Office	Railroad
	Recreation Center	Lynx Blue Line
4	School	Transmission Line
	Solid Waste Facility	Map Grid
	Utility Pole	Conservation Tax Credit Property
	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 4-2-2-4 Alternative 3 Hour Peak Volume/Capacity Ratios

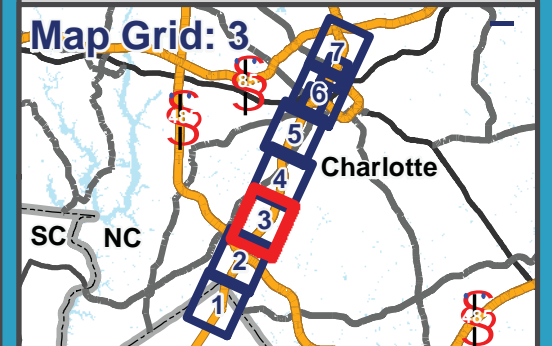
## I-77 Feasibility Study Project No. FS-0810A

August 2014

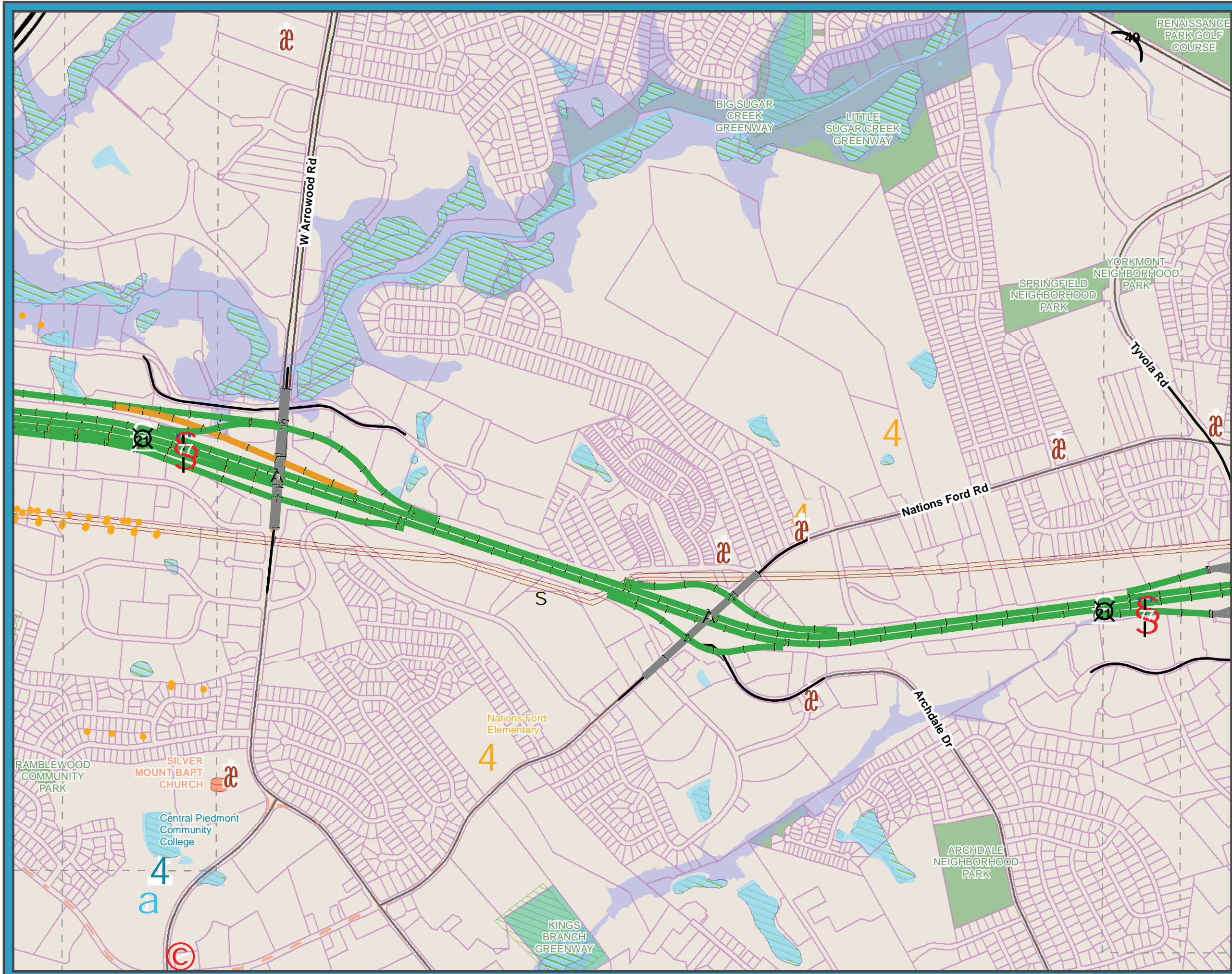
### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
C	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⊙	EMS	1.01 - 1.25
⊙	Fire Station	<b>Adjusted PM V/C</b>
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
o	Police Station	1.01 - 1.25
O	Post Office	Railroad
⌘	Recreation Center	Lynx Blue Line
4	School	Transmission Line
⌘	Solid Waste Facility	Map Grid
⌘	Utility Pole	Conservation Tax Credit Property
⌘	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 4-2-2-4 Alternative 3 Hour Peak Volume/Capacity Ratios

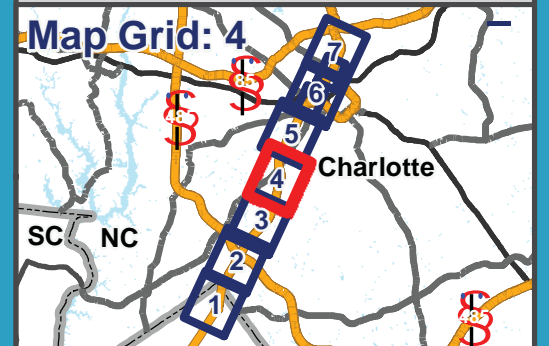
## I-77 Feasibility Study Project No. FS-0810A

August 2014

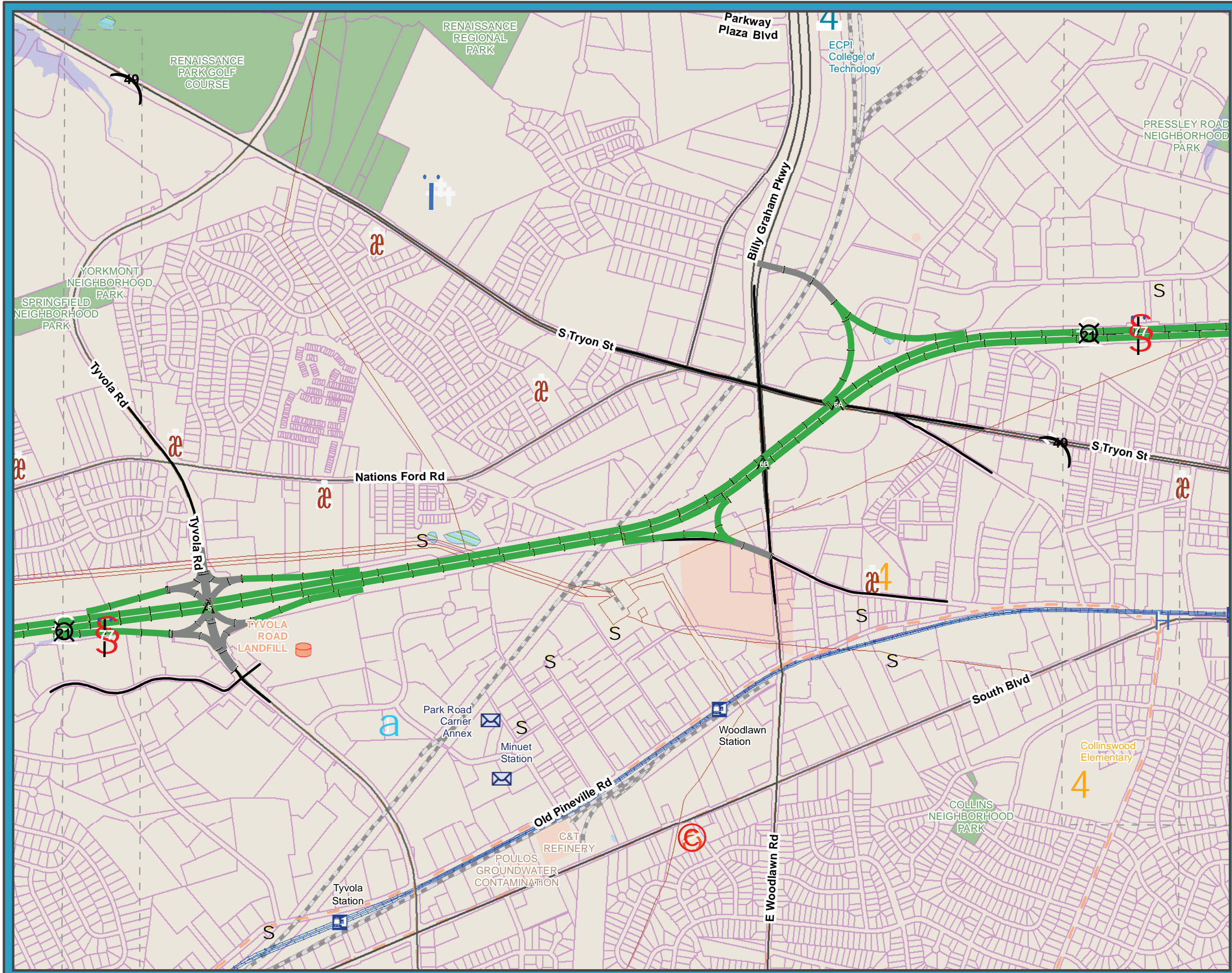
### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
⌂	Cemetery	0.00 - 0.01
⌂	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⚡	EMS	1.01 - 1.25
🚒	Fire Station	<b>Adjusted PM V/C</b>
🏥	Hospital	0.00 - 0.01
📖	Library	0.02 - 0.80
🚏	Lynx Station	0.81 - 1.00
🚓	Police Station	1.01 - 1.25
📮	Post Office	— Railroad
🏠	Recreation Center	— Lynx Blue Line
🎓	School	— Transmission Line
🗑️	Solid Waste Facility	— Map Grid
📶	Utility Pole	— Conservation Tax Credit Property
🚲	Bike Route	— Federal Land Ownership
		— Hazardous Materials Site
		— Historic Resource
		— Lands Managed Conservation
		— Parcel
		— Park
		— State Boundary
		— State Owned Land
		— Waterbody
		— Wetland
		— 100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 4-2-2-4 Alternative 3 Hour Peak Volume/Capacity Ratios

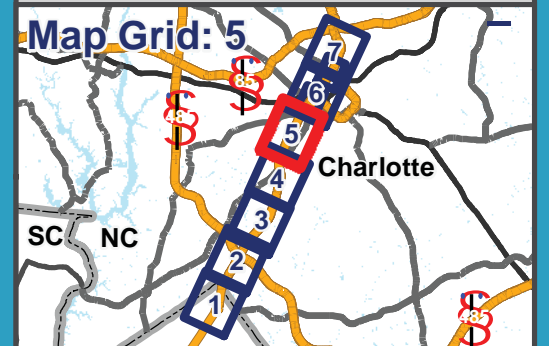
## I-77 Feasibility Study Project No. FS-0810A

August 2014

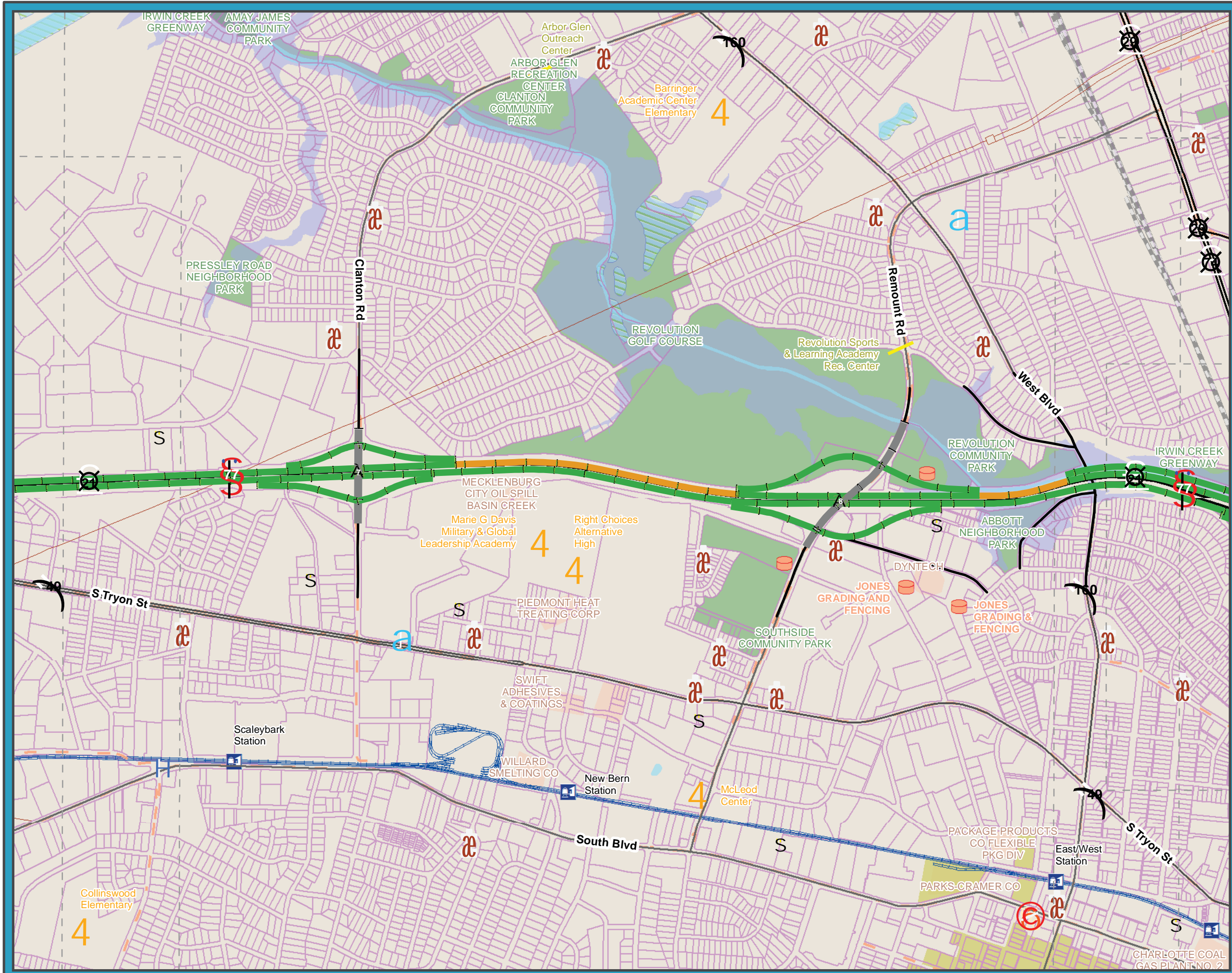
### Legend

S	Cell Tower	Adjusted AM V/C
☠	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⦿	EMS	1.01 - 1.25
⦿	Fire Station	Adjusted PM V/C
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
⦿	Police Station	1.01 - 1.25
⦿	Post Office	Railroad
⦿	Recreation Center	Lynx Blue Line
4	School	Transmission Line
⦿	Solid Waste Facility	Map Grid
⦿	Utility Pole	Conservation Tax Credit Property
⦿	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was retrieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 4-2-2-4 Alternative 3 Hour Peak Volume/Capacity Ratios

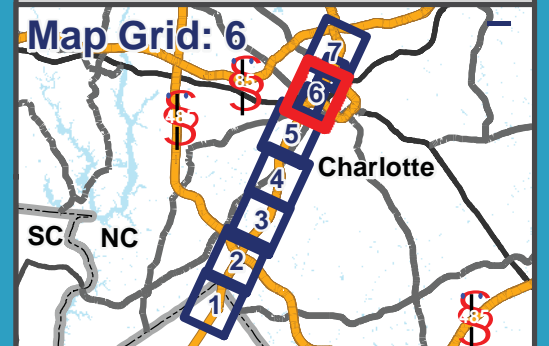
## I-77 Feasibility Study Project No. FS-0810A

August 2014

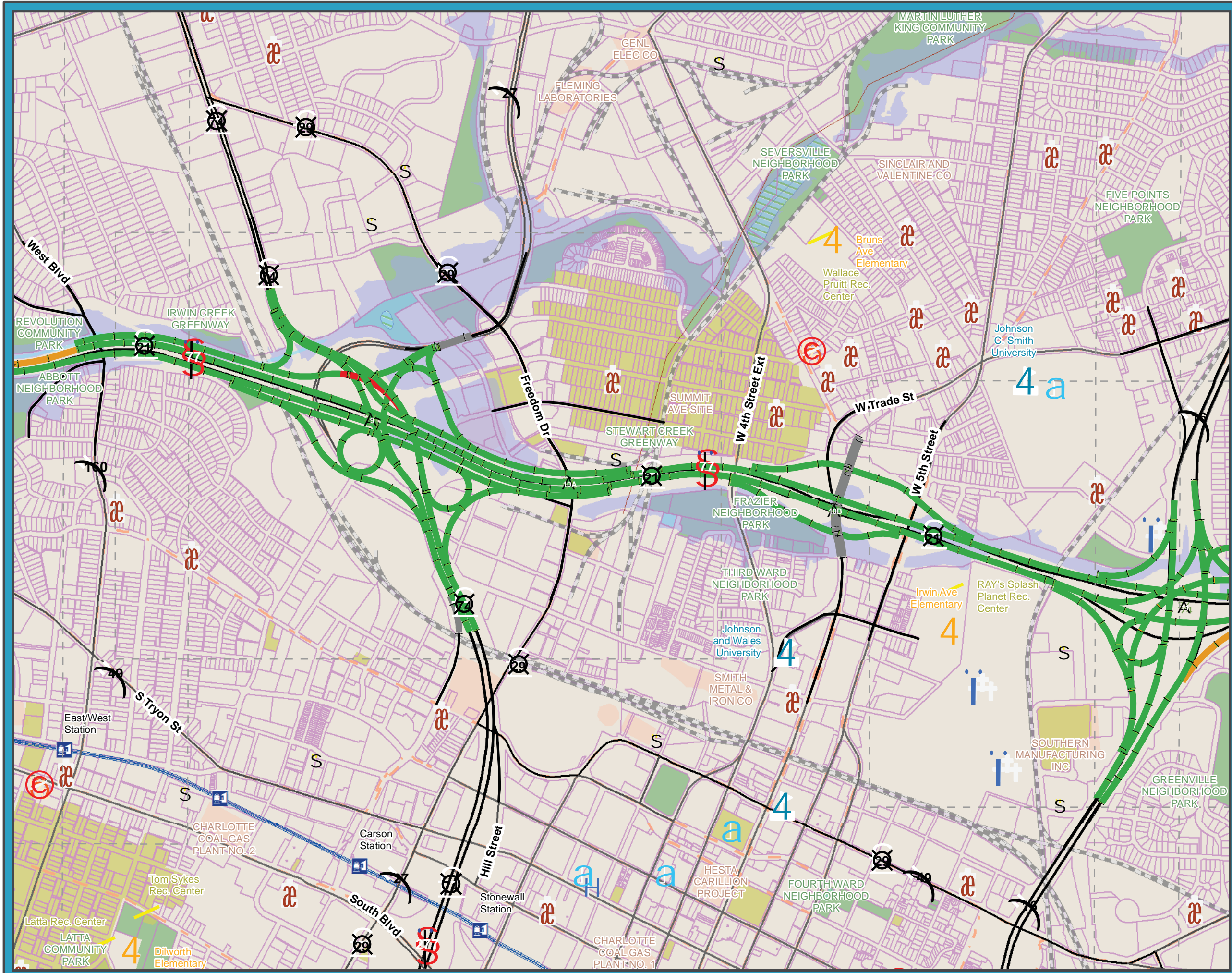
### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
⌂	Cemetery	0.00 - 0.01
⌂	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⌂	EMS	1.01 - 1.25
⌂	Fire Station	<b>Adjusted PM V/C</b>
⌂	Hospital	0.00 - 0.01
⌂	Library	0.02 - 0.80
⌂	Lynx Station	0.81 - 1.00
⌂	Police Station	1.01 - 1.25
⌂	Post Office	— Railroad
⌂	Recreation Center	— Lynx Blue Line
4	School	— Transmission Line
⌂	Solid Waste Facility	— Map Grid
⌂	Utility Pole	— Conservation Tax Credit Property
⌂	Bike Route	— Federal Land Ownership
		— Hazardous Materials Site
		— Historic Resource
		— Lands Managed Conservation
		— Parcel
		— Park
		— State Boundary
		— State Owned Land
		— Waterbody
		— Wetland
		— 100 Year Floodplain

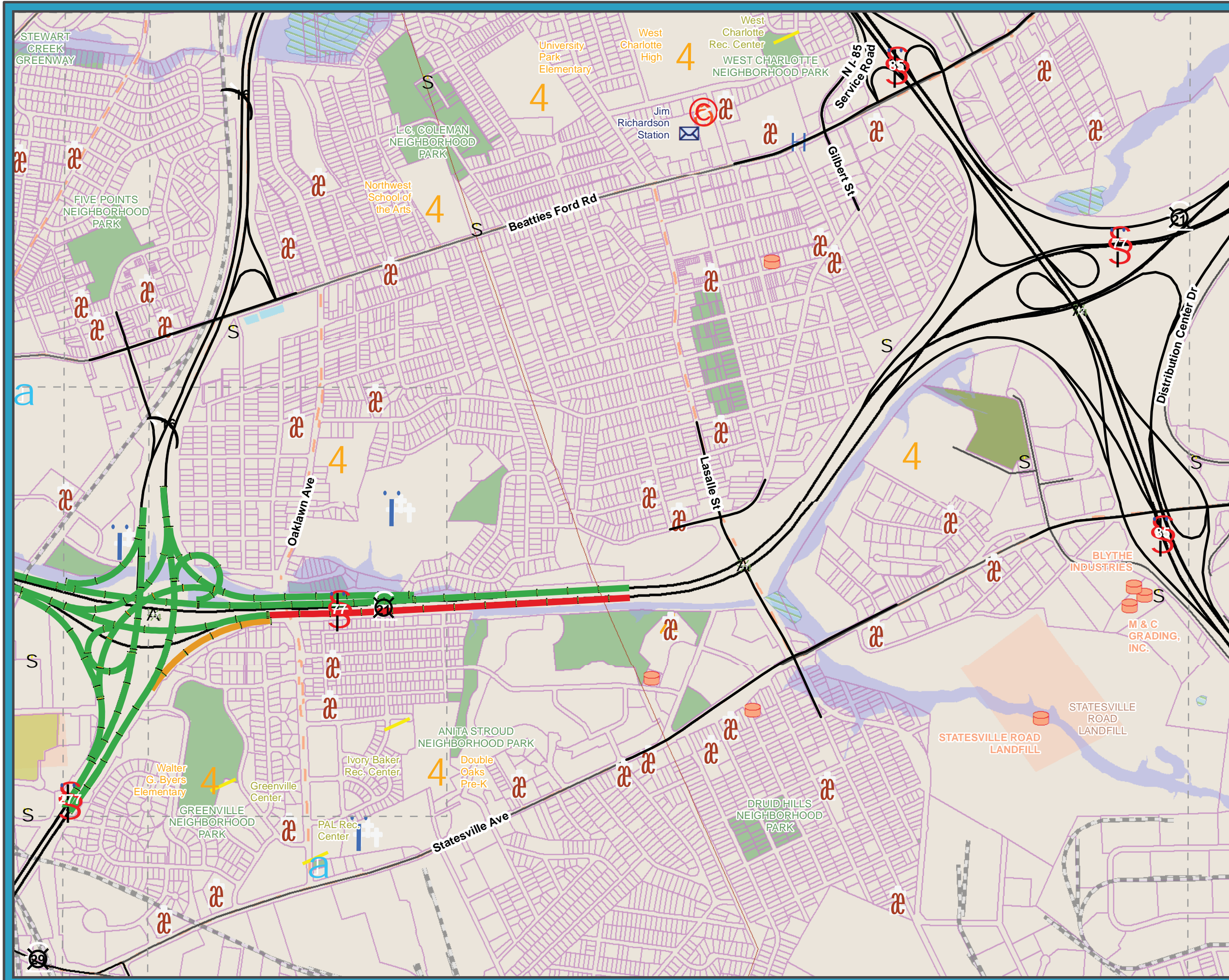
0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC







### 2035 Build 4-2-2-4 Alternative 3 Hour Peak Volume/Capacity Ratios

#### I-77 Feasibility Study Project No. FS-0810A

August 2014

**Legend**

S	Cell Tower	<b>Adjusted AM V/C</b>
i	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⦿	EMS	1.01 - 1.25
⊙	Fire Station	
K	Hospital	<b>Adjusted PM V/C</b>
H	Library	0.00 - 0.01
b	Lynx Station	0.02 - 0.80
⦿	Police Station	0.81 - 1.00
O	Post Office	1.01 - 1.25
⦿	Recreation Center	
4	School	— Railroad
⦿	Solid Waste Facility	— Lynx Blue Line
⦿	Utility Pole	— Transmission Line
⦿	Bike Route	— Map Grid
		— Conservation Tax Credit Property
		— Federal Land Ownership
		— Hazardous Materials Site
		— Historic Resource
		— Lands Managed Conservation
		— Parcel
		— Park
		— State Boundary
		— State Owned Land
		— Waterbody
		— Wetland
		— 100 Year Floodplain

0 1,000 Feet

1 inch = 1,000 feet

**Map Grid: 7**

This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC



**2035 Build 4-2-2-4  
Alternative 3 Hour Peak  
Volume/Capacity Ratios**

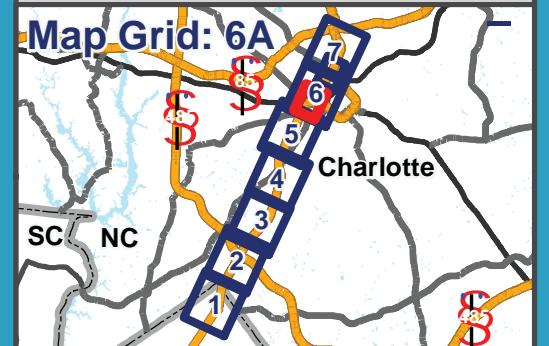
**I-77 Feasibility Study  
Project No. FS-0810A**

August 2014

**Legend**

S	Cell Tower	<b>Adjusted AM V/C</b>
☠	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⦿	EMS	1.01 - 1.25
⦿	Fire Station	<b>Adjusted PM V/C</b>
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
o	Police Station	1.01 - 1.25
o	Post Office	— Railroad
—	Recreation Center	— Lynx Blue Line
4	School	— Transmission Line
⌘	Solid Waste Facility	— Map Grid
⌘	Utility Pole	— Conservation Tax Credit Property
—	Bike Route	— Federal Land Ownership
		— Hazardous Materials Site
		— Historic Resource
		— Lands Managed Conservation
		— Parcel
		— Park
		— State Boundary
		— State Owned Land
		— Waterbody
		— Wetland
		— 100 Year Floodplain

0 500 Feet  
1 inch = 500 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 4-2-2-4 Alternative 3 Hour Peak Volume/Capacity Ratios

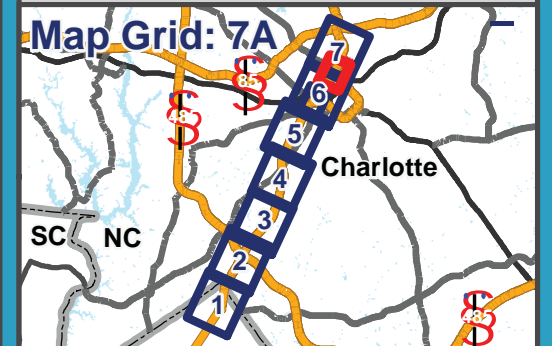
## I-77 Feasibility Study Project No. FS-0810A

August 2014

### Legend

S	Cell Tower	Adjusted AM V/C
⌘	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
⌘	College/Universities	0.81 - 1.00
⌘	EMS	1.01 - 1.25
⌘	Fire Station	Adjusted PM V/C
⌘	Hospital	0.00 - 0.01
⌘	Library	0.02 - 0.80
⌘	Lynx Station	0.81 - 1.00
⌘	Police Station	1.01 - 1.25
⌘	Post Office	Railroad
⌘	Recreation Center	Lynx Blue Line
⌘	School	Transmission Line
⌘	Solid Waste Facility	Map Grid
⌘	Utility Pole	Conservation Tax Credit Property
⌘	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 500 Feet  
1 inch = 500 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 5-2-2-5 Alternative Peak Hour Volume/Capacity Ratios

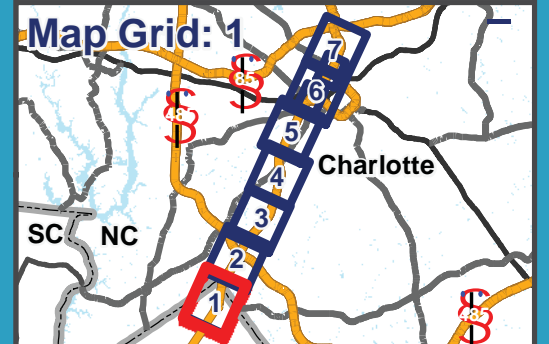
## I-77 Feasibility Study Project No. FS-0810A

August 2014

### Legend

S	Cell Tower	Adjusted AM V/C
i	Cemetery	0.00 - 0.01
⛔	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⦿	EMS	1.01 - 1.25
⦿	Fire Station	Adjusted PM V/C
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
a	Police Station	1.01 - 1.25
O	Post Office	Railroad
⦿	Recreation Center	Lynx Blue Line
4	School	Transmission Line
⦿	Solid Waste Facility	Map Grid
⦿	Utility Pole	Conservation Tax Credit Property
⦿	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 5-2-2-5 Alternative Peak Hour Volume/Capacity Ratios

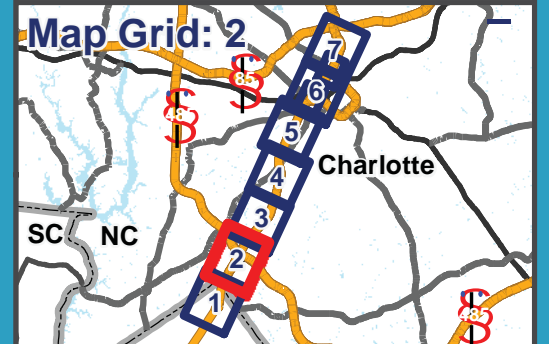
## I-77 Feasibility Study Project No. FS-0810A

August 2014

### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
	Cemetery	0.00 - 0.01
	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
	EMS	1.01 - 1.25
	Fire Station	<b>Adjusted PM V/C</b>
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
	Police Station	1.01 - 1.25
O	Post Office	Railroad
	Recreation Center	Lynx Blue Line
4	School	Transmission Line
	Solid Waste Facility	Map Grid
	Utility Pole	Conservation Tax Credit Property
	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 5-2-2-5 Alternative Peak Hour Volume/Capacity Ratios

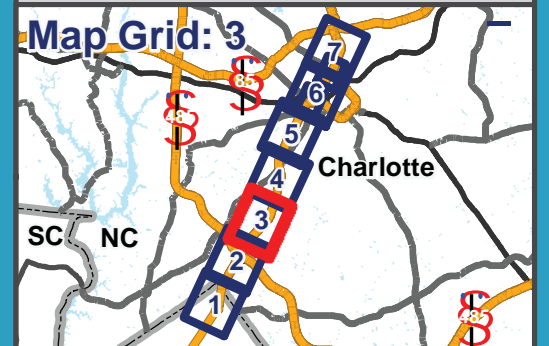
## I-77 Feasibility Study Project No. FS-0810A

August 2014

### Legend

S	Cell Tower	Adjusted AM V/C
☠	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⦿	EMS	1.01 - 1.25
⦿	Fire Station	Adjusted PM V/C
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
⦿	Police Station	1.01 - 1.25
⦿	Post Office	Railroad
⦿	Recreation Center	Lynx Blue Line
4	School	Transmission Line
⦿	Solid Waste Facility	Map Grid
⦿	Utility Pole	Conservation Tax Credit Property
⦿	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 5-2-2-5 Alternative Peak Hour Volume/Capacity Ratios

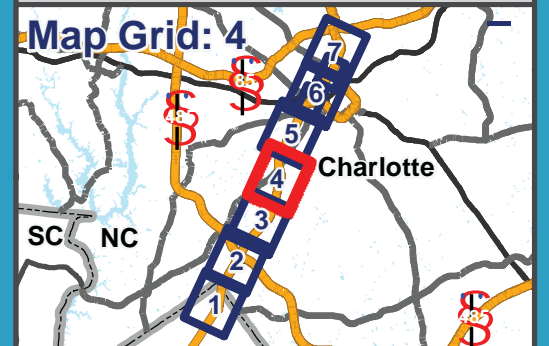
## I-77 Feasibility Study Project No. FS-0810A

August 2014

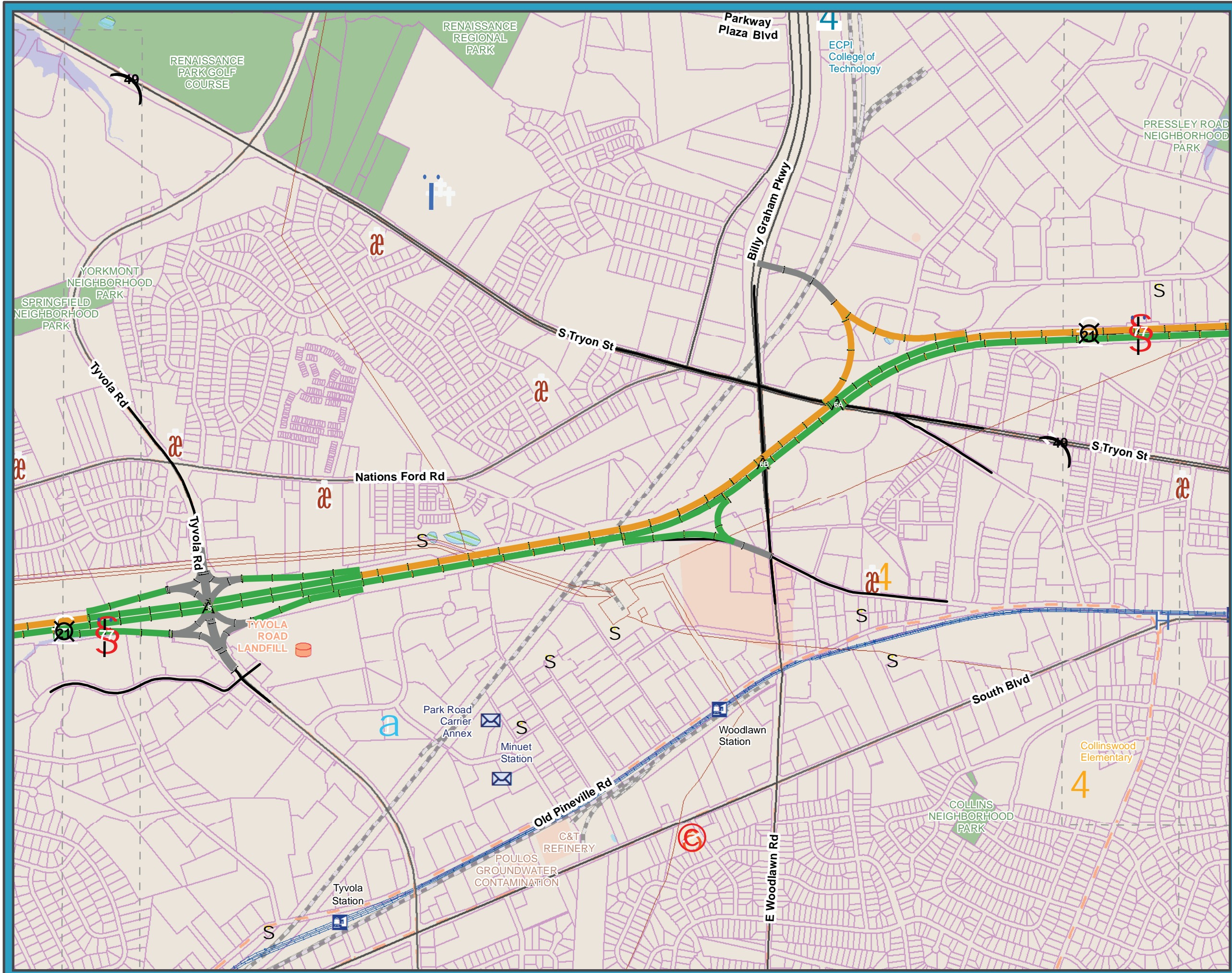
### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
⌂	Cemetery	0.00 - 0.01
⌂	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⚡	EMS	1.01 - 1.25
🚒	Fire Station	
H	Hospital	<b>Adjusted PM V/C</b>
H	Library	0.00 - 0.01
b	Lynx Station	0.02 - 0.80
🚓	Police Station	0.81 - 1.00
📮	Post Office	1.01 - 1.25
🏠	Recreation Center	Railroad
4	School	Lynx Blue Line
🗑️	Solid Waste Facility	Transmission Line
📶	Utility Pole	Map Grid
🚲	Bike Route	Conservation Tax Credit Property
		Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 5-2-2-5 Alternative Peak Hour Volume/Capacity Ratios

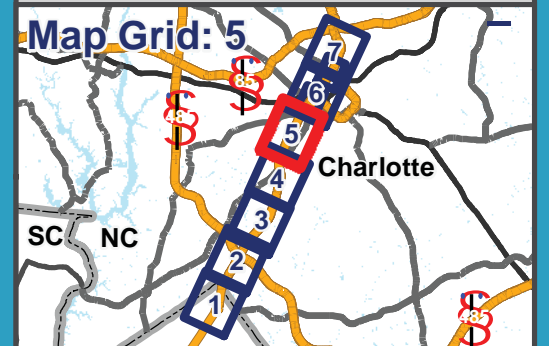
## I-77 Feasibility Study Project No. FS-0810A

August 2014

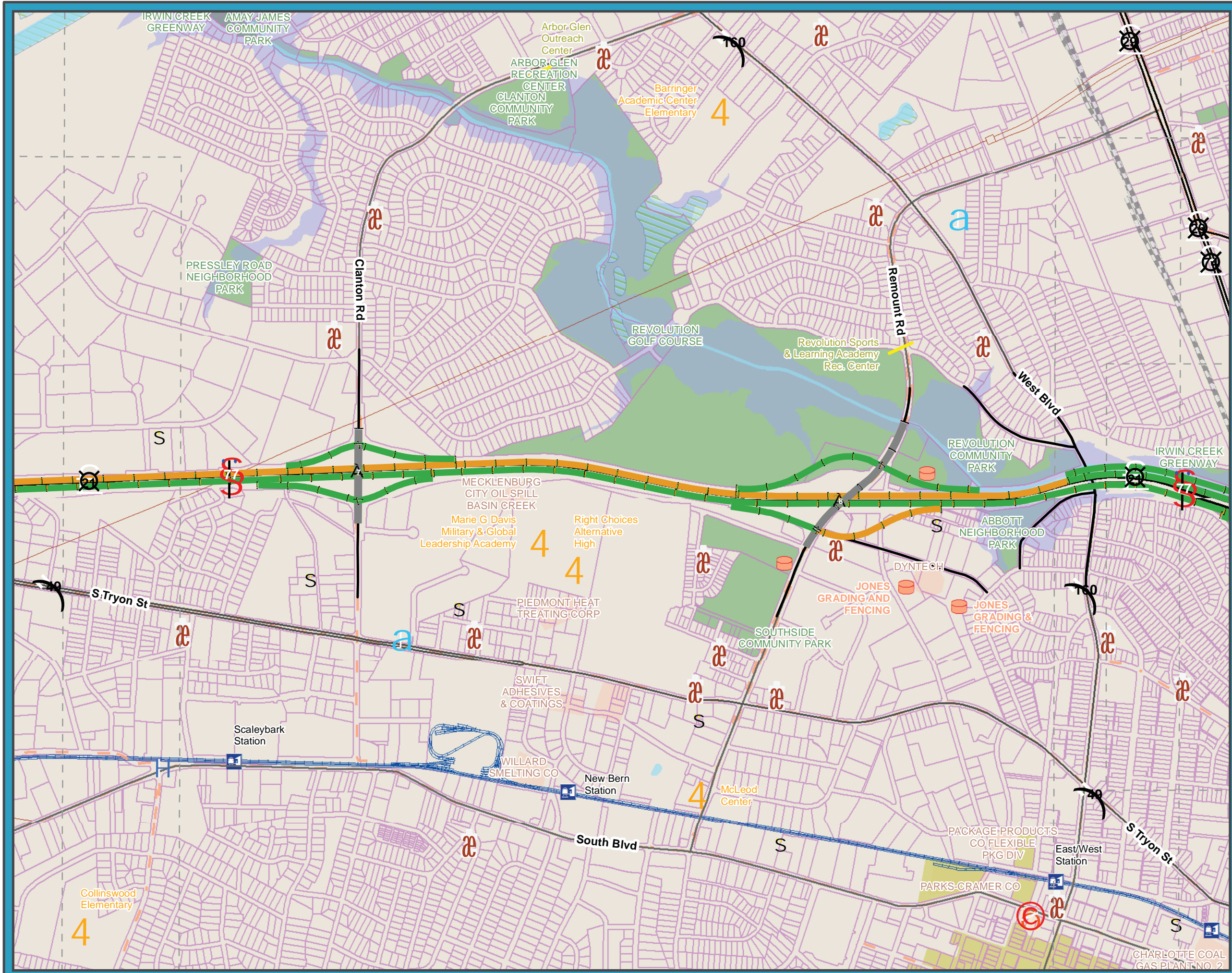
### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
Cemetery		0.00 - 0.01
Church		0.02 - 0.80
College/Universities		0.81 - 1.00
EMS		1.01 - 1.25
Fire Station		<b>Adjusted PM V/C</b>
Hospital		0.00 - 0.01
Library		0.02 - 0.80
Lynx Station		0.81 - 1.00
Police Station		1.01 - 1.25
Post Office		Railroad
Recreation Center		Lynx Blue Line
School		Transmission Line
Solid Waste Facility		Map Grid
Utility Pole		Conservation Tax Credit Property
Bike Route		Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 5-2-2-5 Alternative Peak Hour Volume/Capacity Ratios

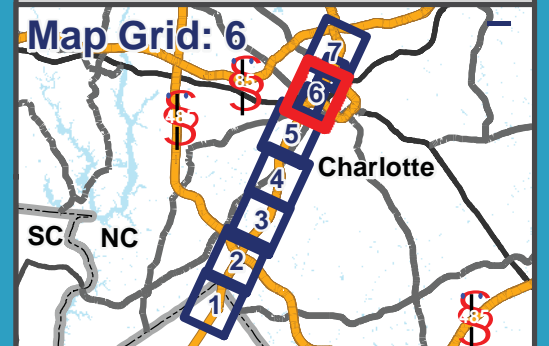
## I-77 Feasibility Study Project No. FS-0810A

August 2014

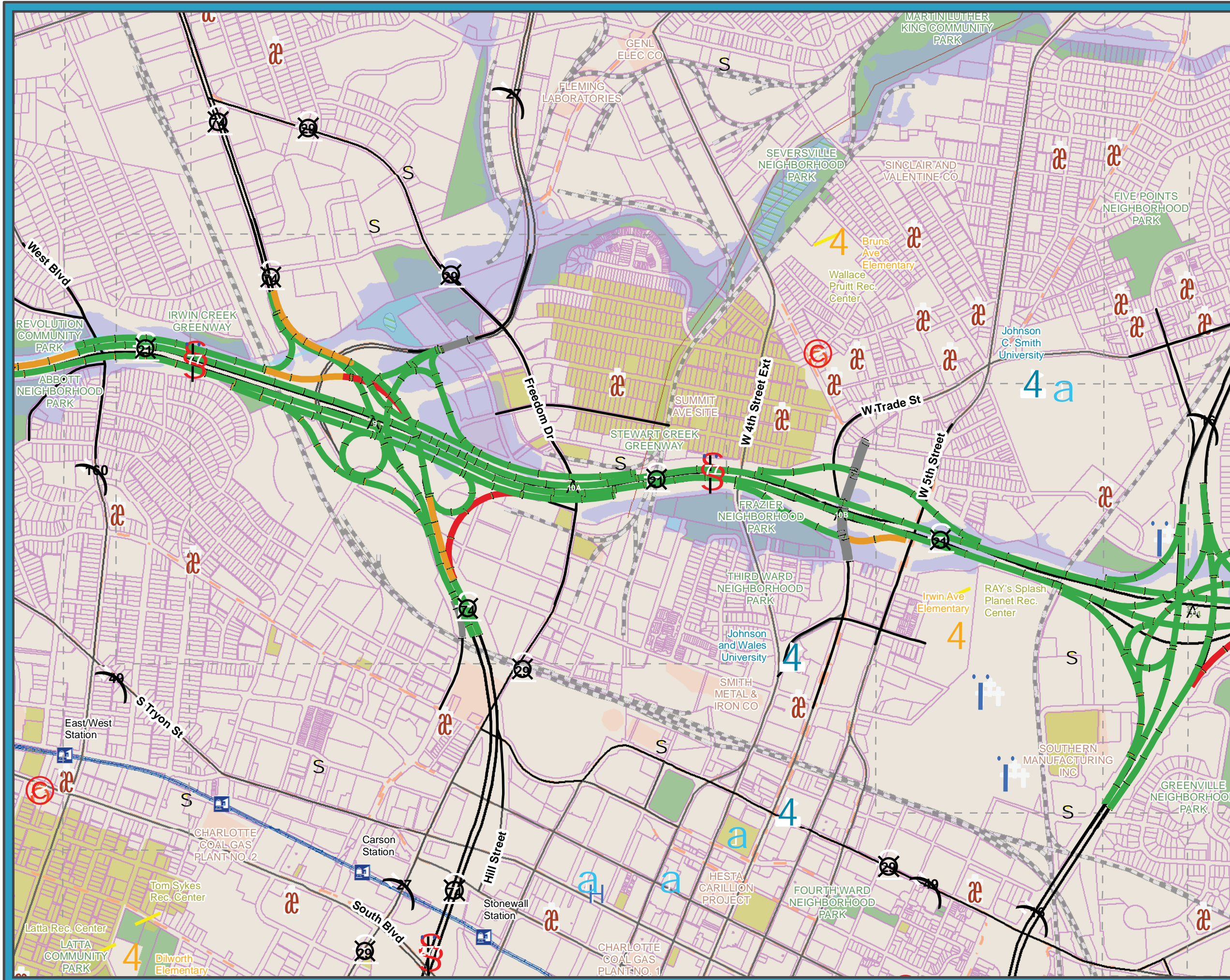
### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
☠	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⊕	EMS	1.01 - 1.25
⊙	Fire Station	<b>Adjusted PM V/C</b>
Ⓚ	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
o	Police Station	1.01 - 1.25
⓪	Post Office	— Railroad
Ⓜ	Recreation Center	— Lynx Blue Line
4	School	— Transmission Line
Ⓜ	Solid Waste Facility	— Map Grid
Ⓜ	Utility Pole	— Conservation Tax Credit Property
Ⓜ	Bike Route	— Federal Land Ownership
		— Hazardous Materials Site
		— Historic Resource
		— Lands Managed Conservation
		— Parcel
		— Park
		— State Boundary
		— State Owned Land
		— Waterbody
		— Wetland
		— 100 Year Floodplain

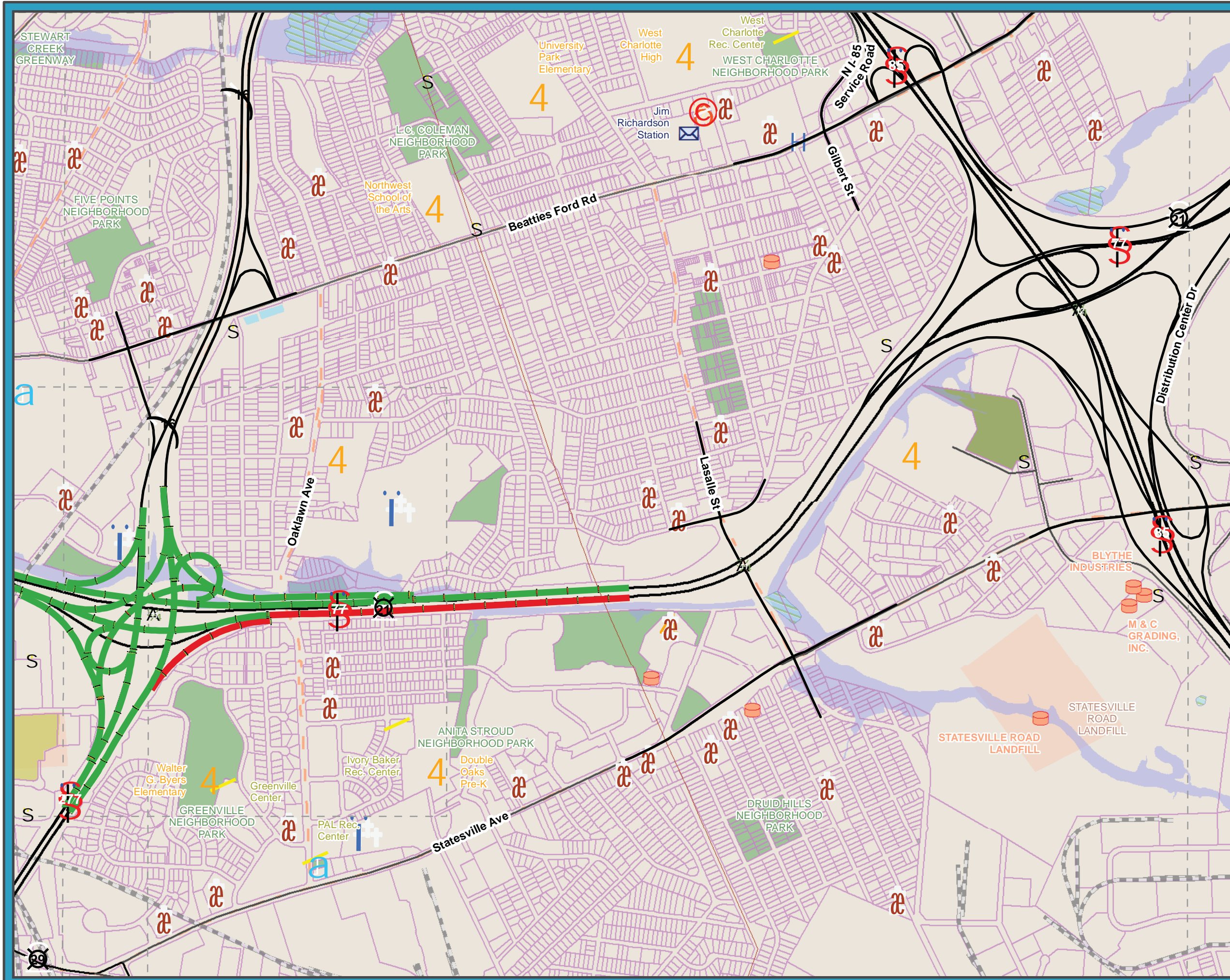
0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC







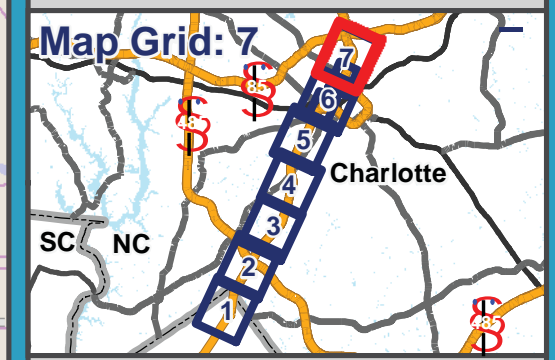
# 2035 Build 5-2-2-5 Alternative Peak Hour Volume/Capacity Ratios

## I-77 Feasibility Study Project No. FS-0810A

August 2014

Legend	
	Cell Tower
	Cemetery
	Church
	College/Universities
	EMS
	Fire Station
	Hospital
	Library
	Lynx Station
	Police Station
	Post Office
	Recreation Center
	School
	Solid Waste Facility
	Utility Pole
	Bike Route
<b>Adjusted AM V/C</b>	
	0.00 - 0.01
	0.02 - 0.80
	0.81 - 1.00
	1.01 - 1.25
<b>Adjusted PM V/C</b>	
	0.00 - 0.01
	0.02 - 0.80
	0.81 - 1.00
	1.01 - 1.25
	Railroad
	Lynx Blue Line
	Transmission Line
	Map Grid
	Conservation Tax Credit Property
	Federal Land Ownership
	Hazardous Materials Site
	Historic Resource
	Lands Managed Conservation
	Parcel
	Park
	State Boundary
	State Owned Land
	Waterbody
	Wetland
	100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 5-2-2-5 Alternative Peak Hour Volume/Capacity Ratios

## I-77 Feasibility Study Project No. FS-0810A

August 2014

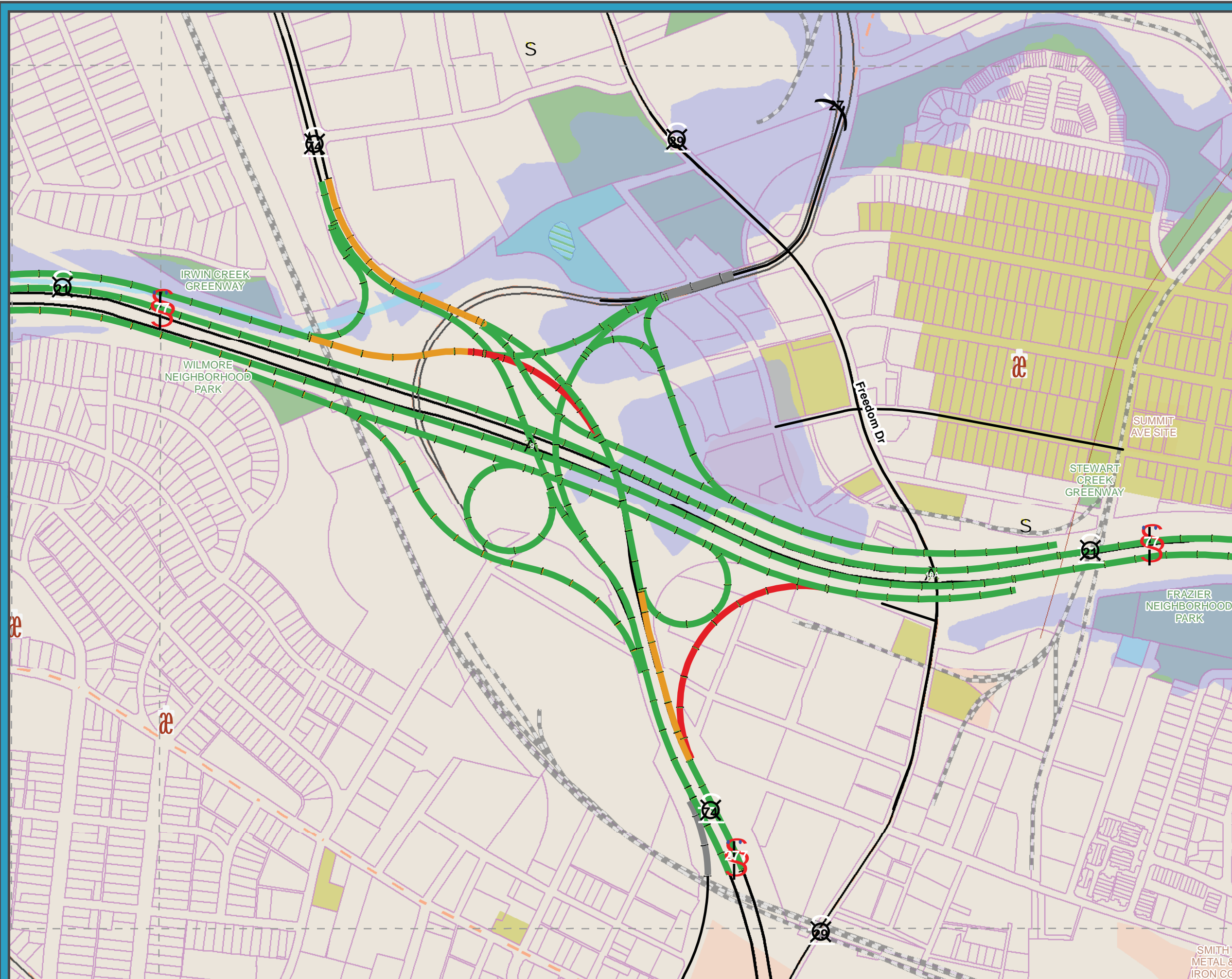
### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
	Cemetery	0.00 - 0.01
	Church	0.02 - 0.80
	College/Universities	0.81 - 1.00
	EMS	1.01 - 1.25
	Fire Station	<b>Adjusted PM V/C</b>
	Hospital	0.00 - 0.01
	Library	0.02 - 0.80
	Lynx Station	0.81 - 1.00
	Police Station	1.01 - 1.25
	Post Office	Railroad
	Recreation Center	Lynx Blue Line
	School	Transmission Line
	Solid Waste Facility	Map Grid
	Utility Pole	Conservation Tax Credit Property
	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 500 Feet  
1 inch = 500 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC



SMITH  
METAL &  
IRON CO



# 2035 Build 5-2-2-5 Alternative Peak Hour Volume/Capacity Ratios

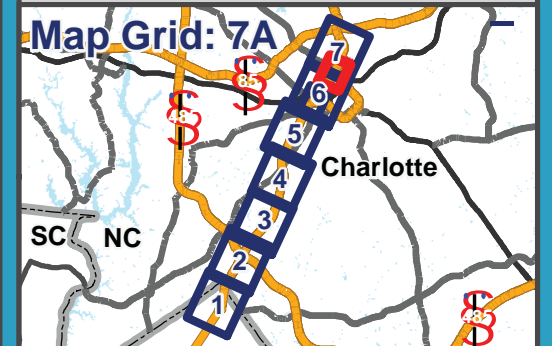
## I-77 Feasibility Study Project No. FS-0810A

August 2014

### Legend

S	Cell Tower	Adjusted AM V/C
⌘	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⌘	EMS	1.01 - 1.25
⌘	Fire Station	Adjusted PM V/C
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
⌘	Police Station	1.01 - 1.25
⌘	Post Office	Railroad
⌘	Recreation Center	Lynx Blue Line
4	School	Transmission Line
⌘	Solid Waste Facility	Map Grid
⌘	Utility Pole	Conservation Tax Credit Property
⌘	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 500 Feet  
1 inch = 500 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 5-2-2-5 Alternative 3 Hour Peak Volume/Capacity Ratios

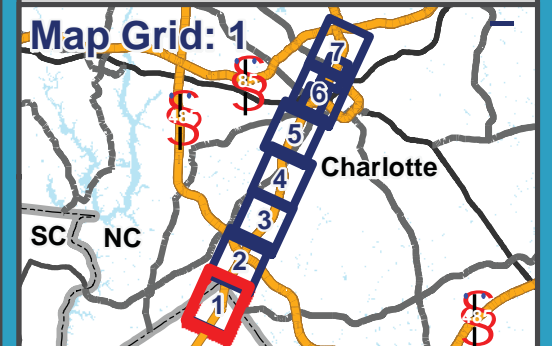
## I-77 Feasibility Study Project No. FS-0810A

August 2014

### Legend

S	Cell Tower	Adjusted AM V/C
i	Cemetery	0.00 - 0.01
⛔	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⦿	EMS	1.01 - 1.25
⦿	Fire Station	Adjusted PM V/C
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
⦿	Police Station	1.01 - 1.25
⦿	Post Office	Railroad
⦿	Recreation Center	Lynx Blue Line
4	School	Transmission Line
⦿	Solid Waste Facility	Map Grid
⦿	Utility Pole	Conservation Tax Credit Property
⦿	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 5-2-2-5 Alternative 3 Hour Peak Volume/Capacity Ratios

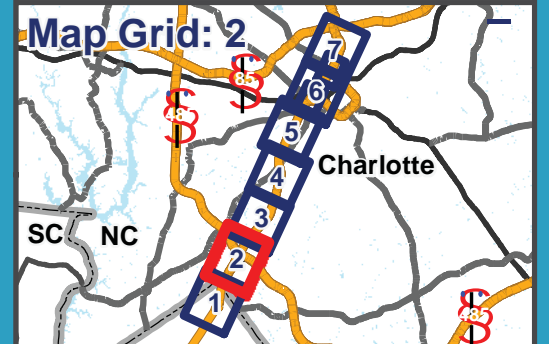
## I-77 Feasibility Study Project No. FS-0810A

August 2014

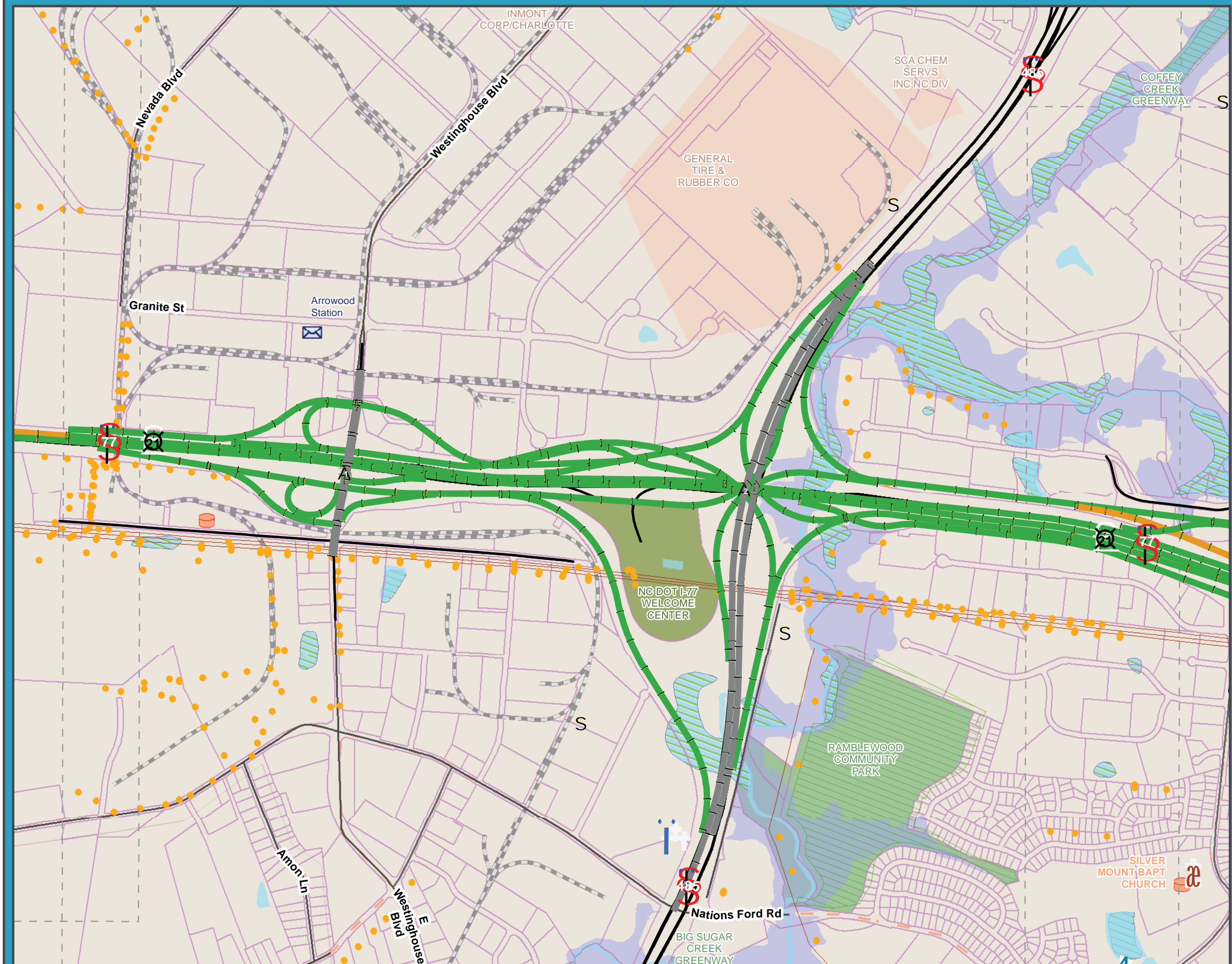
### Legend

S	Cell Tower	Adjusted AM V/C
☠	Cemetery	0.00 - 0.01
⛔	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
🚑	EMS	1.01 - 1.25
🚒	Fire Station	Adjusted PM V/C
🏥	Hospital	0.00 - 0.01
📖	Library	0.02 - 0.80
🚏	Lynx Station	0.81 - 1.00
🚔	Police Station	1.01 - 1.25
📮	Post Office	Railroad
🏠	Recreation Center	Lynx Blue Line
🎓	School	Transmission Line
🗑	Solid Waste Facility	Map Grid
🌳	Utility Pole	Conservation Tax Credit Property
🚲	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 5-2-2-5 Alternative 3 Hour Peak Volume/Capacity Ratios

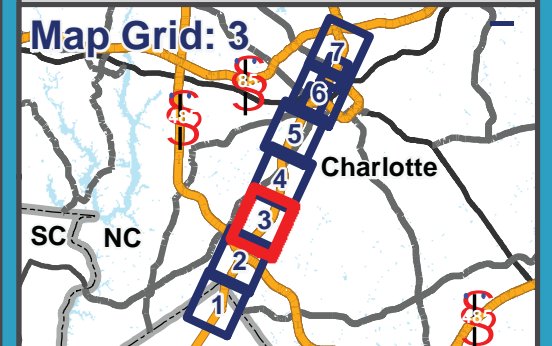
## I-77 Feasibility Study Project No. FS-0810A

August 2014

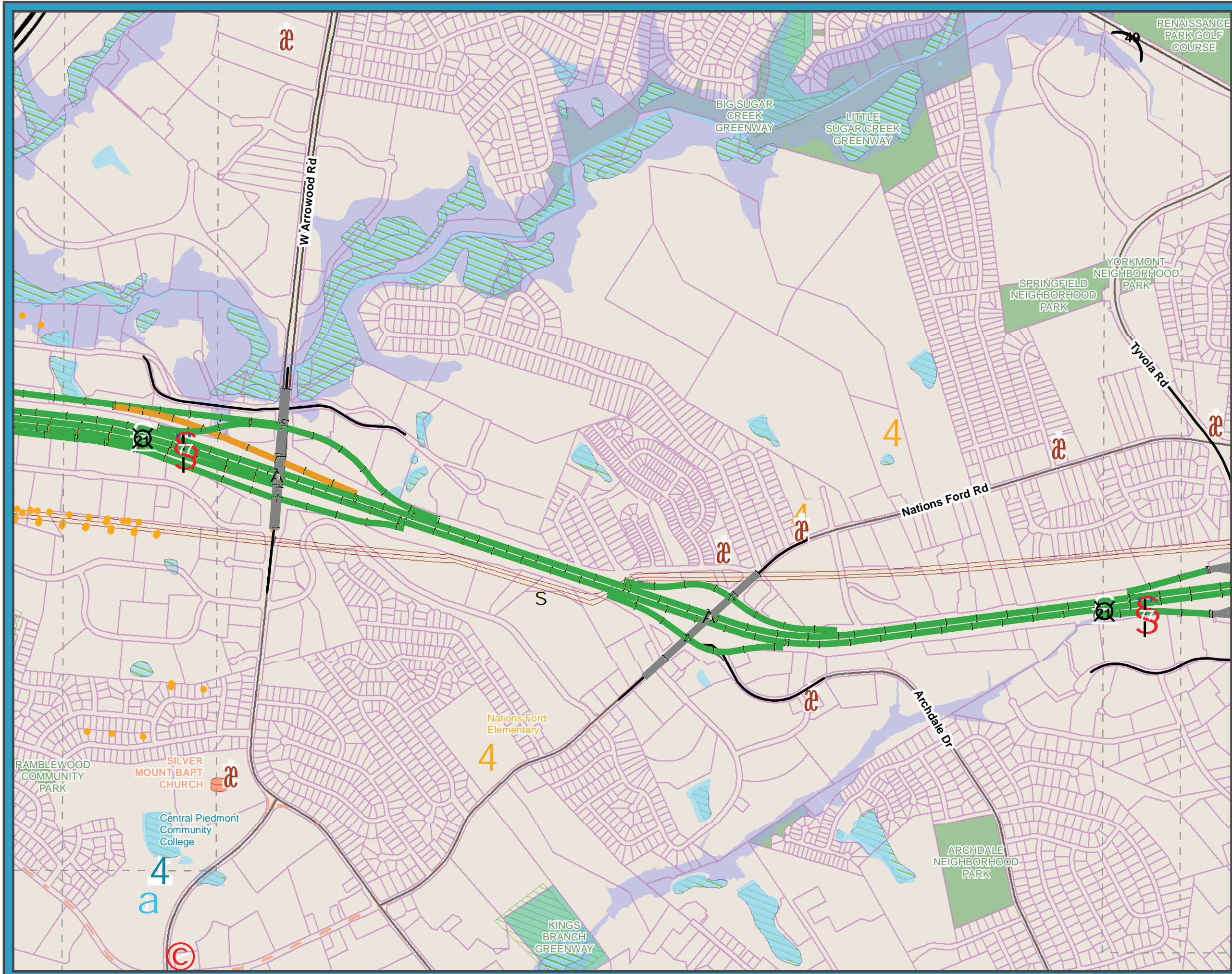
### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
☠	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⦿	EMS	1.01 - 1.25
⦿	Fire Station	<b>Adjusted PM V/C</b>
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
⦿	Police Station	1.01 - 1.25
⦿	Post Office	— Railroad
⦿	Recreation Center	— Lynx Blue Line
4	School	— Transmission Line
⦿	Solid Waste Facility	— Map Grid
⦿	Utility Pole	— Conservation Tax Credit Property
—	Bike Route	— Federal Land Ownership
		— Hazardous Materials Site
		— Historic Resource
		— Lands Managed Conservation
		— Parcel
		— Park
		— State Boundary
		— State Owned Land
		— Waterbody
		— Wetland
		— 100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 5-2-2-5 Alternative 3 Hour Peak Volume/Capacity Ratios

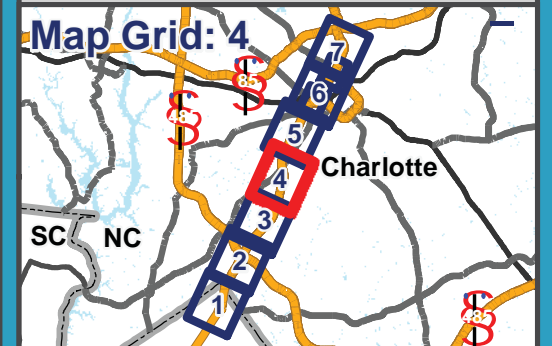
## I-77 Feasibility Study Project No. FS-0810A

August 2014

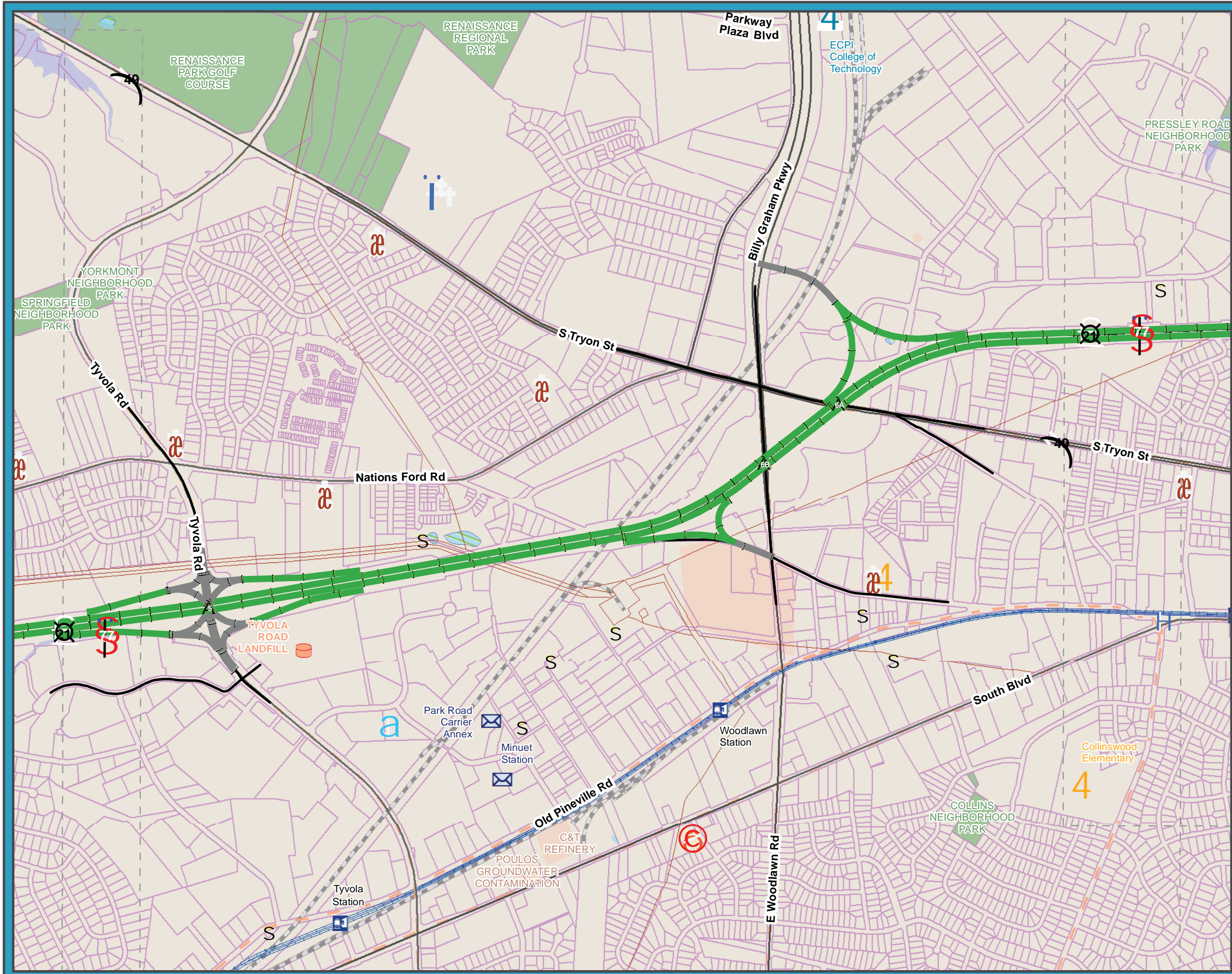
### Legend

S	Cell Tower	<b>Adjusted AM V/C</b>
⌵	Cemetery	0.00 - 0.01
⌵	Church	0.02 - 0.80
⌵	College/Universities	0.81 - 1.00
4	EMS	1.01 - 1.25
⌵	Fire Station	<b>Adjusted PM V/C</b>
⌵	Hospital	0.00 - 0.01
⌵	Library	0.02 - 0.80
⌵	Lynx Station	0.81 - 1.00
⌵	Police Station	1.01 - 1.25
⌵	Post Office	Railroad
⌵	Recreation Center	Lynx Blue Line
4	School	Transmission Line
⌵	Solid Waste Facility	Map Grid
⌵	Utility Pole	Conservation Tax Credit Property
⌵	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# 2035 Build 5-2-2-5 Alternative 3 Hour Peak Volume/Capacity Ratios

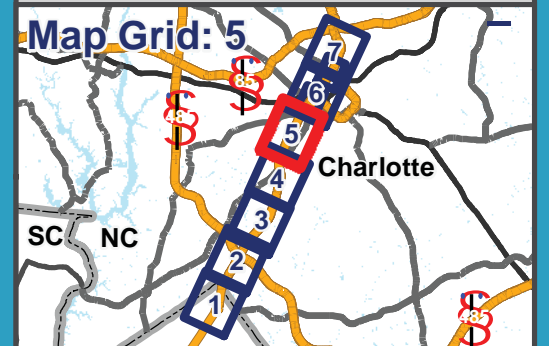
## I-77 Feasibility Study Project No. FS-0810A

August 2014

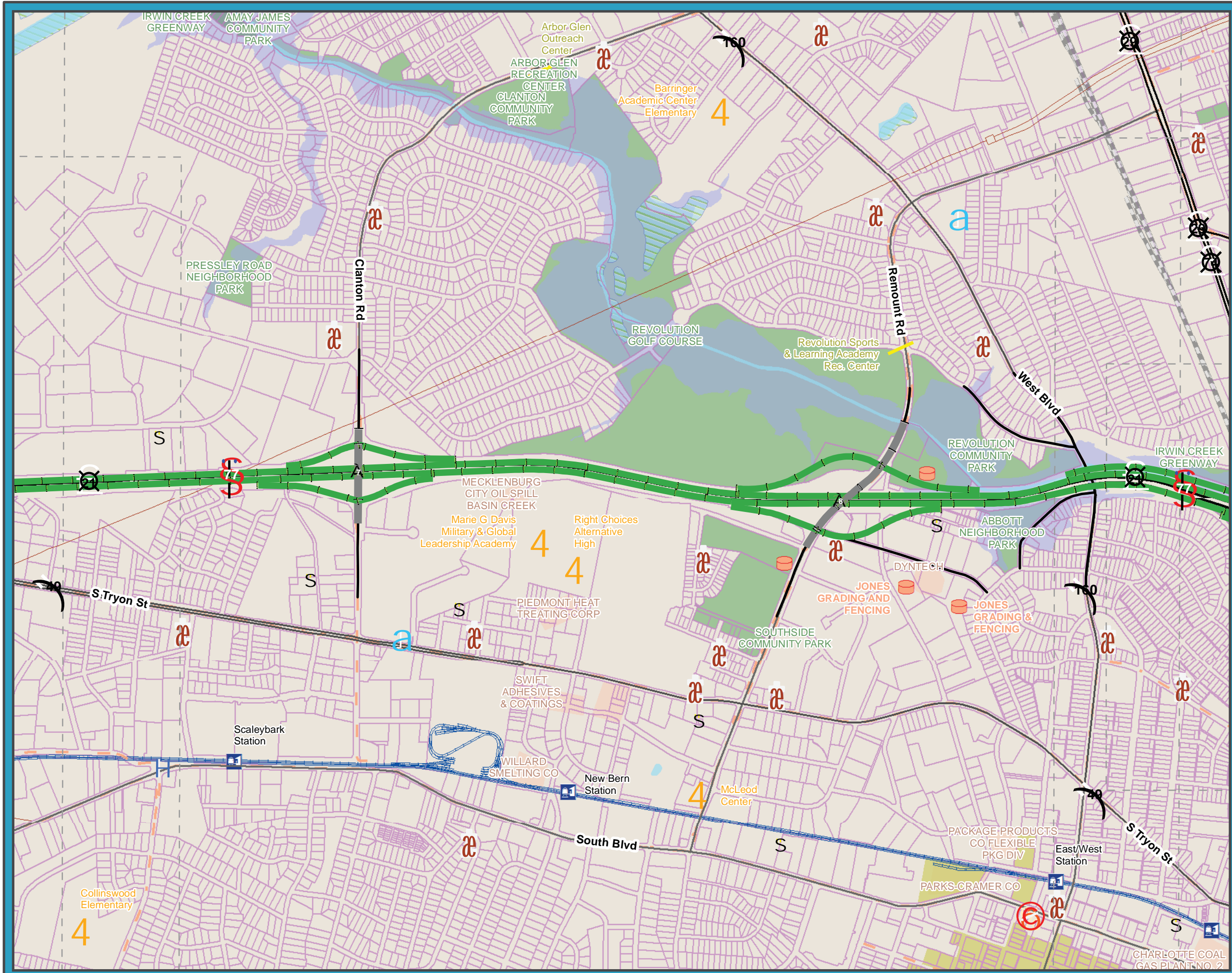
### Legend

S	Cell Tower	Adjusted AM V/C
☠	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⦿	EMS	1.01 - 1.25
⦿	Fire Station	Adjusted PM V/C
K	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
⦿	Police Station	1.01 - 1.25
⦿	Post Office	Railroad
⦿	Recreation Center	Lynx Blue Line
4	School	Transmission Line
⦿	Solid Waste Facility	Map Grid
⦿	Utility Pole	Conservation Tax Credit Property
⦿	Bike Route	Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





**2035 Build 5-2-2-5  
Alternative 3 Hour Peak  
Volume/Capacity Ratios**

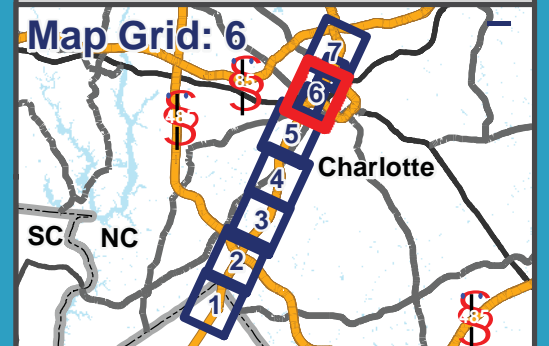
**I-77 Feasibility Study  
Project No. FS-0810A**

August 2014

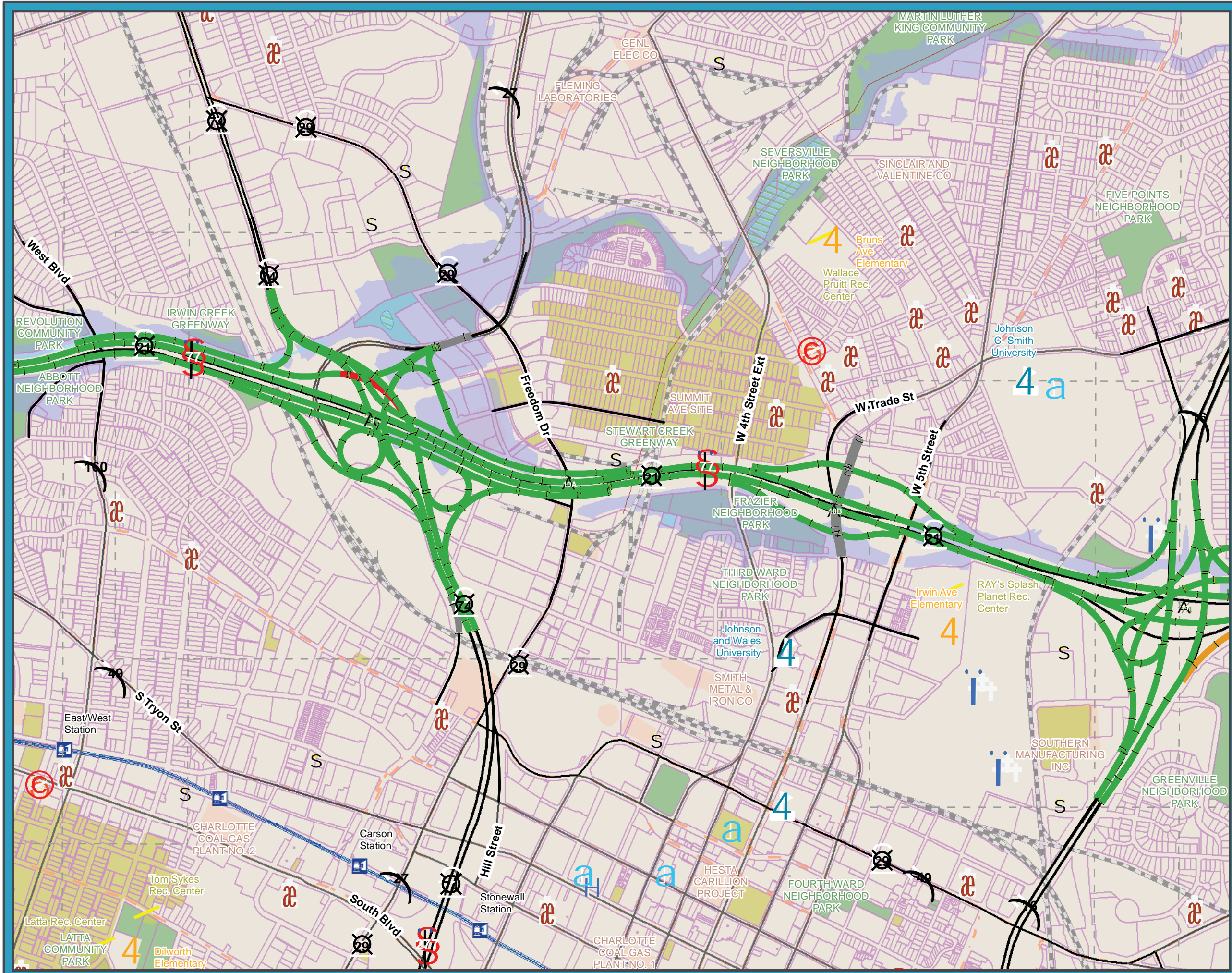
**Legend**

S	Cell Tower	<b>Adjusted AM V/C</b>
☠	Cemetery	0.00 - 0.01
⌘	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⓪	EMS	1.01 - 1.25
Ⓢ	Fire Station	<b>Adjusted PM V/C</b>
Ⓚ	Hospital	0.00 - 0.01
H	Library	0.02 - 0.80
b	Lynx Station	0.81 - 1.00
⓪	Police Station	1.01 - 1.25
⓪	Post Office	— Railroad
Ⓚ	Recreation Center	— Lynx Blue Line
4	School	— Transmission Line
Ⓚ	Solid Waste Facility	— Map Grid
Ⓚ	Utility Pole	— Conservation Tax Credit Property
Ⓚ	Bike Route	— Federal Land Ownership
		— Hazardous Materials Site
		— Historic Resource
		— Lands Managed Conservation
		— Parcel
		— Park
		— State Boundary
		— State Owned Land
		— Waterbody
		— Wetland
		— 100 Year Floodplain

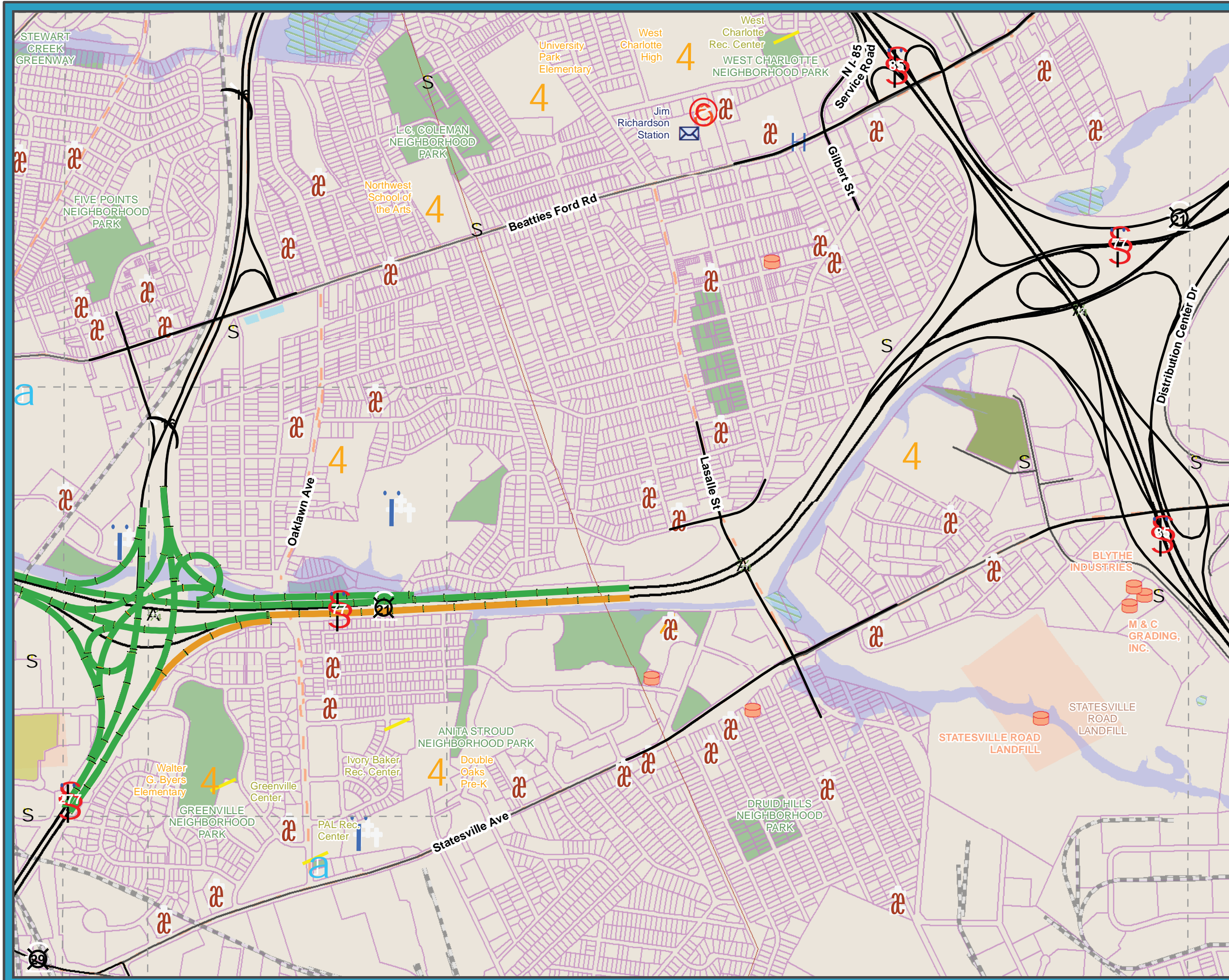
0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC







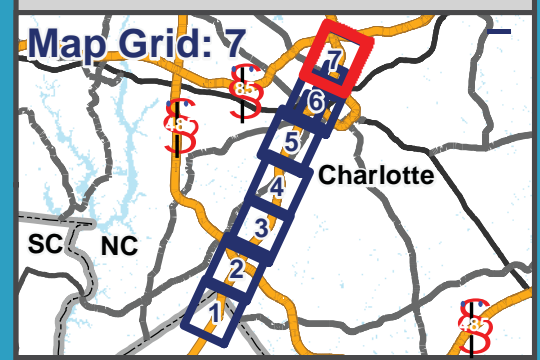
# 2035 Build 5-2-2-5 Alternative 3 Hour Peak Volume/Capacity Ratios

## I-77 Feasibility Study Project No. FS-0810A

August 2014

Legend	
	Cell Tower
	Cemetery
	Church
	College/Universities
	EMS
	Fire Station
	Hospital
	Library
	Lynx Station
	Police Station
	Post Office
	Recreation Center
	School
	Solid Waste Facility
	Utility Pole
	Bike Route
<b>Adjusted AM V/C</b>	
	0.00 - 0.01
	0.02 - 0.80
	0.81 - 1.00
	1.01 - 1.25
<b>Adjusted PM V/C</b>	
	0.00 - 0.01
	0.02 - 0.80
	0.81 - 1.00
	1.01 - 1.25
	Railroad
	Lynx Blue Line
	Transmission Line
	Map Grid
	Conservation Tax Credit Property
	Federal Land Ownership
	Hazardous Materials Site
	Historic Resource
	Lands Managed Conservation
	Parcel
	Park
	State Boundary
	State Owned Land
	Waterbody
	Wetland
	100 Year Floodplain

0 1,000 Feet  
1 inch = 1,000 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





**2035 Build 5-2-2-5  
Alternative 3 Hour Peak  
Volume/Capacity Ratios**

**I-77 Feasibility Study  
Project No. FS-0810A**

August 2014

**Legend**

S	Cell Tower	<b>Adjusted AM V/C</b>
☠	Cemetery	0.00 - 0.01
⛔	Church	0.02 - 0.80
4	College/Universities	0.81 - 1.00
⚡	EMS	1.01 - 1.25
🚒	Fire Station	<b>Adjusted PM V/C</b>
🏥	Hospital	0.00 - 0.01
📖	Library	0.02 - 0.80
🚏	Lynx Station	0.81 - 1.00
👮	Police Station	1.01 - 1.25
📮	Post Office	— Railroad
🏠	Recreation Center	— Lynx Blue Line
4	School	— Transmission Line
🗑	Solid Waste Facility	— Map Grid
📶	Utility Pole	— Conservation Tax Credit Property
🚴	Bike Route	— Federal Land Ownership
		— Hazardous Materials Site
		— Historic Resource
		— Lands Managed Conservation
		— Parcel
		— Park
		— State Boundary
		— State Owned Land
		— Waterbody
		— Wetland
		— 100 Year Floodplain

0 500 Feet  
1 inch = 500 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





**2035 Build 5-2-2-5  
Alternative 3 Hour Peak  
Volume/Capacity Ratios**

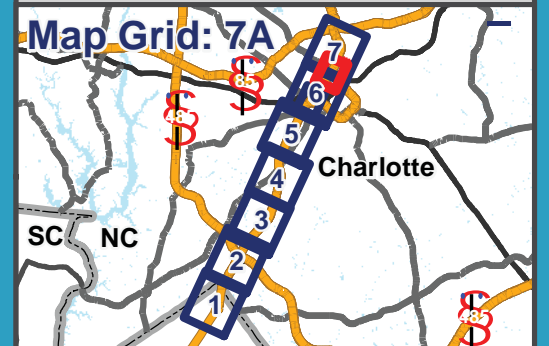
**I-77 Feasibility Study  
Project No. FS-0810A**

August 2014

**Legend**

S	Cell Tower	<b>Adjusted AM V/C</b>
⌵	Cemetery	0.00 - 0.01
⌵	Church	0.02 - 0.80
⌵	College/Universities	0.81 - 1.00
⌵	EMS	1.01 - 1.25
⌵	Fire Station	
⌵	Hospital	<b>Adjusted PM V/C</b>
⌵	Library	0.00 - 0.01
⌵	Lynx Station	0.02 - 0.80
⌵	Police Station	0.81 - 1.00
⌵	Post Office	1.01 - 1.25
⌵	Recreation Center	
⌵	School	0.00 - 0.01
⌵	Solid Waste Facility	0.02 - 0.80
⌵	Utility Pole	0.81 - 1.00
⌵	Bike Route	1.01 - 1.25
		Railroad
		Lynx Blue Line
		Transmission Line
		Map Grid
		Conservation Tax Credit Property
		Federal Land Ownership
		Hazardous Materials Site
		Historic Resource
		Lands Managed Conservation
		Parcel
		Park
		State Boundary
		State Owned Land
		Waterbody
		Wetland
		100 Year Floodplain

0 500 Feet  
1 inch = 500 feet



This map is for reference only.  
Sources: Data was recieved from  
NC Department of Transportation,  
Mecklenburg County, NC,  
York County, SC  
and the City of Charlotte, NC





# APPENDIX D: MAJOR COORDINATION







# SCOPING MEETING #1







## SCOPING MEETING MINUTES

TO: Meeting Attendees

FROM: Chris Werner, PE

Date: April 26, 2011

SUBJECT: TIP FS-0810A, I-77 Improvements Feasibility Study, Mecklenburg County.

---

A meeting was held on April 26, 2011 at 10:00 AM in the Roadway Design Conference Room at the NCDOT Century Center. The purpose of this meeting was to discuss the feasibility study scope of the proposed improvements to I-77. Those in attendance are shown on the attached sign-in sheet.

Chris Werner led the meeting and began by giving a project description, which spans I-77 from 5th Street in Charlotte to the South Carolina State Line, including 13 interchanges. Mr. Werner also reviewed the current and projected AADT along the I-77 corridor.

Given the high AADT for the entire corridor, Mr. Werner discussed the potential measures of effectiveness (MOEs) and approach to be used for evaluating project alternatives. Volume to capacity ratio (v/c) seemed most appropriate given the high AADT for the corridor, with the v/c to be calculated for peak hour volumes and 2 hour peak volumes. Both the peak hour and 2 hour peak v/c ratios would be applied to a graphic to make it easier while evaluating project alternatives. Mr. Werner noted the 2 hour peak v/c ratio graphics will assist in identifying alternatives that should be carried on to conceptual designs and further evaluated in the feasibility study. Discussion points regarding MOEs included the following:

- It was agreed that the use of v/c ratios were an acceptable MOE for capacity.
- Mr. Dunlop stated that NCDOT prefers to use peak hour volumes for the analysis.
- CDOT stated that they normally use two hour peak periods for analysis purposes and that the peak period for this project may actually be a 2 hour period. It was noted it may be a 2 hour period because the network is constrained.
- Mr. Werner noted that it was the URS Team's suggestion to provide peak hour v/c ratios, with an agreed upon factor to be applied to the peak hour volumes (across the board) to approximate the 2 hour peak v/c ratios.

Anna Gallup noted the traffic forecast for the project was based on a travel demand model which is now several versions old. Discussion points regarding the traffic forecast and travel demand model included the following:

- Ms. Gallup explained that CDOT has been further developing the model with more robust information which could result with different volumes than that reported in the project forecast. This information includes major changes in land use and HOT lanes input.



## MEETING MINUTES

FS-0810A Scoping Meeting 4/26/2011

Page 2 of 4

Ms. Gallup also noted the older version of the model dealt with vehicle input and not person input.

- It was questioned whether a new forecast needed to be prepared or if the current forecast would suffice for the feasibility study purposes. Concern amongst the group was that a new forecast could take well over a year, significantly delaying the project.
- Ms. Gallup suggested CDOT could review the current model data and the project traffic forecast in order to identify an order of magnitude comparison, which could take around 6 weeks.
- Mr. Dunlop inquired about the directional splits and whether there was potential for implementing reversible lanes. It was noted that a 70/30 directional distribution rule of thumb usually justifies reversible lanes; CDOT also noted that the *Fast Lanes Study* did not recommend reversible lanes. The direction distribution split shown on the forecast were questioned; therefore, it was recommended count data be reviewed to identify the actual split. Derrick Lewis offered to contact the NCDOT Traffic Surveys Unit about getting traffic counts.
- CDOT requested copies of any traffic counts the NCDOT Traffic Survey Unit provided.
- It was noted that the forecast was based upon a constrained model.
- It was agreed by the group that the current project traffic forecast could be modified by the URS Team using engineering judgment based upon the order of magnitude changes from the CDOT comparison to the current model and reviewing traffic count data in the area in order to better estimate the directional distribution.

Discussion amongst the group then turned to HOV and HOT lanes, which included the following:

- CDOT noted the model can generate HOT usage based on assumed fares if needed as they are no longer looking at adding HOV lanes; if managed lanes are added they would be HOT lanes. CDOT explained that HOT lanes are not usually considered when there is only 1 HOV lane, but if there are 2 HOV lanes, HOT lanes become a possible option. Derrick Lewis suggested, for the intentions of the feasibility study, it would be better for this study to focus on HOV lanes and noting in the report that HOT is a future opportunity that may be evaluated in future, more detailed studies.
- CDOT noted the traffic forecast doesn't currently show a direct connection from the HOV lanes to I-485. CDOT inquired if this connection should be provided as they are looking locally at potential HOT lanes on I-485 (east of I-77). They also inquired about direct connections to I-277, to which Mr. Lewis replied yes, there should be direct connection from the HOV lanes to I-485 and I-277. Mr. Lewis noted he would be interested in seeing the model data with and without the direct connections to I-277 and I-485.
- CDOT noted they are currently looking at incorporating HOT lane provisions north of the project, which would transition back into I-77 near the 5<sup>th</sup> Street interchange. NCDOT requested that CDOT provide any data available for consideration in developing the feasibility study.



## MEETING MINUTES

FS-0810A Scoping Meeting 4/26/2011

Page 3 of 4

- Given many of the interchanges within the study area are already too close to one another, it was noted that access to HOV lanes could not be provided between every interchange. NCDOT requested CDOT to submit a request for interchanges that should have access to the HOV lanes and also a list of potential interchanges that should be reviewed for permanent closure.
- CDOT inquired if the HOV lanes will terminate at I-485. Mr. Lewis replied that the HOV lanes should go from 5<sup>th</sup> Street to Carowinds Boulevard.
- It was noted no heavy trucks are permitted in HOV/HOT lanes.

Mr. Lewis asked the group if there were any know issues, properties of concern, major improvements or constraints.

- Tim Gibbs noted the 2035 Long Range Transportation Plan (LRTP) shows the extension of Archdale Drive west, with a grade separation over I-77.
- Bob Cook noted the LRTP also segments I-77 for funding purposes, which should be used for the feasibility study during the preparation of cost estimates. Mr. Cook will provide the these segments.
- It was noted there were several FEMA Buyout Properties within the project study area; URS will coordinate with CDOT to obtain the FEMA Buyout Properties data layer.
- Several potential railroad improvements were identified including the potential for double tracking near the Woodlawn Road interchange and modification of the mainline railroad immediately south of the I-77 and I-277 interchange.

Mr. Werner moved on to describe alternatives that have been suggested thus far which include (see attached handout):

- 4 general purpose lanes and 1 HOV lane in each direction (4-1-1-4)
- 4 general purpose lanes with 2 HOV lanes in each direction (4-2-2-4)
- 5 general purpose lanes and 1 HOV lane in each direction (5-1-1-5)
- 5 general purpose lanes and 2 HOV lanes in each direction (5-2-2-5)

Comments regarding potential alternatives included the following:

- Mr. Dunlop inquired about the use of auxiliary lanes between exits. He noted that the effectiveness of the inside lanes are lost when there are 5 or more lanes because people don't want to get trapped. It was noted auxiliary lanes will be implemented where appropriate.
- Mr. Dunlop asked if there are through travel demand volumes, and suggested possibly dividing the general purpose lanes into 2 facilities, creating express lanes and sited the New Jersey Turnpike as an example. CDOT offered to review the current model in order to identify the percentage of through traffic on the I-77 corridor within the project study area.
- Mr. Lewis commented that we should be looking at designing up as well as out, possibly elevating lanes in order to consider the cost of going vertical versus widening. It was stated



## MEETING MINUTES

FS-0810A Scoping Meeting 4/26/2011

Page 4 of 4

we may not need to look at elevating the entire facility, just areas with potential right-of-way issues. There was concern amongst the group regarding the cost associated with the replacement of a completely elevated facility at the end of its lifespan. The US 74/I-277 area was identified as a good area where an elevated facility definitely should be considered.

Action Items from the meeting included the following:

- NCDOT will determine if any traffic counts along I-77 within the project study area are available. If counts are available, CDOT will be provided copies.
- Ms. Gallup will review the current model against the current project traffic forecast in order to identify order of magnitude changes; it was noted this review could take up to six weeks. The URS Team will modify the current project traffic forecast using the order of magnitude changes identified by Ms. Gallup.
- CDOT will provide NCDOT with data regarding the HOT lane provisions north of the project.
- CDOT will submit to NCDOT a request of interchanges that should have access to the HOV lanes, as well as a list of interchanges that could potentially be permanently closed.
- CDOT will provide the LRTP I-77 segments which should be used for the feasibility study during the preparation of cost estimates.
- URS will coordinate with CDOT to obtain the FEMA Buyout Properties data layer.
- CDOT offered to review the current model in order to identify the percentage of through traffic on the I-77 corridor within the project study area.
- Once the traffic forecast has been updated, an additional meeting will be held with the attendees in order to review the forecast changes and to discuss potential alternatives.
- URS will provide Ms. Teresa Hart with a half size copy of the Revised Environmental Features Map.



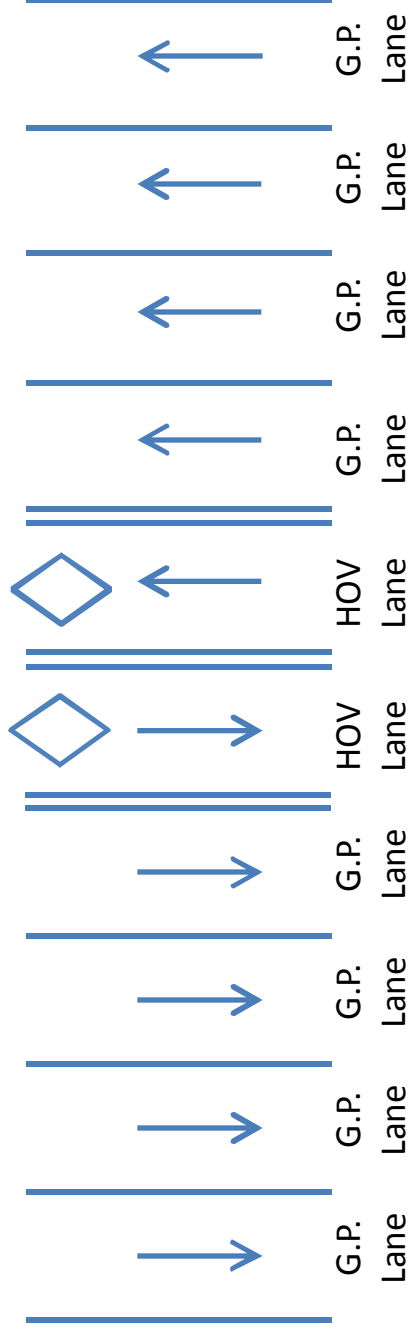


I-77 Improvements Feasibility Study  
 FS-0810A  
 Mecklenburg County, North Carolina  
 April 26, 2011  
 Scoping Meeting

Name/Agency	Email Address
JAMES DUNLOP NCDOT Construction Mgmt	jdunlop@ncdot.gov
Theresa Ellerby/NCOUT POST	tellerby@ncdot.gov
Sarah Wicklund URS	Sarah.Wicklund@urscorp.com
Bill Elam Hydraulics	belam@ncdot.gov
Charles Hunt/NCOT Structure	chunt@ncdot.gov
Greg Brew	gbrew@ncdot.gov
Tim Gibbs Charlotte DOT	tgibbs@charlottenc.gov
Teresa Hart, PDEA	thart@ncdot.gov
Derrick Lewis	dlew@ncdot.gov
Nathan Phillips HMM	nathan.phillips@hatchmott.com
MARK FREEMAN HMM	MARK.FREEMAN@HATCHMOTT.COM
Anna Gallup (phone)	agallup@charlottenc.gov
Martin Kinnamon (phone)	mkinnamon@charlottenc.gov
Joe McLelland (phone)	jwmclelland@charlottenc.gov
Stuart Basham (phone)	sbasham@charlottenc.gov
Robert Cook (phone)	rwcook@charlottenc.gov
Chris Werner URS	christopher_werner@urscorp.com

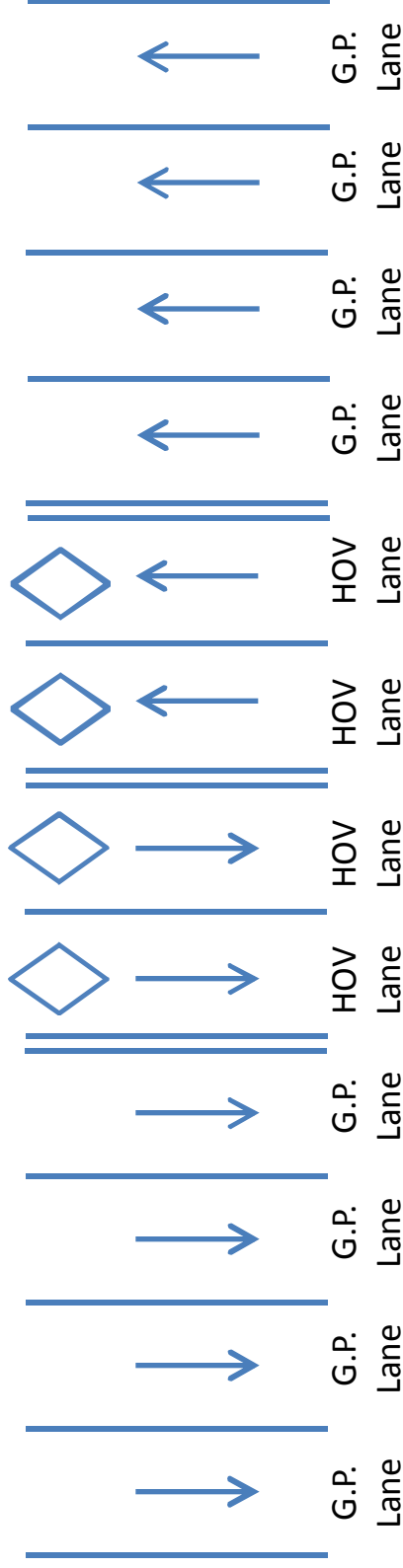


# I-77 Feasibility Study Typical Section: 4 General Purpose Lanes+ 1 HOV Lane Per Side





# I-77 Feasibility Study Typical Section: 4 General Purpose Lanes + 2 HOV Lanes Per Side

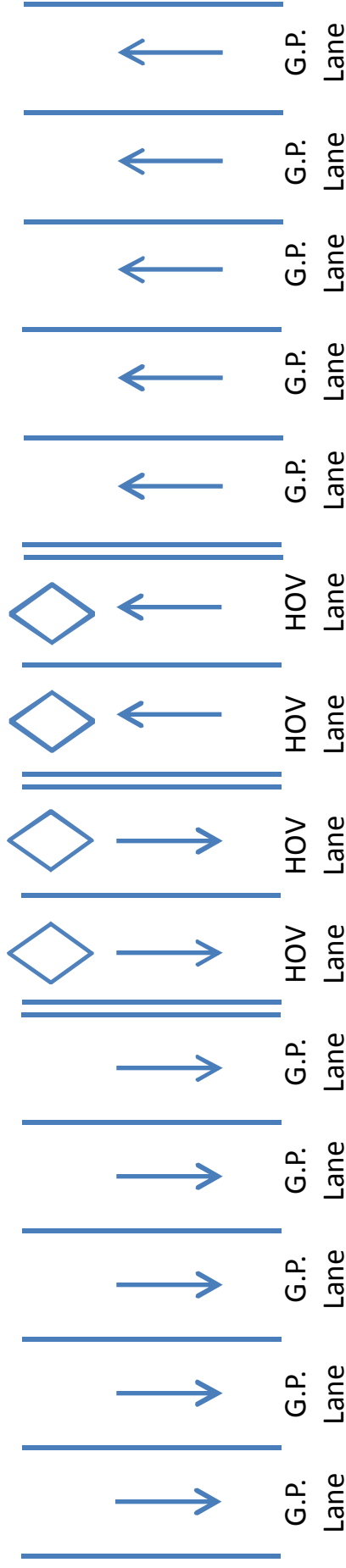








# I-77 Feasibility Study Typical Section: 5 General Purpose Lanes + 2 HOV Lanes Per Side









## SCOPING MEETING #2







## SCOPING MEETING MINUTES

To: File

FROM: Chris Werner, PE

Date: October 19, 2012

SUBJECT: TIP FS-0810A, I-77 Improvements Feasibility Study, Mecklenburg County.

---

A meeting was held on October 18, 2012 at 1:00 PM in the Roadway Design Conference Room at the NCDOT Century Center. Those in attendees are shown on the attached sign-in sheet. The purpose of this meeting was to review action items from the first Scoping Meeting and reinstate the project.

Chris Werner began the meeting with introductions and reviewing the purpose of the meeting. Major discussion points of the meeting are shown below:

### Scoping Meeting #1 action items follow-up:

- Action Item 1: Traffic counts to be reviewed to determine if I-77 directional distribution on forecast is accurate. *Follow-up: Traffic counts were reviewed and directional distributions shown on forecast are reasonable.*
- Action Item 2: In coordination with CDOT, URS/HMM will compare the traffic forecast volumes to the current version of the Travel Demand Model. *Follow-up: Upon review it was determined the travel demand volumes were very similar to the traffic forecast volumes, thus the traffic forecast will be used without adjustments.*
- Action Item 3: CDOT will provide NCDOT with projected HOV lane data. *Follow-up: As a part of the travel demand model/ traffic forecast review, CDOT provided percentages of I-77 traffic using HOV lanes.*
- Action Item 4: CDOT will submit a request of interchanges that should have access to the HOV lanes, as well as a list of interchanges that could potentially be permanently closed. *Follow-up: NCDOT and CDOT discussion needs to continue in order to appropriately identify interchanges with access to/from HOV lanes and identifying potential interchange consolidation/closure.*
- Action Item 5: CDOT will provide the LRTP I-77 segments which should be used for the feasibility study during the preparation of cost estimates. *Follow-up: URS will coordinate with CDOT in order to identify segment breaks prior to developing functional designs for project alternatives.*
- Action Item 6: URS will coordinate with CDOT to obtain the FEMA Buyout Properties data layer. *Follow-up: Data has been received and added to the environmental features mapping.*



## MEETING MINUTES

### I-77 Improvements Feasibility Study (FS-0810A)

10/19/2012

Page 2 of 3

- Action Item 7: Upon reconciling the traffic forecast volumes, an additional meeting will be held with attendees in order to review the forecast changes (if any) and to discuss potential alternatives. *Follow-up: As described above, the traffic forecast will be used without adjustments. Through previous studies prepared by CDOT, CDOT has recommended NCDOT not consider any alternatives with reversible lanes or alternatives with only 1 HOV lane in each direction.*

#### **Additional Updates since Scoping Meeting #1:**

- The northern project terminus has been extended from Fourth Street to just south of LaSalle Street. This required the I-3311C traffic forecast and FS-0810A forecast be combined for the purpose of preparing the FS-0810A traffic operations analysis.
- Updated GIS data layers have been collected. Coordination with Mecklenburg County is underway to obtain 2012 data.
- The I-277 Loop Study has been prepared, which will be reviewed as alternatives are being developed for FS-0810A.
- CDOT requested updated costs for FS-0810A by approximately February 2013 for inclusion in the MUMPO LRTP update. It was determined a realistic cost estimate would need to be based on the actual functional designs including construction cost estimates, right-of-way estimates and utility estimates. The level of effort required to prepare the functional designs and estimates is not possible within the desired timeframe; however, NCDOT and URS are working together to provide an update to cost estimates for the previous LRTP update.
- An NCDOT/CDOT coordination meeting was held August 28, 2012 in order to review FS-0810A, Managed Fast Lanes Study Phase III, and other adjacent projects. CDOT requested in the future that periodic meetings be held to coordinate all projects within the area.

#### **Proposed Traffic Operations Analysis Methodology Discussion:**

Outcome of Scoping Meeting #1 included agreement of using Volume to Capacity (VC) Ratio as the appropriate MOE for this feasibility study. Since then, further consideration has been given to identifying methodology for providing 15 minute peak period VC ratios as well as 2 hour peak period VC ratios. Peter Trencansky then provided a handout (see attached) and walked attendees through the recommended draft approach. The attendees were reminded that the overall goal considered while developing the approach was to provide peak-hour MOE's preferred by both CDOT and NCDOT, while using the current traffic forecast and being consistent with a feasibility study this size and with this level of congestion. Chris Werner also noted that Arc Map software would be utilized to assist in the performing the VC ratio analysis which would allow additional flexibility in analyzing various peak-hour scenarios and nearly automated figure creation. Discussion on the proposed traffic operations analysis methodology included the following:

- It was recommended that peak 1-hour, 2-hour and 3-hour VC ratio data be reported for no build and build scenarios.
- It was suggested, before discussing potential alternatives, that VC ratio data be prepared and reported for I-77 being improved to a 10-lane, 12-lane and 14-lane facility with only general purpose lanes. The reasoning behind this was that it should be determined whether widening could accommodate the projected traffic, and if not then this would be



## MEETING MINUTES

### I-77 Improvements Feasibility Study (FS-0810A)

10/19/2012

Page 3 of 3

the basis for developing additional widening alternatives and the inclusion of managed lanes.

- It was noted that the current traffic forecast did not include a 10-lane facility; therefore, URS/HMM will utilize the 5-2-2-5 forecast, adding the managed lanes traffic to the general purpose freeway traffic to represent a 10-lane facility. *Follow-up: Following the meeting it was determined that a 5-2-2-5 forecast did not exist; therefore, the 5-1-1-5 forecast will be used.*
- It was suggested that once the 10-lane facility VC ratio data and corresponding figures were complete, the attendees of this meeting reconvene to review the data and to discuss potential alternatives for consideration. It was also suggested that CDOT could provide a factor to apply to the 10-lane traffic forecast data to represent the 12-lane and 14-lane scenarios.
- During the development of alternatives, it was suggested that separate facilities be considered due to the anticipated number of lanes. This would essentially result with a center facility to serve more through-type traffic while the outside facility would accommodate the local trips and provide access to interchanges from the inside facility.

#### **Additional Miscellaneous Discussion:**

- The 2040 Travel Demand Model is currently being prepared.
- The I-277 Loop Study is Phase I of the overall study, with additional phases to follow. Designs prepared during Phase I are not preliminary designs.
- It was noted when over four lanes are provided in each direction, that capacity is often lost due to drivers' fear of being trapped and unable to make desired exits. Consideration may be given to providing parallel facilities in order to serve local and through traffic.
- Direct-connects between I-77/I-485 and I-77/US 74 should be considered when developing alternatives.
- Cost estimates for South Carolina portion should be reported in separate section and not included in the overall project cost estimate.

#### **Action items include:**

- URS/HMM to develop 10-lane facility VC ratio data.
- A follow-up meeting will be scheduled once the 10-lane facility VC ratio data is available for review so alternative discussion can be held.





I-77 Improvements Feasibility Study  
 FS-0810A  
 Mecklenburg County, North Carolina  
 October 18, 2012  
 Scoping Meeting #2

Name/Agency	Email Address
Mike Reese / NCDOT Cong. Mgmt	mike reese @ncdot.gov
JAMES DUNLOP / NCDOT Cong. Mgmt	j.dunlop@ncdot.gov
Jennifer Harris / NCDOT ADEA	jhharris1@ncdot.gov
NORM STEINMAN	nsteinman@ci.charlotte.nc.us
Derrick Lewis	dlewis@ncdot.gov
Timothy Gibbs	t.gibbs@charlottenc.gov
STUART BASHAM	SBASHAM@CI.CHARLOTTE.NC.US
Greg Brew	gbrew@ncdot.gov
Theresa Ellerby	tellerby@ncdot.gov
Mike Pekarek	mike.pekarek@hatchmott.com
Nathan Phillips	nathan.phillips@hatchmott.com
MARK FREEMAN	MARK.FREEMAN@HATCHMOTT.COM
PETER TRENCANSKY	Peter.trencansky@urs.com
Chris Werner	christopher_werner@urs.com



Volume/Capacity Calculation Methodology

2009 Traffic Forecast Summary

Average Annual Daily Traffic (AADT)124000

Design Hour Factor (k-Factor)11%

2010 Traffic Count Data Summary

Date	Daily Vol.	AM Pk (1-hr)	AM Pk (3-hr)	PM Pk (1-hr)	PM Pk (3-hr)
11/11/2010	137565	10728	26747	12228	31814
11/12/2010	147812	10751	27113	12292	33991
11/15/2010	131093	11571	28015	11823	30490
11/16/2010	128332	11608	27938	11659	29626
11/17/2010	135903	11451	27839	12278	31557
Average	136141	11222	27530	12056	31496

Percent of Daily Traffic in AM Pk (1-hr)8.2%

Percent of Daily Traffic in AM Pk (3-hr)20.2%

Percent of Daily Traffic in PM Pk (1-hr)8.9%

Percent of Daily Traffic in PM Pk (3-hr)23.1%

Percent of Daily Traffic in AM/PM Pk (1-hr)17.1%

Percent of Daily Traffic in AM/PM Pk (3-hr)43.4%

Determining Peak 3-hour Period Design Factor

Maximum Peak 3-hr Percentage (Counts)23.1%

Average Peak 3-hr Percentage (Counts)21.7%

Design Hour Factor for 1-hr (Forecast)11%

Peak 3-hr Design Period Factor (Max)2.10

Peak 3-hr Design Period Factor (Average)1.97

Determining Peak 3-hour Volume

NBSB

AM Peak Hour (1-hr) Volume from IAU98914222

PM Peak Hour (1-hr) Volume from IAU39068566

AM Peak Hour (3-hr) Volume (Max)208028879

PM Peak Hour (3-hr) Volume (Max)821518016

AM Peak Hour (3-hr) Volume (Avg)194938321

PM Peak Hour (3-hr) Volume (Avg)769816881

Summary of Peak Hour Volumes

(assumes "Average" 3-hour volumes)

NBSB

AM Peak (15-min)104124444

AM Peak (1-hr)98914222

AM Peak (3-hr)194938321

PM Peak (15-min)41129017

PM Peak (1-hr)39068566

PM Peak (3-hour)769816881

Peak Hour Capacity (Basic Freeway Segment)

(Assumes 8-lanes, Level Terrain, 6% trucks, 65 mph FFS)

Peak 15-min Capacity7600

Peak 1-hr Capacity7980

Peak 3-hr Capacity23940

Volume to Capacity Ratio (2009 Existing)

NBSB

AM Peak 15-min Volume/Capacity1.370.58

AM Peak 1-hr Volume/Capacity1.240.53

AM Peak 3-hr Volume/Capacity0.810.35

PM Peak 15-min Volume/Capacity0.541.19

PM Peak 1-hr Volume/Capacity0.491.07

PM Peak 3-hr Volume/Capacity0.320.71







# CRTPO COMMENTS ON DRAFT FEASIBILITY STUDY









600 East Fourth Street  
Charlotte, NC 28202  
704-336-2205  
www.crtpo.org

October 1, 2014

Mr. Shane York, PE  
North Carolina Department of Transportation  
Feasibility Studies Unit  
Program Development Branch  
1534 Mail Service Center  
Raleigh NC 27699-1534

**SUBJECT: I-77 South Feasibility Study (Project # FS-0810A)**

Dear Mr. York:

Thank you for the opportunity to provide comments on the draft feasibility study for I-77 South.

Our comments and questions are presented in this letter in the following sequence:

1. General comments
2. Section-by-Section comments
3. Appendix comments
4. Land use comments

**1. General Comments**

**1.1 I-277/I-77 Loop Strategic Plan (Uptown Loop Study)**

The City of Charlotte and NCDOT worked together on a study to review issues pertaining to the I-77/I-277 (freeway) Loop around Uptown Charlotte. The results of that study are in conflict with the proposals for both I-77/I-277 interchanges and the existing interchanges for Morehead St. (US 29/NC 27) and W. Trade and W. Fifth Streets. Great care should be taken in subsequent studies to address these discrepancies.

**1.2 West Boulevard/Remount Road Interchanges**

Consideration should be given to the impacts of leaving the Remount Rd. and West Blvd. (NC 160) interchanges "as is" before definitively determining that the West Blvd. interchange will be closed and Remount Rd. becomes a full movement interchange. Those impacts could include changes in accessibility, vehicle miles traveled and neighborhood cohesion.

**1.3 Mainline Cross Sections and Managed Lanes Access**

Going forward, in order for us and other stakeholders to clearly understand the tradeoffs between benefits and impacts, we would like to ensure that the next phases in the development of this



project include the thorough evaluation of options for the following attributes throughout the project length:

- Collector/distributor roads or lanes;
- Express lanes;
- Options for vertical and horizontal alignments; and
- Direct connectors to/from managed lanes

The evaluation of express lanes and/or collector /distributor (c/d) roads will reveal if congestion on the mainline lanes will be significantly lower with c/d roads or lanes. The comparison of horizontal widening against the construction of an (at least partially) elevated roadway will be useful to determine differences in capital costs, right-of-way acquisitions and neighborhood-type impacts.

In addition, we need to understand the need for adding lanes to I-77 between the Belk and Brookshire freeways since the current and future volumes in this section are lower than volumes going away from Uptown Charlotte to both the north and south.

#### 1.4 Congestion Management Process

In compliance with the metropolitan transportation planning regulations, the CRTPO has in place a Congestion Management Process (CMP). The CMP evaluated the following components of this project:

- I-77 widening, from Exit 6 to Exit 11
- I-77/Belk Freeway interchange
- I-77/Brookshire Freeway interchange

The evaluation recommended implementation of work zone management techniques and freeway ramp metering for the mainline widening components of the project. For the interchange improvement components, the evaluation recommended work zone management techniques, freeway ramp metering (I-277/Brookshire Freeway only) and variable speed limits (I-277/Belk Freeway only).

In addition to the techniques mentioned above, the CMP proposed a total of 16 different congestion management strategies for fully-controlled access facilities. As the analysis of the I-77 South project continues into subsequent phases, the CMP and its congestion management strategies should be consulted to determine what strategies are appropriate.

#### 1.5 I-77 Strategic Corridor Plan

A comprehensive, multi-modal strategy is critical to addressing the complex mobility issues in the I-77 corridor. Therefore, the proposed improvements should be a part of a strategic plan for the corridor from Rock Hill, SC to Statesville.

## 2. Section-by-Section Comments

Section 2.1: Charlotte is the largest city in NC. Large employment concentrations exist near the corridor, especially in Uptown Charlotte, the Arrowood Industrial Park and Ballantyne.

Since this roadway is part of the Interstate Highway System, it was designed and built to allow access only at interchanges with selected arterials, and never directly to/from adjacent parcels. While categorized as a freeway/expressway on the Thoroughfare Plan, I-77 is a freeway.



The following topics should be described in this section:

- Existing operating conditions
- Ongoing growth in population, employment and travel is anticipated
- Additional capacity to increase reliability and maintenance of travel times
- Application of a variety of technologies – managed lanes, express lanes, collector/distributor lanes, ramp management - will be necessary to expand long-term choices for the traveling public

- Section 2.3: First Bullet - Change the word “dominate” to ‘dominant’  
Fourth Bullet – the former Waddell High School is now the Waddell Language Academy  
Fifth Bullet – Woodlawn Drive should be Woodlawn Road  
Eighth Bullet & Ninth Bullet – West Blvd. is also NC 160  
Tenth Bullet – Refer to I-277 at the US 74 interchange also as the John Belk Freeway; reference the US 29/NC 27 interchange also as W. Morehead St.  
Twelfth Bullet – Refer to the LaSalle St. interchange as the LaSalle St. /Atando Ave. interchange
- Section 3.0: The *Fast Lanes Study* referenced from 2009 should be noted as Phase 2 of the *Fast Lanes Study*.
- Section 4.0: Project # U-3850 is no longer in the TIP. Instead, describe Project # I-5405 (I-77 North Improvements, between I-277 (Brookshire Frwy.) and NC 150).
- Section 6.3.1: The City doesn’t support consideration of eliminating the Arrowood Rd. interchange.
- Section 6.3.4: Woodlawn Drive should be Woodlawn Road.
- Section 7.0: Exhibit 2 implies that the 3-2-2-3 option would be worse than the 2035 No Build option. Please explain how.
- Section 9.0: List some of the adjacent neighborhoods (e.g. Wesley Heights, Third Ward, Waddell Park, Genesis Park, Lincoln Heights, etc.). Also see comments in 4.2 –Area Plan & Neighborhood Impacts below on pages 4 and 5.

Note that infringement upon some of the adjacent neighborhoods may trigger an environmental justice review. The CRTPO’s environmental justice analysis indicates significant concentrations of low-income and minority communities along the corridor.

### 3. Appendix Comments

Figure 2: The two leftmost arrows on Typical Section 4 are shown heading in the wrong direction.

Figure 3/  
Sheet 3: Will the loop ramp from eastbound Westinghouse (in Quadrant C) remain if the interchange is revised?



Figure 3/  
Sheet 10:

W. Trade St. is shown as being relocated north of I-77. The City does not support this relocation as it will allow for increased speeds along W. Trade St. and require relocation of the City's East-West Streetcar Line at a significant expense.

The proposed loop in Quadrant A will likely trigger an Environmental Justice analysis for the project.

Figure 3/  
Sheet 11:

Label Atando Ave. on the map.

#### **4. Land Use Comments**

##### **4.1 General**

The most ambitious of several reconstruction options ("5/2/2/5", signifying the development of five general purpose lanes and two managed lanes in each direction) would impact/displace for additional right-of-way a total of 122 residential properties and 187 business properties, (446 parcels), with other options having lesser impacts. These properties have a calculated value of \$310 million (reflecting a potential loss of nearly \$1.5 million City and \$2.5 million County real estate taxes (FY2015 tax rates)). The loss of, or impact upon, other land uses (recreational, institutional, open space, cemetery) also appears to be fairly significant by looking at the maps although the feasibility study does not specifically quantify the impacts upon these land uses.

In one instance – the area around the I-77 Woodlawn/Billy Graham/South Tryon interchange – a suggested reconfiguration of this interchange could make (current) right-of-way available for future development, creating a potential land use planning opportunity in order to anticipate eventual land use changes in this area. The suggested elimination of a bridge in the Freedom Drive/Wilkinson Blvd. area would similarly make right-of-way land available for alternate land use. These are discussed in greater detail below.

##### **4.2 Area Plan & Neighborhood Impacts**

The proposed project traverses 13.12 miles, entirely within the City of Charlotte. The roadway right-of-way passes either through or abutting a total of 15 area plan geographies, specifically:

- Central District Plan
- West Morehead Corridor Plan
- Wesley Heights Area Plan
- West End Pedscape Plan
- Third Ward Vision Plan
- Center City Plan
- Bryant Park Area Plan
- Wilmore Small Area Plan
- South End Transit Station Area Plan
- New Bern Transit Station Area Plan
- Scaleybark Transit Station Area Plan
- Woodlawn Transit Station Area Plan
- Southwest District Plan
- Tyvola/Archdale Transit Station Area Plan
- Steele Creek Area Plan

The direct land use impacts upon these areas is principally in the form of expanding of the I-77 right-of-way and thereby encroaching into adjacent residential, commercial and industrial areas (as well as into a number of institutional and governmental properties). While the feasibility study



does not specifically inventory these latter land uses, by looking at the maps therein, the following properties appear to be impacted:

- Double Oaks Neighborhood Park
- Anita Stroud Neighborhood Park/Greenway
- Irwin Creek Greenway
- Biddleville Park
- Johnson C. Smith University
- Elmwood Cemetery
- Irwin Avenue Elementary School
- Frazier Neighborhood Park
- Wesley Heights Greenway
- Wilmore Neighborhood Park
- Abbott Neighborhood Park
- Revolution Community Park/Golf Course
- Humane Society of Charlotte
- Military & Global Leadership Academy at Marie G. Davis
- Charlotte Mecklenburg Schools Atrium office development (education center)
- Charlotte Housing Authority (Southside Homes)
- Hamilton Street/Greenville City-owned vacant property
- NC Music Factory/County-owned property
- Optimist Park/County-owned vacant property

We expect that a subsequent study phase could quantify the potential loss to right-of-way of these properties (in terms of acreage at the very least).

At the appropriate time, the entities whose properties could be impacted should be engaged in discussion as to their capital development plans for these properties with respect to potential impacts associated with right-of-way acquisition. Specific mitigation measures (to offset the loss of certain of these community resources) should then be available within the project's scope.

#### 4.3 I-77 Woodlawn/Billy Graham/South Tryon Interchange Land Use Opportunity

The feasibility study suggests the possibility to re-configure the Interstate 77 interchange at Woodlawn/Billy Graham/South Tryon, in order to improve efficiency of this exit that serves three separate thoroughfares. The proposed re-design eliminates four clover-leaves in the current interchange. Two of the interchanges are located within the Woodlawn Transit Station Area Plan while the other two are located within the Central District. The prospect of the eventual availability of these parcels for private development suggests that future land uses should be eventually assigned to these properties by undertaking an interchange land use/infrastructure plan, as the current right-of-way has no future land use recommendation assigned to it.

#### 4.4 I-77/Belk Freeway (I-277)/Freedom/Wilkinson Interchange

A similar situation seems to exist in the area of the I-77/Freedom/Wilkinson interchange area, where it is proposed to eliminate the Freedom Drive bridge over Wilkinson in favor of a ramp to be developed further east in the interchange. The land in question adjoins Bryant Neighborhood Park and what appears to be a tributary of Irwin Creek, and as such might make a suitable expansion of the park or greenway, or an addition to the nearby business park that currently fronts on nearby West Morehead Street.



Please advise if you require clarification regarding our comments by contacting Tim Gibbs of the Charlotte DOT staff ([tgibbs@charlottenc.gov](mailto:tgibbs@charlottenc.gov) or 704.336.3917) or Robert Cook, CRTPO Secretary ([rwcook@charlottenc.gov](mailto:rwcook@charlottenc.gov) or 704.336.8643).

Sincerely,

A handwritten signature in black ink, appearing to read "Danny Pleasant". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Danny Pleasant, AICP  
Chairman, CRTPO Technical Coordinating Committee

- c. Debra Campbell, Assistant City Manager, City of Charlotte  
Ed McKinney, AICP, Interim Planning Director, Charlotte-Mecklenburg Planning Department  
David McDonald, PE, Transit Planning Manager, Charlotte Area Transit System  
Robert Cook, AICP, Secretary, Charlotte Regional Transportation Planning Organization  
Norm Steinman, AICP, Planning and Design Division Manager, Charlotte DOT  
Louis Mitchell, PE, Division Engineer, Division 10, NCDOT  
Scott Cole, PE, Deputy Division Engineer, Division 10, NCDOT



NCDOT RESPONSE TO  
CRTPO COMMENTS ON  
DRAFT FEASIBILITY STUDY









STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

PAT MCCRORY  
GOVERNOR

ANTHONY J. TATA  
SECRETARY

To: Danny Pleasant, AICP  
Charlotte Regional Transportation Planning Organization (CRTPO)  
Technical Coordinating Committee  
600 East Fourth Street  
Charlotte, NC 28202

From: Derrick Lewis, PE  
North Carolina Department of Transportation Program Development Branch  
Feasibility Studies Unit  
1534 Mail Service Center  
Raleigh, NC 27699-1534

Date: December 19, 2014

Subject: I-77 South Feasibility Study (Project # FS-0810A)

---

We wish to thank CRTPO for the review of the Draft Feasibility Study. It is our intention to provide responses to all of your comments which may be address during the Feasibility Study process. With regard to your comments which need to reviewed, considered and further evaluated during subsequent phases of this project, your comments in addition to this comment/response letter will be included within the Final Feasibility Study, which will be the starting point for further development of this project.

As you may know, a feasibility study is not the result of exhaustive environmental and engineering analysis. Additionally, alternatives developed within a feasibility study are intended to be initial, high-level, potential alternatives to meet the project purpose. A feasibility study as performed by NCDOT is a preliminary engineering document used to indicate a potential scope of work, costs and impacts to assist in programming decisions while keeping the actual financial costs of the feasibility study to a reasonable budget level. The capital costs developed in the feasibility study are much more refined than a cursory evaluation, but they are intended to provide order of magnitude costs and not necessarily get into the details of all the possible options that could be envisioned. During later planning and design phases, NCDOT Project Development and Environmental Analysis Unit and the Roadway Design Unit will include extensive stakeholder engagement. Initial engagement will include discussion on the project needs, constraints, and alternatives to be considered to meet the project purpose. The concepts included in this feasibility study, as well as the concepts developed in the I-277/I-77 Loop Strategic Plan (Uptown Loop Study) can be further investigated at this time as well.

**MAILING ADDRESS:**  
NC DEPARTMENT OF TRANSPORTATION  
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS  
1548 MAIL SERVICE CENTER  
RALEIGH NC 27699-1548

TELEPHONE: 919-707-6000  
FAX: 919-250-4224

WEBSITE:  
[HTTPS://CONNECT.NCDOT.GOV/RESOURCES/ENVIRONMENTAL/PAGES/DEFAULT.ASPX](https://connect.ncdot.gov/resources/ENVIRONMENTAL/PAGES/DEFAULT.ASPX)

**LOCATION:**  
CENTURY CENTER, BUILDING A  
1000 BIRCH RIDGE DRIVE  
RALEIGH NC 27610



The following are responses to the comments provided by CRTPO on October 1, 2014.

Comment/Action	Incorporated?	Response
<b>General Comments</b>		
<b>1.1 I-277/I-77 Loop Strategic Plan (Uptown Loop Study).</b> The City of Charlotte and NCDOT worked together on a study to review issues pertaining to the I-77/I-277 (freeway) Loop around Uptown Charlotte. The results of that study are in conflict with the proposals for both I-77/I-277 interchanges and the existing interchanges for Morehead St. (US 29/NC 27) and W. Trade and W. Fifth Streets. Great care should be taken in subsequent studies to address these discrepancies.	<i>No change- please see response</i>	The I-277/I-77 Loop Strategic Plan (Uptown Study) and the I-77 Reconstruction Feasibility Study (I-77 South Feasibility Study) are two projects, both of which had different purposes or objectives. Due to the timing of these studies, specific details of each could not be incorporated into one another. As both of these studies are high-level planning studies, subsequent projects will be required at which time consideration should be given to the purposes of both projects and considered/incorporated where possible.
<b>1.2 West Boulevard/Remount Road Interchanges</b> Consideration should be given to the impacts of leaving the Remount Rd. and West Blvd. (NC 160) interchanges "as is" before definitively determining that the West Blvd. interchange will be closed and Remount Rd. becomes a full movement interchange. Those impacts could include changes in accessibility, vehicle miles traveled and neighborhood cohesion.	<i>No change- please see response</i>	It should be noted that the feasibility study recommendation to close/consolidate interchanges is not the final word but the beginning of the conversation. The closure and/or consolidation of partial interchanges could result in direct and indirect effects to access, vehicle miles traveled and neighborhood cohesion. As documented within the Feasibility Study, should the closure of the West Blvd interchange be further considered as an option, additional evaluation would be performed during the NEPA phase which would also require coordination, review by and approval by the Federal Highway Administration.
<b>1.3 Mainline Cross Sections and Managed Lanes Access</b> Going forward, in order for us and other stakeholders to clearly understand the tradeoffs between benefits and impacts, we would like to ensure that the next phases in the development of this project include the thorough evaluation of options for the following attributes throughout the project length:	<i>No change- please see response</i>	In general, a feasibility study performed by NCDOT is a preliminary engineering document used to indicate a potential scope of work, costs and impacts to assist in programming decisions. Additionally, a feasibility study is not intended to provide every conceivable option but a range of potential options with estimated costs. Further evaluation will be performed during the NEPA phase, which will require



<ul style="list-style-type: none"> <li>• Collector/distributor roads or lanes;</li> <li>• Express lanes;</li> <li>• Options for vertical and horizontal alignments; and</li> <li>• Direct connectors to/from managed lane</li> </ul> <p>The evaluation of express lanes and/or collector /distributor (c/d) roads will reveal if congestion on the mainline lanes will be significantly lower with c/d roads or lanes. The comparison of horizontal widening against the construction of an (at least partially) elevated roadway will be useful to determine differences in capital costs, right-of-way acquisitions and neighborhood-type impacts.</p> <p>In addition, we need to understand the need for adding lanes to I-77 between the Belk and Brookshire freeways since the current and future volumes in this section are lower than volumes going away from Uptown Charlotte to both the north and south.</p>	<p><i>No change- please see response</i></p> <p><i>No change- please see response</i></p>	<p>an evaluation of a full range of alternatives, which may include those included in your comment, in addition to others.</p> <p>Evaluation of this complexity could not be performed as a part of this feasibility study level due to limitations associated with the traffic forecast or uncertainty of the design requirements such as the required interchange configurations, managed lanes components (ingress/egress) locations, direct connect locations, or ramp locations. Information or feasible components identified within this feasibility study should provide an initial concept to begin this type of investigation during the NEPA phase.</p> <p>This section is only marginally adequate at the present time. Over time, we anticipate that the section between the Belk and Brookshire will need improvements. While the ultimate improvements needed will be determined and implemented based on the later planning and design phases, the feasibility study provides a potential costs if said improvements are implemented.</p>
<p><b>1.4 Congestion Management Process</b>  In compliance with the metropolitan transportation planning regulations, the CRTPO has in place a Congestion Management Process (CMP). The CMP evaluated the following components of this project:</p> <ul style="list-style-type: none"> <li>• I-77 widening, from Exit 6 to Exit 11</li> <li>• I-77 /Belk Freeway interchange</li> <li>• I-77 /Brookshire Freeway interchange</li> </ul> <p>The evaluation recommended implementation of work zone</p>	<p><i>No change- please see response</i></p>	<p>The CRTPO CMP includes a significant amount of information and strategies which will assist in initiating and developing the project during the NEPA Phase. Review of the CRTPO CMP should be performed as a part of the NEPA process with strategies considered and implemented as appropriate. While the current feasibility study does not get into the alternative traffic management strategies mentioned here, it does not preclude them from being added at a later date. As the Department get additional experience, we anticipate these strategies will be considered on future projects</p>

<p>management techniques and freeway ramp metering for the mainline widening components of the project. For the interchange improvement components, the evaluation recommended work zone management techniques, freeway ramp metering (I-277 /Brookshire Freeway only) and variable speed limits (I-277 /Bell Freeway only).</p> <p>In addition to the techniques mentioned above, the CMP proposed a total of 16 different congestion management strategies for fully-controlled access facilities. As the analysis of the I-77 South project continues into subsequent phases, the CMP and its congestion management strategies should be consulted to determine what strategies are appropriate.</p>		<p>including this one.</p>
<p><b>1.5 I-77 Strategic Corridor Plan</b>  A comprehensive, multi-modal strategy is critical to addressing the complex mobility issues in the I-77 corridor. Therefore, the proposed improvements should be a part of a strategic plan for the corridor from Rock Hill, SC to Statesville.</p>	<p><i>No change- please see response</i></p>	<p>Upon initiation of the NEPA phase, specific needs for the project will be identified through evaluation and stakeholder coordination. Based upon these needs, primary purposes and secondary benefits will be identified for which alternatives will be developed and evaluated based upon their ability to meet the purpose of the project. As alternatives are developed for the project, consideration will be given to the local, regional and statewide plans to make sure the alternatives are consistent with these plans.</p>
<p><b>Section 2.1</b>  Charlotte is the largest city in NC. Large employment concentrations exist near the corridor, especially in Uptown Charlotte, the Arrowood Industrial Park and Ballantyne.</p>	<p><i>See response</i></p>	<p>Demographic information has been added to Section 2.1</p>
<p><b>Section 2.1</b>  Since this roadway is part of the Interstate Highway System, it was designed and built to allow access only at interchanges with selected arterials, and never directly to/from adjacent parcels. While categorized as a freeway/expressway on the Thoroughfare</p>	<p><i>See response</i></p>	<p>This comment appears to be referencing documentation included in Section 2.2 which is merely documenting the I-77 classification included in the Mecklenburg-Union Planning Organization (MUMPO) Thoroughfare Plan.</p>



Plan, I-77 is a freeway.		
<b>Section 2.1</b> The following topics should be described in this section: <ul style="list-style-type: none"> <li>Existing operating conditions</li> <li>Ongoing growth in population, employment and travel is anticipated</li> <li>Additional capacity to increase reliability and maintenance of travel times</li> <li>Application of a variety of technologies- managed lanes, express lanes,</li> <li>collector/distributor lanes, ramp management - will be necessary to expand long-term choices for the traveling public</li> </ul>	<i>See response</i>  <i>See response</i>  <i>See response</i>  <i>See response</i>	A discussion of existing traffic operations is included in Traffic Operations, Section 7.0.  Demographic information was added to Section 2.1.  Edits incorporated into Sections 2.1 (paragraph 2)  Section 2.1 has been modified to note further evaluation of a full range of alternatives and technologies will be considered/evaluated during the NEPA phase.  Section 2.1 has been modified to note further evaluation of a full range of alternatives and technologies will be considered/evaluated during the NEPA phase.
<b>Section 2.3</b> First Bullet- Change the word "dominate" to 'dominant' Fourth Bullet - the former Waddell High School is now the Waddell Language Academy Fifth Bullet - Woodlawn Drive should be Woodlawn Road Eighth Bullet & Ninth Bullet - West Blvd. is also NC 160 Tenth Bullet- Refer to I-277 at the US 74 interchange also as the John Belk Freeway; reference the US 29/NC 27 interchange also as W. Morehead St. Twelfth Bullet - Refer to the LaSalle St. interchange as the LaSalle St./Atando Ave. interchange	Yes  Yes  Yes  Yes  Yes  Yes	NOTE: As a result of these comments, the following figure revisions have also been completed: <ul style="list-style-type: none"> <li>Waddell High School changed to Waddell Language Academy (Figure 3, Sheet 6 of 11)</li> <li>Woodlawn Drive changed to Woodlawn Road (Figure 3, Sheet 7 of 11)</li> </ul>
<b>Section 3.0</b> The Fast Lanes Study referenced from 2009 should be noted as Phase 2 of the Fast Lanes Study.	Yes	Comment incorporated.

<p><b>Section 4.0</b> Project# U-3850 is no longer in the TIP. Instead, describe Project# I-5405 (I-77 North Improvements, between I-277 (Brookshire Frwy.) and NC 150).</p>	<p>Yes</p>	<p>Comment incorporated.</p>
<p><b>Section 6.3.1</b> The City doesn't support consideration of eliminating the Arrowood Rd. interchange.</p>	<p><i>See response</i></p>	<p>We will note the City's objection to eliminating the Arrowood Road interchange. The feasibility study is not the final word on interchange modifications but the beginning of the discussion. The closure of an interchange could result in direct and indirect effects to access, vehicle miles traveled and neighborhood cohesion. As documented within the Feasibility Study, should the closure of the Arrowood Rd interchange be further considered as an option, additional evaluation would be performed during the NEPA phase which would also require coordination, review by and approval by the Federal Highway Administration.</p>
<p><b>Section 6.3.4</b> Woodlawn Drive should be Woodlawn Road.</p>	<p>Yes</p>	<p>Comment incorporated.</p>



<p><b>Section 7.0</b></p> <p>Exhibit 2 implies that the 3-2-2-3 option would be worse than the 2035 No Build option. Please explain how.</p>	<p><i>See response</i></p>	<p>The methodology utilized within this feasibility study was developed to provide an order of magnitude comparison of alternatives considered, utilizing the available traffic forecast and providing MOEs for both CDOT and NCDOT. Information or feasible components identified within this feasibility study should provide an initial concept to begin this type of investigation during the NEPA phase. An updated traffic forecast will be prepared and detailed traffic operations analysis will be performed during the NEPA phase. When these detailed traffic operational analysis are prepared in later planning and design phases, it is anticipated that the overall operations and throughput of the corridor will improve when the reliability and sustainability of the managed lanes is fully realized.</p>
<p><b>Section 9.0</b></p> <p>List some of the adjacent neighborhoods (e.g. Wesley Heights, Third Ward, Waddell Park, Genesis Park, Lincoln Heights, etc.). Also see comments in 4.2 - Area Plan &amp; Neighborhood Impacts below on pages 4 and 5.</p> <p>Note that infringement upon some of the adjacent neighborhoods may trigger an Environmental justice review. The CRTPO's environmental justice analysis indicates significant concentrations of low-income and minority communities along the corridor.</p>	<p><i>See response</i></p>	<p>The Feasibility Study includes a very high level glimpse into the land use and the communities impacted. A rigorous public involvement effort will be conducted and community resources will be inventoried and evaluated during the NEPA phase to identify direct and indirect effects associated with potential build alternatives. Additionally, during the NEPA phase a multitude of community studies will be prepared including a Community Characteristics report will identify Environmental Justice populations and a Community Impact Assessment, which will address the impacts of the project.</p>
<p><b>Appendix Comments</b></p>		
<p><b>Figure 2:</b> The two leftmost arrows on Typical Section 4 are shown heading in the wrong direction.</p>	<p>Yes</p>	<p>Comment incorporated.</p>
<p><b>Figure 3/ Sheet 3:</b> Will the loop ramp from eastbound Westinghouse (in Quadrant C) remain if the interchange is revised?</p>	<p><i>See response</i></p>	<p>The loop ramp from eastbound Westinghouse Blvd is currently shown to remain as is; a more detailed analysis will be performed during the NEPA phase which will identify the most appropriate interchange configuration to handle the</p>

		traffic demand at this location, as is the case for all interchanges within the project study area.
<b>Figure 3/ Sheet 10:</b> W. Trade St. is shown as being relocated north of I-77. The City does not support this relocation as it will allow for increased speeds along W. Trade St. and require relocation of the City's East-West Streetcar Line at a significant expense. The proposed loop in Quadrant A will likely trigger an Environmental Justice analysis for the project.	<i>See response</i>	A more detailed analysis will be performed during the NEPA phase which will identify the most appropriate interchange configuration to handle the traffic demand at this location. As noted in the feasibility study, this realignment and configuration was developed to minimize impacts to the adjacent neighborhoods/historic district, accommodate both the projected travel demand of the two interchanges while improving interchange spacing, improving off-ramp lengths to prevent potential queuing onto I-77, and reduce the amount of entrance/exit ramp locations on I-77. Additionally, during the NEPA phase a multitude of community studies will be prepared including a Community Characteristics report will identify Environmental Justice populations and a Community Impact Assessment, which will address the impacts of the project.
<b>Figure 3/ Sheet 11:</b> Label Atando Ave. on the map.	Yes	Comment incorporated.
<b>Land Use Comments</b>		
<b>4.1 General (see response below comment 4.4)</b>  The most ambitious of several reconstruction options ("5/2/2/5", signifying the development of five general purpose lanes and two managed lanes in each direction) would impact/displace for additional right-of-way a total of 122 residential properties and 187 business properties, ( 446 parcels), with other options having lesser impacts. These properties have a calculated value of \$310 million (reflecting a potential loss of nearly \$1.5 million City and \$2.5 million County real estate taxes (FY2015 tax rates)). The loss of, or impact upon, other land uses (recreational, institutional, open space, cemetery) also appears to be fairly significant by looking at the maps although the feasibility study does not specifically quantify the impacts upon these land uses. In one instance-the area around the I-77 Woodlawn/Billy Graham/South Tryon interchange-a suggested reconfiguration of this interchange could make (current) right-of-way available for future development, creating a potential land use planning opportunity in order to anticipate eventual land use changes in this area. The suggested elimination of a bridge in the Freedom Drive/Wilkinson Blvd. area would similarly make right-of-way land available for alternate land		



use. These are discussed in greater detail below.

#### **4.2 Area Plan & Neighborhood Impacts (*see response below comment 4.4*)**

The proposed project traverses 13.12 miles, entirely within the City of Charlotte. The roadway right-of-way passes either through or abutting a total of 15 area plan geographies, specifically:

- Central District Plan, West Morehead Corridor Plan, Wesley Heights Area Plan, West End Pedscape Plan, Third Ward Vision Plan, Center City Plan, Bryant Park Plan, Wilmore Small Area Plan, South End Transit Station Area Plan, New Bern Transit Station Area Plan, Scaleybark Transit Station Area Plan, Woodlawn Transit Station Area Plan, Southwest District Plan, Tyvola/Archdale Transit Station Area Plan, Steele Creek Area Plan

The direct land use impacts upon these areas is principally in the form of expanding of the I-77 right-of-way and thereby encroaching into adjacent residential, commercial and industrial areas (as well as into a number of institutional and governmental properties). While the feasibility study does not specifically inventory these latter land uses, by looking at the maps therein, the following properties appear to be impacted:

- Double Oaks Neighborhood Park, Abbott Neighborhood Park, Anita Stroud Neighborhood, Revolution Community Park/Golf Course, Park/Greenway Irwin Creek Greenway, Humane Society of Charlotte, Biddleville Park, Military & Global Leadership Academy at Marie G. Davis, Johnson C. Smith University, Charlotte Mecklenburg Schools Atrium office development (education center), Elmwood Cemetery, Charlotte Housing Authority (Southside Homes), Irwin Avenue Elementary School, Hamilton Street/Greenville City-owned vacant property, Frazier Neighborhood Park, NC Music Factory /County-owned property, Wesley Heights Greenway, Optimist Park/County-owned vacant property, Wilmore Neighborhood Park

We expect that a subsequent study phase could quantify the potential loss to right-of-way of these properties (in terms of acreage at the very least).

At the appropriate time, the entities whose properties could be impacted should be engaged in discussion as to their capital development plans for these properties with respect to potential impacts associated with right-of-way acquisition. Specific mitigation measures (to offset the loss of certain of these community resources) should then be available within the project's scope.

#### **4.3 I-77 Woodlawn/Billy Graham/South Tryon Interchange Land Use Opportunity (*see response below comment 4.4*)**

The feasibility study suggests the possibility to re-configure the Interstate 77 interchange at Woodlawn/Billy Graham/South Tryon, in order to improve efficiency of this exit that serves three separate thoroughfares. The proposed re-design eliminates four clover-leaves in the current interchange. Two of the interchanges are located within the Woodlawn Transit Station Area Plan while the other two are located within the Central District. The prospect of the eventual availability of these parcels for private development suggests that future land uses should be eventually assigned to these properties by undertaking an interchange land use/infrastructure plan, as the current right-of-way has no future land

use recommendation assigned to it.

**4.4 I-77 /Belk Freeway (I-277)/Freedom/Wilkinson Interchange (*see response below comment 4.4*)**

A similar situation seems to exist in the area of the I-77 /Freedom/Wilkinson interchange area, where it is proposed to eliminate the Freedom Drive bridge over Wilkinson in favor of a ramp to be developed further east in the interchange. The land in question adjoins Bryant Neighborhood Park and what appears to be a tributary of Irwin Creek, and as such might make a suitable expansion of the park or greenway, or an addition to the nearby business park that currently fronts on nearby West Morehead Street.

**Response:**

**The Feasibility Study includes a very high level glimpse into the land use and the communities impacted. A rigorous public involvement effort will be conducted and community resources will be inventoried and evaluated during the NEPA phase to identify direct and indirect effects associated with potential build alternatives.**