

Appendix C

Northern Corridor BRT Traffic Analysis

City of Raleigh

Raleigh, North Carolina

April 14, 2026



Raleigh

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Introduction

Based on coordination with the City of Raleigh (City), HDR reviewed traffic volumes along the Midtown and Triangle Town Center (TTC) Alignments for the Northern Corridor Major Investment Study Bus Rapid Transit (BRT) in Raleigh, North Carolina. The goal of this memo is to identify corridors that are currently at or nearing capacity and to determine anticipated operations with the BRT in operation along these corridors using the most recent available Average Annual Daily Traffic (AADT) volumes from the NCDOT AADT Web Map application.

Methodology

The most recent available AADT volumes from the NCDOT Traffic Volume Maps were extracted along the following corridors for the Midtown Alignments:

- Six Forks Road (SR 1005) from Rowan Street to Atlantic Avenue
- St Albans Drive from Rowan Street to Wake Forest Road (SR 2000)
- Wake Forest Road (SR 2000) from St Albans Drive to Capital Boulevard (US 401)
- Atlantic Avenue from Six Forks Road to Capital Boulevard (US 401)
- Capital Boulevard (US 401) from Atlantic Avenue to Lane Street

Along St Albans Drive, the most recent available data was from 2021. For all other corridors, 2023 data was used. Refer to **Figure 1** for the Existing Midtown Alignment AADT Map. Similarly, for the TTC Alignments, the most recent AADT volumes were extracted along the following corridors:

- Capital Boulevard (US 401) from Fenton Street to Old Wake Forest Road
- Atlantic Avenue from Capital Boulevard to New Hope Church Road
- New Hope Church Road from Atlantic Avenue to Capital Boulevard

Refer to **Figure 2** for the Existing TTC Alignments AADT Map. It should be noted that daily traffic volumes were used; however, weekday peak hour traffic volumes may show exaggerated results, since many of these corridors experience a heavier distribution of peak hour traffic volumes due to commuter trips between these major urban hubs (downtown Raleigh, North Hills, Midtown, and Triangle Town Center) and relatively heavy residential development between. Most corridors were noted to have a relatively high K-Factor between 10-11%, indicating the peak hour experiences 10-11% of the daily traffic. This may indicate worse traffic capacity performance during the peak periods than may be shown using AADTs. Poor intersection performance along these corridors may also lead to lower existing volumes, since these factors may limit corridor progression. This report does not take into consideration any vehicles that may reroute due to any changes in congestion as a result of the BRT. It is recommended that after the alignments are selected, peak hour traffic volumes be evaluated.

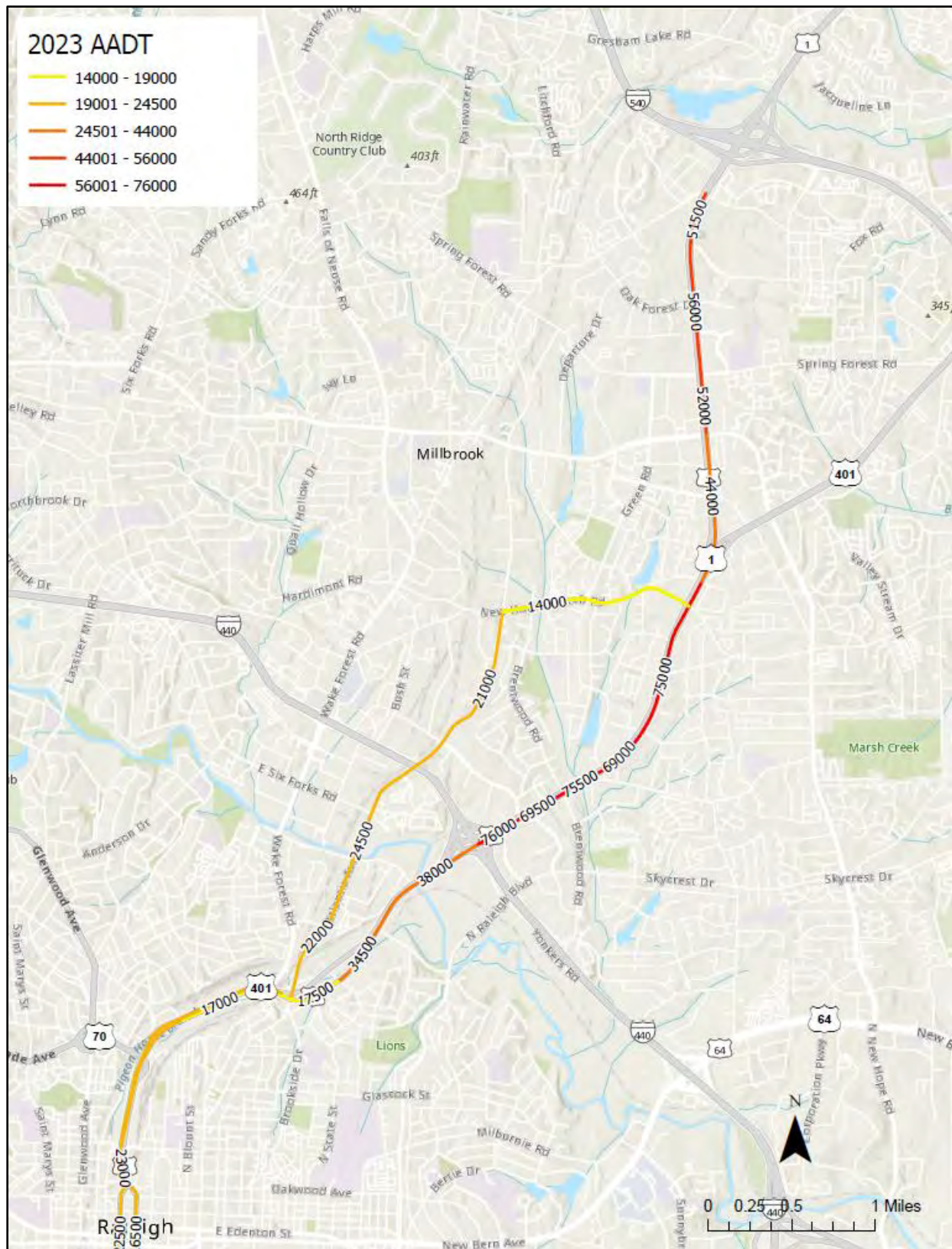
2023 AADT

- 7500 - 9100
- 9101 - 21000
- 21001 - 45000
- 45001 - 54500

*Saint Albans AADT is sourced from the 2021 TCDS Data

Map showing 2023 Average Annual Daily Traffic (AADT) by road segment in Saint Albans, Vermont. The map uses a color scale to represent traffic volume ranges. Key roads and locations labeled include Saint Albans Dr, Wake Forest Rd, Atlantic Ave, Capital Blvd, Wade Ave, Glenwood Ave, and various local streets. Traffic volume values are displayed along the road segments, ranging from 9100 to 54500. The map also shows geographical features like the Connecticut River and surrounding areas like North Hills and Drewry Hills #2.

Figure 2: Study Area Existing AADTs – TTC Alignments



AADT Evaluation

These volumes were compared against Florida Department of Transportation (FDOT) Level-of-Service (LOS) Service Volume Thresholds as included in the FDOT 2023 Multimodal Quality / Level of Service Handbook to determine how each of these corridors operate. Capacities are based on roadway classification and number of lanes. Consideration was made for both existing laneage and the proposed laneage as part of each of the BRT alignments. No growth was applied to the existing AADTs as part of this review. Additionally, no volume adjustments were considered using the FDOT Service Volume tables. It should be noted that this analysis methodology does not take into consideration external factors that may slow progression along these corridors, such as poorly operating intersections and narrow lane widths. It is recommended that after the alignments are selected, peak hour traffic volumes be evaluated at subject intersections within the selected corridors.

Existing volume to capacity ratios were calculated and used to determine if the corridors are under, nearing, or over capacity. Corridors with a V/C ratio less than 0.8 were categorized as under capacity, between 0.8 and 1.0 were determined to be nearing capacity, and over 1.0 were recorded as over capacity. It should be noted that future growth may cause these corridors to reach capacity if roadway improvements are not made. Refer to **Table 1** and **Table 2** for a summary of each segment capacity without and with the BRT for the Midtown Alignments and TTC Alignments, respectively.

Overall, it was determined that, based on 2023 daily traffic volumes, the Wake Forest Road / Capital Boulevard ramps, as well as the Capital Boulevard segment between Westinghouse Boulevard and Ashton Square are over capacity currently.

Along the segments included in the Midtown Alignments, there are a few corridors within the study area that are near capacity, but most corridor segments were determined to be under capacity without the BRT in place. Once the BRT is established based on the most recent alignment plans, using existing daily volumes, half of the segments would be anticipated to be over capacity, with additional segments nearing capacity.

Along the segments included in the TTC Alignments, in addition to the segments of Capital Boulevard that were identified to be over capacity, there were also a few segments nearing capacity, including New Hope Church Road and the northernmost segments along Capital Boulevard within the study area. Once the BRT is established based on the most recent alignment plans, using existing daily volumes, most segments would be anticipated to be over capacity.

Figure 3 and **Figure 4** illustrate existing capacities and capacities with the Northern Corridor BRT, respectively, for the Midtown Alignments. **Figure 5** and **Figure 6** illustrate existing capacities and capacities with the Northern Corridor BRT, respectively, for the TTC Alignments.

Table 1: Corridor Capacities for the Northern Corridor BRT – Midtown Alignments

Existing Conditions									BRT Alignment			
Street Name	To	From	FDOT Classification	Number of Through Lanes	FDOT Service Capacity	2023 AADT	V/C	Under, Near, or Over Capacity	Through Lanes	FDOT Service Capacity	V/C	Under, Near, or Over Capacity
Atlantic Ave	Six Forks Rd	Whitaker Mill Rd	C4-Urban General	4	36100	24500	0.68	Under	2	17600	1.39	Over
	Whitaker Mill Rd	Capital Blvd	C4-Urban General	4	36100	22000	0.61	Under	2	17600	1.25	Over
Capital Blvd Northbound	Wade Ave	Wake Forest Rd	C5-Urban Center	3**	26700***	17000	0.64	Under	3**	26700***	0.64	Under
	Lane St	Wade Ave	C5-Urban Center	3**	26700***	23000	0.86	Near	3**	26700***	0.86	Near
Capital Blvd Southbound	Wake Forest Rd	Wade Ave	C5-Urban Center	3**	26700***	23000	0.86	Near	3**	26700***	0.86	Near
	Wade Ave	Lane St	C5-Urban Center	3**	26700***	24500	0.92	Near	3**	26700***	0.92	Near
Saint Albans Dr	Dartmouth Rd	Wake Forest Rd	C5-Urban Center	2	13900	9090*	0.65	Under	2	13900	0.65	Under
	Rowan St	Dartmouth Rd	C5-Urban Center	2	13900	9090*	0.65	Under	2	13900	0.65	Under
Six Forks Rd	I-440	Anderson Dr	C4-Urban General	4	36100	28000	0.78	Under	2	17600	1.59	Over
	Anderson Dr	Wake Forest Rd	C4-Urban General	4	36100	23500	0.65	Under	2	17600	1.34	Over
	Dartmouth Rd	I-440	C5-Urban Center	6	53900	45000	0.83	Near	6	53900	0.83	Near
	Rowan St	Dartmouth Rd	C5-Urban Center	6	53900	38500	0.71	Under	6	53900	0.71	Under
	Wake Forest Rd	Atlantic Ave	C4-Urban General	4	36100	20000	0.55	Under	2	17600	1.14	Over
Wake Forest Rd	I-440	Wake Towne Dr	C4-Urban General	6	56800	34000	0.60	Under	4	36100	0.94	Near
	Wake Towne Dr	Six Forks Rd	C4-Urban General	6	56800	26000	0.46	Under	4	36100	0.72	Under
	Mills St	Whitaker Mill Rd	C4-Urban General	4	36100	20500	0.57	Under	2	17600	1.16	Over
	Whitaker Mill Rd	Capital Blvd	C4-Urban General	4	36100	18000	0.50	Under	2	17600	1.02	Over
	Six Forks Rd	Mills St	C4-Urban General	4	36100	25500	0.71	Under	4	36100	0.71	Under
	Saint Albans Dr	I-440	C4-Urban General	6	56800	54500	0.96	Near	4	36100	1.51	Over
Wake Forest Rd WB On-Ramp	Capital Blvd	Wake Forest Rd Ramp	C4-Urban General	1	6900	9100	1.32	Over	1	6900	1.32	Over
Wake Forest Rd EB Off-Ramp	Wake Forest Rd	Capital Blvd	C4-Urban General	1	6900	7500	1.09	Over	1	6900	1.09	Over

*AADT based on 2021 TCDS data as 2023 data was not available

**Directional volumes and laneage were used

***Determined using the peak hour directional since ADTs are one-way and assuming a K-factor of 10%

Table 2: Corridor Capacities for the Northern Corridor BRT – TTC Alignments

Existing Conditions									BRT Alignment			
Street Name	From	To	FDOT Classification	Number of Through Lanes	FDOT Service Capacity	2023 AADT	V/C	Under, Near, or Over Capacity	Number of Through Lanes	FDOT Service Capacity	V/C	Under, Near, or Over Capacity
Capital Boulevard	Fenton Steet	Crabtree Boulevard	C4-Urban General	6	56800	34500	0.61	Under	4	36100	0.96	Near
	Crabtree Boulevard	I-440	C4-Urban General	6	56800	38000	0.67	Under	4	36100	1.05	Over
	I-440	Westinghouse Boulevard	C4-Urban General	8	66900	76000	1.14	Over	8	66900	1.14	Over
	Westinghouse Boulevard	Brentwood Road	C4-Urban General	8	66900	69500	1.04	Over	8	66900	1.04	Over
	Brentwood Road	Brewton Place	C4-Urban General	8	66900	75500	1.13	Over	8	66900	1.13	Over
	Brewton Place	Starmount Drive	C4-Urban General	8	66900	69000	1.03	Over	7*	56800	1.21	Over
	Starmount Drive	Buffaloe Road	C4-Urban General	8	66900	75000	1.12	Over	7*	56800	1.32	Over
	Buffaloe Road	Ashton Square	C4-Urban General	8	66900	76000	1.14	Over	6	56800	1.34	Over
	Ashton Square	North New Hope Road	C4-Urban General	7*	56800	44000	0.77	Under	7*	56800	0.77	Under
	North New Hope Road	Spring Forest Road	C4-Urban General	7*	56800	52000	0.92	Near	7*	56800	0.92	Near
Atlantic Avenue	Spring Forest Road	Sumner Boulevard	C4-Urban General	6	56800	56000	0.99	Near	7*	56800	0.99	Near
	Sumner Boulevard	Old Wake Forest Road	C4-Urban General	6	56800	51500	0.91	Near	6	56800	0.91	Near
	Capital Boulevard	Wicker Drive	C4-Urban General	4	36100	22000	0.61	Under	2	17600	1.25	Over
New Hope Church Road	Wicker Drive	Highwoods Boulevard	C4-Urban General	4	36100	24500	0.68	Under	2	17600	1.39	Over
	Highwoods Boulevard	New Hope Church Road	C4-Urban General	4	36100	21000	0.58	Under	2	17600	1.19	Over
New Hope Church Road	Atlantic Avenue	Capital Boulevard	C4-Urban General	2**	17600	14000	0.80	Near	2	17600	0.80	Near

*6 lanes were assumed to provide conservative results due to the northbound through movements only having 3 lanes

**The western section of this segment consists of a 4-lane section; however, the eastern section of the segment was used to provide conservative results

Figure 3: Existing Study Area Capacity – Midtown Alignments

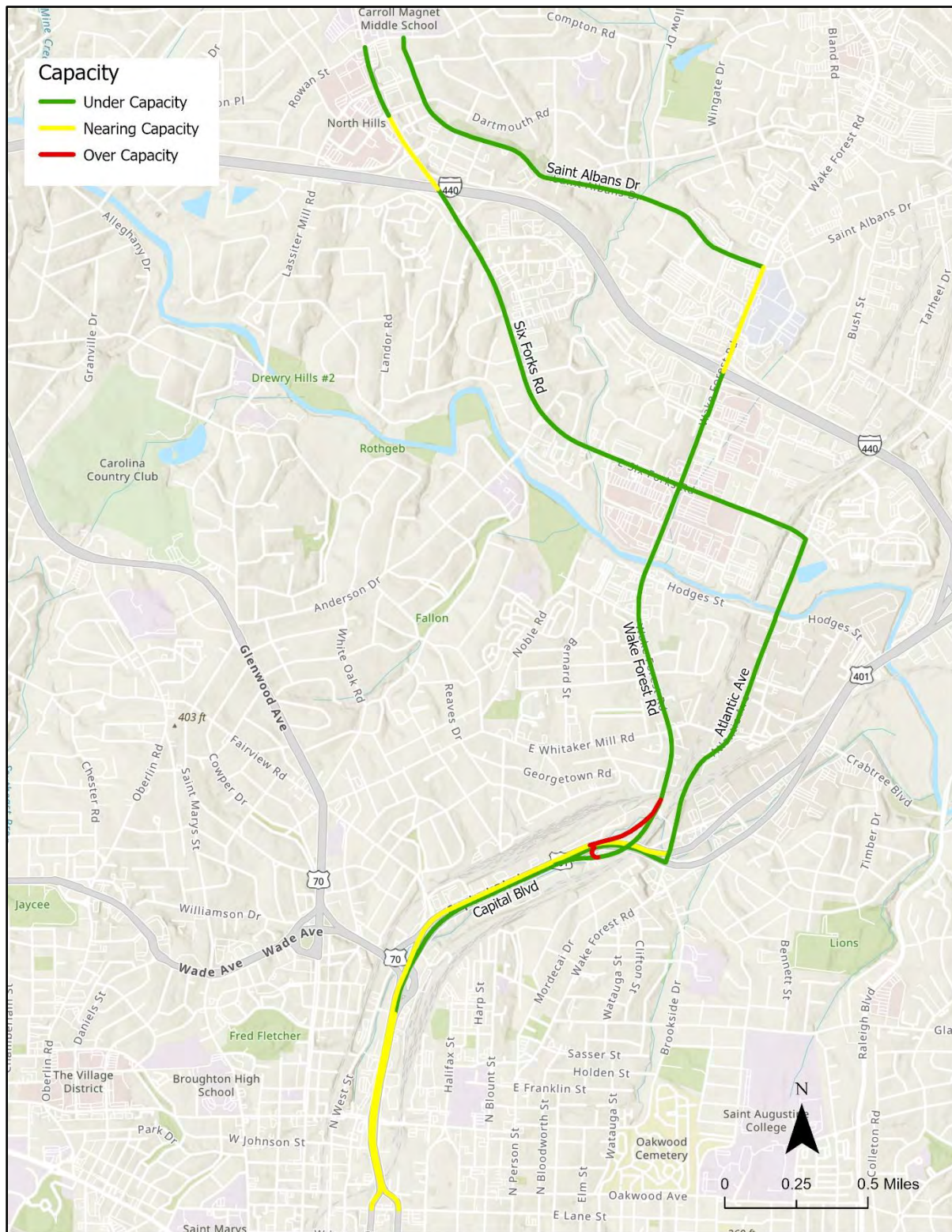
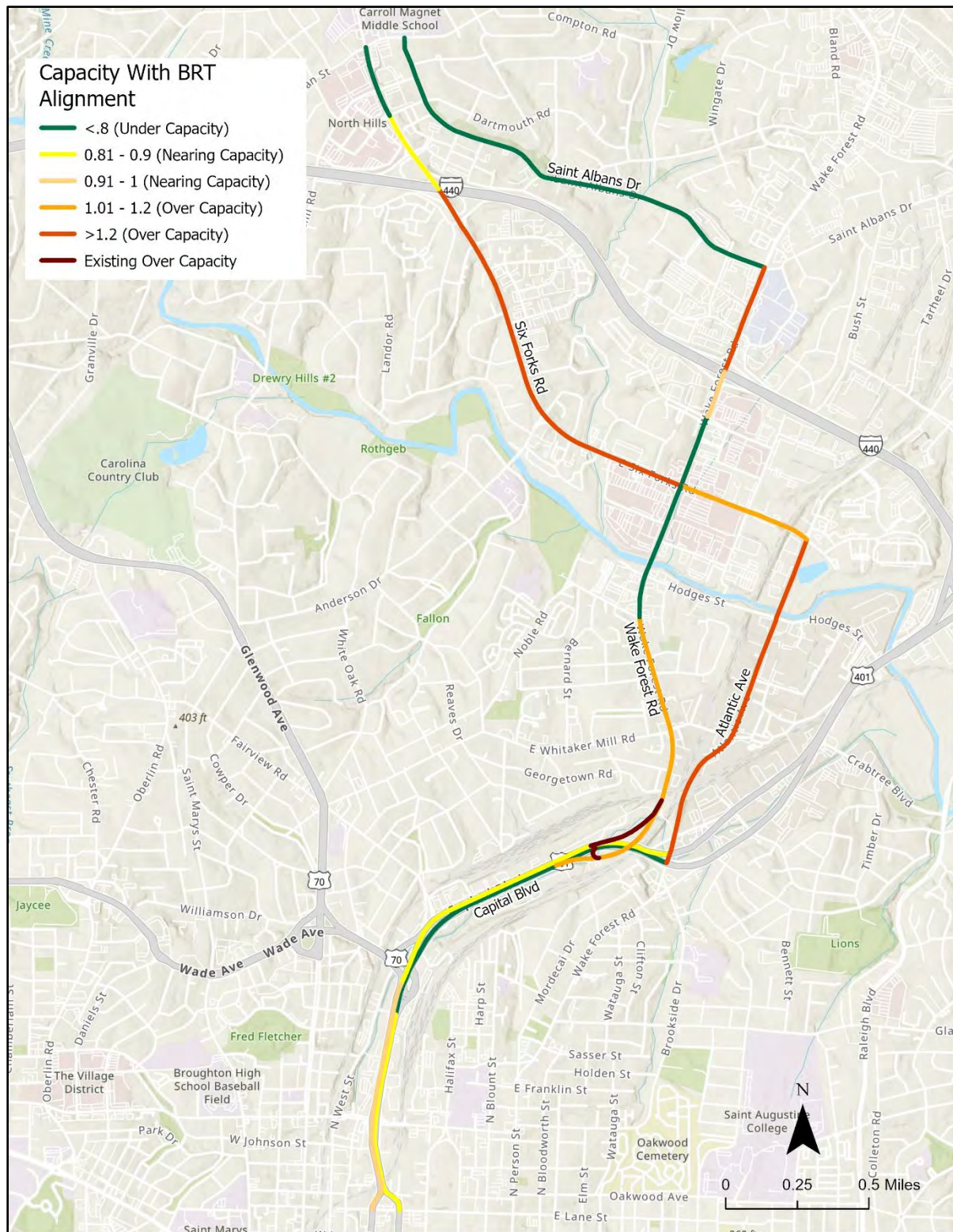


Figure 4: Study Area Capacity with Northern Corridor BRT – Midtown Alignments

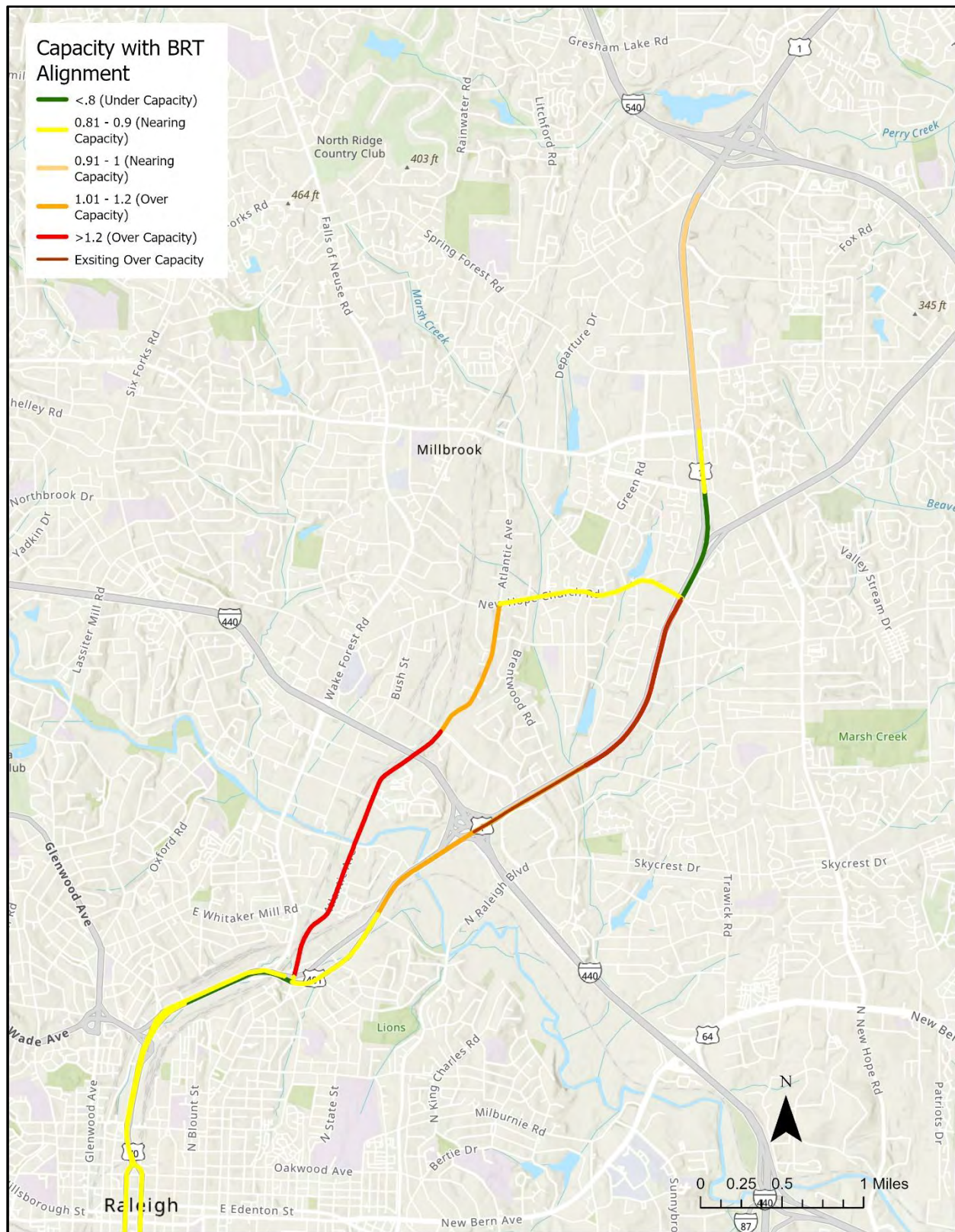


Capacity

- Under Capacity
- Nearing Capacity
- Over Capacity

Map of Raleigh, North Carolina, showing road capacity status. The map highlights major roads like I-40, I-85, and I-95. A legend indicates three capacity levels: Under Capacity (green), Nearing Capacity (yellow), and Over Capacity (red). The map shows that I-40 is mostly under capacity, while I-85 and I-95 are nearing or over capacity. A scale bar and north arrow are also present.

Figure 6: Study Area Capacity with Northern Corridor BRT – TTC Alignments



Peak Hour Evaluation

In addition to the evaluation of AADT volumes, weekday peak hour traffic volumes were reviewed for the same Midtown and TTC corridors to provide a more detailed understanding of operational performance during the most critical travel periods. Because these peak periods occur at isolated intervals, an additional V/C threshold of 0.61 – 0.80 was identified to be labeled as “nearing capacity”. Peak hour volumes were derived using corridor-specific K-factors and were applied to both existing and proposed lane configurations associated with the BRT alternatives. Due to anticipated fluctuating K-factors throughout the study area, it is recommended that after the alignments are selected, peak hour traffic volumes be collected and evaluated at subject intersections within the selected corridors.

These peak hour volumes were compared against the FDOT capacity thresholds, consistent with the methodology described previously, to assess operational performance under existing conditions and with implementation of the BRT alignments. Similar to the AADT based analysis, no growth factors or volume redistribution assumptions were applied, and no adjustments were made to account for external influences such as intersection delay, signal coordination, or constrained lane widths. The peak hour analysis provides a more realistic assessment of corridor performance, recognizing that these urban corridors experience concentrated commuter traffic between Downtown Raleigh, Midtown, North Hills, and Triangle Town Center, and therefore may exhibit more constrained operations during peak periods than reflected by daily volumes alone.

Refer to **Table 3** and **Table 4** for a summary of each segment capacity without and with the BRT for the Midtown Alignments and TTC Alignments, respectively.

Figure 7 and **Figure 8** illustrate existing capacities and capacities with the Northern Corridor BRT, respectively, for the Midtown Alignments. **Figure 9** and **Figure 10** illustrate existing capacities and capacities with the Northern Corridor BRT, respectively, for the TTC Alignments.

Table 3: Corridor Peak Hour Capacities for the Northern Corridor BRT – Midtown Alignments

Existing Conditions Peak Hour											BRT Alignment Peak Hour				
Street Name	To	From	FDOT Classification	Number of Through Lanes	FDOT Service Capacity	Station ID	Peak Hour Capacity	K factor peak hour	K factor	V/C	Under, Near, or Over Capacity	Number of Through Lanes	FDOT Service Capacity	V/C	Under, Near, or Over Capacity
Atlantic Ave	Six Forks Rd	Whitaker Mill Rd	C4-Urban General	4	36100	920001536	3,250	2,531	0.103291	0.78	Under	2	17600	1.39	Over
	Whitaker Mill Rd	Capital Blvd	C4-Urban General	4	36100	920001543	3,250	2,272	0.103291	0.70	Under	2	17600	1.25	Over
Capital Blvd Northbound	Wade Ave	Wake Forest Rd	C5-Urban Center	3**	26700***	920000712	2,670	1,859	0.10936	0.70	Under	3**	26700***	0.64	Near
	Lane St	Wade Ave	C5-Urban Center	3**	26700***	920000667	2,670	2,515	0.10936	0.94	Near	3**	26700***	0.86	Near
Capital Blvd Southbound	Wake Forest Rd	Wade Ave	C5-Urban Center	3**	26700***	920000712	2,670	2,515	0.10936	0.94	Near	3**	26700***	0.86	Near
	Wade Ave	Lane St	C5-Urban Center	3**	26700***	920000667	2,670	2,679	0.10936	1.00	Over	3**	26700***	0.92	Near
Saint Albans Dr	Dartmouth Rd	Wake Forest Rd	C5-Urban Center	2	13900	9990000212	1,250	987	0.10859	0.79	Under	2	13900	0.65	Near
	Rowan St	Dartmouth Rd	C5-Urban Center	2	13900	9990000212	1,250	987	0.10859	0.79	Under	2	13900	0.65	Near
Six Forks Rd	I-440	Anderson Dr	C4-Urban General	4	36100	920000515	3,250	2,661	0.095031	0.82	Near	2	17600	1.59	Over
	Anderson Dr	Wake Forest Rd	C4-Urban General	4	36100	920000233	3,250	2,233	0.095031	0.69	Under	2	17600	1.34	Over
	Dartmouth Rd	I-440	C5-Urban Center	6	53900	920000499	4,850	4,276	0.095031	0.88	Near	6	53900	0.83	Near
	Rowan St	Dartmouth Rd	C5-Urban Center	6	53900	920000298	4,850	3,659	0.095031	0.75	Under	6	53900	0.71	Near
	Wake Forest Rd	Atlantic Ave	C4-Urban General	4	36100	920001902	3,250	1,901	0.095031	0.58	Under	2	17600	1.14	Over
Wake Forest Rd	I-440	Wake Towne Dr	C4-Urban General	6	56800	920001530	5,110	3,461	0.101805	0.68	Under	4	36100	0.94	Near
	Wake Towne Dr	Six Forks Rd	C4-Urban General	6	56800	920000401	5,110	2,647	0.101805	0.52	Under	4	36100	0.72	Near
	Mills St	Whitaker Mill Rd	C4-Urban General	4	36100	920000496	3,250	2,087	0.101805	0.64	Under	2	17600	1.16	Over
	Whitaker Mill Rd	Capital Blvd	C4-Urban General	4	36100		3,250	1,832	0.101805	0.56	Under	2	17600	1.02	Over
	Six Forks Rd	Mills St	C4-Urban General	4	36100	920000363	3,250	2,596	0.101805	0.80	Near	4	36100	0.71	Near
	Saint Albans Dr	I-440	C4-Urban General	6	56800	920001527	5,110	5,548	0.101805	1.09	Over	4	36100	1.51	Over
Wake Forest Rd WB On-Ramp	Capital Blvd	Wake Forest Rd Ramp	C4-Urban General	1	6900		870	943	0.103645	1.08	Over	1	6900	1.32	Over
Wake Forest Rd EB Off-Ramp	Wake Forest Rd	Capital Blvd	C4-Urban General	1	6900	920002346	870	777	0.103645	0.89	Near	1	6900	1.09	Over

*AADT based on 2021 TCDS data as 2023 data was not available

**Directional volumes and laneage were used

***Determined using the peak hour directional since ADTs are one-way and assuming a K-factor of 10%

Table 4: Corridor Peak Hour Capacities for the Northern Corridor BRT – TTC Alignments

Existing Peak Hour Conditions									BRT Peak Hour Alignment				
Street Name	From	To	FDOT Classification	Number of Through Lanes	Station ID	FDOT Peak hour Capacity	2023 Peak Hour	V/C Peak Hour	Capacity Peak Hour	Number of Through Lanes	FDOT Service Capacity	V/C	Under, Near, or Over Capacity
Capital Boulevard	Fenton Steet	Crabtree Boulevard	C4-Urban General	6	920000740	5,110	3,282	0.64	Under	4	3,250	1.01	Over
	Crabtree Boulevard	I-440	C4-Urban General	6	920000756	5,110	3,715	0.73	Near	4	3,250	1.14	Over
	I-440	Westinghouse Boulevard	C4-Urban General	8	920000231	6,020	6,224	1.03	Over	8	6,020	1.03	Over
	Westinghouse Boulevard	Brentwood Road	C4-Urban General	8	920000192	6,020	5,597	0.93	Near	8	6,020	0.93	Near
	Brentwood Road	Brewton Place	C4-Urban General	8	920000203	6,020	6,346	1.05	Over	8	6,020	1.05	Over
	Brewton Place	Starmount Drive	C4-Urban General	8	920000417	6,020	5,731	0.95	Near	7*	5,110	1.12	Over
	Starmount Drive	Buffaloe Road	C4-Urban General	8	920000530	6,020	6,072	1.01	Over	7*	5,110	1.19	Over
	Buffaloe Road	Ashton Square	C4-Urban General	8	920000264	6,020	6,284	1.04	Over	6	5,110	1.23	Over
	Ashton Square	North New Hope Road	C4-Urban General	7*	920000421	5,110	2,651	0.52	Under	7*	5,110	0.52	Under
	North New Hope Road	Spring Forest Road	C4-Urban General	7*	920000546	5,110	4,468	0.87	Near	7*	5,110	0.87	Near
Atlantic Avenue	Spring Forest Road	Sumner Boulevard	C4-Urban General	6	920000458	5,110	4,918	0.96	Near	7*	5,110	0.96	Near
	Sumner Boulevard	Old Wake Forest Road	C4-Urban General	6	920000459	5,110	4,698	0.92	Near	6	5,110	0.92	Near
	Capital Boulevard	Wicker Drive	C4-Urban General	4	920001543	3,250	2,256	0.69	Near	2	1,580	1.43	Over
	Wicker Drive	Highwoods Boulevard	C4-Urban General	4	920001536	3,250	2,397	0.74	Near	2	1,580	1.52	Over
New Hope Church Road	Highwoods Boulevard	New Hope Church Road	C4-Urban General	4	920001522	3,250	2,194	0.68	Near	2	1,580	1.39	Over
	Atlantic Avenue	Capital Boulevard	C4-Urban General	2**	920001838	1,580	1,410	0.89	Near	2	1,580	0.89	Near

*6 lanes were assumed to provide conservative results due to the northbound through movements only having 3 lanes

**The western section of this segment consists of a 4-lane section; however, the eastern section of the segment was used to provide conservative results

Peak Hour Capacity

- < 0.60 (Under Capacity)
- 0.61 - 0.80 (Nearing Capacity)
- 0.81 - 1 (Nearing Capacity)
- > 1 (Over Capacity)

The map displays the following roads and their capacity status:

- Over Capacity (> 1):** Capital Blvd (I-77), Wake Forest Rd (I-40), and a section of Atlantic Ave.
- Nearing Capacity (0.81 - 1):** Six Forks Rd (I-440).
- Nearing Capacity (0.61 - 0.80):** Saint Albans Dr, Wake Forest Rd (I-40), and a section of Atlantic Ave.
- Under Capacity (< 0.60):** Wake Forest Rd (I-40) and a section of Atlantic Ave.

Other roads shown include: Rowan St, Dartmouth Rd, Saint Albans Dr, Lassiter Mill Rd, Landor Rd, Wake Forest Rd, Hodges St, Atlantic Ave, Crabtree Blvd, Timber Dr, Raleigh Blvd, Colleton Rd, Oakwood Ave, Elm St, Watauga St, N Bloodworth St, N Person St, N Blount St, Harp St, Halifax St, N West St, W Johnson St, Park Dr, Broughton High School Baseball Field, Saint Marv's, The Village District, Daniels St, Oberlin Rd, Jaycee, Williamson Dr, Wade Ave, Fairview Rd, Cowper Dr, Saint Marv's St, Chester Rd, Glenwood Ave, Anderson Dr, White Oak Rd, Reeves Dr, E Whitaker Mill Rd, Georgetown Rd, Noble Rd, Bernard St, E Six Forks Rd, Wake Forest Rd, and Wake Forest Dr.

Landmarks and parks shown include: Carroll Magnet Middle School, North Hills, Drewry Hills #2, Rothgeb, Fallon, Carolina Country Club, and Saint Augustine College.

Scale: 0 to 0.5 Miles. North arrow pointing up.

Peak Hour Capacity With BRT Alignment

- < 0.60 (Under Capacity)
- 0.61 - 0.80 (Nearing Capacity)
- 0.81 - 1 (Nearing Capacity)
- > 1 (Over Capacity)
- Existing Over Capacity

0 0.25 0.5 Miles

Peak Hour Capacity

- < 0.60 (Under Capacity)
- 0.61 to 0.80 (Nearing Capacity)
- 0.81 to 1 (Nearing Capacity)
- > 1 (Over Capacity)

Map showing the proposed 100-mile-per-hour corridor from Raleigh to the northeast, with peak hour capacity indicated by color. The corridor is shown as a red line, indicating it is over capacity. Major roads shown include I-440, I-540, US-1, and various local roads like Wake Forest Rd, Bush St, and N Raleigh Blvd. The map also shows the locations of Millbrook and Raleigh, and the surrounding area including the North Ridge Country Club and various creeks and lakes.

Figure 10: Study Area Peak Hour Capacity with Northern Corridor BRT – TTC Alignments

