Raleigh Downtown **Transportation Plan**

VOLUME 1: EXISTING CONDITIONS AND CURRENT SYSTEM INVETORY REPORT

May 2018

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APPENDICES

1.0 Project Description

The City of Raleigh, in partnership with CAMPO, GoTriangle and NCDOT is leading the Raleigh Downtown Transportation Plan. This plan focuses on transit, transportation, and urban design recommendations for the urban core of Downtown Raleigh. The 2015 Wake County Transit Plan created a vision for transit to connect the region, connect all Wake County communities, create frequent, reliable urban mobility, and enhance access to transit. The Downtown Transportation Plan builds on the Wake County Transit Plan by further developing the vision for transit and transportation in Downtown Raleigh. The goals of this plan are to develop an operational transit plan for the next 10 years, and to identify how the rights-of-way of streets can be utilized to accommodate all transportation modes within the context of existing plans and potential future development and transit operations.

1.1 Study Area Context

The Downtown study area lies centrally as the hub of the City's regional and local public transportation network. The Downtown area provides a modest urban design hierarchy containing a dominant street grid with generally 66-foot wide rights-of-ways, and four 100-foot wide streets radiating from the State Capitol. Local and regional transit systems, GoRaleigh and GoTriangle, operate in downtown along with two major transportation facilities: Raleigh Union Station and GoRaleigh Station. GoRaleigh Station currently serves local and regional buses as well as the R-Line, a free downtown circulator. Beginning in June 2018, Amtrak and NCDOT will offer four daily round trips between the newly-built Raleigh Union Station and Charlotte, with one of those trains (The Carolinian) providing extended service to New York City. The new station and will also serve Amtrak's long-distance Silver Star passenger train, providing service to the Northeast and Florida. Bicycle accommodations such as bike lanes and shared lanes are utilized daily by many commuters and recreational riders in Downtown Raleigh as well. The majority of the right-of-way in Downtown is currently utilized for automobile and bus traffic, on-street parking, bicycle facilities, on-street dining, street trees, transit stops, sidewalks and loading zones. See Exhibit 2.1-A for the study area map for this project.

2.0 Existing Conditions and Current System Inventory

2.1 Street Network and Typical Sections

There are approximately 36 centerline miles of roadway and 56 miles of sidewalk within the study area. Data collection was completed in the field for numerous streets within the study area in order to verify the existing conditions and typical street sections. The field data collection included identifying laneage configurations, lane widths, turn lane locations, bike lanes, loading zones, on-street parking, pedestrian signals, sidewalk widths and street markings. The selected typical street sections are represented in the in Exhibits 2.1-D through 2.1-F of the Appendix.

2.1.1 Functional Classification

Functional classification groups streets and highways into classes according to the character of service they are intended to provide. NCDOT provides a functional street classification system of freeways, expressways, major arterials, minor arterials, collectors and local roads. The NCDOT functional classification data is limited to state-maintained roads only and does not include City streets. Figure 1 provides a summary of NCDOT mileage by roadway classification in downtown Raleigh. The source of the data is the NCDOT Road Characteristics GIS file and the classifications are shown in Exhibit 2.1-C.

FIGURE 1: MILES OF NCDOT ROADS IN STUDY AREA

NCDOT Functional Classification	Total Length
Freeways and Expressways	2.3 miles
Principal Arterials	4.6 miles
Minor Arterial	6.4 miles
Major Collector	8 miles
Local Roads	16 miles

2.1.2 Travel Direction for One-Way Streets

The Downtown study area contains an array of one-way and bi-directional streets. Many of the northbound and southbound streets are one-way streets. Figure 2 provides a summary of the travel direction for the one-way streets within the study area. For a map with travel directions, see Exhibit 2.1-B of the Appendix.

FIGURE 2: TRAVEL DIRECTION OF ONE-WAY STREETS

One-Way Street	Travel Direction
Mayo Street	Southbound
Lane Street	Westbound (east of Harrington St.)
Jones Street	Eastbound (east of Harrington St.)
Edenton Street	Westbound (east of Hillsborough St.)
Morgan Street/New Bern Avenue	Eastbound (east of McDowell St.)
Person Street	Northbound
Blount Street	Southbound
Wilmington Street	Northbound
Salisbury Street	Northbound
McDowell Street	Northbound
Dawson Street	Southbound

2.1.3 Typical Sections

Below is a list of the streets represented in the typical sections in Exhibits 2.1-D through 2.1-F of the Appendix. Locations were selected to provide a typical section generally representative of the specified street, but all streets vary in laneage, sidewalks, right-of-way width and other elements at different locations. Total right-of-way width at these locations has been verified in the field and shown on the typical sections along with lane widths, configuration, and sidewalk width.

Fayetteville Street – From Hargett Street to Martin Street

Between Hargett Street and Martin Street, Fayetteville Street is an undivided two lane street with parking in the northbound and southbound direction. The street provides a variety of uses including office space, residential, outdoor amphitheater, and a City Plaza for outdoor events such as the weekly farmers market and various festivals. Fayetteville Street is the “great main street” of Downtown Raleigh. Large sidewalks widths, outdoor seating arrangements, and other amenities showcase Fayetteville Street as a very pedestrian friendly environment.

Edenton Street – From Person Street to Blount Street

Edenton Street between Person Street and Blount Street is a one-way directional street. There are three westbound travel lanes which eventually merge into Hillsborough Street. On-street parking is available on the right side of Edenton Street, and sidewalks are present on both sides. Residential and commercial businesses are the primary land use.

Hillsborough Street – From West Street to Harrington Street

Hillsborough Street is a three-lane street between West Street and Harrington Street. There is one eastbound travel lane and one westbound travel lane, with a center shared turn lane. On-street parking is available on both sides of the street, along with bicycle lanes in each direction. Planting strips and sidewalks are also present in both directions.

Hillsborough Street – From Mayo Street to Snow Avenue

Hillsborough Street is a two-lane street between Mayo Street and Snow Avenue. There is one eastbound travel lane and one westbound travel lane along with buffered bicycle lanes in each direction. On-Street parking is available on both sides of the street. Land use is a mix of apartments, recreational facilities, and Saint Mary's School facilities.

Hillsborough Street – From St. Mary's Street to Boylan Avenue

Hillsborough Street is a three-lane street between St. Mary's Street and Boylan Avenue. There is one eastbound travel lane and one westbound travel lane with a shared center turn lane. On-Street parking is available on the westbound side of the street with bicycle lanes and sidewalks in each direction. Land use us a combination of mixed-use, apartments, and commercial businesses.

McDowell Street – From Cabarrus Street to Davie Street

McDowell Street is a one-way, three lane undivided street from Cabarrus Street to Davie Street with three lanes of travel in the northbound direction. On-street parking is available on one side of the street with sidewalk on both sides. As one of the gateway streets into Downtown, McDowell Street wayfinding signage is provided for key destinations in the area.

McDowell Street – From Morgan Street to Hargett Street

McDowell Street is a one-way, four-lane street from Morgan Street to Hargett Street. There are three northbound travel lanes and one shared through-right lane. Sidewalks are present in each direction and land use is primarily commercial.

Martin Luther King Jr. Boulevard – From Blount Street to Person Street

Martin Luther King Jr. Boulevard between Person Street and Blount Street is a two-way, five-lane roadway with two eastbound lanes, two westbound lanes and a turn lane. The land use along this section is residential to the south and Shaw University is located on the north side. There are sidewalks present on both sides of the roadway.

Martin Luther King Jr. Boulevard – From Salisbury Street to McDowell Street

Between Salisbury Street and McDowell Street, Martin Luther King Jr. Boulevard is a seven-lane median divided roadway that transitions to a six-lane undivided facility east of the Wilmington Street/Salisbury Street intersection. A sidewalk is present on the south side of the street that begins approximately 825 feet west of the Blount Street intersection. Generally, access is controlled in this section of roadway and few driveways are present.

New Bern Avenue – From Person Street to Bloodworth Street

New Bern Avenue is a one-way directional street between Person Street to Bloodworth Street. There are three eastbound travel lanes and on-street parking is located on both sides of the street. There is also a dedicated bicycle lane on the right side of the street. New Bern Avenue also includes sidewalks and large vegetated buffers. The land use is a combination of commercial and residential development.

West Street – From Morgan Street to Hargett Street

Between Morgan Street and Hargett Street, West Street is a two-lane undivided street with on-street parking on both sides. Sidewalks are present on both sides, where construction can allow. The primary land use is commercial development.

FIGURE 3: TYPICAL ROADWAY SECTIONS ATTRIBUTES

Roadway	Roadway Limit	Right-of-Way Width (Feet)	Lane Width (feet)	Median Width (Feet)
Fayetteville Street	Hargett St – Martin St	100	10	n/a
Edenton Street	Person St – Blount St	66	10	n/a
West Street	Morgan St – Hargett St	66	10	n/a
New Bern Avenue	Person St – Bloodworth St	98	12	n/a
Hillsborough Street	West St – Harrington St	100	11	n/a
Hillsborough Street	St Mary's St – Boylan Ave	66	10	n/a
Hillsborough Street	Mayo St – Snow Ave	66	9	n/a
McDowell Street	Morgan St – Hargett St	66	9	n/a
McDowell Street	Cabarrus St – Davie St	66	10	n/a
Martin Luther King Jr Boulevard	Blount St – Person St	80	11-12	n/a
Martin Luther King Jr Boulevard	Salisbury St – McDowell St	120-177	12	5-15

2.2 Traffic Data

This section provides an assessment of the existing traffic conditions for the project study area. These assessments include evaluation of intersection level-of-service (LOS), average annualized daily traffic (AADT), and volume-to-capacity (V/C) analysis. These analyses are important for the determination and prioritization of design recommendations for corridors and intersections within those corridors.

2.2.1 Level-of-Service (LOS) Analysis

The level-of-service analysis includes 44 signalized intersections and 4 unsignalized intersections within the study area. Intersection turning movement count data was provided by the City of Raleigh. The data obtained includes counts collected between the years 2011 and 2018. Vehicle volume adjustments were made along some corridors to account for the data coming from varying years and to more accurately reflect existing conditions. These adjustments were based on knowledge of general traffic conditions in the area. The four unsignalized intersections did not have existing count data available. For one unsignalized intersection, volumes were estimated and balanced with adjacent intersections that did have available count data. For the remaining three unsignalized intersections, existing LOS is not provided. The 48 study intersections are listed below, categorized by corridor:

Intersections along Peace St. (8 total)

- Peace Street (St.) at Saint Mary's St.
- Peace St. at Glenwood Avenue
- Peace St. at West St.
- Peace St. at Capital Boulevard SB Ramps
- Peace St. at Capital Boulevard SB Ramps
- Peace St. at Salisbury St./Wilmington St.
- Peace St. at Blount St.
- Peace St. at Person St.

Intersections along Wilmington St. (4 total)

- Wilmington St. at Edenton St.
- Wilmington Street at Morgan St.
- Wilmington Street at Hargett St.
- Wilmington Street at Martin St.

Intersections along Dawson St. (8 total)

- Dawson St. at Lane St.
- Dawson St. at Jones St.
- Dawson St. at Edenton St.
- Dawson St. at Morgan St.
- Dawson St. at Hargett St.
- Dawson St. at Martin St.
- Dawson St. at Davie St.
- Dawson St. at MLK Jr. Boulevard Ramps

Intersections along McDowell St. (8 total)

- McDowell St. at Jones St.
- McDowell St. at Edenton St.
- McDowell St. at Morgan St.
- McDowell St. at Hargett St.
- McDowell St. at Martin St.
- McDowell St. at Davie St.
- McDowell St. at South St.
- McDowell St. at MLK Jr. Boulevard Ramps

Intersections along Salisbury St. (5 total)

- Salisbury St. at Edenton St.
- Salisbury St. at Morgan St.
- Salisbury St. at Hargett St.
- Salisbury St. at Martin St.
- Salisbury Street / Wilmington at MLK Jr. Boulevard

Intersections along Blount St. (5 total)

- Blount St. at Edenton St.
- Blount St. at Morgan St.
- Blount St. at Hargett St.
- Blount St. at Martin St.
- Blount St. at MLK Jr. Boulevard

Intersections along Person St. (5 total)

- Person St. at Edenton St.
- Person St. at Morgan St./New Bern Avenue
- Person St. at Hargett St.
- Person St. at Martin St.
- Person St. at MLK Jr. Boulevard

Intersections along Glenwood Ave. (2 total)

- Glenwood Avenue at Hillsborough St.
- Glenwood Avenue at Morgan St.

Intersections with no level-of-service data (3 total)

- Morgan Street and Hillsborough roundabout
- West Street at Hargett Street
- West Street at Martin Street

2.2.2 Methodology

Existing AM and PM peak periods analysis were performed for a typical weekday in Synchro (Version 9.2) using methodologies prescribed in the Highway Capacity Manual (HCM 2010). Existing signal settings and timings were provided by the City and used in the model. Signal plans provided by the City were used to determine other Synchro input parameters such as intersection geometry, laneage, turn bay lengths, and speed limits.

2.2.3 Measures of Effectiveness

Peak hour level-of-service (LOS) is a measure of effectiveness that assesses the performance of the intersection from a driver's perspective. LOS can range from A to F and is based on control delay (seconds/vehicle) experienced at the intersection. In generally, LOS D or better at signalized intersections is acceptable for urban areas during peak periods. At unsignalized intersections, LOS E and sometimes LOS F is not uncommon since the side-street may experience considerable delay. Figure 4 outlines the ranges of the various level of services as determined in the Highway Capacity Manual (HCM 2010).

FIGURE 4: HCM LEVELS OF SERVICE

LOS	Description	Signalized Intersection: Control Delay (veh/sec)	Lane Width (feet)
A	Most vehicles travel through the intersection without stopping or any delay	<= 10	<=10
B	Most vehicles can clear the intersection without stopping but some may stop	10 - 20	10 - 15
C	Many vehicles may stop while some may clear through the intersection without stopping	20 - 35	15 - 25
D	Many vehicles will stop and there may be cycle failures	35 - 55	25 - 35
E	Frequent cycle failures and queueing	55 - 80	35 - 50
F	Unacceptable cycle failures and queueing	> 80	> 50

LOS was determined for each study intersection and is shown on Exhibit 2.2-A and Exhibit 2.2-B. The unsignalized intersection of Peace Street at Capital Boulevard southbound (SB) ramps currently operates at LOS F during the AM and PM peak hours. This is due to large delays experience by the side street vehicles on the Capital Boulevard SB off ramp. Currently, this intersection is under construction for modifications.

The signalized intersection of MLK Jr. Boulevard at Person Street also experiences unacceptable delays in the AM peak hour. This is due to the large volume of vehicles of a typical morning commute that comes from the south. Conversely, during the PM peak hour the adjacent intersection of MLK Jr. Boulevard at Blount Street experiences LOS F as those same morning commuters return in the opposite direction.

2.2.4 Average Annual Daily Traffic (AADT)

Average Annual Daily Traffic is the average number of vehicles utilizing a segment of roadway on any given day, displayed as vehicles per day. The AADT number encompasses vehicles traveling in both directions of a facility. The most recent AADT data (2016) was obtained from the North Carolina Department of Transportation (NCDOT) for available segments within the study area. The data is shown in Exhibit 2.2-A.

2.2.5 Volume-to-Capacity (V/C)

Capacity is defined as the maximum number of vehicles that can use a facility for a given period. Facilities with more lanes have higher capacity and higher speed facilities have higher capacity values. The NDOT Transportation Planning Branch (TPB) has published a system level planning document that provided capacity values for various types of facilities. These values are based on a level of service D threshold. Therefore, segments of facilities with volume-to-capacity (V/C) ratios less than one suggest acceptable level of service while segments with V/C ratios greater than or equal to one operate below acceptable limits. The V/C map (Exhibit 2.2-D) provides V/C ratios for segments within the study area. Values were calculated from the 2016 AADT volumes and the capacity values provided in the NCDOT TPB document.

2.3 On-Street Parking Inventory

In October 2016 on-street parking data was collected for the Downtown Development and Future Parking Needs Study, which included parking time limits, paid and free parking areas, and peak-hour occupancy. A total of 3,619 of the on-street parking spaces that were inventoried for the Downtown Development and Future Parking Need Study are located within the study area for this project. No additional on-street parking data was collected for this study. The peak-hour occupancy data represents the time of day where parking is at its highest occupancy, based on the data from the previous study, the peak hour on-street parking in this study area occurred during a weekday at 2 p.m. This data is shown in Exhibit 2.3-B of the Appendix.

2.3.1 On-Street Parking Limits

Downtown on-street parking includes a variety of paid and free parking. Figure 5 shows the total number of paid spaces by time limit and total number of free spaces for each street within the study area. There are 2,700 free parking spaces, representing 74% of total parking. Exhibit 2.3-A shows that the majority of the paid parking is oriented around the State Capitol Building and free parking is along the periphery of the study area.

FIGURE 5: ON-STREET PARKING INVENTORY

Street	Paid Parking (Number of Spaces by Time Limit)				Total Paid Parking Spaces	Total Free Parking Spaces
	2-hour	*1-hour*	*30-min*	*15-min*		
Bloodworth St						328
East St						154
Person St						226
Blount St	104				104	124
Wilmington St		50			50	66
Fayetteville St	118				118	
Salisbury St	17	40		4	61	68
McDowell St	30	12			42	1
Dawson St	29				29	13
Vaughn Ct						4
Johnson St						33
Harrington St						154
West St						126
Commerce Pl						25
Glenwood Ave	85				85	18
Johnson St						34
Tucker St						27
North St						109
Lane St	9				9	209
Jones St	49				49	174
Edenton St	34				34	55
Hillsborough St		42			42	27
New Bern Pl						48
Morgan St	32			11	43	12
New Bern Ave						33
Hargett St	30	48		13	91	54
Martin St		61		9	70	45
Davie St	16	30	7	3	56	85
Cabarrus St	26				26	102
Lenoir	12				12	172
South St						103
Total	***591***	***283***	***7***	***40***		***2698***

2.4 Transit Network

2.4.1 Transit Agency and Route Inventory

Downtown Raleigh is currently served by two fixed route public transportation providers: GoRaleigh and GoTriangle. GoTriangle provides regional service to Downtown Raleigh with twelve regional bus routes. From the GoRaleigh Station, GoTriangle buses run north to Wake Forest, east to Knightdale, Wendell, and Zebulon, south to Garner and Fuquay-Varina, and west to Cary, Apex, Durham, Chapel Hill, and Carrboro. GoRaleigh also serves the Downtown area with eighteen standard fixed bus routes, two express bus routes, and a free Downtown circulator – the R-Line. All buses serving Downtown can be accessed from the GoRaleigh Station, located immediately west of the Moore Square Park. Exhibit 2.4-A shows the full route inventory of transit routes in Downtown Raleigh.

2.4.2 Transit Ridership

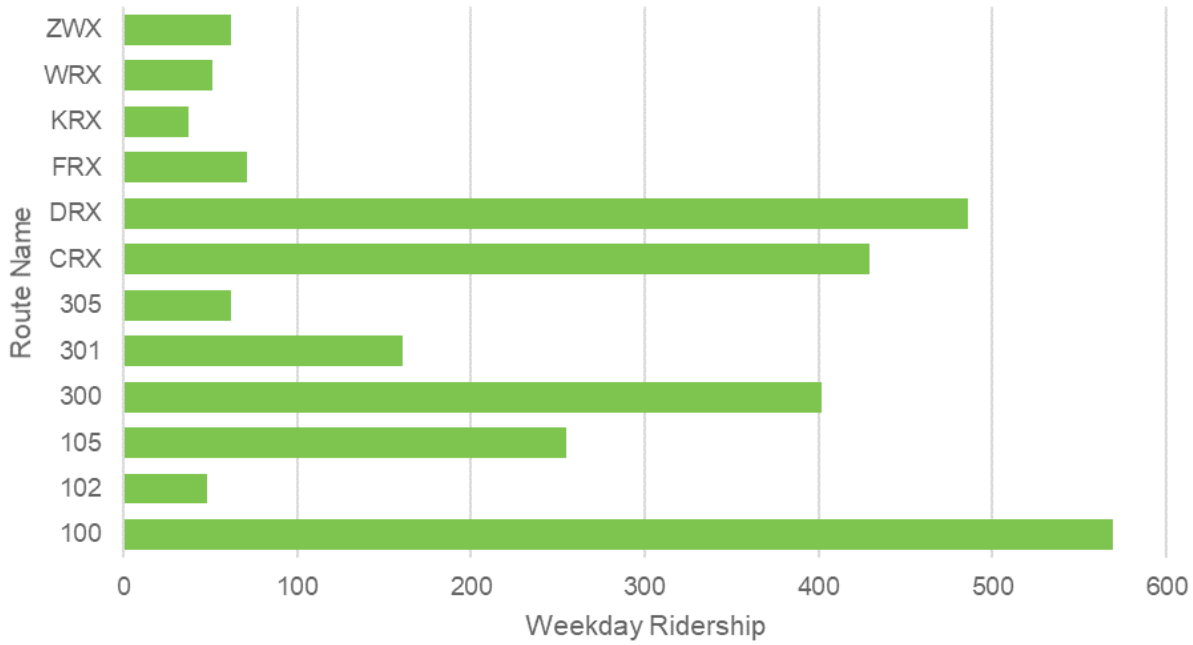
Transit ridership data was obtained from both GoTriangle and GoRaleigh for the year 2017. The datasets included daily boardings and alightings aggregated by stop ID, as well as ridership data by route. The data was consolidated and post processed to show the average weekday boardings and alightings by stop. This data can be seen on Exhibit 2.4-B and Exhibit 2.4-C in the Appendix. The stops with the most boardings or alightings within the study area are shown in Figure 6 below. Of the GoTriangle routes servicing downtown, Route 100 serving GoRaleigh Station, RDU Airport, and the Regional Transit Center has the highest weekday ridership. For the GoRaleigh System, Route 1 serving Capital Boulevard and Route 15 serving Wake Med Hospital have the highest ridership. Figures 7 & 8 show weekday ridership by route for GoTriangle and GoRaleigh respectively.

FIGURE 6: HIGHEST DAILY BOARDINGS AND ALIGHTINGS BY STOP

Stop	Weekday Boardings/Alightings
Go Raleigh Station	6,261 boardings
Edenton Street at Salisbury Street	108 boardings
Hargett Street at Fayetteville Street	98 boardings
Stop	**Weekday Alightings**
GoRaleigh Station	5,909 alightings
Salisbury Street at Morgan Street	216 alightings
Salisbury Street at Hargett Street	144 alightings

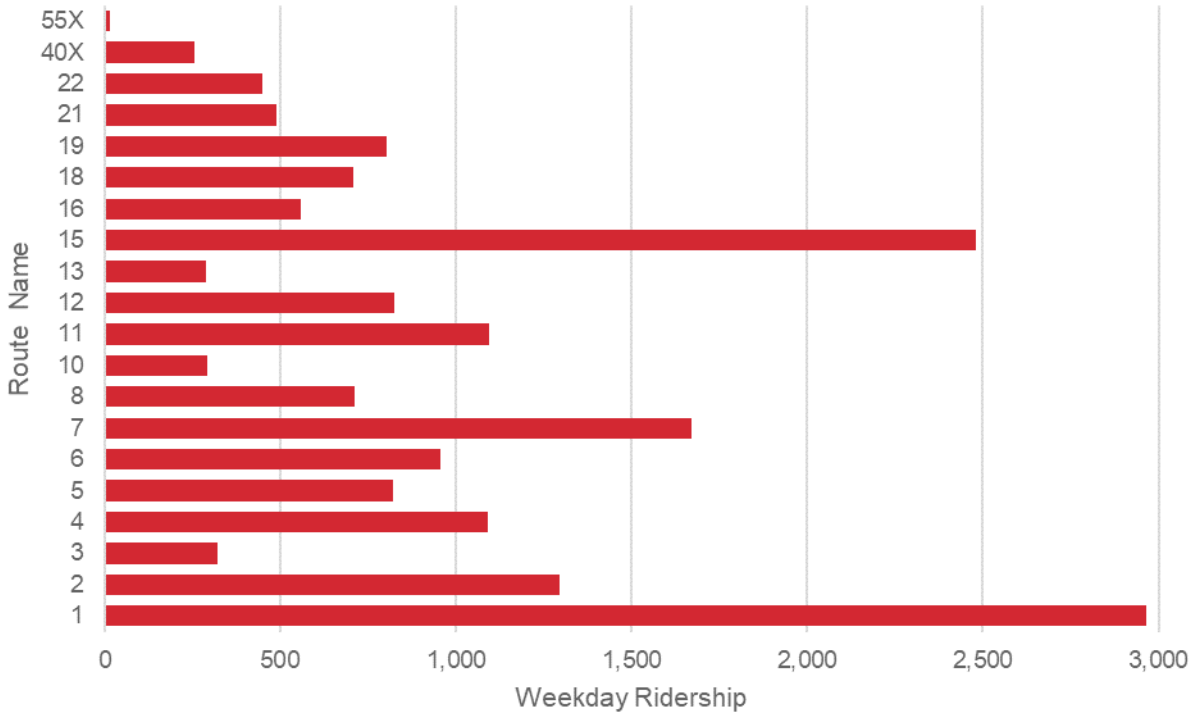
Note: Data includes totals for both GoRaleigh and GoTriangle combined

FIGURE 7: GOTRIANGLE WEEKDAY RIDERSHIP BY ROUTE



Note: Routes shown serve downtown Raleigh

FIGURE 8: GORALEIGH WEEKDAY RIDERSHIP BY ROUTE



Note: Routes shown serve downtown Raleigh

2.5 Pedestrian and Bicycle Network

The bicycle network within the study area is comprised of a wide variety of bicycle infrastructure. According to the City of Raleigh's GIS database, approximately 7.8 total miles of bicycle infrastructure has been installed over the last 7 years within the study area. The bicycle infrastructure includes buffered bike lanes, bikes lanes, shared lane markings, and greenways. The bicycle infrastructure information within in the study area was obtained from the City of Raleigh GIS database. The bicycle and pedestrian volumes are based on bicycle and pedestrian turning movement counts. The data is limited to a select group of intersections included in a previous study and provided by the City of Raleigh as well (see Exhibit 2.5-A of the Appendix).

2.5.1 Bicycle Infrastructure

Shared use bicycle lanes with sharrow markings in the travel lane are the most common bicycle accommodations, with approximately 4.5 miles in the study area. Dedicated bicycle lanes denote a dedicated lane where bicyclists claim their own right-of-way on the street adjacent to vehicular traffic. These are typically designated with a solid white lane on both sides and a white bicycle lane symbol and arrow showing the direction of travel. Approximately 25% of the dedicated bicycle lanes are also buffered bicycle lanes, which provide an added white striped buffer (typically 3 feet wide) to help increase the separation distance from the bicyclist to vehicular travel or on-street parking. Intersection crossing markings, which indicate the intended path of bicyclists through intersections, have been added to various intersections as well. These markings are made with fluorescent green thermoplastic paint and guide bicyclists on a safe and direct path through intersections. Dedicated bicycle lanes cover approximately 3.1 miles of the study area and are featured on major corridors including Hillsborough Street, Wilmington Street, and Salisbury Street. Bicycle Infrastructure is shown in Exhibit 2.5-B.

2.5.2 Bicycle and Pedestrian Accounts

Bicycle and pedestrian turning movement counts were obtained from the City of Raleigh from a study that analyzed potential future sites for bicycle and pedestrian amenities in 2016. Bicycle movements both in-street and on the sidewalk, and pedestrians crossing both in the crosswalk and midblock were counted for 10 consecutive hours for four days during the week. The counts were only conducted for a small number of intersections in the study area. Bicycle and pedestrian counts based on the data provided are shown in Exhibit 2.5-A.

2.6 Crash Data

A summary of crashes that occurred within the study area is shown in Figure 9.

FIGURE 9: SUMMARY OF CRASH DATA

Crash Type	Total	With Injuries	Non-Injuries	Fatalities
Vehicle Crashes	2,006	396	1,670	0
Bicycle Crashes	56	43	12	1
Pedestrian Crashes	101	93	8	0
Total for All Modes	2,163	532	1,690	1

2.6.1 Vehicle Crash Density

Vehicle crash data for this study was obtained from NCDOT over a 5-year period, from 2011-2016 for state maintained roads only (this data only vehicle-to-vehicle crashes). Only crash locations with spatial coordinates for the location of the incident were included in this analysis. Severity information was not included for vehicle crashes in the data provided. Vehicle crash data information is shown in Exhibit 2.6-A.

Intersections with high vehicle-to-vehicle crash frequency include:

- Morgan Street at Dawson Street
- Morgan Street at McDowell Street
- Edenton Street at Dawson Street
- Edenton Street at McDowell Street
- Hargett Street at Blount Street
- Person Street at Edenton Street
- Dawson Street at Lane Street
- Blount Street at Martin Street

2.6.2 Bicycle Crash Severity and Density

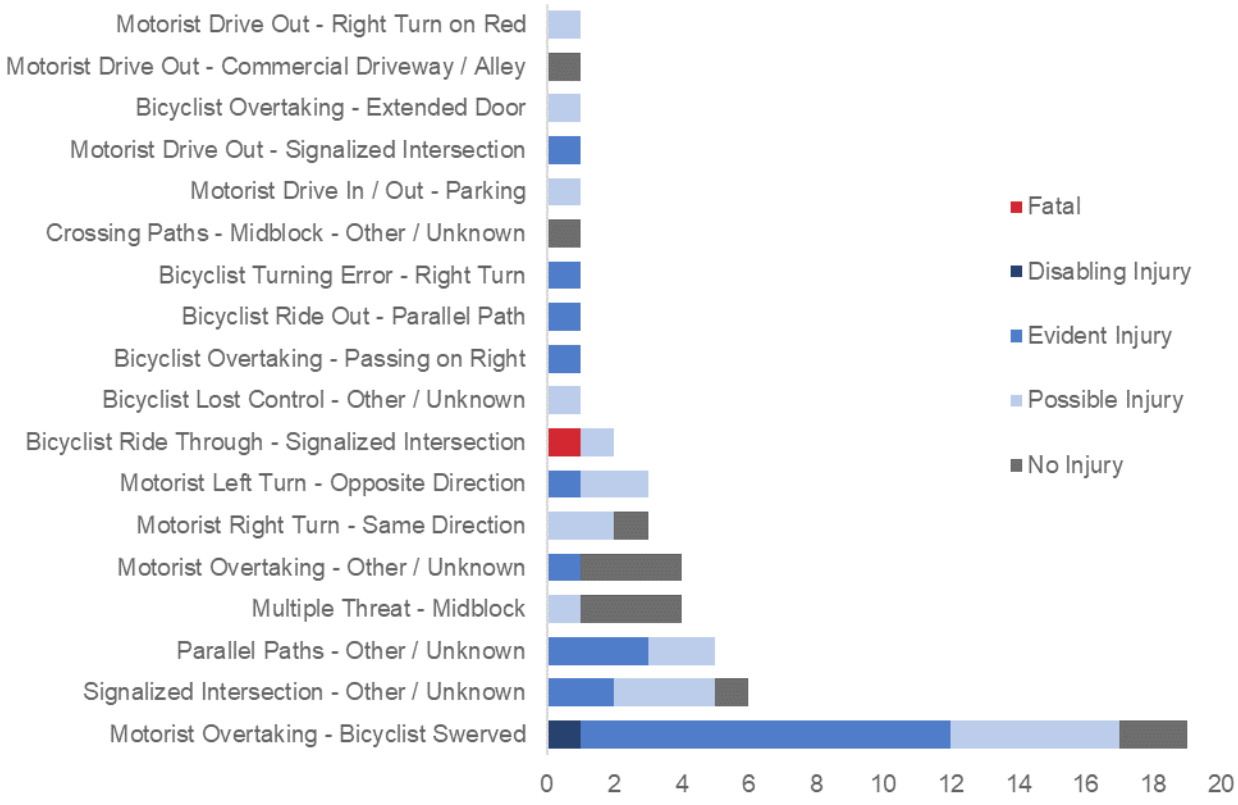
Bicycle and pedestrian crash data was obtained from the NCDOT Bicycle and Pedestrian Data Tool for a 3-year period from 2012-2015. Only crash locations with spatial coordinates for the location of the incident were included in this analysis. Severity information included whether the crashes resulted in no injury, possibly injury, evident injury, disabling injury, fatality or unknown.

Roadways and intersections with high bicycle crash frequency include:

- Glenwood Avenue at Tucker Street
- Hillsborough Street at Boylan Avenue
- McDowell Street at Hillsborough Street
- Davie Street at McDowell Street
- Martin Street at Blount Street
- Fayetteville Street (between Davie St and Martin St)

Figure 10 displays the crash severity by crash type for bicycle crashes. A motorist overtaking a bicyclist is the most common with 17 injured. One bicycle fatality occurred due to a bicyclist failing to yield and riding through a signalized intersection. See Exhibit 2.6-B for Bicycle Crash Density and Exhibit 2.6-C for Bicycle Crash Severity.

FIGURE 10: BICYCLE CRASH SEVERITY BY CRASH TYPE



Source: NCDOT Bicycle and Pedestrian Crash Data Tool (2012-2015)

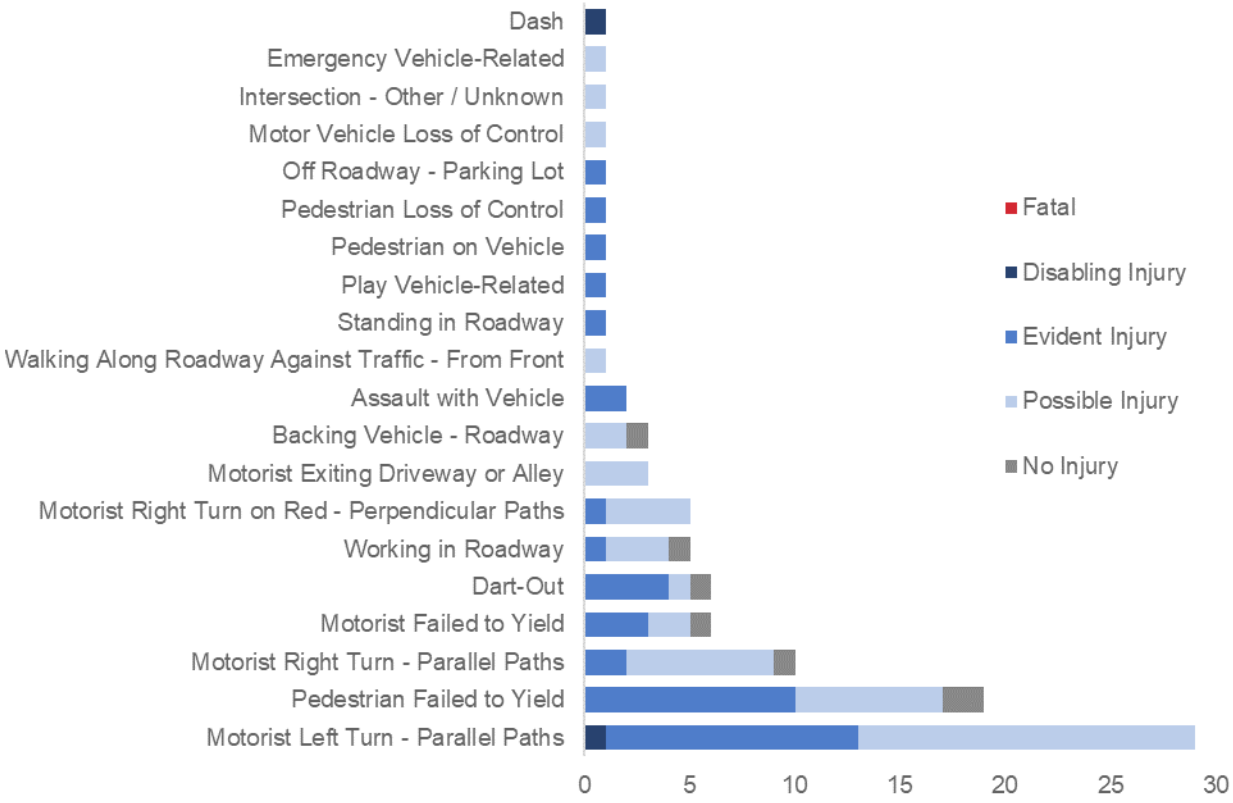
2.6.3 Pedestrian Crash Density and Severity

Sections and intersections with high crash frequency include:

- Glenwood Avenue (Between Johnson St and North St)
- Morgan Street at Dawson Street
- Cabarrus St at Dawson Street
- Martin Street at McDowell Street
- Morgan Street at Salisbury Street
- Edenton Street at Person Street
- Salisbury Street Davie Street

Figure 11 shows the crash severity and crash type by the number of pedestrian crashes occurred. A motorist making a left turn is the most common crash type with 28 injured. No fatalities occurred during the study period in the study area. See Exhibit 2.6-D for Pedestrian Crash Density and Exhibit 2.6-E for Pedestrian Crash Severity.

FIGURE 11: PEDESTRIAN CRASH SEVERITY BY CRASH TYPE



Source: NCDOT Bicycle and Pedestrian Crash Data Tool (2012-2015)

2.7 Multimodal Level-of-Service Analysis

2.7.1 Level-of-Service (LOS) Analysis

The level-of-service analysis includes 18 signalized intersections and 2 unsignalized mid-block pedestrian crosswalks within the study area. Fourteen intersections were identified by the City of Raleigh and 6 intersections were determined based on a review of corridors and intersections with frequent bicycle and pedestrian activity. Intersection turning movement count data was provided by the City of Raleigh. Bicycle and pedestrian count data was provided by the City of Raleigh and limited to a select group of 14 available intersections. Vehicle volume adjustments and engineering judgment were made along some corridors to account for various count data and to more accurately reflect existing conditions. These adjustments were based on knowledge of general traffic conditions in the area. For two signalized intersections and the two unsignalized mid-block crosswalks, volumes were estimated and balanced with available adjacent intersection count data. The 20 study intersection locations are listed below:

1. Peace Street at Boylan Avenue
2. Wilmington Street at Salisbury Street and Peace Street
3. Peace Street at Person Street
4. Glenwood Avenue at North Street
5. Salisbury Street at Jones Street
6. Wilmington Street at Jones Street
7. Edenton Street at West Street
8. Edenton Street at Blount Street
9. Edenton Street at Bloodworth Street
10. Hillsborough Street at Ashe Avenue
11. Hillsborough Street at Boylan Avenue
12. Hillsborough Street and Harrington Street
13. Salisbury Street at Hargett Street
14. Hargett Street at Moore Square (Mid-block crossing)
15. Wilmington Street at Martin Street
16. Martin Street at Moore Square (Mid-block crossing)
17. Davie Street at Blount Street
18. Salisbury Street at Lenoir Street
19. Wilmington Street at South Street
20. Wilmington Street and Salisbury Street at MLK Jr Boulevard

2.7.2 Methodology

Existing conditions analyses was performed for a typical weekday using methodologies prescribed in the Highway Capacity Manual (HCM 2010) and National Cooperative Highway Research Program (NCHRP) Report 825 – Planning and Preliminary Engineering Applications Guide to the Highway Capacity Manual. For this planning-level analysis, inputs values for pedestrian, bicycle, and transit LOS were based on existing information provided by the City of Raleigh, existing roadway geometrics, existing signal timing, existing transit plans, engineering judgment, and HCM default assumptions.

2.7.3 Measure of Effectiveness

For this planning level analysis, level-of-service (LOS) is a measure of effectiveness that evaluates the quality of service of urban street segments and signalized intersections for pedestrians, bicycles, and transit. LOS score can range from A to F. LOS A represents the best operating conditions from the traveler's perspective and LOS F the worst. LOS score is based on the following:

- Pedestrian signalized intersection LOS score evaluates the quality of service provided to pedestrians traveling through a signalized intersection. Service measures that determine LOS include conflicting motorized vehicle volumes and speeds, crosswalk length, average pedestrian delay, and the presence of right-turn channelizing islands (HCM 6, Equations 19-71 through 19-76).
- Pedestrian segment LOS score reflects pedestrian comfort with the walking environment between signalized intersections and is determined by the perceived separation between pedestrians and vehicle traffic. Service measures that determine LOS include motorized vehicle volumes and speeds, the provision of sidewalks, sidewalk width, and the perceived separation between vehicle traffic and the pedestrian (NCHRP Report 825, Equation 148).
- Bicycle signalized intersection LOS score evaluates the quality of service provided to bicyclists traveling through a signalized intersection. Service measures that determine LOS include perceived separation from motorized vehicle traffic, motorized vehicle volumes, cross-street width, and presence and utilization of on-street parking (HCM 6, Equations 19-79 through 19-82).
- Bicycle segment LOS score reflects bicycle comfort with the bicycling environment between signalized intersections. Service measures that determine LOS include perceived separation from motorized vehicle traffic, motorized vehicle volumes, roadway widths, proportion of heavy vehicles, pavement condition, and presence and utilization of on-street parking (NCHRP Report 825, Equation 149).
- Transit segment LOS score relative to transit passengers' experiences walking to or from bus stops in the segment, waiting for buses at bus stops in the segment, and riding on buses within the segment. Service measures that determine LOS include the pedestrian LOS score for urban street segments and transit wait-ride score, comprised of a headway factor and perceived travel time factor (NCHRP Report 825, Equations 167 through 172).

The pedestrian, bicycle, and transit LOS scores use the same scale allowing for multimodal analysis in which the relative quality of service of each travel mode can be evaluated and compared to each other (2). Figure 12 shows the ranges of level-of-service thresholds for each mode of travel.

FIGURE 12: HCM LEVELS-OF-SERVICE

LOS	Pedestrian and Bicycle LOS Score	Transit LOS Score
A	<=1.50	<=2.00
B	>1.50-2.50	>2.00-2.75
C	>2.50-3.50	>2.75-3.50
D	>3.50-4.50	>3.50-4.25
E	>4.50-5.50	>4.25-5.00
F	>5.50	>5.00

Pedestrian signalized intersection and segment LOS was determined for each study intersection and is shown on Figure 14 and Exhibit 2.8-A. Pedestrian LOS C or better was calculated for each signalized intersection crosswalk and roadway segment, where applicable. The intersections of Peace Street at Wilmington Street/Salisbury Street and MLK Jr. Boulevard at Wilmington Street/ Salisbury Street are primarily LOS C with a lower perceived quality of service than other study area locations.

Bicyclists signalized intersection and segment LOS was determined for each study intersection and is shown on Figure 15 and Exhibit 2.8-B. Bicycle LOS D or better was calculated for bicyclists traveling through each signalized intersection and on each roadway segment, where applicable. The one exception of LOS F occurred for the southbound bicyclist movement at the intersection MLK Jr. Boulevard at Wilmington Street and Salisbury Street. The study area intersections along Peace Street, Edenton Street, and MLK Jr. Boulevard have multiple intersection movements and segments at LOS D. All study area intersections have at least one intersection movement or segment at LOS C or D.

Transit segment LOS was determined for each study intersection and is shown on Figure 16 and Exhibit 2.8-C. Transit LOS D or better was calculated for each roadway segment, where applicable. The intersections of Peace Street at Boylan Avenue and at Wilmington Street/Salisbury Street have segments at LOS D.

Comparatively, LOS scores are generally better for pedestrians and transit than bicyclist at study area intersections and segments. Overall, all modes have multiple intersection movements and segments at LOS C or D.

References

1. Elefteriadou, L. The Highway Capacity Manual 6th edition: A Guide for Multimodal Mobility Analysis. The National Academies Press. Washington, DC. 2016.

2. National Academies of Sciences, Engineering, and Medicine. Planning and Preliminary Engineering Applications Guide to the Highway Capacity Manual. The National Academies Press. Washington, DC. 2016.

FIGURE 13: PEDESTRIAN LEVEL-OF-SERVICE RESULTS

Intersection				Pedestrian LOS							
				Intersection (Crosswalk)				Segment			
ID #	East-West Facility	North-South Facility	Score/ LOS	East	West	North	South	EB	WB	NB	SB
1	Peace Street	Boylan Avenue	Score	2.31	2.44	1.79	2.18	2.58	3.15	2.14	1.23
			LOS	B	B	B	B	C	C	B	A
2	Peace Street	Wilmington Street and Salisbury Street	Score	2.68	3.47	2.25	2.6	2.86	2.62	3.13	2.5
			LOS	C	C	B	C	C	C	C	B
3	Peace Street	Person Street	Score	-	2.85	2.99	2.35	2.03	-	2.43	-
			LOS	-	C	C	B	B	-	B	-
4	North Street	Glenwood Avenue	Score	1.85	1.77	2.18	2.21	1.19	1.57	1.83	2.46
			LOS	B	B	B	B	A	B	B	B
5	Jones Street	Salisbury Street	Score	2.05	1.93	2.16	2.02	2.03	-	-	2.72
			LOS	B	B	B	B	B	-	-	C
6	Jones Street	Wilmington Street	Score	1.9	2.09	2.37	2.28	2.47	-	2.89	-
			LOS	B	B	B	B	B	-	C	-
7	Edenton Street	West Street	Score	2.17	2.16	2.22	2.18	-	1.7	2.28	1.83
			LOS	B	B	B	B	-	B	B	B
8	Edenton Street	Blount Street	Score	2.27	2.21	2.49	2.79	-	2.26	-	2.47
			LOS	B	B	B	C	-	B	-	B
9	Edenton Street	Bloodworth Street	Score	2.15	2.3	1.63	1.67	-	1.8	1.7	1.37
			LOS	B	B	B	B	-	B	B	A
10	Hillsborough Street	Ashe Avenue	Score	2.35	2.33	1.43	1.92	2.67	2.95	2.31	-
			LOS	B	B	A	B	C	C	B	-
11	Hillsborough Street	Boylan Avenue	Score	2.3	2.38	2.06	2.15	2.14	3.24	2.35	1.62
			LOS	B	B	B	B	B	C	B	B
12	Hillsborough Street	Harrington Street	Score	2.18	2.2	1.78	2.04	1.83	1.06	1.34	1.41
			LOS	B	B	B	B	B	A	A	A
13	Hargett Street	S Salisbury Street	Score	1.98	1.95	2.05	2.05	1.58	2.34	-	1.81
			LOS	B	B	B	B	B	B	-	B
14	Hargett Street	*	Score	-	1.84	-	-	1.7	1.37	-	-
			LOS	-	B	-	-	B	A	-	-
15	Martin Street	Wilmington Street	Score	1.95	2.02	2.14	2.13	2.3	2.58	1.2	-
			LOS	B	B	B	B	B	C	A	-
16	Martin Street	*	Score	-	2.03	-	-	2.05	1.58	-	-
			LOS	-	B	-	-	B	B	-	-
17	Davie Street	Blount Street	Score	1.97	2.15	2.42	2.42	1.91	1.34	-	2.32
			LOS	B	B	B	B	B	A	-	B
18	Lenoir Street	Salisbury Street	Score	2.09	2.02	2.13	2.31	1.44	2.43	-	2.7
			LOS	B	B	B	B	A	B	-	C
19	South Street	Wilmington Street	Score	1.81	2.04	2.22	2.26	0.96	1.28	1.85	-
			LOS	B	B	B	B	A	A	B	-
20	MLK Jr Boulevard	Wilmington Street and Salisbury Street	Score	3.18	3.16	3.1	2.88	2.98	2.86	2.61	2.64
			LOS	C	C	C	C	C	C	C	C

** Mid-block pedestrian crossing between Blount Street and Person Street.*

"-" Score and LOS not applicable.

FIGURE 14: BICYCLE LEVEL-OF-SERVICE RESULTS

Intersection				Pedestrian LOS							
ID #	East-West Facility	North-South Facility	Score/ LOS	Intersection (Crosswalk)				Segment			
				East	West	North	South	EB	WB	NB	SB
1	Peace Street	Boylan Avenue	Score	3.02	2.93	2.55	1.43	3.59	3.54	3.07	-0.82
			LOS	C	C	C	A	D	D	C	A
2	Peace Street	Wilmington Street and Salisbury Street	Score	3.78	3.62	3.87	3.22	3.87	3.66	2.65	3.58
			LOS	D	D	D	C	D	D	C	D
3	Peace Street	Person Street	Score	3.17	-	2.81	-	3.63	-	3.74	-
			LOS	C	-	C	-	D	-	D	-
4	North Street	Glenwood Avenue	Score	1.37	1.59	2.5	3.46	1.19	2.06	3.42	1.06
			LOS	A	B	B	C	A	B	C	A
5	Jones Street	Salisbury Street	Score	1.61	-	-	1.36	3.41	-	-	3.54
			LOS	B	-	-	A	C	-	-	D
6	Jones Street	Wilmington Street	Score	1.78	-	2.85	-	2.94	-	3.72	-
			LOS	B	-	C	-	C	-	D	-
7	Edenton Street	West Street	Score	-	2.7	1.92	3.24	-	3.04	3.96	0
			LOS	-	C	B	C	-	C	D	A
8	Edenton Street	Blount Street	Score	-	2.06	-	2.38	-	3.68	-	3.84
			LOS	-	B	-	B	-	D	-	D
9	Edenton Street	Bloodworth Street	Score	-	1.86	1.52	1.56	-	3.52	2.36	2.59
			LOS	-	B	B	B	-	D	B	C
10	Hillsborough Street	Ashe Avenue	Score	2.94	1.87	-	-	3.75	0.42	-	-
			LOS	C	B	-	-	D	A	-	-
11	Hillsborough Street	Boylan Avenue	Score	0.55	3.08	2.42	2.92	2.19	2.68	3.18	3.33
			LOS	A	C	B	C	B	C	C	C
12	Hillsborough Street	Harrington Street	Score	1.03	0.82	2.56	0.41	2.45	2.25	1.93	1.16
			LOS	A	A	C	A	B	B	B	A
13	Hargett Street	S Salisbury Street	Score	1.45	1.66	-	0.66	2.91	3.62	-	2.24
			LOS	A	B	-	A	C	C	-	B
14	Hargett Street	*	Score	1.06	0.91	-	-	2.55	-1.45	-	-
			LOS	A	A	-	-	C	A	-	-
15	Martin Street	Wilmington Street	Score	2.3	2.58	1.2	-	3.71	2.6	2.35	-
			LOS	B	C	A	-	D	C	B	-
16	Martin Street	*	Score	1.61	3.12	-	-	3.47	-1.74	-	-
			LOS	B	C	-	-	C	A	-	-
17	Davie Street	Blount Street	Score	2.44	1.07	-	2.91	3.63	2.55	-	3.89
			LOS	B	A	-	C	D	C	-	D
18	Lenoir Street	Salisbury Street	Score	2.53	2.67	-	1.88	1.63	3.28	-	2.33
			LOS	C	C	-	B	B	C	-	B
19	South Street	Wilmington Street	Score	0.97	0.55	1.79	-	3.24	0.74	1.8	-
			LOS	A	A	B	-	C	A	B	-
20	MLK Jr Boulevard	Wilmington Street and Salisbury Street	Score	3.84	3.65	3.21	5.96	3.73	3.66	3.05	3.49
			LOS	D	D	C	F	D	D	C	C

** Mid-block pedestrian crossing between Blount Street and Person Street.*

"-" Score and LOS not applicable.

FIGURE 13: TRANSIT LEVEL-OF-SERVICE RESULTS

Intersection				Segment			
ID #	East-West Facility	North-South Facility	Score/ LOS	EB	WB	NB	SB
1	Peace Street	Boylan Avenue	Score	3.46	3.51	3.39	3.26
			LOS	C	D	C	C
2	Peace Street	Wilmington Street and Salisbury Street	Score	2.24	2.2	3.54	2.18
			LOS	B	B	D	B
3	Peace Street	Person Street	Score	1.79	-	-	-
			LOS	A	-	-	-
4	North Street	Glenwood Avenue	Score	-	-	2.08	2.18
			LOS	-	-	B	B
5	Jones Street	Salisbury Street	Score	3.11	-	-	0.72
			LOS	C	-	-	A
6	Jones Street	Wilmington Street	Score	-	-	0.83	-
			LOS	-	-	A	-
7	Edenton Street	West Street	Score	-	1.24	-	-
			LOS	-	A	-	-
8	Edenton Street	Blount Street	Score	-	1.97	-	1.85
			LOS	-	A	-	A
9	Edenton Street	Bloodworth Street	Score	-	1.75	-	-
			LOS	-	A	-	-
10	Hillsborough Street	Ashe Avenue	Score	3.24	3.28	-	-
			LOS	C	C	-	-
11	Hillsborough Street	Boylan Avenue	Score	1.25	1.41	-	-
			LOS	A	A	-	-
12	Hillsborough Street	Harrington Street	Score	1.55	1.44	3.27	3.28
			LOS	A	A	C	C
13	Hargett Street	S Salisbury Street	Score	0.89	1.26	-	0.39
			LOS	A	A	-	A
14	Hargett Street	*	Score	0.8	0.75	-	-
			LOS	A	A	-	-
15	Martin Street	Wilmington Street	Score	0.42	-	1.79	-
			LOS	A	-	A	-
16	Martin Street	*	Score	0.62	-	-	-
			LOS	A	-	-	-
17	Davie Street	Blount Street	Score	1.56	1.18	-	-
			LOS	A	A	-	-
18	Lenoir Street	Salisbury Street	Score	-	3.31	-	1.89
			LOS	-	C	-	A
19	South Street	Wilmington Street	Score	1.05	-	1.76	-
			LOS	A	-	A	-
20	MLK Jr Boulevard	Wilmington Street and Salisbury Street	Score	-	3.27	3.08	-
			LOS	-	C	C	-

** Mid-block pedestrian crossing between Blount Street and Person Street.*

"-" Score and LOS not applicable.

2.8 Local Plans Review

This section provides a review of local plans to identify potential street functions in the downtown study area and show how the various plans compliment or are at odds with one another. Vehicular, pedestrian, bicycle, and transit modes were reviewed along with multimodal corridors to identify planned street functions. The review also focuses on potential downtown transit alignments and corridors, including transit corridor connections from the Wake County Transit Plan. Local plans reviewed include the following:

- Wake County Transit Plan (November 2016);
- Raleigh 2030 Comprehensive Plan (Adopted October 7, 2009);
- BikeRaleigh Plan (Adopted May 17, 2016);
- Downtown Plan (September 15, 2015);
- Downtown West Gateway Plan;
- Blount Street - Person Street Corridor Study (Adopted July 16, 2013);
- Southern Gateway Corridor Study (Adopted February 7, 2017).

Exhibit 2.7-A provides an overview map of local plan boundaries. This boundary map shows where plans overlap and connect in downtown Raleigh. Exhibit 2.7-B provides an overlay map of potential street functions based on a review and comparison of local plans. The overlay map summarizes primary and secondary street functions by mode and corridor, identifies potential constraints, and calls out areas with potentially competing street functions.

Wake County Transit Plan

The Wake County Transit Investment Strategy Report was submitted November 2016. The Wake County Transit Plan envisions four “big moves” to connect the region across county lines, connect all Wake Count communities to the transit network, provide frequent, reliable urban mobility to the densifying areas of the County, and give enhanced access to transit across Wake County. This review focuses on providing frequent, reliable urban mobility by increasing the size of the frequent network from 17 miles to 83 miles. This also includes providing bus rapid transit improvements along the north, east, south, and west corridors to improve speed, reliability, and amenities of bus services. This initial review evaluates how the frequent network and BRT corridors may connect, interact, and complement the downtown street network and planned street functions.

Raleigh 2030 Comprehensive Plan

The 2030 Comprehensive Plan for the City of Raleigh was adopted October 7, 2009 with an effective date of November 1, 2009. The Plan has adopted Comprehensive Plan Amendments with the most recent occurring July 5, 2016. The 2030 Comprehensive Plan is a long-range policy document that establishes a vision for the City, provide policy guidance for growth and development and contains action items to implement the vision. The City is currently updating the 2030 Comprehensive Plan. The revised draft will be presented to City Council and Planning Commission for review and approval in 2018. For purposes of this report, the adopted Plan is currently used at the guiding Plan with the updated Plan considered for notable differences.

BikeRaleigh Plan

The BikeRaleigh Plan was adopted May 17, 2016. The purpose of this plan is to improve cycling conditions in order to bring benefits to the entire city. One specific measurable goal for the Plan includes building priority projects to serve cyclists of all ages and abilities, including 30 miles of Separated Bikeways (buffered bicycle lanes, cycle tracks, and side paths) and 30 miles of Neighborhood Bikeways.

Downtown Plan

The Downtown Plan final report was submitted September 15, 2015. The plan lays out goals and strategies for realizing a collective vision. The four plan framework themes are BREATHE: A Greener Raleigh, MOVE: Create Connections, STAY: Revitalization & Redevelopment, and LINK: Network & Partner. The five catalytic project areas including the plan are Gateway Center, North End, Moore Square, Nash Square/Raleigh Union Station, and Glenwood Green.

Downtown West Gateway Plan

This plan provides specific policies and actions to guide redevelopment within an area west of Downtown Raleigh located between the Raleigh Convention Center and the Boylan Heights residential neighborhood. The major catalysts for change in the Downtown West Gateway include the Raleigh Convention Center, a Multimodal Transit Center to serve as a regional gateway to downtown, and redevelopment activities associated with the Jamaica Drive and Saunders North Redevelopment Areas. Specific actions include, but are not limited to, two-way traffic conversions, streetscape improvements, and street and pedestrian connections.

Blount St - Person St Corridor Study

The Blount St - Person St Corridor Study was adopted by Raleigh City Council July 16, 2013. This study prepared a vision for the corridor, an alternatives summary, a decision-making framework, and a phasing plan. The decision-making framework focused on the stated themes and vision for the corridor, including business and economic development, neighborhood and historic character, traffic and mobility, and walkable and multimodal. The three phases include Phase 1 - Road Diet Restriping, Phase 2 - Streetscape, and Phase 3 - Two-Way Restoration.

Southern Gateway Corridor Study

The Southern Gateway Corridor Study was adopted February 7, 2017. This study focused on South Saunders Street and South Wilmington Street which form the southern gateway to downtown Raleigh. The study was completed in three phases. The first phase of the project identified issues and a vision for the area around South Saunders and South Wilmington Streets. The second phase focused on design ideas and creadted an implementation plan. In the third phase, the updated final study report and corresponding comprehensive plan amendments were reviewed and approved by the Planning Commission and City Council. A major transportation / transit recommendation is to transform South Wilmington Street into a complete street that maintains vehicle traffic, establishes a separate bike facility, and dedicated transit lanes (for Bus Rapid Transit). Figure 16 provides a summary of street functions as indicated in the various plans reviewed.

FIGURE 16: LOCAL PLAN REVIEW - PLANNED OR POTENTIAL STREET USES

Corridor(s)	Corridor (N/S, E/W)	Raleigh 2030 Comprehensive Plan	Downtown Plan	BikeRaleigh Plan	Wake County Transit Plan	Blount Street - Person Street Corridor Study	Downtown West Gateway Plan	Southern Gateway Corridor Study
St. Mary's Street	N/S	● ●		●				
Boylan Avenue	N/S	● ●	●	●			●	
Glenwood Avenue	N/S	● ● ●	●	●				
Saunders Street	N/S	●		●				
West Street	N/S	● ●	● ● ●	●	●			
Harrington Street	N/S	● ●	●	●				
Dawson Street / McDowell Street	N/S	● ● ●		●	●			
Salisbury Street / Wilmington Street	N/S	● ● ● ●	●	●	●			● ●
Blount Street / Person Street	N/S	● ● ●	●	●		● ● ● ●		●
Bloodworth Street	N/S	●		●				
E Peace Street	E/W	● ●	● ●	●				
W Peace Street	E/W	●	● ●	●				
Lane Street / Jones Street	E/W	● ●	● ●	●				
Edenton Street / Morgan Street	E/W	● ● ●	●	●				
Edenton Street / New Bern Avenue	E/W	● ● ● ●	●	●	●			
Hillsborough Street	E/W	● ● ●	●	●				
Hargett Street	E/W	● ●	● ●	●			●	
Martin Street	E/W	● ● ●	● ●	●			●	
Davie Street	E/W	● ● ●		●				
Cabarrus Street	E/W	●		●				
Lenoir Street	E/W	●	●	●	●			●
South Street	E/W			●				
MLK Jr Boulevard / Western Boulevard	E/W	● ●		●	●			

Pedestrian | Bicycle | Transit | Multimodal

2.9 Downtown Raleigh Streetscape Assessment

The Downtown Raleigh Streetscape Assessment was developed in parallel with the Raleigh Downtown Transportation Plan. The Streetscape Assessment provides a baseline of existing streetscape elements and the cultural features that make Downtown Raleigh unique. Some of the elements in the Streetscape Assessment include existing street character, street furniture, street trees, hardscape, street lights, and sidewalk width. Upon completion of the Streetscape Assessment, the City will initiate the next step toward updating the Downtown Streetscape Design Guidelines.

2.9.1 Sidewalk Widths

Many of the street corridors in Downtown have a 66-foot right-of-way width. This width was set by the original Christmas Plan, and since has been reinforced by the evolution of urban development that placed buildings at or near the right-of-way lines. The resulting width of the pedestrian space behind the curb is generally limited to between 10 and 12 feet on each side of the street. These dimensions can be extremely limiting and will need to be carefully allocated in order to accommodate the needs of a growing and active population.

2.9.2 Pedestrian Crossings

As Downtown has become a more popular destination to live and work, vehicular and pedestrian traffic has increased exponentially. In general, Downtown streetscapes are not built to handle this increased activity and this has created problem areas that are not safe for pedestrians. Pedestrians are at the most risk at corners and crosswalks. Pedestrian safety can be prioritized going forward by implementing traffic-calming measures such as bump-outs at intersections to reduce the distance of the crosswalk.

2.9.3 Hardscape

Most of the existing hardscape conditions within Downtown have emanated from guidance issued in the 1991 Streetscape Master Plan. This plan established that all concrete paving should be scored with a 2-foot by 2-foot grid pattern called the “Capital Grid.” The existing materials in Downtown are primarily brick and concrete with this Capital Grid pattern that is installed using a window pane effect. The overall condition of the hardscape is moderate to poor, with significant wear in most places. The most recent, significant streetscape project in Downtown is the Fayetteville Street improvements, which were completed between 2005 and 2009. Fayetteville Street has its own distinct template completed with precast concrete pavers and granite curb banding. Outside of these more recent streetscape projects, many of the sidewalks in Downtown are in need of renovation.

2.9.4 Softscape

Street trees are the main type of vegetation in the Raleigh Downtown streetscape. Street trees are an important part of the urban streetscape, providing shade, oxygen, and scale to the pedestrian environment. The 1991 Downtown Streetscape Master Plan denoted certain species to specific

streets, which has been partially followed in terms of tree species being planted. Currently, species selection is regulated through the City Tree Manual, which addresses issues such as tree vitality, arboriculture, and design criteria. One area of concern observed during the visual scan of Downtown, is that some tree grates are currently heaving, causing tripping hazards and in some cases also girdling the tree and adversely affecting the tree's health.

2.9.5 Street Furnishings

Downtown Raleigh street furnishings are generally in good condition, and seem to be consistent, functional, and provide positive character to the downtown. Elements noted during the high-level visual scan of Downtown include benches, bike racks, trash receptacles, and trash/recycling compactors.

2.9.6 Street Lighting

Street lighting in downtown Raleigh is provided via partnership with Duke Energy. As such the lighting standards and fixtures are selected from a defined menu provided by Duke Energy. With a few exceptions, one standard, LED roadway light fixture is used Downtown. General exceptions include Fayetteville Street, City Market, Hillsborough Street, and the majority of the Moore Square district.

2.10 Warehouse District Assessment

A Warehouse District Assessment was also developed in parallel with the Raleigh Downtown Transportation Plan. This assessment provides an inventory of existing identity, culture, architecture, infrastructure, and urban framework within the Warehouse District. Information gathered in this assessment will be used to help guide future development in the Warehouse District and will also be used to develop specific requirements to include in the updated Downtown Streetscape Design Guidelines.

2.10.1 Identity and History

In 2002—to preserve some of the cultural history and architectural character of Raleigh's railroad heyday—North Carolina's State Historic Preservation Office successfully nominated approximately 35 of Raleigh's railroad-related structures to the Depot National Historic District (DNHD). The DNHD encompasses approximately four city blocks (including Nash Square) between the Norfolk Southern rail line, and Raleigh's central business district. In many ways, the DNHD represents the core identity of what is today referred to as Raleigh's Warehouse District (WHD); much of the reason for this, is that throughout the early years of the 21st century, many of the buildings in the DNHD and those in its vicinity, have been re-purposed for arts and entertainment related uses, breathing new life and energy into the area.

2.10.2 Transportation and Infrastructure

The Warehouse District as a whole is well connected to the surrounding neighborhoods as well as the region, due to the primary vehicular routes that travel through the district. Major north-south connectors, Dawson and McDowell Streets provide access to residential areas adjacent to Raleigh's

downtown, before connecting with Interstate 40 approximately 2-miles south of downtown. In the east-west directions, Hillsborough and Morgan Streets connect the Warehouse District to North Carolina State University to the west, as well as additional residential neighborhoods on either side of Downtown.

Completed in 2018, Raleigh Union Station (RUS) forms a critical transportation link between North Carolina's most populous cities, Charlotte, and Raleigh, while also connecting many smaller and mid-size cities along the way. While the inter-city connectivity is important for the State and the region, it is perhaps more important for the Warehouse District, and the parcels immediately adjacent to RUS.

2.10.3 Urban Framework

Raleigh's city blocks are laid out in a rational grid, approximately 440 feet square, clearly represented by Nash Square in the northeast corner of the Warehouse District. At different locations throughout the city, this grid is subdivided in different ways to accommodate unique circumstances. The Warehouse District is one of the places in which the grid is most interrupted; while the east-west streets maintain their 440' spacing, the north-south streets are spaced at approximately half the distance, or 220' in some places, and become irregular wedge-shaped blocks where they are directly adjacent to the railroad tracks. This irregularity and reduced block size, combined with the density of smaller footprint buildings, creates a finer grain or texture within the district, contributing to its unique character. West of the railroad tracks, the north-south streets of the grid are almost imperceptible, and quickly erode into a more curvilinear and suburban style in Boylan Heights.

2.10.4 Culture and Architecture

Anchored by CAM and supported by numerous smaller art spaces, the Warehouse district is a creative hub for the city of Raleigh. The brick warehouse buildings of the district, and particularly within the DNHD, have housed a renaissance of arts and culture in downtown Raleigh. In addition to CAM, which offers programming that draws locals and visitors alike, art galleries and creative work spaces like Imurj and VAE Raleigh have defined the district as a place where art is created and enjoyed. The concentration of spaces and organizations focused on the arts has imbued a creativity that is reflected throughout the district's retail and employment destinations as well, such as installations on restaurant walls and the mural treatments found on many of the re-purposed brick buildings in the district.

The architectural character of the WHD is varied and unique, comprised of multiple styles and forms, which relate to the market demands and design practices of the time periods in which they were constructed. The predominant building material in the district is readily identifiable as brick, which was common for the type of construction and era in which many of the district's buildings were built; these bricks tell part of a deeper story of the Piedmont Region, its availability of red clay, and North Carolina's history as a major brick producing state.